ArcGIS Web App Builder

(Basic Customization and Extension)

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October 26, 2016

WSB & Associates, Inc.

Agenda

- Introduction - WAB
- Themes
  - Components and UI redesign
  - Create new custom theme
- Widget
  - Components & Life Cycle
  - JavaScript API and Introduction
- Create simple Widgets from scratch
- Modify Existing Widgets

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Introduction - WAB

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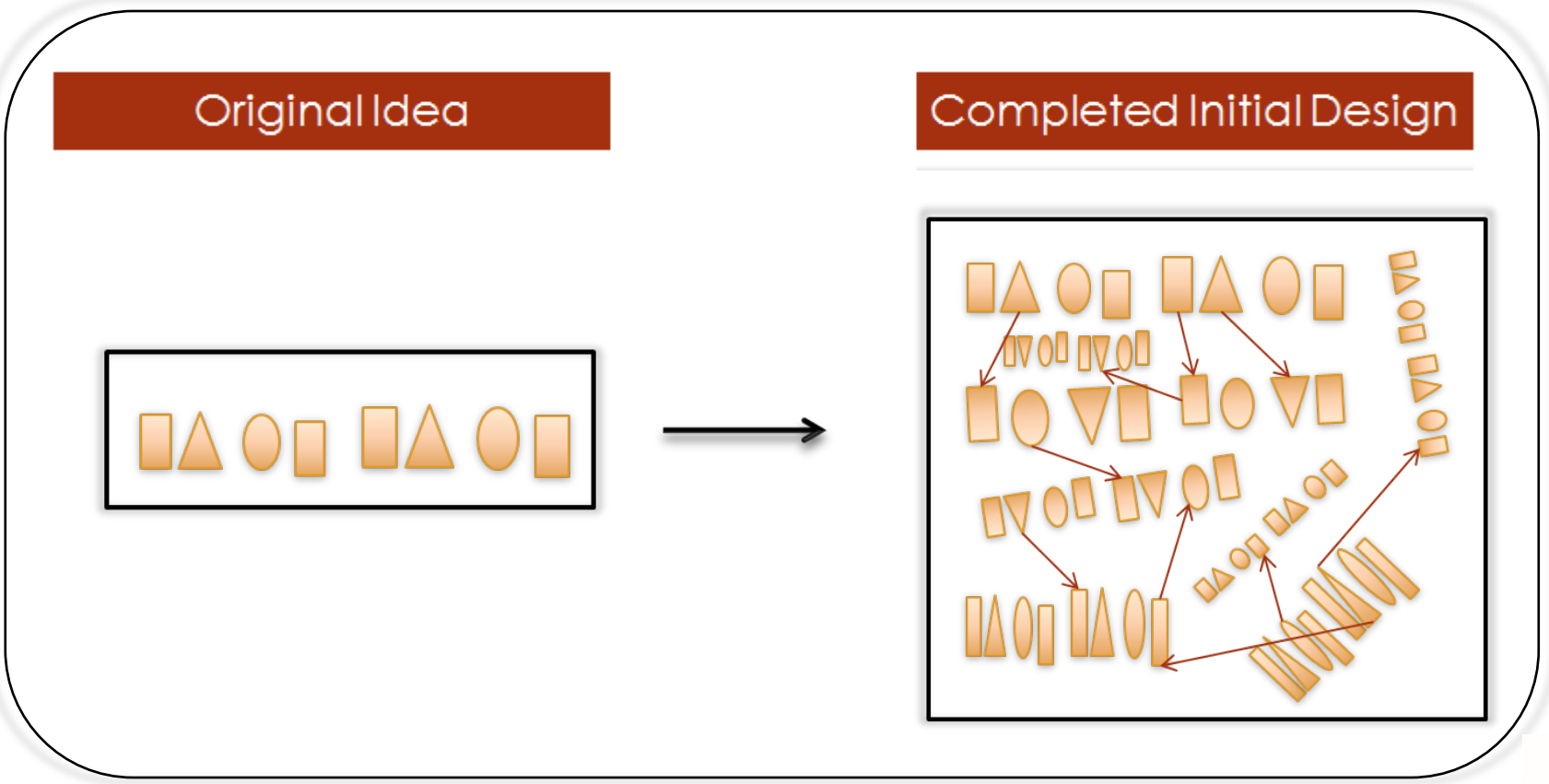
Basic Idea

- App is never a fixed design



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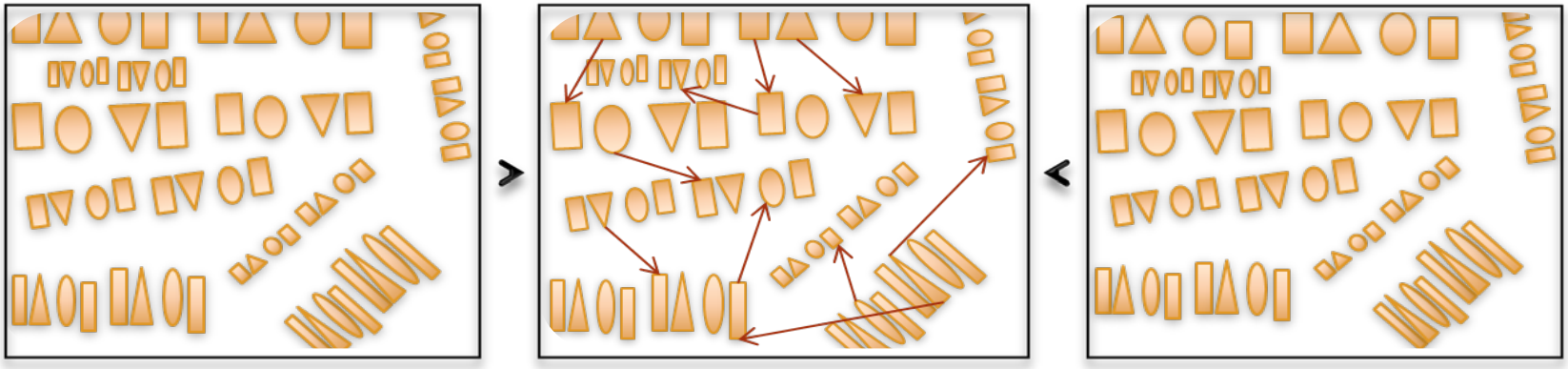
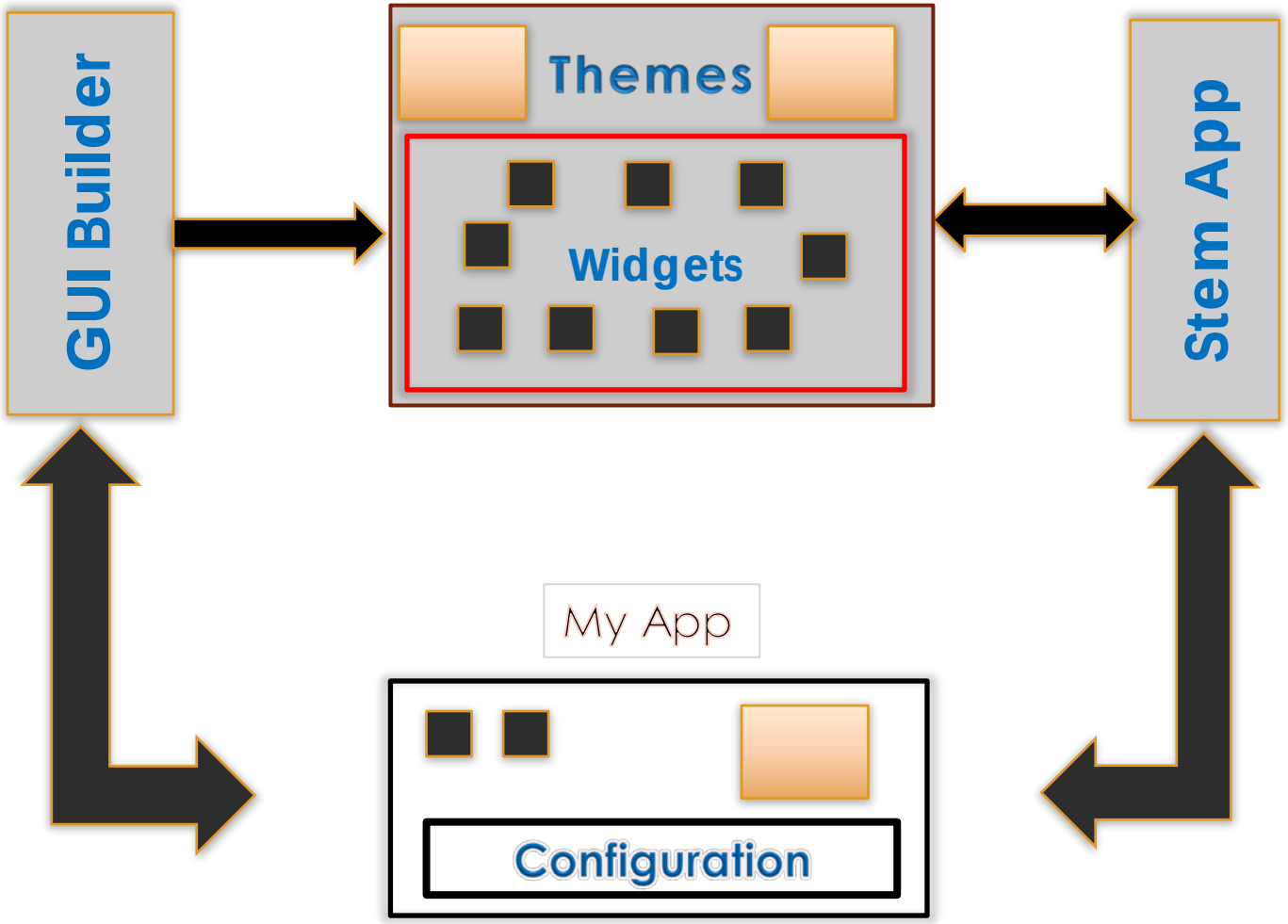


More Ideas . More Ideas

App Builder



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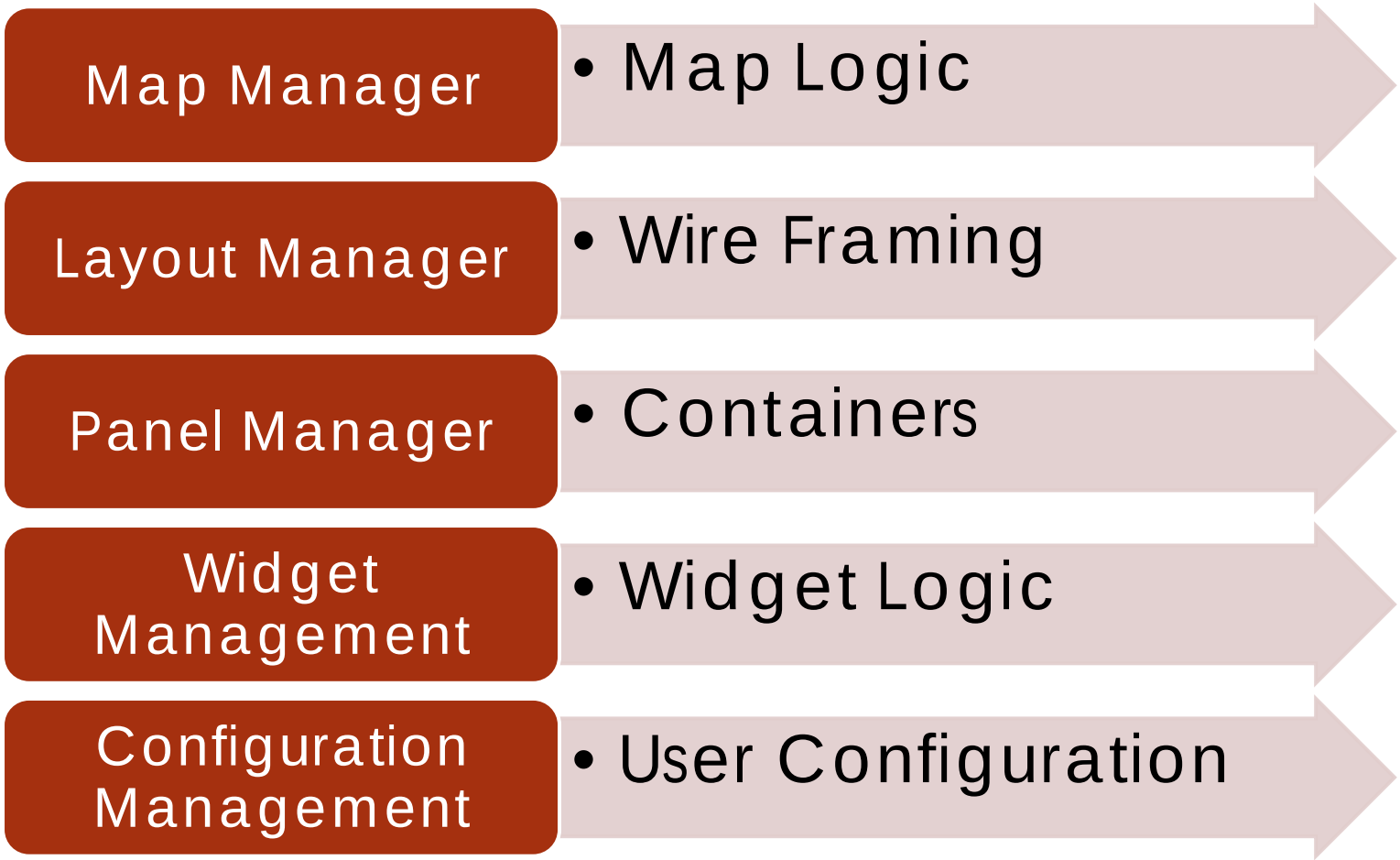
Stem App Role?



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ArcGIS JavaScript API

- ArcGIS Web App Builder (Latest 2.2 version)
  - 3D builder uses JSAP 4.1
  - 2D builder uses JSAPI 3.18
- Core concept are same as JSAPI
  - Can Always follow JSAP samples

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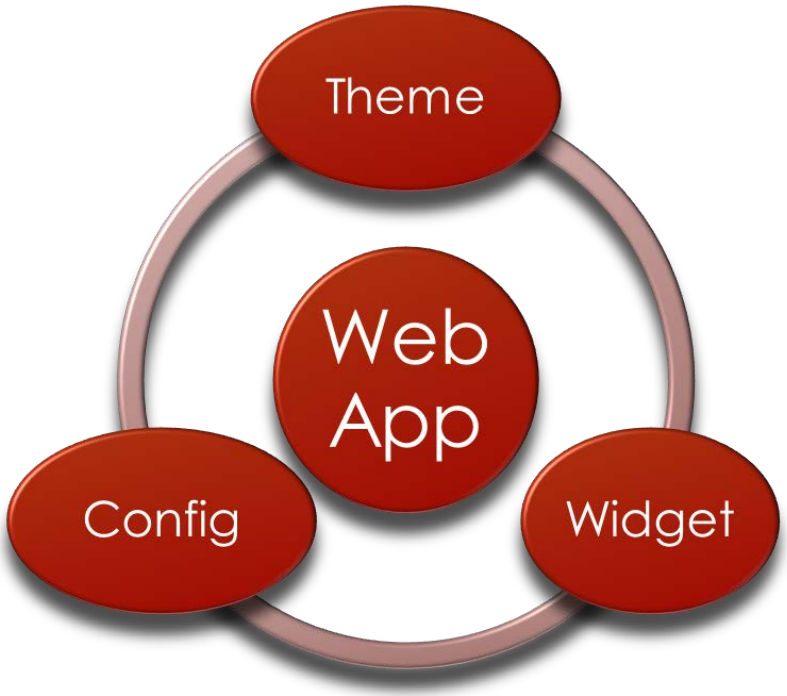
What we Control



- Themes – Styling and Layout
- Widget – Tools
- Config – Data and App properties

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Themes – What it has ?

- HTML
- JavaScript
- Style (CSS)
- Wireframe or Layout
- Panels
- Widgets
- Branding

Widgets

- HTML – JavaScript
- Style (CSS)
- Data and Configuration
- NLS Support
- Builder Config

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Widgets

Base Class (WAB)

- Access to Map
- Access to config data (services, icons, logos)
- Widget Events (open, close)
- Widget Communication

What We do?

- User Interface
- Widget Config data
- Widget CSS
- Business Logic

Source: ESRI Dev Summit 2016 Proceedings

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Widgets Types

- In-Panel Widgets
  - Search, Query , Draw
- Off-Panel Widgets
  - Scalebar , Coordinate , Zoom-Slider, Controller

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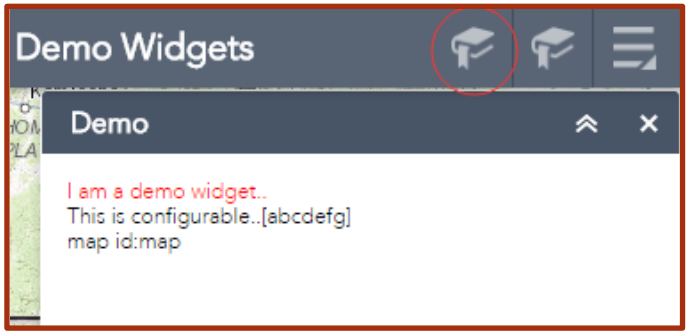
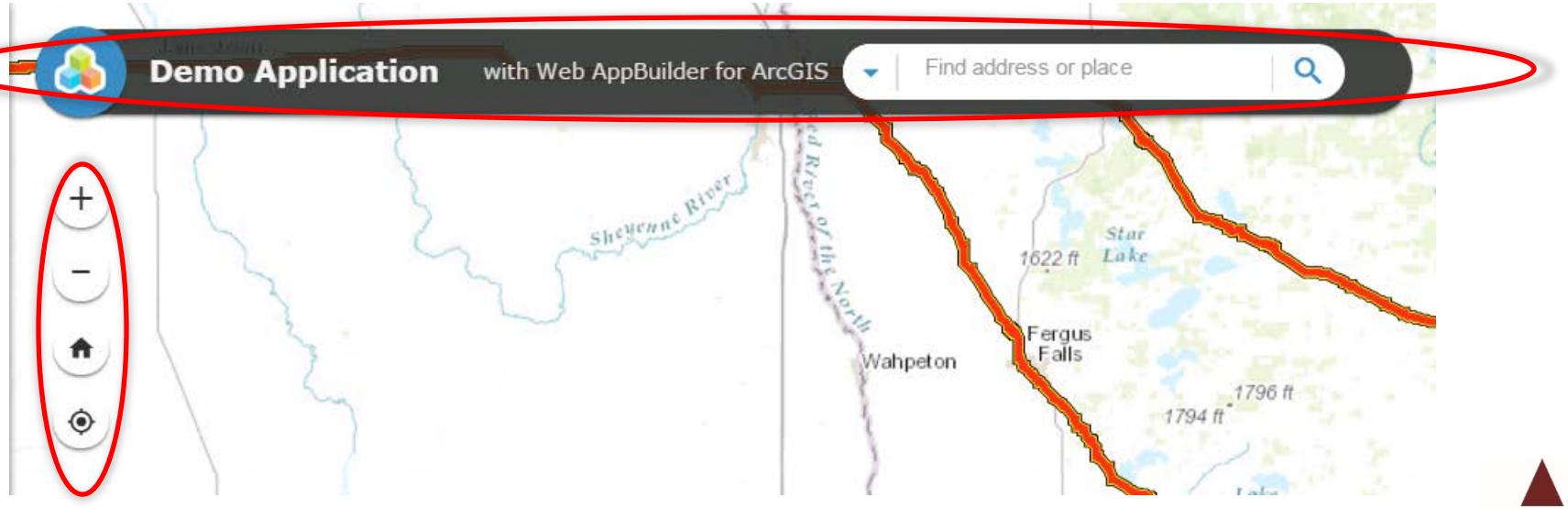
In-Panel Widgets

- Requires panel for displaying content
- Can have its own style
- Different panel for different widgets



Off-Panel Widgets

- Shows on map directly
- Position specification required per layout
- Can be enabled or disabled by default



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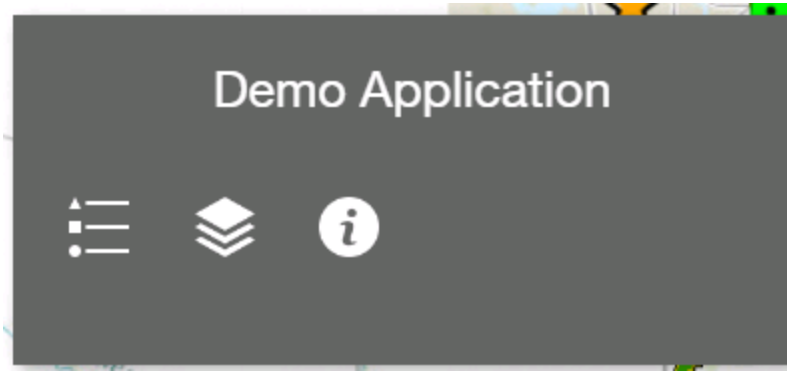
Controller Widget

- Type of off-panel (On-screen) widget
- Controls display of other widget
- Examples
  - BoxController in Box Theme



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Panel

- Type of widget
- Used for displaying widget content
- Reusable amongst different themes

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Themes

Themes – Widget Position Customization

- client ➜ stempapp ➜ themes ➜ FoldableTheme ➜ layouts ➜ default
- Open config.json file.
- For Any widget in "widgetOnScreen" array
- Change the position

Themes- Widgets Positioning

- Off-Panel Widget
  - Change the x,y coordinate
  - Change x,y coordinate for each layout
  - Can add new widgets by adding entry in array (Widget-on screen array)

- On-Panel Widget
  - Add New Place Holders
  - Change Default Position

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Themes – CSS Customization

- Default color available
- What if you want to customize further
  - Custom Header Color
  - CSS3 styles
- Basic CSS knowledge is required
  - Client-> StempApp -> Themes -> FoldableTheme -> manifest.json
  - Client-> StempApp -> Themes -> FoldableTheme -> Styles

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CSS (Cascading Style Sheet)

CSS Knowledge Is Important

http://www.w3schools.com/css/default.asp

```
/* HTML body size and Position */
body {
    height: 100%;
    width: 100%;
    background-color: #555;
    overflow: hidden
;}
/* style for the div with id sample1
#sample1 {
    background-color:#f00;
    color: #0f0;
    font-weight: bold;
}
```

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Themes - CSS

```
/* Main Background */
.jimu-main-background{
    background-color: #d07d0e;
}

/* Popup Title Header */
.esriPopup .titlePane {
     background-color: #d07d0e;
}


.jimu-widget-header-controller .jimu-drop-menu{
    background-color: #d07d0e;
}
.jimu-header-more-popup .icon-node {
    background-color: #d07d0e;
}
.jimu-header-more-popup .close-inner {
    background-color: #d07d0e;
}

.jimu-on-screen-widget-panel>.jimu-panel-title,
.jimu-foldable-panel>.jimu-panel-title,
.jimu-title-panel>.title{
     background-color: #d07d0e;
}
```

For More CSS3 Styles Check CSS3

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Custom Theme I

- Possible With Almost No-Coding
- Creating your own panels and controllers from scratch
- Mix – Match existing panel and containers
- Create custom branding

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Custom Theme II

- Create a custom theme to include UI from Box theme and Launchpad theme
- Use Demo Theme folder as starting point or minimal code required

Widgets

JavaScript Basics

- Client Side Scripting Language
- Technically, code cannot be hidden
- JavaScript != Java (No similarity other than name)
- http://www.w3schools.com/js/default.asp

```
<div id="sample1" onmouseover="alert('mouse-over')" >
Hello World!!</div>


<button type="button" onclick="alert('hello')" > Click me
</button>
```

JavaScript

- Objects, variables, and data types
  - Strings
    - `var message = “Hello World!”;`
    - `message.length    // Evaluates to 11`
    - `message[0]  //Evaluates to “H”`
  - Numbers
    - `var x = 34; //integer`
    - `var x = 34.00; // double`
    - `var x = 34e5; //scientific notation`
  - Booleans
    - `var x = true;`
    - `var x = false;`

The Document Object Model - JavaScript

- Objects, variables, and data types
  - Arrays
    - `var cars = new Array();`
    - `cars[0] = “Saab”;`
    - `cars[1] = “Ford”;`
    - `cars //evaluates to cars(“Saab”, “Ford”)`

The Document Object Model - JavaScript

- Example - Conditional Statement

If/ Else if/ Else Statements

```
if (Name == “Vikrant”){
    // do something code to execute if conditon1 is true
}
else if (Name == “Justin” ){
    // // code to execute if condition1 is false
    // and condition2 is true
}
else {
    // code to execute if both condition1
    // and condition2 are false
}
```

JavaScript Loops

- Loops
  - For Loop

```
for (start at; end at; increment by){
    // code to execute each loop
}
```

Example

```
for (var i=0;i < 10;i++){
    print I;
}
```

Output: 0 1 2 3 4 5 6 7 8 9

JavaScript Object Parse

```
Var myAttriubutes = {
                        “pin”:0123456,
                        ”name”:”vik”,
                        “workplace”:”WSB”
                       };
For ( var key in myAttributes){
    console.log(key + “ : “ + myAttributes[key])
}
```

Outputs :

pin : 0123456

name : vik

workplace : WSB

Working Example

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Widgets

Development and Modification

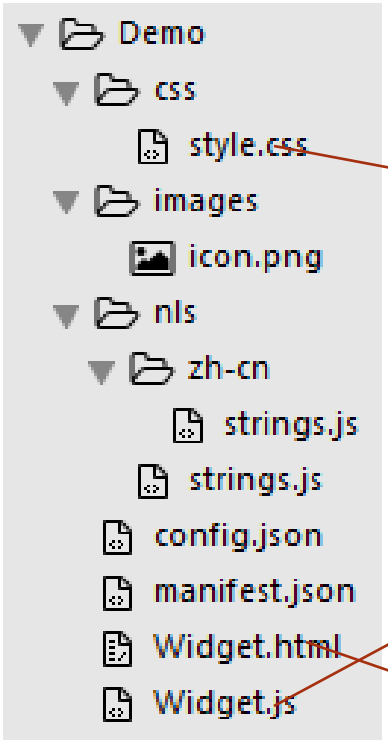
Widget Development

- Understanding of JavaScript
- Understanding of Dojo
- Dojo Dijit lifecycle

Code Structure

- Example

Widget File Structure




```
<!DOCTYPE html>
<html>
  <head>
    <meta http-equiv="Content-Type" content="text/html; charset=utf-8">
    <meta name="viewport" content="initial-scale=1, maximum-scale=1,user-scalable=no"/
    <title>Simple Map</title>
    <link rel="stylesheet" href="https://js.arcgis.com/3.18/esri/css/esri.css">
    <style>
      html, body, #map {
        height: 100%;
        margin: 0;
        padding: 0;
      }
    </style>
    <script src="https://js.arcgis.com/3.18/"></script>
    <script>
      var map;

      require(["esri/map", "dojo/domReady!"], function(Map) {
        map = new Map("map", {
          basemap: "topo",
          center: [-122.45, 37.75],
          zoom: 13
        });
      });
    </script>
  </head>

  <body>
    <div id="map"></div>
  </body>
</html>
```

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Widget Manifest File

- Describes a widget's attributes and properties

```
{
  "name": “WidgetName",
  "2D": true,
  "3D": false,
  "platform": "HTML",
  "version": "2.2",
  "wabVersion": "2.2",
  "author": "WSB & Associtates Inc",
  "description": "This Widget Display Content in Panel",
  "copyright": "",
  "license": "http://www.apache.org/licenses/LICENSE-2.0",
  "properties": {
          "inPanel":true,
          "hasLocale": false,
          "hasStyle":false,
          "hasConfig":false,
          "hasUIFile":true,
          "hasSettingPage":false,
          "hasSettingUIFile":false
           }
}
```

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Widget Properties

Name	Description
id	The unique ID of the widget set in the config.json file or generated by the app container.
icon	The widget's icon URL.
config	The widget's config object.
map	The map this widget works with (for 2D widget).
sceneView	The scene this widget works with (for 3D widget).
appConfig	The app's main config.json file is stored here.
folderUrl	The widget folder's URL.
state	The widget's current state, that is, active, opened or closed.
windowState	The widget's current window state, that is, normal, maximized, or minimized.
position	The widget's position. It is important for on-screen widget.

Source: ArcGIS Web Builder help

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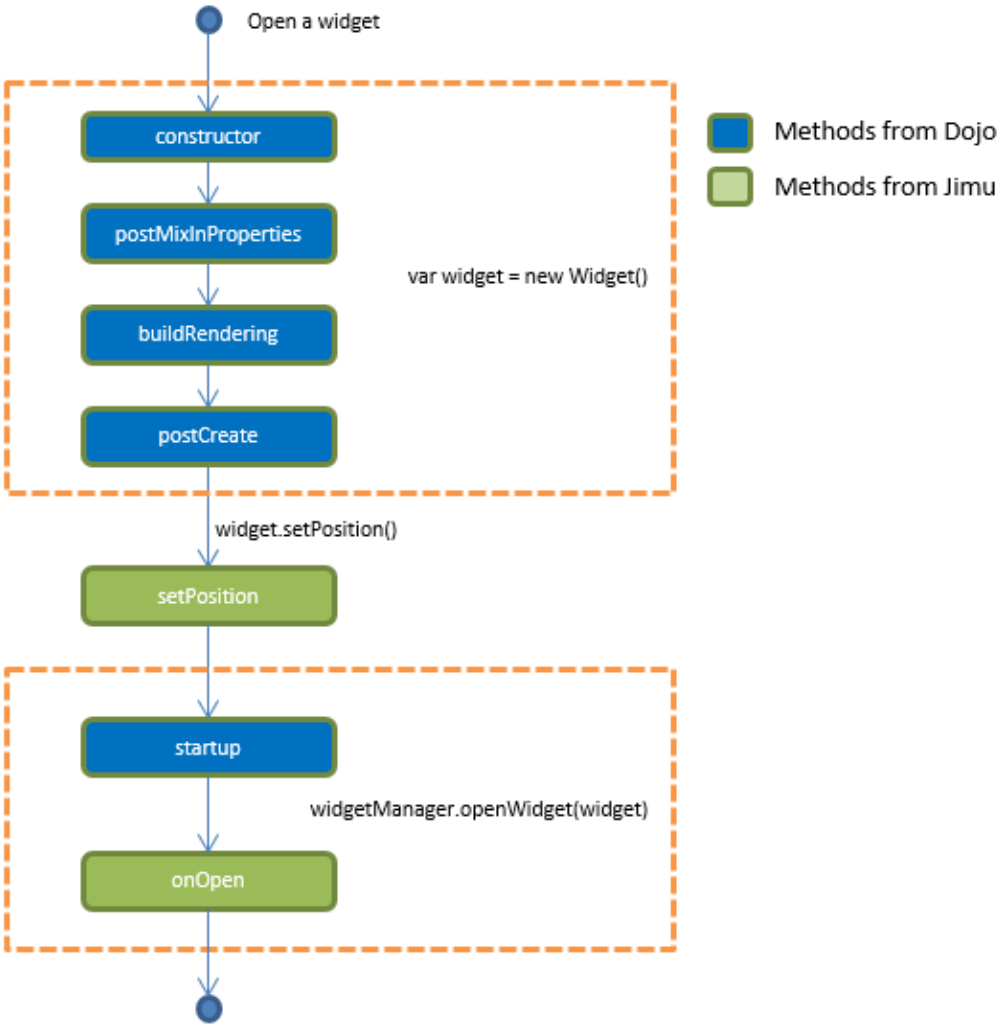
Widget Life Cycle I



Source: ArcGIS Web Builder help

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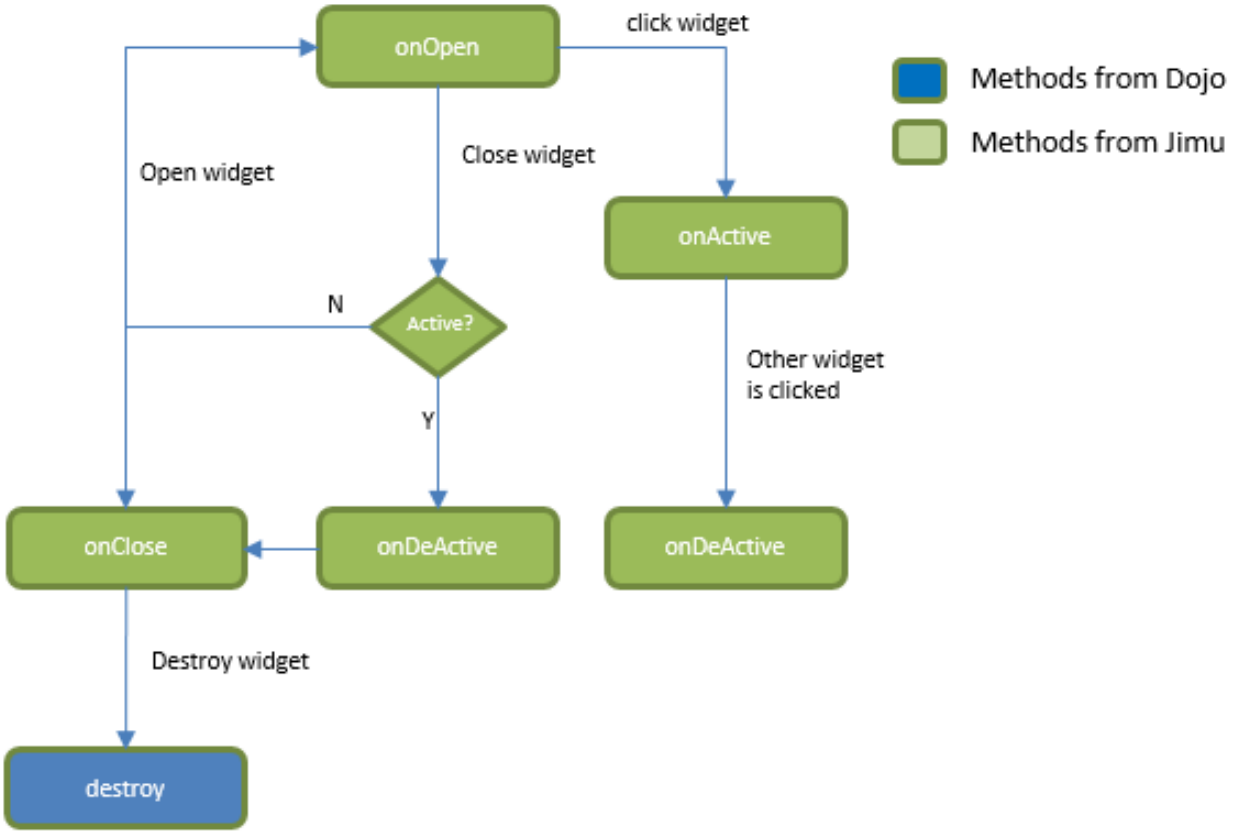
Widget Life Cycle II



Source: ArcGIS Web Builder help

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Base Widget

```
define(['dojo/_base/declare', 'jimu/BaseWidget'],
function(declare, BaseWidget) {
    //To create a widget, you need to derive from BaseWidget
  return declare([BaseWidget], {
    // Widget code goes here
    baseClass: 'jimu-widget-demo'
  });
});
```

Demo I

- Define Widget Template in Widget.html
- Simple container showing some text

```
<div>
    <div>My Name Is Vik!<div>
</div>
```

Widget Config File

- To Store Data or Settings of the widget
- Usually done by Widget Settings Page, but can be written manually.

```
// Sample 1
{
  “DeveloperName":“Vik“
 }

// Sample  2
{
  “DeveloperName":“Vik“,
  “mapServiceUrl”:”Some Map Service URL”,
  “layerId”:”layerId”
 }
```

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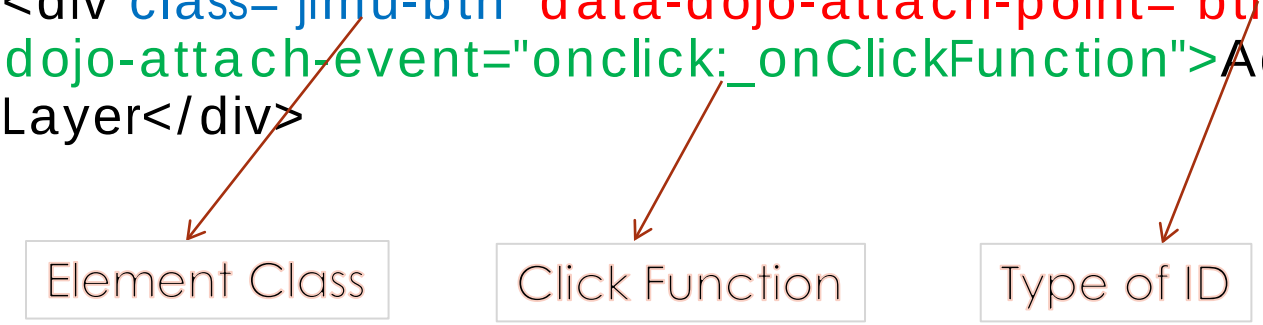
Widget Template Inline-Properties

Dojo Properties for HTML elements in widget

```
<div class="jimu-btn" data-dojo-attach-point="btnName" data-dojo-attach-event="onclick:_onClickFunction">Add Layer</div>
```



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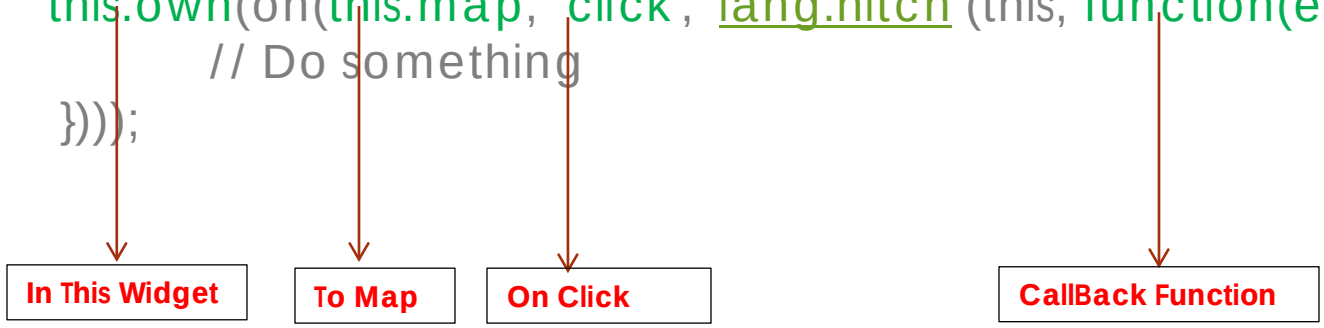
Event Handling

Example 1: Add Map Click event

```
this.own(on(this.map, 'click', lang.hitch (this, function(evt) {
        // Do something
 })));
```



Example 2: Check Measure Complete

```
this.own(on(this.measurement, 'measure-end', lang.hitch(this, function(measureResult) {
        console.log(measureResult);
        this._displayMeasureLabel(measureResult);
})));
```

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Demo II

- Create Simple Widget with Dynamic Table
- When open, popup results shows up in panel
- Few Lines of custom code

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Demo III

- Display measurement widget labels on the map
- Add event for measure complete
- Get results from measure
- Display text symbol on map

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Demo IV

- DemoWidget in Attachment Folder
- Full Description of implementing Out-Of-The Box draw tool
- Also query map layer by drawing

Limitations Discussion !

- Have to work with Web Maps
- Limited layout and design for non-developers
- Custom UI design and complex structure not very straight forward implement
- Limitation of some widgets for working in mobile devices (specifically editor)
- Code Redundancy, cause possible slowdown.
- Existing Business Logic Re-usability

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