

# Web AppBuilder for ArcGIS

## Customization and Extension

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**Let's talk about App Creation**



# 10 challenges for people building apps

Quickly turn business requirements into usable apps

Build apps without dependencies on developer skills

Easily maintain apps

Unified UX to build apps that work across multiple form factors and platforms

Understand how apps are used by end-users

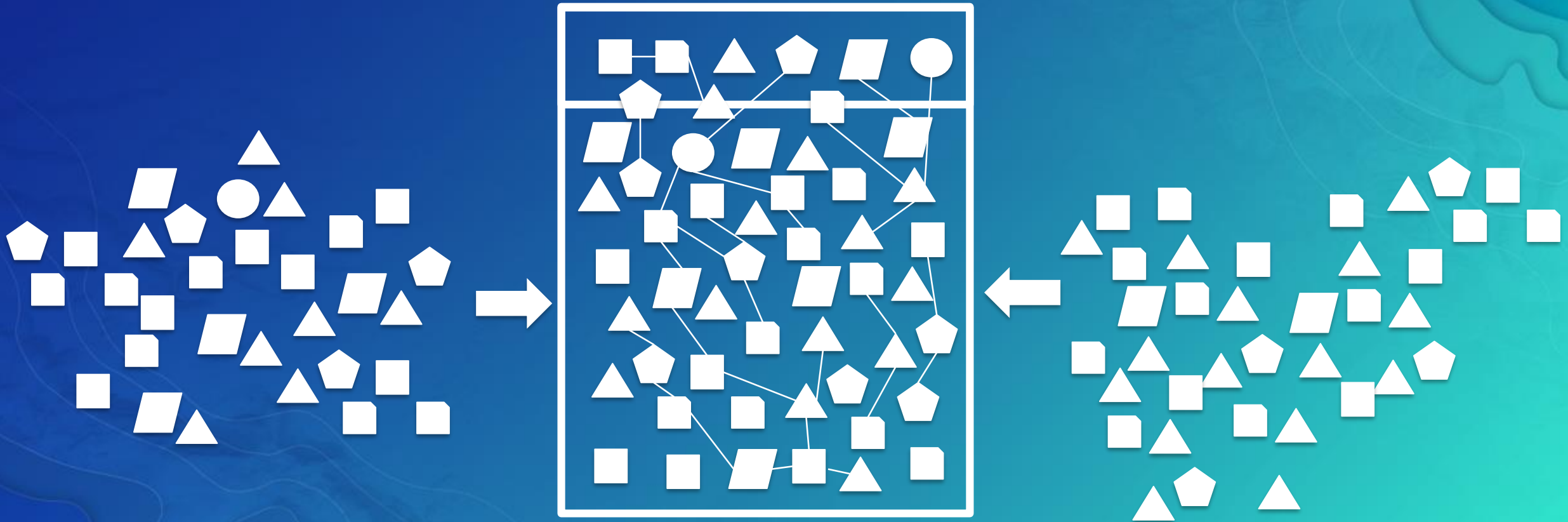
Understand if the apps are effective at getting the job done

Secure apps, their content and functionality

Deploy apps simply and securely

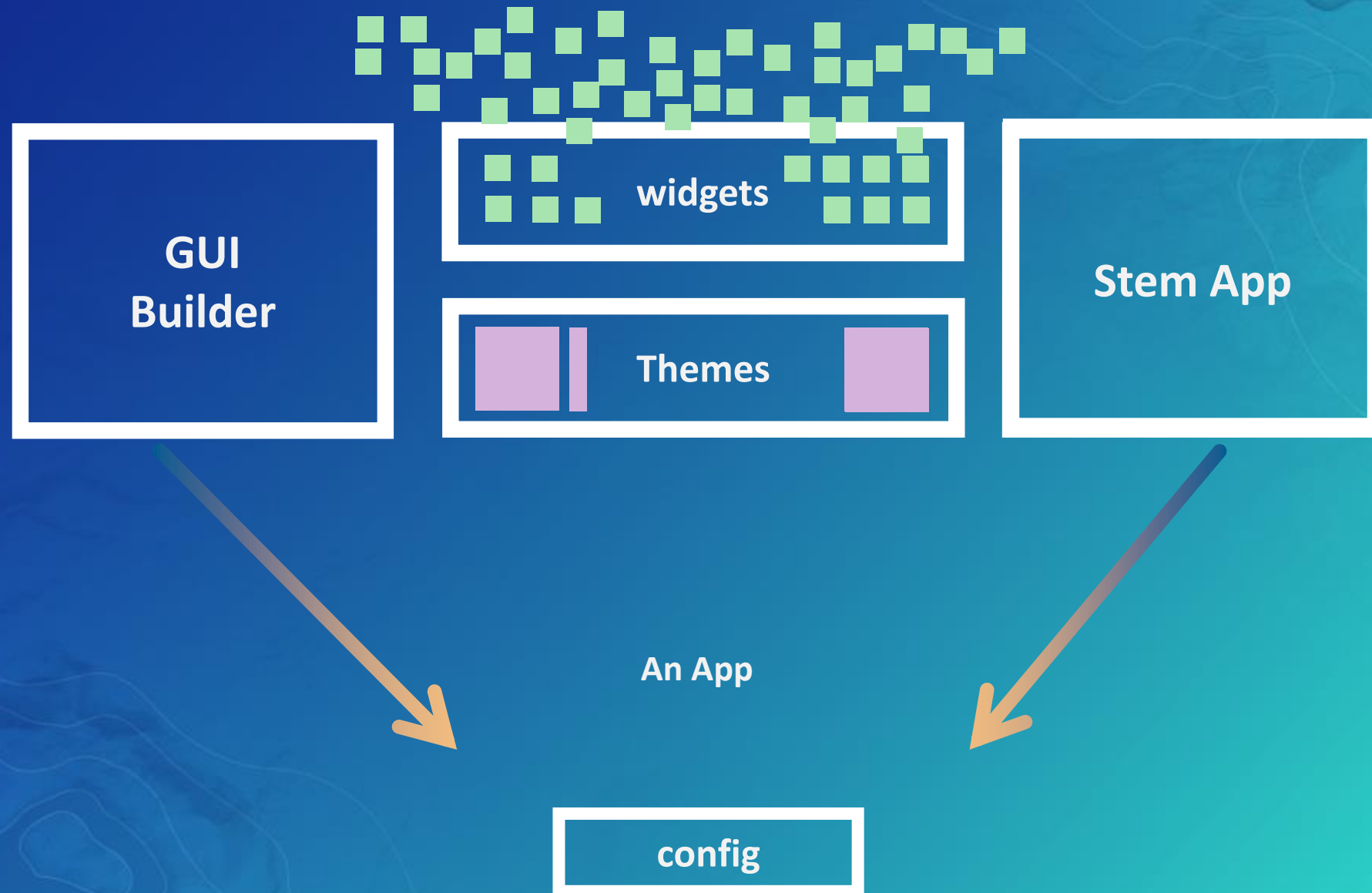
Monitor and control the use of premium services

# A Traditional way to Build an App





# A different way to Build an App



## Access Type

**36%**

Private

**14%**

Shared

**225,458**

Total AppBuilder Apps

**35%**

Public

**15%**

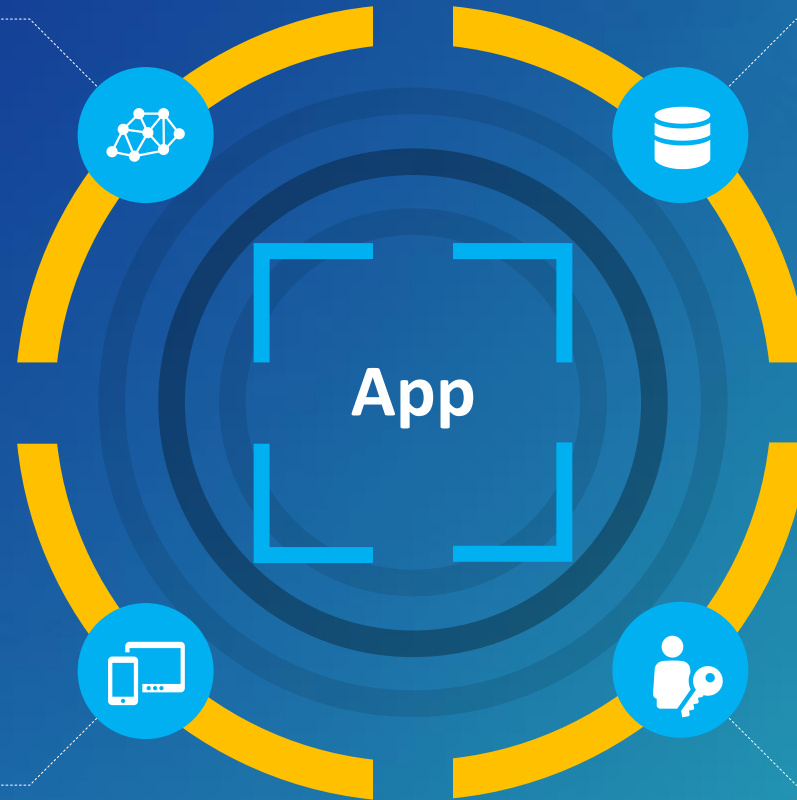
Account



**App has changed...**

**App Lifecycle is complex**

**Apps are data**

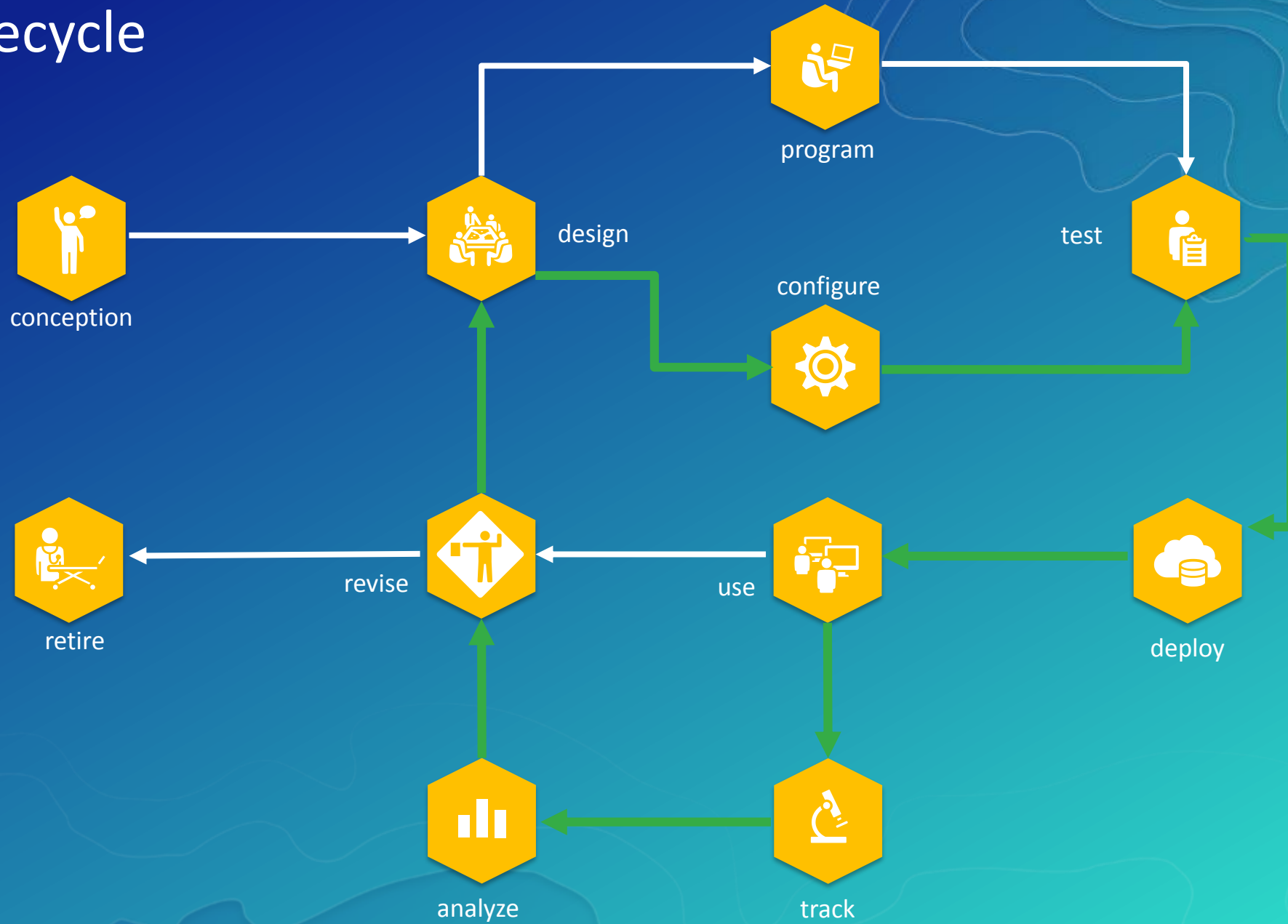


**Apps are  
disposable**

**Apps are a conduit to  
understand your users**



# App Lifecycle





# Builder

simply, app creation made easier





## Introduction



Julie Powell



## Create a Theme



Moxie Zhang



## What's Coming

What are the exciting new features and functions introduced recently



Moxie Zhang



## WAB Communities



Julie Powell



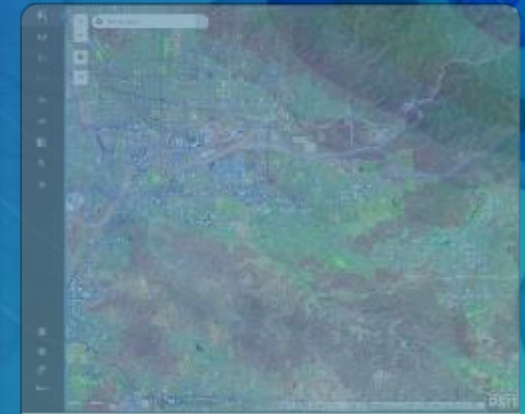
## Q&A



Moxie Zhang



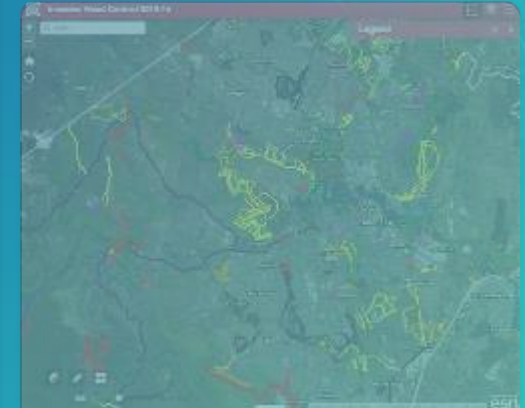
Julie Powell



## Agriculture



ArcGIS Online WAB Show Case



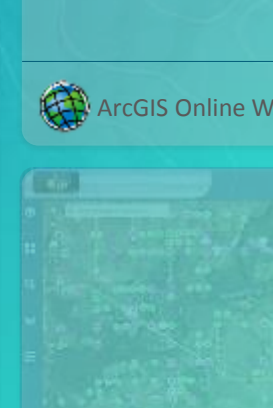
## Invasive Weed



ArcGIS Online WAB Show Case



## Boone County

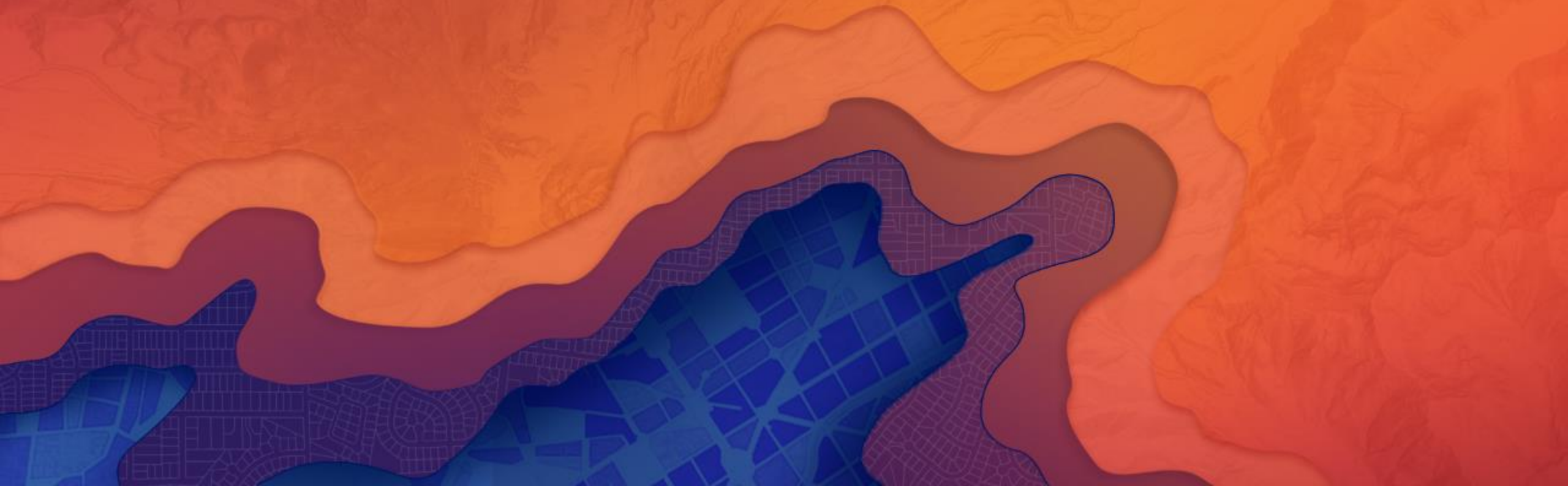


## Muscatine County



# Introduction

Web AppBuilder for ArcGIS



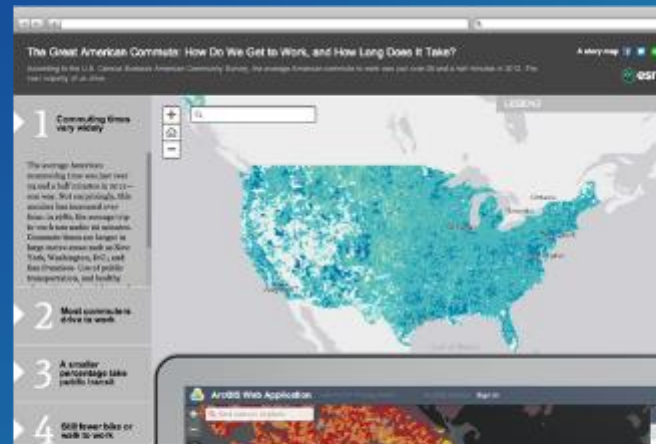


# Building Web Apps for Your Organization Using the ArcGIS API for JavaScript

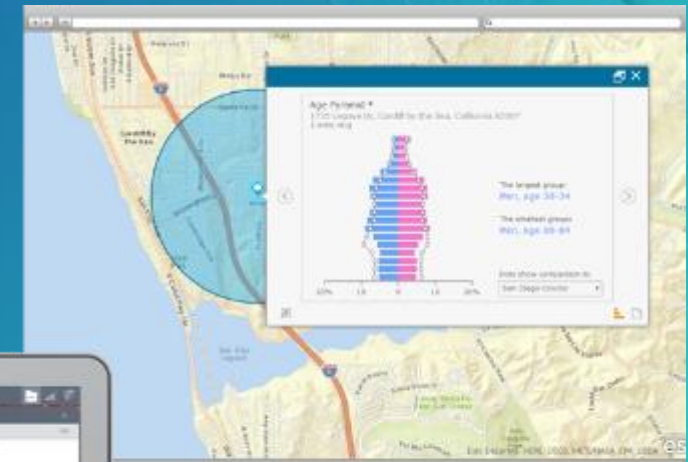
## Samples




## Configurable Apps & Builders



## Widgets



# Web AppBuilder (Developer Edition)

 Web AppBuilder for ArcGIS

Apps

Templates

julie.powell ▾

All

2D

3D


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A↕Z

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Import ▾

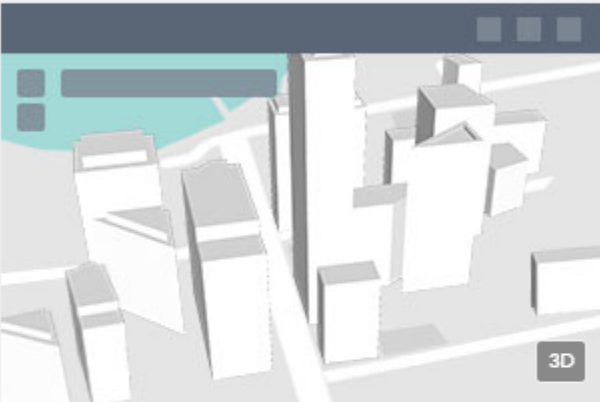
3D

**Portland Waterfront**

3/2/2016, 10:09 AM julie.powell

Click Edit App Info menu to add a description.







3D

**Portland Waterfront app**

3/2/2016, 10:08 AM julie.powell

Click Edit App Info menu to add a description.



# Widget

- Execution at run time
- Configure-in, not cut/paste
- Self sufficient and distributable
- Need container, no coding block
- Has programing framework of container

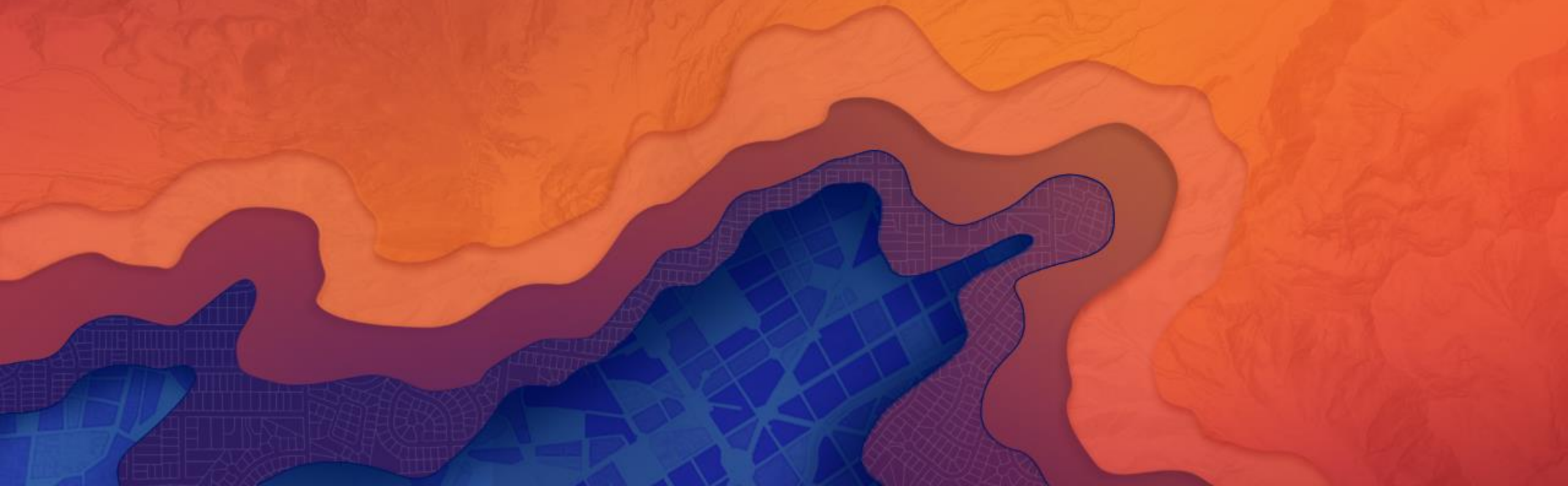
# Theme

- Applied at run time
- Configure-in, not modify css
- Need container
- Self sufficient and distributable
- Has programing framework of container



# Widgets

Building blocks of apps





# Break the code into files

## MyWidget.css

```
html, body, #map{
  height: 100%;
  margin: 0;
  padding: 0;
}
```

## MyWidget.js

```
define(['dojo/_base/declare', 'jimu/BaseWidget'],
function(declare, BaseWidget){
  var clazz = declare([BaseWidget],{
  });
  return clazz;
});
```

## MyWidget.html

```
<div id="feedback">
  <h3>Washington State</h3>
  <div id="info">
    <div id="note">
      Note: This sample requires an ArcGIS Server version 10.1 map service to generate a renderer.
    </div>
    Select a field to use to create a renderer for the counties in Washington state.
  </div>
  <div id="legendWrapper"></div>
  <div id="fieldWrapper">
    Currently selected attribute:
  </div>
</div>
```

Tutorial:

[https://developers.arcgis.com/javascript/jshelp/intro\\_custom\\_dijit.html](https://developers.arcgis.com/javascript/jshelp/intro_custom_dijit.html)

## Styles

```
<!DOCTYPE html>
<html>
<head>
  <meta http-equiv="Content-Type" content="text/html; charset=utf-8">
  <!--The viewport meta tag is used to improve the presentation and behavior of the samples
  on iOS devices-->
  <meta name="viewport" content="initial-scale=1, maximum-scale=1, user-scalable=no">
  <title>Class Breaks Renderer</title>

  <link rel="stylesheet" href="http://js.arcgis.com/3.13/esri/css/esri.css">
</head>
<body>
  <div id="map">
  </div>
</body>
</html>
```

## Scripts

```
<script>
  var dojo = require([
    "esri/map", "esri/layers/FeatureLayer",
    "esri/InfoTemplate", "esri/symbols/SimpleFillSymbol",
    "esri/renderers/ClassBreaksRenderer",
    "esri/Color", "dojo/dom-style", "dojo/domReady!"
  ], function(
    Map, FeatureLayer,
    InfoTemplate, SimpleFillSymbol,
    ClassBreaksRenderer,
    Color, domStyle
  ) {
    map = new Map("map", {
      basemap: "streets",
      center: [-98.215, 38.382],
      zoom: 7,
      slider: false
    });

    var symbol = new SimpleFillSymbol();
    symbol.setColor(new Color([150, 150, 150, 0.5]));

    // Add five breaks to the renderer.
    // If you have ESRI's ArcMap available, this can be a good way to determine break values.
    // You can also copy the RGB values from the color schemes ArcMap applies, or use colors
    // from a site like www.colorbrewer.org
    //
    // alternatively, ArcGIS Server's generate renderer task could be used
    var renderer = new ClassBreaksRenderer(symbol, "POP07_SQMI");
    renderer.addBreak(0, 25, new SimpleFillSymbol().setColor(new Color([156, 168, 0, 0.5])););
    renderer.addBreak(25, 75, new SimpleFillSymbol().setColor(new Color([139, 209, 0, 0.5])););
    renderer.addBreak(75, 175, new SimpleFillSymbol().setColor(new Color([255, 255, 0, 0.5])););
    renderer.addBreak(175, 400, new SimpleFillSymbol().setColor(new Color([255, 150, 0, 0.5])););
    renderer.addBreak(400, Infinity, new SimpleFillSymbol().setColor(new Color([255, 0, 0, 0.5])););

    var infoTemplate = new InfoTemplate("${NAME}", "${*}");
    var featureLayer = new FeatureLayer("http://sampleserver1.arcgisonline.com/ArcGIS/rest/services/Demographics/Geodatabase/FeatureServer/0");
    featureLayer.setInfoTemplate(infoTemplate);

    map.addLayer(featureLayer);
    map.infoWindow.setTitle("Washington State");
    map.infoWindow.setContent("Currently selected attribute:");
    map.infoWindow.show();
  });
</script>
```

## Markup

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

## Inheriting from BaseWidget

```
define(['dojo/ base/declare', 'jimu/BaseWidget'],  
function(declare, BaseWidget){  
    var clazz = declare([BaseWidget], {  
    });  
    return clazz;  
});
```

A widget derived from the BaseWidget class

## Dijit lifecycle

- postCreate
- startup
- ...



## Widget events

- onOpen, onActive
- onClose, onDeActive



# BaseWidget

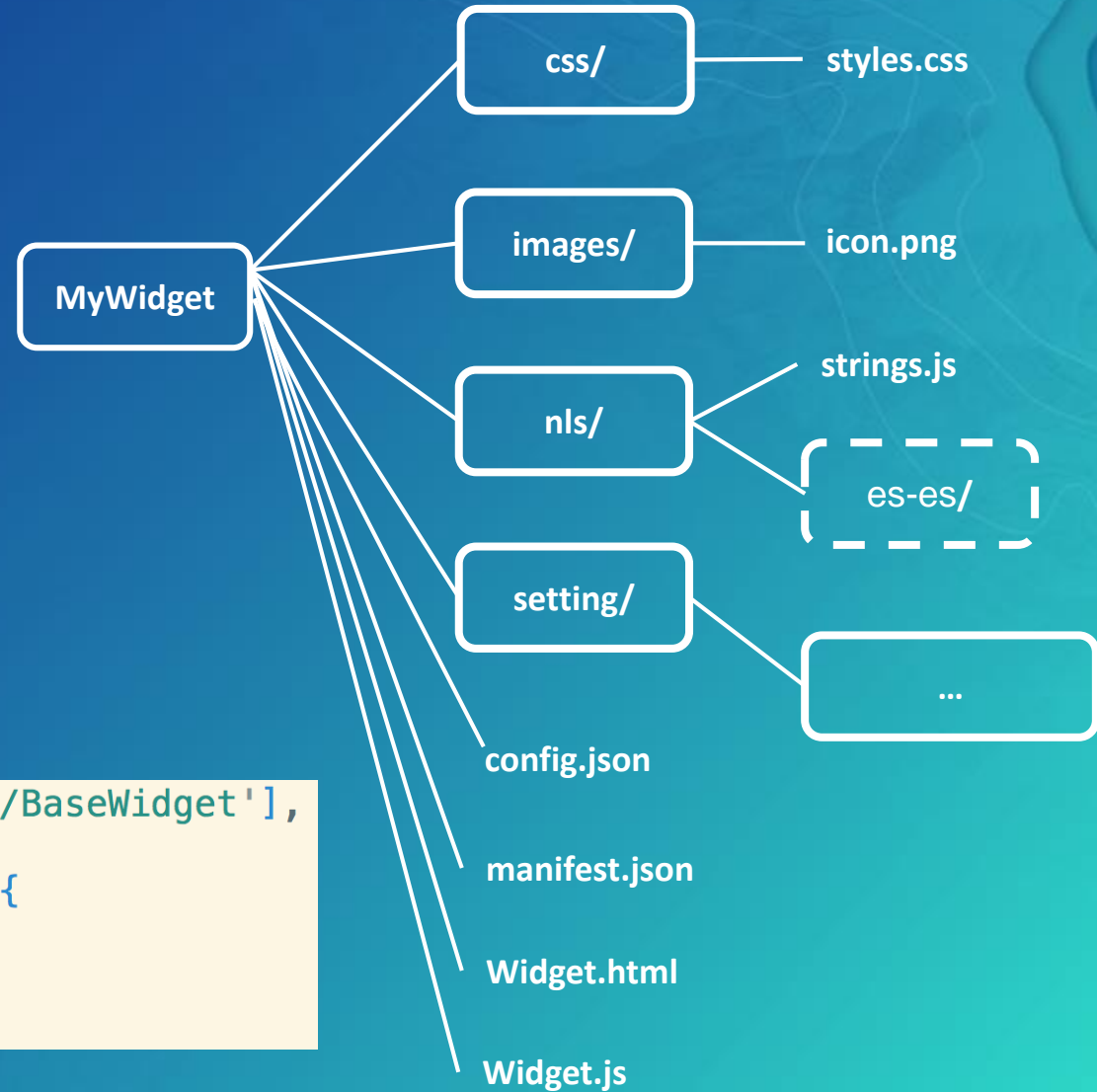
- App properties (name, icon, localization)
- App config data
- Widget's config data
- Map object
- Widget state (open, closed, active...)
- Events (open/signIn)
- Widget communication

## Your job?

- Widget UI (HTML/template)
- Widget config file (JSON)
- Widget styles (CSS)
- Localization
- **Your unique business logic / workflows (JavaScript)**



# Widget Files

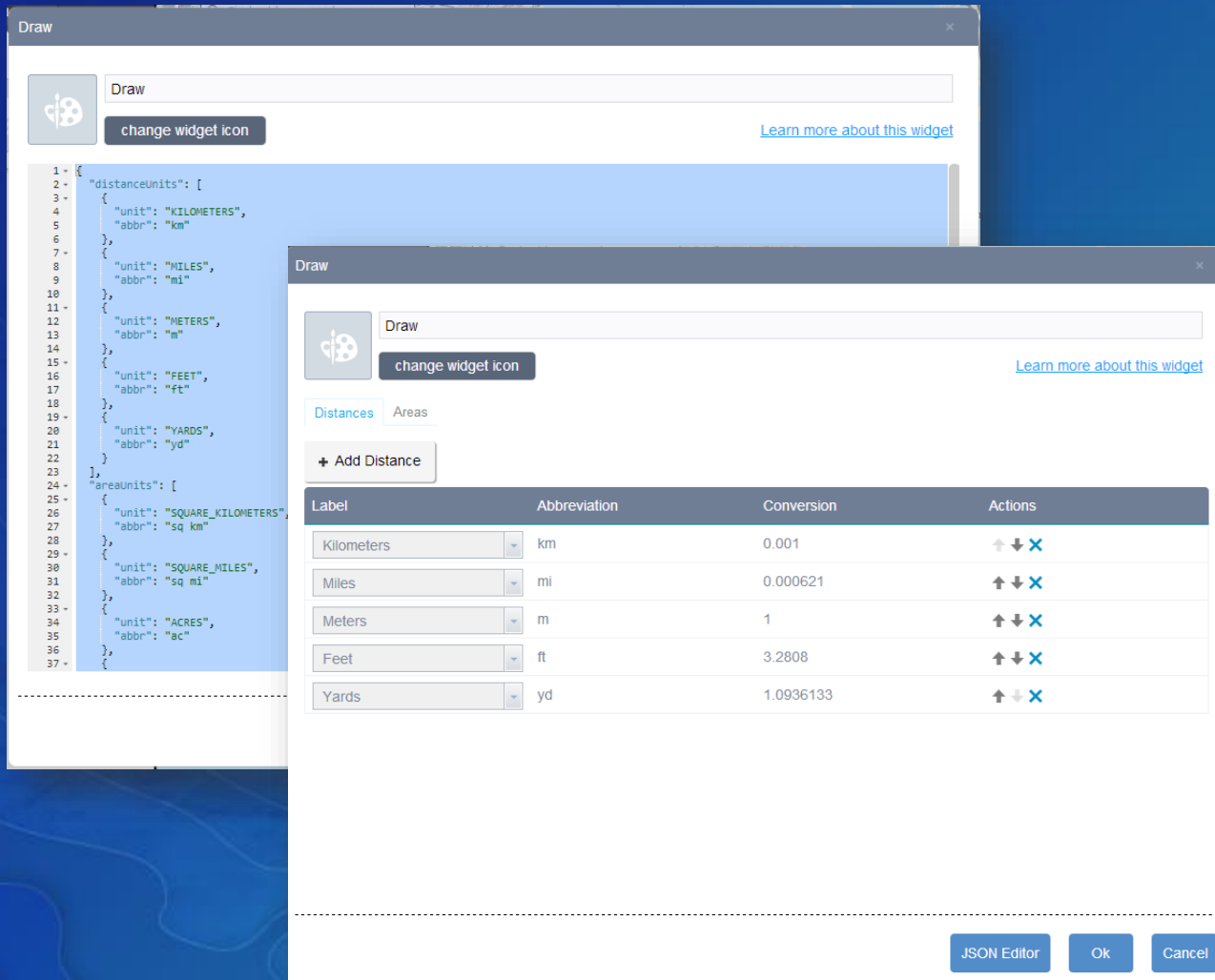


```
define(['dojo/_base/declare', 'jimu/BaseWidget'],  
function(declare, BaseWidget){  
    var clazz = declare([BaseWidget],{  
    });  
    return clazz;  
});
```

# Getting Started...

1. Download developer edition
2. Connect to organization or portal
3. **Copy** widget template
4. **Run** the builder
5. **Create** an app with your widget
6. **Build** your widget in the app

# Configure your custom widget inside the builder



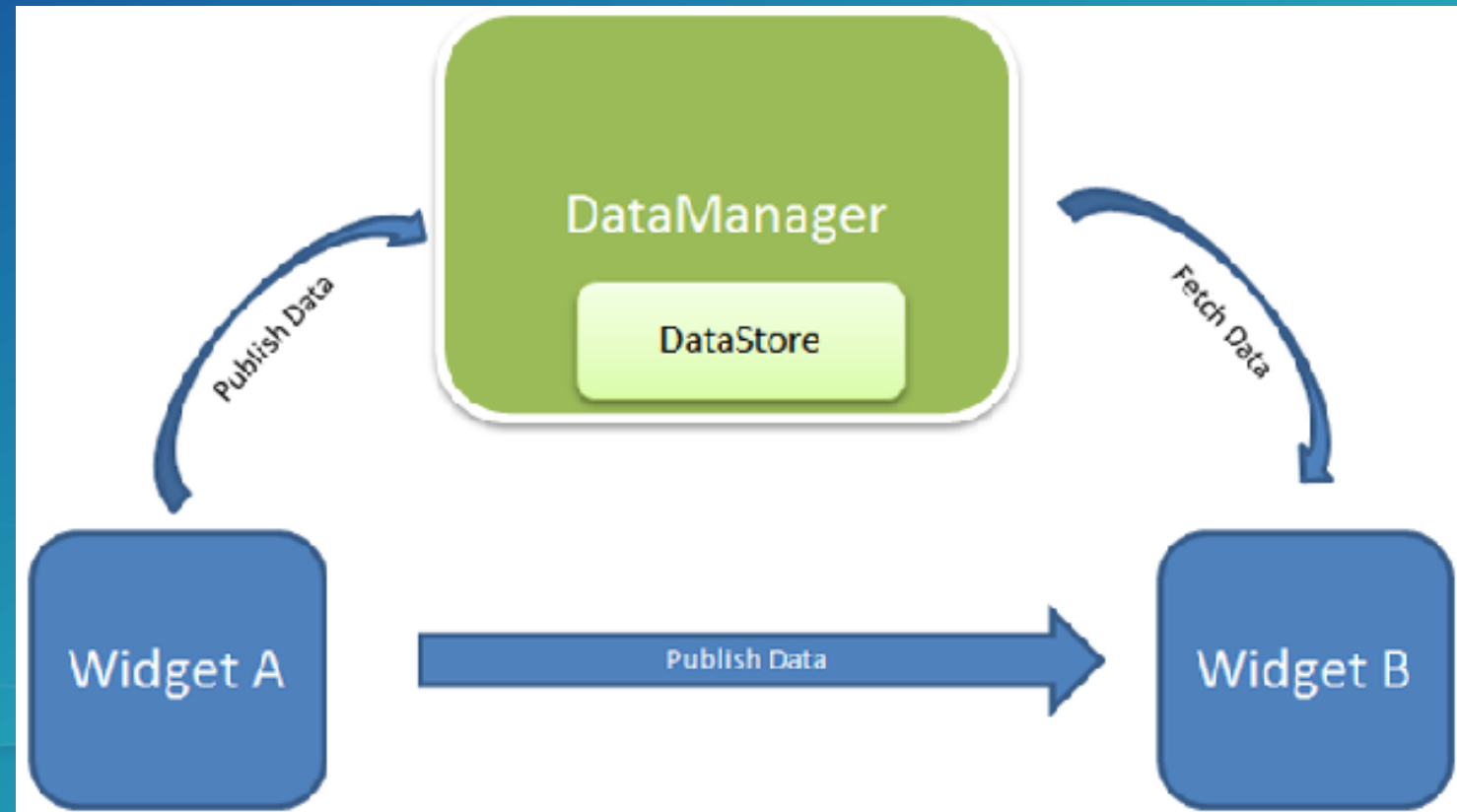
## Building a UI for the user

- **Setting.js**
  - Config info
  - getConfig, setConfig
- **Setting.html**
- **Usual localization pattern**
- **CSS**

# Widget to Widget Data Sharing / Communication

...using the DataStore

- Get all data, or..
- Data from a specific widget
- Handled through events
- Widget loading order handled
- Can load another widget:  
`this.openWidgetById`





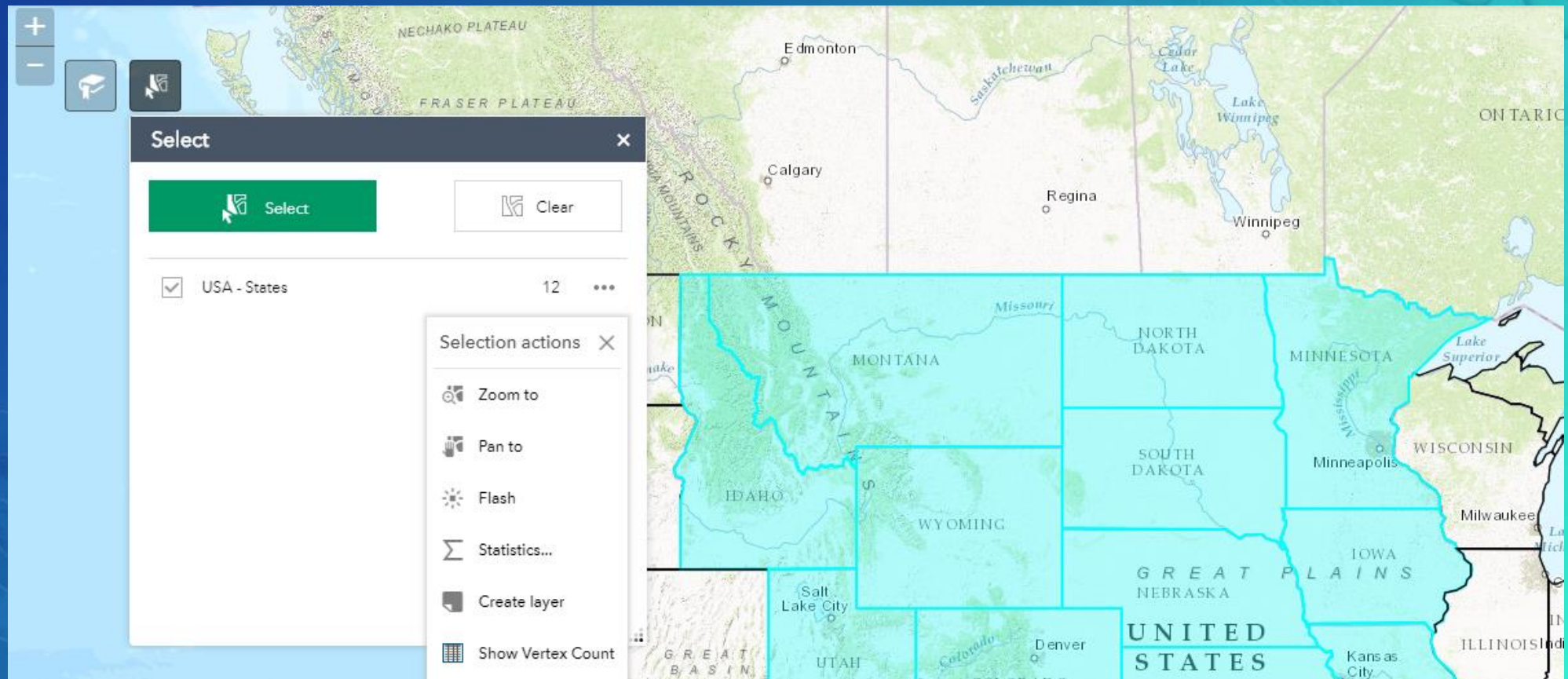
# Extra data source

- Configure a layer or statistics
- Configure the refresh interval of the data
- Currently supported by InfoGraphic widget



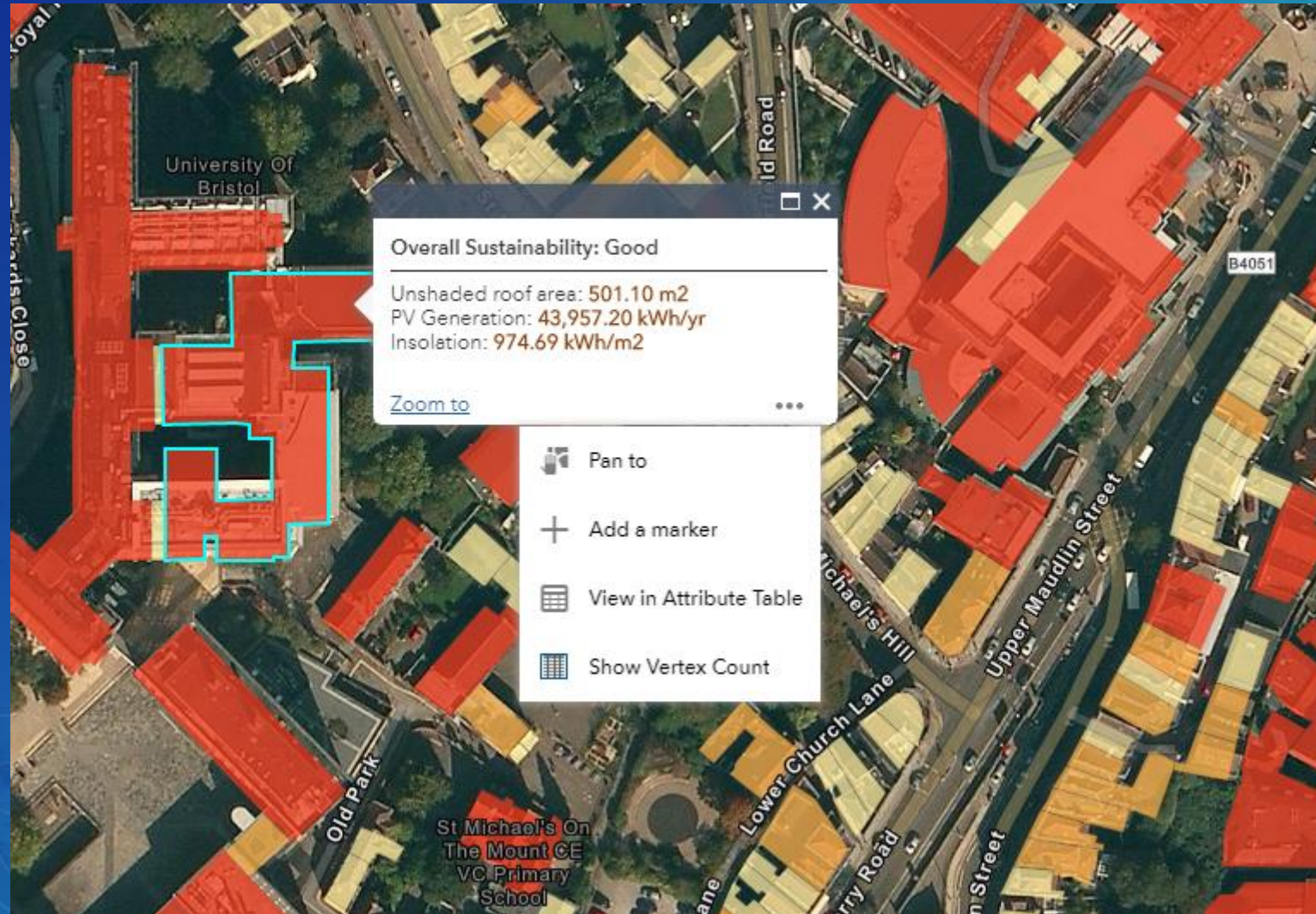
# Feature Actions

- Your widget can work with selected feature sets
- Example: Zoom To, Export to CSV, send to GP





# Feature Actions



# Feature Actions

## manifest.json

```
...  
"featureActions": [{  
  "name": "ShowVertex",  
  "uri": "myFeatureAction"  
}]
```

## “myFeatureAction.js”

```
isFeatureSupported: function(featureSet){ return...  
onExecute: function(featureSet){...}
```

## Widget.js

Do something

```
WidgetManager.getInstance().triggerWidgetOpen(this.widgetId) .
```

```
graph TD; A["isFeatureSupported: function(featureSet){ return...  
onExecute: function(featureSet){...}"] --> B["WidgetManager.getInstance().triggerWidgetOpen(this.widgetId) ."]; B --> C["Do something"];
```



# Web AppBuilder for ArcGIS (Developer Edition)

[Home](#)[Guide](#)[API Reference](#)[Sample Code](#)[Forum](#)[▼ Samples](#)[Create a custom in-panel widget](#)[Create a new widget](#)[Create a custom widget using the Report diji](#)[Create a new theme](#)[Create a new style for a theme](#)[Create a new default layout](#)[Create a non-default layout](#)[Create a new panel](#)[Create a new layout widget](#)[Create a new controller widget](#)[Create a feature action in your widget](#)[Create configurable app templates](#)[Send a layer to the Attribute Table widget](#)

## Create a feature action in your widget

A feature action is a piece of code that is requested to execute on one feature or a set of features. Web AppBuilder provides some out-of-the-box feature actions, such as **Zoom To**, **Export to CSV File**, and **View in Attribute Table**. Additionally, you can create your custom feature action by extending the `BaseFeatureAction` class. The following steps demonstrate how to create a feature action in the Demo widget that shows the count of vertexes for a selected feature set.

Note:

The complete code is available in the Demo widget. Access the following URL to play the feature action in the Demo widget:

```
http://<your host machine>:3344/webappviewer/?config=sample-configs/config-demo.json
```

## Create a feature action class

- 1 Browse to the `~\client\stemapp\widgets\samplewidgets` folder under the Web AppBuilder installation.
- 2 Under the Demo widget folder, create a new text file named `ShowVertexFeatureAction.js`.
- 3 Copy and paste the following code snippet into the file. It creates a feature action class by

In this topic

[Create a feature action class](#)[Declare the feature action in the widget manifest](#)[Label the feature action](#)[Provide an icon for the feature action](#)[Display the count number](#)[Use the feature action](#)

# Theme

App in style with personality



Theme is you





Specks  
of GIS

Shirts  
of GIS

Beards  
of GIS

Feet  
of GIS

Because you are special



A photograph of a field of green grass with a single red poppy flower in focus. The flower is bright red and stands out against the blurred green background. The text is overlaid on the left side of the image.

**Your apps deserve to**  
*stand out from the crowd.*

**via creating your own theme**

A menu of tools

Interactive content

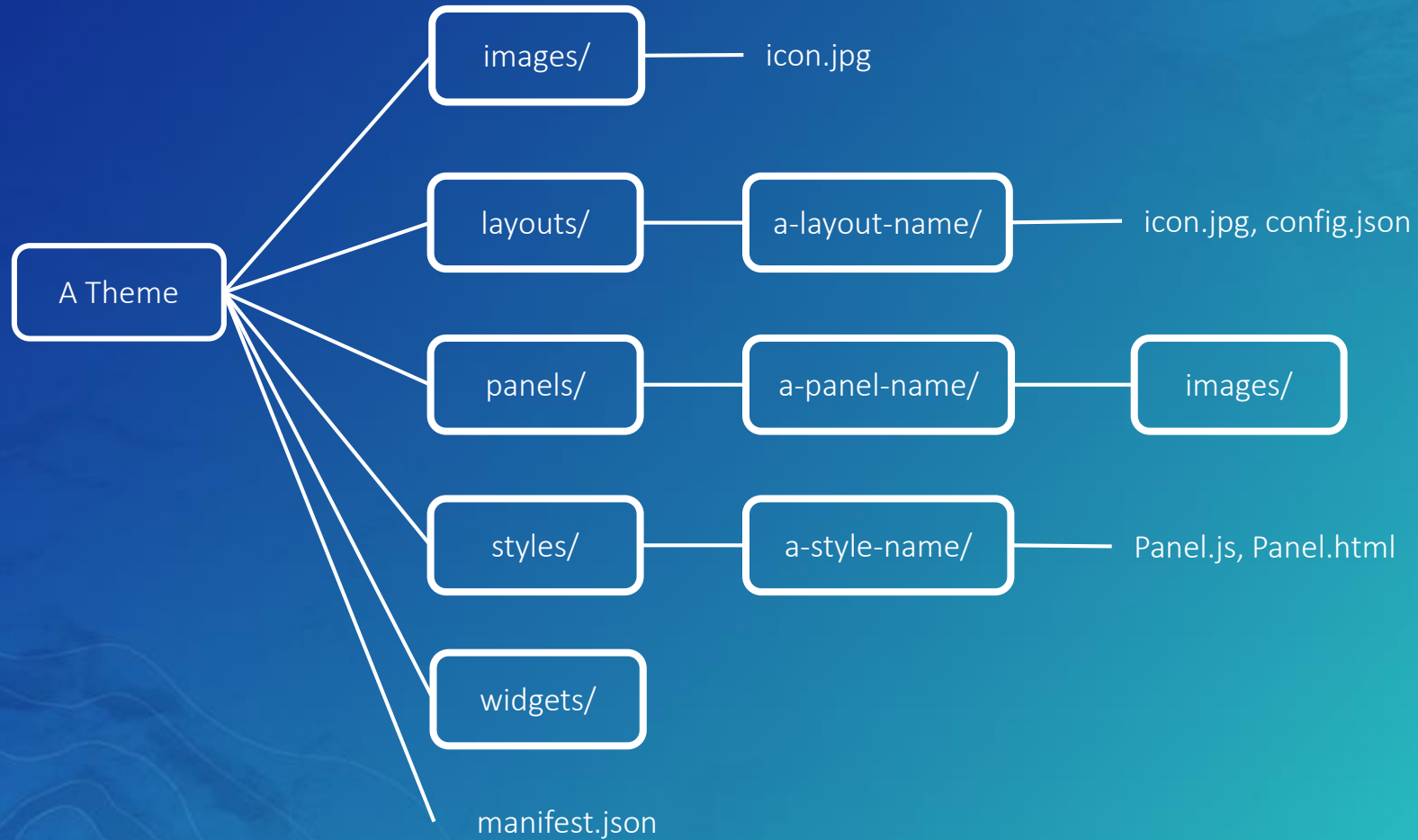
Shortcut items

Map, of course

The "player"



# Theme Convention and Defaulting







# Create a Theme

Embrace your own style

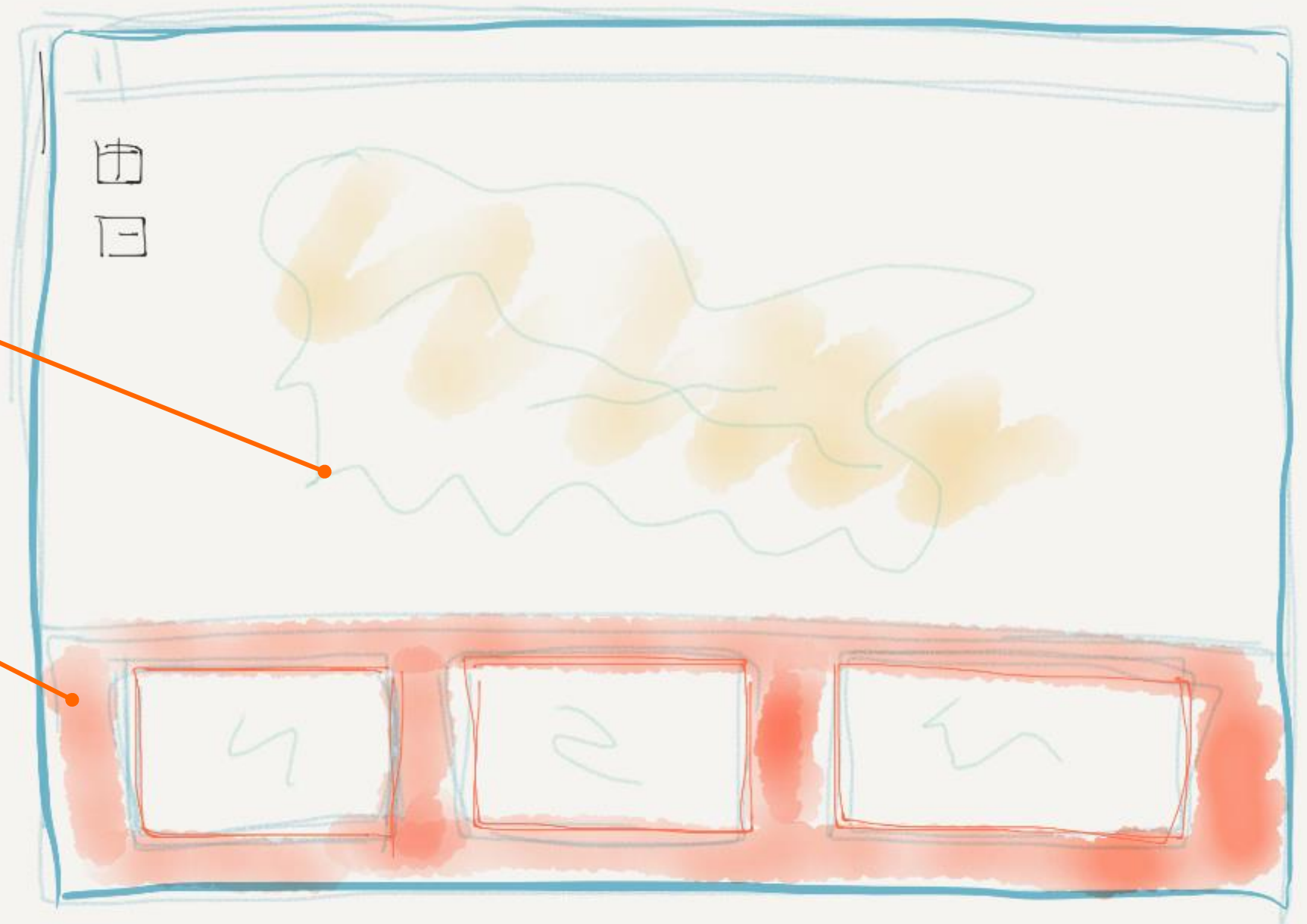


**My pretty  
layout**

**My cool  
color**

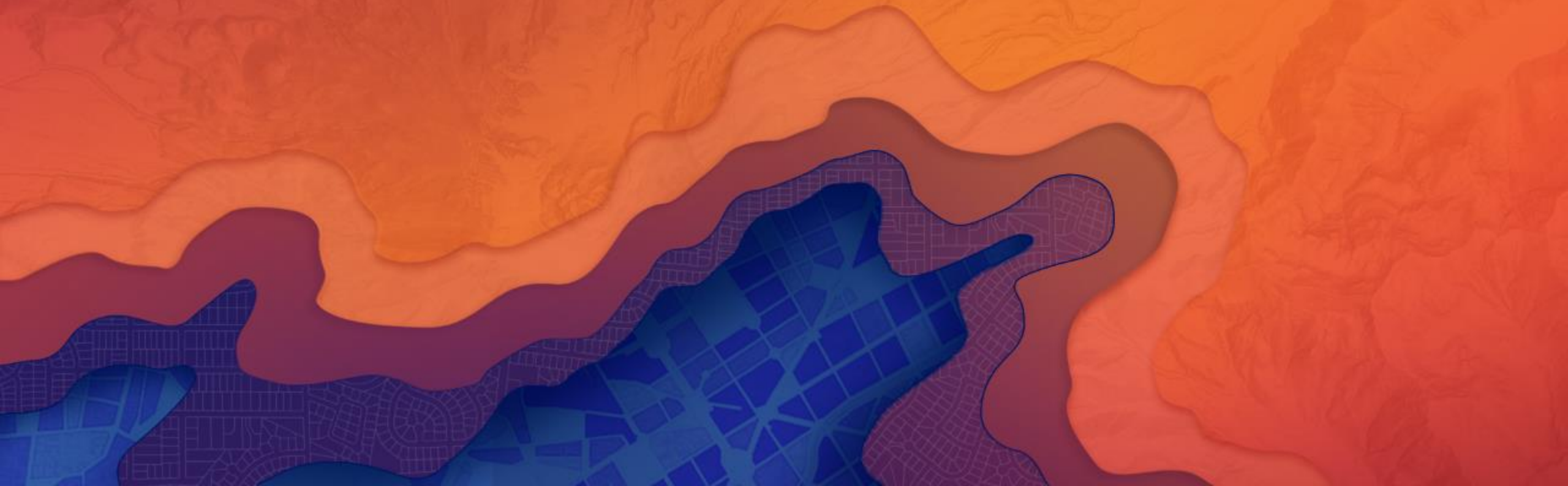


FF8000

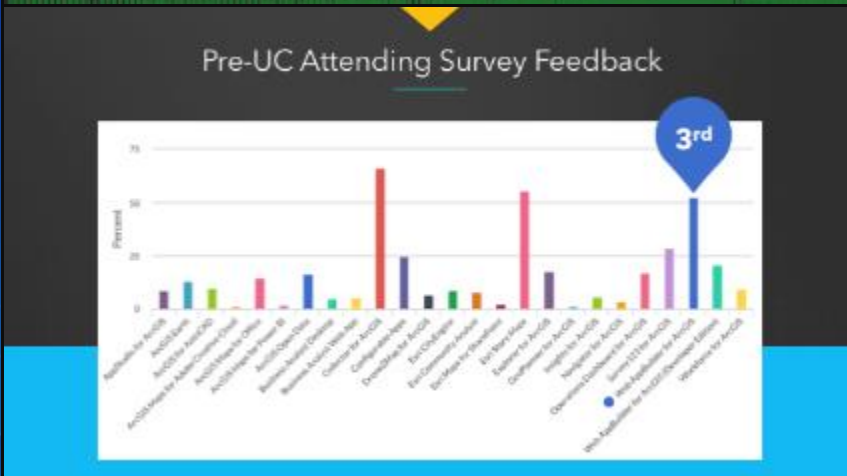
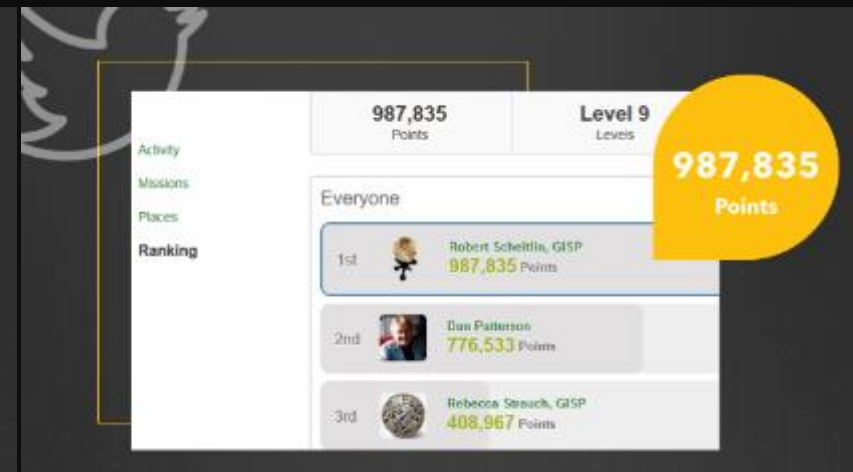


# What's Coming

Evolution with excitements



# Web AppBuilder is greatly appreciated by our users..



however, we can't stand still in this fast moving world...



The background of the slide is a blurred image of a person's face, likely a woman, looking down at a chessboard. In the foreground, several chess pieces are visible, including a king, queen, and various pawns, arranged on the board. The overall tone is professional and strategic.

# 10 challenges for people building apps

Quickly turn business requirements into usable apps

Build apps without dependencies on developer skills

Easily maintain apps

Unified UX to build apps that work across multiple form factors and platforms

Understand how apps are used by end-users

Understand if the apps are effective at getting the job done

Secure apps, their content and functionality

Deploy apps simply and securely

Monitor and control the use of premium services



less coding



Limited needs for  
grand-up dev works



cheaper  
better UX  
simpler  
faster  
managed



added value



# What Esri Has

Configurable App simplifies the app creation

- **Web AppBuilder (WAB), as a tool, has significantly simplified the app creation process**
  - **Since the first WAB release, in two years, more than 220,000 apps are created and hosted on ArcGIS Online**
- 
- However, as a tool, WAB can only partially meet the customer's requirements for apps (in previous slides)
  - Esri app creation needs to evolve into being a system to encapsulate the whole app stack and requirements
  - Hence ...



The image is a composite. The top half shows a wide aerial night view of a city with a blue semi-transparent overlay. The bottom half is a detailed aerial night view of a city intersection with light trails from cars. The text 'appbuilder.arcgis.com' is centered in the blue overlay area.

[appbuilder.arcgis.com](https://appbuilder.arcgis.com)

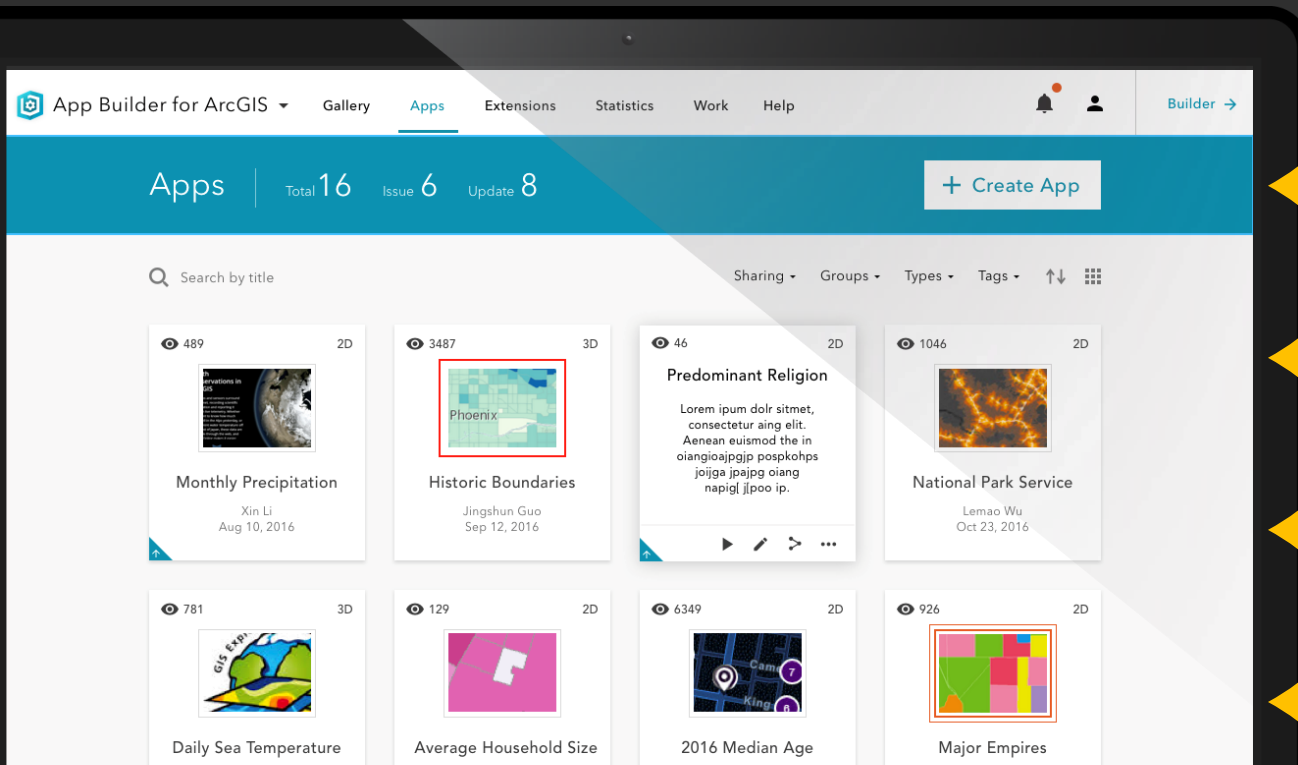


# What is App Builder for ArcGIS

... a web user experience for creating and managing app through the app's lifecycle

... is the evolution of Web AppBuilder, an integrated and unified web user experience

for



Configuring and creating apps



Managing app's lifecycle



Analyzing and reporting the use pattern of the apps



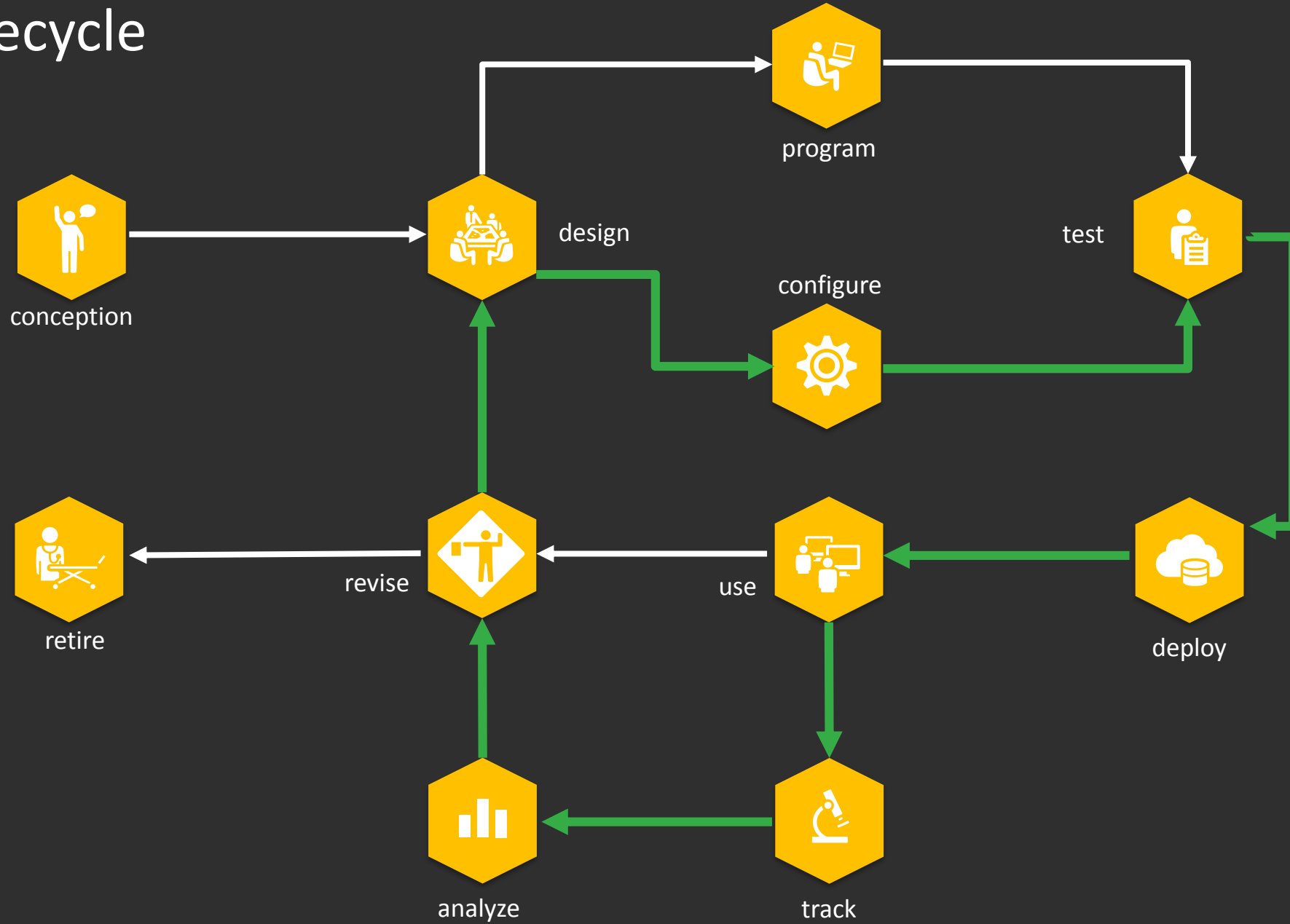
Allowing integration of other app tools

# Anatomy of an ArcGIS app

An App is a living and breathing being made out of...



# App Lifecycle





**App Lifecycle is complex**

**Apps are data**

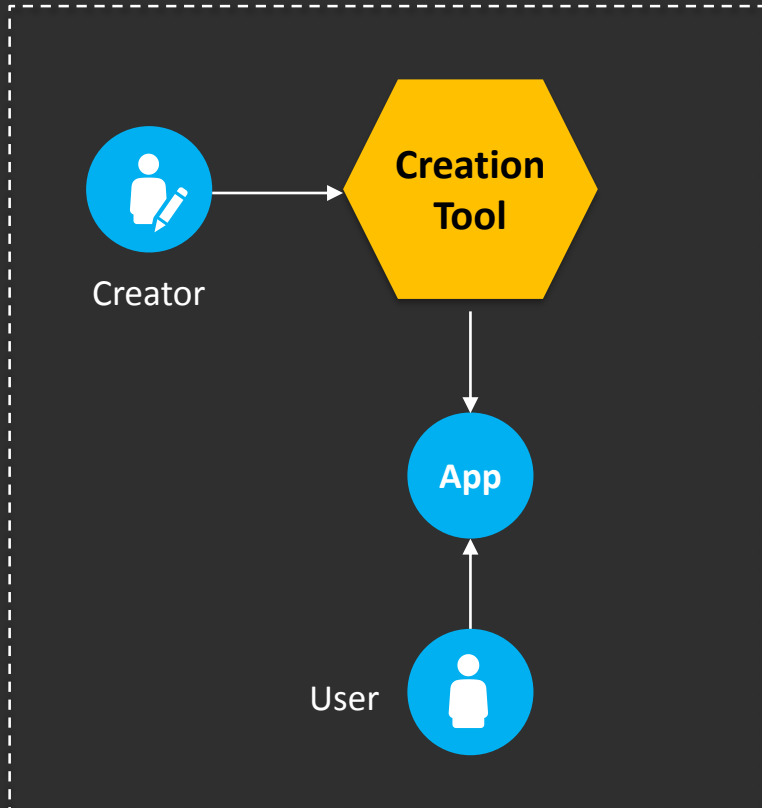
**Apps are disposable**

**Apps are a conduit to  
understand your users**

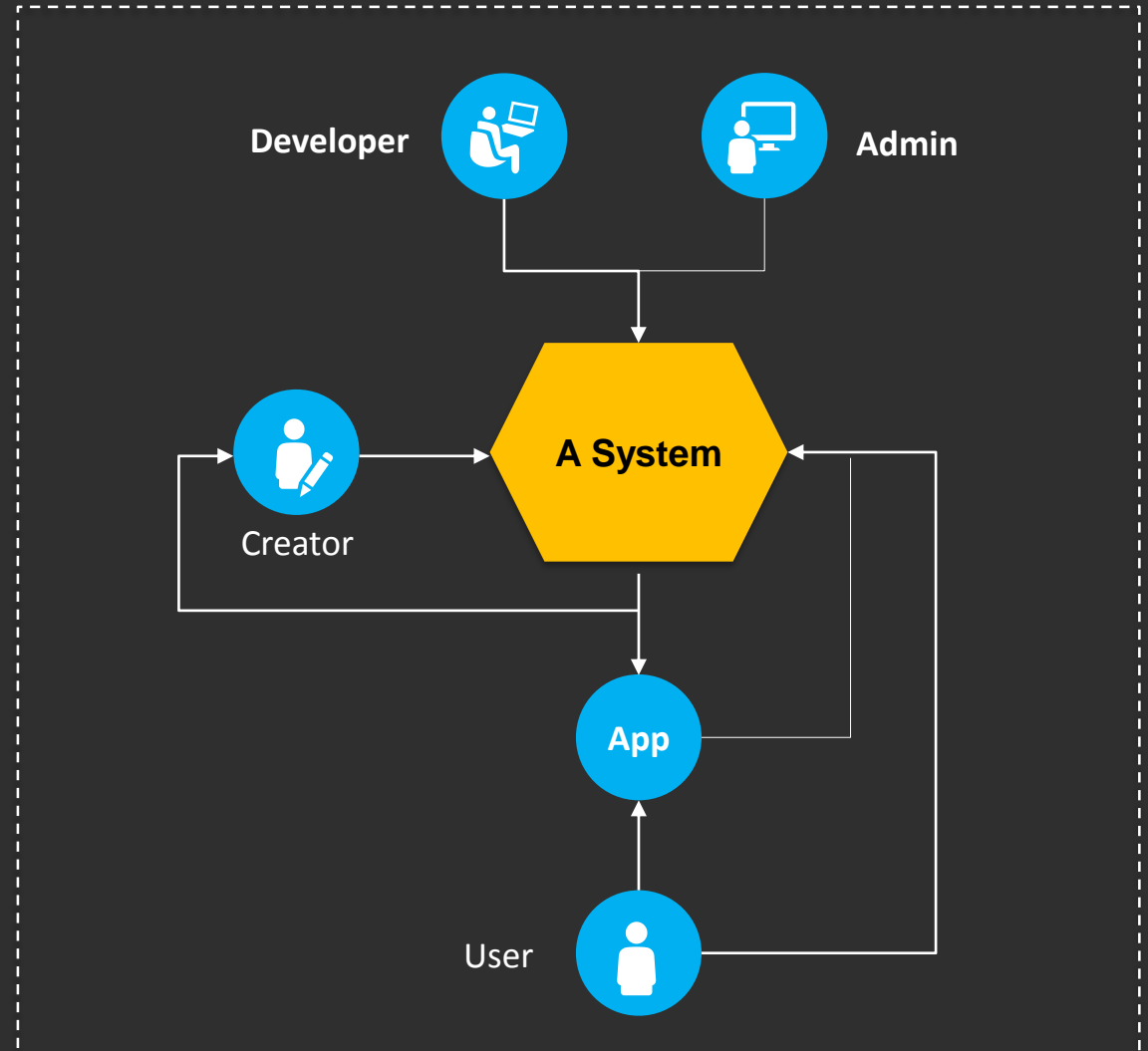


# The Solution for the Whole App Stack

Go beyond configurable apps

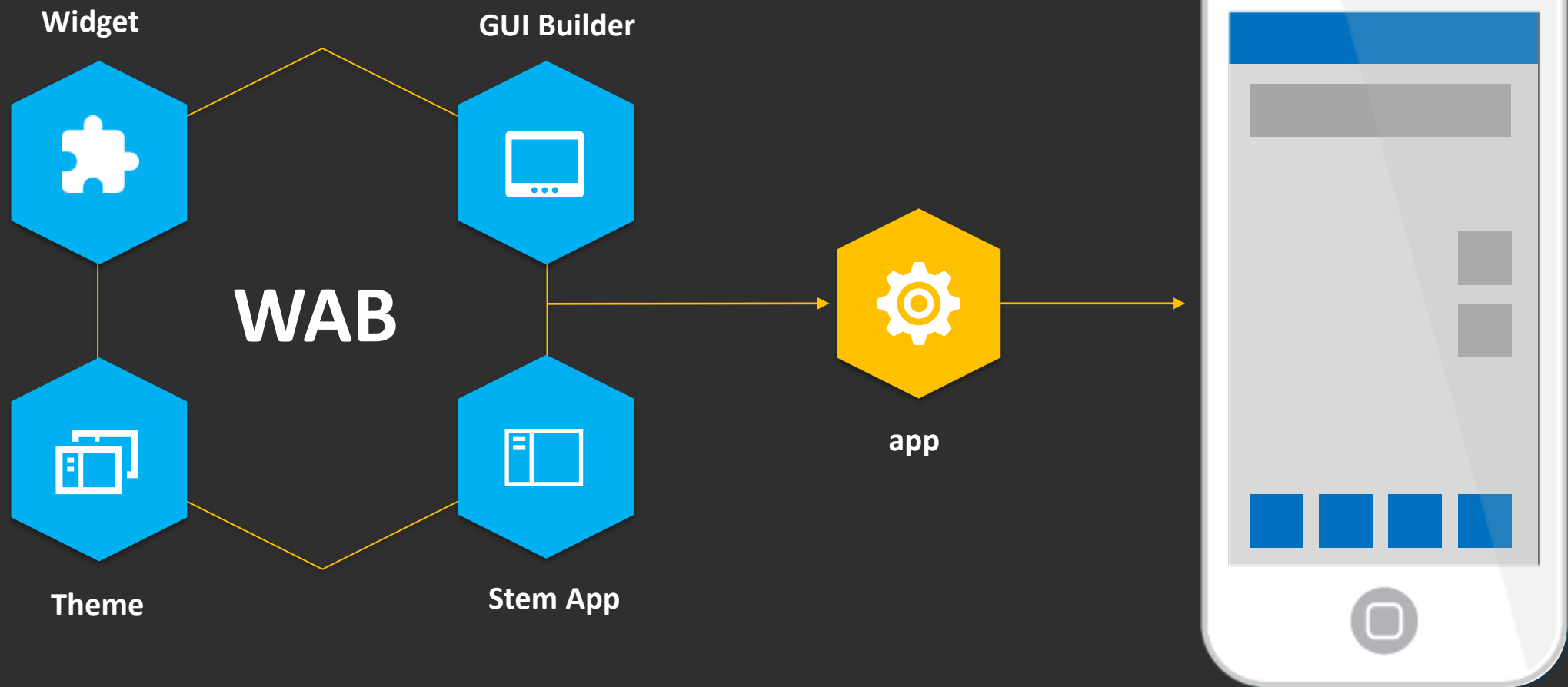


**Evolving WAB from a tool to be a system to manage the full App lifecycle**



# Web AppBuilder as a Tool (tool centric)

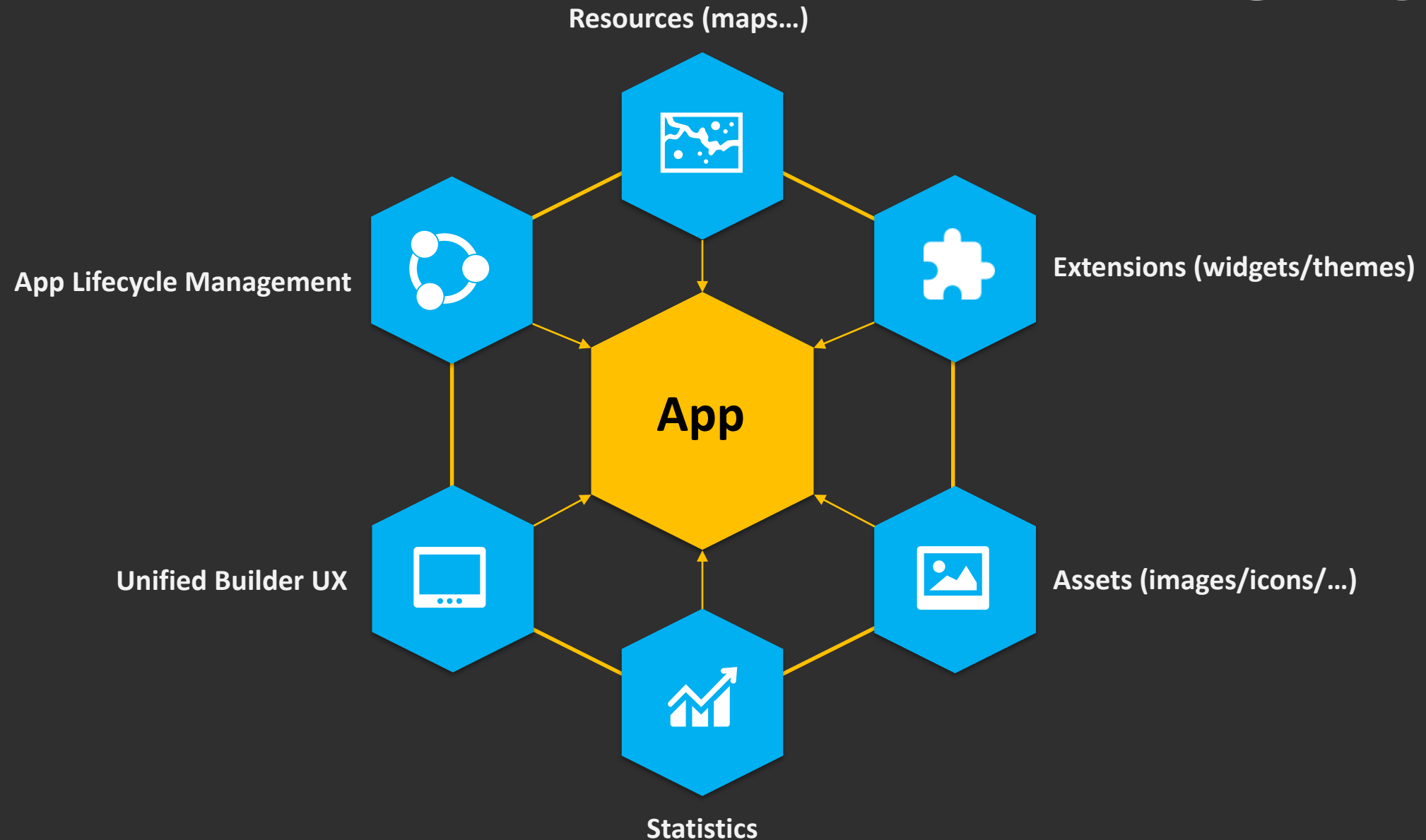
before



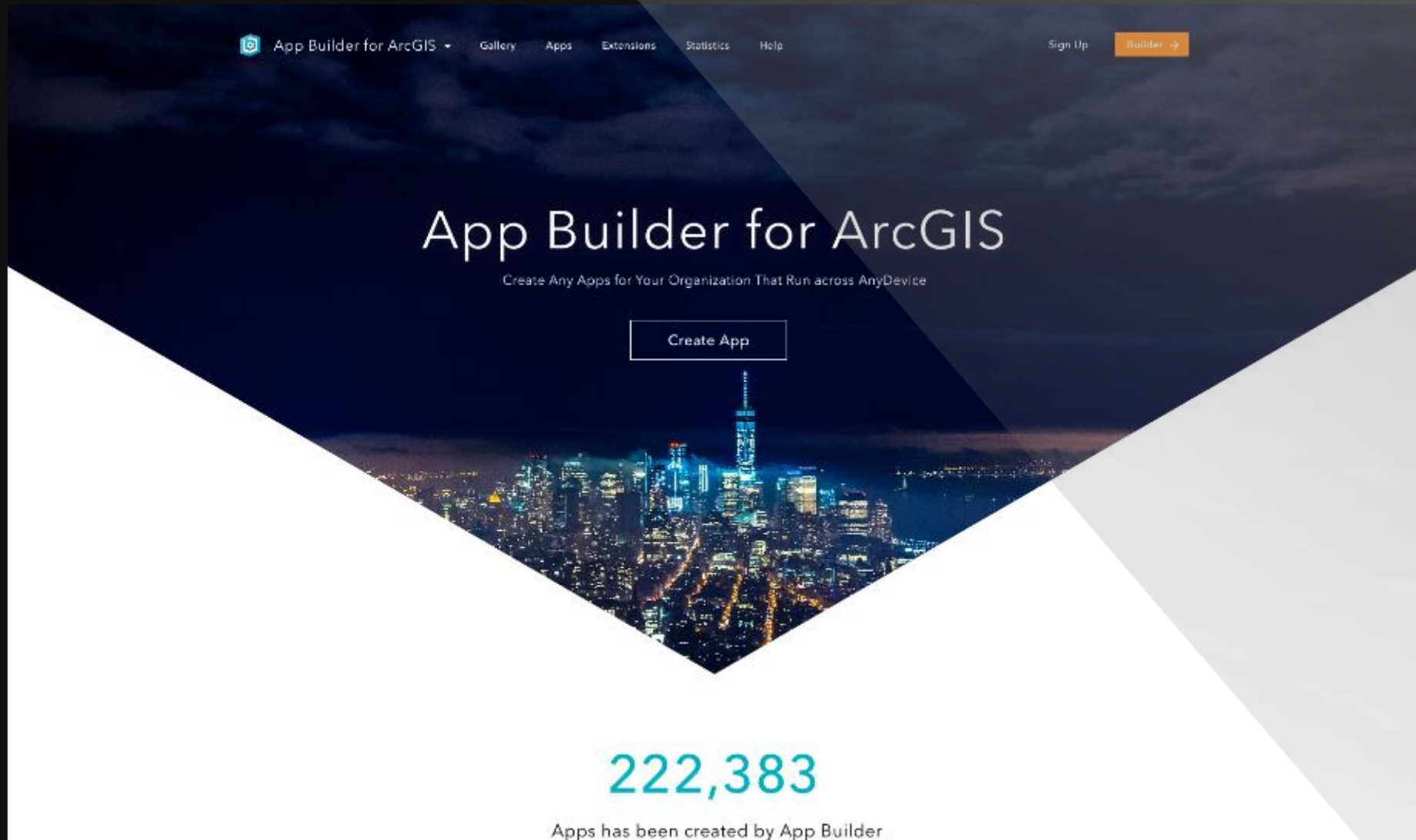


appbuilder.arcgis.com (app centric)

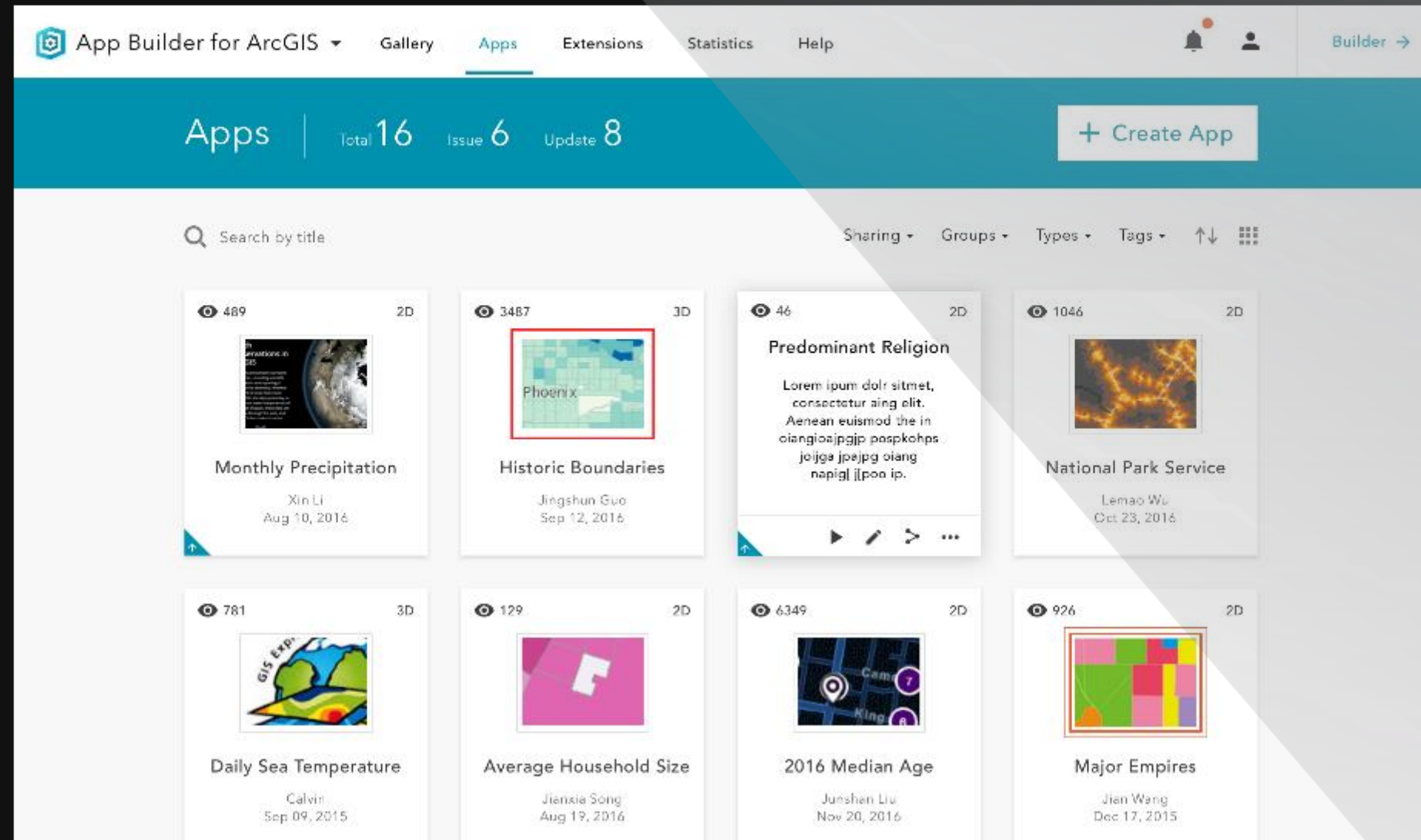
after



# appbuilder.arcgis.com UI/UX

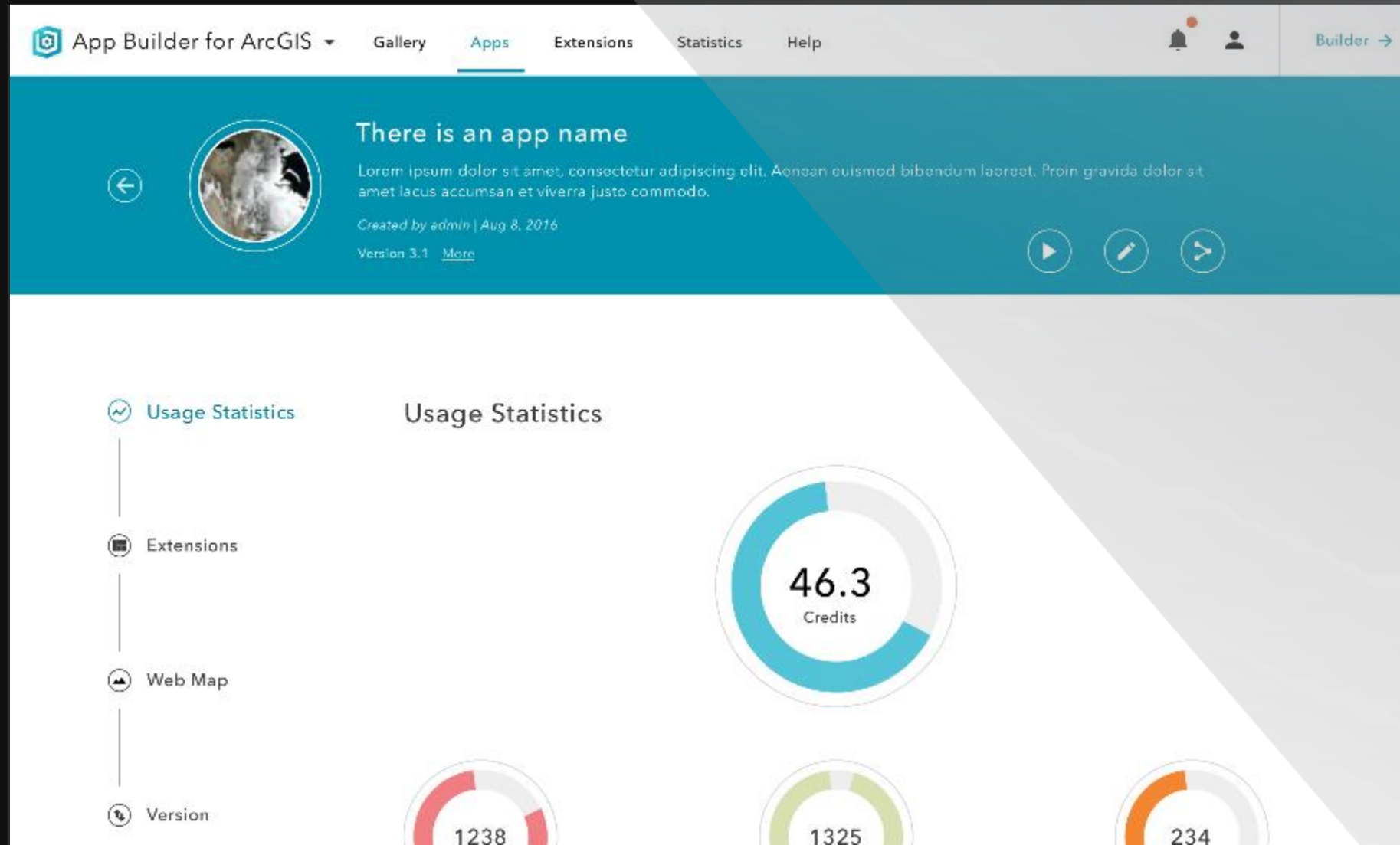


# appbuilder.arcgis.com UI/UX

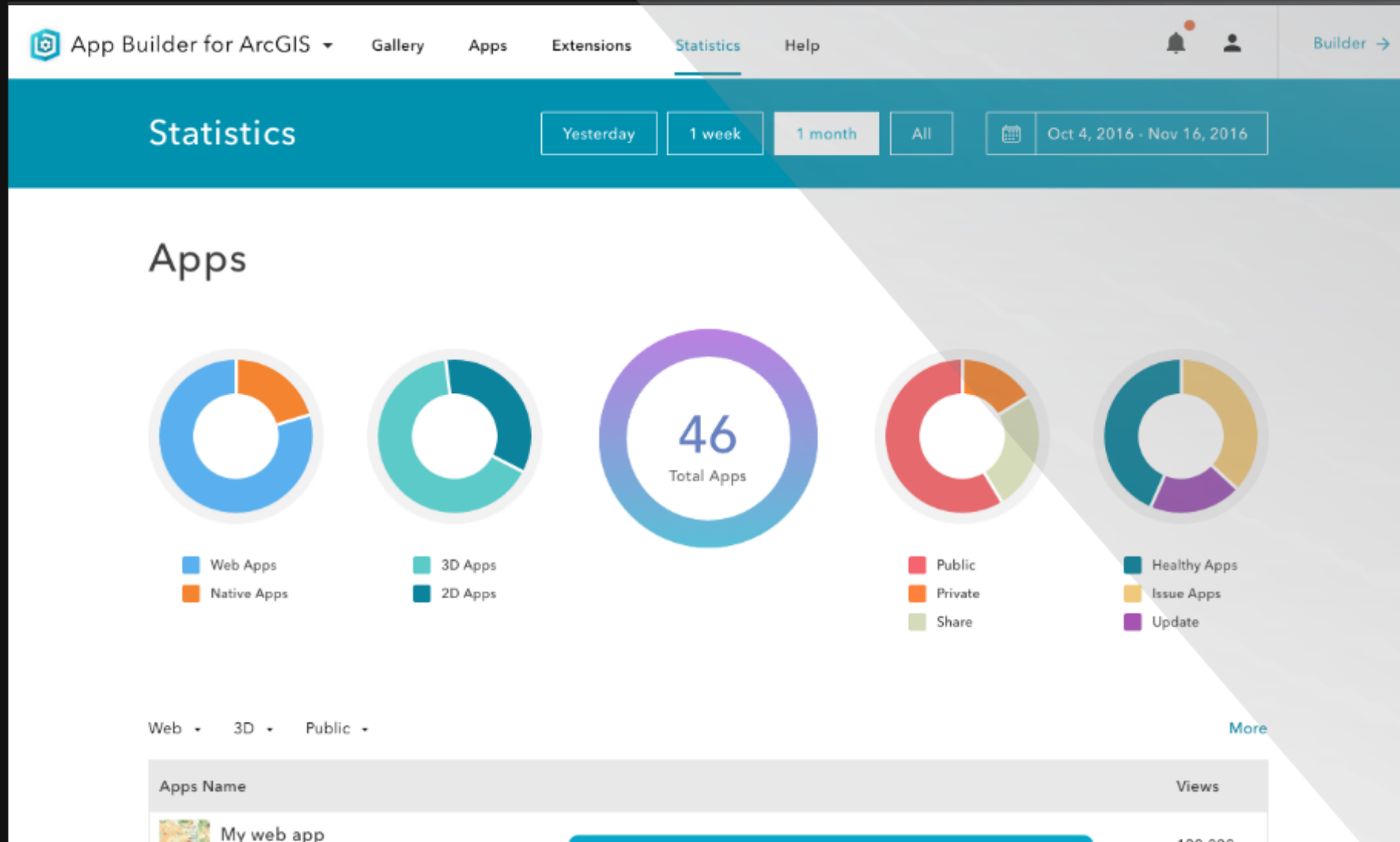




# appbuilder.arcgis.com UI/UX

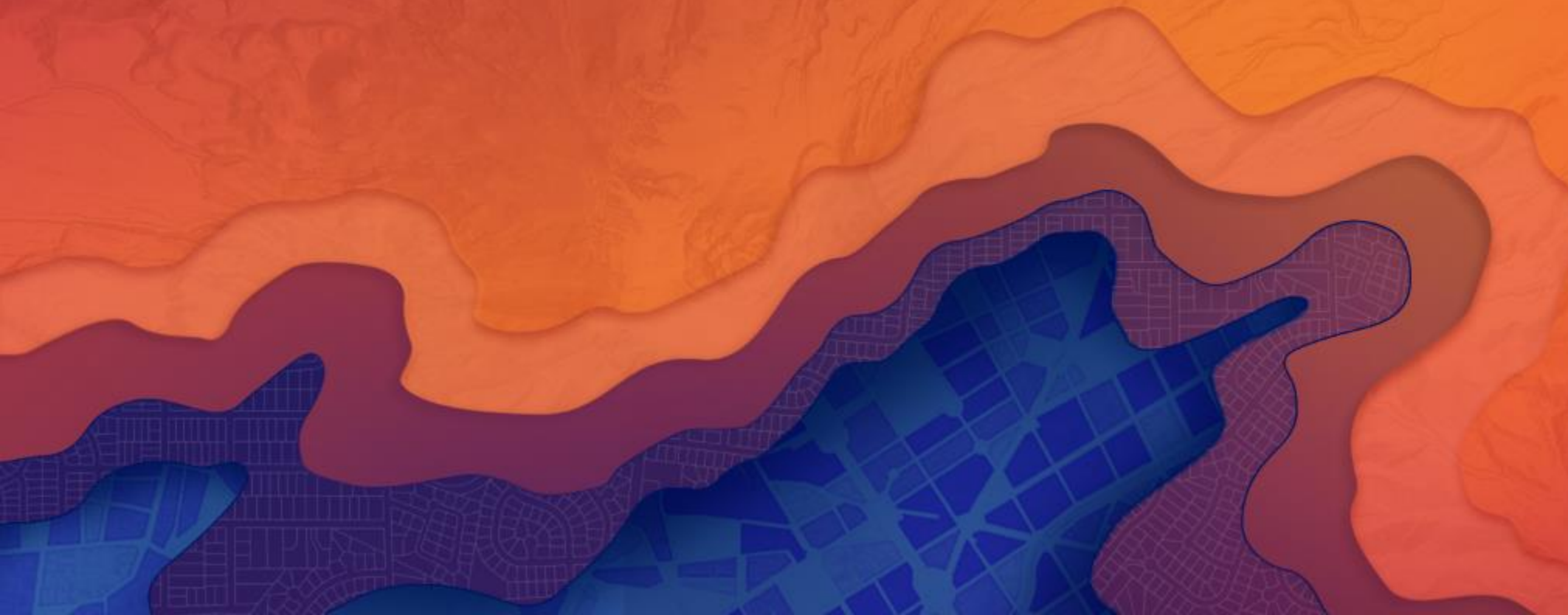


# appbuilder.arcgis.com UI/UX



# Community

For you and by you





# Documentation

Online help documentation

<http://doc.arcgis.com/en/web-appbuilder>

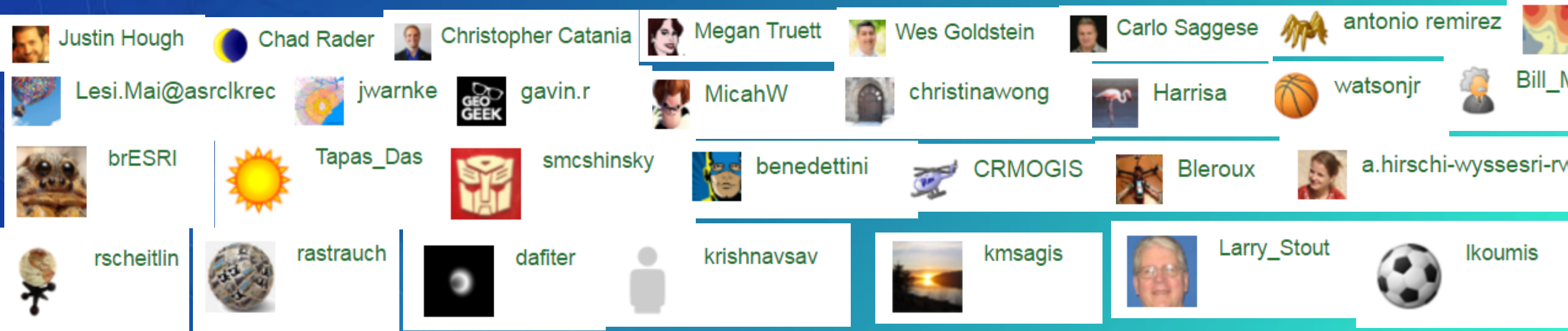
Developer Edition help documentation

<http://developers.arcgis.com/web-appbuilder>





<https://geonet.esri.com/community/gis/web-gis/web-appbuilder>  
<https://geonet.esri.com/groups/web-app-builder-custom-widgets>



Web Course

# Creating Web Applications Using Templates and Web AppBuilder for ArcGIS

🕒 3 Hours

⊕ Wish List

**<https://training.esri.com>**



## Other Online Resources

- **Esri Solutions Widgets:**
  - <https://github.com/Esri/solutions-webappbuilder-widgets>
- **Lists of Widgets:**
  - <http://codesharing.arcgis.com/>
  - <http://esri-es.github.io/Web-AppBuilder-Custom-Widgets/>
  - <https://github.com/gavinr/wab-widget-search>
- **“Awesome ArcGIS”** <https://github.com/hhkaos/awesome-arcgis>



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GeoEvent Server: Internet of Things (IoT)

## The Internet of Things (IoT)

Smart Cities



Esri 2017 Developer Summit  
Tech...

from Esri... | 163 videos



GeoEvent Server:  
Internet of Things  
(IoT)

2



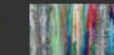
ArcGIS API for  
JavaScript  
Programming  
Patterns and API  
Fundamentals

3



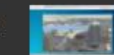
ArcGIS Enterprise:  
An Introduction

4



Web AppBuilder for  
ArcGIS Enterprise  
Deployments

5



Web AppBuilder for  
ArcGIS Advanced  
Development Tools  
and Techniques

6



Building Responsive  
Web Apps with the  
ArcGIS API for  
JavaScript

## GeoEvent Server: Internet of Things (IoT)

The world is becoming more instrumented every day. This session will be a fun exploration of how various things can be integrated into ArcGIS using GeoEvent Server. Presented by Morakot Pilouk, Ming Zhao and Josh Joyner



from Esri Events | March 23, 2017

Share

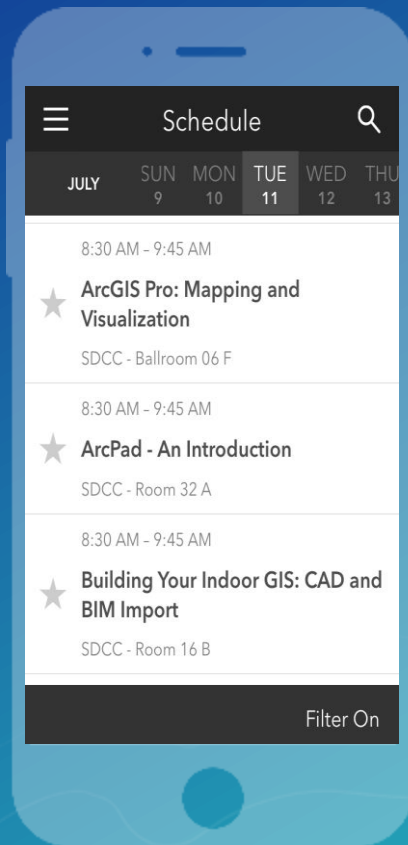
Transcripts

# Please Take Our Survey on the Esri Events App!

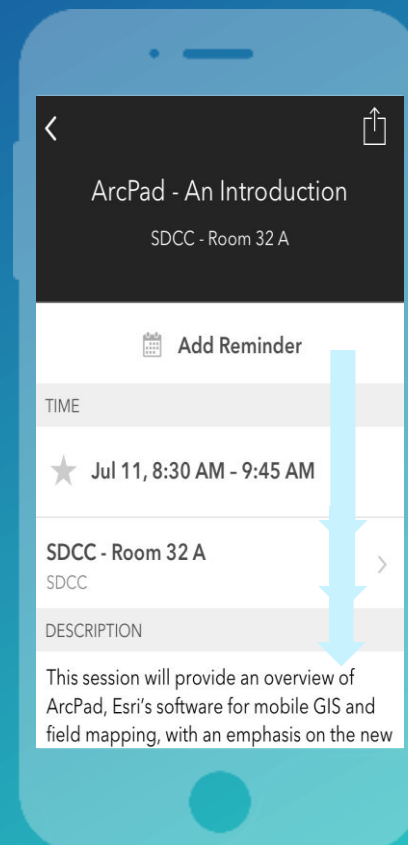
**Download the Esri Events app and find your event**



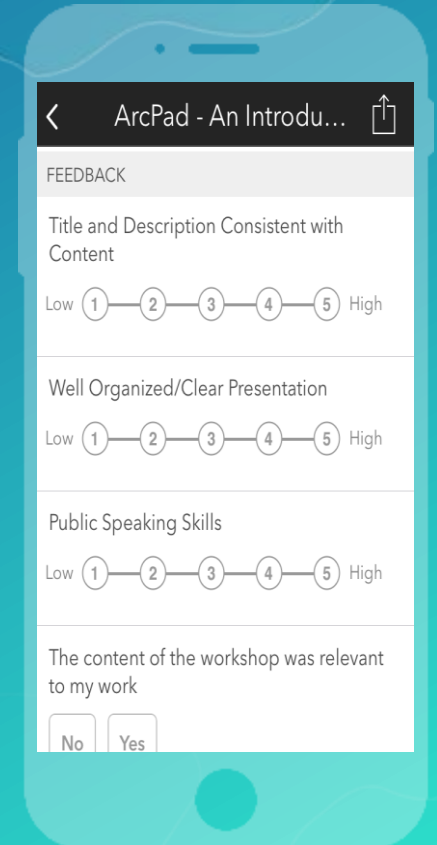
**Select the session you attended**



**Scroll down to find the survey**



**Complete Answers and Select "Submit"**







esri

THE  
SCIENCE  
OF  
WHERE