



ESRI DEVELOPER SUMMIT 2023

Building an Instant App in React with TypeScript

Cameron Smith and Ryan Libed

Introductions



Cameron Smith

Software Engineer on
ArcGIS Instant Apps

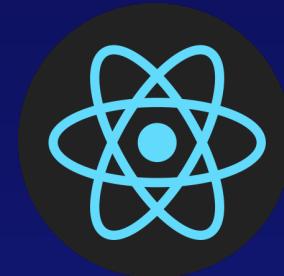


Ryan Libed

Software Engineer on
ArcGIS Instant Apps

Agenda

- Introduction to ArcGIS Instant Apps
 - What are they?
 - Architecture Overview
- Technologies
 - React
 - TypeScript
 - Calcite Components
 - ArcGIS Maps SDK for JavaScript
- Demo
 - Create your own Instant App Ecosystem

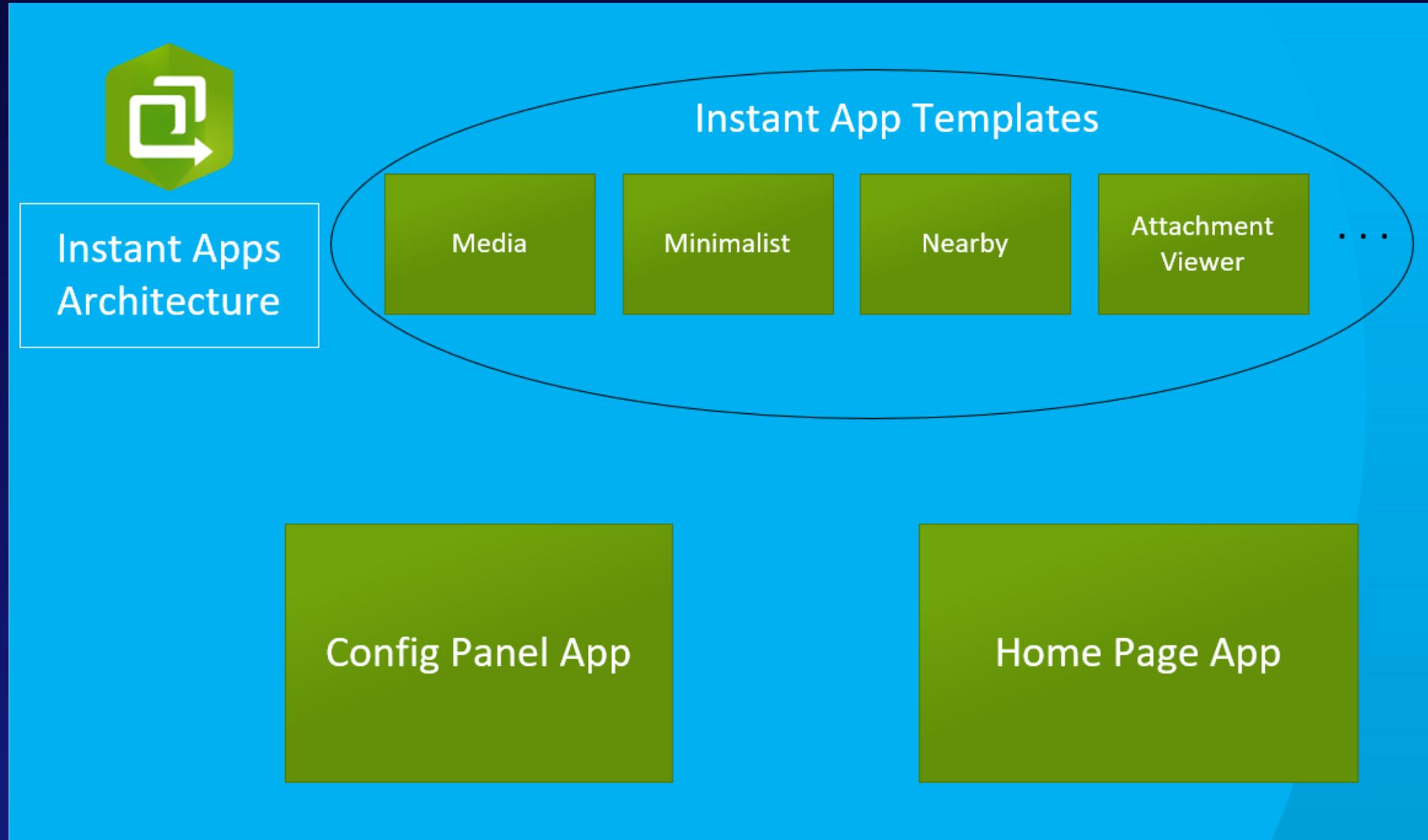


What is ArcGIS Instant Apps?

- App Builder System
 - Wix, squarespace... etc
 - Instant Apps is the same, but for Spatial Web Apps



Instant Apps Architecture



Most Important:

Portal Item



Portal Item:

- > esri
- > esri/analysis
- > esri/core
- > esri/form
- > esri/geometry
- > esri/identity
- > esri/layers
- > esri/networks
- > esri/popup
- < esri/portal
- Portal
- PortalFolder

PortalItem

AMD: `require(["esri/portal/PortalItem"], (PortalItem) => { /* code goes here */ });`

ESM: `import PortalItem from "@arcgis/core/portal/PortalItem.js";`

Class: `esri/portal/PortalItem`

Inheritance: `PortalItem > Accessor`

Since: ArcGIS Maps SDK for JavaScript 4.0

An item (a unit of content) in the Portal. Each item has a unique identifier and a well known URL that is independent of the user owning the item. An item may have associated binary or textual data which is available via the item data resource. View the ArcGIS portal API REST documentation for the [item](#) for more details.

<https://developers.arcgis.com/javascript/latest/api-reference/esri-portal-PortalItem.html>



Content

My Content

My Favorites

My Groups

My Organization

Living Atlas

[New item](#)[Create app](#) Search csmith_CATs[Table](#)[Date Modified](#)[Filter](#)

Folders



1 - 20 of 217 in csmith_CATs

 Filter folders[All my content](#)[csmith_CATs](#)[_UC 2022 - 1 - Media Map Example](#)[_UC 2022 - 2 - Slider Time Example](#)[_UC 2022 - 3 - Slider Numeric Ex 1](#)[_UC 2022 - 4 - Slider](#)

Filters

[Categories](#)

water

Geology

fgngfjhdgfjdhfghdj

Atlas (Beta)

[Item type](#)

Maps

Layers

Scenes

Apps

Developer credentials

Tools

<input type="checkbox"/>	Title			Modified	
<input type="checkbox"/>	Slider Prod Test		Instant App		... Mar 3, 2023
<input type="checkbox"/>	3D Viewer - CORS test		Instant App		... Mar 2, 2023
<input type="checkbox"/>	Atlas Imgry Layer test		Instant App		... Feb 28, 2023
<input type="checkbox"/>	GEBCO Shaded Relief 2021 MAP		Web Map	+ M	... Feb 28, 2023
<input type="checkbox"/>	Atlas Imagery Tile Test		Instant App		... Feb 27, 2023
<input type="checkbox"/>	Imagery Tile Service Example		Web Map	+ M	... Feb 27, 2023
<input type="checkbox"/>	Tiled Imagery Layer Example		Web Map		... Feb 27, 2023
<input type="checkbox"/>	Labor Stats		Instant App		... Feb 24, 2023
<input type="checkbox"/>	Labor Stats		Web Map		... Feb 24, 2023
<input type="checkbox"/>	Untitled experience 1		Web Experience		... Feb 23, 2023
<input type="checkbox"/>	My scene		Web Scene		... Feb 23, 2023
<input type="checkbox"/>	Copy of Copy of Mt. St. Helens point cloud by chyrse_wma		Web Scene		... Feb 23, 2023
<input type="checkbox"/>	Insets - Onboarding Tooltip test		Instant App		... Feb 23, 2023
<input type="checkbox"/>	testadsafadfs		Instant App		... Feb 23, 2023
<input type="checkbox"/>	retwetwrretwewtr		Instant App		... Jan 27, 2023

← → C H webapps.maps.arcgis.com/home/item.html?id=b749b733fa8642feb47a0dea8752c2d 🔍 ⭐ ⓘ JS

Home Map Scene Notebook Groups Content Organization

Cameron Smith
csmith_CATs

Imagery Tile Service edit

edit thumbnail Add a brief summary about the item. edit

Web Map by csmith_CATs

Item created: Feb 27, 2023 Item updated: Feb 27, 2023 View count: 12

edit Add to Favorites

Description edit
Add an in-depth description of the item.

Layers edit
 Esri_2020_Land_Cover_V2 Tiled Imagery Layer

Item Information learn more
Low High
💡 Top Improvement: Add a summary

Details

Overview Usage Settings

Open in Map Viewer dropdown

Open in ArcGIS Desktop dropdown

Open in Field Maps Designer

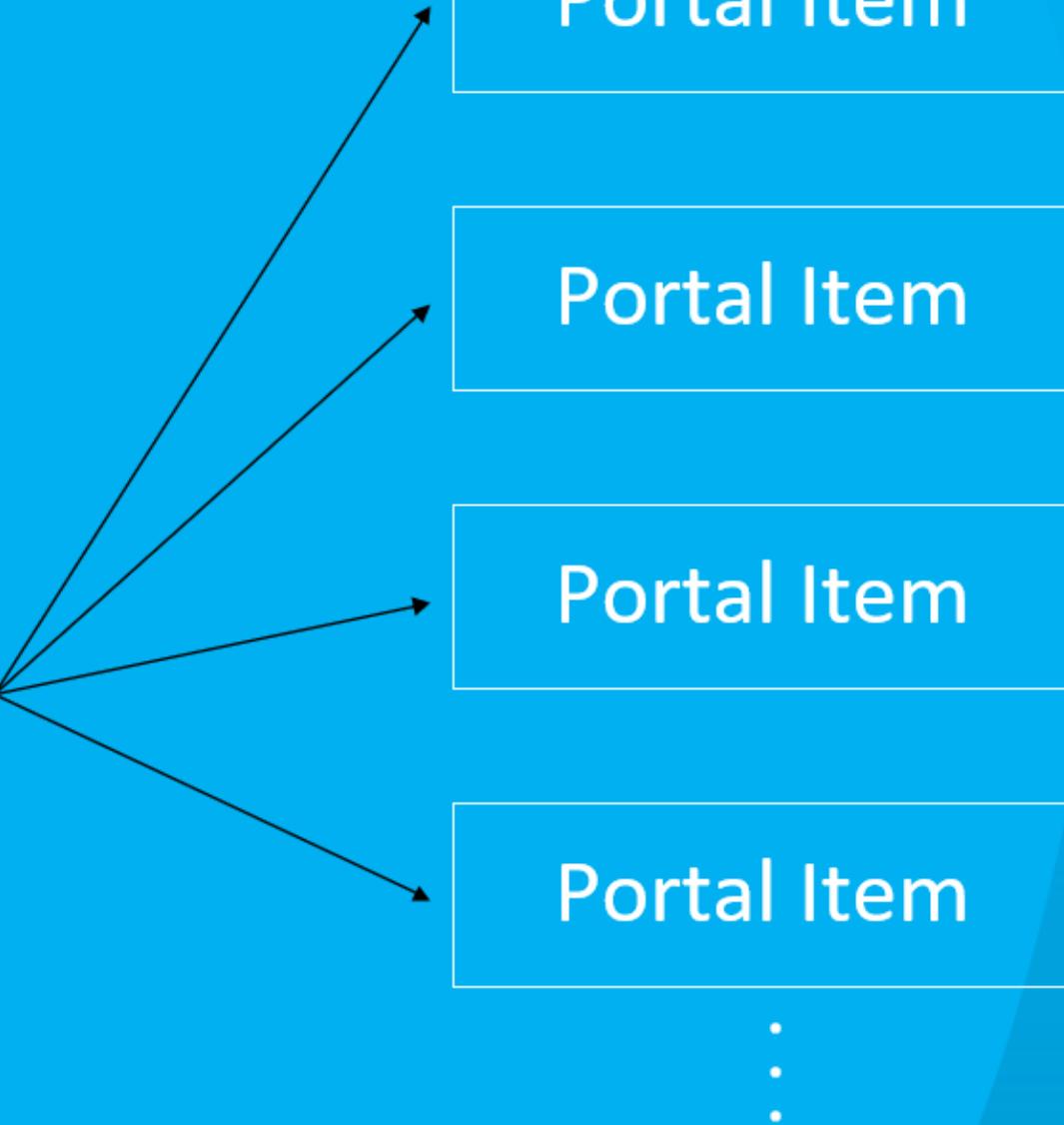
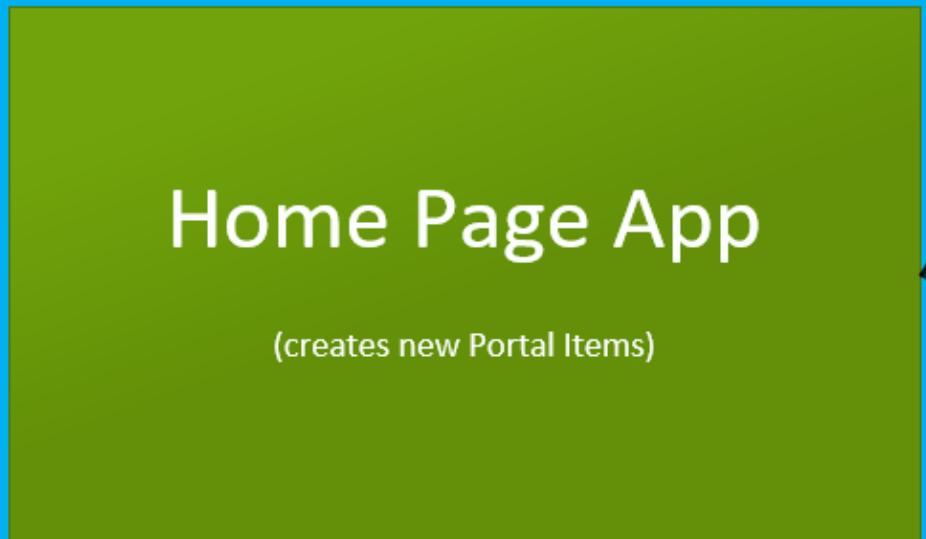
Create Web App dropdown

Share

Metadata

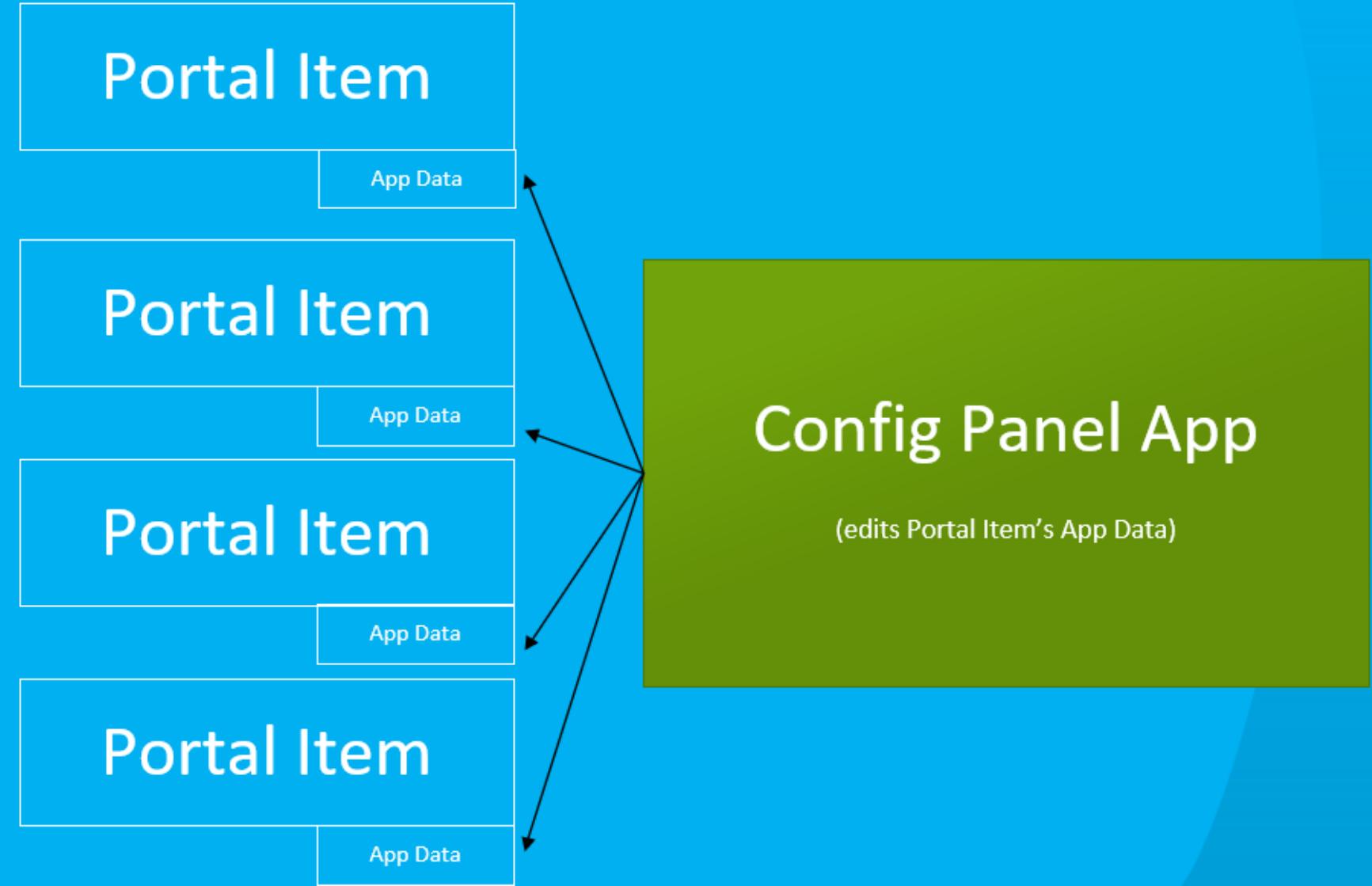


Instant Apps
Architecture



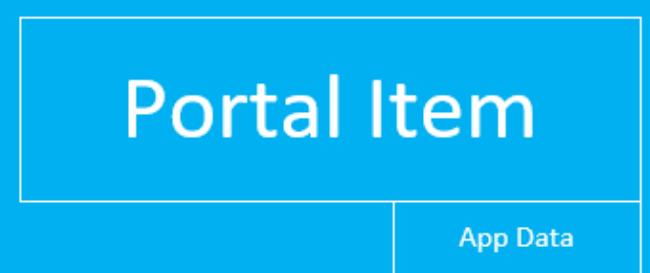


Instant Apps Architecture





Instant Apps Architecture



Nearby
Template

(reads Portal Item's App Data)

Sidebar
Template

(reads Portal Item's App Data)

Basic
Template

(reads Portal Item's App Data)

Technologies

```
const view = new View({  
  container: "view",  
  map: map,  
  environment: {  
    lightings: {  
      directShadowsEnabled: true  
    }  
  }  
})
```

```
const layer = view.map.allLayers.get("layer");  
view.whenLayerView(layer)  
.then((layerView) => console.log(layerView))  
// if there were problems with the layer  
.catch(console.error);
```

ReactJS

- JavaScript library for building user interfaces
- Virtual DOM
- JSX (JavaScript Syntax Extension)
- One-way data binding
- Manage state through `useState` and perform side effects with `useEffect`

TypeScript

- JavaScript with syntax for types
- Open-source programming language developed by Microsoft
- Superset of JavaScript
- Helps with code management
- Throws errors to catch issues earlier on in development

ArcGIS Maps SDK for JavaScript

- "ArcGIS Maps SDK for JavaScript to build compelling web apps that unlock your data's potential with interactive user experiences and stunning 2D and 3D visualizations."
- Integration
 - CDN
 - ESModules
- Portal, PortalItem, WebMap, WebScenes, MapView, SceneView, FeatureLayer, various widgets, and much more...
- Documentation

Calcite Components

- Visual language for products
 - Design guidelines
 - Color, spacing, typography
 - Graphic resources
 - Icons, symbols, Figma UI kit
 - Interactive documentation
 - Patterns & best practices
 - Documentation
- Web Components for Calcite Design System
 - 50+ web components
 - Easily build beautiful consistent apps

Calcite Components

Benefits

- Consistent UX
- Speed up development timelines
- Accessibility
- Web standards
- Framework integration

Calcite Components

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Instant Apps Components

- Web component library used in ArcGIS Instant Apps
- Calcite components
- ArcGIS Map SDK for JavaScript
- Easily import and implement functional UIs to perform a particular task
- [GitHub](#)

Web Components

- Custom elements
 - Browser-compatible events
 - Use native APIs
 - DOM element lifecycle
- Shadow DOM
 - Encapsulates component HTML & CSS
 - `<slot>` tag for distributing content
- StencilJS
 - "Stencil is a library for building reusable, scalable, Design systems."

```
<calcite-card>
  <h3 slot="title">Esri</h3>
  
  <span slot="subtitle">
    Esri is an international supplier of geographic information system software...
  </span>
</calcite-card>
```



```
const view = new SceneView({  
  container: "viewDiv",  
  map: map,  
  environment: {  
    lighting: {  
      directShadowsEnabled: true  
    }  
  }  
})
```



Instant Apps Demo

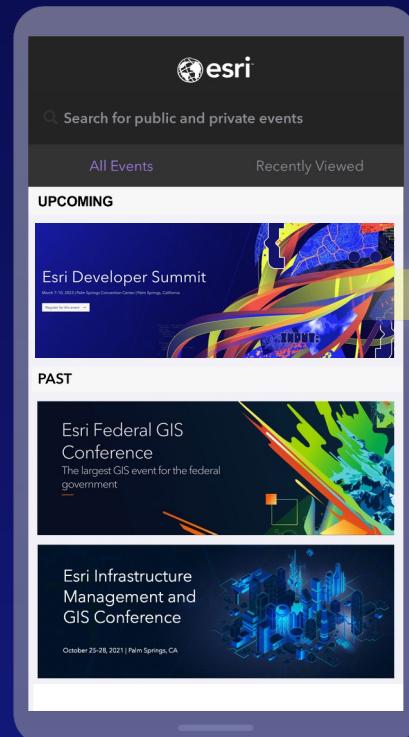
```
const layers = view.map.layers;  
const layerView = layers.getLayerView(0);  
  
layerView.on("change", () => {  
  const layer = layers.getLayer(0);  
  console.log(layer);  
});  
  
// If you try to interact with the layerView directly, like  
// layerView.setFeature(...), it will throw an error.  
// That's because the layerView is only valid while the layer  
// is visible in the scene view. Once the layer is no longer  
// visible, its layerView becomes invalid.
```

Resources

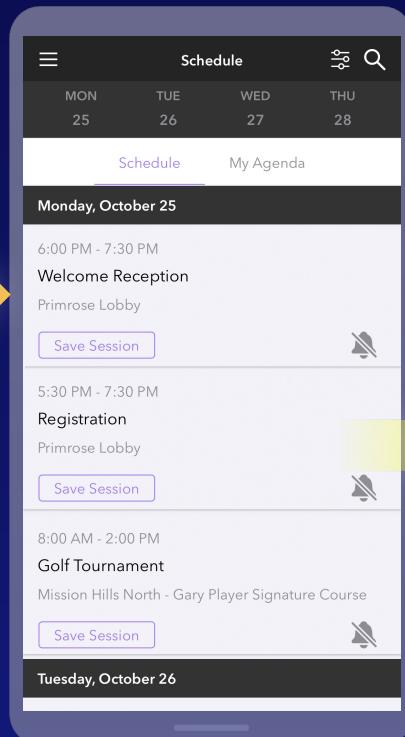
- ReactJS – [Create react app with TypeScript](#)
- [TypeScript](#)
- [ArcGIS Map SDK for JavaScript](#)
- [Calcite Components](#)
- [Instant App Components](#)
- [StencilJS](#)
- [ArcGIS Instant Apps](#)

Please Share Your Feedback in the App

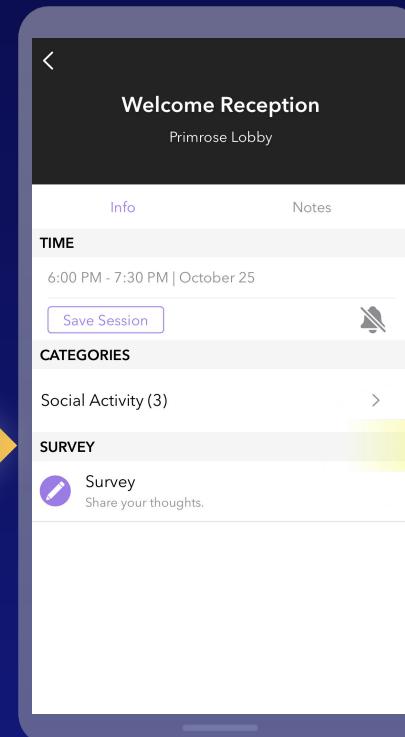
Download the Esri Events app and find your event



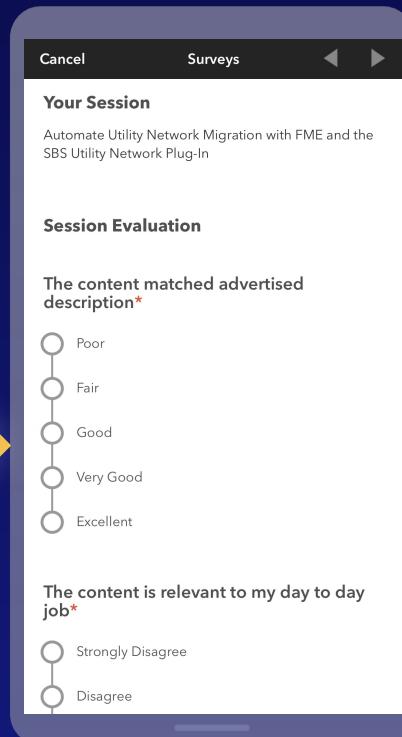
Select the session you attended



Scroll down to "Survey"



Log in to access the survey



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-  links.esri.com/DevVideos
-  github.com/Esri
-  github.com/EsriDevSummit
-  links.esri.com/EsriDevCommunity



Q&A

```
const view = new View({  
  container: "view",  
  map: map,  
  environment: {  
    lightings: {  
      directShadowsEnabled: true  
    }  
  }  
})
```

```
const layer = view.map.allLayers.get("layer");  
view.whenLayerView(layer)  
.then((layerView) => console.log(layerView))  
// if there were problems with the layer  
.catch(console.error);
```



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SCIENCE
OF
WHERE®

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```
const layer = view.map.addLayer(  
  view.whenLayerView(layer)   
    .then(layerView => const  
      {  
        if (there were problems)  
          catch(console.error);  
      }  
    );  
  );
```

E/SCRIPT>

LIVE
BY
THE
CODE