



Building Web Apps with ArcGIS Maps SDK for JavaScript & Calcite Design System

Julie Powell

Matt Driscoll

```
<arcgis-map zoom="4" center="-118,34">
  <arcgis-search position="top-right" />
</arcgis-map>
```

```
view.goTo({
  center: [-126, 49]
})
.catch(function(error) {
  if (error.name != "AbortError") {
    console.error(error);
  }
});
```

Calcite Design System

BUILD accessible, user-friendly, consistent apps
...with less effort!

The Calcite Design System is a comprehensive UI library designed to help you build accessible, user-friendly, and consistent applications with less effort. It features a wide range of UI components, including:

- Appearance:** Tools for setting transparency, color (Hex, RGB), and saved themes.
- Modals:** Danger Modal, Brand Modal, and a general modal for file operations.
- Alerts:** Brand Alert, Info Alert, Success Alert, and Danger Alert.
- Form Fields:** Tile Select, Input fields, and a large form section for mapping attributes.
- Tables:** A table component showing data for "Colorado Venues" with columns for "Name" and "Description".
- Calendars:** A calendar view for August 2022.
- Maps:** A map titled "The Red Rocks and Blue Water" showing Colorado.
- Search:** A search bar with placeholder "Search" and a dropdown menu.
- File Management:** A sidebar for "home_my_sandiego" showing "Application Data", "Project Data", and "List item label".
- Facility:** A section for managing facility layers, including "Add layer from URL", "Add layer from file", "Create Sketch layer", and "Create Route layer".
- Scenes:** A sidebar for "Scenes" with sections for "Apps", "Tools", and "Notebooks".
- Contact Us:** A "Contact Us" button.
- Sort by:** Options for "Relevance", "Date Modified", "Title", and "Sort direction" (Least recent or Most recent).
- Brand Notice:** A notice about working securely with other organizations.
- Info Notice:** A notice about switching between map layers.
- Success Notice:** A notice about urban planning.
- Danger:** A danger notice with a link.

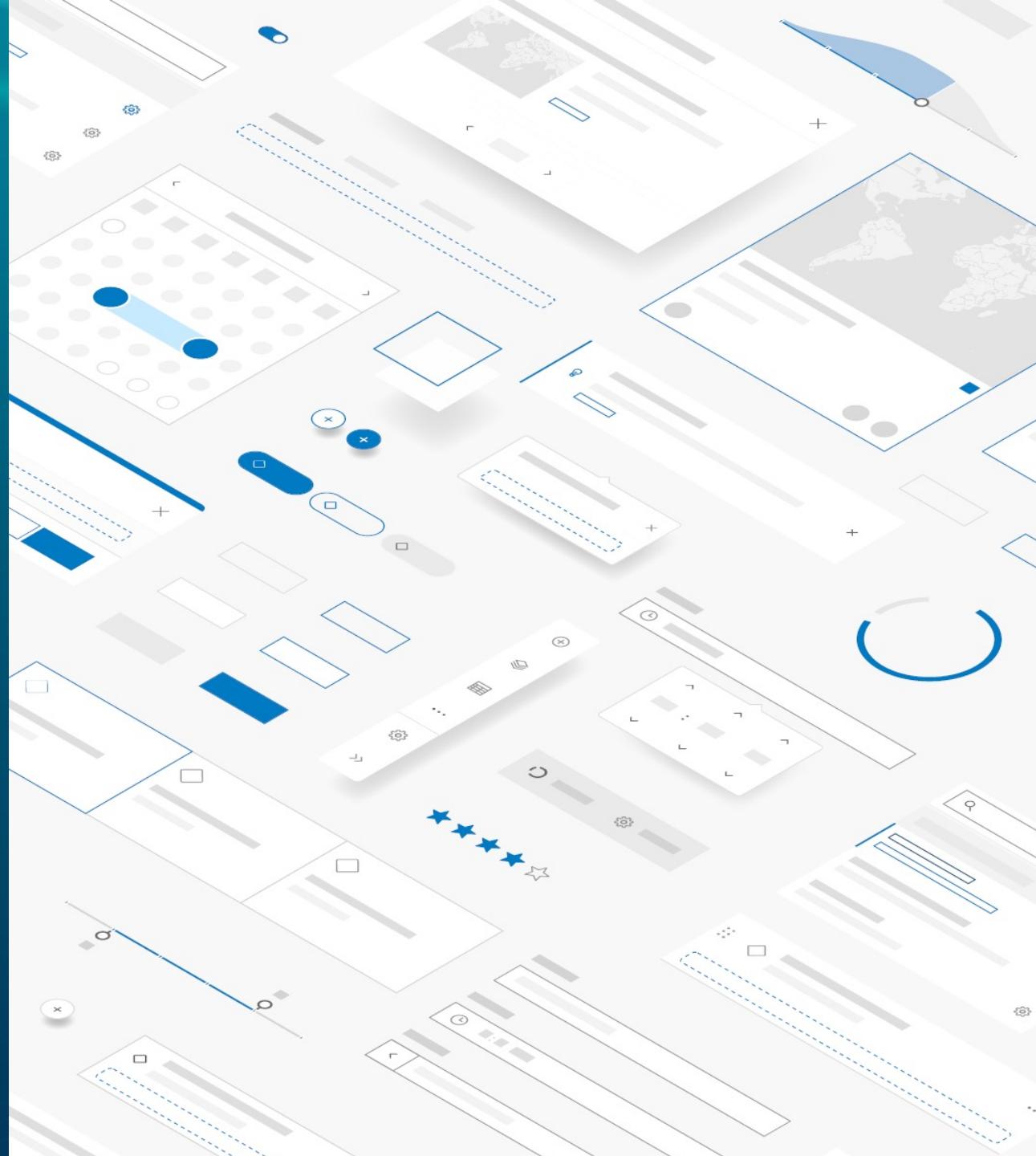
The interface is highly customizable, with sections for "Whole layer" and "Feature-specific" styling, and a "Transparent" section for advanced styling options. The right sidebar provides navigation and search functionality, making it easy to find specific components or documentation.

Calcite Design System

- Web components
- Color & themes, typography, accessibility, icons
- Figma Web UI Kit
- Design guidelines & best practices, tutorials, component sample playground

FOR BUILDING...

User-friendly, accessible, responsive,
consistent apps



Consistent experiences across ArcGIS

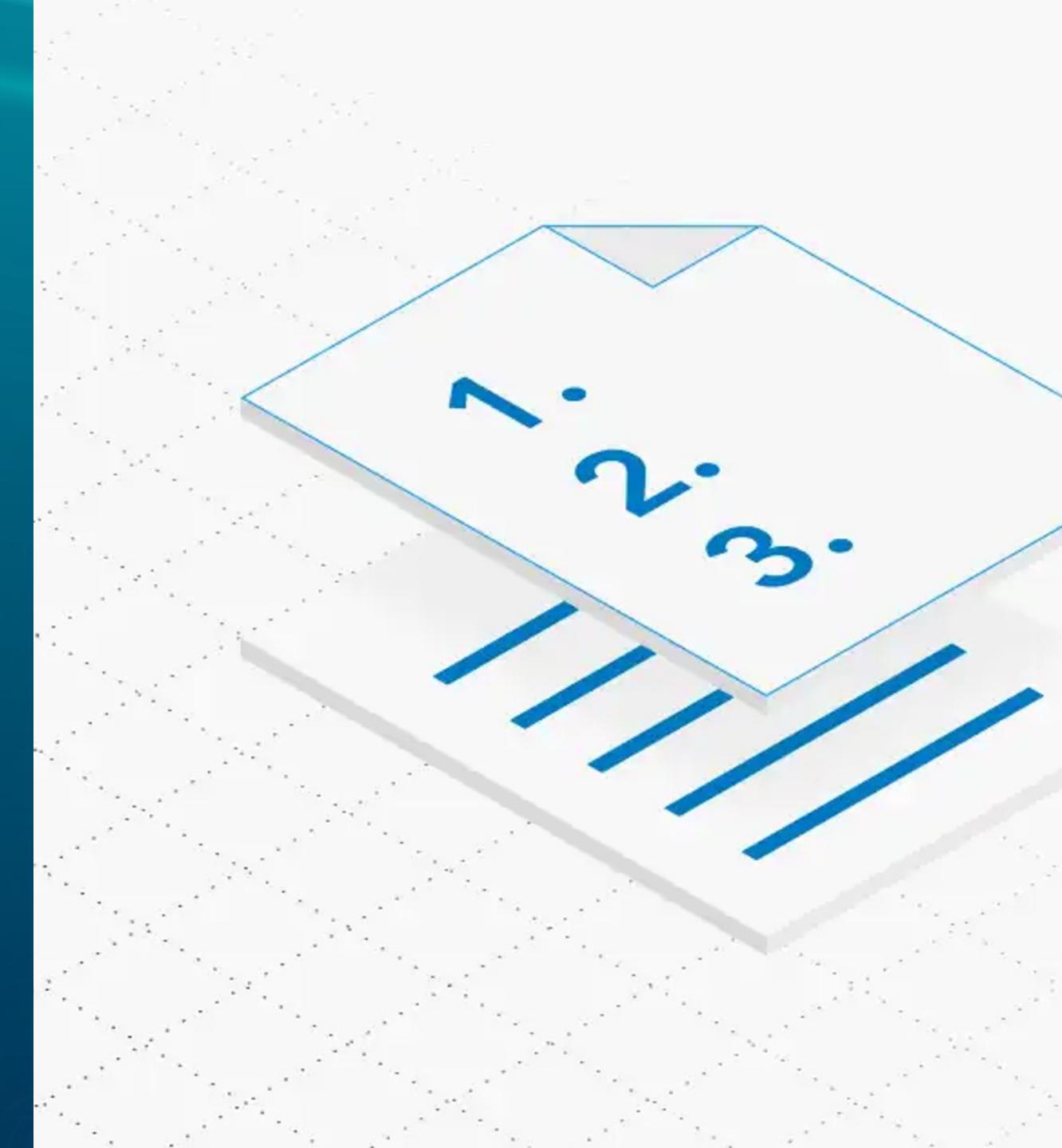
The image displays two side-by-side screenshots of ArcGIS interfaces, illustrating a consistent user experience across different platforms.

Left Screenshot: A map titled "air quality" showing air quality conditions across Europe and North Africa. The map uses colored circles to represent data points, with colors ranging from light blue to red. The interface includes a left sidebar with options like "Map properties", "Background", "Map view", "Preserve map scale", and "Time". The main map area shows a satellite view of the continent. A top navigation bar includes "Open in Map Viewer Classic", user profile "Julie Powell", and a "Properties" panel. A modal window titled "Configure Interactive Legend: 10.3 Search Configuration Development" is open, showing a world map with various global power plants and their fuel types.

Right Screenshot: A search results page titled "10.3 Search Configuration Development". It shows a world map with numerous colored dots representing power plants categorized by fuel type. The legend on the right lists four categories: "Hydro" (red), "Solar" (blue), "Wind" (green), and "Gas" (purple). The top navigation bar includes "Open in Map Viewer", "Recent Conditions in Air Quality", and user profile "Ryan Libed". The bottom of the screen shows the Esri logo and "Powered by Esri".

Agenda

- Quick tour
- How web components work
- Layout
- Building apps with Calcite & ArcGIS Maps
SDK for JavaScript
- Resources
- Q&A



Quick Tour (part 1)



Julie

Web Components

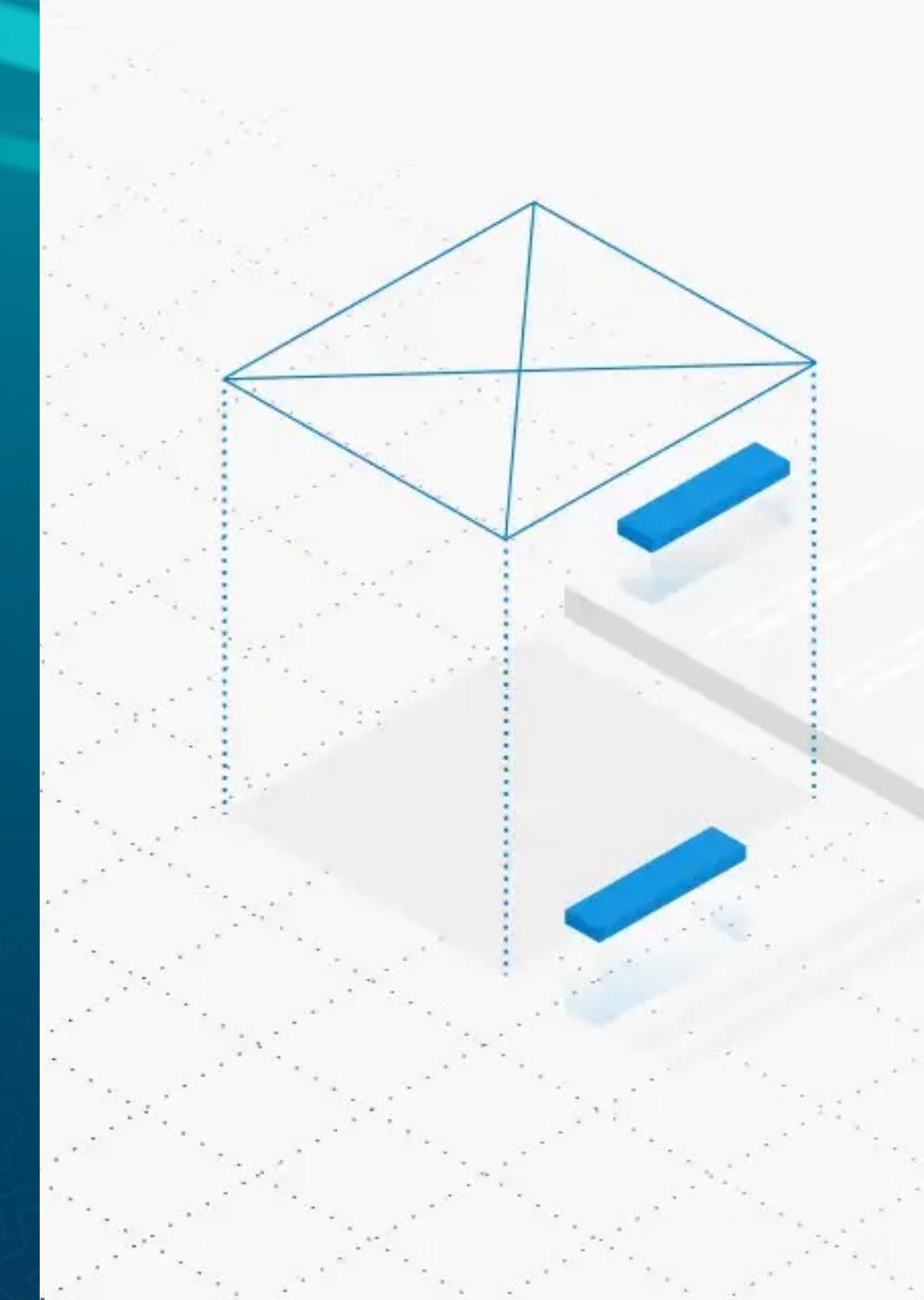


Matt

What are Web Components?

Suite of different technologies (web standards)

- Create custom Element
 - Define custom UI
 - Define custom behavior
 - Attributes, properties, methods, events & styles
(css vars)
 - Reusable
- Custom element is registered on the document
 - Extends *HTMLElement*
 - *<my-custom-element>*
- Utilize them in your web apps



Why Web Components?

Benefits of using web components

- Web Standards (W3C Spec)
- Supported by modern browsers
- Developer familiarity – HTML/JS
- Encapsulation
 - Functionality and styling
 - Shadow DOM
- Framework agnostic
 - Can be used in any framework

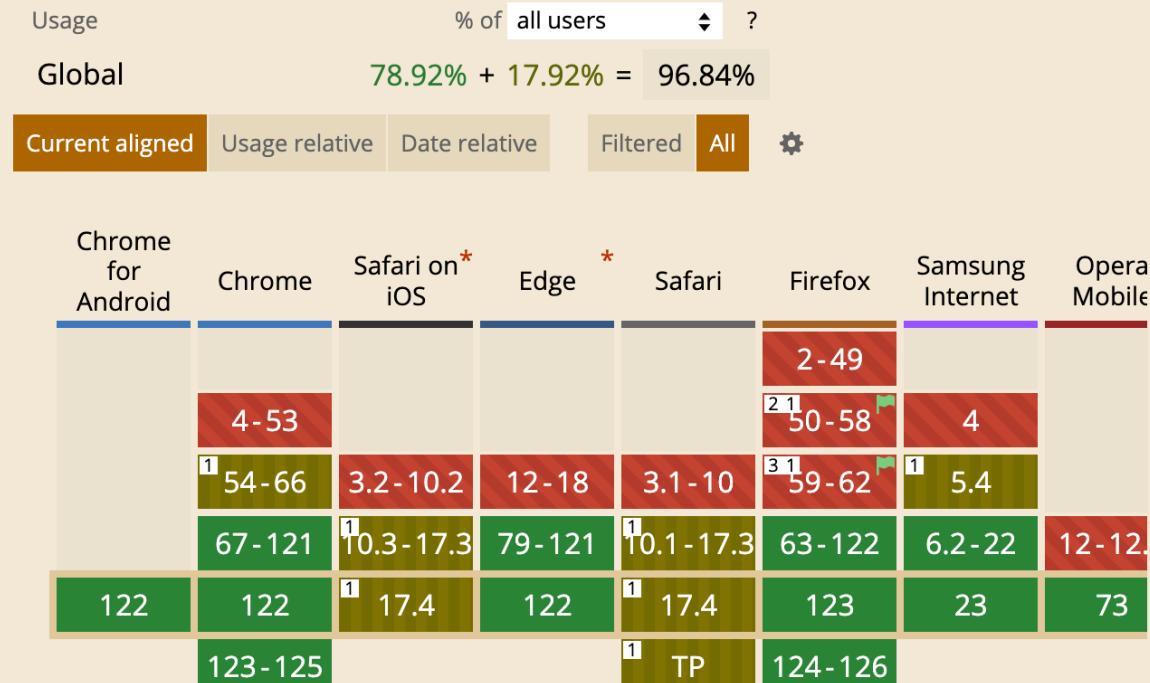
Custom Elements (V1)

≡ - LS



Limited availability across major browsers [?](#) [!](#)

One of the key features of the Web Components system, custom elements allow new HTML tags to be defined.



Notes

Test on a real browser

Known issues (0)

Resources (6)

Feedback

All major browser engines are working on implementing this spec.

Configuring Web Components

Component attributes, Properties, and methods

Attributes

```
<my-component my-prop="value" my-boolean-prop></my-component>
```

Properties and methods

```
const myComponent = document.querySelector("my-component");
myComponent.myProp = "value";
myComponent.myBooleanProp = true;
myComponent.myMethod();
myComponent.myComplexProp = { a: 1, b: 2 };
```

Configuring Web Components

Component slots

- The slot element represents a placeholder
 - Defined in shadow DOM of the component
- An element with a slot attribute
 - Assigned to the slot whose name matches
 - If no slot name, content goes into slot tag without a name

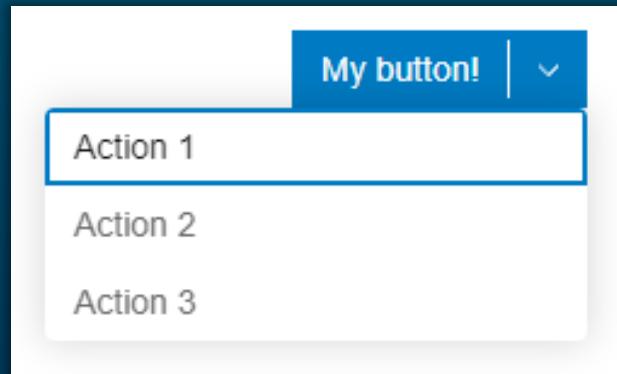
```
<!-- Placeholder in component -->
<slot name="mySlot"></slot>
```

```
<!-- Element slotted into component -->
<div slot="mySlot">Hello World</div>
```

Default Slots

For default content placement (default slot tag without a name)

```
<calcite-split-button primary-text="My Button!">
  <calcite-dropdown-group>
    <calcite-dropdown-item>Action 1</calcite-dropdown-item>
    <calcite-dropdown-item>Action 2</calcite-dropdown-item>
    <calcite-dropdown-item>Action 3</calcite-dropdown-item>
  </calcite-dropdown-group>
</calcite-split-button>
```



Named Slots

Customize specific regions

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



Esri

Esri is an international supplier of geographic
information system software...

Styling Web Components

Styling components using CSS Variables

```
<calcite-icon scale="l" icon="arcgis-online"></calcite-icon>
```



Customized Icon: [Documentation](#) | [Sample](#) | [Theming](#)

```
<style>
  calcite-icon {
    --calcite-ui-icon-color: green;
  }
</style>
```

```
<calcite-icon scale="l" icon="arcgis-online"></calcite-icon>
```



Web Components

Recap of web component core concepts

- Custom elements
 - Standards based
 - Framework agnostic
 - Encapsulated
- Configuring custom elements
 - Properties
 - Attributes
 - Slots
- Styling (CSS vars)
 - App
 - Components

Calcite taxonomy



Julie

Form / configuration

Radio
 Radio
 Checkbox

Switch

Slider

Text
Placeholder

Number
123

Combobox Label
Chip Chip Type to filter

Date
MM/DD/YYYY
April 2021

Button

TextArea
The quick brown fox jumped The quick brown fox jumped The quick brown fox jumped

Select
Placeholder

- Dropdown text

Not all components are shown.

Not all variations are shown.

Organizing

Panel
Summary

Block
Description

Editable & configurable content

Listitem
Description lorem ipsum

Listitem
Description lorem ipsum

Listitem
Description lorem ipsum

Accordion

Read only content

Card

This is the body of the card lorem

Jan 10, 2021

Messaging / onboarding

Notice
Body lorem ipsum

Alert
Body lorem ipsum

Modal

The quick brown fox jumped The quick brown

Button

Layout



Julie

Control the layout

It's all about slots

- Components library
- Example variations

ArcGIS Online: Gallery and Organization pages

A great example of a study description that might wrap to a line or two, but isn't overly verbose.

Card slots

Name	Description
default (unnamed)	A slot for adding subheader/description content.
footer-leading	A slot for adding a leading footer.
footer-trailing	A slot for adding a trailing footer.
subtitle	A slot for adding a card subtitle or short summary.
thumbnail	A slot for adding a thumbnail to the card.
title	A slot for adding a card title.

Branding your app

- Light/dark MODES
- Branding (theme)
- Fonts
- Component styles

Calcite Fun



Julie

Building Apps

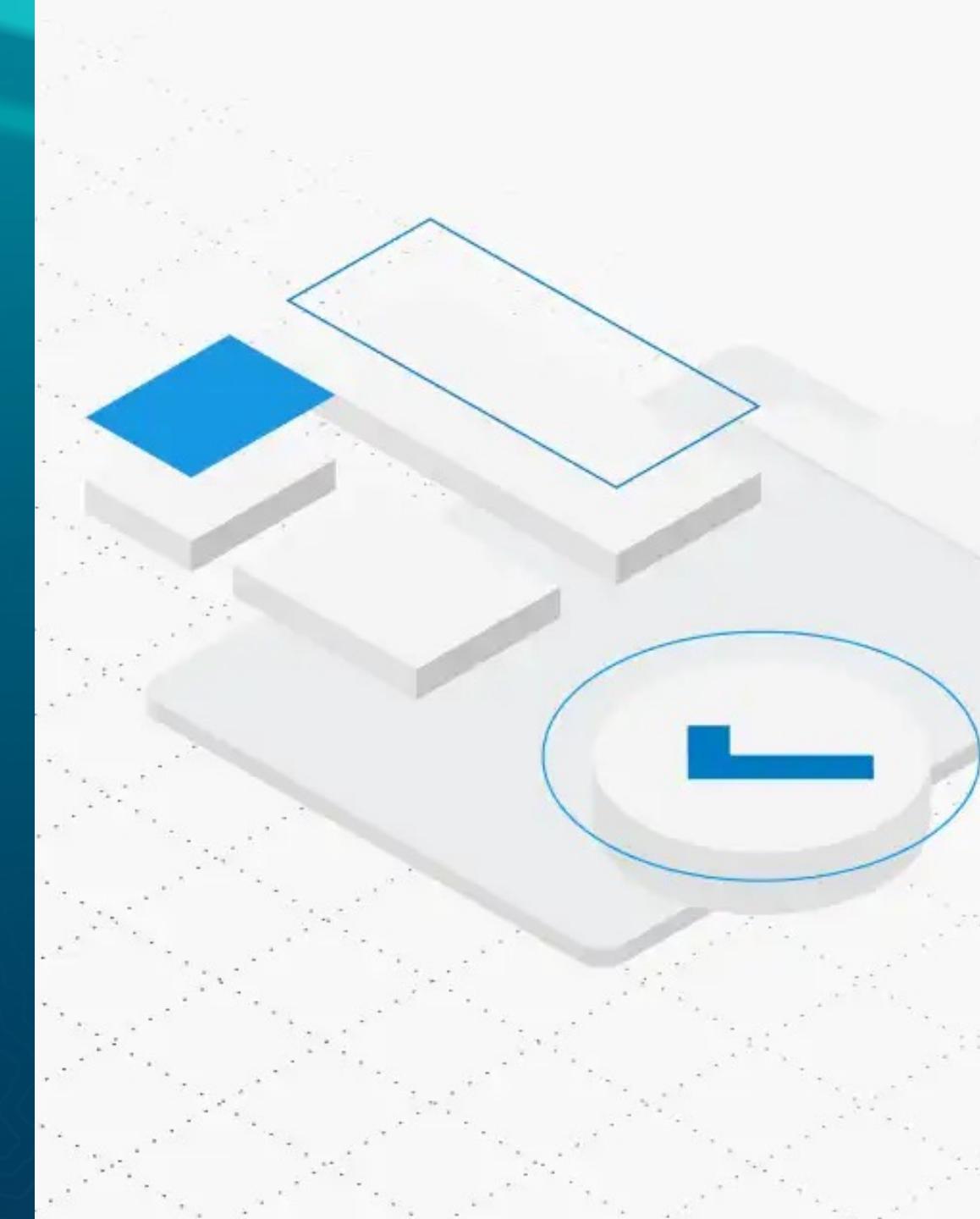


Matt

Building a Calcite app

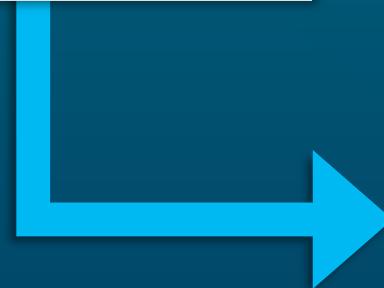
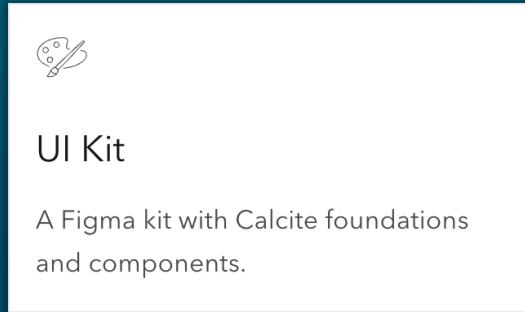
The process to create a Calcite app

- Idea 
 - App to view and filter universities
 - Use a web map and feature layers
- Start design using [Calcite UI Kit](#)
- Transfer design to
 - Calcite Components
 - HTML/JS



Initial Design and Layout

Using the Calcite UI Kit to create a University Finder app

The UniversityFinder application interface. It features a header with a graduation cap icon and the title "UniversityFinder". Below the header is a "Results" section showing four university entries: "Milan Institute-las Vegas", "South Florida State College", "Universal Technical Institute-auto Motorcycle & Marine Mechanics Institute Division-orlando", and "Finger Lakes Health College Of Nursing". Each entry includes the name, category, and enrollment range. To the right is a map of North America with大学 locations marked by green dots of varying sizes. A sidebar on the right contains a "Filters" section with dropdowns for "School type" (set to "All"), "Highest degree offered" (with options like "Associates", "Bachelor's", "Masters", "Doctorate", and "Post-graduate certificate"), and "In-betweenies". There are also sliders for "Enrollment range" (0 to 160,000) and a toggle switch for "Offers on campus housing".

UniversityFinder

Results

0 universities found within the map.

Milan Institute-las Vegas
Other Technical And Trade Schools
Under 1,000

South Florida State College
Junior Colleges
1,000 - 4,999

Universal Technical Institute-auto Motorcycle & Marine Mechanics Institute Division-orlando
Other Technical And Trade Schools
1,000 - 4,999

Finger Lakes Health College Of Nursing
Colleges, Universities, And Professional Schools
Under 1,000

Filters

Basics

School type

All

Highest degree offered

Associates Bachelor's Masters Doctorate Post-graduate certificate

In-betweenies

Enrollment range

0 160000

Housing

Offers on campus housing

Edmonton

Calgary

Vancouver

Seattle

San Francisco

Los Angeles

Denver

Chicago

Detroit

St. Louis

Atlanta

Dallas

Houston

Monterrey

Guadalajara

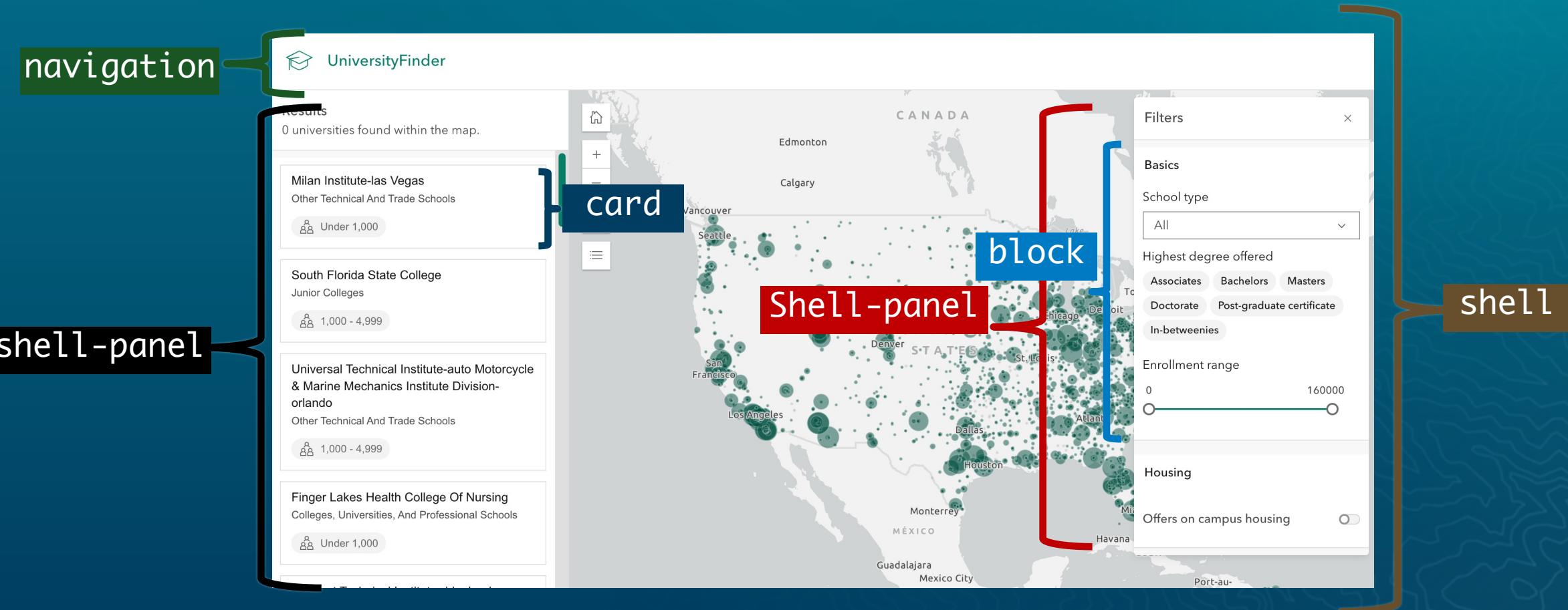
MéXICO

MEXICO City

Havana

Port-au-

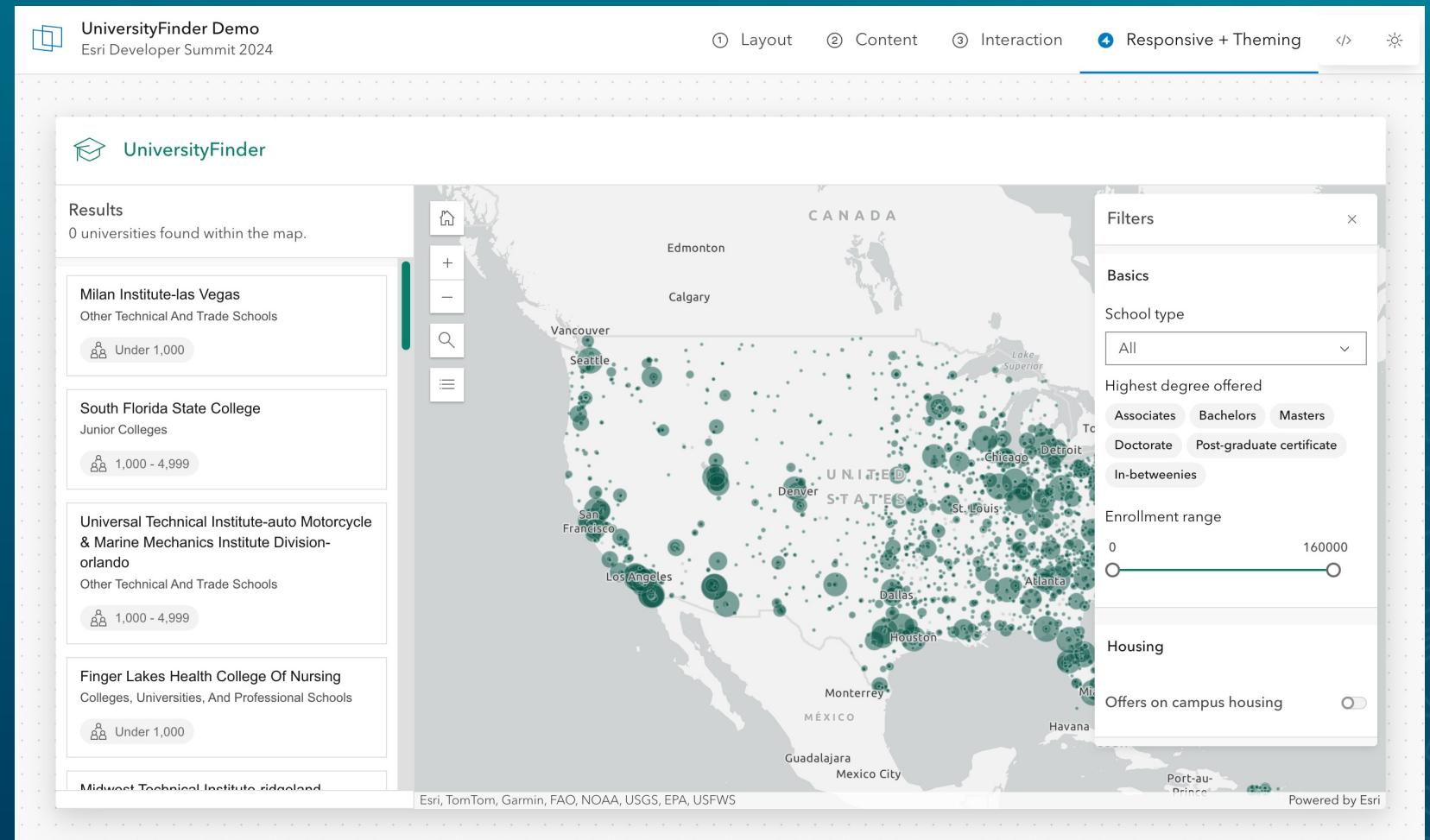
App Layout



Demo

Calcite app

- UniversityFinder App



Demo

JS Maps SDK's Feature Table & Calcite Table

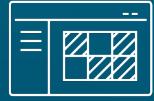
CollegesUniversities (Total: 646 | Selection: 646)

School Name	Enrollment	Website	City	State	Zip Code	Phone Number
California University of Manage...	0	www.calums.edu	Anaheim	CA	92801	(714) 533-3946

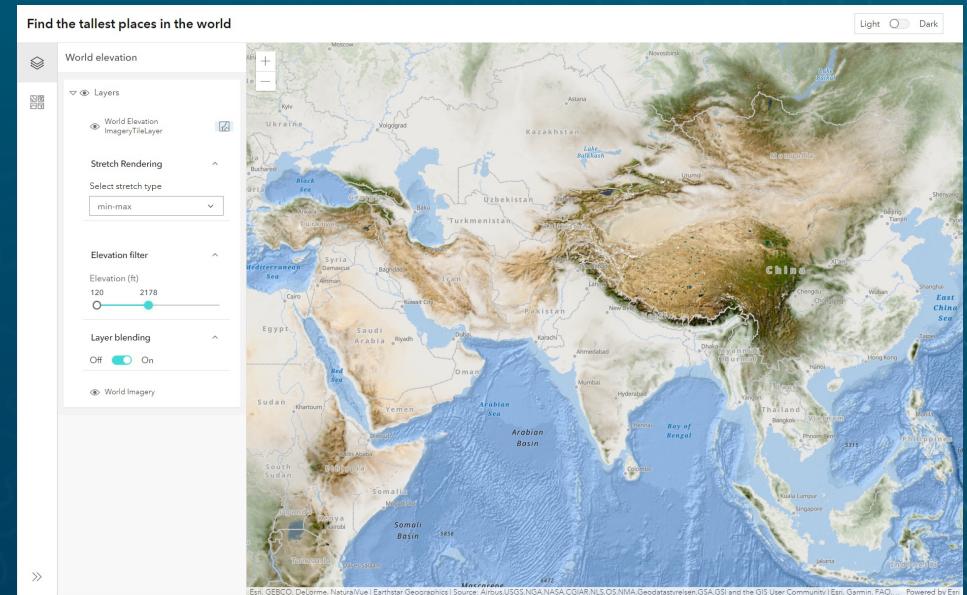
Plots

Plot	Sunny days (yearly)	Size (area in ft)	Fruits (yield in lbs)	Vegetables (yield in lbs)	
N-1A North zone	280	177	185	543	ult.aspx
N-1B North zone	236	132	954	312	Martinez
N-1C North zone	160	94	214	432	El Cajon
N-2A North zone	280	183	1,255	747	Inglewood
N-2B North zone	340	143	954	112	Panorama City
N-2C North zone	280	139	581	632	Panorama City
S-1A South zone	315	97	485	243	Los Angeles
S-1B South zone	220	301	2,154	1,912	Hollywood
S-1C South zone	230	80	214	252	Sacramento
Total All Plots	260 average	1,346	6,996	5,182	Martinez

Using Calcite in JS Maps SDK UI Components

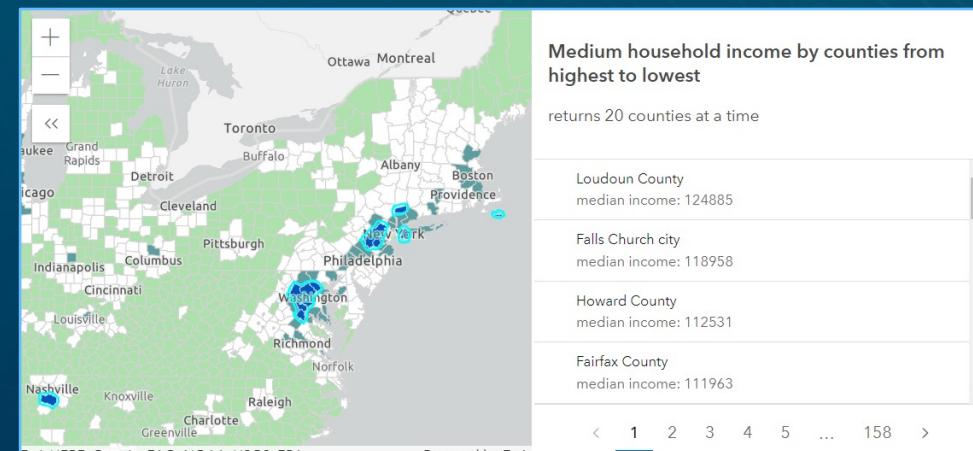
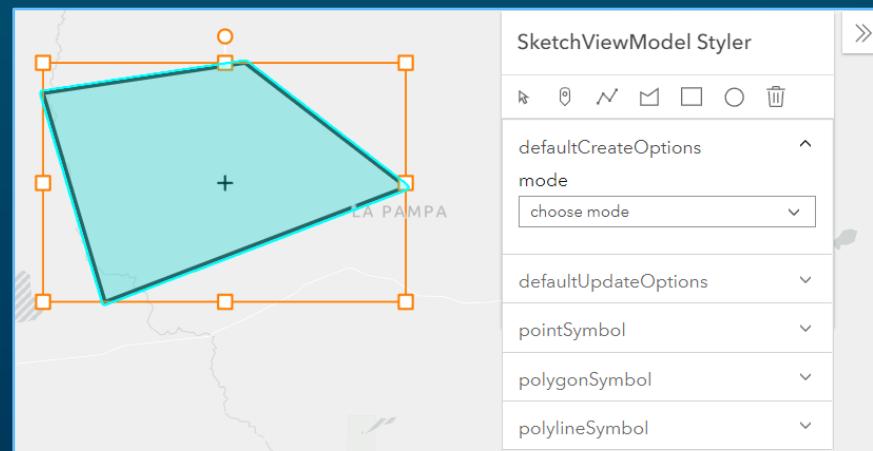
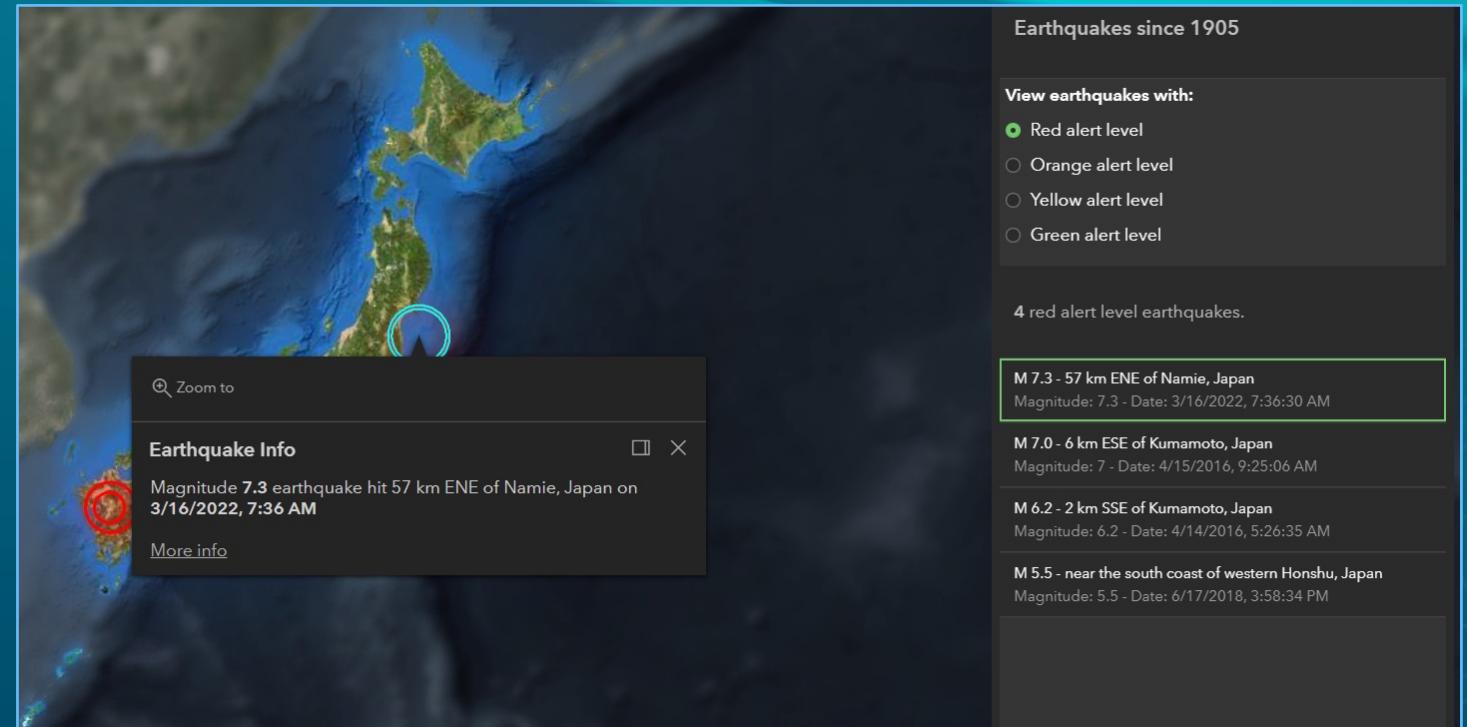
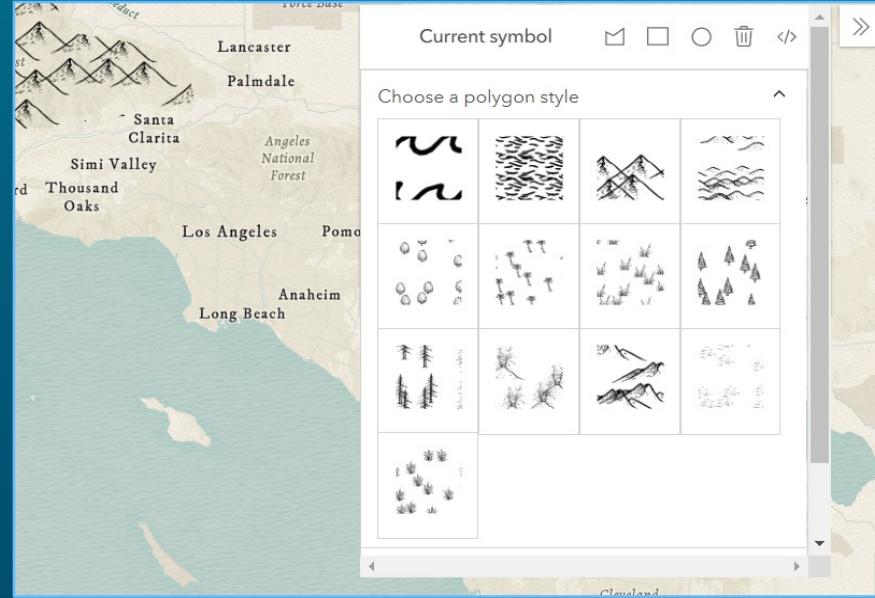


Julie Powell



JS SDK Samples use Calcite

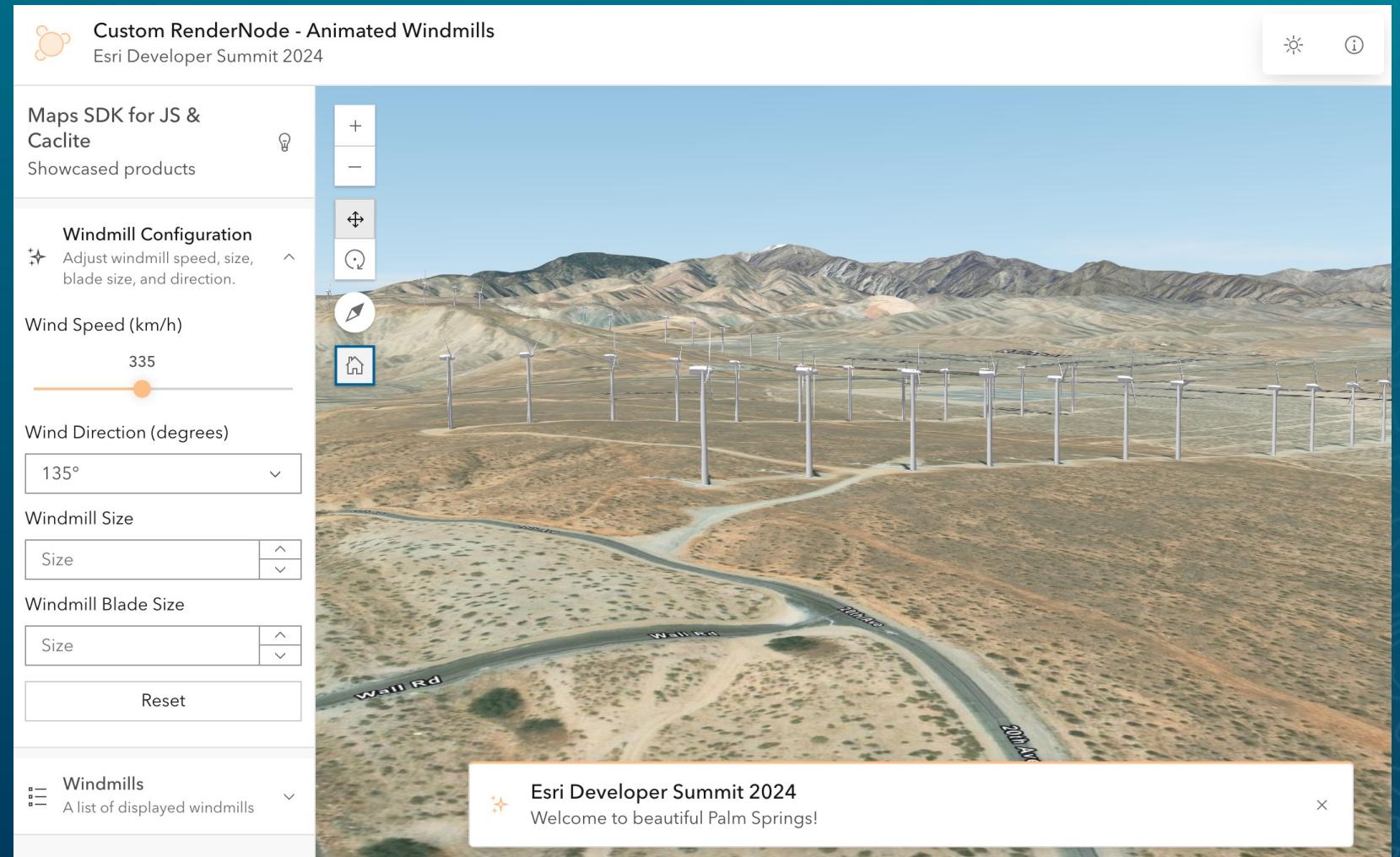
Search for “Calcite components”



Demo

Calcite app from sample

- Custom RenderNode Sample
- Windmills App



Calcite & JavaScript Maps SDK videos

Calcite

<https://esriurl.com/calcite-videos>

The screenshot shows the 'Calcite Design System' channel page. At the top, there's a brief description: 'Calcite Design System is a collection of design and development resources for creating beautiful, easy to use, cohesive experiences across apps with minimal effort.' Below this, there are links to 'Documentation', 'YouTube', 'Twitter', and 'GitHub'. The main content area shows a grid of video thumbnails. One thumbnail is highlighted, showing a woman speaking at a podium with the text 'Build Beautiful Web Apps Faster'. Other thumbnails include 'ArcGIS API for JavaScript: Build a custom UI for API widgets' and 'Calcite Design System: Design & Build Web Apps'.

JavaScript Maps SDK

<https://esriurl.com/js-sdk-videos>

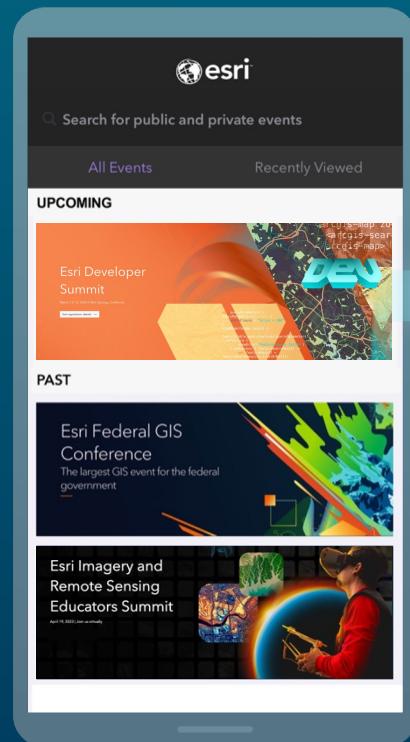
The screenshot shows the 'ArcGIS API for JavaScript' channel page. The top section features a dark banner with the text 'Build compelling web apps that unlock your data's potential with interactive user experiences and stunning 2D and 3D visualizations.' Below the banner, there are links to 'Documentation', 'YouTube', 'Twitter', and 'GitHub'. A 'Products Channel' button is visible. The main content area shows a grid of video thumbnails. One thumbnail is highlighted, showing a man speaking at a podium with the text 'ArcGIS API for JavaScript'. Other thumbnails include 'The New Animated Flow Renderer' and 'Web Editing'.

Additional resources

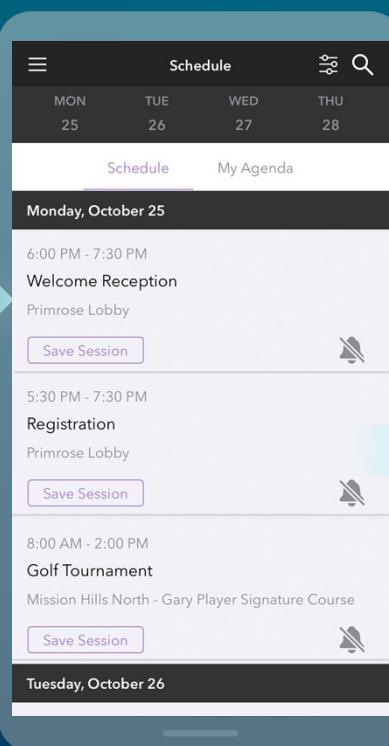
- <https://developers.arcgis.com/calcite-design-system/>
- <https://developers.arcgis.com/calcite-design-system/resources/ui-kit/>
- <https://github.com/Esri/calcite-components/>
- <https://npmjs.com/package/@esri/calcite-components>

Please Share Your Feedback in the App

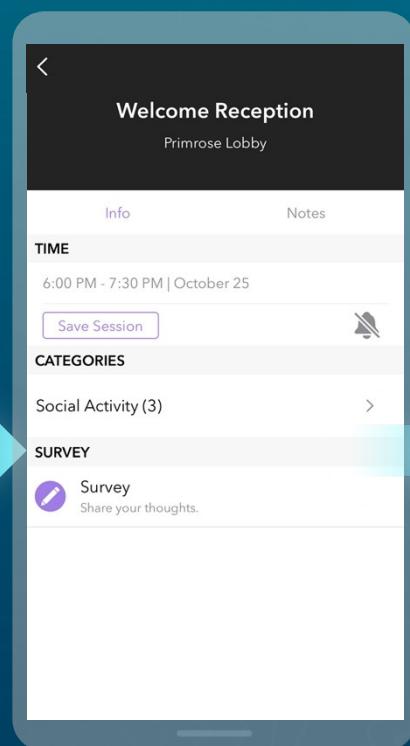
Download the Esri Events app and find your event



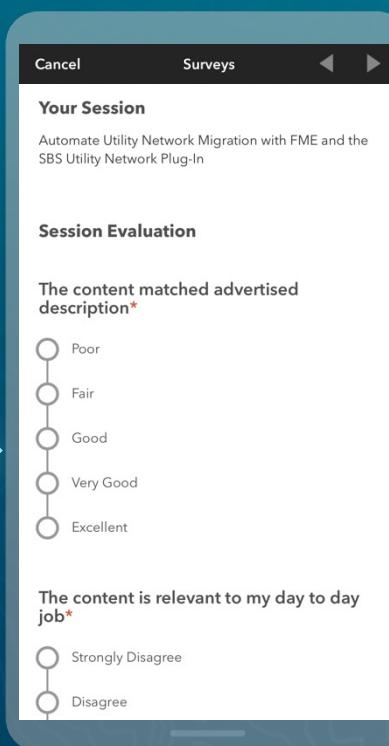
Select the session you attended



Scroll down to "Survey"



Log in to access the survey



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-  links.esri.com/EsriDevCommunity

```
<arcgis-map zoom="4" center="-118,34" />  
  
view.goTo({  
  center: [-126, 49]  
})  
.catch(function(error) {  
  if (error.name != "AbortError") {  
    console.error(error);  
  }  
});
```

```
// show the compass and pass the  
mapRotation state data  
Compass(rotation = mapRotation)  
    // reset the ComposableMapView's viewpoint  
rotation to point north using the  
mapViewModel  
    mapViewModel.setViewpointRotation(0.0)  
}
```



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OF
WHERE®

```
const layerList = new LayerList({  
    view: view  
});  
  
// Add widget to the top right corner  
// of the view  
view.ui.add(layerList, "top-right")  
  
<arcgis-map zoom="4" center="-118,34"
```



esriurl.com/2024-ds-calcite-apps

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