Practical Guide for Building a 3D Web App from 2D Data

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Palm Springs, CA

Kristian Ekenes

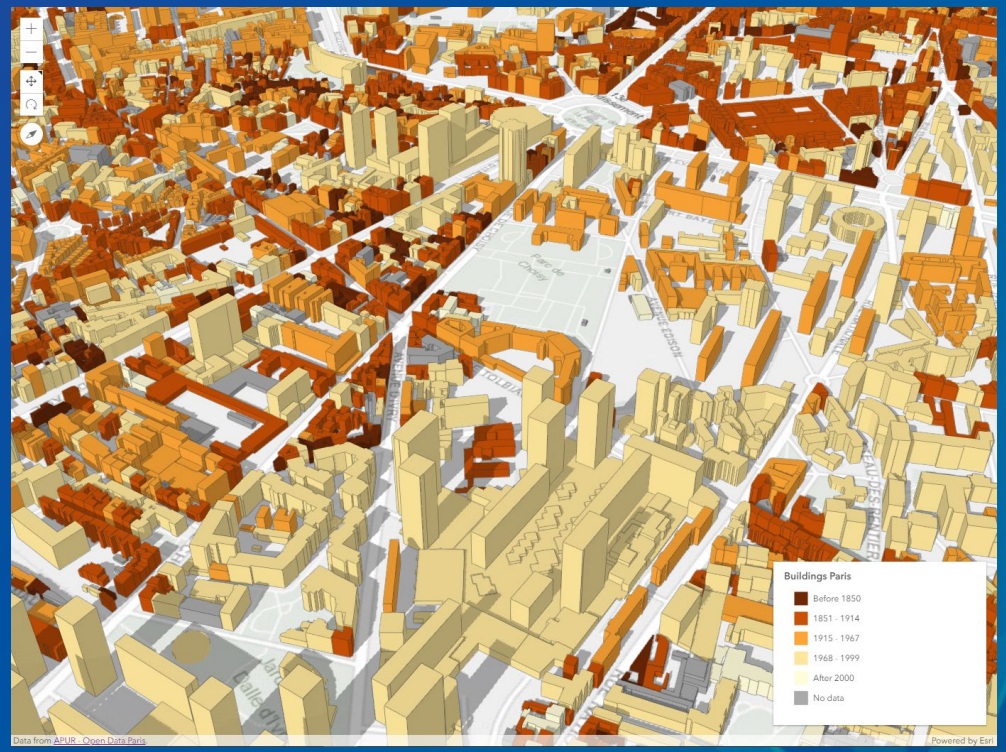
- Product Engineer JS API
- Data visualization, Smart Mapping, Arcade
- Redlands, California

Raluca Nicola

- Product Engineer JS API
- Data visualization, 3D
- Zurich, Switzerland

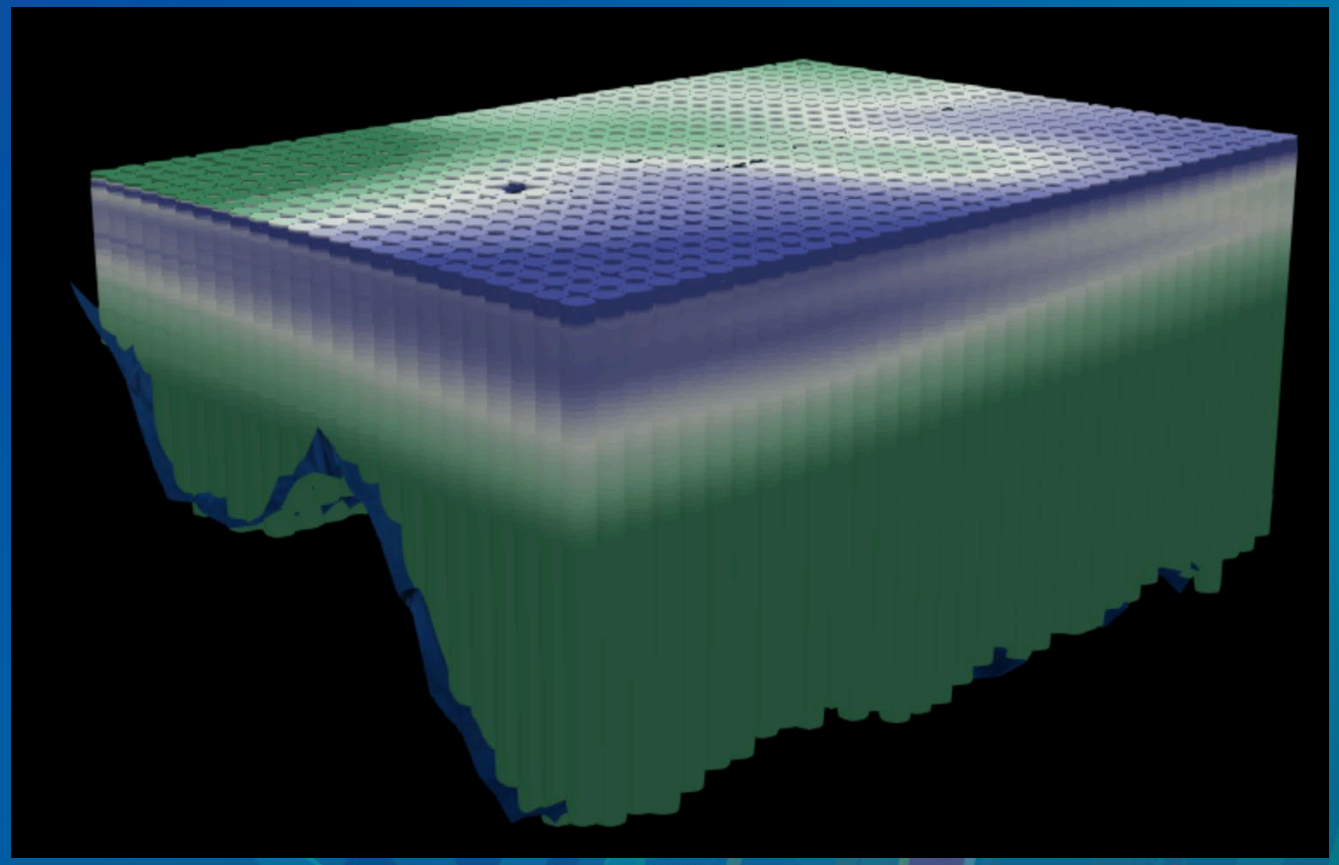
You will learn

how to create city visualizations



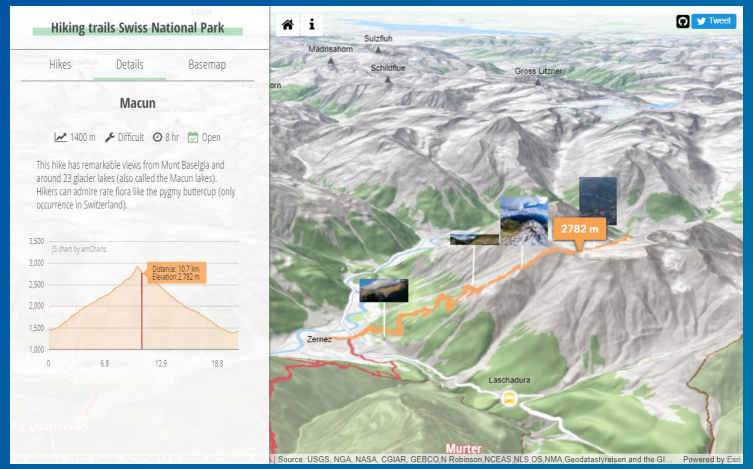
using polygon extrusion and web styles

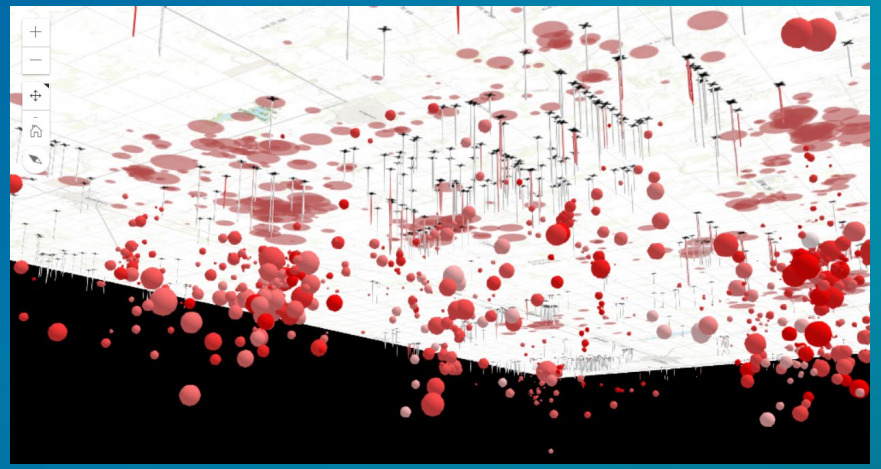
how to visualize scientific data

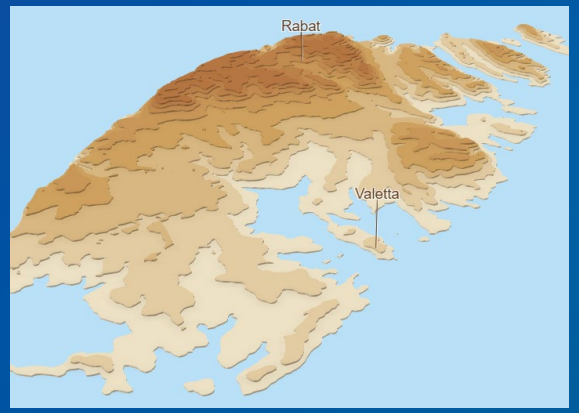


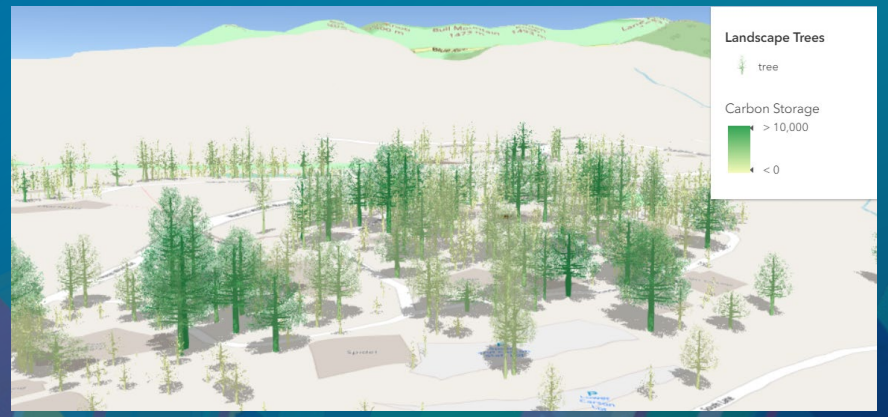
using z values from attributes

and some other examples









Marine data analysis

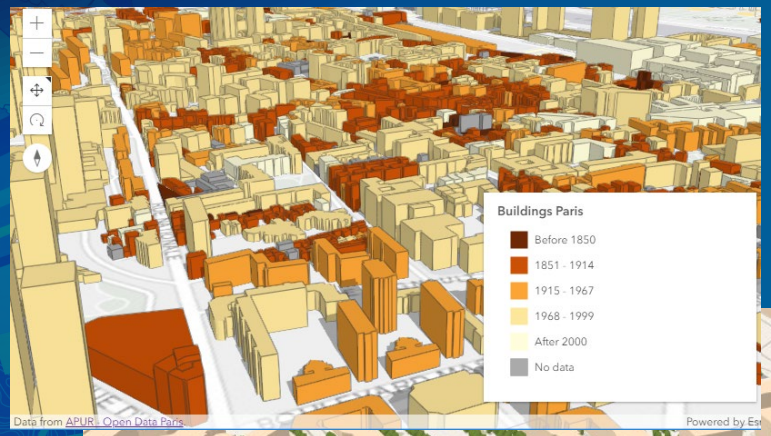
15 min

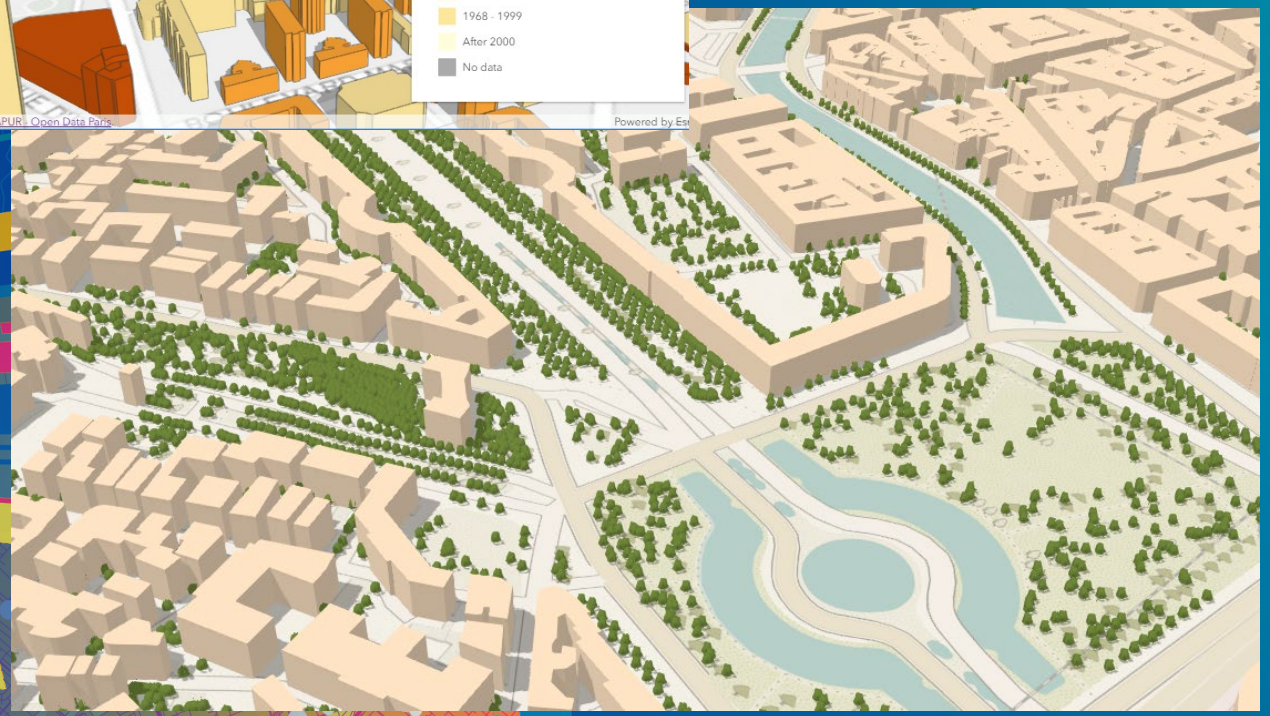
City visualizations

15 min

Other visualizations

20 min





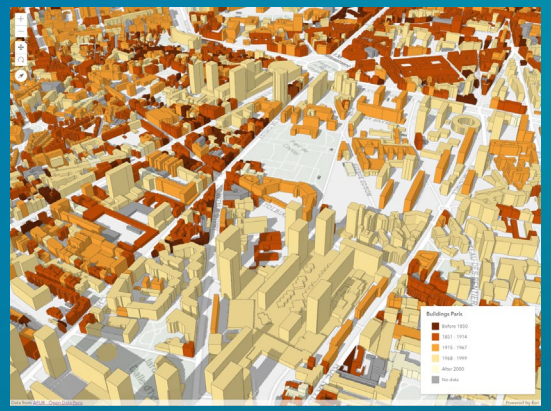
City visualizations

Cities in Romania – using OSM data
Paris – using open data

Resources

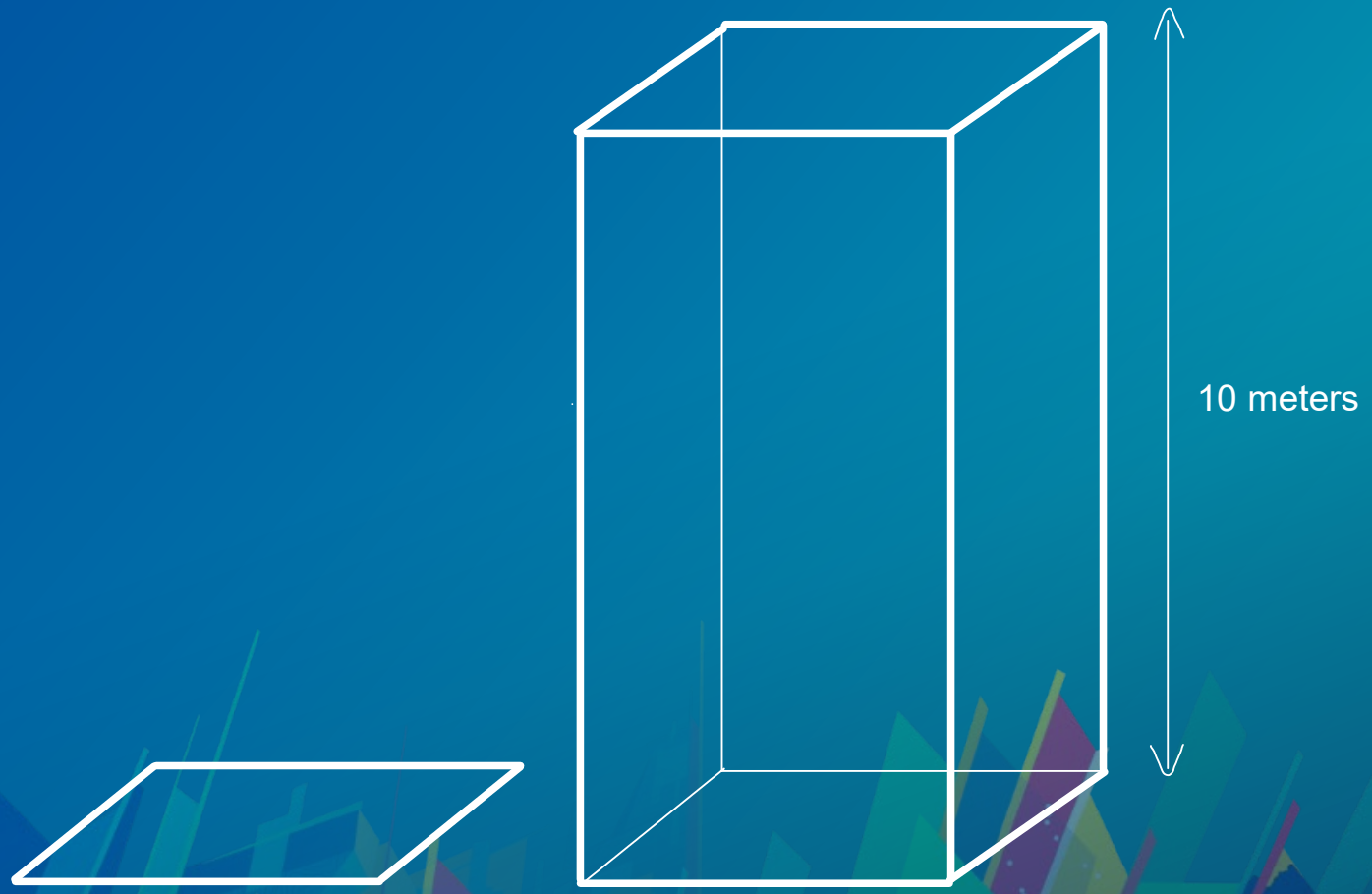
- OpenStreetMap – building footprints & trees
- Open Data portals – building footprints
- ESRI basemaps & elevation services
- ESRI Web Styles

ArcGIS API for JavaScript →



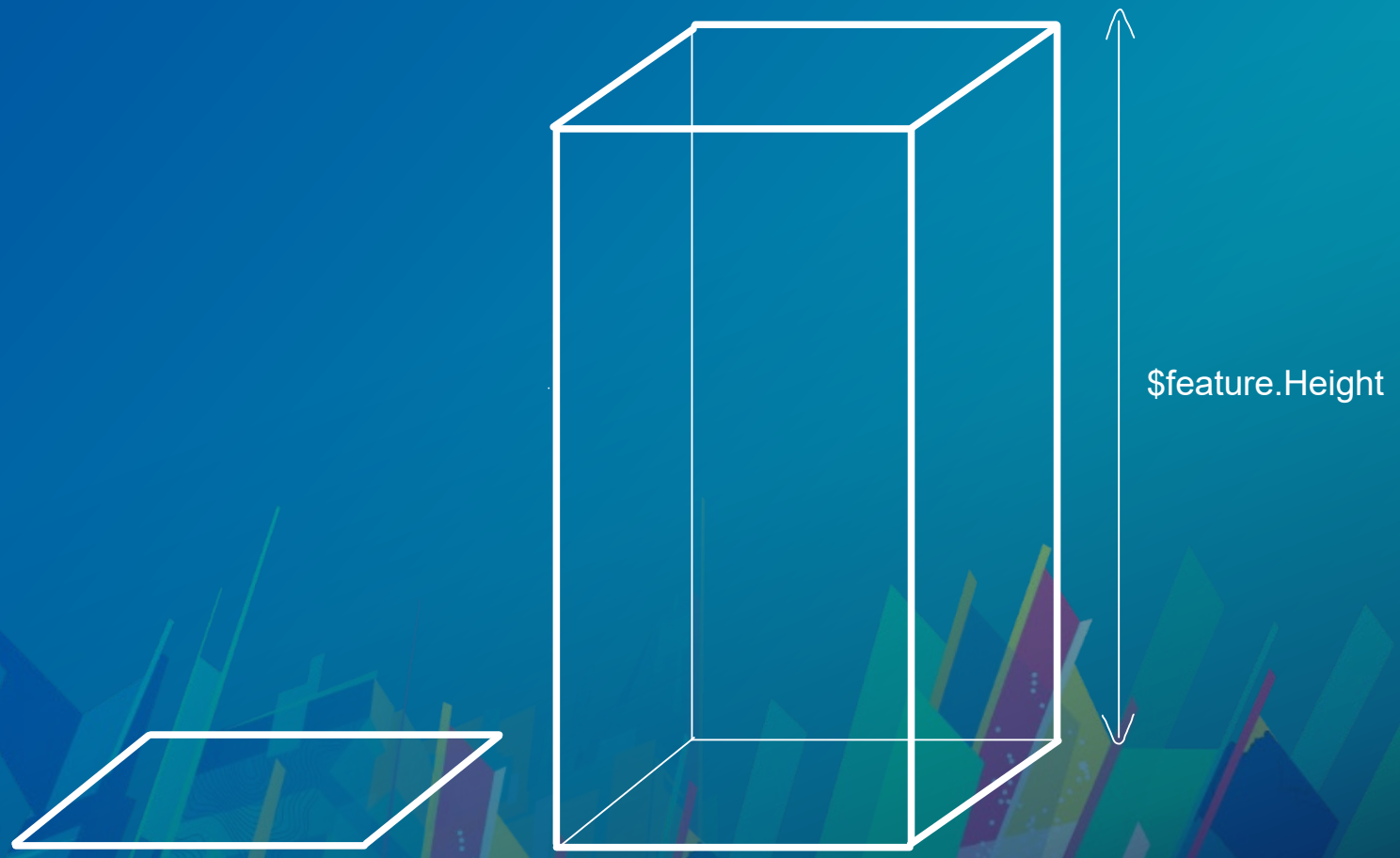
Building footprint extrusion

```
const renderer = {
  type: "simple",
  symbol: {
    type: "polygon-3d",
    symbolLayers: [{
      type: "extrude",
      material: {
        color: "#FEE79B"
      },
      size: 10
    }]
  }
}
```



Building footprint extrusion

```
const renderer = {
  type: "simple",
  symbol: {
    type: "polygon-3d",
    symbolLayers: [{
      type: "extrude",
      material: {
        color: "#FEE79B"
      }
    }]
  },
  visualVariables: [{
    type: "size",
    field: "Height",
    valueUnit: "meters"
  }]
}
```



3D models – WebStyleSymbols

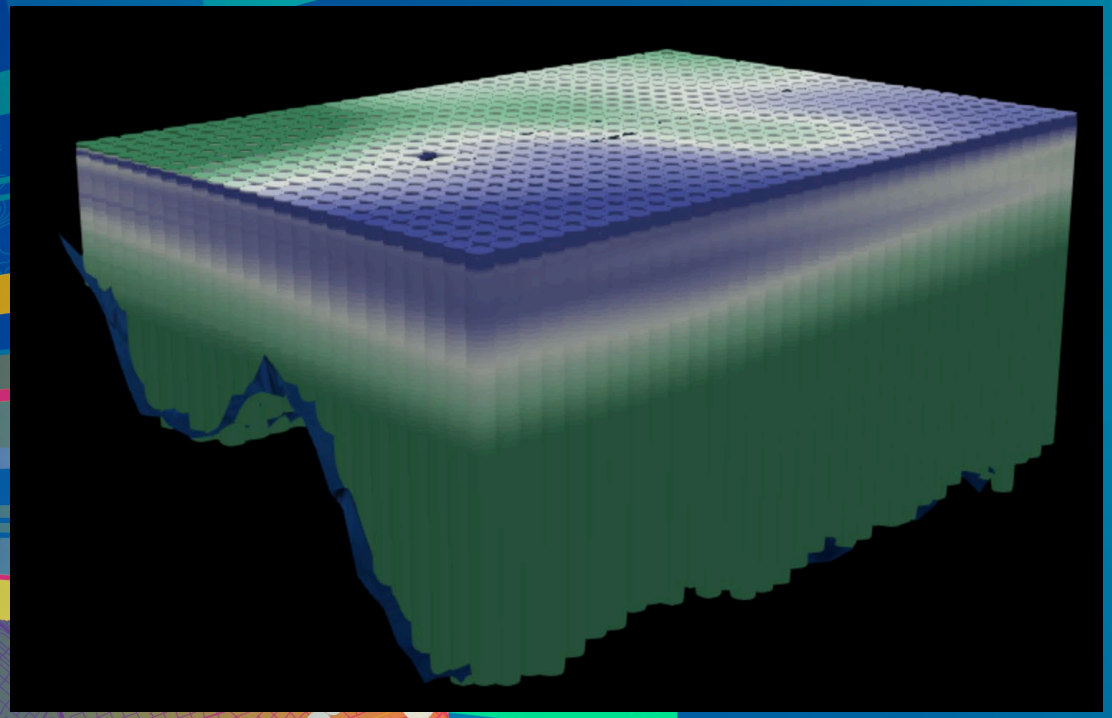
```
const renderer = {
  type: "simple",
  symbol: new WebStyleSymbol({
    "styleName": "EsriRealisticTreesStyle",
    "name": "Frangula"
  })
}
```

3D models - glTF

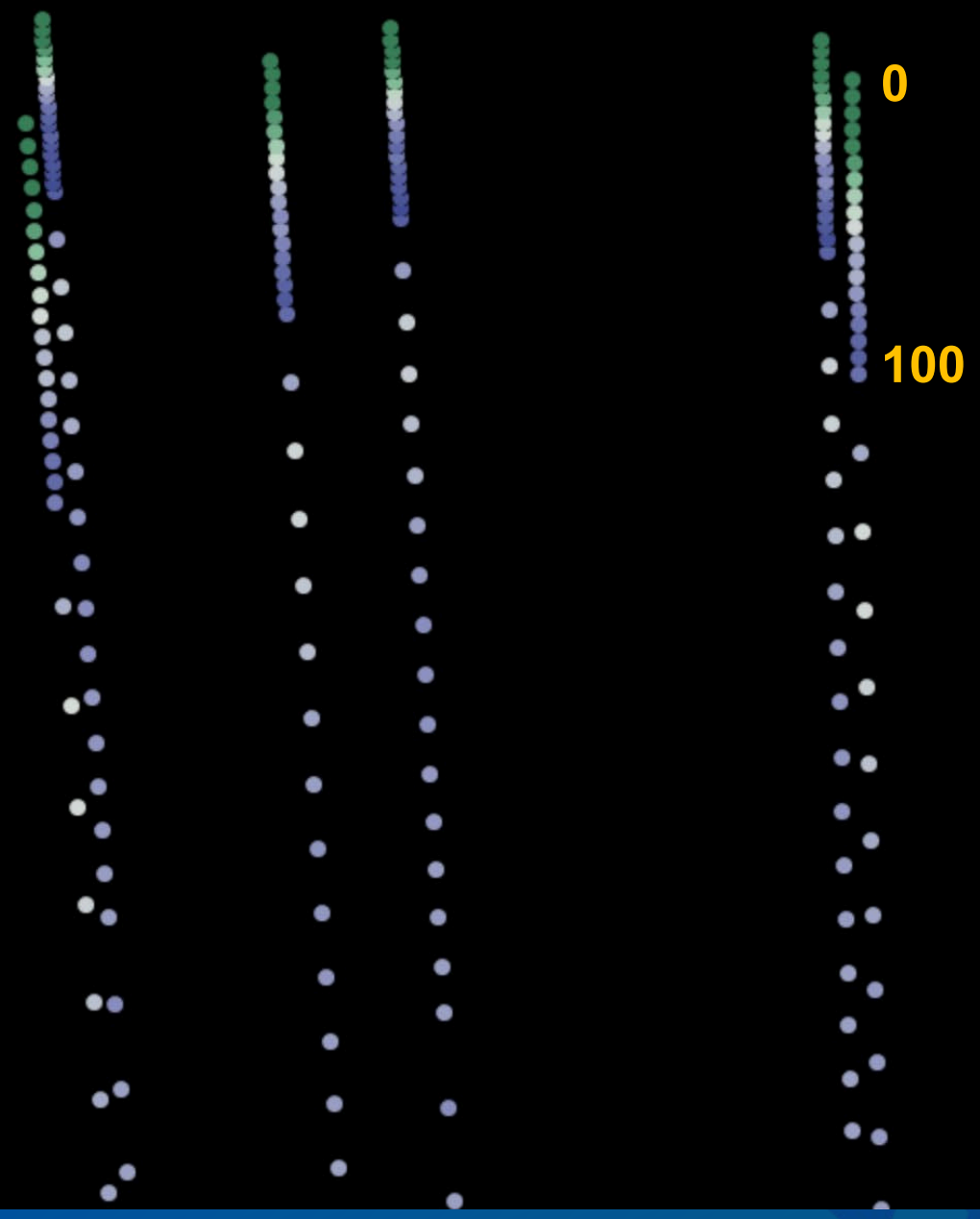
```
const renderer = {
  type: "simple",
  symbol: {
    type: "point-3d",
    symbolLayers: [
      {
        type: "object",
        resource: {
          href: "./low_poly_tree/scene.gltf"
        },
        anchor: "relative",
        anchorPosition: { x: 0, y: 0, z: -0.5 }
      }
    ]
  }
}
```

Scaled 3D models

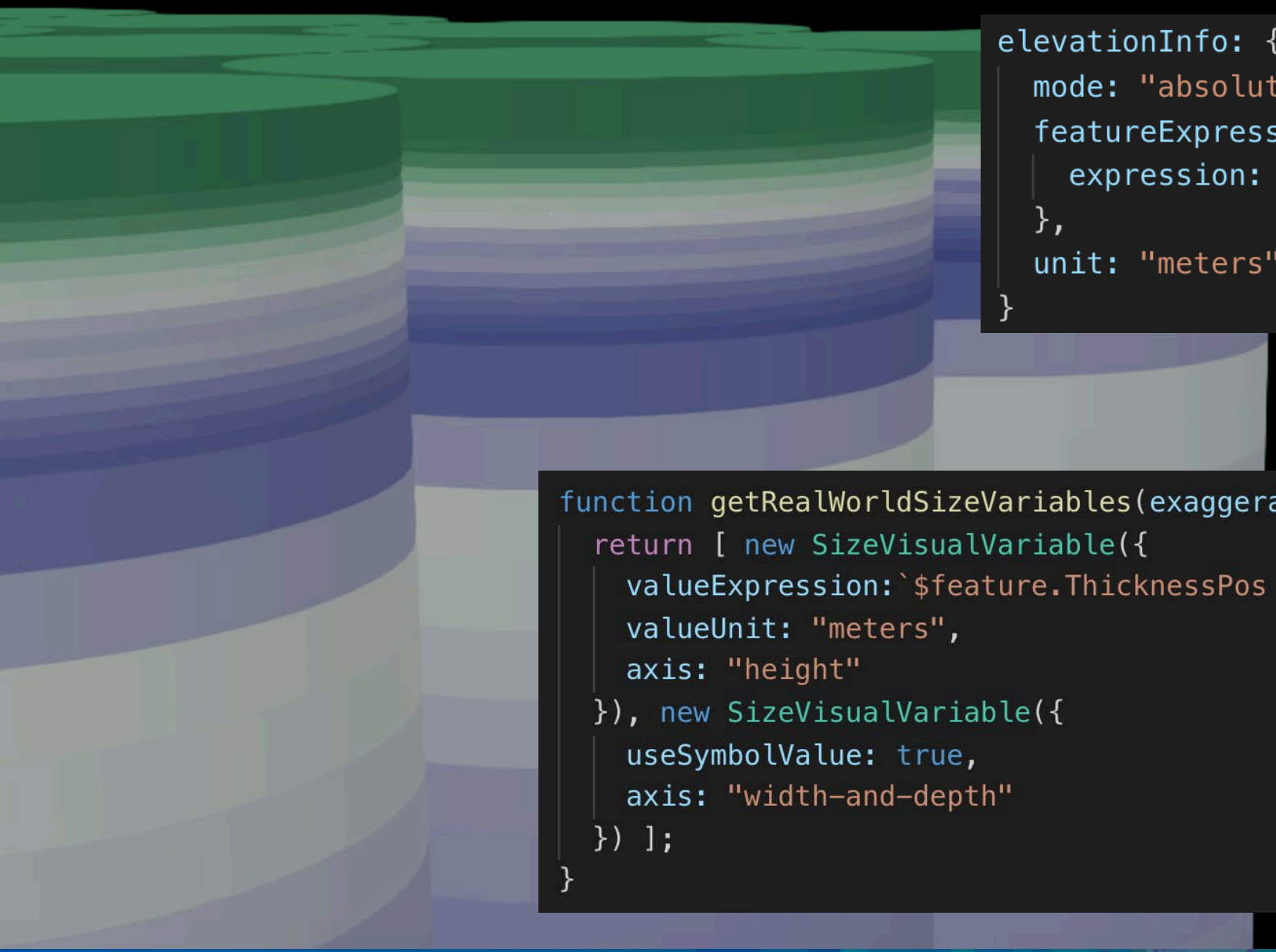
Earthquake visualization



Marine data analysis

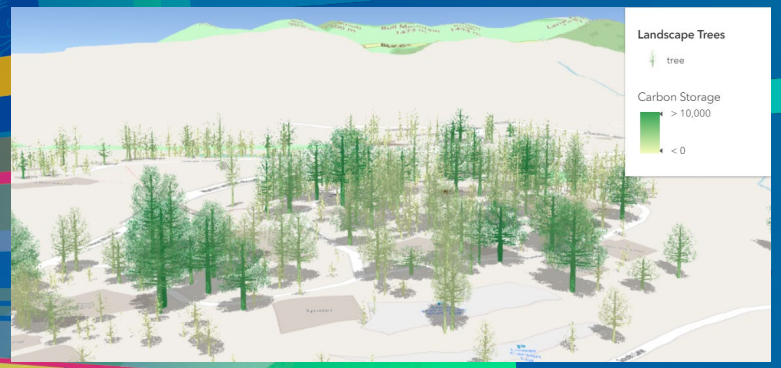



```
elevationInfo: {
  mode: "absolute-height",
  featureExpressionInfo: {
    expression: `$feature.UnitTop * ${exaggeration}`
  },
  unit: "meters"
}
```

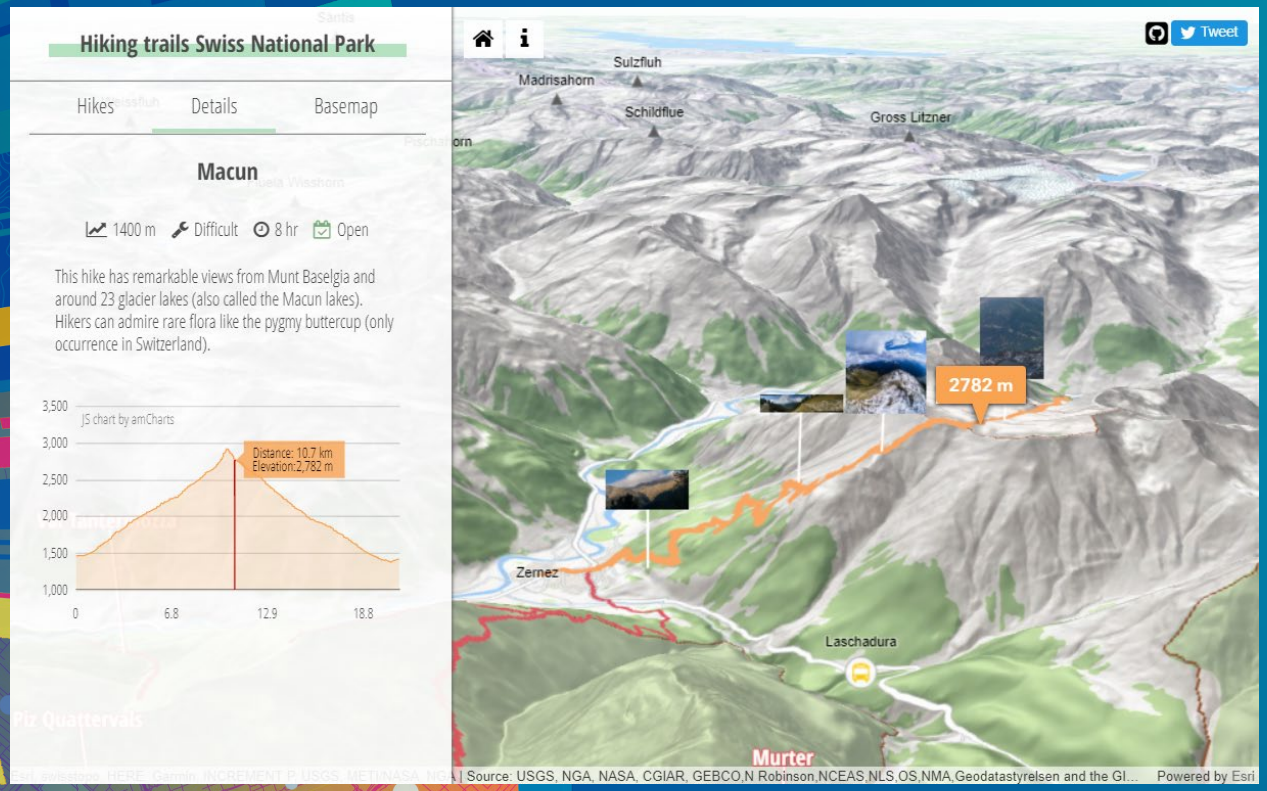


```
elevationInfo: {
  mode: "absolute-height",
  featureExpressionInfo: {
    expression: `$feature.UnitTop * ${exaggeration}`
  },
  unit: "meters"
}
```

```
function getRealWorldSizeVariables(exaggeration: number): SizeVisualVariable[] {
  return [ new SizeVisualVariable({
    valueExpression:`$feature.ThicknessPos * ${exaggeration}`,
    valueUnit: "meters",
    axis: "height"
  }), new SizeVisualVariable({
    useSymbolValue: true,
    axis: "width-and-depth"
  }) ];
}
```

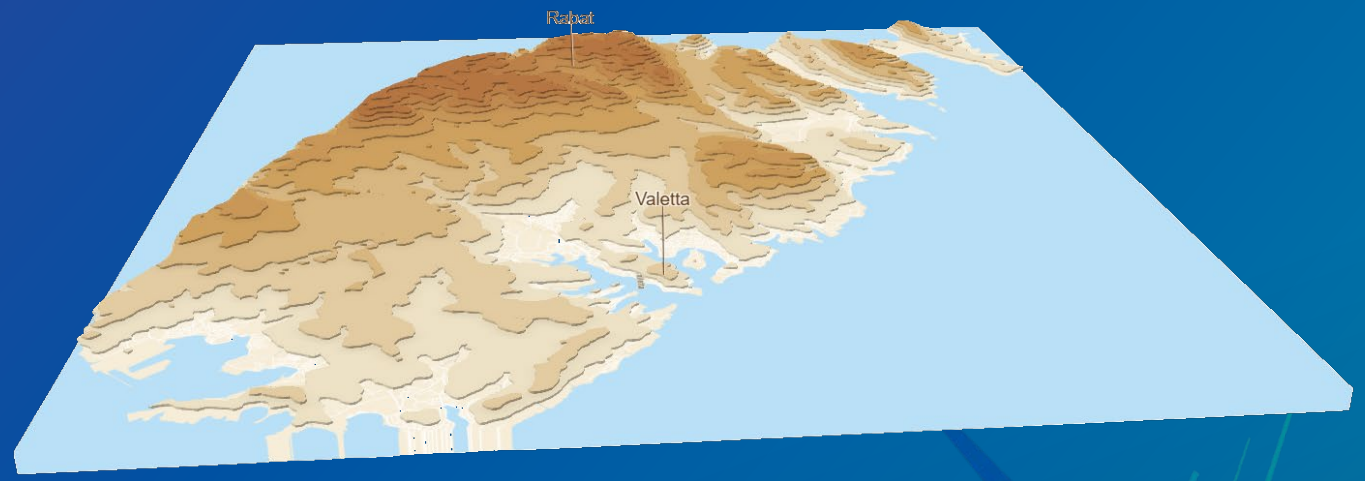


Documentation samples



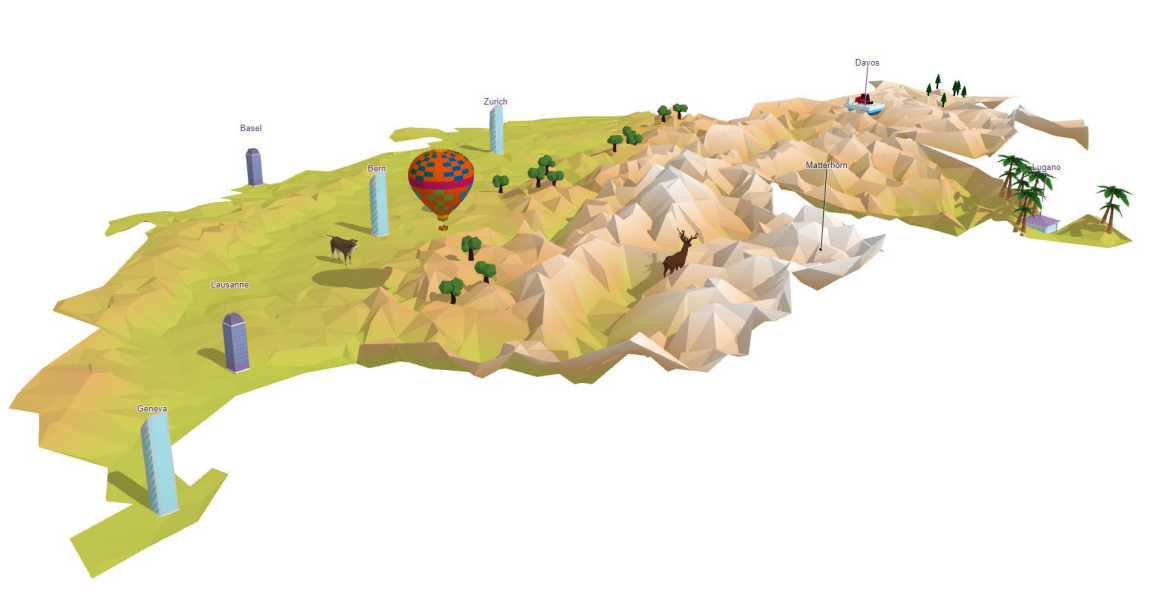
Hiking app

Swiss National Park



Terrain visualization

Using contour lines



Low poly map

A low poly map of Switzerland

Resources

ArcGIS API for JavaScript SDK samples:

https://developers.arcgis.com/javascript/latest/sample-code/index.html?search=webstyle

Making the leap to 3D - http://www.esri.com/esri-news/arcuser/fall-2017/making-the-leap-to-web-3d (ArcUser article)

Visualize large feature datasets in 3D with ArcGIS API for JavaScript - https://www.esri.com/arcgis-blog/products/js-api-arcgis/3d-gis/visualize-large-feature-datasets-in-3d-with-arcgis-api-for-javascript/

Resources

Romania in 3D - https://github.com/RalucaNicola/JSAPI_demos/romania-3D

Visualization of Paris - https://github.com/RalucaNicola/JSAPI_demos/extrude-buildings-paris

Ocean salinity visualization – **https://github.com/ekenes/esri-ts-samples/tree/master/visualization/emu/3d**

Hiking app – https://github.com/RalucaNicola/hiking-app

esri

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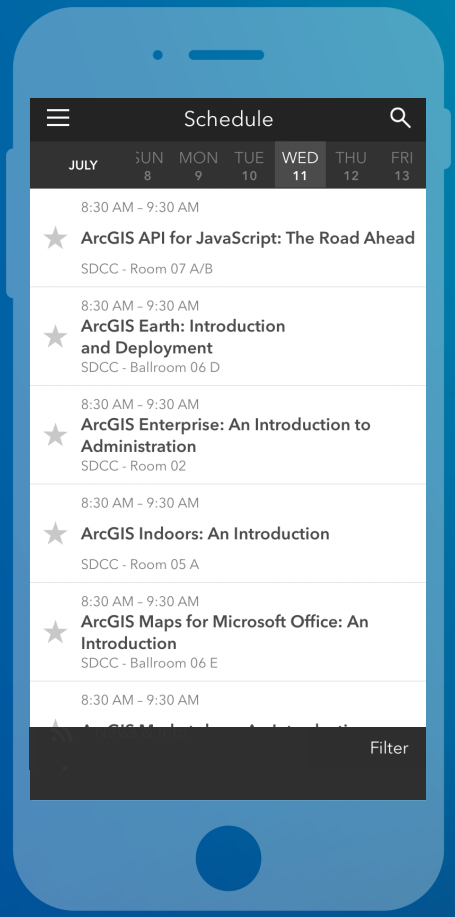

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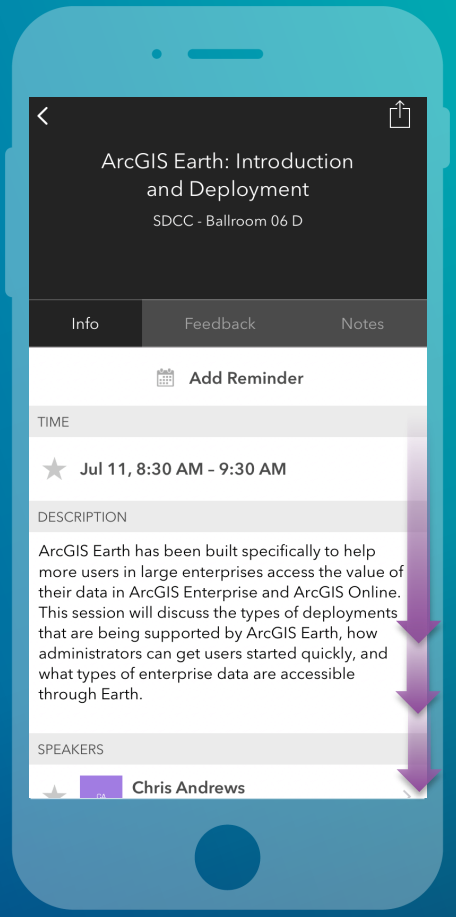

Complete answers and select “Submit”