

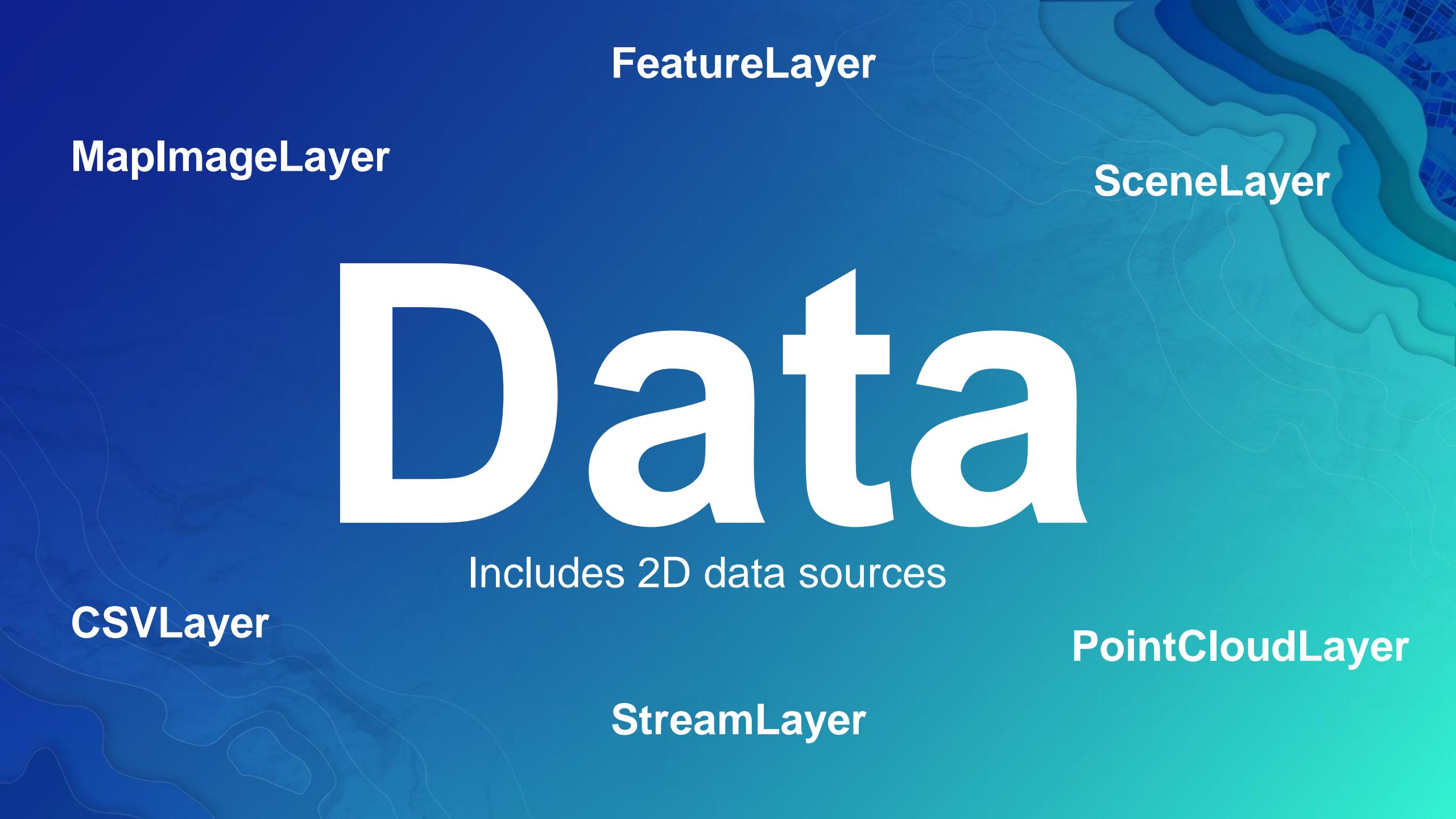
3D Visualization with the ArcGIS API for JavaScript

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API Overview

Renderers, symbols, symbol layers...



FeatureLayer

MapImageLayer

SceneLayer

Data

Includes 2D data sources

CSVLayer

PointCloudLayer

StreamLayer

What can we visualize?

- Location
- Types
- Data (numbers)
- Combinations of the above



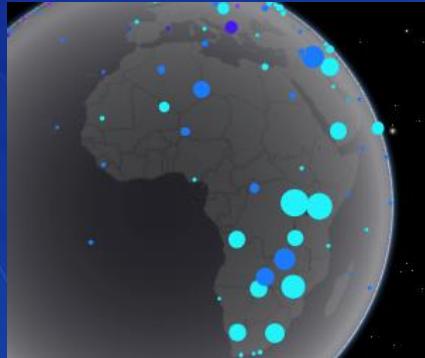
Symbols

And symbol layers

3D Symbols

based on geometry type

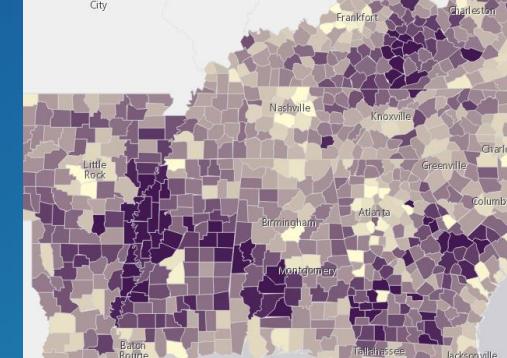
Points



Lines



Polygons



Mesh



`PointSymbol3D`

`LineSymbol3D`

`PolygonSymbol3D`

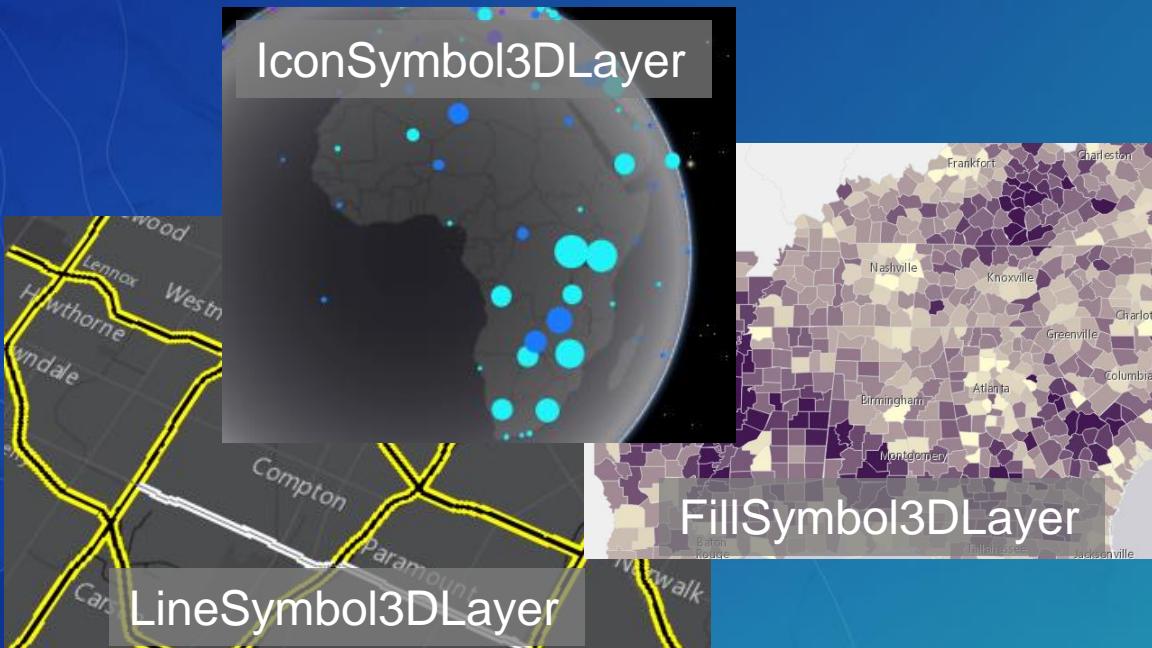
`MeshSymbol3D`

3D Symbols

Each must be composed of one or more symbol layers

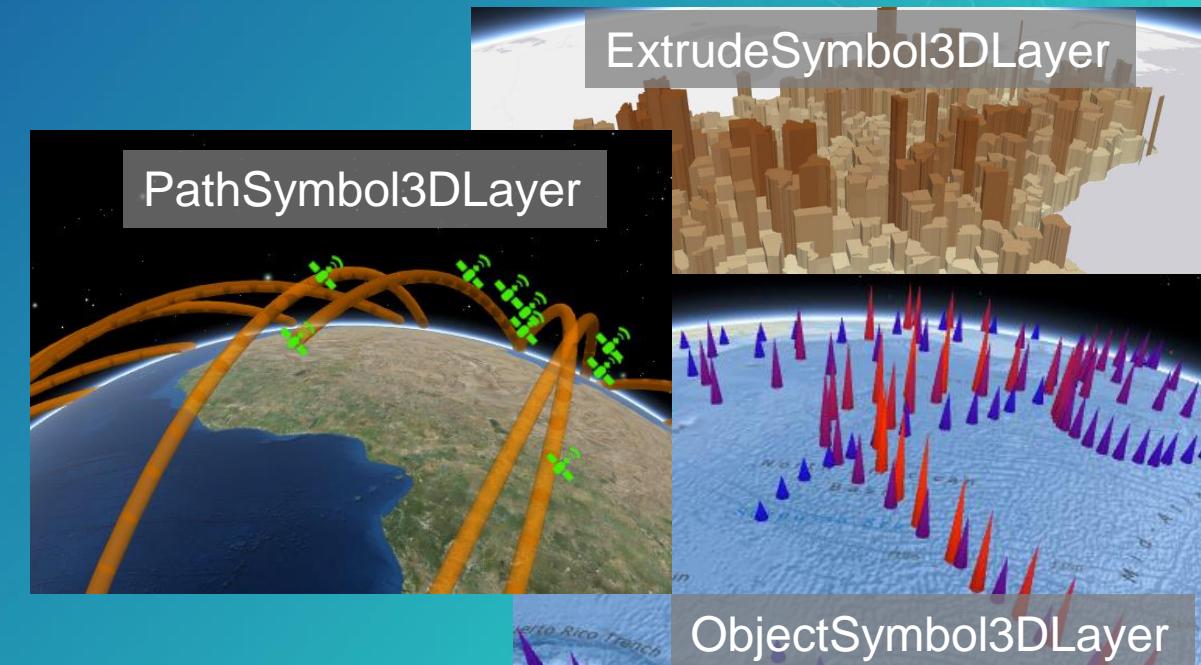
Flat

Size is expressed in screen units



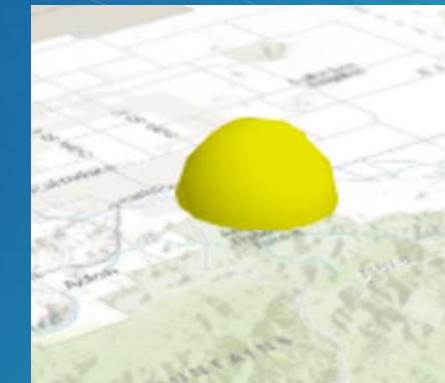
Volumetric

Size is expressed in real-world units

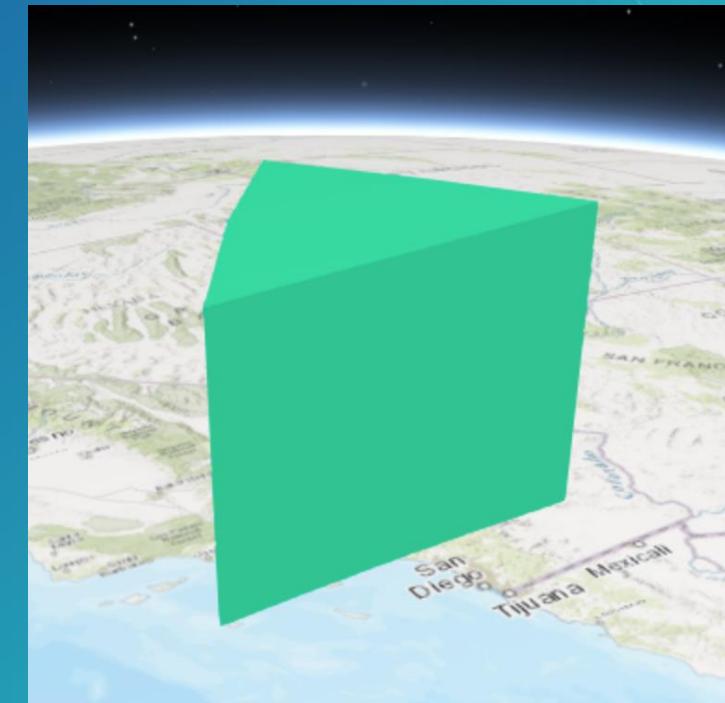


3D Symbols

```
var pointSymbol3D = new PointSymbol3D({  
    symbolLayers: [new ObjectSymbol3DLayer({  
        depth: 10000,  
        height: 10000,  
        resource: { primitive: "sphere" },  
        width: 10000,  
        material: { color: [230, 230, 0, 1] }  
    })]  
});
```



```
var pointSym3D = new PolygonSymbol3D({  
    symbolLayers: [new ExtrudeSymbol3DLayer({  
        size: 300000,  
        material: { color: [0, 230, 169, 1] }  
    })]  
});
```



Data-driven visualization

- Renderers & Visual Variables

1. Field value(s)

TOTAL_POP

2. Arcade expression

Round((\$feature.BACHELOR + \$feature.MASTER) / \$feature.POP_25UP);

3. JavaScript function

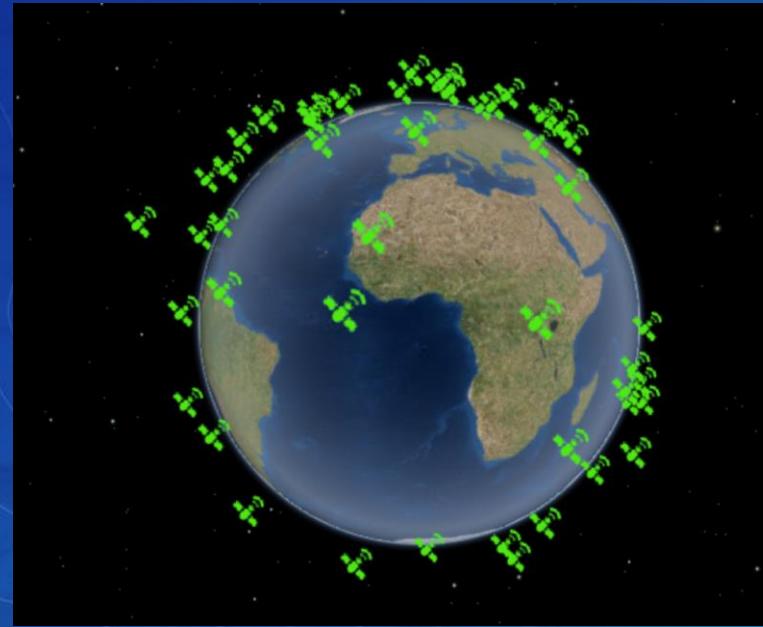
```
function (graphic){  
    return graphic.attributes.POP_DENSITY;  
}
```

Renderers



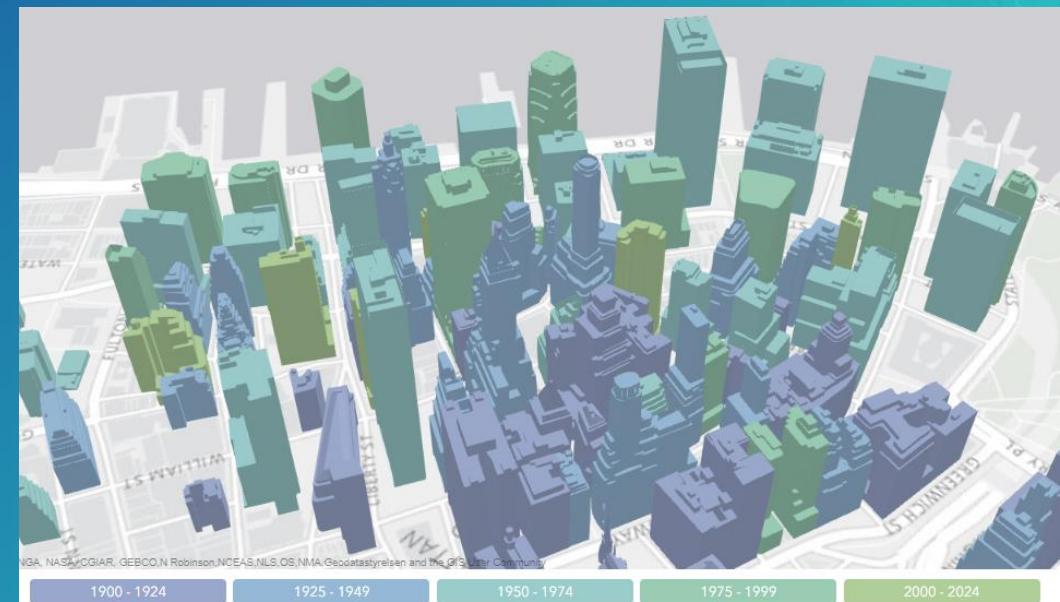
Renderers

SimpleRenderer



ClassBreaksRenderer

UniqueValueRenderer



1900 - 1924

1925 - 1949

1950 - 1974

1975 - 1999

2000 - 2024

Renderers

SimpleRenderer

```
layer.renderer = new SimpleRenderer({  
    symbol: createSymbol("#ff002e")  
});
```

```
var renderer = new ClassBreaksRenderer({  
    field: "population",  
    classBreakInfos: [{  
        minValue: 0,  
        maxValue: 2500,  
        symbol: createSymbol("#f8e3c2", 3)  
    }, {  
        minValue: 2500,  
        maxValue: 15000,  
        symbol: createSymbol("#e5998c", 6)  
    }, {  
        minValue: 15000,  
        maxValue: 75000,  
        symbol: createSymbol("#d86868", 12)  
    }, {  
        minValue: 75000,  
        maxValue: 10000000,  
        symbol: createSymbol("#9b3557", 22)  
    }]  
});
```

UniqueValueRenderer

```
var renderer = new UniqueValueRenderer({  
    valueExpression: "var parties = [$feature.MP06025a_B," +  
                    "$feature.MP06024a_B, $feature.MP06026a_B];" +  
                    "return Decode( Max(parties)," +  
                    "$feature.MP06025a_B, 'republican'," +  
                    "$feature.MP06025a_B, 'democrat'," +  
                    "$feature.MP06025a_B, 'independent'," +  
                    "'n/a' );",  
    valueExpressionTitle: "Winner of the election",  
    uniqueValueInfos: [{  
        value: "democrat",  
        symbol: createSymbol("#00c3ff"),  
        label: "Democrat"  
    }, {  
        value: "republican",  
        symbol: createSymbol("#ff002e"),  
        label: "Republican"  
    }, {  
        value: "independent",  
        symbol: createSymbol("#faff00"),  
        label: "Independent/other party"  
    }]  
});
```

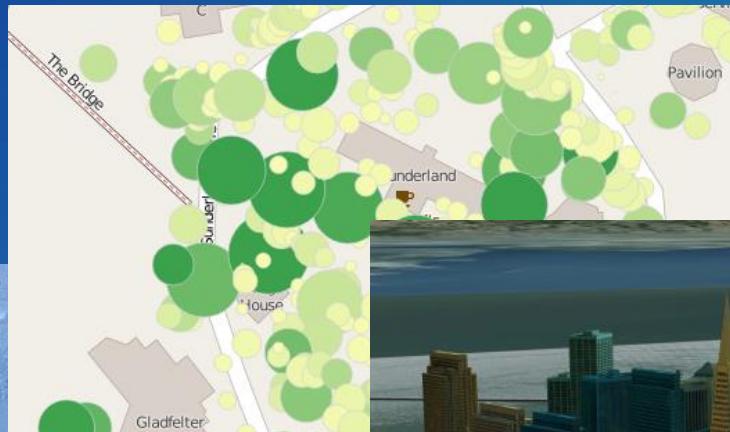
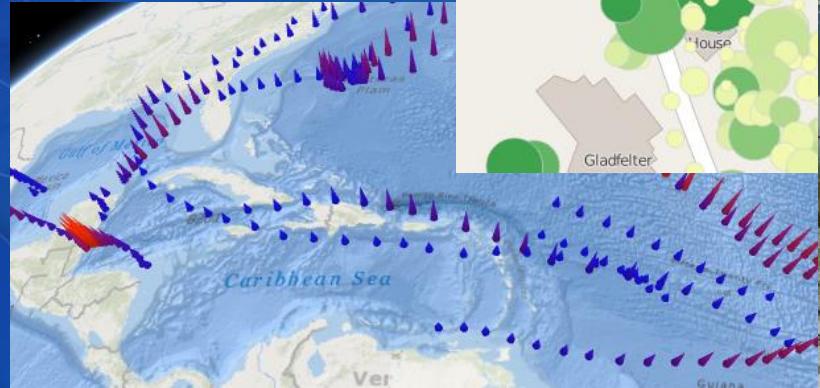
ClassBreaksRenderer

- ...and PointCloud Renderers

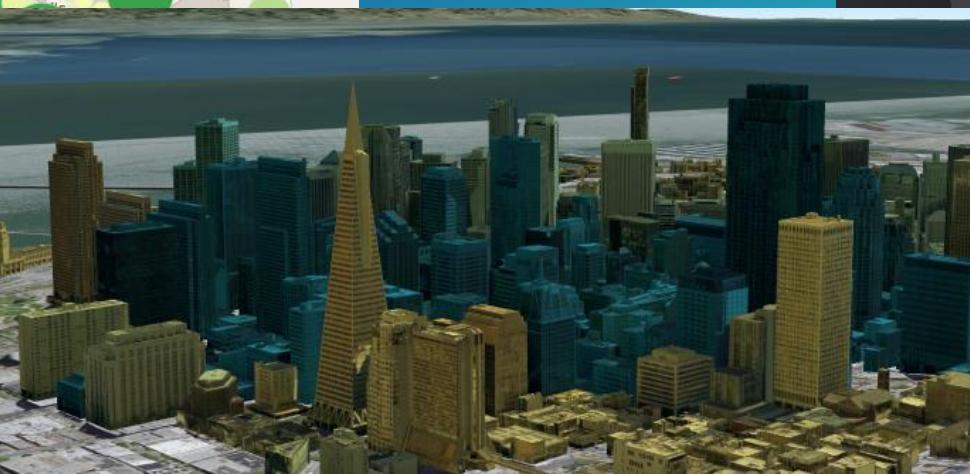
Renderers

Visual Variables

- Color
- Size
 - Height
 - Width
 - Depth
- Rotation
- Opacity



- A property of the renderer
- For numeric data-driven continuous visualizations

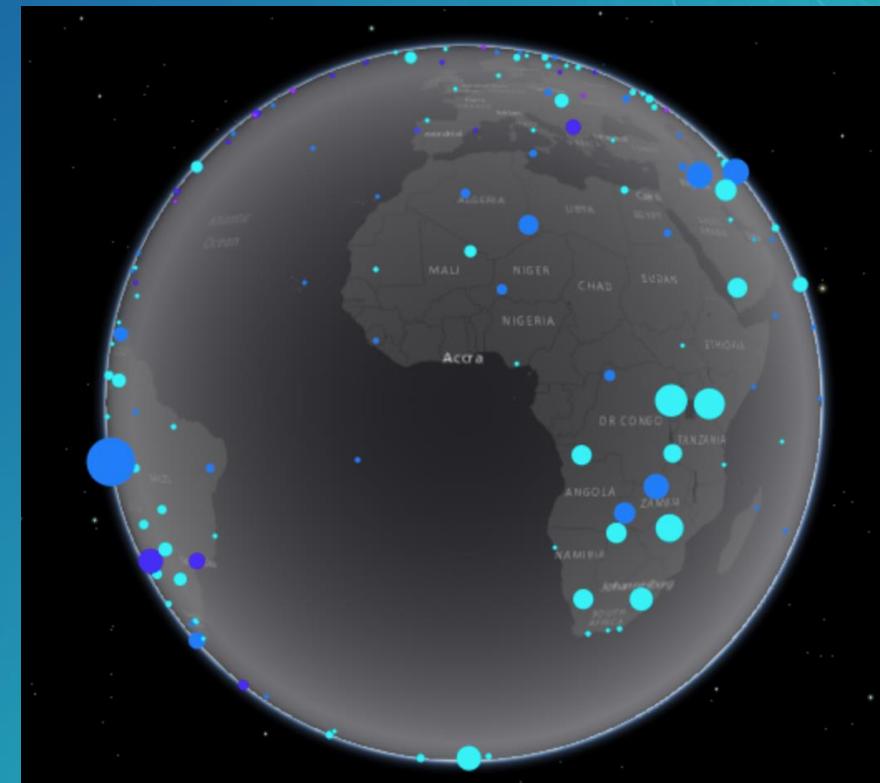


Renderers

Visual Variables

```
var renderer = new SimpleRenderer({
  symbol: new PointSymbol3D({
    symbolLayers: [ new IconSymbol3DLayer() ]
  }),
  visualVariables: [
    {
      type: "size",
      field: "elevation_ft",
      stops: [
        { value: 0, size: 2 },
        { value: 15000, size: 35 }
      ]
    },
    {
      type: "color",
      field: "type_airport",
      stops: [
        { value: 1, color: [252, 12, 245] },
        { value: 3, color: [83, 0, 244] },
        { value: 7, color: [4, 245, 248] }
      ]
    }
  ]
});
```

```
var strengthArcade = document.getElementById("strength").text;
renderer.visualVariables = [
  {
    type: "opacity",
    valueExpression: strengthArcade,
    valueExpressionTitle: "Share of registered voters",
    stops: [
      { value: 33, opacity: 0.05, label: "< 33%" },
      { value: 44, opacity: 1.0, label: "> 44%" }
    ]
  }
];
```



Examples

Points of interest





Colorized
building
textures



PointCloud Visualization

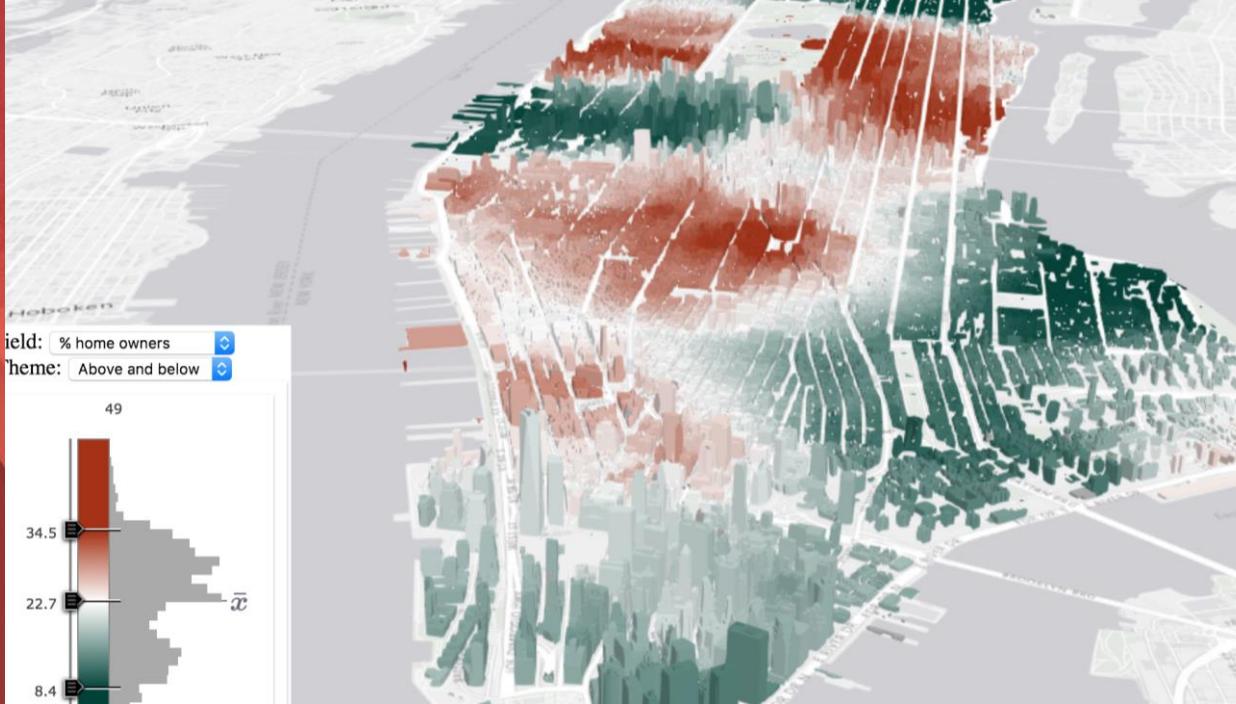
Renderers and more



Extrusions

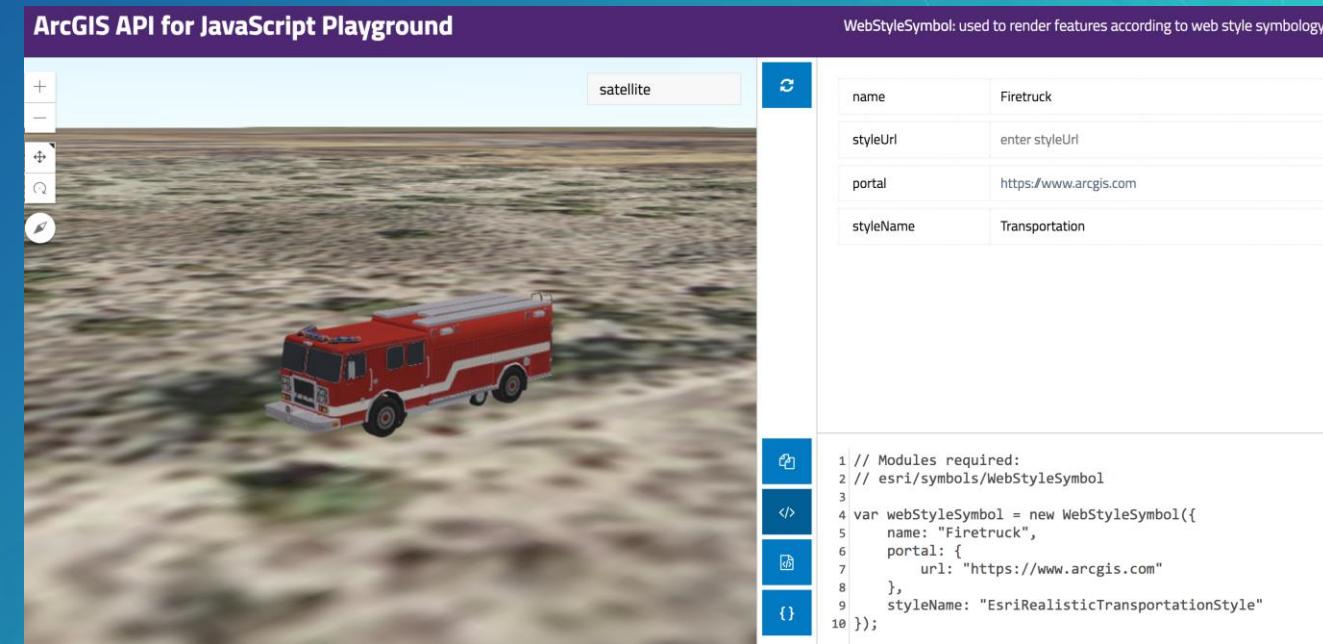
Data exploration

Smart mapping in custom apps



Resources

- Get started with visualization
- ArcGIS Blog
 - Icons, lines, fills
 - Objects, paths, extrusion
 - Real world sizes
- Documentation
 - Renderer
 - Symbol3D
 - Symbol3DLayer

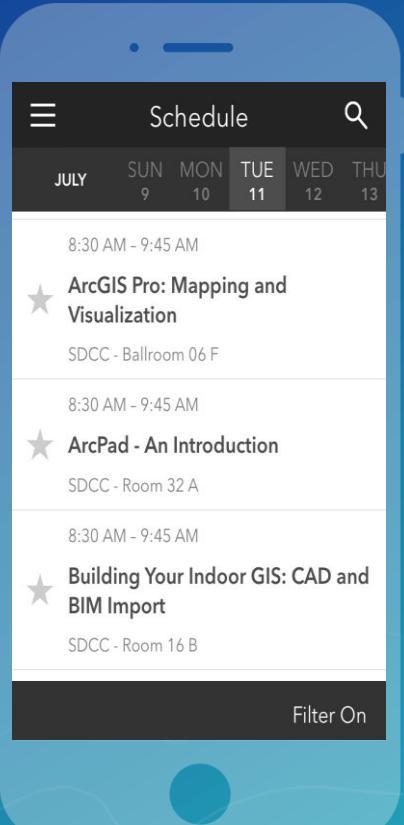


Please Take Our Survey on the Esri Events App!

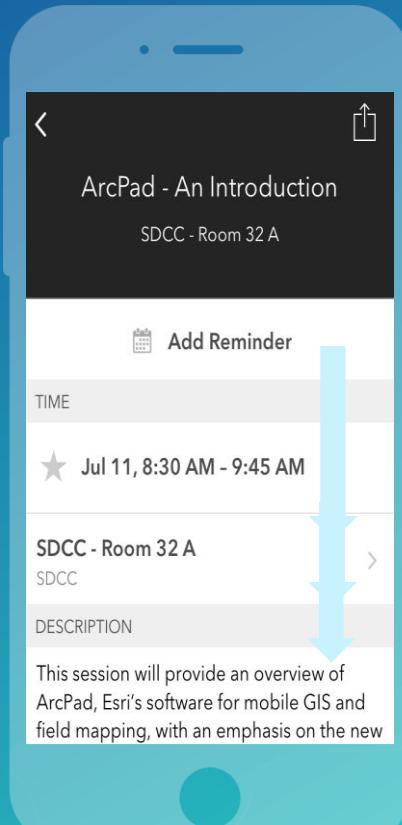
Download the Esri Events app and find your event



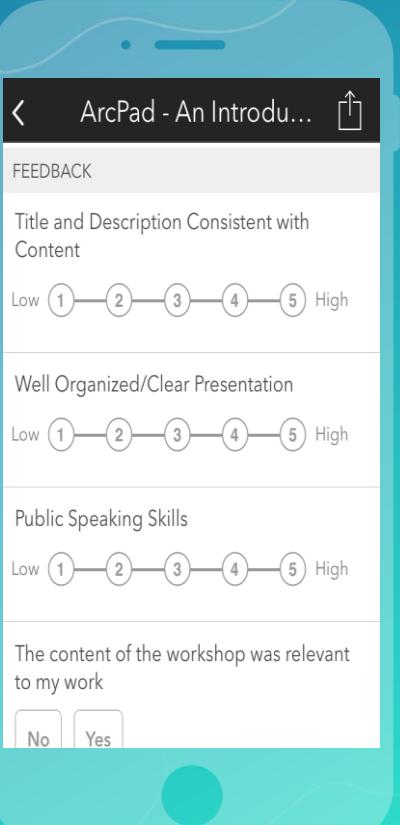
Select the session you attended



Scroll down to find the survey



Complete Answers and Select “Submit”





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