3D Visualization with the ArcGIS API for JavaScript

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API Overview
Renderers, symbols, symbol layers…
Data

Includes 2D data sources
What can we visualize?

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

And symbol layers
3D Symbols
based on geometry type

Points
LineSymbol3D
PolygonSymbol3D
MeshSymbol3D

Lines
Polygons
Mesh
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

```javascript
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
Renderers

SimpleRenderer

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

ClassBreaksRenderer

```javascript
var renderer = new ClassBreaksRenderer({
  field: "population",
  classBreakInfos: [{
    minValue: 0,
    maxValue: 2500,
    symbol: createSymbol("#f8e3c2", 3)
  }, {
    minValue: 2500,
    maxValue: 15000,
    symbol: createSymbol("#e599c8", 6)
  }, {
    minValue: 15000,
    maxValue: 75000,
    symbol: createSymbol("#d86868", 12)
  }, {
    minValue: 75000,
    maxValue: 1000000,
    symbol: createSymbol("#9b3557", 22)
  }]
});
```

UniqueValueRenderer

```javascript
var renderer = new UniqueValueRenderer({
  valueExpression: "var parties = [$feature.MP06025a_B, "$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("#fa007a"),
    label: "Independent/other party"
  }]
});
```

…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

```javascript
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] }
        ]
    }]
});
```
Examples
Points of interest
Colorized building textures
PointCloud Visualization

Renderers and more
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
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