2D Visualization with the ArcGIS API for JavaScript

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API Overview
Renderers, Symbols, etc.
What can we visualize?

- Where?
- What?
- How much?
- When?
- Multivariate
Data

FeatureLayer
MapImageLayer
CSVLayer
StreamLayer
Symbols
Symbols
based on geometry type

Points
SimpleMarkerSymbol
PictureMarkerSymbol

Lines
SimpleLineSymbol

Polygons
SimpleFillSymbol
PictureFillSymbol
Symbols

```javascript
var marker = new SimpleMarkerSymbol({
  style: "diamond",
  outline: {
    width: 1.75,
    color: [76, 115, 0, 0.75]
  },
  color: [170, 255, 0, 1]
});

var fill = new SimpleFillSymbol({
  outline: {
    width: 2.75,
    color: [0, 77, 168, 1]
  },
  color: [115, 178, 255, 0.72]
});
```
Data-driven visualization

- **Field value(s)**
  TOTAL_POP

- **Arcade expression**
  \[
  \text{Round(} (\text{feature.BACHELOR} + \text{feature.MASTER}) \div \text{feature.POP}_25UP) \);\]

- **JavaScript function**
  ```javascript
  function (graphic){
    return graphic.attributes.POP_DENSITY;
  }
  ```
Renderers
Renderers

SimpleRenderer

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

UniqueValueRenderer

```javascript
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("#0033ff"),
        label: "Democrat"
    }, {
        value: "republican",
        symbol: createSymbol("#ff002e"),
        label: "Republican"
    }, {
        value: "independent",
        symbol: createSymbol("#faff00"),
        label: "Independent/other party"
    }]
});
```

ClassBreaksRenderer

```javascript
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: 1000000,
        symbol: createSymbol("#9b3557", 22)
    }]
});
```
Renderers

Visual Variables

- Color
- Size
- Opacity
- Rotation

• A property of the renderer
• For numeric data-driven continuous visualizations
var renderer = new SimpleRenderer({
    symbol: new SimpleFillSymbol(
        {
            outline: {
                color: "lightgray",
                width: 0.5
            }
        },
    label: "% population in poverty by county",
    visualVariables: [
        {
            type: "color",
            field: "POP_POVERTY",
            normalizationField: "TOTPOP_CY",
            stops: [
                {
                    value: 0.1,
                    color: "#FFFFCD4",
                    label: "<10%"
                },
                {
                    value: 0.3,
                    color: "#D2B48C",
                    label: ">30%"
                }
            ]
        }]
    });

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%"
            }
        ]
    }];
Renderers (3.x only)

- BlendRenderer
- DotDensityRenderer
- HeatmapRenderer
Examples
Visual Variables
Multivariate visualizations
Arcade expressions

Predominance
Data Exploration

Smart Mapping
Clustering
Available in 3.x; coming in 4.x soon
Resources

• Get started with visualization
• ArcGIS Blog
  • Visualizing data in web apps
  • Predominance visualizations using Arcade
  • Using Arcade expressions in web apps
• Documentation
• Renderer
• Symbol
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