



ArcGIS Runtime: Styling Maps

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~~Michael Wilburn~~ Justin Colville ☺

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[Disclaimer]

Not a session about cartography!

Consider instead ↷

Rethinking How to Style Your Maps

Pasadena/Sierra/Ventura

Wed, Mar 6
5:30pm – 6:30pm

Web maps are much more than pixels on a screen – they are windows into information and understanding. Come learn how new map style options unlock valuable information hidden within your data. See different ways to allow someone to touch the map and have it respond with more information. This session identifies what's special about web maps, shares useful patterns, and other resources available to any map maker.

Categories - Esri Technical Session, Online, Beginner, Partner

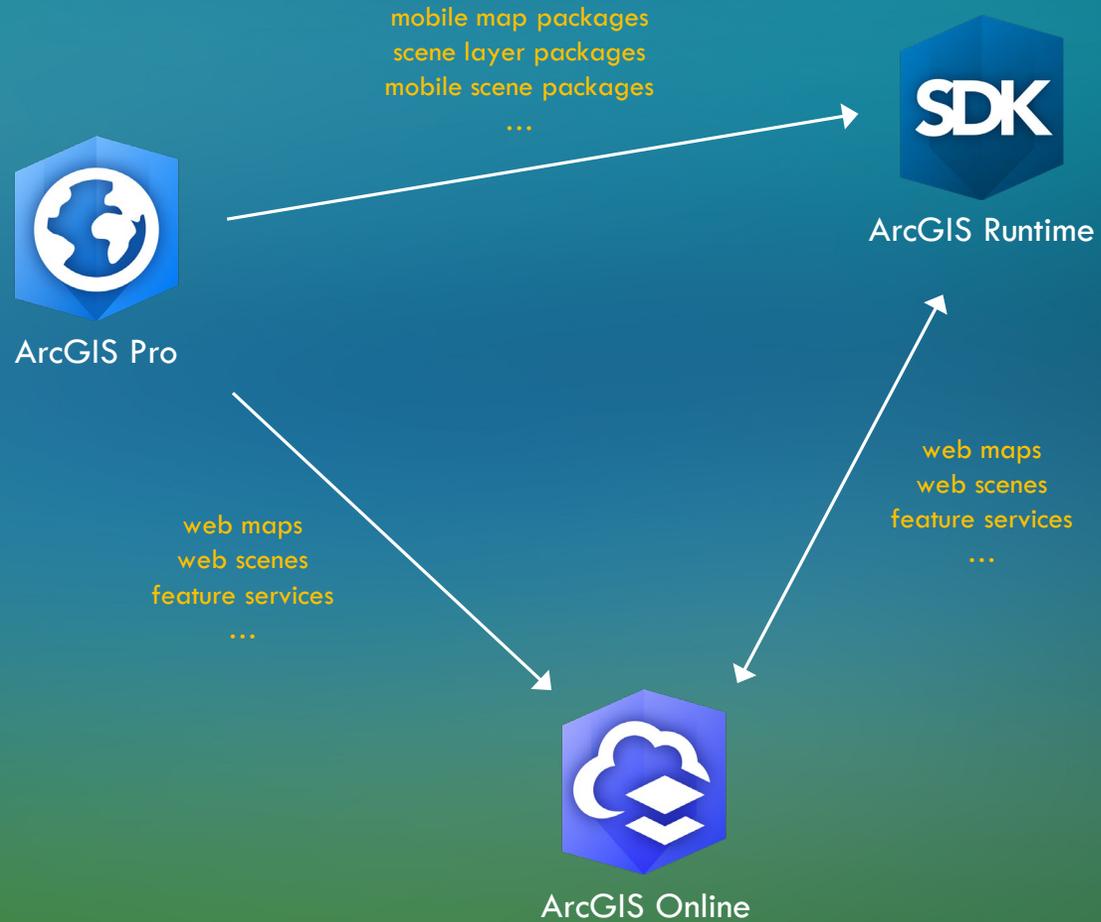
Jeremy Bartley + Jim Herries



Map Authoring Workflows



Avenues for authoring and styling maps



Create elsewhere, consume in Runtime

- **ArcGIS Pro** 
 - Most powerful application for authoring maps
 - Work with local data or consume layers online
 - Save as an .mmpk/.mspck – read directly
 - Publish to AGOL (feature service, web map, etc.)
- **ArcGIS Online** 
 - Skip the desktop application; author directly in the browser
 - Add public layers from online or from your private org
 - Take advantage of features like smart mapping
 - | *data-driven styling and intelligent defaults that are tailored to your data*

Benefits of building with ArcGIS Pro/Online

- WYSIWYG symbol editors
- Visual variables and Arcade expressions
- Separate data maintenance with app maintenance
- Offload authoring experience to be handled independent of your app's code
- App ingests once, no need for configuration code to modify

```
private void setUpMap() {  
    if (mMapView != null) {  
        // Portland Street Trees web map  
        String itemId = "24c44529167c45e39ce0d3668c156f3e";  
        Portal portal = new Portal("https://www.arcgis.com", false);  
        PortalItem portalItem = new PortalItem(portal, itemId);  
        // add the web map to the map, set the map to the map view  
        ArcGISMap map = new ArcGISMap(portalItem);  
        mMapView.setMap(map);  
    }  
}
```

Symbology - Trees of Portland

Vary symbology by attribute

- > Transparency
- > Rotation
- > Color
- > Size

Field: DBH pt

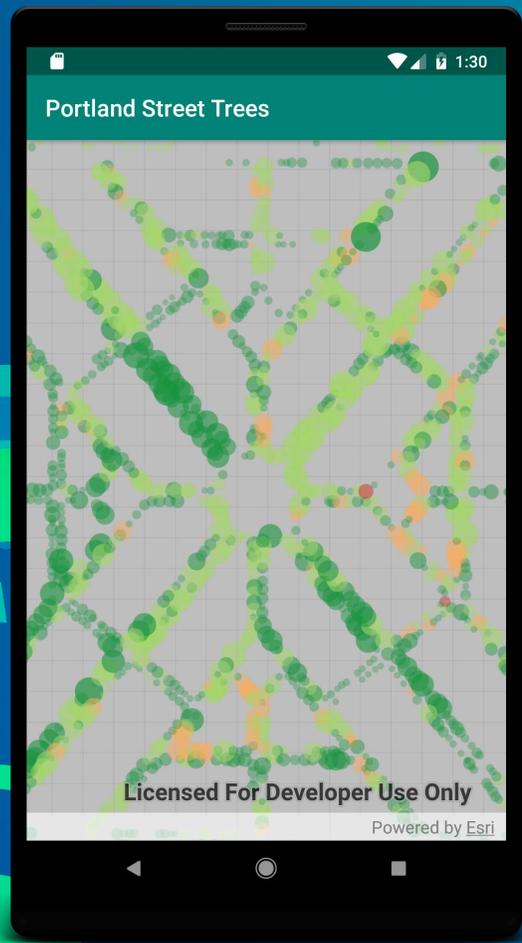
Normalization: <None>

Enable size range

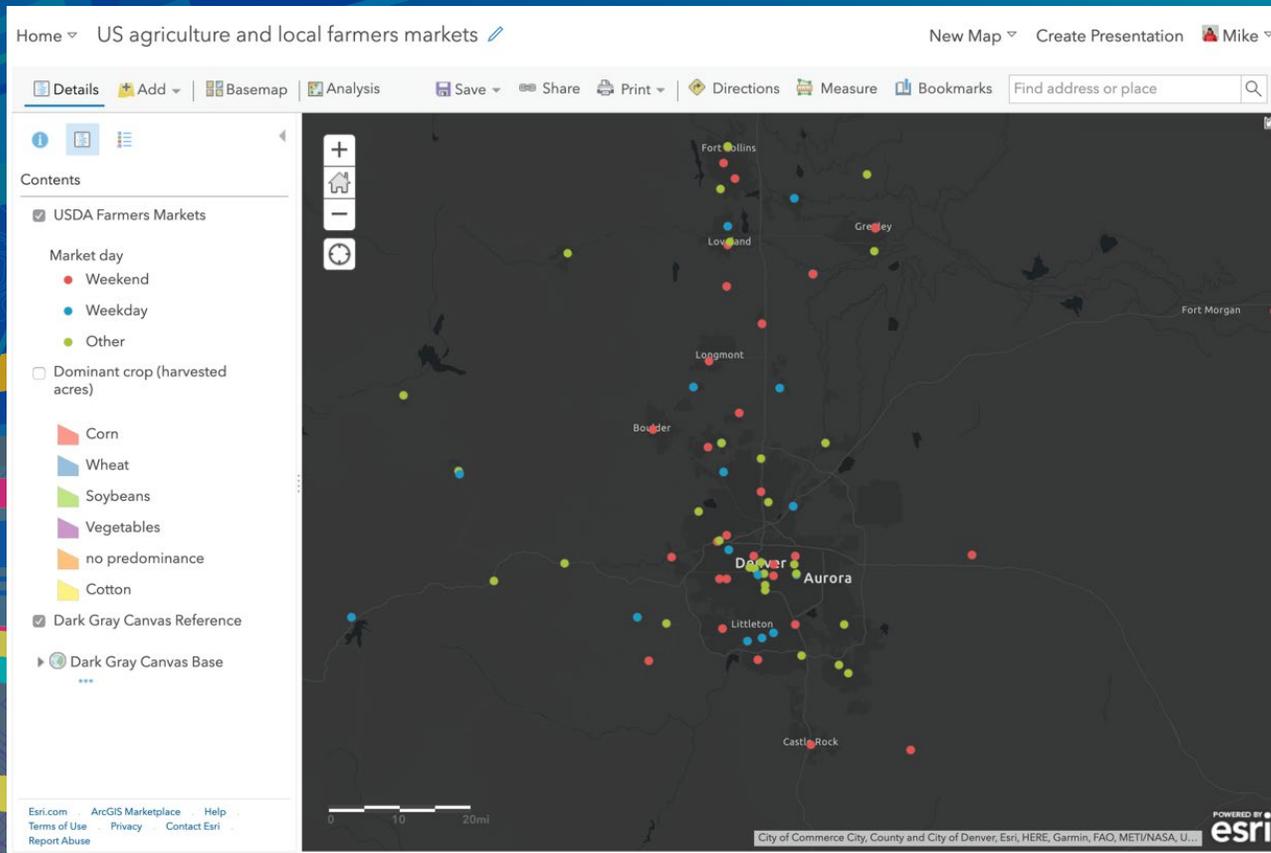
Minimum: 4 pt

Maximum: 20 pt

Show legend



DEMO: Creating and reading an .mmpk



DEMO: Authoring and consuming a web map



Runtime Programmatic Symbol Workflows

ArcGIS Symbol API Specs

1. Simple Symbols

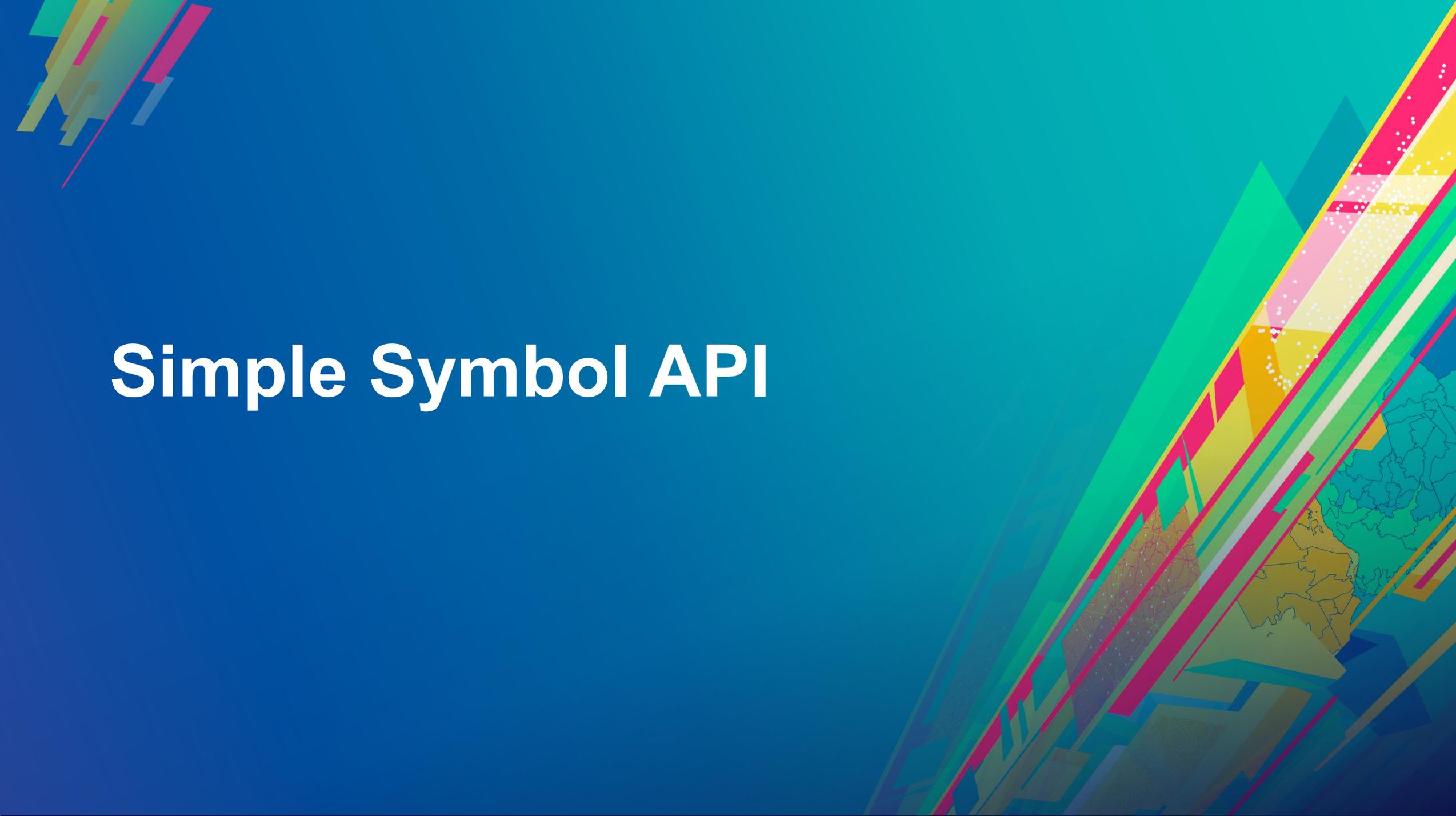
- Basic shapes and patterns
- Simple JSON spec
- Works everywhere in the platform

2. Multilayer Symbols

- Basic & advanced shapes and patterns
- Large JSON spec with many possibilities
- Works in Pro & Runtime*, but not JavaScript yet

*Runtime support for modifying is new at Update 5

Simple Symbol API

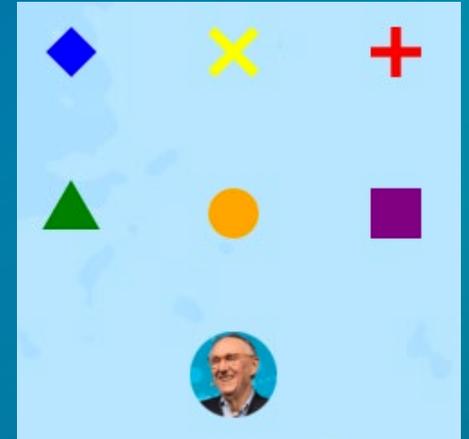
The background features a vibrant blue gradient. On the right side, there is a complex, layered graphic composed of various geometric shapes and patterns. These include overlapping triangles, lines, and a faint outline of a world map. The colors used in the graphic are bright green, yellow, pink, and light blue, creating a modern and dynamic aesthetic.

Simple Symbol API

- **Points**

- **SimpleMarkerSymbol**

- Circle
- Square
- Triangle
- Cross
- X
- Diamond



```
// create simple marker symbol
SimpleMarkerSymbol* sms = new SimpleMarkerSymbol(SimpleMarkerSymbolStyle::Circle, QColor("orange"), 28.0f, this);
```

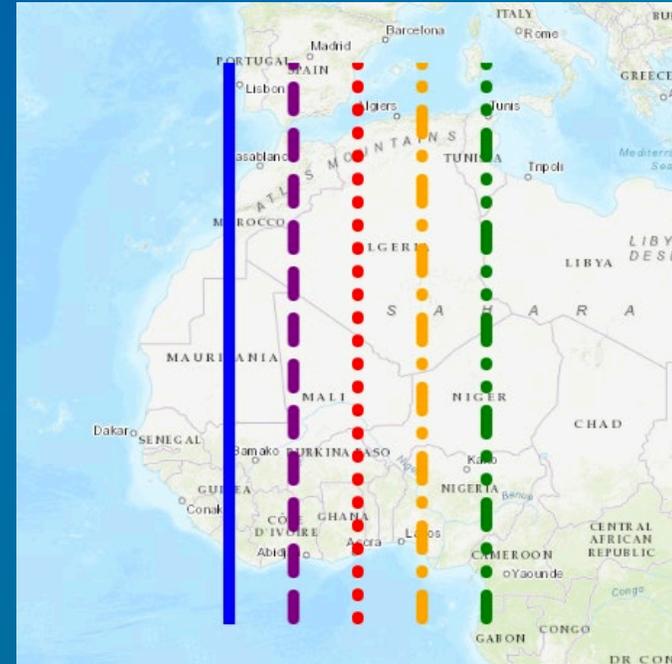
- **PictureMarkerSymbol**

- Image

```
// create picture marker symbol
QUrl imageUrl("https://esriaustralia.com.au/s/image/resize/u/lib/cms/jack-dangermond-profile.png");
PictureMarkerSymbol* pms = new PictureMarkerSymbol(imageUrl, this);
```

Simple Symbol API

- Lines
 - SimpleLineSymbol
 - Solid
 - Dash
 - Dot
 - DashDot
 - DashDotDot



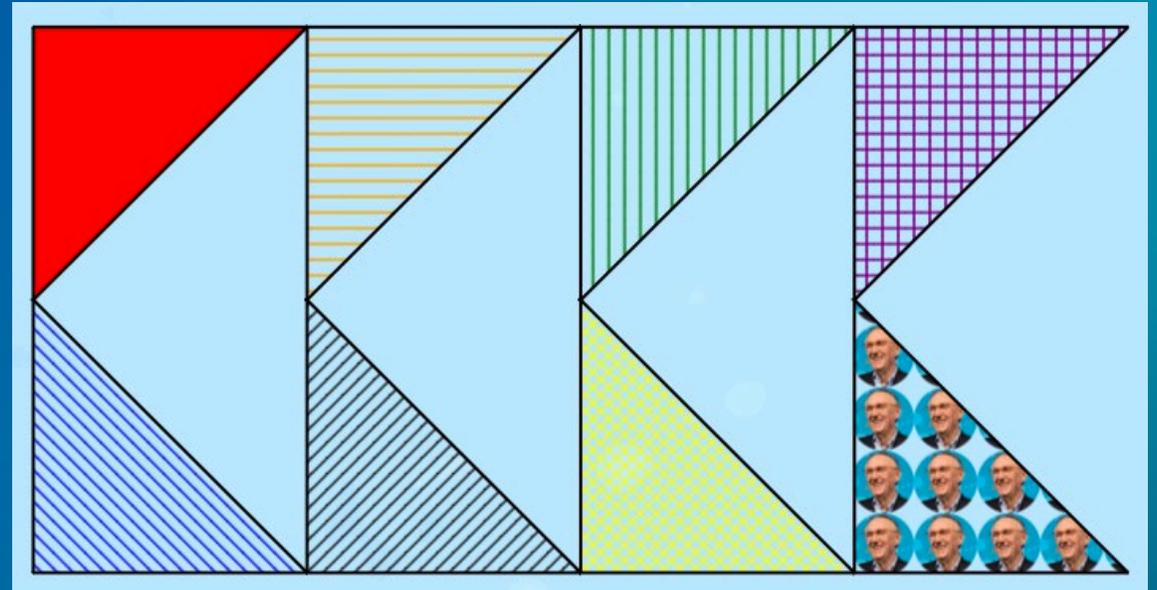
```
SimpleLineSymbol* sls1 = new SimpleLineSymbol(SimpleLineStyle::DashDot, QColor("orange"), 8.0f, this);
```

Simple Symbol API

- Polygon

- SimpleFillSymbol

- Solid
- Horizontal
- Vertical
- Cross
- Backward Diagonal
- Forward Diagonal
- Diagonal Cross



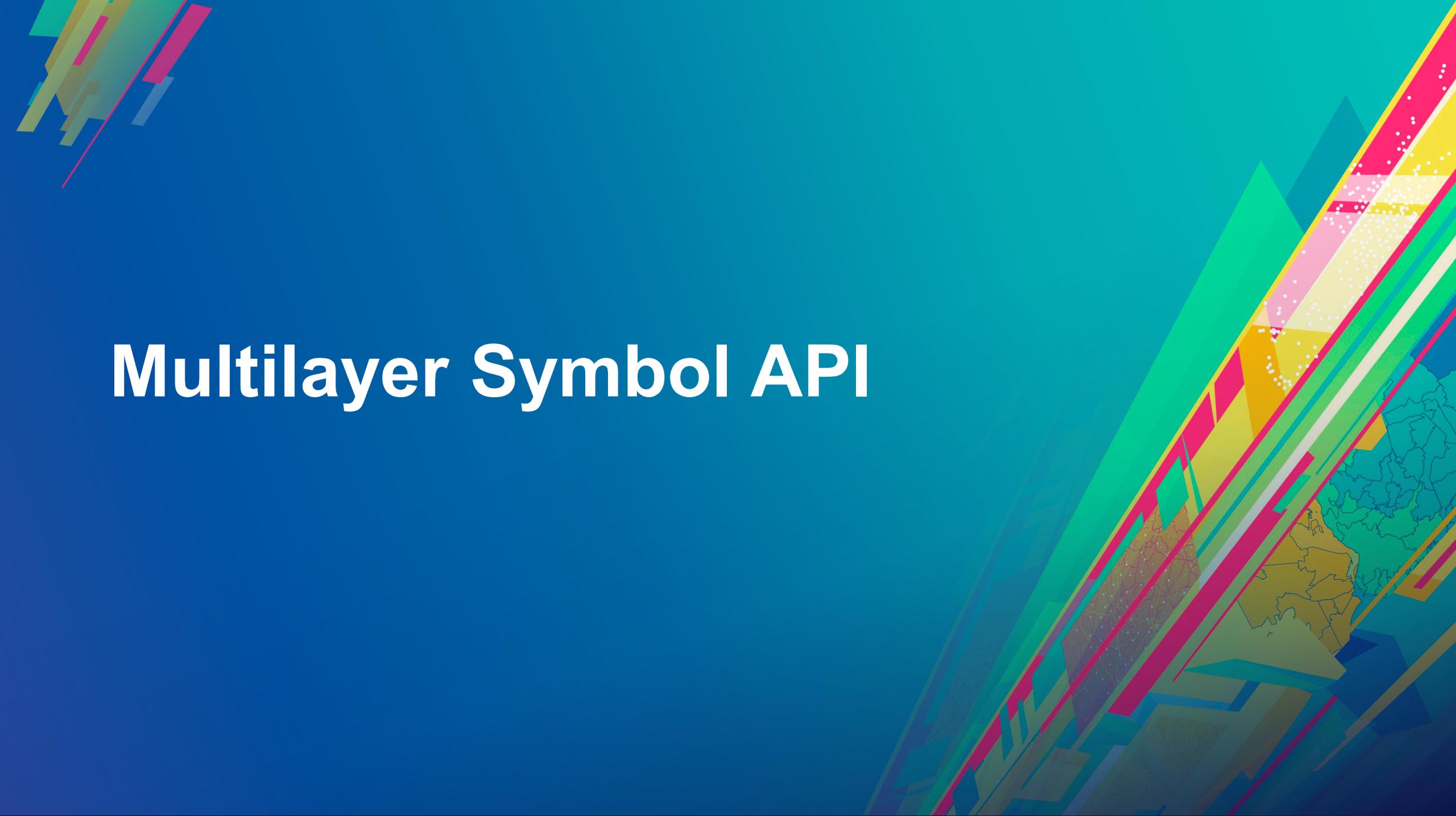
```
SimpleFillSymbol* sfs = new SimpleFillSymbol(SimpleFillSymbolStyle::Solid, QColor("red"), this);
```

- PictureFillSymbol

- Image

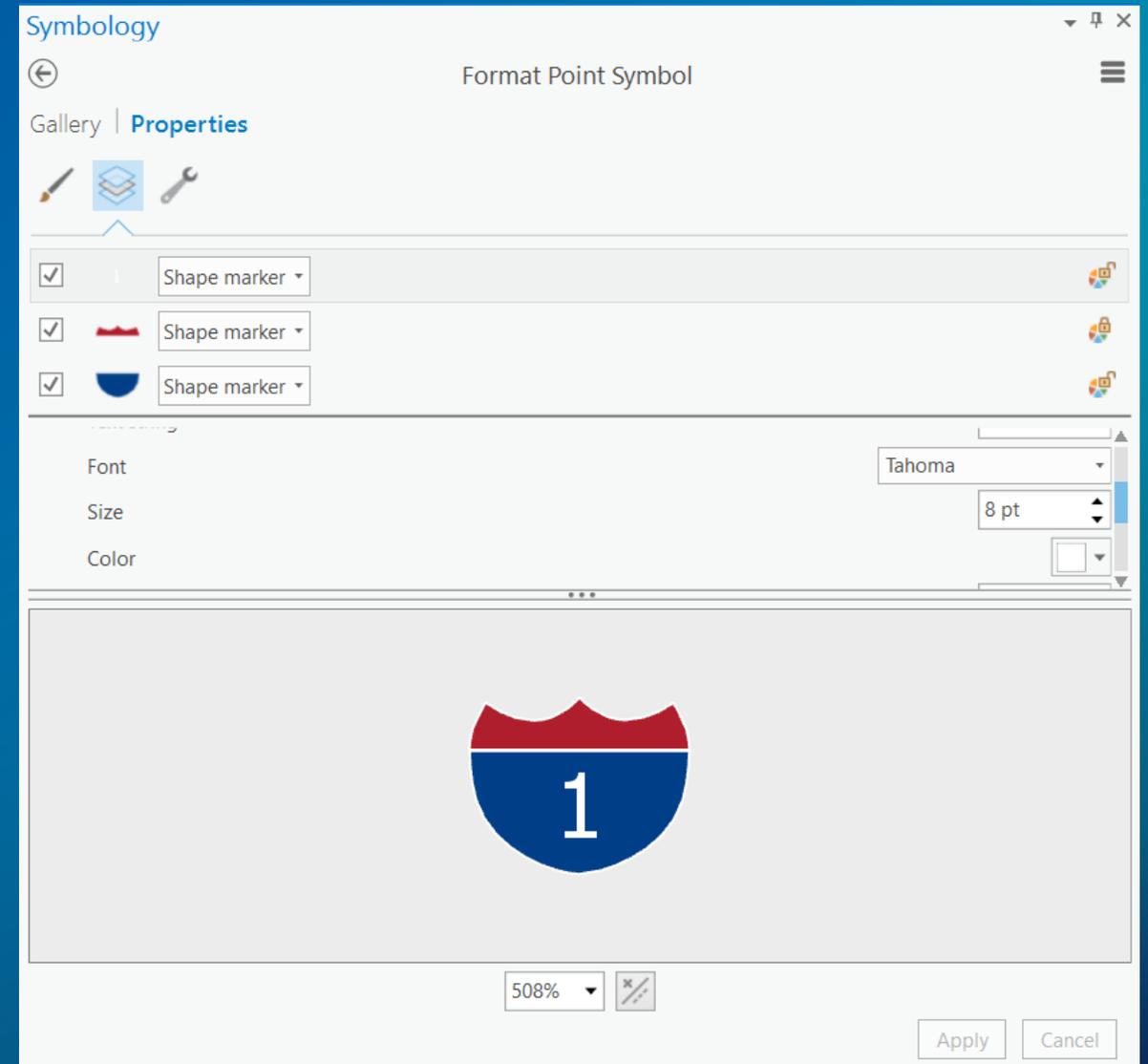
```
QUrl imageUrl("https://esriaustralia.com.au/s/image/resize/u/lib/cms/jack-dangermond-profile.png");  
PictureFillSymbol* pfs = new PictureFillSymbol(imageUrl, this);
```

Multilayer Symbol API

The background features a vibrant blue gradient. On the right side, there are several overlapping, diagonal stripes in various colors including green, yellow, pink, and blue. These stripes have a layered, 3D effect. In the bottom right corner, a faint outline of a world map is visible, with some regions highlighted in a light green color. The overall aesthetic is modern and digital.

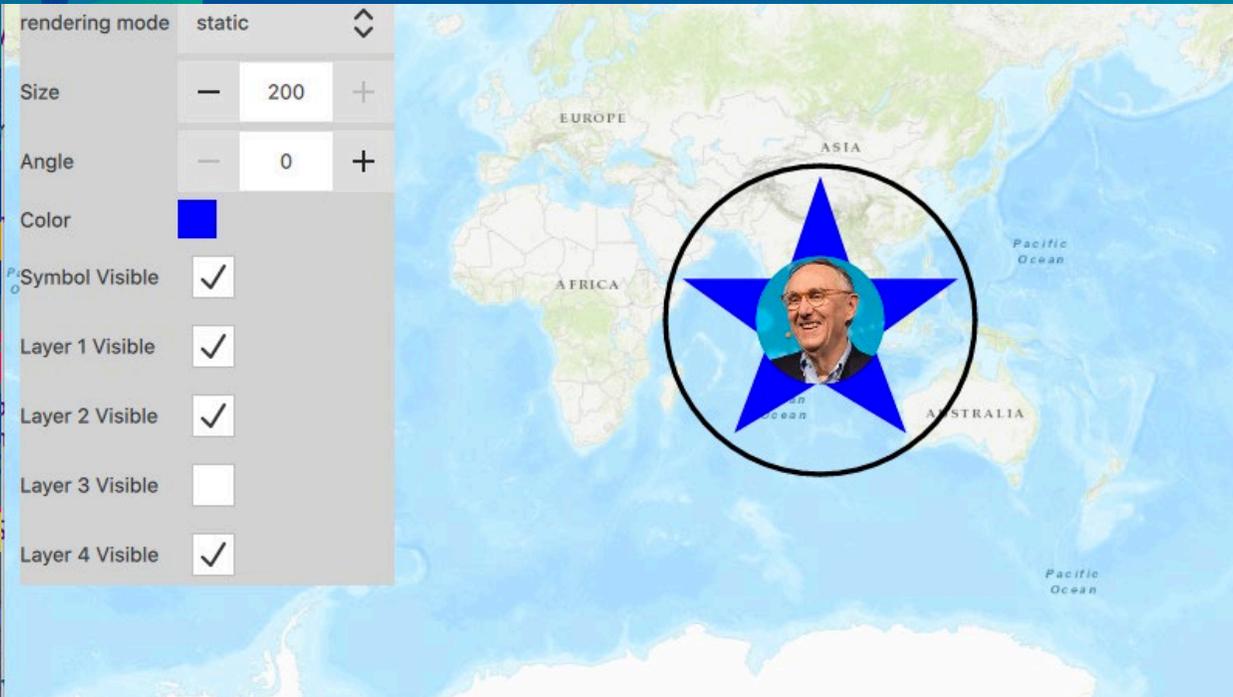
Multilayer Symbols

- ‘Symbol of Symbols’
- Opens up more customization options:
 - Custom shape geometry for Points
 - Lines with custom geometric effects
 - Polygons with repeating point symbols
- Symbol Model for ArcGIS Pro & the future
- Workflows:
 - Create in Pro (MMPK, MSPK, .stylx)
 - Consume/Modify in Runtime
 - Create in Runtime



Multilayer Symbol API

- **MultilayerSymbol base class**
 - **MultilayerPointSymbol**
 - **MultilayerPolylineSymbol**
 - **MultilayerPolygonSymbol**
 - **All of these contain a mutable list of SymbolLayer**
- **SymbolLayer base class**
 - **MarkerSymbolLayer**
 - **StrokeSymbolLayer**
 - **FillSymbolLayer**



MultilayerSymbol Editor Example

Summary

- **Several workflows for styling maps**
- **ArcGIS Pro**
 - MMPK, MSPK, Style File
 - Multilayer symbol editor
 - Visual Variables & Arcade
- **ArcGIS Online**
 - Web maps
 - Smart mapping
- **Runtime**
 - Consume and modify with Symbol APIs
 - Create Programmatically



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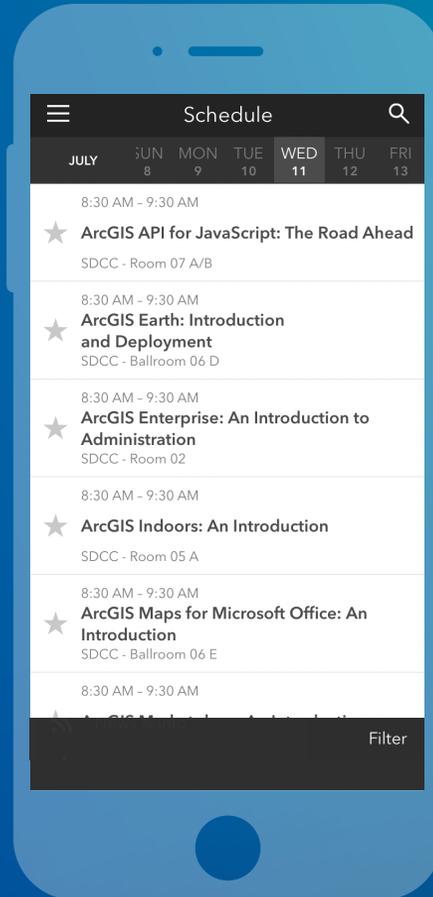
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SCIENCE
OF
WHERE

Please Take Our Survey on the App

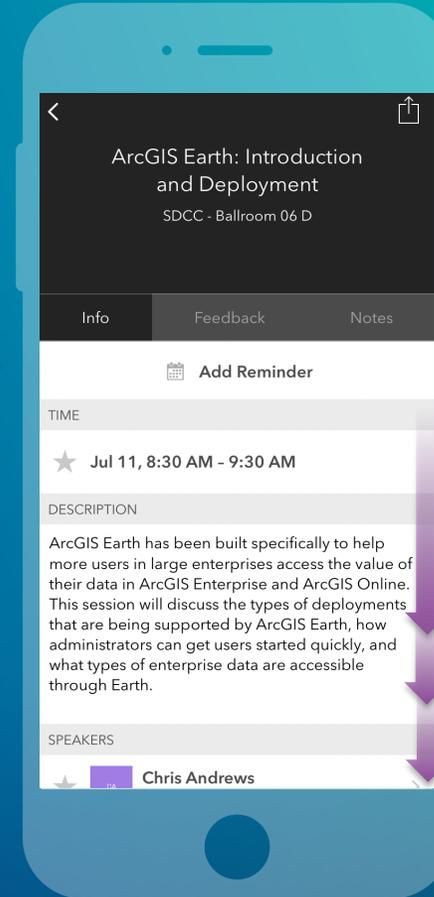
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