

# How does the Scene Viewer Work ?

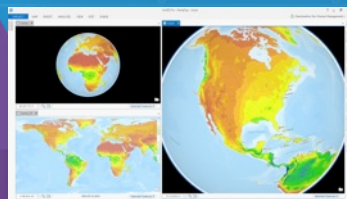
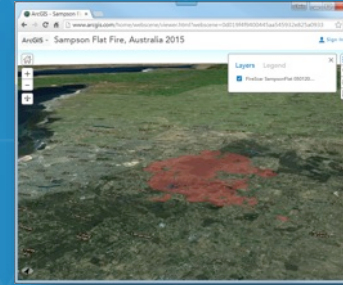
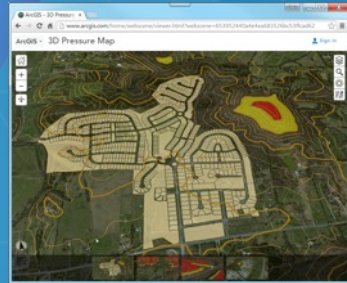
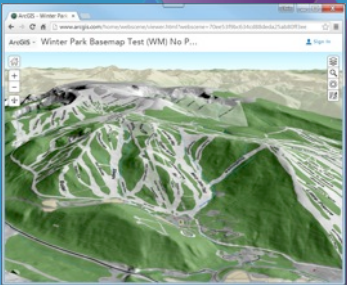
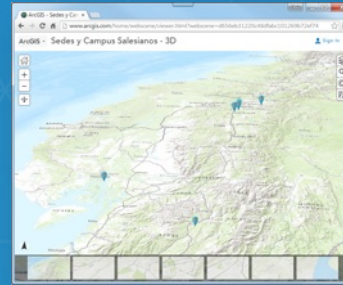
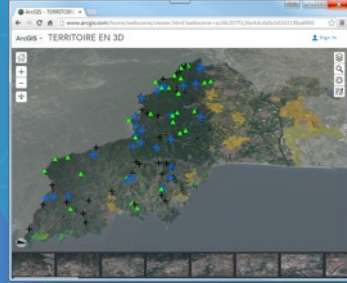
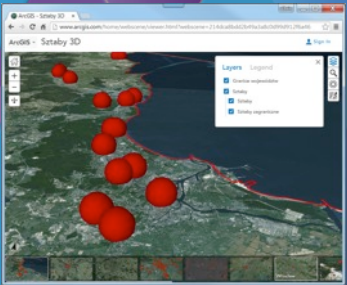
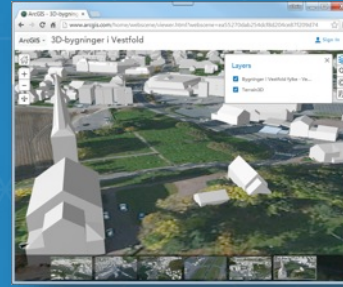
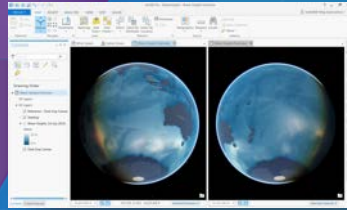
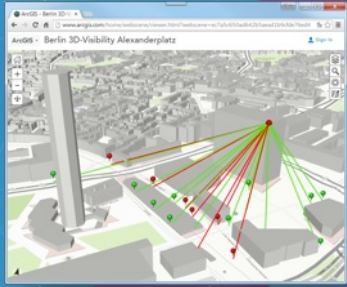
Javier Gutierrez  
Johannes Schmid

# Agenda

- **Introduction**
- **View a Scene**
- **WebScene Specification**
- **Author a Scene**
- **Wrap-up**



# Introduction



# 3D across the Platform

Edit and manage 2D and 3D data

Create visualizations and analyses

Package data for distributed use

Customize the end user experience



Desktop



Web



Runtime



Web Scenes



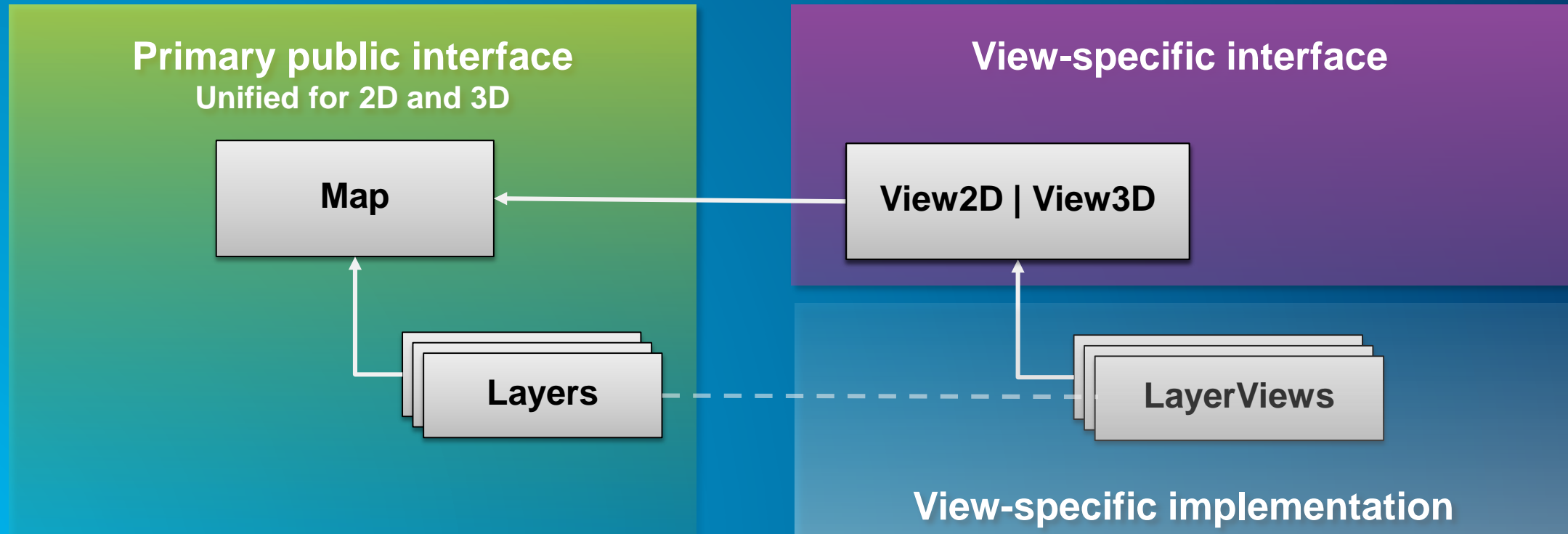
# Introduction

## What is the Scene Viewer

- **Tool to View, Author, Edit, Save and Share 3D Web Scenes**
  - ArcGIS Online and On-Premise Portal
- **Browser based web application - WebGL**
  - Modern Browser + Graphics Card required
- **Simple, modern user experience**
- **Built with ArcGIS API for JavaScript 4.0**

# Extending the ArcGIS JavaScript API to 3D

- ArcGIS API for JavaScript 4.0
  - One API for 2D and 3D



# View a Scene

3D navigation + slides + viewer tools + light and shadows

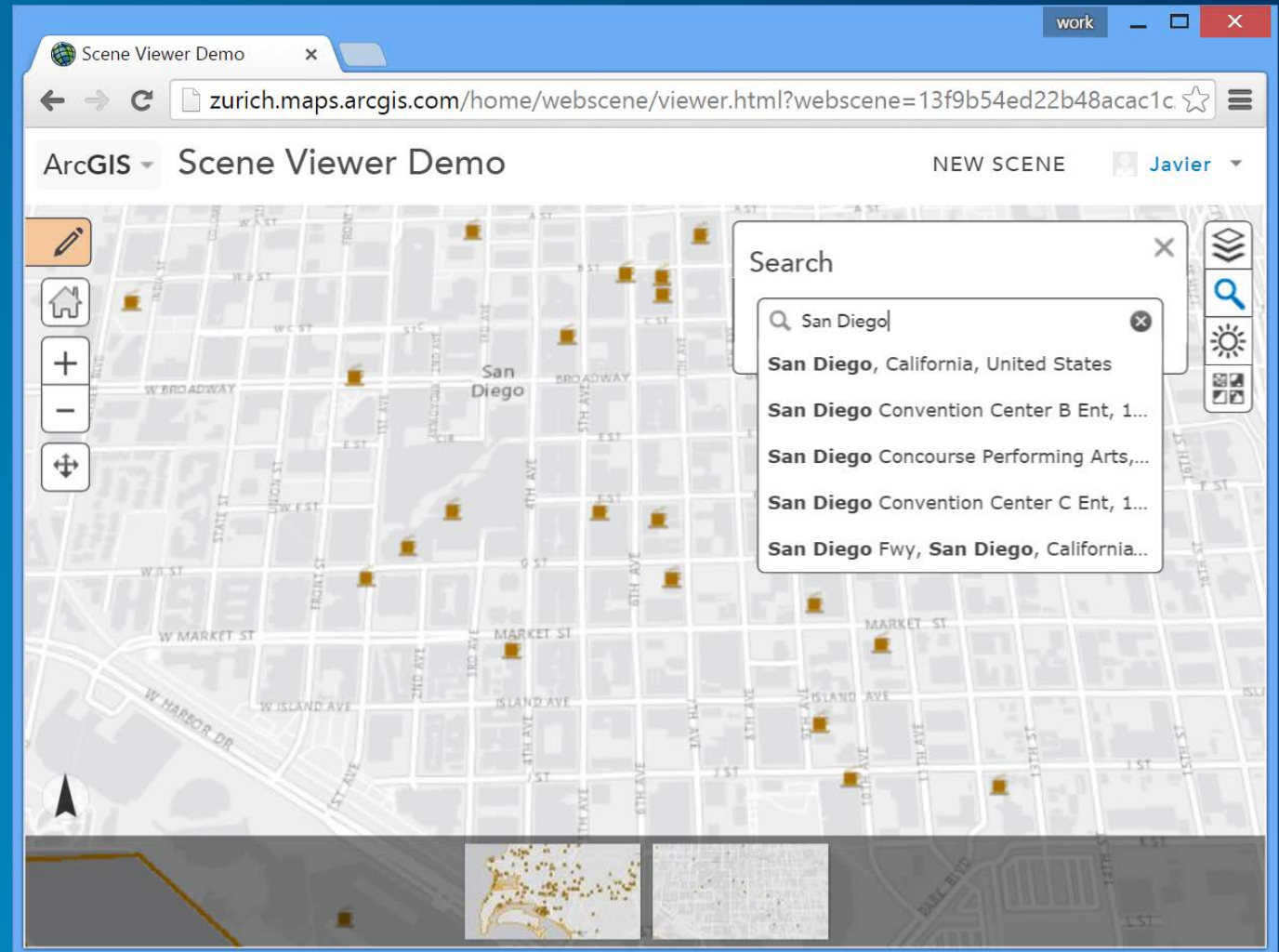


# View a Scene

- Navigation
- Search
- Slides

## Demo

<http://zurich.maps.arcgis.com/home/webscene/viewer.html?webscene=13f9b54ed22b48acac1c2b1e3aba3ec1>

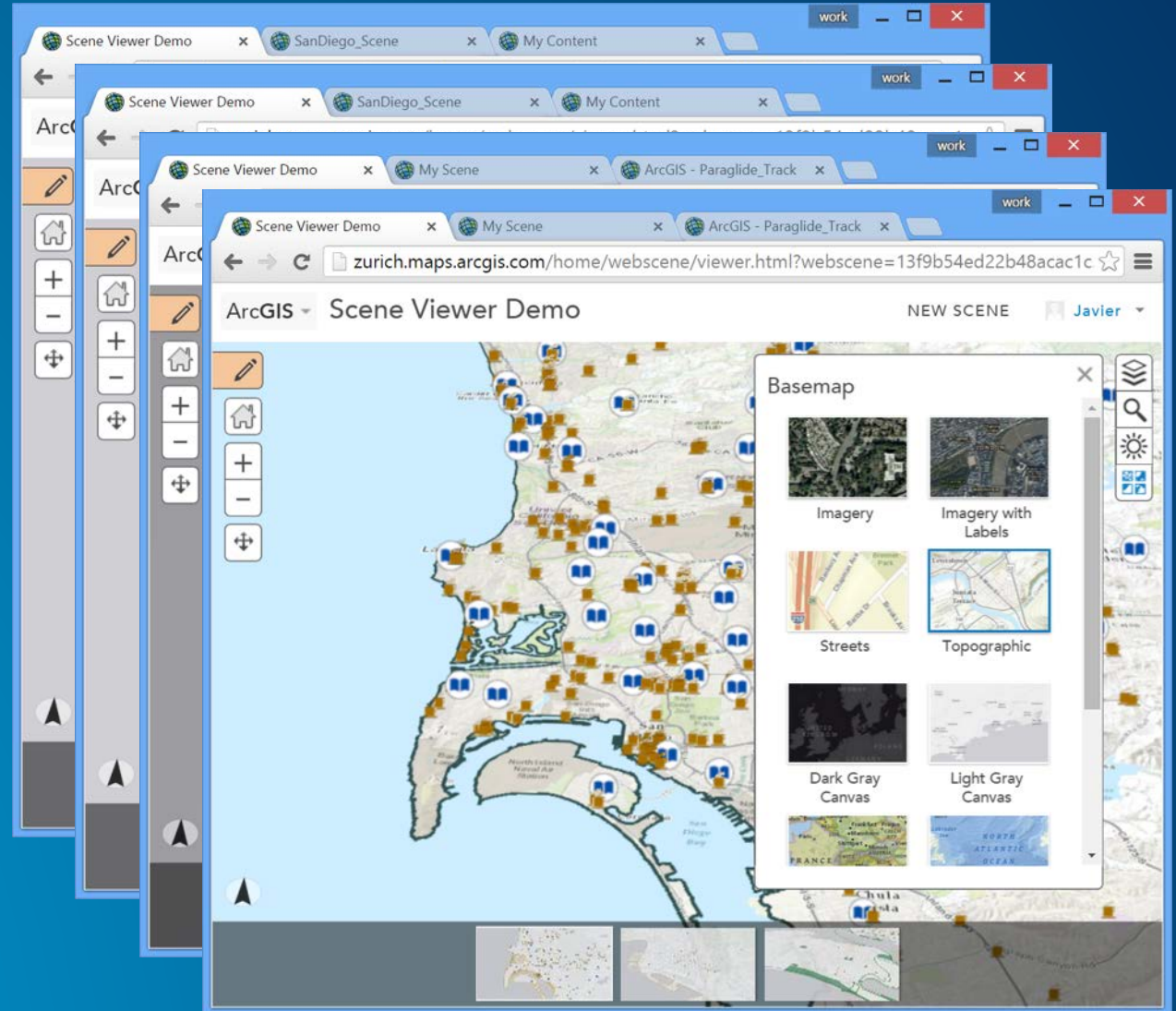


# View a Scene

- Layers / Legends
- Light/Shadows
- Basemap

## Demo

<http://zurich.maps.arcgis.com/home/webscene/viewer.html?webscene=13f9b54ed22b48acac1c2b1e3aba3ec1>



# WebScene Specification

operational layers + basemap + presentation + initial state



# WebScene JSON

```
{  
  // required  
  "operationalLayers": [ ... ],  
  "baseMap": {  
    "baseMapLayers": [ ... ],  
    "elevationLayers": [ ... ]  
  },  
  // optional  
  "initialState": { ... },  
  "presentation": { ... },  
  
  "version": "1.0",  
  "authoringApp": "WebSceneViewer",  
  "authoringAppVersion": "3.7.0.0"  
}
```

ArcGIS FEATURES PLANS GALLERY MAP SCENE HELP Sign In

## Gallery

### Esri Featured Content Sort By:

**Maps**

Show

- All
- Imagery
- Basemaps
- Historical Maps
- Demographics & Lifestyle
- Landscape
- Earth Observations
- Urban Systems
- Transportation
- Boundaries & Places
- Story Maps


**Scenes**


Area


- All
- United States
- World


**Apps**


Search the website or visit the ArcGIS Marketplace





**Brest, France Scene** 





**Rotterdam, the Netherlands Scene** 





**Berlin, Germany Scene** 




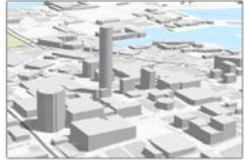
**Basel, Switzerland Scene** 




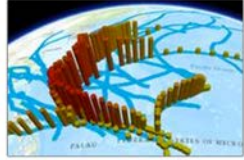
**Portland, Oregon USA Scene** 




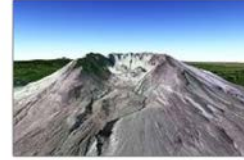
**Auckland, New Zealand Scene** 





**Western Pacific Typhoons (2005)** 



**Interesting Places** 



**Winter Sun Exposure** 



# WebScene JSON – Layers

```
{
  "operationalLayers": [{
    "url": "http://.../Hurricane/FeatureServer/0",
    "title": "HurricaneAndrew Points",
    "id": "14bad5e9347-layer1",
    "visibility": true,
    "layerType": "ArcGISFeatureLayer"
  }
]}
```

- **Layer Types**

- **Feature Layer**
- **Tiled Map Layer**
- **Dynamic Map Layer**
- **Scene Layer**
- **Elevation Layer**
- **Group Layer**

DEMO

<http://zurich.maps.arcgis.com/home/webscene/viewer.html?webscene=ba39c8aa87ad49629132507e6fb7f12d>





# WebScene JSON – Group Layers

```
{
  "operationalLayers": {
    "title": "Hurricane",
    "id": "148e1a43abe-layer2",
    "layerType": "GroupLayer",
    "visibilityMode": "independent",
    "listMode": "show",
    "layers": [{
      "url": "http://.../Hurricane/FeatureServer/0",
      "title": "HurricaneAndrew Points",
      ...
    }]
  }
}
```

- **Visibility Modes**

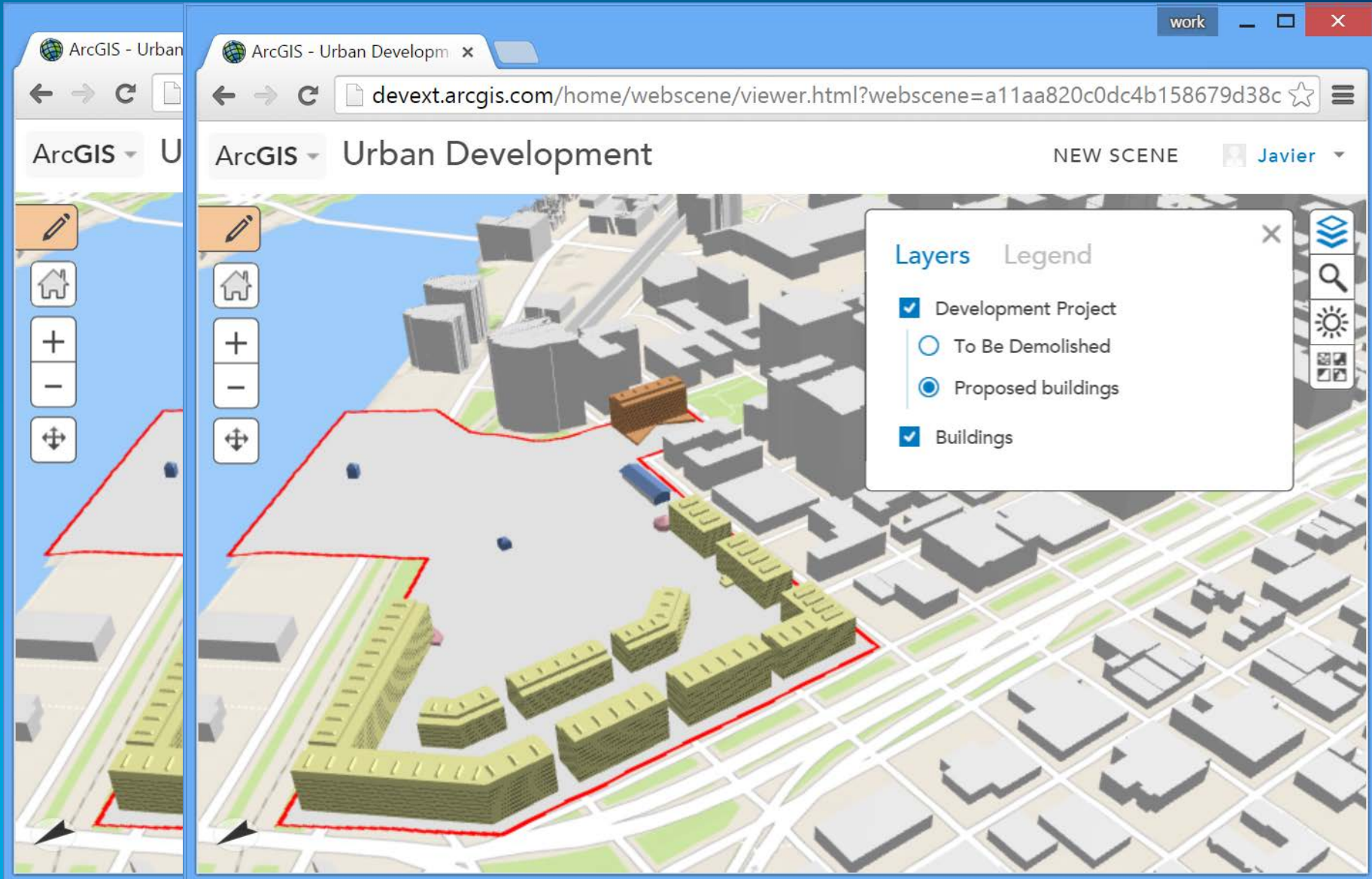
- Independent
- Exclusive
- Inherited

- **List Modes**

- Show
- Hide
- Hide-children

## Demo

<http://devext.arcgis.com/home/webscene/viewer.html?webscene=a11aa820c0dc4b158679d38c247971b4>



# WebScene JSON – Layer Definition

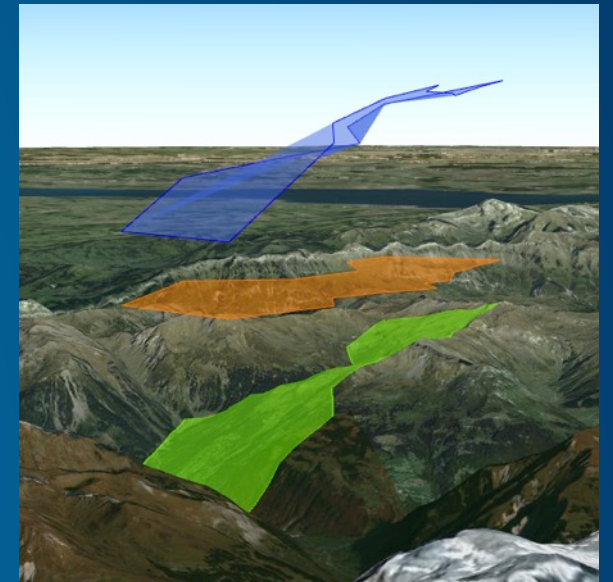
```
"operationalLayers": [{  
  "url": "...",  
  "title": "HurricaneAndrew Points",  
  "layerDefinition": {  
    "drawingInfo": {  
      "renderer": { ... },  
      "labelingInfo": [ {...} ]  
    },  
    "popupInfo": { ... },  
    "elevationInfo": {  
      "mode": "absoluteHeight",  
      "offset": 10000  
    }  
  }  
}]
```

- **Elevation Info Modes**

- **Absolute: Z value ( or 0 )**
- **Relative: Terrain + Z value (or 0)**
- **On The Ground: Draped**

## DEMO

<http://zurich.maps.arcgis.com/home/webscene/viewer.html?webscene=e82fec2cb3ff4f62ab33ae024fd43805>





# WebScene JSON – Renderer & Symbols

```
"operationalLayers": [{  
  "layerDefinition": {  
    "drawingInfo": {  
      "renderer": {  
        "type": "classBreaks",  
        "field": "WIND_KTS",  
        "defaultSymbol": { ... },  
        "classBreakInfos": [{  
          "symbol": { ... },  
          "label": "0 - 60",  
          "classMaxValue": 120  
        }, ...]  
      }  
    }  
  }  
}]
```

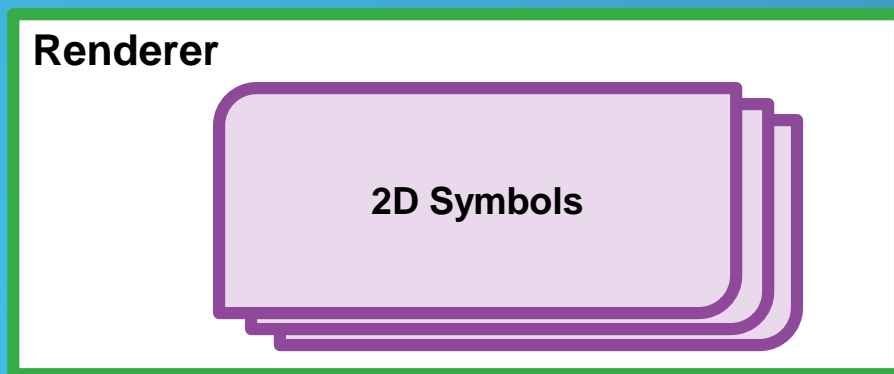
```
"symbol" : {  
  "type" : "PointSymbol3D",  
  "symbolLayers" : [{  
    "width" : 1000,  
    "height" : 1600,  
    "resource" : {  
      "primitive" : "cone"  
    },  
    "type" : "Object",  
    "material" : {  
      "color" : [255, 0, 0]  
    }  
  }  
]  
}
```



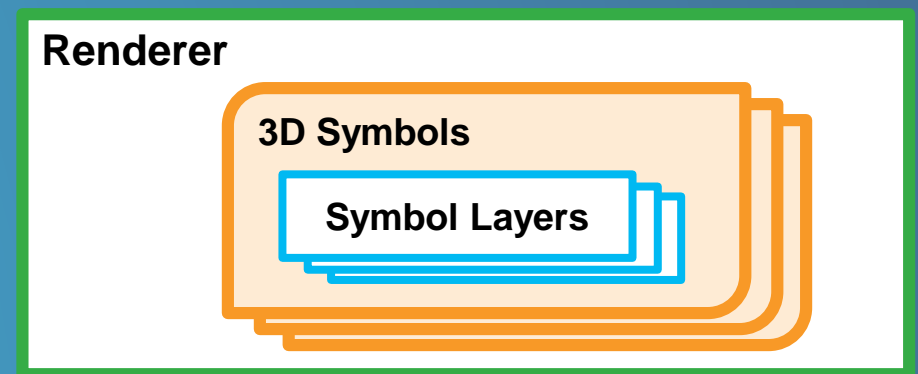
# Web 3D Symbology

- New modern and simple spec
- Inherits concepts from JS and Pro symbology
- Design with 3D and 2D in mind
  - future proof, flexible and extensible

Existing 2D Symbology



New 3D Symbology






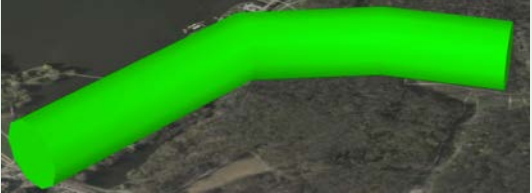

# Web3D Symbology

- Symbol – Symbol Layer relationships

	Icon	Object	Line	Path	Fill
PointSymbol3D	✓	✓	✗	✗	✗
LineSymbol3D	✗	✗	✓	✓	✗
PolygonSymbol3D	✗	✗	✓	✗	✓
MeshSymbol3D	✗	✗	✗	✗	✓

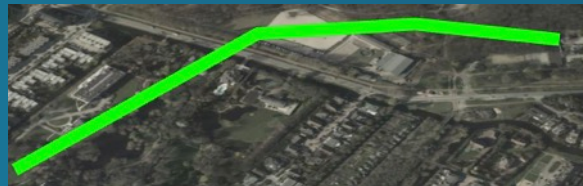


# Web3D Symbology: flat vs. volumetric

Web3D “flat” symbol layer	Web3D “volumetric” symbol layer
Icon 	Object 
Line 	Path 
Fill 	Extrude

# WebScene JSON – Renderer & Symbols

```
"symbol": {  
  "type": "LineSymbol3D",  
  "symbolLayers": [  
    {  
      "size": 3,  
      "type": "Line",  
      "material": {  
        "color": [ 0, 255, 0 ],  
        "transparency": 30  
      }  
    }  
  ]  
}
```



```
"symbol": {  
  "type": "LineSymbol3D",  
  "symbolLayers": [  
    {  
      "width": 300,  
      "type": "Path",  
      "material": {  
        "color": [ 0, 255, 0 ],  
        "transparency": 30  
      }  
    }  
  ]  
}
```



# WebScene JSON

```
{  
  // required  
  "operationalLayers": [ ... ],  
  "baseMap": {  
    "baseMapLayers": [ ... ],  
    "elevationLayers": [ ... ]  
  },  
  // optional  
  "initialState": { ... },  
  "presentation": { ... },  
  
  "version": "1.0",  
  "authoringApp": "WebSceneViewer",  
  "authoringAppVersion": "3.7.0.0"  
}
```

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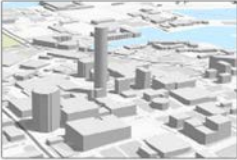
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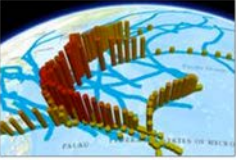
**Rotterdam, the Netherlands Scene** 

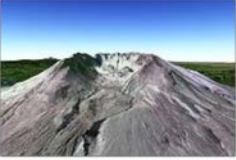
**Berlin, Germany Scene** 


**Basel, Switzerland Scene** 

**Portland, Oregon USA Scene** 

**Auckland, New Zealand Scene** 

**Western Pacific Typhoons (2005)** 

**Interesting Places** 

**Winter Sun Exposure** 



# WebScene JSON – Basemap

```
"baseMap": {  
  "title": "Imagery",  
  "baseMapLayers": [{  
    "url": "http://.../World_Imagery/MapServer",  
    "layerType": "ArcGISTiledMapServiceLayer",  
    "isReference": false  
  }],  
  "elevationLayers": [{  
    "url": "http://.../Terrain3D/ImageServer",  
    "layerType": "ArcGISTiledElevationServiceLayer"  
  }]  
}
```

- **Same as in 2D**
  - Multiple imagery layers
  - Reference layers
- **Extended with Elevation**
  - Esri World Elevation Service
  - **World Coverage**
    - 10m US
    - 30m or 90m World



# WebScene JSON – Presentation

```
"presentation": {
  "slides": [{
    "id": "slide_1",
    "title": { "text": "Overview" },
    "description": { "text": "" },
    "thumbnail": {
      "url": "data:image/jpeg;base64,/9j/4AAQS..."
    },
    "viewpoint": { ... },
    "visibleLayers": [{
      "id": "14b9d963757-layer1"
    }],
    "baseMap": { ... }
  ]
}
```

- **Presentation**
  - List of slides + config
- **Slide**
  - Stores scene state
    - Title, Description, Thumb
    - Viewpoint
    - Visible Layers
    - Basemap
    - ...
  - Slides > Bookmarks
  - Tied to scene data



# WebScene JSON – Initial State

```
"initialState": {  
  "viewpoint": {  
    "camera": {  
      "position": {  
        "x": -9816454.805143524,  
        "y": 5119416.309146534,  
        "z": 26573.093655988574,  
        "spatialReference": {  
          "wkid": 102100  
        }  
      },  
      "heading": 0,  
      "tilt": 0  
    }  
  }  
}
```

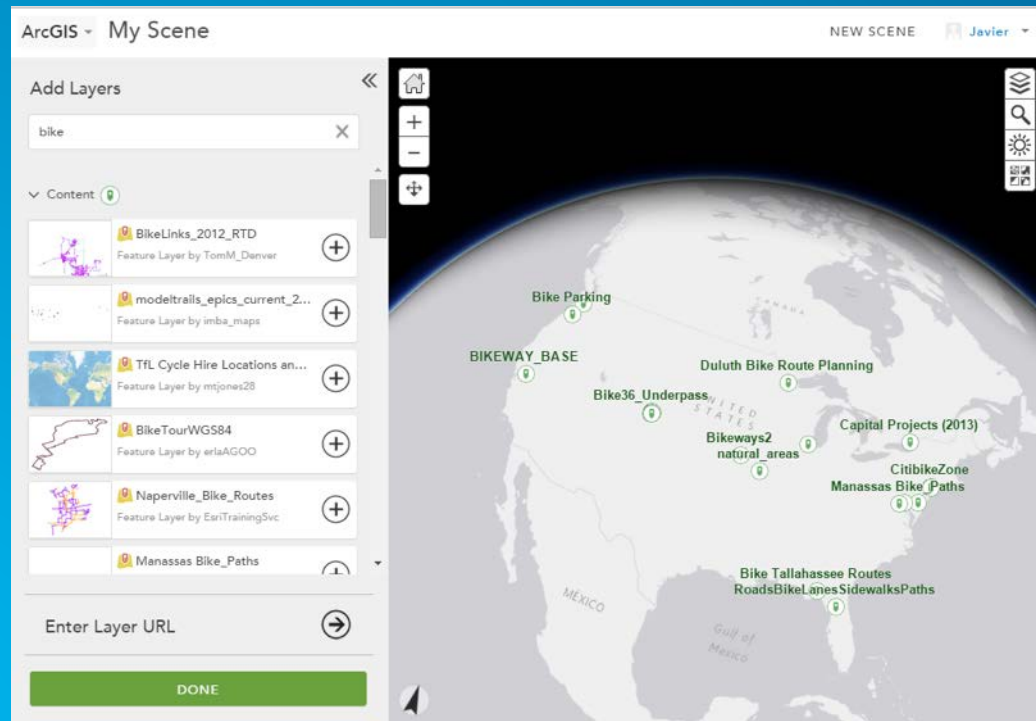
- Stores initial view of the scene
- Viewpoint
  - 2D/3D location
  - Target geometry
  - Same in slides
- Camera
  - Position + angles

# Author a Scene

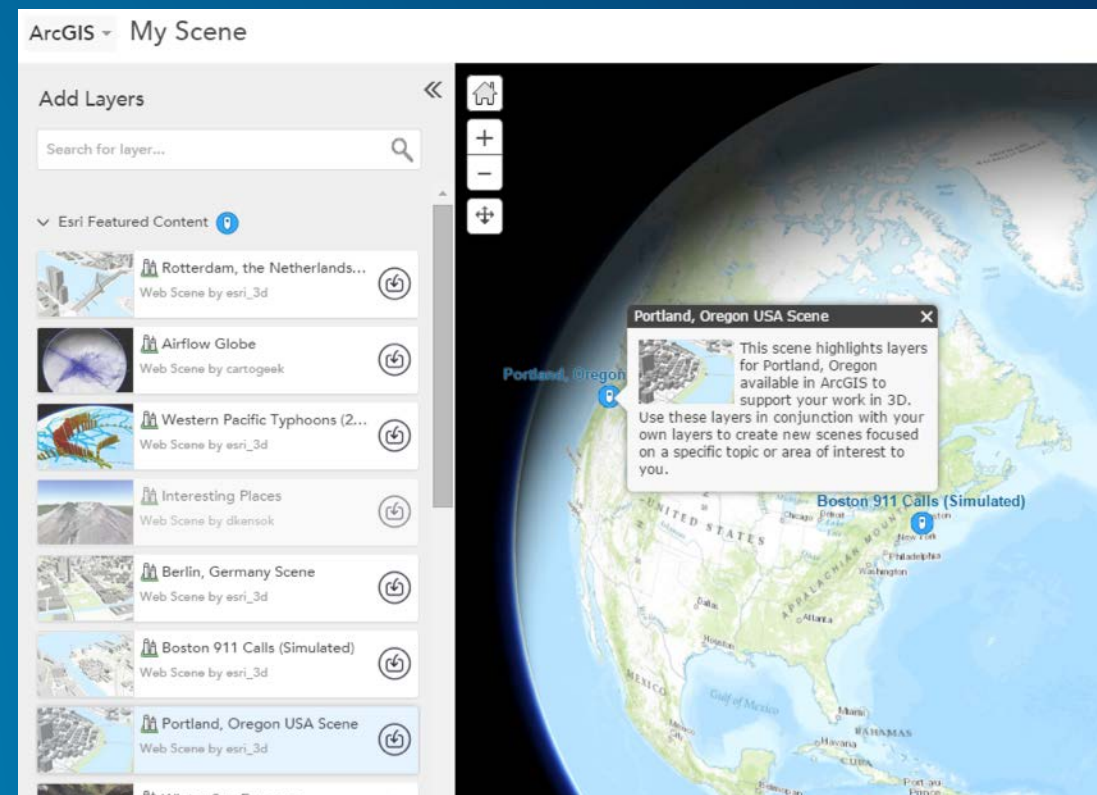
add layer + table of contents + configure layer + slides

# Add Layer

- Find Content
  - Layer location in scene view + name
  - Esri Featured Content / My Content / Content
  - Search keywords



- Esri Featured Content
  - Lists featured scenes (not layers)
  - Click imports the scene

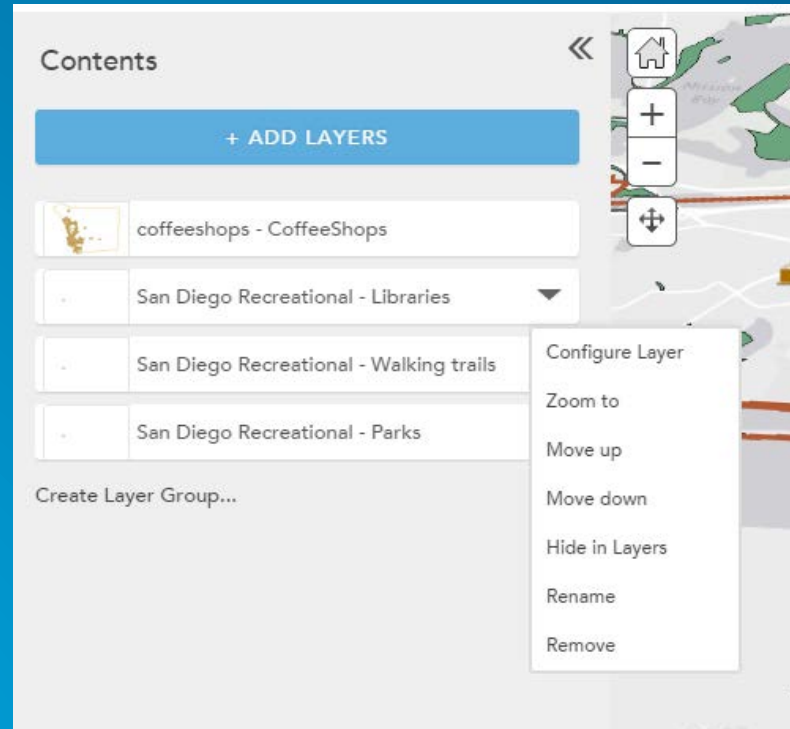




# Table of Contents

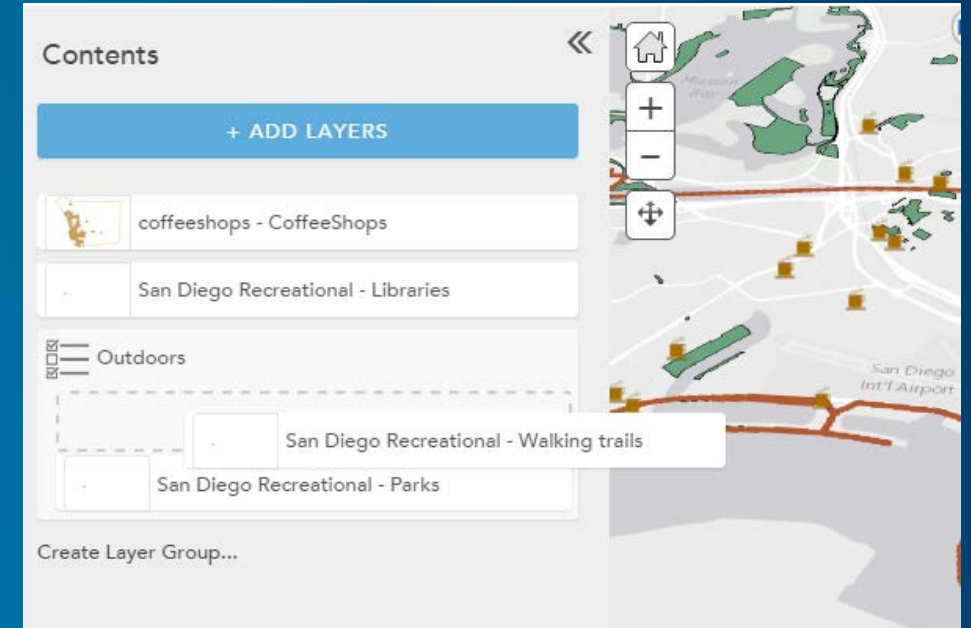
- **Layers**

- Add
- Rename
- Reorder
- Configure
- Remove



- **Layer Groups**

- Create
- Populate
- Change type



# Configure Layer

- **Tiled/Dynamic Map Layer**

- Transparency
- Legend

- **Scene Layer**

- Transparency
- Legend
- Popups
- Symbols

- **Feature Layer**

- Elevation Mode
- Transparency
- Legend
- Popups
- Labels
- Symbols

## Configure Layer

coffeeshops - CoffeeShops

Feature Layer by tps

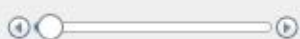
Elevation Mode

Relative to ground

Offset (meters)

40

Transparency



Pop-ups

on

Legend

off

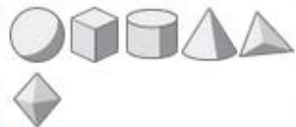
Symbols

Change symbols

Type

3D Obj

Shape



Color



Size (meters)

80





# Slides

- Create
- Rename
- Reorder
- Update

The screenshot displays the ArcGIS My Scene web interface. The browser address bar shows the URL `zurich.maps.arcgis.com/home/webscene/viewer.html?#`. The page title is "ArcGIS My Scene" and the user name "Javier" is visible in the top right. The interface is divided into a left sidebar and a main map area. The sidebar contains a "Slides" section with two slide thumbnails: "La Jolla" and "Slide 2". Below the slides is a "+ ADD SLIDE" button and a "DONE" button at the bottom. The main map area shows a satellite-style map of Mission Bay, San Diego, with a red line indicating a path or boundary. The map includes labels for "Mission Bay", "Sea World San Diego", "University of San Diego", and "San Diego River". A navigation toolbar is visible on the right side of the map, and a north arrow is located in the bottom left corner of the map area.



# Wrap-up

# Scene Viewer

- **Now available in ArcGIS Online**
- **Very soon in Portal for ArcGIS 10.3.1**
- **View and author scenes in the browser**
- **Integrated 3D across the platform**
- **What's coming**
  - **Share your scene**
  - **Compare slides side by side**
  - **Store light settings in Slides**
  - **More layer types**
  - ...

# Rate This Session

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**Questions?**



**Thank you!**

## Related Sessions

- **ArcGIS API for JavaScript: The Road Ahead**
  - Thursday, 5.30pm
  - Friday, 8.30am
  - Room: Primrose B