

Leveraging Vector Tile Layers in Web Apps

Rene Rubalcava

Vector Tiles

Vector Tiles

Do they work?

Vector Tiles
Do they work?
YES!

Questions?

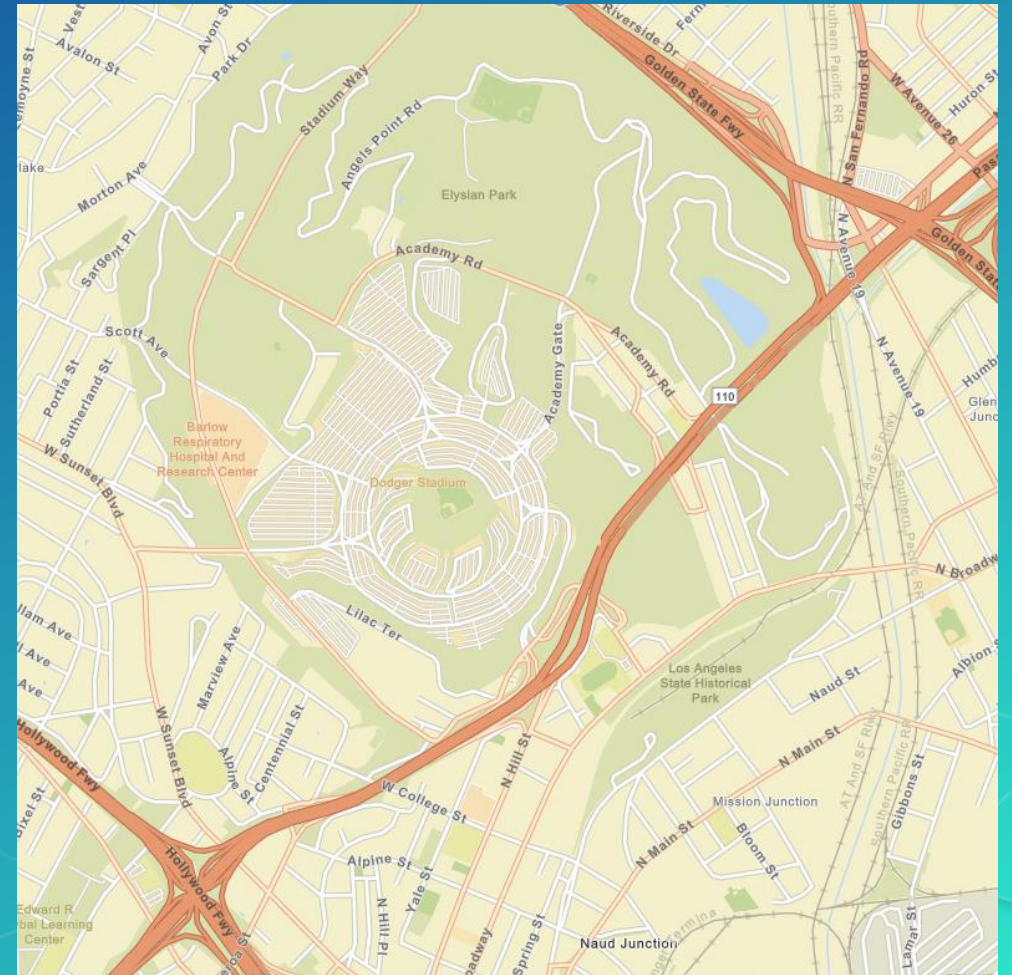
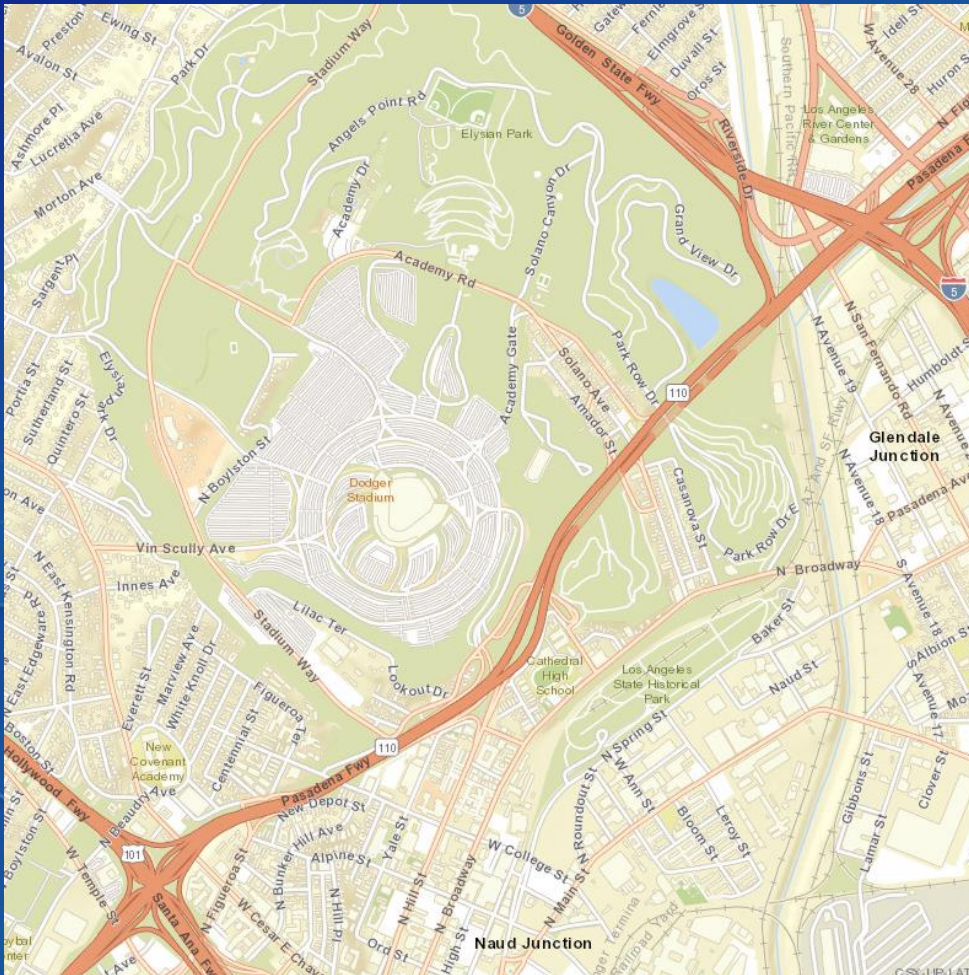
Kidding



Quick Intro

What are Vector Tiles?

Similar to Raster Tiles



What are Vector Tiles?

- Tiles of vector graphics rather than tiles of images

What are Vector Tiles?

- Tiles of vector graphics rather than tiles of images
- Smaller in size

What are Vector Tiles?

- Tiles of vector graphics rather than tiles of images
- Smaller in size
- Powered by GPU!
 - WebGL



1

Benefits to you and users



2

How to style (the good, the bad, the ugly)

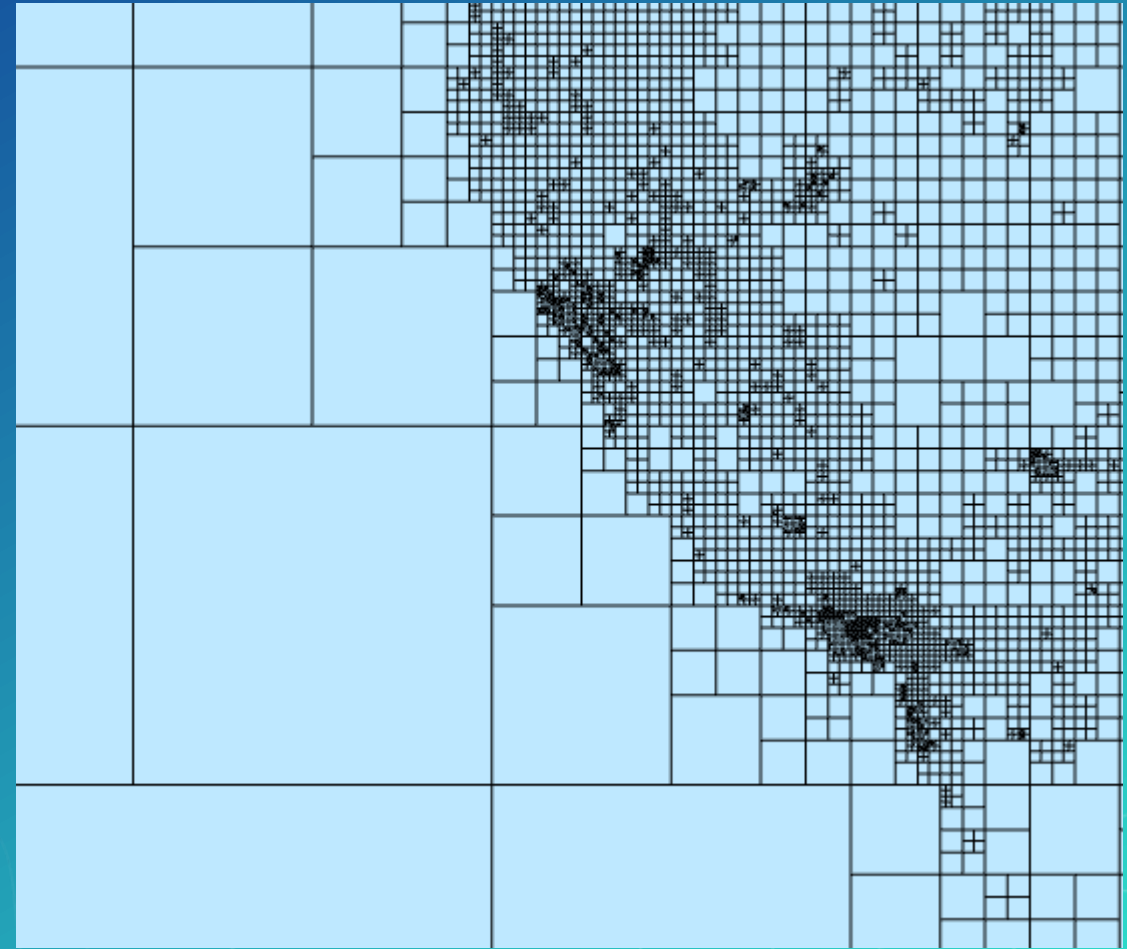


3

Publish and consume

Benefits

- Indexed Vector Tiles
 - Over-zoom
 - Normal tiling supported
 - Publish from ArcGIS Pro

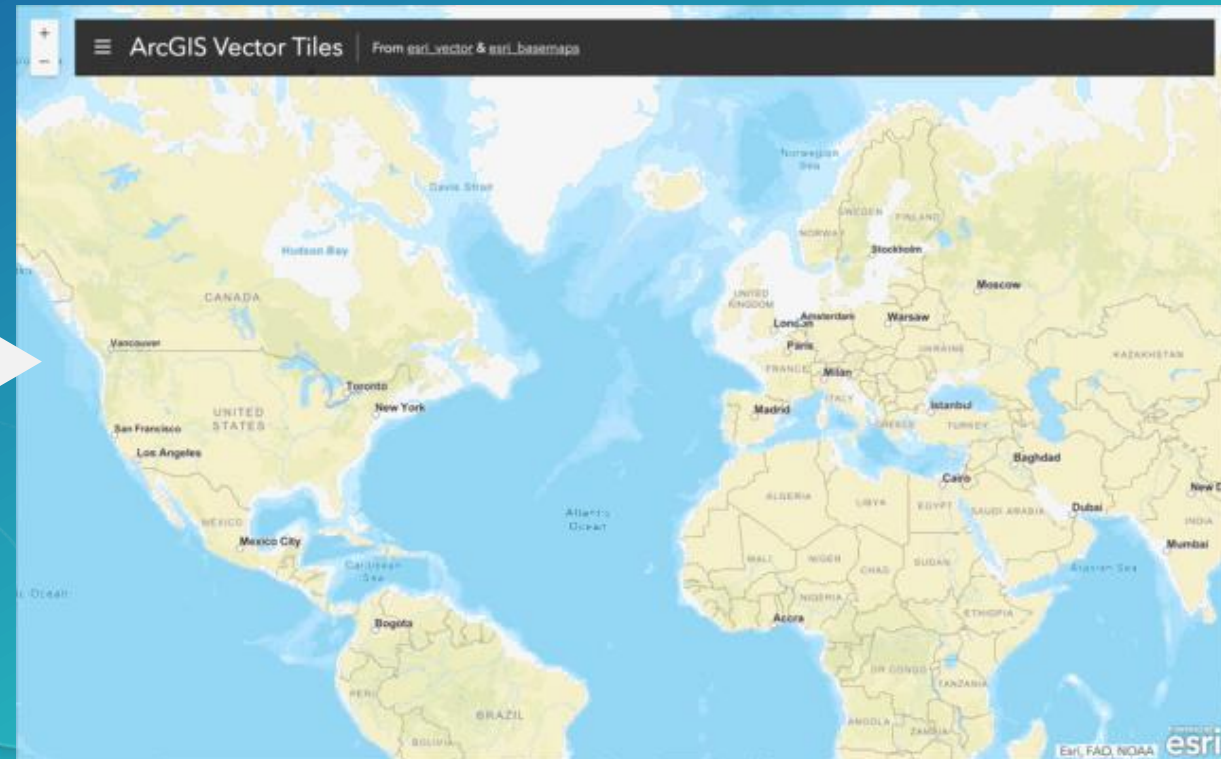


Benefits

- Esri provided Basemaps
 - Vector Basemaps Group

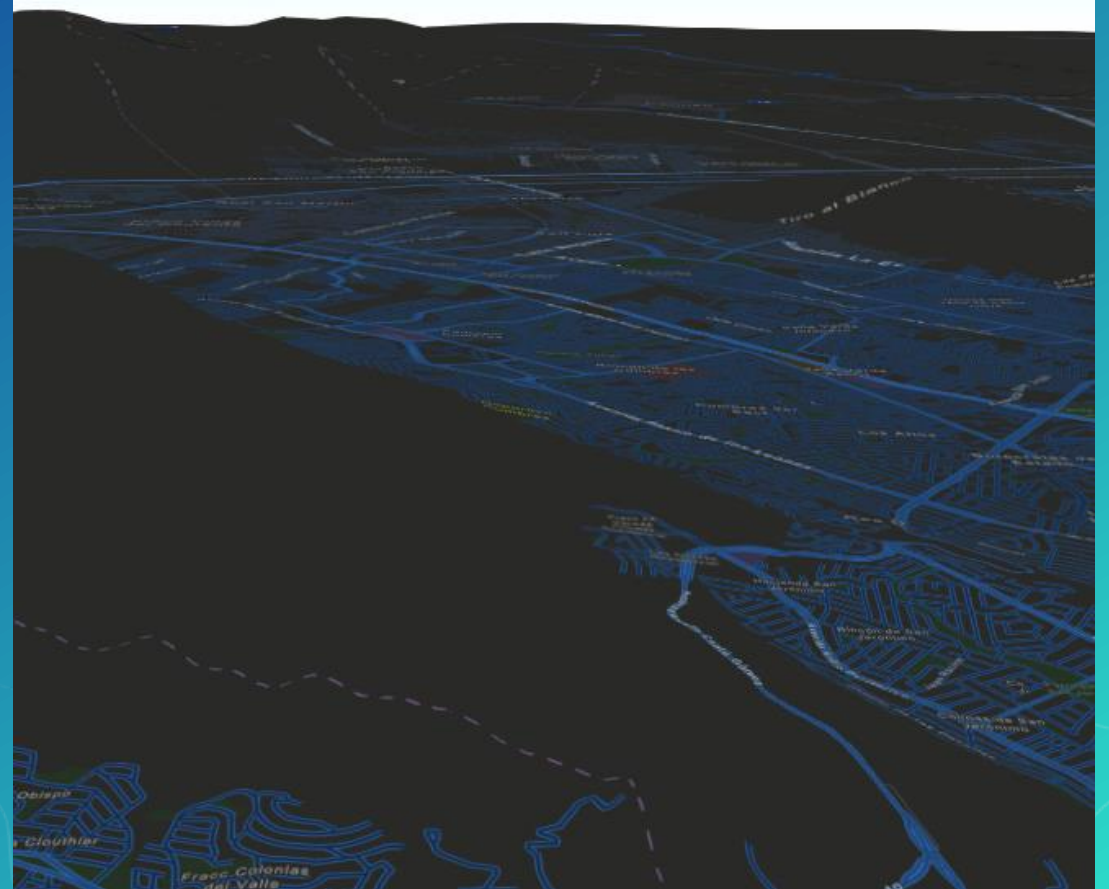
VT Basemap Explorer

<https://esri-es.github.io/arcgis-vector-tiles/>



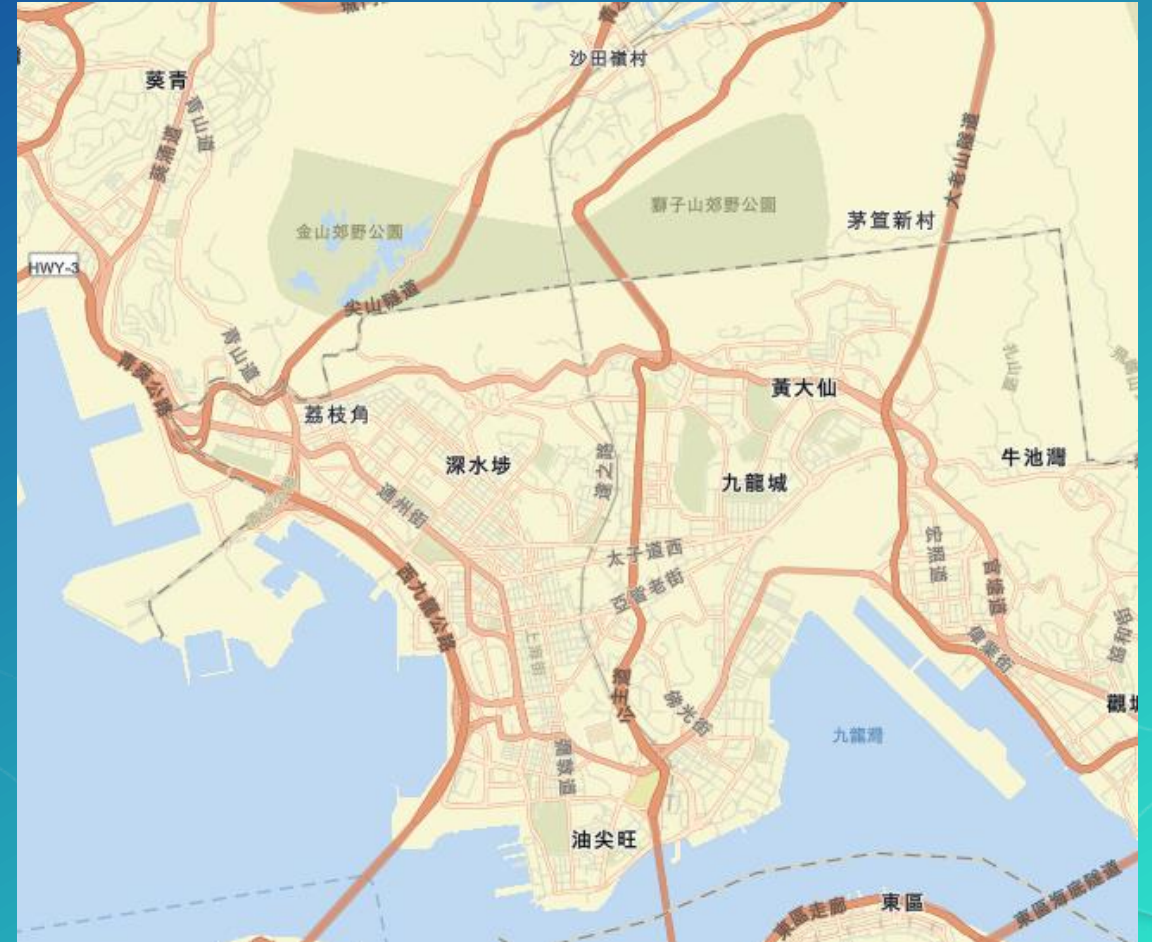
Benefits

- ArcGIS API for JavaScript
 - Out-of-the-box
 - 3D



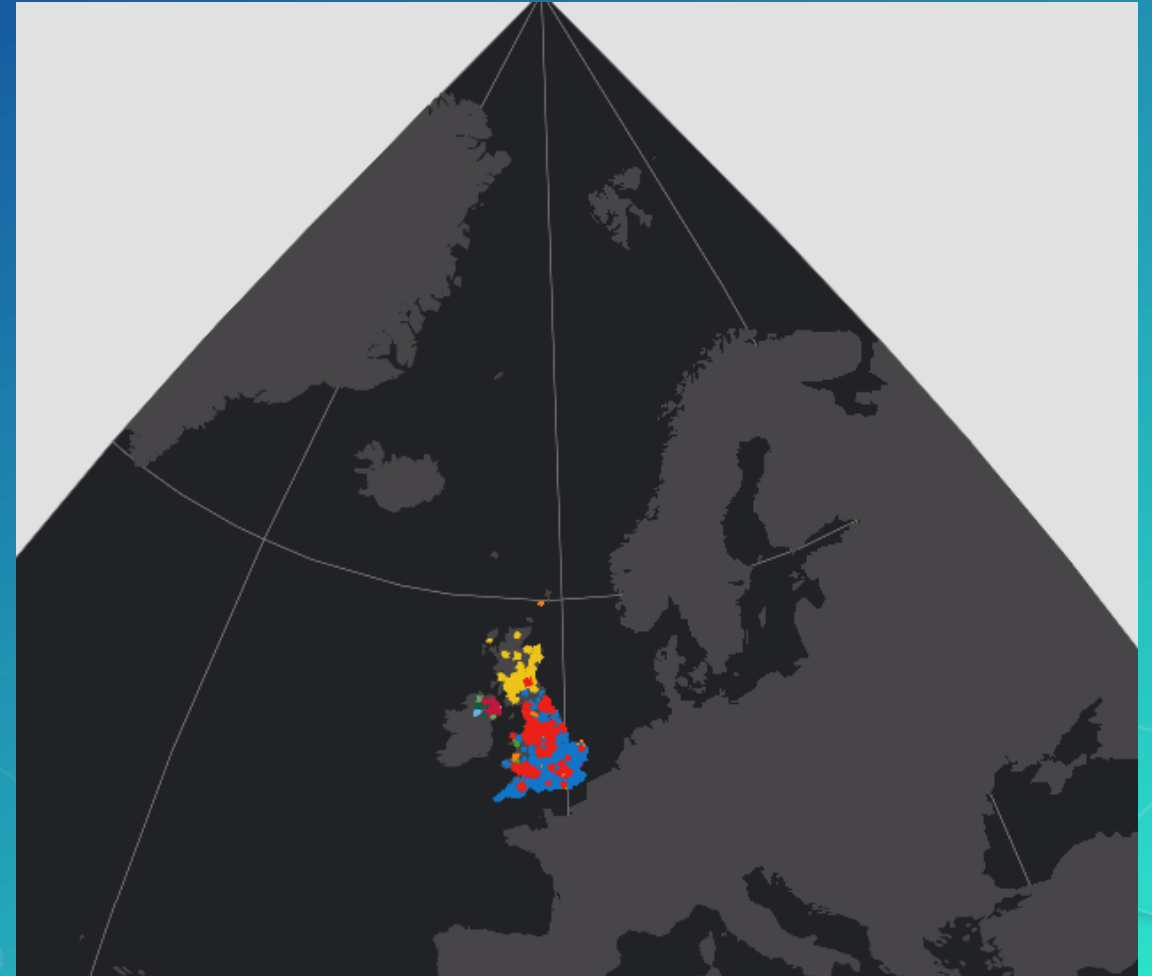
Benefits

- ArcGIS API for JavaScript
 - Out-of-the-box
 - 3D
 - Localized Labels



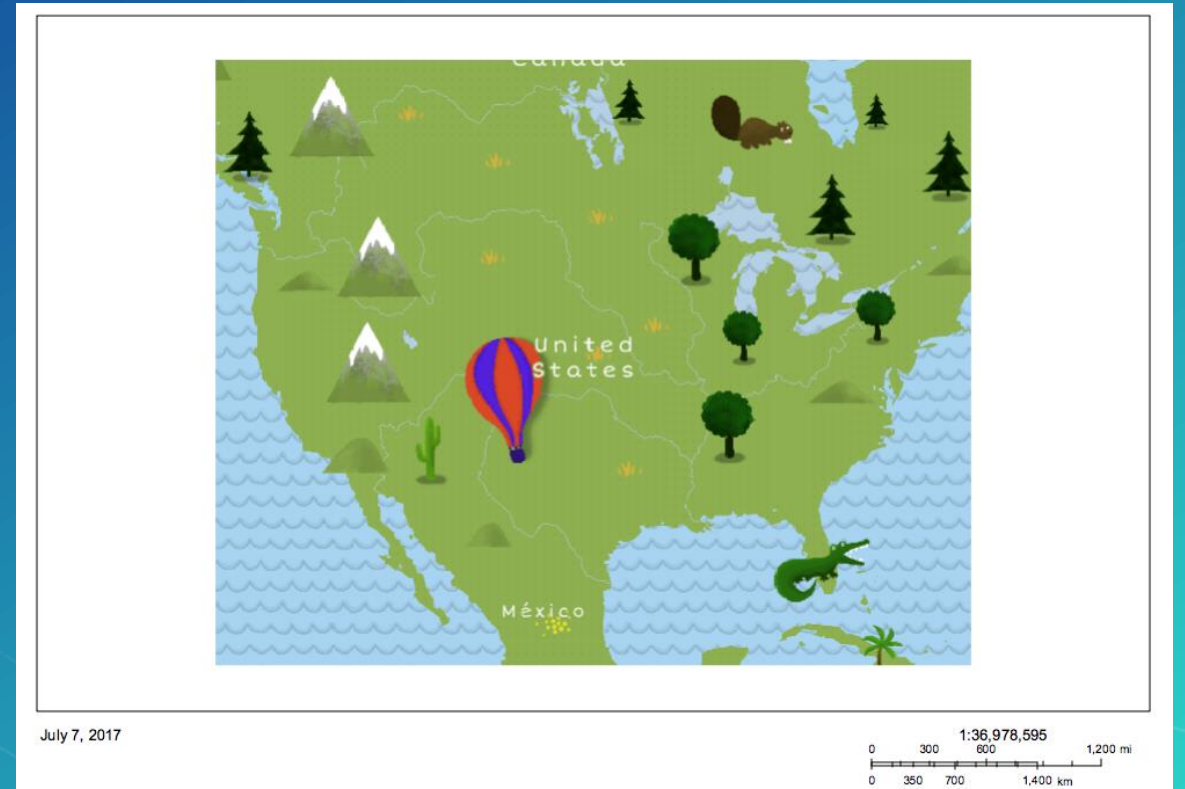
Benefits

- ArcGIS API for JavaScript
 - Out-of-the-box
 - 3D
 - Localized Labels
 - Custom Projections



Benefits

- ArcGIS API for JavaScript
 - Out-of-the-box
 - 3D
 - Localized Labels
 - Custom Projections
 - Printing



Benefits

- Do you need more than the basemaps?

Benefits

- Do you need more than the basemaps?
 - Custom styles?

Benefits

- Do you need more than the basemaps?
 - Custom styles?
 - Publish your own data?

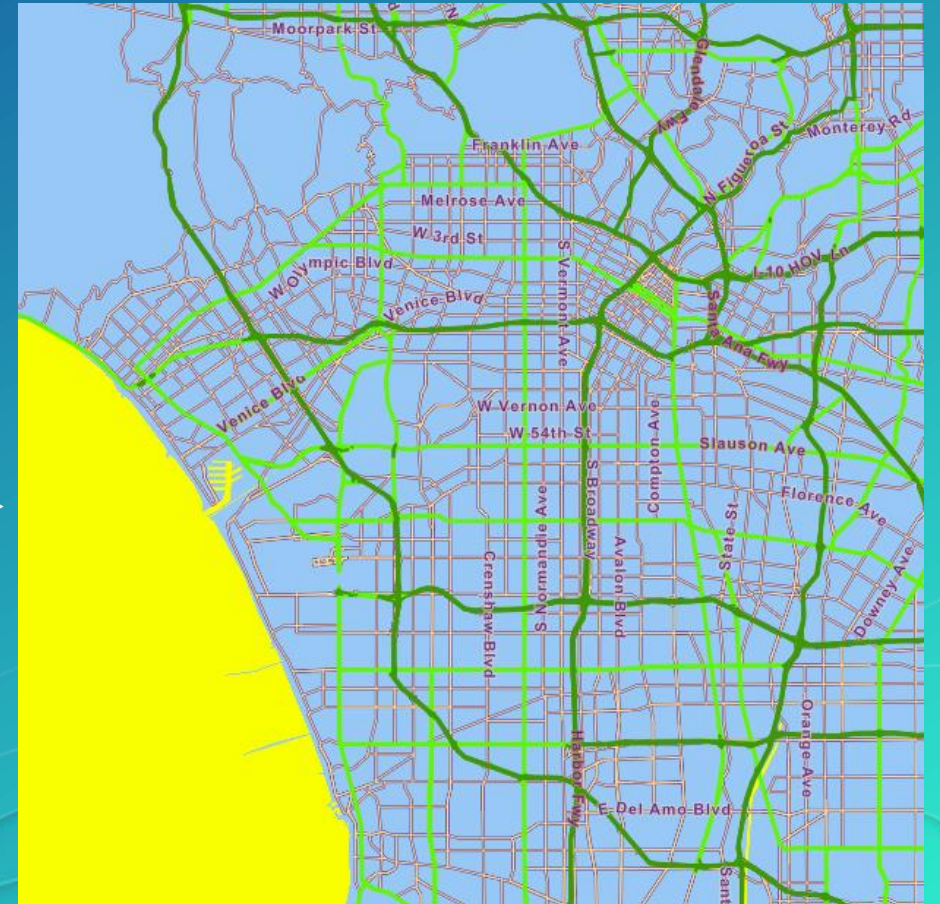
Benefits - Summary

- Indexed Vector Tiles
- Provided basemaps
- What are your needs?

Custom Styling

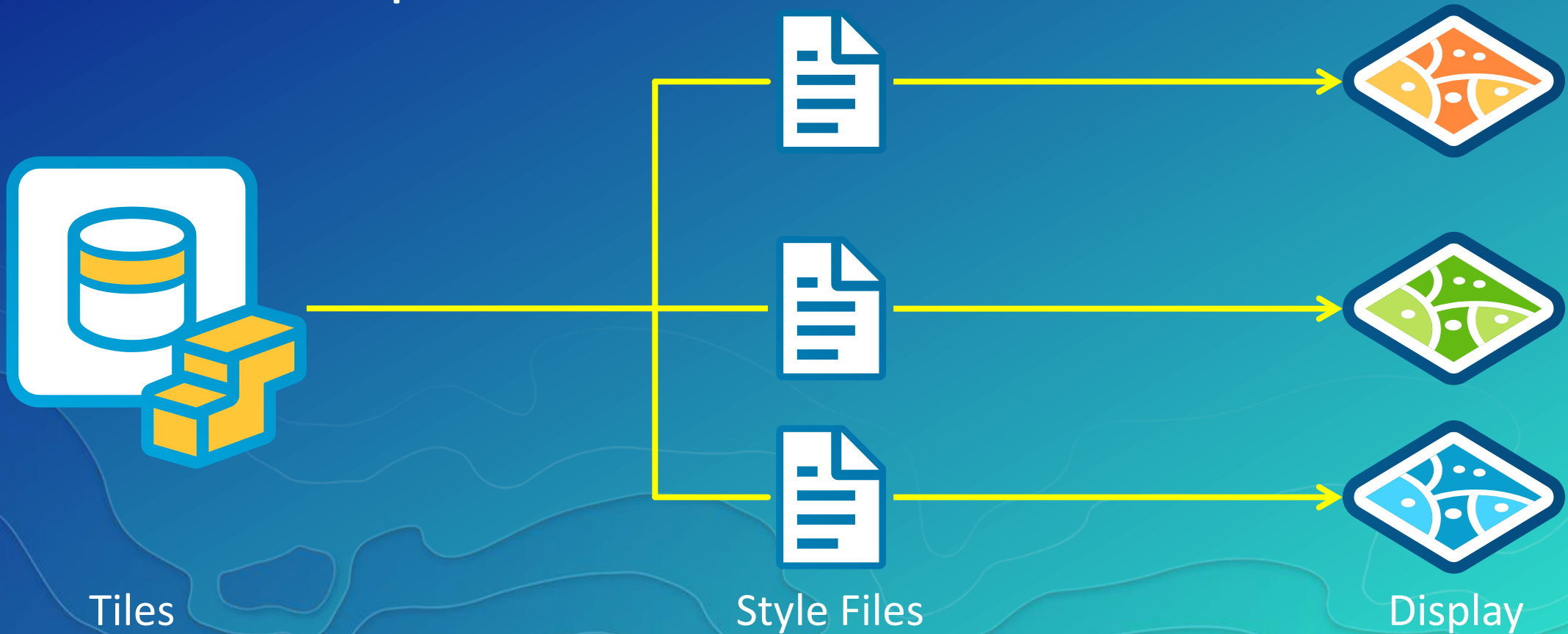
- This is going to be fun!

Please don't do this →



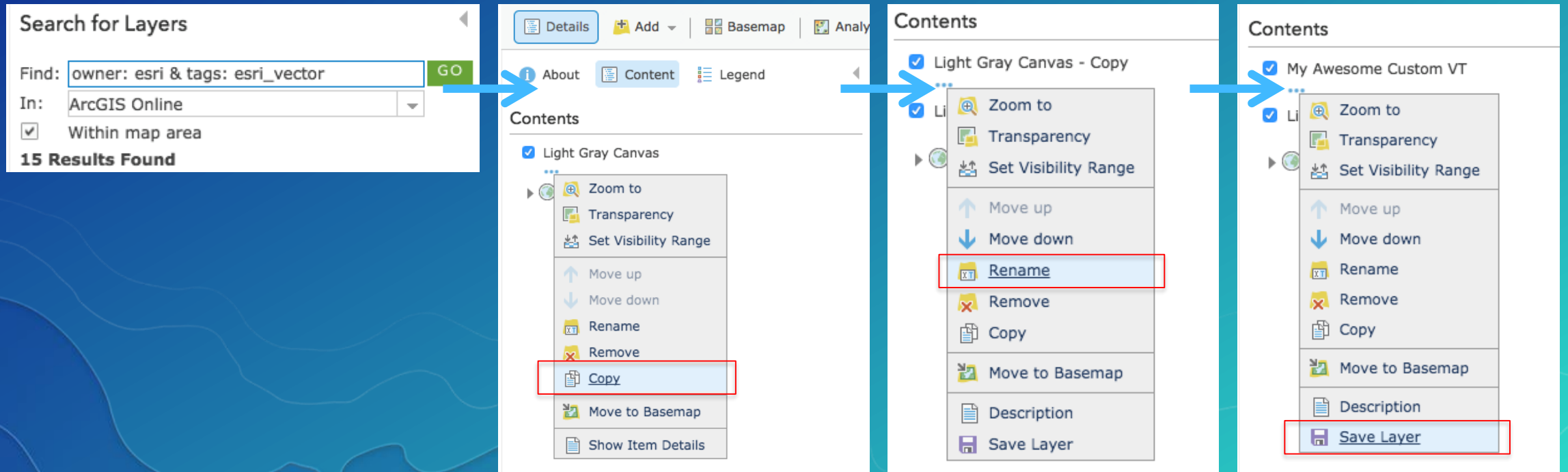
Custom Styling

- Quick Prerequisite



Custom Styling

• Step 1 – Copy a style in Online



Custom Styling

- Step 2 – Get creative!

3.X

```
vectorTileLayer.setStyle(styleJSON)
```

4.X

```
vectorTileLayer.loadStyle(styleJSON)
```

Custom Styling

• Step 2 – Get creative!

The screenshot shows the Esri Vector Basemap Style Editor interface. On the left, a JSON configuration for a style is displayed, with line numbers 1 through 36. The configuration includes a background layer with a red fill color (#f9fd01) and a building layer with a blue fill color (#552582) and a red outline color (#d9d188). The map on the right shows a street map of Los Angeles with the background colored red and buildings colored blue. The interface includes a search bar, a map navigation toolbar, and a 'Style Reference' link.

```
1- {
2-   "glyphs": "http://basemaps.arcgis.com/arcgis",
3-   "layers": [
4-     {
5-       "id": "background",
6-       "point": {
7-         "background-color": "#f9fd01"
8-       },
9-       "type": "background"
10-    },
11-    {
12-      "id": "Land",
13-      "point": {
14-        "fill-color": "#99c8f4"
15-      },
16-      "source": "esri",
17-      "source-layer": "Land",
18-      "type": "fill"
19-    },
20-    {
21-      "id": "Building",
22-      "layout": {},
23-      "minzoom": 15,
24-      "point": {
25-        "fill-color": "#552582",
26-        "fill-outline-color": "#d9d188"
27-      },
28-      "source": "esri",
29-      "source-layer": "Building",
30-      "type": "fill"
31-    },
32-    {
33-      "id": "Road/Local/1",
34-      "type": "line",
35-      "source": "esri",
36-      "source-layer": "Road",
```

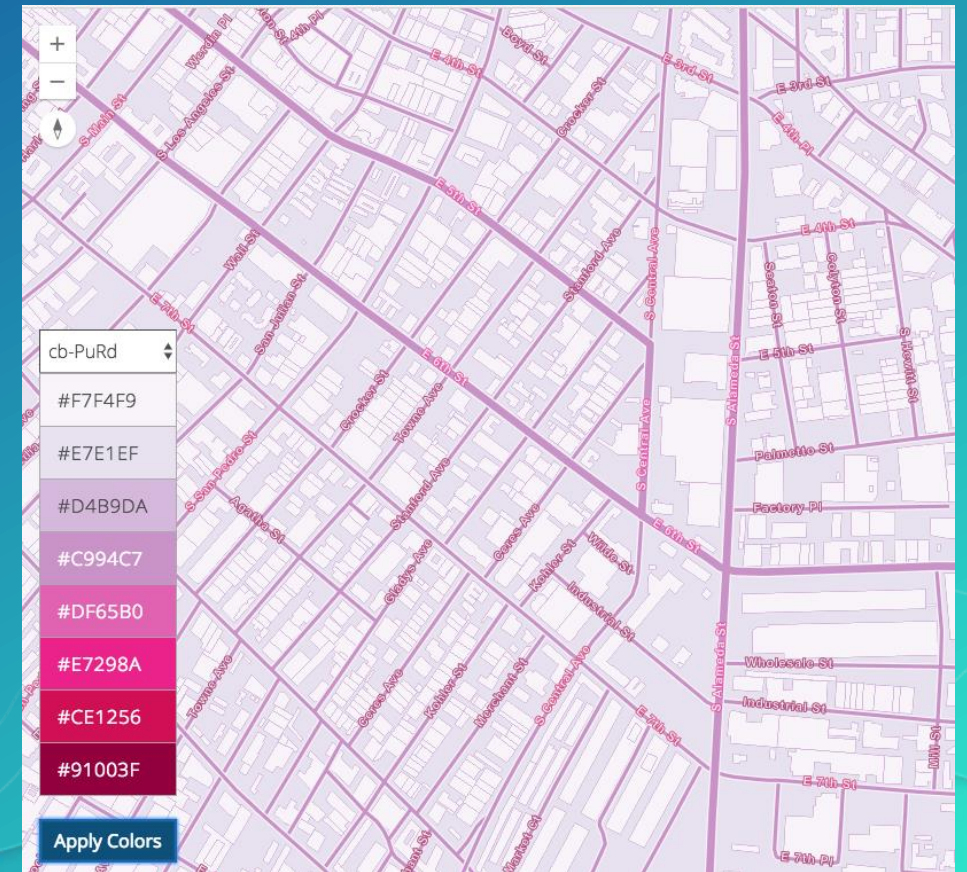
The screenshot shows the Vector Basemap Style Editor interface. The top bar includes the title 'Vector Basemap Style Editor BETA', a user profile 'Rene Rubalcava', and links to 'Esri Vector Basemaps', 'Style Reference', 'GitHub', and 'Show Me'. The main area is divided into two panels. The left panel shows a map of California with a red background and blue buildings. The right panel shows a table of style layers and a 'Replace Color' dialog.

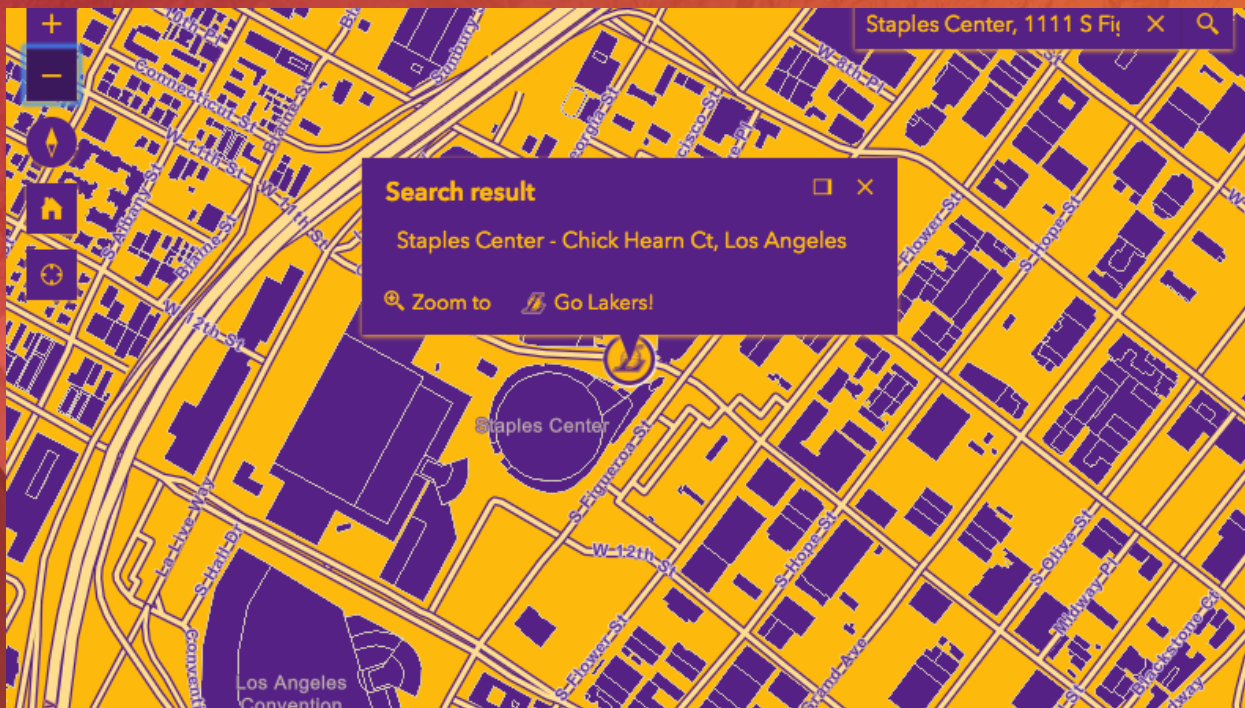
Title	Owner	Access
Vector Start	odoenet	public
World Navigation Map (Mature Support) - VT	odoenet	private
World Street Map (Night - WGS84) - VT	odoenet	private

id	zoom	type	bac fill	fill-out	line	color	text	text	color
Airport/Airport runway		fill	#EE						
Building		fill	#DF	#EE					
Land		fill	#EE						
Special area of Interest/Bike, walk or pedestrian		fill	#EE						
Water area/Dam or weir		fill	#DF	#EE					

Custom Styling

- Step 3 – Experiment!





Style demos!

Disclaimer: I am not a cartographer. I write code. I make beautifully ugly maps.

Custom Styling - Summary

- Copy a style
- Edit the style
- Save the style back to Portal/Online
- Have fun!

Publish and Consume

- Got some data?

Publish and Consume

- Got some data?
- Want to publish some tiles?

Publish and Consume

- Got some data?
- Want to publish some tiles?
- Let's publish some tiles!

Publish and Consume

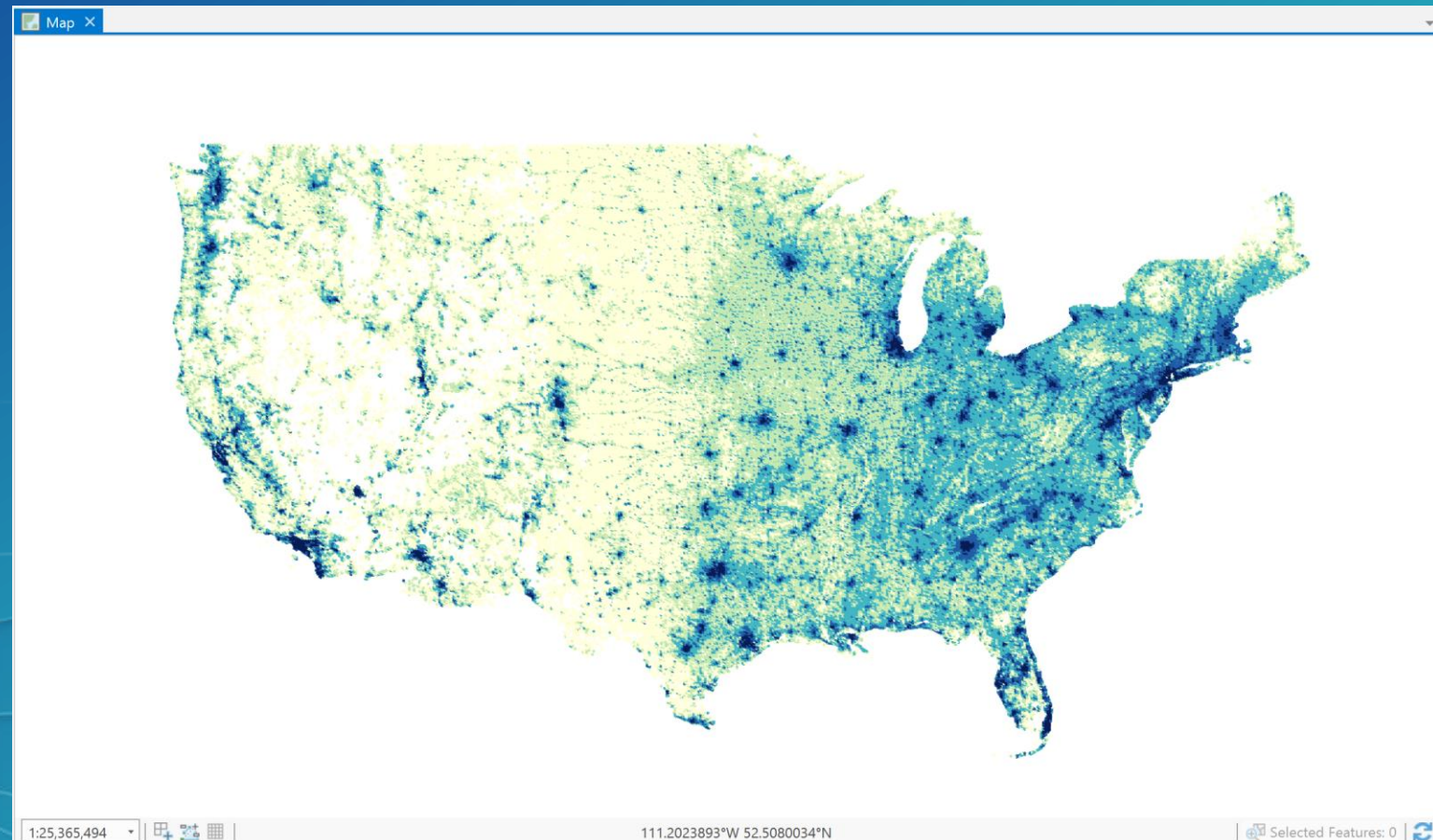
- I have a little bit of data

0 of 192444 selected

But their hexbins

$192,444 \times 6 =$

1,154,664 vertices!



Publish and Consume

- Publish

Geoprocessing

← Create Vector Tile Index

Parameters | Environments

Input Map
Map

Output Tile Feature Class
AwesomeIndex

☒ Package for ArcGIS Online | Bing Maps | Google Maps

Maximum Vertex Count 10000

Geoprocessing

← Create Vector Tile Package

Parameters | Environments

Input Map
Map

Output File
C:\Users\rene8209\Documents\ArcGIS\Projects\VT T

☒ Package for ArcGIS Online | Bing Maps | Google Maps

Tiling Format
Indexed

Minimum Cached Scale 295828763.795778

Maximum Cached Scale 564.248588

Index Polygons
USHexbinIndex

Summary
Everything is awesome!

Tags
awesome

Geoprocessing

← Share Package

Parameters | Environments

Input Package
C:\Users\rene8209\Documents\ArcGIS\Projects\VT T

Summary
So much awesome!

Tags
awesome

Credits
Awesomeness

☒ Everybody

Groups
Select All Within Organization


Publish and Consume

• Consume

USHouseholdsHex

[Overview](#)[Usage](#)[Settings](#)

Edit Thumbnail




★ Add to Favorites

US Households

by Rene.Rubalcava

Last Modified: June 9, 2016

 Tile Layer (hosted)

Description

Triangle visualization of US Households

Layers

USHouseholdsHex

Edit

Open in Map Vi...

Open in Scene Viewer

View style

Share

Details

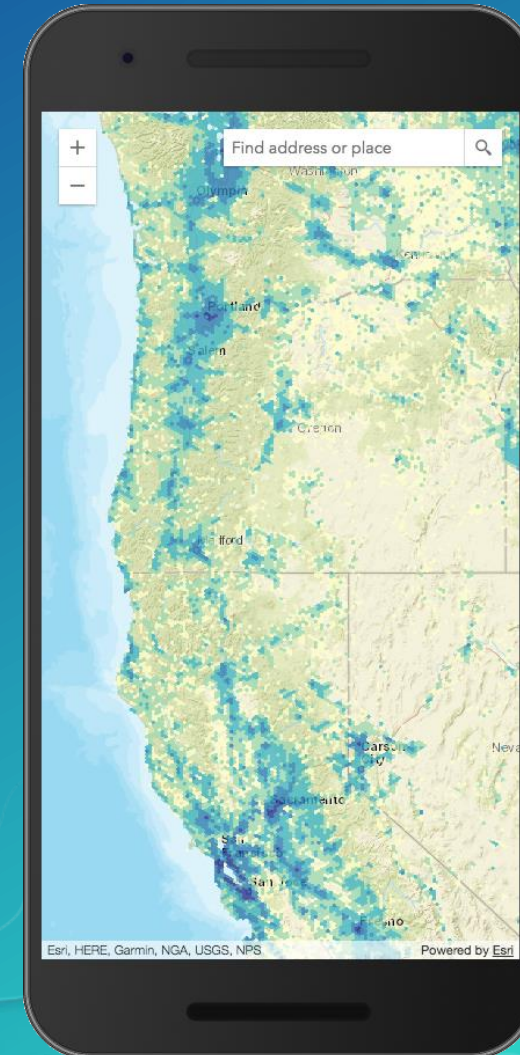
★★★★★ 0 ratings, 1 views

Source: [Vector Tile Service](#)

Created from: [USHouseholdsHex](#), Vector Tile Package

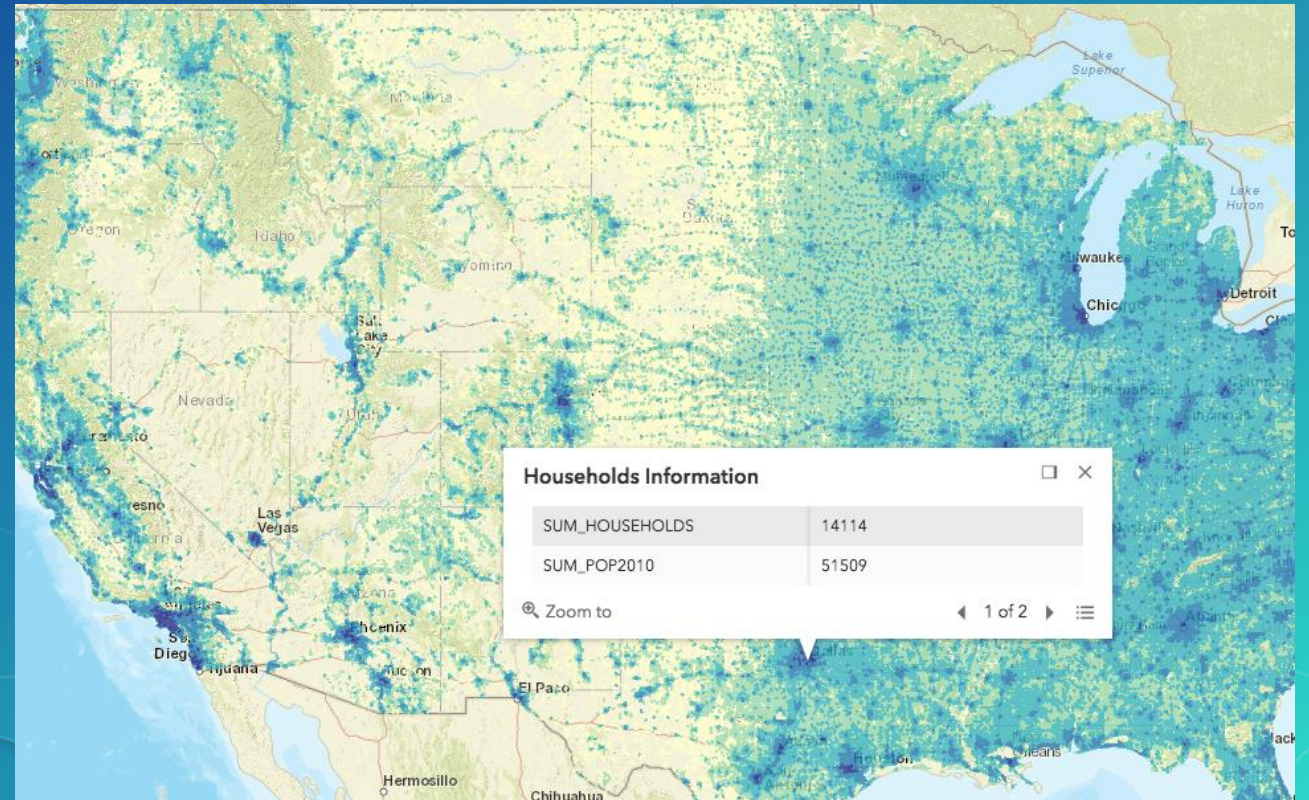
Created: June 9, 2016

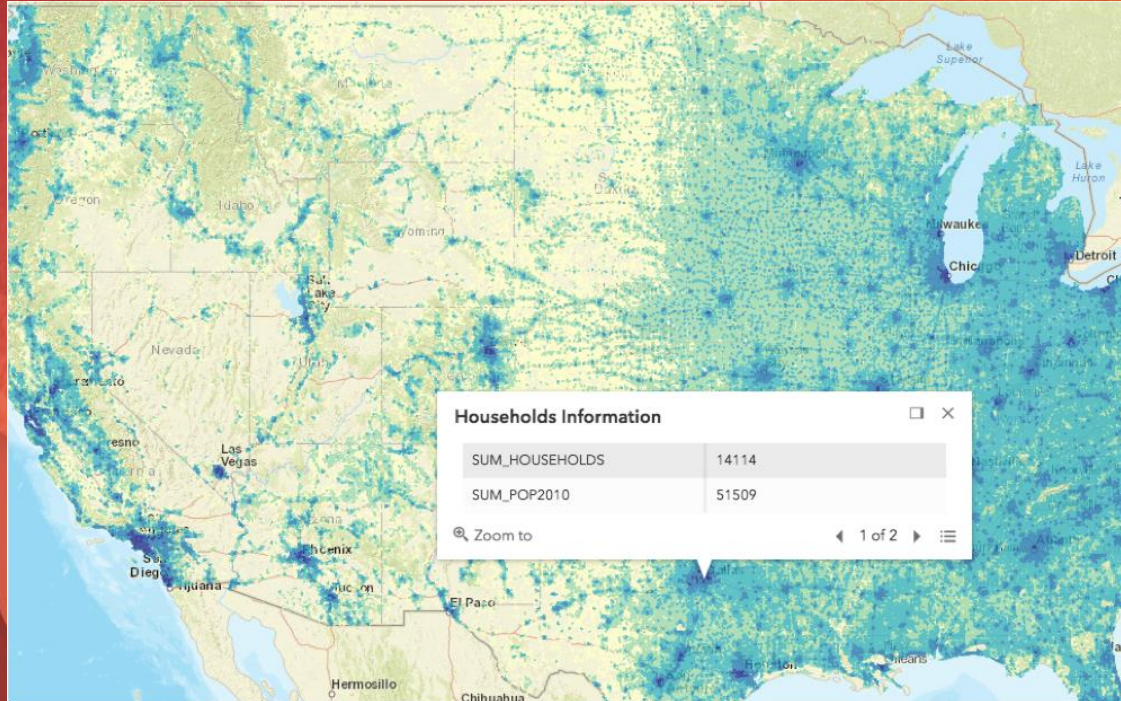
Size: 7 MB



Publish and Consume

- Consume++
 - Publish source data
 - Don't display it





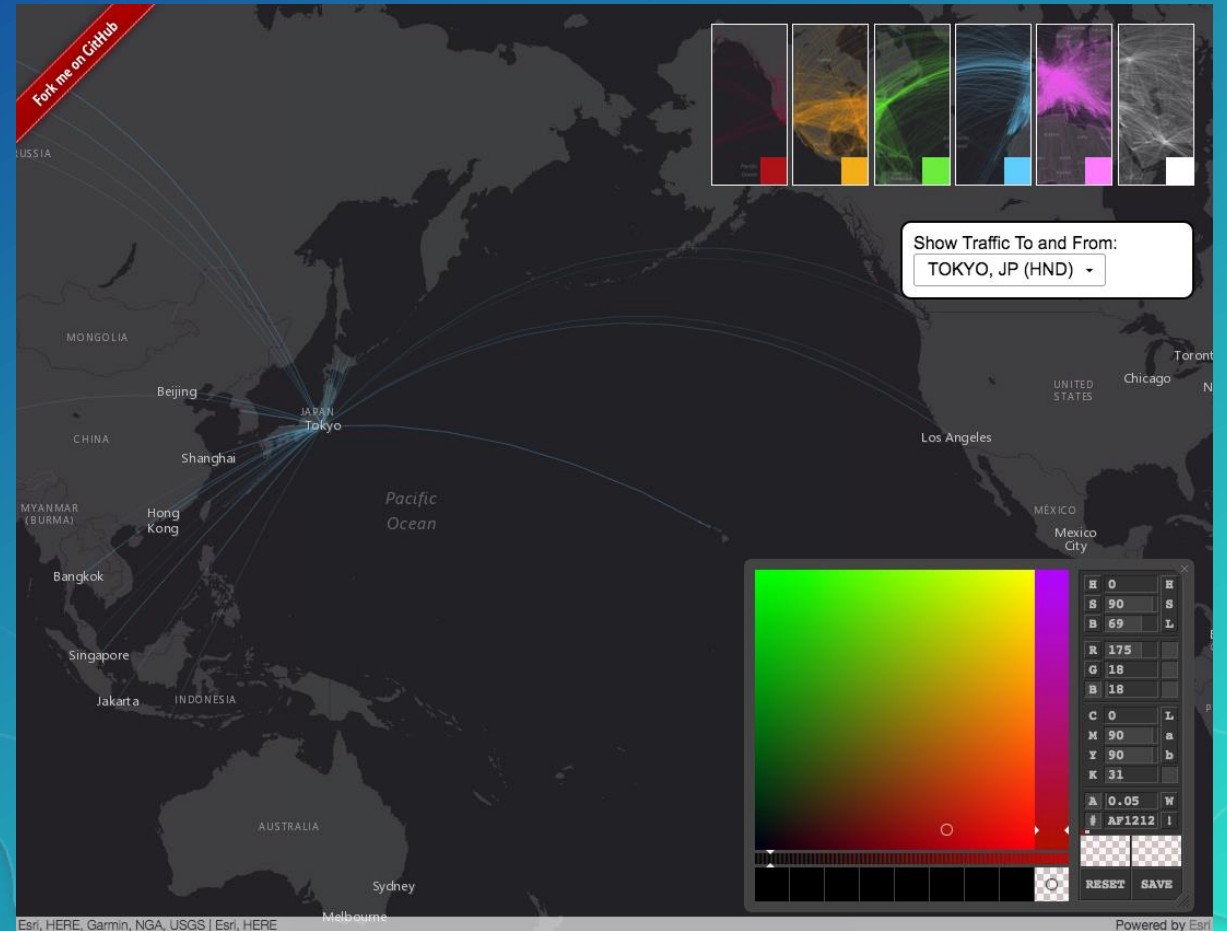
Query hax

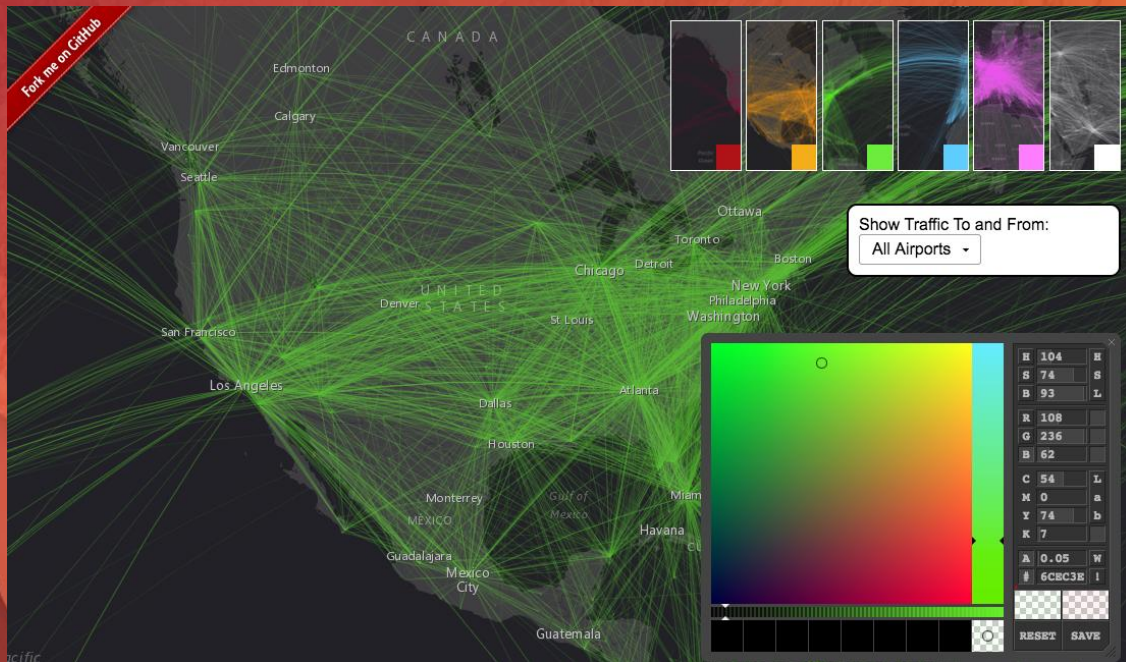
Query the source data, display the tiles.

Publish and Consume

- Consume+++
 - Filter the layer style
 - Style on the fly

<https://gbochenek.github.io/vector-tile-demo-js/>





More fun hax

You can apply filters to styles

Publish and Consume - Summary

- Publish tiles in Pro
- Consume tiles in Online/App
- Have even more fun!

Resources

- Editors

- <https://github.com/Esri/arcgis-vectortile-style-editor>
- <https://maps.esri.com/jg/VectorBasemapStyleEditor/>

- Demos

- <https://esri-es.github.io/arcgis-vector-tiles/>
- <https://gbochenek.github.io/vector-tile-demo-js/>
- <https://github.com/odoe/esrijs-vt-demos>

Questions?

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esri

THE
SCIENCE
OF
WHERE