



ArcGIS API for JavaScript: Creating Custom Layers and Layer Views

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2019 ESRI DEVELOPER SUMMIT
Palm Springs, CA

Agenda

- Intro to custom Layers and LayerViews in JSAPI 4.x
- Examples to guide and inspire
- Deep dive into “Earth at Night, Mountains of Light” custom elevation layer
- These slides are available at <https://github.com/jwasilgeo/presentations>

Extending Layer and LayerView in 4.x

- **Custom Layer (for 2D MapView and 3D SceneView)**
 - [esri/layers/BaseDynamicLayer](#)
 - [esri/layers/BaseElevationLayer](#)
 - [esri/layers/BaseTileLayer](#)

- **Custom LayerView (for 2D MapView)**
 - [esri/views/2d/layers/BaseLayerView2D](#)
 - [esri/views/2d/layers/BaseLayerViewGL2D](#)

- **Custom externalRenderers (for 3D SceneView)**
 - [esri/views/3d/externalRenderers](#)

Extending Layer and LayerView in 4.x

- **Custom Layer**

- **Layers are for data access; they do not have direct visual representation**

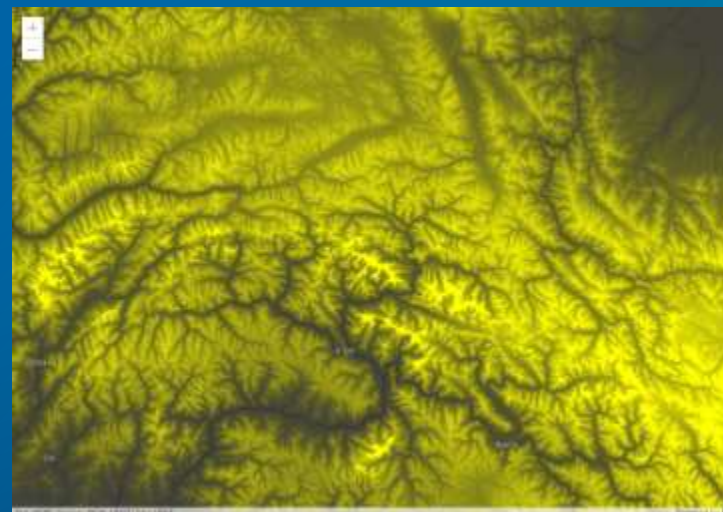
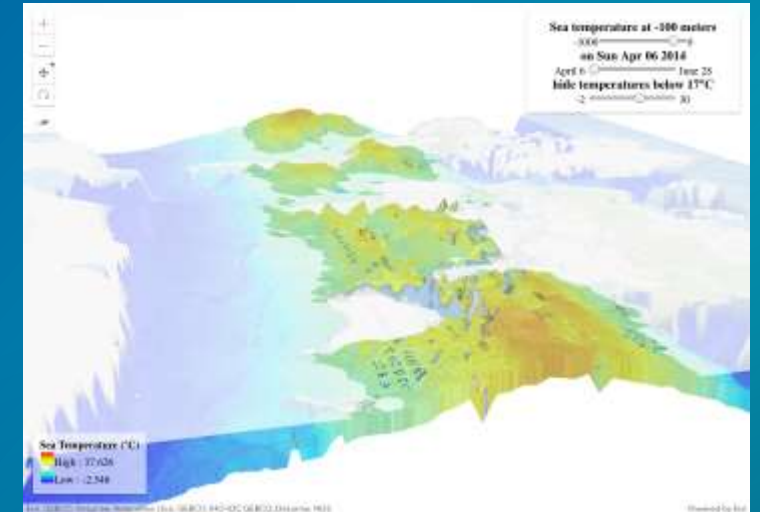
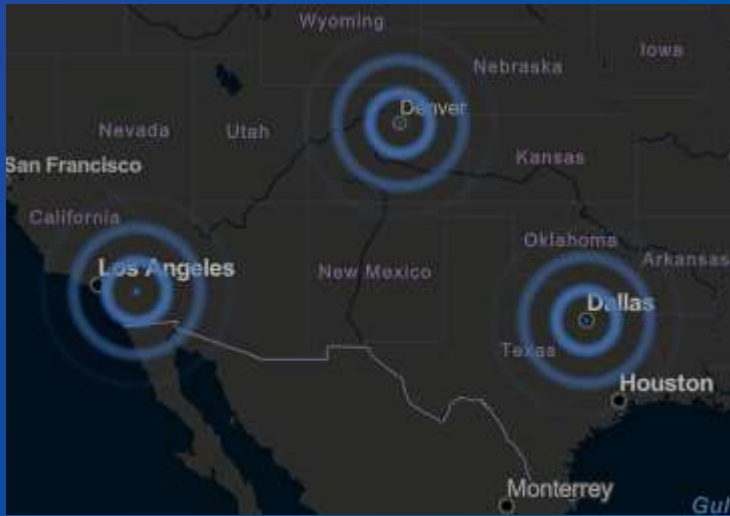
- **Why create a custom layer?**
 - **To connect to a service not supported (yet) by the JSAPI**
 - **To manipulate data client-side before it is displayed in a MapView or SceneView**
 - **To mash up multiple services to create new visualizations**

- **Limitations**
 - **Suited for static content**
 - **No control over when it redraws**
 - **Limited to image formats and tiles**

Extending Layer and LayerView in 4.x

- **Custom LayerView (2D only)**
 - Represents the view of a Layer after it has been added to a Map
 - Responsible for calling a Layer's API to get data and redraw
 - Canvas or WebGL is exposed to draw anything you want in a MapView
- **Custom externalRenderers (3D only)**
 - WebGL is exposed to draw anything you want in a SceneView

Examples of what's possible: <http://esriurl.com/jsCustomLayers>





Demo

Canvas-Flowmap-Layer

Custom BaseLayerView2D

<https://github.com/sarahbellum/Canvas-Flowmap-Layer>

Deep dive: “Earth at Night, Mountains of Light”

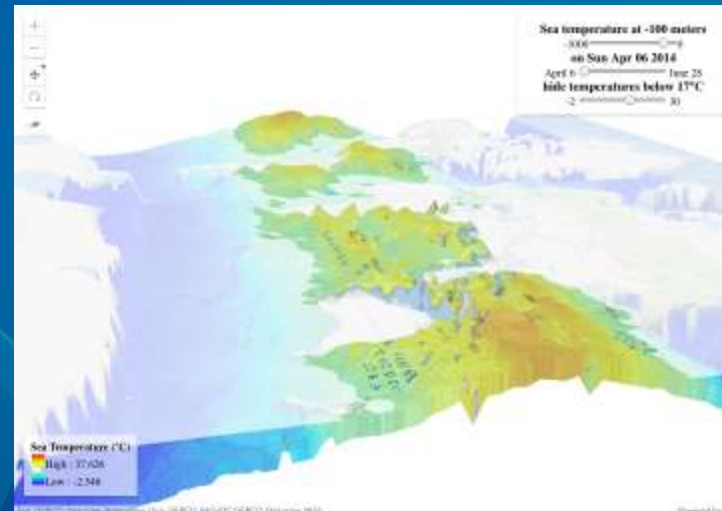


Deep dive: “Earth at Night, Mountains of Light”

- Custom BaseElevationLayer with NASA nighttime lights tiled image service
- Final product:
 - <https://jwasilgeo.github.io/esri-experiments/earth-at-night/>
- Blog post with more details:
 - <https://petrichor.studio/>

Deep dive: “Earth at Night, Mountains of Light”

- Inspired by 3 official JSAPI samples:
 - BaseElevationLayer – Exaggerating elevation: <http://esriurl.com/15250>
 - BaseElevationLayer – Thematic data as elevation: <http://esriurl.com/15251>
 - Using callout lines with labels: <http://esriurl.com/15252>





DEMO

“Earth at Night, Mountains of Light”

Step 1: SceneView with
WebTileLayer pointing at NASA tiled
image service

<https://github.com/jwasilgeo/esri-experiments>



DEMO

“Earth at Night, Mountains of Light”

Step 2: BaseElevationLayer driven by NASA WebTileLayer, helped by [chroma.js](#) to turn color into height

<https://github.com/jwasilgeo/esri-experiments>

Deep dive: “Earth at Night, Mountains of Light”

- JSAPI BaseElevationLayer details

- **load()** method

- establish and rely on a WebTileLayer instance pointing to NASA tiled image service

- **fetchTile()** method

- get nighttime image tiles
- convert image pixel colors to exaggerated elevation values
- return a promise that resolves to an ElevationTileData object

- chroma.js API details

- **luminance()** method

- relative brightness of a color
- [R, G, B] to 0 - 1

Resources

- **Blog post about “Earth at Night, Mountains of Light”**
 - <https://petrichor.studio/2019/02/14/earth-at-night-mountains-of-light/>
- **These slides will be available at [Esri Proceedings webpage](#) and at**
 - <https://github.com/jwasilgeo/presentations>
- **Dev Summit 2018: “ArcGIS API for JavaScript: Creating Custom Layers”**
 - <http://proceedings.esri.com/library/userconf/devsummit18/papers/dev-int-018.pdf>
- **Official docs for “Layer” and “LayerView”**
 - <https://developers.arcgis.com/javascript/latest/api-reference/esri-layers-Layer.html>
 - <https://developers.arcgis.com/javascript/latest/api-reference/esri-views-layers-LayerView.html>

Upcoming Presentations this Week at Dev Summit 2019

- **Advanced WebGL in 2D Map Views with the ArcGIS API for JavaScript**
 - Thursday, March 07, 1:00 pm - 1:30 pm
 - Demo Theater 1: Oasis 1-2
 - Dario D'Amico, Yaron Fine, Matthew George

- **Advanced WebGL in 3D Scene Views with the ArcGIS API for JavaScript**
 - Thursday, March 07, 1:30 pm - 2:00 pm
 - Demo Theater 1: Oasis 1-2
 - Stefan Eilemann



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