ArcGIS GeoEvent Server:
Visualizing Real-Time Data

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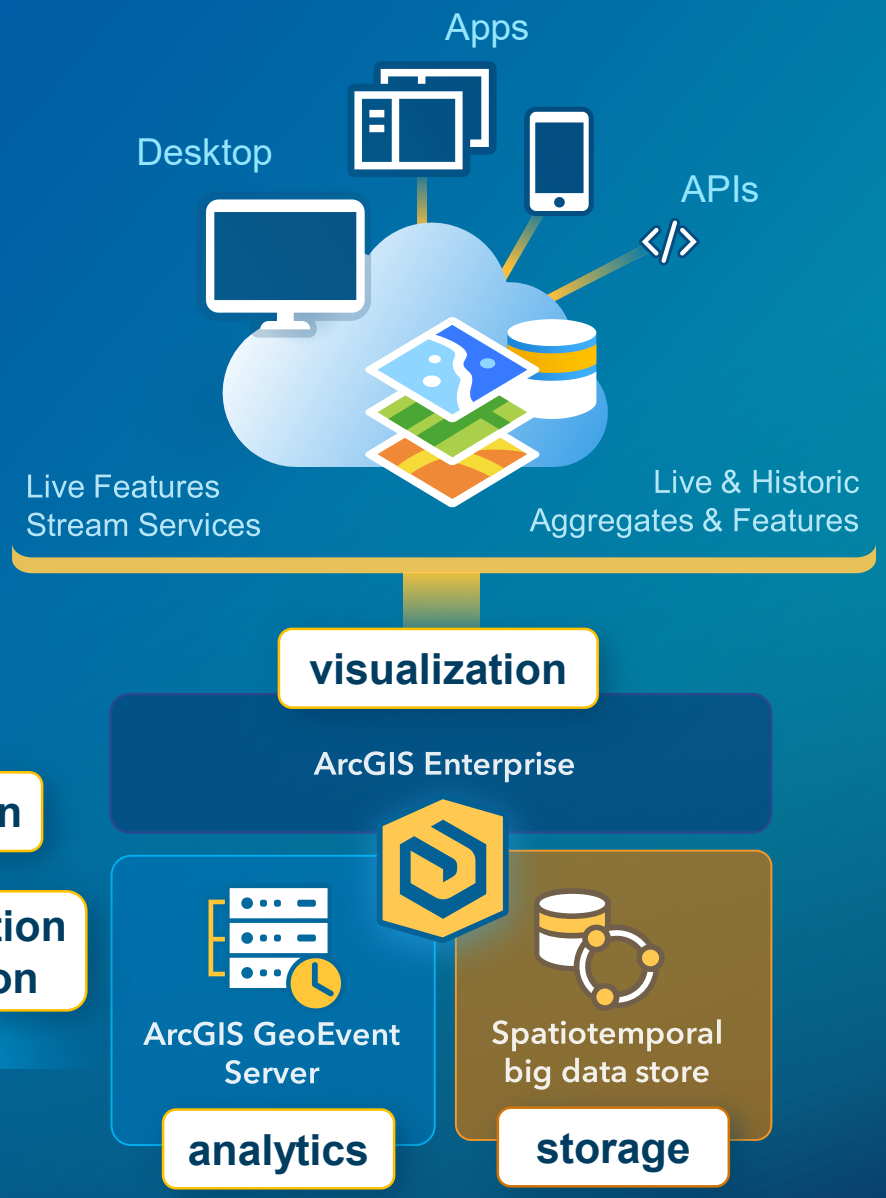
2019 ESRI DEVELOPER SUMMIT
Palm Springs, CA

ArcGIS Enterprise

With Real-time Capabilities



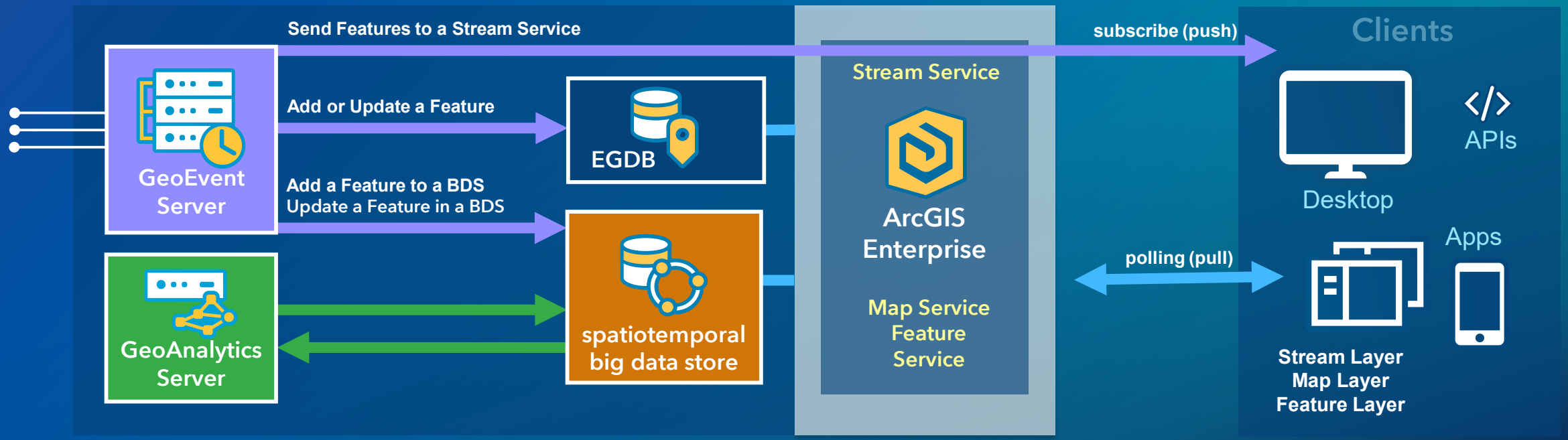
Agenda:

1. Visualization Overview
2. Visualizing Stream Layers
3. Visualizing Features
4. Resources & Wrap-Up

1 Visualization Overview

Visualization

- Stream layers in apps subscribe to stream services to immediately visualize observations
  - does not require storage, low latency, no playback
- Map & Features layers in apps periodically poll to visualize most current observations
  - backed by an enterprise geodatabase (EGDB) or a spatiotemporal big data store (BDS)
  - history can be retrieved & queried for playback

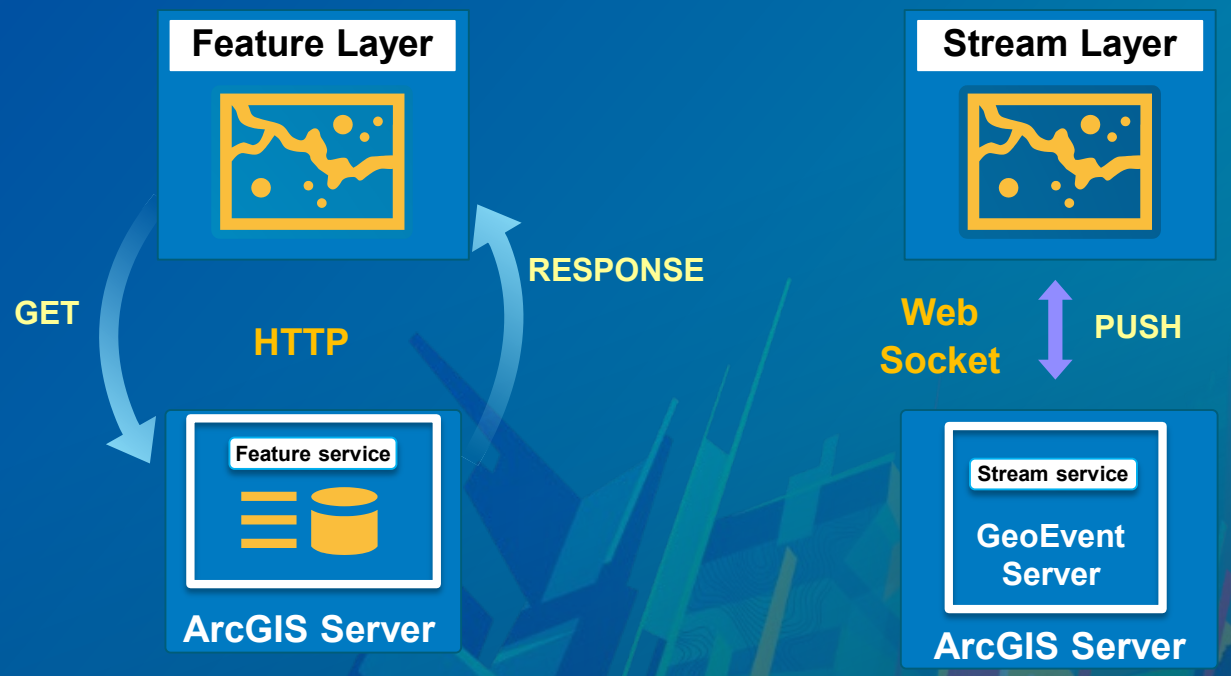


2 Visualizing Stream Layers

Stream Layers

advantages when working with real-time data

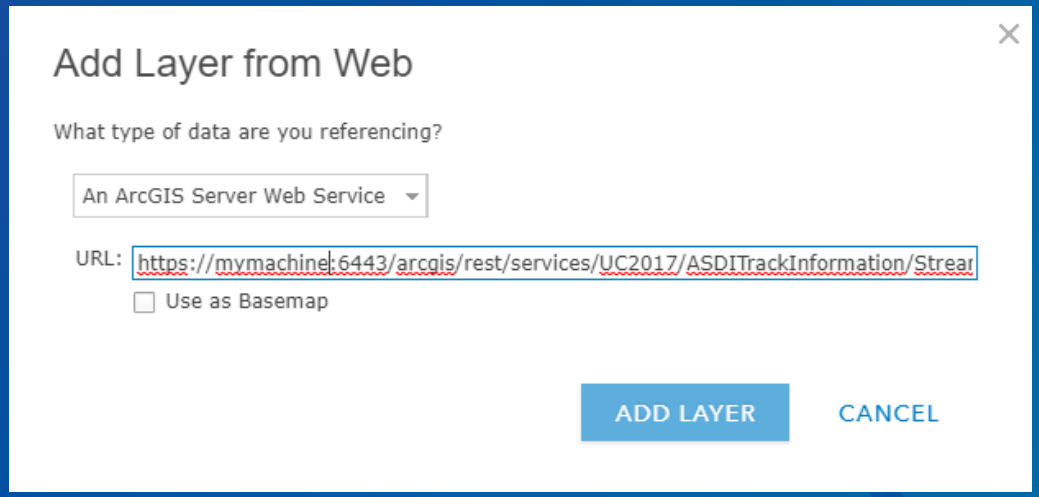
- More **responsive** and more **efficient** than feature layers.
- Stream Layers display **immediately** and refresh **automatically**.
- Data is only sent to the client **once**.



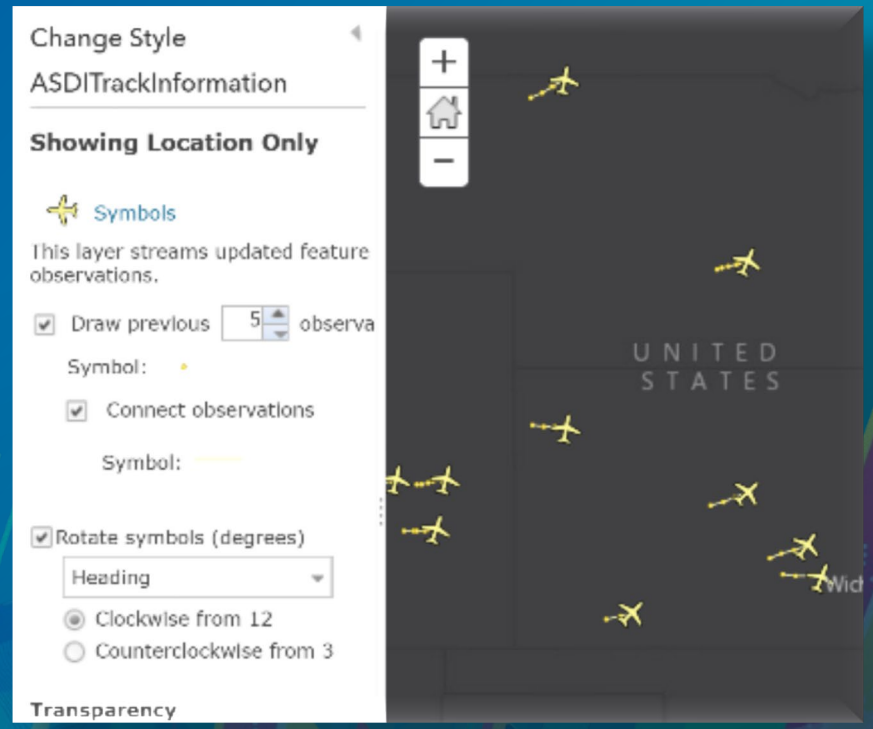
Visualization of real-time data

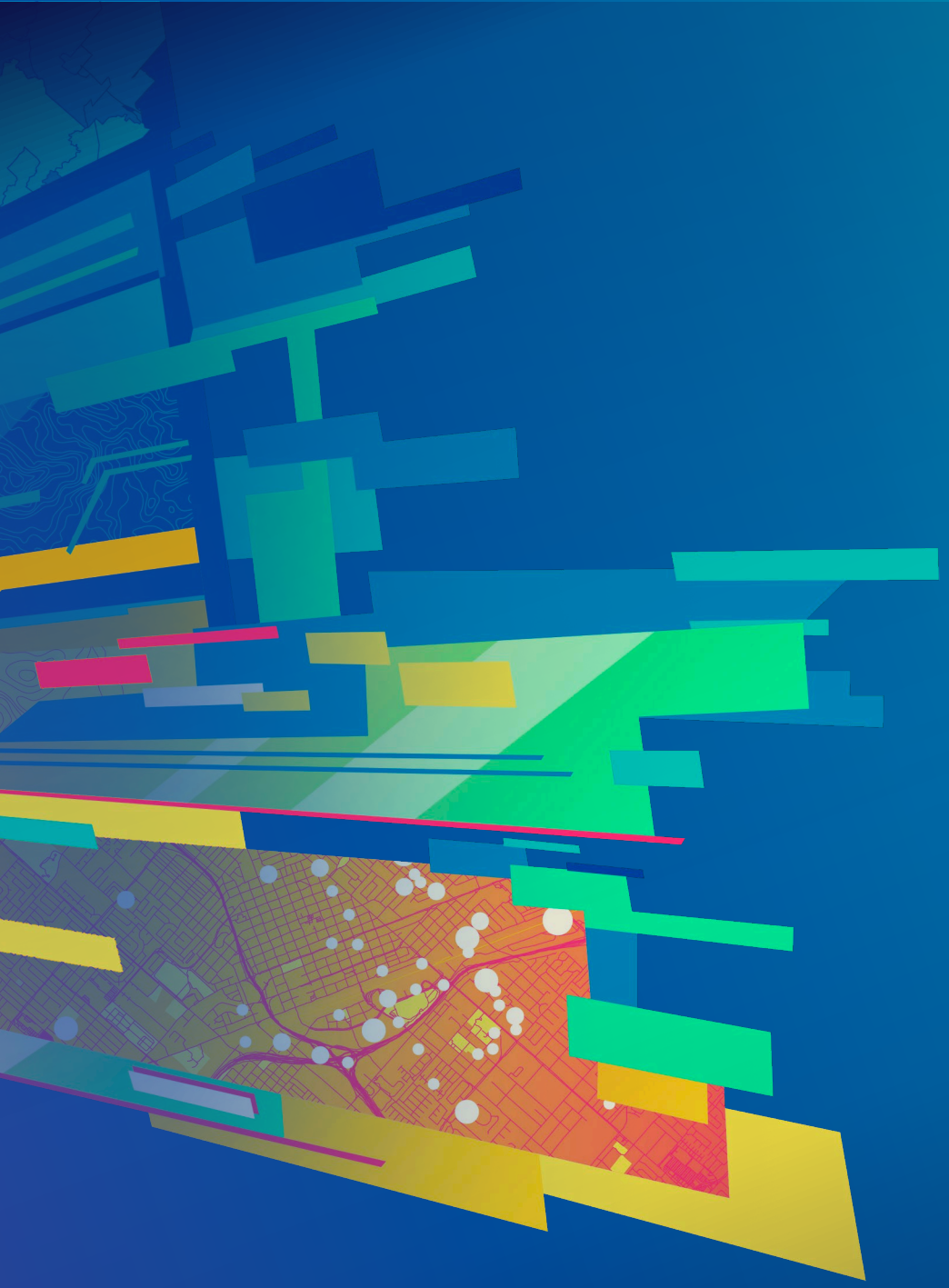
in a web map by adding a stream service

Add Stream Service



Configure the Layer



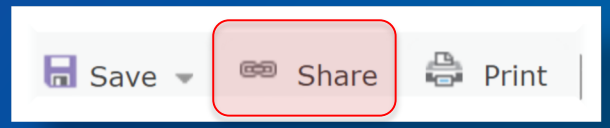


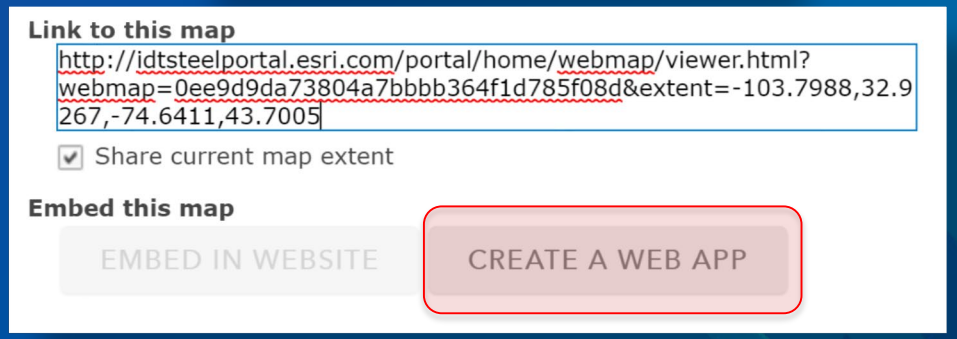
Stream Layers in Webmaps

Visualization of real-time data

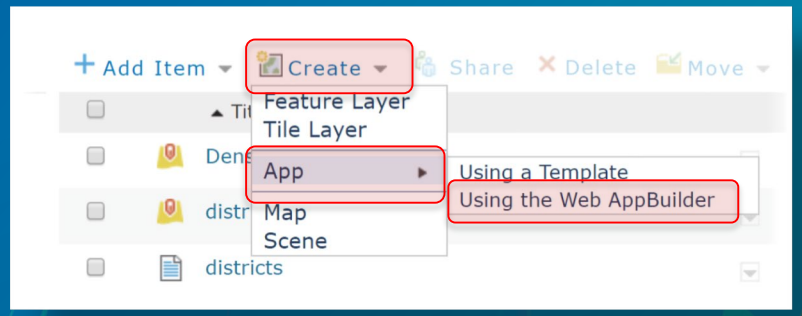
In a web app using Web AppBuilder

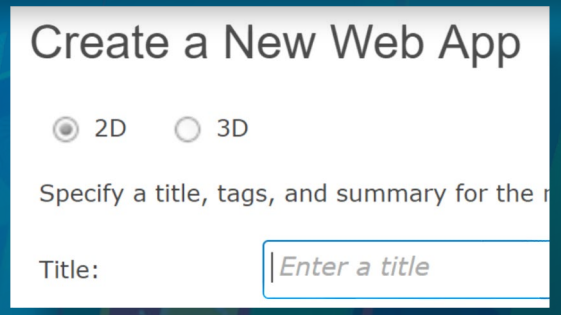
From The Map Viewer

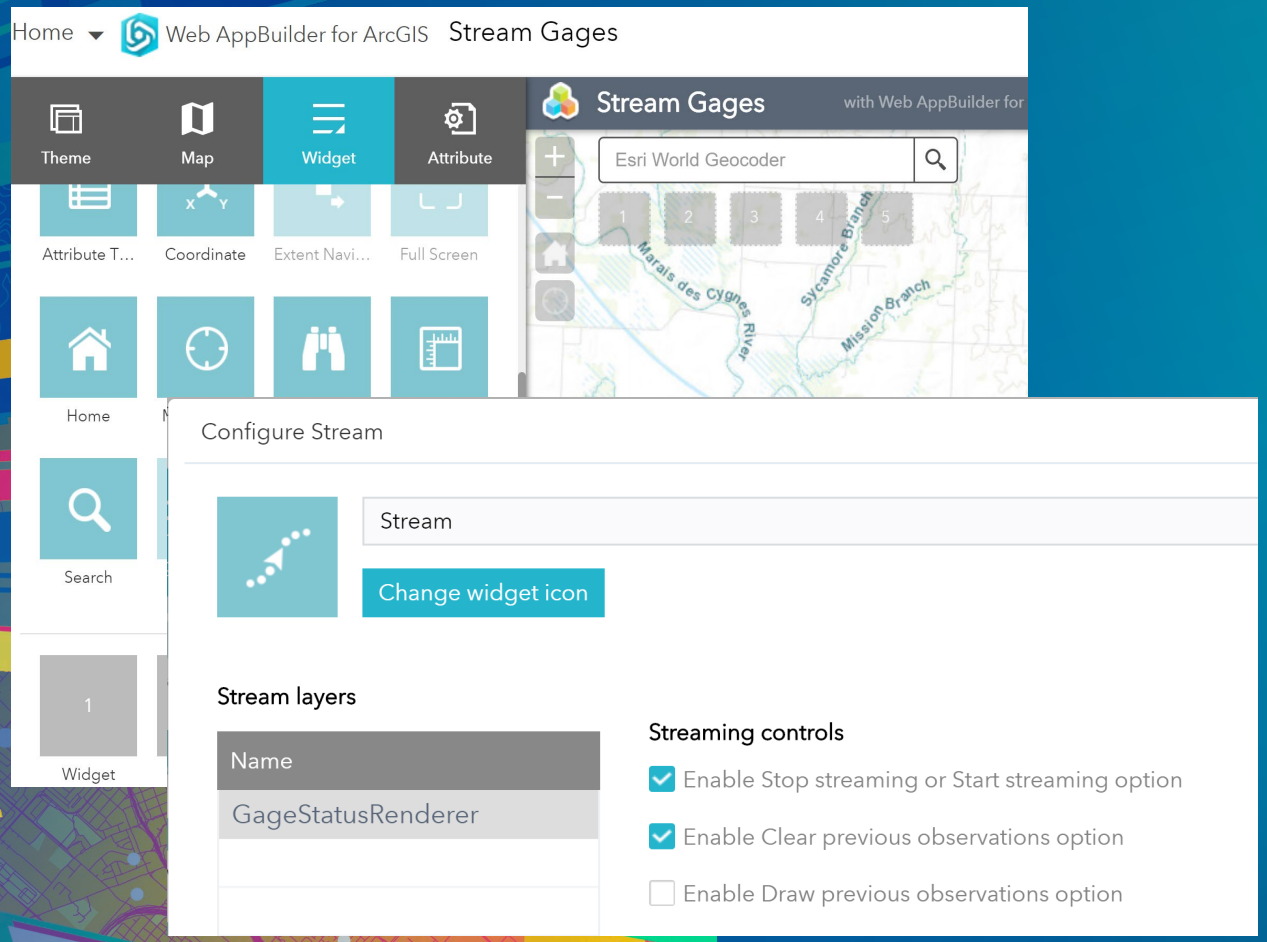




From My Contents





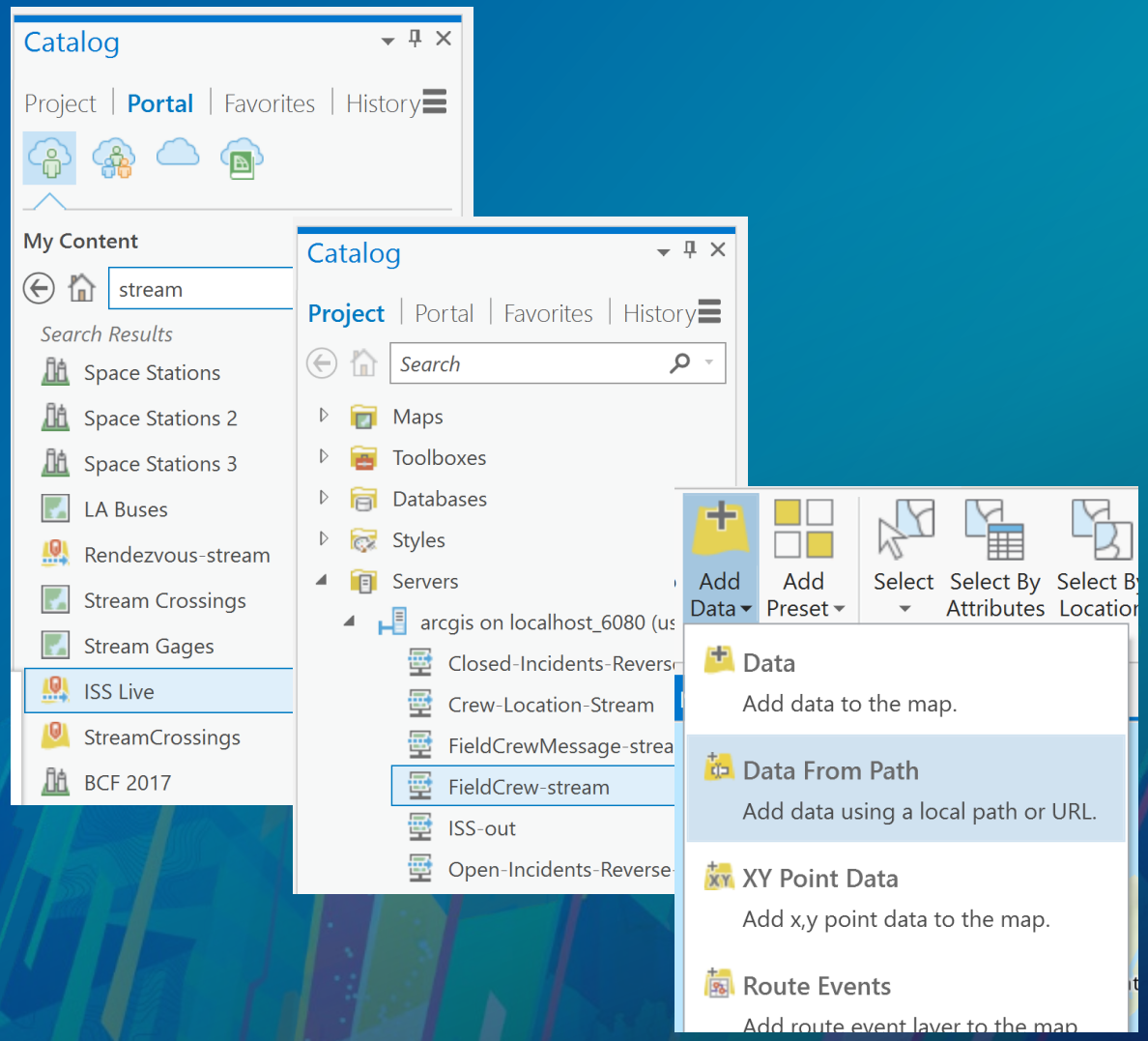


Stream Layers in Web AppBuilder

Visualization of real-time data

adding a stream service to ArcGIS Pro 2.2+

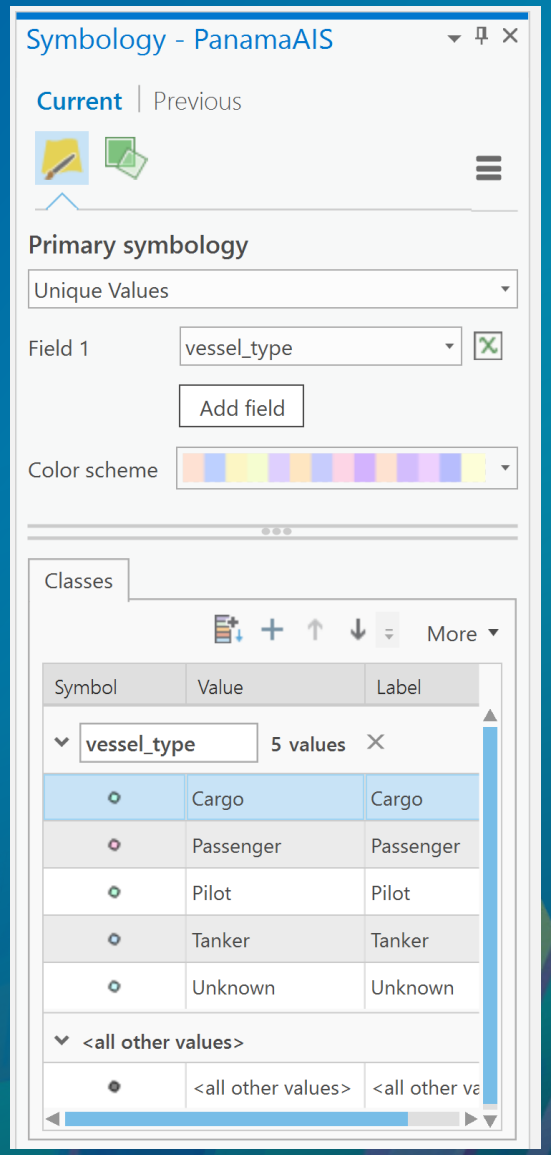
- Add a Portal or ArcGIS Online item
- From a server connection
- Add Data From Path

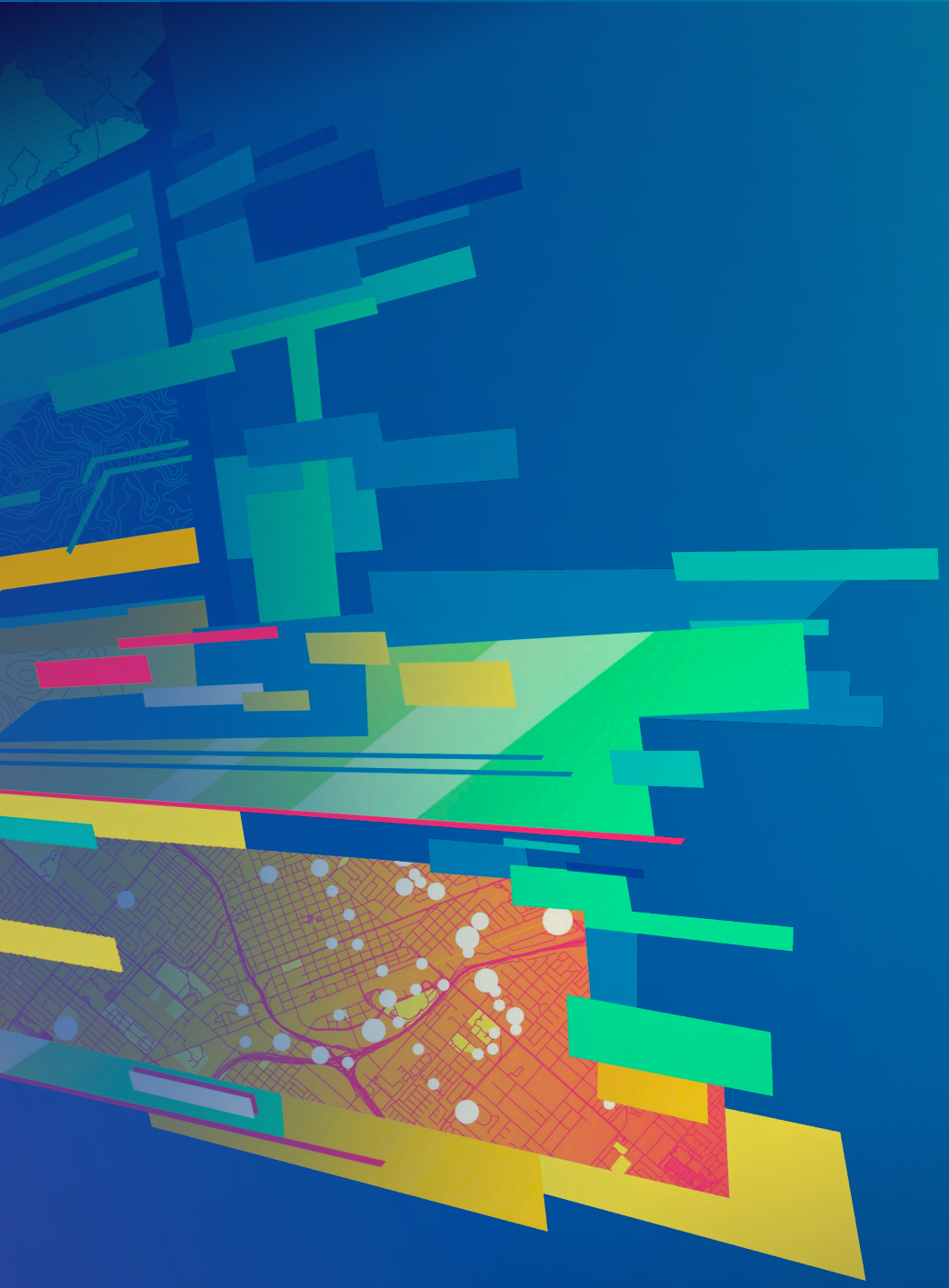


Visualization of real-time data

symbolizing a stream service in ArcGIS Pro 2.2+

- **Set Renderer**
  - Single Symbol
  - Unique Values
  - Graduated Symbols
  - Graduated Colors
- **Current Observations**
- **Previous Observations**
- **Vary by attribute:**
  - Transparency
  - Rotation
  - Size
  - Color





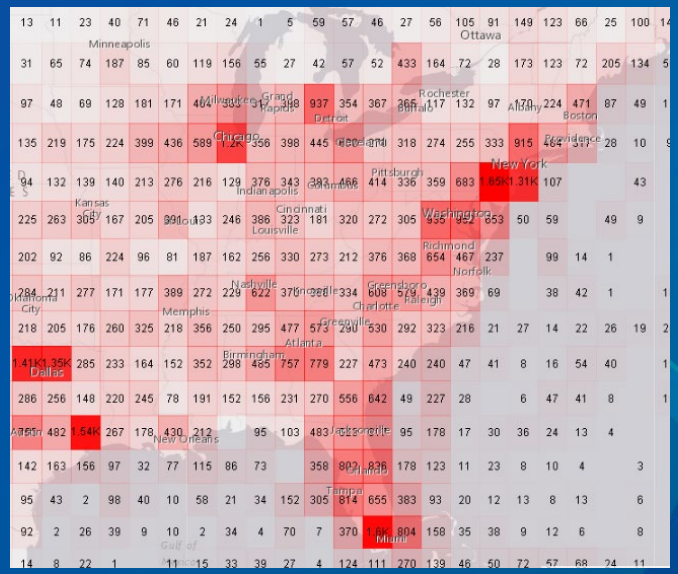
Stream Layers in ArcGIS Pro

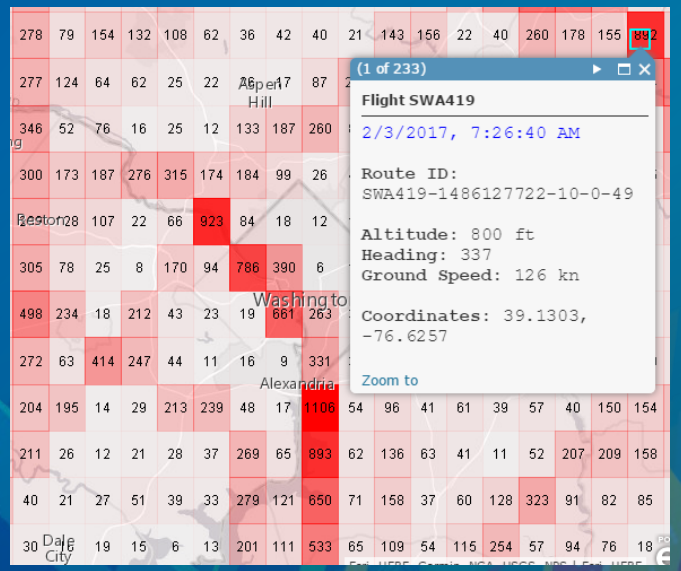
3 Visualizing Features

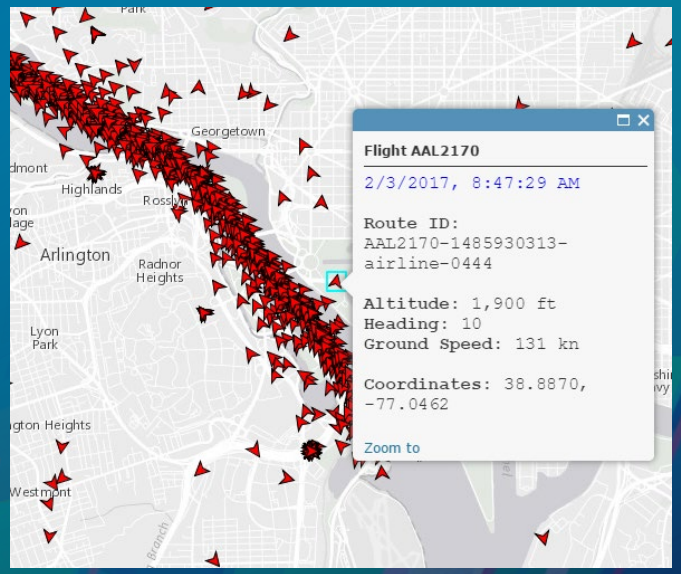
Visualization

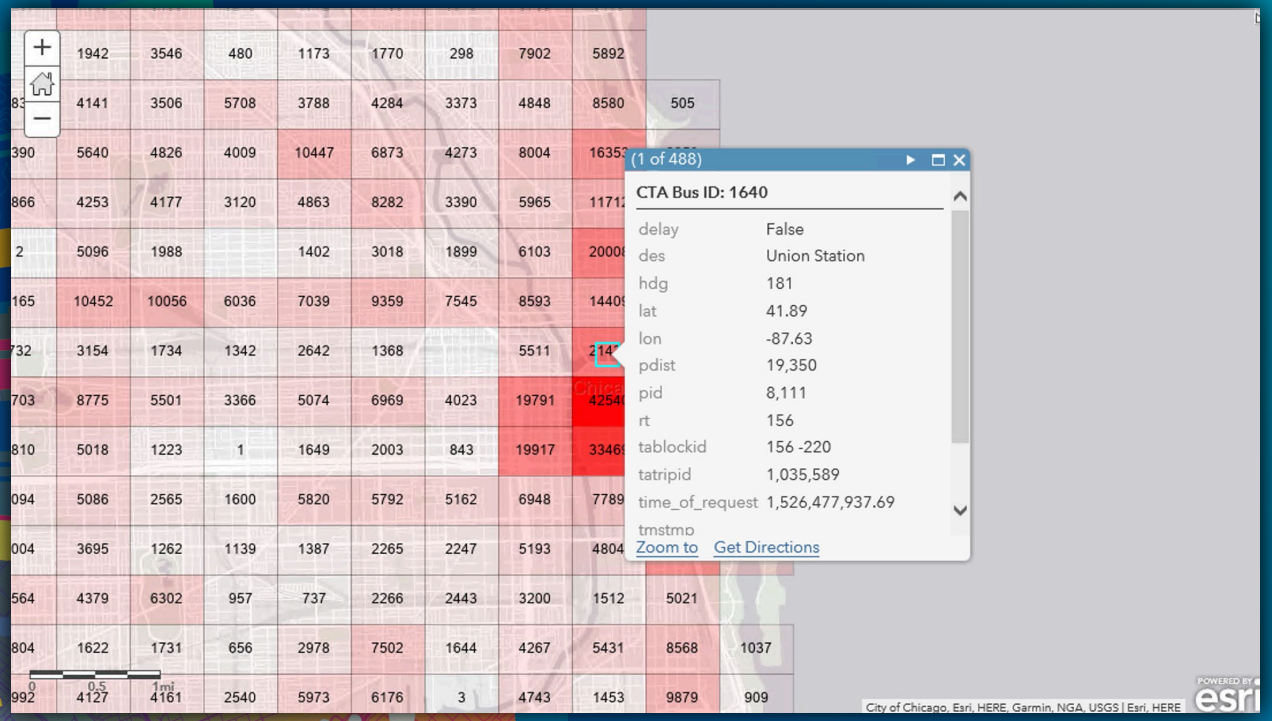
of observation data

- Map & Feature services that use data in the spatiotemporal big data store enable you to:
  - Visualize on-the-fly aggregations of data
  - Perform exploratory queries over any combination of space, time, and attributes
  - Switch visualization from aggregation to raw features
  - Inspect feature-level attributes while in aggregation *or* raw feature view
  - Replay (via time slider) historic observations in aggregation *or* raw feature view









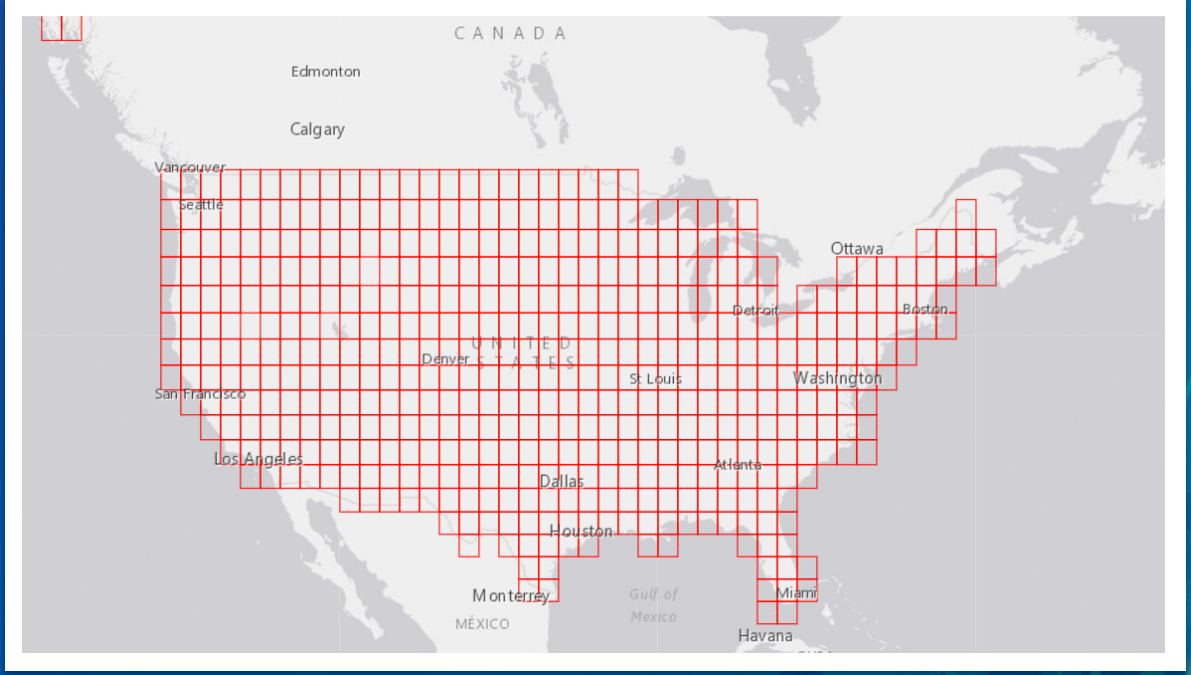
Visualizing observation data

Map & feature services using data from the spatiotemporal big data store

Spatiotemporal big data store

geohash spatial indexing to support on-the-fly aggregation

- As data is written to a dataset in the spatiotemporal big data store
  - A spatial index for geohash aggregation is continuously updated

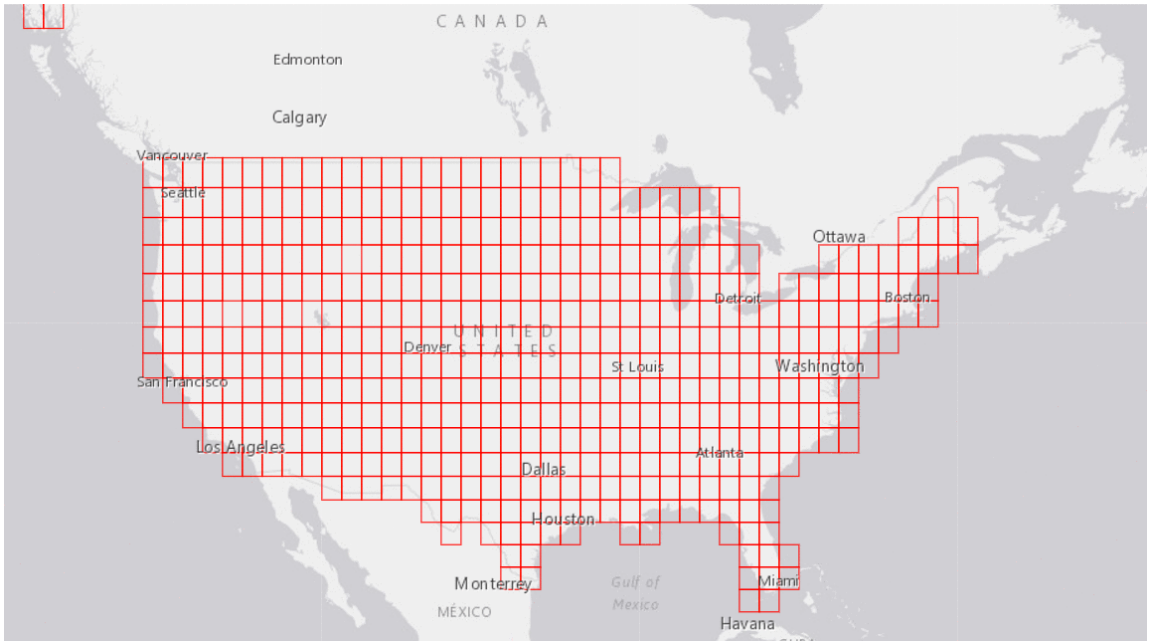


geohash aggregation (based on a geohash index)

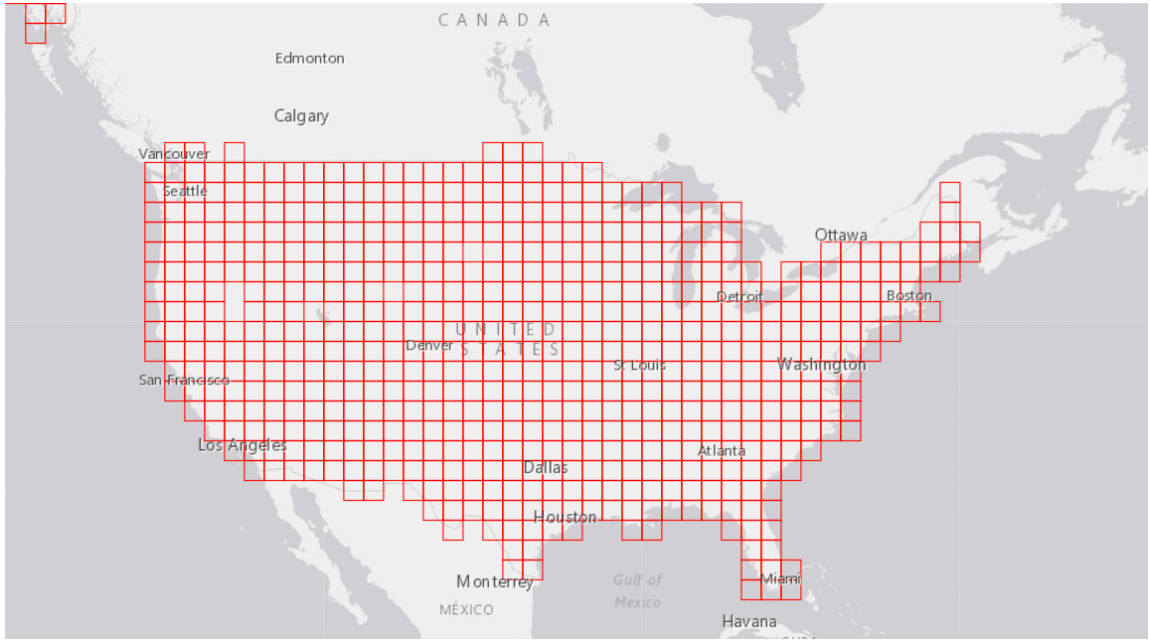
Spatiotemporal big data store

geohash & square spatial indexing to support on-the-fly aggregation

- As data is written to a dataset in the spatiotemporal big data store
  - A spatial index for geohash aggregation is continuously updated
  - A spatial index for square aggregation is continuously updated



geohash aggregation (based on a geohash index)

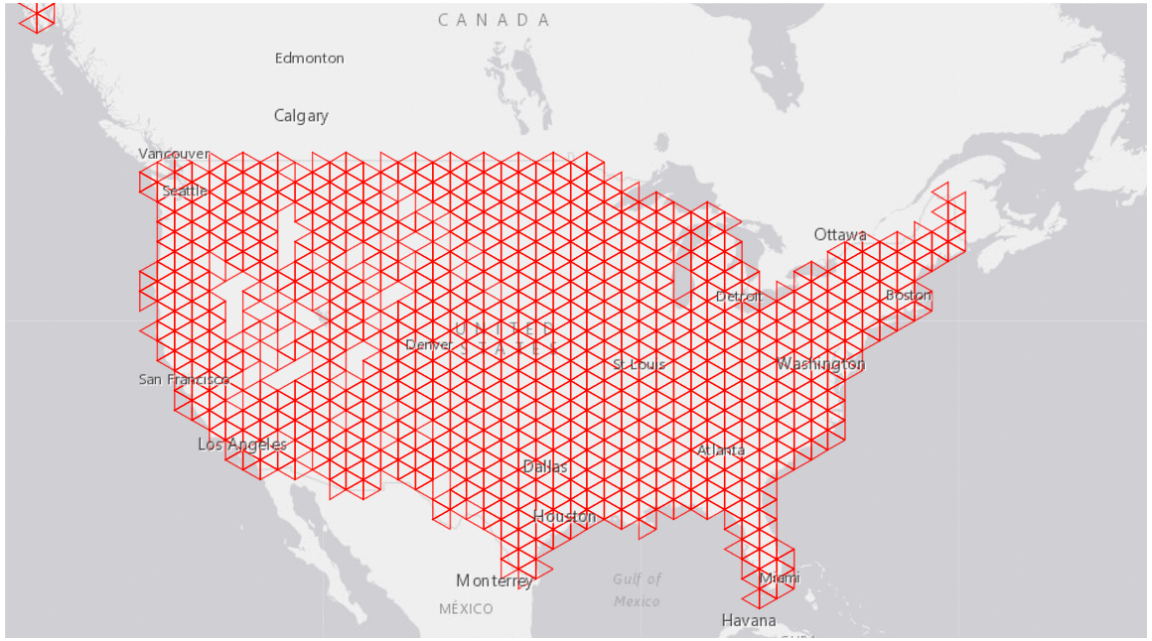


square aggregation (based on a square index)

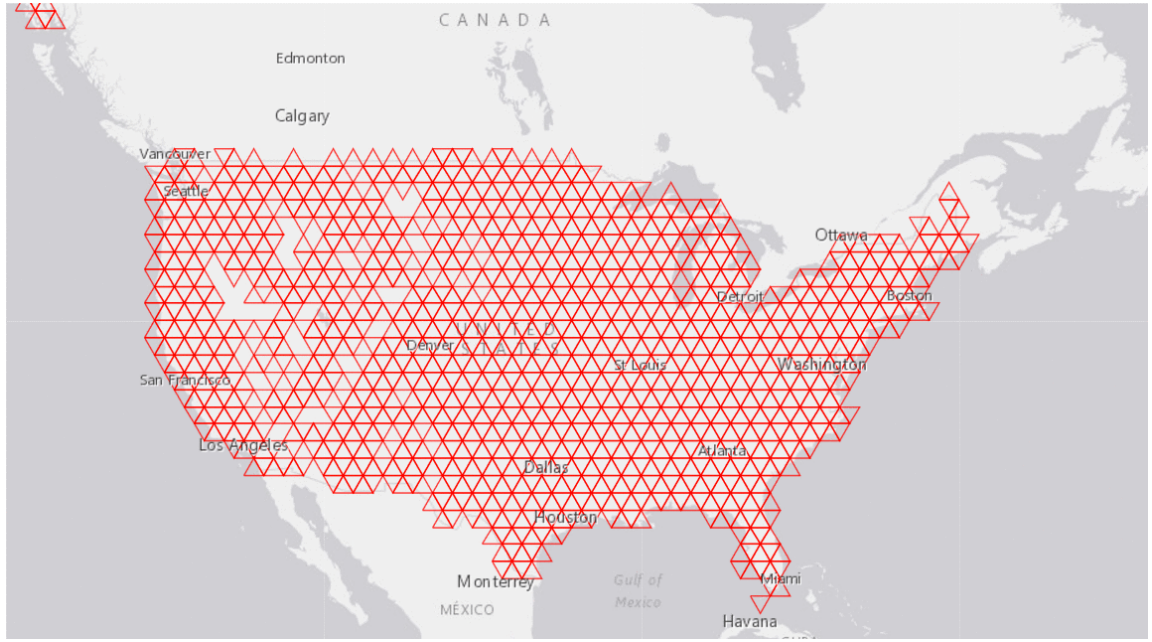
Spatiotemporal big data store

triangle spatial indexing to support on-the-fly aggregation

- As data is written to a dataset in the spatiotemporal big data store
  - A spatial index for ‘pointy triangle’ aggregation is continuously updated
  - A spatial index for ‘flat triangle’ aggregation is continuously updated



pointy triangle aggregation (based on a pointy triangle index)

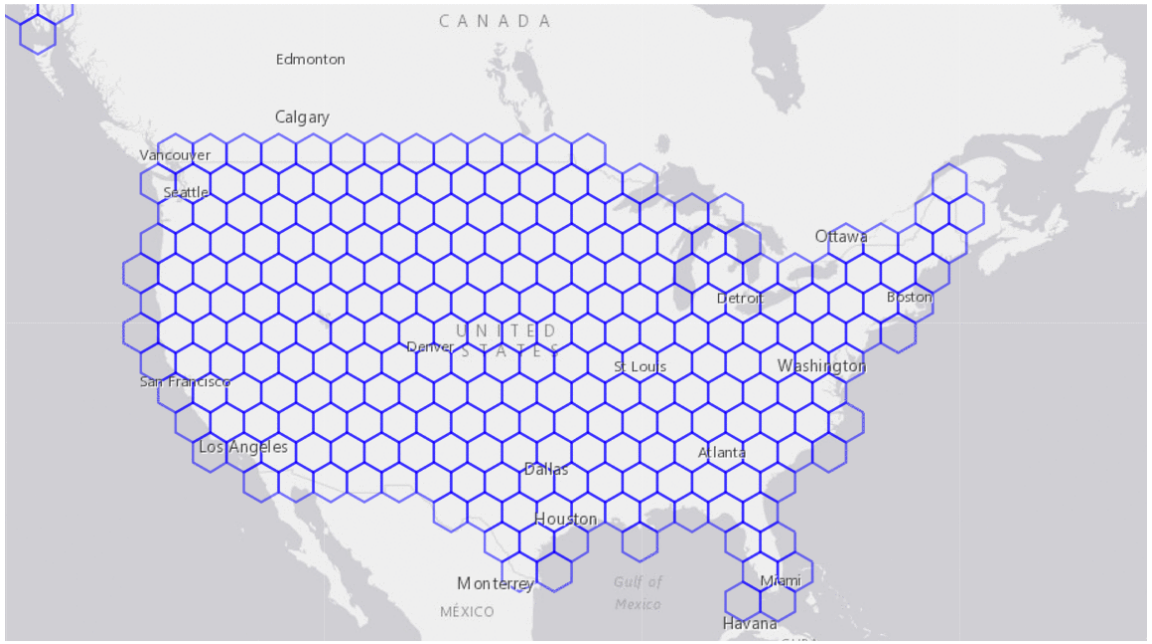


flat triangle aggregation (based on a flat triangle index)

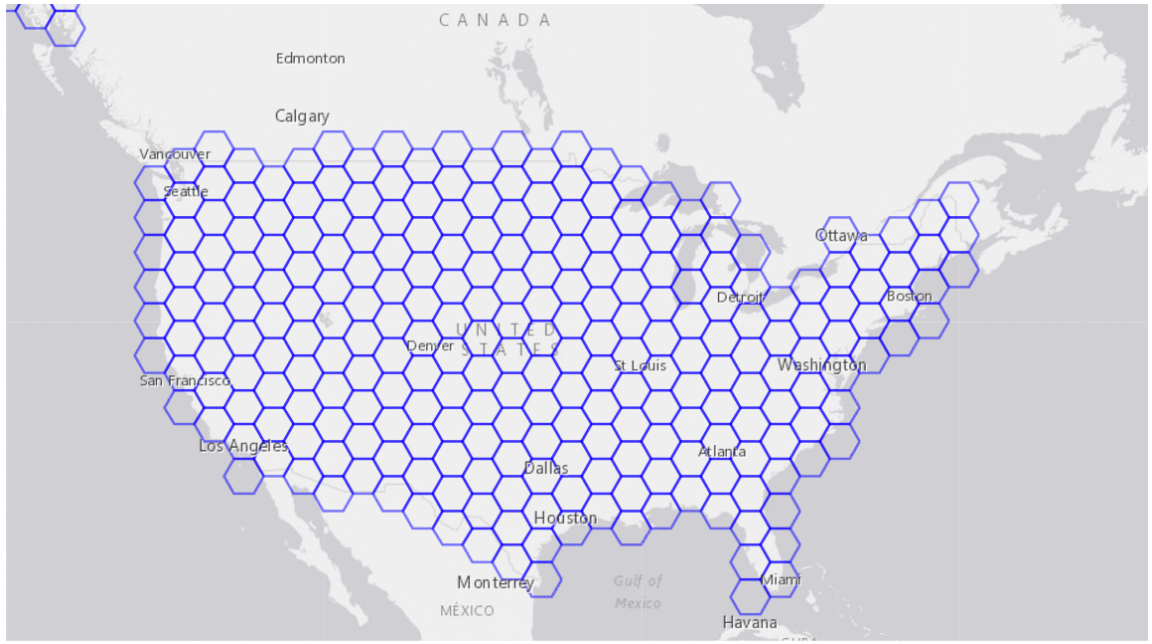
Spatiotemporal big data store

hexagon (same as triangle) spatial indexing to support on-the-fly aggregation

- As data is written to a dataset in the spatiotemporal big data store
  - A spatial index for ‘pointy hexagon’ (pointy triangle) aggregation is continuously updated
  - A spatial index for ‘flat hexagon’ (flat triangle) aggregation is continuously updated



pointy hexagon aggregation (based on a pointy triangle index)

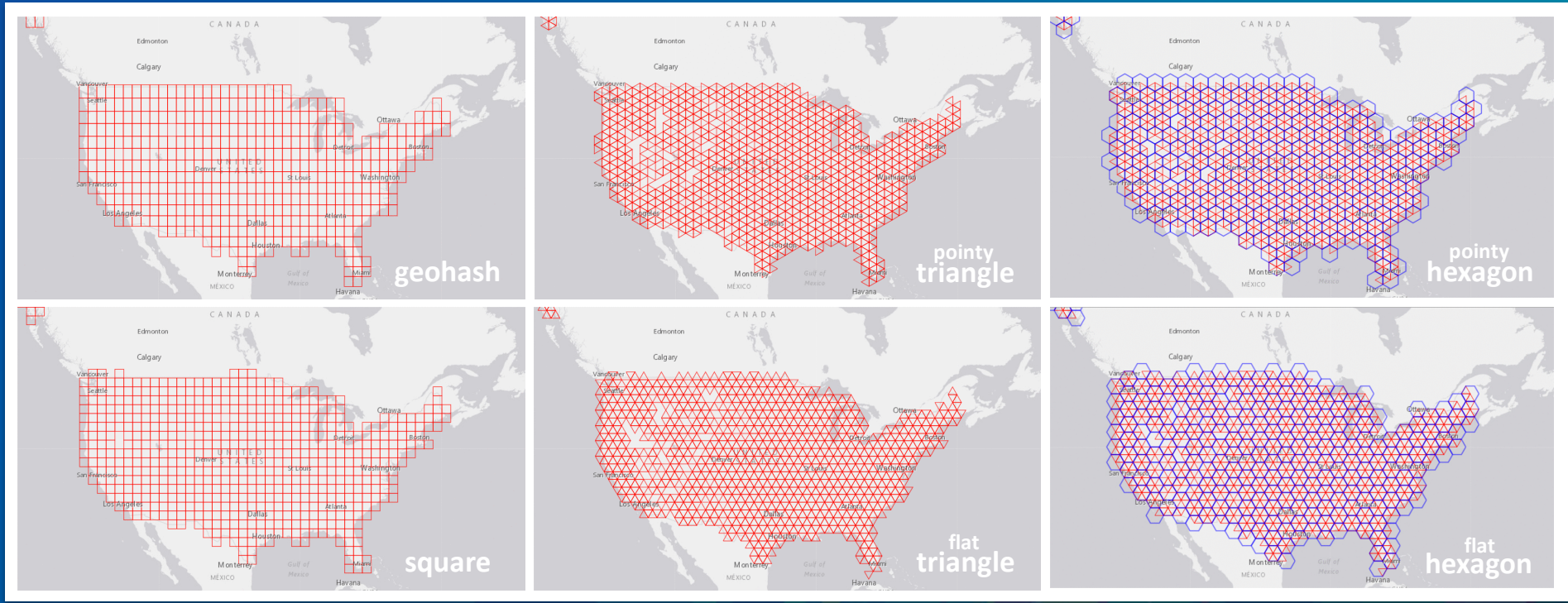


flat hexagon aggregation (based on a flat triangle index)

Spatiotemporal big data store

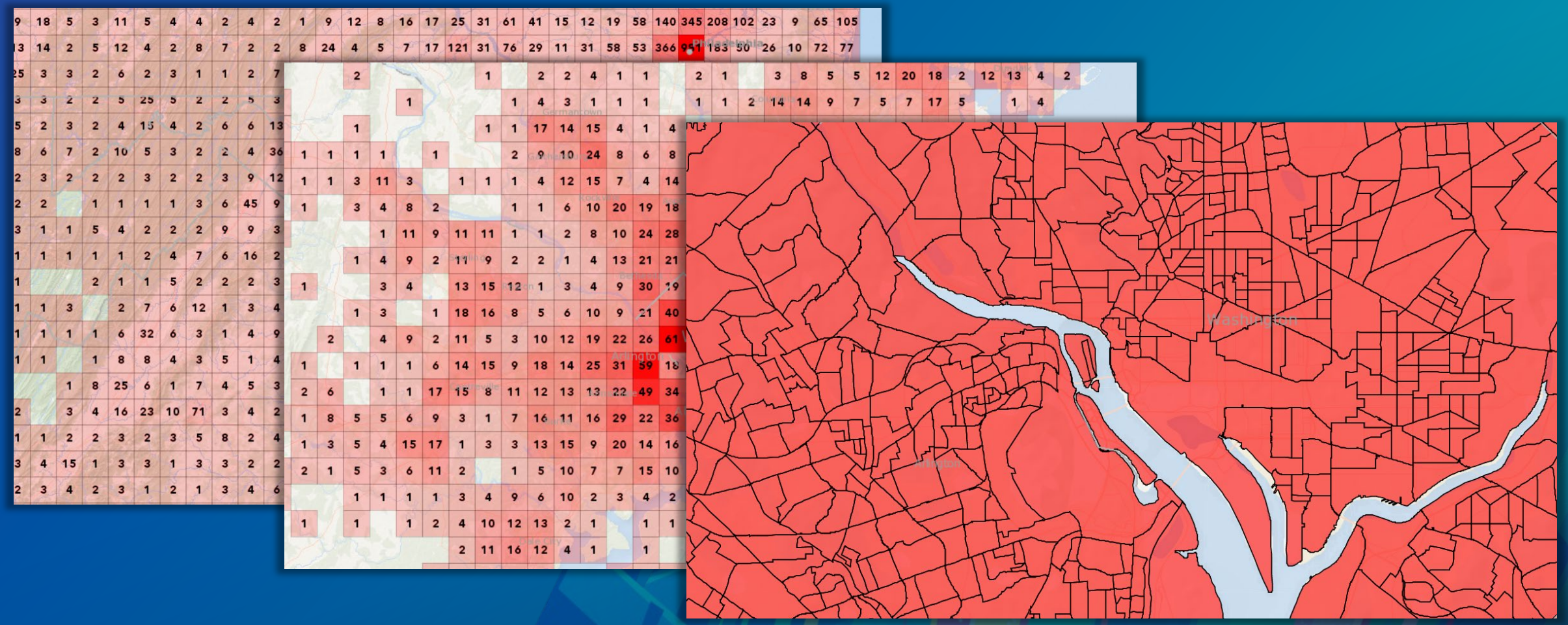
spatial indexing to support on-the-fly aggregation

- As data is written to a dataset in the spatiotemporal big data store
  - Up to four types of spatial indices are supported: geohash, square, pointy & flat hexagon/triangle
  - This is in addition to a temporal index on the time field
  - And an inverted index on each of the attribute fields

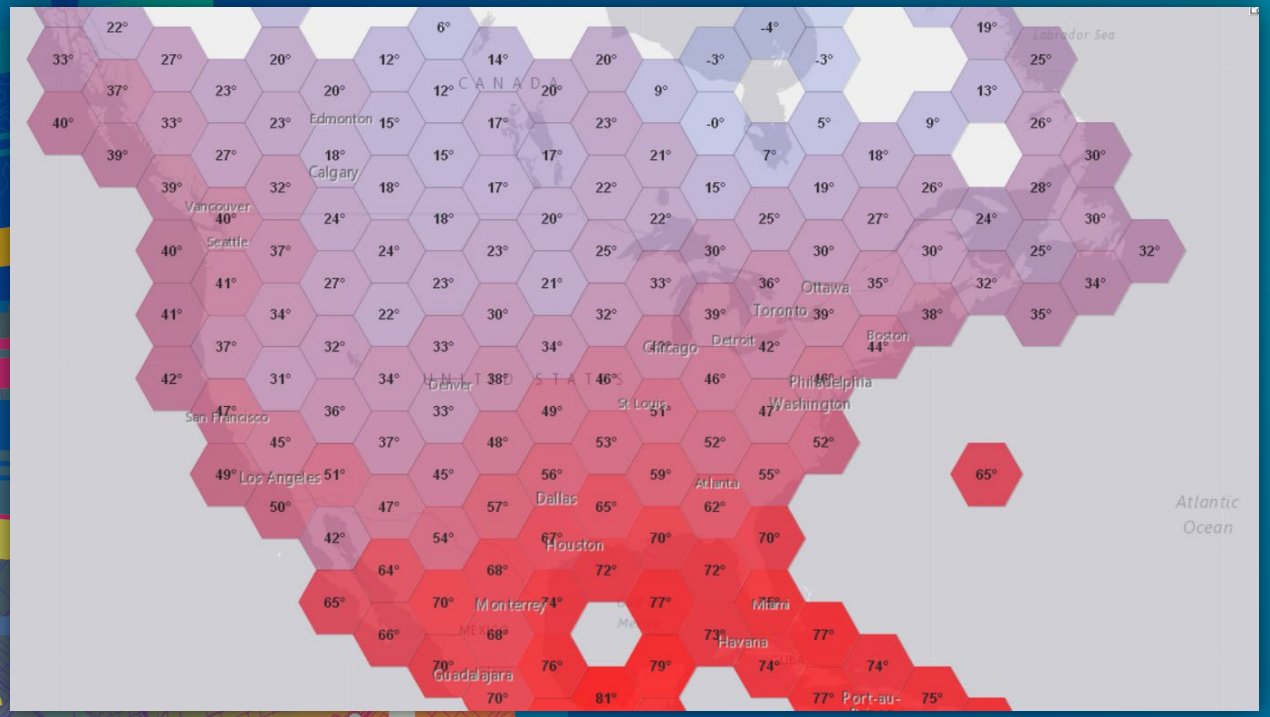


Visualization

map services: on-the-fly aggregation of polyline and polygon features



aggregation using centroid of polyline & polylgon features



Storage, visualization & replay

Map and feature services backed by the spatiotemporal big data store

Sample Applications & Tutorials

helpful links

- **StreamLayer API help:**
  - **4.x:** https://developers.arcgis.com/javascript/latest/api-reference/esri-layers-StreamLayer.html
  - **3.x:** https://developers.arcgis.com/javascript/3/jsapi/streamlayer-amd.html
- **Sample stream services with simulated data:**
  - https://geoeventsample1.esri.com:6443/arcgis/rest/services
- **Sample applications on GitHub:**
  - https://github.com/Esri/aggregation-viewer-server-map-service
- **Tutorials:**
  - http://links.esri.com/geoevent-tutorials
- **Discussions & Blogs (on GeoNet)**
  - https://geonet.esri.com/community/gis/enterprise-gis/geoevent/content

See Us Here

Tuesday:

01:00 PM - 02:00 PM : **ArcGIS GeoEvent Server: An Introduction** (Mojave Learning Center)
04:00 PM - 05:00 PM : **ArcGIS GeoEvent Server: Visualizing Real-Time Data** (Primrose A)
05:30 PM - 06:30 PM : **ArcGIS GeoEvent Server: Applying Real-Time Analytics** (Smoketree A-E)

Wednesday:

10:30 PM - 11:30 PM : **Real-Time and Big Data GIS: Best Practices** (Catalina/Madera)
04:00 PM - 05:00 PM : **ArcGIS GeoEvent Server: Creating Connectors & Processors using the GeoEvent SDK** (Mesquite G-H)

Thursday:

01:00 PM - 02:00 PM : **Real-Time and Big Data GIS: Road Ahead** (Primrose C-D)

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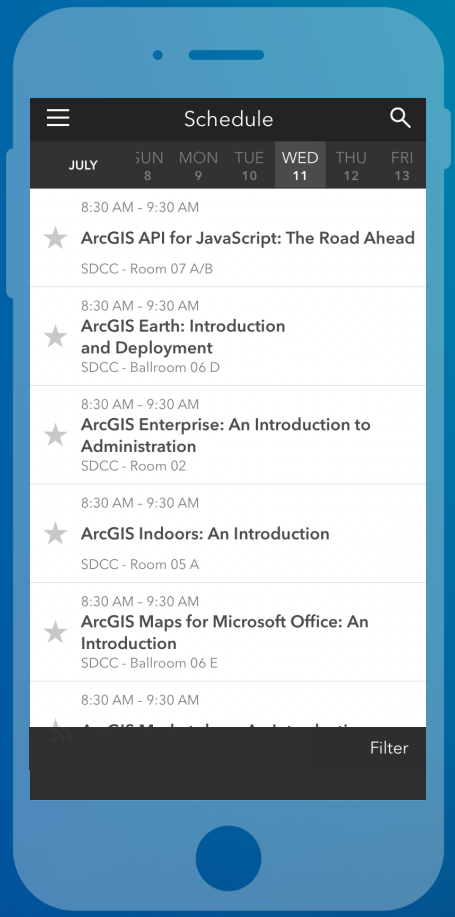
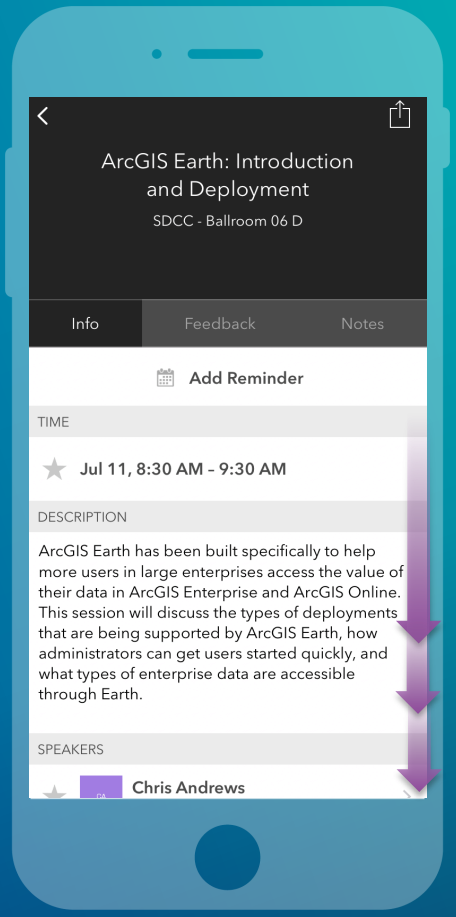
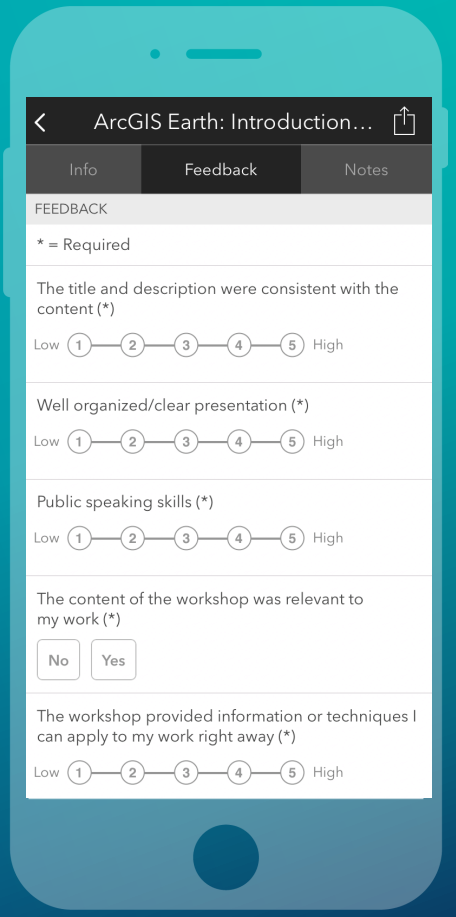


Scroll down to find the feedback section



Complete answers and select “Submit”



Questions / Feedback?

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