



ArcGIS GeoEvent Server: Leveraging Stream Services

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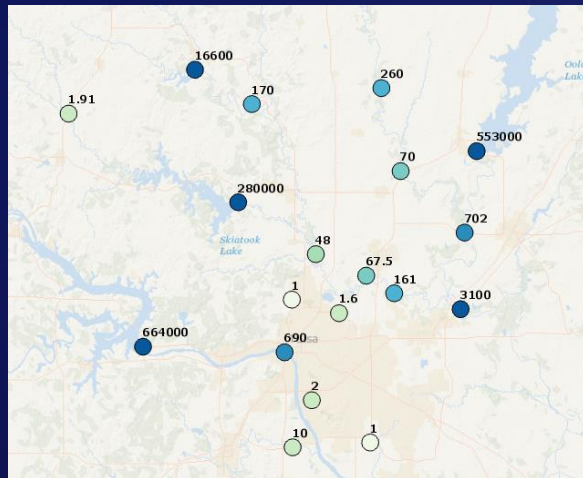
**GIS
INSPIRING
WHAT'S
NEXT**

Agenda

- 1 Overview of Stream Services & Stream Layers
 - 2 Publishing Stream Services
 - 3 Visualization of real-time data
 - 4 Sample applications & Tutorials
 - 5 Questions
-

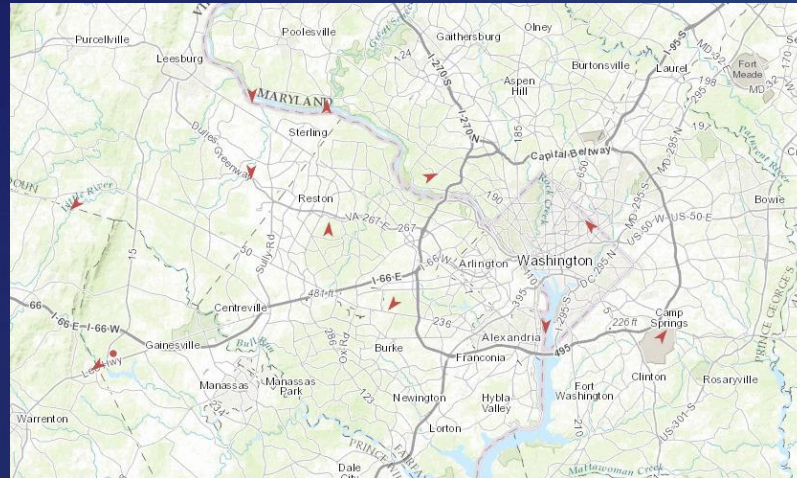
Real-Time GIS – Types of observations and data

stationary sensors...



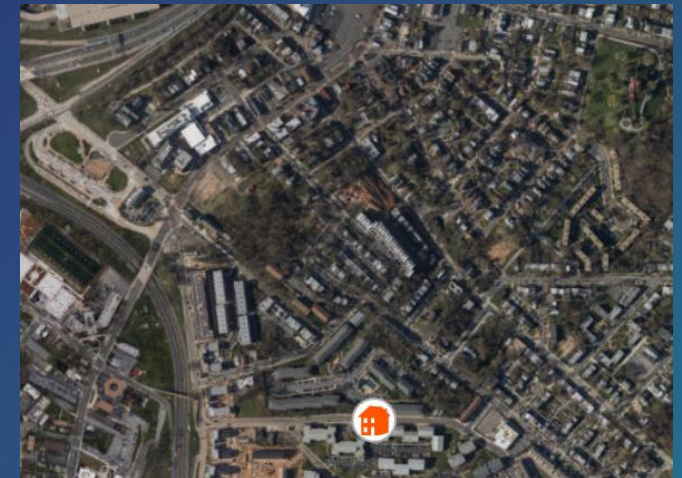
- water gauges
- weather stations
- air quality sensors
- device temperature

things that move...



- airplanes
- vehicles
- animals
- storms
- ships
- satellites
- trains
- people

things that “just happen”...



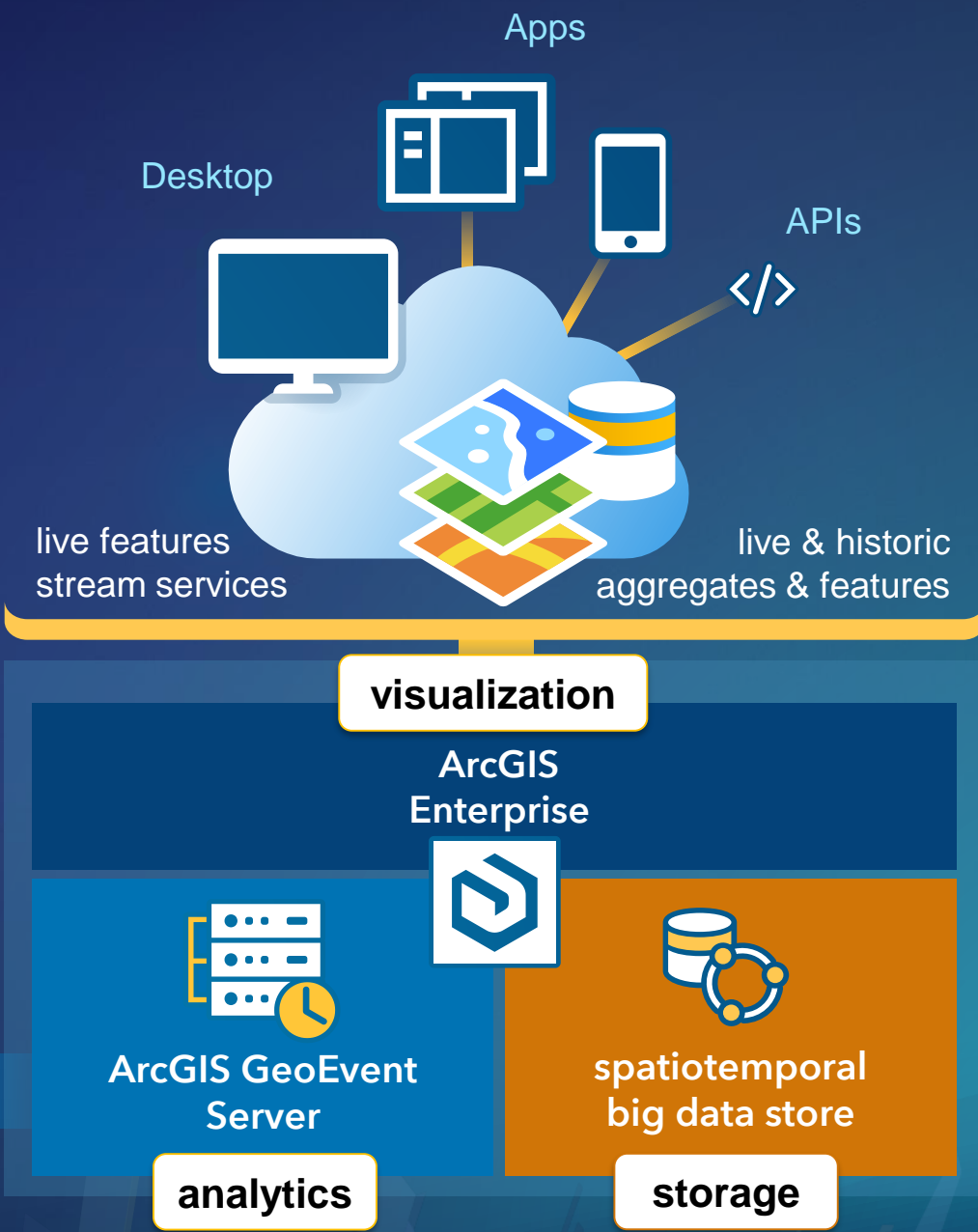
- crimes
- lightning
- accidents
- tweets



Overview of Stream Services & Stream Layers

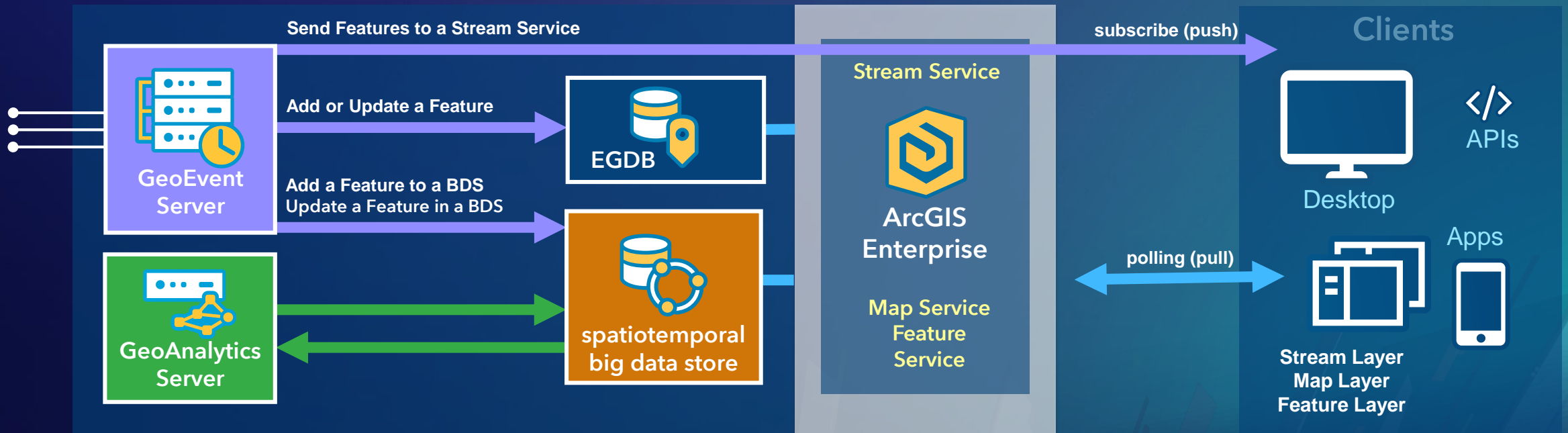
ArcGIS Enterprise

with real-time capabilities



Visualization

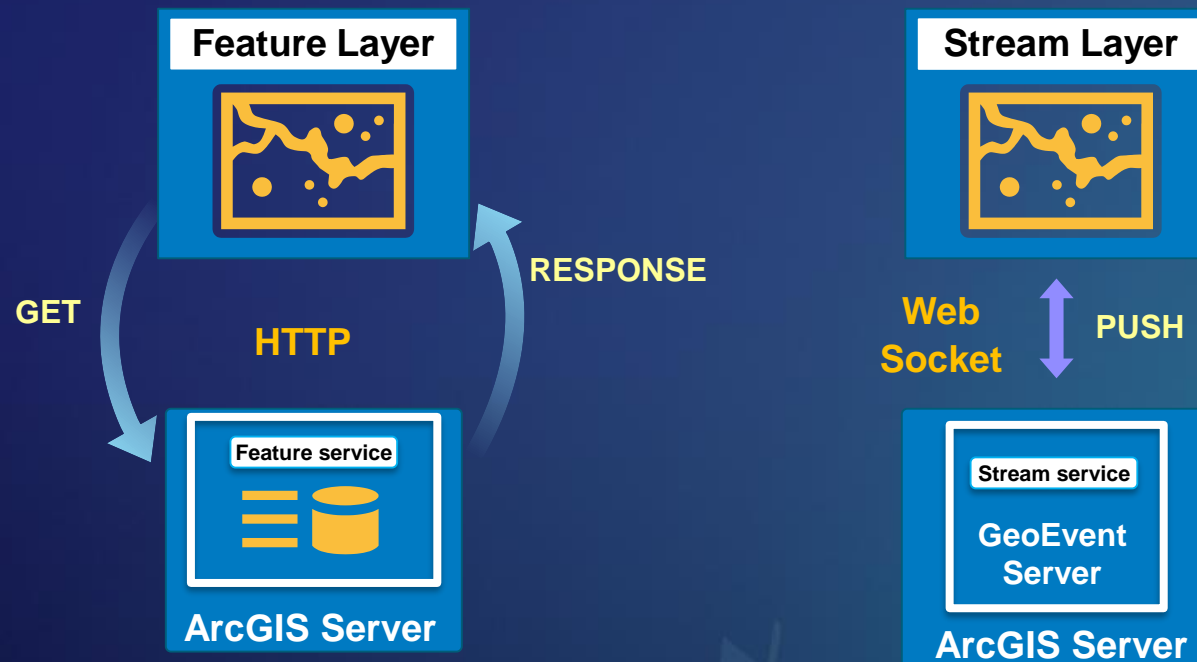
- Stream layers in apps **subscribe** to stream services to immediately visualize observations
 - does not require storage, low latency, no playback
- Map & Features layers in apps **poll** to visualize most current observations
 - backed by an enterprise geodatabase (EGDB) or a spatiotemporal big data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



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**.



Stream Layers

pre-requisites

- **ArcGIS GeoEvent Server**
 - Stream Services are published as part of the configuration of an outbound connector.
- **Web Browsers** that support Web Sockets.
 - <http://caniuse.com/websockets>
- **Network** support for the **Web Socket** protocol
 - `ws://` `wss://`
- **No custom plug-in required:** standard JavaScript implementation.



Stream Layers

where can I use stream layers?

- ArcGIS Online & Portal for ArcGIS **Web Maps**.
- ArcGIS Online & Portal for ArcGIS **web application templates** (2D only).
- Web applications built using **Web AppBuilder** (2D only).
- Your own 2D or 3D web apps that use the **ArcGIS API for JavaScript**.
- **ArcGIS Pro v2.2** maps and scenes



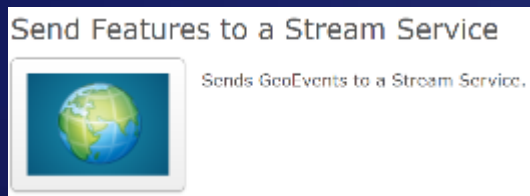
2

Publishing Stream Services

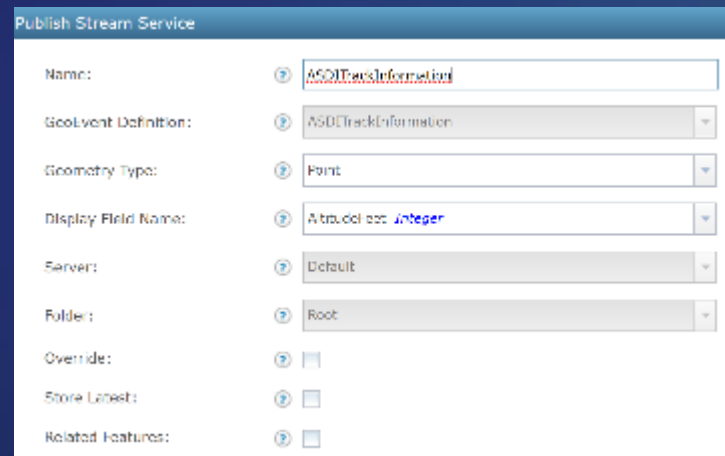
Publishing Stream Services

using *GeoEvent Server*

Create Output Connector



Publish Service

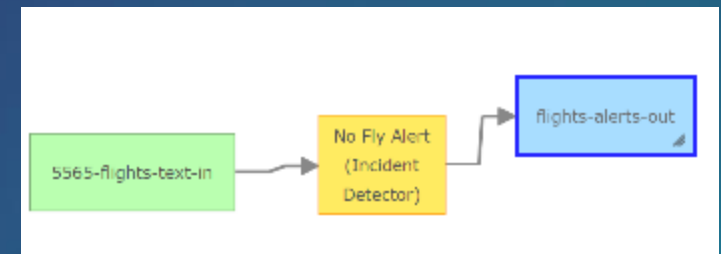


Publish Stream Service

Name:	<input type="text" value="ASDTrackInformation"/>
GeoEvent Definition:	<input type="text" value="ASDTrackInformation"/>
Geometry Type:	<input type="text" value="Point"/>
Display Field Name:	<input type="text" value="AttrLevel: Integer"/>
Server:	<input type="text" value="Default"/>
Folder:	<input type="text" value="Root"/>
Override:	<input type="checkbox"/>
Store Latest:	<input type="checkbox"/>
Related Features:	<input type="checkbox"/>

The image shows a configuration form for "Publish Stream Service" with fields for Name, GeoEvent Definition, Geometry Type, Display Field Name, Server, Folder, Override, Store Latest, and Related Features.

Wire Together With Input



Publishing Stream Services

ArcGIS REST Services Directory

ArcGIS REST Services Directory

[Home](#) > [services](#)

[JSON](#) | [SOAP](#)

Folder: /

Current Version: 10.4

View Footprints In: [ArcGIS Online map viewer](#)

Folders:

- [Utilities](#)

Services:

- [ASDITrackInformation](#) (StreamServer)
- [Flights](#) (StreamServer)
- [Gages](#) (MapServer)
- [SampleWorldCities](#) (MapServer)

Supported Interfaces: [REST](#) [SOAP](#) [Sitemap](#) [Geo Sitemap](#)

ArcGIS REST Services Directory

[Home](#) > [services](#) > [Flights \(StreamServer\)](#)

[JSON](#)

Flights (StreamServer)

View In: [ArcGIS JavaScript](#)

View In: [ArcGIS Online Map Viewer](#)

Geometry Type: esriGeometryPoint

Geometry Field: Location

Spatial Reference: 4326 (4326)

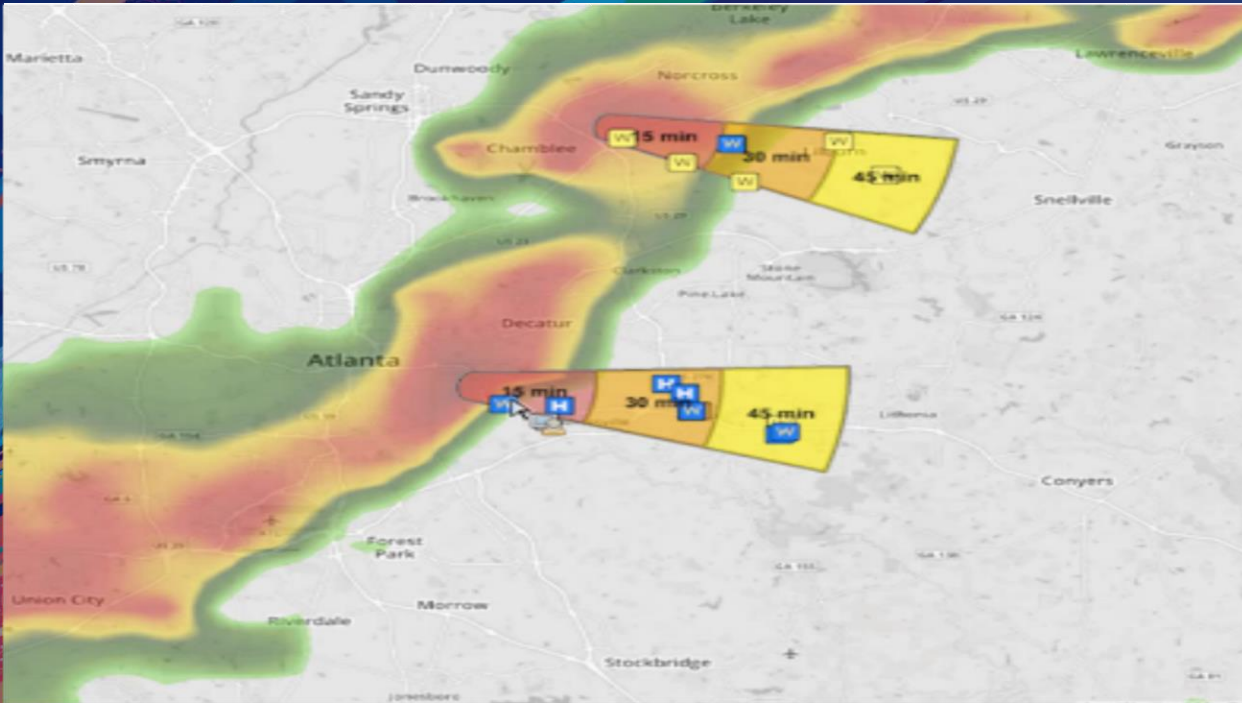
Fields:

- MsgTime (type: esriFieldTypeDate , alias: MsgTime , nullable: true)
- DepArpt (type: esriFieldTypeString , alias: DepArpt , nullable: true)
- FltId (type: esriFieldTypeString , alias: FltId , nullable: true)
- Heading (type: esriFieldTypeInteger , alias: Heading , nullable: true)
- AltitudeFeet (type: esriFieldTypeInteger , alias: AltitudeFeet , nullable: true)
- FID (type: esriFieldTypeInteger , alias: FID , nullable: true)

Web Socket URLs:

- ws://URSUS.ESRI.COM:6180/arcgis/ws/services/Flights/StreamServer
- wss://URSUS.ESRI.COM:6143/arcgis/ws/services/Flights/StreamServer

Capabilities: [Subscribe](#)



Publishing

stream service & the REST endpoint



Visualization of real-time data

Visualization of real-time data

in a web map by adding a stream service

Add Stream Service

Add Layer from Web

What type of data are you referencing?

An ArcGIS Server Web Service

URL: <https://mymachine:6443/arcgis/rest/services/UC2017/ASDITrackInformation/Stream>

Use as Basemap

ADD LAYER CANCEL

Configure the Layer

Change Style

ASDITrackInformation

Showing Location Only

Symbols

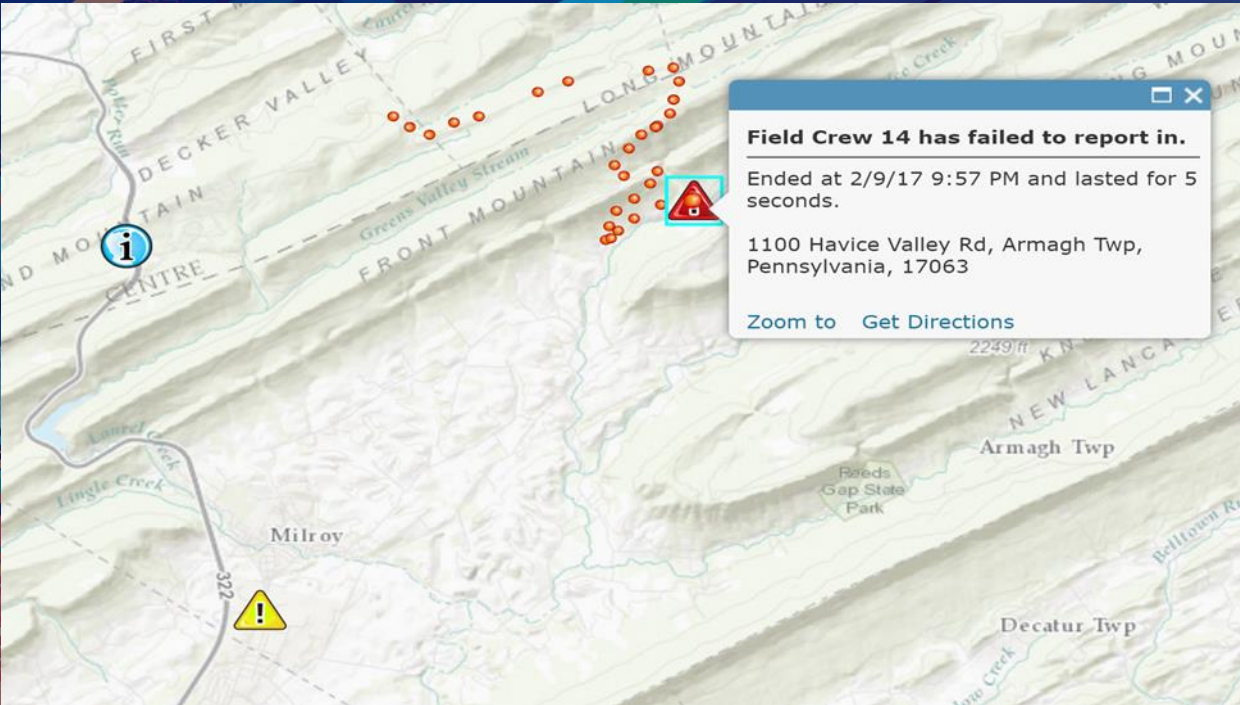
This layer streams updated feature observations.

Draw previous 5 observa
Symbol: •

Connect observations
Symbol: —

Rotate symbols (degrees)
Heading
 Clockwise from 12
 Counterclockwise from 3

Transparency

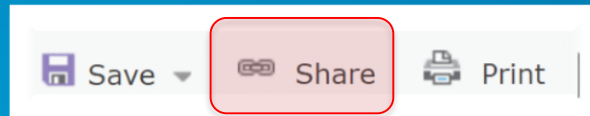


Stream Layers in Webmaps

Visualization of real-time data

In a web app using Web AppBuilder

From The Map Viewer



Link to this map

<http://idtsteelportal.esri.com/portal/home/webmap/viewer.html?webmap=0ee9d9da73804a7bbbb364f1d785f08d&extent=-103.7988,32.9267,-74.6411,43.7005>

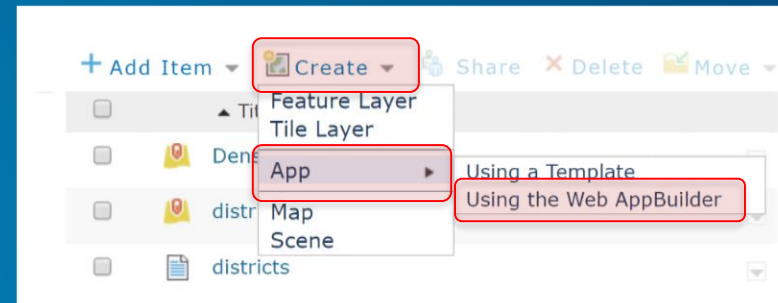
Share current map extent

Embed this map

EMBED IN WEBSITE

CREATE A WEB APP

From My Contents



Create a New Web App

2D 3D

Specify a title, tags, and summary for the r

Title:

Stream Layers in Web AppBuilder

The screenshot displays the Web AppBuilder for ArcGIS interface. The top navigation bar includes 'Home', 'Web AppBuilder for ArcGIS', and 'Stream Gages'. Below this is a toolbar with icons for Theme, Map, Widget, and Attribute. A central map area shows a stream network with labels like 'Marais des Cygnes' and 'Sycamore Branch'. A 'Configure Stream' dialog box is open, showing the 'Stream' widget icon and a 'Change widget icon' button. The 'Stream layers' section contains a table with the following data:

Name
GageStatusRenderer

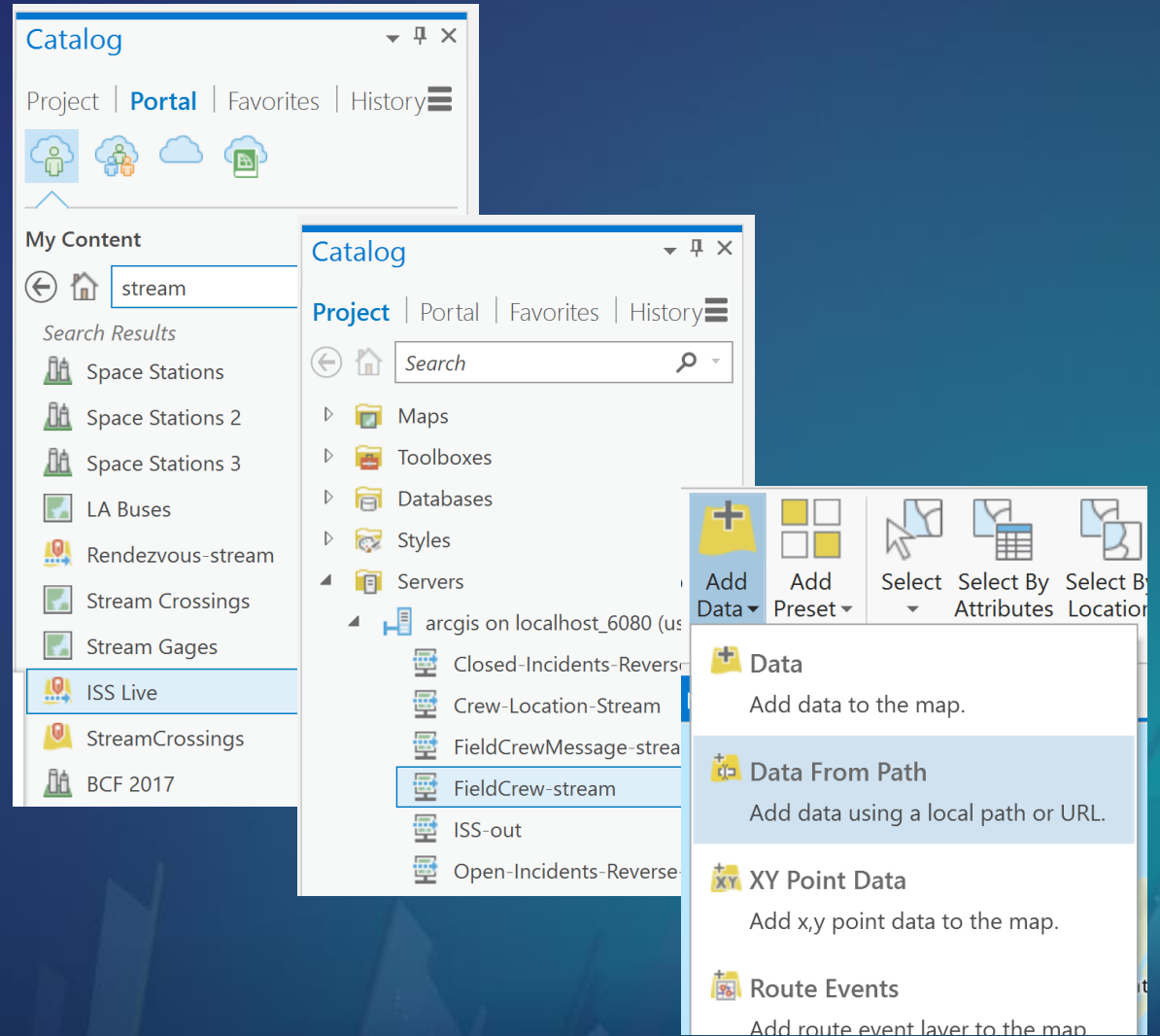
The 'Streaming controls' section includes three options:

- Enable Stop streaming or Start streaming option
- Enable Clear previous observations option
- Enable Draw previous observations option

Visualization of real-time data

adding a stream service to ArcGIS Pro 2.2

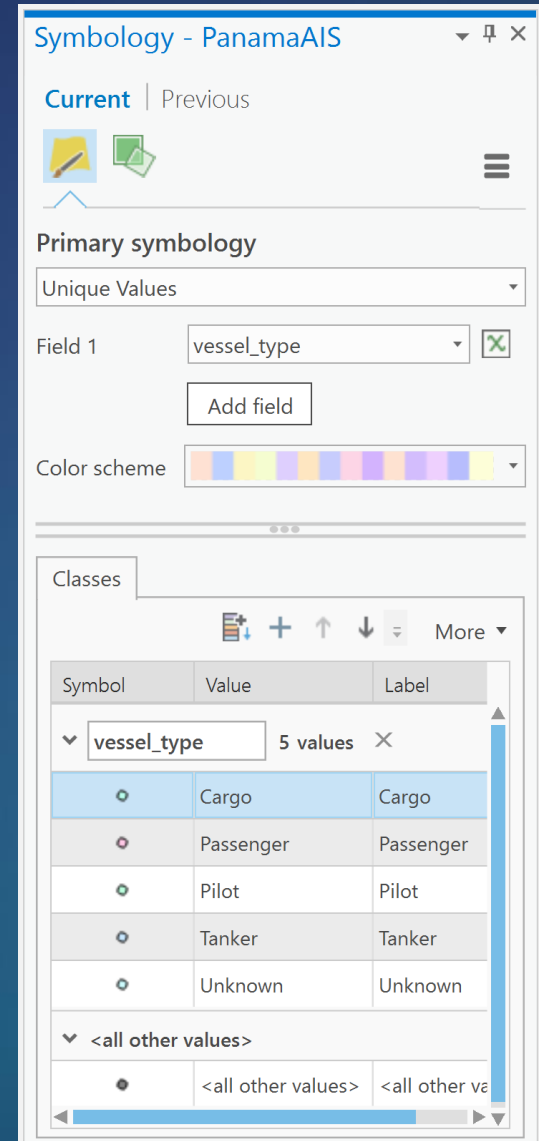
- **Add a Portal or ArcGIS Online item**
- **From a server connection**
- **Add Data From Path**

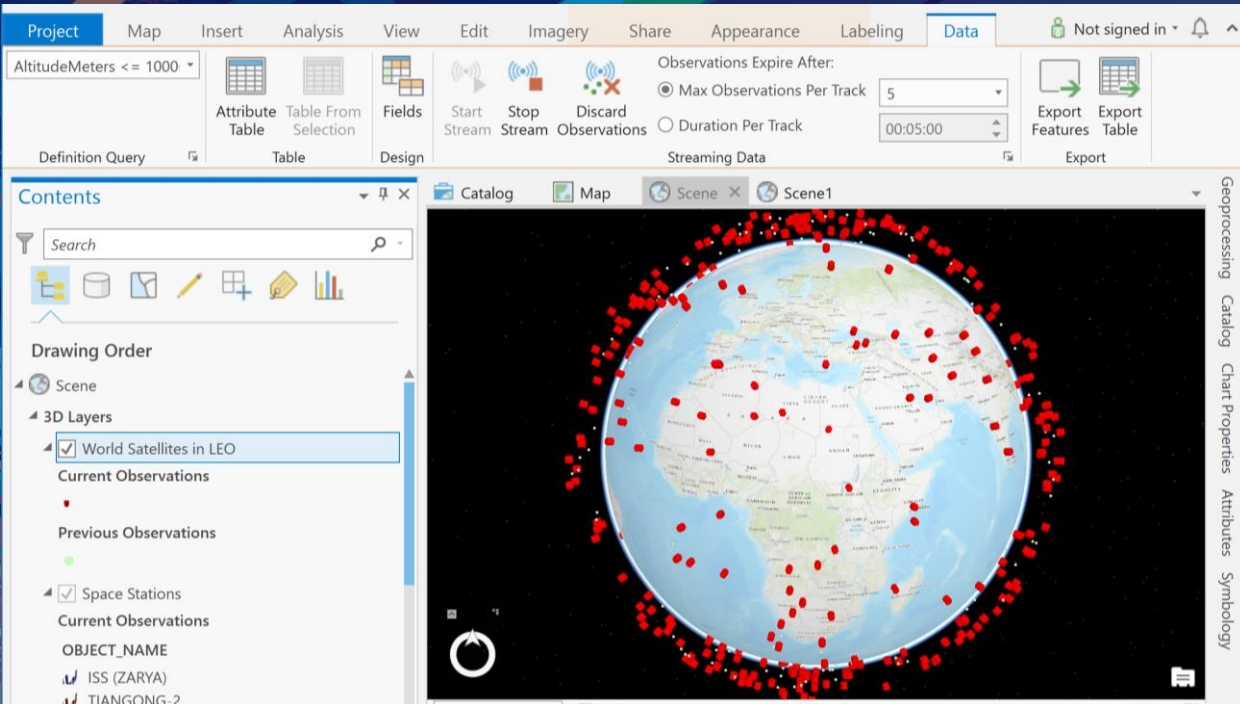


Visualization of real-time data

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

Stream Layers in custom applications

very little code required using the ArcGIS API for JavaScript

- ArcGIS API for JavaScript
 - 3.x for 2D applications
 - 4.x for 2D or 3D applications

```
require([
  "esri/Map",
  "esri/views/MapView",
  "esri/layers/StreamLayer",
  "dojo/domReady!"
])
```

```
var url = "http://ec2-75-101-155-202.compute-1.amazonaws.com:6080/arcgis/rest/services/AsdiTracks/StreamServer";
var streamLayer = new StreamLayer ( { url: url } );
var map = new Map( {
  basemap: "topo",
  layers: [ streamLayer ]
} );
var view = new MapView( { container: "mapDiv", map: map } );
```



Sample applications & Tutorials

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 applications on GitHub:**
 - <https://github.com/jcardonadcdev/esri-uc-2017>
- **Sample stream services with simulated data:**
 - <https://geoeventsample1.esri.com:6443/arcgis/rest/services>
 - <https://geoeventsample3.esri.com:6443/arcgis/rest/>
 - <http://ec2-75-101-155-202.compute-1.amazonaws.com:6080/arcgis/rest/>
- **Tutorials:**
 - <http://links.esri.com/geoevent-tutorials>
 - <http://links.esri.com/geoevent-streamservices>
- **Discussions & Blogs (on GeoNet)**
 - <https://geonet.esri.com/community/gis/enterprise-gis/geoevent/content>

Please Attend Our Other Sessions!

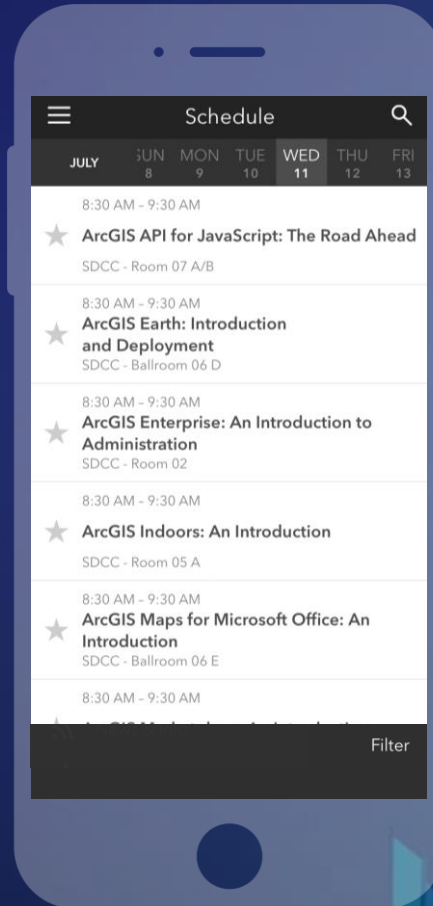
WORKSHOP	LOCATION	DAY	TIME FRAME
ArcGIS GeoEvent Server: An Introduction	SDCC - Room 03 SDCC - Room 04	Tuesday	8:30 am - 9:30 am 4:00 pm - 5:00 pm
ArcGIS and the Internet of Things (IoT)	SDCC - Room 04 SDCC - Room 03	Tuesday Wednesday	10:00 am - 11:00 am 10:00 am - 11:00 am
ArcGIS GeoEvent Server: Applying Real-Time Analytics	SDCC - Room 31 SDCC - Room 15 B	Tuesday Wednesday	2:30 pm - 3:30 pm 4:00 pm - 5:00 pm
Real-Time & Big Data GIS: Leveraging the Spatiotemporal Big Data Store	SDCC - Room 05 B SDCC - Room 14 B	Wednesday Thursday	8:30 am - 9:30 am 1:00 pm - 2:00 pm
Real-Time & Big Data GIS: Road Ahead	SDCC - Room 05 B SDCC - Room 15 A	Wednesday Thursday	1:00 pm - 2:00 pm 10:00 am - 11:00 am
Real-Time & Big Data GIS: Best Practices	SDCC - Room 17 B SDCC - Room 14 B	Wednesday Thursday	2:30 pm - 3:30 pm 2:30 pm - 3:30 pm
The Smart Workplace: Monitoring Assets and Personnel in Real-Time	SDCC - Room 30 D	Thursday	1:00 pm - 2:00 pm
ArcGIS GeoEvent Server: Leveraging Stream Services	SDCC - Room 33 C	Thursday	2:30 pm - 3:30 pm

Please Take Our Survey on the App

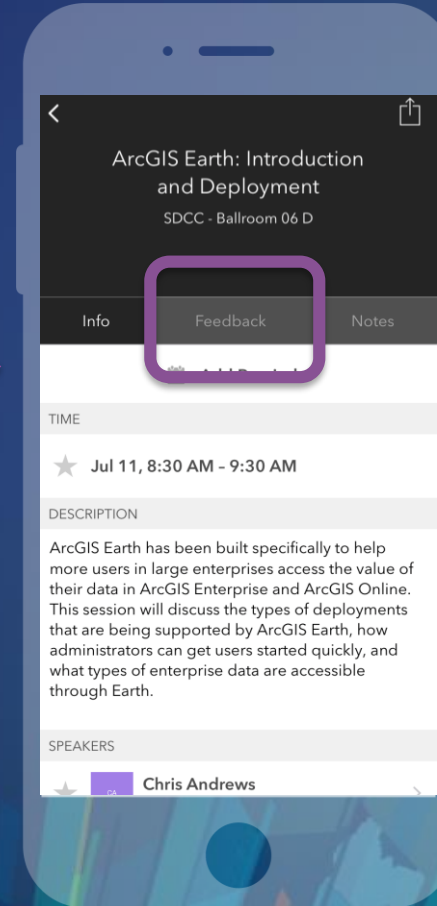
Download the Esri Events app and find your event



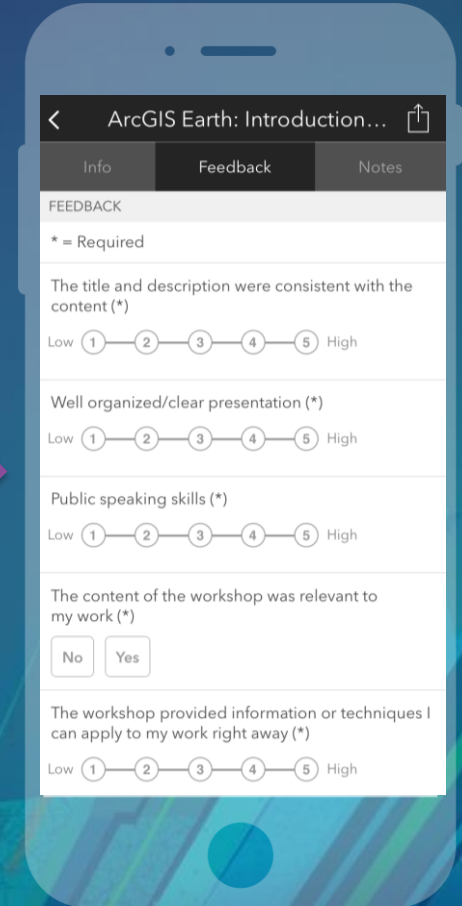
Select the session you attended



Scroll down to find the feedback section

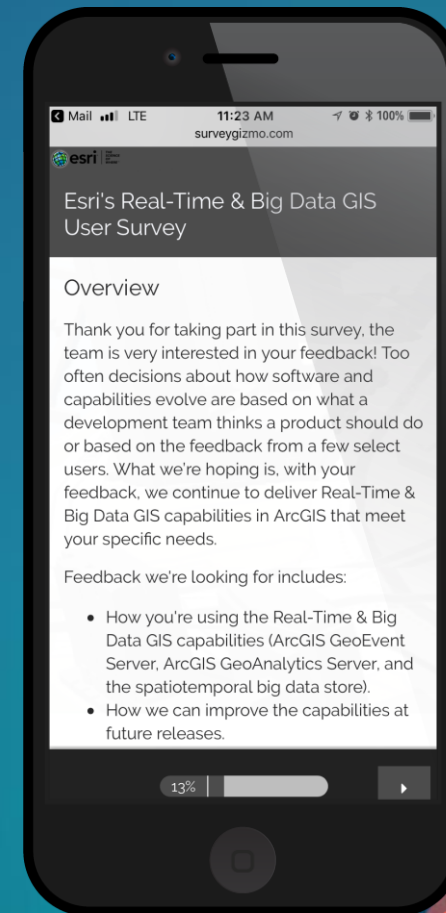
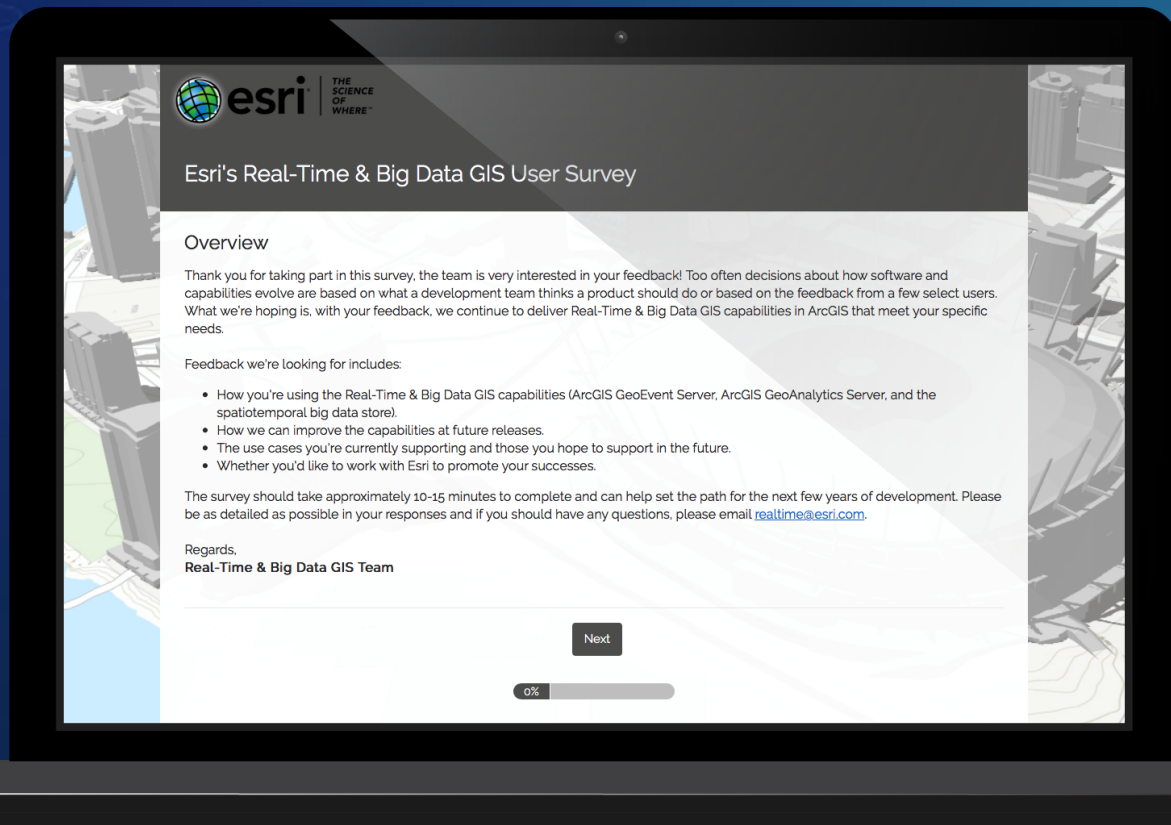


Complete answers and select "Submit"



Help us improve the Real-Time & Big Data GIS Capabilities

<http://esriurl.com/RealTimeSurvey>



Questions / Feedback?



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esri

**THE
SCIENCE
OF
WHERE**