ArcGIS GeoEvent Server: Leveraging Stream Services

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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

tings that move…

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

tings that “just happen”…

• crimes
• lightning
• accidents
• tweets
1 Overview of Stream Services & Stream Layers
ArcGIS Enterprise
with real-time capabilities

ArcGIS GeoEvent Server
analytics
spatiotemporal big data store
visualization
ArcGIS Enterprise

ingestion
actuation

Desktop
Apps
APIs

live & historic aggregates & features
live features stream services

storage
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
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](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
Wire Together With Input
Publishing Stream Services

ArcGIS REST Services Directory

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

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)
- DepaArpt (type: esriFieldTypeString, alias: DepaArpt, nullable: true)
- FIdd (type: esriFieldTypeString, alias: FIdd, nullable: true)
- Heading (type: esriFieldTypeInteger, alias: Heading, nullable: true)
- AttitudeFeet (type: esriFieldTypeInteger, alias: AttitudeFeet, nullable: true)
- FID (type: esriFieldTypeInteger, alias: FID, nullable: true)

Web Socket URLs:
- ws://URSUS.ESRI.COM:6190/arcgis/ws/services/Flights/StreamServer
- ws://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
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
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

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

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:**
  - 3.x: https://developers.arcgis.com/javascript/3/jsapi/streamlayer-amd.html

- **Sample applications on GitHub:**

- **Sample stream services with simulated data:**
  - https://geoeventsample1.esri.com:6443/arcgis/rest/services
  - https://geoeventsample3.esri.com:6443/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
<table>
<thead>
<tr>
<th>WORKSHOP</th>
<th>LOCATION</th>
<th>DAY</th>
<th>TIME FRAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>ArcGIS GeoEvent Server: An Introduction</td>
<td>SDCC - Room 03 SDCC - Room 04</td>
<td>Tuesday</td>
<td>8:30 am - 9:30 am 4:00 pm - 5:00 pm</td>
</tr>
<tr>
<td>ArcGIS and the Internet of Things (IoT)</td>
<td>SDCC - Room 04 SDCC - Room 03</td>
<td>Tuesday/Wednesday</td>
<td>10:00 am - 11:00 am 10:00 am - 11:00 am</td>
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<tr>
<td>ArcGIS GeoEvent Server: Applying Real-Time Analytics</td>
<td>SDCC - Room 31 SDCC - Room 15 B</td>
<td>Tuesday/Wednesday</td>
<td>2:30 pm - 3:30 pm 4:00 pm - 5:00 pm</td>
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<td>Real-Time &amp; Big Data GIS: Leveraging the Spatiotemporal Big Data Store</td>
<td>SDCC - Room 05 B SDCC - Room 14 B</td>
<td>Wednesday/Thursday</td>
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<td>Real-Time &amp; Big Data GIS: Road Ahead</td>
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<td>Real-Time &amp; Big Data GIS: Best Practices</td>
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<td>The Smart Workplace: Monitoring Assets and Personnel in Real-Time</td>
<td>SDCC - Room 30 D</td>
<td>Thursday</td>
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<tr>
<td>ArcGIS GeoEvent Server: Leveraging Stream Services</td>
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<td>Thursday</td>
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http://esriurl.com/RealTimeSurvey
Questions / Feedback?

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