ArcGIS GeoEvent Extension for Server: An Introduction

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What is Real-Time GIS?
GIS Data

- GIS data typically represents state at a specific moment in time: “historic”, “current”, or “future”.

Credit: iStockphoto/chris_lemmens
Real-Time GIS Data

- Real-time GIS data is a continuous stream of events flowing from sensors, where each event represents the latest state of the sensor.
  - Emergency response
  - Utility networks
  - Warehouses
  - Environmental

1. Challenge #1

- Police Car
- Police Person
- Ambulance
- Network Sensor
- Warehouse Item
- Storm
- Wind
- Temperature
- Earthquake
- Wild Fire

2. Applications
Real-Time Analytics

- What fishing vessels are inside designated “no fishing” zones?

Challenge #2

Continuous Analysis

Features

- Vessel
- Alert

Applications

Inside Boundary
Real-Time Notifications and Alerting

• Tell a parent when their child leaves school property.
ArcGIS GeoEvent Extension for Server

Integrates and Exploits real-time data

- Integrates real-time streaming data into ArcGIS
- Performs continuous processing and real-time analytics
- Sends updates and alerts to those who need it where they need it
Working with Real-Time Data
Working with Real-Time Data

*Making features come alive*

- Connect an output to your feature
- Import the schema of your feature as a GeoEvent Definition
- Configure an input to receive real-time data
- Author and publish a GeoEvent Service
- Visualize your real-time feature
Making Feature Come Alive

Vehicles
Receiving Real-Time Data

*Input Connectors*

- Easily integrate real-time streaming data with ArcGIS by using an input **connector**.

<table>
<thead>
<tr>
<th>GeoEvent Extension Inputs</th>
<th>GeoEvent Services Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receive RSS</td>
<td>Twitter</td>
</tr>
<tr>
<td>Receive text from a TCP Socket</td>
<td>Instagram</td>
</tr>
<tr>
<td>Receive text from a UDP Socket</td>
<td>CAP</td>
</tr>
<tr>
<td>http:// Receive Features on a REST endpoint</td>
<td>GeoMessage</td>
</tr>
<tr>
<td>http:// Receive JSON on a REST endpoint</td>
<td>VMF</td>
</tr>
<tr>
<td>ws:// Receive JSON on a Web Socket</td>
<td>Cursor-on-Target</td>
</tr>
<tr>
<td>ws:// Receive JSON on external Web Socket</td>
<td>VMF</td>
</tr>
<tr>
<td>Poll an ArcGIS Server for Features</td>
<td>RabbitMQ</td>
</tr>
<tr>
<td>http:// Poll an external website for JSON</td>
<td>NMEA</td>
</tr>
<tr>
<td>.csv Watch a folder for new .csv files</td>
<td>TAIP (Trimble)</td>
</tr>
<tr>
<td>.json Watch a folder for new .json files</td>
<td>RAP (Sierra Wireless)</td>
</tr>
</tbody>
</table>

You can create your own connectors.

Out of the Box

- Twitter
- VMF
- Esri Gallery
- ExactEarth
- Out of the Box
- Twitter
- VMF
- Esri Gallery
- ExactEarth

Partner Gallery

- Twitter
- VMF
- Esri Gallery
- ExactEarth

Partner Gallery

- Twitter
- VMF
- Esri Gallery
- ExactEarth
Sending Real-Time Data

Output Connectors

- Easily send updates and results to those who need it, where they need it using an output connector.
Applying Real-Time Analytics
Applying real-time analytics

**GeoEvent Services**

- A GeoEvent Service configures the flow of GeoEvents,
  - The Filtering and GeoEvent Processing steps to perform,
  - what input(s) to apply them to,
  - and what output(s) to send the results to.
Applying real-time analytics

**Filtering**

- A **Filter** eliminates GeoEvents based on an expression.
Filtering
Attribute, Spatial and Combined Expressions
Applying real-time analytics

*GeoEvent Processing*

- You can perform continuous analytics on GeoEvents as they are received using a processor.

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<td>Out of the Box</td>
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<tr>
<td>Field Enricher</td>
<td>Field Reducer</td>
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<tr>
<td>Field Calculator</td>
<td>GeoTagger</td>
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<tr>
<td>Field Mapper</td>
<td>Track Gap Detector</td>
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<tr>
<td>Incident Detector</td>
<td></td>
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<tr>
<td>Esri Gallery</td>
<td></td>
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<tr>
<td>Track Idle Detector</td>
<td>ETA Calculator</td>
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<td>Service Area</td>
<td>Buffer</td>
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<td>Ellipse</td>
<td>Range Fan</td>
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<td>Visibility</td>
<td>Query Report</td>
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<tr>
<td>SDK</td>
<td></td>
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<tr>
<td>Slope Calculator</td>
<td>Volume Control</td>
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</table>
GeoEvent Processing

Incident Detection

AMB-15 is inside a Dangerous area Ongoing for last 7 minutes and 0 seconds.
Extending GeoEvent

Software Development Kit (SDK)

- You can create your own connectors and processors using the GeoEvent SDK.
Deployment Patterns
Deployment Patterns

*Using local feature services*

GeoEvent Extension > GeoEvent Services > GeoEvent Extension

ArcGIS Server

- Inputs
- Outputs

ArcGIS Online / Portal for ArcGIS
- operation view
- web map

Your Dashboards
- Operations Dashboard for ArcGIS

Your Applications
- Your Dashboards
- Your Applications
Deployment Patterns

Using remote feature services

GeoEvent Extension

GeoEvent Services

Inputs

Outputs

ArcGIS Server

10.2.x

ArcGIS Server

10.1.x

Your Dashboards

Operations Dashboard for ArcGIS

ArcGIS Online / Portal for ArcGIS

operation view

web map

Your Applications

ArcGIS GeoEvent Extension for Server - An Introduction
Deployment Patterns

*Using ArcGIS Online / Portal for ArcGIS feature services*

GeoEvent Extension

Operations Dashboard for ArcGIS

Your Dashboards

ArcGIS Online / Portal for ArcGIS

- operation view
- web map
- feature layers

Your Applications
Administering GeoEvent
Administering GeoEvent

REST Admin API

- You can manage GeoEvent programmatically using a complete set of REST administrative endpoints.
  - *GeoEvent Manager* exclusively uses the REST Admin API

```
https://localhost:6143/geoevent/admin
```
ArcGIS GeoEvent Extension for Server

Summary

• ArcGIS is a dynamic platform that enables continuous analytics and real-time visualization for better understanding of our world.

• The GeoEvent extension allows you to:
  - to know what is happening, as it happens
  - be alerted when interesting events occur
  - react and make smarter decisions faster
Where to learn more?

Resources

• To learn more, visit the tutorial in the Esri Gallery:
  - [http://links.esri.com/geoevent](http://links.esri.com/geoevent)
    - Introduction
    - Notifications
    - RSS
    - Web Sockets
    - Working with HTTP
    - GeoEvent Caches
    - REST Admin API

• GeoEvent Forum is on GeoNet
  - [https://geonet.esri.com/community/gis/enterprise-gis/geoevent](https://geonet.esri.com/community/gis/enterprise-gis/geoevent)
Where to learn more?

Remaining Sessions

- **Building Real-Time Web Applications**
  - Tue 10:15-11:30am (Ballroom 6B)

- **Applying Real-Time Analytics**
  - Tue 1:30-2:45pm (Ballroom 6E), Wed 3:15-4:30pm (Ballroom 6A), Fri 9:00-10:15am (Room 7A/B)

- **The Internet of Things (IoT)**
  - Tue 3:15-4:30pm (Ballroom 6E)

- **Extending with New Processors and Connectors**
  - Wed 10:15-11:30am (Room 3)

- **Using Community Connectors**
  - Wed 12:30-1:00pm (Exhibit Hall C – Geodata Management Demo Theater)

- **ArcGIS for Server and Portal for ArcGIS: The Road Ahead**
  - Wed 1:30-2:45pm (Ballroom 6A)

- **Applying Real-Time GIS to Fire, Ice, and Sustainable Mobility**
  - Wed 3:15-4:30pm (Room 23C, Moderated Paper Session)

- **Real-Time GIS SIG**
  - Wed 5:30-7:00pm (Room 10)

- **Applying Real-Time GIS to Asset Protection**
  - Thu 3:15-4:30pm (Room 24A, Moderated Paper Session)
Thank you...

• Please fill out the session survey:

Offering ID: 1131

Online – www.esri.com/ucsessionssurveys
Paper – pick up and put in drop box
Questions / Feedback?

To learn more:
http://links.esri.com/geoevent-processor
https://geonet.esri.com/community/gis/enterprise-gis/geoevent

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