ArcGIS GeoEvent Extension for Server: Applying Real-Time Analytics

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ArcGIS GeoEvent Extension for Server
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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
Receiving Real-Time Data

**Input Connectors**

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

GeoEvent Extension

GeoEvent Services

**Inputs**

- Receive RSS
- Receive text from a TCP Socket
- Receive text from a UDP Socket
- Receive Features on a REST endpoint
- Receive JSON on a REST endpoint
- Receive JSON on a Web Socket
- Receive JSON on external Web Socket
- Poll an ArcGIS Server for Features
- Poll an external website for JSON
- Watch a folder for new .csv files
- Watch a folder for new .json files

**Outputs**

- Twitter
- Instagram
- CAP
- Cursor-on-Target
- VMF
- VMF
- GeoMessage
- GeoMessage
- ActiveMQ
- RabbitMQ
- NMEA
- TAIP (Trimble)
- RAP (Sierra Wireless)

You can create your own connectors.

Out of the Box

- Esri Gallery
  - Twitter
  - Instagram
  - CAP
  - VMF
  - GeoMessage
  - GeoMessage
  - ActiveMQ
  - RabbitMQ
  - NMEA
  - TAIP (Trimble)
  - RAP (Sierra Wireless)

Partner Gallery

- Esri Gallery
  - GNIP
  - Geofeedia
  - exactEarth
  - ASDI (FAA)
  - OSIsoft
  - ASDI (FAA)
  - exactEarth
  - ASDI (FAA)
  - OSIsoft
  - ASDI (FAA)
  - exactEarth

- Partner Gallery
  - Valarm
  - Harris
  - CompassCom
  - CompassCom
  - Zonar
  - NetworkFleet
  - NetworkFleet
  - Zonar
  - Zonar
Sensors used in this workshop

Yoctopuce Yocto-Light
- Reports luminosity

Yoctopuce Yocto-VOC
- Reports volatile organic compounds

Yoctopuce Yocto-CO2
- Reports carbon dioxide

Yoctopuce Yocto-Meteo
- Reports ambient temperature, relative humidity & barometric pressure

Valarm & Yocto-Meteo with Solar Power

ArcGIS GeoEvent Extension for Server - Applying Real-Time Analytics
Integrating a sensor network with ArcGIS

Valarm for GeoEvent
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

*GeoEvent Processing*

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

GeoEvent Extension

**Inputs**
- GeoEvent Services

**Outputs**
- Out of the Box
  - Field Enricher
  - Field Reducer
  - Field Calculator
  - GeoTagger
  - Field Mapper
  - Track Gap Detector
  - Incident Detector

**Esri Gallery**
- Track Idle Detector
- ETA Calculator
- Service Area
- Buffer
- Ellipse
- Range Fan
- Visibility
- Query Report

**SDK**
- Slope Calculator
- Volume Control

You can create your own processors.
GeoEvent Processing

*Processors – derive a new GeoEvent*

- **A Field Mapper processor**
  - Translates from one GeoEvent Definition to another
  - Specifying how fields map across the GeoEvent Definitions

```json
{
  "id": "53c14c0de4b07cbb857a1d4f",
  "deviceId": "52df1e34e4b0293fcac059e9",
  "timestamp": 1405176845553,
  "lat": 34.0642350014815,
  "lng": -117.1238773357668,
  "alt": 475.59906005859375,
  "acc": 47.20000076293945,
  "deviceId": "52df1e34e4b0293fcac059e9",
  "timestamp": 1405176845553,
  "co2": 1604.0,
  "voc": 463.0,
  "geometry": -117.123…, 34.064…
}
```
GeoEvent Processing

Processors – modify a GeoEvent

• A Field Reducer processor
  - Removes specified fields from a GeoEvent
  - derives a new GeoEvent Definition based on the resulting schema

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<thead>
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**GeoEvent Processing**

*Processors – modify a GeoEvent*

- **A Field Enricher processor**
  - Uses a field on the incoming GeoEvent to join with another data source and retrieve fields.
  - After the Field Enricher retrieves the required data from a data source, it enriches the GeoEvent with new fields derived from the source.
GeoEvent Processing
Field Mapper and Field Enricher
GeoEvent Processing

Processors – calculate new fields on a GeoEvent

- A Field Calculator processor uses an expression to
  - calculate a new field or update an existing field.
  - Expressions can be mathematical expressions, string operations, or regular expressions.

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Event

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Enriched Event

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**GeoEvent Processing**

*Processors – calculate new fields on a GeoEvent*

- **A GeoTagger processor**
  - uses a spatial expression to tag the event with related geometries.

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GeoEvent Processing
Field Calculator and GeoTagger

![Temp chart](image.png)
GeoEvent Processing

Processors – derive a new GeoEvent

• An Incident Detector Processor
  - creates an Incident upon an opening expression being met,
  - maintains state for the duration of an incident,
  - closes the incident based on a closing expression, or expiration.
Alerting and Notifying

Incident Detector
GeoEvent Processing

Processors – derive a new GeoEvent

- A **Track Gap Detector** processor
  - Detects the absence of events and alerts about the situation.
Applying Real-Time Analytics

What's coming at ArcGIS 10.3
Applying real-time analytics

What’s coming at ArcGIS 10.3

- Additional Spatial Operators
  - inside, outside, enter, exit  
  [already available at 10.2.x]
  - intersect, disjoint, touches, contains, crosses, equals, overlaps, within
Applying real-time analytics

What’s coming at ArcGIS 10.3

- Additional Out-of-the-Box Spatial Processors

GeoEvent Extension

Out of the Box

- Field Enricher
- Field Reducer
- Field Calculator
- GeoTagger
- Field Mapper
- Track Gap Detector
- Incident Detector

Coming at ArcGIS 10.3

- Buffer Creator
- Convex Hull Creator
- Difference Creator
- Envelope Creator
- Intersector
- Projector
- Simplifier
- Symmetric Difference
- Union Creator

You can create your own processors.

Esri Gallery

- Track Idle Detector
- ETA Calculator
- Service Area
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- Ellipse
- Range Fan
- Visibility
- Query Report

SDK

- Slope Calculator
- Volume Control

ETA Calculator

Service Area

Buffer

Ellipse

Range Fan

Visibility

Query Report
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*

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

- **An Introduction**
  - Wed 8:30-9:45am (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: 1145

Online – [www.esri.com/ucsessionsurveys](http://www.esri.com/ucsessionsurveys)
Paper – pick up and put in drop box
Questions / Feedback?

To learn more:
http://links.esri.com/geoevent

https://geonet.esri.com/community/gis/enterprise-gis/geoevent

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