GeoEvent Server: An Introduction

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Agenda:

1. Key Product Capabilities
2. Working with Real-Time Data
3. Demo: Vehicle Location and Alert Monitoring
4. Consuming Real-Time Data
5. Wrap-up
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
GeoEvent Server – Key Capability #1

- Ingest Data: Vehicle Location

Bringing real-time and big data capabilities to your ArcGIS Enterprise
<table>
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<th>GeoEvent Server – Key Capability #1</th>
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<tbody>
<tr>
<td>❖ Ingest Data: Sensors and Instruments</td>
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Bringing real-time and big data capabilities to your ArcGIS Enterprise
Bringing real-time and big data capabilities to your ArcGIS Enterprise

GeoEvent Server – Key Capability #1

- Ingest Data: Weather Monitoring

GeoEvent Server server role

spatiotemporal big data store

Apps

Desktop

APIs

Ingest Data: Weather Monitoring
Bringing real-time and big data capabilities to your ArcGIS Enterprise

GeoEvent Server – Key Capability #1

- Ingest Data: Public Safety Data Feeds

Desktop

GeoEvent Server server role

spatiotemporal big data store

Apps

APIs

Ingest Data:

- GeoEvent Server
  - Key Capability #1
Bringing real-time and big data capabilities to your ArcGIS Enterprise

GeoEvent Server – Key Capability #1

- Ingest Data: Commercial, Industrial, Utilities
GeoEvent Server – Key Capability #1

❖ Ingest Data: Configurable inputs for any type of data

Bringing real-time and big data capabilities to your ArcGIS Enterprise
GeoEvent Server – Key Capability #2

- Apply real-time analytics: Filtering
  - Identify event records with specified attribute values
<table>
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<td>✤ Apply real-time analytics: Filtering</td>
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<tr>
<td>▪ Identify event records with specified attribute values</td>
</tr>
<tr>
<td>▪ Determine spatial relationships with established geofences</td>
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- **outside**
- **inside**
- **disjoint**
- **crosses**

**GeoEvent Server**
- server role
- spatiotemporal big data store

**Bringing real-time and big data capabilities to your ArcGIS Enterprise**
GeoEvent Server – Key Capability #2

- Apply real-time analytics: Processing
  - Configure and use over two dozen types of processors
    ✓ Field Calculator
    ✓ Field Mapper
    ✓ Buffer Creator
    ✓ GeoTagger
    ✓ Incident Detector
    ✓ Track Gap Detector
    ...

Bringing real-time and big data capabilities to your ArcGIS Enterprise
GeoEvent Server – Key Capability #2

- Apply real-time analytics: Processing
  - Configure and use over two dozen types of processors
    - Field Calculator
    - Field Mapper
    - **Buffer Creator**
    - GeoTagger
    - Incident Detector
    - Track Gap Detector
    - ...

Bringing real-time and big data capabilities to your ArcGIS Enterprise
Bringing real-time and big data capabilities to your ArcGIS Enterprise

GeoEvent Server – Key Capability #3

- Store data as feature records in a geodatabase
  - Configurable outputs enable processed events to be stored in a traditional relational geodatabase
  - When data is received at a high volume, high velocity, or is accumulated over time, a spatiotemporal big data store is an available noSQL option for enterprise storage
GeoEvent Server – Key Capability #4

- Visualize feature records
  - Relational geodatabase feature services support traditional RESTful web applications and APIs
  - Big data map and feature services support on-the-fly feature aggregation

Bringing real-time and big data capabilities to your ArcGIS Enterprise
Bringing real-time and big data capabilities to your ArcGIS Enterprise

GeoEvent Server – Key Capability #4

- **Visualize feature records**
  - Relational geodatabase feature services support traditional RESTful web applications and APIs
  - Big data map and feature services support on-the-fly feature aggregation
  - Stream Services

![Diagram showing integration of GeoEvent Server, ArcGIS Enterprise, ArcGIS Data Store, Desktop Apps and APIs, GeoEvent Server server role, and spatiotemporal big data store.]

**GeoEvent Server**

**ArcGIS Enterprise**

**ArcGIS Data Store**

**Desktop Apps and APIs**

**GeoEvent Server server role**

**Spatiotemporal big data store**
GeoEvent Server – Key Capability #5

- Notify stakeholders about detected patterns of interest
  - Configurable outputs provide the capability to format an e-mail or SMS text message
  - How you choose to disseminate processed event records is entirely up to you

Bringing real-time and big data capabilities to your ArcGIS Enterprise
GeoEvent Server – Key Capability #5

- Adjust the behavior of things in our environment through actuation

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<th>Amazon</th>
<th>IoT</th>
<th>Azure</th>
<th>GeoEvent Server server role</th>
<th>spatiotemporal big data store</th>
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Bringing real-time and big data capabilities to your ArcGIS Enterprise
GeoEvent Server
server role
spatiotemporal big
data store
Working with Real-Time Data
Configurable Input Connectors

**Out of the Box Input connectors**
- Poll an ArcGIS map or feature service
- Poll an external web server or service
- Receive data records via HTTP/POST
- Receive data records via TCP / UDP socket
- Subscribe to an external web socket
- Watch a system folder for changes to a file

**GeoEvent Gallery Samples**
- FlightAware
- Verizon Connect / Telogis
- Waze
- Apache Kafka
- GeoTab Fleet Management
- ...

**Partner Gallery connectors**
- exactEarth
- Valarm
- CompassLDE
- enviroCar
- ...

**GeoEvent Server server role**

You can create your own custom inputs through the GeoEvent Manager or SDK (Java)
Out of the Box Output Connectors

- Add or Update a feature
- Add or Update a spatiotemporal big data store
- Send Features to a Stream Service
- Push data records to an external website
- Push data records to an external websocket
- Send data records via TCP/UDP socket
- Send a text, email, or instant message
- Write a local file (CSV, JSON, GeoJSON)

You can create your own custom outputs through the GeoEvent Manager or SDK (Java)

Gallery Components

- Amazon & Azure IoT
- Hadoop
- Kafka
- MQTT
- ActiveMQ
- RabbitMQ
- MongoDB
- Twitter
- …
Working with Real-Time Data
Configurable Filters & Processors

Out of the Box Output Geoprocessing
- Attribute & Spatial Filtering
- Buffer Creator
- Convex Hull Creator
- Difference Creator
- Envelope Creator
- Field Calculator
- Field Enricher
- Field Mapper
- Field Reducer
- Geotagger
- Incident Detector
- Intersector
- Projector
- Simplifier
- Symmetric Difference
- Track Gap Detector
- Union Creator

Sample Add-on Processors
- Add XYZ
- Event Volume Control
- Motion Calculator
- Range Fan
- Reverse Geocoder
- Service Area Creator
- Track Idle Detector
- ...

You can create your own custom processors through the GeoEvent Manager or SDK (Java)
Vehicle Location and Alert Monitoring

Using GeoEvent Server to build a common operational display
Vehicle Location and Monitoring (Demo)
Vehicle Location and Monitoring (Demo)
Vehicle Location and Monitoring (Demo)
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Vehicle Location and Monitoring (Demo)
Consuming Real-Time Data

- 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
ArcGIS GeoEvent Server

summary

- Apps
- Desktop
- APIs
- ArcGIS Enterprise
- ArcGIS GeoEvent Server
- spatiotemporal big data store
- visualization
- ingoastion
- actuation
- live & historic aggregates & features
- live features stream services
- ArcGIS Enterprise
- analytics
- ArcGIS GeoEvent Server
- storage

- spatiotemporal big data store
- visualization
- ingestion
- actuation
Help us improve the Real-Time & Big Data GIS Capabilities

http://esriurl.com/RealTimeSurvey
Questions / Feedback?

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