Agenda

1. What is Real-Time GIS?
2. Working with Real-Time Data
3. Applying Real-Time Analytics
4. Visualizing Real-Time Data
5. Wrap-up
What is Real-Time GIS
ArcGIS Enterprise
with real-time capabilities

- Ingest high velocity real-time data into ArcGIS.
- Perform continuous analytics on events as they are received.
- Store observations in a spatiotemporal big data store.
- Visualize high velocity & volume data:
  - as an aggregation
  - or as discrete features.
- Notify about patterns of interest.

GeoEvent Server is a “server role” extending the capabilities of your ArcGIS Enterprise …
GIS data

what has happened, what is happening, what will happen

The ‘current’ snapshot is outdated almost as soon as it’s created …
Real-Time GIS data
continuous stream of events flowing from a data feed

Each event represents the latest state of the sensor…
Real-Time analytics

what fishing vessels are inside designated ‘no fishing’ zones?

Continuous processing on event data as it is received …
Real-Time actions
notify & alert a parent when their child leaves school property

Continuous Analysis
Outside Boundary

Features
Child

Applications

Alerting stakeholders on discovered patterns of interest in real-time ...
2 Working with Real-Time Data
Ingestion of real-time data

you can create your own connectors

GeoEvent Server

GeoEvent Services

Inputs

Outputs

Out of the Box

Poll an ArcGIS Server for Features

HTTP

Poll an external website for GeoJSON, JSON, or XML

REST

Receive Features, GeoJSON, JSON, or XML on a REST endpoint

WS

Receive GeoJSON or JSON on a WebSocket

RSS

Receive RSS

TCP

Receive Text from a TCP or UDP Socket

WS

Subscribe to an external WebSocket for GeoJSON or JSON

Watch a Folder for new CSV, GeoJSON, or JSON Files

Esri Gallery

ActiveMQ

AIS

Common Alerting Protocol

CoT

Cursor-on-Target

esd

Exploitation Support Data

GTFS

Instagram

Kafka

KML

MQTT

NMEA 0183

RabbitMQ

Sierra Wireless (RAP)

Trimble (TAIP)

Twitter

Partner Gallery

AWS IoT

Amazon IoT

Azure IoT

CompassLDE

enviroCar

exactEarth AIS

FAA (ASDI)

GNIP

Networkfleet

OSIsoft

Valarm

Waze

Zonar

Ingestion of real-time data

input connectors
Real-Time actions

output connectors

GeoEvent Server

GeoEvent Services

you can create your own connectors

Out of the Box

Add or Update a Feature
Publish Text to a UDP Socket
Push GeoJSON or JSON to an external Website
Push GeoJSON or JSON to an external WebSocket
Push Text to an external TCP Socket
Send a Text Message
Send an Email
Send an Instant Message
Send Features to a Stream Service
Write to a CSV, GeoJSON, or JSON File
Add a Feature to a spatiotemporal big data store
Update a feature in a spatiotemporal big data store

Esri Gallery

Amazon IoT
Azure IoT
ActiveMQ
Cursor-on-Target
Hadoop
Kafka
MongoDB
MQTT
RabbitMQ
Twitter
A GeoEvent Service configures the flow of real-time data,
- the filtering and processing steps to perform,
- the input(s) where data comes from and the output(s) to which results are sent.
Working with real-time data
visualizing ingested real-time data using a stream, feature or map service

- Configure an input to receive real-time data & define a geoevent definition accordingly
- Create an output and publish a Stream / Feature / Map Service using the geoevent definition
- Author and publish a geoevent service
- Visualize your Stream / Feature / Map Service
Making Features Come Alive

Tracking vehicles using GTFS
Applying Real-Time Analytics
Real-Time analytics

filtering

- A **filter** eliminates real-time data based on an expression.

real-time data is allowed to pass through when a filter’s expression evaluates TRUE ...
Filtering
Using filters for attribute, spatial and combination expressions
Real-Time analytics

processors

you can create your own processors

processors perform analytics on real-time data
Processing
detecting patterns of interest
Real-Time analytics

gerofencing – spatial operators

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any geometry feature can be used as a geofence …
Real-Time analytics
geofencing – incoming weather hazard intersects ground stations treated as geofences
Real-Time analytics
geofencing – spatial operators & scope

- Geofencing scope: Any or All
- Scope should not be confused with a geofence’s Category & Name.
Real-Time analytics
geofencing – spatial operators & scope

- Intersects Any geofence

- Intersects All geofences
Real-Time analytics

geofencing – notify when construction vehicles become disjoint from a zone vs. all zones
4 Visualizing Real-Time Data
Visualization

choosing a service type: stream service, feature service, map service

- **Stream layers in apps subscribe** to stream services to immediately visualize observations.
  - Does not require storage, is low latency, cannot be replayed.

- **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.
Visualization

Visualization stream services

Web
Device
Desktop

Apps

live features
live & historic aggregates & features

ArcGIS Enterprise
GeoEvent Server
spatiotemporal big data store
5 Wrap-up
Summary

Real-Time GIS: GeoEvent Server

- ArcGIS Enterprise is a full-featured mapping and analytics platform
- GeoEvent Server brings real-time capabilities to the ArcGIS Enterprise
- Simplifies real-time data ingest with configurable out-of-the-box inbound connectors
- Enables continuous analytics to be executed on event data as it arrives
- Extends options for data storage with an enterprise spatiotemporal data store
- Provides solutions for high volume data visualization with on-the-fly aggregation
- Supports stakeholder notification of patterns of interest as they are discovered in real-time

GeoEvent Server enables the application of Real-Time GIS in your organization …
Summary

Real-Time GIS: GeoEvent Server

- Step-by-Step Tutorials, free to download
  - Introduction
  - Stream services
  - Spatiotemporal Big Data Store
  - Notifications

- Blogs and discussions on the forum
  - http://links.esri.com/geoevent-forum

- Video recordings of technical workshops
  - http://www.esri.com/videos

Self-paced training & introductions to GeoEvent Server ...
Esri Public Sector GIS Conference

The Geospatial Event for State and Local Government

December 5-7, 2017 - Philadelphia, Pennsylvania

Registration now OPEN
Call for Papers until November 3rd
Call for Maps and Apps until November 10th
