Applying Real-Time GIS

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What is GIS?

Note: Embedded video is available at: http://video.esri.com/watch/3623/what-is-gis_question
GIS Is **Evolving**

GIS is Becoming Part of an Interconnected Platform

- Bringing Together Data, Technology, and People…
- …Creating a Framework for Solving Complex Problems
GIS Integrates All Types of Information

Web Maps and Services

- Social Media
- Big Data
- Enterprise Data
- Imagery
- Maps
- Analysis and Models
- Real-Time

GIS Data Categories:

- Imagery
- Analysis and Models
- Enterprise Data
- Big Data
- Social Media
- Real-Time
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The ‘current’ snapshot is outdated almost as soon as it’s created...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 sensors

Challenge #1

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

Applications

Each event represents the latest state of the sensor...
Real-Time Analytics
What fishing vessels are inside designated “no fishing” zones?
Real-Time Notifications and Alerting
Tell a parent when their child leaves school property

Continuous Analysis
- Outside Boundary

Features
- Child

Applications
- SMS

Challenge #3
Real-Time GIS with the GeoEvent Extension

Processing and Analysis

ArcGIS Server

Inputs

Outputs

ws://
Working with Real-Time Data

Social Media Monitoring
Receiving Real-Time Data

Input Connectors

GeoEvent Extension

- GeoEvent Services

Create your own connectors

Out of the Box

- 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 XML on a REST Endpoint
- Receive JSON on a WebSocket
- Receive JSON on an External WebSocket
- Poll an ArcGIS Server for Features
- Poll an External Website for JSON
- Poll an External Website for XML
- Watch a Folder for New CSV Files
- Watch a Folder for New JSON Files

Esri Gallery

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

Partner Gallery

- GNIP
- Geofeedia
- exactEarth
- CoT
- ASDI (FAA)
- OSIsoft
- AHL
- Harris
- CompassCom
- NetworkFleet
- Zonar
- NetworkFleet
- Zonar

Poll an External Website for XML

Receive XML on a REST Endpoint

Poll an External Website for JSON

Receive JSON on a WebSocket

Poll an External Website for Features

Receive Features on a REST Endpoint

Poll an ArcGIS Server for Features

Receive Text from a TCP Socket

Receive Text from a UDP Socket

Receive JSON on an External WebSocket

Watch a Folder for New CSV Files

Watch a Folder for New JSON Files
Sending Real-Time Data

Output Connectors

GeoEvent Extension

Create your own connectors

Out of the Box

- Add a feature
- Update a feature
- Send an email
- Send an instant message
- Send a text message
- Publish JSON to a Web Socket
- Push JSON to an external Web Socket
- Publish text on a TCP Socket
- Publish text on a UDP Socket
- Publish JSON to an external website
- Publish on a REST endpoint
- Write to a .csv file
- Write to a .json file

Partner

- Twitter
- ActiveMQ
- RabbitMQ
- Hadoop
- MongoDB
- CESIUM

Esri Gallery
Applying Real-Time Analytics

Vehicle Monitoring

**AMB-15** is inside a Dangerous area Ongoing for last 7 minutes and 0 seconds.
New Way to Visualize Real-Time Data in Web Apps

Stream Services

GeoEvent Extension

ArcGIS Server

GeoEvent Services

Stream Services

Send Features to a Stream Service

ws://

Substitute (Push)

Polling (Pull)

Update a Feature

Add a Feature

ArcGIS Server

feature layers

Map Services
Feature Services
...

Your Web Applications

Feature Layers

Stream Layers
Where are you from?
Put yourself on a map

Please enter your name:

Select the US state you are from or which is your favorite

If you want to get notified via text message, enter your phone number (optional):

Please use your full 10 digit number incl. the area code without dashes.

Send to GeoEvent
Real-Time GIS Example

Weather Warning
Real-Time GIS Example: Convoy Separation
Success Stories

GeoEvent Extension
Alternative Energy
Sensor Network Monitoring
The Internet of Things (IoT)

An emerging trend
The Internet of Things (IoT)
Everything Connected

- More things are connected to the Internet than people
- Over 16 billion devices are connected at the end of 2014 (20% more than in 2013)

Prediction: 40.9 billion devices connected by 2020
Connected Vehicles
Smart Traffic
Connected Buildings

Smart Workplace
Connected Environment
Smart Agriculture
A modern solution for frantic and frequent head counts…
IoT Example

Firefighters
The Internet of Things (IoT)  
Everything connected

- Geospatial reasoning is needed amongst the Internet of Things.
- Performing geospatial reasoning closer to the things can improve their ability to sense.
- When meaningful patterns are found things can notify people or even other things.
Want to learn more?
Real-Time GIS Resources

- Tutorials @ links.esri.com/geoevent
  - Introduction
  - Notifications
  - RSS
  - WebSockets
  - Working with HTTP
  - GeoEvent Caches
  - REST Admin API

- Real-Time GIS Community @ geonet.esri.com/groups/real-time-gis

- GeoEvent Extension forum @ geonet.esri.com/community/gis/enterprise-gis/geoevent
Questions/Comments?