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Esri International Developer Summit

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Extending ArcGIS GeoEvent Processor with New Connectors

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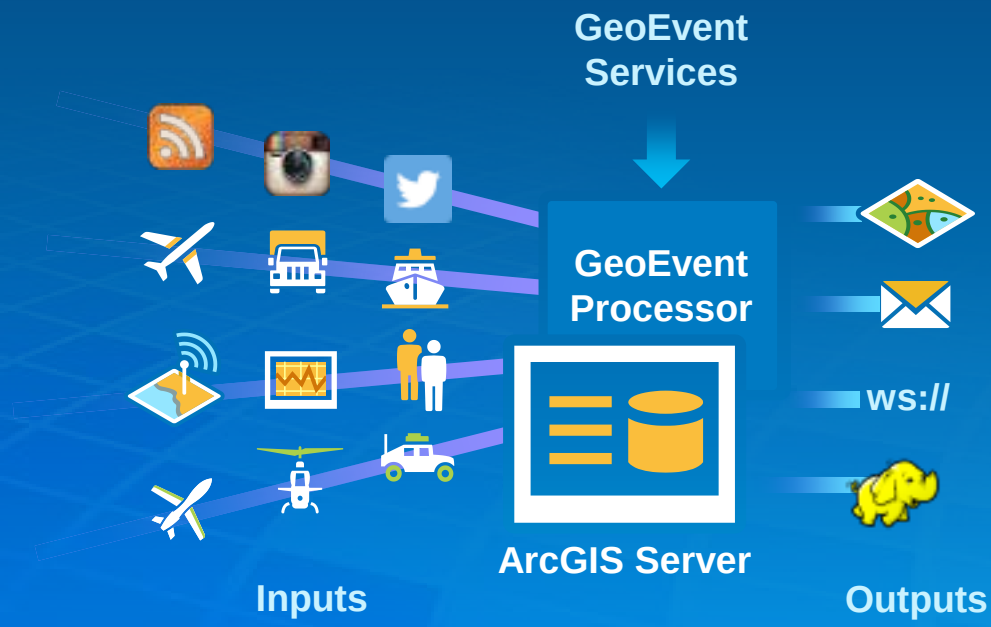
ArcGIS GeoEvent Processor for Server

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



Demo

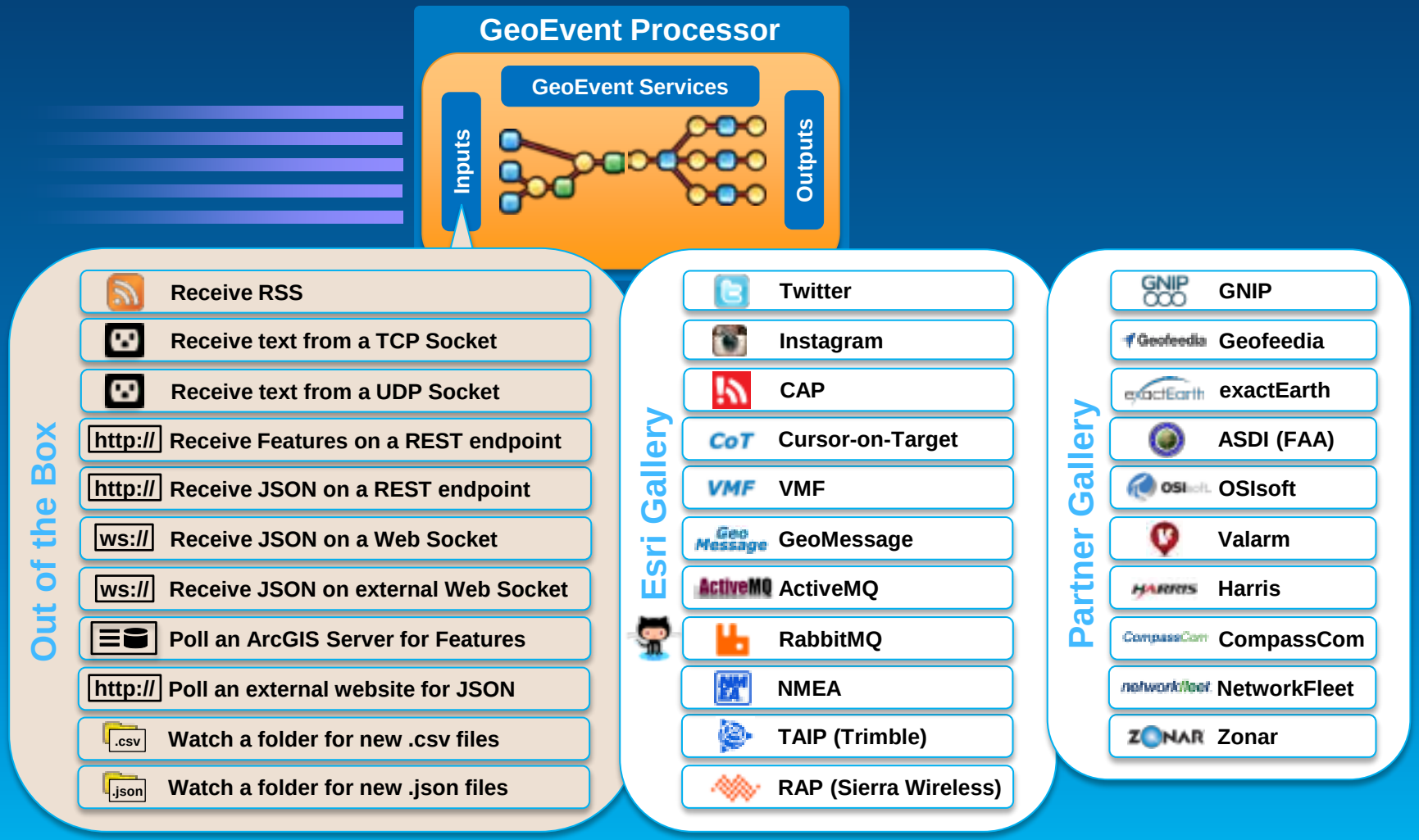
Receiving Real-Time Data

Ming Zhao

Receiving real-time data

Connectors

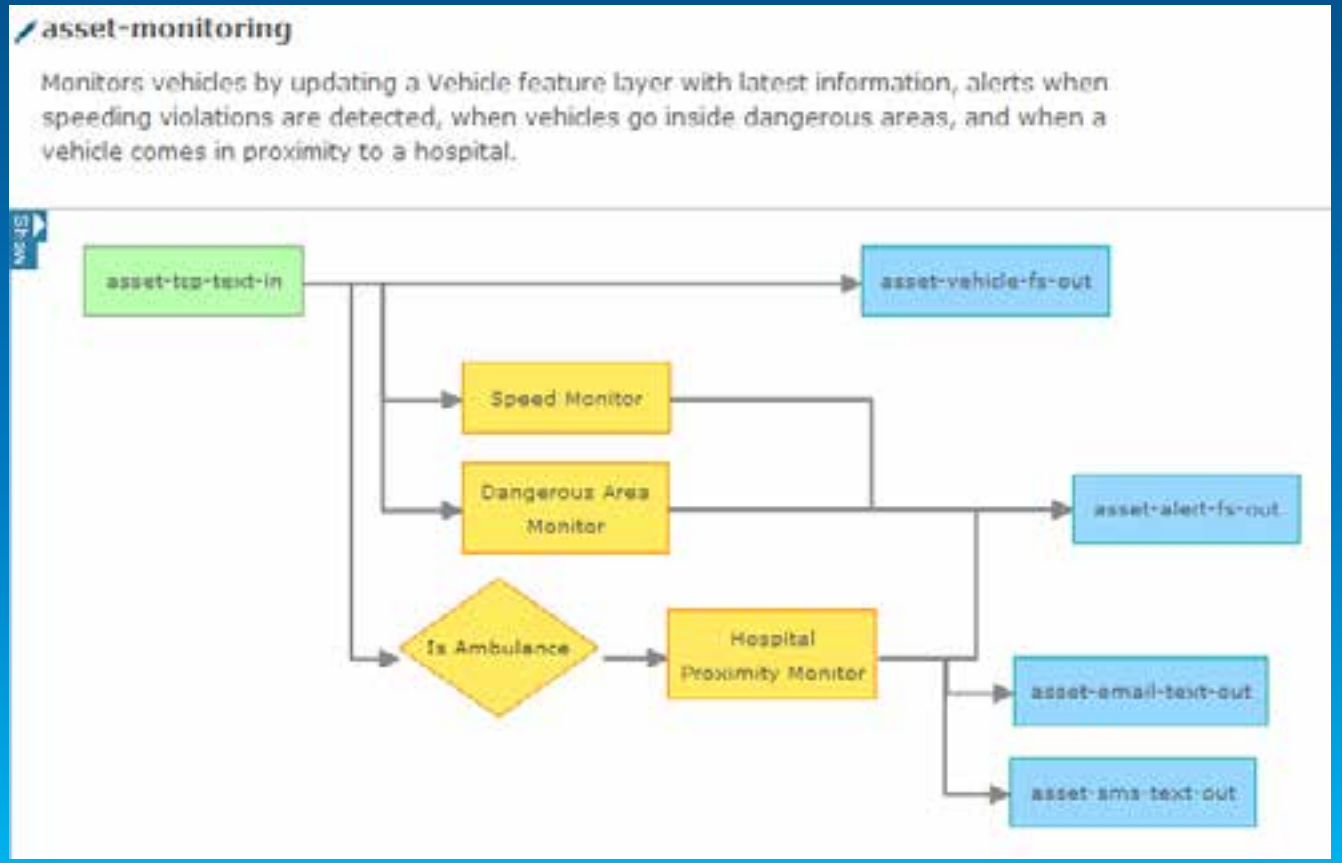
- You can easily integrate real-time data with ArcGIS by using an input connector.



Applying real-time analytics

GeoEvent Services

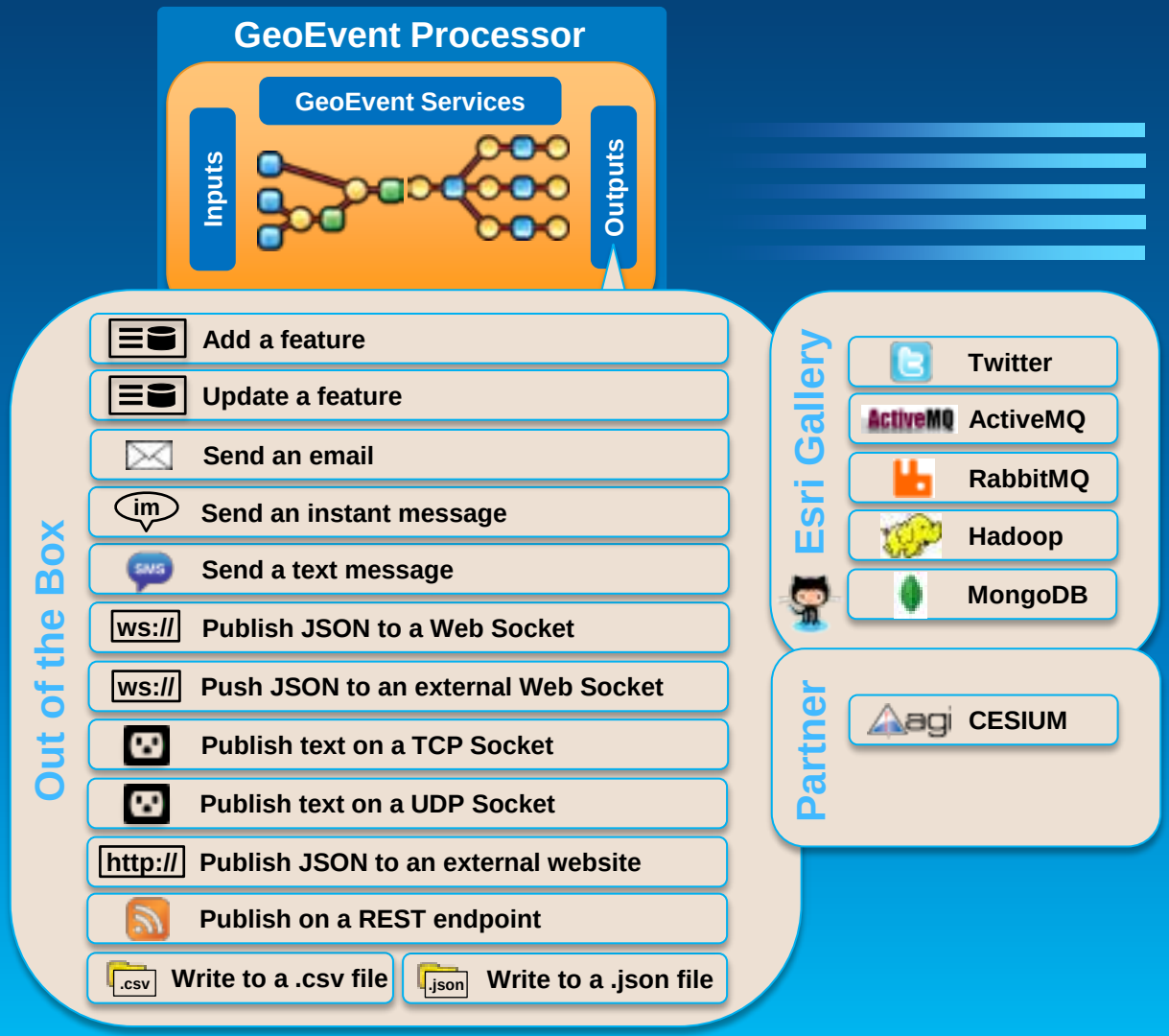
- A **GeoEvent Service** configures the flow of GeoEvents,
  - the **Filtering** and **GeoEvent Processing** steps to perform,
  - what input(s) to apply them to,
  - and what outputs(s) to send the results to.



Sending real-time data

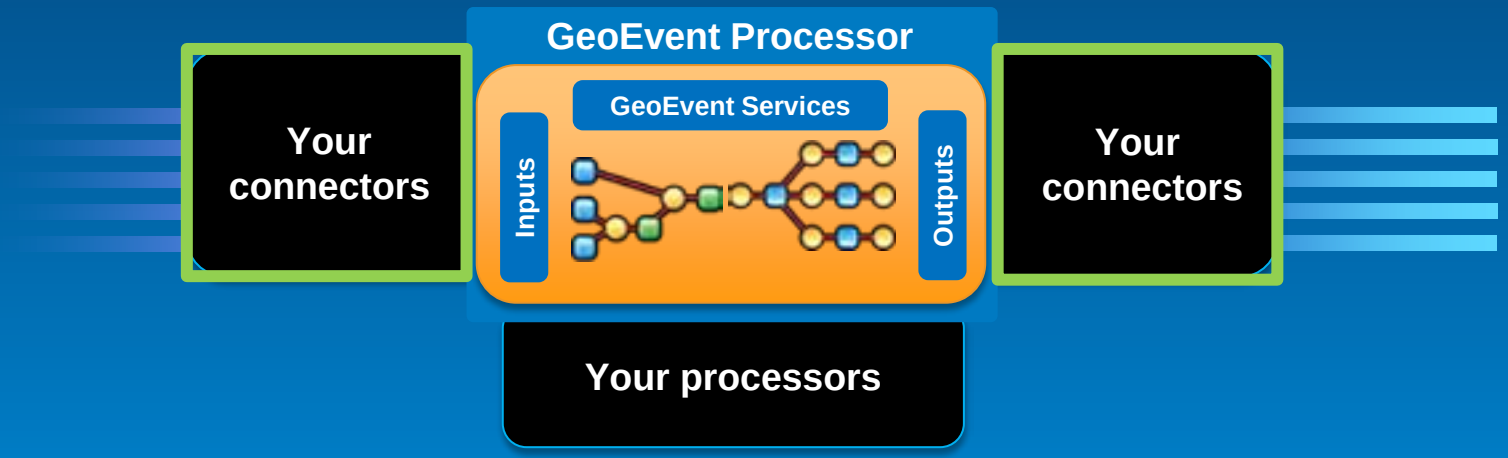
Connectors

- You can easily send updates and results to those who need it where they need it using an output connector.



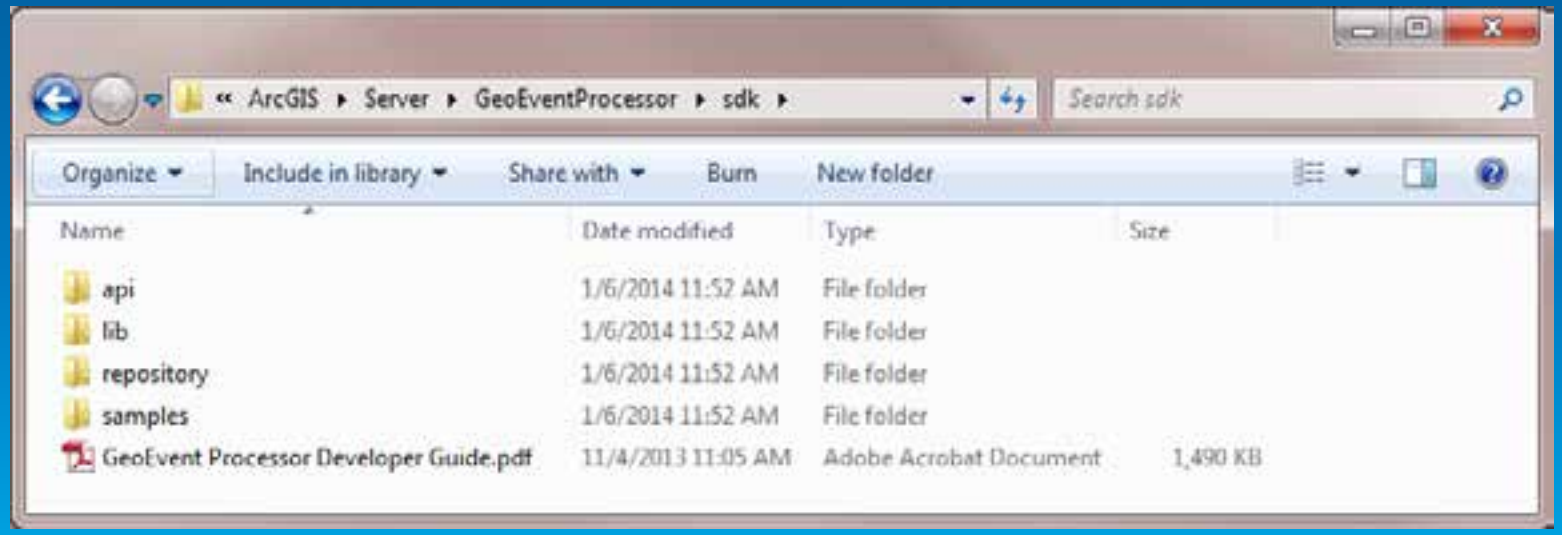
Extending GeoEvent Processor
Software Development Kit (SDK)

- You can create your own custom connectors and processors using the GeoEvent Processor Software Development Kit (SDK).



GeoEvent Processor SDK

- **api:** JavaDoc content associated with GeoEvent Processor SDK
- **lib:** Contains library used to build connectors (and processors)
- **repository:** Local maven repository
- **samples:** Sample connectors (and processors)
- GeoEvent Processor Developer Guide



Connectors

Ryan Elliott

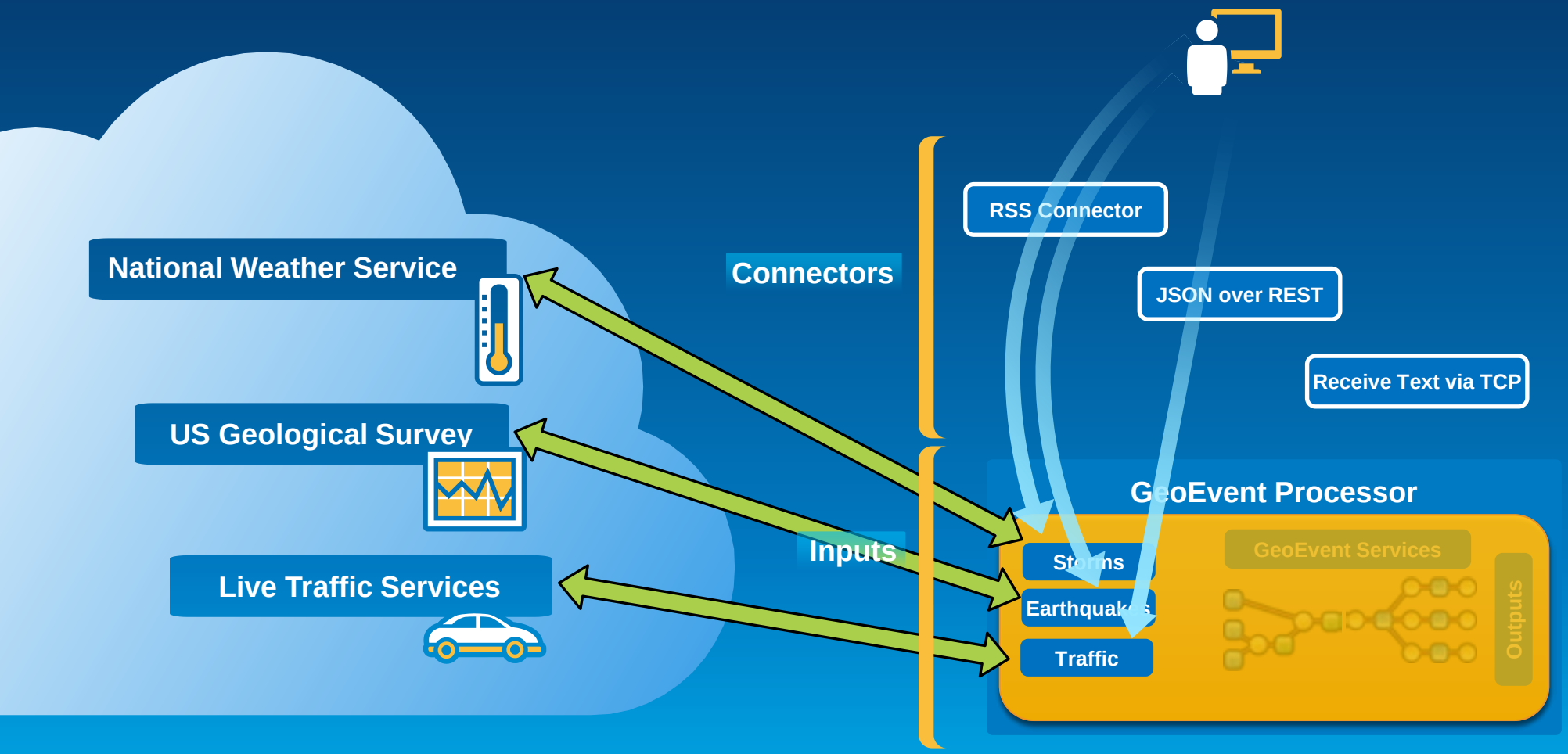
Connectors

What Does a Connector Do?

- **Connectors** are used to create **Inputs** and **Outputs**, hiding the technical details
- It might be very specific
  - Get latest earthquakes from USGS
- Or more general
  - Connect to an RSS feed

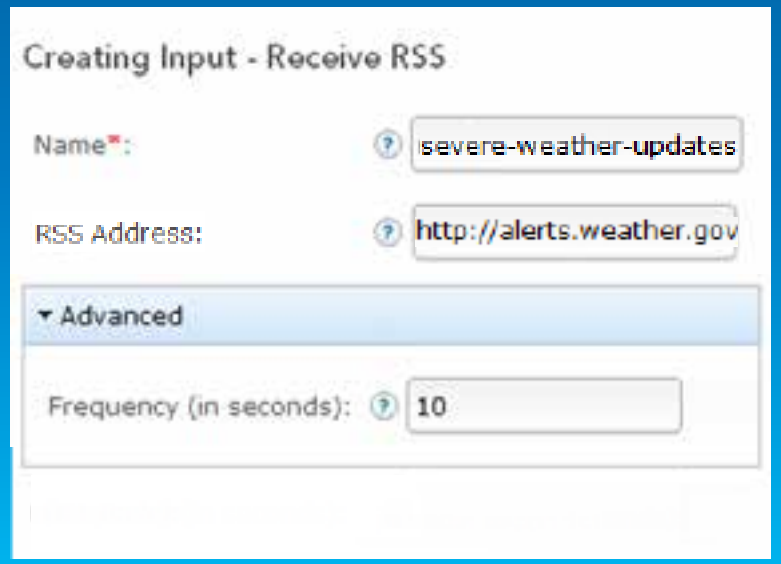
Creating Inputs

Configured using Connectors



Connector
How Does it Help

- The connector helps the user by
  - Providing default values
  - Re-label properties to be appropriate to the context
  - Move properties under an “advanced” area to discourage modification
  - Completely hide properties that the user should not see



Connector
How Does it Help

- By choosing a Connector, the user implicitly selects components from the GeoEvent Processor that know
  - HOW to move data (Transport)
  - WHAT the data looks like (Adapter)

Example Input

Demo

Exploring a Connector

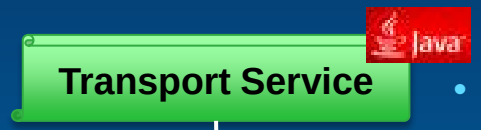
Ming Zhao

Transport

Ryan Elliott

Transport

What makes up a Transport?



- Provides a Transport Definition
- Instantiates new Transports

- Defines transport metadata and properties

- Implements transport application logic

Transport Behavior

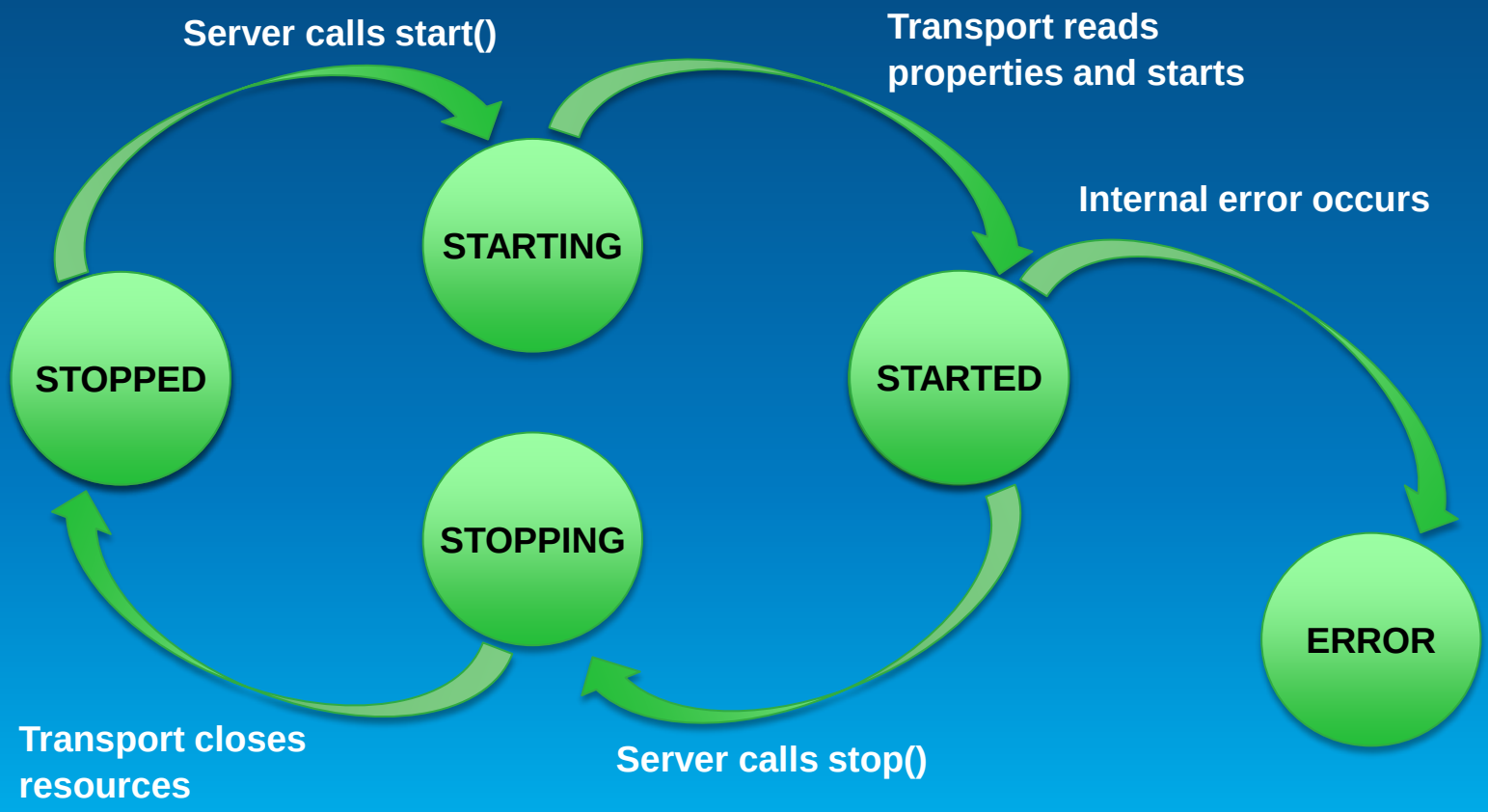
Transports

- Transports are given
  - Properties defining behavior
  - A “ByteListener” where the bytes should be sent
- Transport is started by the server and it sends bytes to the receiver
- Transport is stopped by the server and it stops sending bytes

Transport Lifecycle

Transports

Transports have a lifecycle that determines if they are producing data.



Outbound Transports

Transports

- Outbound Transports accept arrays of bytes from the Adapter and transmit them.
- Occasionally the destination for the bytes depends on content in the GeoEvent.
  - The Transport has the option of “looking back” at the GeoEvent that generated the bytes, and using it to route the data.

CHALLENGE !

- **Create a Transport to receive UDP packets and push them into the GeoEvent Processor.**

Demo

Create a Custom UDP Transport

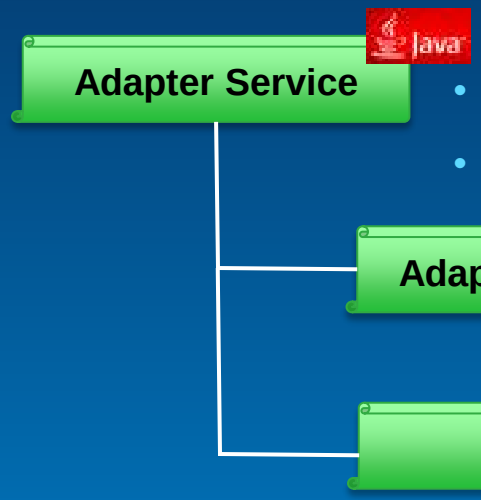
Ming Zhao

Adapter

Ryan Elliott

Adapter

What makes up an Adapter?



- Provides an Adapter Definition
- Instantiates new Adapters
- Defines adapter metadata and properties
- Implements adapter application logic

Adapter Behavior

Adapters

- Adapters are given
  - Properties defining behavior
  - A “GeoEventListener” where the GeoEvents should be sent
- Adapters are DATA DRIVEN
  - No start/stop calls
  - The adapter is handed a byte array and pushes any generated GeoEvents to the Listener

CHALLENGE !

- Create an Adapter to parse the binary format from our sensors

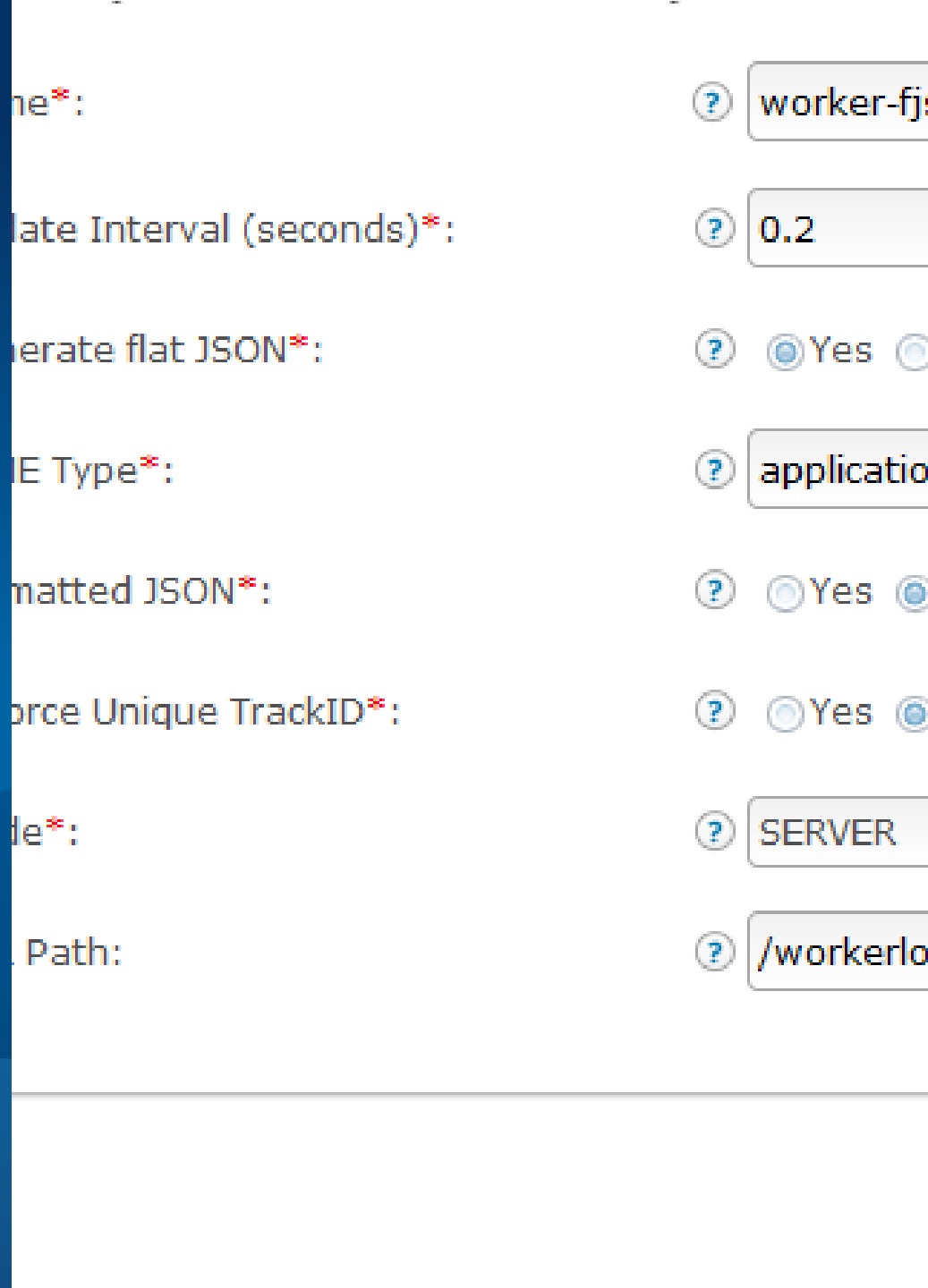
Demo

Parsing a Custom Binary Message Format

Ming Zhao

Properties

Ryan Elliott



Property Definition

Properties

- Transports and Adapters request properties through their “Definition” class.
- Each requested property has a
  - Name
  - Description
  - Type (String, Integer, Float, …)
  - Default Value

CHALLENGE !

- Add properties to the Transport so that it can receive packets on different ports

Demo

Add Property and Deploy

Ming Zhao

Advanced Topics – More on Properties

Properties

- Properties can be Mandatory or Optional.
- Some properties are dependent on others
  - Example: “Compression Algorithm” depends on “Compressed = True”
- Some properties only accept values from a list of Allowed Values
  - “Compression Algorithm” : [Run Length Encoding, Zip, LZW]

Review

- Connectors – Recipe for creating inputs/outputs
- Transport – Moves raw data in/out of the GeoEvent Processor
- Adapter – Converts raw data to GeoEvents and back
- Properties – Used to configure an input/output for a specific use case

ArcGIS GeoEvent Processor

Additional Workshops

- The Internet of Things (IoT) and ArcGIS GeoEvent Processor
  Wednesday 4:00pm - 5:00pm Primrose C/D
- Extending ArcGIS GeoEvent Processor with New Processors
  Wednesday 5:30pm - 6:30pm Primrose C/D
- Use Cases for Applying Real-Time Analytics Using ArcGIS GeoEvent Processor
  Thursday2:30pm - 3:30pm Primrose C/D

GeoEvent Processor

Additional Resources

- Developer Guide in the SDK
- Forum
  http://forums.arcgis.com/forums/257-GeoEvent-Processor
- Resource Center – Includes Tutorials
  http://pro.arcgis.com/share/goeevent-processor
- Browse the GitHub projects

Questions / Feedback?

To learn more:

http://pro.arcgis.com/share/geoevent-processor

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Understanding our world.