

**2013 Esri Europe, Middle East,  
and Africa User Conference**

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# **ArcGIS GeoEvent Processor for Server Grundlagen und Einsatzmöglichkeiten**

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- Raum- Zeitliche Daten
- Darstellung, Aufzeichnung und Analyse
- Entwicklung
- Beispiele, Beispiele, Beispiele





# Beispiel

ID: Christine

Längengrad: 11.609059  
Breitengrad: 48.405957  
Höhe: 468

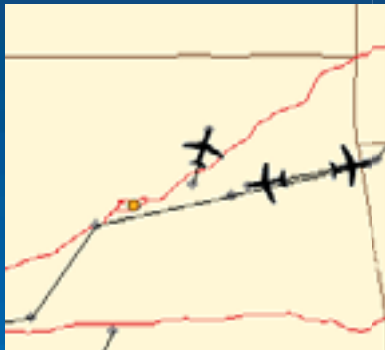


Zeit: 12:10

# Raum-Zeitliche Daten

## Dynamisch

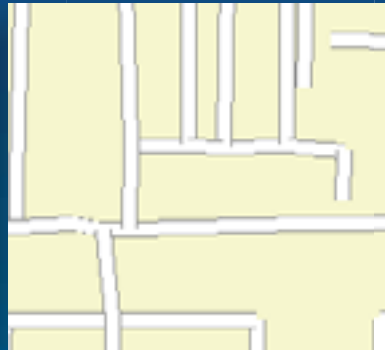
Räumliche Bewegung



- Flugzeuge
- UAV
- Fahrzeuge
- Tiere
- Wirbelstürme

## Diskret

Irgend etwas passiert irgendwo



- Kriminalität
- Blitzeinschläge
- Unfälle

## Stationär

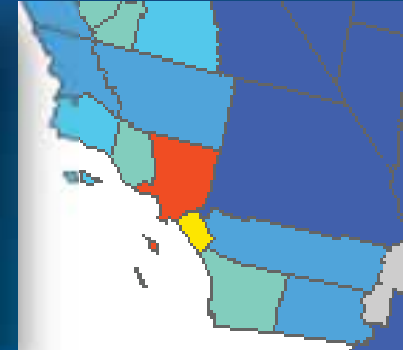
Räumlich nicht veränderbar



- Wetter Stationen
- Verkehrs Sensorik
- Luft Qualität
- Windräder
- Smart Meter
- Pegelstände

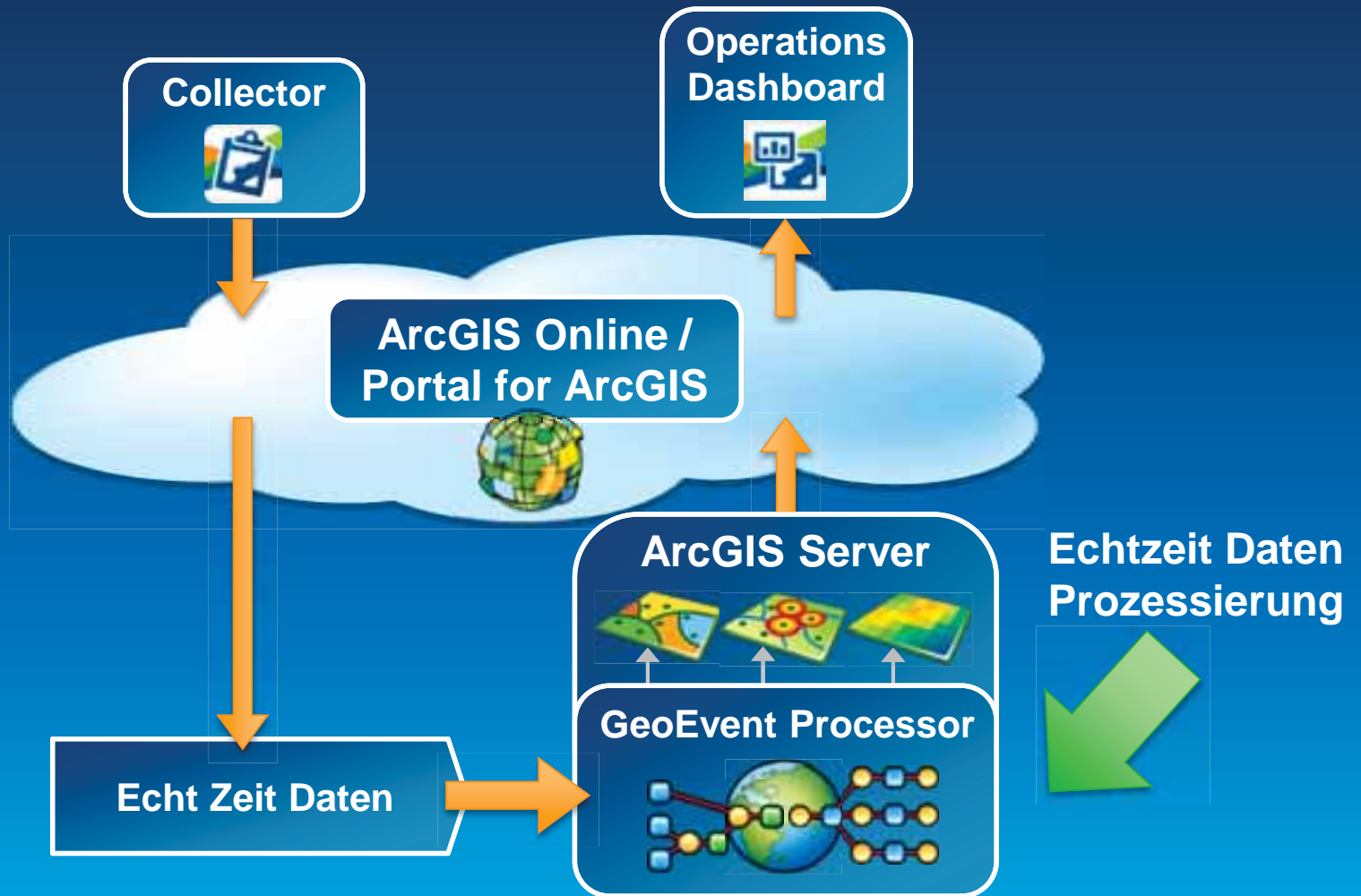
## Veränderlich

Wachstumsänderung

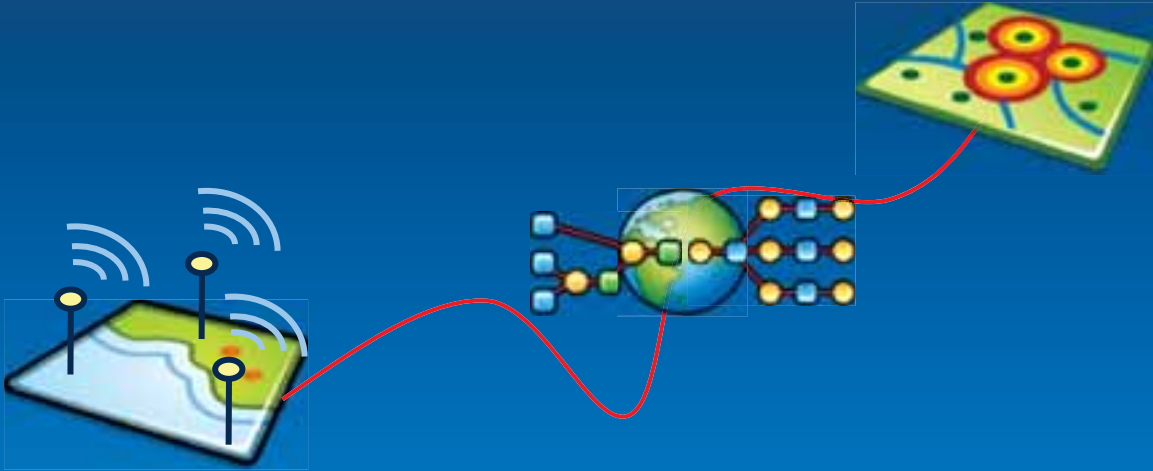


- Bevölkerung
- Agrarflächen
- Verteilung
- Nutzflächen
- Wahlergebnisse

# ArcGIS unterstützt Echtzeit GIS



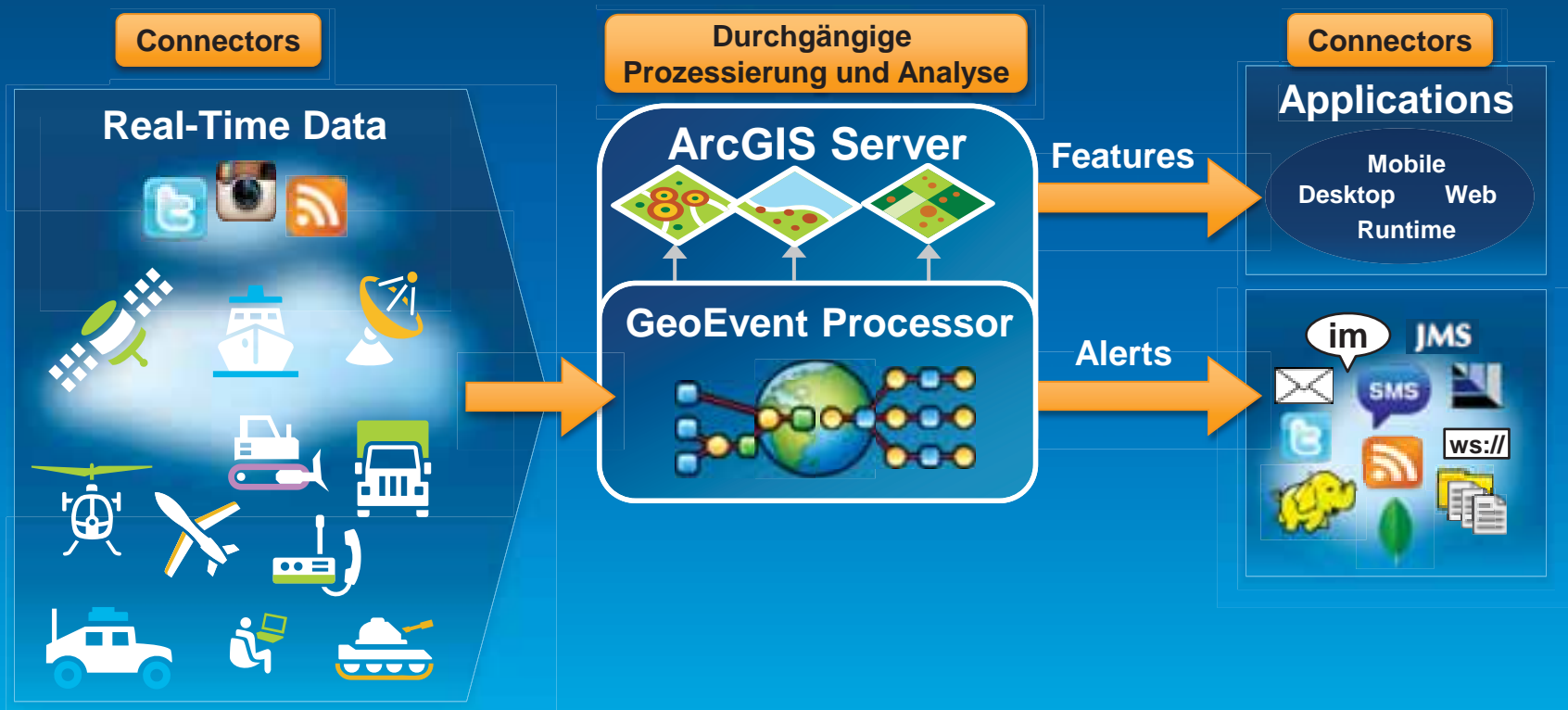
# Funktionsweise





# GeoEvent Processor

- Empfangen und Senden von Daten
- Durchgängige Datenprozessierung, Überwachung und Analyse
- Versenden von Nachrichten an berechtigte Nutzer und Gruppen

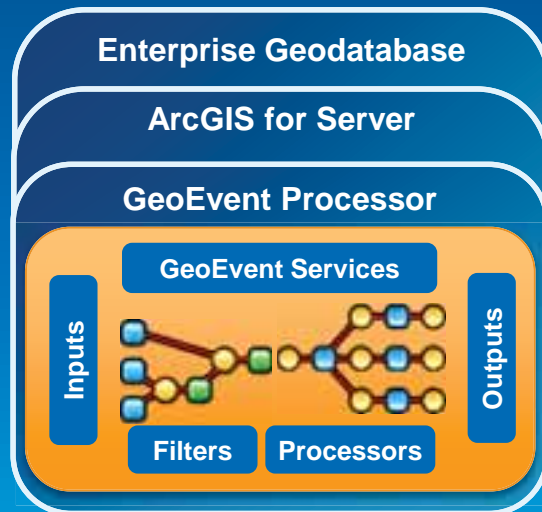


# GeoEvent Processor – Systemdesign

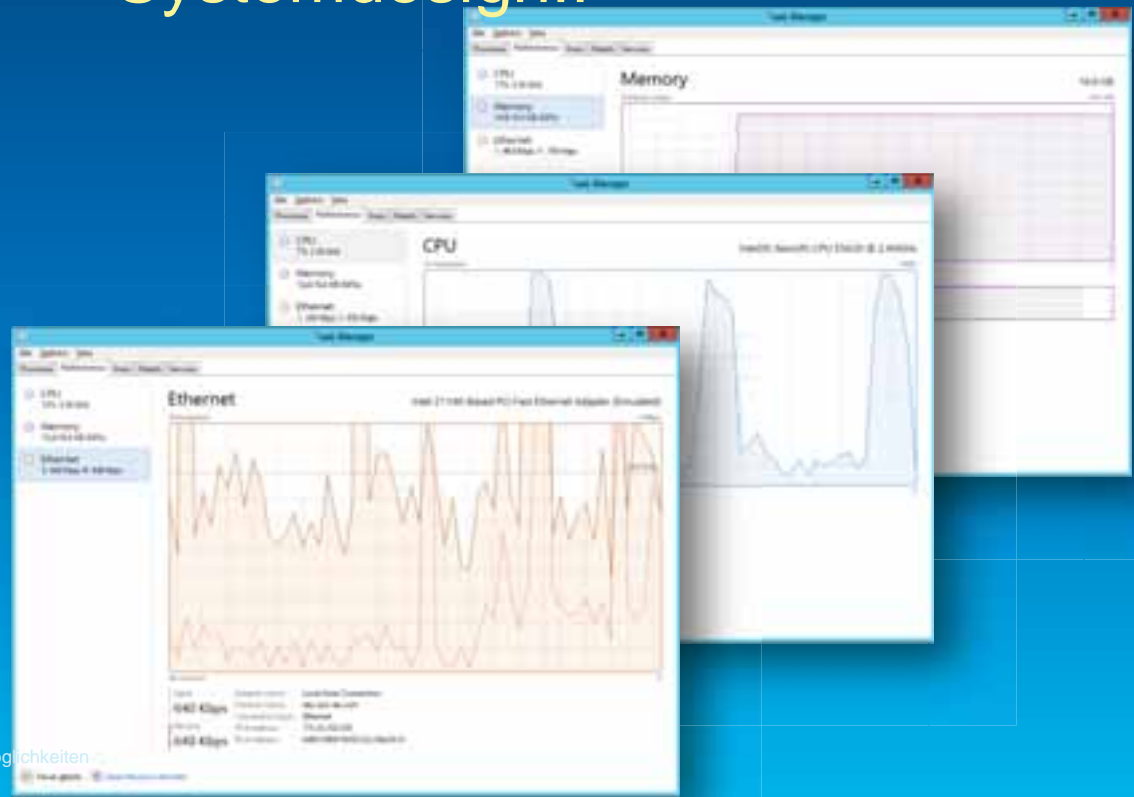
- **Inputs** und **Outputs** bestehen aus Connectors

- **Input** empfängt Echt-Zeit Datenströme von beliebigen Sensoren
- **Output** sendet bearbeitete Datenströme zu Clients über definierte Protokolle

- **Voraussetzung**



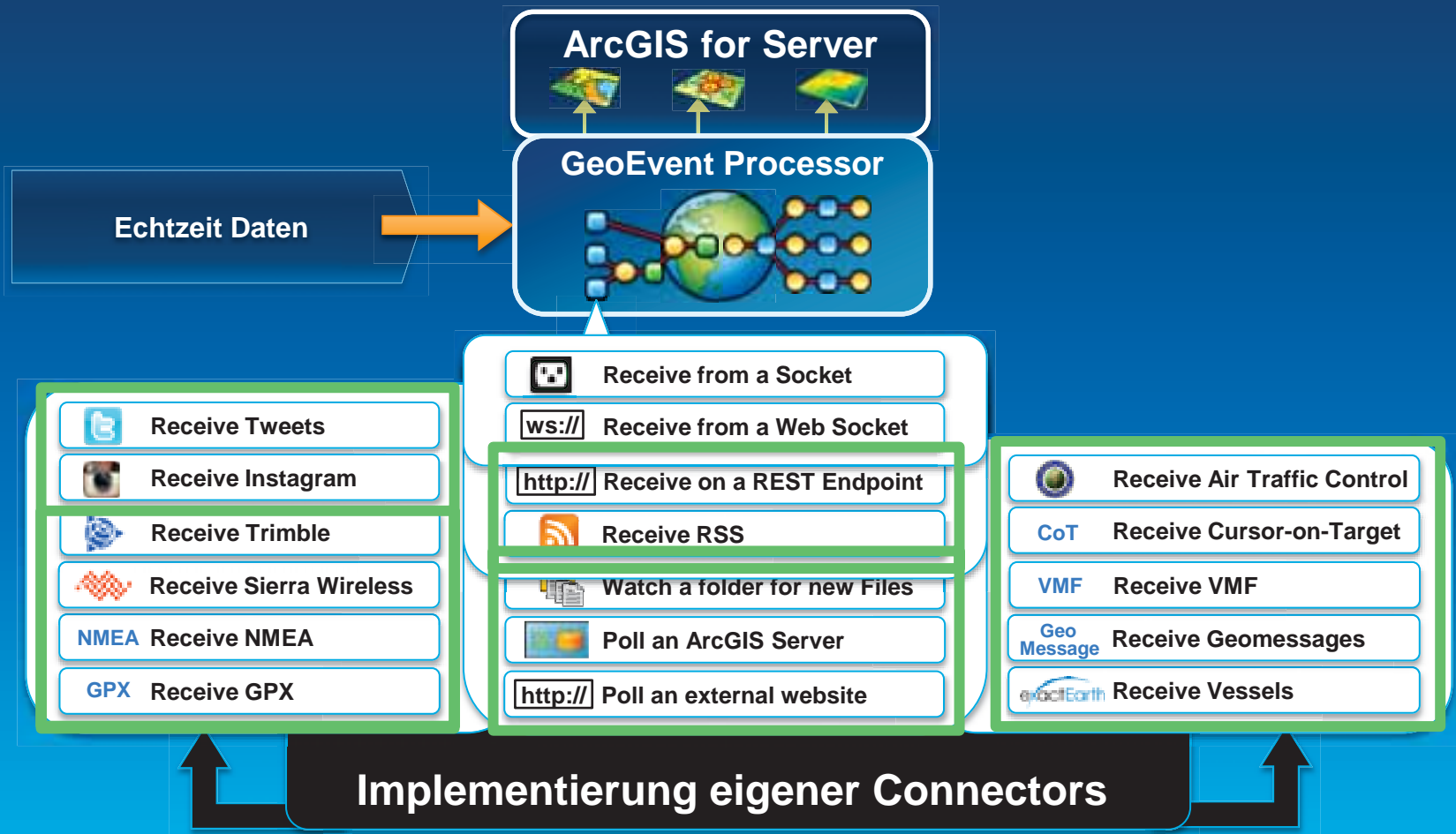
- **Systemdesign!!**



# Empfang von Echtzeitdaten

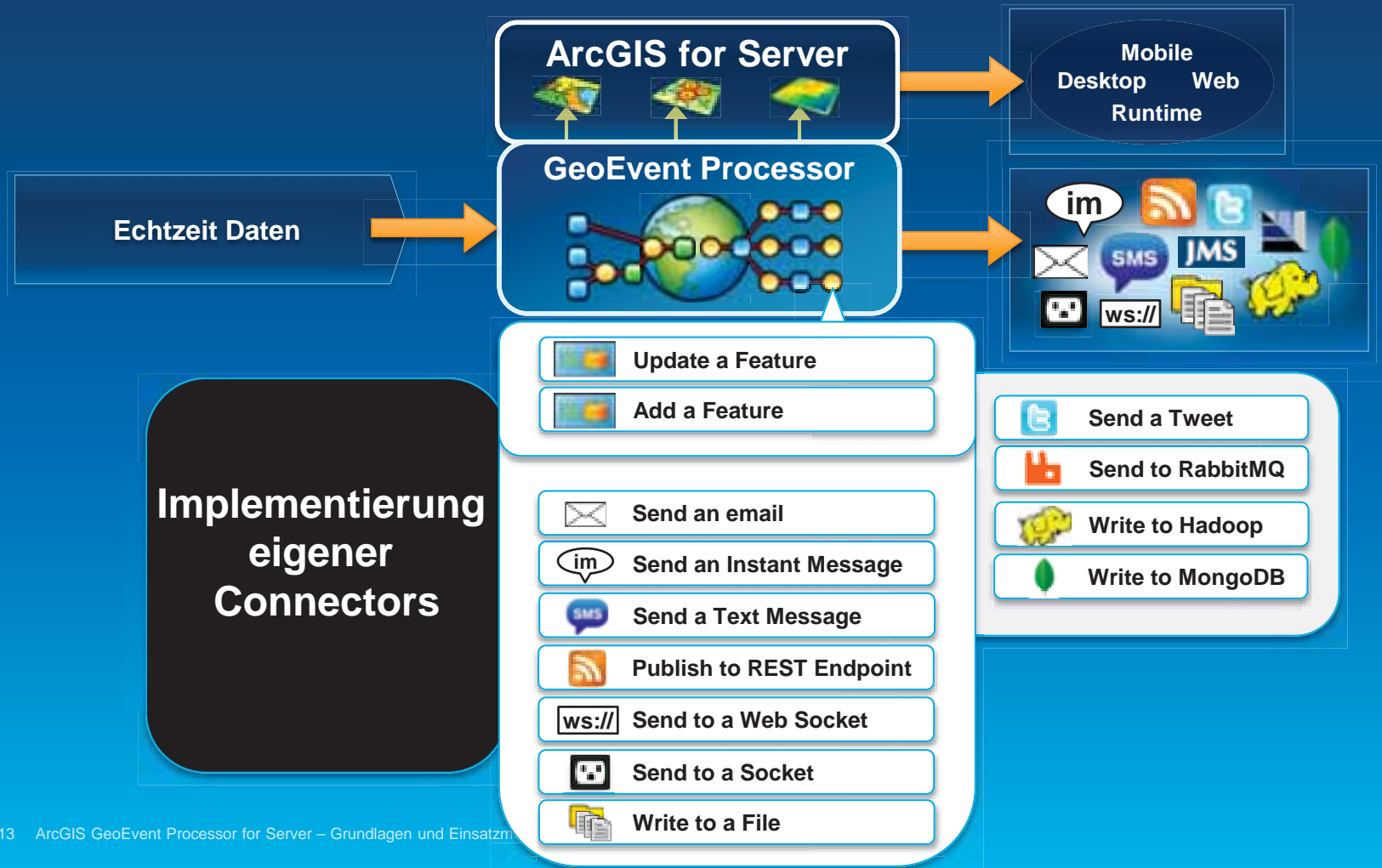
## Input Connector

- GeoEvent Processor verbindet sich über (Standard) Connectors mit Sensoren



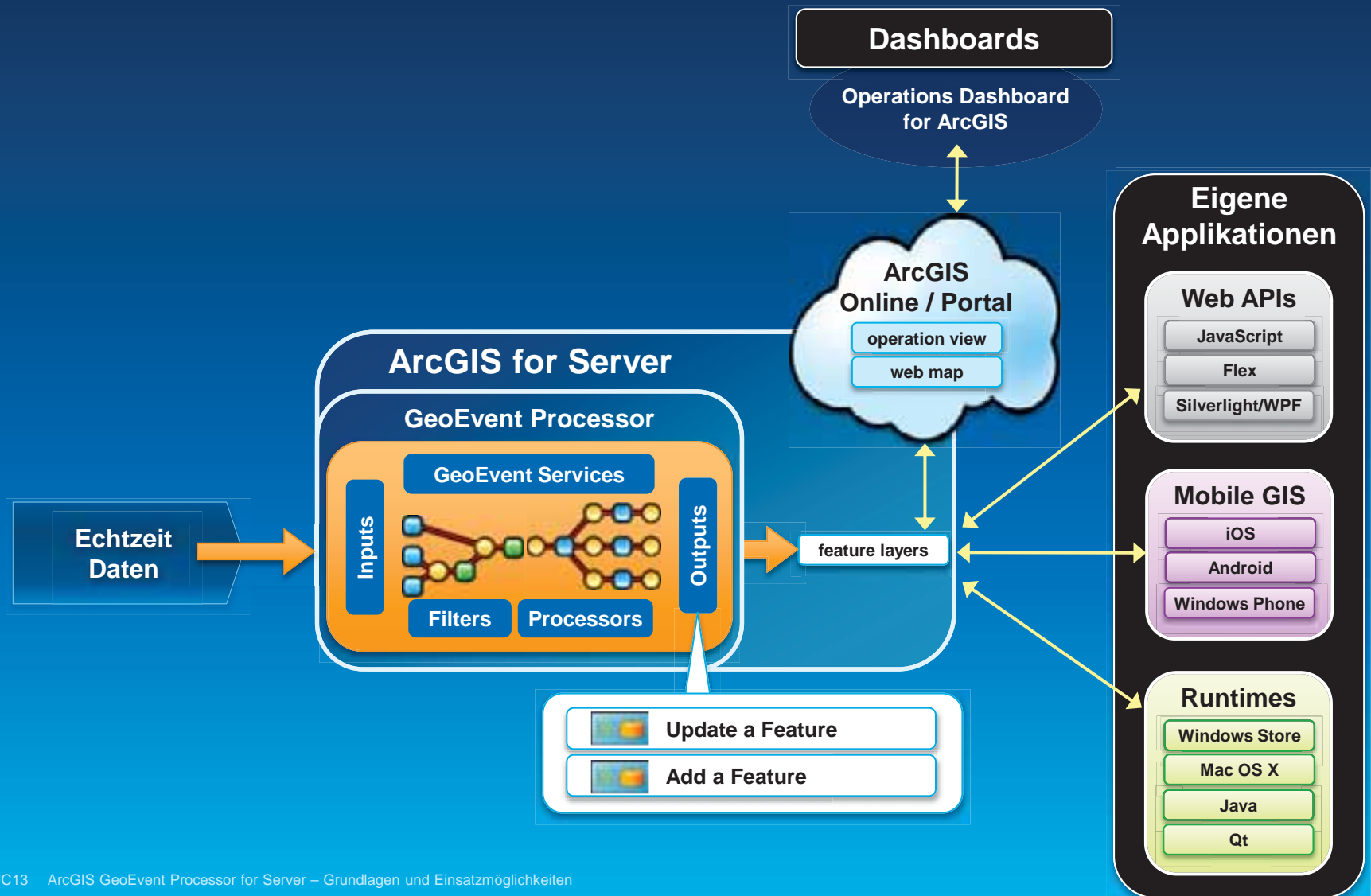
# Senden von Echtzeit Daten

## Output Connector



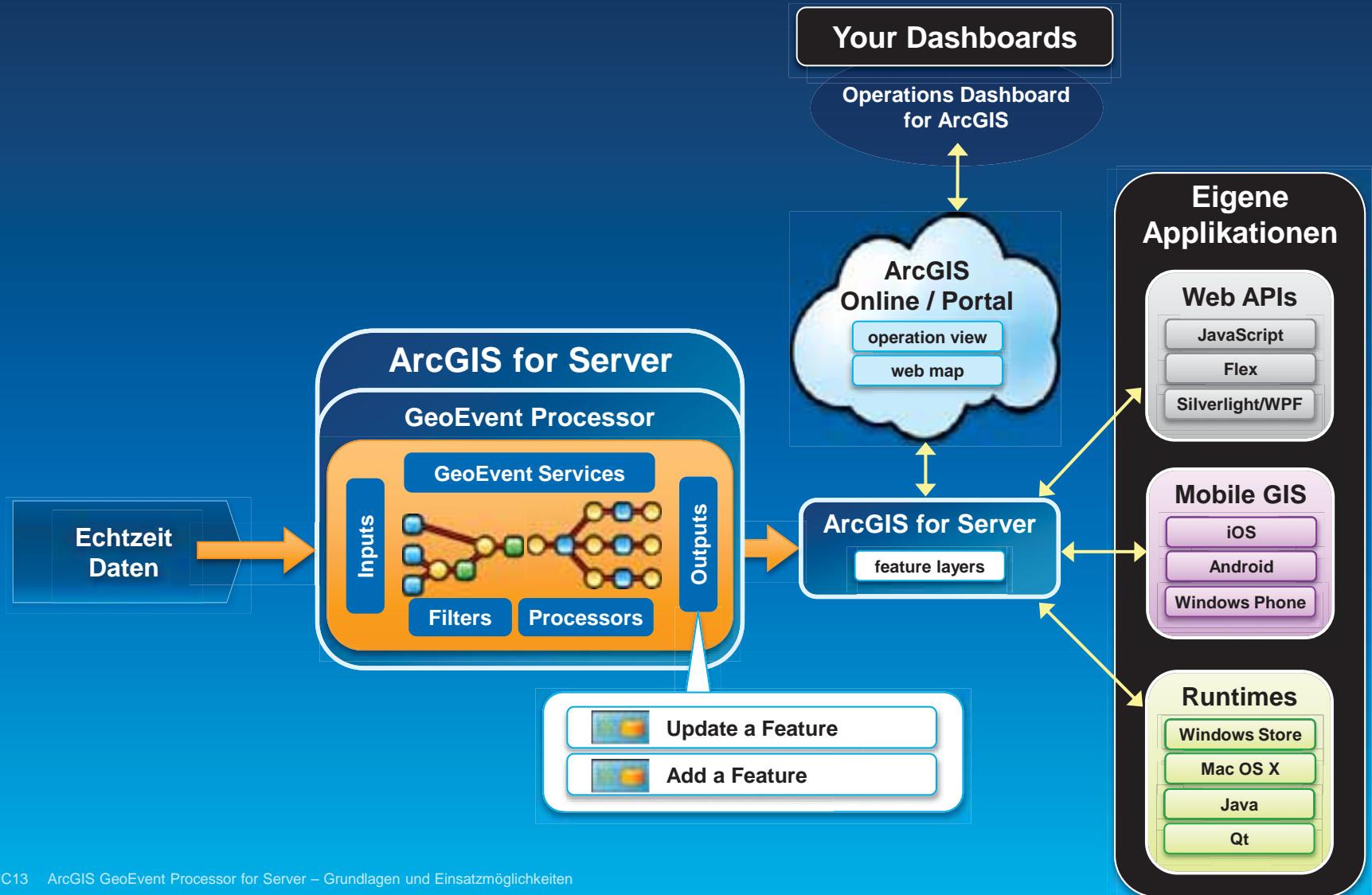
# GeoEvent Processor

Verbindung von Echtzeit-Daten mit einem lokalen Feature Services



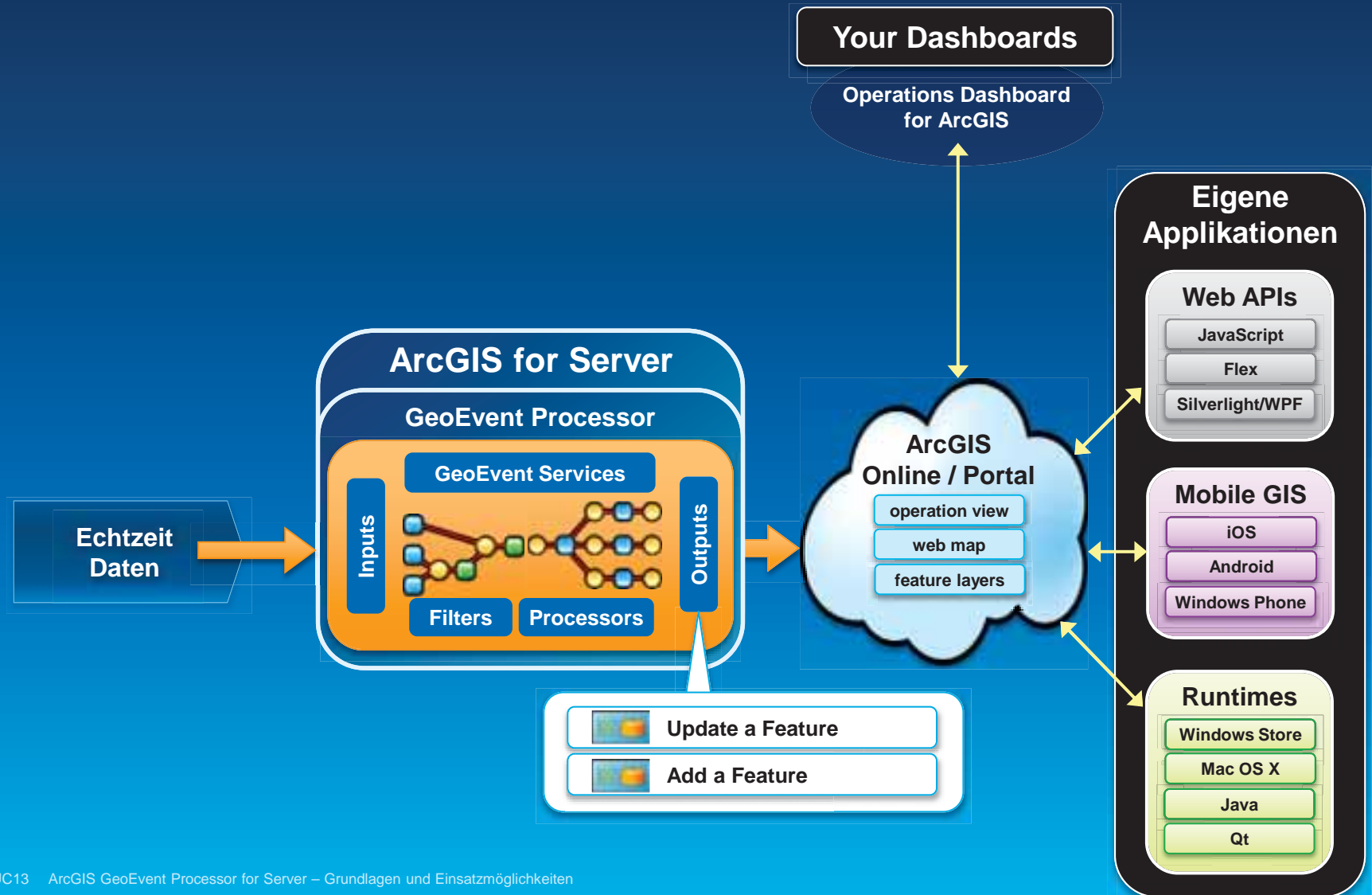
# GeoEvent Processor

Verbindung von Echtzeit-Daten mit einem externen Feature Services



# GeoEvent Processor

Verbindung von Echtzeit-Daten mit einem ArcGIS Online feature services



# Connectors

## Default – Input

Poll an ArcGIS Server for Features

Poll an external website for JSON

Receive Features on a REST endpoint

Receive JSON on a REST endpoint

Receive JSON on a Web Socket

Receive text from a TCP Socket

Receive text from a UDP Socket

Subscribe to an external Web Socket for JSON

Watch a folder for new .csv files

Watch a folder for new .json files

Receive RSS

## Default – Output

Add a Feature

Update a Feature

Publish GeoEvents on a REST endpoint

Publish json to a UDP Socket

Publish JSON to a Web Socket

Publish text to a TCP Socket

Publish text to a UDP Socket

Push JSON to an external Web Socket

Push JSON to an external website

Send a text message

Send an email

Send an instant message

Write to a .csv file

Write to a .json file



# Custom In- und Outputs

- Custom In- und Outputs lassen sich mit dem Geo Event Processor SDK erstellen

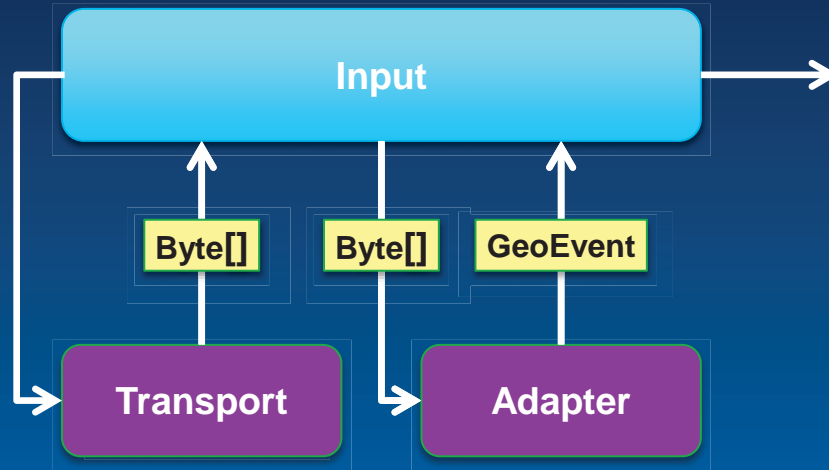
<http://resources.arcgis.com/en/help/main/10.2/0154/015400000664000000.htm>

- Gallery



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

# Input



- Der Transport weiß **wie** die Daten empfangen werden können
- Der Adapter weiß um **welche** Daten es sich handelt

# Connectors

## Default – Input

Poll an ArcGIS Server for Features

Poll an external website for JSON

Receive Features on a REST endpoint

Receive JSON on a REST endpoint

Receive JSON on a Web Socket

Receive text from a TCP Socket

Receive text from a UDP Socket

Subscribe to an external Web Socket for JSON

Watch a folder for new .csv files

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Receive RSS

## Default – Output

Add a Feature

Update a Feature

Publish GeoEvents on a REST endpoint

Publish json to a UDP Socket

Publish JSON to a Web Socket

Publish text to a TCP Socket

Publish text to a UDP Socket

Push JSON to an external Web Socket

Push JSON to an external website

Send a text message

Send an email

Send an instant message

Write to a .csv file

Write to a .json file

# SDK Tour

- API in einem einzelnen JAR
- Alle Abhängigkeiten in einem Maven repository
- Javadoc
- Beispiele für Adapter, Transport und Processor



# Demo Code

# Adapter hinzufügen















# GeoEvent Definitions



## GeoEvent Definitions

New GeoEvent Definition

Import GeoEvent Definitions

Name	Fields	
Asset	LastUpdated, shape, AssetName, AssetGroupName, Speed, Panic	  
Earthquake-MagniDouble	title, link, description, guid, GEOMETRY, geo_lat, geo_long, magn...	  
Earthquake-MagniString	title, link, description, guid, GEOMETRY, geo_lat, geo_long, magn...	  
EarthquakeOut	title, link, description, guid, GEOMETRY, geo_lat, geo_long, magn...	  

FlightGeoEventDefin

GeoFences

incident

Instagram

openweathermap

Reuters\_\_World\_Nei

sBahn

TweetStatus

TweetWithInfo

USGS\_All\_Earthquak

\_Hour

USGS\_All\_Earthquak

\_Month

USGSGeo3Son

GeoEvent Definition Name: \*

Owner Name: com.esri.ges.adapter.Inbound/Flight/10.2.0

Fields for

FlightGeoEventDefinition

New Field

Reorder Fields

Name	Type	Cardinality	Tags
Name	String	1	
Winkel	Integer	1	
Höhe	Integer	1	
Geschwindigkeit	Integer	1	
Transpondercode	Integer	1	TRACK_ID
Radar	String	1	
Typ	String	1	
Registration	String	1	
Start	String	1	
Ziel	String	1	
Flugnummer	String	1	
Zeitstempel	Date	1	
Shape	Geometry	1	GEOMETRY

# Geofences

- Featureservice
- Editierbar über ArcGIS Online, Portal, ArcGIS Desktop, Apps, .....

Import GeoFences Synchronize GeoFences

### GeoFences

Category/Name	Active
DangerousArea (4)	x
Germany (1)	x
Deutschland	Yes / x

### GeoFence Synchronizations

Category	ArcGIS Server Connection	Service	Layer	Refresh Interval
AisGeoFence	vsdev1296	AisGeoFence	sde.WRITER_AisGeoFence	1 second / x
Category	ags1	AssetMonitor	GeoFences	3 seconds / x

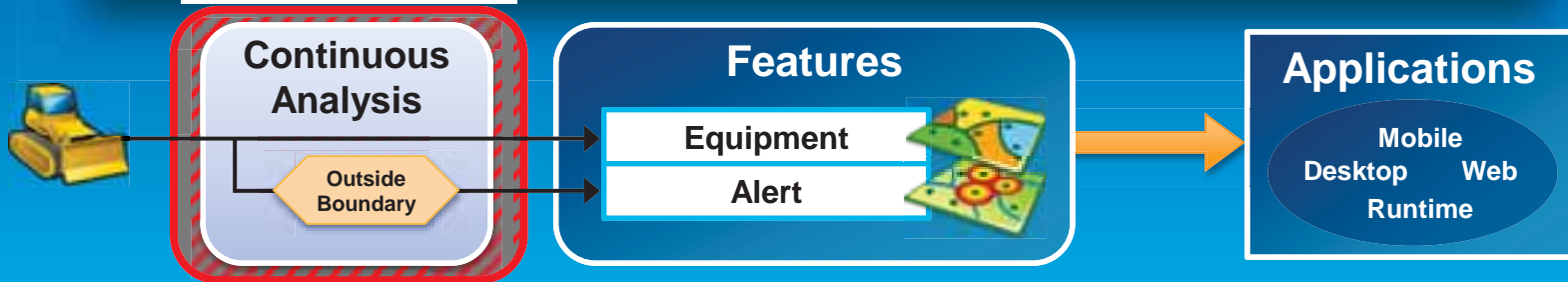


# Analyse von Echtzeit GIS Daten

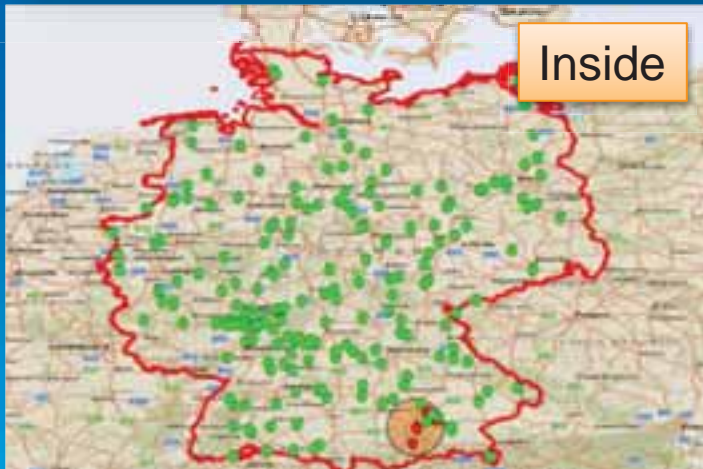
Frage: Befindet sich mein Bagger noch auf der Baustelle?



**Challenge #2**



# Filter



## Attributive Filter

Equals

Not Equals

Greater Than

Greater Than or Equal To

Is Null

Less Than

Less Than or Equal To

Exists

Matches

## Räumliche Filter

Inside

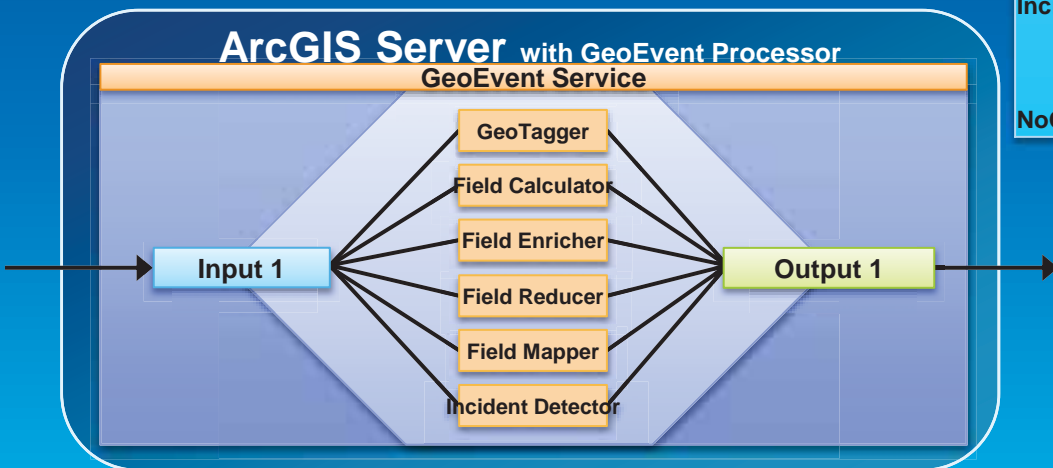
Outside

Enter

Exit

# Processors

- Berechnung von Attributen
- Modifikation von Attributen
- Erstellung neuer Geoevents
- Erstellung eigener Processors



<b>FieldCalculator</b>	Calculates new data values from existing data values in GeoEvents using a mathematical (or text manipulation) expression, and enriches the GeoEvents with the results.
<b>FieldCalculator-RegEx</b>	Appends a new field to GeoEvents that contains the results of a regular expression.
<b>FieldEnricher-FeatureService</b>	Enriches GeoEvents with attributes contained in a Feature Layer (or Table in a Feature Service) by using common joining data values.
<b>FieldEnricher-File</b>	Enriches GeoEvents with attributes contained in a text file by using common joining data values.
<b>FieldMapper</b>	Maps GeoEvents from an input GeoEvent Definition to an output GeoEvent Definition using the specified field mapping.
<b>FieldReducer</b>	Reduces the size of GeoEvents by removing a set of specified fields from the GeoEvent Definition.
<b>GeoTagger</b>	Tags each GeoEvent with a list of GeoFences that satisfy a specified spatial relationship (IN, OUT, ENTER, EXIT) for the given GeoEvent.
<b>IncidentDetector</b>	Detects, updates, and manages incidents that are defined by the presence of GeoEvents meeting specified conditions.
<b>NoOperation</b>	Does nothing.

# GeoEvent Service aufsetzen

The screenshot displays the ArcGIS GeoEvent Processor Manager interface. The main window shows a workflow diagram with the following components:

- Input:** 'rss-in' (green box)
- Processors:** 'ExtractMagnitude' (yellow box), 'MagnitudeToDouble' (yellow box), and 'RemoveMagnitudeStr' (yellow box). These three processors are highlighted with red boxes.
- Outputs:** 'earthquakes-udp-out' and 'earthquakes-websocket-join-out' (blue boxes).

Three property windows are overlaid on the interface:

- ExtractMagnitude Properties:**
  - Name: ExtractMagnitude
  - Processor: Field Calculator (Regular Expression)
- MagnitudeToDouble Properties:**
  - Name: MagnitudeToDouble
  - Processor: Field Calculator (Regular Expression)
- RemoveMagnitudeStr Properties:**
  - Name: RemoveMagnitudeStr
  - Processor: Field Reducer
  - Property: Fields to Remove
  - Value: magnitudeStr
  - Type: String
  - Property: Resulting GeoEvent Definition Name
  - Value: EarthquakeOut
  - Type: String

# GeoEvent Service aufsetzen

The screenshot displays the GeoEvent Processor for Server interface. At the top, a network packet capture window shows details for frame 8771: 557 bytes on wire (4456 bits), 557 bytes captured (4456 bits) on interface 0. The packet is an Ethernet II frame with source Microsof\_b7:1c:73 (00:1d:d8:b7:1c:73) and destination Broadcast (ff:ff:ff:ff:ff:ff). It is an Internet Protocol Version 4 packet with source 172.23.102.239 and destination 172.23.103.255.

Below the packet capture, a map window titled "M 1.8 - 11m WSW of Redlands, California" shows a red dot indicating an earthquake epicenter. A pop-up window provides details for this event:

- Time: 2013-10-14 19:10:40 UTC
- 2013-10-14 12:10:40 -07:00 at epicenter
- Location: 34.053°N 117.194°W
- Depth: 15.80 km (9.82 mi)

To the right, a text window displays the raw packet data in hexadecimal and ASCII. A red box highlights the word "Redlands" in the ASCII output, which is part of a URL: "http://earthquake.usgs.gov/earthquakes/everpage/ci/11373298/".



```
{ "guid": "urn:earthquake-usgs-gov:nc:72076101", "GEOMETRY": { "x": -122.1037, "y": 37.3227, "z": 0.0, "spatialReference": { "wkid": 4326 } }, "geo_lat": -122.1037, "geo_long": 37.3227, "magnitude": 1.5 }
```

# Beispiel attributive und räumliche Filterung

The image illustrates a workflow for filtering flight data. At the top left, a flowchart shows a sequence of operations: a green box labeled 'url-poll-flights' feeds into a yellow diamond 'FilterDLH'. From 'FilterDLH', the flow splits into three paths: one to a yellow diamond 'InsideArea', one to a yellow diamond 'OutsideArea', and one to a yellow diamond 'enter'. 'InsideArea' leads to a yellow box 'hostile', and 'OutsideArea' leads to a yellow box 'own'. Both 'hostile' and 'own' feed into a yellow diamond 'InsideDE'. 'InsideDE' then feeds into two blue boxes: 'Flight-fs-out' and 'Flight-Mail-Out'. A red arrow points from the 'InsideDE' diamond to the 'Edit Conditions' dialog box.

Below the flowchart, a browser window displays the URL `www.MeinRadar.com/Aircraft.json` and a JSON array of flight data. A red arrow points from the 'url-poll-flights' box to the browser window.

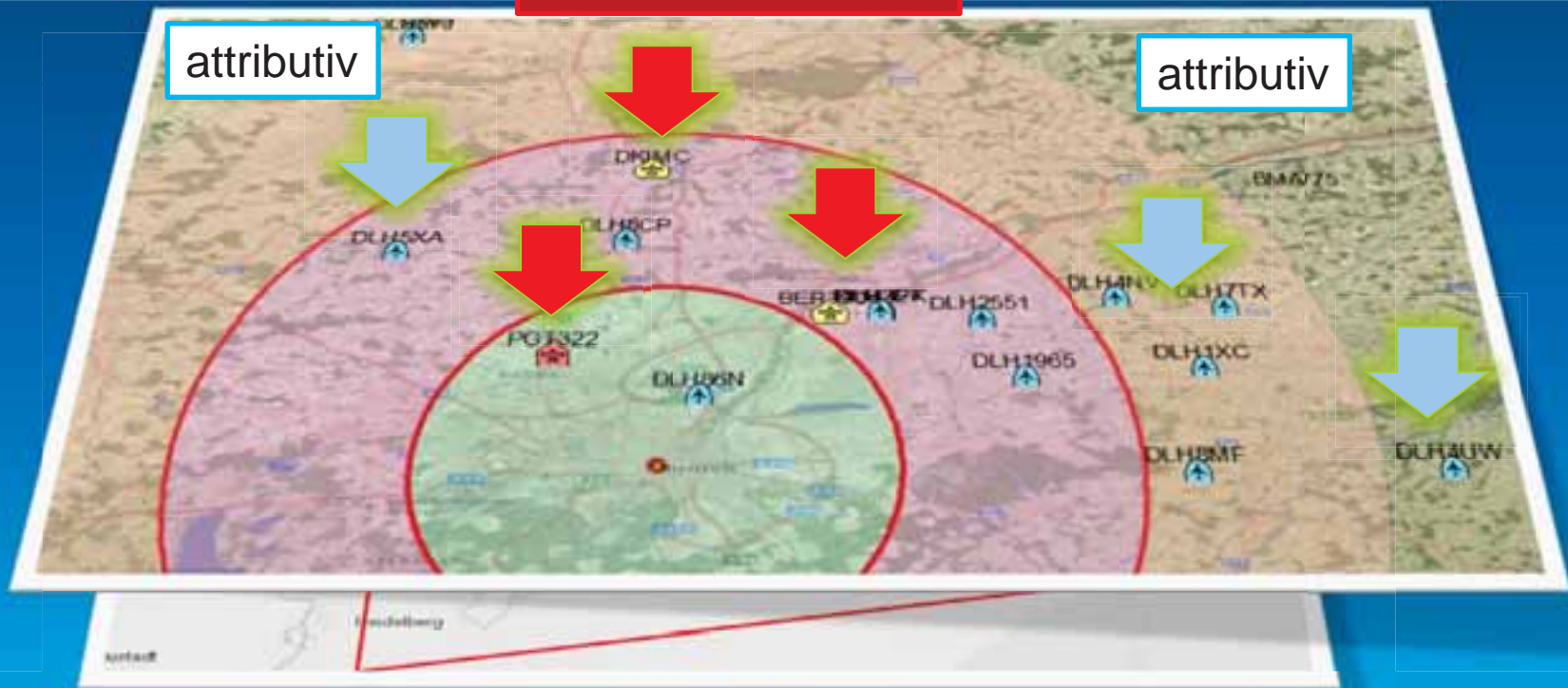
Three software dialog boxes are overlaid on the right side: 1. 'Properties' showing a filter named 'INSIDE Grenze/Deutschland'. 2. 'Edit Conditions' showing a condition 'AND (All of these are true)' with the expression 'INSIDE Grenze/Deutschland'. 3. 'Create Expression' showing a spatial condition type with 'Gefencat(s)' set to 'Grenze', 'Operator' set to 'INSIDE', and 'Operand' set to 'GEOMETRY'. A red arrow points from the 'Edit Conditions' dialog to the 'Create Expression' dialog.

# Beispiel attributive und räumliche Filterung

attributiv + räumlich

attributiv

attributiv

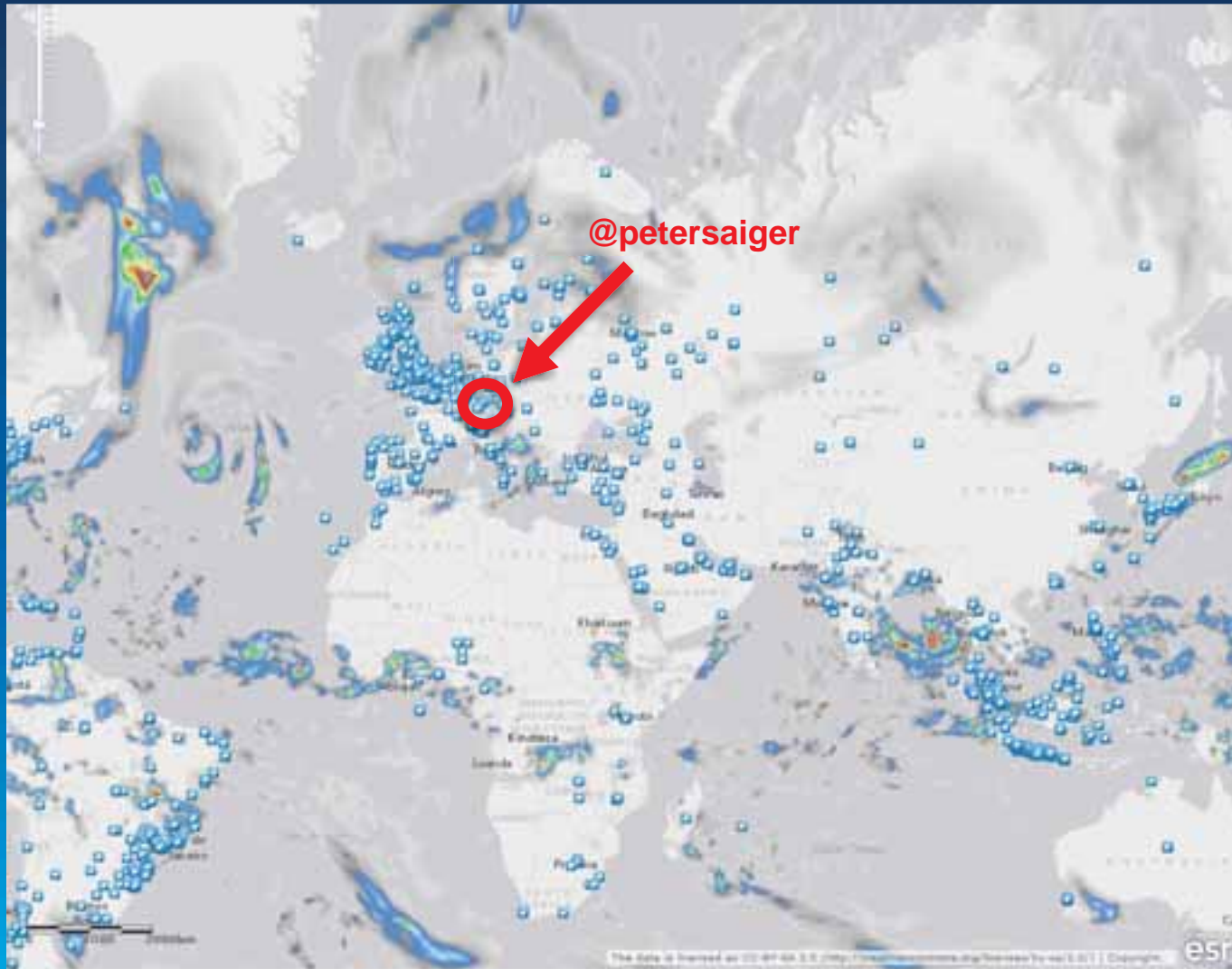


# DEMO Dashboard

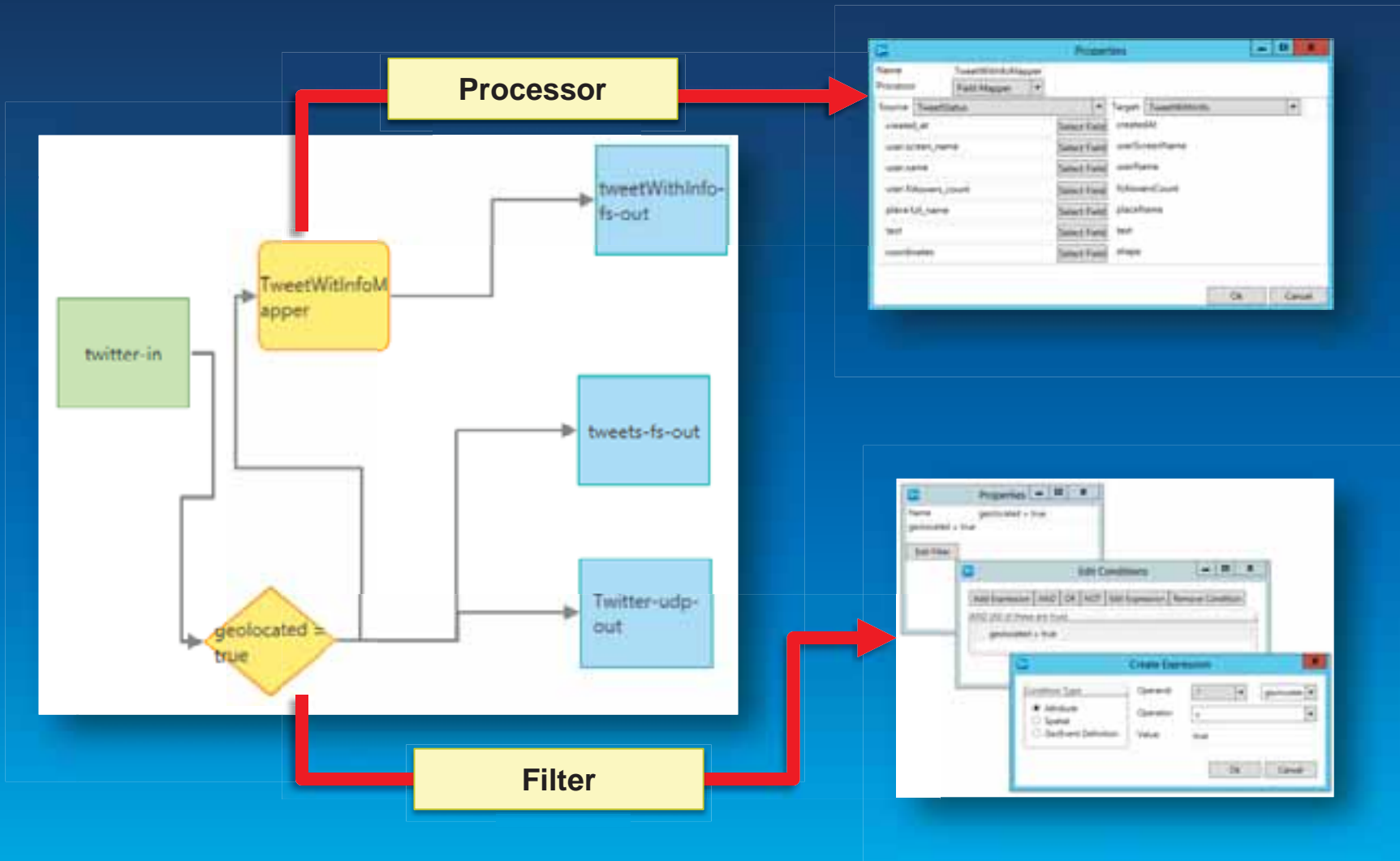
- Lufthansa Tracker



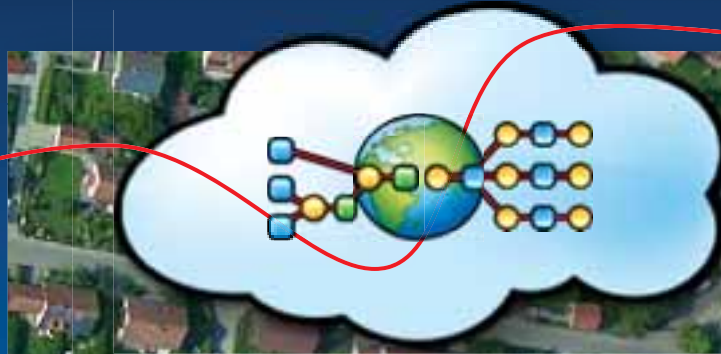
# Twitter Feeds auswerten



# Twitter Feeds auswerten



# Twitter Feeds auswerten



(2 von 2)

TweetWithInfo: petersaiger	
createdAt	
userScreenName	petersaiger
userName	Peter Saiger
followersCount	37
placeName	Kranzberg, Freising
text	Teste erfolgreich die Twitter API des Esri Geoevent Processor mit IOS 7
Zoomen auf Bearbeiten	
Route ermitteln	

# DEMO AGOL

- Twitter + Wetter
- **Keywords:**
- IOS, windows, Weather, Esri, UC, Geoeventprocessor, Geoevent Processor, IOS7, iPhone, iPad, EMEAUC

# Service Monitoring

## Monitoring von

- Services
- Inputs
- Outputs

## auf

- Status
- Input & Output
- Maximaler Durchsatz
- Zeit seit letztem In- / Output

The screenshot displays the ArcGIS GeoEvent Processor Manager interface. The top navigation bar includes 'Services', 'Site', 'Security', and 'Log'. Below this, there are tabs for 'Monitor', 'Inputs', 'GeoEvent Servers', and 'Outputs'. The 'Monitor' tab is active, showing a table of service status and performance metrics.

Name	Status	In/Out	Count	Rate (over last 5 mins)	Max Rate	Time Since Last
GeoEvent Processor	STARTED	In	0	0.00/sec	0.00/sec	03:28:34
GeoEvent Processor	STARTED	Out	5	0.00/sec	0.00/sec	03:28:34
Flight	STARTED	In	2007	14.37/sec	14.37/sec	00:02:25
Flight	STARTED	Out	581	0.51/sec	0.52/sec	00:02:25
Japan	STARTED	In	2810	0.00/sec	70.50/sec	04:28:14
Japan	STARTED	Out	9100	0.00/sec	234.77/sec	04:28:14
Media-gamma-service	STARTED	In	2881	0.17/sec	0.28/sec	00:01:24
Media-gamma-service	STARTED	Out	5202	0.34/sec	0.52/sec	00:01:24
Mobile	STARTED	In	30884	21.04/sec	30.90/sec	00:00:00
Mobile	STARTED	Out	12716	11.00/sec	70.97/sec	00:00:00
Portals	STARTED	In	841	2.70/sec	2.70/sec	00:00:00
Portals	STARTED	Out	14	0.01/sec	0.01/sec	00:00:00
weather-service	STARTED	In	2070	2.45/sec	14.24/sec	00:02:30
weather-service	STARTED	Out	1583	0.78/sec	11.01/sec	00:02:30

Name	Status	Count	Rate (over last 5 mins)	Max Rate	Time Since Last
api1-arcgis	STARTED	4102	0.00/sec	216.75/sec	03:28:27
api1-arcgis-ws	STARTED	6	0.00/sec	0.00/sec	03:28:28
api18-arcgis	STARTED	168	0.00/sec	0.00/sec	03:28:31
api2-arcgis	STARTED	716	0.00/sec	162.80/sec	03:28:10
api4-arcgis	STARTED	362	0.00/sec	16.10/sec	03:28:20
api6-arcgis	STARTED	34	0.00/sec	1.70/sec	03:28:24
GeoEvent Processor	STARTED	6	0.00/sec	0.00/sec	03:28:28
input	STOPPED	6	0.00/sec	0.00/sec	03:28:28
ProcessorManager	STARTED	2021	0.17/sec	1.10/sec	00:01:24
Host	STARTED	2810	0.00/sec	100.20/sec	00:28:22
Host in all_hosts	STARTED	444	0.00/sec	0.00/sec	03:01:07
Mobile-Prod	STARTED	30724	20.04/sec	30.24/sec	00:00:00
Portals	STARTED	841	2.70/sec	2.70/sec	00:00:00

# Backup & Recovery



Export des Configstores





# Beispiele für Klienten

WebSocket



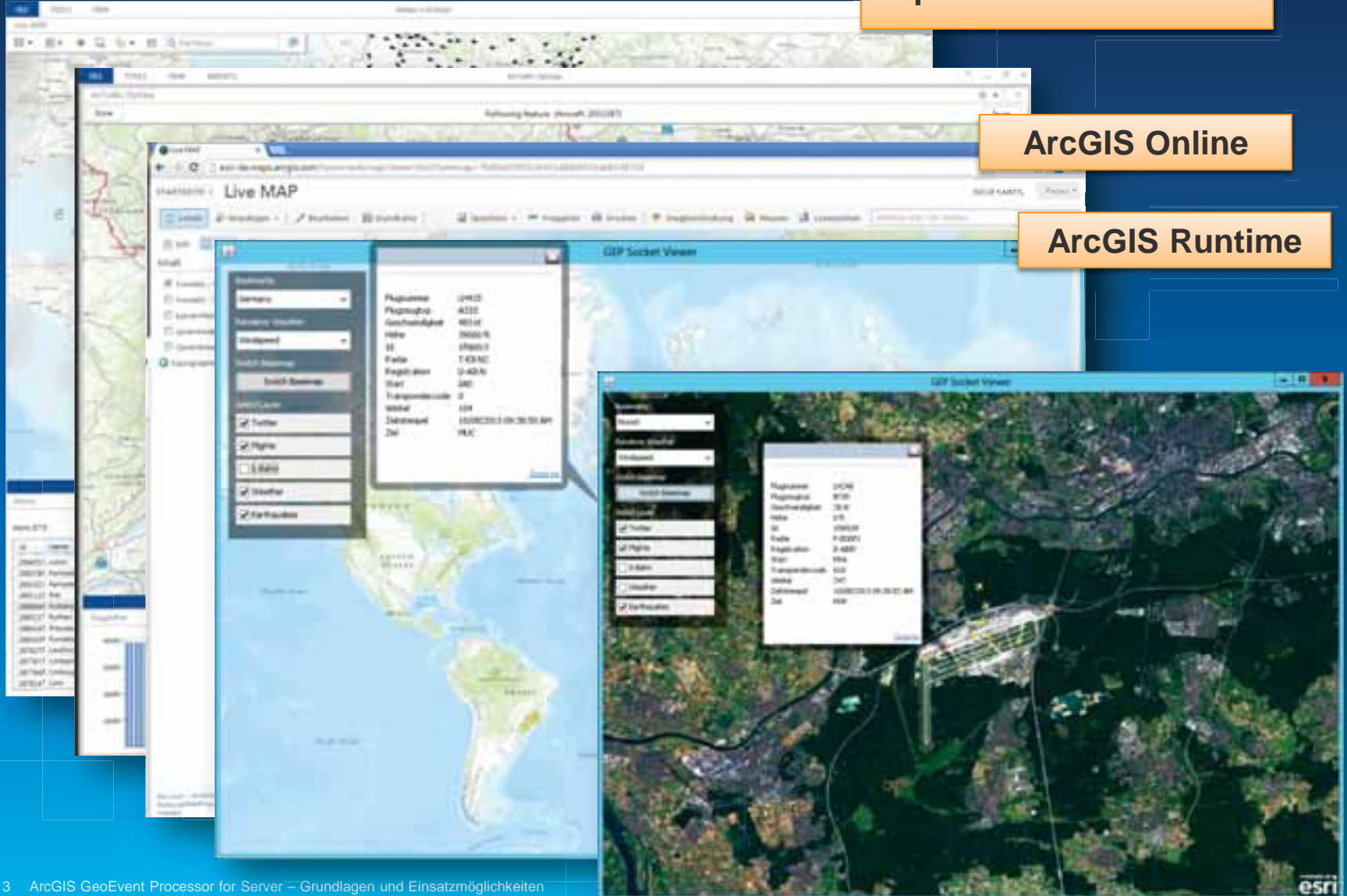


# Beispiele für Klienten

Operations Dashboard

ArcGIS Online

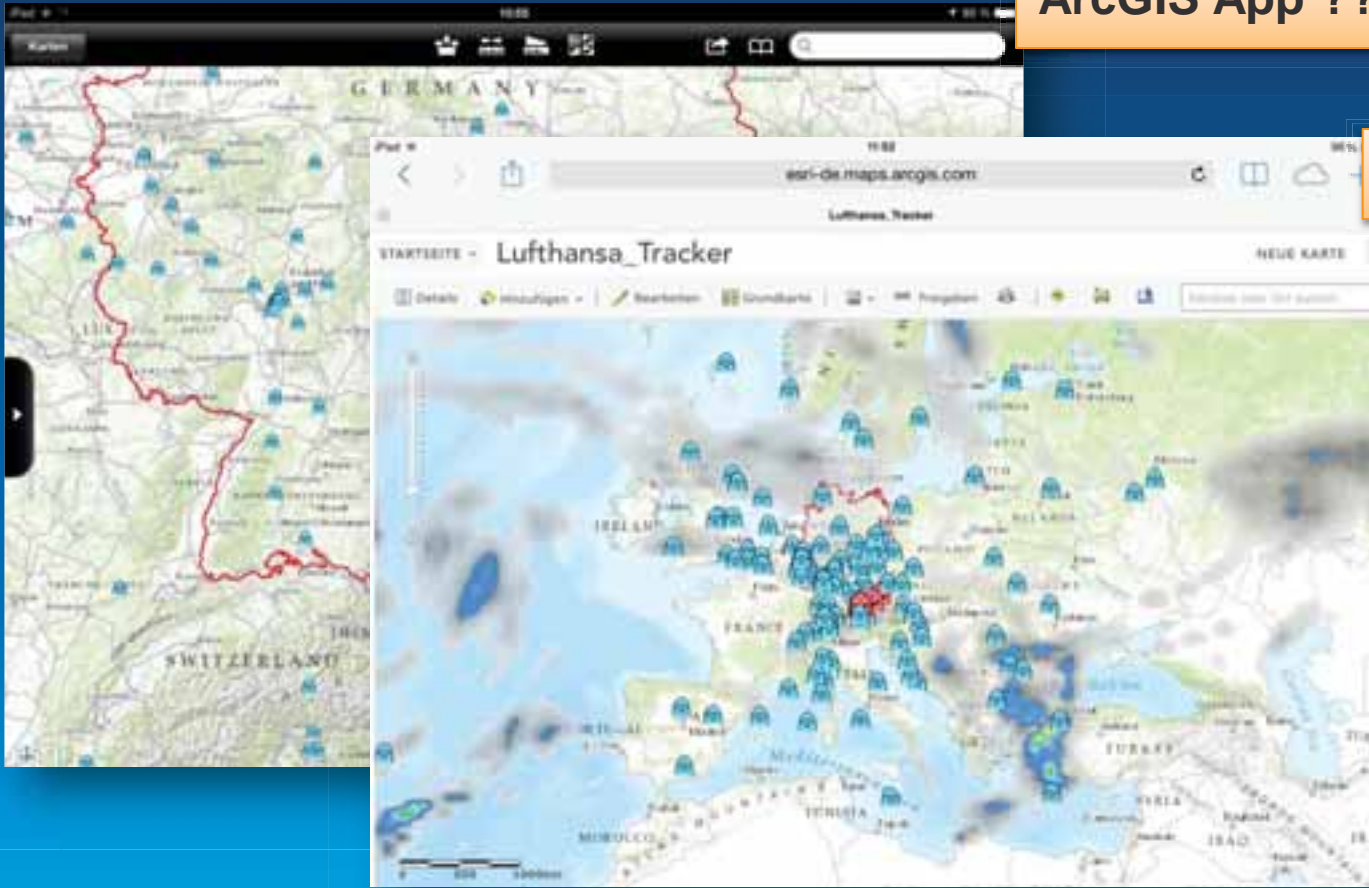
ArcGIS Runtime



# Beispiele für Mobile Darstellung

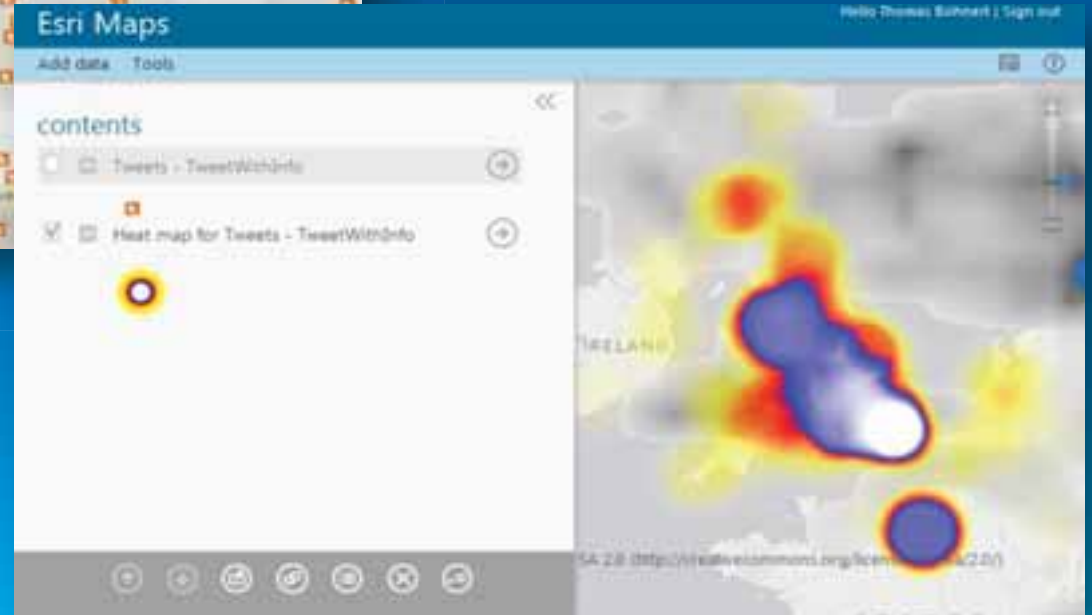
ArcGIS App ??

ArcGIS Online



# Integration in BI Systeme

Microsoft Sharepoint 2013



# Integration in BI Systeme

IBM Cognos 10.2



# Integration in BI Systeme

IBM Cognos 10.2



Rohdaten



Heatmap



Cluster

# Eigene Klienten

**Transports**

Click Add Local Transport or Add Online Transport to deploy the transport to GeoEvent Processor.

Add Local Transport Show:

Name	Type	Version	Description
FeatureService	outbound	10.2.0	ESRI Feature Service OutboundTransport implementation.
File	outbound	10.2.0	ESRI File Transport for outbound streams.
HDFS	outbound	10.2.0	ESRI HDFS Transport for outbound streams.
HTTP	outbound	10.2.0	ESRI Http Outbound Transport implementation.
HTTP-BasicAuthentication	outbound	10.2.0	Basic Authentication Outbound Rest Transport.
HTTP-OAuth1	outbound	10.2.0	Outbound HTTP Transport using Open Authentication.
SMS	outbound	10.2.0	ESRI SMS OutboundTransport implementation.
SMTP	outbound	10.2.0	ESRI SMTP OutboundTransport implementation.
TCP	outbound	10.2.0	Esri TCP Transport for outbound streams.
Twitter	outbound	10.2.0	Sending status update messages to Twitter.
UDP	outbound	10.2.0	ESRI UDP Transport for outbound streams. This transport can be used to send data to broadcast, multicast, or unicast addresses.
WebSocket	outbound	10.2.0	Esri Web Socket Transport for outbound streams.
XMPP	outbound	10.2.0	ESRI XMPP OutboundTransport implementation.

ArcGIS Runtime

JavaScript API

# Eigene Klienten

This endpoint is only designed to handle websocket connections.

If you don't have a proper client, you can click the connect button below to see the data in your browser.

```
{ "x": "11347272", "y": "48005327", "name": "S 6", "trainId": "B447818/19/4095", "direction": "16", "prodclass": "16", "passproc": "0", "stopno": "8002195", "stopname": "Gauting", "stopno": "8000262", "stopname": "München Ost", "line": "6", "geometry": { "x": "11347272E7", "y": "48005327E7", "z": "0.0", "spatialReference": { "wkid": "4326" } } }
{ "x": "11593046", "y": "48129171", "name": "S 1", "trainId": "B479518/27/4095", "direction": "12", "prodclass": "16", "passproc": "0", "stopno": "8004131", "stopname": "München Isarvor", "stopno": "8004168", "stopname": "München Flughafen Terminal", "line": "1", "geometry": { "x": "11593046E7", "y": "48129171E7", "z": "0.0", "spatialReference": { "wkid": "4326" } } }
{ "x": "11503945", "y": "48143950", "name": "S 3", "trainId": "B423918/20/4095", "direction": "31", "prodclass": "16", "passproc": "0", "stopno": "8004179", "stopname": "München Hirschgarten", "stopno": "8002860", "stopname": "Holtkirchen", "line": "3", "geometry": { "x": "11503945E7", "y": "48143950E7", "z": "0.0", "spatialReference": { "wkid": "4326" } } }
```

```
Windows PowerShell (2)
Okt 10, 2013 10:48:12 AM de.esri.arcgisruntime.gep.socket.UDPMessageReceiver$1$1 run
INFO: =Bahn.11901744.48293575.S 2.04/123/18/21/4095.4.16.0.0001825.Erding.0001825.Erding.2."1.1901744E7.4.8293575E7.0.0"

Okt 10, 2013 10:48:12 AM de.esri.arcgisruntime.gep.socket.UDPMessageReceiver$1$1 run
INFO: =Bahn.11940299.40043459.S 4.04/315/18/28/4095.12.16.0.0003290.Kirchseeon.000119.Geltendorf.4."1.1940299E7.4.8043459E7.0.0"
```

# REST API

<http://<Rechnername>:6180/geoevent/rest/>

## GeoEvent Definitions

- [Asset](#)
- [Earthquake-MagniDouble](#)
- [Earthquake-MagniString](#)
- [EarthquakeOut](#)
- [EarthquakeOut](#)
- [FlightGeoEventDefinition](#)
- [FlightGeoEventDefinition](#)
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## ArcGIS GeoEvent Processor for Server

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Current Version: 10.2.0

## GeoEvent Definition

**Name:** sBahn

**Owner:** auto-generated/com.esri.ges.adapter.inbound.Generic-JSON/10.2.0

**GUID:** 8da68d1b-c42b-4ad3-b77a-e8c224a16e33

**Field Definitions:**

- **Name:** x  
**Type:** String  
**Cardinality:** One  
**Tags:**
- **Name:** y  
**Type:** String  
**Cardinality:** One  
**Tags:**
- **Name:** name  
**Type:** String  
**Cardinality:** One  
**Tags:**
- **Name:** trainid  
**Type:** String  
**Cardinality:** One  
**Tags:**
  - TRACK\_ID



# Noch Fragen?

Christine Brunner

Dr. Peter Saiger-Bonnas