



Developing Real-Time Web Apps with the ArcGIS API for JavaScript



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Agenda

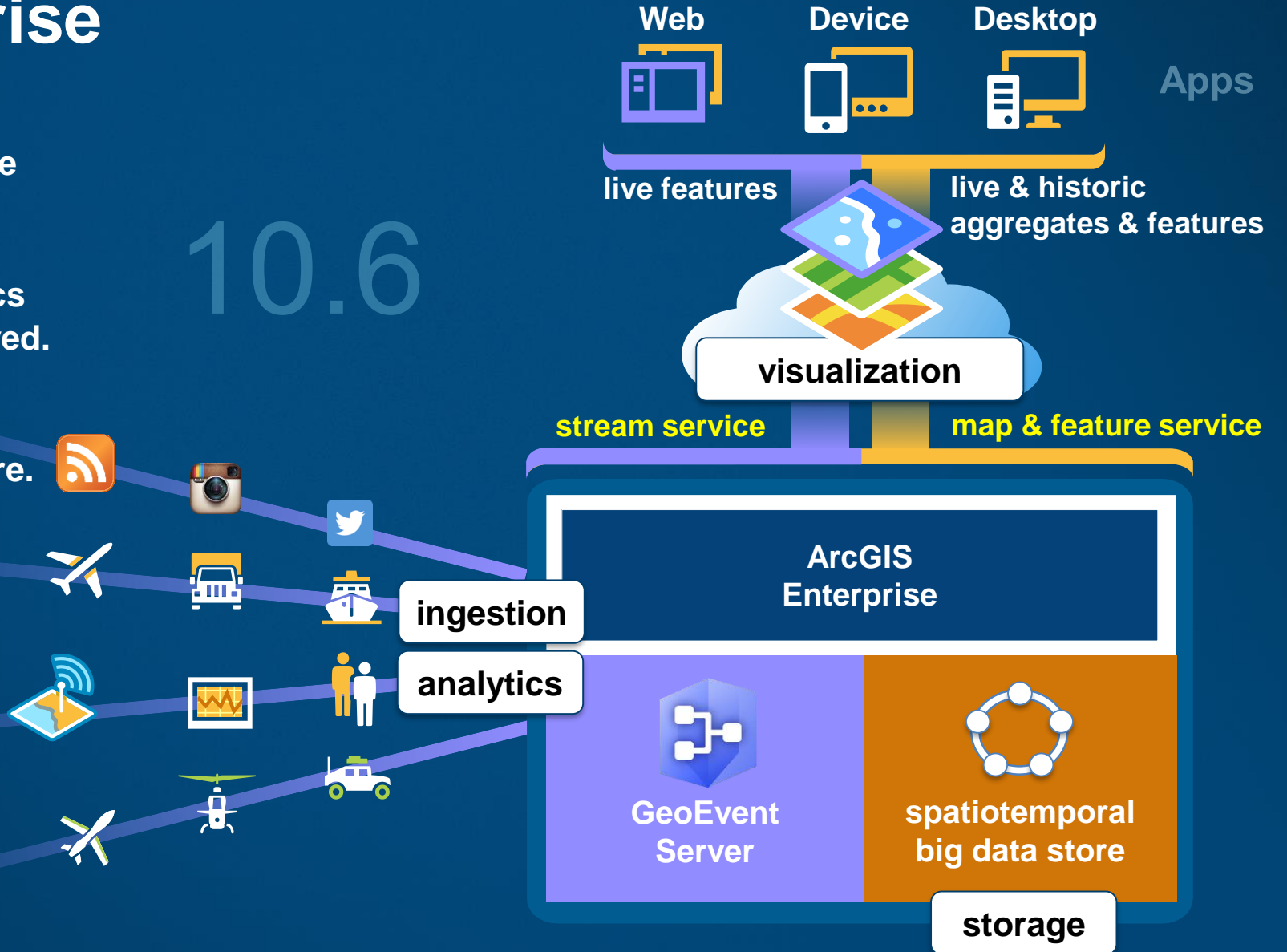
- 1 Overview of Stream Services & Stream Layers
 - 2 Publishing Stream Services
 - 3 Visualization of Real-Time Data
 - 4 Using Stream Layers in Custom Applications
 - 5 Sample Applications and Tutorials
-

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.

10.6

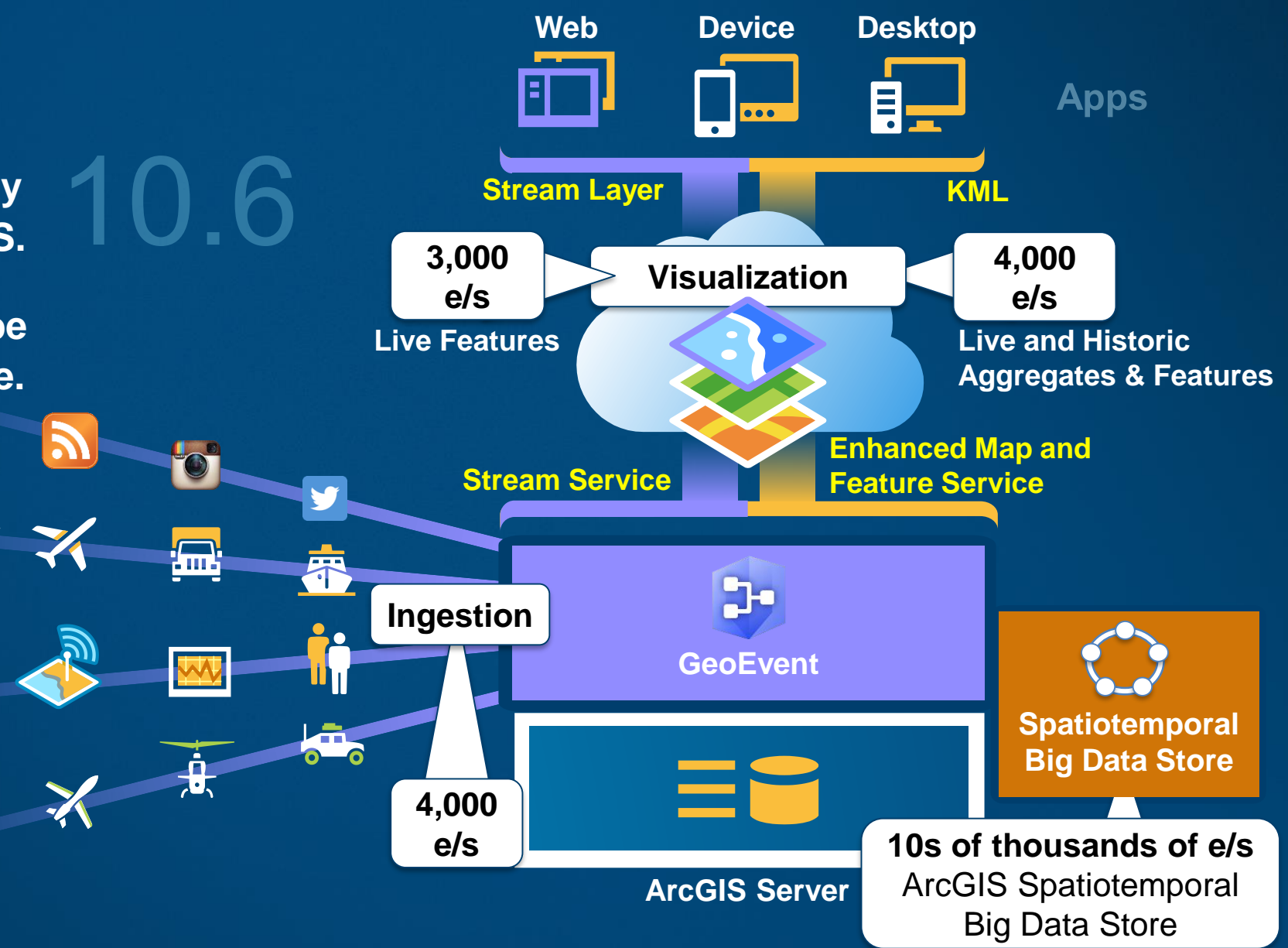


Real-Time GIS

ArcGIS 10.6

- Can ingest higher velocity real-time data into ArcGIS.
- Observations **CAN** now be stored in a Big Data Store.
- Can visualize high velocity and volume data
 - as an **AGGREGATION**,
 - as discrete **FEATURES**,
 - live & **HISTORICALLY**.
- Visualization **CAN** scale.

10.6



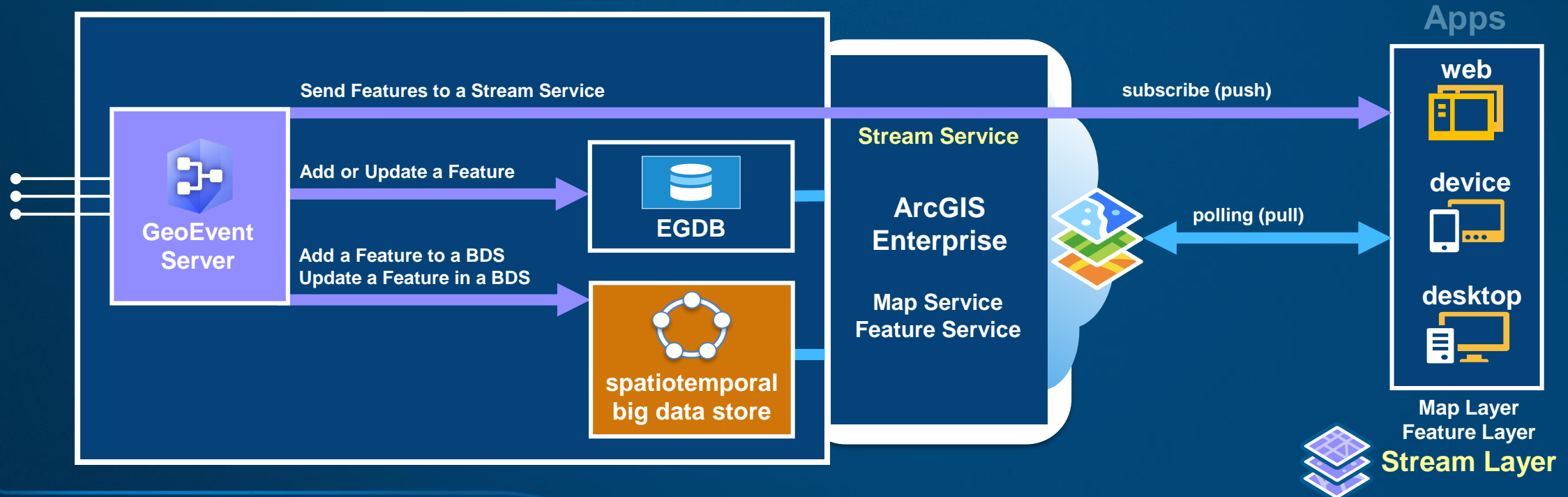


Overview of Stream Services & Stream Layers

Feature Layers vs Stream Layers

two patterns, two important differences

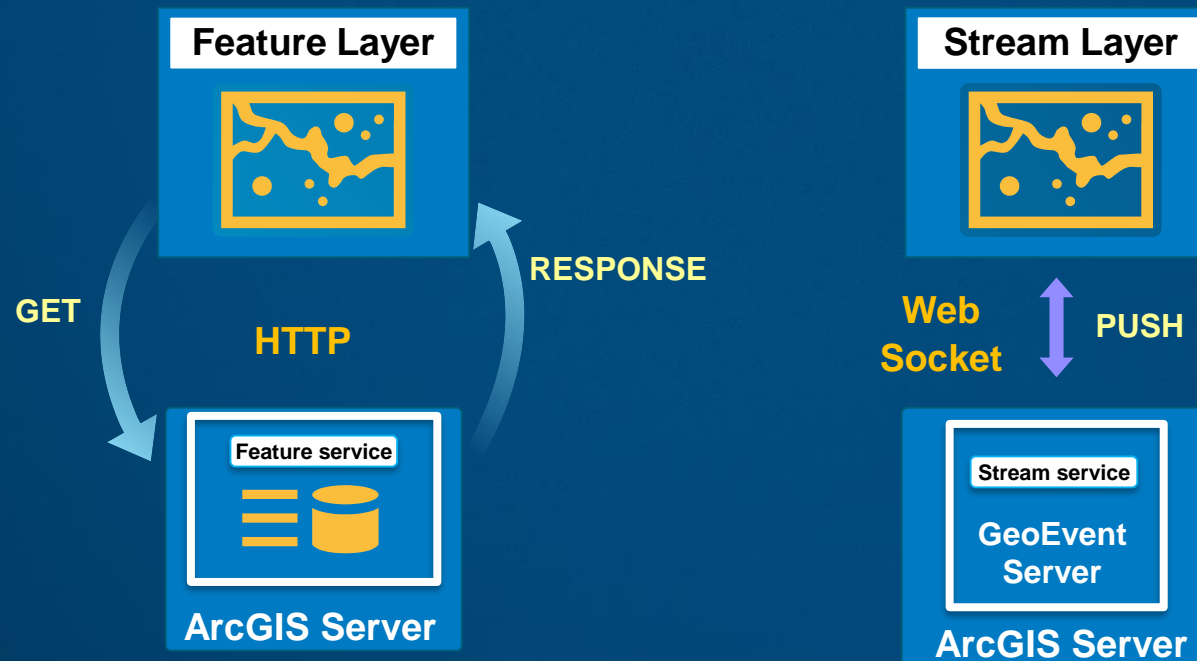
- Feature layers **pull** from feature services.
 - Layers poll to get periodic updates.
 - Must be backed by an enterprise geodatabase (EGDB) or the spatiotemporal big data store.
- Stream layers **subscribe** to stream services.
 - Stream Service **pushes** data to Stream Layer as soon as real-time data is received.
 - Data is not stored in database, cannot be replayed.



Stream Layers

advantages when working with real-time data

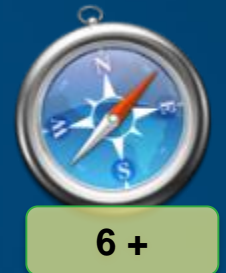
- More **responsive** and more **efficient** than feature layers.
- Stream Layers display **immediately** and refresh **automatically**.
- Data is only sent to the client **once**.



Stream Layers

pre-requisites

- **ArcGIS GeoEvent Server**
 - Stream Services are published as part of the configuration of an outbound connector.
- **Web Browsers** that support Web Sockets.
 - <http://caniuse.com/websockets>
- **Network** support for the **Web Socket** protocol
 - `ws://` `wss://`
- **No custom plug-in required:** standard JavaScript implementation.



Stream Layers

where can I use stream layers?

- ArcGIS Online & Portal for ArcGIS **Web Maps**.
- ArcGIS Online & Portal for ArcGIS **web application templates**.
- Web applications built using **Web AppBuilder**.
- **Your own web apps** that use the ArcGIS API for JavaScript.

2

Publishing Stream Services & Using the REST Endpoint

Demo

3

Visualization of Real-Time Data



Using Stream Layers in Custom Applications

Stream Layers in custom applications

very little code required using the ArcGIS API for JavaScript

- ArcGIS API for JavaScript **3.x**
 - Dojo “require”
 - Construct and add to map

```
require([  
  "esri/map",  
  "esri/layers/StreamLayer",  
  "dojo/domReady!"  
])
```

```
var url = "http://ec2-75-101-155-202.compute-1.amazonaws.com:6080/arcgis/rest/services/AsdiTracks/StreamServer";  
var streamLayer = new StreamLayer ( url );  
var map = new Map( "mapDiv", {  
  basemap: "topo"  
});  
map.addLayer ( streamLayer );
```

Stream Layers in custom applications

very little code required using the ArcGIS API for JavaScript

- ArcGIS API for JavaScript 4.x
 - Dojo “require”
 - Construct and add to map

```
require([
  "esri/Map",
  "esri/views/MapView",
  "esri/layers/StreamLayer",
  "dojo/domReady!"
])
```

```
var url = "http://ec2-75-101-155-202.compute-1.amazonaws.com:6080/arcgis/rest/services/AsdiTracks/StreamServer";
var streamLayer = new StreamLayer ( { url: url } );
var map = new Map( {
  basemap: "topo",
  layers: [ streamLayer ]
} );
var view = new MapView( { container: "mapDiv", map: map } );
```

Stream Layers in custom applications

remove unneeded capabilities

- **purgeOptions**
 - **displayCount**: Maximum number of features to display
 - **age**: Maximum age of features (in minutes). Defaults to no maximum.
- **maximumTrackPoints**: Maximum features per trackId to display. Defaults to 1
- **purgeInterval**: The purge method is automatically called at this interval (in minutes). Defaults to 0 so purging performed when new message is received.

```
var streamLayer = new StreamLayer(url, {
  purgeOptions: {
    displayCount: 1000,
    age: 20
  },
  maximumTrackPoints: 5,
  purgeInterval: 1
});
```

Note: GeoEvent definition “TIME_END” field is honored

Stream Layers in custom applications

applying filters to real-time data

- **definitionExpression:** the where clause used to filter data using attributes.
- **geometryDefinition:** the Extent used as a spatial filter. Only Extent is allowed.

```
var streamLayer = new StreamLayer( url, {  
    definitionExpression: "AltitudeFeet > 18000"  
});  
  
    ymin: 38,  
    xmax: -115,  
    ymax: 42,  
    spatialReference: {  
        wkid: 4326  
    }  
});
```




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Sample Applications & Tutorials

Sample Applications & Tutorials

helpful links

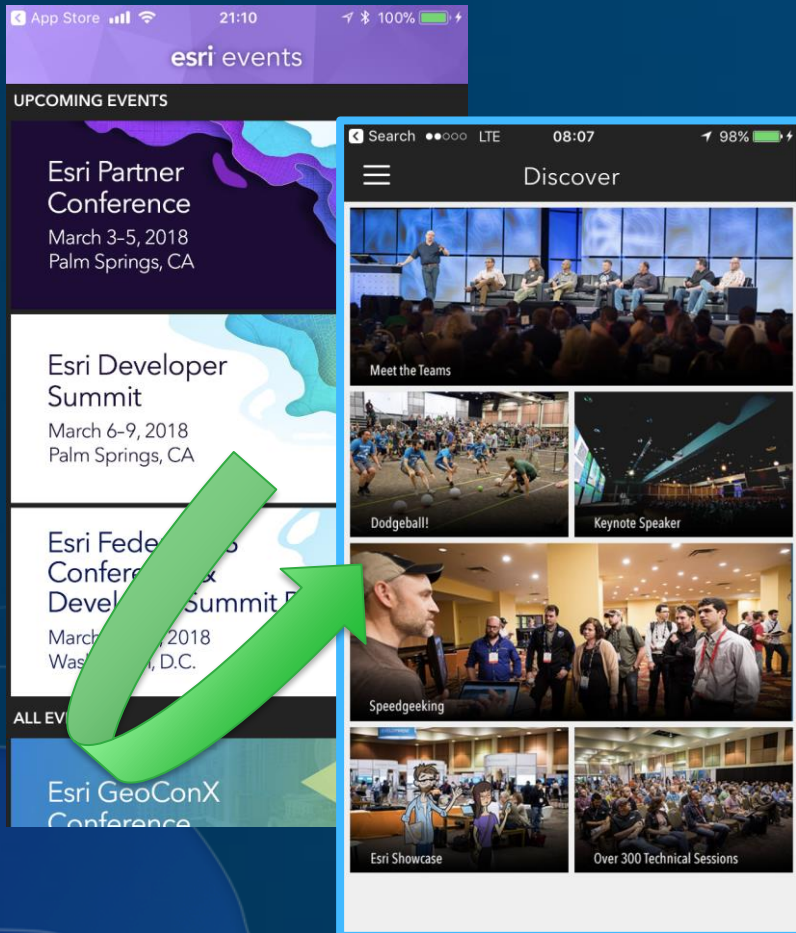
- **StreamLayer API help:**
 - 4.x: <https://developers.arcgis.com/javascript/latest/api-reference/esri-layers-StreamLayer.html>
 - 3.x: <https://developers.arcgis.com/javascript/3/jsapi/streamlayer-amd.html>
- **Sample applications on GitHub:**
 - <https://github.com/jcardonadcdev/esri-uc-2017>
- **Sample stream services with simulated data:**
 - <https://geoeventsample3.esri.com:6443/arcgis/rest/>
 - <http://ec2-75-101-155-202.compute-1.amazonaws.com:6080/arcgis/rest/>
- **Tutorials:**
 - <http://links.esri.com/geoevent-tutorials>
 - <http://links.esri.com/geoevent-streamservices>
- **Discussions & Blogs (on GeoNet)**
 - <https://geonet.esri.com/community/gis/enterprise-gis/geoevent/content>

Please Attend Our Other Sessions!

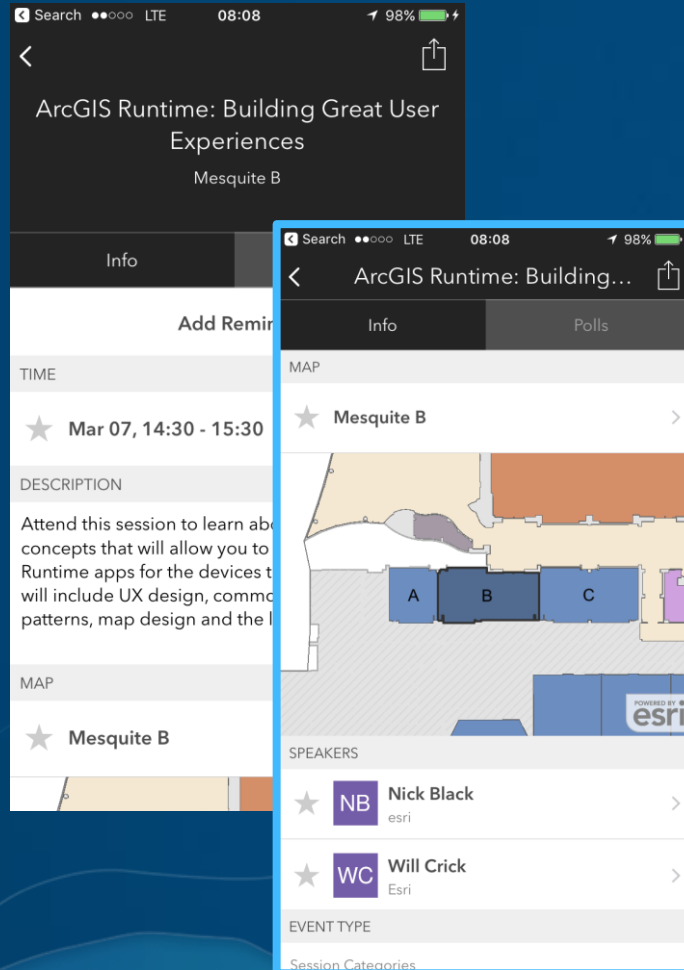
- **GeoEvent Server: An Introduction**
Tue, 2:30-3:30 pm, Primrose B
- **GeoEvent Server: Applying Real-Time Analytics**
Tue, 5:30pm-6:30 pm, Primrose A
- **Real-Time and Big Data GIS: Best Practices**
Wed, 10:30-11:30 am, Primrose B
Fri, 1:00-2:00 pm, Catalina/Madera
- **ArcGIS and the Internet of Things (IoT)**
Wed, 2:30-3:30 pm, Primrose B
- **Real-Time and Big Data GIS: Leveraging the Spatiotemporal Big Data Store**
Wed, 4:00-5:00 pm, Primrose A
- **Developing Real-Time Web Apps with the ArcGIS API for JavaScript**
Thu, 9:00-9:30 am, Demo Theater 1: Oasis 1-2
- **Real-Time GIS: Road Ahead**
Thu, 4:00-5:00 pm, Pasadena/Sierra/Ventura
- **GeoEvent Server: Creating Connectors and Processors Using the GeoEvent SDK**
Fri, 8:30-9:30 am, Mesquite B

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and find your event

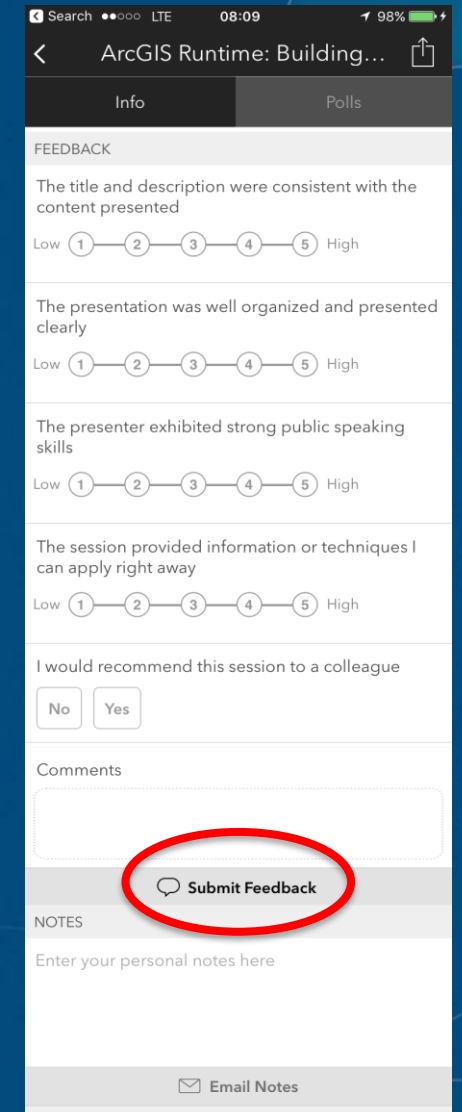


Select the session you
attended



Scroll down to the
“Feedback” section

Complete Answers,
add a Comment,
and Select “Submit”



Esri.com Proceedings page

<http://proceedings.esri.com>

Where users can find PDF'ed
slides after DevSummit

The screenshot shows the Esri.com website's Events page. At the top, there is a navigation bar with the Esri logo and links for Industries, Products, Support & Services, About, and Community. A search bar is located on the right. Below the navigation bar is a red banner with the word "Events" and three sub-tabs: "Main", "Recent Proceedings", and "User Groups". The main content area is a grid of event listings, each with a title and dates. The following table summarizes the visible events:

Event Title	Dates
Esri User Conference	June 27–30, 2016
European Petroleum GIS Conference	November 1–2, 2016
Mid Atlantic User Conference	December 7–9, 2015
AEC Summit	July 20–24, 2015
European Transportation GIS Summit	May 19–20, 2016
National Security and Public Safety	June 25–28, 2016
10th Asia Pacific User Conference	January 27–28, 2015
Federal GIS Conference	February 24 –25, 2016
Ocean GIS Forum	November 1–3, 2016
Business Summit	Jun 25–28, 2016
GeoConX Conference	October 17 20, 2016
Petroleum GIS Conference	April 26–28, 2016
DevSummit (International)	March 8–11, 2016
Geodesign Summit	January 24–26, 2017
Public Sector CIO Summit	March 25–26, 2015
DevSummit Europe	December 6–8, 2016
Geodesign Summit Europe	November 1–2, 2016
Southeast User Conference	May 2–4, 2016
DevSummit, Washington DC	February 24-25, 2016
GIS for a Sustainable World	May 2–4, 2016
Southwest User Conference	January 19–21, 2016
Education User Conference	June 27–30, 2016
Health GIS Conference	September 14–16, 2015
Water Conference	February 9–11, 2016
Electric & Gas GIS Conference	October 5–8, 2015
Imaging & Mapping Forum	June 27–30, 2016

Questions / Feedback?



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