ArcGIS Velocity: An Introduction

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Greg Christakos

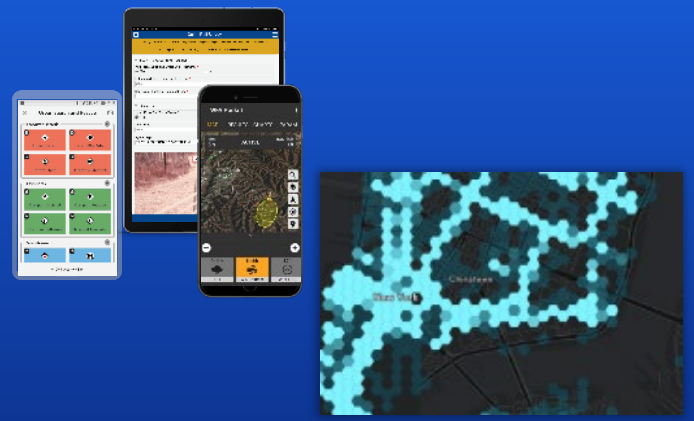
2021 ESRI
DEVELOPER SUMMIT

Introduction & overview

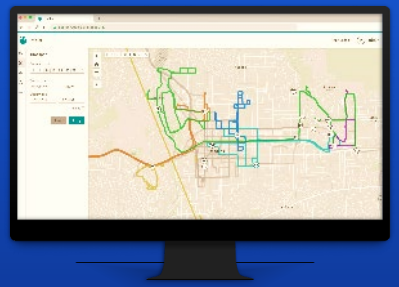
welcome
to the
connected world

Geospatial use cases in the Internet of Things

Personnel Tracking

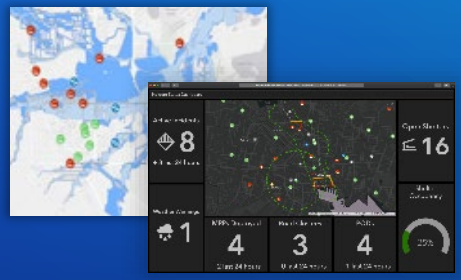


Resource Optimization



Asset & Entity Tracking

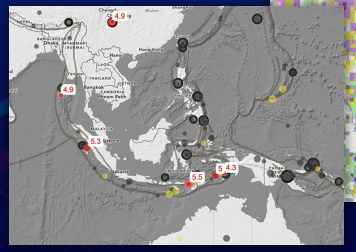
Infrastructure Protection



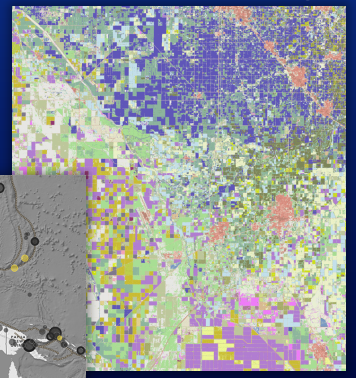
Operations Monitoring

SCADA Integration

Anomaly Detection



Soil & Crop Monitoring



Air Quality Monitoring

Connected Cars

ArcGIS Velocity

Real-time and big data capabilities for ArcGIS Online

- Ingest real-time sensor data
- Analyze data to detect incidents
  - In real-time
  - In *near* real-time
  - Over time
- Take action

Real-Time Visualization & Analytics

Supporting High-Velocity Data Streams

Tracking, Monitoring and Alerting

Enterprise

GeoEvent Server

GeoAnalytics Server

ArcGIS Online

New

Velocity

- Cloud Native Service
- Very Fast
- High Volume
- SaaS

Sensors

Real-Time Data

IoT Platforms

Collapsing the Time from Measurement to Decision Making

How it works

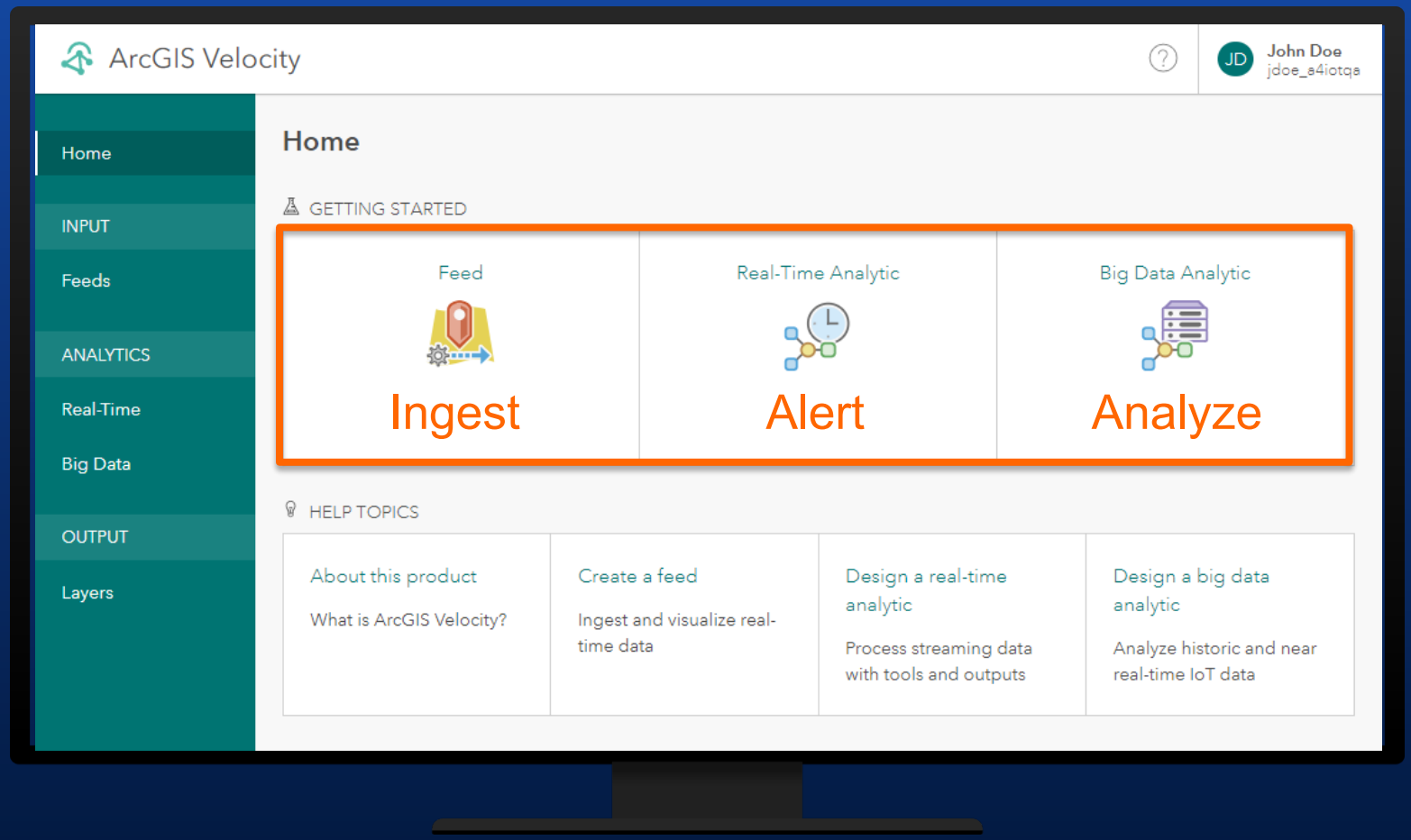
ArcGIS Velocity

Leverage sensor and IoT data for geospatial reasoning

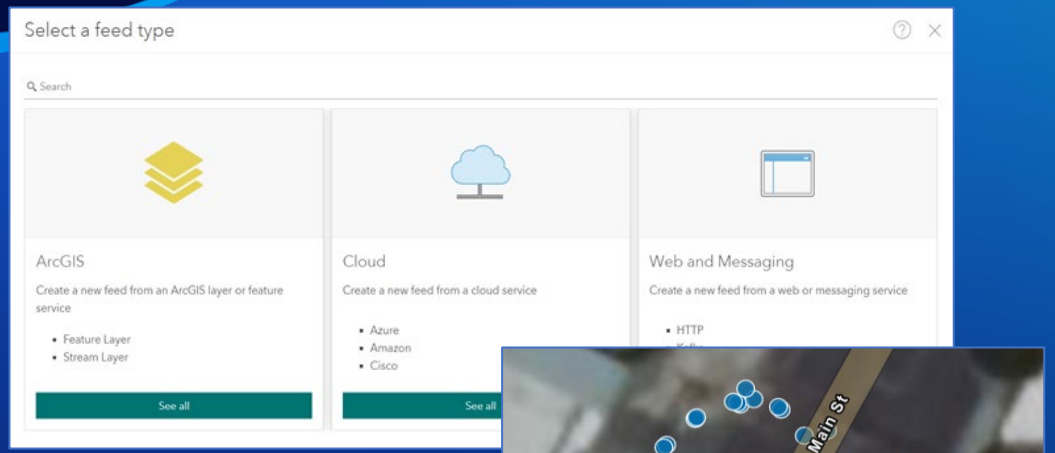
…connects to industry leading cloud IoT platforms, data lakes, and sensor vendor APIs

New application

Authoring experience for hosted real-time & big data tasks



…ingest, process, and analyze your real-time data with ArcGIS Online



Feeds

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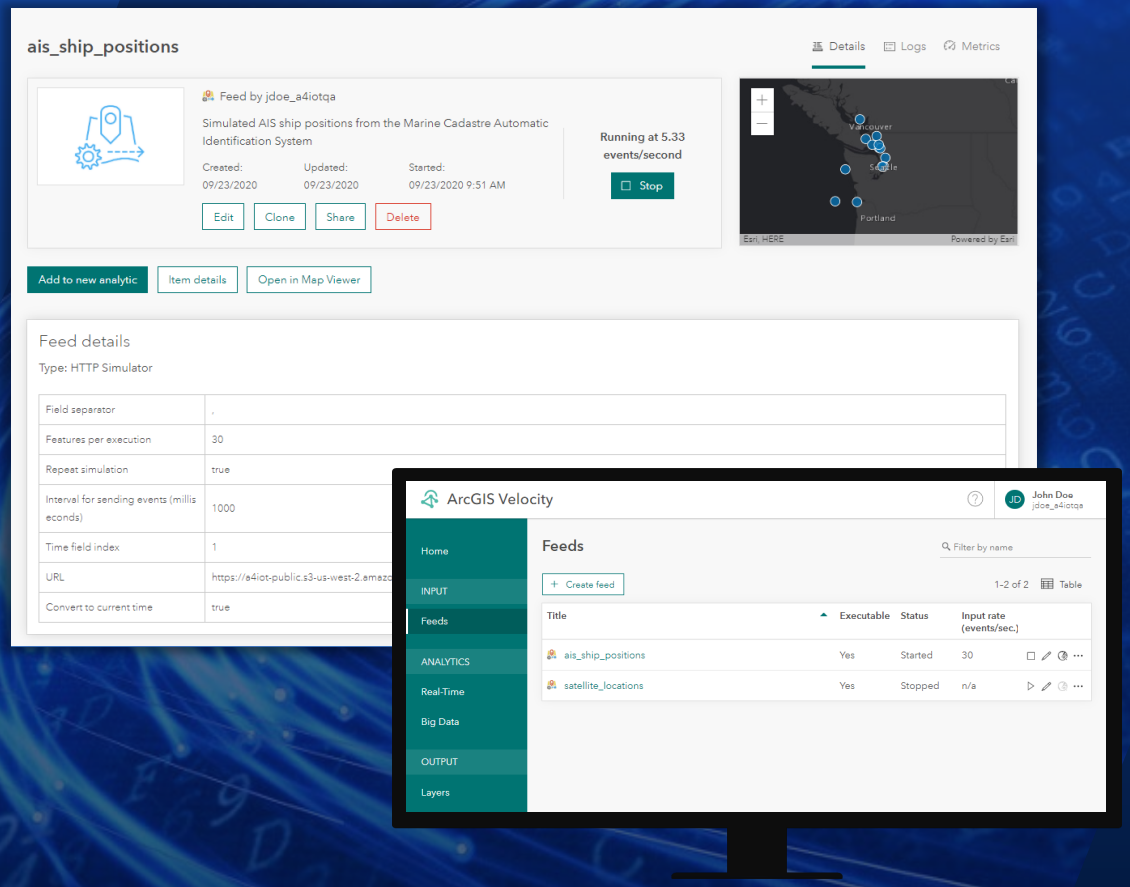
Feeds

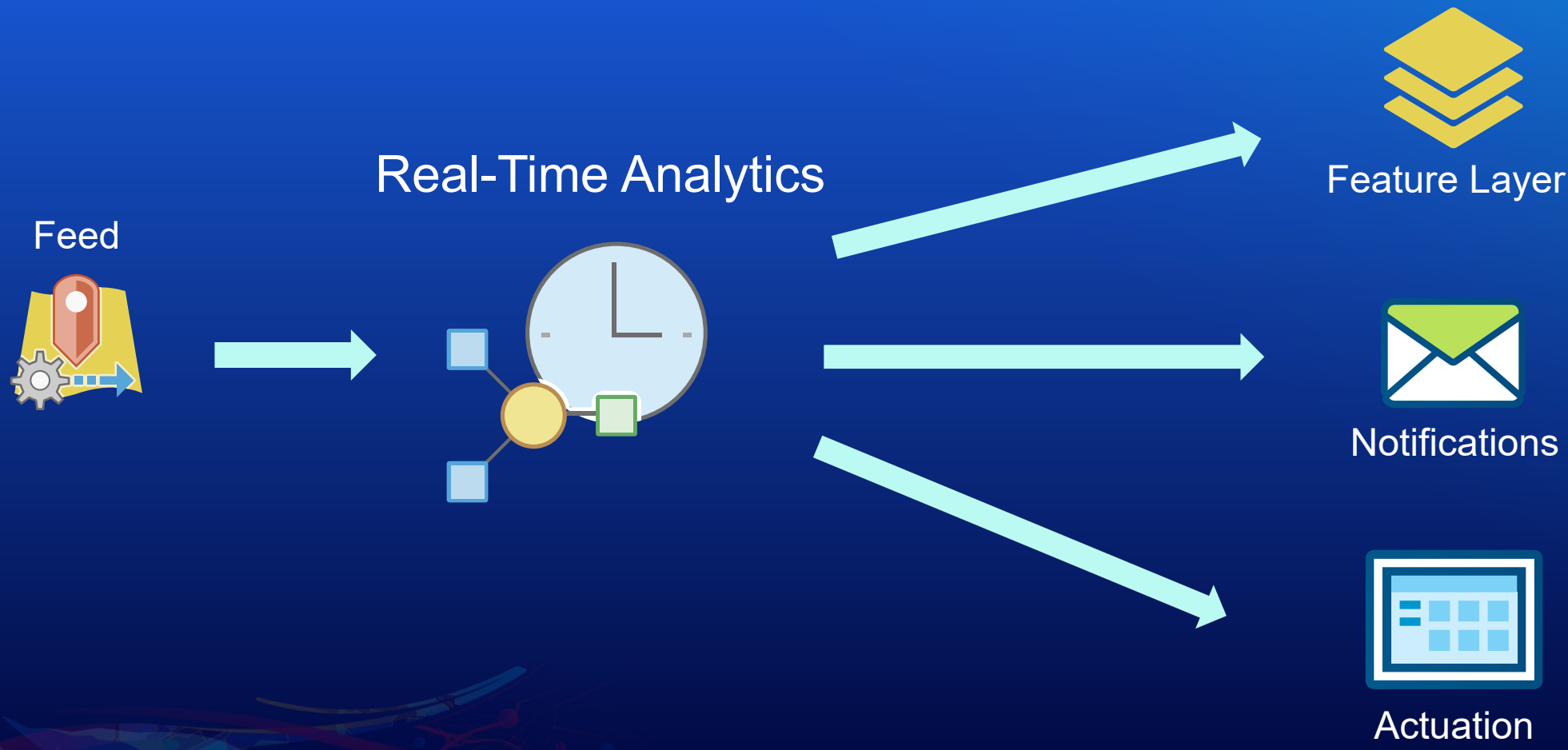
Ingest & visualize real-time data streams

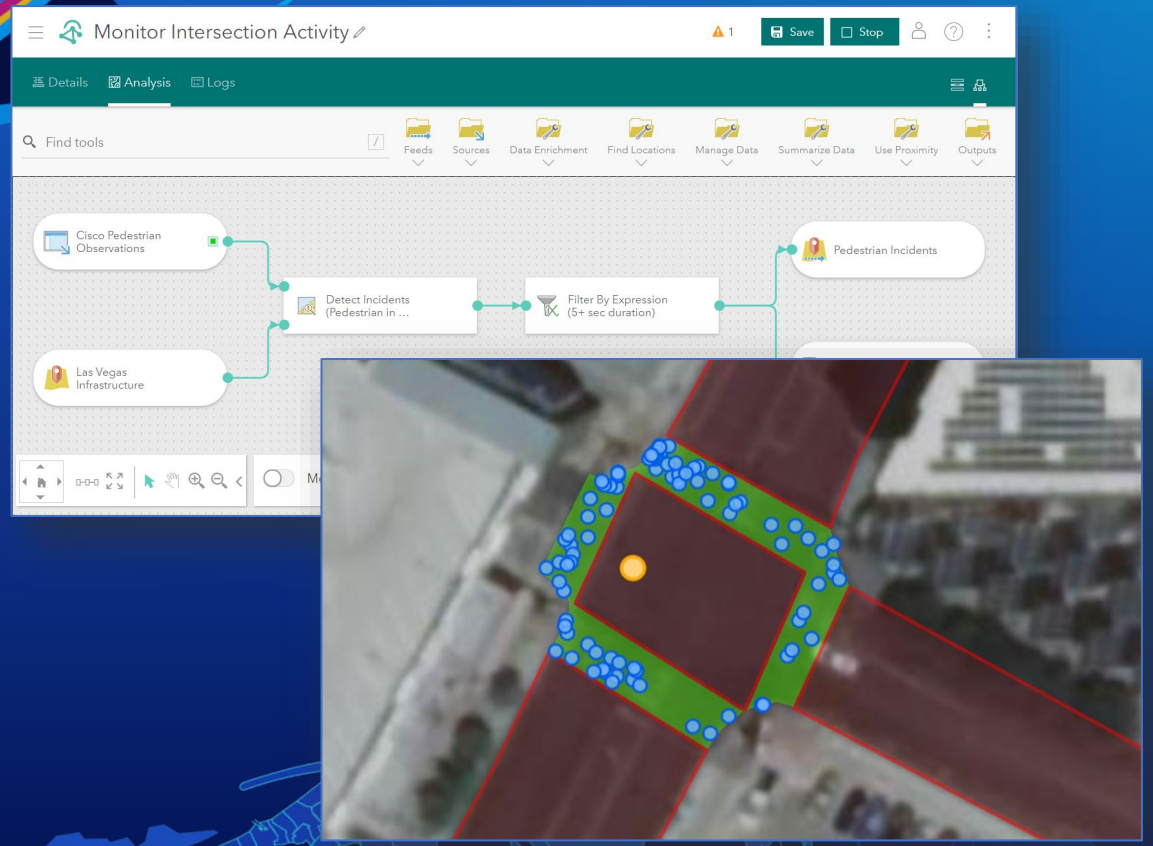
- Connect to data streams
  - ArcGIS (feature layers, stream layers)
  - Cloud IoTs (Azure, AWS, Cisco)
  - Web & Messaging (HTTP, Kafka, MQTT)
- Schema auto-discovery
- Immediate real-time visualization
  - Behaves like stream layer in a map



Real-time analysis

Process and analyze real-time data streams





Real-time analytics

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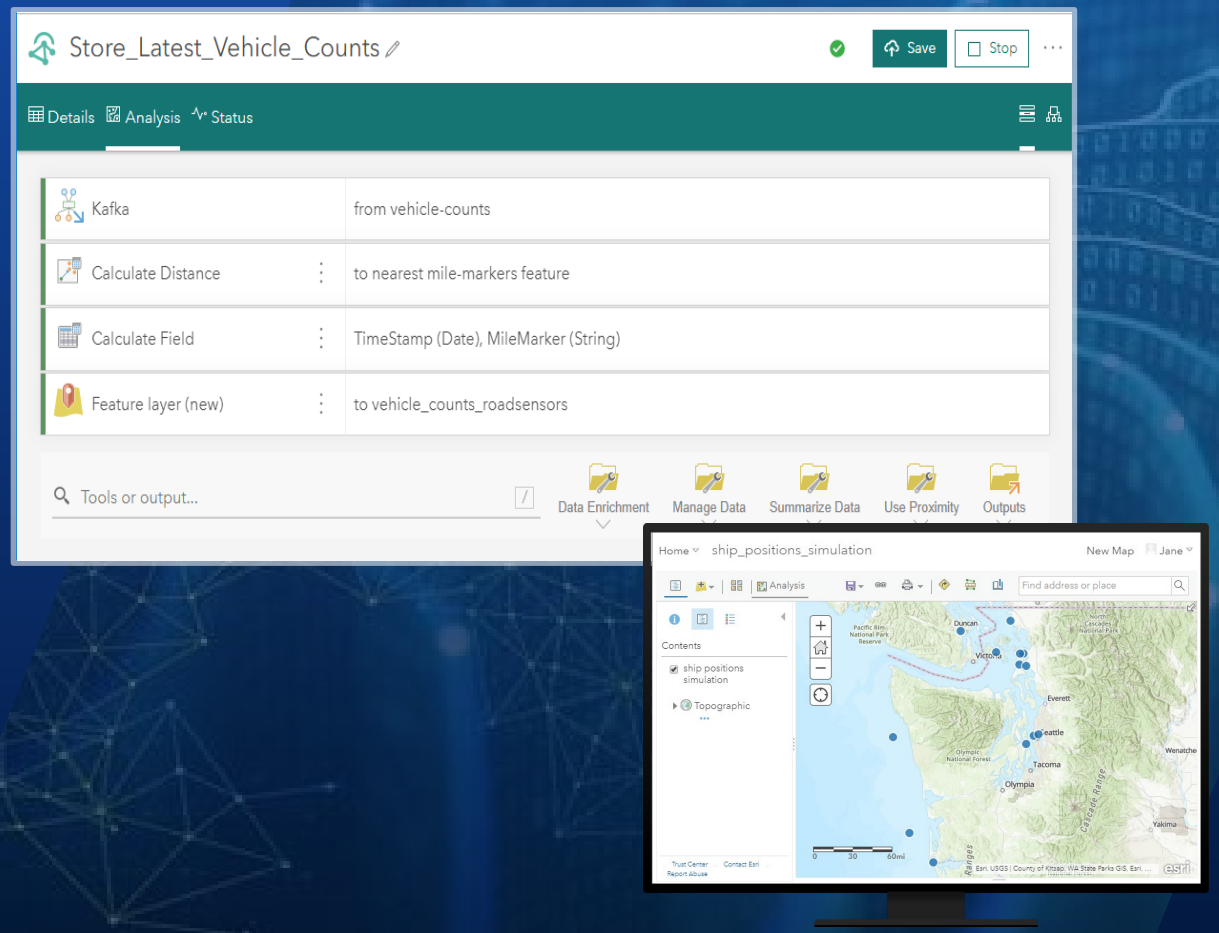
Real-time analytics

Analyze and process real-time data streams

- Input data sources
  - Feeds
  - Static datasets (geofencing, enrichment)
- Analytic tools
- Outputs
  - ArcGIS layers (feature, stream, map image)
  - Alerts & notifications (email, text message)



Inputs & outputs

Supported systems, protocols, and data formats

Feeds and data sources

Feature Layer
Azure Event Hub
HTTP Poll
Stream Layer
Azure Service Bus
AWS IoT
HTTP Receive
Kafka
RabbitMQ
Cisco Kinetic EFM
Azure Blob Store
MQTT
Simulator
Web Socket
Azure Cosmos DB
AWS S3

Outputs

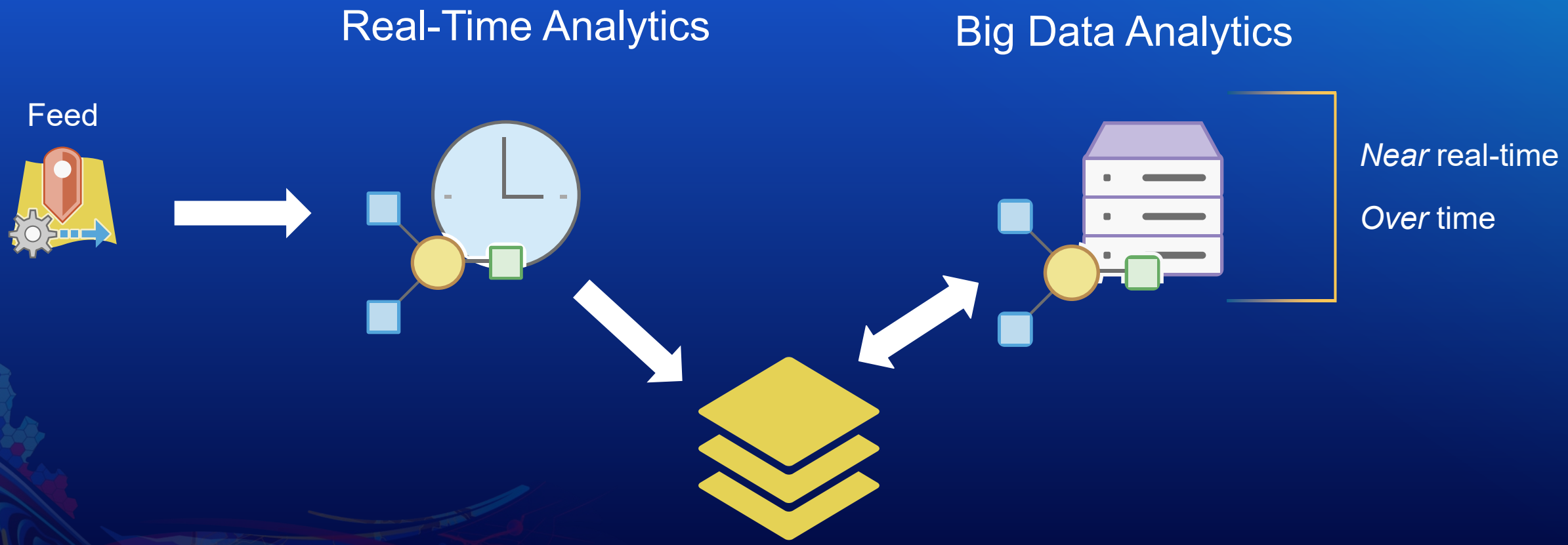
Azure IoT Hub
Feature Layer
Stream Layer
Kafka
AWS S3
Email
Text Message
RabbitMQ
Azure Blob Store
HTTP Post

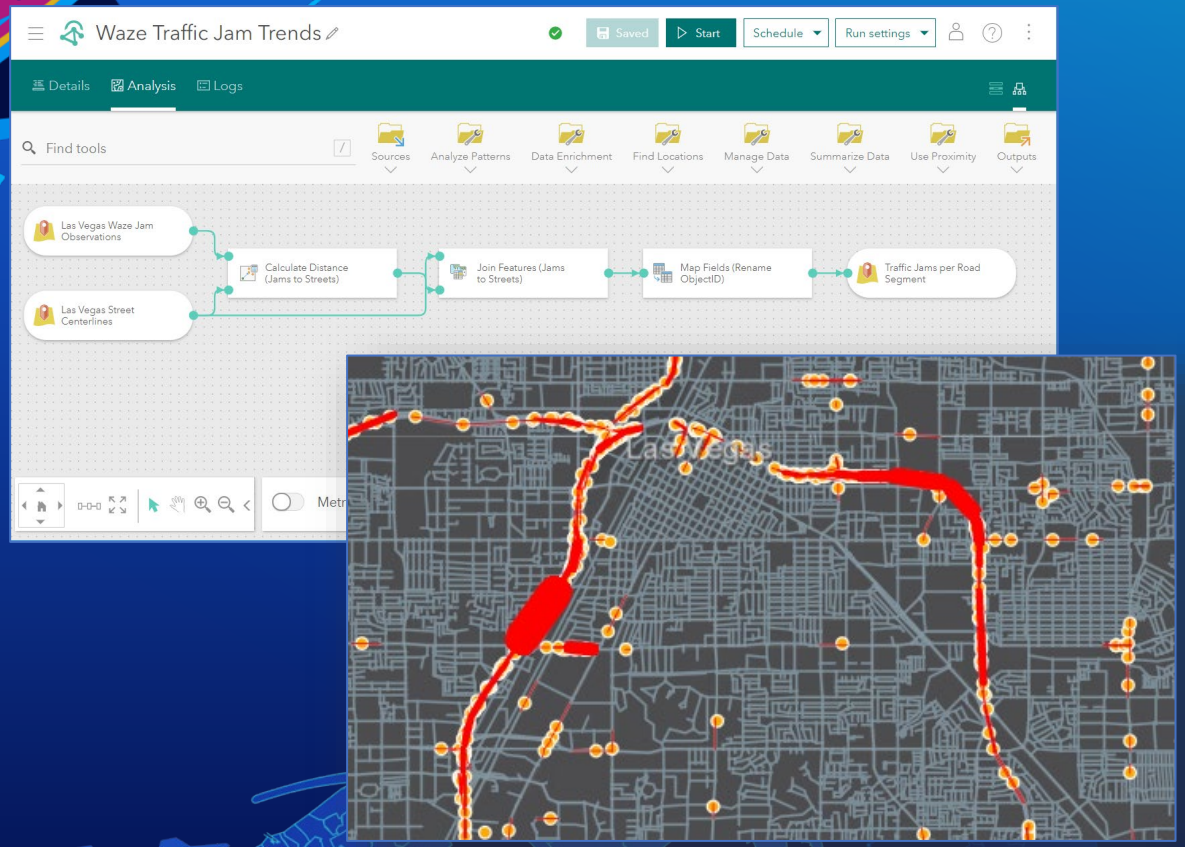
Formats

Delimited
JSON
Feature JSON
Parquet
GeoJSON
RSS
XML
Shapefile

End-to-end analysis

Evaluate incidents, trends, and patterns against any decision timeline





Big data analytics

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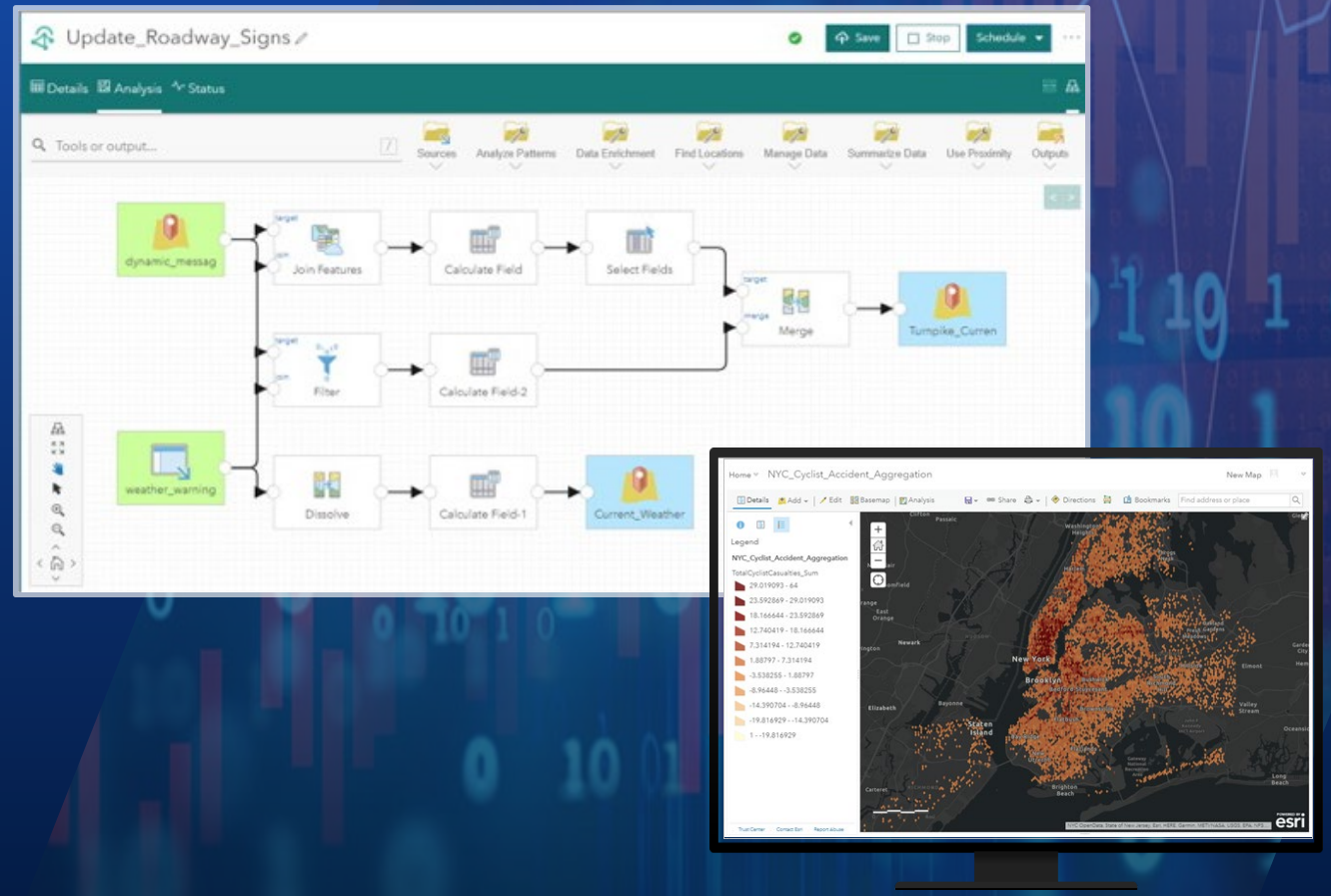
Big data analytics

Perform batch analysis on large volumes of data

- Input data sources
  - ArcGIS (feature layers)
  - Cloud IoTs (Azure Blob, AWS S3)
  - Web & Messaging (HTTP, RSS)
- Analytic tools
  - Analyze patterns
  - Find locations of interest
  - Manage, summarize, & enrich data
- Outputs
  - Store results (feature layers)
  - Alerts & notifications (email, text message)
  - Export data to cloud stores (Azure Blob, AWS S3)



Spatiotemporal analysis

Tools for transforming, enriching, & analyzing geospatial data

- Summarize Data
  - Aggregate Points
  - Join Features
  - Reconstruct Tracks
  - Summarize Attributes
  - Summarize Within
- Find Locations
  - Detect Incidents
  - Find Dwell Locations
  - Find Similar Locations
- Enrich Data
  - Calculate Motion Statistics
- Use Proximity
  - Create Buffers
  - Calculate Distance
  - Snap to Network
- Analyze Patterns
  - Calculate Density
  - Calculate Journeys
  - Find Hot Spots
  - Find Point Clusters
- Manage Data
  - Filter
  - Calculate Fields
  - Dissolve Boundaries
  - Overlay Layers
  - Select Fields
  - Map Fields
  - Project
  - Merge

Visualization

Live or historic observations

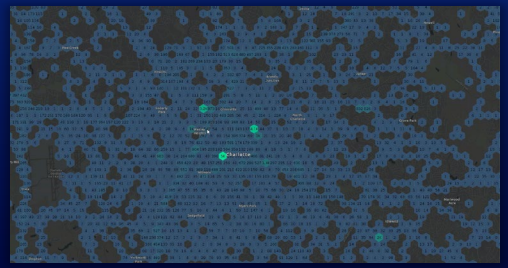
Real-Time Analytics

Big Data Analytics

Stream Layer

Feature Layer

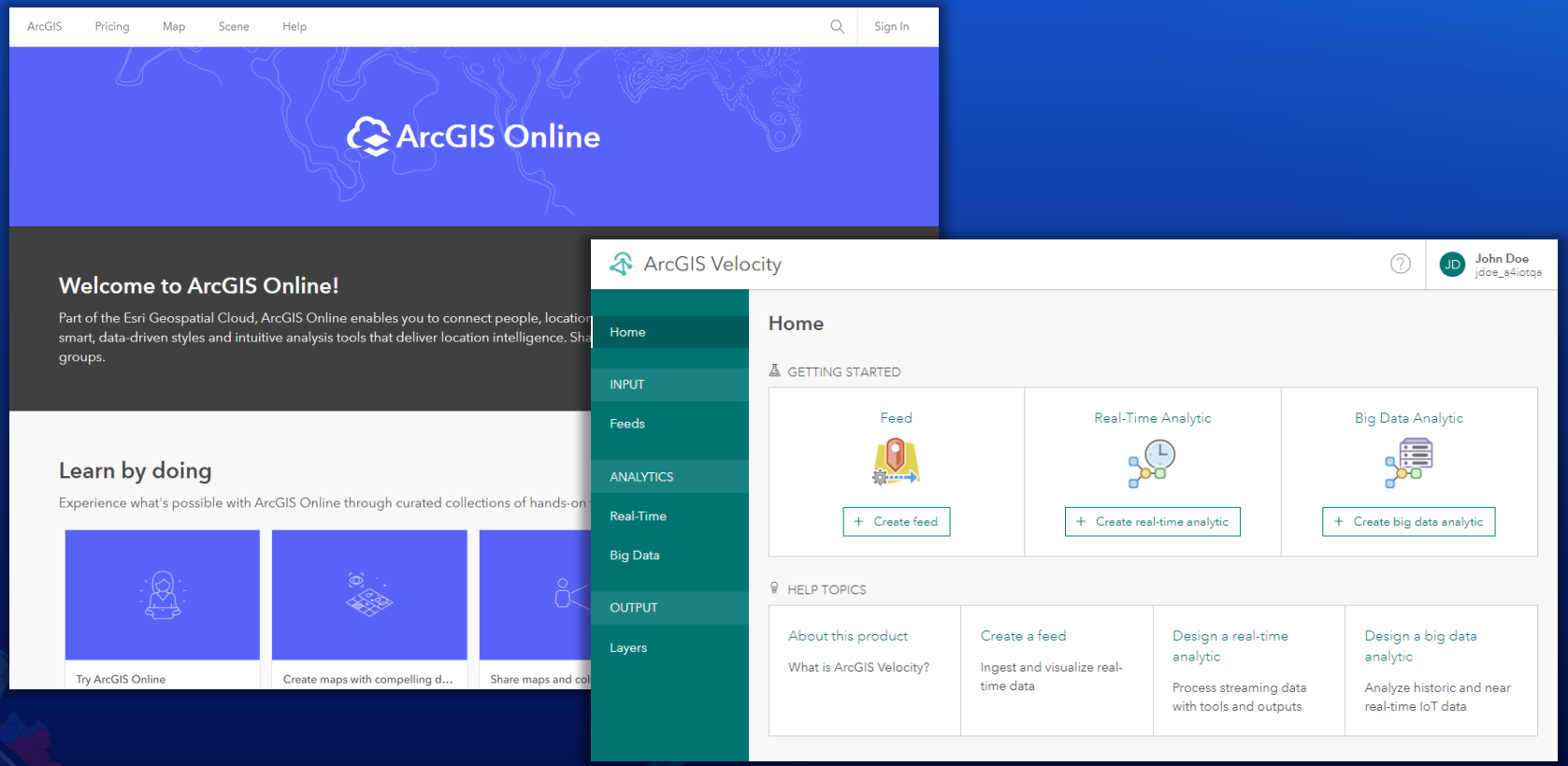
Map Image Layer



Wrap up

Licensing

Annual subscription on top of ArcGIS Online



Tiered Licensing

- Data velocity
- Storage capacity

Licensing

User types and access

Viewer

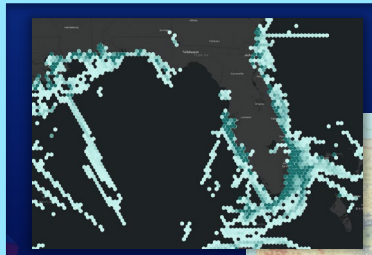
Editor

Field Worker

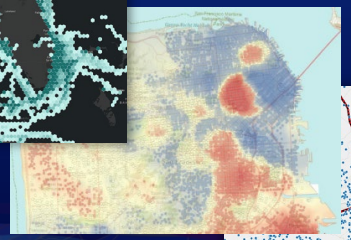
Creator

GIS Professional

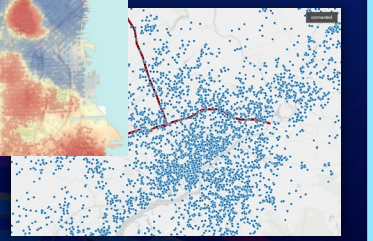
Layers & Feeds - all users



Map Image Layers

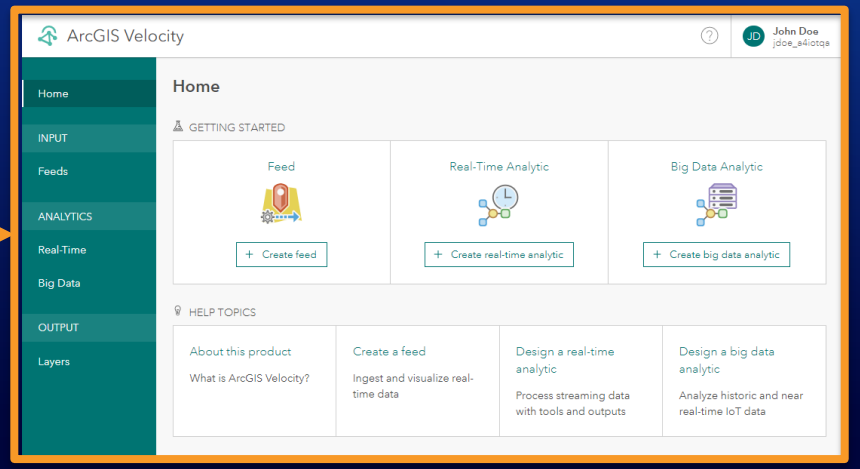


Feature Layers



Feeds & Stream Layers

App - Creators and GIS Pros



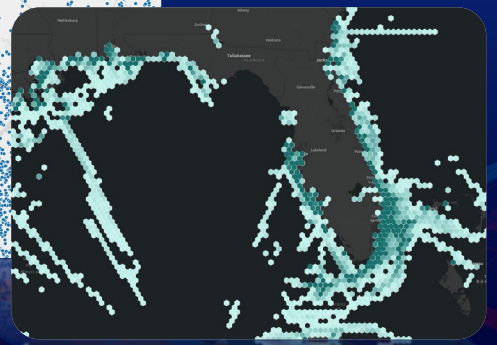
ArcGIS Velocity

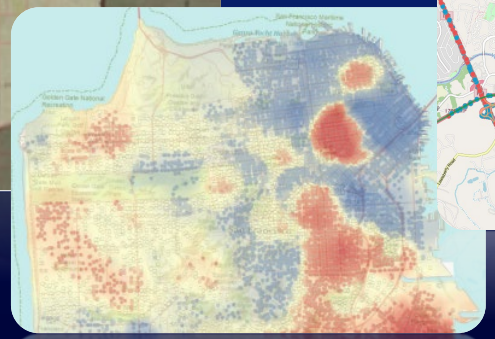
Real-time and big data capabilities for ArcGIS Online

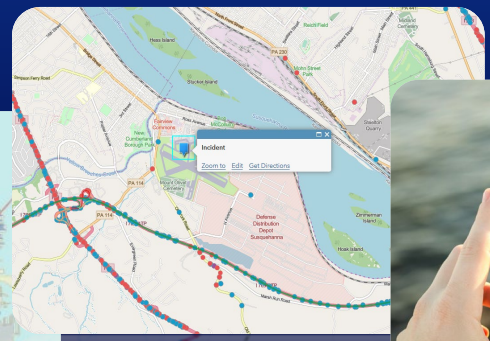
Ingest

Analyze

Alert



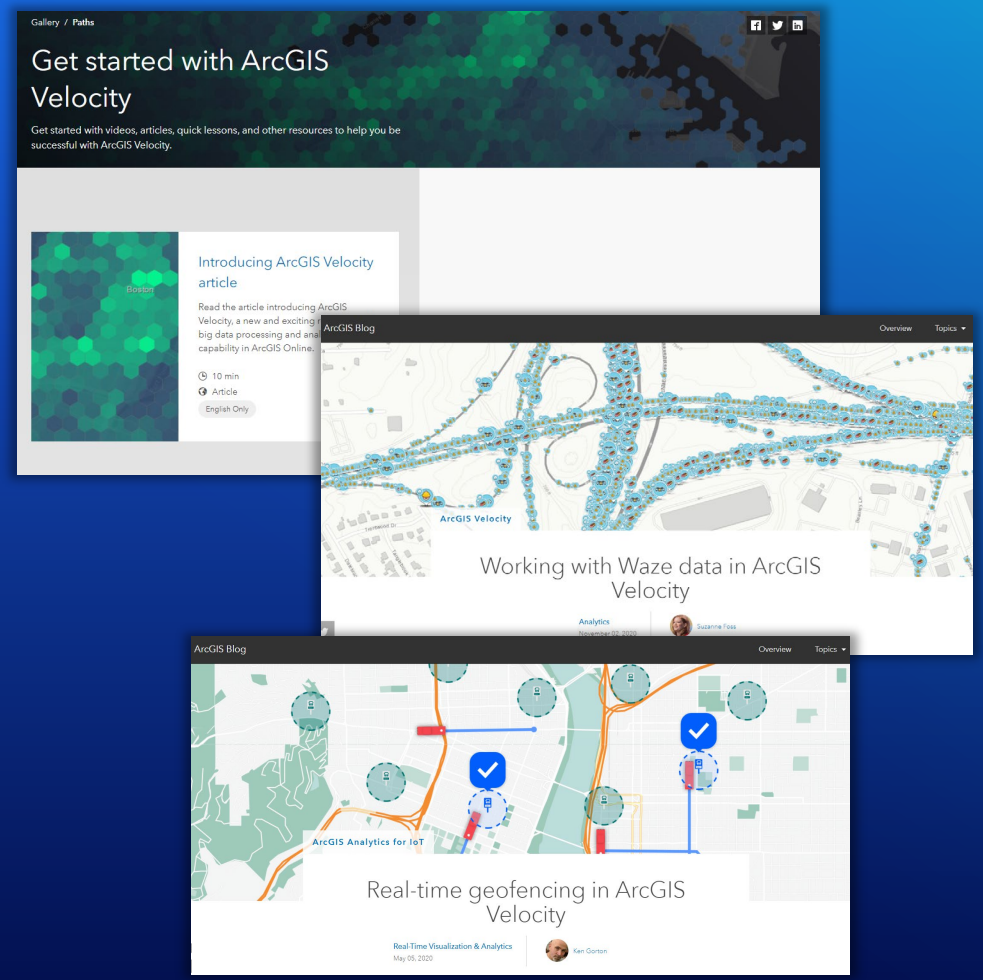




Resources

Tutorials, videos, and documentation

- Documentation
  https://doc.arcgis.com/en/iot
- Learn Path
  https://learn.arcgis.com/en/paths/get-started-with-arcgis-velocity/
- Blogs
  https://www.esri.com/arcgis-blog/?s=#&products=arcgis-velocity
- GeoNet **Updated !**
  https://community.esri.com/t5/arcgis-velocity/ct-p/arcgis-velocity



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