ArcGIS Velocity: An Introduction
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ArcGIS Velocity
Working with a
connected world
Real-time use cases

- Personnel Tracking
- Operations Monitoring
- Resource Optimization
- Asset & Entity Tracking
- Hazard & Threat Monitoring
- SCADA Integration
- Connected Cars
- Soil & Crop Monitoring
- Air Quality Monitoring
- Anomaly Detection
ArcGIS Velocity delivers a real-time framework
Managing and analyzing high volume and velocity data in support of mission critical applications

- Ingest
- Analyze
- Alert
Real-Time Visualization & Analytics

Integrating Sensor Networks and IoT

Supporting High-Velocity Data Streams
Tracking, Monitoring and Alerting

Situational Awareness
Analytics
Alerting

Collapsing the Time from Measurement to Decision Making

Cloud Native Service
Very Fast
High Volume
SaaS
<table>
<thead>
<tr>
<th>ArcGIS GeoEvent Server</th>
<th>ArcGIS Velocity</th>
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<tr>
<td>Enterprise ready</td>
<td>Cloud ready</td>
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<tr>
<td>On-premises, requires ArcGIS Enterprise</td>
<td>Software as a service (SaaS), requires ArcGIS Online</td>
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<td>Secure deployments in local or cloud environments</td>
<td>Kubernetes-based, cloud-native architecture</td>
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<td>Real-time data ingestion, processing, and analysis</td>
<td>High-speed, real-time data ingestion; processing; and analysis</td>
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<td>Extensible</td>
<td>Easy configuration and maintenance with built-in resiliency and failover</td>
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<td>Advanced real-time processing</td>
<td>Big data analysis</td>
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ArcGIS Velocity
Real-time and big data capabilities for ArcGIS Online

**Ingest**
Protocols, formats, data rates

**Analyze**
In real-time, near real-time, over time

**Alert**
Alert, actuate
ArcGIS Velocity
Leverage sensor and IoT data for geospatial reasoning

...connects to industry leading cloud IoT platforms, data lakes, and sensor vendor APIs
ArcGIS Velocity

...ingest, process, and analyze your real-time data with ArcGIS Online
Feeds
Ingest and visualize real-time data streams

• **Connect to data sources**
  - ArcGIS (Feature & Stream Layers)
  - Cloud IoTs (Amazon, Azure, Cisco)
  - Web & Messaging (HTTP, Kafka, RSS…)

• **Schema auto-discovery**

• **Is a type of stream layer**
  - Immediate display of new data

...discover and share real-time data streams as items in ArcGIS
Real-time analysis
Process and analyze real-time data streams
Real-Time Analytics
Real-Time Analytics
Process and analyze real-time data streams

• Input Sources
  - Feeds (one or more)
  - Static data sources (enrichment, joins)

• Analytic Tools
  - Build a pipeline of zero to many….
  - Analyze individual observations

• Outputs
  - ArcGIS Layers (Map & Feature)
  - Alerts & Notifications (Email, Actuations)

...generating alerts from and triggering actions to IoT devices in real-time
Input & output types
Supported types and formats

Feeds and data sources
- Feature Layer
- Stream Layer
  - HTTP Poll
  - Azure Event Hub
  - HTTP Receive
  - Azure Service Bus
  - Cisco Kinetic EFM
  - Connect Reveal
  - MQTT
  - Web Socket
  - Geotab

AWS IoT
RabbitMQ
Azure Blob Store
Simulator
AWS S3
Azure Cosmos DB

Outputs
- Feature Layer
- Stream Layer
  - HTTP Post
  - Amazon S3
  - RabbitMQ

Format
- JSON
- XML
- Delimited
- Feature JSON
- GeoJSON
- RSS
- Parquet
- Shapefile

Formats
- Azure IoT Hub
- Kafka
- Email
- Text Message
- Azure Blob Store
- HTTP Post
- gRPC (beta)
End-to-end analysis
Evaluate incidents, trends, and patterns against any decision timeline

Real-Time Analytics
- Feed
- Feature Layer
  - 100 events/sec → 9 million features/day

Big Data Analytics
- Near real-time
- Over time
Big Data Analytics
Big Data Analytics
Perform batch analysis on stored big data

• Input Sources
  - ArcGIS (Feature Layers)
  - Cloud (Amazon S3, Azure Blob)
  - Web & Messaging (HTTP, RSS…)

• Analytic Tools
  - Analyze Patterns
  - Find Locations
  - Manage, Summarize, Enrich Data

• Output results to one or more destinations

...big data analysis pipelines on-demand or scheduled for recurring execution
Spatiotemporal analysis

Tools for transforming, enriching, and 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
ArcGIS Velocity
Real-time and big data capability for ArcGIS Online

Ingest

Analyze

Alert
Q&A

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