Dynamic Situational Awareness
Through Developer Applications
Mission Focused Applications
Building Apps to support operations

Agile

Simple

High-Performance
GIS Simplifies Working With All Types of Data
Using Web Maps, Scenes, and Layers

A Common Language for integrating data from multiple sensors
Apps Are Bringing the Power of GIS to Everyone
Extending the Reach of GIS

Planning & Design
Visualization
Crowd Source data
Dynamic Briefings
Operational Dashboards

Statistical & Pattern Analysis
Field Collection

Across Organizations and Beyond
ArcGIS for Developers
ArcGIS Developer Platform | Extending GIS and Creating New Apps

- Improved Developer Program
- Supporting GIS, Enterprise, and Independent App Developers

- Java
- Swift
- .NET
- Qt
- Objective-C
- C+
- C#
- Kotlin
- QML

- Deployable Independently
- Dynamic Situational Awareness (DSA) Toolkit

- Pro Add-Ins
- Web
- Native Device Apps

- Pro SDK
- JavaScript API
- Runtime SDK

- ArcGIS
- Connected and Disconnected

- For Devices, Web, and Desktop

- Open

Supporting GIS, Enterprise, and Independent App Developers...
ArcGIS Is Open and Interoperable

### Open Standards and Formats

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### Direct Product Integration

- MS Office
- SQL Server
- SharePoint
- Azure
- Power BI
- Netezza
- SAP HANA
- Adobe Creative Cloud
- Jupyter Notebook
- Teradata
- R
- AWS
- Altibase
- Python
- Oracle
- Hadoop
- AutoCAD
- Revit
- PostgreSQL

### Open Software Architecture

- Open Data Access
- Open APIs & SDKs
- Open-Source Integration
- Extensible Architecture
- Embeddable

... Successfully Integrated into Thousands of Systems
ArcGIS APIs
ArcGIS APIs
For Building Apps With the Power of GIS

ArcGIS API for JavaScript

ArcGIS Runtime SDKs

- Leverage modern developer patterns
- Architected to take full advantage of the power of GIS
ArcGIS JavaScript API

- A modern JavaScript API for Web GIS
- Data driven visualization
  - Turn data into information
  - Feature Layer or Scene Layer
  - Where, What, How Much, and When
  - Smart Mapping
- Analytics - client or server side
  - Local geometry engine
  - Elevation API
  - Geoprocessing on the server
- Compelling apps with responsive widgets
  - Web first design principle
ArcGIS Runtime – A Native App Development SDK

- Supports 6 platforms
  - Android, iOS, macOS, Linux, Universal Windows Platform and Windows
- 6 APIs
  - .Net, Android, iOS, Java, macOS and Qt
- Allows you to select the development environment of your choice
  - Integrates with your solution
  - Makes you productive
- Your users benefit from the optimum solution
Why Build Native App?

- Only native apps can give the best performance
- Fully leverage device capabilities
- Access all peripherals via their native SDKs
- Best debugging experience
- Offline use of ArcGIS
Dynamic Situational Awareness
Example App for Developers
What is the Dynamic Situational Awareness Example App?

Complete open source example application

- **Example App** for developers writing solutions to meet Situational Awareness needs in “DIL” (Disconnected, Intermittent, and Low-Bandwidth) environments

- **Key Characteristics:**
  - Local Data (no reliance on server)
  - Location sharing over peer-to-peer network
  - Exploratory Analysis (Viewshed, Line of Sight)
  - Conditions and Alerts
  - Collaboration (reports, markup, share location)
  - 3D

https://developers.arcgis.com/example-apps/dsa-app-qt/
Dynamic Situational Awareness (DSA) Example App

ArcGIS Runtime 100.2.1 Qt

- DSA-Vehicle
- DSA-Handheld
- Simulator

- Basemap Picker
- Local Data
- Coordinate Conversion
- Viewshed/Line of Sight
- Alerts/Geofencing

- GeoPackage
- Send/Receive Location
- Send/Receive Markup
- Send/Receive Reports

- Exploratory Analysis
- Symbology
- GeoPackage
- Shapefile
- Dynamic Graphics Layer

V1.0 Released April 2018

Open Source

Example Apps

Tools

Runtime SDK
Key Capabilities
Local Data
Local Data

Working in a completely disconnected environment

- ArcGIS Runtime supports several local data formats:
  - GeoPackage
  - Shapefile
  - Mobile Geodatabase
  - ... (additional formats mentioned)

- Rasters can also be used as a source to the elevation surface

App Capabilities

- Layers and their visibility state are serialized for when app closes and reopens
- App includes Layer List Control to see name, toggle visibility, reorder and remove layers

Runtime API Used

- FeatureLayer (with URL to local file)
- RasterLayer (with URL to local file)
- LayerList Model (MVC pattern)
Real-time feeds

Peer-2-Peer SA
Real-time Feeds
“Messages” shared between team members in the field

• Receiving and Broadcasting message feeds over Peer-to-Peer network
• Examples of feeds:
  - Friendly Position Reports, Observation Reports, Sensor Observations, …
  - Simulated over UDP

App Capabilities

- Symbology (MIL-STD-2525C)
- Performance – Dynamic Graphics are optimized for performance on device
- Graphics from feeds can participate in other analyses

Runtime API Used

- Graphics Overlay (dynamic rendering mode)
- DictionaryRenderer (military symbology)
Exploratory Analysis
Viewshed & Line of Sight
Exploratory Analysis
GPU-based Viewshed & Line of Sight analysis

- **Uses the GPU of the device to calculate visibility analysis on-the-fly**
- *Exploratory*: visual only, using data & LOD rendered to screen (not conclusive)
- Two types:
  - “Location” - based on coordinate
  - “GeoElement” - tied to graphic or feature

**App Capabilities**
- Analysis Overlay List
- Analysis results can be attached to current location or existing feature or graphic

**Runtime API Used**
- AnalysisOverlay
  - LocationViewshed, GeoElementViewshed
  - LocationLineOfSight, GeoElementLightOfSight
Alerts and Conditions
Alerts & Conditions

Critical notifications

• Alerting on conditions/rules against the real time feeds
• Conditions are the rules that are always evaluated
  - Attribute
  - Spatial / GeoFence

App Capabilities

- Create Conditions
- View and manage Conditions
- View and manage Alerts

Runtime API Used

- GeometryEngine
- Graphics signal when attribute or geometry changed
Collaboration

Markup and Reports
Collaboration
Shared Situational Awareness

• Collaboration is key for situational awareness
  - Sharing markups and reports over P2P network

App Capabilities

- Simple sketch tool to draw and broadcast markups, and save as local overlay
- Wizard-driven tool to define an observation report and broadcast to others (P2P)

Runtime API Used

- FeatureCollectionLayer - easy to gather data and define an ad-hoc schema
- JsonSerializable toJson, fromJson to serialize and persist
- Graphics Overlay to draw
A complete mapping and analytics platform for developers

Sign Up for Free  Start Developing Your App
Mission Focused Applications
Building Apps to support operations

Agile

High-Performance

Simple

Defense Developers
Did you enjoy today’s session? Register for our upcoming series and continue to learn about the ways you can use web maps and apps in a collaborative environment to integrate data, sensors, and activities in real time.

May 30- Developing Apps for Any Mission

Aug 15- Military Symbology

Sep 19 - Build Analysis into Your Applications

Oct 17- Working with Offline Data
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