ArcGIS Runtime
An Introduction

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ESRI EUROPEAN DEVELOPER SUMMIT
Agenda

- Getting Started
- Solution building strategies
- Developing Apps to work with Web GIS
- Runtime SDKs and supported platforms
- Architecture
- Functionality
- Licensing and deployment
A complete mapping and analytics platform for developers

- Sign Up for Free
- Start Building Your App

High performance
Fast GPU accelerated drawing and client side analytics.

Easy to use
Integrate maps and geocoding into your app in just a few lines of code.

Private and secure
Host your data and apps securely in the cloud or behind your firewall.

Affordable pricing
Start for free and pay as you go for additional services.

Getting Started
John
ArcGIS Runtime Designed for Web GIS
Working with the GeoInformation Model – Maps and Layers

• The GeoInformation Model is the information model of WebGIS
• Content can be authored using online Map Viewer or ArcGIS Pro
  - Complex advanced visualizations easily created with Smart Mapping
  - Capabilities such as popups, bookmarks and slides supported
• The API for working with raw services is the same as content authored
  - No capabilities are lost
• Working with Maps, Scenes and Layers are more productive than the raw services
• Apps can be updated on the fly with new content via the maps they open
ArcGIS Runtime Designed for Web GIS
Working with the GeoInformation Model – ArcGIS Identity

- Users have a unique secure identity
- Content saved under user name
- Users can be assigned special privileges
- Users can share or keep content private
- Organize users, content and services
- Find, upload, share, configure, secure
Esri Apps and Your Apps Working Together
A Field Apps Example

- OSIsoft
- Operations Dashboard
- Geodecisions
- Pix4D
- Drone2Map for ArcGIS
- Survey123 for ArcGIS
- Collector for ArcGIS
- Trimble
- Leica
- BadElf
- Navigate
- ArcGIS for Desktop
- Workforce for ArcGIS
- Navigator for ArcGIS
ArcGIS Runtime SDKs
Supporting Native App Development

• Supports 6 platforms
  - Android, iOS, macOS, Linux, Universal Windows Platform and Windows
• 5 APIs
  - .Net, Android, iOS, Java 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
ArcGIS Runtime SDKs

Why Build a Native App?

- Only native apps give the best possible performance
- Fully leverage device capabilities
- Access all peripherals via their native SDKs
- Best debugging experience
- Offline use of ArcGIS
ArcGIS Runtime SDKs
An Architecture Designed to Maximize Performance and Reuse
ArcGIS Runtime SDKs
C++ Core has Advantages

- C++ core and hardware accelerated rendering offer best performance available
- Performance of C++ core is independent from API chosen
- Common conceptual model across all public APIs
- Capabilities the same across all APIs and devices*
- Public APIs can vary to conform to their platform norms

* Dependent on device support
ArcGIS Runtime SDKs
Working with Layers from Services

- Feature Layer
- Raster Layer
- Map Image Layer
- Tiled Layer
- Scene Layer
- Point Cloud layer
- Integrated Mesh Layer
- Vector Tile Layer
- Service Image Tiled Layer
- OGC services
  - WMTS, WMS, KML and WFS
- Rich symbology with smart mapping
- Layers are created from items or in code connecting directly to the service
ArcGIS Runtime SDKs
Layers from Local GIS Data

- Feature Layer with vector data
  - Mobile Geodatabase, GeoPackage, Shapefile
  - Read and write

- ENC Layer – S57 with S52 symbology

- Raster Layer
  - Mosaic dataset, GeoPackage,
  - Raster file formats: ASRP/USRP, CRF, DTED, GeoTIFF/TIFF, HFA, HRE, IMG, JPEG, JPEG2000, NITF, PNG, RPF, SRTM (HGT), USGS DEM
  - Apply raster renderers and raster functions

- Annotation Layer

- KML Layer
  - Full OGC KML 2.2 + extensions
  - Editable if nodes are not from a network link

- Mobile Map Packages
- Scene Layer Packages
- Vector Tile Basemaps
ArcGIS Runtime SDKs

Working with Maps

• Working with maps
  - Maps are a central API component
    - Build a Map, display it in a MapView
  - Maps are created from items or code

• Platform sharing of maps and layers
  - Share & consume maps from Portal, ArcGIS Pro or other apps
  - Share maps and layers in Mobile Map Packages

• Offline maps and layers for disadvantaged environments
  - Take maps and layers offline using on-demand or pre-planned workflows
Where Do Maps Come From?

- **Portal (web maps)**
  - Create with a PortallItem or URL

- **Pro (mobile maps)**
  - Access maps inside a Mobile Map Package

- **From disk (mobile maps)**
  - Create with a LocallItem or a Path

- **You!**
  - Create a map in code
  - Save to a portal
    - Web maps and mobile maps will be different portal item types
  - Save locally
ArcGIS Runtime SDKs
Offline Mapping Workflows

• Build everything up in code and raw data on the device
  + Provides most flexibility and data type options
  - Development intensive and less flexibility after deployment

• Author Maps and Scenes in ArcGIS Pro and share via Packages
  + Productive authoring experience with advanced cartographic options
  - Read only maps and data

• Author map for use within Online or Enterprise and take offline using on-demand workflow
  + Productive authoring experience with little overhead to support offline use
  + Supports data editing with sync
  - Must consider performance impacts when there are a large number of field users

• Author map for use within Online or Enterprise and take offline using on pre-planned workflow
  + Productive authoring experience with a small amount of upfront cost for defining offline areas
  + Supports data editing with sync
  ± Field areas are restricted to admin selected areas
ArcGIS Runtime SDKs
Working with 3D Content

- High performance on Desktops, laptops and mobile devices
- All 2D layers work in 3D
- Support for specific 3D content
  - Terrain
  - 3D features
  - Models
  - Integrated meshes
  - Point clouds
- Interactive analysis tools
  - Viewshed
  - Line of sight
  - Measure
Runtime 3D Mapping API

SceneView
Scene
Surface
Layer

shLayer
PointCloudLayer
SceneLayer
MapImageLayer
KMLLayer
ArcGIS Runtime SDKs

Analysis

• Works with services
  - Geoprocessing
  - Network analyst

• Local Engines
  - Geometry
  - Projection
  - Network

• Interactive 3D Analysis
Navigation

• Turn by turn voice commands
• Alerts for upcoming maneuvers
• Automatic re-routing when of route*
• Supports network services and Mobile Map Packages

* Not available when connected to ArcGIS Online Network Service
ArcGIS Runtime SDKs
Augmented Reality and Virtual Reality

- Developers want to use their authoritative GIS content and analytics across the mixed reality spectrum
- Critical needs for usability
  - Virtual reality needs high fidelity and responsive performance
  - Augmented reality needs positional accuracy
ArcGIS Runtime SDKs
Supporting Mixed Reality

• Released as part of 100.6
• Enhance existing ArcGIS Runtime SDKs
  - Integrated with the ArcGIS Platform
  - 3D already supported on all platforms/devices
  - Native apps able to access sensors/controllers
• Supporting smartphones
ArcGIS Runtime
Local Server

- Local server is a ‘mini’ ArcGIS server dedicated to one client App
  - Runs in the same security context as client App
- Supports Windows and Linux desktops
- Support for ArcGIS Desktop and ArcGIS Pro packages
- For advanced analytical workflows
- Useful when integrating with ArcGIS Desktop workflows
- Independent SDK
  - Works with .Net, Java and Qt SDKs
Functionality Review
John
**ArcGIS Runtime SDKs**

**Ultimate Performance**

- Device capabilities continue to grow
- Harnessing this power is critical for tomorrow's Apps
- Runtime core brings it all together
  - Display
  - Data access
  - Analytics
- Apps that use large data volumes updating in real-time are now possible
Deploying Apps using ArcGIS Runtime

Technical and Business Considerations

**Technical**
- Deploy runtime binaries and supporting resources (runtime core with API) along with your app and any supporting resources required by your app
- If using Local Server, build and deploy an appropriate Local Server deployment using the tools in the SDK

**Business**
- Revenue generating apps that use ArcGIS Online data or services require a commercial deployment license
- Review functionality and select license level required
- Chose the appropriate licensing method for your App
  - ArcGIS Identity
    - Apps that extend or compliment ArcGIS
  - Embedded license
    - Standalone apps
- Credit bearing services require credit plan
Deploying Apps using ArcGIS Runtime

License Levels

- **Lite**
  - View maps, scenes and layers from the platform, simple routing and place finding

- **Basic**
  - Simple feature editing (connected or disconnected), authoring maps, creating groups, sharing and navigation

- **Standard**
  - Local data access and Local Server

- **Advanced**
  - Direct connect to SDE, Mosaic datasets, advanced GP tools

- **Analysis Extension**
  - Available with Standard and Advanced levels
  - Spatial, 3D and Network Analysis tools
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