Building Applications with the ArcGIS Runtime SDK for WPF

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Agenda

- Introduction
- Functionality Highlights
- SDK
- Building the Map
- Query
- Editing and Geometry
- Spatial Analysis
- Recommended Programming Patterns
- Deployment and Licensing
ArcGIS is a Complete System
Managing and working with geographic information

- Online (Public or Private Cloud)
- Server (on Premises or Private Cloud)
- Desktop
- Mobile Devices
- Content

Many deployment options

- Visualize
- Create
- Collaborate
- Discover
- Manage
- Analyze

Cloud
Enterprise

Web
Mobile
Desktop
## Apps and SDKs

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<th>Windows Mobile</th>
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**Windows Mobile**
- Apps: ArcGIS, ArcGIS Explorer
- Runtime SDK: WPF, Java

**Windows/**
- Apps: ArcGIS
- Runtime SDK: .NET CF

**Windows Phone 7**
- Apps: ArcGIS
- Runtime SDK: Silverlight

**iOS**
- Apps: ArcGIS for iOS

**Android**
- Apps: ArcGIS
- Runtime SDK: Java

**Linux**
- Runtime SDK: Java
ArcGIS Runtime

- Set of Lightweight Components
- Exploit Performance of the Operating System
- Integrate With ArcGIS System
ArcGIS Runtime SDK

- Software Developer Kit for Building Focussed workflow Orientated GIS Applications
- Utilize the ArcGIS Runtime Components
- ArcGIS Runtime API, Samples, Doc, IDE Integration
Getting started

- Part of ESRI Developer Network (EDN)
  - Download from EDN website / DVD
- Install SDK
- Lays Down:
  - Central ArcGIS Runtime
  - API assemblies
  - Samples
  - Conceptual / API reference doc
  - VS 2010 / Blend 4 integration
Demo: The SDK
Map Control

- 2D display
- Displays Layers
- Navigation via Mouse, Keyboard Shortcuts or Touch
- Behaviours and Actions
  - e.g. ConstrainExtentBehavior, MeasureAction
Plan map content

• Map Control

• Live / Temporary Data
  - Vehicles, events, query results…

• Operational Data
  - Facilities, zones, networks…

• Basemap
  - Imagery, topography…
Demo: Add Layers to the Map
Accelerated Display

- High Performance DirectX Map Rendering Engine
- Supports all Tiled and Dynamic Layer Types
- Supports Feature & Graphics Layers with ESRI Symbols
  - SimpleMarker, PictureMarker, SimpleLine, SimpleFill
  - No custom symbols defined via control templates
- Default Rendering Engine is Standard WPF
  - Apps built with existing 2.X ArcGIS API for WPF will continue to work
Accelerated Display

- High Performance DirectX Map Rendering Engine
  - Enable for all layer via map property

  ```xml
  <esri:Map x:Name="_mapControl" UseAcceleratedDisplay="True">
    _mapControl.UseAcceleratedDisplay = true;
  </esri:Map>
  ```

- Enable for Specific Set of Layers via AcceleratedDisplayLayers

  ```xml
  <esri:AcceleratedDisplayLayers>
    <esri:ArcGISTiledMapServiceLayer ID="arcGISTiledMapServiceLayer" Url="http://services.arcgisonline.com/ArcGIS/rest/services/World_Topographic_Map/MapServer" />
  </esri:AcceleratedDisplayLayers>
  ```

  ```javascript
  let acceleratedDisplayLayers = new AcceleratedDisplayLayers();
  acceleratedDisplayLayers.ChildLayers.Add(_baseMap);
  _mapControl.Layers.Add(acceleratedDisplayLayers);
  ```
Demo: Accelerated Display
Why Do We Need GPS Support?

• Computers Today are More Mobile Than Ever
  - Small rugged laptops to tablets
• Solutions are Increasingly Taking Advantage of This
  - Tracking
  - Inspections
  - Data Collection
• Location of the Device is Important
The GPS Layer

- A Graphics Layer that can be Added to a Map
- Displays Data from a GeoPositionWatcher
- From ESRI.ArcGIS.Client.Toolkit.DataSources
- Allows You to Change the Look and Feel of the Symbol Used to Display Position
- Support NMEA Sentences
Querying Data

- Identify Operations
- Attribute and Spatial Queries
- Geocoding and Reverse Geocoding
- Handled by Specific Task Classes in the ESRI.ArcGIS.Client.Task Namespace
- Similar Programming Pattern for Each Task
  - Define input Parameters
  - Execute task asynchronously
  - Process and display results
Demo: Querying Data
Editing Features

- **ArcGIS Runtime Editing**
  - Data in a Map Package
  - Features from a Feature Service
- **Edit in Connected and Disconnected Mode**
- **ArcGIS Runtime SDKs Include:**
  - UI controls / widgets for editing
  - Fine-grained API components
- **Edit Environment Authored in ArcGIS for Desktop**
Runtime Geodatabase Editing Options

- **Permanent Edits to RDBMS**
  - RDBMS referenced by Map Package

- **Permanent Edits to RDBMS**
  - RDBMS via *ArcGIS for Server* Feature Service

- **Permanent Edits to FGDB**
  - FileGDB referenced by Map Package

- **Temporary Edits or What-If Scenarios**
  - FileGDB within Map Package
Using Geoprocessing in the Runtime

- Geoprocessing is the Source of Advanced GIS Analysis in the ArcGIS Runtime
- Connected – ArcGIS Server’s and ArcGIS Online’s Published Services
- Disconnected – Geoprocessing Packages (GPKs)
Geoprocessing Demo
User Experience – Asynchronous Patterns

- API has an Asynchronous Programming Model
- Application Responsiveness is Paramount
- Async Lets You:
  - Perform time-consuming tasks “in the background”
  - Execute multiple operations simultaneously
  - Wait for resources to become available without “hanging” your application
- Event Based Async Pattern
  - ExecuteAsync(…) / ExecuteCompleted
- Synchronous Methods Available but Should be Reserved to Special Cases e.g. Console Application
Preparing to Deploy

- License the Application With an ArcGIS Runtime Deployment License String
  - Take note of ArcGIS for Desktop analyser warnings
  - Ensure it’s the correct level and includes any extensions
- Create an ArcGIS Runtime Deployment
- Select the Client Assemblies Required
  - in the build output directory
Deployment

Deploy Only What Your Need

- **Core**
  - 2D Mapping
    - Full ArcGIS cartographic model
  - Enterprise and File Geodatabases
    - Simple feature & attribute editing
  - ArcGIS Server services
- **Additional Data Formats (SDE Direct Connect, Rasters, Shapefile, …)**
- **Geoprocessing**
  - Geocoding
  - Python scripting
  - Additional Projection Support
Demo: Deploying an App
Where does the ArcGIS Runtime fit in?

ArcGIS Runtime

ArcGIS Desktop

ArcGIS Engine

Map Objects

ArcGIS Explorer

ArcReader
Steps to evaluate UC sessions

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  OR
- Search for session

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• Thank you for attending
• Have fun at UC2012
• Open for Questions

• Please fill out the evaluation:

  www.esri.com/ucsessionssurveys

  First Offering ID:  583
  Second Offering ID:  2035
Please fill in the session survey