Building Applications with the ArcGIS Runtime SDK for WPF
Part I

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Agenda

• Part 1
  - Overview
  - Functionality highlights
  - SDK
  - Building the Map
  - Query

• Part 2
  - Deployment and licensing
  - Editing and geometry
  - Spatial Analysis
  - Recommended programming patterns
  - The ArcGIS Runtime architecture
  - Release plan and roadmap
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
Functionality Overview
Functionality Overview

- Mapping
- GPS
- Query
- Geocoding
- Editing
- Geoprocessing

...Determines deployment size and licensing
Getting Started
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

- Start Menu
- Samples
- Documentation
- IDE Integration
- Resource Center
The ArcGIS Runtime API for WPF
## ArcGIS Runtime API for WPF

<table>
<thead>
<tr>
<th>Assembly (ESRI.ArcGIS…)</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>.Client.dll</td>
<td>ArcGIS Runtime initialization&lt;br&gt;Visible core controls&lt;br&gt;ArcGIS for Server layer types&lt;br&gt;Local tiled layer&lt;br&gt;Graphics components&lt;br&gt;Symbols&lt;br&gt;Tasks</td>
</tr>
<tr>
<td>.Client.Local.dll</td>
<td>Local layer types&lt;br&gt;Local service management&lt;br&gt;Runtime Local Server management&lt;br&gt;GPS device support</td>
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## ArcGIS Runtime API for WPF

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<thead>
<tr>
<th>Assembly (ESRI.ArcGIS...)</th>
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<tbody>
<tr>
<td>.Client.Toolkit.dll</td>
<td>UI controls to support map navigation, layer interaction, editing</td>
</tr>
<tr>
<td>.Client.Toolkit.DataSources.dll</td>
<td>Common additional datasources inc. WMS, WMTS, GeoRSS, OSM</td>
</tr>
<tr>
<td>.Client.WebMap.dll</td>
<td>Components for working with ArcGIS.com WebMaps</td>
</tr>
<tr>
<td>.Client.Bing.dll</td>
<td>Classes for working with the Bing services (need to obtain key)</td>
</tr>
<tr>
<td>.Printing.dll</td>
<td>Support for working with the ExportWebMap task in ArcGIS for Server 10.1</td>
</tr>
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</table>
Building the Map
Map Control

• 2D display
• Displays a set of predefined layer types
• 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...
Tiled Basemaps

- A visual context for operational data
- Seamless / continuous data
  - E.g. Topography, Imagery, Streets
- Entire map pre-rendered as tiles at defined scales
- Fast performance not dependent on detail or complexity of map
Dynamic operational layers

- Map image dynamically rendered from data
  - Per request basis
  - Define extent, visible layers, symbology, datasource

- Can be reprojected on the fly based on the requested spatial reference
Graphics layers

- Graphics layers for display of temporary features
  - Vehicles, events, query results, user interaction, GPS…
- Manipulate geometries
- Set attributes
- Symbolize
- Graphics are in memory on client
  - Performance dependent on number and complexity of features
  - Use Accelerated Display…
New 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

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

- Enable for specific set of layers via AcceleratedDisplayLayers group layer

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

```
AcceleratedDisplayLayers acceleratedDisplayLayers = new AcceleratedDisplayLayers();
acceleratedDisplayLayers.ChildLayers.Add(_baseMap);
_mapControl.Layers.Add(acceleratedDisplayLayers);
```
Demo: Add Layers to the Map

- Tiled
- Dynamic
- Feature
- Graphics
- 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
Demo: GPS
Querying Data
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
ArcGIS Runtime
vs.
ArcGIS Engine & MapObjects
### Core Benefits

<table>
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<tr>
<th>Feature</th>
<th>ArcGIS Runtime</th>
<th>ArcGIS Engine</th>
<th>Map Objects</th>
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<tr>
<td>Simple Object Model</td>
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<tr>
<td>Accelerated Display</td>
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<tr>
<td>Simple Licensing Model</td>
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<td>Geodatabase Read/Write</td>
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<td>ArcGIS Server Services</td>
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<td>Support Rasters</td>
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<td>Utilize Geoprocessing</td>
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<td>Support ArcMap Cartography</td>
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<td>Labelling</td>
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<td>Annotations</td>
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<tr>
<td>Symbols &amp; Styles</td>
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<td>Side by Side SDK and Deployment</td>
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<td>Deploy just what you need</td>
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<td>3D Display</td>
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Where does the ArcGIS Runtime fit in?

ArcGIS Runtime

ArcGIS Desktop
ArcGIS Engine
Map Objects
ArcGIS Explorer
ArcReader
Please fill in the session survey