Agenda

• Introduction
• The SDK:
  - What you get
  - What you can do
• Map and layers
• Let’s build an app that is:
  - Location aware
  - Does geocoding
  - Does routing
• What’s next
ArcGIS Runtime

• Family of SDKs for multiple platforms
  - Consistent capabilities
• Native to the platform
  - For building great apps
• Lightweight and fast
• Powerful
• Easy
Part of the ArcGIS platform

- ArcGIS Online / Portal
  - Maps, services, content and Organization branding

- ArcGIS for Server
  - Services

- ArcGIS for Desktop
  - Packages
SDK Platforms

- **Android 10.1.1**
  - Java/Android

- **JavaSE 10.1.1**
  - Java
  - Win/Linux

- **QT 10.2 BETA**
  - C++
  - Win/Linux

- **iOS 10.1.1**
  - Objective-C
  - Cocoa
  - Touch

- **OS X 10.2 BETA**
  - Objective-C
  - Cocoa

- **Windows Mobile 10.1.1**
  - .NET

- **WPF 10.1.1**
  - .NET/XAML

- **Windows Phone 10.1.1**
  - .NET/XAML

- **Windows Store 10.2 BETA**
  - .NET/XAML

Core Runtime
Runtime form factors

Desktop
- OS X
- WPF

Phones and tablets
- Windows Store
- Windows Mobile
- iOS
- Android
- Windows Phone

Embedded
- QT
- JavaSE
- Windows Mobile
- Windows Phone
ArcGIS Runtime SDK for Java

- Build native apps for Windows and Linux
  - Windows 8 / 7 / Vista / XP, Ubuntu, RedHat
  - 32 and 64 bit Windows, 64 bit Linux*
- Java SE API, uses Swing as GUI toolkit
- Eclipse plugin (Indigo, Juno)
- Part of the ArcGIS Platform for Developers

* 32 bit Linux coming at 10.2 release!
10.1.1 Release out now (January 2013)

- API developed closely with Android SDK
- Functionality in line with other Runtime SDKs

• Get it:
  - EDN subscription

• Get help:
  - Concept documentation, API Reference,
  - Forums

• Give feedback / collaborate:
  - Forums, Ideas site, sessions
  - Twitter: follow @ArcGIS_Runtime
What you get

- The SDK includes:
  - Eclipse plugin (Indigo, Juno)
  - Set of jars to code against
  - Open-source toolkit (mainly UI components)
  - Runtime tools: license / deploy / debug
  - Concept documentation, API reference
  - Tons of samples
What you can do

• Mapping
• Searching (Query, Find, Identify, Geocoding)
• Geometry engine
• GPS
• Network Analysis (Routing, Service Areas, Facilities)
• Editing
• Spatial Analysis (Geoprocessing)
• Advanced Symbology

Local and Online

…Functionality determines deployment size and licensing
Map and Layers

- **Live Data**
  - Graphics layers

- **Operational Data**
  - Dynamic layers / Feature layers
  - Map services / Map packages

- **Basemap**
  - Tiled layers

- **Map**
Map

- **Spatial Reference (SR)**
  - Map SR determined by first layer in map (basemap)
  - Subsequent layers reprojected to the map SR

- **Extent**
  - Envelope in spatial ref coordinates
  - Set initial extent on ‘mapReady’ event

- **Layers**
  - Collection of layer classes with different behaviours
  - Mix and match layer types as required
  - Listen to ‘layerInitializeComplete’ events
Layers

• Add layers to a map’s layer list:

```java
jMap.getLayers().add(Layer);
```

• Same pattern for all layers, local and online
Events – map & layer

• On a Layer: Listen to layer initialization events
  - using a LayerInitializeCompleteListener
  - tells you when/if layer is ready to use

• On a JMap: Listen to map events
  - using a MapEventListener
  - mapReady tells you basemap and spatial reference set, map is ready to use

• On a LayerList: Listen to layerAdded/Removed events
  - using a LayerListEventListener
  - tells you when one or more layers added/removed from map
Map & Layers
Elise Acheson
Web Maps

- Open via web map ID, user credentials:
  - get ID from URL
- Retrieve web map via Portal API

- Create a WebMap instance then initialize the web map:
  - webMap.initializeMap(jMap);
- Get a JMap loaded with all the web map’s layer
  - JSON of web map passed to client API, displays the layers according to order, rendering info, popup info, etc.
- More and more functionality being added to web maps
Tiled Layers

```json
},
"spatialReference": {
  "wkid": 102100
},
"singleFusedMapCache": true,
"tileInfo": {
  "rows": 256,
  "cols": 256,
  "dpi": 96,
  "format": "JPEG",
  "compressionQuality": 90,
  "origin": {
    "x": -20037508.342787,
    "y": 20037508.342787
  },
  "spatialReference": {
    "wkid": 102100
  },
  "lods": [
    {
      "level": 0,
      "resolution": 156543.033928,
      "scale": 591657527.591555
    },
    {
      "level": 1,
      "resolution": 78271.5169639999,
      "scale": 295828763.795777
    },
    {
      "level": 2,
      "resolution": 39135.7584820001,
      "scale": 147914381.897889
    },
    {
      "level": 3,
      "resolution": 19567.8792409999,
      "scale": 73957190.948944
    },
    {
      "level": 4,
      "resolution": 9783.93962049996,
      "scale": 36978595.474472
    }
  ]
```

Dynamic Layers

```json
{
    "currentVersion": 10.11,
    "serviceDescription": "This map contains sample census data of the United States. This service presents various population statistics from Census 2000, including total population, population density, age distribution, and more. The map service presents statistics at the state, county, and city levels.

This is a sample service hosted by ESRI, reserved the right to change or remove this service at any time and with notice.

"copyrightText": "US Bureau of the Census: http://www.census.gov",
"supportsDynamicLayers": true,
"layers": [
    {
        "minScale": 0,
        "maxScale": 0,
        "units": "esriDecimalDegrees",
        "supportedImageFormatTypes": "PNG32, PNG24, PNG, JPG, DIB, TIFF, EMF, PS, PDF, GIF, SVG, SVGZ, BMP",
        "documentInfo": {
            "Title": "Census",
            "Author": "ESRI",
            "Comments": "This map contains sample census data of the United States. This service presents various population statistics from Census 2000, including total population, population density, age distribution, and more. The map service presents statistics at the state, county, and city levels. This is a sample service hosted by ESRI, reserved the right to change or remove this service at any time and with notice.

"category": "",
"antiAliasingMode": "None",
"textAntiAliasingMode": "Force",
"Keywords": "Census"

"capabilities": "Data, Map, Query",
"supportedQueryFormats": "JSON, AMF",
"maxRecordCount": 1000,
"maxImageHeight": 2048,
"maxImageWidth": 2048"
    }
]
}
```
Feature Layers

```json
{
  "currentVersion": 10.11,
  "id": 1,
  "name": "Police",
  "type": "Feature Layer",
  "description": "",
  "copyrightText": "",
  "defaultVisibility": true,
  "editFieldsInfo": null,
  "ownershipBasedAccessControlForFeatures": null,
  "syncCanReturnChanges": false,
  "relationships": [],
  "isDataVersioned": false,
  "supportsRollbackOnFailureParameter": true,
  "supportsStatistics": true,
  "supportsAdvancedQueries": true,
  "geometryType": "esriGeometryPoint",
  "minScale": 100000,
  "maxScale": 0,
  "extent": {
    "xmin": -117.217990074,
    "ymin": 34.0388377500001,
    "xmax": -117.17379999999998,
    "ymax": 34.072963637999976,
    "spatialReference": {
      "wkid": 4326,
      "latestWkid": 4326
    }
  },
  "drawingInfo": {
    "renderer": {
      "type": "simple",
      "symbol": {
        "type": "esriPMS",
        "url": "43d612d8bea7b5b0db952a32d0a8023",
      }
    }
  }
}
```
Location Awareness (GPS)

- **Basic:** GPSLayer, extends GraphicsLayer
  - live data (via serial port) or from file (raw NMEA data)
  - customize symbology

- **Advanced:**
  - implement a GPSEventListener
  - create a GPSWatcher (File* or SerialPort*) using your listener
  - add location (track points, current location, trail) graphics to a GraphicsLayer
Location Awareness (GPS)

Elise Acheson
Geocoding

- Geocode: enter address, get location coordinate
- Reverse Geocode: enter location, get address

- Create a Locator instance from a geocode service via URL
- Options – sync and async for each of:
  - geocoding: `locator.addressToLocations()`
  - reverse geocoding: `locator.locationToAddress()`
  - batch geocoding: `locator.batchAddressToLocation()`
  - single-line geocoding: `locator.find()`
Geocoding
Elise Acheson
Routing

• Network Analysis tasks added at 10.1.1:
  - routing
  - find service areas
  - find closest facility

• Local routing done via geoprocessing
  - create a geoprocessing package (gpk) in Model Builder
  - tutorial (ModelBuilder and Java app) online on Resource Center
Routing
Elise Acheson
What’s coming for Runtime…

• 10.2
  - Offline map use
    - Enhanced productivity offline
    - Network/geocode/search
  - Performance
    - static/dynamic modes for graphics layers
  - Security (OAuth, SAML)
  - Simplification of APIs
  - New developer site (with better doc system)

• Beyond
  - Offline analysis
  - Local data support: Raster and Vector
  - 3D
Questions?

Offering ID for feedback on session is 277