Developing Mapping Applications
Runtime SDK For Android
Dan O'Neill & Will Crick
Whos who

What do you do?
What do we do?
What it's all about

Building a mapping app using ArcGIS for Android SDK
- Levering the ArcGIS platform

- Runtime SDKs vision
- What's new and noteworthy in 10.1.1 (that helps us build a mapping app)
- What is a mapping app?
- Building an app
- Future stuff
- Q & A
ArcGIS Runtime SDK for Android

- v10.1.1. - released Jan 2013
  - recognise the number and date?
- What it included:
  - Wrap around
  - Routing tasks
  - New layers WMS, OSM layers, KML, CSV from webmaps
  - Find task
  - Time aware layers
  - Highlight features & graphics Z order
  - PKI security
  - Developer popups
  - New Geocode service (find method)
  - Online samples
  - Javadoc
  - Android 2.3+ only
The Runtime story
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
Runtime form factors

Desktop

Phone and tablets

- iOS
- Android
- Windows Phone
- Windows Mobile

Embedded

- OS X
- WPF
- Qt
- JavaSE
- Windows Store
- Windows Mobile
- Windows Phone
Design Patterns

What is a mapping app? ArcView right?
Map centric apps

Map first

What map do you open and how does it look?

What tools?

How present those tools?
Toolbar?
Default active tools?
Maps as app navigation

- Part of the app screen flow/navigation
- Allows access to other screens
- Focused toolset
Map-less apps

Use should never know

Tasks run in background

Threading; don’t interrupt their flow
Maps as context

- Shows related information
- Map behavior based on information changes
- Limited tools/map navigation (no distractions)
An Android mapping app
How to…
A mapping app

- Google maps replacement for your organization
  - Open secure maps and layers
  - Turn on GPS
  - Switch basemaps
  - Geocode
  - Route
  - Search for features
Creating a map

- Use a webmap (author in ArcGIS Online)
  - Layers/popups/overides
- Handle load events
- Security

```java
OnWebMapLoadListener webmapListener = new OnWebMapLoadListener() {

    @Override
    public MapLoadAction<UserCredentials> onWebMapLoadError(…, UserCredentials credentials) {
        if (error instanceof EsriSecurityException) {
            UserCredentials creds = new UserCredentials();
            portal.fetchPortalInfo();
            map.enableWrapAround(true);
        }
    }
};
```

- Get associated portal info
  - If required
    ```java
    portal.fetchPortalInfo();
    ```
- Turn on wrap around
  ```java
  map.enableWrapAround(true);
  ```
Switch Basemaps

• **Widget Approach**
  • Query Basemap Gallery Group
  • Set search to public or organization
  • Return a list of basemaps as webmaps
  • Sort returned list

• **Map Layer Approach**
  • Add service URL as basemap layers
  • Set visibility to off, leave opening basemap on
  • Create an options menu
  • Toggle visibility on selection
Switch Basemaps Portal

```java
// fetch portal info
PortalInfo portalInfo = portal.fetchPortalInfo();

String basemapGalleryGroupQuery = portalInfo
    .getBasemapGalleryGroupQuery();

PortalQueryParams portalQueryParams = new PortalQueryParams(  
    basemapGalleryGroupQuery);

// this is very important, you want to allow
// searching public for basemaps
portalQueryParams.setCanSearchPublic(true);

PortalQueryResultSet<PortalGroup> results = portal  
    .findGroups(portalQueryParams);
List<PortalGroup> basemapGroups = results.getResults();

if (basemapGroups != null && basemapGroups.size() > 0) {
    queryParams.setCanSearchPublic(true);
    queryParams.setLimit(15);
    String groupid = basemapGroups.get(0).getGroupId();
    queryParams.setQuery(PortalItemType.WEBMAP, groupid, null);
    queryParams.setSortField("name").setSortOrder(  
        PortalQuerySortOrder.ASCENDING);
    PortalQueryResultSet<PortalItem> queryResultSet = portal  
        .findItems(queryParams);
    itemResults = queryResultSet.getResults();
```
Adding GPS

• Get LocationService from MapView

```java
LocationService ls = map.getLocationService();
ls.setAutoPan(false);

// Do some logic to get fixed GPS

ls.start();
```
Dans fab mapping app

Dan O’Neill
Adding Popups

Will Crick
Popups?

- Configure your information displays more easily
- Uses ArcGIS properties
- Author in Webmap OR define yourself as a developer (see Best Development Practices and Patterns Using ArcGIS Runtime SDK for Android demo theatre – Weds 2.30pm)

- P.s. – Yes, they changed at 10.1.1, sorry, but for the better
Popups workflow

- Get PopupInfo from layer (all types of ArcGIS layer)
- Get Graphics from layers using a QueryTask
  - Scale, visibility, layer type etc…
  - Will be made easier at next release!
- Create a Popup using Graphic and PopupInfo
- Add Popup to PopupContainer
- Show PopupContainer (in dialog, view or activity)

- NOTE: Customize PopupContainerView to add your own buttons etc (extends LinearLayout)
Popup demo

Will
ArcGIS Geocoding

• ArcGIS has a new Geocode service: route.arcgis.com
  • Global coverage
  • Improving every month

• Locator uses this by default

• New find method – address and POI search

• Allows point and radius params
  • Results in radius are promoted
  • Sorted by distance from point
  • Results outside of radius still returned
Geocode workflow

• Workflow
  • Collect user input
  • Set up LocationFindParameters

```java
LocatorFindParameters findParams = new LocatorFindParameters(address);
findParams.setDistance(distance);
findParams.setLocation(pt, sr);
```

• Call find method using Locator.find() method
  • In background thread

```java
results = locator.find(params[0]);
```
Geocode demo

PlaceSearch
Routing

Dan
ArcGIS Routing

• ArcGIS has a new routing service!
  • Global
  • Improving every month

• Requires subscription (uses credits)
  • Must have credentials to access
Routing workflow

- Allow user to provide destination (GPS is start)
- Set stops
- Call RoutingTask.solve()
- Display route on the map
- Get directions and display to user

Note: Android has great text to speech, try it out!
Routing demo

Dan
Wrap up

• Used ArcGIS to building a mapping app for your Organization
  • Opened a webmap
  • Provided a list of alternative basemaps
  • Used popups for displaying information
  • Provided geocoding
  • Provided routing

• Who needs google maps? (Apple do)
Things of interest in 10.2

- Simplification of API
  - Use basemaps
  - Create popups
  - Add graphics to the MapView
    - Default callout & Popup
  - Sketch Layer (maybe J )
Other stuff

- Other sessions
  - Best Development Practices and Patterns Using ArcGIS Runtime SDK for Android demo theatre – Weds 2.30pm
  - Implementing Analysis, Editing, and Offline Applications with ArcGIS Runtime SDK for Android – Weds 4pm
  - Road Ahead for ArcGIS Runtime SDKs – Thurs 10am
Q & A