OVERVIEW

• Basics
• Maps & Layers
• Tasks
• Routing / Graphics
• Conclusion
INTRODUCTION

- Android SDK V1.0 released in December 2011
- latest release V1.1.1 released 24th May 2012
- Java based
- Eclipse plugin with a couple of examples
- Emulator support in the newest version
WHAT DOES THE API INCLUDE?

- **Maps and Layers**
  The API supports display of both dynamic and cached (tiled) map services.

- **Tasks**
  Common GIS tasks such as query, search and identify of features, finding addresses and places...

- **Graphics**
  You can enhance your applications by allowing users to draw graphics or by providing informational popup windows
MAPS & LAYERS

Building layer

Room layer
XML layout

```xml
<?xml version="1.0" encoding="utf-8"?>

<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:id="@+id/layout_main"
    android:layout_width="fill_parent"
    android:layout_height="fill_parent"
    android:orientation="vertical">

    <com.esri.android.map.MapView
        android:id="@+id/map"
        android:layout_width="fill_parent"
        android:layout_height="fill_parent" />

</RelativeLayout>
```
initial layer setup

```java
// layer for rooms
ArcGISDynamicMapServiceLayer roomLayer = new ArcGISDynamicMapServiceLayer(MAPSERVER_ROOMS_URL);
mapView.addLayer(this.roomLayer);

// layer for buildings
ArcGISDynamicMapServiceLayer buildingLayer = new ArcGISDynamicMapServiceLayer(MAPSERVER_BUILDINGS_URL);
buildingLayer.setOpacity(0.4f);
mapView.addLayer(this.buildingLayer);

// initial extent
Envelope initialExtent = new Envelope(MIN_X, MAX_X, MIN_Y, MAX_Y);
mapView.setExtent(initialExtent);
```
MAPS & LAYERS
MAPS & LAYERS

• add more layers on runtime

```javascript
aerialLayer = new ArcGISDynamicMapServiceLayer(MAPSERVER_AERIAL_URL);
this.addLayer(aerialLayer);
```

• or making them invisible

```javascript
aerialLayer.setVisible(false);
```
QUERY TASKS

• querying information from an ArcGIS Server
• query language is SQL based

• sample where clause

```sql
SDE.DBO.Building_Room.RM_ID like '240%'
AND SDE.DBO.Building_Room.BLD_ID = 'HS'
```
**QUERY TASK**

start query

```java
Query query = new Query();
query.setGeometry(new Envelope(MIN_X_QUERY, MIN_Y_QUERY, MAX_X_QUERY, MAX_Y_QUERY));
query.setOutSpatialReference(SpatialReference.create(SPARTIAL_REF_NAD83));
query.setOutFields(outputFields);
query.setReturnIdsOnly(false);
query.setReturnGeometry(true);
query.setWhere(whereClause);
```

handle result

```java
if (result != null) {
    GraphicsLayer graphicsLayer = new GraphicsLayer();
    Graphic[] grs = result.getGraphics();
    graphicsLayer.addGraphics(grs);
    mapView.addLayer(graphicsLayer);
}
```
QUERY TASKS

• result of query:

```
SDE.DBO.Building_Room.OBJECTID: 117646
SDE.DBO.Building_Room.BLDG_FLR_RM_ID: ICT05550
SDE.DBO.Building_Room.CEILING_HEIGHT:
SDE.DBO.Building_Room.ACTUAL_ELEVATION:
SDE.DBO.Building_Room.RM_ID: 550
SDE.DBO.Building_Room.FLR_ID: 05
SDE.DBO.Building_Room.BLD_ID: ICT
SDE.DBO.Building_Room.EHANDLE: 3FD1C
SDE.DBO.Building_Room.BLD_FL_EHANDLE: ICT053FD1C
SDE.DBO.Building_Room.RM_TYPE_LETTER:
SDE.DBO.Room_Info.BLDG_FLR_ID: ICT05
SDE.DBO.Room_Info.RM_ID: 550
SDE.DBO.Room_Info.UPDATED_BY: UCMAPS
SDE_DBO_Building_Room_SHAPE_Length: 14.7271999331381
SDE_DBO_Building_Room_SHAPE_Area: 12.6973513190799

Polygon:
Ring0:[701013.8298,5662670.5024],[701013.2296,5662670.4786],
[701013.2362,5662670.3126]...
```
QUERY TASK
• draw different shapes on maps
ROUTING

• ArcGIS Network analyst
  • module for ArcGIS Server
  • modelling real world networks

  • main uses:
    • best route from A to B
    • closest facilities
Routing

- **Network dataset UofC**
  - One person worked over six months on creating this dataset
  - ca. 12,000 manually created paths
ROUTING ON ANDROID

- **Routing Task**
  - not available in Android SDK 1.0

- **REST service**
  - supports only 2D routes

- **SOAP**
  - supports 3D routing, but NO Java sample code
ROUTING ON ANDROID

result

```
x: 700985.7666999996, y: 5662650.035, z: -2.3499999997511622E-5
x: 700984.4044000003, y: 5662642.9101, z: -2.3499999997511622E-5
x: 700983.699, y: 5662642.8968, z: -2.3499999997511622E-5
x: 700982.6266000001, y: 5662642.889900001, z: -2.3499999997511622E-5
x: 700982.3931999998, y: 5662642.856799999, z: 3.9999765000000025
x: 700982.6266000001, y: 5662642.889900001, z: 7.9999765000000025
x: 700982.6266000001, y: 5662642.889900001, z: 11.999976500000002
x: 700982.6266000001, y: 5662642.889900001, z: 15.999976500000002
x: 700985.4260999998, y: 5662642.976199999, z: 15.999976500000002
x: 700985.4619999997, y: 5662642.9878, z: 15.999976500000002
x: 700985.4685000004, y: 5662642.9322999995, z: 15.999976500000002

[...many more...]

x: 701009.3821, y: 5662655.424900001, z: 15.999976500000002
x: 701009.3502000002, y: 5662655.4603, z: 15.999976500000002
x: 701009.5906999996, y: 5662670.190199999, z: 15.999976500000002
x: 701009.4781, y: 5662671.2984, z: 15.999976500000002
x: 701009.46, y: 5662671.480799999, z: 15.999976500000002
```
ROUTING ON ANDROID

- type of route is adjustable

prefer outdoor

prefer indoor
ROUTING ON ANDROID

• geometry engine
  • geometric operations on device or server

`contains(Geometry geometry1, Geometry geometry2, SpatialReference spatialReference)`
Indicates if one geometry contains another geometry.

`crosses(Geometry geometry1, Geometry geometry2, SpatialReference spatialReference)`
Indicates if one geometry crosses another geometry.

`difference(Geometry inputGeometry, Geometry substractor, SpatialReference spatialReference)`
Creates the difference of two geometries.

`distance(Geometry geometry1, Geometry geometry2, SpatialReference spatialReference)`
Calculates the 2D planar distance between two geometries.
• split route on entering new buildings
CONCLUSION

- SDK is pretty new / Community not that big
- Basic examples in the SDK for adding layers and submitting queries
- No Emulator support until 2 weeks ago
- Poor Online Documentation
- “Easy to Learn, Hard To Master!”