Developing Java Apps with the ArcGIS Runtime SDK

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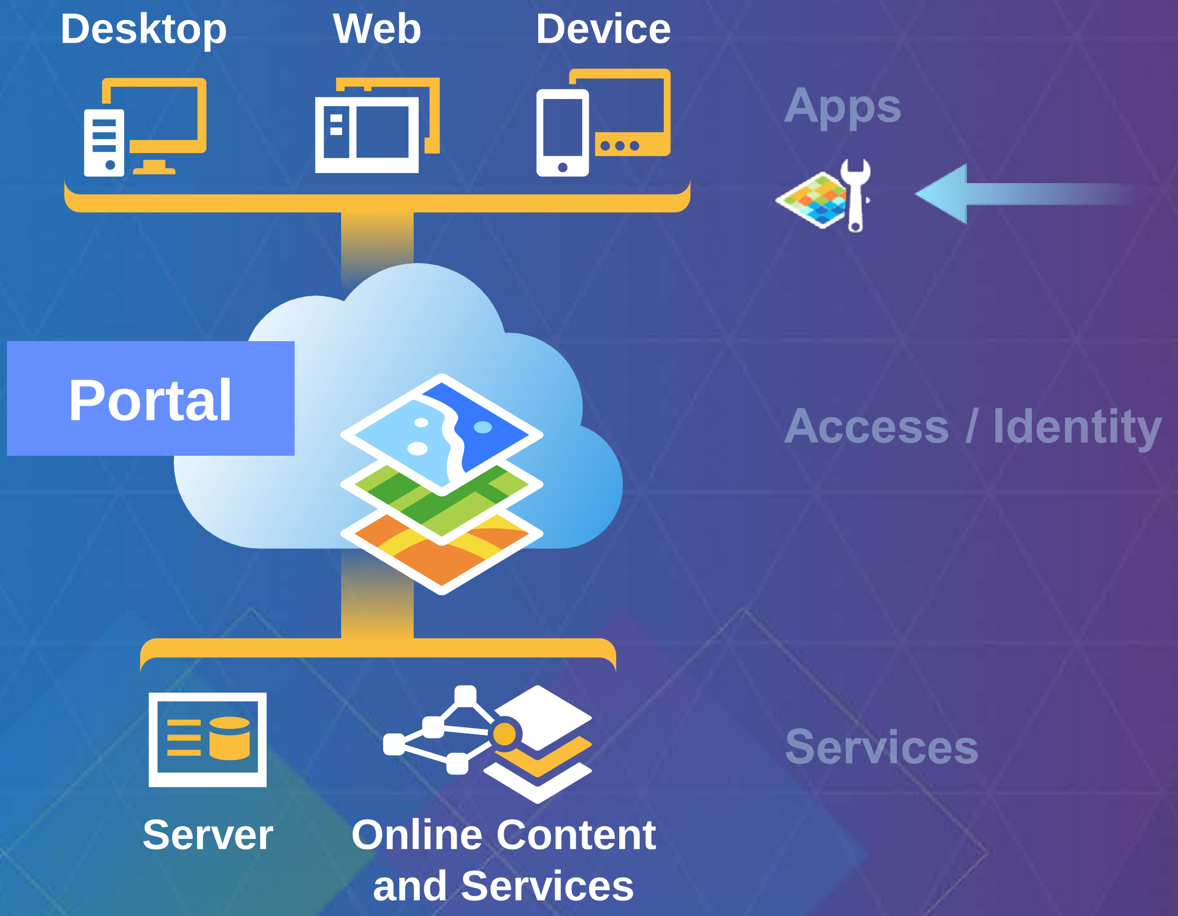
Outline

- Intro to ArcGIS Runtime SDKs
- Get started: download and install the SDK
- Tour of the functionality of the API
- Basics of building a map application
- Online workflow: services, ArcGIS Online, web maps
- Offline workflows: local data, create and update
- Deployment and licensing
- Road map

ArcGIS Platform



ArcGIS Runtime SDKs

ICONS FOR DARK BACKGROUNDS

ArcGIS Runtime

Runtime built using C++

EXPLOITS THE CAPABILITIES OF THE DEVICE

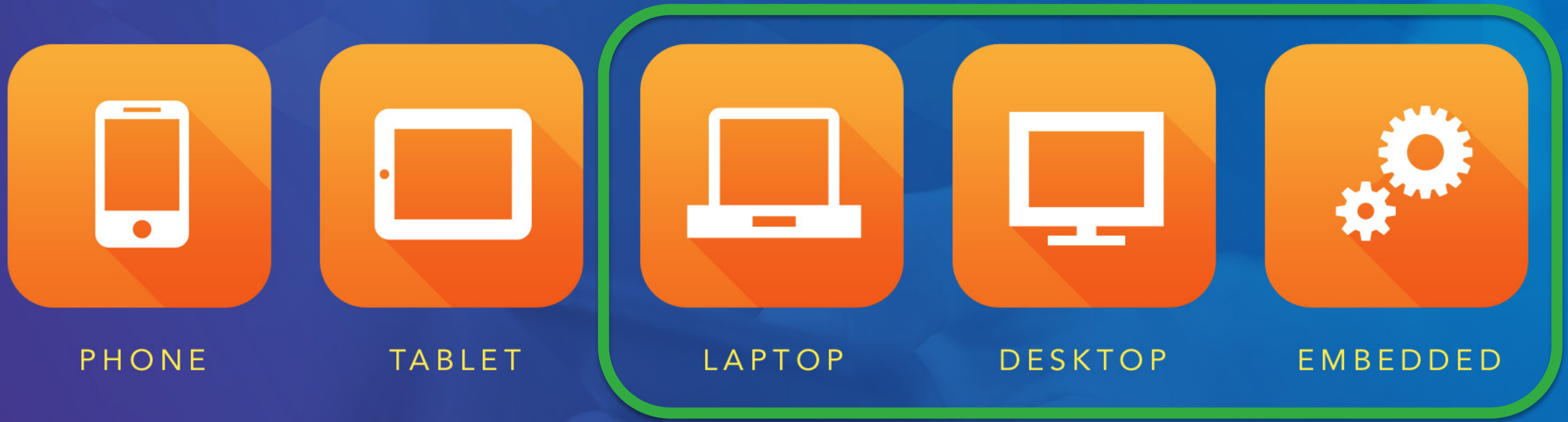
Functionality exposed to developers via an API native to the platform

INTUITIVE TO LEARN

Common functionality set and conceptual model

EASES MULTI PLATFORM DEVELOPMENT

Device Platforms



PHONE

TABLET

LAPTOP

DESKTOP

EMBEDDED

Java SE

ArcGIS Runtime SDK for Java

- Integrates with the ArcGIS Platform

- Build native apps for Windows and Linux
  - Windows 8 / 7
  - Ubuntu, RedHat
  - 32 and 64 bit Windows, 32 and 64 bit Linux

- Java SE API, Swing and JavaFX (Beta)
- Eclipse plugin
- Developed alongside Runtime SDK for Android

ArcGIS Runtime SDK for Java

- **Get it:** free download on developers.arcgis.com/java
- What you get:
  - Set of jars to code against
  - Open-source toolkit (mainly UI components)
  - Eclipse plugin, includes map application template
  - Runtime tools: deploy / debug
  - Documentation: Guide, API reference
  - Tons of samples

- **Get help:** Guide, API Reference, Forum
- **Give feedback:** GeoNet, web site pages, sessions

GeoNet: https://geonet.esri.com/community/developers/native-app-developers/arcgis-runtime-sdk-for-java

DEMO

The SDK

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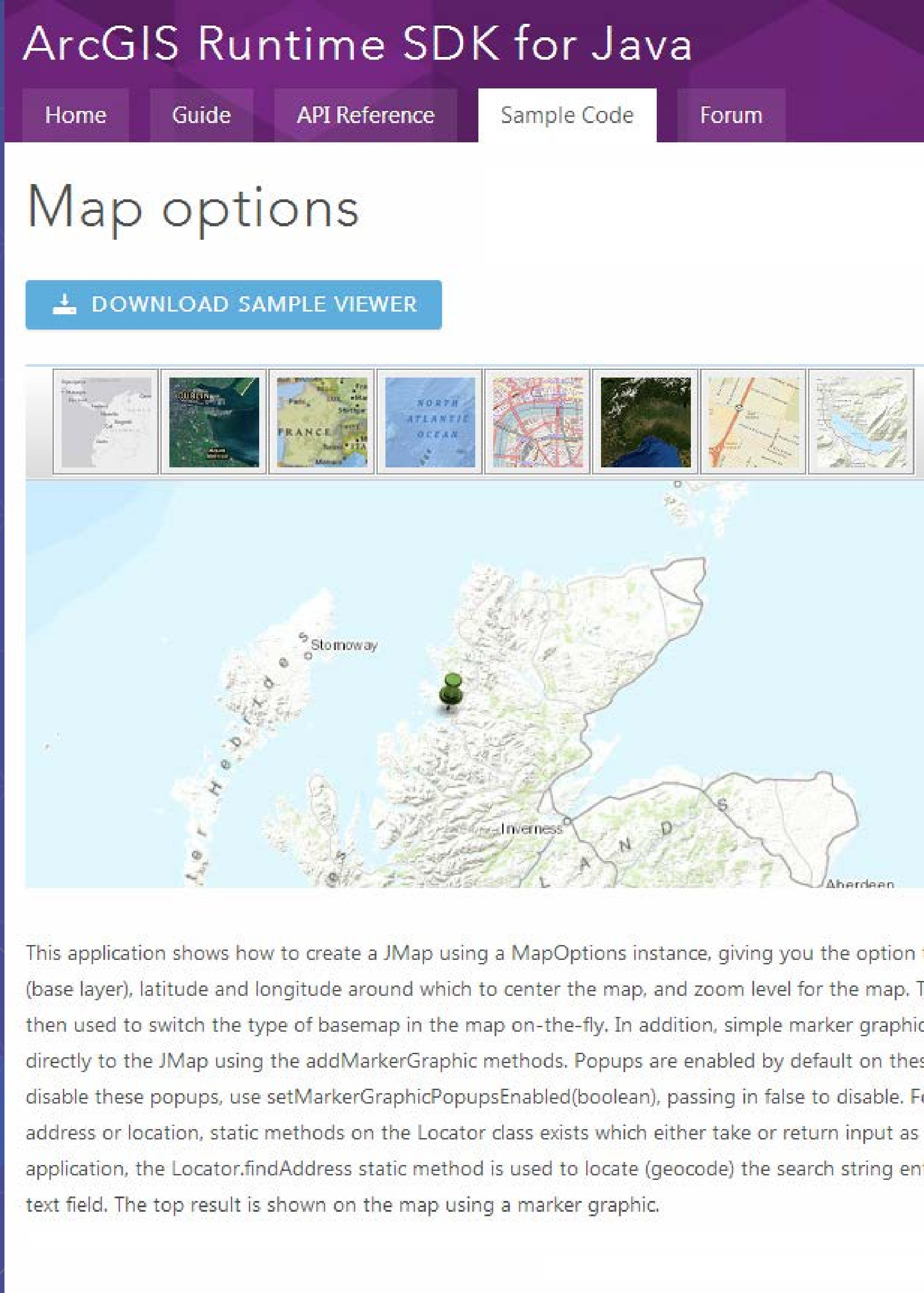

Map options

This application shows how to create a JMap using a MapOptions instance, giving you the option
(base layer), latitude and longitude around which to center the map, and zoom level for the map. T
then used to switch the type of basemap in the map on-the-fly. In addition, simple marker graphic
directly to the JMap using the addMarkerGraphic methods. Popups are enabled by default on thes
disable these popups, use setMarkerGraphicPopupsEnabled(boolean), passing in false to disable. F
address or location, static methods on the Locator class exists which either take or return input as
application, the Locator.findAddress static method is used to locate (geocode) the search string en
text field. The top result is shown on the map using a marker graphic.

What you can do

- Mapping
- Searching
  - query, find, identify, address finding, locating addresses by coordinates
- Editing
- Geometry operations
- GPS
- Network Analysis (route finding, drive times, closest facility)
- Spatial Analysis (Geoprocessing)
- Read local data files, i.e shapefiles and raster files
- Advanced Symbology

→ Online and offline

DEMO

Functionality Tour

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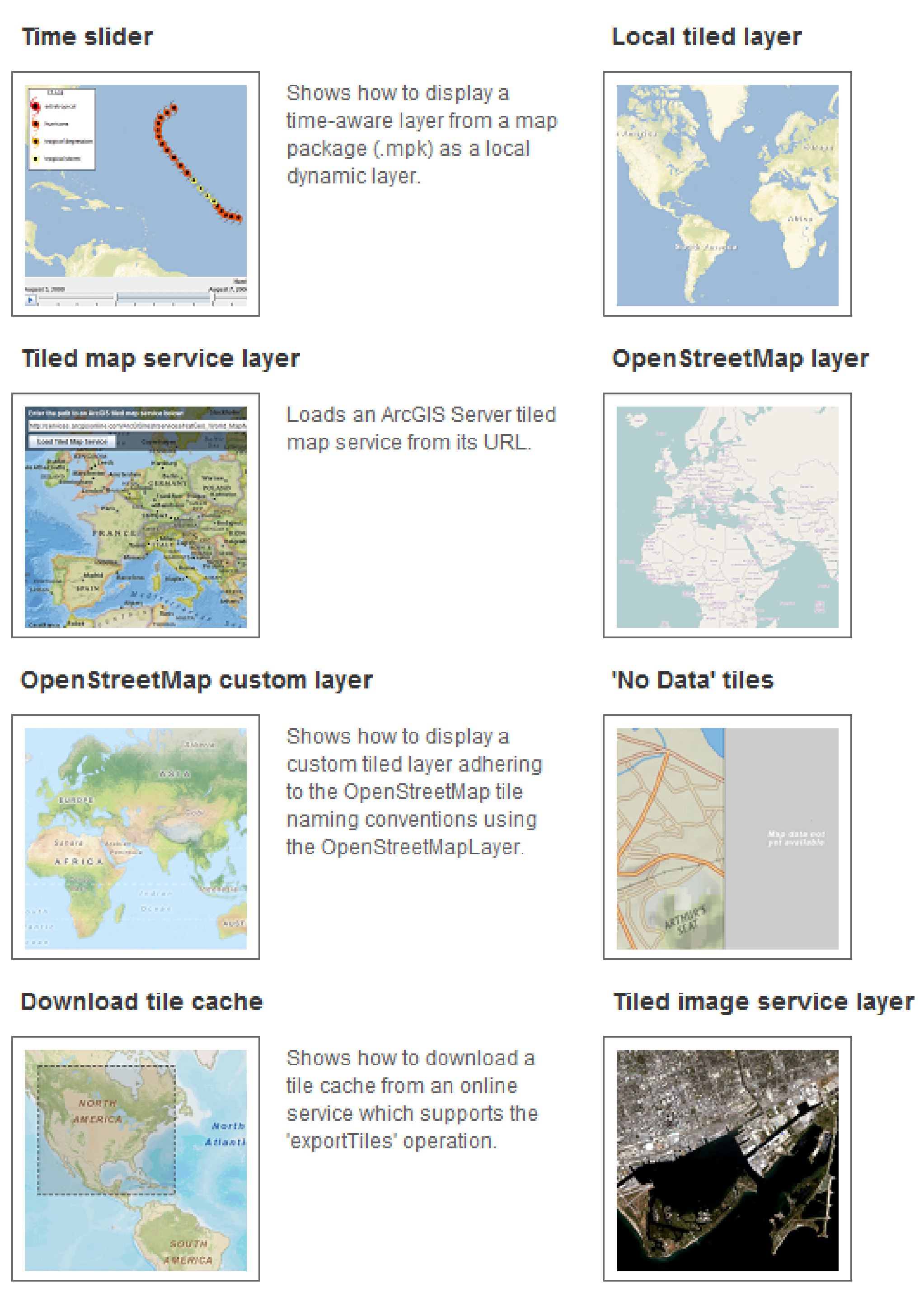

Time slider

Shows how to display a time-aware layer from a map package (.mpk) as a local dynamic layer.

Local tiled layer

Tiled map service layer

Loads an ArcGIS Server tiled map service from its URL.

OpenStreetMap layer

OpenStreetMap custom layer

Shows how to display a custom tiled layer adhering to the OpenStreetMap tile naming conventions using the OpenStreetMapLayer.

'No Data' tiles

Download tile cache

Shows how to download a tile cache from an online service which supports the 'exportTiles' operation.

Tiled image service layer

Build a map

- “Live” Data
  - Graphics layers
- Operational Data
  - Dynamic layers / Feature layers
- Basemap
  - Tiled layers
- Map

DEMO

Build a map

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Features & Graphics

- Data on a map can be a Feature or a Graphic
- Both contain attributes and geometry

- Graphics
  - Not associated to a service
  - Not persisted
  - Displayed by a GraphicsLayer

- Features
  - Associated to a service
  - Persisted to a database or a service
    - Share, query, edit
  - Displayed by a FeatureLayer

Interaction using MapOverlay

- Used to handle mouse-events on the map
  - onMouseClicked, onMouseMoved, onMouseDragged, etc
  - override onPaint to draw onto map

- Use the Toolkit overlays
  - editing
  - popups
  - scale bar & navigator
  - hit tests (responding to graphics being clicked)

- Add an overlay to the JMap:

```
jMap.addMapOverlay(...);
```

DEMO

Graphics & Features Map interaction

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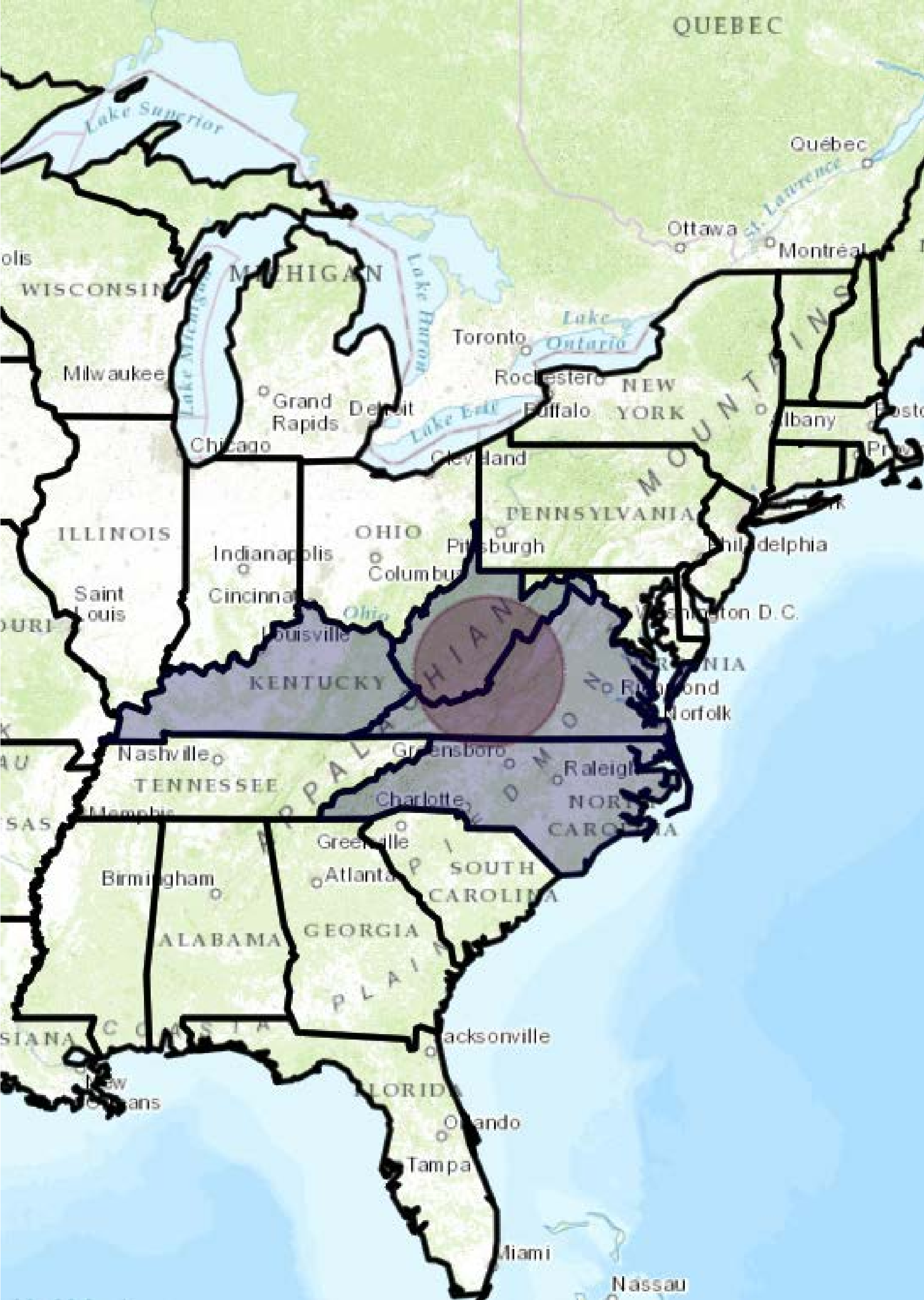

Online and offline workflows

Online

- ArcGIS for Server services
- ArcGIS Online (web maps)
- Portal for ArcGIS

  - Basemaps: map services
  - Dynamic layers: map services
  - Feature layers: feature services
  - Geocoding: geocode services
  - Route finding: network analyst service
  - Analysis: geoprocessing services

Offline

- ArcGIS for Desktop: prepare data
- Download data from online services
- Local Server (services)

  - Basemaps: local tile cache
  - Dynamic layers: local map services (mpk)
  - Feature layers: local geodatabase or shapefiles
  - Geocoding: local geocoding
  - Route finding: local routing
  - Analysis: geoprocessing services (gpk)

Online workflows

- ArcGIS Services
  - REST API
  - Create via ArcGIS for Desktop, ArcGIS for Server
  - Map services
    - tiled layers, dynamic layers
  - Feature services
    - feature layers, editing, search tasks (query)
  - Image services
    - image service layers
  - Geocode services
    - geocode task
  - Network Analysis services
    - route task, closest facility task, service area task

- Other online data sources: WMS, OpenStreetMap, Bing basemaps, KML

WebMap and Portal

- Open via web map ID, Portal, user credentials if secure
  - get ID from URL
- Retrieve web map via Portal API
  - query for web map items on a Portal
- Create a `WebMap` instance then load into `JMap`:

```
WebMap webmap = new WebMap(“webmap_id”);
jMap.loadWebMap(webmap);
```

- JMap loads all the web map’s layers
  - JSON of web map passed to client API, displays the layers according to order, rendering info, popup info, etc.

DEMO

WebMap and Portal

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Portal

Offline workflows

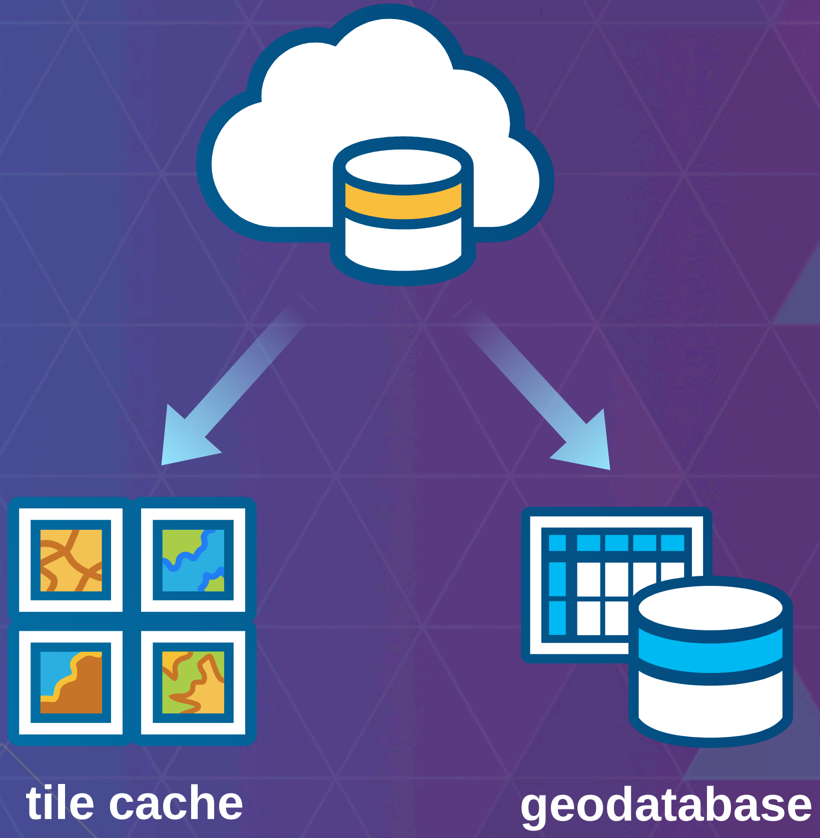
- Create data from services: tile caches, geodatabases
- Offline routing
- Offline geocoding
- Read/Display file-based data sources directly from device

- Geometry operations done locally via API
- Local Server for offline geoprocessing
- Local Server for offline dynamic map services

Offline

- Services pattern: create from ArcGIS services
- Desktop pattern: create in ArcMap

- Create local tile caches (basemaps)
- Create local geodatabases
  - geodatabase for storing feature data locally
  - edit offline
  - query offline
  - sync edits back with service



Read more: http://developers.arcgis.com/java/guide/create-an-offline-map.htm

DEMO

Offline workflow

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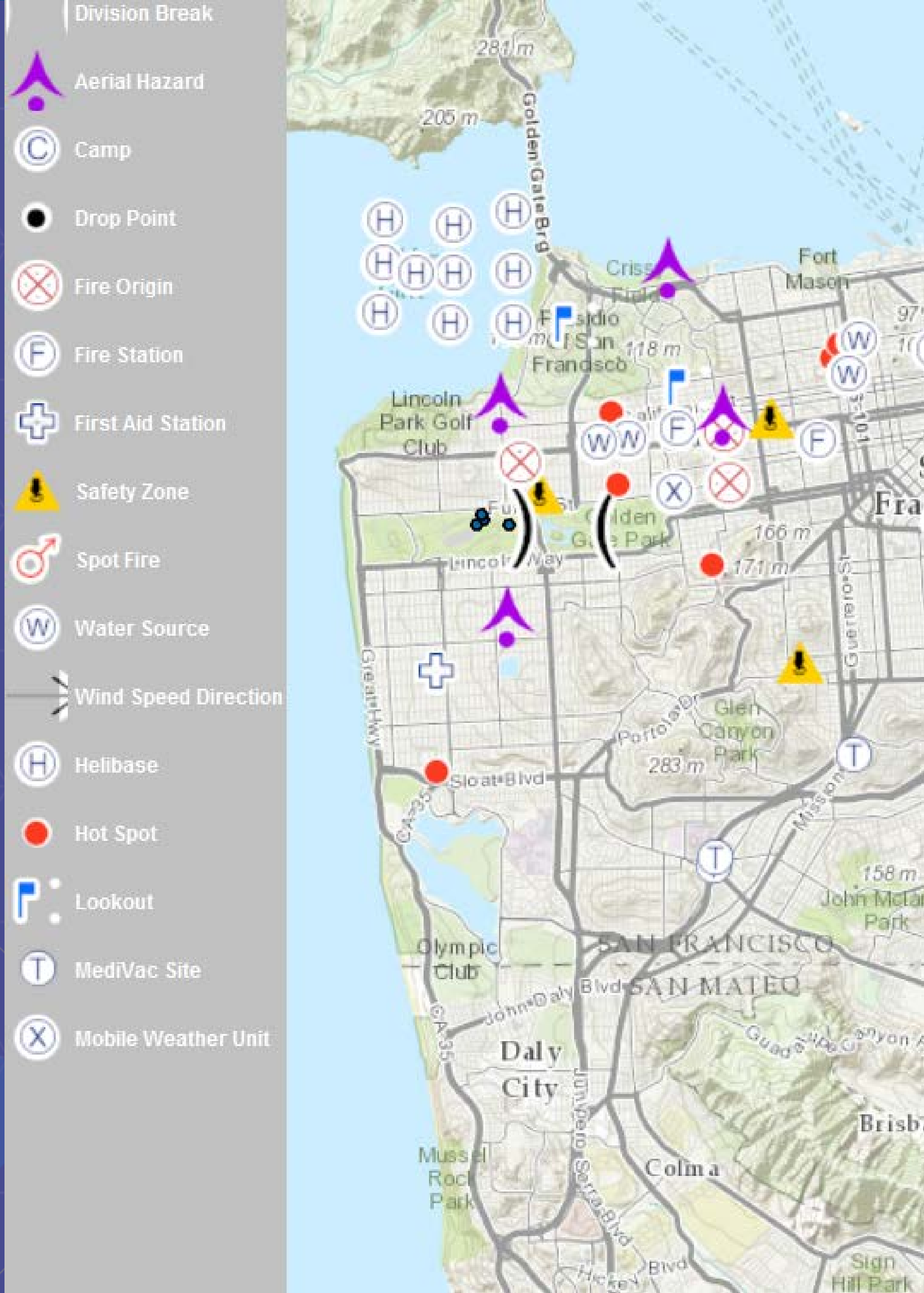
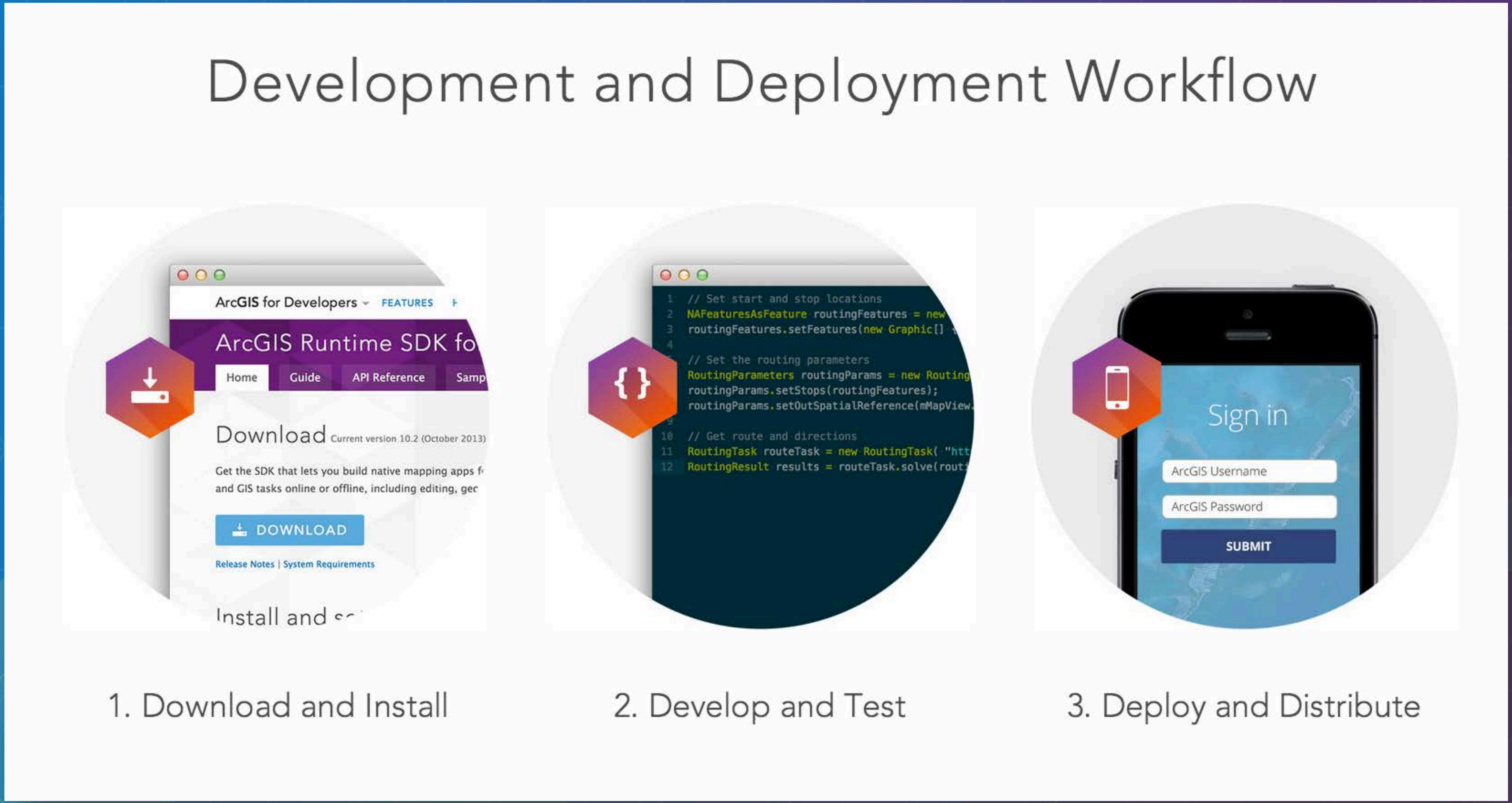


Runtime Licensing



Development and Deployment Workflow

ArcGIS for Developers FEATURES

ArcGIS Runtime SDK fo

Home Guide API Reference Samp

Download Current version 10.2 (October 2013)

Get the SDK that lets you build native mapping apps f
and GIS tasks online or offline, including editing, geo

DOWNLOAD

Release Notes | System Requirements

Install and s

```
// Set start and stop locations
NAFeaturesAsFeature routingFeatures = new
routingFeatures.setFeatures(new Graphic[] {

// Set the routing parameters
RoutingParameters routingParams = new Routing
routingParams.setStops(routingFeatures);
routingParams.setOutSpatialReference(mMapView.

// Get route and directions
RoutingTask routeTask = new RoutingTask( "htt
RoutingResult results = routeTask.solve(rout
```

Sign in

ArcGIS Username

ArcGIS Password

SUBMIT

1. Download and Install

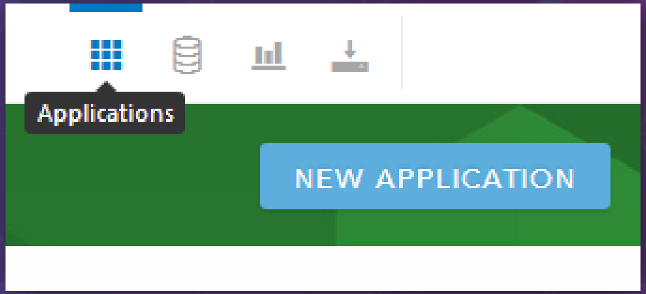
2. Develop and Test

3. Deploy and Distribute

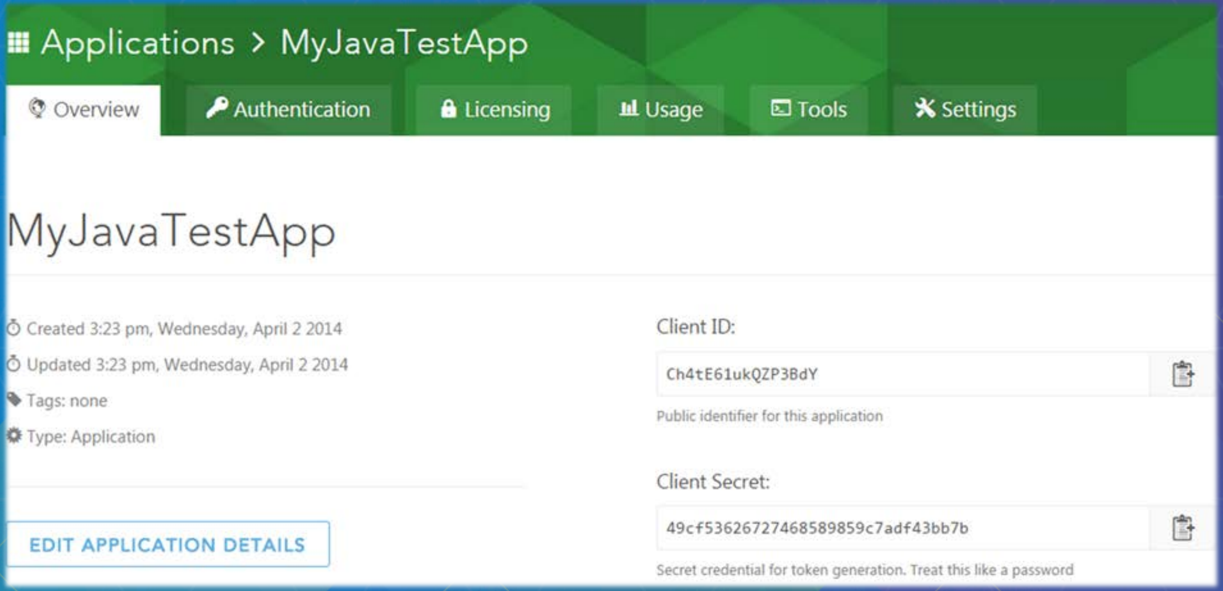
License your app at Basic level

1. Go to developers.arcgis.com and log in (or create a developer account)
2. Create a New Application (or select existing)
3. Click on Runtime SDK Licensing
4. Copy the Client ID and set it in your app

2.



3.



MyJavaTestApp

Created 3:23 pm, Wednesday, April 2 2014

Updated 3:23 pm, Wednesday, April 2 2014

Tags: none

Type: Application

EDIT APPLICATION DETAILS

Client ID:

Ch4tE61ukQZP3BdY

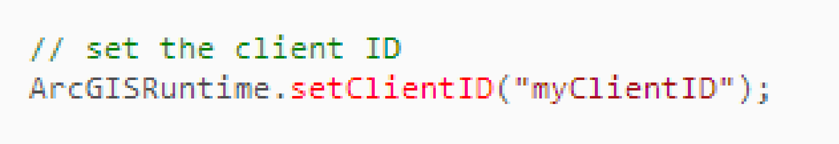
Public identifier for this application

Client Secret:

49cf53626727468589859c7adf43bb7b

Secret credential for token generation. Treat this like a password

4.



```
// set the client ID
ArcGISRuntime.setClientID("myClientID");
```

License your app at Standard level

2 ways:

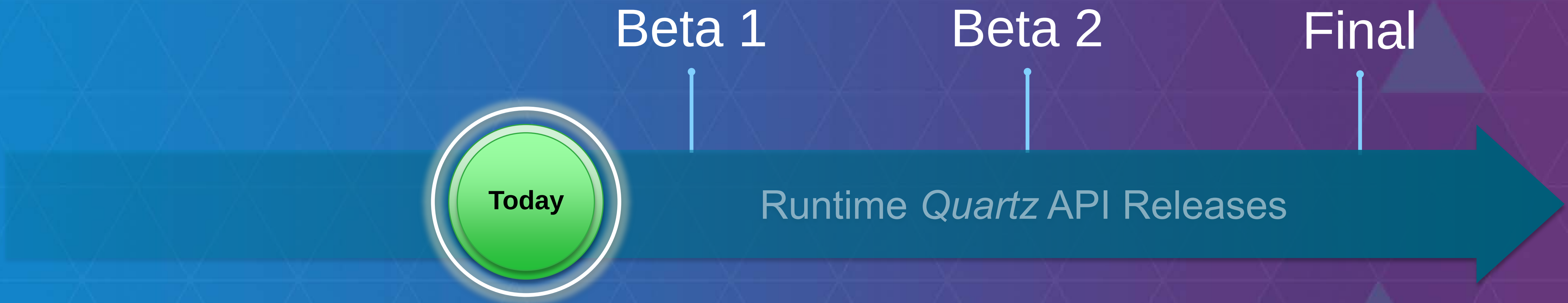
1. Use an ArcGIS organizational account (ArcGIS Online or Portal for ArcGIS)
   - Requires users of your app to log in with their account

2. Use a license string obtained from Customer Service or your international distributor
   - License burned into the app
   - Extensions can also be added with this option (e.g. Local Server geoprocessing)

** You must use workflow 2 if you want to license any extensions **

What’s ahead?

- *“Quartz” 100*
- *Full 3D*
- *Mac OS support*
- *JavaFX – fully supported*
- *“Installer-less” SDK*
- *Expanded IDE support - Netbeans*
- *Custom symbol dictionaries*
- *Closing the functional gaps between Engine and Runtime*



Beta 1

Beta 2

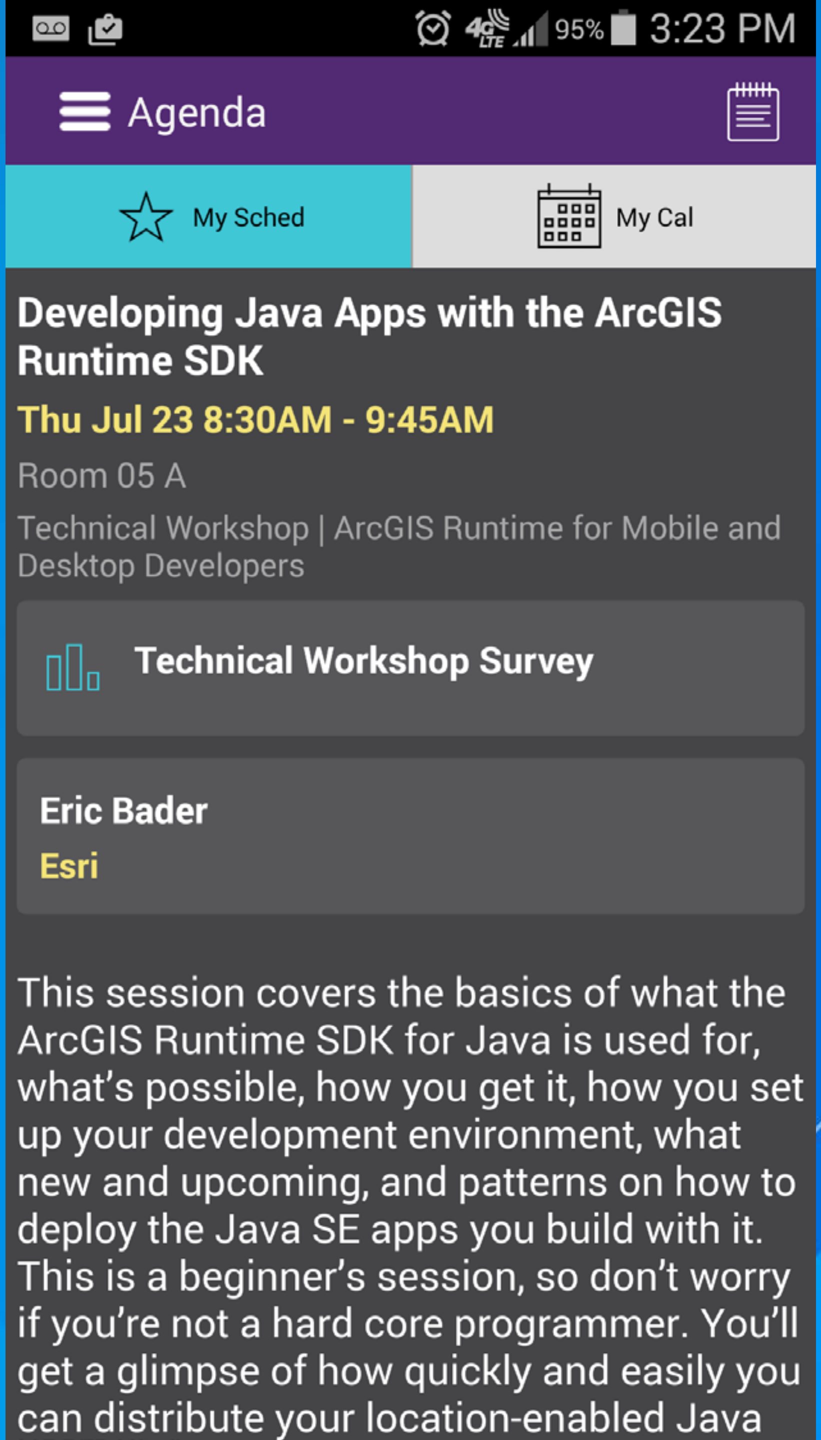
Final

Today

Runtime *Quartz* API Releases

Thank you…

- Please fill out the session survey in your mobile app
- Select [enter session title here] in the Mobile App
  - Use the Search Feature to quickly find this title
- Click “Technical Workshop Survey”
- Answer a few short questions and enter any comments



Developing Java Apps with the ArcGIS Runtime SDK

Thu Jul 23 8:30AM - 9:45AM

Room 05 A

Technical Workshop | ArcGIS Runtime for Mobile and Desktop Developers

Technical Workshop Survey

Eric Bader

Esri

This session covers the basics of what the ArcGIS Runtime SDK for Java is used for, what’s possible, how you get it, how you set up your development environment, what new and upcoming, and patterns on how to deploy the Java SE apps you build with it. This is a beginner’s session, so don’t worry if you’re not a hard core programmer. You’ll get a glimpse of how quickly and easily you can distribute your location-enabled Java

Want to learn more?

- Everything you need to know:
  - http://developers.arcgis.com/java

- Additional Resources
  - Stuff on GitHub: https://github.com/Esri/arcgis-runtime-samples-java

esri

Understanding our world.