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Building Applications with ArcGIS Runtime SDK for Java

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Agenda

- Introduction
- SDK
- Building the Map
- Interacting with the Map
- Editing
- Querying Data
- Spatial Analysis using Geoprocessing
- Asynchronous programming patterns
- Deployment and Licensing

Introduction to the ArcGIS Runtime

ArcGIS is a Complete System

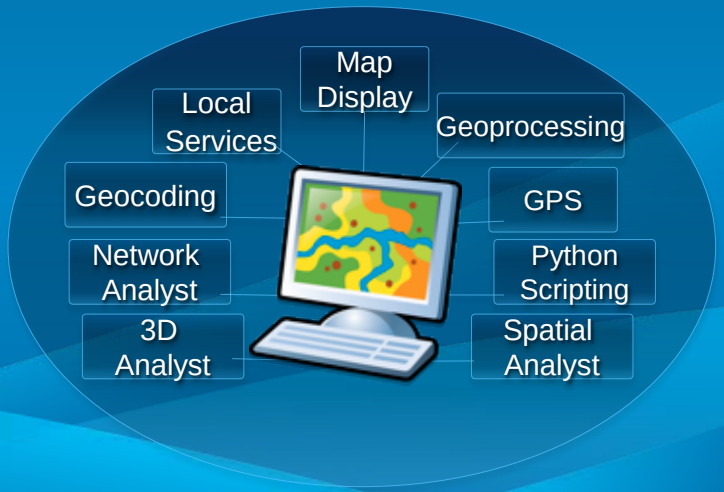
Managing and working with geographic information

- Online (public or private cloud)
- Server (on premises or private cloud)
- Desktop
- Mobile/devices
- Content

Many deployment options

What is the ArcGIS Runtime for Windows and Linux?

- Set of lightweight components
  - Embed mapping and GIS capabilities into your applications
- New Architecture
  - Native 64-bit and 32-bit
  - Utilizes hardware (CPUs, GPU)
  - Utilizes asynchronous programming patterns for responsive applications
- Simplified deployment
  - No installation required
  - Deploy only what you need
  - Side by side



ArcGIS Runtime Apps and SDKs

Windows Mobile	Windows	Windows Phone 7	iOS	Android	Linux
Apps • .ArcGIS	**Apps** • ArcGIS • ArcGIS Explorer	**Apps** • ArcGIS	**Apps** • ArcGIS for iOS	**Apps** • ArcGIS	
Runtime SDK • .NET CF	**Runtime SDKs** • WPF, Java	**Runtime SDK** • Silverlight	**Runtime SDK** • Objective C	**Runtime SDK** • Java	**Runtime SDK** • Java
					

Getting Started with Runtime SDK for Java

Getting Started

- How do you get it?
  - Part of Esri Developer Network (EDN)
  - Download from EDN website / DVD
- What do you need?
  - Java SE JDK Version 6 or 7
- Hardware accelerated display
  - Windows – DirectX or OpenGL
  - Linux – OpenGL
  - Recommended to update display driver

Getting Started

- Supported Platforms
  - Windows 7, Vista, XP, Server 2003 and 2008
  - Red Hat 6.0, 6.1, 6.2
  - Ubuntu 10.04, 12.04
- Contains both 64-bit and 32-bit binaries
  - Linux is only 64 bit
- Eclipse Plugin
  - Indigo or Helios
- License for Development

Demo: SDK Resources and Eclipse Integration

Mark Baird

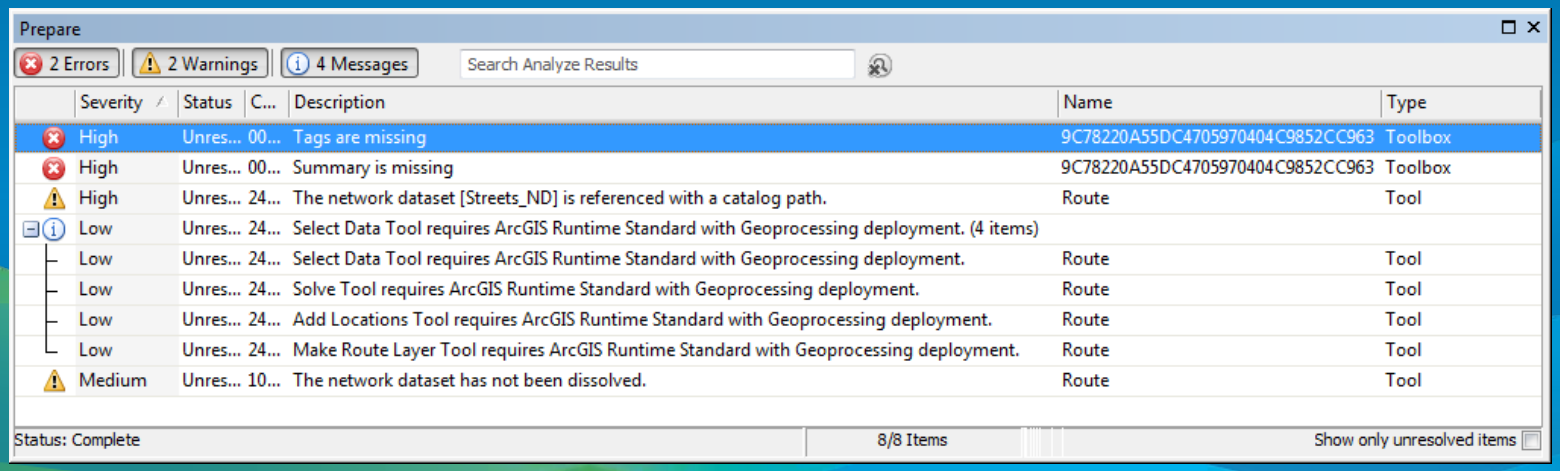
Building the Map

Provisioning Content

- Online Content
- Local Content is authored through packages
  - Map Packages
    - Editing, querying, mapping
  - Tile Packages
    - High performance base maps
  - Locator Packages
    - Geocoding
  - Geoprocessing Packages
    - Models and Scripts

Provisioning Content

- Packaging process runs analyzers
- Identifies
  - Errors that prevent package from working in the Runtime
  - Runtime deployment requirements
  - Runtime licensing requirements
  - Performance improvements



Severity	Status	C...	Description	Name	Type
High	Unres...	00...	Tags are missing	9C78220A55DC4705970404C9852CC963	Toolbox
High	Unres...	00...	Summary is missing	9C78220A55DC4705970404C9852CC963	Toolbox
High	Unres...	24...	The network dataset [Streets_ND] is referenced with a catalog path.	Route	Tool
Low	Unres...	24...	Select Data Tool requires ArcGIS Runtime Standard with Geoprocessing deployment. (4 items)		
Low	Unres...	24...	Select Data Tool requires ArcGIS Runtime Standard with Geoprocessing deployment.	Route	Tool
Low	Unres...	24...	Solve Tool requires ArcGIS Runtime Standard with Geoprocessing deployment.	Route	Tool
Low	Unres...	24...	Add Locations Tool requires ArcGIS Runtime Standard with Geoprocessing deployment.	Route	Tool
Low	Unres...	24...	Make Route Layer Tool requires ArcGIS Runtime Standard with Geoprocessing deployment.	Route	Tool
Medium	Unres...	10...	The network dataset has not been dissolved.	Route	Tool

Building the map

- Map Control - Swing

- Live / temporary data
  - Vehicles, people, events…
  - Graphics and Graphic Layers

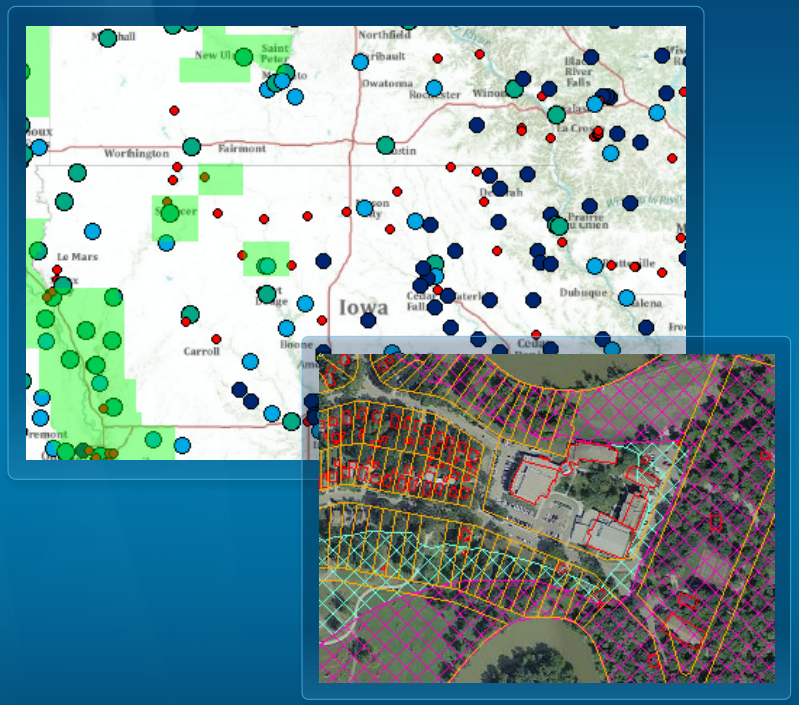
Graphics

- Operational data
  - Facilities, zones, networks…
  - MPK, Dynamic Maps, Feature Layers

Dynamic

- Basemap
  - Imagery, topography…
  - TPK, Tiled Services

Tiled



Demo: Building a Map

Mark Baird and Vijay Gandhi

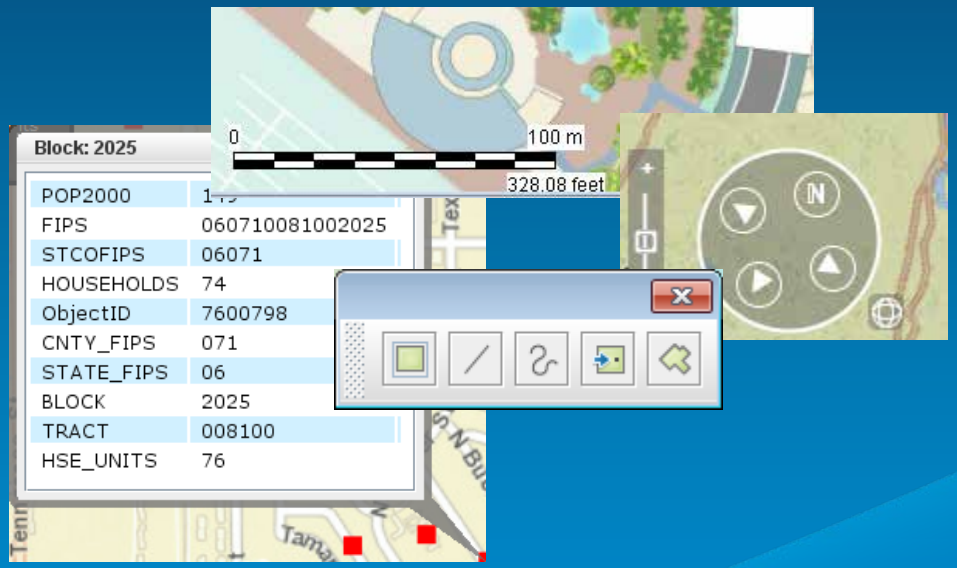
Interacting with the Map

Map Overlay

- Similar to a Glass pane
- Create a class that extends MapOverlay
  - Override methods
- Handle Mouse Interaction
  - Capture Mouse events happening on the Map Control
  - For example: Customized tool or special behavior
- Display non-geographical components
  - Paint on top of the MapControl
  - For example: Company Logo or Copyright Statement
- Can be turned on and off
  - MapOverlay.setActive(boolean)

Toolkit

- UI Components and Features
  - Editing
  - Popups
  - Scalebar
  - Navigator
  - Drawing
- Source Code Available
  - Use as is
  - Extend
  - Learn



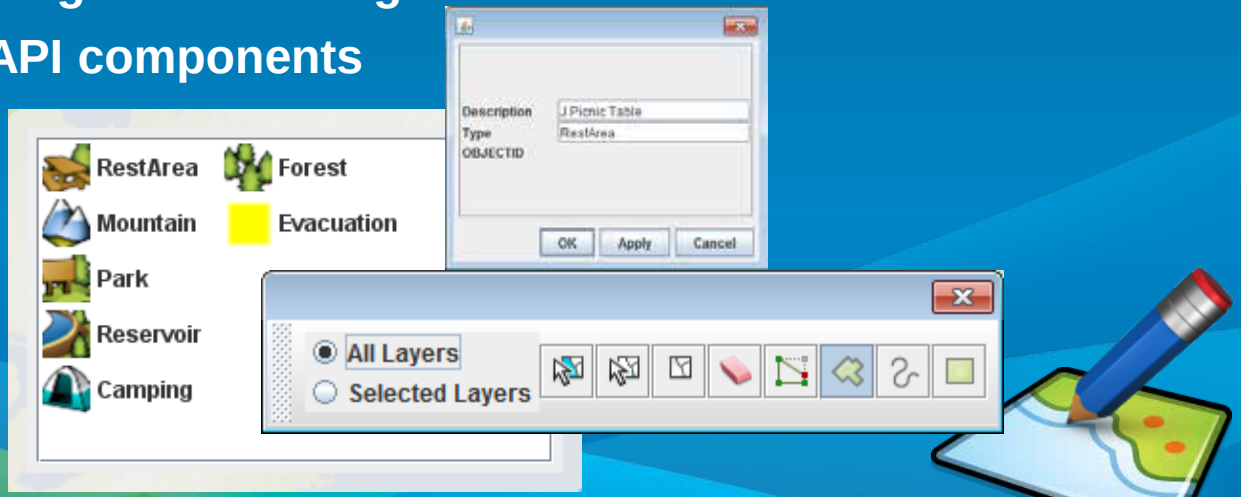
Demo: MapOverlay and Toolkits

Vijay Gandhi

Editing

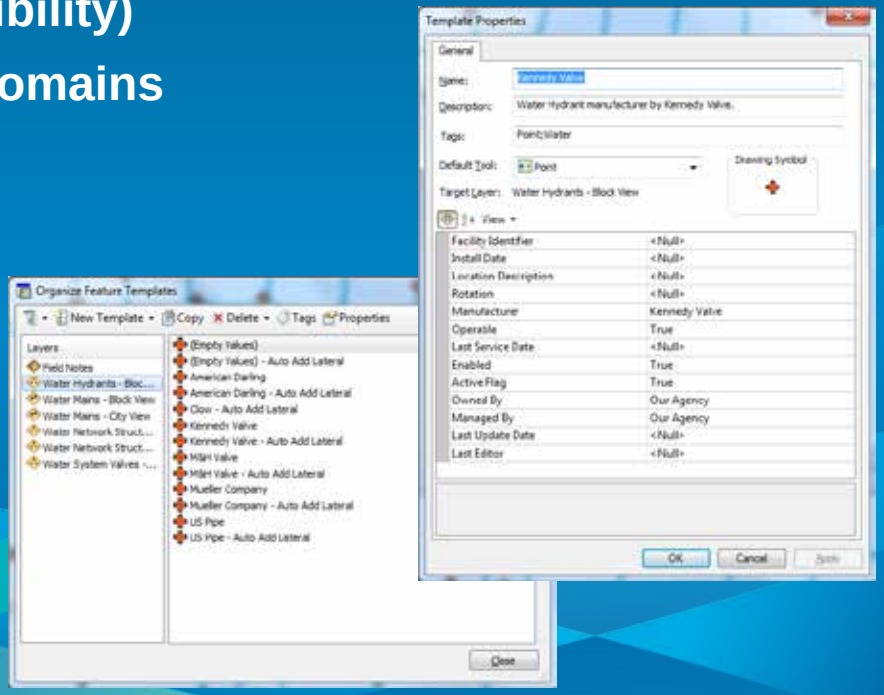
Editing Features

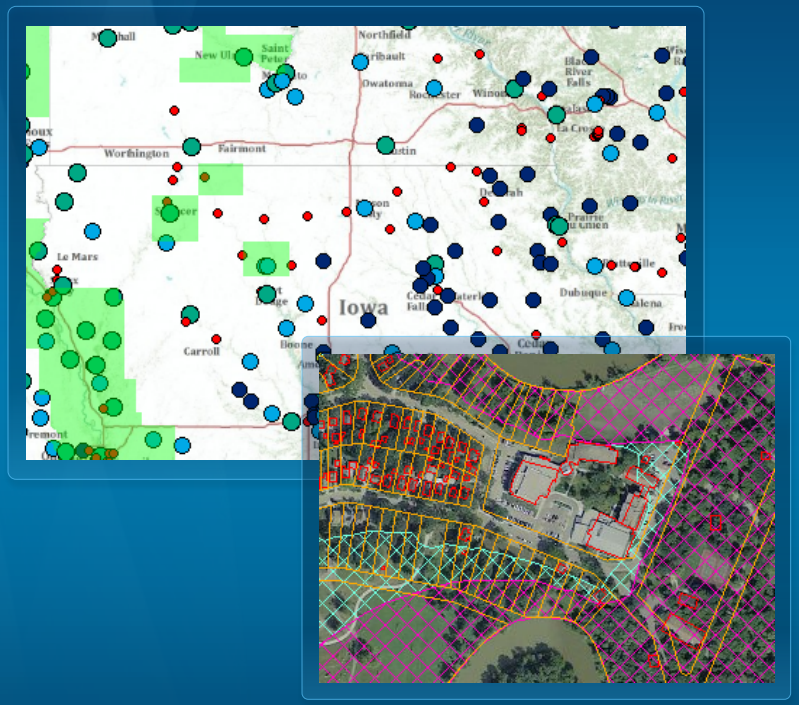
- Edit simple features
  - Feature Services
  - Data from a map package
- Edit Environment Authored in ArcGIS for Desktop
- ArcGIS Runtime SDKs Include:
  - UI controls / widgets for editing
  - Fine-grained API components



Authoring maps for editing

- Add just the Editable Layers to the Map Document
- Choose Map Coordinate System Wisely
- Set Layer and Table Properties
  - Define feature templates
  - Field properties (aliases, visibility)
  - Set subtypes and attribute domains
  - Default editing tools





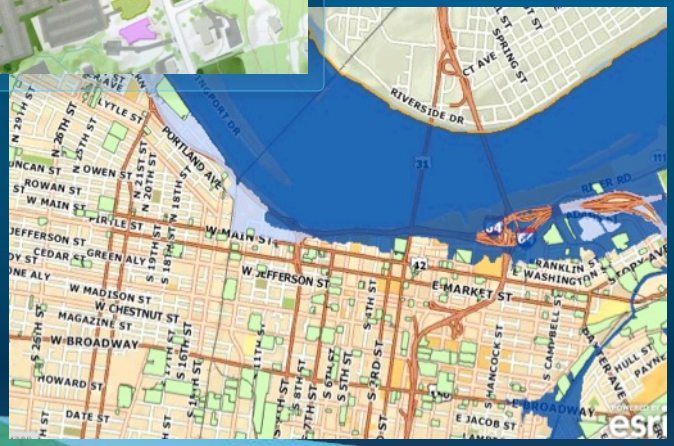
Demo: Editing

Vijay Gandhi

Querying Data

Querying Data

- Task based framework
  - Execute Task Synchronously or Asynchronously
- Task Types
  - Identify
  - Query - Attribute and Spatial
  - Geocoding and Reverse Geocoding
- Similar Programming Pattern for Each Task
  - Define input Parameters
  - Execute task asynchronously
  - Process and display results



Demo: Querying Data

Vijay Gandhi

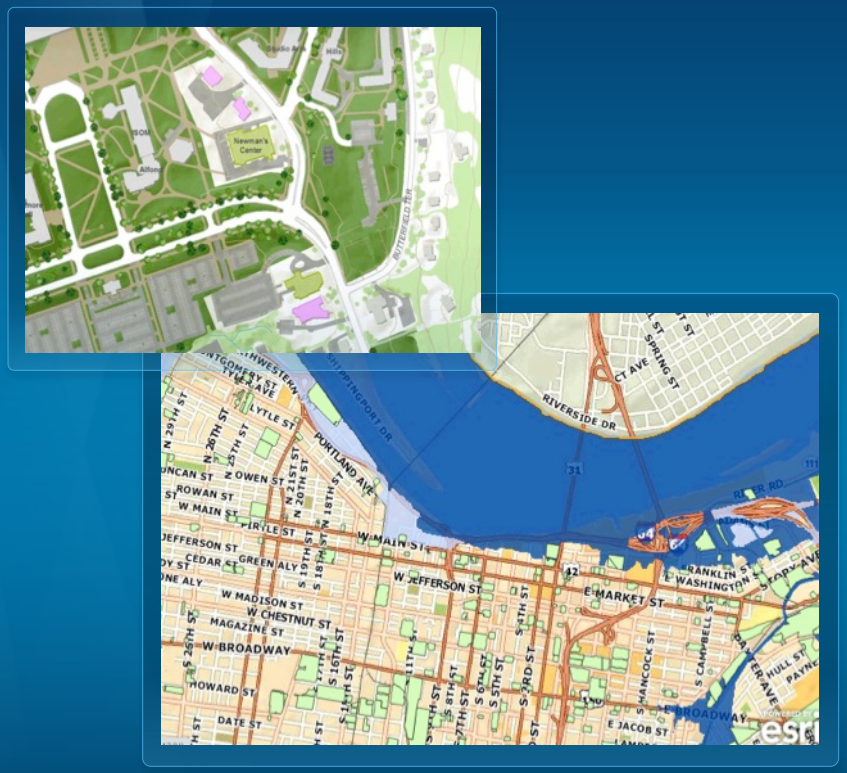
Geoprocessing in the Runtime

Using Geoprocessing in the Runtime

- Geoprocessing is the Source of Advanced GIS Analysis in the ArcGIS Runtime
  - Functionality that goes beyond the API
- Connected
  - ArcGIS Server's and ArcGIS Online's Published Services
- Disconnected
  - Local Geoprocessing from Geoprocessing Packages (GPKs)

GIS Analysis

Geoprocessing



Demo: Geoprocessing

Vijay Gandhi

Providing a good user experience

User Experience – Asynchronous Patterns

- API has an Asynchronous Programming Model
- Application Responsiveness is Paramount
- Async Lets You:
  - Perform time-consuming tasks “in the background”
  - Execute multiple operations simultaneously
  - Wait for resources to become available without “hanging” your application
- Event Based Async Pattern
  - ExecuteAsync(…) / ExecuteCompleted
- Synchronous Methods Available but Should be Reserved to Special Cases e.g. Console Application

Deploying applications

Deployment – Build your own

Deploy Only What Your Need

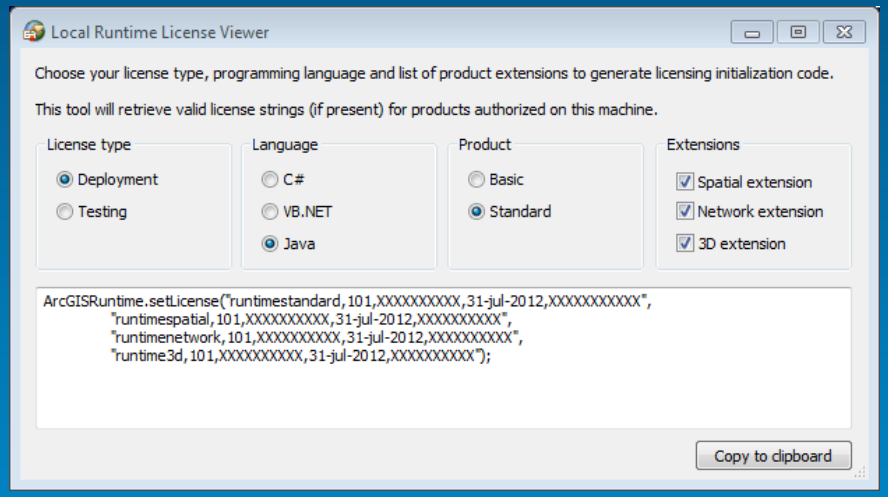
- Core
  - 2D Mapping
    - Full ArcGIS cartographic model
  - Enterprise and File Geodatabases
    - Simple feature & attribute editing
  - ArcGIS Server services
- Additional Data Formats (SDE Direct Connect, Rasters, Shapefile,…)
- Geoprocessing
- Geocoding
- Python scripting
- Additional Projection Support

Licensing for Deployment

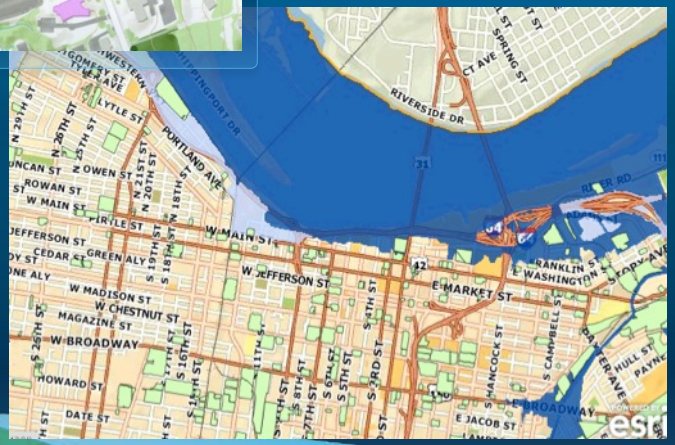
- Basic
  - Full client to ArcGIS Server services
  - Local Tile Packages & GPS Support
- Standard
  - Local Map, Geoprocessing and Locator Packages
  - Geodatabase Editing & Routing
- Extensions
  - Spatial Analyst, 3D Analyst, Network Analyst
- Determine the Type and Number of Licenses
- Purchase Runtime Licenses

Licensing for Deployment

- Enable Licenses using Software Authorization Wizard
- Use License Viewer to get license string



- Call ArcGISRuntime.setLicense(“runtimestandard,.....”)

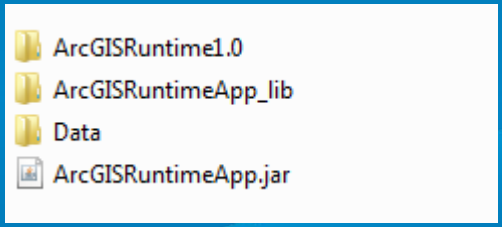


Demo: Deploying an App

Mark Baird

Building your Deployment Summary

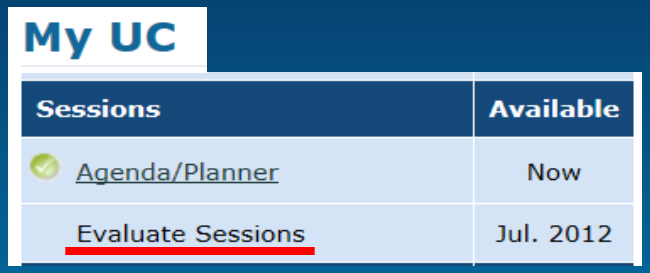
- License the Application With an ArcGIS Runtime Deployment License String
  - Ensure it’s the correct level and includes any extensions
- Create a jar file from your application
- Create an ArcGIS Runtime Deployment
  - Take note of ArcGIS for Desktop analyser warnings
  - Place deployment relative to your application



Where does the ArcGIS Runtime fit in?

Steps to evaluate UC sessions

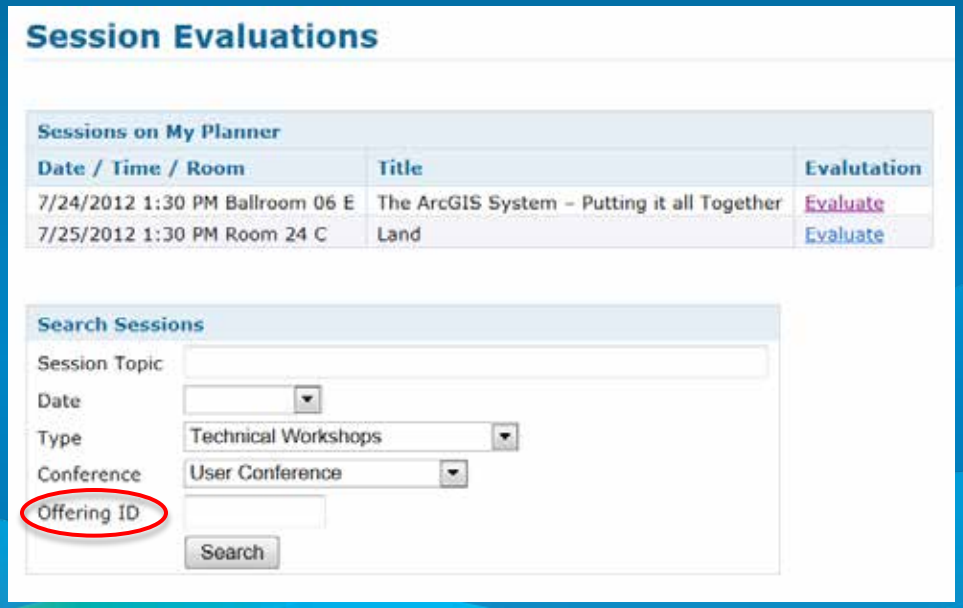
- My UC Homepage >
  "Evaluate Sessions"



- Choose session from planner

OR

- Search for session



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- Thank you for attending
- Have fun at UC2012
- Open for Questions

- Please fill out the evaluation:

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