ArcGIS Runtime SDK for Qt: Building Apps

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Cross-platform apps
Agenda for today

• Intro to Qt Framework and ArcGIS Runtime SDK for Qt
• App design patterns with this SDK
• SDK resources for developers

• This is an intro-level tech session
What is the Qt Framework?

**Portable**
- Write once, run anywhere
- Builds as native C++

**Approachable**
- Cross-platform libraries
- High-level abstractions

**Open**
- Pre-built some platforms
- Source code available
Why use Qt?

• Native app experience
  - Good performance
  - Access to device sensors
  - Access to device hardware and storage

• Write once, deploy everywhere
  - Single code base that targets most platforms
    - Windows, Linux, Android, iOS

• Focus on app building and not platform nuances
Why use ArcGIS Runtime SDK for Qt?

• You need a location component in your app
• You need to do more than put dots on a map:
  - Analysis
  - Work connected or disconnected
  - High performance graphics display
  - Customizable symbology
  - Support for various data formats
• Bring the power of the ArcGIS Platform to your app
Getting started

• Install the Qt Framework from the Qt Company
• Log onto ArcGIS for Developers with your developer subscription
• Download ArcGIS Runtime SDK for Qt
• Run the installer and the post installer
Demo: Download and Install
App Patterns
# QML and C++ app patterns

<table>
<thead>
<tr>
<th>App Pattern</th>
<th>API to use</th>
<th>Ideal for</th>
<th>Runs on Linux, macOS &amp; Windows</th>
<th>Runs on iOS &amp; Android</th>
</tr>
</thead>
<tbody>
<tr>
<td>QML with Qt Quick</td>
<td>QML</td>
<td>Web Developer</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>C++ with Qt Quick</td>
<td>C++</td>
<td>C++ Developer</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>C++ with Qt Widgets</td>
<td>C++</td>
<td>C++ Developer</td>
<td>Yes</td>
<td>No</td>
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</tbody>
</table>
Using the C++ API

- Provides all Runtime capabilities
- Create your UI with Qt Quick (targets any platforms) or Qt Widgets (targets desktop platforms)
- Works with Local Server
- Most flexibility
- Best design pattern
Using the QML API

• The declarative language from The Qt Company
• Declare components similarly to writing JSON or CSS
• Write procedural code as JavaScript functions
• Create UI rapidly with Qt Quick, with animation and prebuilt controls
• ArcGIS Runtime extends QML with types encapsulating ArcGIS functionality

```qml
MapView {
    id: mapView
    anchors.fill: parent

    // Create a new Map with the world streets vector basemap
    Map {
        BasemapStreetsVector {}
    }

    // Create a new feature layer to display features in the world cities table
    FeatureLayer {
        // Create feature table using the world cities URL
        ServiceFeatureTable {
            id: featureTable
            url: worldCitiesUrl
        }
    }
}
```
App Patterns Demo
Using the SDK to build apps

- SDK contains many components:
  - API Reference
  - Conceptual guide documentation
  - Samples
  - Toolkit components
  - GeoNet
- ArcGIS for Developers
Building an app
Exploring the Qt Sample Viewer
**ArcGIS Runtime 100.x License Model**

### Lite
- **Named User – Level 1**
- **License Key**
- View maps, scenes, layers, packages from the ArcGIS Platform
- Edit features in public feature services
- Generate a mobile geodatabase from a sync-enabled feature service
- Download updates from a sync-enabled feature service to a mobile geodatabase
- Place finding
- Simple and optimized routing
- Service areas and find closest facilities using a network service

### Basic
- **Named User – Level 2**
- **License Key**
- **All capabilities of Lite**
- Edit features in mobile geodatabases or private feature services
- Synchronize edits to features and attachments from a mobile geodatabase to a feature service
- Add, update, delete content on portals

### Standard
- **License Key**
- **All capabilities of Basic**
- Access to additional data
  - Shapefiles
  - GeoPackages
  - ENC layers
  - Raster layers
  - Use of raster functions
  - Raster elevation sources
- Visual analysis
  - Line of sight
  - Viewshed
  - Local Server

### Advanced
- **All capabilities of Standard**
- **Local Server**
- Feature services
  - Edit enterprise geodatabases
- GP services
  - Subset of ArcGIS Desktop standard and advanced tools

### Analysis Extension
- **License Key**
- Calculate service areas and find closest facilities using a local network dataset
- Local Server GP tools from 3D Analyst, Spatial Analyst, Network Analyst

### StreetMap Premium Extensions
- **License Keys**
Where to from here?

• Create a developer account
  - https://developers.arcgis.com/sign-up

• Download Qt Framework and ArcGIS Runtime SDK for Qt

• Read the guide fundamental topics

• Study and modify the samples
  - https://github.com/Esri/arcgis-runtime-samples-qt

• Use the Forum and join the community discussion
ArcGIS Runtime session tracks at DevSummit 2018

- ArcGIS Runtime SDKs share a common core, architecture and design
- Product sessions (like this one) promote specific development experiences
- Functional sessions promote common capabilities and workflows
  - Building 3D Applications (Wednesday, 1pm, San Jacinto)
  - ArcGIS Runtime: Styling Maps (Wednesday, 2:30pm Demo Theatre 1)
  - ArcGIS Runtime: Analysis (Wednesday, 4pm, San Jacinto)
  - An Introduction to the API and Architecture (Thursday, 9am, Catalina/Marina)
  - Editing Your Data Online and Offline (Thursday, 5:30p, Catalina/Madera)
- Qt specific sessions
  - Bring Out Your Qt Side: ExeQting Best App Development Practices (Thursday, 9am, Demo theater 2)
  - ArcGIS + Qt to Power Your Cross-Platform Apps (Thursday, 5:30pm, Mesquite C)
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