ArcGIS Runtime: Building 3D Apps

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Agenda

- 3D across the ArcGIS Platform
- 3D in ArcGIS Runtime
- Road ahead
ArcGIS 3D helps customers

Create and Manage
Quickly and easily extract value from 2D and 3D data

Visualize and Analyze
Understand and experience events and change

Design and Simulate
Manage the designed environment
3D GIS across industries

- Mining
- Scientific Visualization
- Urban Planning
- Developing Energy resources
- Environmental assessment
- Transportation
- Utilities and Telecommunications
- Military
- Land Information Management
- Facilities Management
3D across the ArcGIS Platform
ArcGIS Runtime – Modern Architecture

- 64 Bit
- Local and Cloud
- Multi-Threaded
- Common APIs
ArcGIS Runtime SDKs – Common Core

.NET

Runtime Common API
C++ with C ABI

C++ Runtime core

3D Mapping and GIS capabilities
3D in Runtime Today

• Version 100.2.1
  - Fully supported on desktop and mobile platforms in all Runtime SDKs
  - Scenes
  - Elevation sources
  - Layers
  - 3D symbols
  - View Controllers
  - Analysis
Scenes

- **SceneView**
  - Renders data in 3D and enables interaction
- **Scene**
  - Defines how data is organized and presented in 3D
- **Web Scene**
  - Document to define display and interaction of spatial content in 3D
Scene Layers

• Optimized for display of 3D content
• Based on I3S spec
• 3D objects, integrated mesh

Sources
- ArcGIS scene service
- Scene layer package (.slpk)
Elevation sources

- Defines height values across the surface of a scene
- One or many

Sources
- ArcGIS image service
- Tile package with LERC
- Local raster
Feature layers

- **Dynamic** rendering of feature layers (2D and 3D)
  - From services or local data
    - Feature services, mobile geodatabase, shapefiles, geopackage, ...
    - Billboard marker symbols
    - Honor scene placement, relative/absolute, z values
    - Extrusion

- Not supported yet
  - Point scene layers
  - Point cloud scene layers
  - Vector tiled layers
  - Multipatch geometry
3D Symbology

- Extrusion
- 3D marker symbols
- Model marker symbols
  - Formats defined by open asset library (assimp)
- Distance composite symbol
Cameras, viewpoints, and controllers

- **Camera**
  - location, altitude, heading, pitch
  - RotateAround
- **Viewpoint**
  - camera, geometry, scale, rotation
- **GeoView.GetCurrentViewpoint**
  - geometry or center\scale
- **GeoView.SetViewpoint**
  - viewpoint, camera, timespan

- **Controllers**
  - Globe – Free roaming global navigation
  - OrbitGeoElement – pivot camera around a target element
  - OrbitLocation – pivot camera around target point
Exploratory Analysis

- Visual and interactive
- Uses what’s visible in the scene
- GPU powered

- Line of sight
- Viewshed
3D Demos

- Scene layers
- View controllers
- Analysis
- Feature display
ArcGIS Runtime road ahead for 3D

- Full support on mobile platforms
  - Improved memory management
  - Optimized for OpenGL, DirectX
- Camera controllers to follow geoelement
- Local elevation from TPKs
- WMTS, OSM, Web tiled layers, WMS, shapefiles, ArcGIS image services
- Analysis: viewshed, line of sight, measure
- Dynamic feature layers
- WGS84 tiled layers (100.2.1)

- Read/write web scenes
- Mobile scene packages
- Scene layer select, identify
- Scene layer renderers
- Point cloud scene layers
- Vector tiled layers
- Analysis: Measure Distance
Virtual and Augmented Reality with ArcGIS Runtime

- Enhance existing ArcGIS Runtime SDKs
  - VR: Add “stereo display” rendering mode
  - AR: Transparent background to render on video/camera feed
  - Private beta

- Integrate ArcGIS Runtime with game engines
  - Enable access to GIS data and analytics in developer environment optimized for immersive 3D experiences
  - Game engines currently power VR, AR and mixed reality (MR) solutions
ArcGIS Runtime: Private Beta program

- Started November 2017
- Targeting high-end mobile devices
  - Good framerate, high resolution, best chipsets, superior camera, AR kits
- Limited to Runtime SDKs for .NET, iOS, and Android
  - Built on Runtime 100.2
  - Includes samples and toolkits to integrate with device capabilities

To request access to the beta program, email: ArcGISRuntimeARVRBeta@esri.com
Questions?

www.esri.com/3d

developers.arcgis.com/arcgis-runtime
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