



# ArcGIS Runtime SDK for .NET

## Building Windows Apps

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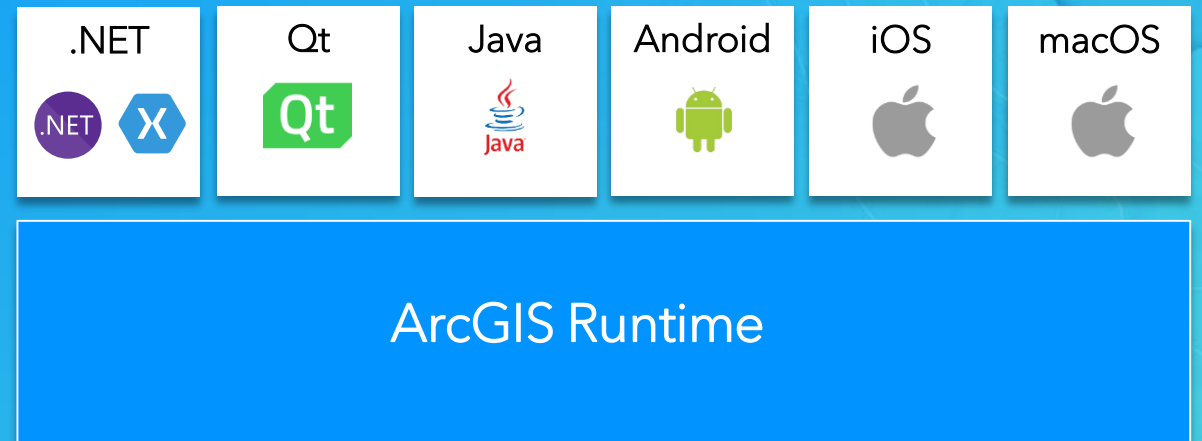
2018 Esri DEVSummit Conference | Palm Springs, CA

# ArcGIS Runtime SDK for .NET Parts I and II

- Part I
  - Building Windows Apps
- Part II
  - Building Xamarin Apps

# ArcGIS Runtime session tracks at DevSummit 2018

- ArcGIS Runtime SDKs share a common core, architecture and design
- Functional sessions promote common capabilities and workflows
  - An Introduction to the API and Architecture
  - Working with Your Portal
  - Building 3D Applications
  - Network Analysis
  - Styling Maps
  - Analysis
  - Building Great User Experiences
  - Working with Maps Online and Offline
  - Editing Your Data Online and Offline
  - Integrating Imagery
- Product sessions promote platform-specific development experiences
- Demo theaters highlight examples of specific technical capabilities



# Dev Summit 2018

Dev Summit 2017

- Watch *'ArcGIS Runtime SDK for .NET: Building Apps'*
  - <http://esriurl.com/ds2017net>
- Topics covered:
  - Overview and history
  - Architecture
  - What is UWP?
  - What is Xamarin?
  - Getting Started
  - Installation / IDE integration
  - Building a simple app
  - Migrating from previous major release (10.2.x)
  - Road ahead for 2017...

# Agenda

- New in 2017-2018
- Architecture of the SDK
- Toolkit
- Tips and Tricks
- Cross platform development
- Roadmap for 2018



New in 2017-2018



## The road ahead... Dev Summit 2017

- ✓ Improved support for Virtual Machines w. support for Software Rendering
- ✓ Visual Studio 2017 integration
- ✓ Simpler Callout API
- ✓ Upcoming features across the runtimes:
  - ✓ - Toolkit out of beta
  - ✓ - Take an entire map offline
  - ✓ - Improved Raster support
  - ✓ - Full ArcGIS Server Dynamic Layer support
  - ✓ - Improved Label support
  - ✓ - Coordinate notation formatter
  - ✓ - WMTS, WebTiledLayer, S57 Layers
  - ✓ - Related tables and more...

# What's new

- v100.1 – June 2017
  - Raster on Android and iOS
  - Take a map offline
  - Related tables
  - Image Services
  - OpenStreetMap
  - Bing
  - WMTS
  - Camera controllers in 3D
  - Labeling
  - Service Area (online)
  - Closest Facility (online)
  - Coordinate Notation
  - Map Service DynamicLayer
- v100.2 – December 2017
  - Layers: ENC, WMS
  - Tables: Shapefile, Geopackage
  - Raster: Geopackage
  - Export Vector Tile Packages
  - Offline maps preplanned workflow
  - Dynamic feature layer rendering
  - Line of Sight
  - Viewshed
  - Service Area (local)
  - Closest Facility (local)
  - Statistics Queries
  - Transformations
  - Transactional editing
  - SketchEditor enhancements
  - Time
- v100.2.1 – February 2018
  - Bug fixes
  - Raster datasets and tile packages in mobile map packages
  - SceneView WGS84 basemaps
  - WMS versions <1.3
- Patch – February 2018
  - ArcGIS Runtime Local Geoprocessing Service Startup Patch
    - Windows 7 SP1
    - Windows Server 2008 R2
  - Patches:
    - Local Server SDK v100.0 – v100.2
    - .NET SDK v10.2.7
    - Qt SDK 10.2.6
    - Java SDK 10.2.4
    - WPF SDK v10.2.5

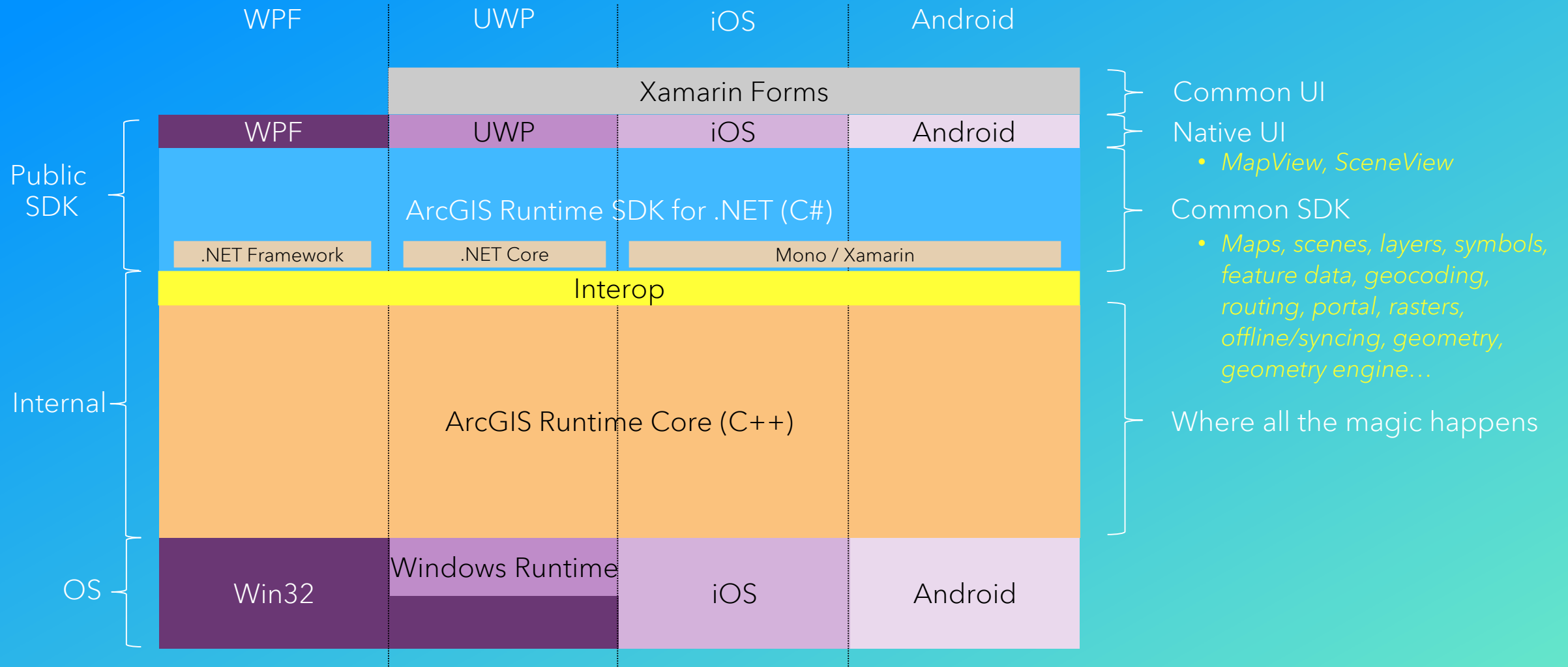


# Architecture



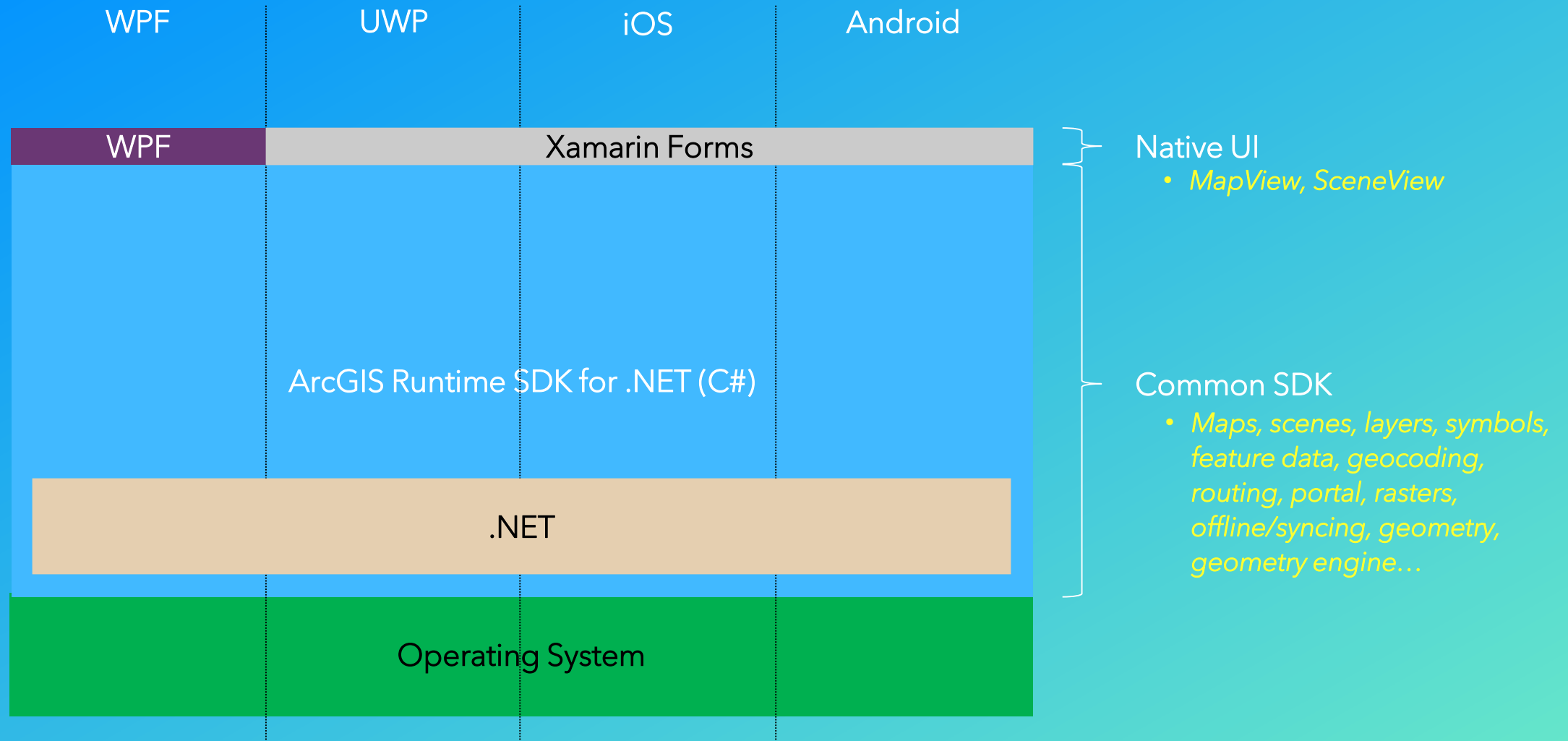
# ArcGIS Runtime SDK for .NET

## Architecture Diagram



# ArcGIS Runtime SDK for .NET

A simpler view...



# Toolkit



Esri / **arcgis-toolkit-dotnet** Unwatch 38 Star 55 Fork 75

Code Issues 4 Pull requests 0 Projects 0 Wiki Insights Settings

Toolkit for ArcGIS Runtime SDK for .NET Edit

arcgis-runtime-sdk uwp wpf xamarin-forms xamarin-android xamarin-ios xamarin native-development toolkit csharp xaml Manage topics

471 commits 4 branches 8 releases 10 contributors Apache-2.0

Branch: master New pull request Create new file Upload files Find file Clone or download

File	Commit Message	Time Ago
build	Remove build warnings caused by XamlTypeInfo.g.cs	4 years ago
src	Fixed default value for Forms.LayerLegend and allow setting of proper...	an hour ago
.gitignore	Update to v100.2	3 months ago
CONTRIBUTING.md	Added contributing guidelines and link to nuget	4 years ago
README.md	Added TimeSlider description	15 hours ago
appveyor.yml	Update appveyor.yml	2 months ago
license.txt	Updated nuspec, license, and readme.	a year ago

README.md

## ArcGIS Runtime SDK for .NET - Toolkit

The ArcGIS Runtime SDK for .NET Toolkit contains controls and utilities you can use with ArcGIS Runtime SDK for .NET.

# Demo: Toolkit



# Toolkit

- <https://github.com/Esri/arcgis-toolkit-dotnet>
- Early beta of toolkit v100.x on Nuget.org
- AppVeyor build for Pull Requests and master
- Code analyzers enforce coding guidelines
- Beta update planned for Q1 2018
  - Compass
  - Legend
  - ScaleLine
  - TimeSlider
- Roadmap...
  - Popup UI
  - Table of contents
  - Template picker / editing toolbar
  - Measure toolbar

# Tips and Tricks





The background features a gradient from light blue to teal. On the left, there are several overlapping, wavy, semi-transparent blue shapes that resemble topographic contour lines or liquid ripples. On the right, there are more complex, wavy shapes in shades of purple and magenta, also appearing semi-transparent and layered. The overall aesthetic is modern and abstract.

New samples

# New Samples

This screenshot shows the GitHub repository page for 'Esri / arcgis-runtime-samples-dotnet'. The repository has 55 Unwatched items, 118 Stars, and 285 Forks. It contains 1,614 commits, 17 branches, and 9 releases. The repository is managed by Apache-2.0. A table of recent commits is visible, including one by 'nCastel' titled 'Viewshed (Location) sample (#423)'.

Commit	Author	Message	Time
62c2caa	nCastel	Viewshed (Location) sample (#423)	7 days
		Certification fixes (#364)	3 months
		Updated master to latest release.	a year
		Updated master to latest release.	a year
		Revert "Merge pull request #313 from Esri/thad/statisticalquery-group..."	5 months
		Update license file per latest conversations.	3 years

## arcgis-runtime-samples-dotnet

This project contains samples for the ArcGIS Runtime SDK for .NET including WPF, UWP and Xamarin platforms.

### Samples - Table of Contents

This screenshot shows the 'Sample Code' page of the ArcGIS Runtime SDK for .NET. It provides instructions on how to get the code from GitHub and lists various sample categories such as Analysis, Line of Sight, and Viewshed. A 'Get the Code from GitHub' button is prominently displayed.

## ArcGIS Runtime SDK for .NET Samples

Viewing: **WPF** | UWP | Android | iOS | Forms

[Get the Code from GitHub](#)

Get hands-on with version 100.2.1 of ArcGIS Runtime SDK for .NET by using the samples, which illustrate the variety of mapping and GIS capabilities you can add to your own applications.

You have some choices for getting started with sample code, described on this page:

- Samples in GitHub
- The code samples here, on this SDK website

### Samples in GitHub

The code samples described on this page are also available on GitHub (choose the master branch). With a free GitHub account, you can:

This screenshot shows the API Reference page for the 'ArcGISFeature Class'. It details the class's inheritance hierarchy, namespace, assembly, and syntax. A code snippet is provided for the class definition.

## ArcGIS Runtime SDK for .NET

### ArcGISFeature Class

Represents a row in a `ArcGISFeatureTable`.

#### Inheritance Hierarchy

- System.Object
- Esri.ArcGISRuntime.Data.GeoElement
- Esri.ArcGISRuntime.Data.Feature
- Esri.ArcGISRuntime.Data.ArcGISFeature

Namespace: Esri.ArcGISRuntime.Data  
Assembly: Esri.ArcGISRuntime (in Esri.ArcGISRuntime.dll) Version: 100.2.1.0

#### Syntax

```
CF VB  
public sealed class ArcGISFeature : Feature, ILoadable
```

The `ArcGISFeature` type exposes the following members.

#### Properties

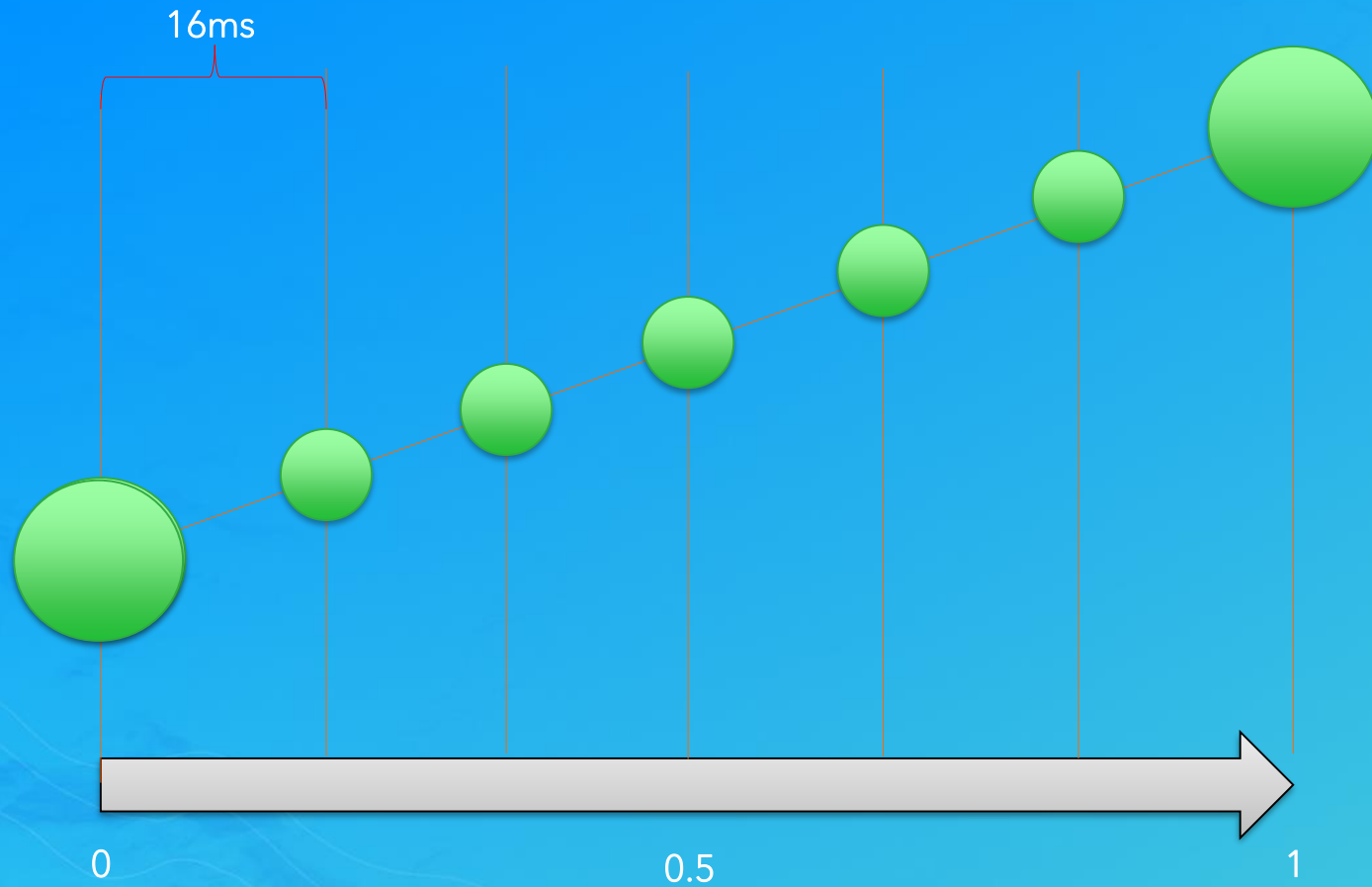
Name	Description
Attributes	Gets all attributes of the geo element. (Inherited from <code>GeoElement</code> .)
CanEditAttachments	Gets a value indicating whether attachments on this feature can be edited.



The background features a gradient from light blue at the top to a darker teal at the bottom. On the left side, there are several overlapping, wavy, semi-transparent blue shapes that resemble topographical contours or liquid splashes. On the right side, there are similar wavy shapes in shades of purple and magenta, also overlapping and semi-transparent.

# Animating graphics and features

# Frame-by-frame animation



# Frame-by-frame animation

Framebased event classes:

WPF and UWP

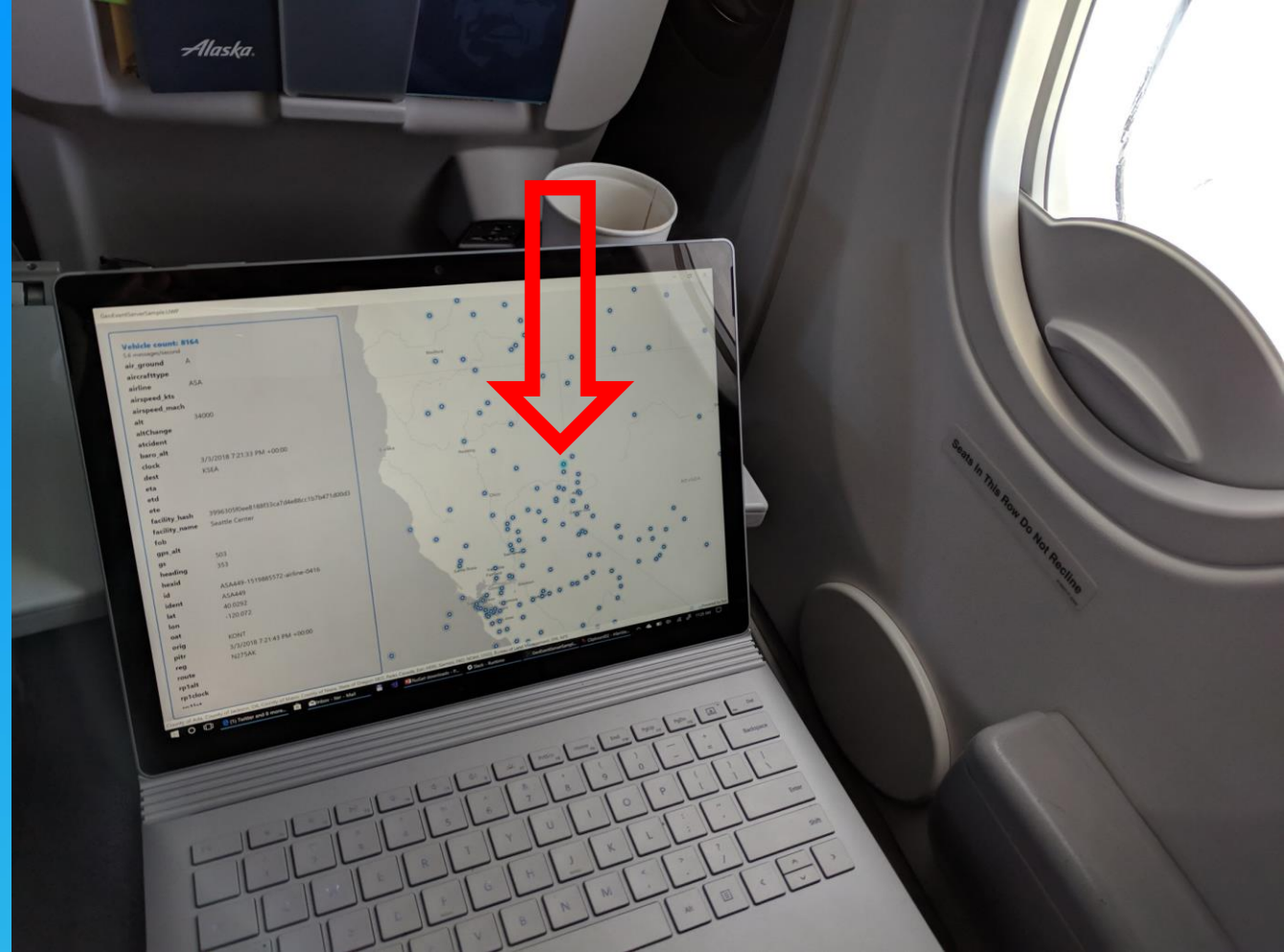
CompositionTarget.Rendering

Android:

Android.Animation.TimeAnimator

iOS:

CoreAnimation.CADisplayLink



Full source-code in "GeoEvent Server Streaming Sample"

<https://github.com/Esri/arcgis-runtime-demos-dotnet>

The background features a gradient from light blue to teal. On the left, there are several overlapping, wavy, semi-transparent blue shapes that resemble topographic contour lines or liquid ripples. On the right, there are similar wavy shapes in shades of purple and magenta, also semi-transparent and overlapping. The overall effect is a modern, abstract, and fluid design.

# Renderers



# Renderers

The hidden secrets...

```
{
  "renderer": {
    "type": "heatmap",
    "blurRadius": 10,
    "colorStops": [
      { "ratio": 0, "color": [0,0,0,0] },
      { "ratio": 0.01, "color": [133,193,200,0] },
      { "ratio": 1, "color": [255,255,200,0] },
    ],
    "maxPixelIntensity": 1000,
    "minPixelIntensity": 0
  }
}
```

```
Renderer myRenderer = Renderer.FromJson(json);
```

<https://developers.arcgis.com/web-map-specification/objects/heatmapRenderer/>

<https://developers.arcgis.com/web-map-specification/objects/visualVariable/>

Western  
Addition

San Francisco

Mission  
District

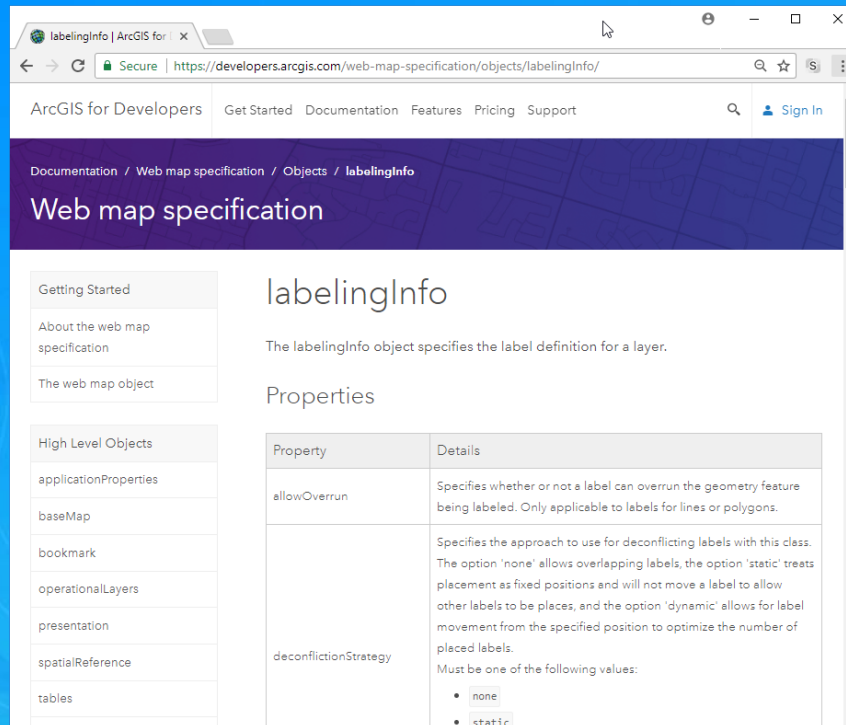




# Labeling

# Labeling

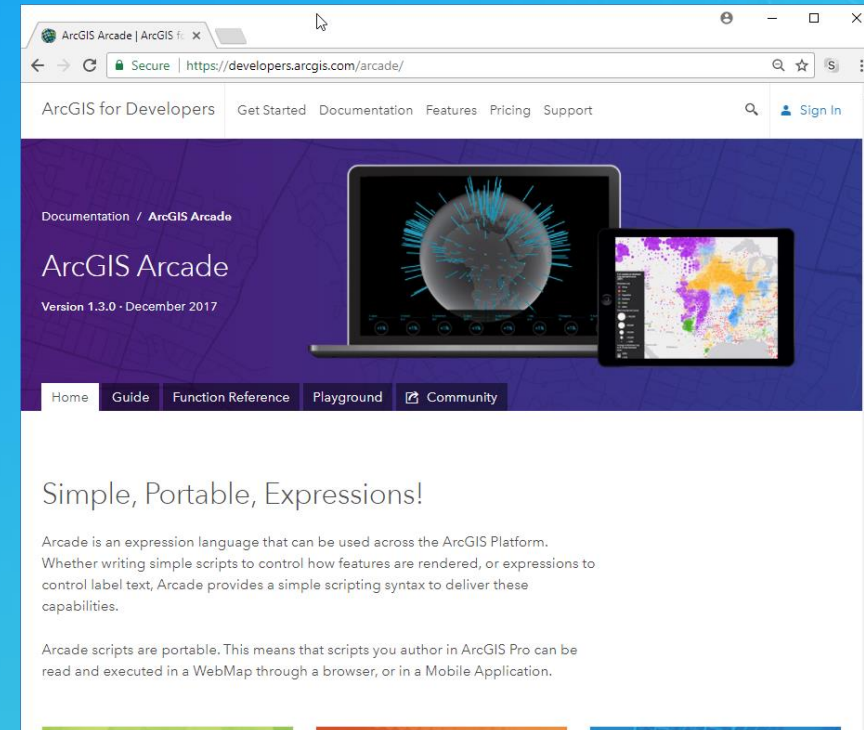
<https://developers.arcgis.com/web-map-specification/objects/labelingInfo/>



The screenshot shows the ArcGIS Developers website page for the `labelingInfo` object. The page is titled "labelingInfo" and is part of the "Web map specification" documentation. It includes a navigation menu with "Getting Started", "About the web map specification", and "The web map object". A sidebar on the left lists "High Level Objects" such as `applicationProperties`, `baseMap`, `bookmark`, `operationalLayers`, `presentation`, `spatialReference`, and `tables`. The main content area describes the `labelingInfo` object and lists its properties:

Property	Details
<code>allowOverrun</code>	Specifies whether or not a label can overrun the geometry feature being labeled. Only applicable to labels for lines or polygons.
<code>deconflictionStrategy</code>	Specifies the approach to use for deconflicting labels with this class. The option 'none' allows overlapping labels, the option 'static' treats placement as fixed positions and will not move a label to allow other labels to be placed, and the option 'dynamic' allows for label movement from the specified position to optimize the number of placed labels. Must be one of the following values: <ul style="list-style-type: none"><li><code>none</code></li><li><code>static</code></li></ul>

<https://developers.arcgis.com/arcade/>



The screenshot shows the ArcGIS Arcade website. The page is titled "ArcGIS Arcade" and is part of the "ArcGIS for Developers" documentation. It includes a navigation menu with "Home", "Guide", "Function Reference", "Playground", and "Community". The main content area features a large image of a laptop and a tablet displaying maps. Below the image, the text reads: "Simple, Portable, Expressions!". The text describes Arcade as an expression language that can be used across the ArcGIS Platform, whether writing simple scripts to control how features are rendered, or expressions to control label text. It also states that Arcade scripts are portable, meaning they can be read and executed in a WebMap through a browser, or in a Mobile Application.

The background features a gradient from light blue to teal. On the left, there are several overlapping, wavy, semi-transparent shapes in various shades of blue. On the right, there are similar wavy shapes in shades of purple and magenta, some with a pixelated or mosaic-like texture.

# Python Scripts

# Python

- ArcGIS Runtime Local Server

```
# Import necessary modules
import arcpy
import os

# Set variables from input parameters.
workspace = arcpy.GetParameterAsText(0)

# Set the current workspace
arcpy.env.workspace = str(workspace)

# Create the output table.
outTableFc = arcpy.CreateTable_management('in_memory', 'datasets')

# Set the field names and definitions for the output table.
arcpy.AddField_management(outTableFc, 'NAME', 'TEXT', '', '', 260)
arcpy.AddField_management(outTableFc, 'DATATYPE', 'TEXT', '', '', 260)

# Create an insert cursor to insert rows into the output table.
fields = ['NAME', 'DATATYPE']
cur = arcpy.da.InsertCursor(outTableFc, fields)

# Feature
datasets = arcpy.ListFeatureClasses()

# For each dataset insert the name into a new row in the table.
for dataset in datasets:
    cur.insertRow((dataset, 'Feature Class'))

# Mosaic
datasets = arcpy.ListDatasets(feature_type='mosaic')
```



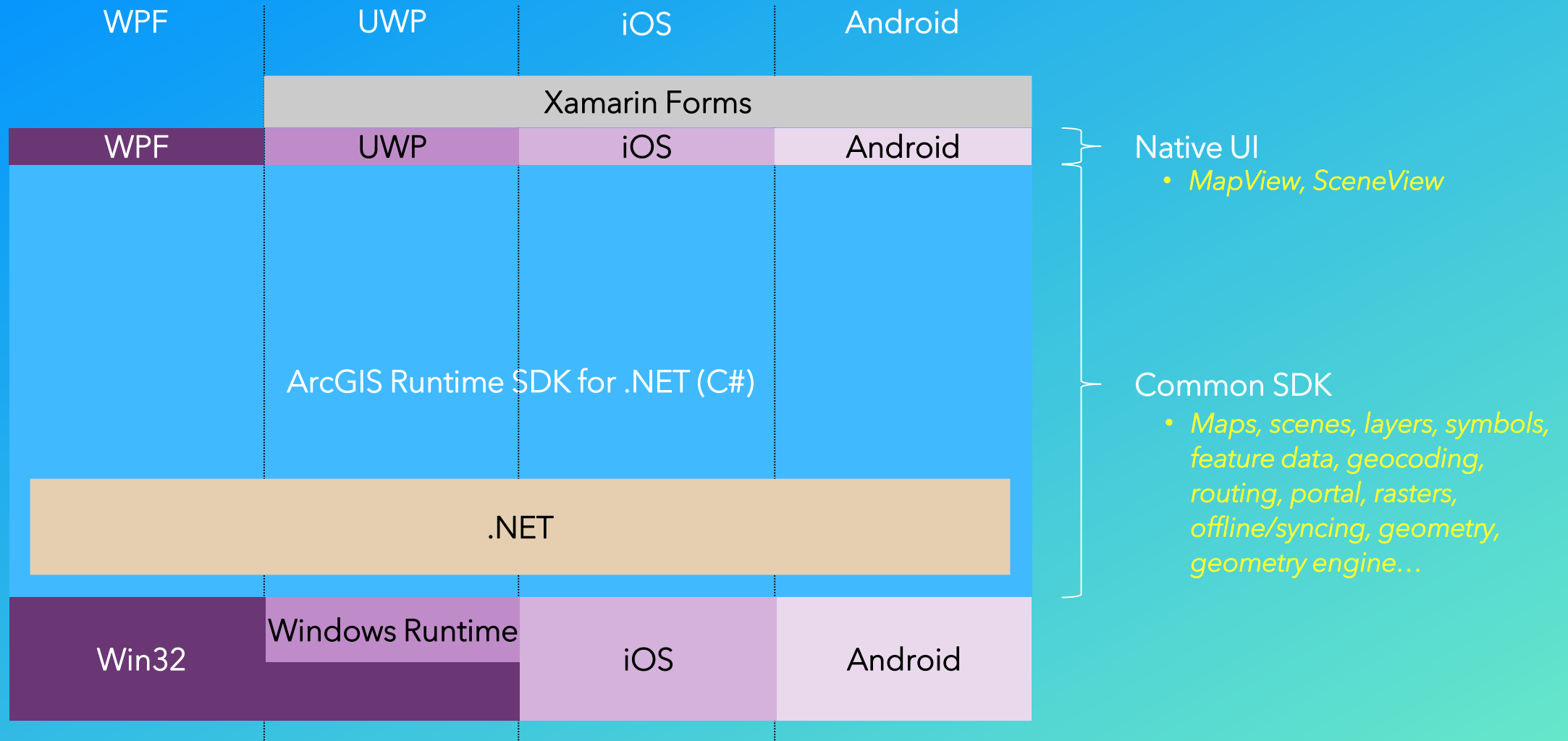
# Cross Platform Dev

The background features a teal-to-blue gradient. In the top right, there are faint, light blue topographic contour lines. In the bottom left, there are layered, wavy shapes in shades of purple and teal, resembling a stylized landscape or abstract graphic.



# ArcGIS Runtime SDK for .NET

A simpler view...





# Demo: Cross Platform

The background features a gradient from light blue to teal. On the left, there are several overlapping, wavy, semi-transparent shapes in various shades of blue. On the right, there are similar wavy shapes in shades of purple and magenta, some with a pixelated or mosaic-like texture.

# .NET Standard

# Resources











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