



ArcGIS Pro SDK for .NET: 2D and 3D, Tool Design, and MVVM

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Session Overview

- ▶ 2 D / 3 D considerations in the ArcGIS Pro SDK
- ▶ Tool Deign
- ▶ MVVM Pattern

Map

- ▶ 2D and 3D.
- ▶ Create with MapFactory.
 - ▶ Use Defaults.

```
QueuedTask.Run(() => {  
    MapFactory.CreateMap("Map", MapType.Map,  
        MapViewingMode.Map, Basemap.Streets);  
})
```

```
string mxd = @"C:\Data\SDK\ForDemo.mxd";  
var item = ItemFactory.Create(mxd, ItemFactory.ItemType.PathItem);  
await Project.Current.AddAsync(item);  
  
//Or, use map factory  
await MapFactory.CreateMapAsync(item);
```

MapView.ViewingMode

- ▶ MapViewingMode enumeration
 - ▶ Map: Data is displayed on a 2D surface, only valid for 2D Maps.
 - ▶ SceneLocal: Data is projected on to a surface, only valid for 3D Scenes.
 - ▶ SceneGlobal: Data is projected on to a spherical globe, only valid for 3D Scenes.

```
var mapView = MapView.Active;  
bool is2D = (mapView.ViewingMode == MapViewingMode.Map);
```

Navigation and Interaction

- ▶ Same methods for 2D and 3D
- ▶ SelectFeatures, GetFeatures
- ▶ Overloaded ZoomToAsync and PanToAsync

```
var mapView = MapView.Active;  
var selection = mapView.SelectFeatures(geometry);  
mapView.ZoomToAsync(selection);
```

Camera

- ▶ Defines the display content of a view via its:
 - ▶ Viewing Location: X,Y, Z, Scale
 - ▶ Viewing Direction: Heading/Yaw, Pitch and Roll
- ▶ 2D: X,Y, Scale, Heading/Yaw
- ▶ 3D: X,Y, Z, Heading/Yaw, Pitch, Roll

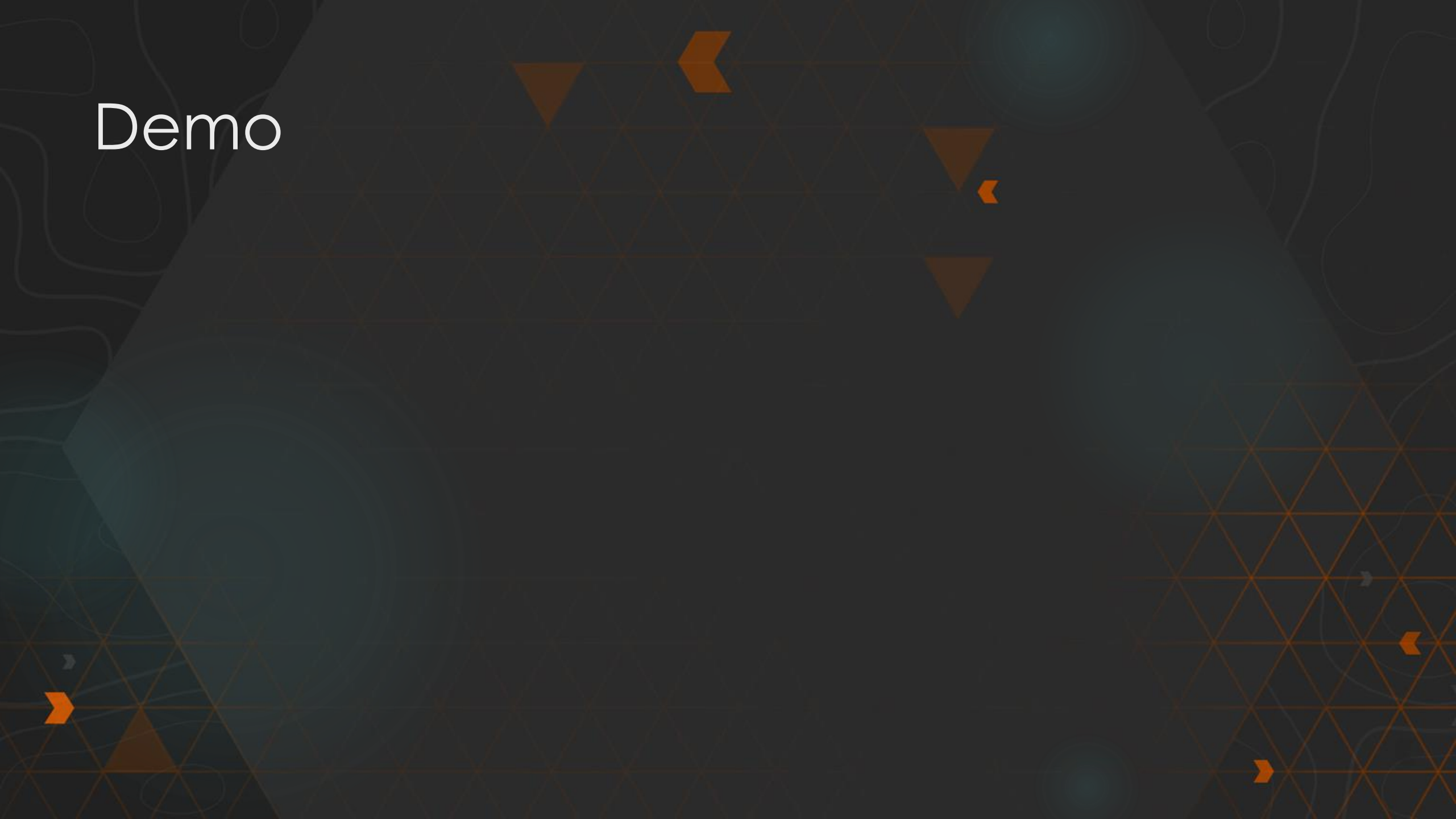
```
var camera = mapView.Camera;  
camera.Pitch = 45.0;  
mapView.ZoomToAsync(camera);
```

Extent

- ▶ Calculated by camera and aspect ratio of the View.
 - ▶ 2D: represents the bounding box in the View.
 - ▶ 3D: represents the viewing area of interest.

```
var extent = mapView.Extent;  
var newExtent = GeometryEngine.Expand(extent, 1.5, 1.5, true);  
mapView.ZoomToAsync(extent);
```

Demo



MapTool

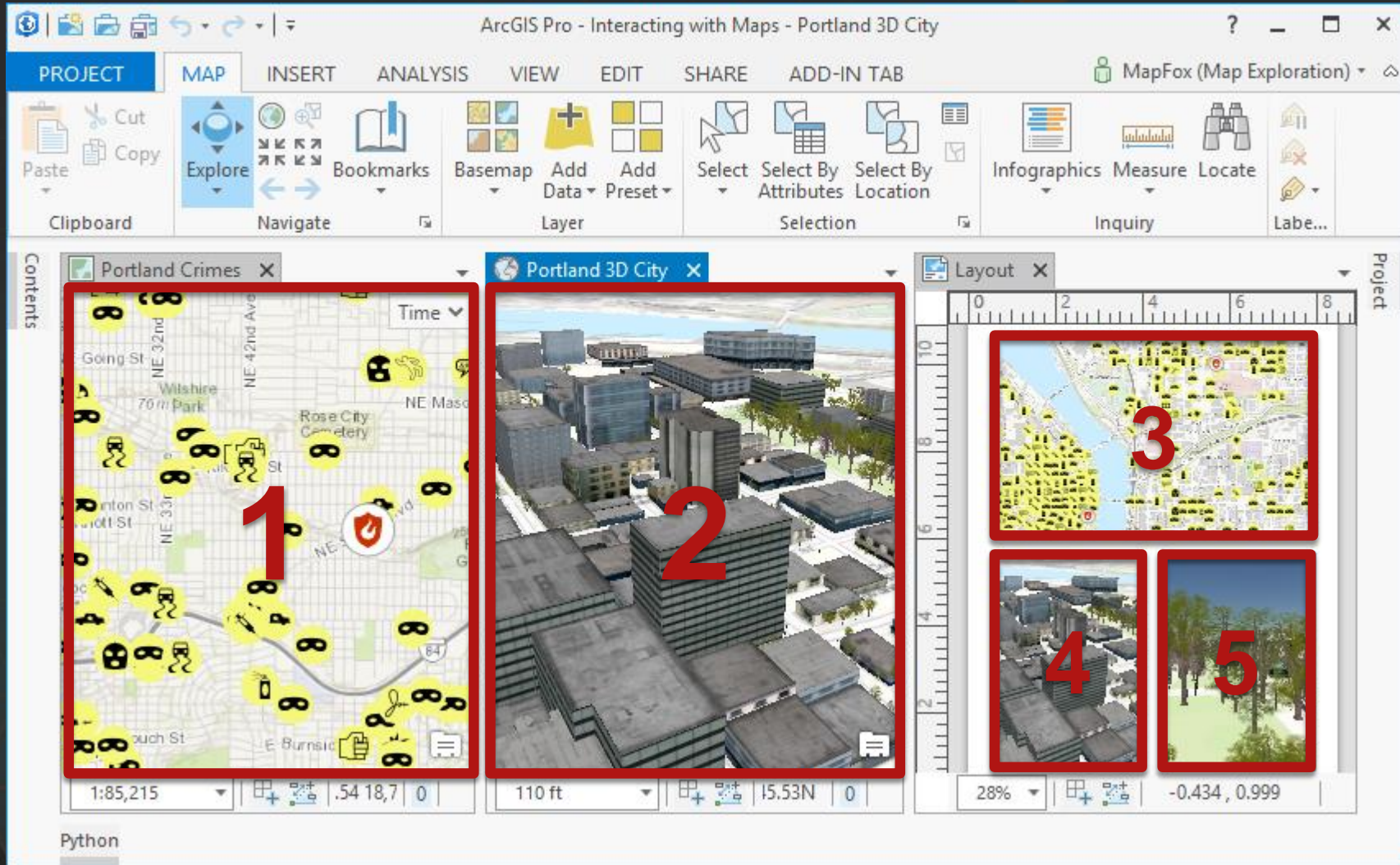
- ▶ Base class representing a tool to perform interactive operations with a MapView.
- ▶ Used to create custom tools for Selection, Identify, Editing, etc.
- ▶ Provides virtual methods for Keyboard and Mouse Events
- ▶ Provides properties to set default behavior of left-click to create a sketch.
 - ▶ Virtual SketchComplete and SketchCancelled methods.

Active MapView

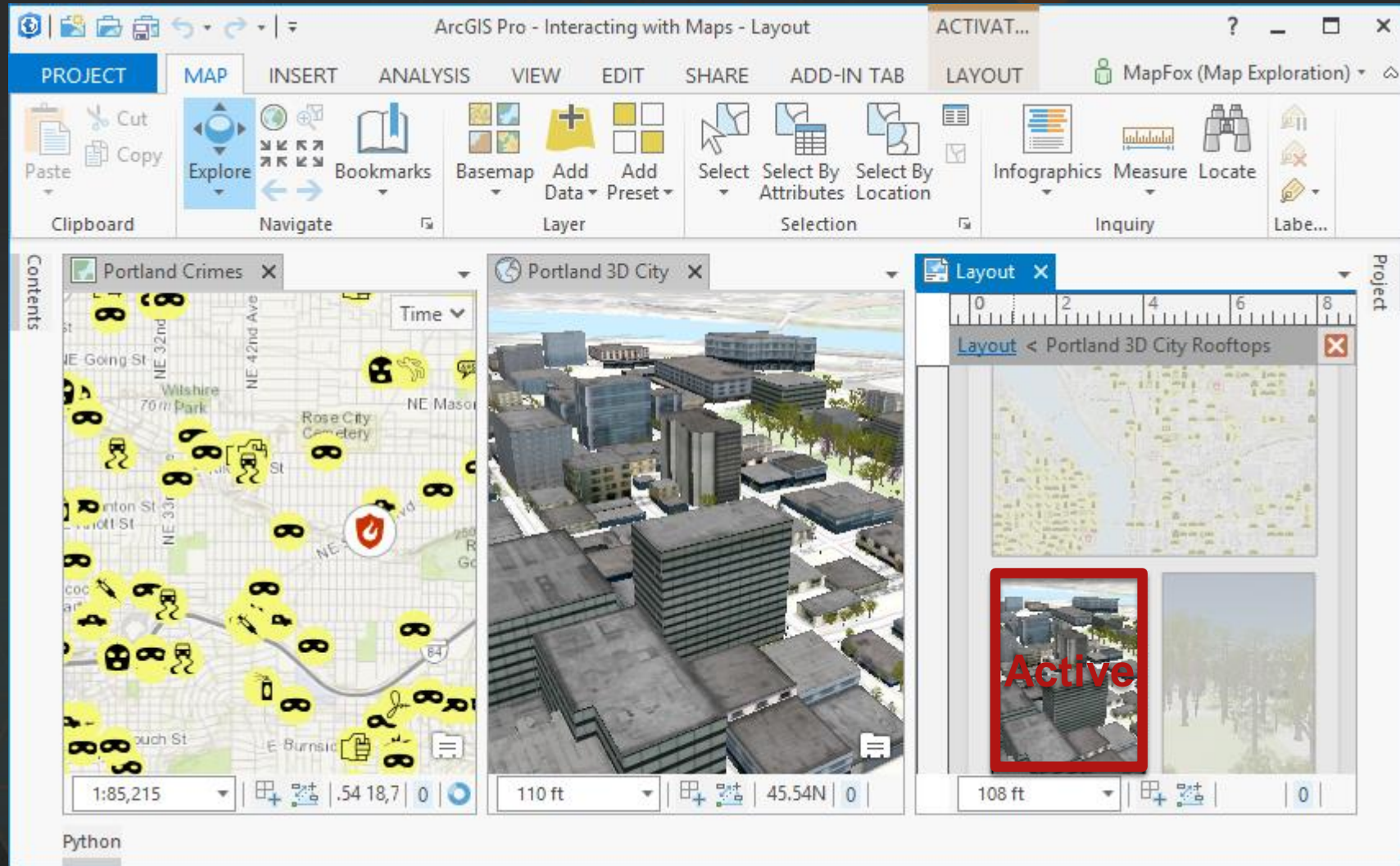
- ▶ ArcGIS Pro is contextual.
 - ▶ Ribbon tabs and commands respond to the active view.
- ▶ MapView.Active
 - ▶ Static property that returns the active map view in the application.
 - ▶ Can be null if there is no active map view.

```
var mapView = MapView.Active;  
if (mapView != null)  
{ .....
```

MapView

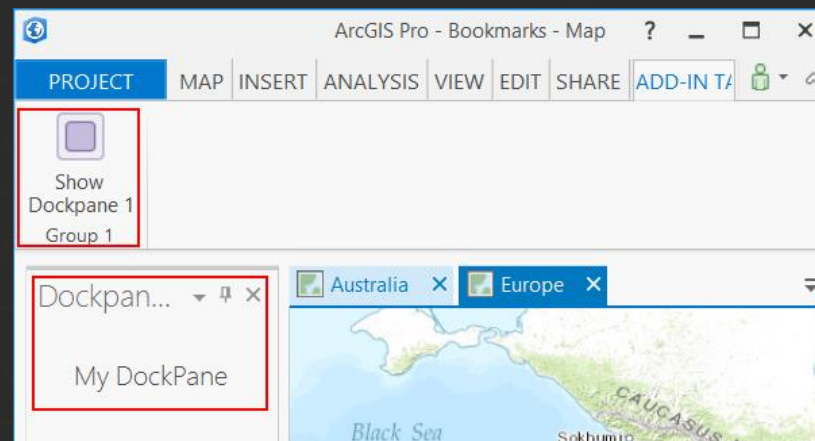


Active MapView



MVVM Pattern in Add-ins

- ▶ Model-View-ViewModel (MVVM) Pattern used for many of the Framework elements
 - ▶ Dockpane, Pane, Custom Control, Property Page
- ▶ What is MVVM?
 - ▶ Pattern used in WPF / .Net
 - ▶ Model: Classes to represent data consumed by the app
 - ▶ View: User interface (UI) elements the user interacts with
 - ▶ ViewModel: Classes that wrap data (coming from a model) and provide business logic for the UI (views)
- ▶ Demo: Dockpane



MVVM Pattern in Add-ins

- ▶ The MVVM patterns in a dockpane Add-in:
 - ▶ Config.daml
 - ▶ see the className references for View and View Model

```
<dockPane id="Demo1Dockpane Dockpane1" caption="Dockpane 1"  
         className="Dockpane1ViewModel" keytip="DockPane"  
         initiallyVisible="true" dock="group" dockWith="esri_core_contentsDockPane">  
  <content className="Dockpane1View" />  
</dockPane>
```

- ▶ Dockpane1.xaml – View ... UI “look & feel” is coded in XAML
- ▶ Dockpane1ViewModel.cs – View Model ... business logic is coded in the view model

Demo: MVVM in a Dockpane

My Identify ✕

Select the layer to View

Select Layer: Crimes ✕ Select

OBJECTID	RecordID	MajorOffense_Type	Address
11390	14266617	Drugs	N GOING ST and N INTERST
12517	14257871	Burglary	4300-4498 block of N MARY
13743	14262727	Disorderly Conduct	N INTERSTATE AVE and N F
19125	14269534	Larceny	1501-1549 block of N GOIN
30699	14265095	DUII	N GOING ST and N INTERST
30880	14259967	Vandalism	4701-4799 block of N INTER
33780	14263212	Larceny	4701-4799 block of N INTER
45926	14265680	Drugs	N GOING ST and N MARYL
49102	14259377	Larceny	1501-1599 block of N PRESC
49500	14266377	Drugs	N INTERSTATE AVE and N

Selected Feature Count by Layer

Feature Layers

- Fire Stations
- Crimes

Exit ArcGIS Pro

Portland Crimes ✕ Portland 3D City

Advanced Patterns and Concepts: Helpful background knowledge

- ▶ Windows Presentation Foundation (WPF)
 - ▶ XAML
 - ▶ Data binding
 - ▶ Commands
 - ▶ Data templates
- ▶ Asynchrony in .NET: Task-based Asynchronous Pattern (TAP)
 - ▶ TAP is based on the `Task` and `Task<TResult>` types in the `System.Threading.Tasks` namespace
 - ▶ `Task<TResult>` types represent arbitrary asynchronous operations.

ArcGIS Pro SDK for .NET Sessions

Wed 11 Nov 10:15 - 11:15 A 03/04

ArcGIS Pro SDK for .NET: Programming Patterns

Technical Workshop | Desktop & Pro

Wed 11 Nov 13:45 - 14:45 B 07/08

ArcGIS Pro SDK for .NET: 2D and 3D, Tool Design, and MVVM

Technical Workshop | Desktop & Pro

Thu 12 Nov 13:45 - 14:45 B 05

ArcGIS Pro SDK for .NET: Editing and Geodatabase Integration

Technical Workshop | Desktop & Pro