Building Custom Python Add-Ins for ArcMap

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Goals of the Session

1. What is a python add-in & why build them?
2. Let’s build the world’s simplest add-in!
3. Highlight 3 add-ins we’ve created at Connexus.
4. Touch on add-ins in ArcGIS Pro!

Please ask questions as we go along!

What is an add-in?

An add-in is a customization, such as a collection of tools on a toolbar, that plugs into an ArcGIS Desktop application (i.e., ArcMap, ArcCatalog) to provide supplemental functionality for accomplishing custom tasks.

-Esri

What is an add-in?

An add-in is a customization, such as a collection of tools on a toolbar, that plugs into an ArcGIS Desktop application (i.e., ArcMap, ArcCatalog) to provide supplemental functionality for accomplishing custom tasks.

-Esri

Think Custom:

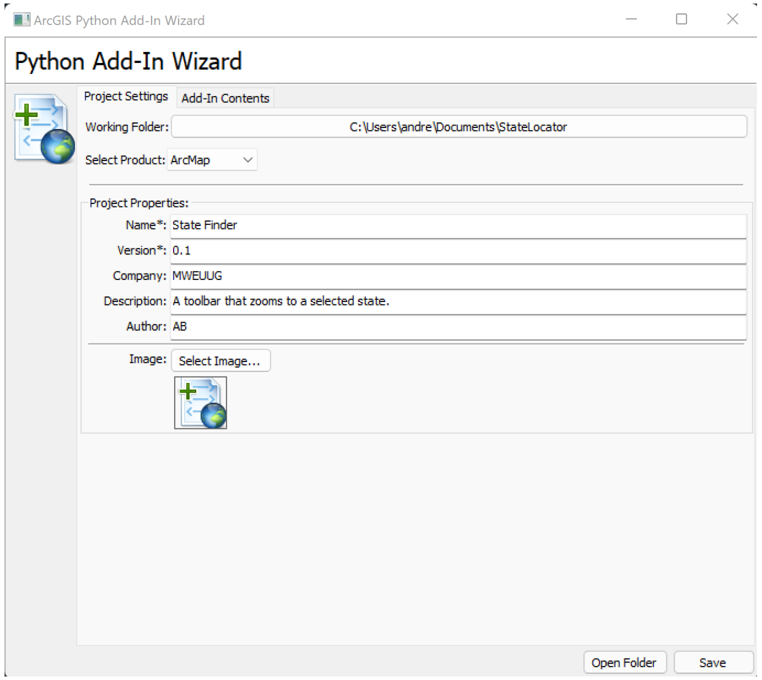
- Toolbars
- Buttons
- Comboboxes
- Menus

What is a *Python* add-in?

ArcGIS 10.1 introduced Python to the list of languages for authoring Desktop add-ins.

To simplify the development of Python add-ins, you must download and use the **Python Add-In Wizard.**

The result is a single compressed file with a **.esriaddin** extension.



ArcGIS Python Add-In Wizard

Python Add-In Wizard

Project Settings | Add-In Contents

Working Folder: C:\Users\andre\Documents\StateLocator

Select Product: ArcMap

Project Properties:

Name*: State Finder

Version*: 0.1

Company: MWEUUG

Description: A toolbar that zooms to a selected state.

Author: AB

Image: Select Image...

Open Folder | Save

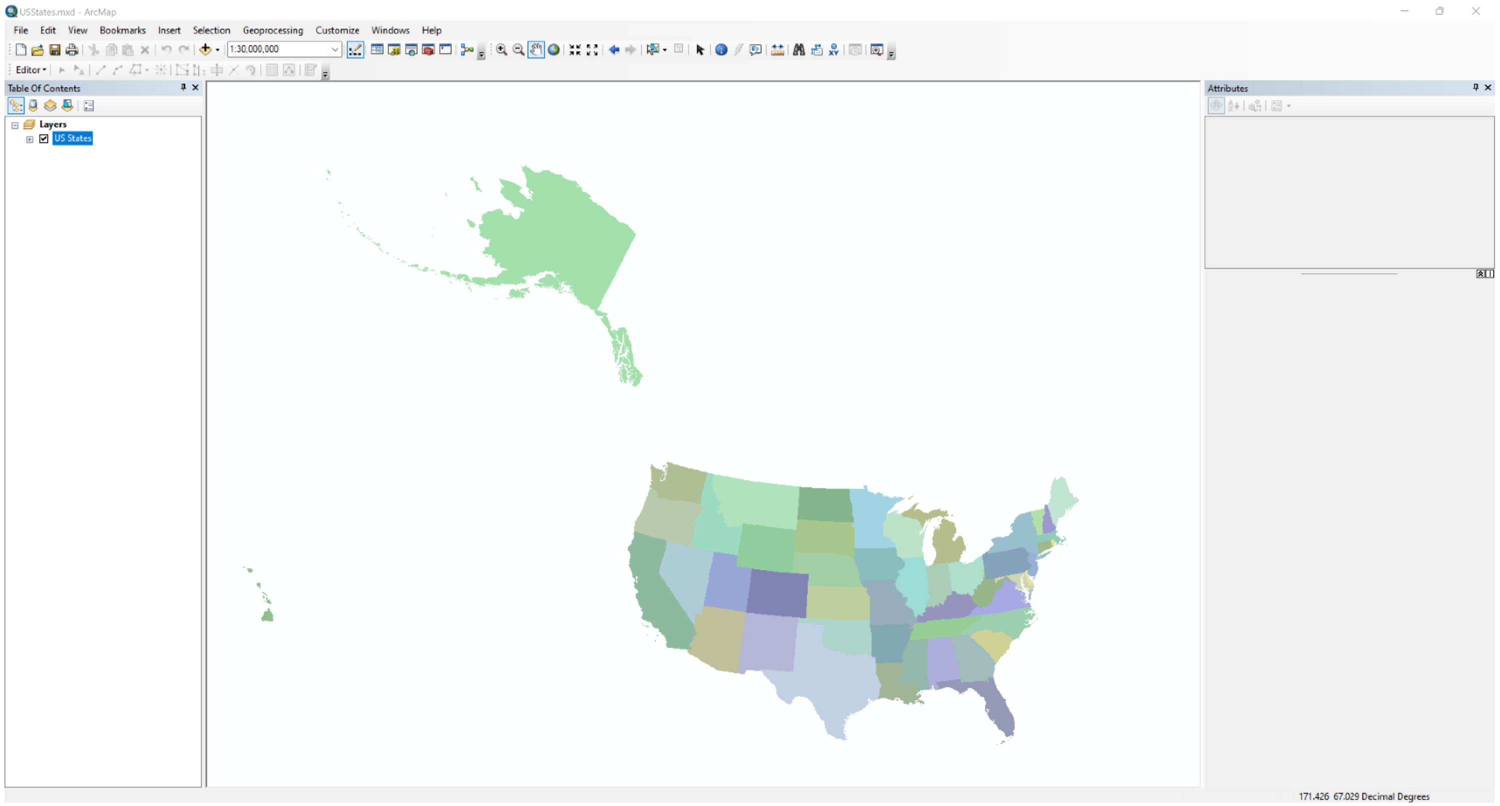
Why build them?

- Add-ins can perform a repetitive task involving many steps with the ‘push of a button’.
- Ability for non-GIS people to get a task done that they would otherwise ask us to do.
- Easily shared across an organization.
- Enhances the overall User experience.
- Often, they pay for themselves many times over.

Let's Build One!

World's Simplest Add-in: ***State Locator***

"I just want a button to zoom to a state I choose"


USStates.mxd - ArcMap
File Edit View Bookmarks Insert Selection Geoprocessing Customize Windows Help
1:30,000,000
Editor
Table Of Contents
Layers
US States
Attributes
171.426 67.029 Decimal Degrees

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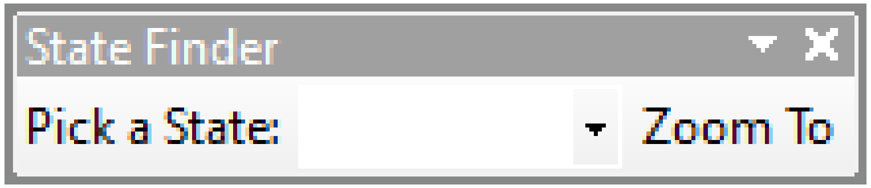
Let’s Build One!

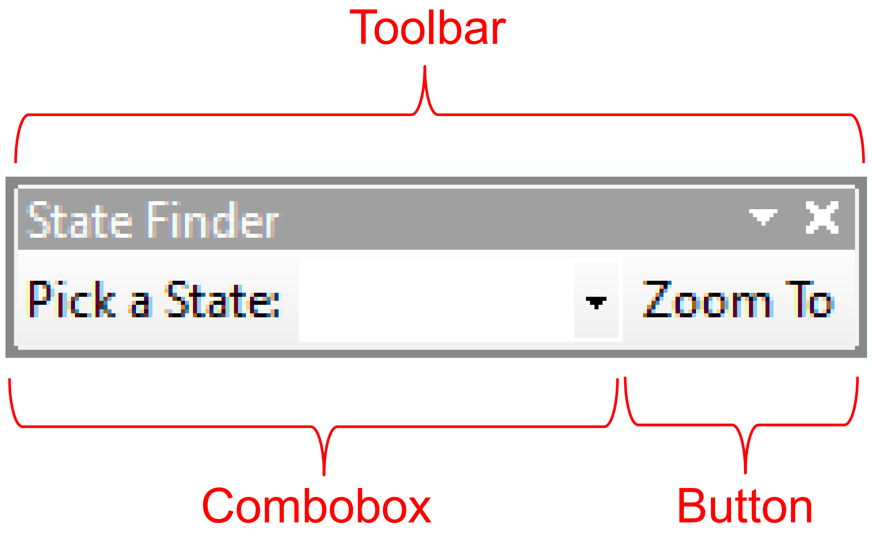
How the **State Finder** will work:

1. Choose a state from a prepopulated list.
2. Press ‘Zoom To’ selects that state and zooms to it.



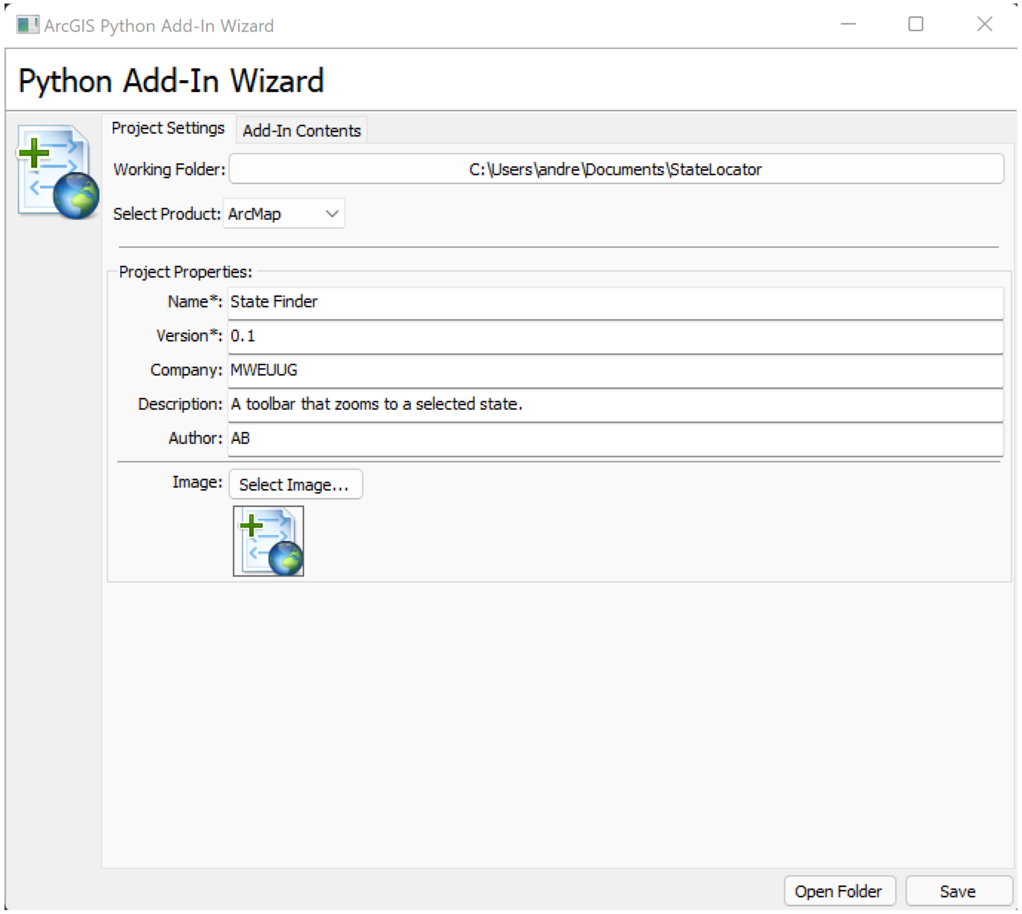
Let's Build One!

We need to create 3 components, or classes, for our add-in:



Let’s Build One!

STEP 1: Download and open the **Python Add-In Wizard**



Working Folder: C:\Users\andre\Documents\StateLocator

Select Product: ArcMap

Project Properties:

Name*: State Finder

Version*: 0.1

Company: MWEUUG

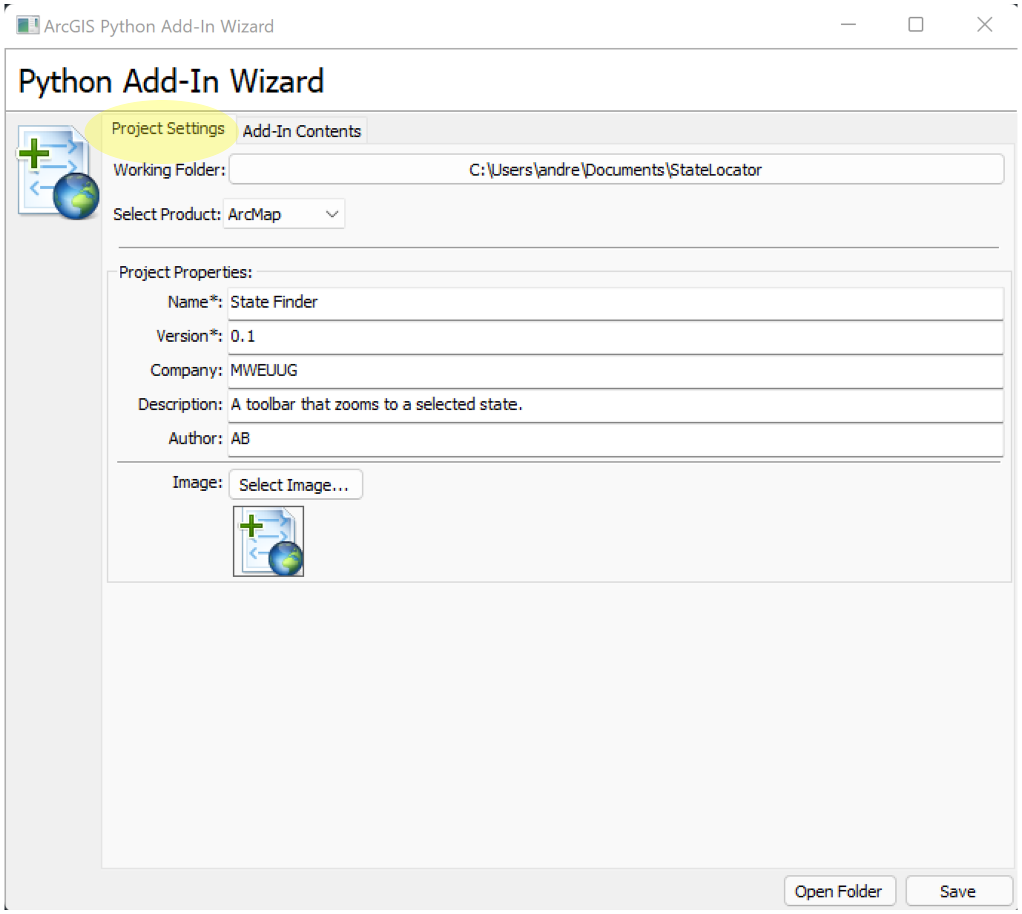
Description: A toolbar that zooms to a selected state.

Author: AB

Image:

Let's Build One!

STEP 2: Define the **Project Settings**



Working Folder: C:\Users\andre\Documents\StateLocator

Select Product: ArcMap

Project Properties:

Name*: State Finder

Version*: 0.1

Company: MWEUUG

Description: A toolbar that zooms to a selected state.

Author: AB

Image: Select Image...

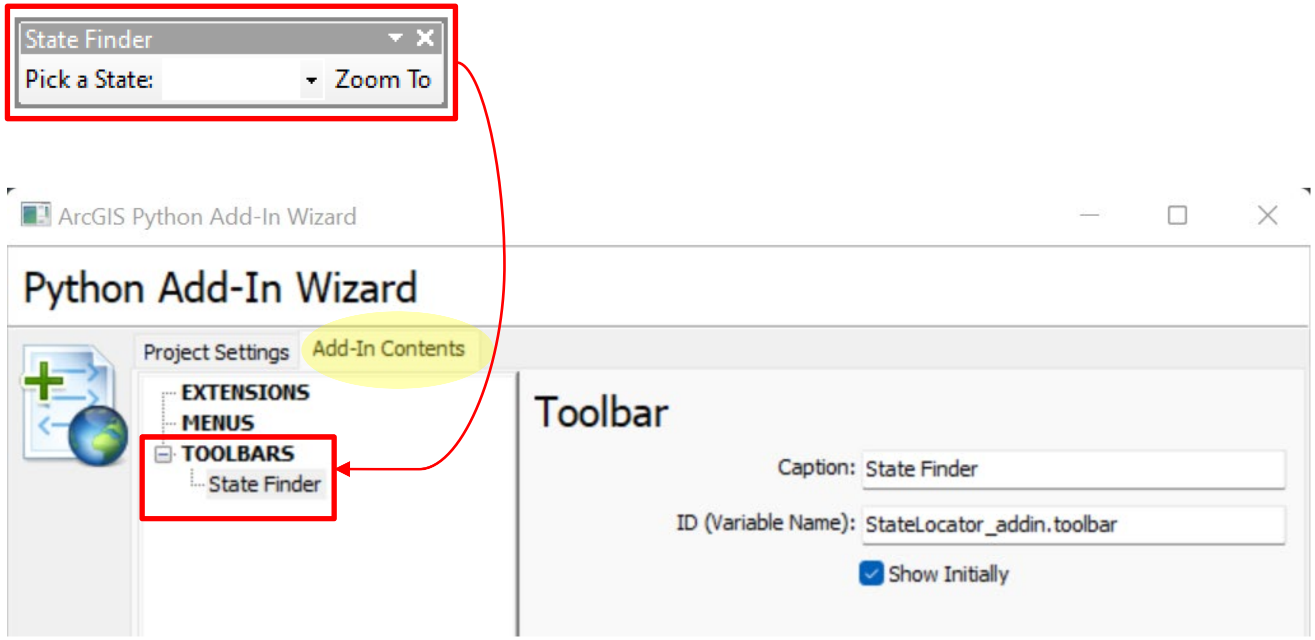
Define Working Folder

Project metadata

Image (if any)

Let’s Build One!

STEP 3: Toggle over to the ’**Add-In Contents**’ and construct the **Toolbar**



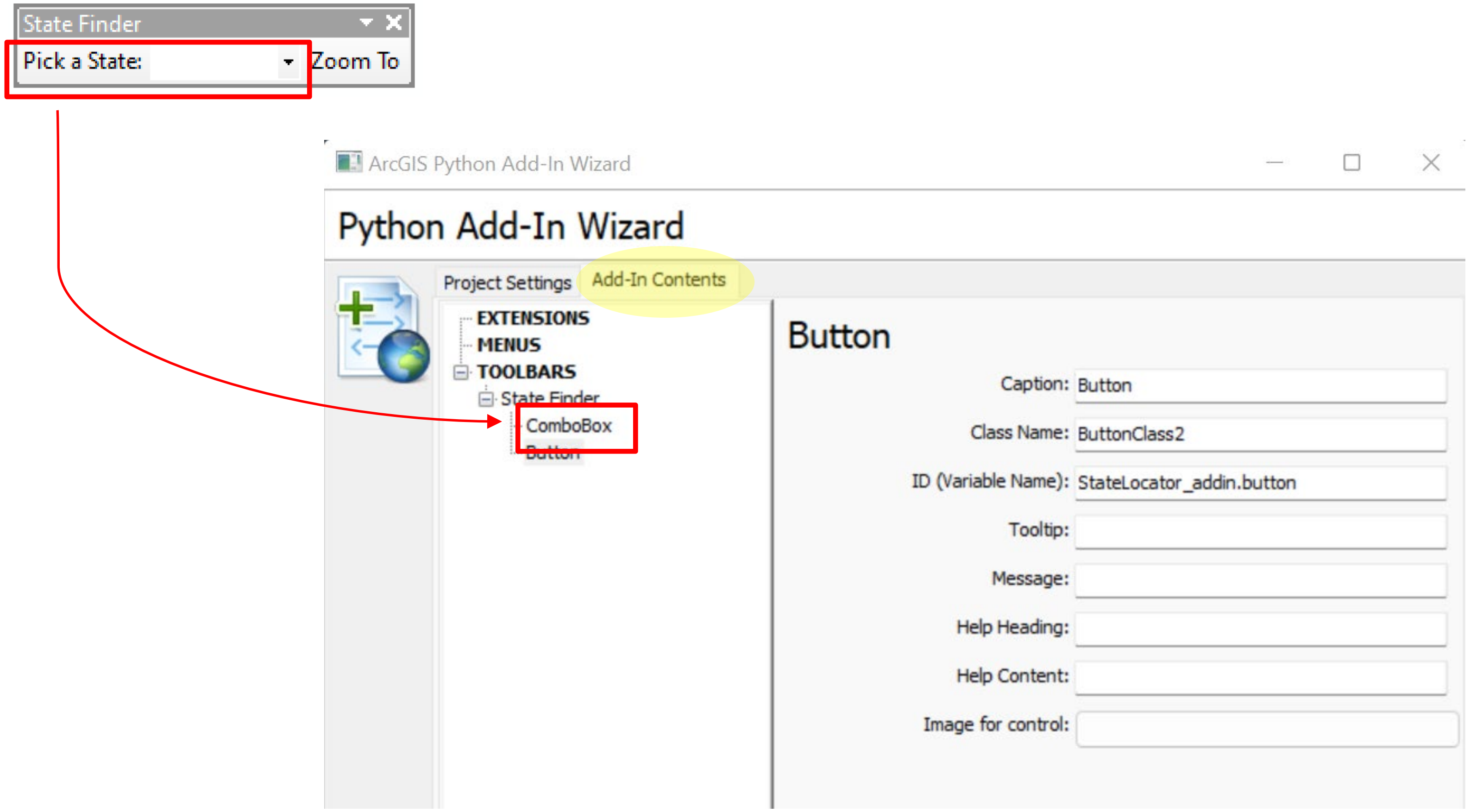
Caption: State Finder

ID (Variable Name): StateLocator_addin.toolbar

[✓] Show Initially

Let’s Build One!

STEP 4: Construct the **Combobox**



ArcGIS Python Add-In Wizard

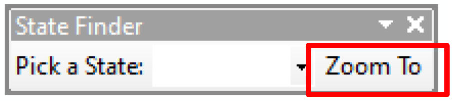
Python Add-In Wizard

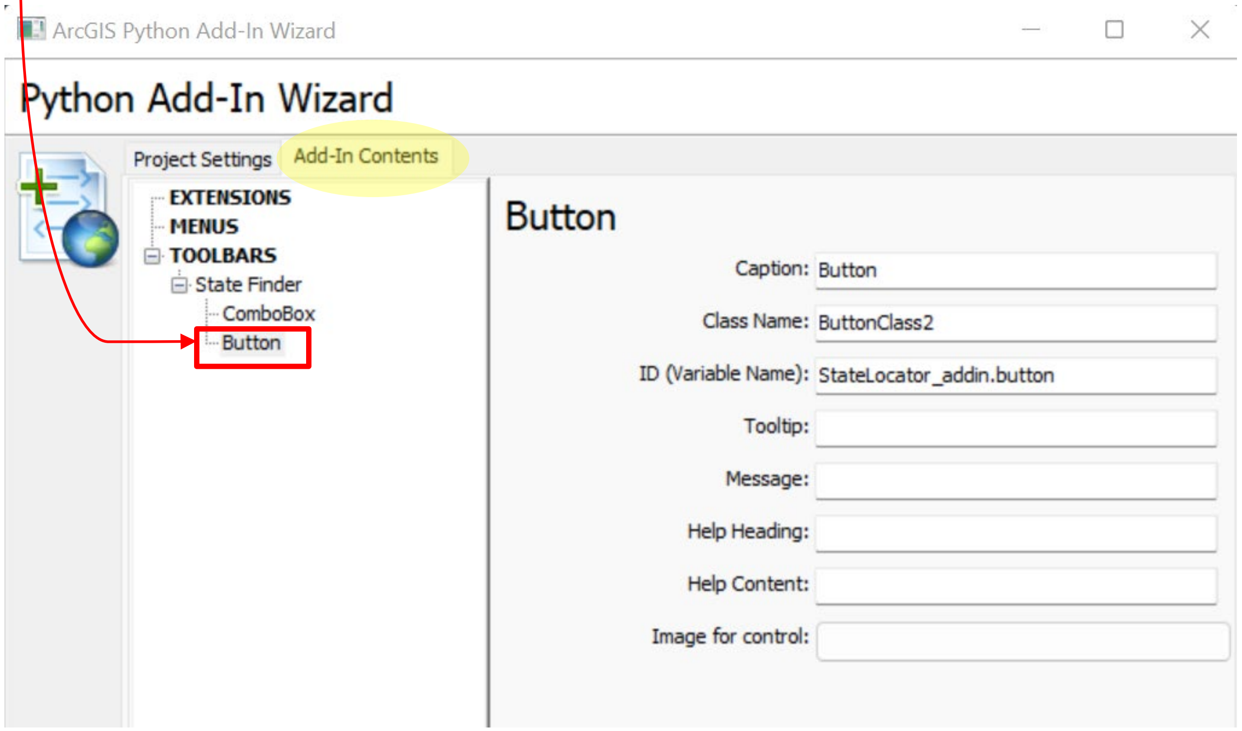
Button

Caption:	Button
Class Name:	ButtonClass2
ID (Variable Name):	StateLocator_addin.button
Tooltip:	
Message:	
Help Heading:	
Help Content:	
Image for control:	

Let's Build One!

STEP 5: Construct the **Button** & Save



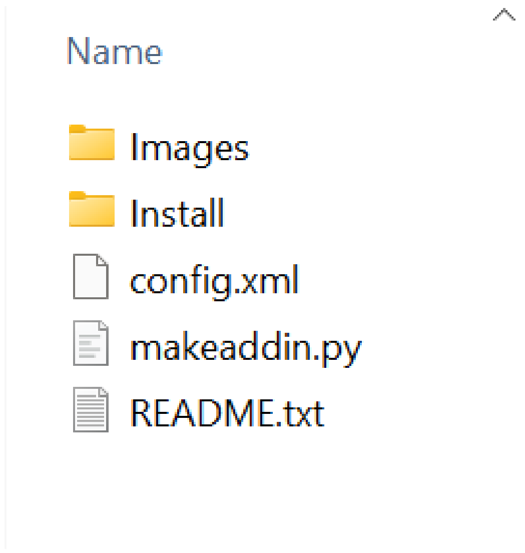


Button

Caption:	Button
Class Name:	ButtonClass2
ID (Variable Name):	StateLocator_addin.button
Tooltip:	
Message:	
Help Heading:	
Help Content:	
Image for control:	

Let’s Build One!

STEP 6: Open the **Working folder**



Name

Images

Install

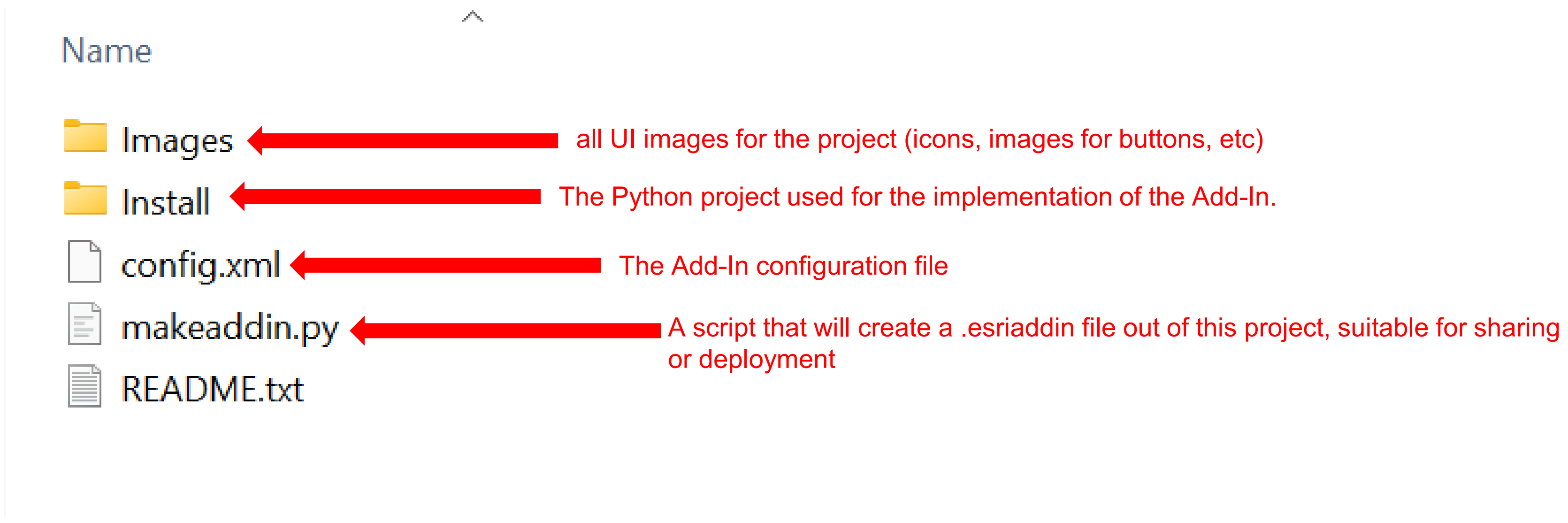
config.xml

makeaddin.py

README.txt

Let’s Build One!

STEP 6: Open the **Working folder**



Name

Images — all UI images for the project (icons, images for buttons, etc)

Install — The Python project used for the implementation of the Add-In.

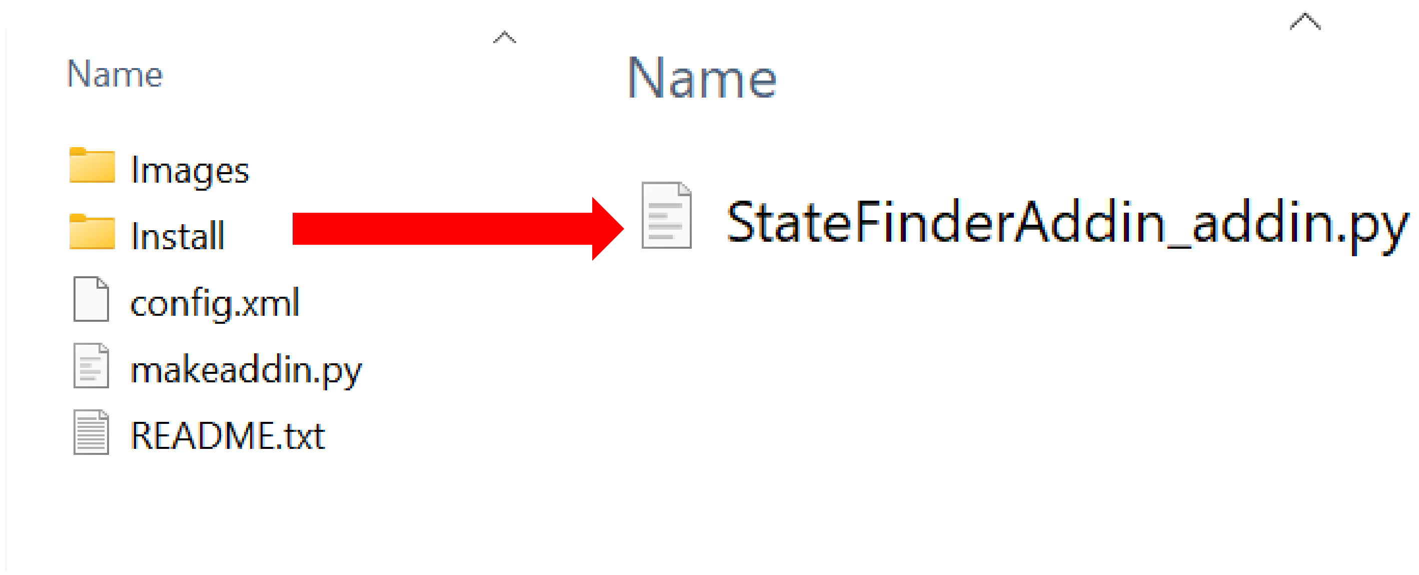
config.xml — The Add-In configuration file

makeaddin.py — A script that will create a .esriaddin file out of this project, suitable for sharing or deployment

README.txt

Let’s Build One!

STEP 7: Open the python script in the **Install** folder

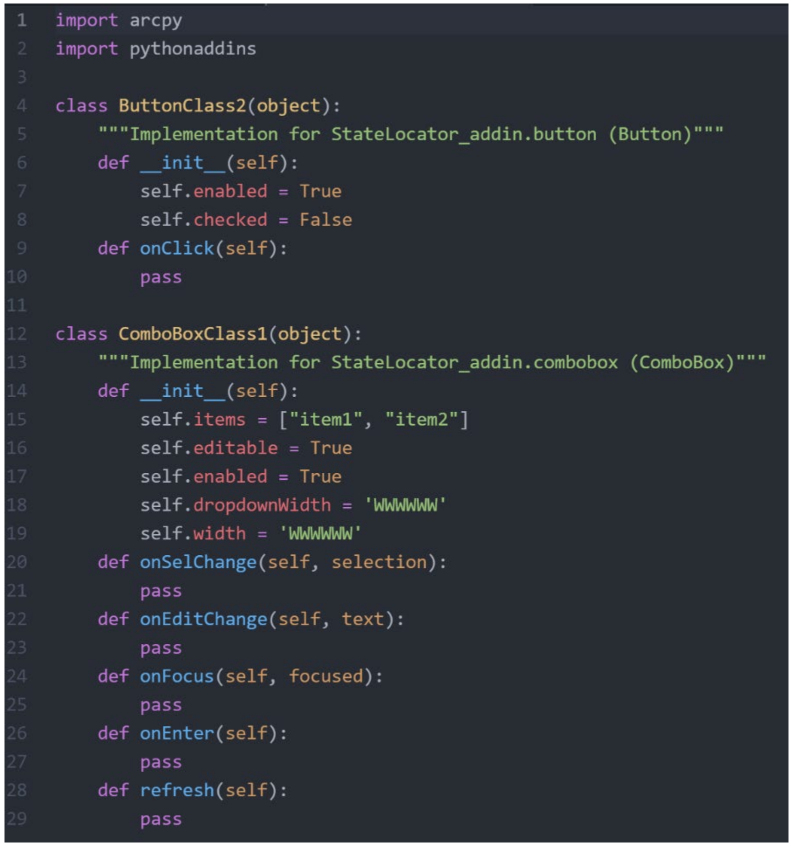


Name
- Images
- Install
- config.xml
- makeaddin.py
- README.txt

Name
- StateFinderAddin_addin.py

Let’s Build One!

STEP 7: Open the python script in the **Install** folder



```python
import arcpy
import pythonaddins

class ButtonClass2(object):
    """Implementation for StateLocator_addin.button (Button)"""
    def __init__(self):
        self.enabled = True
        self.checked = False
    def onClick(self):
        pass

class ComboBoxClass1(object):
    """Implementation for StateLocator_addin.combobox (ComboBox)"""
    def __init__(self):
        self.items = ["item1", "item2"]
        self.editable = True
        self.enabled = True
        self.dropdownWidth = 'WWWWWW'
        self.width = 'WWWWWW'
    def onSelChange(self, selection):
        pass
    def onEditChange(self, text):
        pass
    def onFocus(self, focused):
        pass
    def onEnter(self):
        pass
    def refresh(self):
        pass
```

Button Class

Combobox Class

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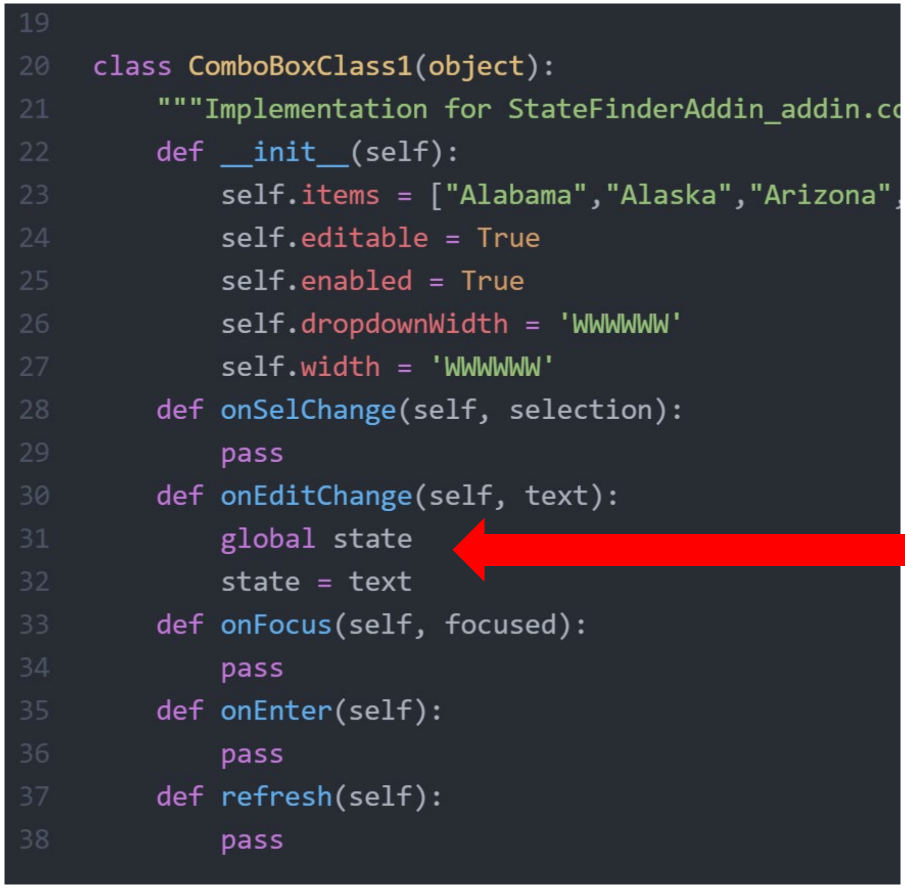
STEP 8: Add your python code to the **ComboBoxClass**



```

class ComboBoxClass1(object):
    """Implementation for StateFinderAddin_addin.co
    def __init__(self):
        self.items = ["Alabama","Alaska","Arizona",
        self.editable = True
        self.enabled = True
        self.dropdownWidth = 'WWWWWW'
        self.width = 'WWWWWW'
    def onSelChange(self, selection):
        pass
    def onEditChange(self, text):
        global state
        state = text
    def onFocus(self, focused):
        pass
    def onEnter(self):
        pass
    def refresh(self):
        pass
```

Added a list of States

Turns the selected State into a global variable

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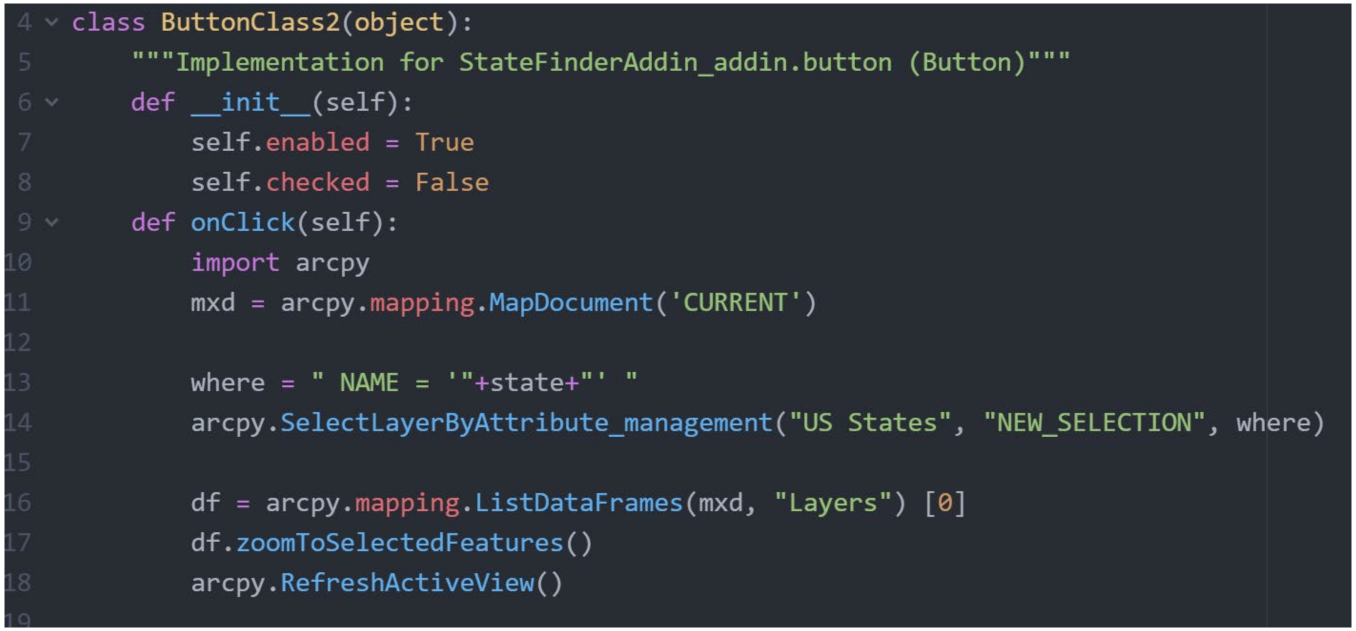
Let's Build One!

STEP 9: Add your python code to the **ButtonClass**, Save file.

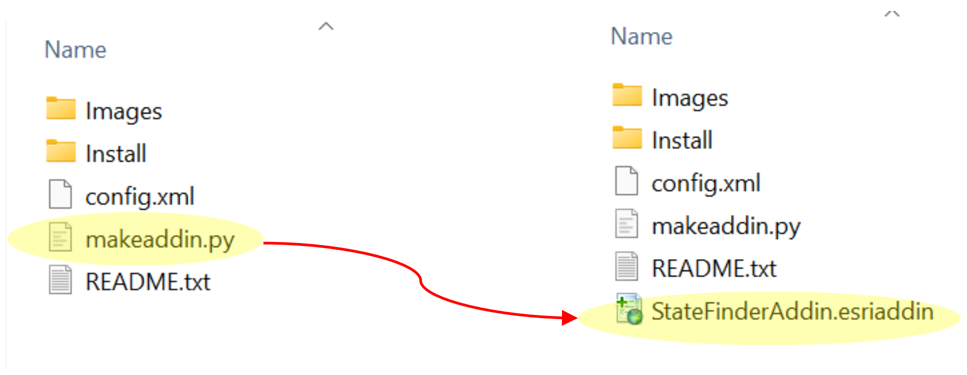


```
class ButtonClass2(object):
    """Implementation for StateFinderAddin_addin.button (Button)"""
    def __init__(self):
        self.enabled = True
        self.checked = False
    def onClick(self):
        import arcpy
        mxd = arcpy.mapping.MapDocument('CURRENT')

        where = " NAME = '"+state+"' "
        arcpy.SelectLayerByAttribute_management("US States", "NEW_SELECTION", where)

        df = arcpy.mapping.ListDataFrames(mxd, "Layers") [0]
        df.zoomToSelectedFeatures()
        arcpy.RefreshActiveView()
```

$\Big\}$ **Python script that will run when the button is clicked**

Let’s Build One!

STEP 10: Click the **makeaddin.py** to create the **.esriaddin** file!



Name
Images
Install
config.xml
makeaddin.py
README.txt

Name
Images
Install
config.xml
makeaddin.py
README.txt
StateFinderAddin.esriaddin

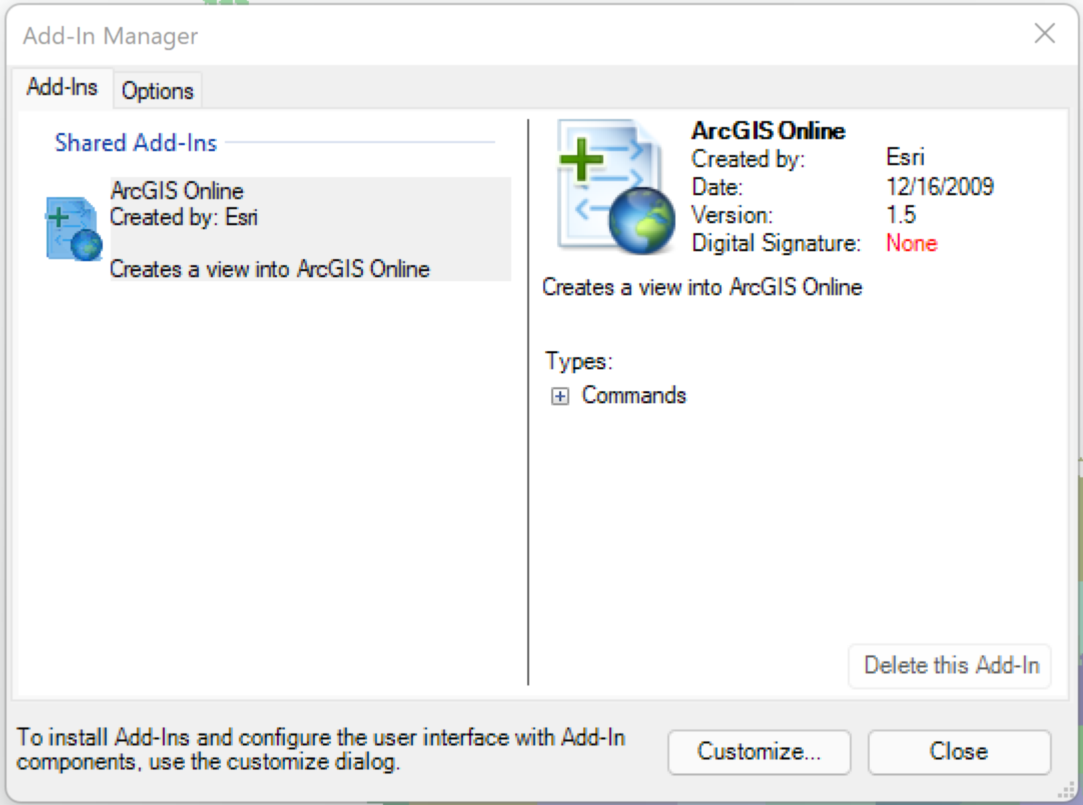
Let’s Build One!

Quick Recap:

- Created a project in the Python Add-in Wizard
- Set up the Toolbar, Combobox and Button
- Added our python logic
- Ran the makeaddin.py script
- Result: **StateFinderAddin.esriaddin** file

Let's Build One!

Install the add-in in **ArcMap**!



Add-In Manager

Shared Add-Ins

ArcGIS Online
Created by: Esri

Creates a view into ArcGIS Online

ArcGIS Online	
Created by:	Esri
Date:	12/16/2009
Version:	1.5
Digital Signature:	None

Creates a view into ArcGIS Online

Types:
⊞ Commands

To install Add-Ins and configure the user interface with Add-In components, use the customize dialog.

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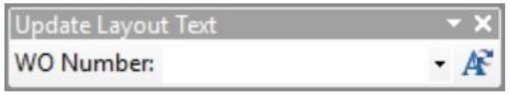
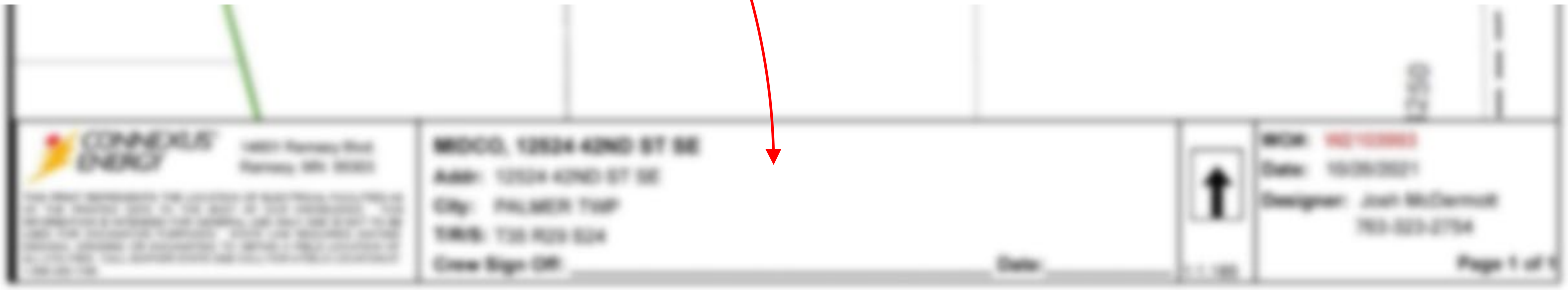
Add-ins we've built at Connexus

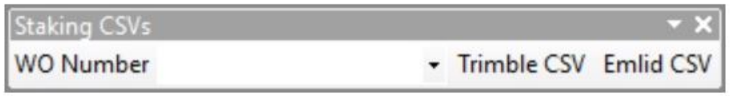
Update Layout Text – Design Group

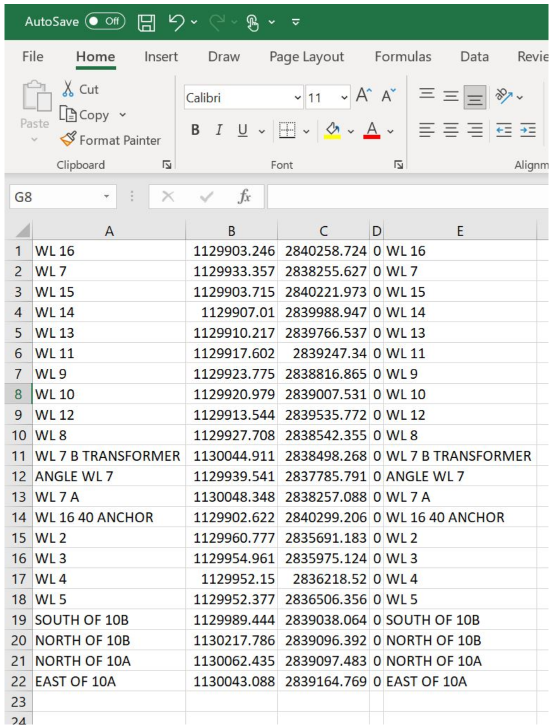




Add-ins we've built at Connexus

CSVs files for Trimble Unit Field Staking – Design Group

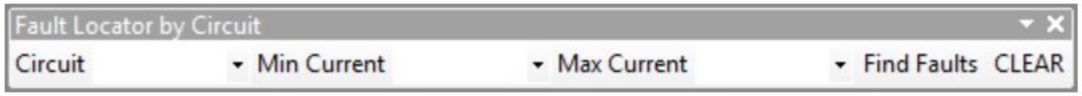




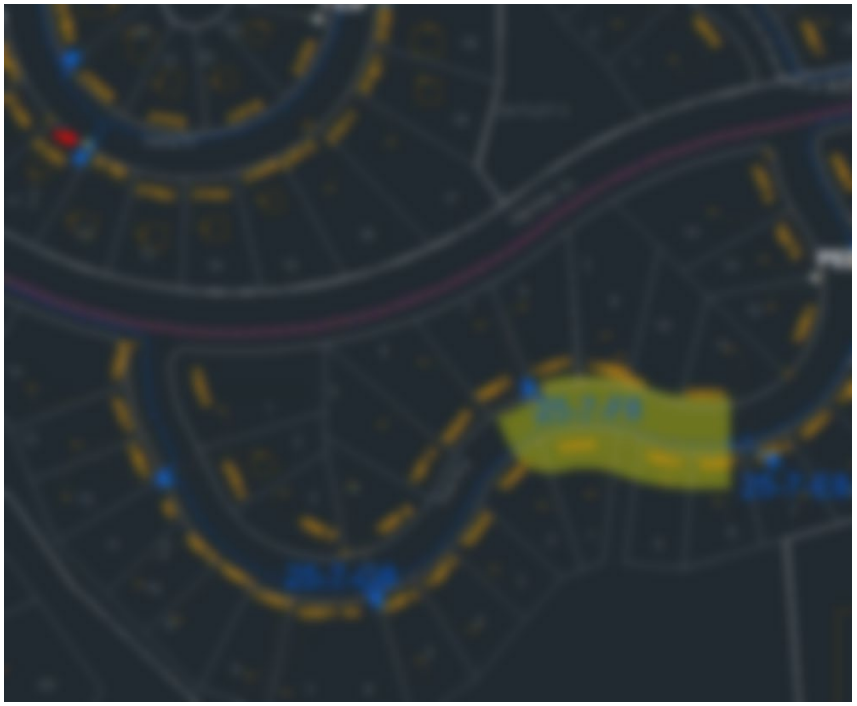
	A	B	C	D	E
1	WL 16	1129903.246	2840258.724	0	WL 16
2	WL 7	1129933.357	2838255.627	0	WL 7
3	WL 15	1129903.715	2840221.973	0	WL 15
4	WL 14	1129907.01	2839988.947	0	WL 14
5	WL 13	1129910.217	2839766.537	0	WL 13
6	WL 11	1129917.602	2839247.34	0	WL 11
7	WL 9	1129923.775	2838816.865	0	WL 9
8	WL 10	1129920.979	2839007.531	0	WL 10
9	WL 12	1129913.544	2839535.772	0	WL 12
10	WL 8	1129927.708	2838542.355	0	WL 8
11	WL 7 B TRANSFORMER	1130044.911	2838498.268	0	WL 7 B TRANSFORMER
12	ANGLE WL 7	1129939.541	2837785.791	0	ANGLE WL 7
13	WL 7 A	1130048.348	2838257.088	0	WL 7 A
14	WL 16 40 ANCHOR	1129902.622	2840299.206	0	WL 16 40 ANCHOR
15	WL 2	1129960.777	2835691.183	0	WL 2
16	WL 3	1129954.961	2835975.124	0	WL 3
17	WL 4	1129952.15	2836218.52	0	WL 4
18	WL 5	1129952.377	2836506.356	0	WL 5
19	SOUTH OF 10B	1129989.444	2839038.064	0	SOUTH OF 10B
20	NORTH OF 10B	1130217.786	2839096.392	0	NORTH OF 10B
21	NORTH OF 10A	1130062.435	2839097.483	0	NORTH OF 10A
22	EAST OF 10A	1130043.088	2839164.769	0	EAST OF 10A
23					
24					

Add-ins we've built at Connexus

Fault Finder – System Operations


Fault Locator by Circuit

Circuit ▾ Min Current ▾ Max Current ▾ Find Faults CLEAR



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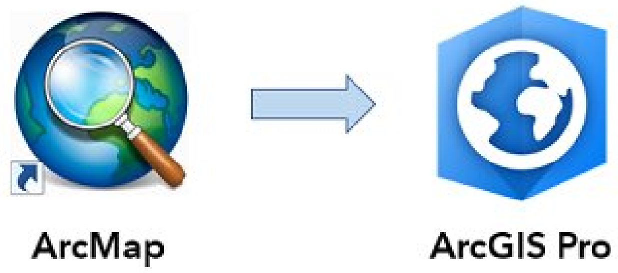
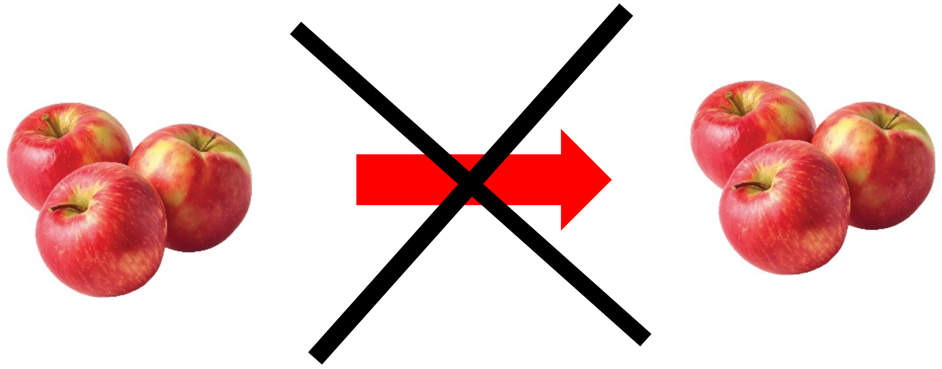
Add-ins in ArcGIS Pro



Migrating from ArcMap to ArcGIS Pro – Add-in wise

- No software translation options!
- Will need to rebuild them!



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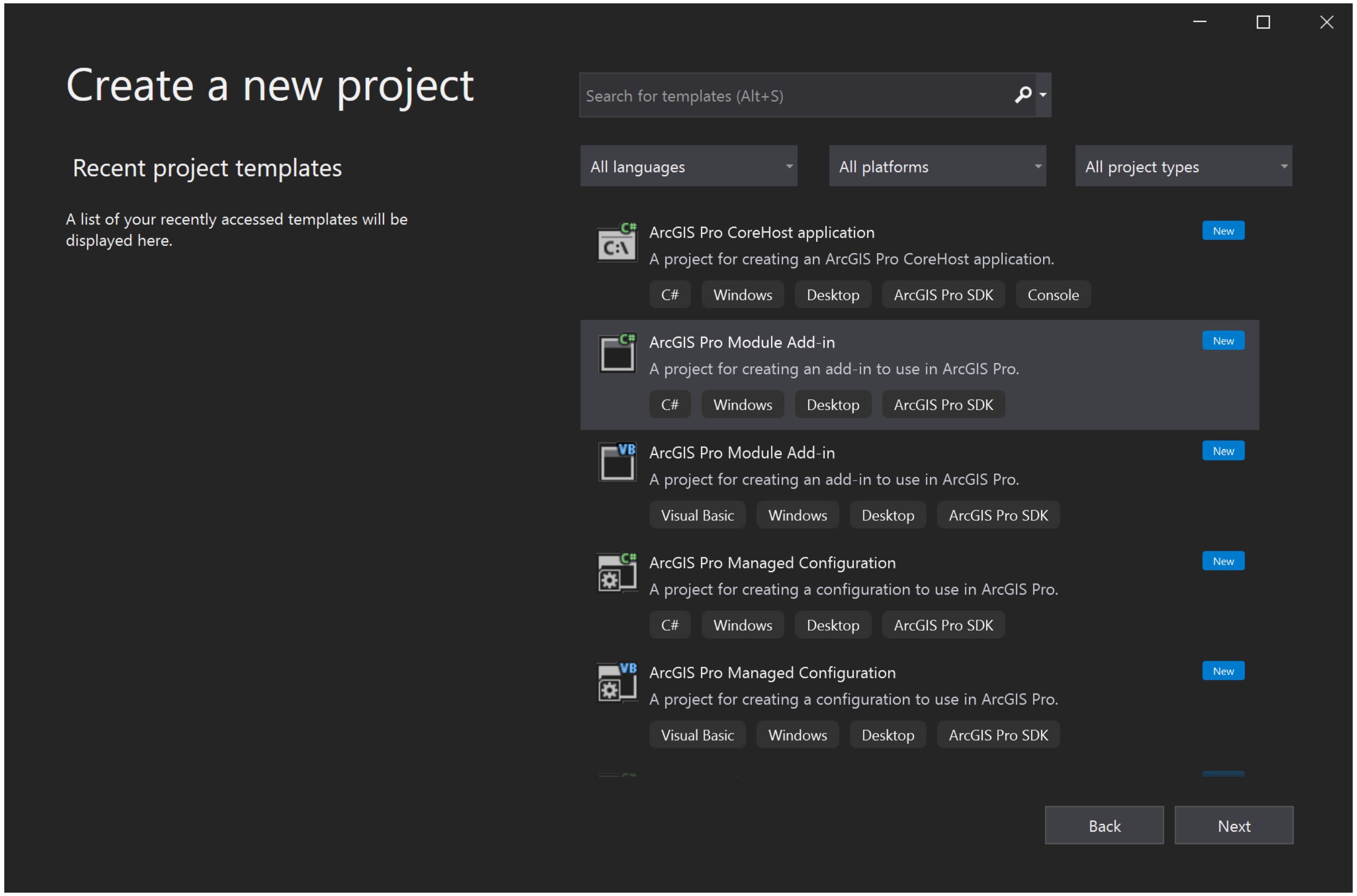
Add-ins in ArcGIS Pro

Add-ins are authored using the **ArcGIS Pro SDK for .NET** module for **MS Visual Studio**, **not the Add-in Wizard!**



Create a new project

Recent project templates

A list of your recently accessed templates will be displayed here.

Search for templates (Alt+S)

All languages | All platforms | All project types

ArcGIS Pro CoreHost application — New
A project for creating an ArcGIS Pro CoreHost application.
C# | Windows | Desktop | ArcGIS Pro SDK | Console

ArcGIS Pro Module Add-in — New
A project for creating an add-in to use in ArcGIS Pro.
C# | Windows | Desktop | ArcGIS Pro SDK

ArcGIS Pro Module Add-in — New
A project for creating an add-in to use in ArcGIS Pro.
Visual Basic | Windows | Desktop | ArcGIS Pro SDK

ArcGIS Pro Managed Configuration — New
A project for creating a configuration to use in ArcGIS Pro.
C# | Windows | Desktop | ArcGIS Pro SDK

ArcGIS Pro Managed Configuration — New
A project for creating a configuration to use in ArcGIS Pro.
Visual Basic | Windows | Desktop | ArcGIS Pro SDK

How to get started & Resources:

- Esri Learning Plan - ArcPy

https://www.esri.com/training/catalog/5e7a48e6a662e60f85592a97/arcpy-essentials/

- Esri Documentation for creating add-ins

https://desktop.arcgis.com/en/arcmap/latest/analyze/python-addins/creating-an-add-in-project.htm

- Download Esri Python Add-In Wizard

https://www.arcgis.com/home/item.html?id=5f3aefe77f6b4f61ad3e4c62f30bff3b

- Ersi – Build your first ArcGIS Pro Add-in

https://developers.arcgis.com/documentation/arcgis-add-ins-and-automation/arcgis-pro/tutorials/build-your-first-add-in/

Tips:

1. Start with getting your python script to work in the console.
2. Build your script up one step at a time and debug as you go.
3. Steal as much code as you can find! ☺

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