ModelBuilder: Tips and Tricks

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Resources

Resources and Geonet Community

- **ModelBuilder vocabulary**
  https://pro.arcgis.com/en/pro-app/latest/help/analysis/geoprocessing/modelbuilder/modelbuilder-vocabulary.htm

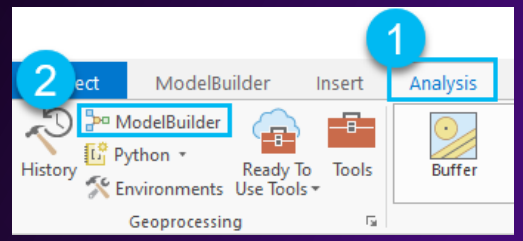
- **Geonet community**
  https://community.esri.com/t5/arcgis-pro/ct-p/arcgis-pro

- **ArcGIS keyboard shortcuts**
  https://pro.arcgis.com/en/pro-app/latest/get-started/arcgis-pro-keyboard-shortcuts.htm#ESRI_SECTION1_B5890B2BE57D4F12AFF751A199FBE159

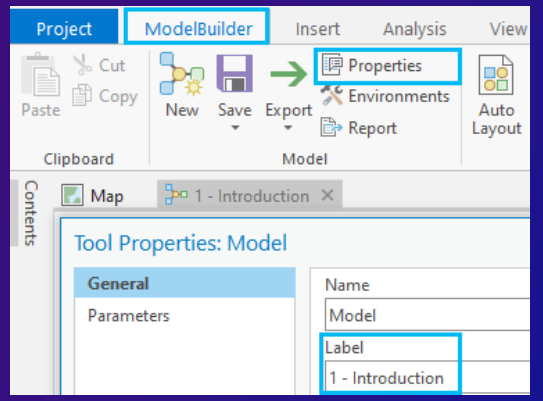
Search Tools

Search Tools

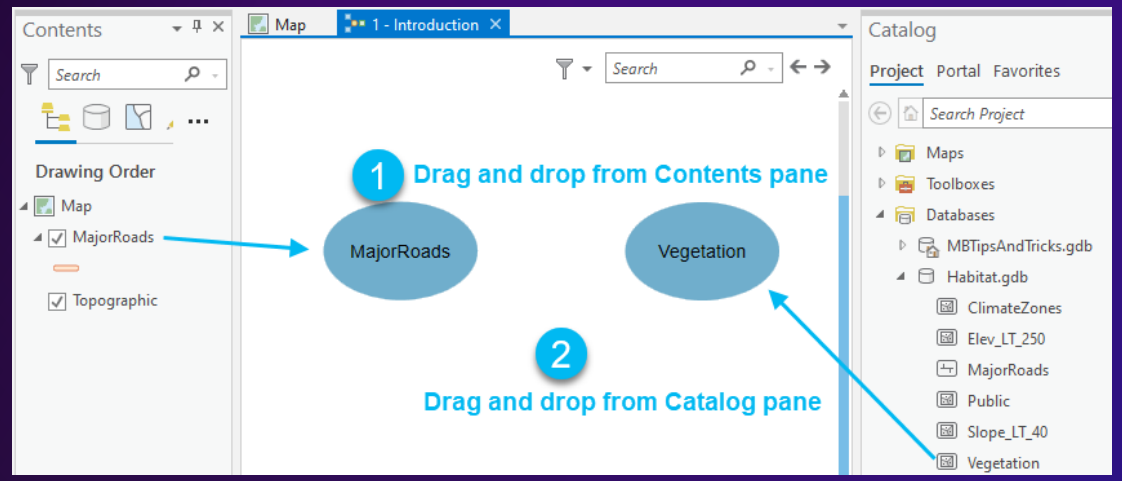
- **Create a model**



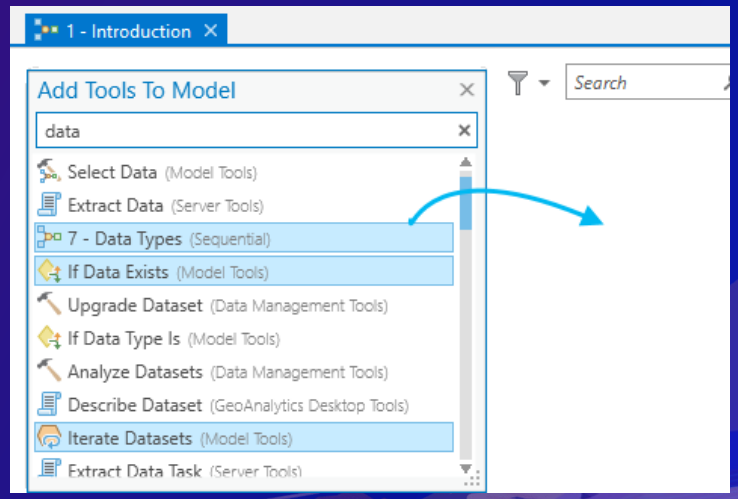
- **Rename model**



- **Add data**

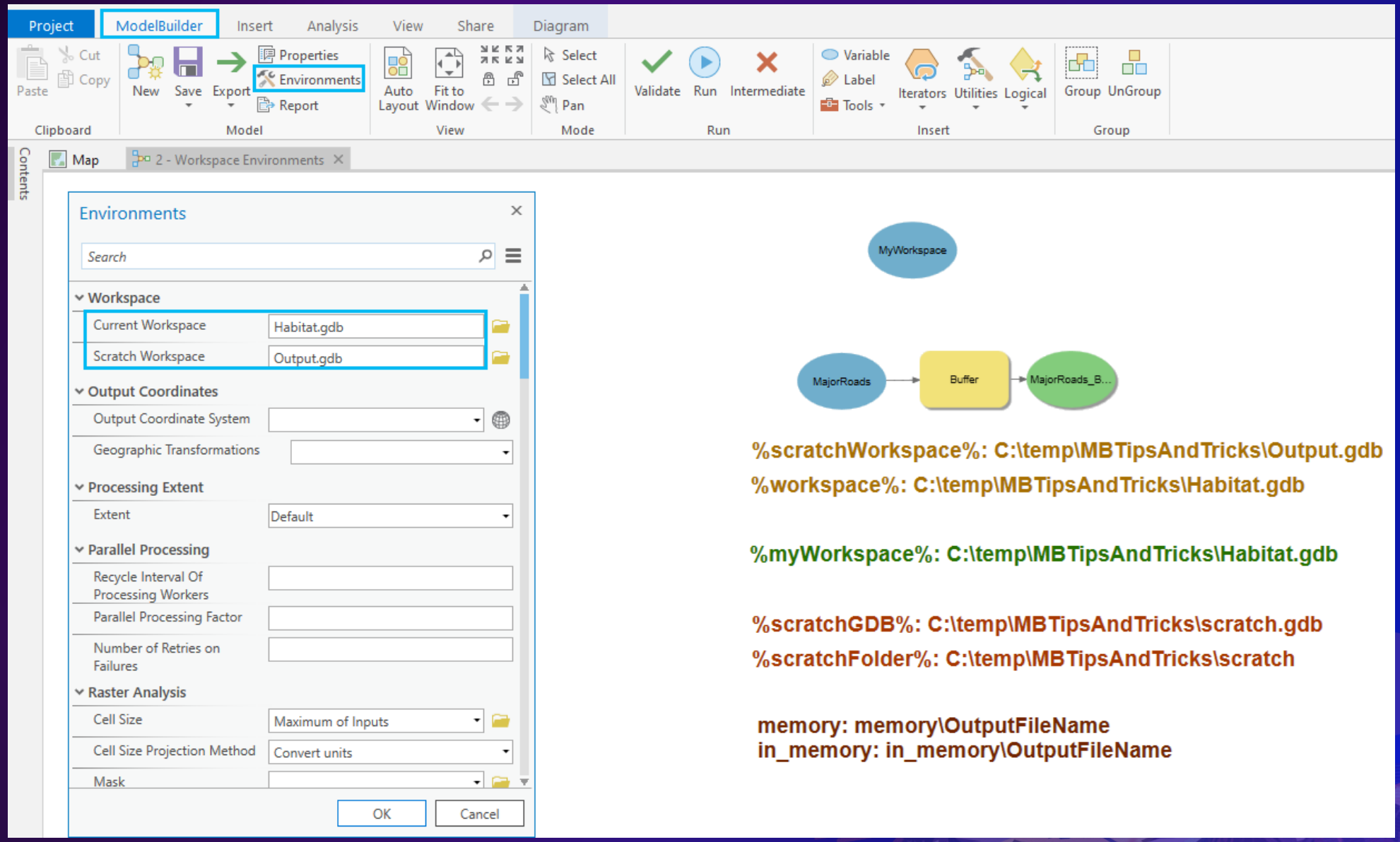


- **Add tool**



Workspace Environments

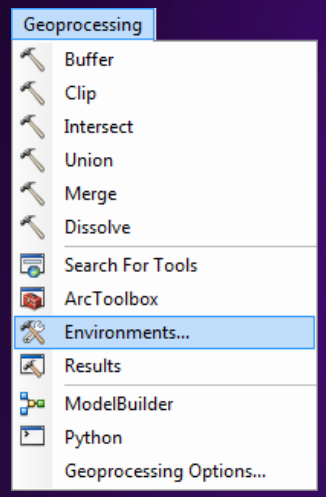
Workspace Environments

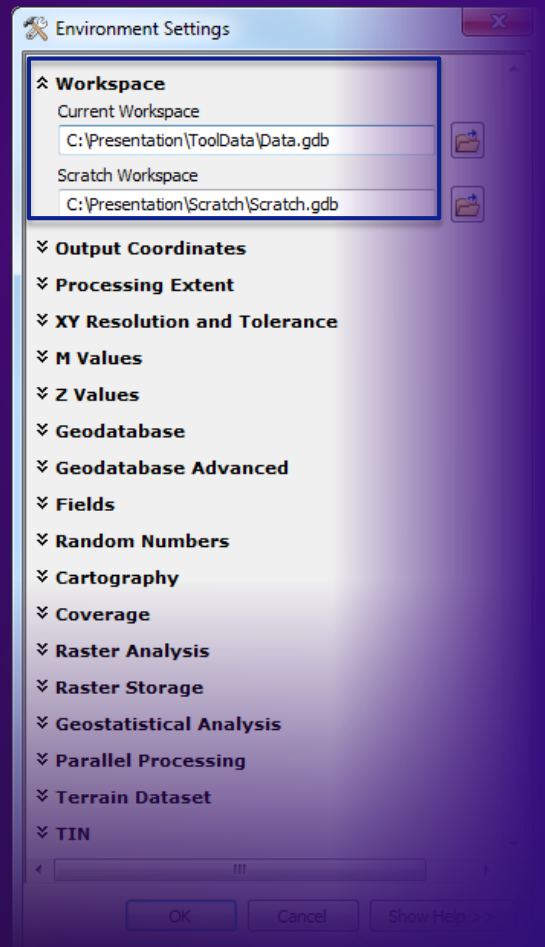


Workspace Environments

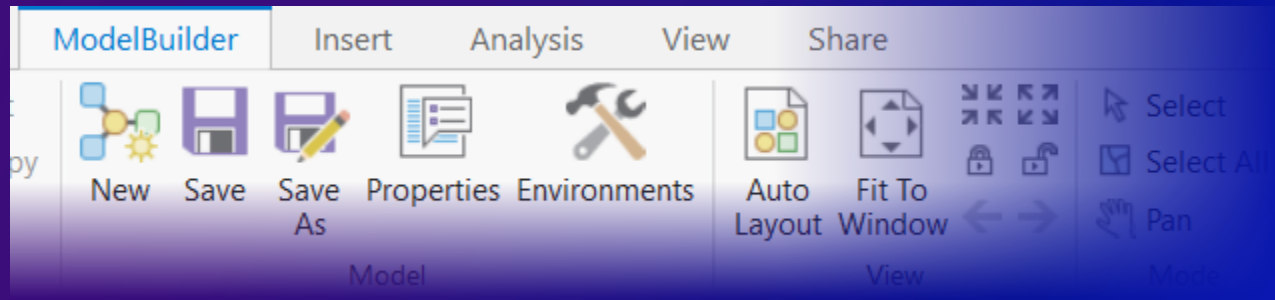
- Create and save a map document in your root folder
- Set the workspace environments at the application level

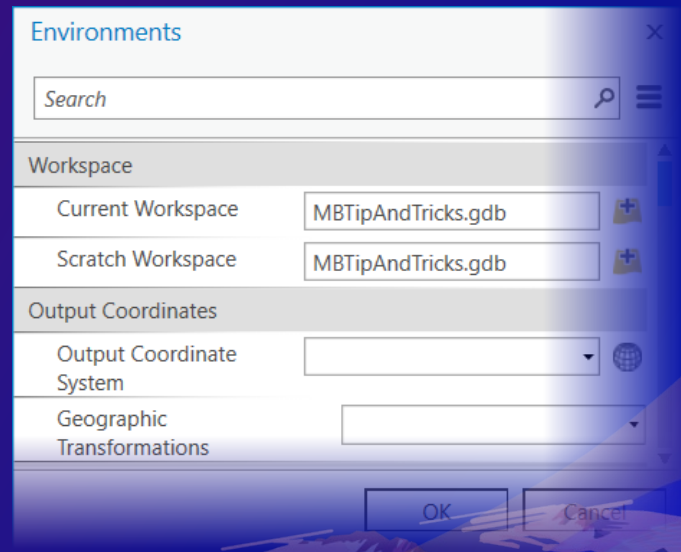
10x





Pro

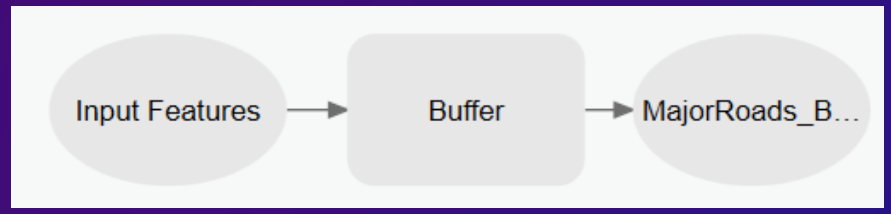




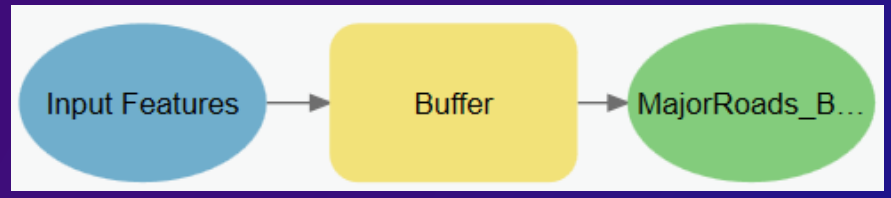
Model State

Model State

- Not ready to run



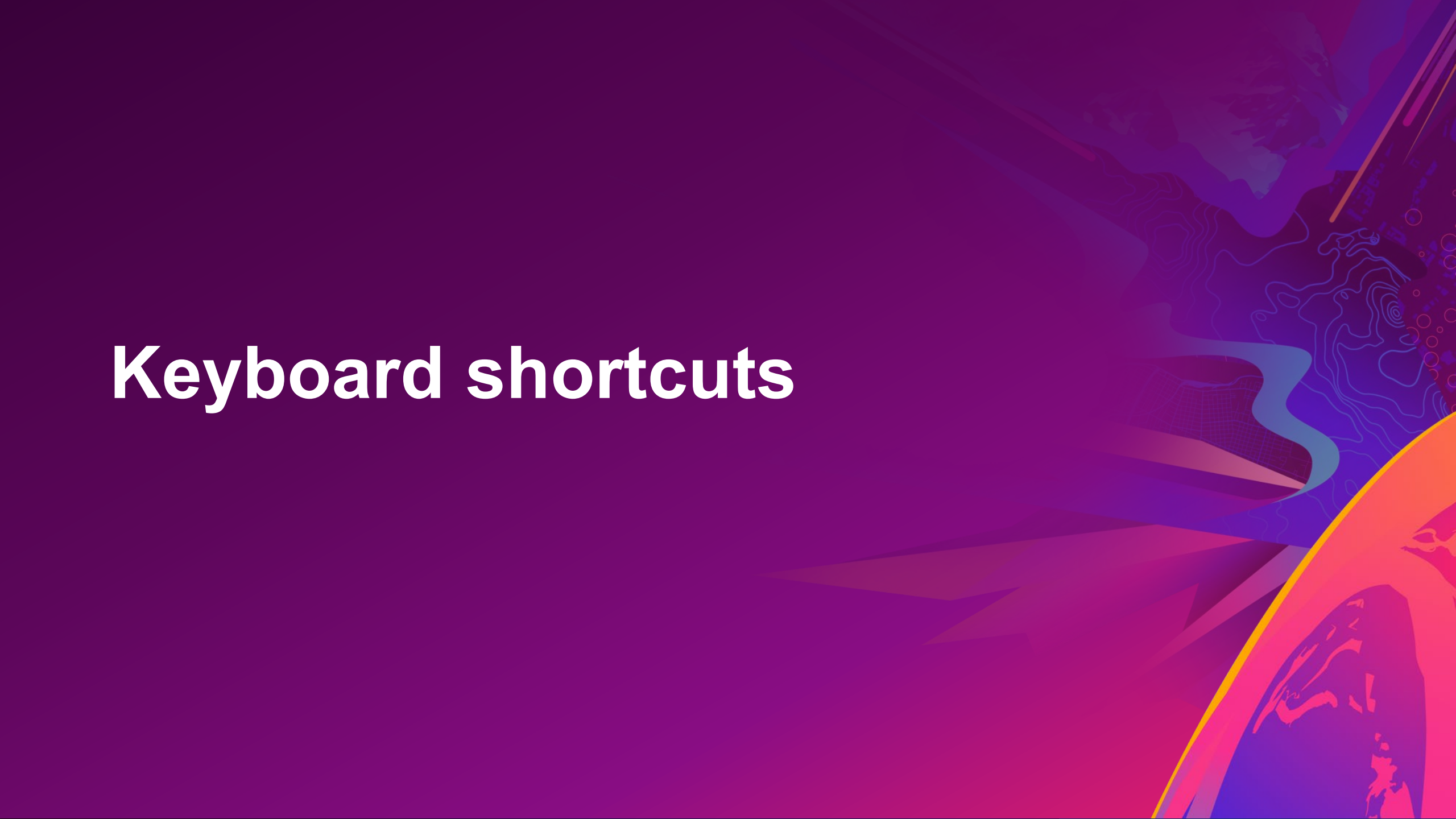
- Ready to run



- Running

- Has been run

Keyboard shortcuts



ModelBuilder Keyboard Shortcuts

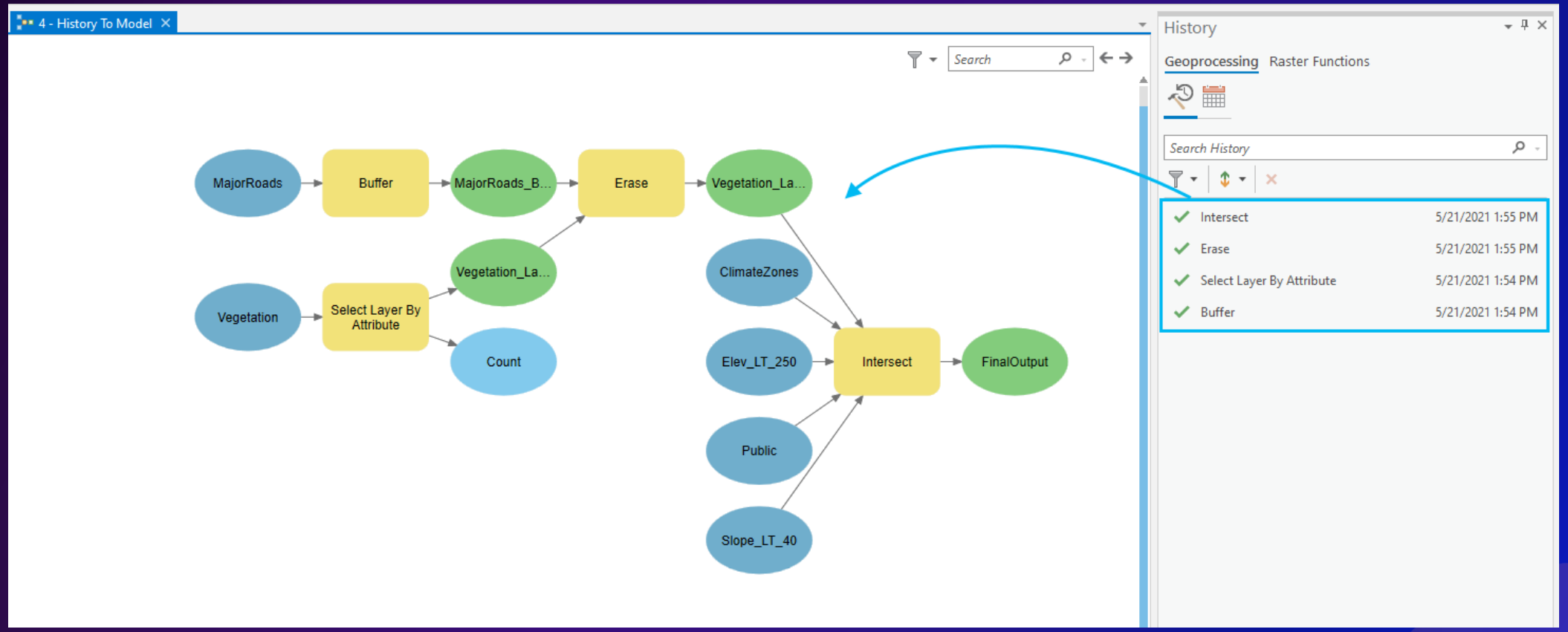
Model element

Keyboard shortcut	Action
Ctrl+O	Open the selected model element.
Ctrl+R	Rename the selected model element.
Ctrl+P	Revert the current **Parameter** setting for the selected model elements.
Ctrl+D	Check **Add To Display** for the selected model elements.
Ctrl+Shift+D	Uncheck **Add To Display** for the selected model elements.
Ctrl+I	Check **Intermediate Data** for the selected model elements.
Ctrl+Shift+I	Uncheck **Intermediate Data** for the selected model elements.

Find more ModelBuilder shortcuts at:
https://pro.arcgis.com/en/pro-app/latest/get-started/arcgis-pro-keyboard-shortcuts.htm#ESRI_SECTION1_B5890B2BE57D4F12AFF751A199FBE159

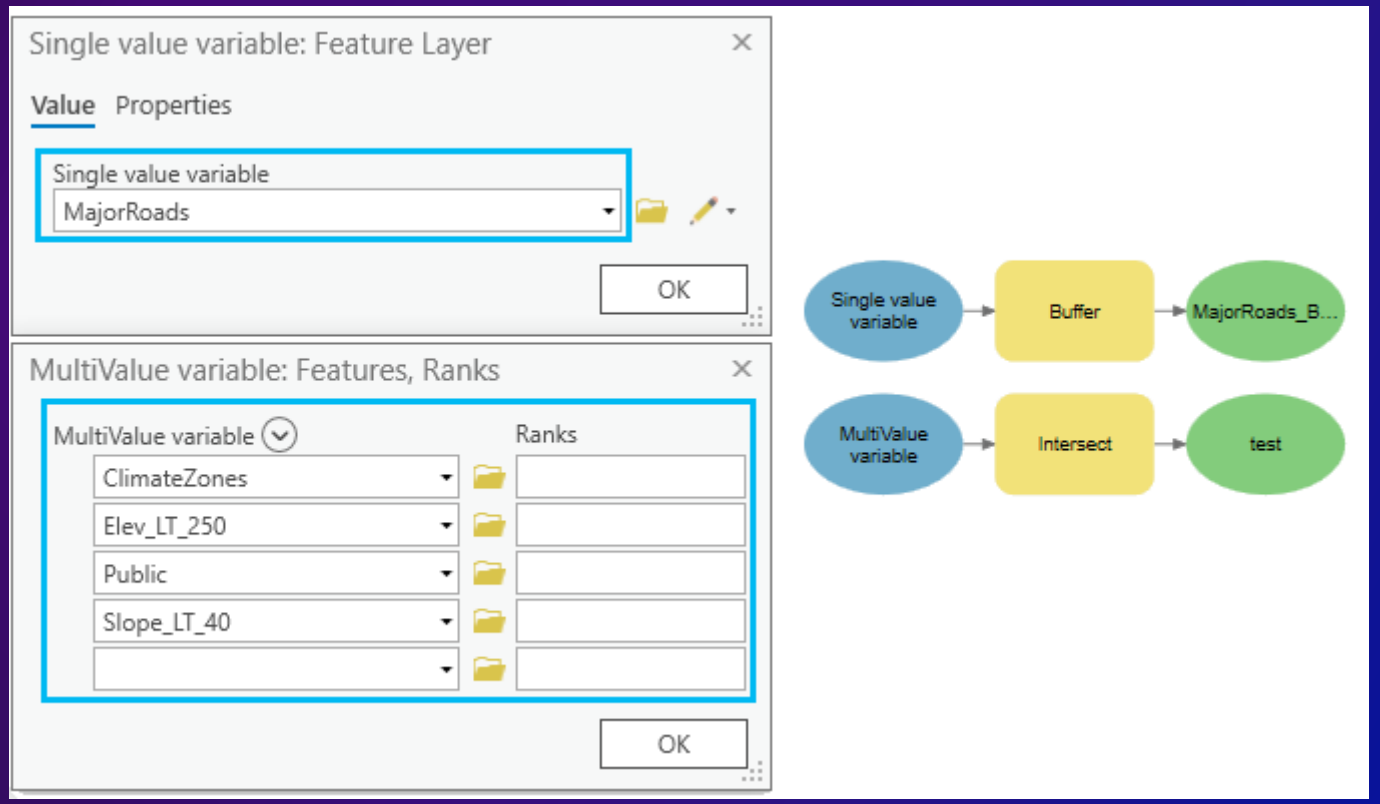
History To Model

History To Model



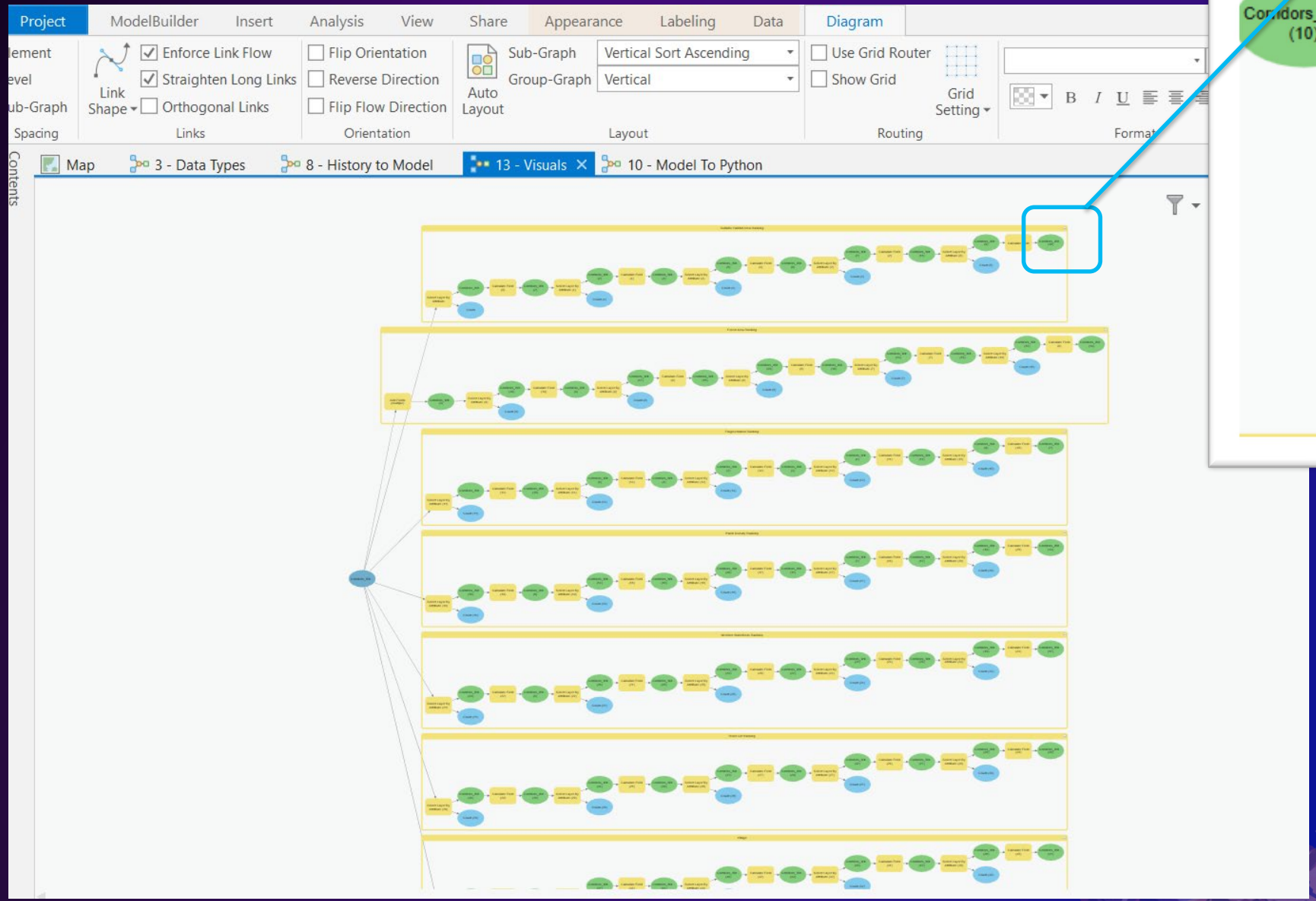
Variables

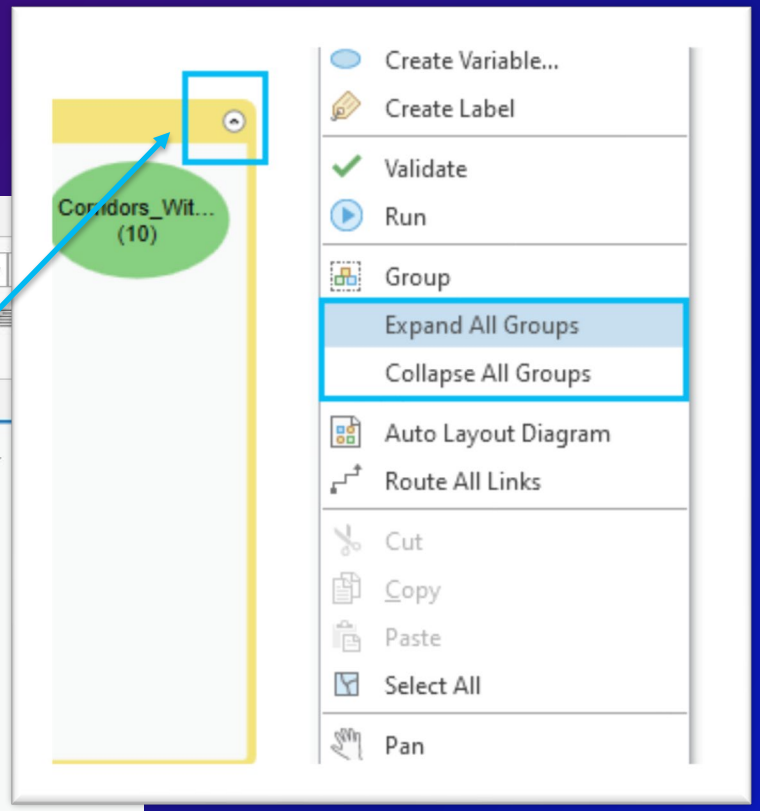
Variables


Single value variable: Feature Layer
Value
Properties
Single value variable
MajorRoads
OK
MultiValue variable: Features, Ranks
MultiValue variable
Ranks
ClimateZones
Elev_LT_250
Public
Slope_LT_40
OK
Single value variable
Buffer
MajorRoads_B...
MultiValue variable
Intersect
test

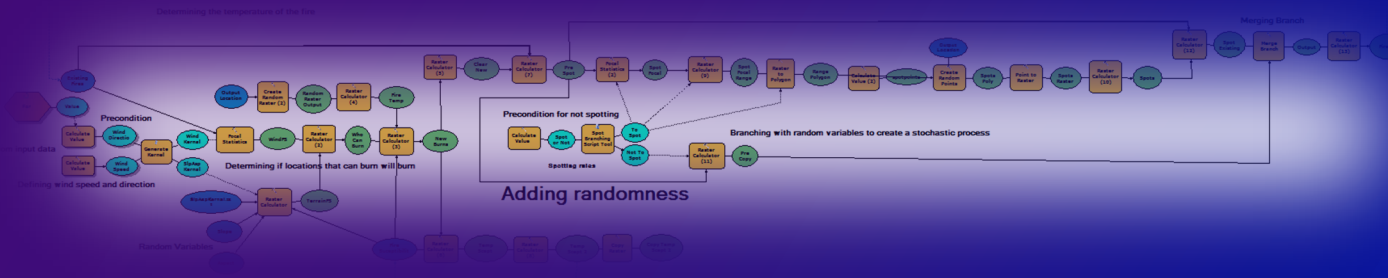
Groups and Formatting

Grouping and Formatting

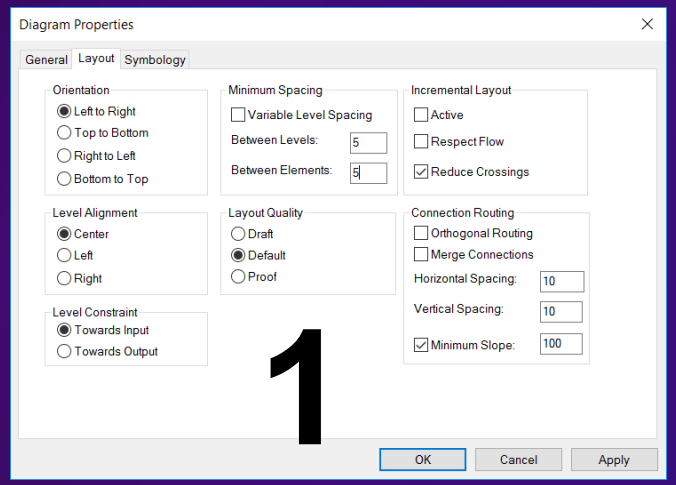




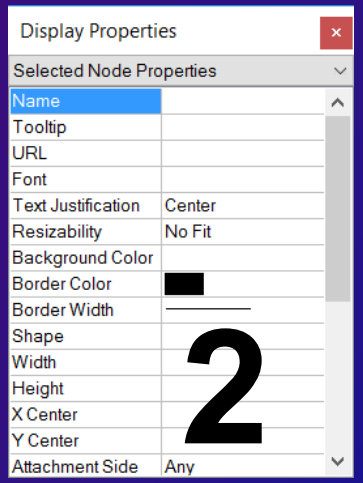
Viewing Big Models 10x



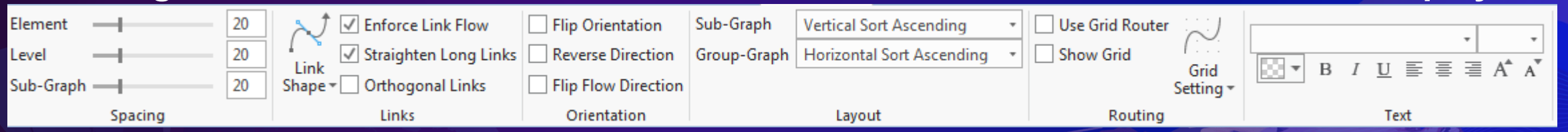
10x Diagram Properties



10x Display Properties



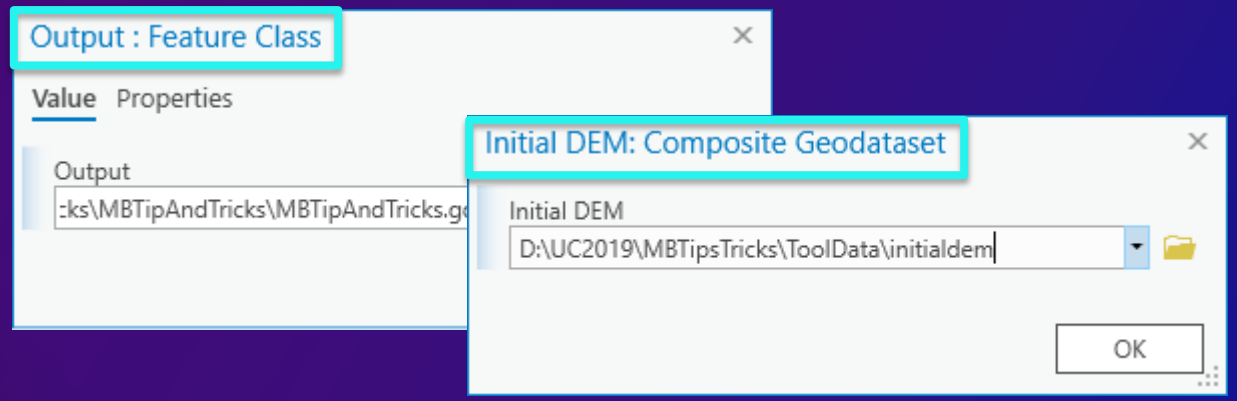
Pro Diagram



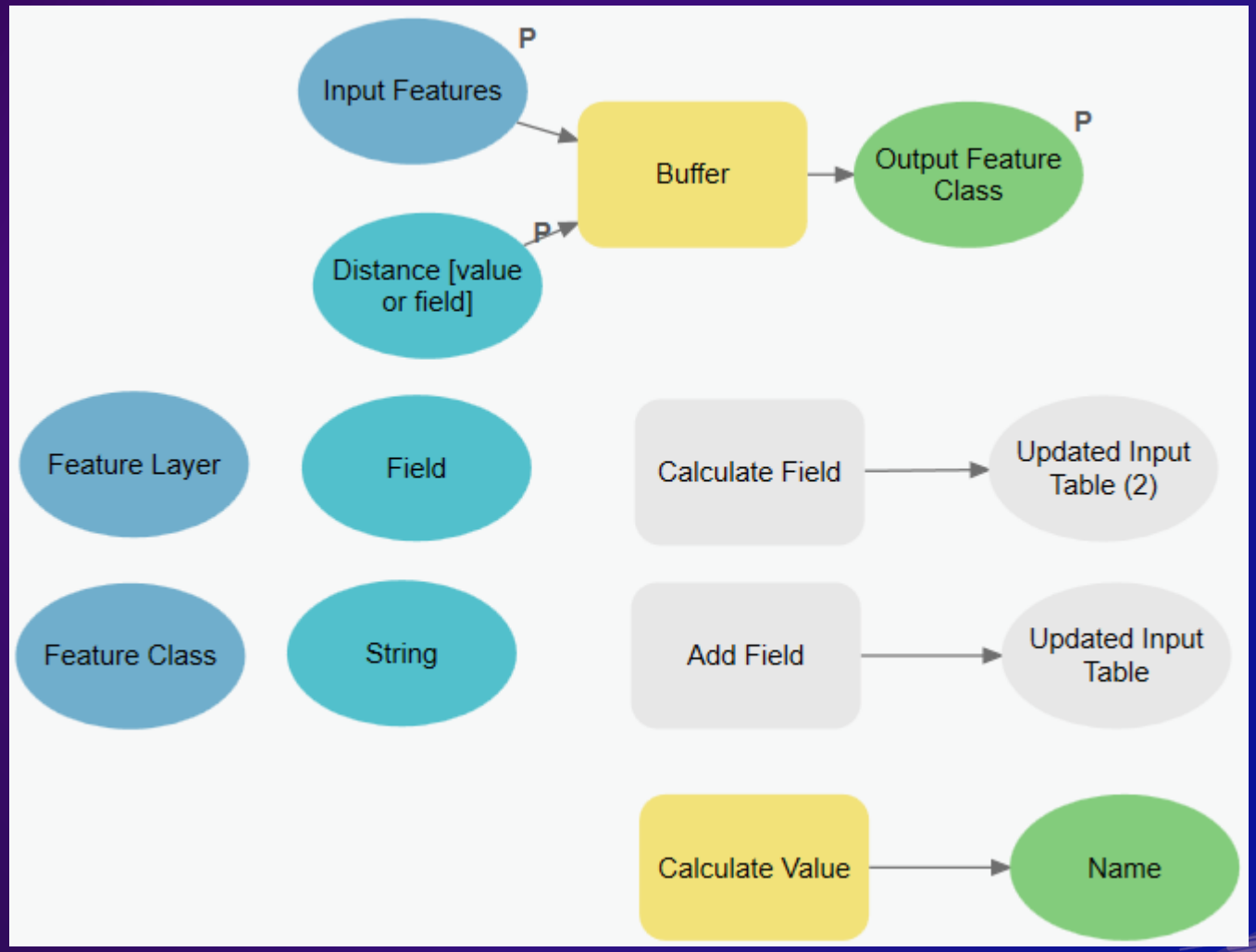
Pro Display

Data Types

Data Types


Output : Feature Class
Value
Properties
Output
:ks\MBTipAndTricks\MBTipAndTricks.g
Initial DEM: Composite Geodataset
Initial DEM
D:\UC2019\MBTipsTricks\ToolData\initialdem
OK

Data Types

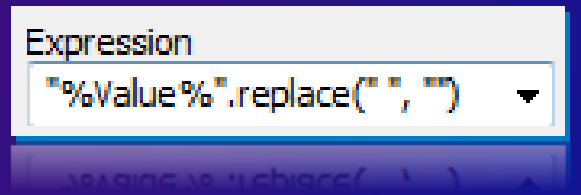

P
Input Features
Buffer
Output Feature Class
P
P
Distance [value or field]
Feature Layer
Field
Calculate Field
Updated Input Table (2)
Feature Class
String
Add Field
Updated Input Table
Calculate Value
Name

Inline Substitution

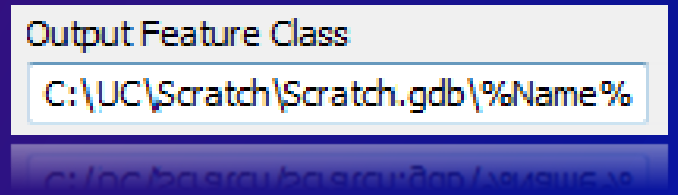
Inline Substitution

- In SQL expressions - Name = '%Value%'

- "%Value%".replace(" ", "")



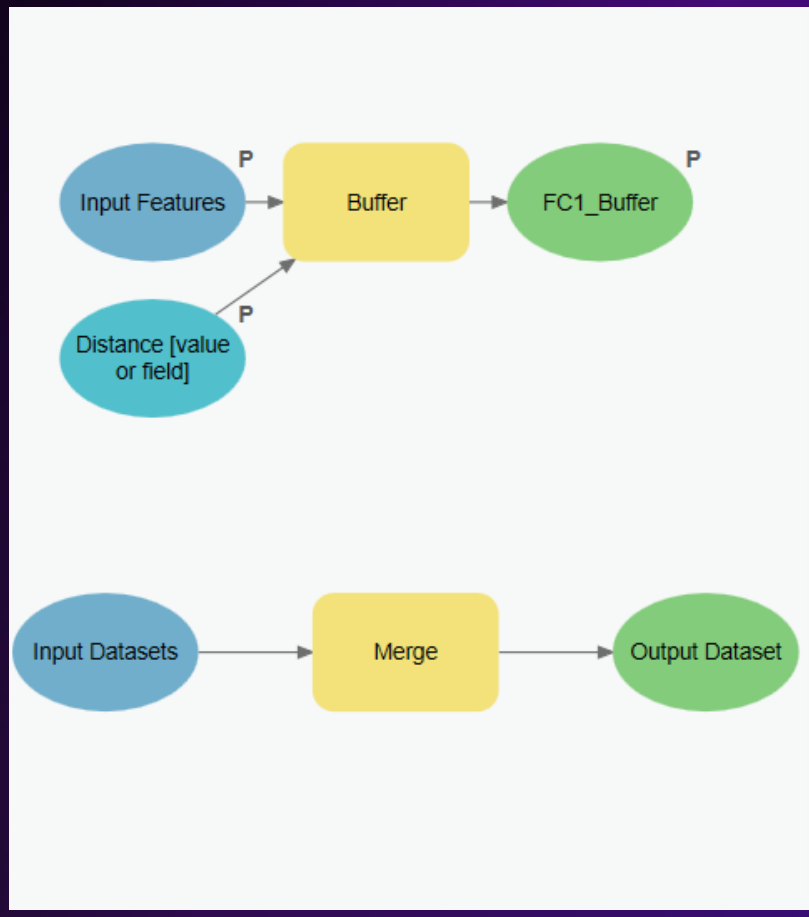
- In Output name – C:\Scratch\Scratch.gdb\%Value%

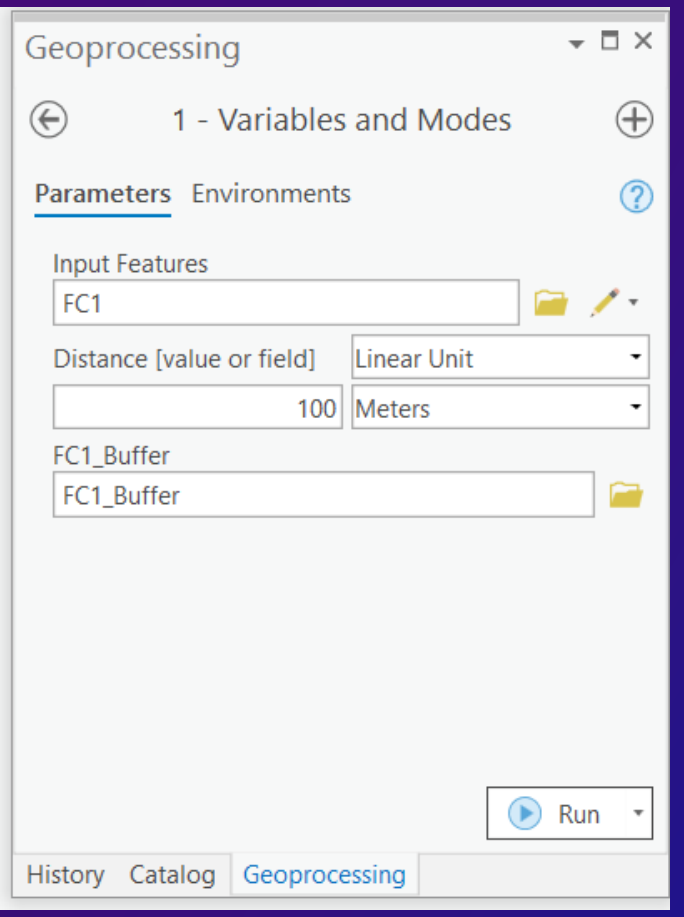


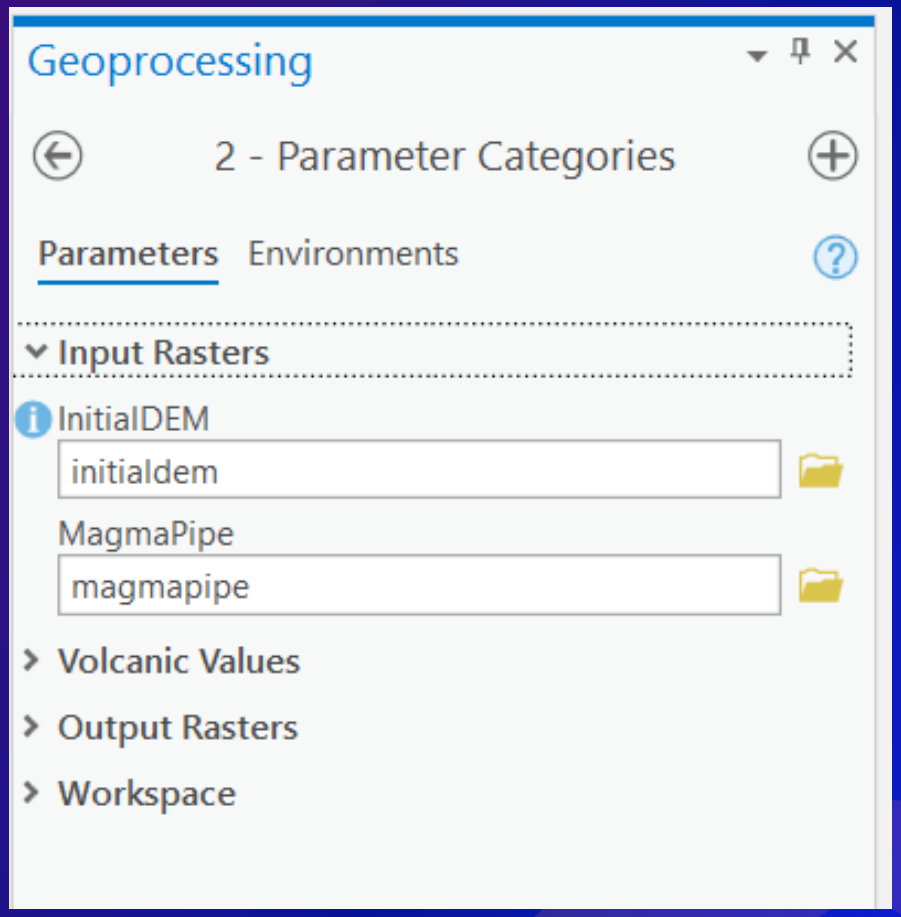
- If string put "quotes" around your inline variable substitution

Model and Model Tool

Model and Model Tool

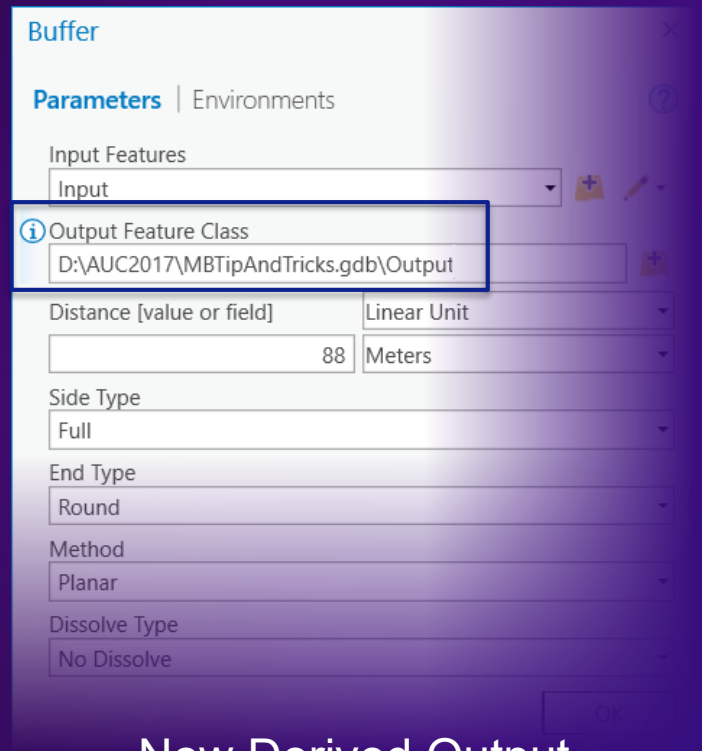






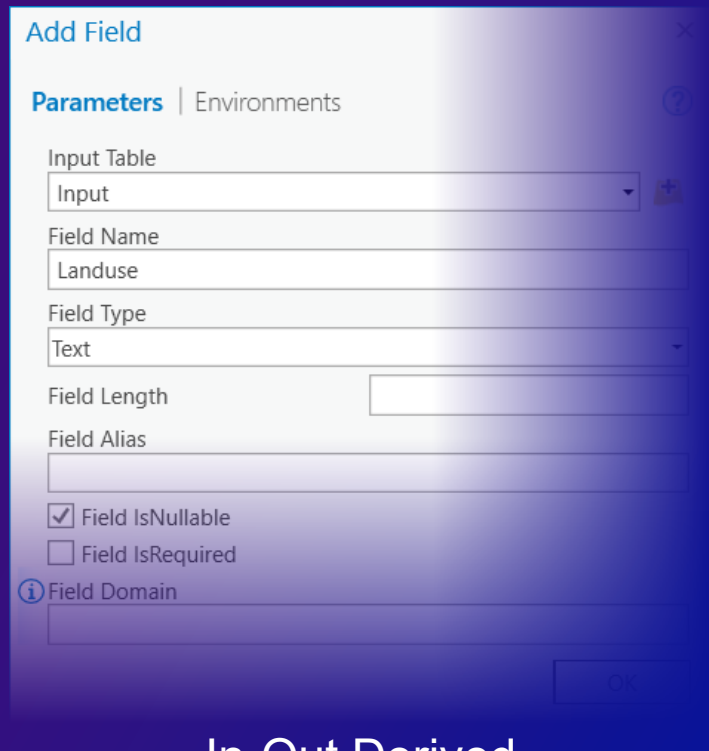
Model Variables

Model Variables



New Derived Output

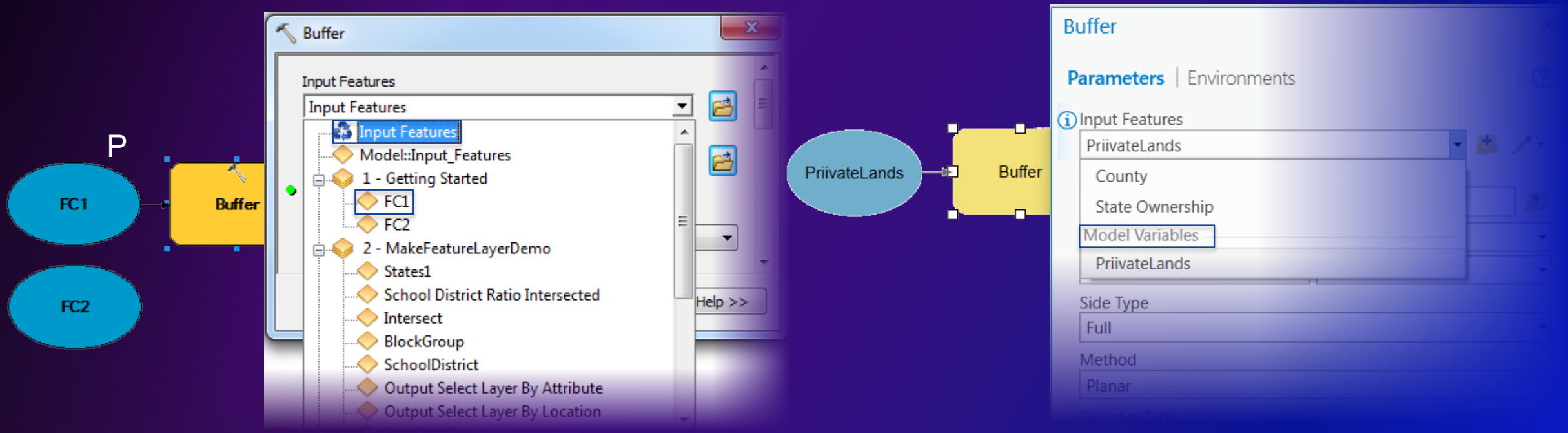
New output created



In-Out Derived

Modifies Input/No new output

Variable and layer symbol 10x ArcMap



Parameter Filters

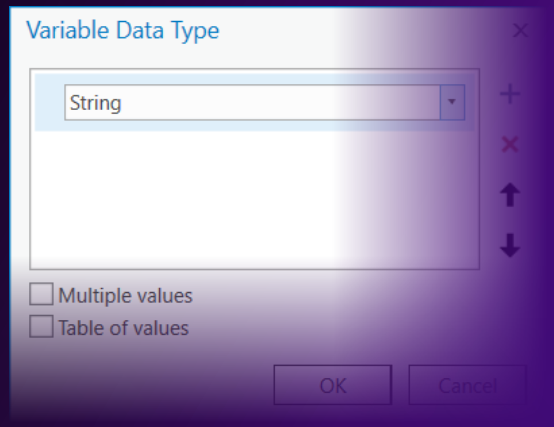
Variable Filters

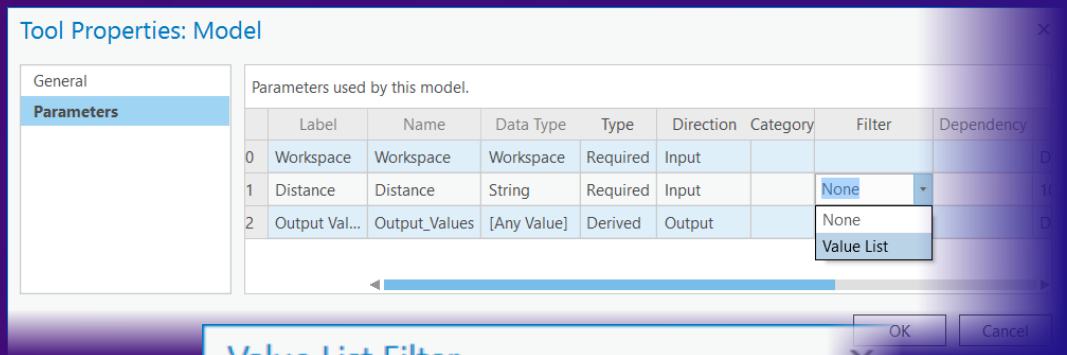
Create Variable of data type String

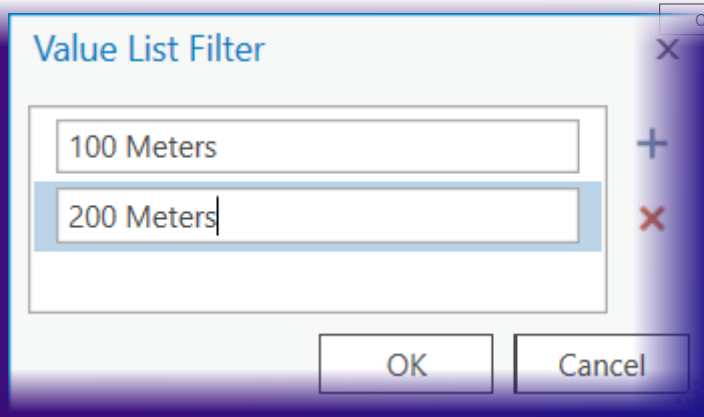
Rename the variable & Make model parameter

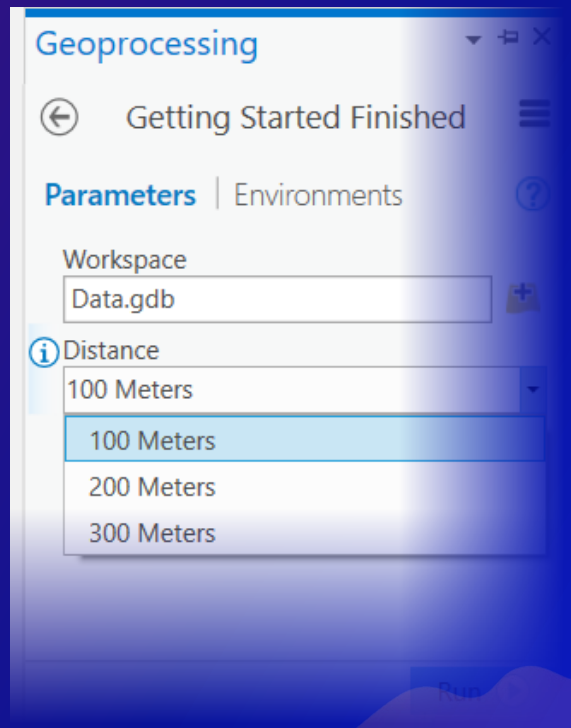
Add a value list filter

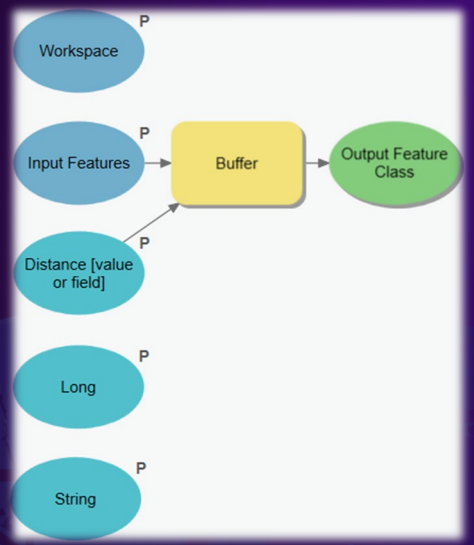
Choice list on tool dialog





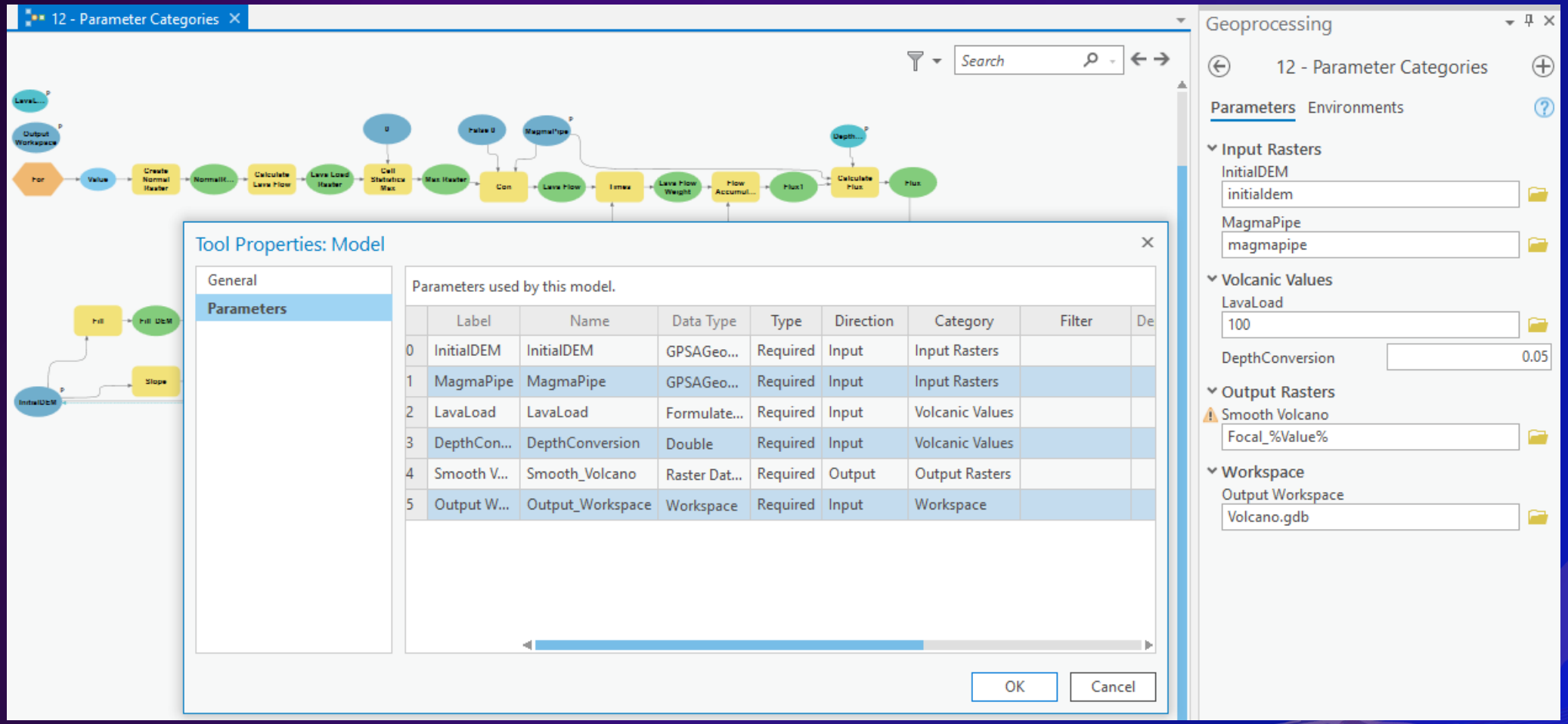






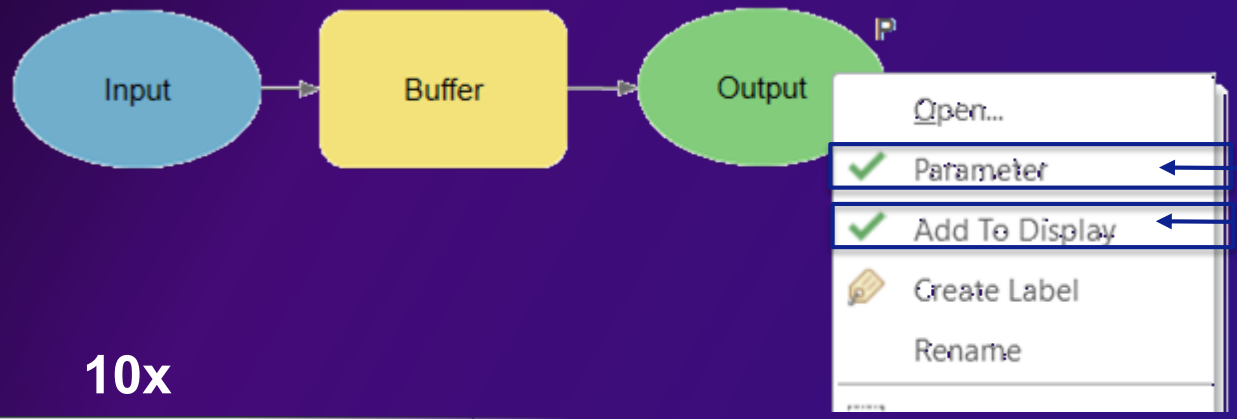
Parameter Categories

Parameter Categories



Add To Display and Symbology

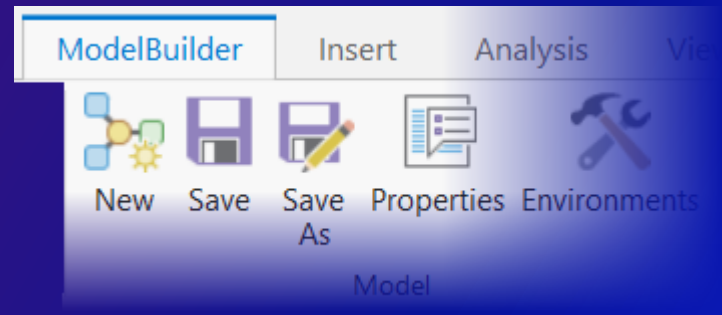
Add To Display



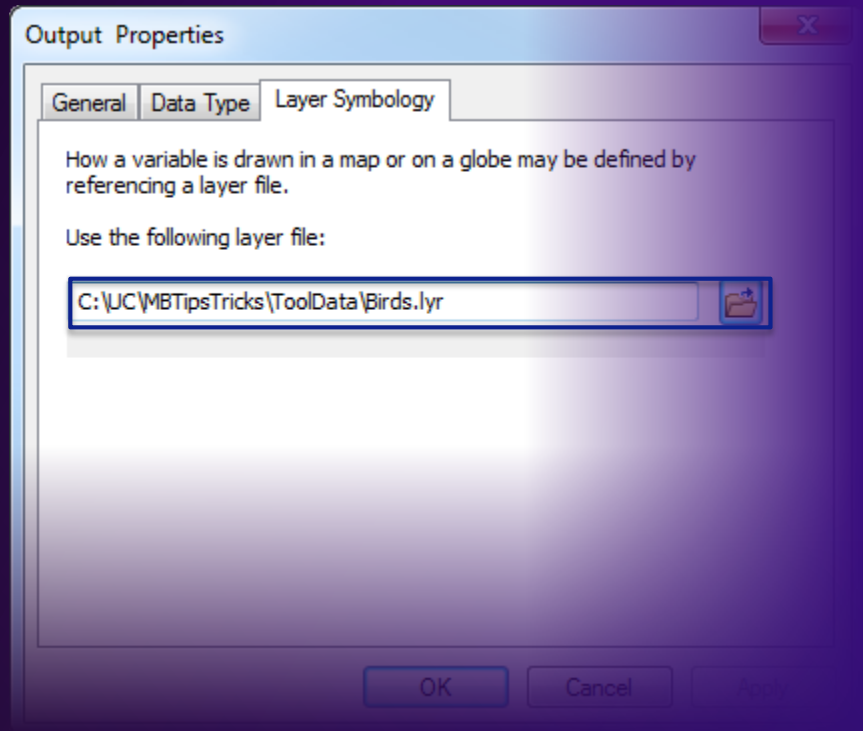
Pro

Display output from model tool dialog

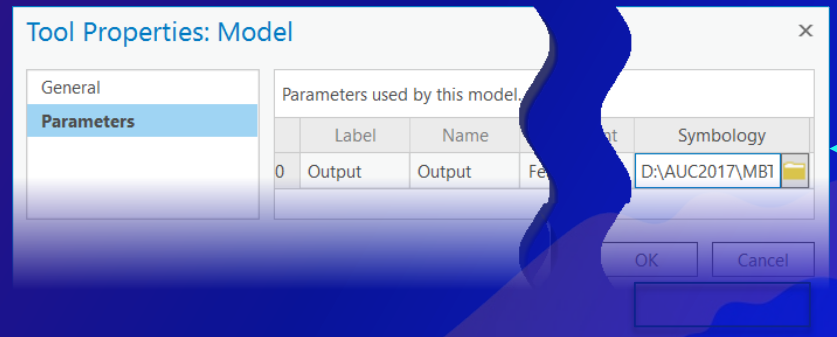
Display output inside the model



10x

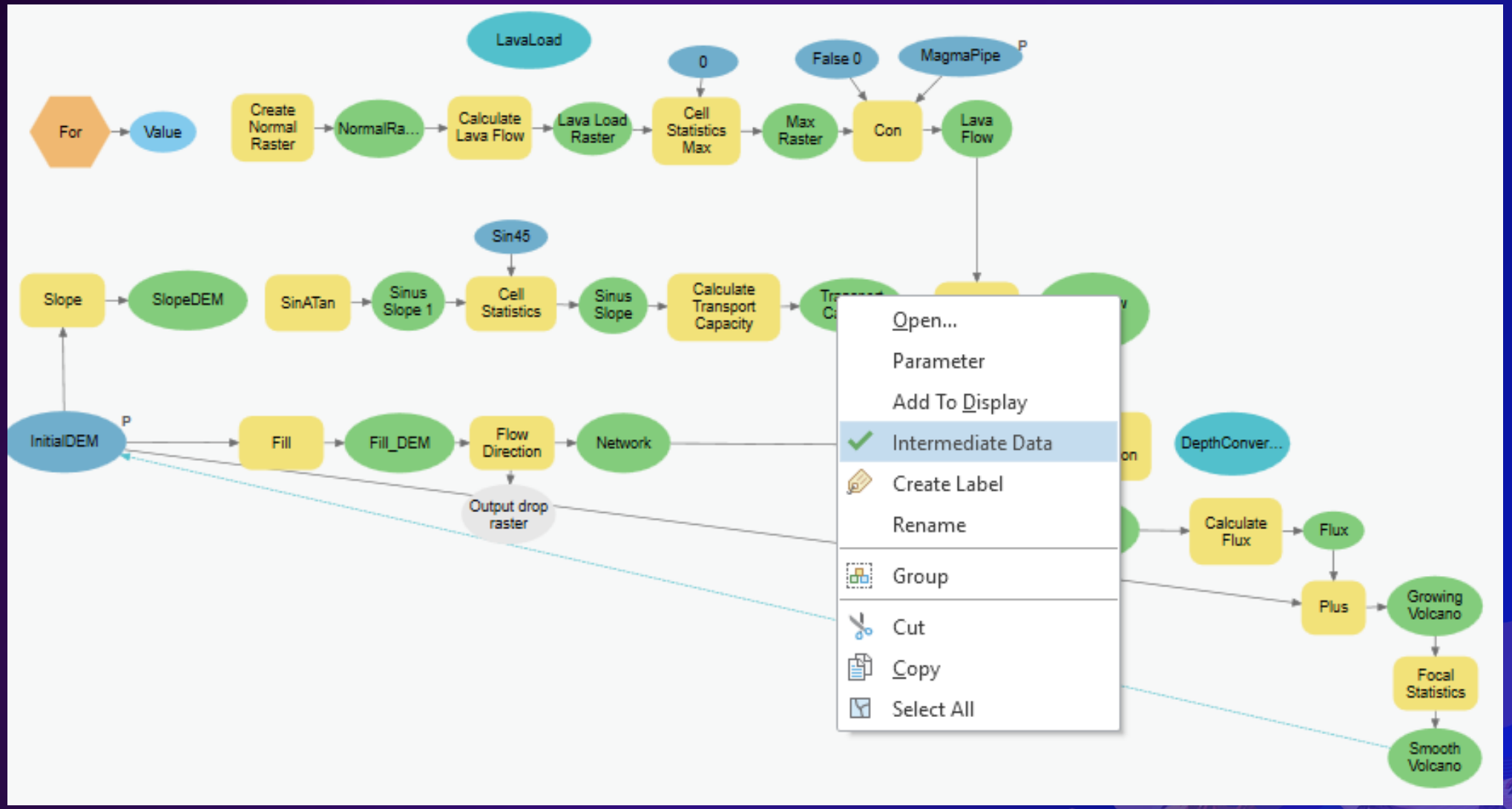


Display output with symbology using layer file

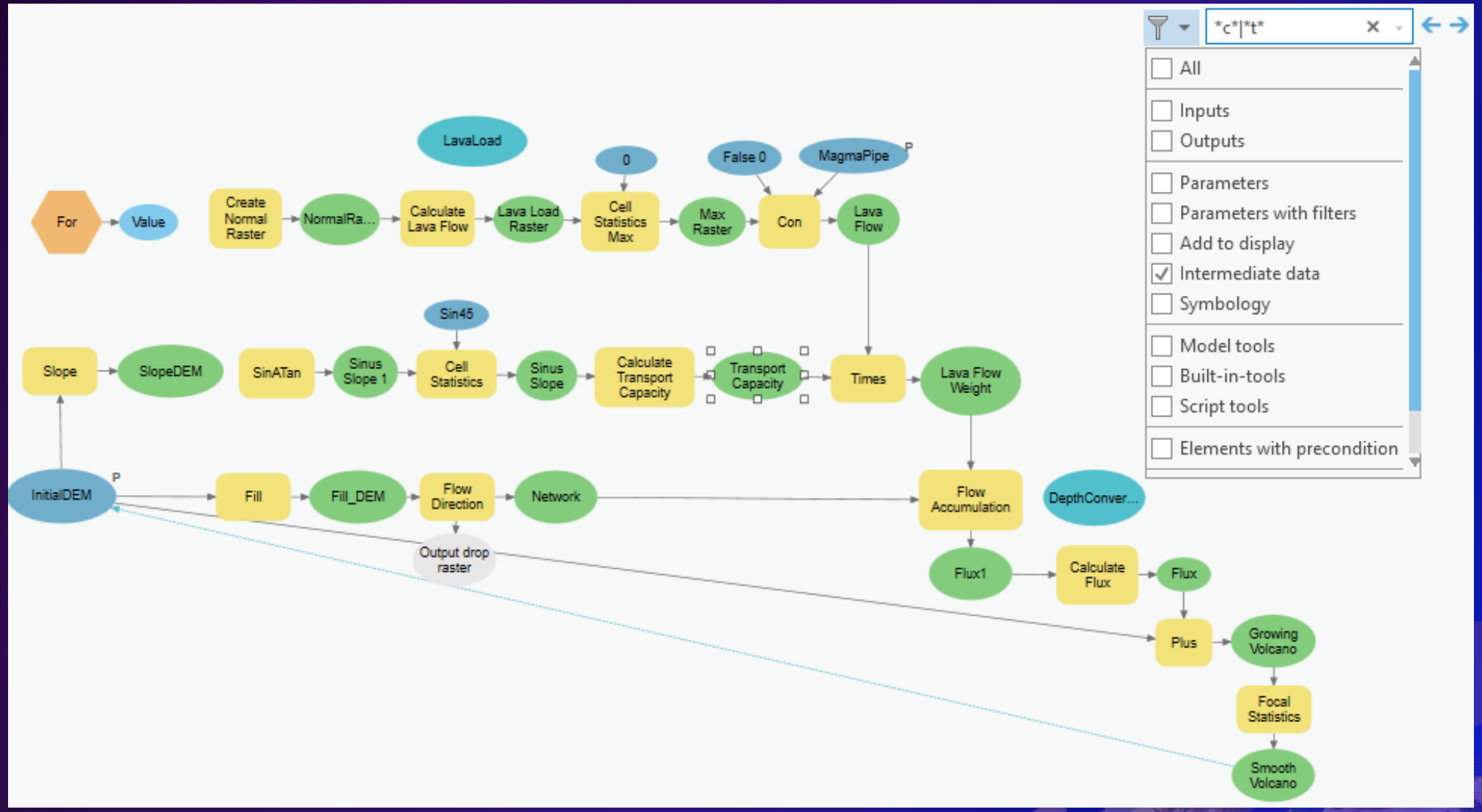


Intermediate Data and Search

Intermediate Data

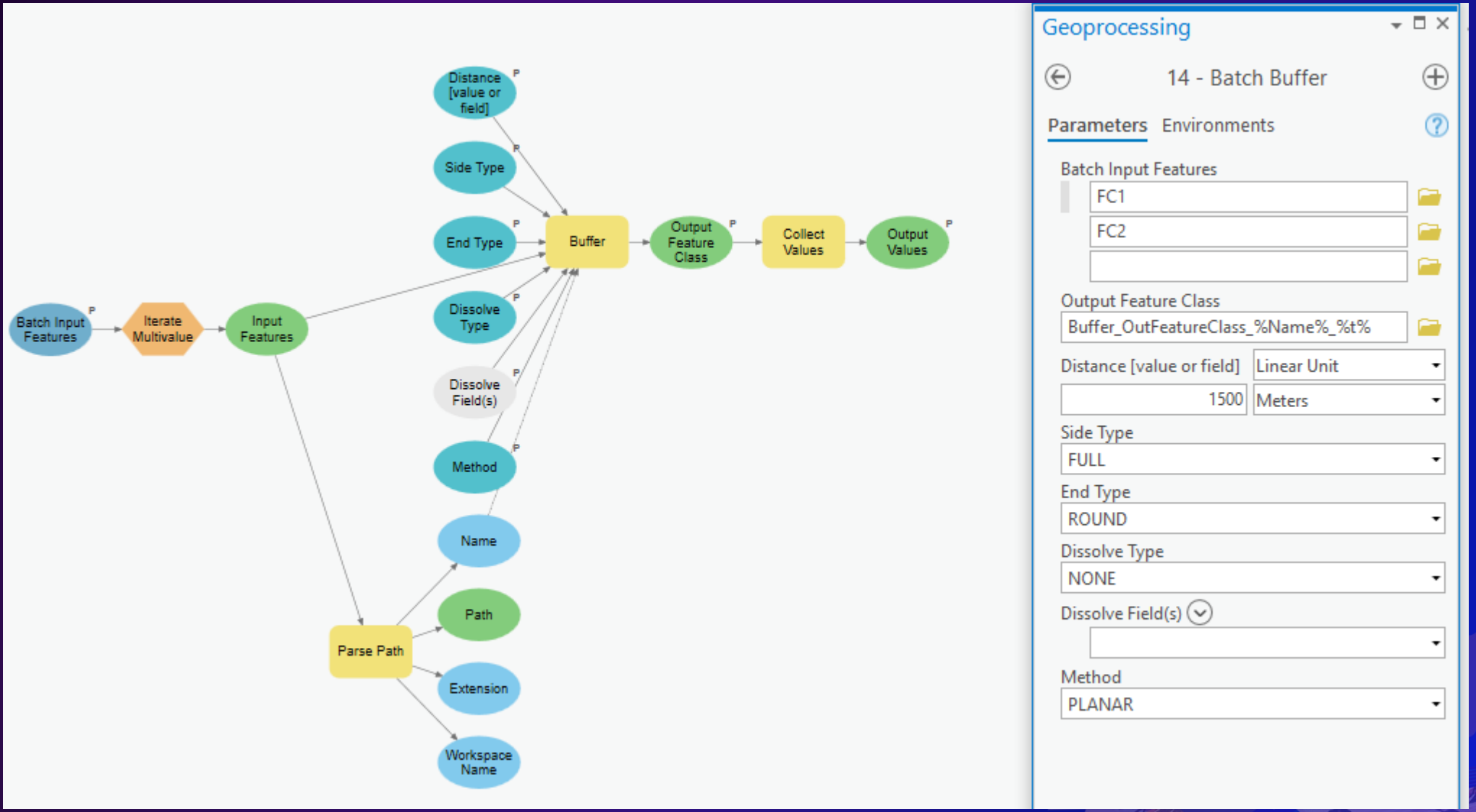


Search


c|*t*
All
Inputs
Outputs
Parameters
Parameters with filters
Add to display
Intermediate data
Symbology
Model tools
Built-in-tools
Script tools
Elements with precondition
LavaLoad
0
False 0
MagmaPipe
For
Value
Create Normal Raster
NormalRa...
Calculate Lava Flow
Lava Load Raster
Cell Statistics Max
Max Raster
Con
Lava Flow
Sin45
Slope
SlopeDEM
SinATan
Sinus Slope 1
Cell Statistics
Sinus Slope
Calculate Transport Capacity
Transport Capacity
Times
Lava Flow Weight
InitialDEM
Fill
Fill_DEM
Flow Direction
Network
Output drop raster
Flow Accumulation
DepthConver...
Flux1
Calculate Flux
Flux
Plus
Growing Volcano
Focal Statistics
Smooth Volcano

Batch Model

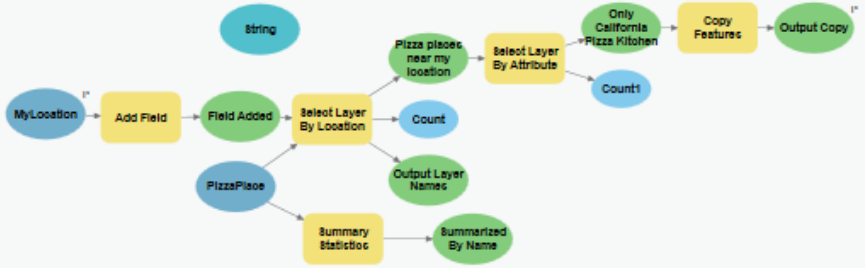
Batch Model


Distance [value or field]
Side Type
End Type
Buffer
Output Feature Class
Collect Values
Output Values
Batch Input Features
Iterate Multivalue
Input Features
Dissolve Type
Dissolve Field(s)
Method
Name
Path
Parse Path
Extension
Workspace Name
Geoprocessing
14 - Batch Buffer
Parameters
Environments
Batch Input Features
FC1
FC2
Output Feature Class
Buffer_OutFeatureClass_%Name%_%t%
Distance [value or field]
Linear Unit
1500
Meters
Side Type
FULL
End Type
ROUND
Dissolve Type
NONE
Dissolve Field(s)
Method
PLANAR

Model To Python

Model To Python

Map | 15 - Model To Python

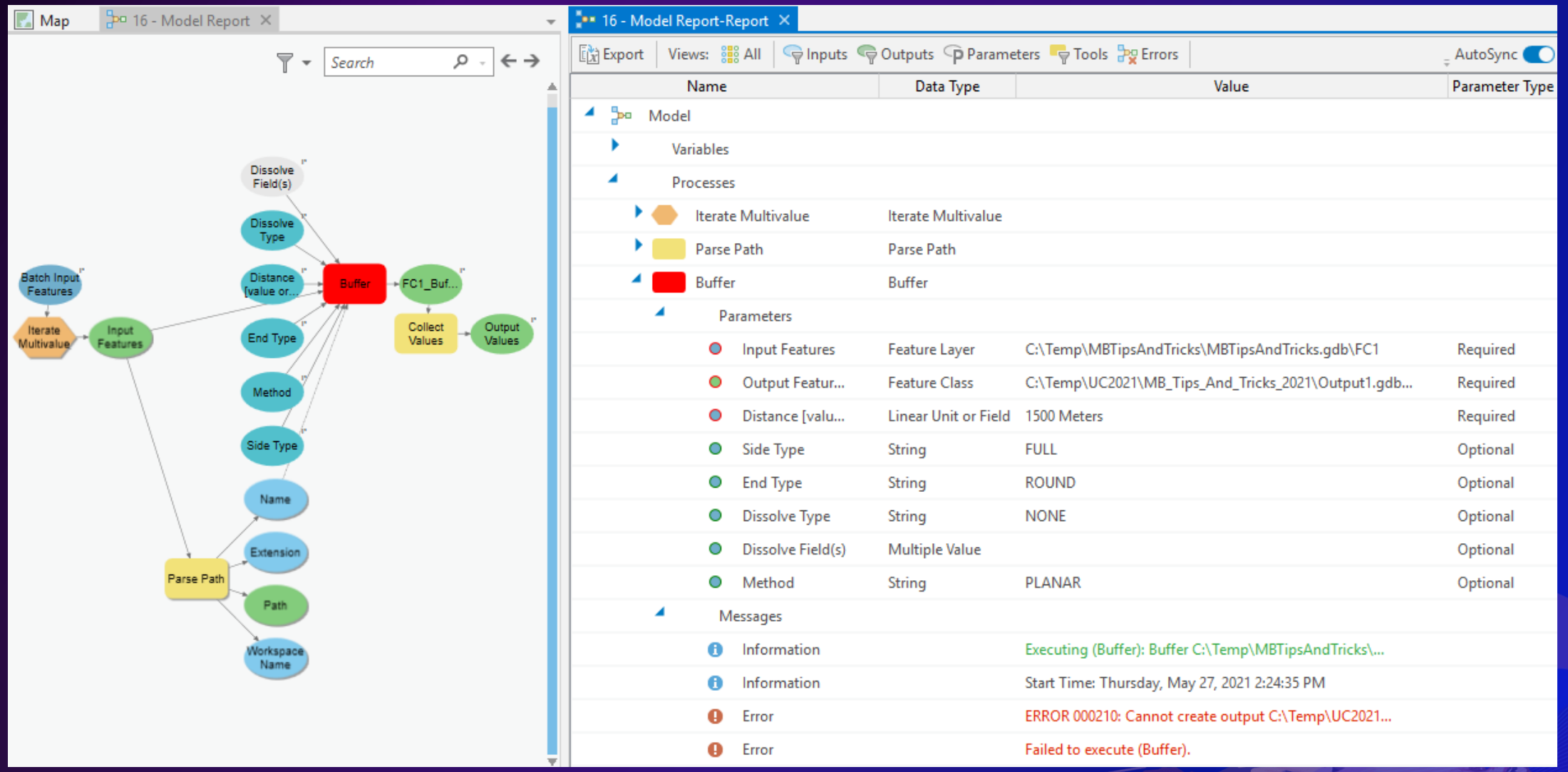


Python

```
# -*- coding: utf-8 -*-
"""
Generated by ArcGIS ModelBuilder on : 2021-06-01 19:34:01
"""
import arcpy
from sys import argv

def ModelToPython(MyLocation="C:\\Temp\\MBTipsAndTricks\\MBTipsAndTricks.gdb\\MyLocation",
Output_Copy=fr"{arcpy.env.scratchGDB}\Output"):  # 15 - Model To Python

    # To allow overwriting outputs change overwriteOutput option to True.
    arcpy.env.overwriteOutput = False

    # Model Environment settings
    with arcpy.EnvManager(scratchWorkspace=r"C:\Temp\UC2021\MB_Tips_And_Tricks_2021\Output.gdb"):
        PizzaPlace = "C:\\Temp\\MBTipsAndTricks\\MBTipsAndTricks.gdb\\PizzaPlace"
        String = "Dominos Pizza"

        # Process: Add Field (Add Field) (management)
        Field_Added = arcpy.management.AddField(in_table=MyLocation, field_name="MyField", field_type="LONG",
field_precision=None, field_scale=None, field_length=None, field_alias="", field_is_nullable="NULLABLE",
field_is_required="NON_REQUIRED", field_domain="")[0]

        # Process: Select Layer By Location (Select Layer By Location) (management)
        Pizza_places_near_my_location, Output_Layer_Names, Count = arcpy.management.SelectLayerByLocation(in_layer=
[PizzaPlace], overlap_type="INTERSECT", select_features=Field_Added, search_distance="1000 Meters",
selection_type="NEW_SELECTION", invert_spatial_relationship="NOT_INVERT")

        # Process: Select Layer By Attribute (Select Layer By Attribute) (management)
        Only_California_Pizza_Kitchen, Count1 = arcpy.management.SelectLayerByAttribute
(in_layer_or_view=Pizza_places_near_my_location, selection_type="SUBSET_SELECTION", where_clause=f"\"Pizza_Name\" =
'{String}'", invert_where_clause="")

        # Process: Copy Features (Copy Features) (management)
        with arcpy.EnvManager(extent="5936889.13296736 2276016.72497392 5947473.38761856 2288504.24031093"):
            arcpy.management.CopyFeatures(in_features=Only_California_Pizza_Kitchen, out_feature_class=Output_Copy,
config_keyword="", spatial_grid_1=0, spatial_grid_2=0, spatial_grid_3=0)

        # Process: Summary Statistics (Summary Statistics) (analysis)
        Summarized_By_Name = "C:\\Temp\\MBTipsAndTricks\\Output.gdb\\PizzaPlace_Statistics"
        arcpy.analysis.Statistics(in_table=PizzaPlace, out_table=Summarized_By_Name, statistics_fields=[["Pizza_Name",
"COUNT"]], case_field=[])

if __name__ == '__main__':
    # Global Environment settings
    with arcpy.EnvManager(workspace=r"C:\Temp\MBTipsAndTricks\MBTipsAndTricks.gdb"):
        ModelToPython(*argv[1:])
```

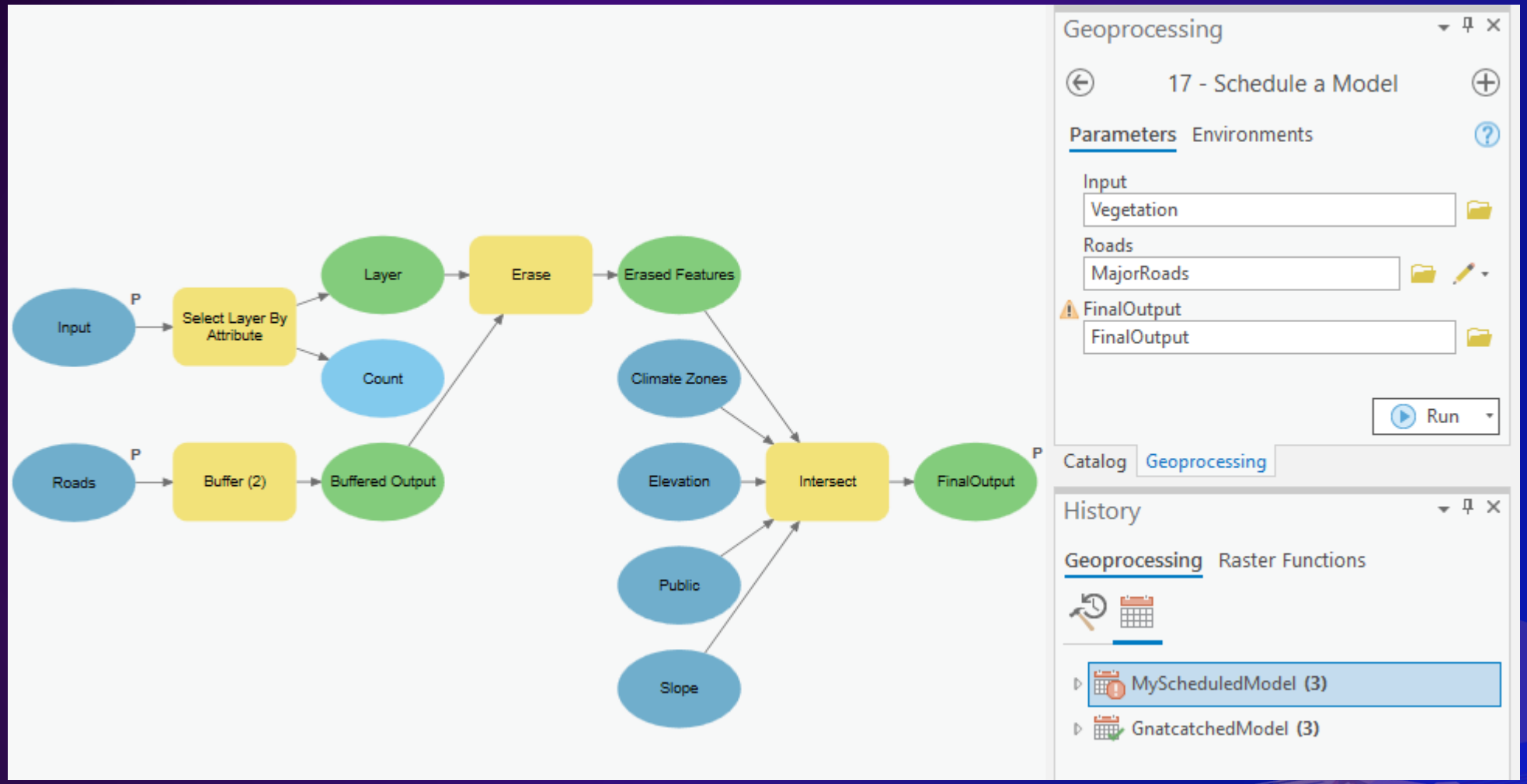
Model Report

Model Report



Schedule a Model Run

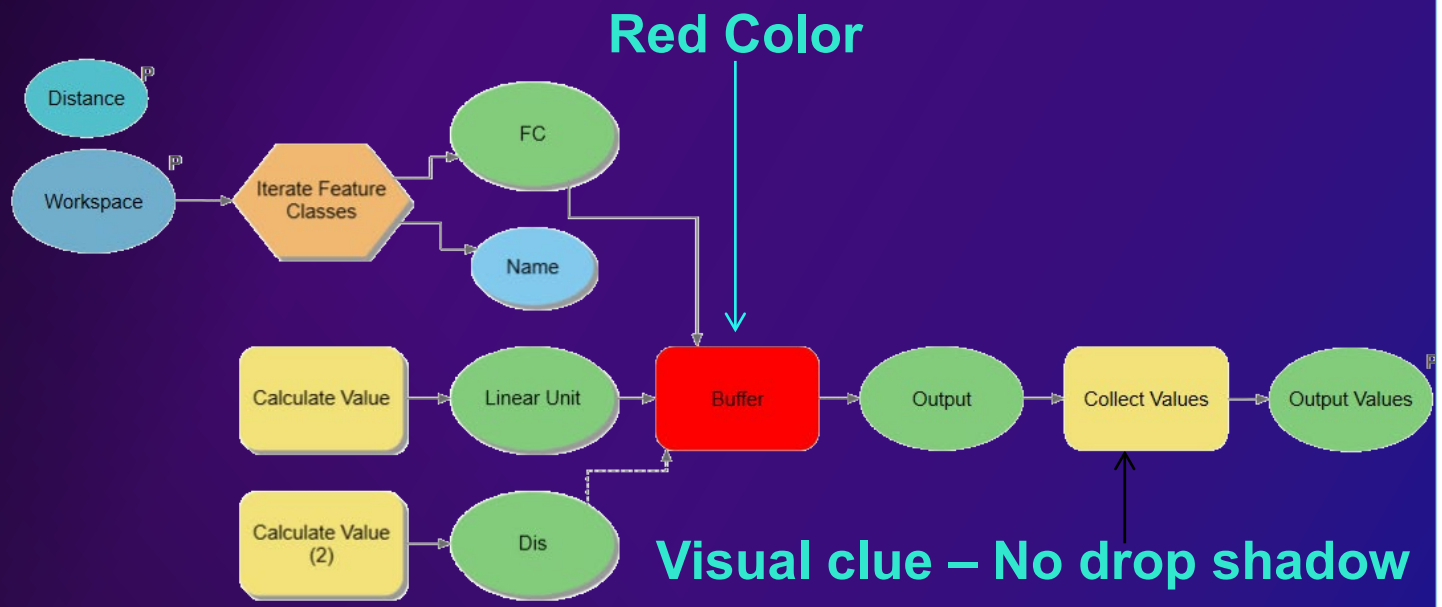
Schedule a Model Run

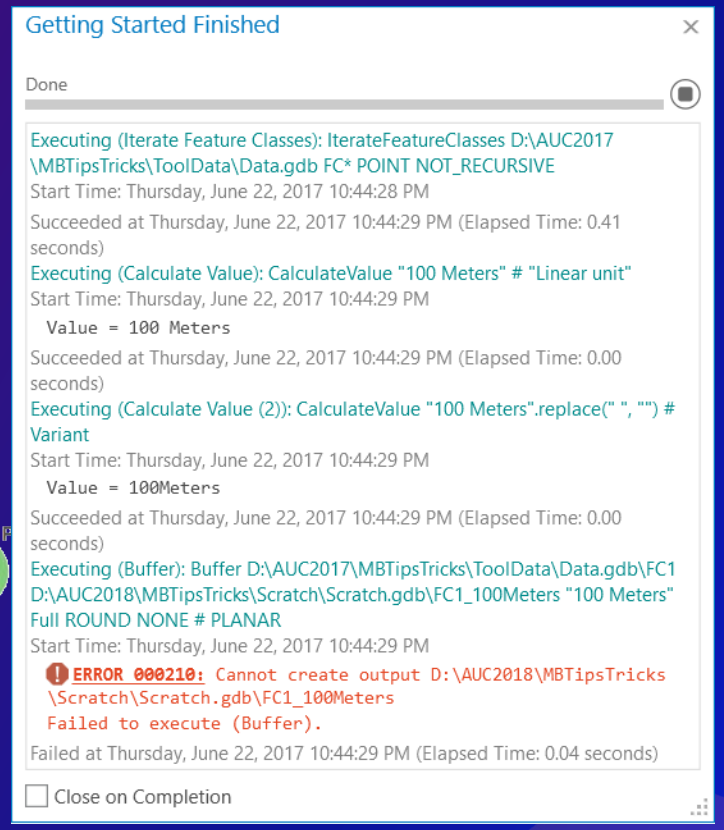


Debugging a Model

Debugging a model

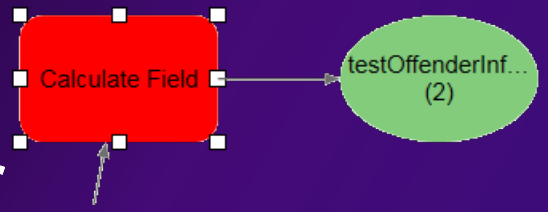
- How do I know where did my model break?

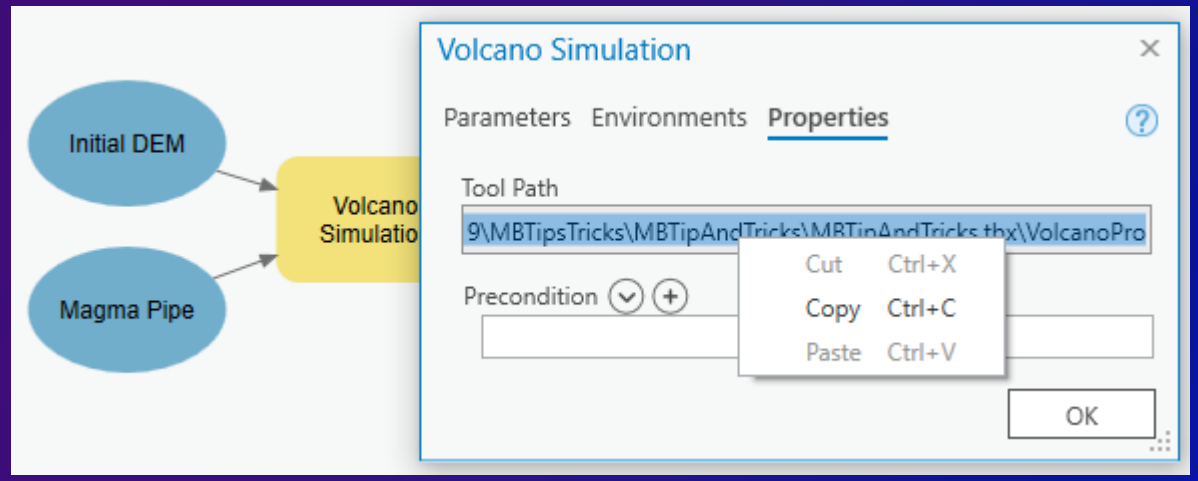




Messages

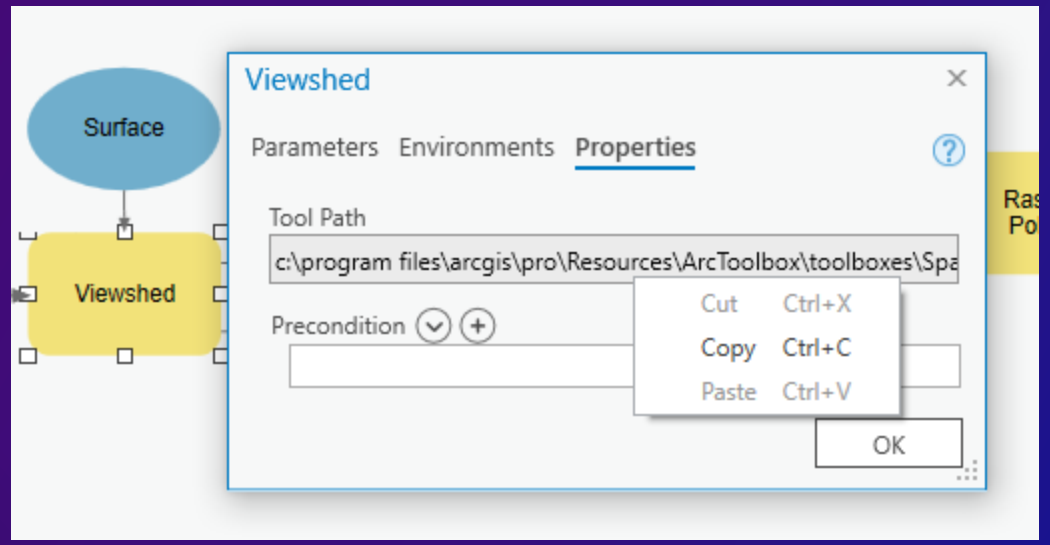
Debugging models





- Red color
- No drop Shadow
- UI validation error filter
- Python syntax error <>
- Tool missing – Delete toolbox or model
- Schema locks Add Geom during editing
- Script tool – script or tool missing python package is missing.
- Old models to Pro > Save > Popup > Save As – popup message
- Old Scripts don't work – Analyze tool - Print
- Calculation differences – Pairwise Buffer

Tool Missing

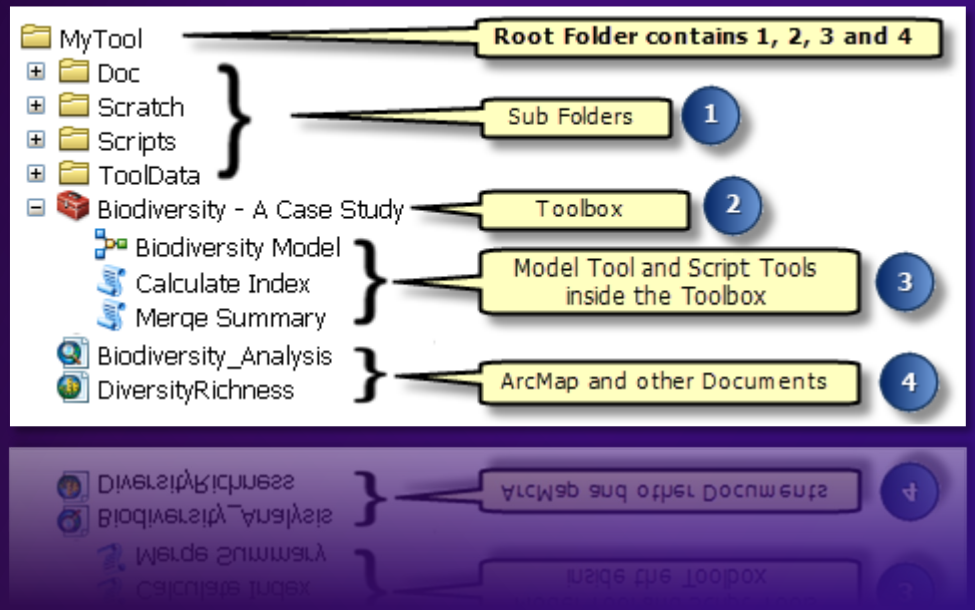


ArcMap Tips

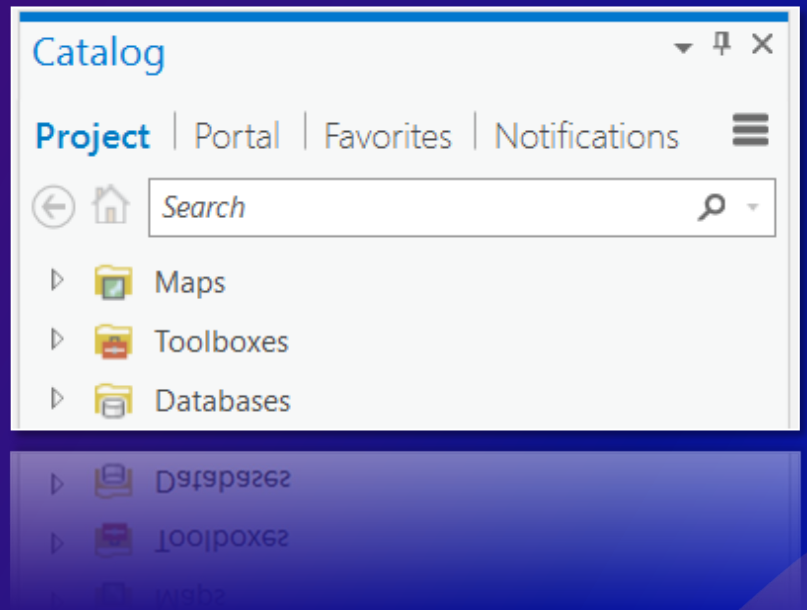
Organize well

- **Well begun is half done.** ***Aristotle***

10x

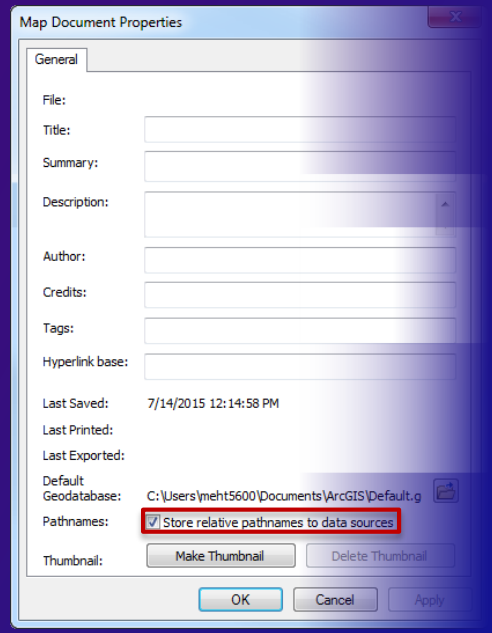


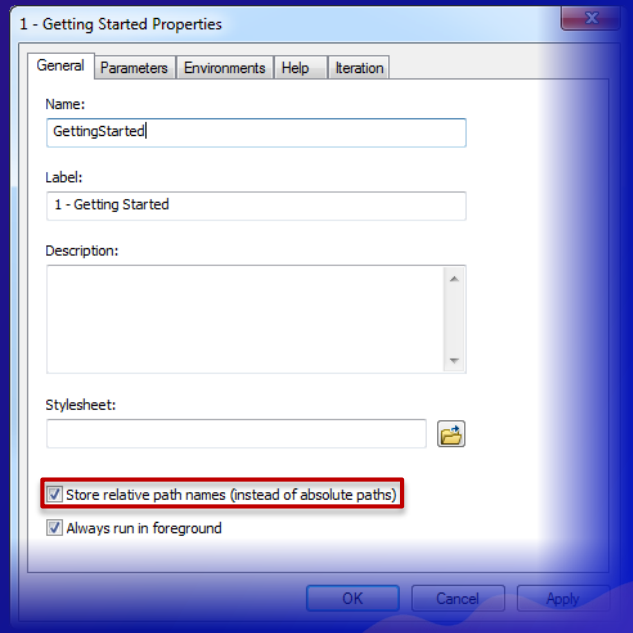
Pro



Relatively well 10x ArcMap

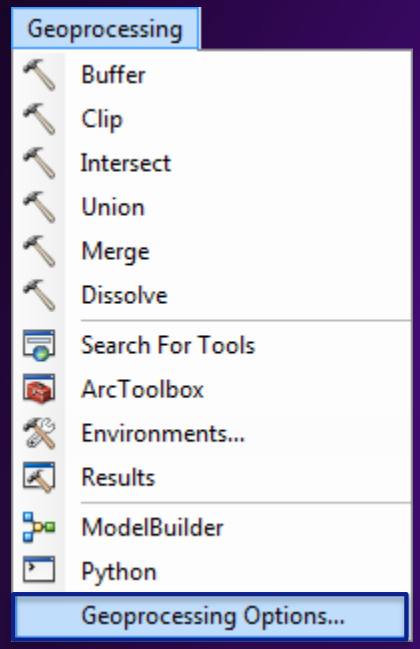
- Want to share Data + Map + Model/s
- Have to move Data + Map + Model/s from one dish space to another
  - Relative path in map document
  - Relative path in a model
- Relative paths do not work without data and folders
- GPK
- Relative path is true by default in ArcGIS Pro

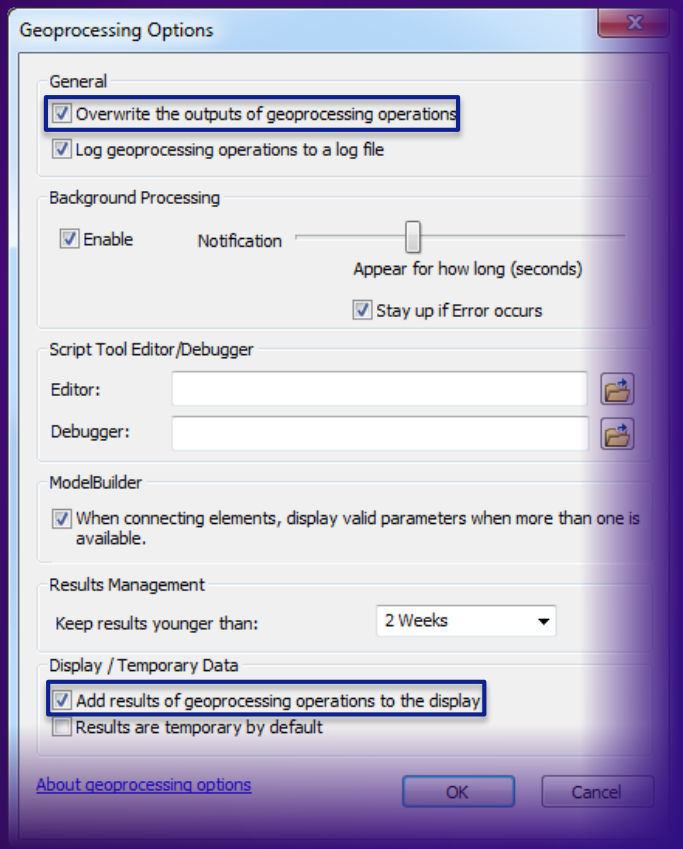




Geoprocessing options

10x





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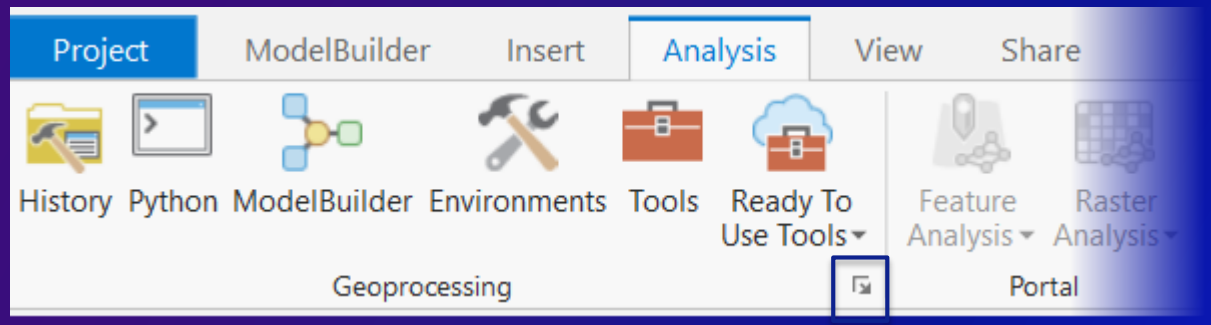

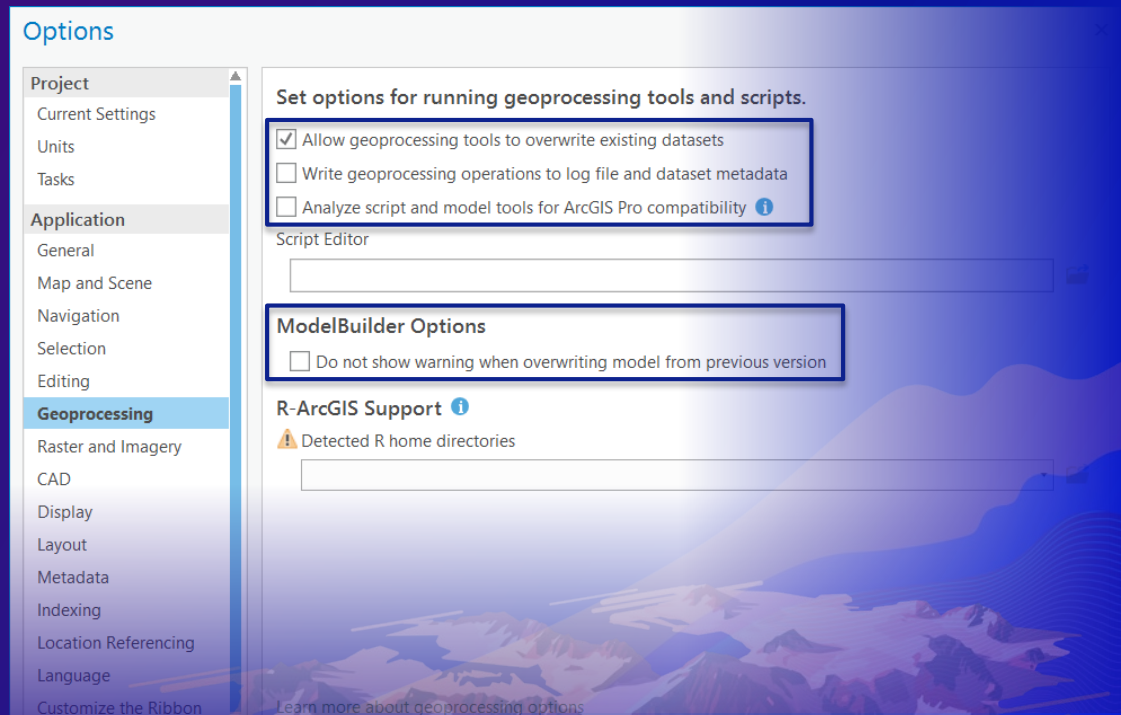

Advanced Techniques

1. Iterators
2. Inline Variable Substitution
3. Preconditions
4. Nested Models
5. Feedback Loops

What we have covered so far

1. Getting started
2. Resources and community
3. Adding Data and Tools
4. Environments
5. Model State
6. Shortcut Keys
7. History to Model
8. Variable Types
9. Groups and Formatting
10. Data Types
11. Model Tool
12. Add To Display and Symbology
13. Derived Data
14. Parameter Filters
15. Parameter Categories
16. Intermediate Data
17. Batch Model
18. Model To Python
19. Model Report
20. Schedule a Model
21. Debugging a Model

We want your feedback

Click on the Session Survey link
below this video window