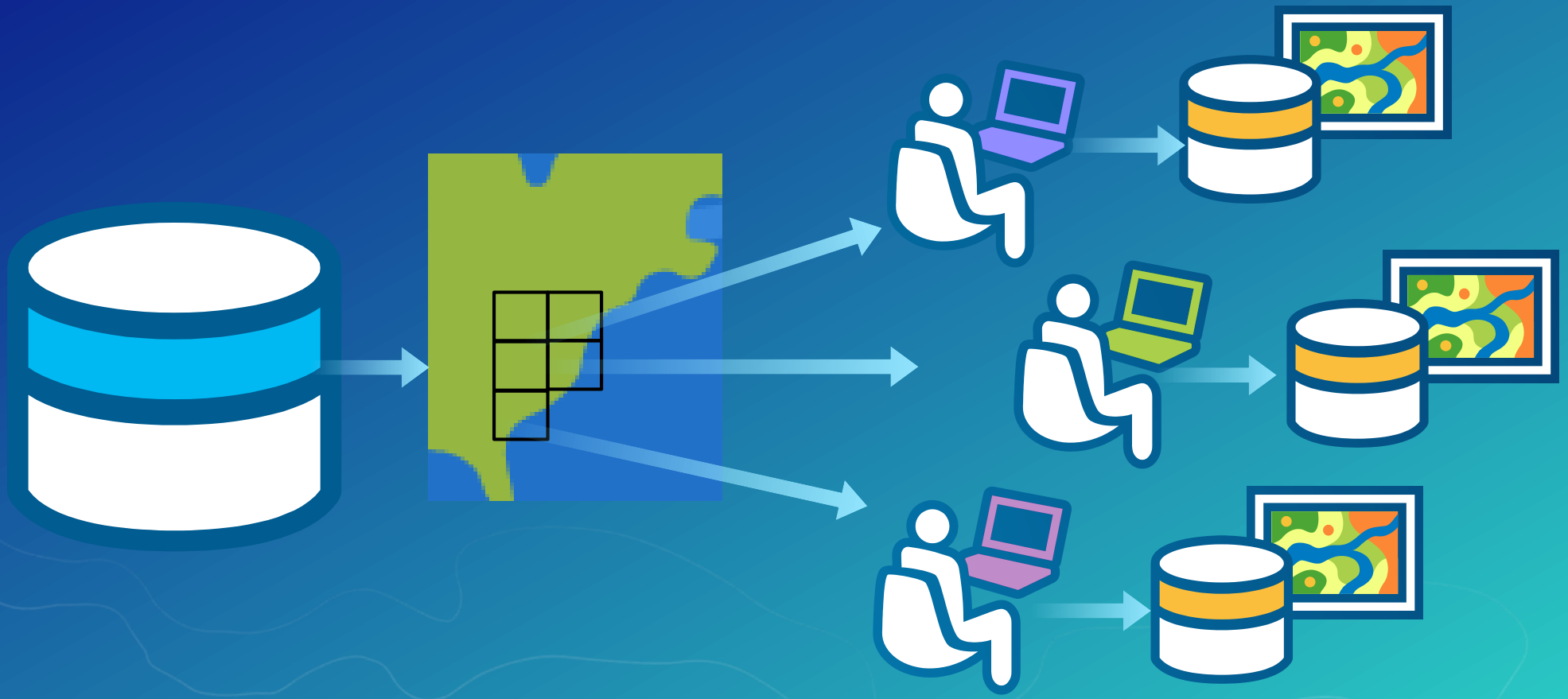
Esri Production Mapping: Map Automation & Advanced Cartography

MADHURA PHATERPEKAR

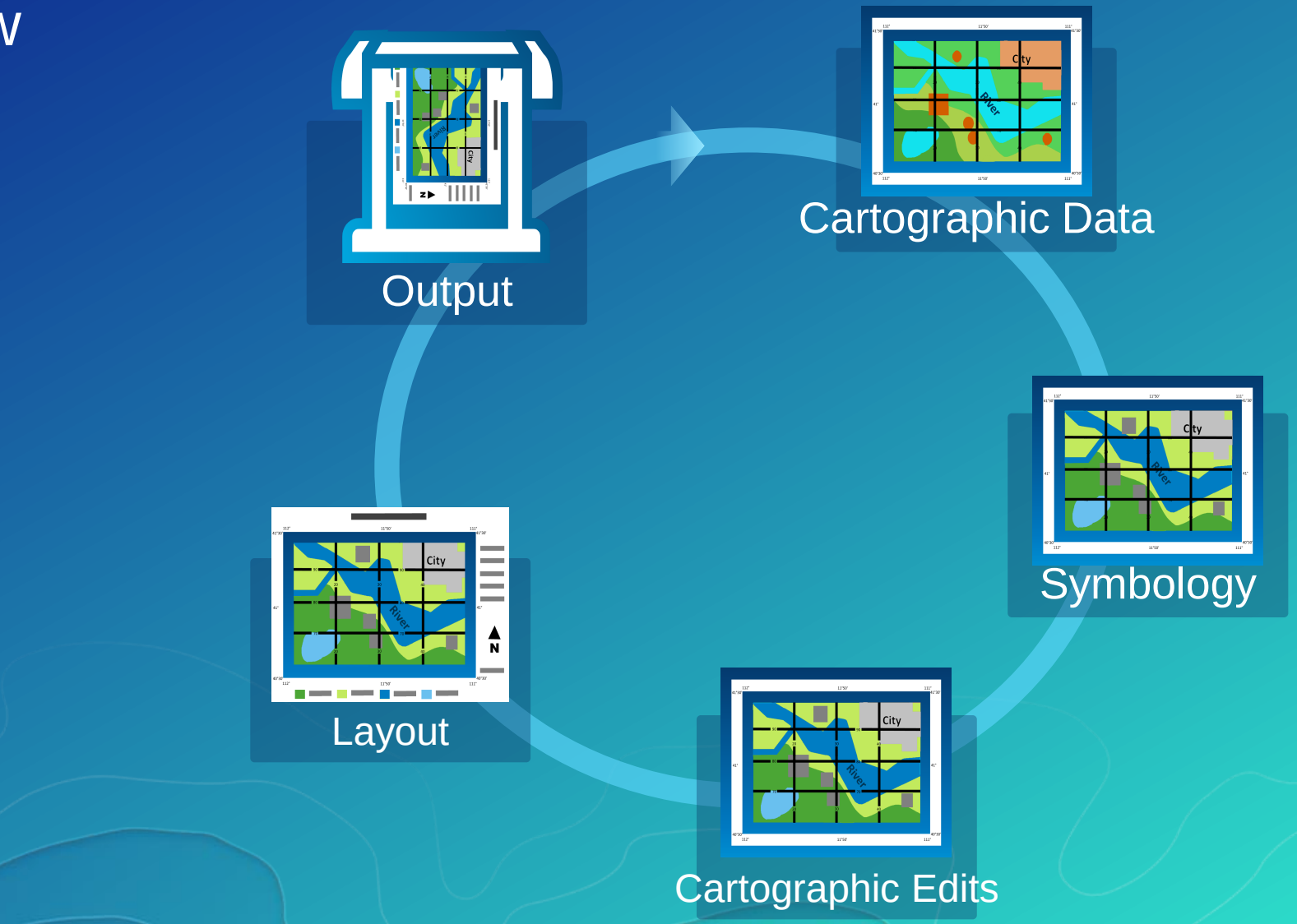
JOE SHEFFIELD

Traditional Cartography



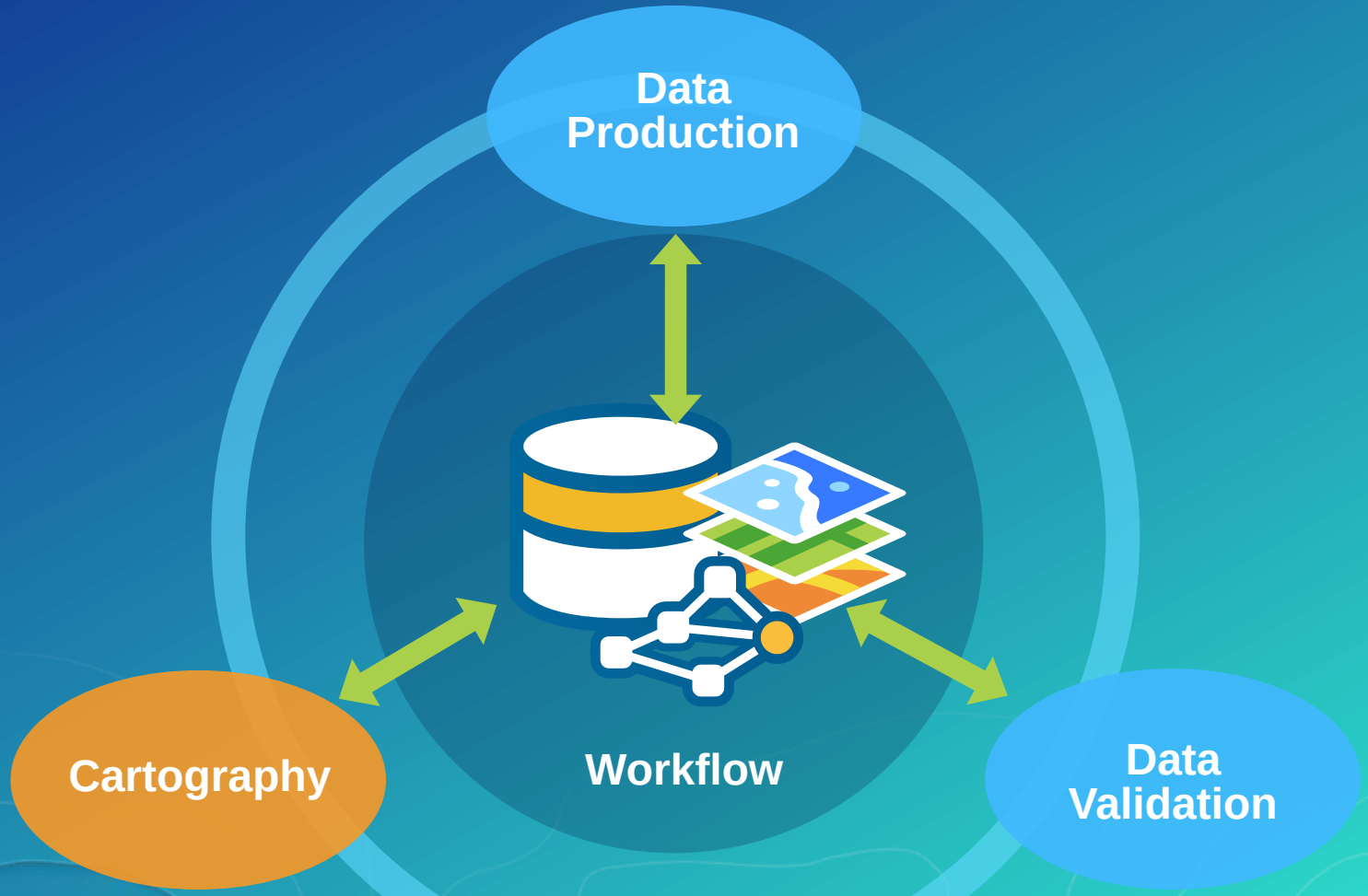
What you really want

Cartographic Workflow

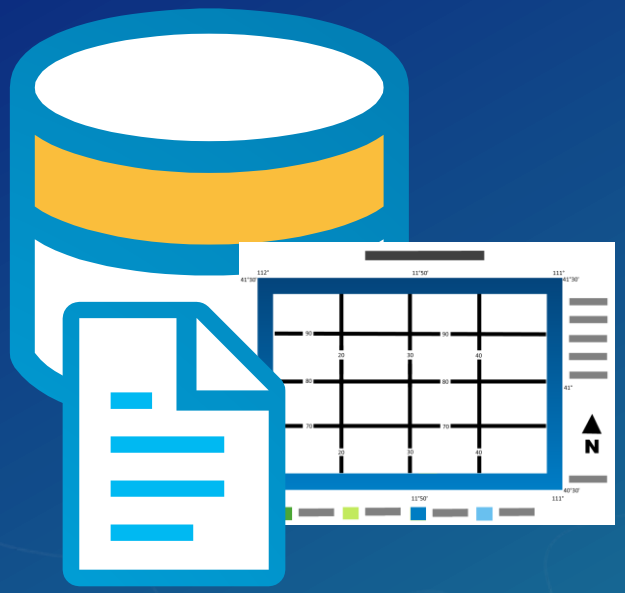


Esri Production Mapping

A collection of ArcMap Extensions

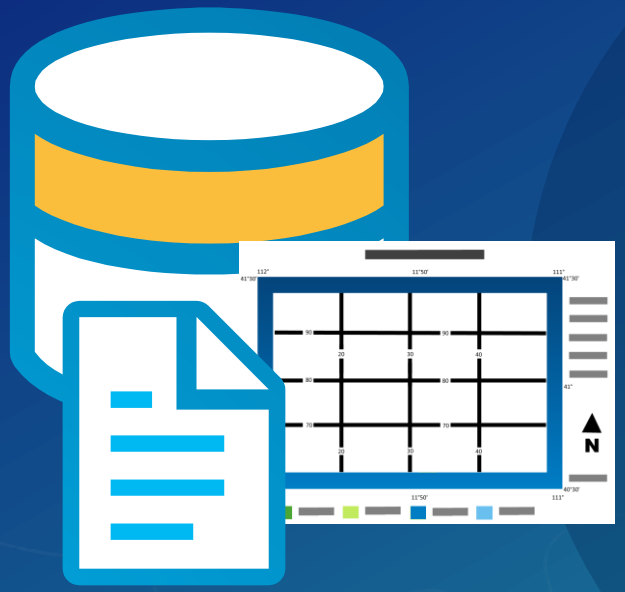


Map Automation



Production Mapping
Cartographic Rules

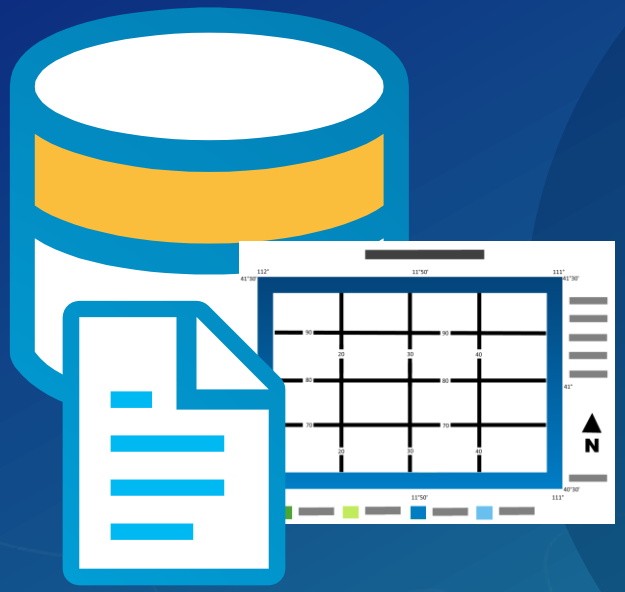
Map Automation



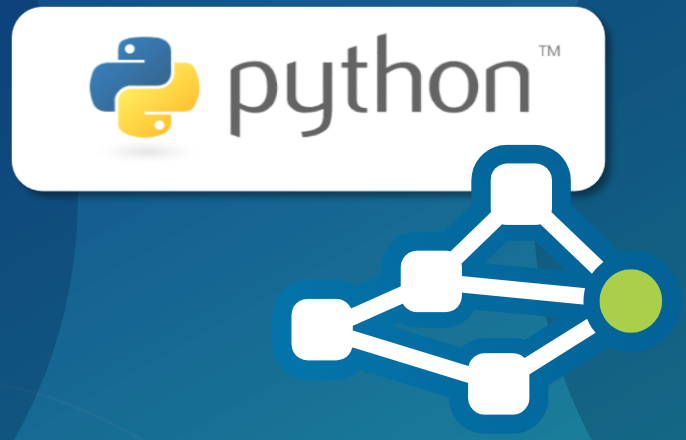
Production Mapping
Cartographic Rules

Geoprocessing
& Python

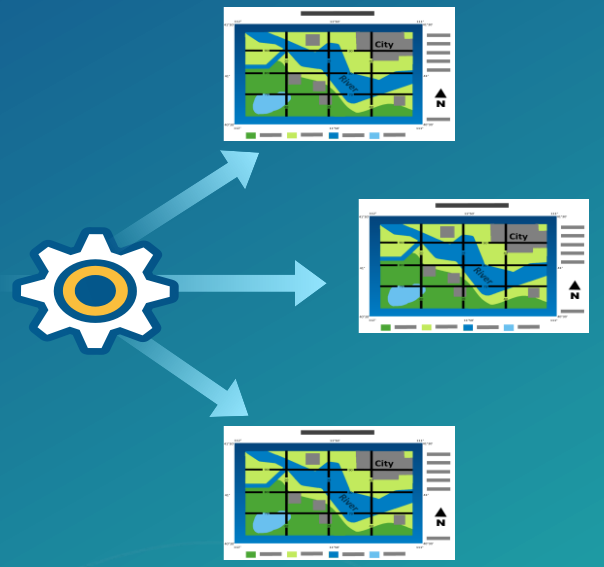
Map Automation



Production Mapping
Cartographic Rules



Geoprocessing
& Python



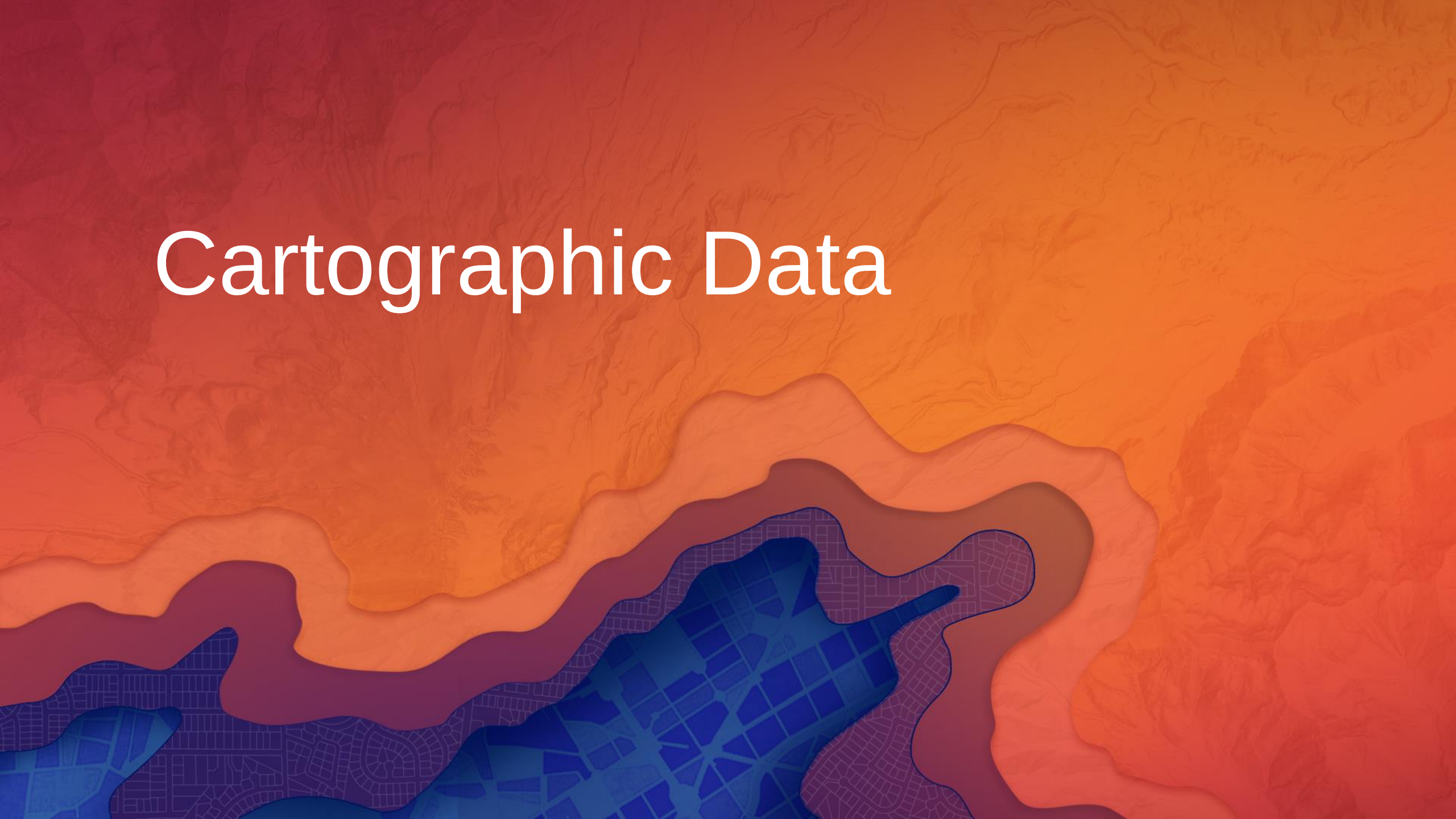
Standard
Output

Civilian Topographic Model (CTM)

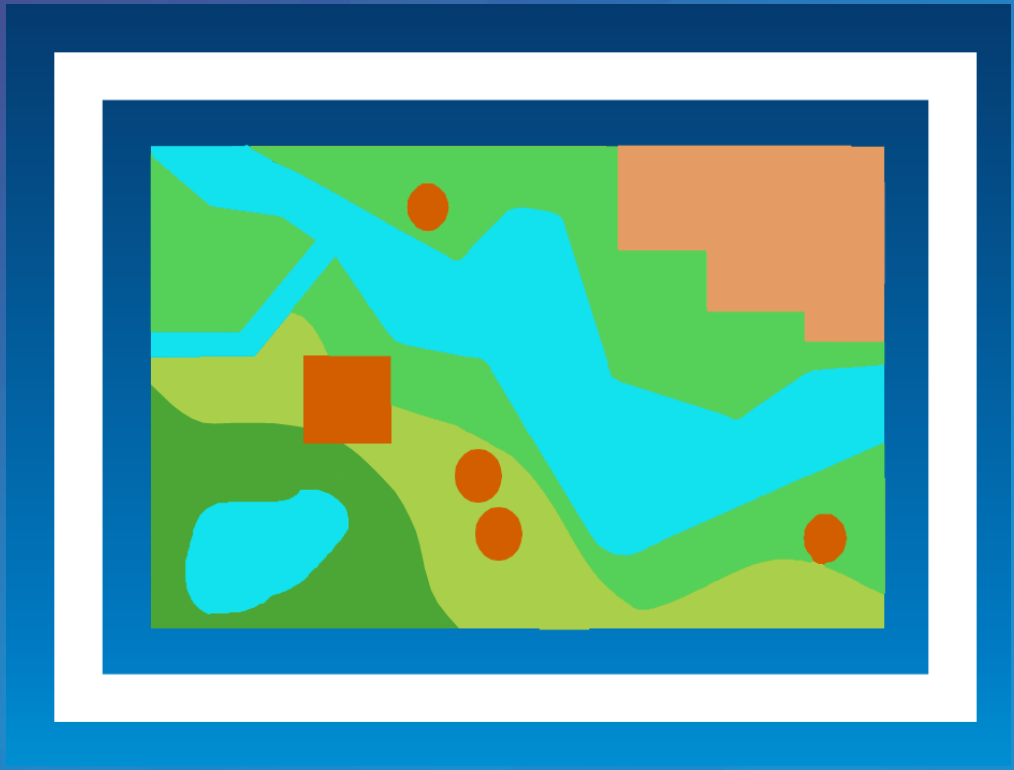
- Based on the National System for Geospatial Intelligence Feature Data dictionary (NFDD)
- Includes:
  - Database schema
  - Editing Rules
  - Quality Control Rules
  - Cartographic templates for 25K
  - Cartographic templates for 50K
  - 50K Generalization Models
  - Workflow Manger Workflows
  - Distributed Generalization Workflows

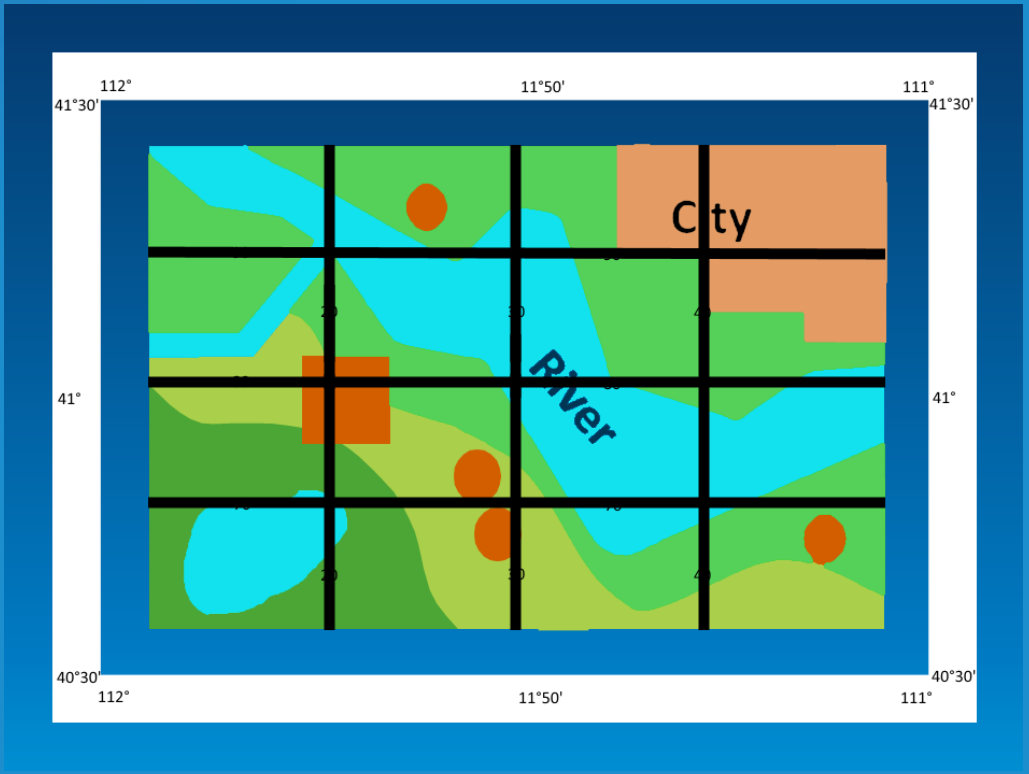
https://github.com/esri/ctm

Cartographic Data



Cartographic Data



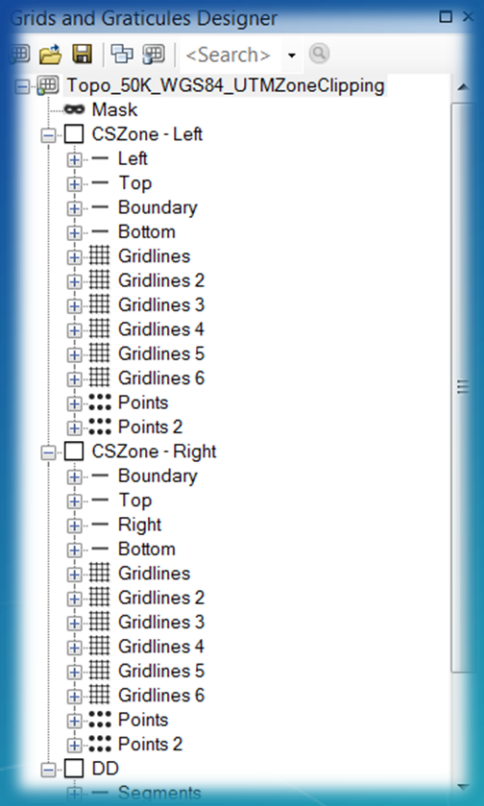


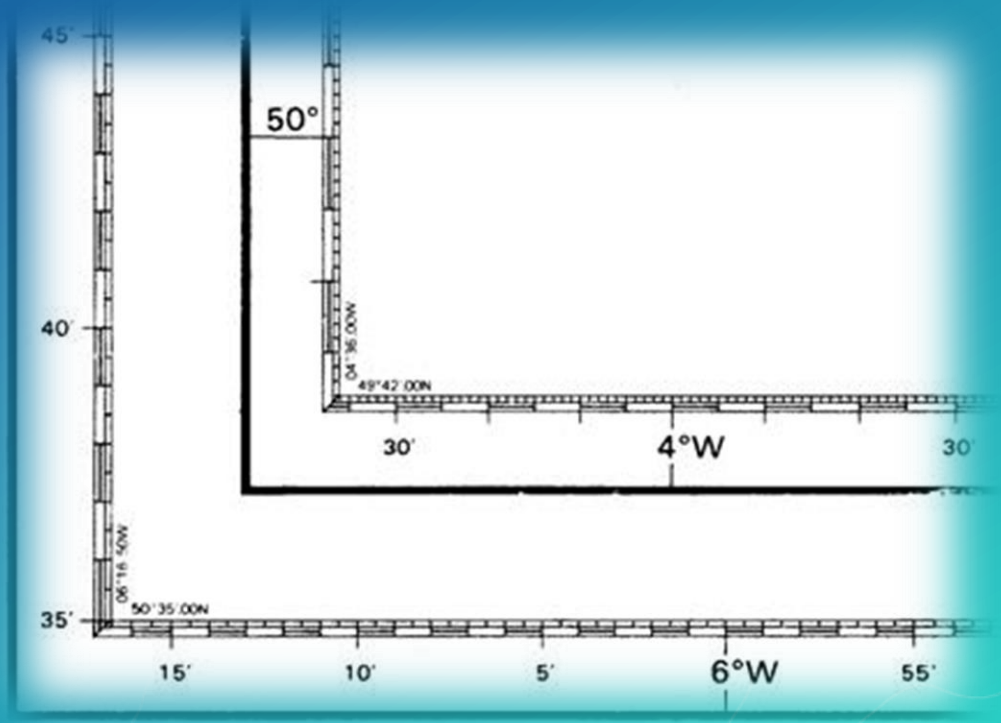
- Data and text used to enrich cartographic products
- Create data appropriate for your cartographic scale

Grids and Graticules

Design

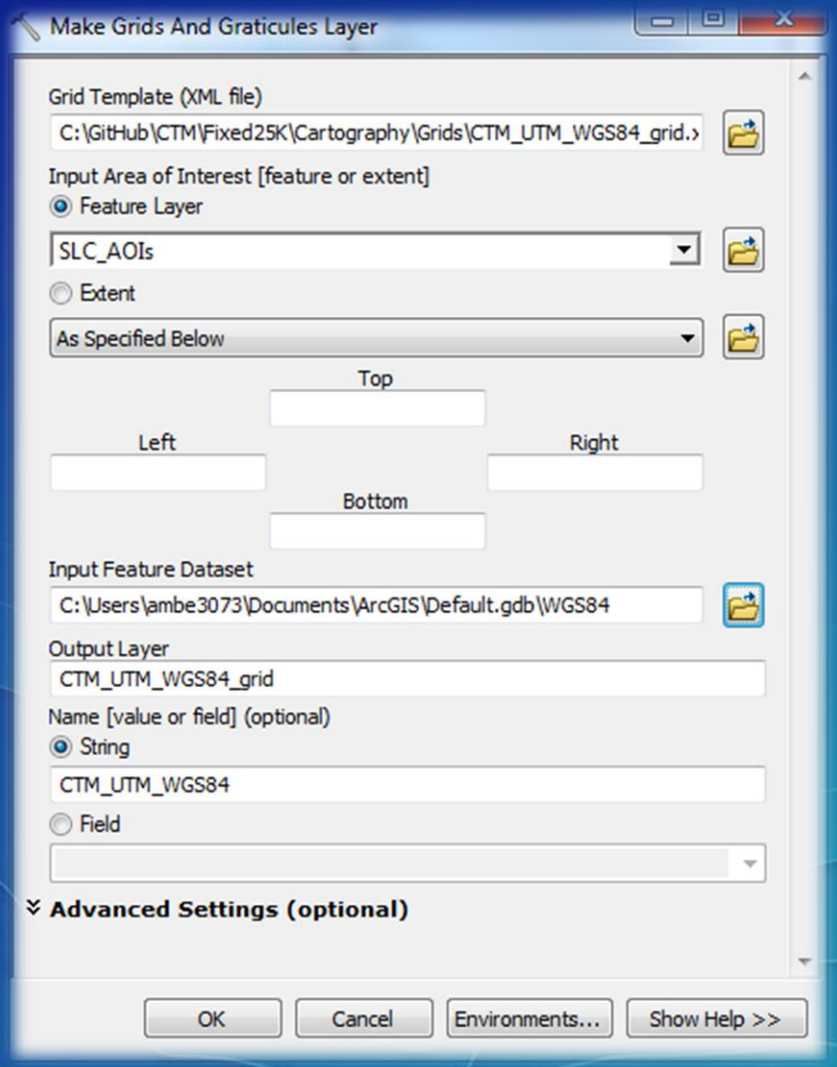
- Feature based
- Fine Grain Custom Design
- Geographically aware
  - Scale
  - Coordinate system
  - Rotation





Grids and Graticules

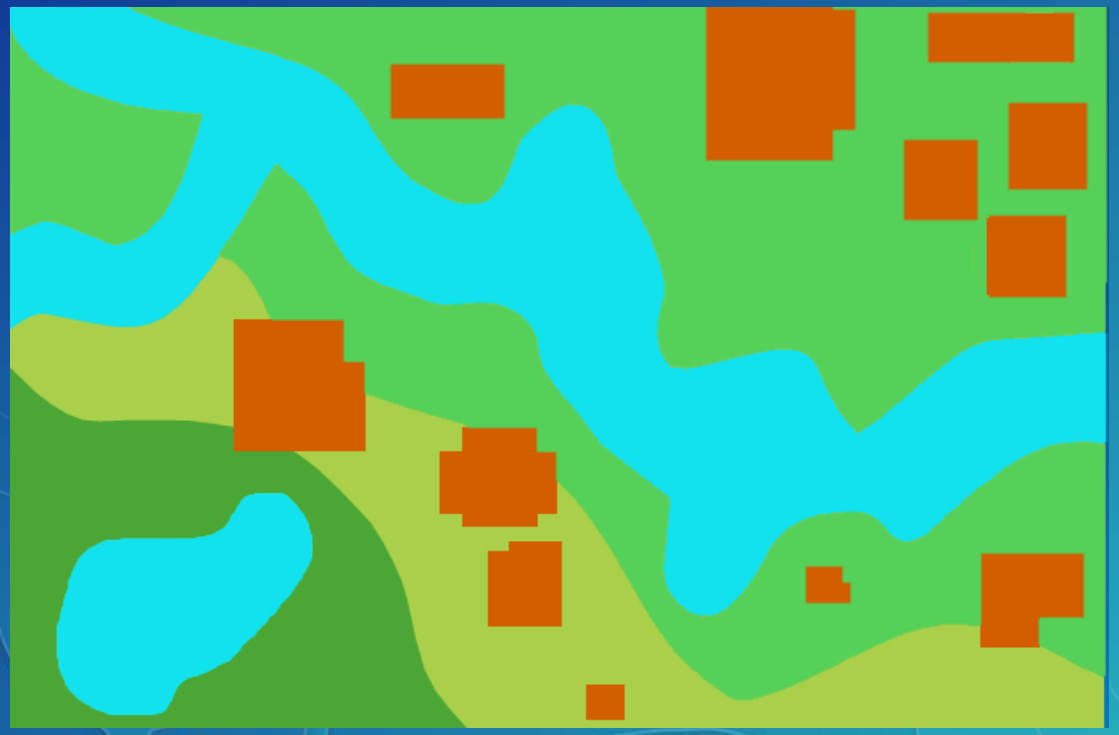
Applying




```python
#Define grid object
grid = arcpyproduction.mapping.Grid(grid_xml)

#Uses the appropriate XML for to create the grid
arcpy.AddMessage("Creating the Grid...")
output_layer = map_name + '_' + grid.type
grid_result = arcpy.MakeGridsAndGraticulesLayer_cartography(grid_xml,
                aoi, gfds, output_layer, map_name)
grid_layer = grid_result.getOutput(0)

# Add the grid layer to the top of the map
arcpy.mapping.AddLayer(data_frame, grid_layer, "TOP")
arcpy.AddMessage("Grid Layer added to map...")

# Updates the data frame properties base on the grid
final_mxd.activeView = 'PAGE_LAYOUT'
grid.updateDataFrameProperties(data_frame, aoi)
```

Generalization

- Resolves the appearance of feature geometry at smaller scales



Feature Generalization

1: 25000

1: 50000

- Features assessed individually without regard to symbology or spatial relationships

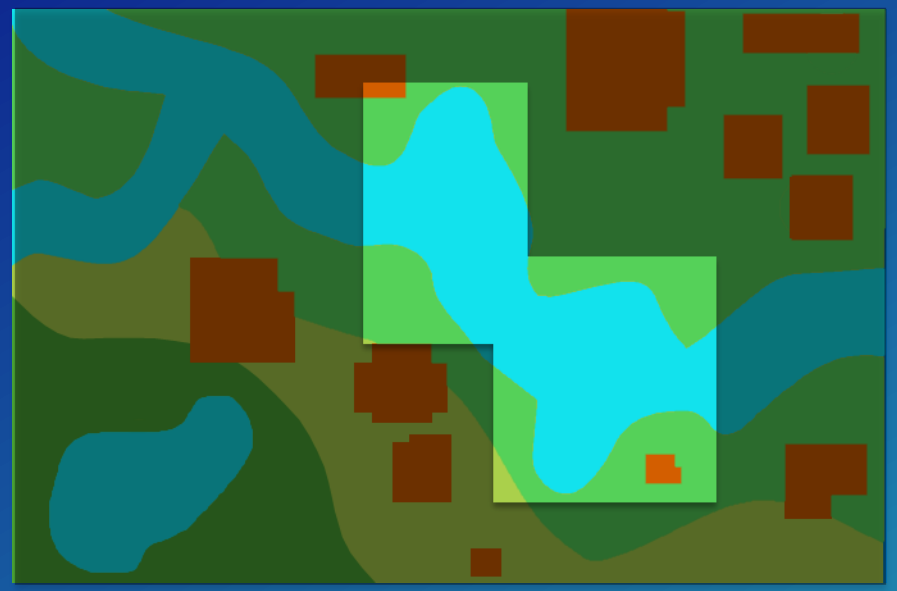
Contextual Generalization

1: 25000

1: 50000

- Features are assessed collectively
  - Maintain pattern, density, and spatial relationships

Contextual Generalization

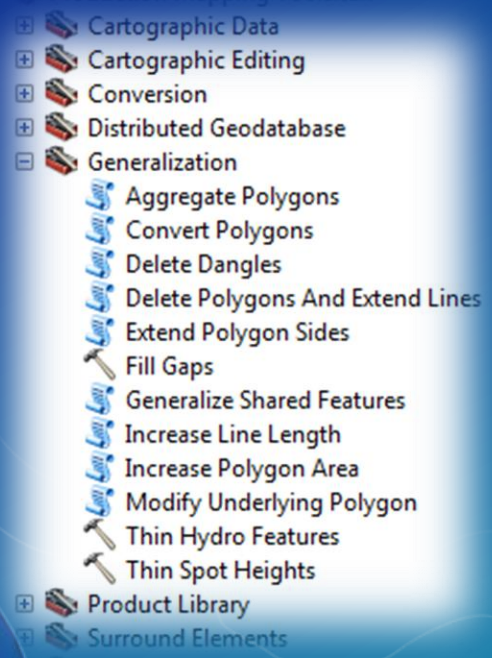


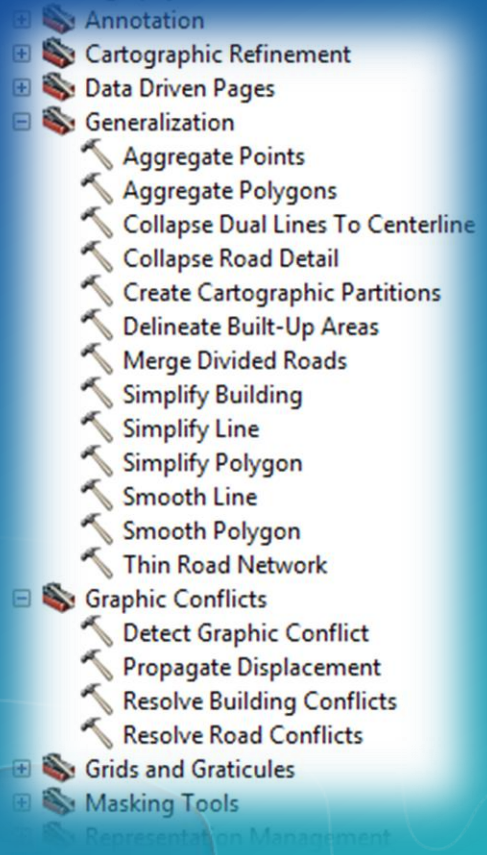
1: 25000

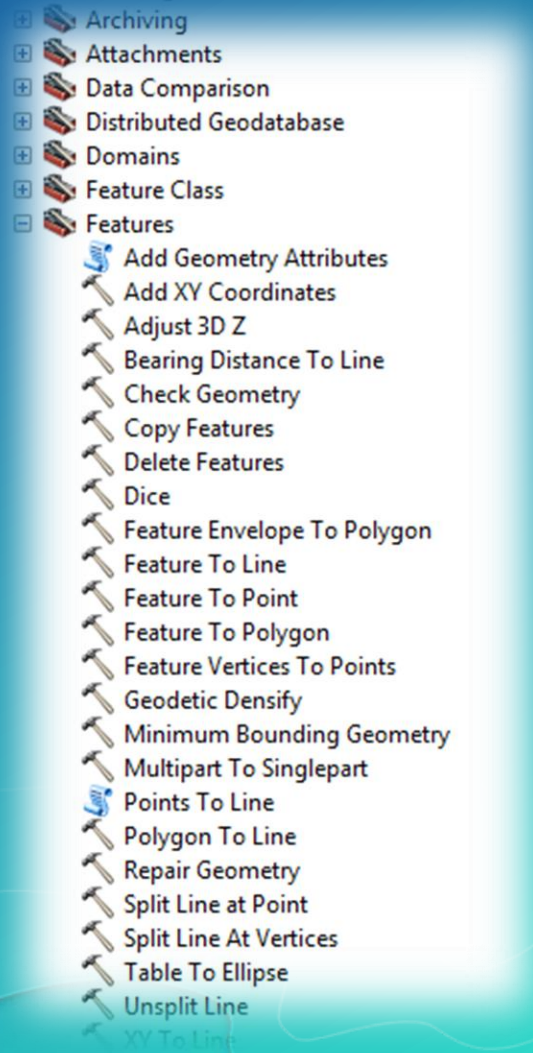
1: 50000

- Features from multiple layers assessed simultaneously
  - Maintain pattern, density, and spatial relationships

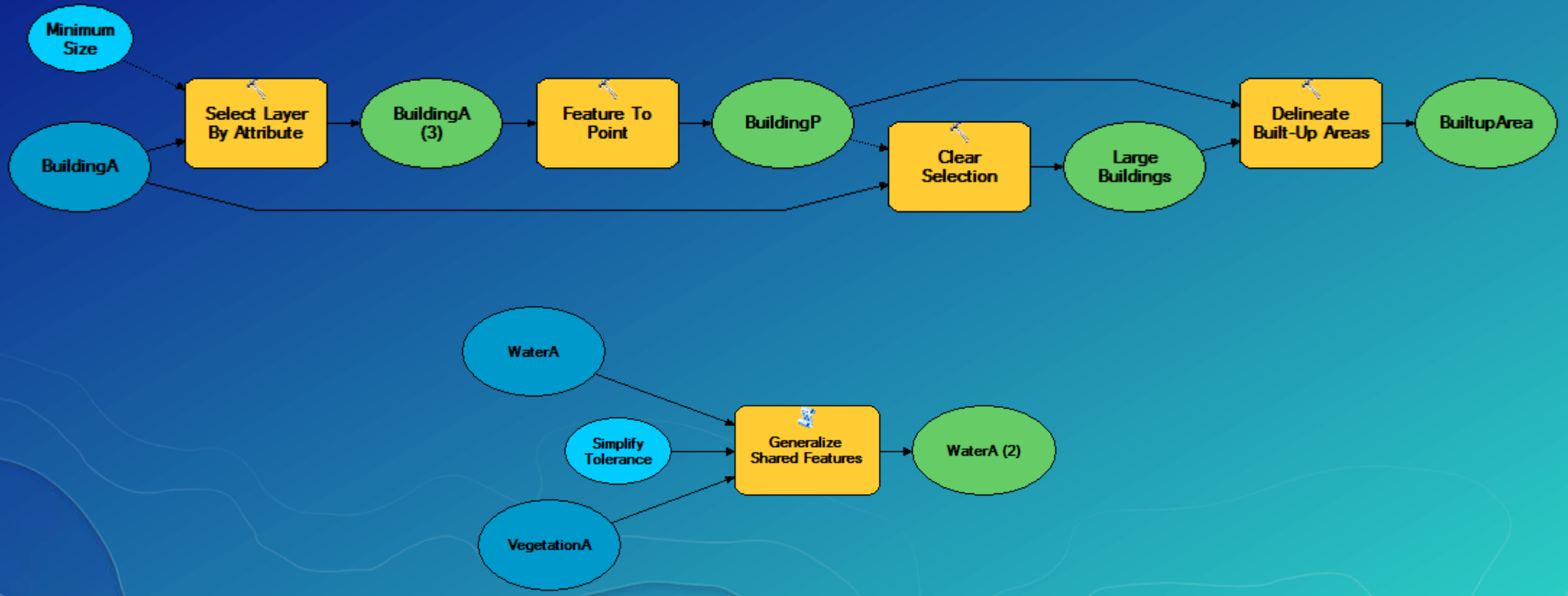
Generalization Tools



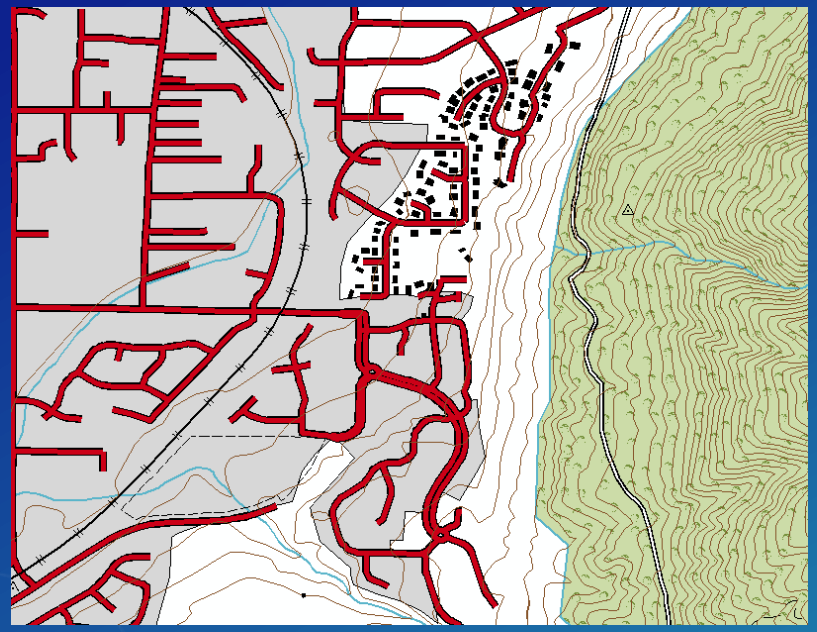




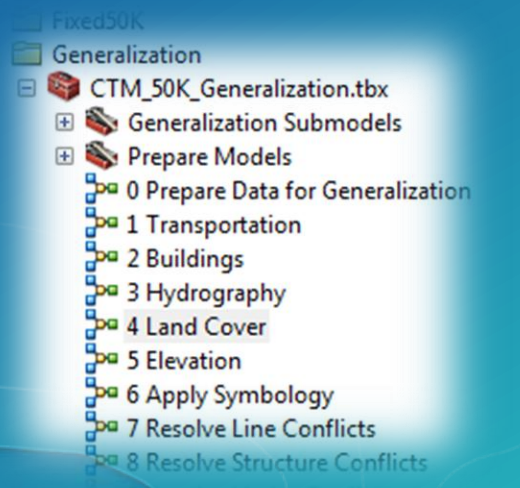
Find the tool and add to a model

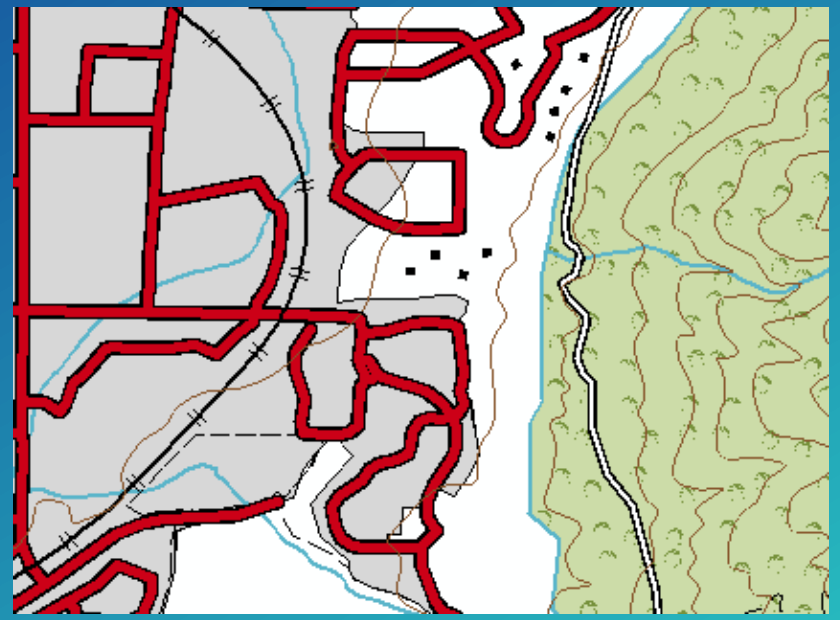


Run the models



1: 25000





1: 50000

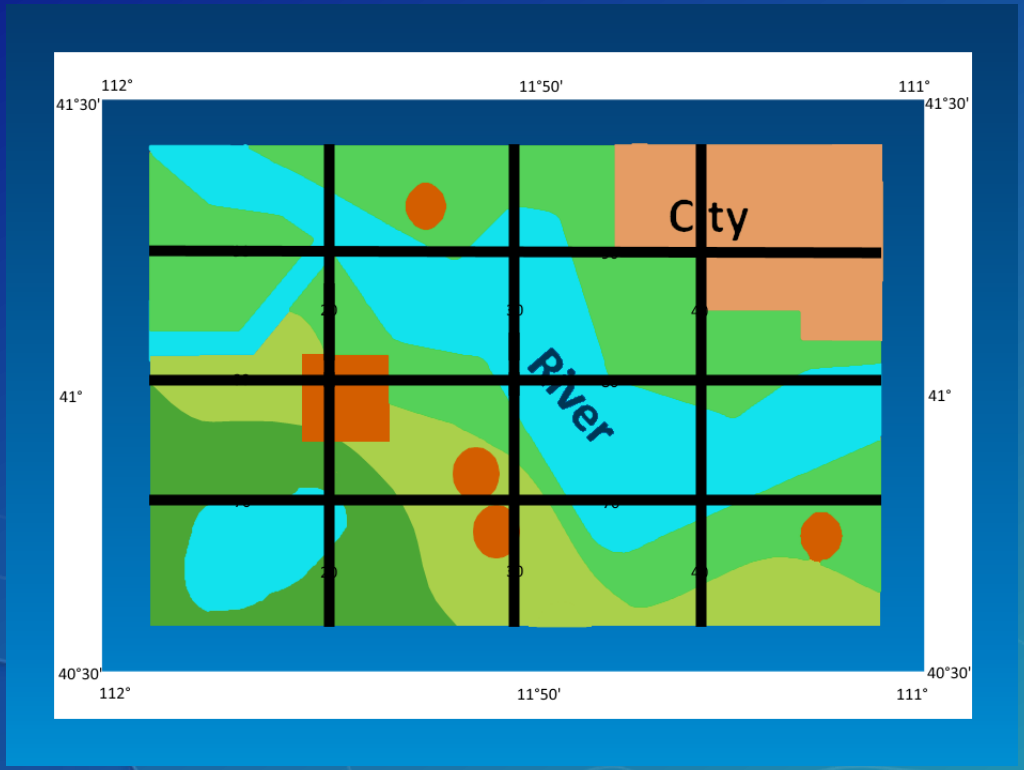
Demo: Cartographic Generalization

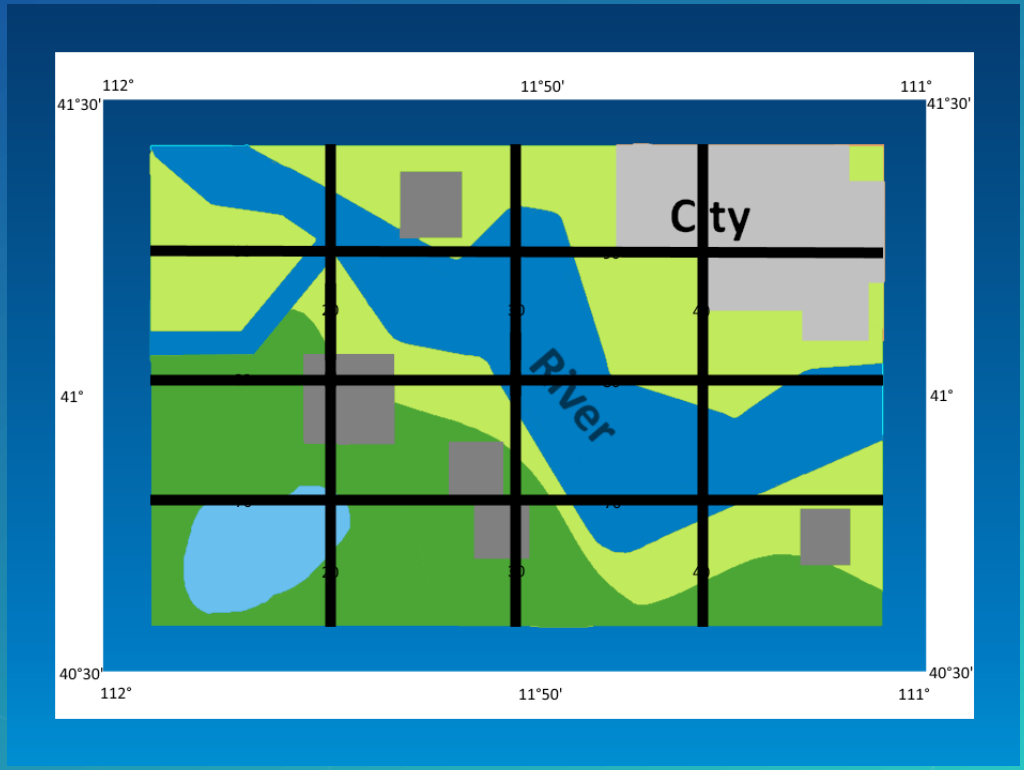
Joe Sheffield

Symbology

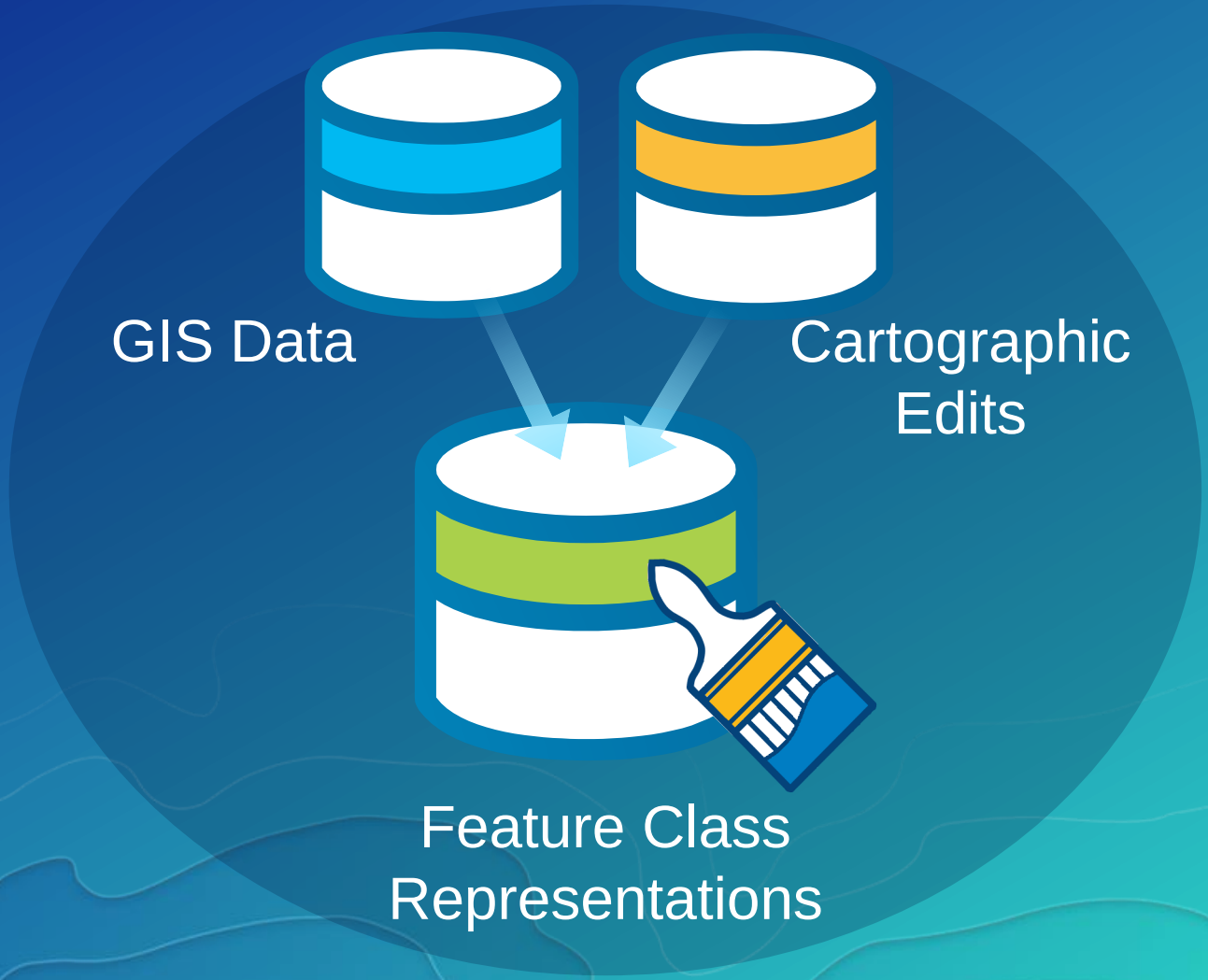
Symbology

Intuitively displaying information





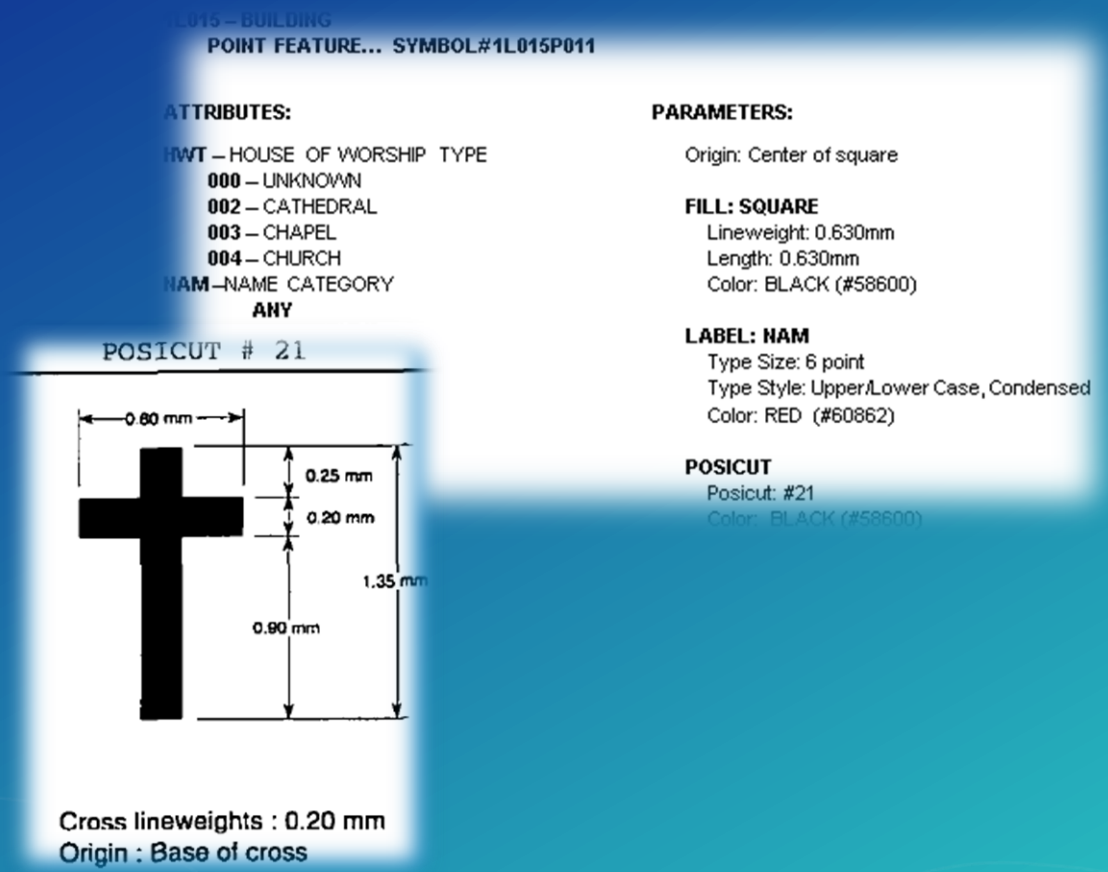
Feature Class Representations

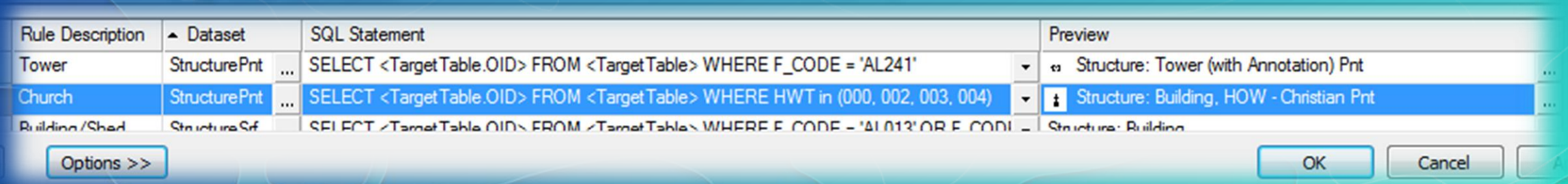


Visual Specifications

Defining

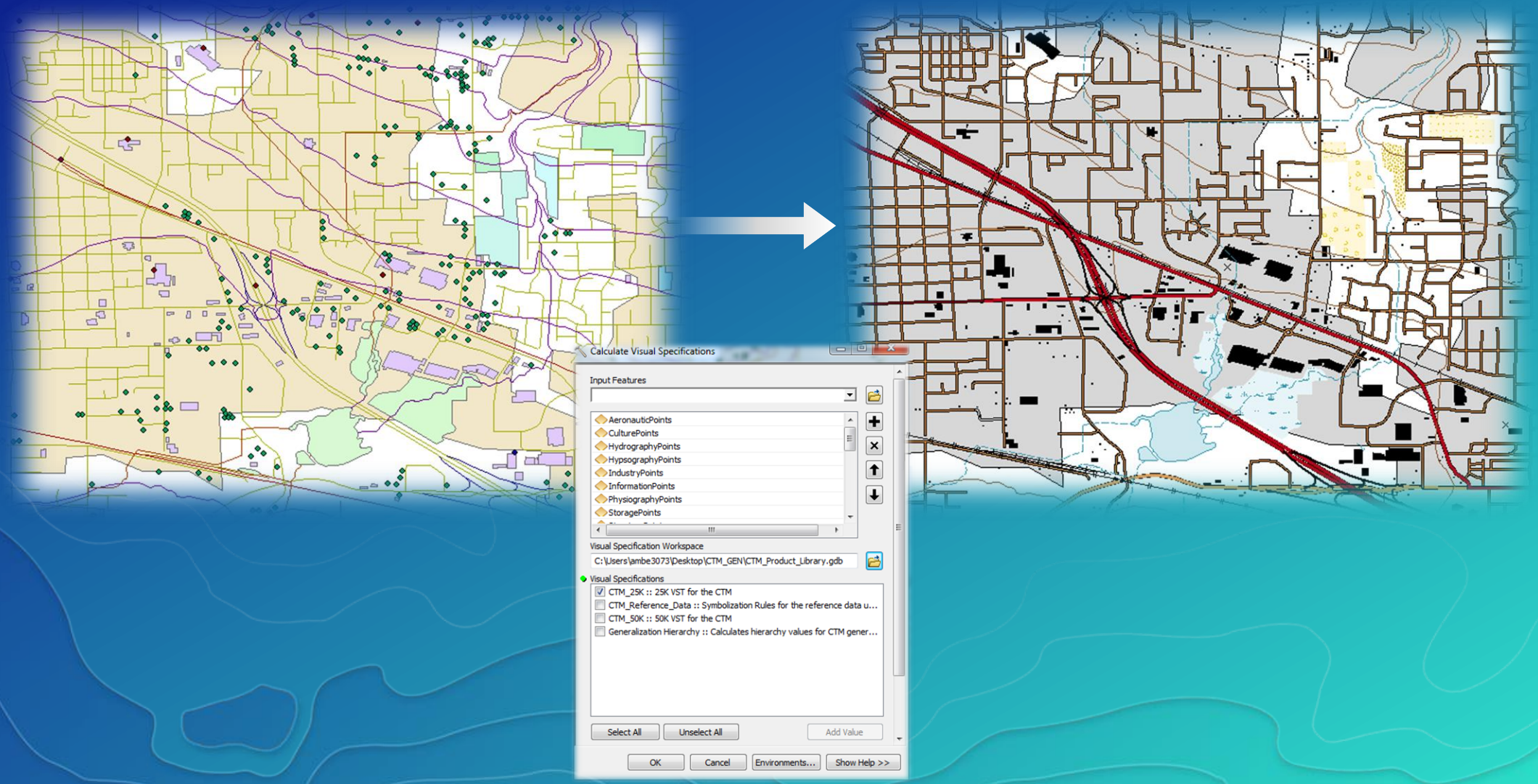
- Create Symbology
- Know Your Rules
- Define Specifications





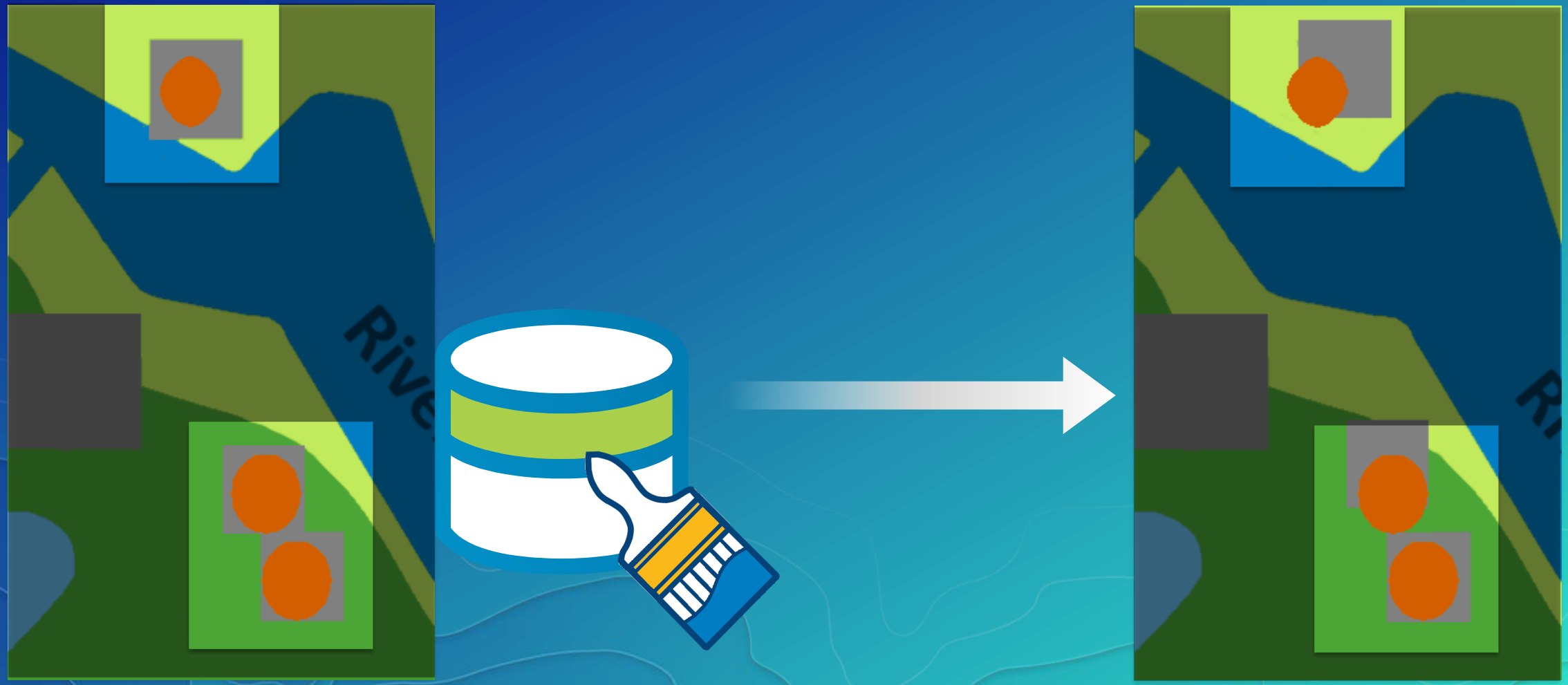
Visual Specifications

Applying



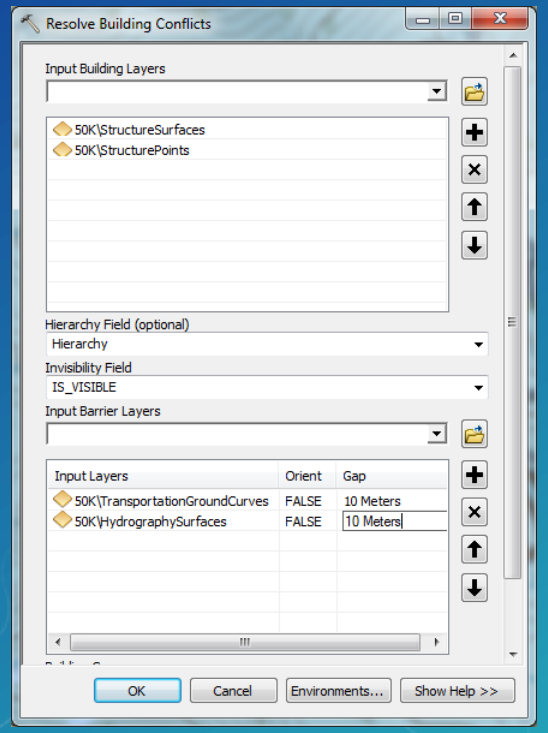
Cartographic Edits

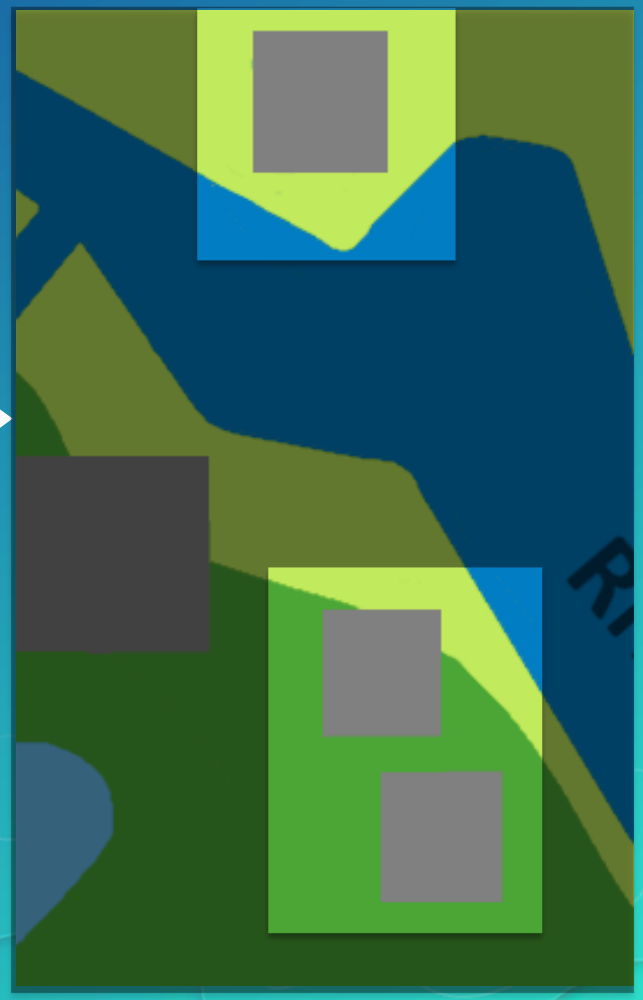
Feature Class Representations



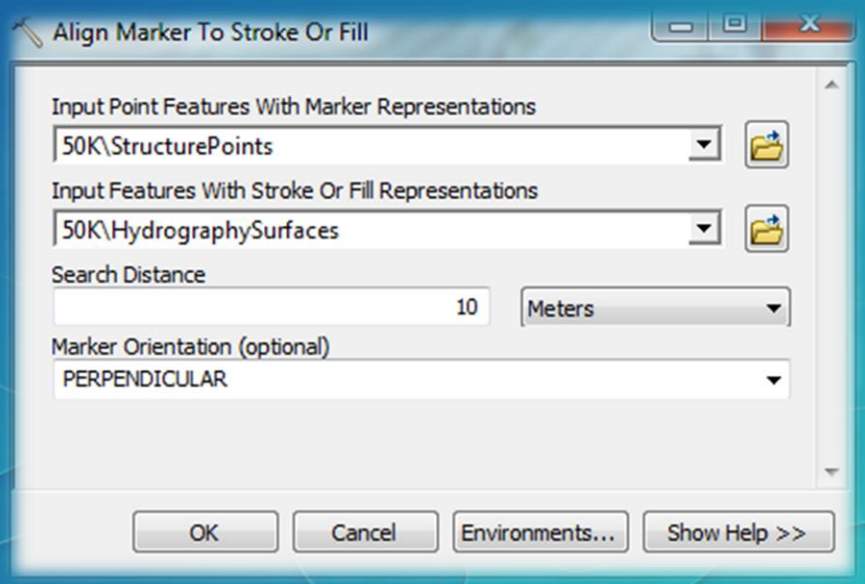
Conflict Resolution

Managing placement of symbolized features

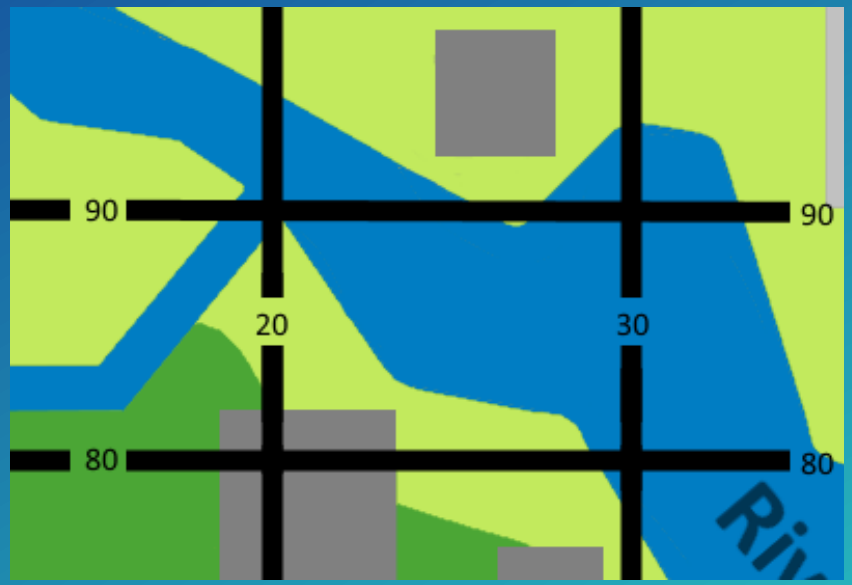




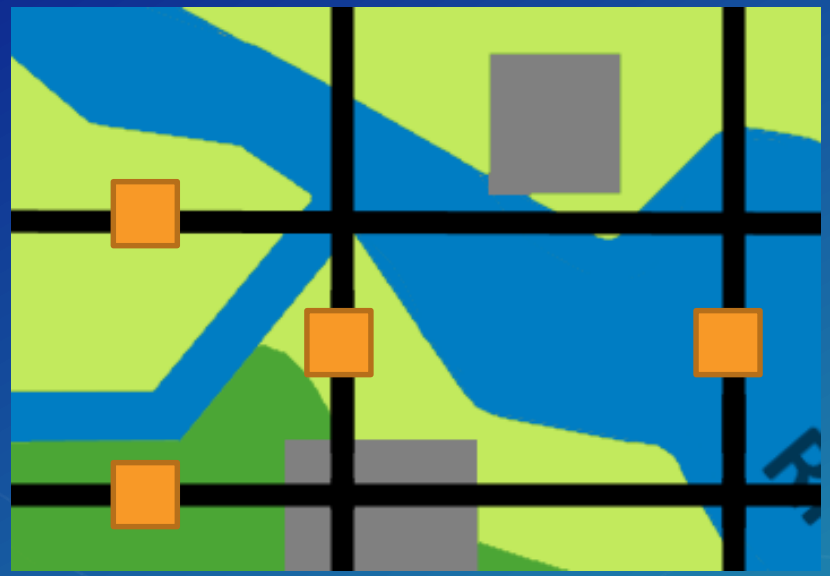
Cartographic Refinement

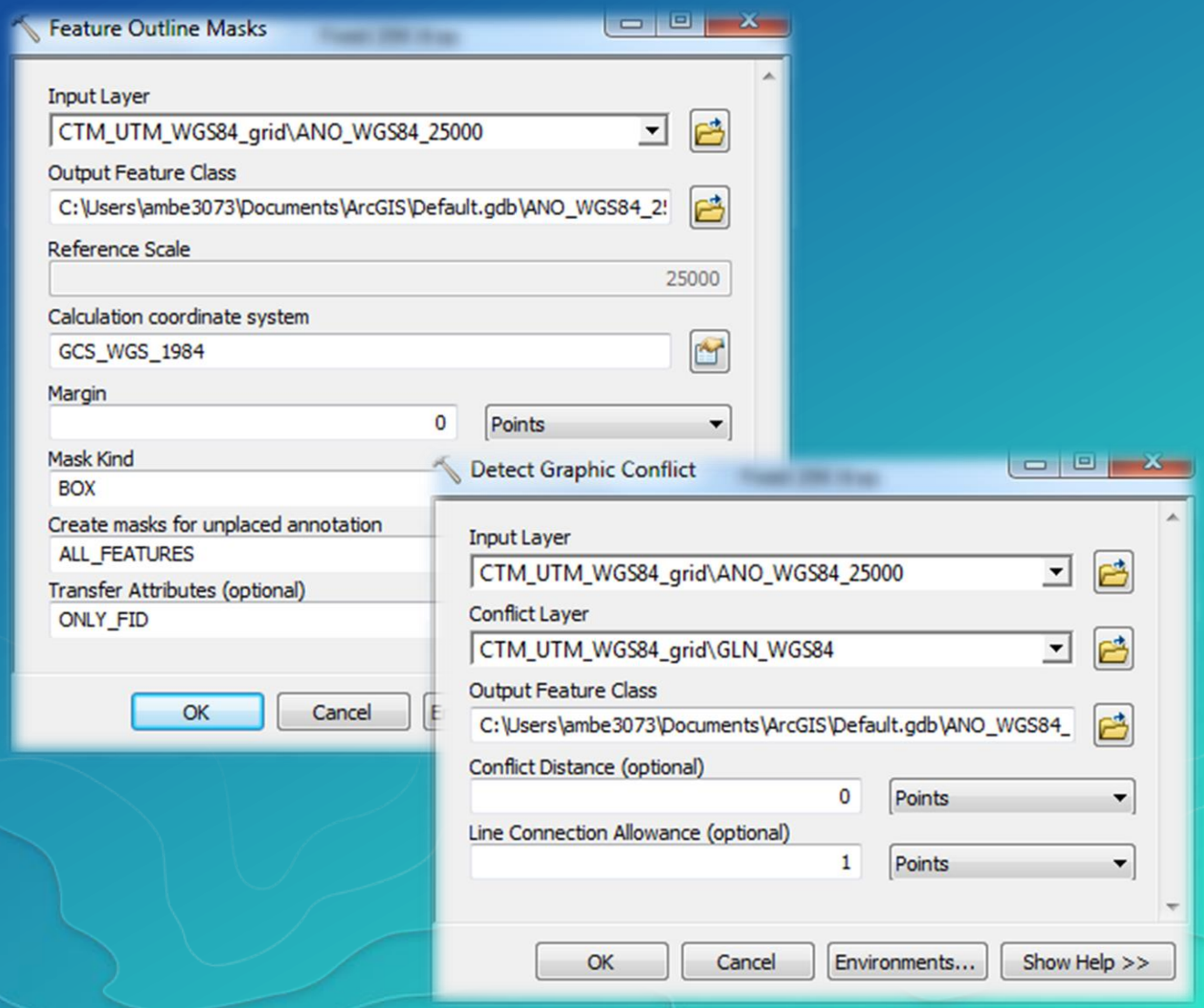


Masking

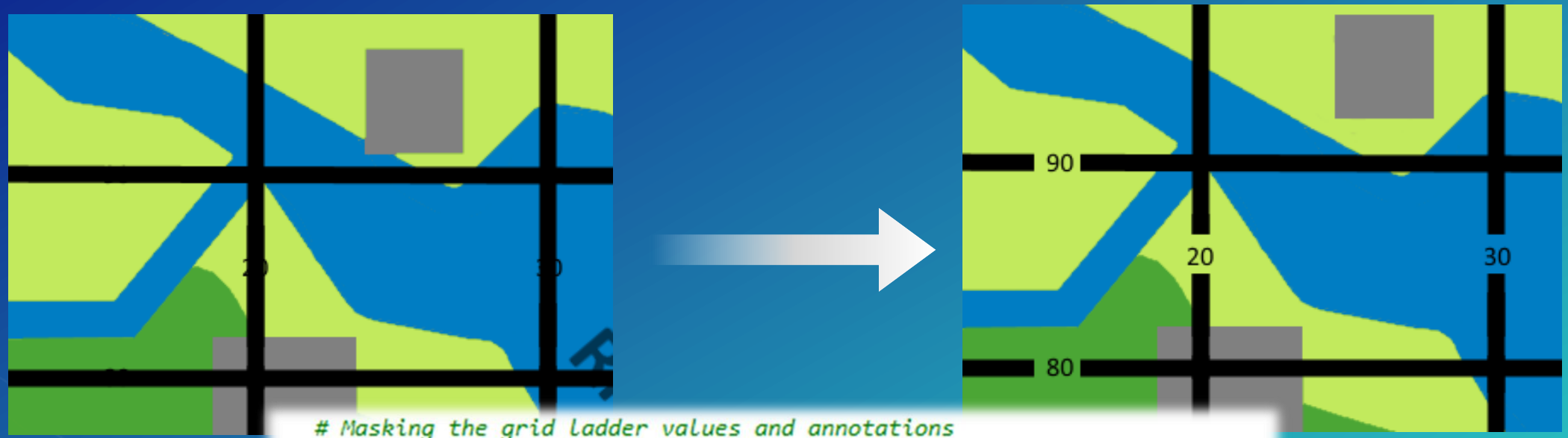


Masking




Feature Outline Masks
Input Layer
CTM_UTM_WGS84_grid\ANO_WGS84_25000
Output Feature Class
C:\Users\ambe3073\Documents\ArcGIS\Default.gdb\ANO_WGS84_2
Reference Scale
25000
Calculation coordinate system
GCS_WGS_1984
Margin
0
Points
Mask Kind
BOX
Create masks for unplaced annotation
ALL_FEATURES
Transfer Attributes (optional)
ONLY_FID
OK
Cancel
Detect Graphic Conflict
Input Layer
CTM_UTM_WGS84_grid\ANO_WGS84_25000
Conflict Layer
CTM_UTM_WGS84_grid\GLN_WGS84
Output Feature Class
C:\Users\ambe3073\Documents\ArcGIS\Default.gdb\ANO_WGS84_
Conflict Distance (optional)
0
Points
Line Connection Allowance (optional)
1
Points
OK
Cancel
Environments...
Show Help >>

Masking

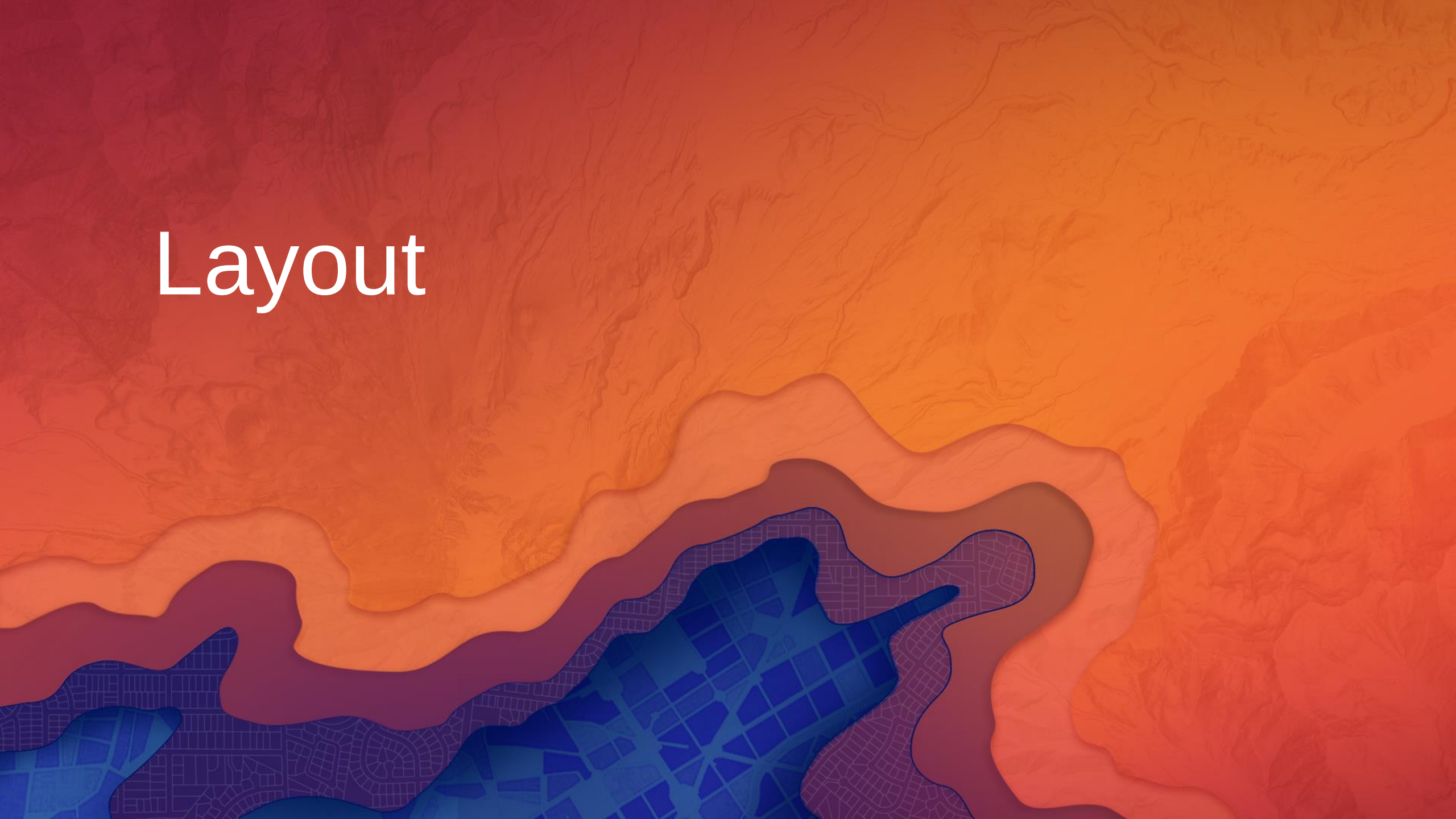



```
# Masking the grid ladder values and annotations
arcpy.AddMessage("getting output of masks.")
mask_layer = arcpy.mapping.Layer(masks.getOutput(0))
arcpy.mapping.AddLayer(data_frame, anno_mask_layer, 'BOTTOM')
anno_mask = arcpy.mapping.ListLayers(final_mxd, mask_layer.name,
                                     data_frame)[0]
arcpy.AddMessage("Annotation Mask layer added to the map...")
arcpyproduction.mapping.EnableLayerMasking(data_frame, 'true')
arcpyproduction.mapping.MaskLayer(data_frame, 'APPEND', anno_mask,
                                  gridline_layer)
arcpy.AddMessage("Masking applied to gridlines...")
```

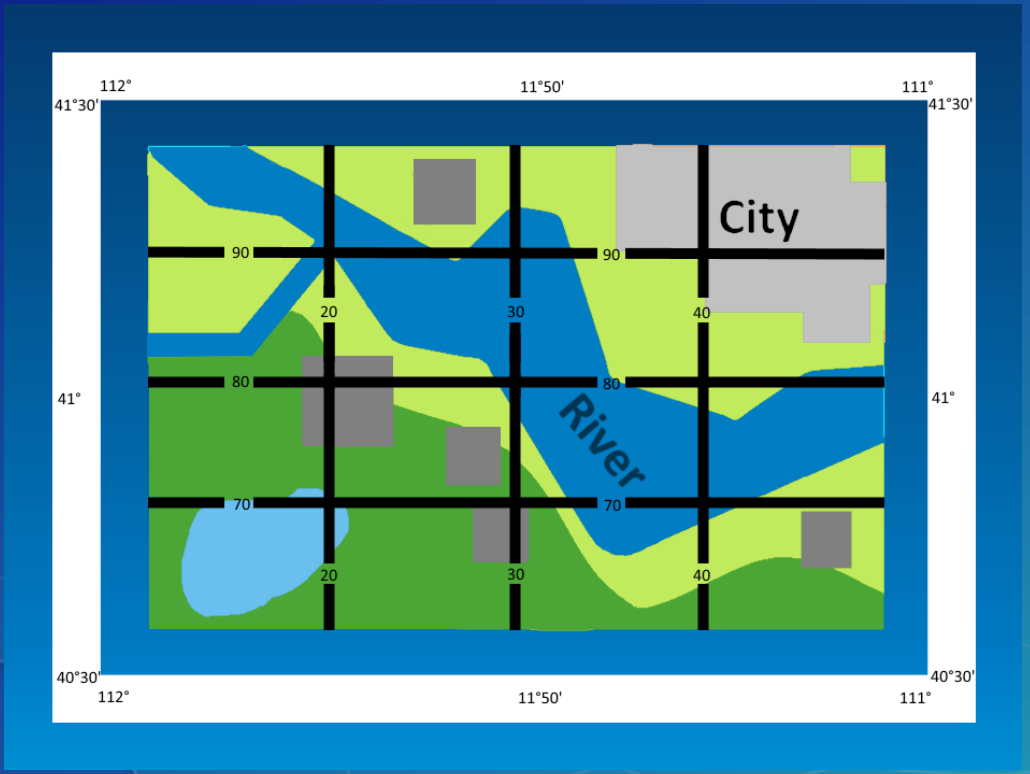
Demo: Symbology & Cartographic Edits

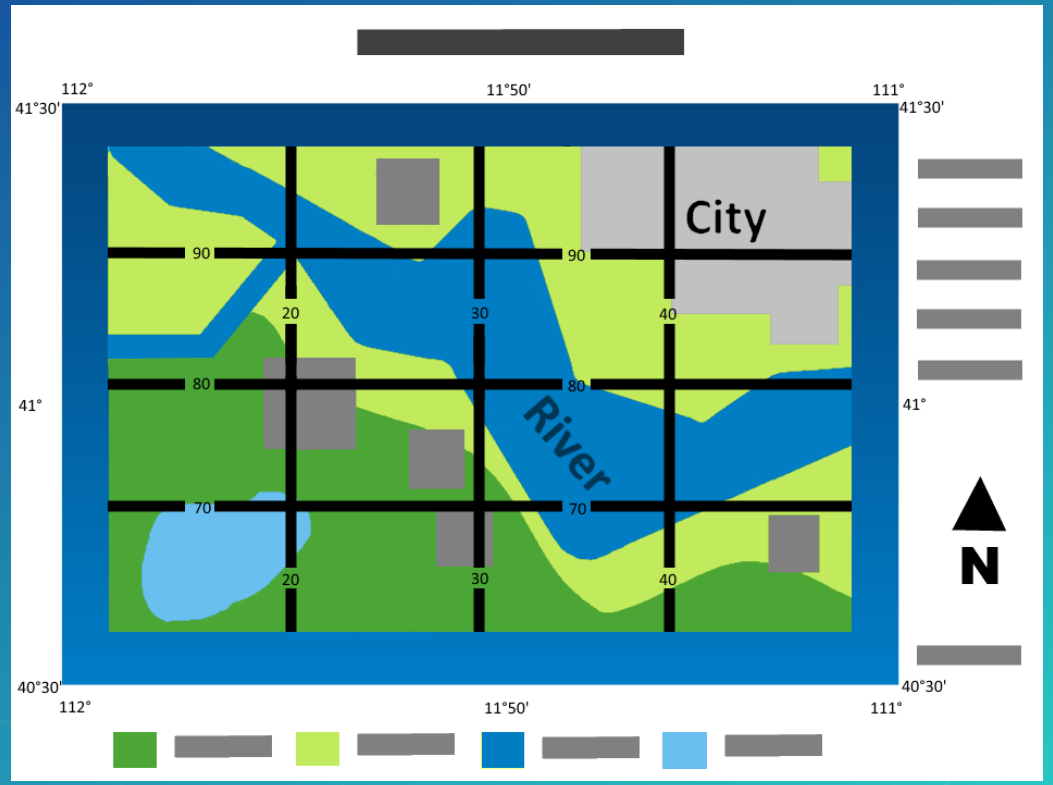
Joe Sheffield

Layout



Layout
Providing Context





Layout Elements

Types of Elements

- Static Elements

Producer Information

Logo

Product Name

Layout Elements

Types of Elements

- Static Elements
- Dynamic Elements
  - Dynamic Text
  - Dynamic Graphics
- Template Page

Sheet Name

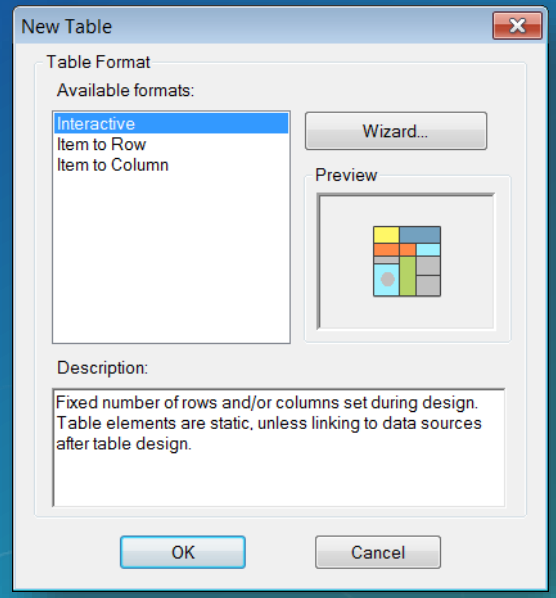
Angle Of North

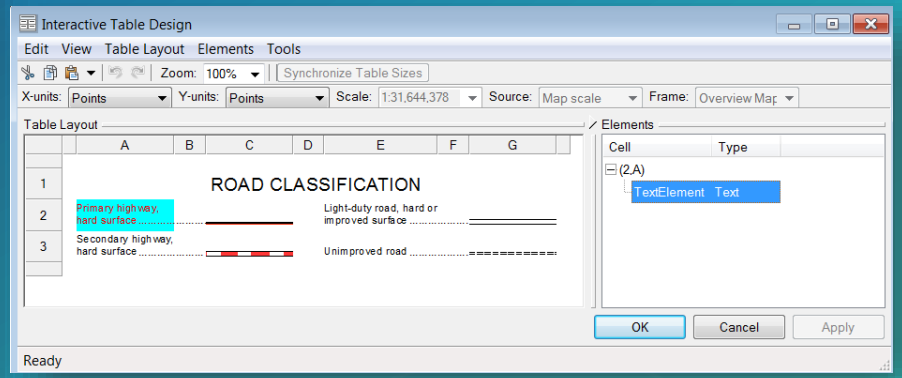
Map Legend

Layout Elements
Automating

- Static Elements
- Dynamic Elements
  - Dynamic Text
  - Python
  - Graphic Table Element
- Page Size

```
#Gets the list of layout elements
layout_elements = arcpy.mapping.ListLayoutElements(final_mxd)
for element in layout_element_list:

    #Update State Name text element
    if element.name == "State Name":
        element.text = state_name.upper()
```

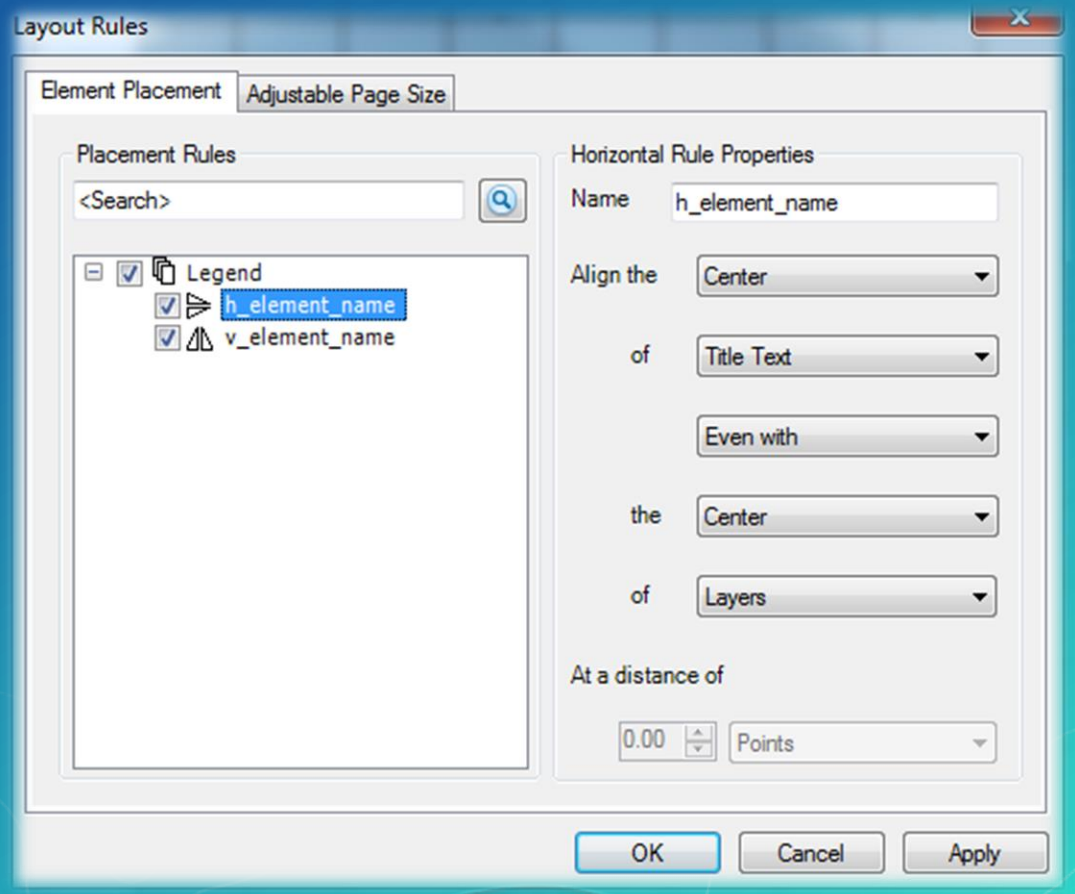




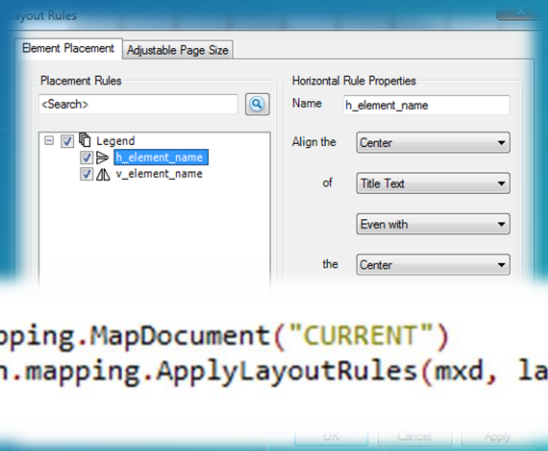

```
# Define variables
mxd = arcpy.mapping.MapDocument(r'C:\Project\Project.mxd')

# Set the page size
arcpyproduction.mapping.SetPageSize(mxd, "CUSTOM",
                                    custom_width=60, custom_height=40, page_units="CENTIMETERS")
```

Layout Rules

Design



Layout Rules
Apply

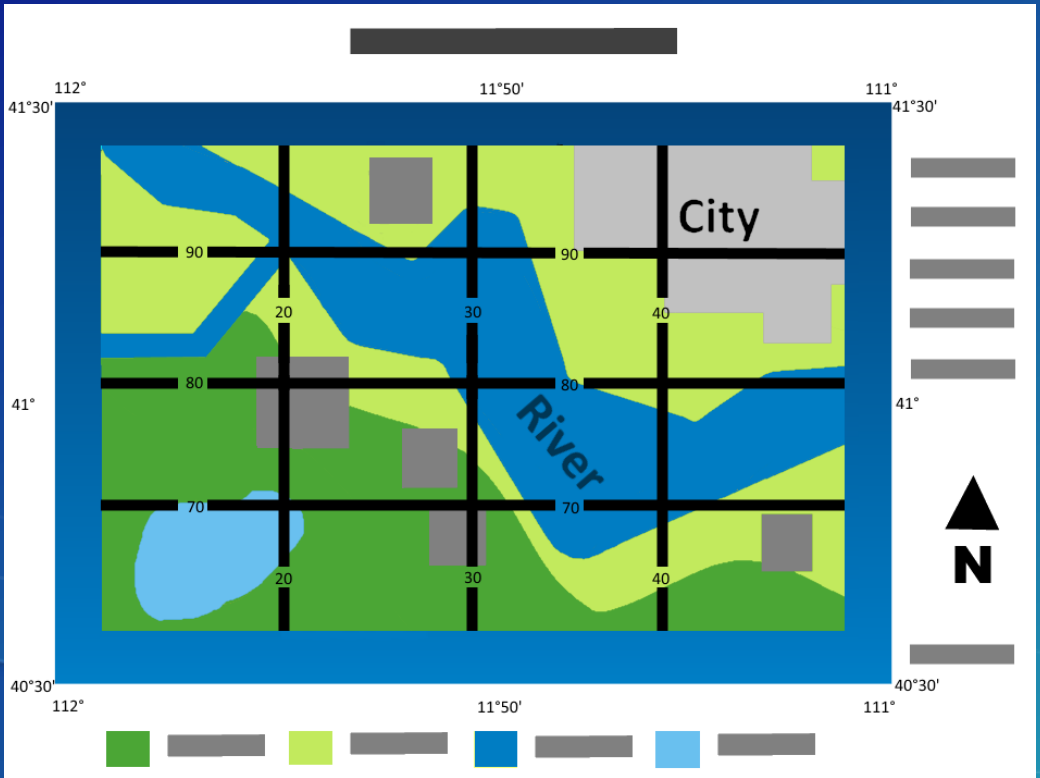



```
mxd = arcpy.mapping.MapDocument("CURRENT")
arcpyproduction.mapping.ApplyLayoutRules(mxd, layout_rules.xml)
```

Output Product

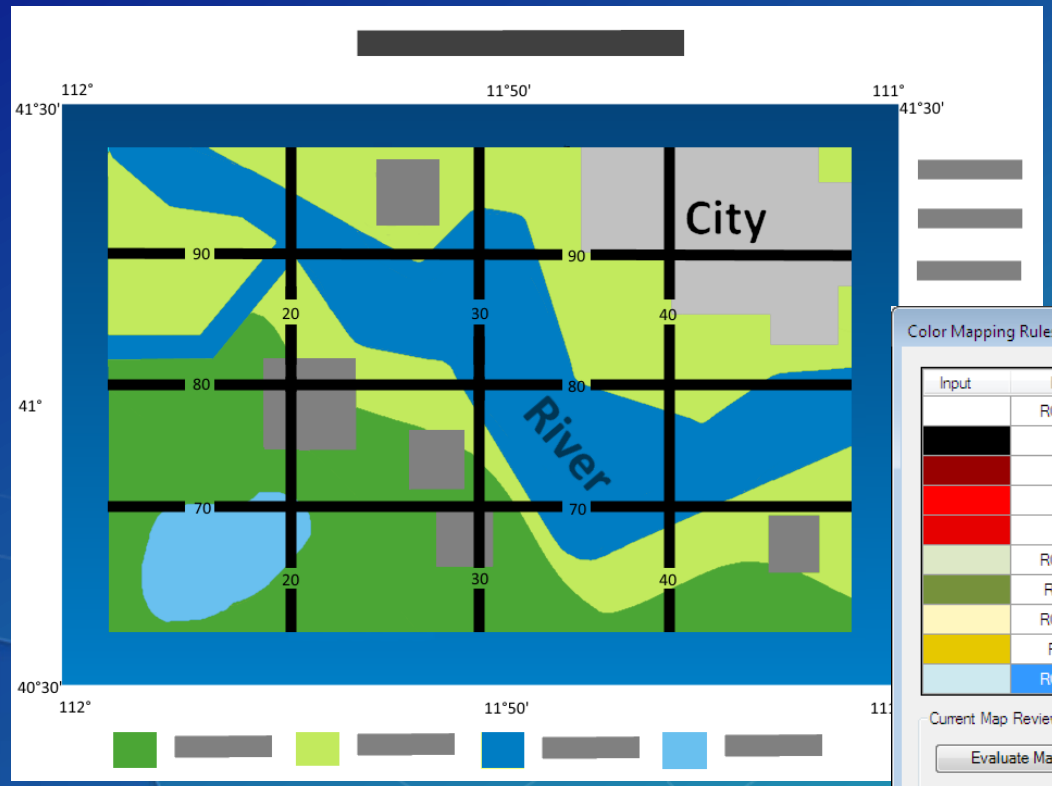
Product/ Map

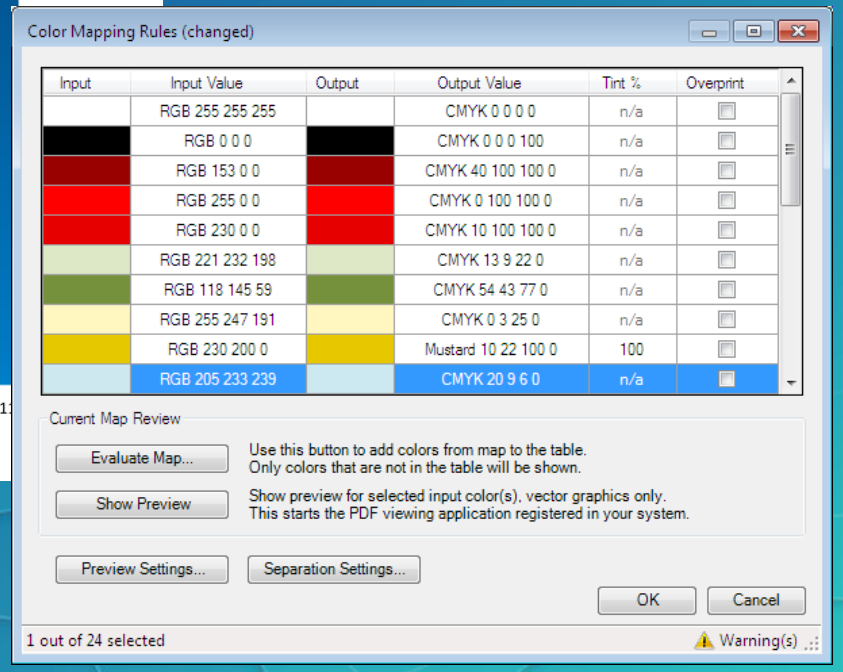
Sharing with community, the way they need it



Production PDF

Color Separation and Transparency

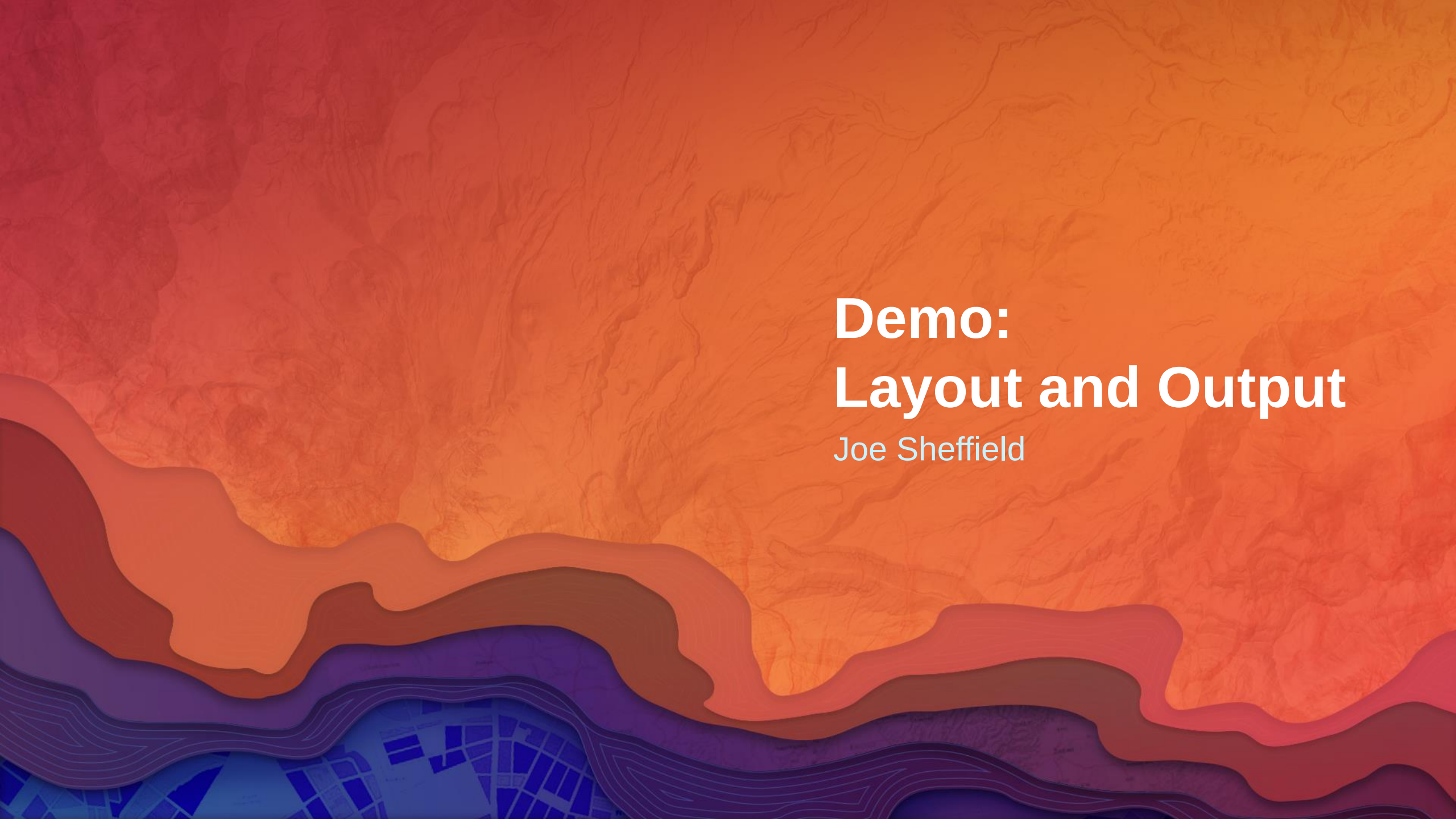




Automating Output

Using Python

```
if export == 'JPEG':
    filename = map_doc_name  + ".jpg"
    outfile = os.path.join(outputdirectory, filename)

    # Run the export tool
    arcpy.mapping.ExportToJPEG(mxd, outfile)


elif export == "MAP PACKAGE":
    filename = map_doc_name + ".mpk"
    outfile = os.path.join(outputdirectory, filename)
    mxd = mxd.filePath

    # Run the export tool
    arcpy.PackageMap_management(mxd, outfile)


elif export == 'PRODUCTION PDF':
    filename = ap_doc_name  + ".pdf"
    outfile = os.path.join(outputdirectory, filename)
    setting_file = os.path.join(product_location, "colormap.xml")

    arcpyproduction.mapping.ExportToProductionPDF(mxd, outfile, setting_file)

arcpy.AddMessage("Output is located: " + outfile)
```



Demo:
Layout and Output

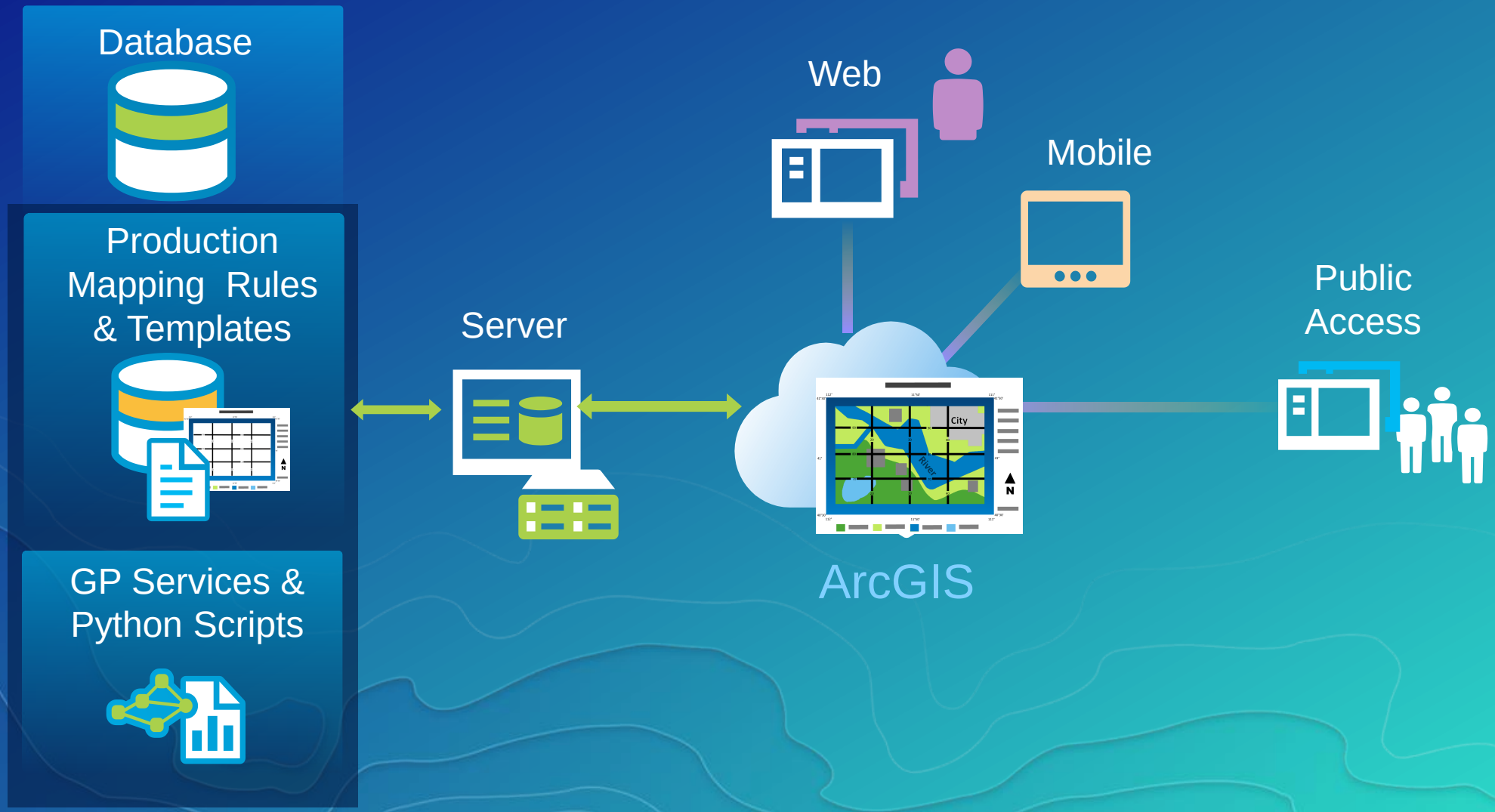
Joe Sheffield

Product On Demand

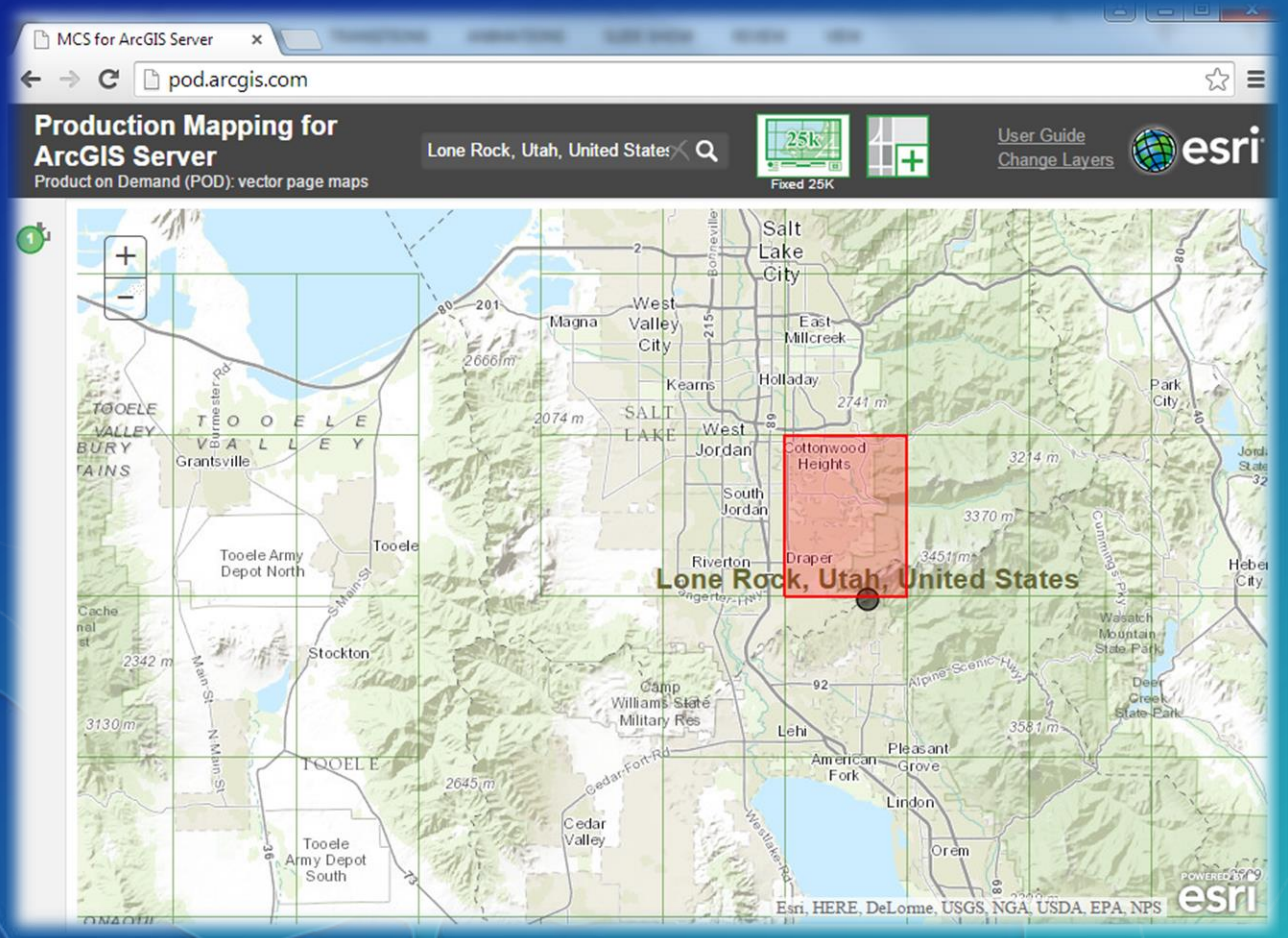
Production Mapping for ArcGIS Server

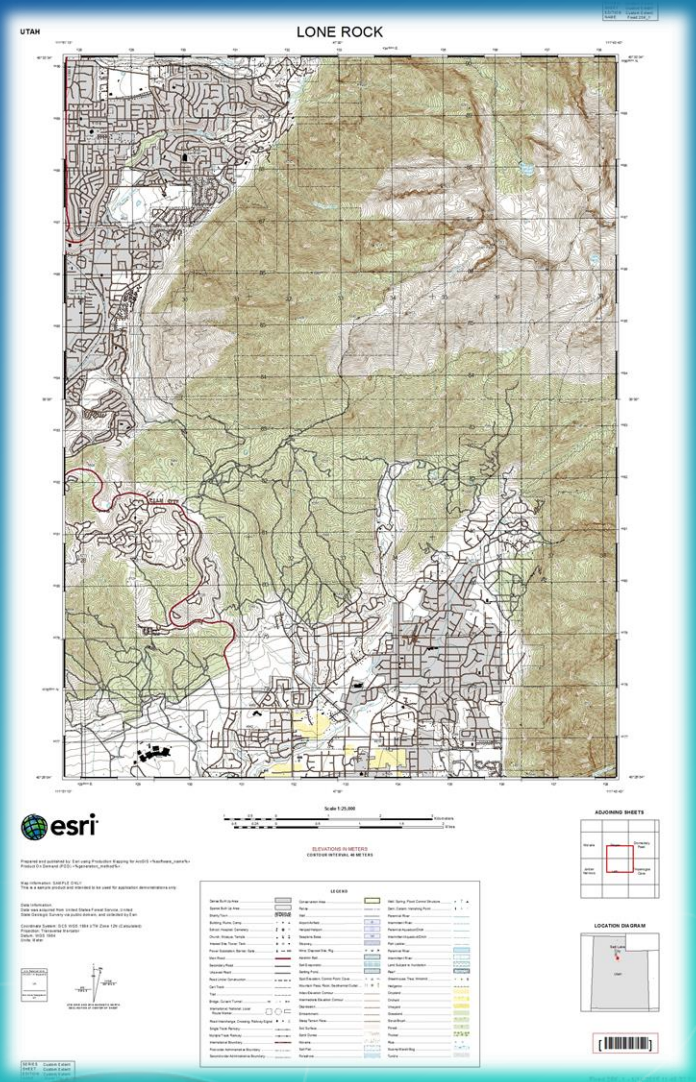
Enabling self-service mapping for Authoritative products

Production Mapping for ArcGIS Server



Product on Demand



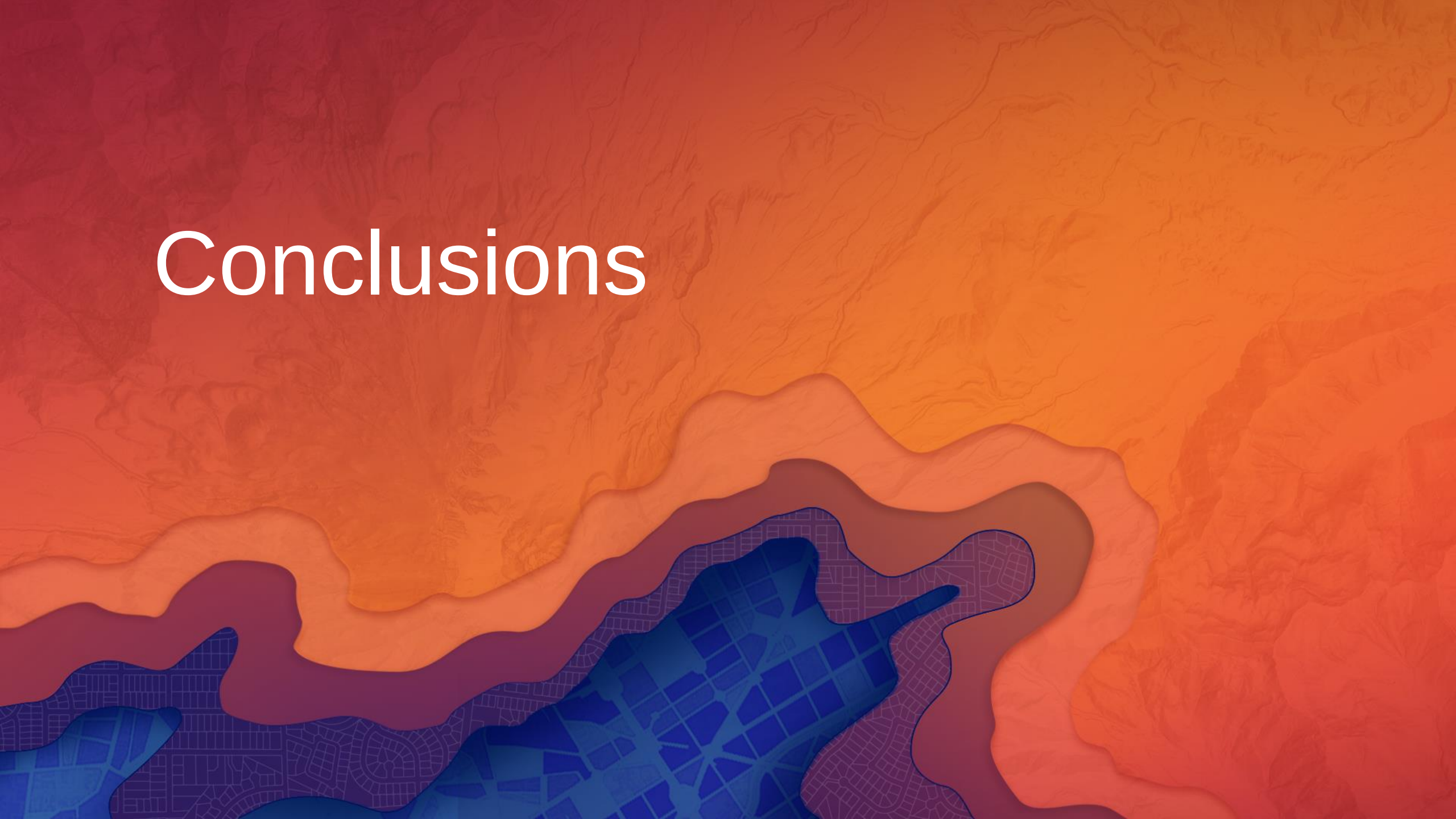


https://github.com/Esri/product-on-demand

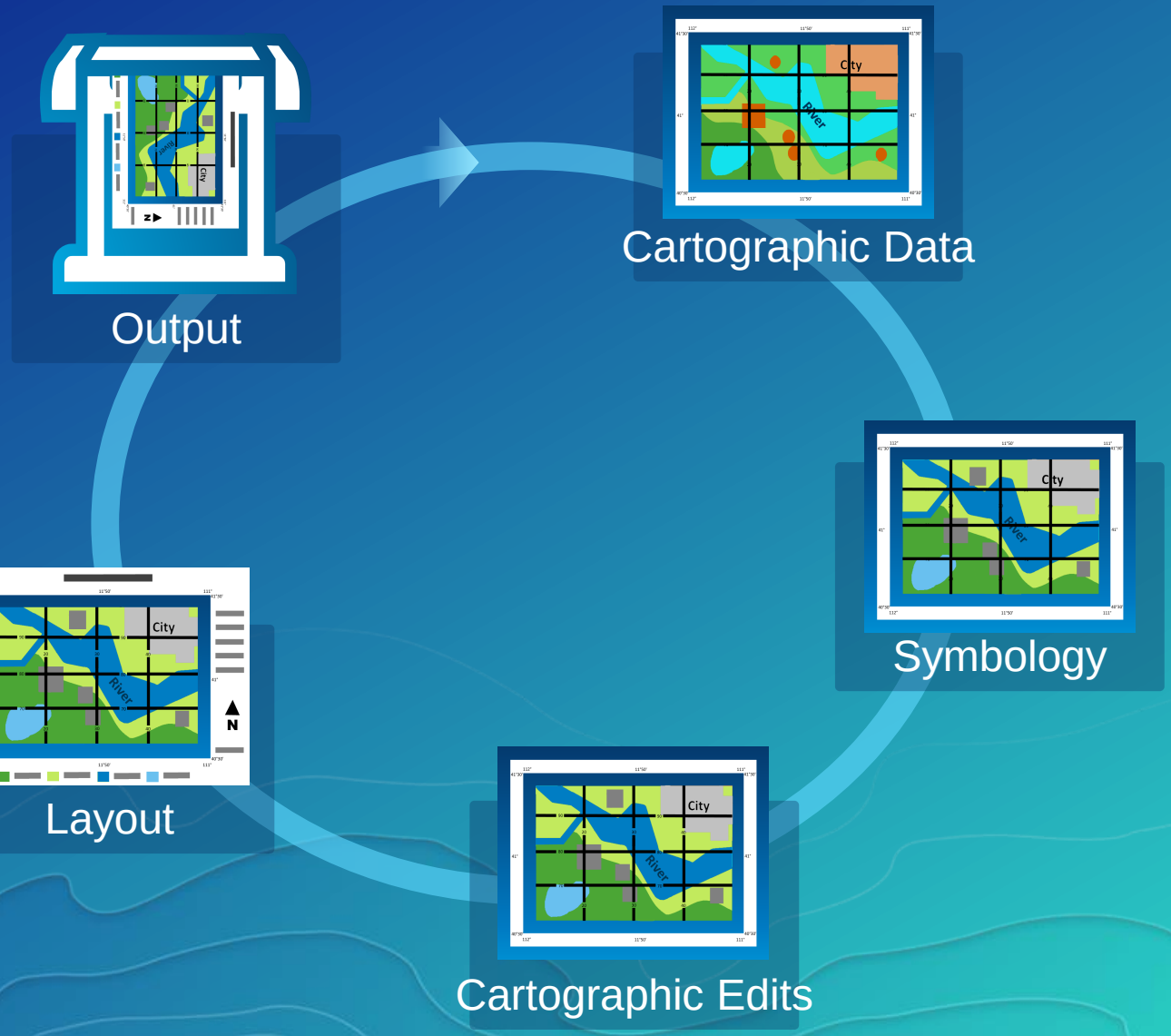
Demo:
POD

Joe Sheffield

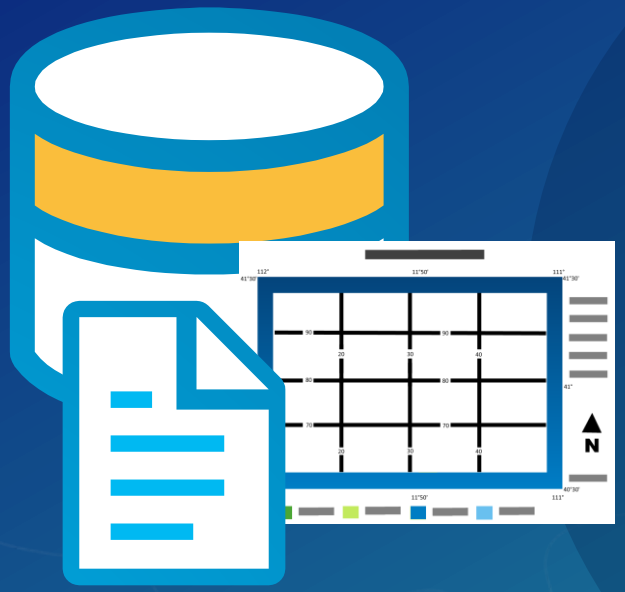
Conclusions



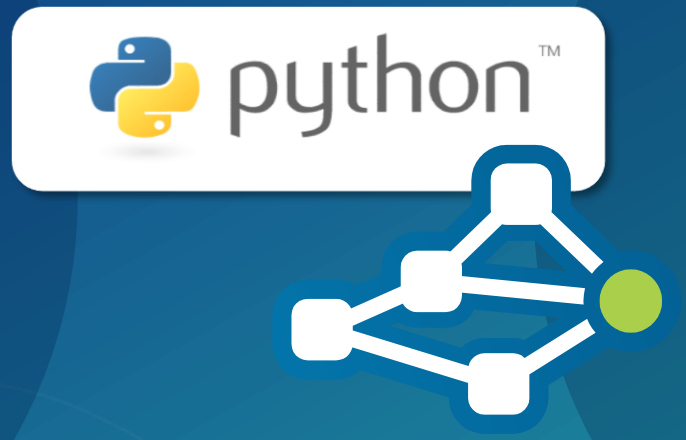
Map Automation & Advanced Cartography



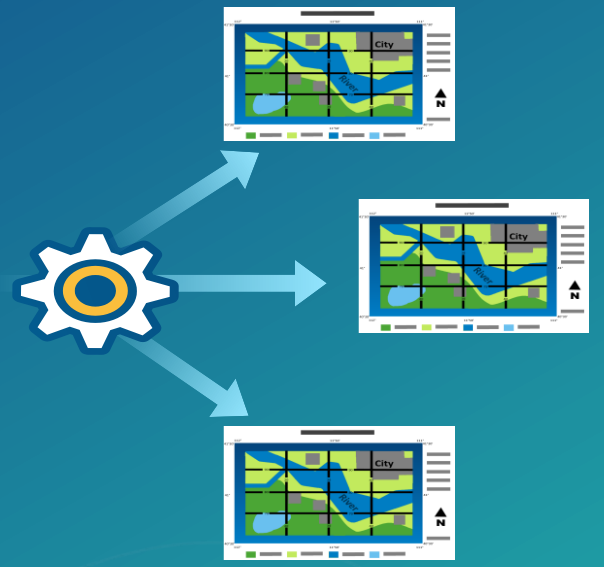
Map Automation



Production Mapping
Cartographic Rules



Geoprocessing
& Python



Standard
Output

References

Production Mapping

Learn More:
Desktop: http://www.esri.com/productionmapping
Server: http://www.esri.com/software/arcgis/arcgisserver/extensions/production-mapping

Email us: productionmapping@esri.com

CTM

Get it:

https://github.com/esri/ctm

Product on Demand

Get it:

https://github.com/Esri/product-on-demand

Try it:

http://pod.arcgis.com/

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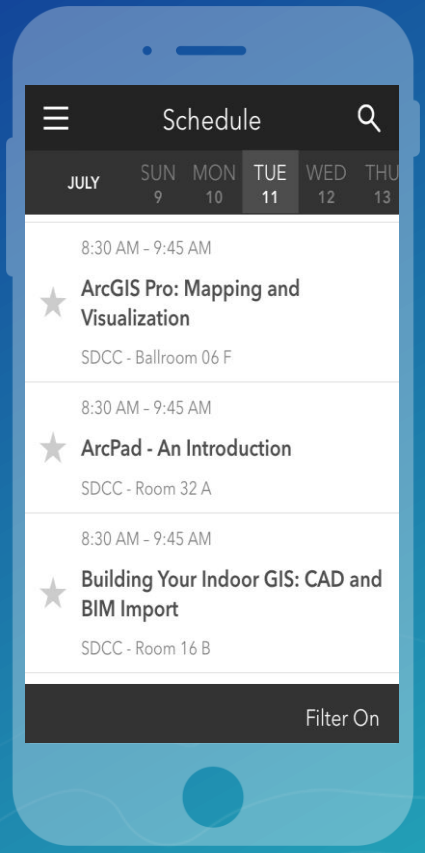
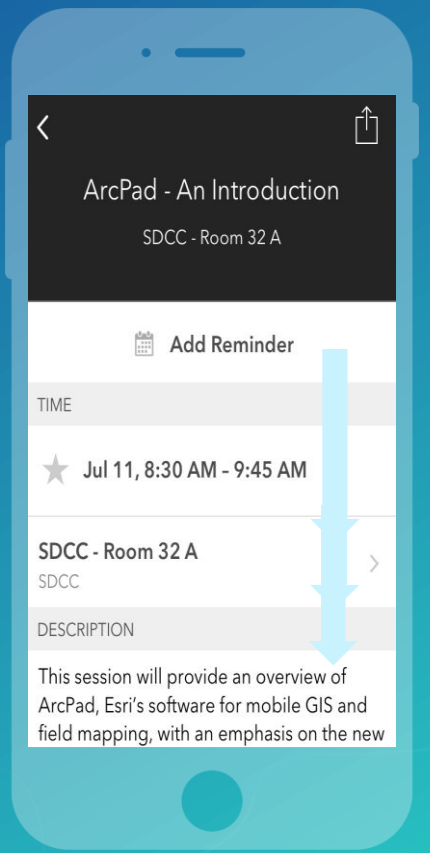
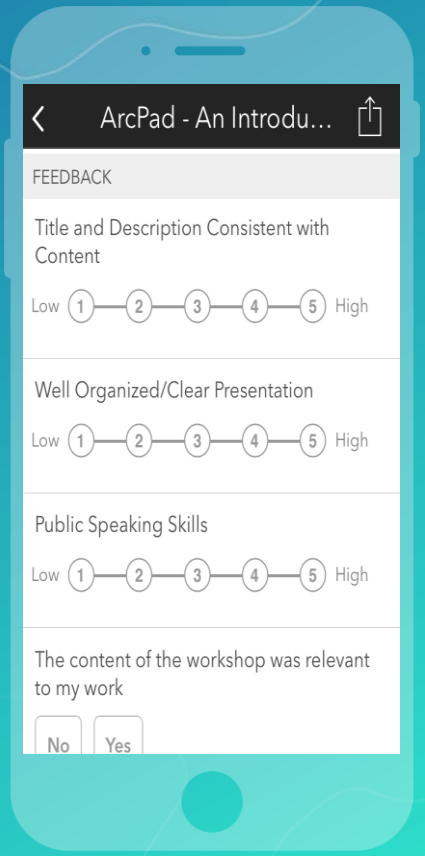


Scroll down to find the survey



Complete Answers and Select "Submit"

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