Developing an Automated Process to Analyze Condo Values in a 3D Environment

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Developing an Automated Process to Analyze Condo Values in a 3D Environment

- Disclaimer and Resources
- Background
- Data Used and Logic
- Automated Process
- SceneViewer Demo
- Lessons Learned
Disclaimer

• I'm very new to Python and by no means claim to be an expert on the subject.

Resources

GIS Stack Exchange - https://gis.stackexchange.com/

GeoNet - https://community.esri.com/community/gis


PyCharm IDE – www.jetbrains.com
Boulder County, Colorado
Background
Data Used and Logic

- Georeference recorded condo plat to parcel fabric
- Digitize footprint characteristics
- Repeat for each floor/level
Data Used and Logic

- Ends here...
Data Used and Logic
Automated Process
Where to begin?

Automate process using the following data:
• CONDO 1st LEVEL…thru 5th LEVEL
• PARCELS_OWNER (Parcel Layer with Ownership)
• VALUES Table (Assessor Values)
Data Prep – Geoprocessing Tools
Data Prep – Geoprocessing Script

Python Geoprocessing script

- Make Feature Layer
- Make Table View
- Add Join
- FC to FC
- Add Join
- FC to FC
- Remove Join
Data Prep – Final Results

Approximately 14 minutes to run…
For each Condo Level FC:

- Definition query
- Apply base height
- Apply elevation
- Extrude each Condo Level FC
- Layer 3D to FC
- Create Scene Layer Package (final product)
- Delete temporary FC

Scene Layer Package – Same Logic

```python
import arcpy

# BEFORE RUNNING THIS PYTHON SCRIPT
# DELTE ALL 5 CONDO_1ST...CONDO_5TH
# SERVICE LAYER PACKAGES FROM
# HERE ~ G:\ArcThemes\3D_Condo\AGOL SLQ

# Variables to form definition query
field = "SUBCODE"
value = "(1152,1153,1154,1155)"

# concatenate query parts
queryStr = str(field) + "IN" + str(value)

# Specify the current project (CURRENT), datasets (Layers)
p = arcpy.mapping.ListProjector("CURRENT")
m = p.listMaps("Map 3D")

# Apply definition query to specified layer group
for lyr in m.listLayers("CONDO"):  # if lyr.supports("DEFINITIOENQUERY"):
    lyr.definitionQuery = queryStr
    lyr.MakeFeatureLayer_management("CONDO_1ST_LEVEL", "CONDO_1ST_LEVEL_SELECTED")
    lyr.MakeFeatureLayer_management("CONDO_2ND_LEVEL", "CONDO_2ND_LEVEL_SELECTED")
    lyr.MakeFeatureLayer_management("CONDO_3RD_LEVEL", "CONDO_3RD_LEVEL_SELECTED")
    lyr.MakeFeatureLayer_management("CONDO_4TH_LEVEL", "CONDO_4TH_LEVEL_SELECTED")
    lyr.MakeFeatureLayer_management("CONDO_5TH_LEVEL", "CONDO_5TH_LEVEL_SELECTED")
    lyr.Layer3DObjectFeatureClass_3D("CONDO_1ST_LEVEL_SELECTED", "CONDO_1ST_LEVEL_ID")
    lyr.Layer3DObjectFeatureClass_3D("CONDO_2ND_LEVEL_SELECTED", "CONDO_2ND_LEVEL_ID")
    lyr.Layer3DObjectFeatureClass_3D("CONDO_3RD_LEVEL_SELECTED", "CONDO_3RD_LEVEL_ID")
    lyr.Layer3DObjectFeatureClass_3D("CONDO_4TH_LEVEL_SELECTED", "CONDO_4TH_LEVEL_ID")
    lyr.Layer3DObjectFeatureClass_3D("CONDO_5TH_LEVEL_SELECTED", "CONDO_5TH_LEVEL_ID")

    # Apply extrusion
    for lyr in m.listLayers("3D"):  # if lyr.supports("EXTRUSION"):
        lyr.extrusion(0.1, 0.1)

        # Create a 3D layer package to that AGOL can consume the data
        arcpy.management.CreateSceneLayerPackage("CONDO_1ST_LEVEL_3D", r"G:\ArcThemes\3D_Condo\AGOL SLQ\CONDO_1ST.bsp")
        arcpy.management.CreateSceneLayerPackage("CONDO_2ND_LEVEL_3D", r"G:\ArcThemes\3D_Condo\AGOL SLQ\CONDO_2ND.bsp")
        arcpy.management.CreateSceneLayerPackage("CONDO_3RD_LEVEL_3D", r"G:\ArcThemes\3D_Condo\AGOL SLQ\CONDO_3RD.bsp")
        arcpy.management.CreateSceneLayerPackage("CONDO_4TH_LEVEL_3D", r"G:\ArcThemes\3D_Condo\AGOL SLQ\CONDO_4TH.bsp")
        arcpy.management.CreateSceneLayerPackage("CONDO_5TH_LEVEL_3D", r"G:\ArcThemes\3D_Condo\AGOL SLQ\CONDO_5TH.bsp")

    # Deleting the "selected" feature classes since those are temporary
    arcpy.management.Delete("CONDO_1ST_LEVEL_SELECTED", None)
    arcpy.management.Delete("CONDO_2ND_LEVEL_SELECTED", None)
    arcpy.management.Delete("CONDO_3RD_LEVEL_SELECTED", None)
    arcpy.management.Delete("CONDO_4TH_LEVEL_SELECTED", None)
    arcpy.management.Delete("CONDO_5TH_LEVEL_SELECTED", None)
```
Caveat with AGOL

- AGOL Scene Viewer has a 2,000 record import limit
- AGOL Map (2D viewer) doesn’t have this limitation

Result
- I had to limit my import records and alter logic
- Embed a Definition Query within the Script and utilize SubCode Field
Geoprocessing – Final Results

SubCode
Approximately 4 ½ minutes to run...
### ArcGIS Online

![ArcGIS Online Content Page]

**Content**

- **My Content**
- **My Favorites**
- **My Groups**
- **My Organization**

**Folders**

- All My Content
- pcoventry_bouldercounty
- Gold Run Condos
- Temp
- temp_delete

**Item Type**

- Maps
- Layers
- Scenes
- Apps
- Tools
- Files

**Search pcoventry_bouldercounty**

1 - 13 of 13 in pcoventry_bouldercounty

<table>
<thead>
<tr>
<th>Title</th>
<th>Modified</th>
</tr>
</thead>
<tbody>
<tr>
<td>My Scene</td>
<td>Web Scene</td>
</tr>
<tr>
<td>My Scene_20171114</td>
<td>Web Scene</td>
</tr>
<tr>
<td>My Scene_20171114</td>
<td>Web Mapping Application</td>
</tr>
<tr>
<td>CONDO_5TH</td>
<td>Scene Layer (hosted)</td>
</tr>
<tr>
<td>CONDO_4TH</td>
<td>Scene Layer (hosted)</td>
</tr>
<tr>
<td>CONDO_5TH</td>
<td>Scene Layer Package</td>
</tr>
<tr>
<td>CONDO_3RD</td>
<td>Scene Layer (hosted)</td>
</tr>
<tr>
<td>CONDO_2ND</td>
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<td>CONDO_3RD</td>
<td>Scene Layer Package</td>
</tr>
<tr>
<td>CONDO_2ND</td>
<td>Scene Layer Package</td>
</tr>
</tbody>
</table>
ArcGIS Online – SceneViewer demo

http://www.arcgis.com/home/index.html
Summary

- A need to visualize condo value distribution in a 3D environment
- AGOL’s Scene View makes it possible for an appraisal staff
- Python allowed for an automated process
Lessons Learned

Caveat with AGOL

- AGOL Scene Viewer has a 2,000 record import limit
- Unable to Label Features in AGOL Scene Viewer

ArcPy

- ArcMap – ArcPy versus ArcGIS Pro’s ArcPy

Benefits of using Python over ModelBuilder:

- Run script outside of ESRI
- Able to schedule an overnight script
Any questions??

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