



Automated Export to PDF with Embedded Tables using Python

Overview

- Purpose
- Problem Examples
- Troubleshooting
- Solution

Purpose

Mass production of cartographic products:

- Primarily for report generation
- First evolved while supporting the USDOT Central Federal Lands Highway Division

Static Map Automation:

- Continuous updates to maps which include tables
- Issue resurfaced while supporting DHS Office of Infrastructure Protection

Ever growing security policies :

- Software and Hardware Restrictions a constant road block
- Requirements still have to be met

Use what you have, and let geoprocessing live within your workstation

US Department of Transportation (USDOT)

Central Federal Lands Highway Division (CFLHD)
US Forest Service Highway Condition Reports



Task:

Generate over 900 maps supporting highway and bridge condition reports across 10 states.

Highlights:

- Three month timeline
- Staff limited to a single Geospatial Analyst
- Utilized data driven pages to mass produce maps
- Each map required an embedded dynamically generated attribute table

US Department of Transportation (USDOT)

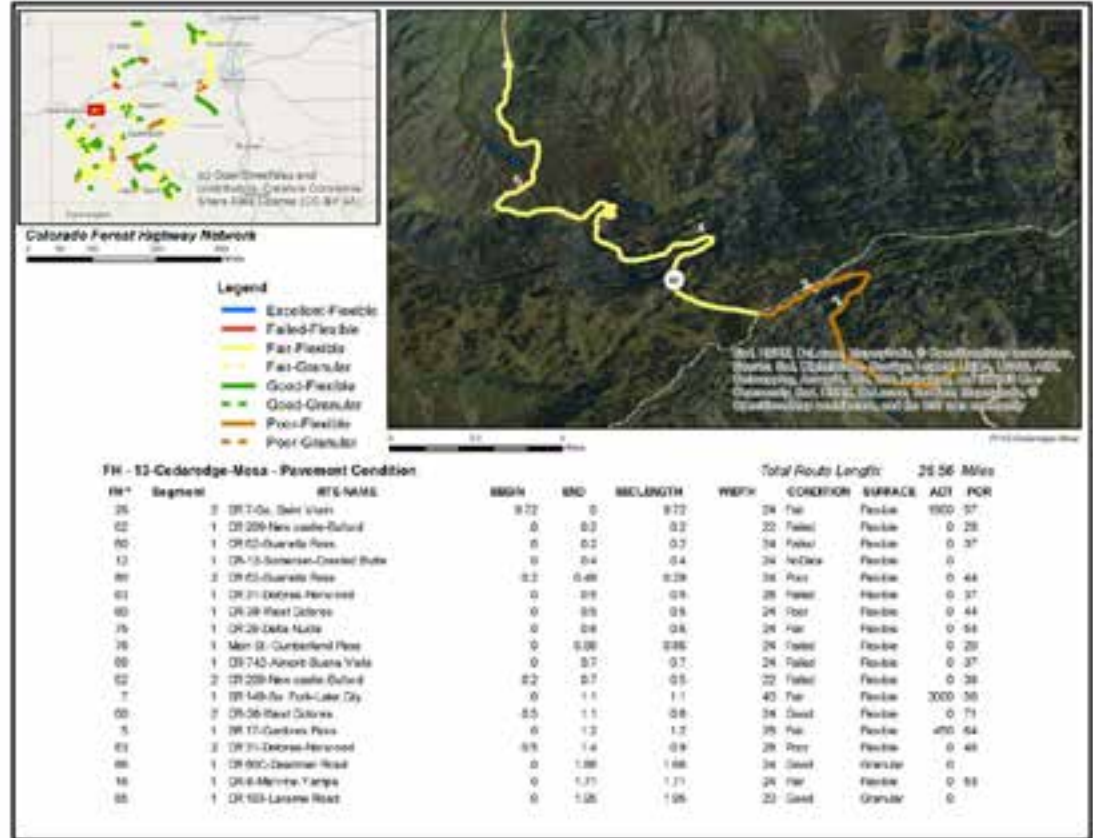
Central Federal Lands Highway Division (CFLHD)

US Forest Service Highway Condition Reports



Challenges:

- When map is exported from ArcMap to PDF, the table loses the wireframe
- Lack of wireframe makes attribute table insertion look sloppy

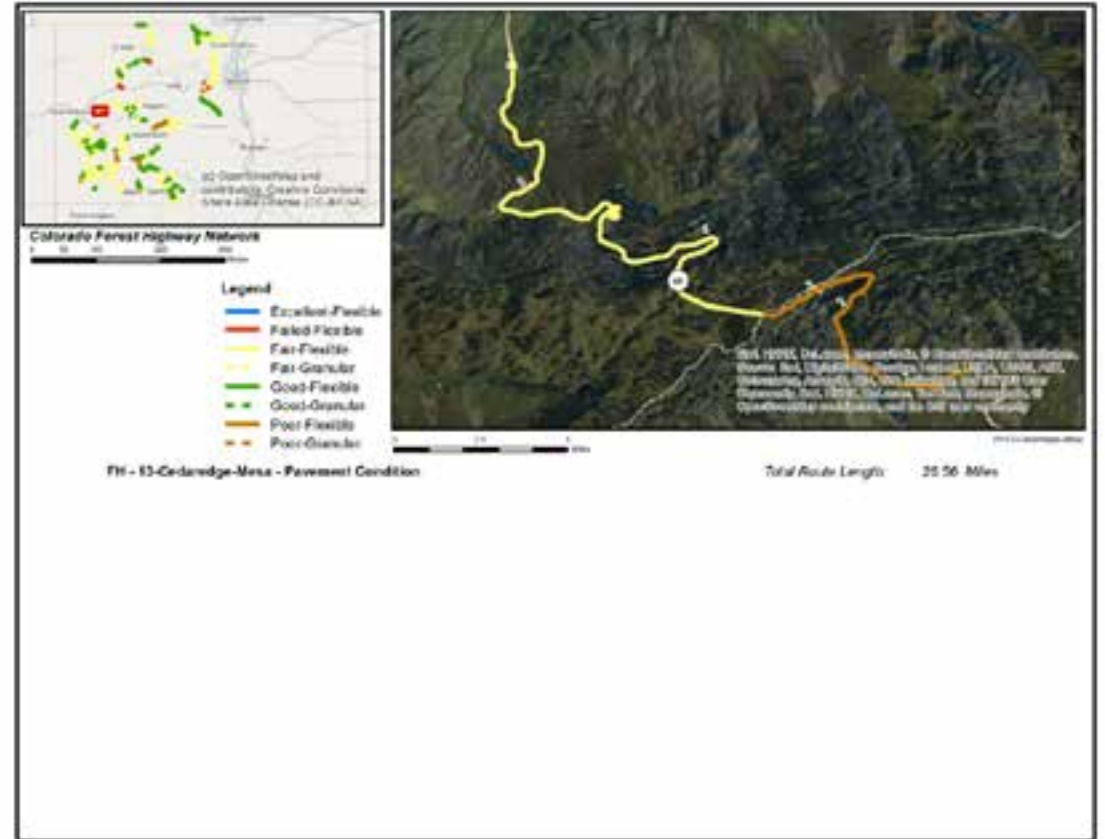


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More Challenges:

- When using the ExportToPDF function in the arcpy.mapping module within Python, the table does not get produced at all.



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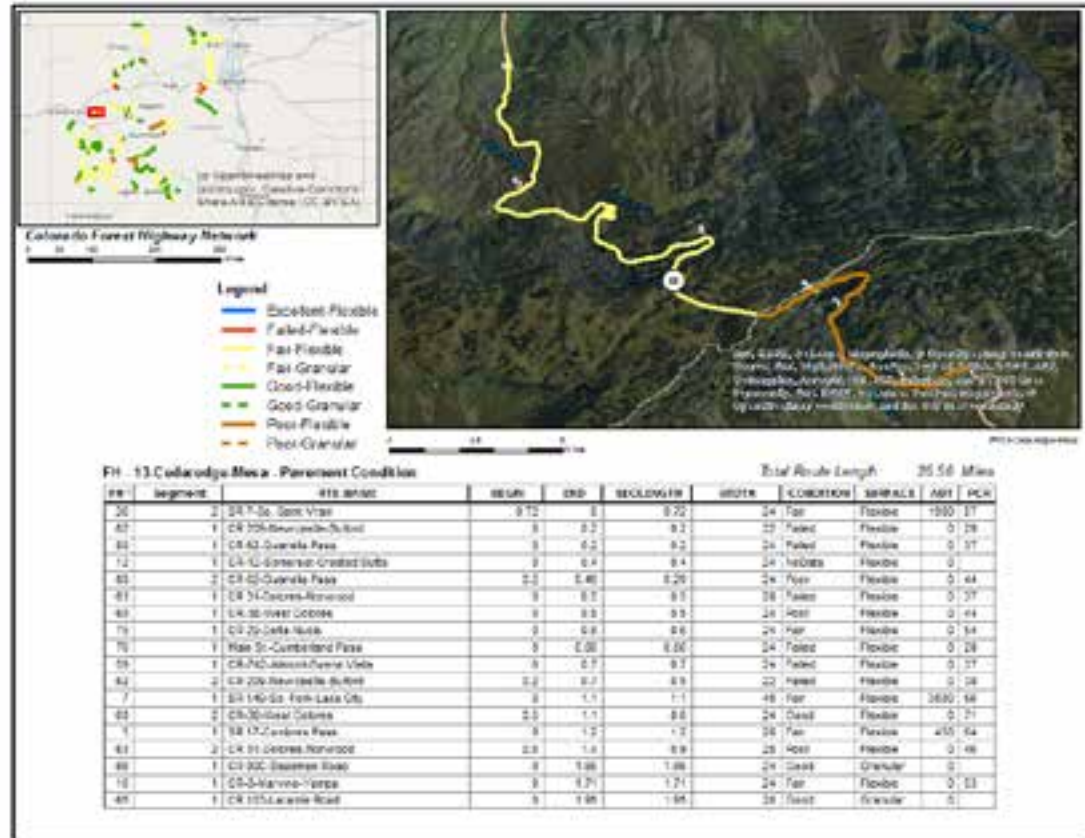
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US Forest Service Highway Condition Reports



Further Investigation:

- File types such as PNG and JPEG export just fine.

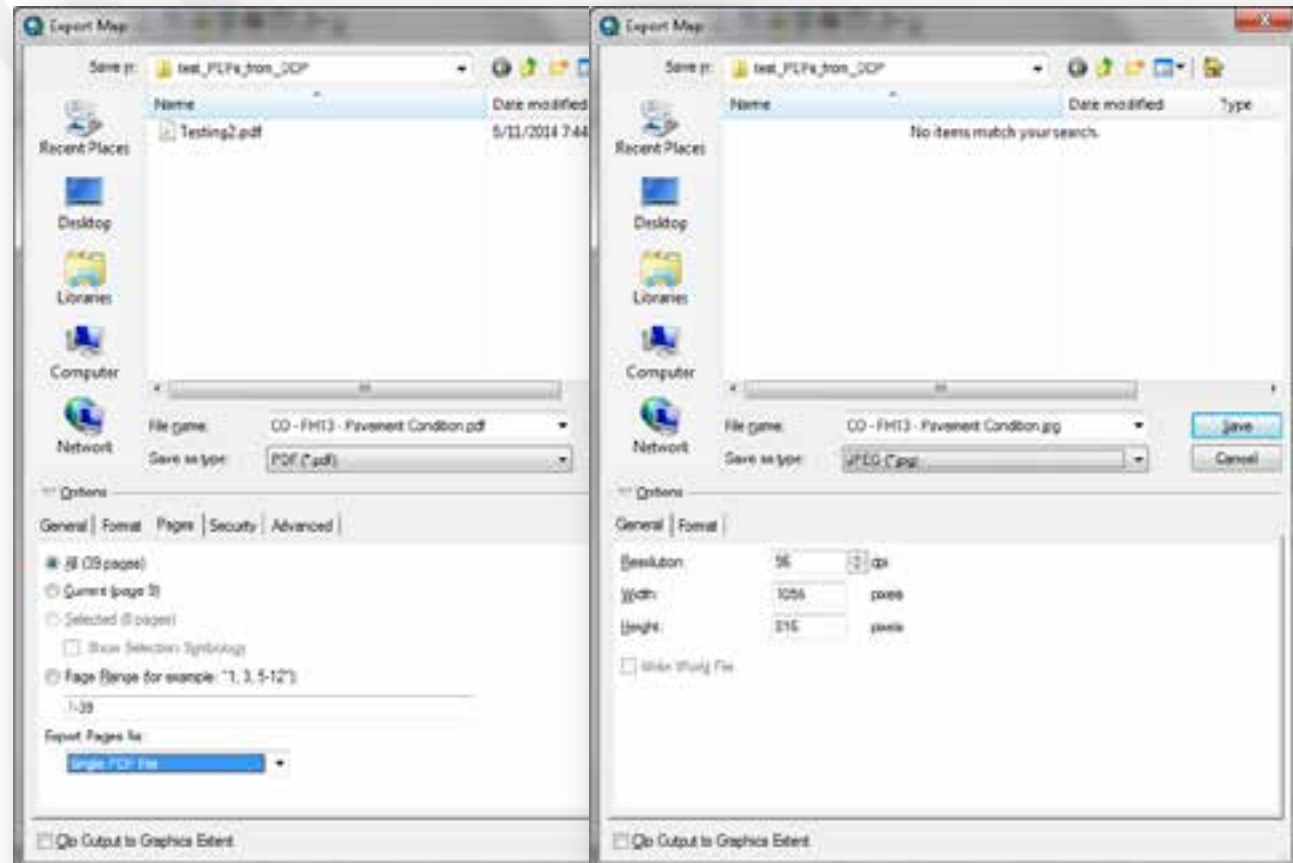


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Further Investigation:

- Exporting multiple pages from Data Driven Pages is only available in PDF format



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Solution:

- Develop a Python script that will save a separate MXD file for each page within the Data Driven Pages set.

Solution:

- Develop a custom AddIn that will loop through all the MXDs (exported by the Python script) in a folder, open each one, export it to a PNG, close the MXD, and move on to the next one.

```
File Edit Format Run Options Windows Help
@MapDoc Data Driven Pages into MXDs
@Erica McElroy
#12-30-2011

import arcpy, sys, os, shutil
from os.path import join

#Below python to overwrite existing files
arcpy.env.overwriteOutput = True
#-----

### Create a new, empty pdf document in the specified output directory
outdir = r"C:\ZF\Roads Power Service Highway Condition Reports\2012 Delivery\"

# Create the map page
#Name the layers from the map document that is currently open.
map = arcpy.mapping.MapDocument(r"C:\ZF\Roads Power Service Highway Condition R

#variable that stores the data driven pages
DDP = arcpy.GetDataDrivenPages

#Find the user how many total pages there are..
arcpy.AddMessage("There are "+str(DDP.getPageCount)+" pages in this map")
print "There are "+str(DDP.getPageCount)+" pages in this map"

#Get the layers and put them into the following variables.
mxdFrame = arcpy.mapping.ListDataFrames(map, "LayersOnly")[0]
lyrPaths = arcpy.ListLayers(mxdFrame, "Layers", DataDrivenPages)

# Start of loop create individual MXDs-----
arcpy.AddMessage ("Now going into the loop")
print "Now going into loop"

for pageNum in xrange(DDP.getPageCount + 1):
    arcpy.AddMessage("in "+str(pageNum))
    arcpy.AddMessage (".....will go")
    #Get the values from the attribute table
    #now = the current page
    DDP.currentPageID = pageNum
    row = DDP.getPageRow
    arcpy.AddMessage (".....will go after attribute value")
```

```
python win32com.client.Dispatch("MapDoc")
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Project Description:

Provide geospatial support for the protection of our nation's critical infrastructure

Highlights:

- Cartographic products range in size from Quick Turn individual maps to multi-page map books
- Many products are repetitive and are requested frequently during an event or project
 - Annual events such as College Bowl Games, Marathons, etc.
 - Daily Update Briefs during an ongoing project

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Challenges:

Develop a daily executed work flow, that reads an Excel spreadsheet, converts the data, produces a map, and exports it to PDF.

The image displays a workflow for processing personnel data. On the left, an Excel spreadsheet titled "Personnel Master List" contains the following data:

NAME	DISTRICT	STATE	PHONE
* Indicator			
* John Smith	Salt Lake City	UT	555-555-555
* John Smith	Sacramento	CA	555-555-555
* John Smith	Sothton	VA	555-555-555
* John Smith	Kansas City	MO	555-555-555
* John Smith	Chicago	IL	555-555-555
* John Smith	Philadelphia	PA	555-555-555
* John Smith	Seattle	WA	555-555-555
* John Smith	Darnton	TX	555-555-555
* John Smith	Atlanta	GA	555-555-555
* John Smith	New York City	NY	555-555-555
* John Smith	Charlotte	NC	555-555-555
* John Smith	Anchorage	AK	555-555-555
* John Smith	Chicago	IL	555-555-555
* John Smith	Branch Chief	VA	555-555-555
* John Smith	San Francisco	CA	555-555-555

In the center, a terminal window shows a series of commands and their outputs, including file paths and system messages. On the right, a map application titled "Personnel Locations - June 19, 2014" displays a map of the United States with colored markers indicating the locations of personnel. The map is surrounded by several data tables and a legend, providing a visual overview of the personnel distribution across the country.

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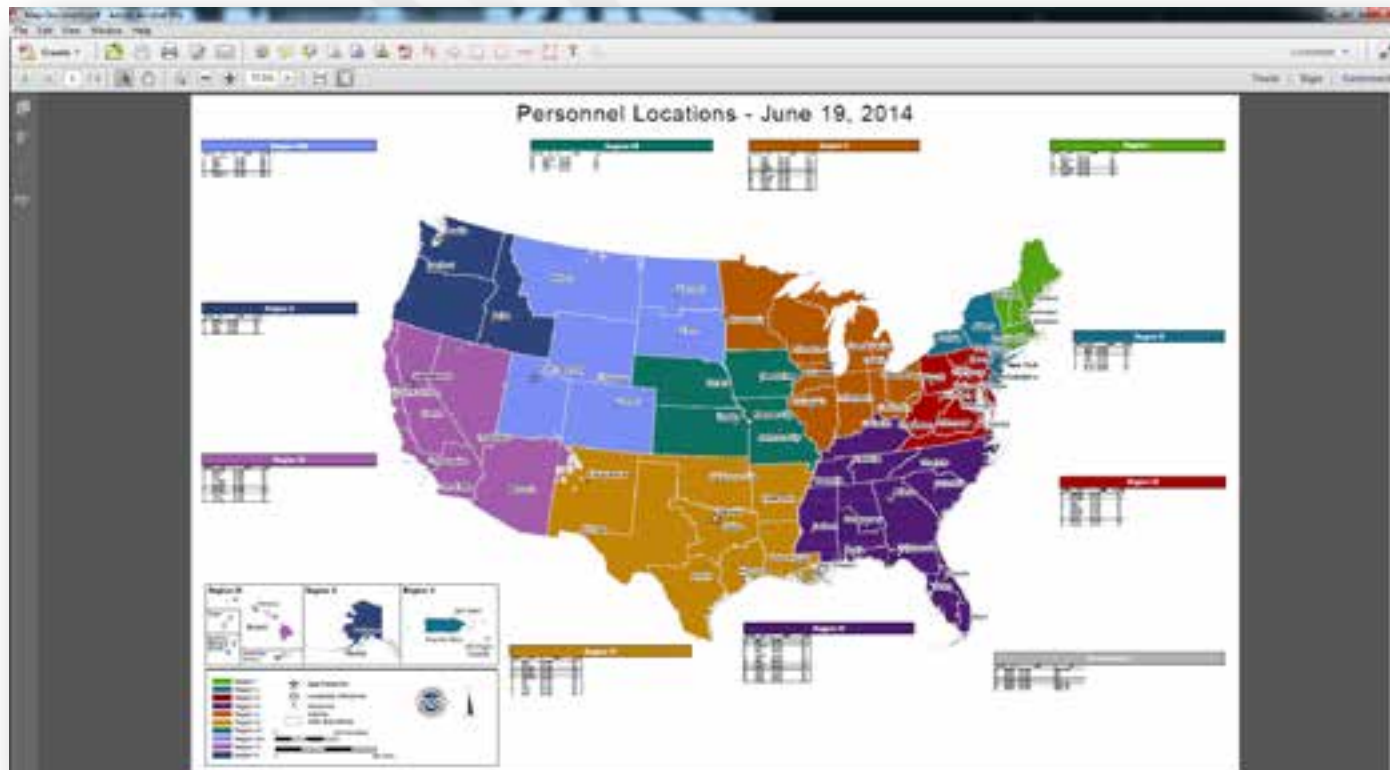


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Challenges:

- From previous experience we knew that exporting the attribute table to a PDF was going to be difficult.
- After further investigation, it appeared that the attribute table would export, but the size changes.



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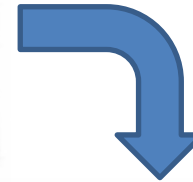
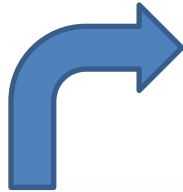
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Troubleshooting:

- While working in Layout View, the “Zoom to Percent” value was increased to have a closer look at the table. When the file was saved, closed and reopened, the tables appeared larger.

~Changing the value doesn't make the display change immediately. You must save, close and reopen the MXD



~This value will be different from one user to another depending on how their ArcMap interface is configured



STATE	CITY	NAME	TYPE
IL	Chicago	John Smith	RD
IL	Chicago	Jane Smith	PSA
IL	Chicago	John Smith	PSA
IL	Syringham	John Smith	PSA
IN	Indianapolis	Jane Smith	PSA
MI	Detroit	Jane Smith	PSA
MI	Grand Rapids	John Smith	PSA
MI	Minneapolis	Jane Smith	PSA
OH	Cincinnati	Jane Smith	PSA
OH	Cleveland	Jane Smith	PSA
WI	Milwaukee	Jane Smith	PSA

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Troubleshooting:

- Fortunately when the map was exported to PDF, it maintained the table size characteristics



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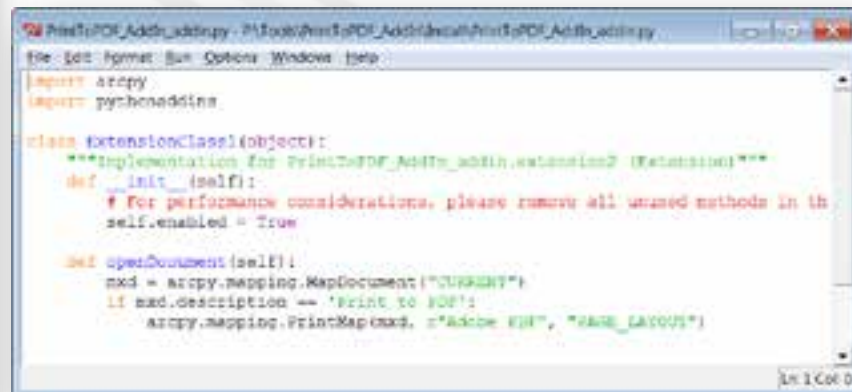


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Solution:

- Knowing that the map could export correctly if the MXD file was fully opened and assembled, we set out to build a solution.
- A Python AddIn was written that would execute every time ArcMap would open.
- The AddIn looks for text within the Map Document Properties Description box. If this box contains the phrase "Print to PDF" the map will be Printed to a PDF file.



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Solution:

- Roll the functionality of the AddIn into a Python script for automation
- Add separate processes for multiple layout sizes
- Add separate processes to move the PDFs to a file share for others to access

```
Personal Map Update - Dev - Connected - C:\Users\jprohato\PSA Map Update\Automation for EAC Presentations\log\log_stdout...
File Edit Format Run Options Windows Help

# Process: Add Field
arcpy.AddField_management(PSA_List_TableSelect, "TYPE", "TEXT", "", "", "10", "", "REQUIRED", "NO"
print "Add Field Complete"

# Process: Calculate Field
arcpy.CalculateField_management(PSA_List_TableSelect_0, "TYPE", "N", "N", "%% s\\\\IT-0876111"
print "Calculate Field Complete"

# Process: Calculate Field (2)
arcpy.CalculateField_management(PSA_List_TableSelect, "COUNT", "N", "N", "%% s\\\\IT-0876111"
print "Calculate Field Complete"

# Process: Calculate Field (3)
arcpy.CalculateField_management(PSA_List_TableSelect, "COUNT", "N", "N", "%% s\\\\IT-0876111"
print "Calculate Field Complete"

# Process: Calculate Field (4)
arcpy.CalculateField_management(PSA_List_TableSelect, "COUNT", "N", "N", "%% s\\\\IT-0876111"
print "Calculate Field Complete"

# Process: Decode Addresses
arcpy.GeocodeAddresses_geocoding(PSA_List_TableSelect, Mapping_Cities_Complete, "City City VISIBL
print "Geocoding Complete"

# Process: Spatial Join
arcpy.SpatialJoin_analysis(PSA_and_Rte, FEMA_Regions_W004_Tribal_Overlay_Clip_20150403, PSA_and
arcpy.SpatialJoin_analysis(PSA_and_Rte, FEMA_Regions_W004_Tribal_Overlay_Clip_20150403, PSA_and
print "Spatial Join on Define Regions Complete"

# Process: Calculate Field (5)
arcpy.CalculateField_management(PSA_and_Rte_SpatialJoin, "NAME", "TEXT", "NAME: %*", "%*"
print "Calculate Field Complete"

# Process: Calculate Field (7)
arcpy.CalculateField_management(PSA_and_Rte_SpatialJoin_4, "COUNT", "N", "N", "%% s\\\\IT-0876111"
print "Calculate Field Complete"

# Process: Calculate Field (8)
arcpy.CalculateField_management(PSA_and_Rte_SpatialJoin_0, "COUNT", "N", "N", "%% s\\\\IT-0876111"
print "Calculate Field Complete"

# Process: Before Print

```


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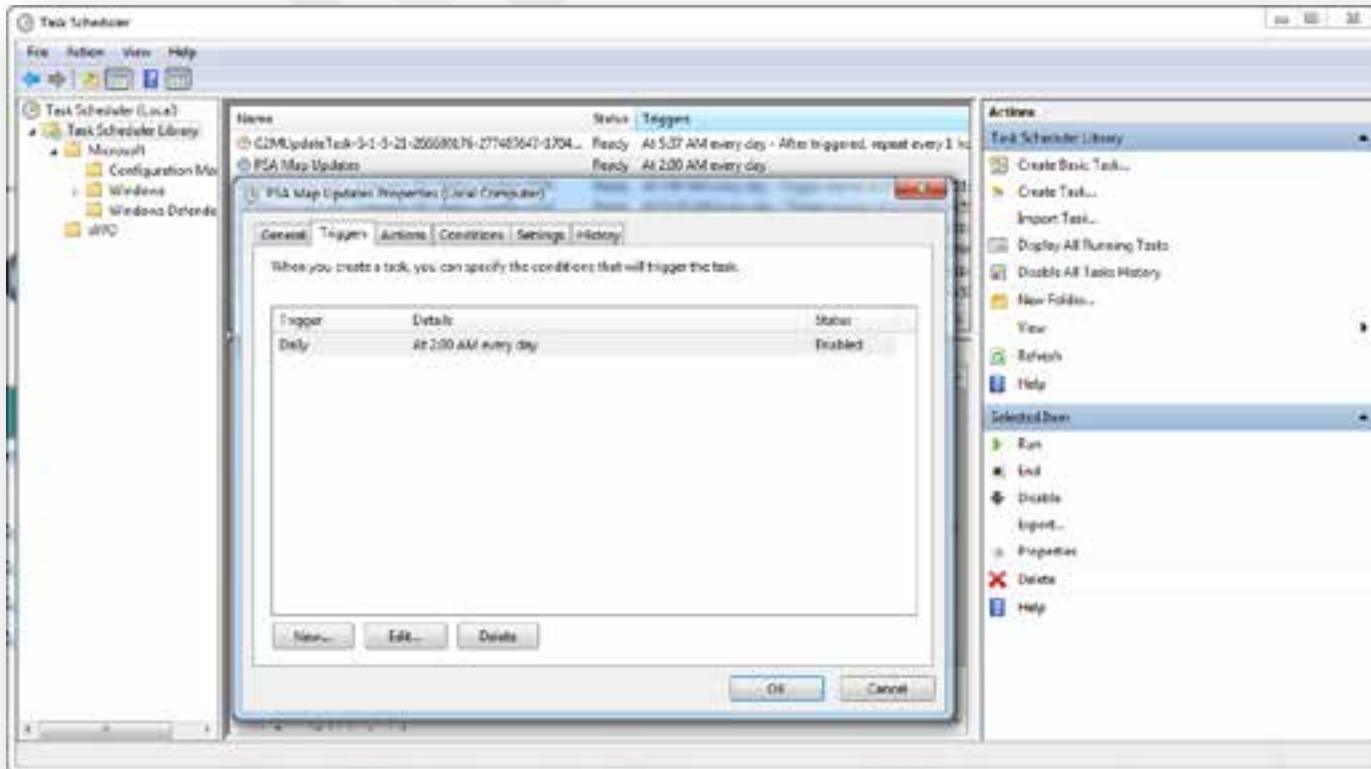


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Solution:

- A scheduled task was setup within the Windows OS to execute the process each night.



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Summary:

- The process requires a PDF print driver (i.e. Adobe PDF, PDF Creator or CutePDF)
- Changing the value doesn't make the display change immediately. You must save, close and reopen the MXD
- This value will be different from one user to another depending on how their ArcMap interface is configured
- Occasionally you'll have to modify the font size and column width in the attribute table properties (especially for larger maps)

Questions?

Useful Links:

Blog Post - <http://zekiah.com/index.php?q=blog/2013/06/04/automation-semi-dynamic-maps-geoprocessing>

Code for this solution – <https://github.com/Zekiah/MapToPDF>

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