BrochureBuilder Documentation

*N:\Planning - New File Structure\GIS\VRT\_PythonScripts\ServiceChanges\BrochureBuilder\BrochureBuilder Documentation.*docx

This script reads in a GTFS file and returns all the necessary data to build the maps for the printed and online schedules.

Requisites

* [Python 3](https://www.python.org/)
* [GTFSTK](https://mrcagney.github.io/gtfstk_docs/)
* [Pandas](https://pandas.pydata.org/pandas-docs/stable/)
* [Numpy](https://docs.scipy.org/doc/numpy/)
* [Geopandas](http://geopandas.org/)
* [OSMNX](https://osmnx.readthedocs.io/en/stable/)
* [TKInter](https://docs.python.org/3/library/tkinter.html)
* [Shapely](https://shapely.readthedocs.io/en/latest/)
* [Jupyter](https://jupyter.org/documentation)/IPython
* [Matplotlib](https://matplotlib.org/)

Usage

1. Run the script. A dialog box will open. Find the GTFS zipfile, centerline shapefile, and the folder that you’d like to save the data to. Click “Run” to begin running. **TODO: Build as .exe that can be run without downloading requisites. This script probably won’t run if using a centerline file that’s different from the one at** [**N:\Planning - New File Structure\GIS\Data\Transportation\Centerline\centerline.shp**](file:///N:\Planning%20-%20New%20File%20Structure\GIS\Data\Transportation\Centerline\centerline.shp)**. The function is set up to fall back to Open Street Map if no centerline file is provided, but the GUI lacks the capacity to accept none.**
2. The script will output the following shapefiles to the output folder:
   1. <GTFS Filename>\_routes
      1. Converts GTFS shapes.txt to shapefile
      2. Dissolves the shapefile into single route rather than unique outbound and inbound lines
   2. <GTFS Filename>\_timepoints
      1. If the GTFS feed has timepoints specified, it will select all identified timepoints, otherwise it will select all stops with non-null “departure\_time” values in the stop\_times.txt.
      2. Assigns each timepoint a mapping label which is the stop name with the 3-letter location signifier (i.e. NWC) dropped.
      3. Loops through each route, and assigns an ordered number to each timepoint by label. This means that timepoints with the same label (i.e. State & 18th NWC and State & 18th SEC) on opposite sides of the street will get a single numbered output (State & 18th), while timepoints with different labels (i.e. State & Clover SWC and State & 35th NWC) will get different numbers (State & Clover; #3, State 35th; #6). This is something that should be manually fixed in ArcMap/Illustrator. **TODO: make this not do that.**
   3. <GTFS Filename>\_stops\_routes
      1. Creates a shapefile of points for each unique combination of stops and route in stop\_times.txt. **TODO: opening this layer in ArcMap gives an “Unknown Spatial Error Reference.” I’ve set the crs to WGS84 in geopandas, but still get this error. I’m not sure what else to do about this. It works fine for building brochures, but should be fixed at some point**
   4. <GTFS Filename>\_transfers
      1. Creates a shapefile of points for each unique combination of stops and routes in transfers.txt.
   5. <GTFS Filename>\_water
      1. Buffers and assigns a route identifier for water features near each route. **TODO: This one runs slower than it should. Consider multiprocessing or threading. TODO: Make this one generic to buffer any shapefile (parks, park and rides, schools, etc.) along a route.**
   6. <GTFS Filename>\_streets
      1. Creates a one mile walkshed of each stop along each route to create the non-square buffers on each route line. **TODO: This one is really slow. I think it’s just because it’s single-processing OpenStreetMap API calls, then doing some other stuff. Consider multiprocessing or threading. TODO: split streets into Interstate, Arterial, Collector, and Local.**
3. Open all the output files in ArcMap **TODO: I think most of this could be automated in ArcMap using** [**the Python console**](http://desktop.arcgis.com/en/arcmap/10.3/analyze/executing-tools/using-the-python-window.htm) **or** [**Model Builder**](http://desktop.arcgis.com/en/arcmap/10.3/analyze/modelbuilder/what-is-modelbuilder.htm)
   1. Make sure that [brochures.style](file:///\\VRIDE-FS2\Development\Planning%20-%20New%20File%20Structure\GIS\Symbols\brochures.style) is in the Style Manager. See [ArcMap documentation for assistance](https://desktop.arcgis.com/en/arcmap/latest/extensions/task-assistant-manager/loading-styles-from-a-folder.htm.).
   2. Set up all symbologies:
      1. Existing routes should have line symbols defined in brochures.style. Refer to [ArcMap documentation for adding new symbols in Style Manager](http://desktop.arcgis.com/en/arcmap/10.3/map/styles-and-symbols/about-creating-new-symbols.htm) to establish new route symbols.
      2. Stops and transfers have point symbols in brochures.style.
      3. Set the timepoints symbology to be no fill, no outline. The numbered squares will be displayed as labels.
      4. Water has a polygon symbology in brochures.style.
      5. Streets are styled by the FuncClass column. Line symbols for Interstate, Arterial, Collector, and Local are in brochures.style. It will likely be easier to set scale ranges and symbologies if the layer is split into these four FuncClass classifications.
      6. It is recommended to set the [minimum visible scale](http://desktop.arcgis.com/en/arcmap/latest/map/working-with-layers/displaying-layers-at-certain-map-scales.htm) for local streets to the scale of the largest local route (currently the 52).
   3. Set up Labeling
      1. Use the [Maplex Label Engine](http://desktop.arcgis.com/en/arcmap/10.3/map/working-with-text/enabling-maplex-for-arcgis-and-adding-the-labeling-toolbar.htm).
      2. Interstates have a shield label in brochures.style. Other street labels have their own label in brochures.style. For arterials and collectors use the StNm and StSuffix to make the label.
         1. In the Properties dialog box, check “Remove duplicates” for all layers.
         2. For the arterials and collectors, set the placement to be “Curved Offset.”
      3. Duplicate the timepoints layer.
      4. Label one of the timepoints as the numbers and one as the labels. Keep both on.
      5. Timepoints have 2 labels in brochures.tyle. Use the StopLabel column for the text, and the number for the numbers.
         1. Set the position of the numbers labels to “Center.”
         2. In the Properties dialog box of the numbers layer, check “Never remove (place overlapping).”
         3. Set the offset to 20
         4. Uncheck “Stack Label” on the timepoint labels. In the Properties dialog box, check “Remove duplicates” and “Never remove (place overlapping).”
      6. Set the Weight Ranking of the routes layer to 1000 so that labels don’t run over the top of them.
   4. Set up Data Driven Pages
      1. Duplicate the routes layer.
         1. Label one of the routes layers as the driver and turn it off.
         2. Label one of the timepoints as the numbers and one as the labels. Keep both on.
      2. [Enable Data Driven Pages](http://desktop.arcgis.com/en/arcmap/10.3/map/page-layouts/creating-data-driven-pages.htm) on your driver layer.
         1. Set the name field to “route\_short\_name” (ArcMap typically shortens this to “route\_shor”)
      3. In the rest of the non-driver layers, enable page definitions to show matches to “route\_short\_name.”
   5. Export
      1. Under File -> Page and Print Setup, set the page setup to 8.5”x11” landscape.
      2. In the Data Frame Properties, set the Frame Border to None, the position to be at 0 inches away from the bottom left corner, and the size to be 11” wide by 8.5” tall.
      3. In the Python Window, paste the following:

mxd = arcpy.mapping.MapDocument("CURRENT")

for pageNum in range(1, mxd.dataDrivenPages.pageCount + 1):

mxd.dataDrivenPages.currentPageID = pageNum

pageName=mxd.dataDrivenPages.pageRow.route\_shor

arcpy.mapping.ExportToAI(mxd, r"file\path\to\destination\folder\\" + str(pageName) + ".ai")

del mxd

* + 1. Modify the file\path\to\destination\folder\ to the actual file path to the destination folder. Keep the \\ at the end.
    2. Make sure the tabs are included.
    3. Move the cursor to the bottom of the script and press enter to execute.
  1. You’ll likely still have to create inset maps of downtown Boise for intercounty routes. Do that in ArcMap and overwrite your exports.

1. Open in Illustrator and edit as needed.
   1. It will probably ask to update fonts. Do it and save over the original. I don’t know what this is about.
2. Place the map in the brochure template
   1. Open your template or the current copy of the brochure.
   2. Press Ctrl+Shift+P and open your .ai map export.
   3. Place the file in the brochure where needed.
3. If additional edits need to be made, open the links panel in Illustrator, and edit original to edit original. This maintains a single source for all of the maps in various formats (online, printed, rollplots, etc).
4. To export .svg files for online maps, use [this guide](https://webdogs.com/blog/export-svg-web-using-adobe-illustrator/).
5. Build the system map. It’s a burley task to get all of the overlapping routes rainbow-ed out and such. Good luck!