FME Training

for Esri Utility Network Migration

Electric Migration Workspace

Safe Software training team:
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Jovita Chan (Q&A)

Thanks also to John Long and John Alsup from Esri

ArcGIS Licensing

ESU291378785 ArcGIS Pro Advanced
ESU015674076 ArcGIS Pro Data Interoperability

ESU603624567 ArcGIS Desktop Advanced
ESU479175011 Data Interoperability

Thanks to Esri for supplying the training licenses

AGENDA

Schedule is 8:00 – 11:00 PST with a break

Day 1 (Monday) Ryan

- Introduction to FME Workbench

Day 2 (Tuesday) Ryan

- Dive into transformation tools and other workbench functionality used in the Esri UN migration workspaces

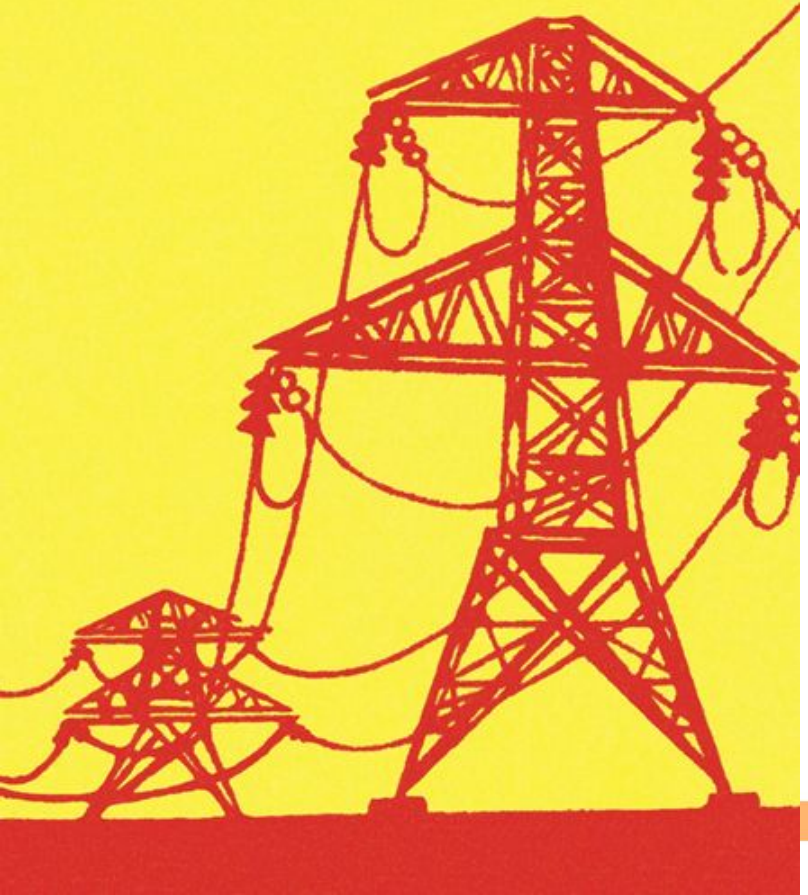
Day 3 (Wednesday) Trent n' Mark

- Deep dive into water migration and the **schema mapping**

Day 4 (Thursday) Mark n' Trent

- Deeper dive into electric migration and the schema mapping

TODAY'S GOALS

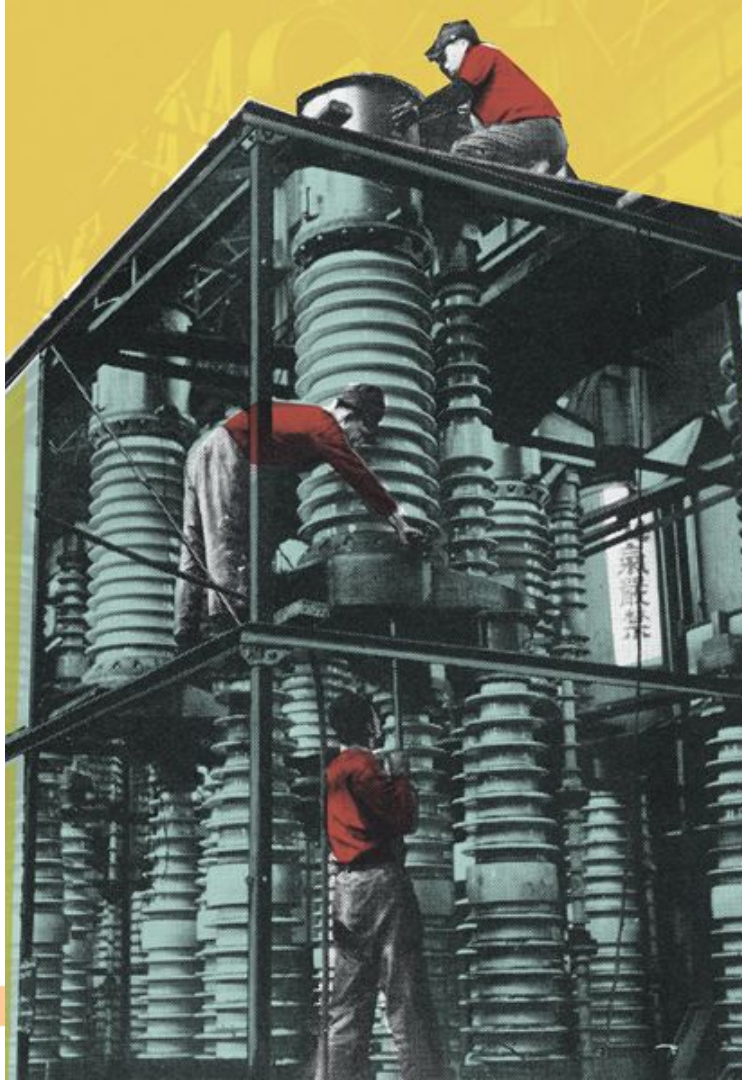


- Introduce the key aspects of FME Workbench
- Review the primary transformation tools used in the migration workspaces
- Deep dive into Water migration workspace (Simple migration)
- Deeper dive into Electric migration workspace (Basic migration)
  - Schema mapping specific to Electric Migration
  - Topology issues
  - Creating Assemblies
  - Assembly definition XML
  - Exercises

By the end of today you should have a good understanding of the electric migration workspace. You should be able to edit the key parts of the electric migration workspace.

More Resources

- **FME Training for Utility Networks**
  https://knowledge.safe.com/articles/72048/utility-network-migration-tools.html
- **Esri ArcGIS Pro Utility Network Migration Tools**
  https://knowledge.safe.com/articles/72048/utility-network-migration-tools.html
- **Esri GeoNet - Utility Network Migration Status Page**
  https://community.esri.com/thread/214206-esri-utility-network-configuration-and-migration-tool-status
- **What is Esri Utility Network**
  http://pro.arcgis.com/en/pro-app/help/data/utility-network/what-is-a-utility-network-.htm
- **Introduction to Esri Asset Package**
  http://solutions.arcgis.com/utilities/help/utility-network-automation/asset-package-reference/an-overview-of-the-asset-package.htm
- **Documentation**
  Electric Distribution Utility Network Migration Tools Documentation.pdf
  Esri Utility Network_ Assembly XML Doc.pdf



Electric Migration Pattern

Basic Migration

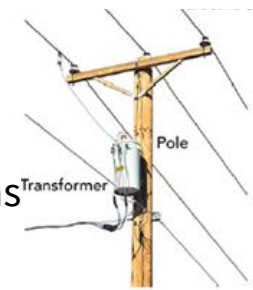
Schema Mapping

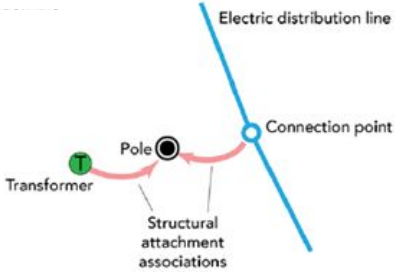
Network topology

- Geometric Network (lines & junctions)
- Explicit network (associations between junctions & devices)

Devices

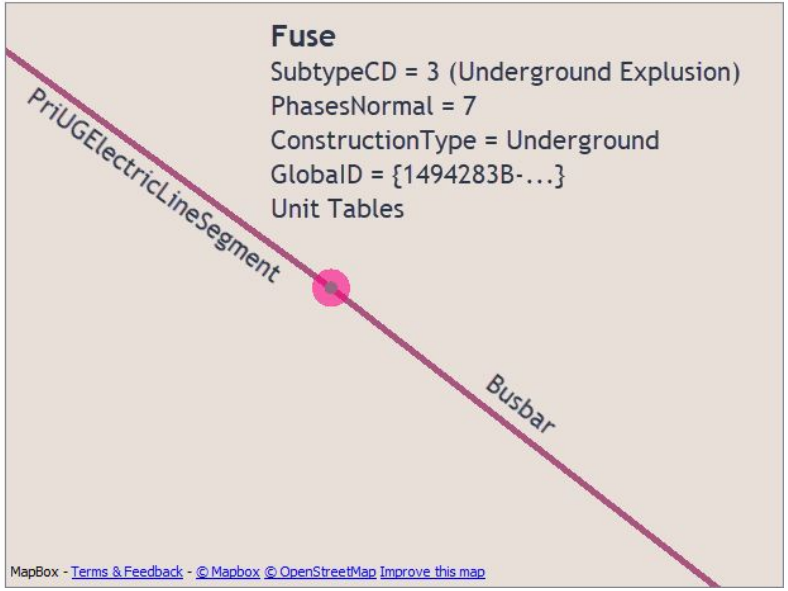
- More complex objects (devices). An ArcGIS device (point geometry) becomes multiple assets:
  - Assembly
  - Device
  - Junction
  - Associations
  - Terminals
  - Structures



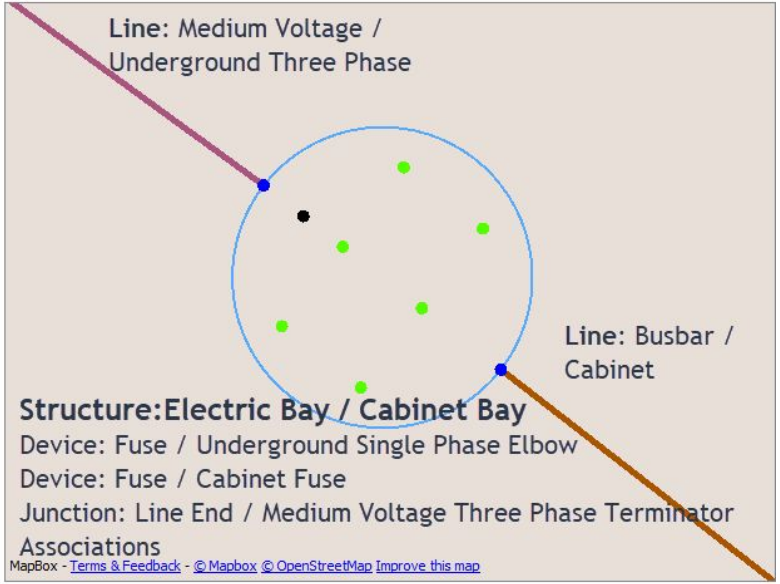


Electric Migration

ArcGIS Device



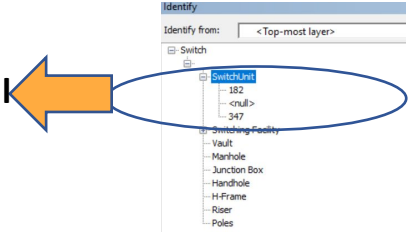
UN Assembly / Support Structure

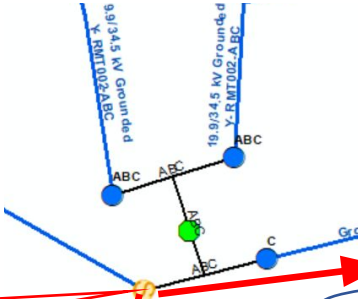


Creating Devices for Switch Gears

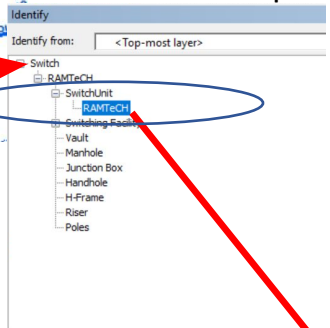
Three Unit Records for each phases

Defines number of devices and individual attributes of devices

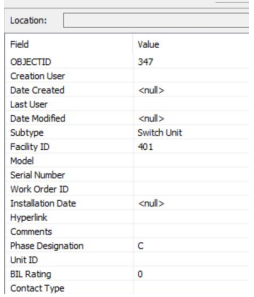




One Unit Record for all 3 phases



Or



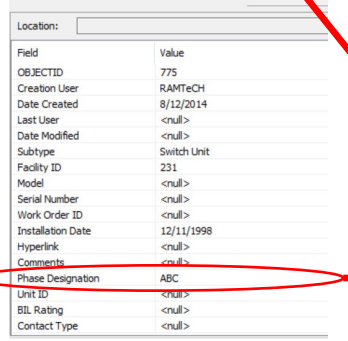
StructureJunction/Electric Bay/Cabinet Bay

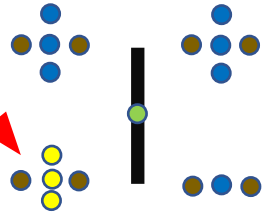
Switch Feature Class

Code	Description
1	Overhead Disconnect
2	Overhead Load Break
3	Underground Disconnect
4	Underground Load Break
5	SCADA Controlled Switch

Defines Device Asset Group / Type

ElectricDevice/Switch/Overhead Medium Voltage Three Phase Load Breaking

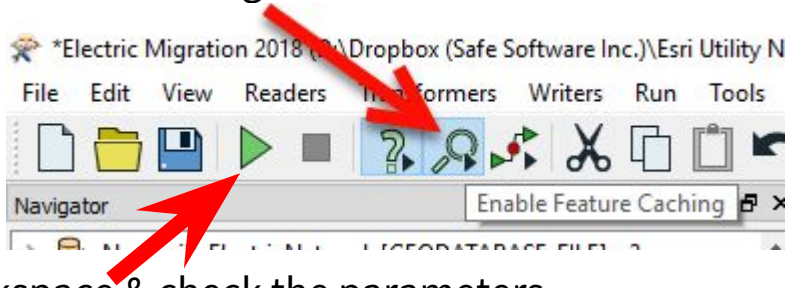




Run the Electric Migration

Step 1: Run a Migration

- Find the folder: `..\EsriUNTraining\Basic`
- Open the workspace:
  `Electric Migration beta.fmw`
- Set Enable Feature Caching: **Off**



- Run the workspace & check the parameters
- Check the results in Data Inspector
  Find Fuse: {1494283B-C6F1-4C27-8513-4E06B33A088C}
- Isolate the data with Test Data & Feature Caching : **On**
  Fuse: {1494283B-C6F1-4C27-8513-4E06B33A088C}
  Switch Facility: 9AE1E625-D88C-423F-8539-907C8C75E4D8

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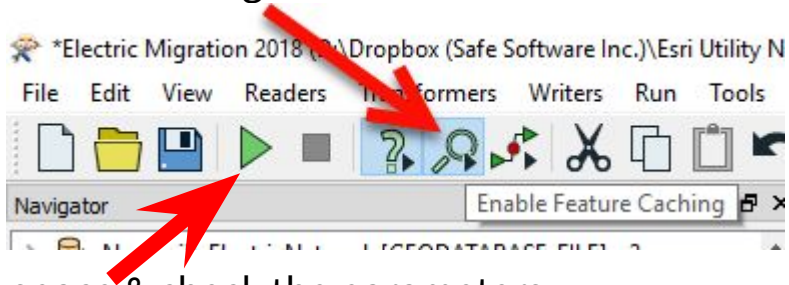

- Run the workspace & check the parameters
- Check the results in Data Inspector
  Find Fuse: {EDCADCC6-A8D5-4348-91CE-268766799D85}
- Isolate the data with Test Data & Feature Caching : **On**
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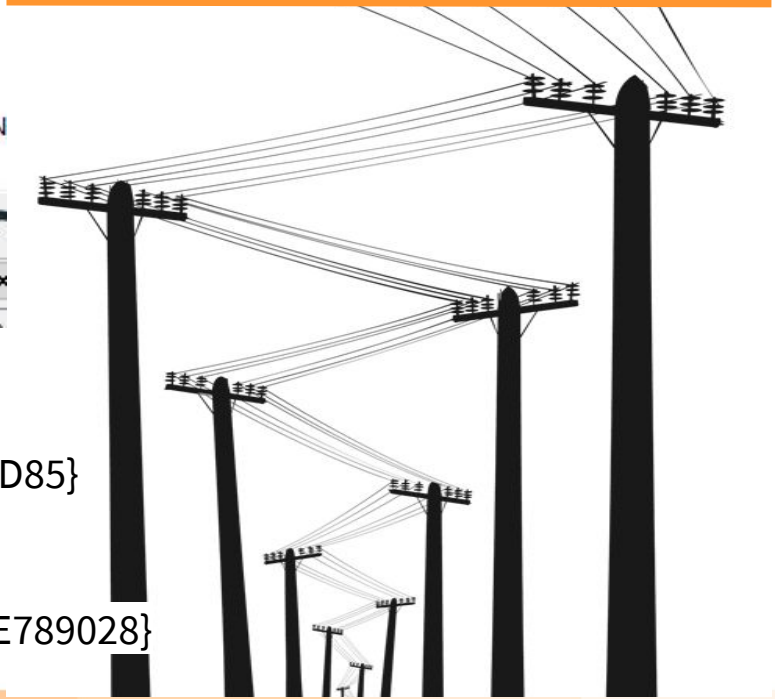
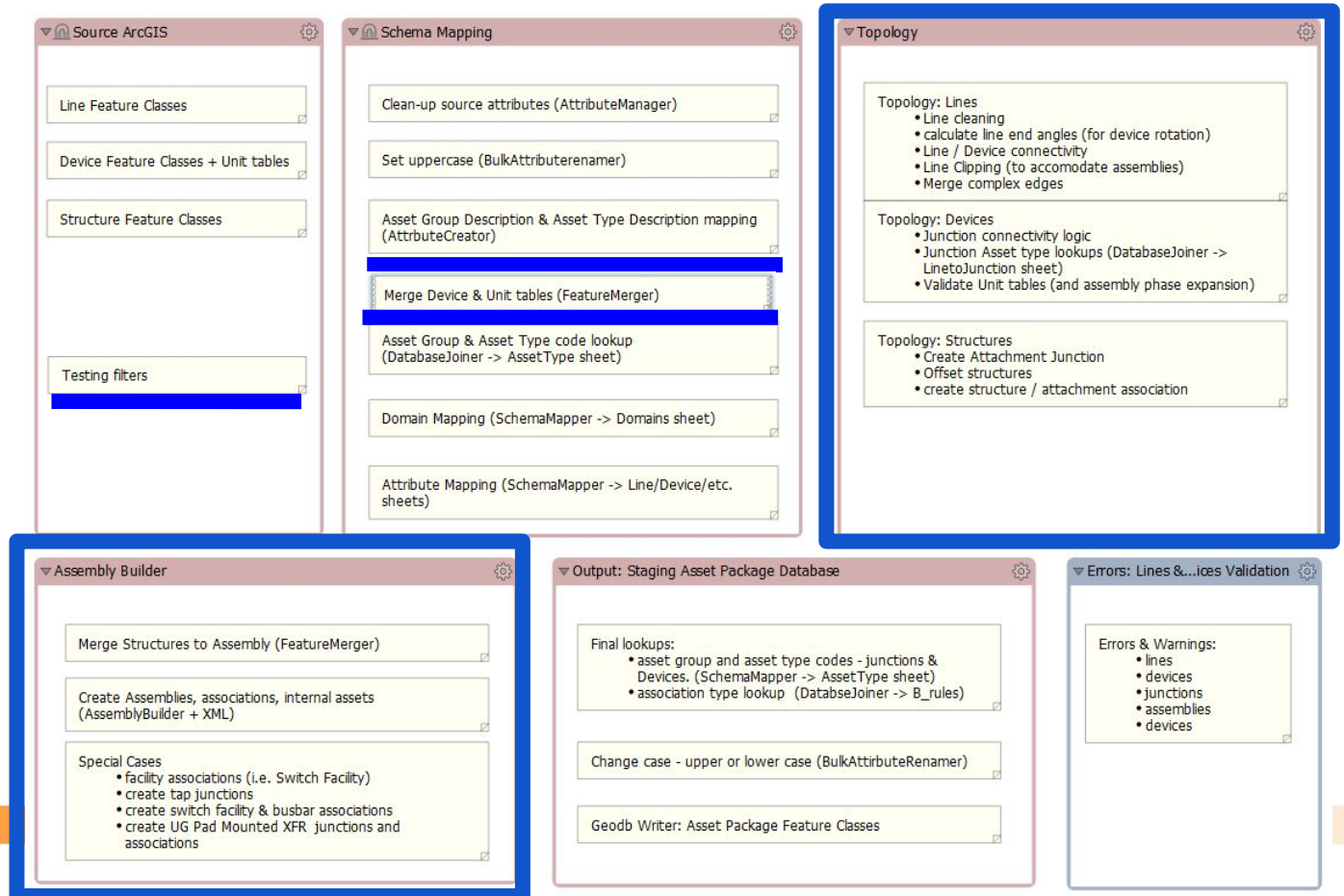
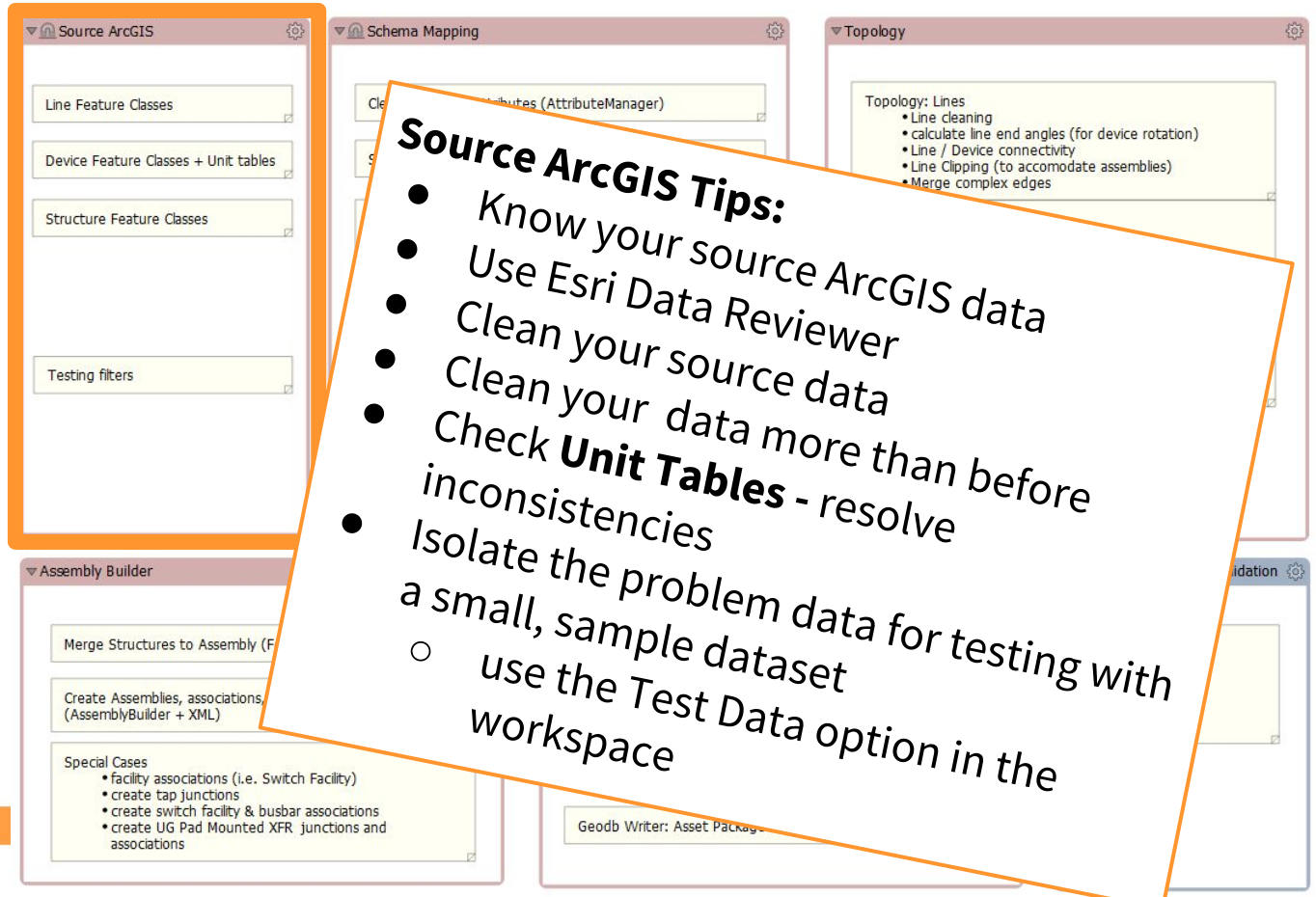
  Switch Facility: {0FE54F47-E32D-441A-ADBB-01167E789028}



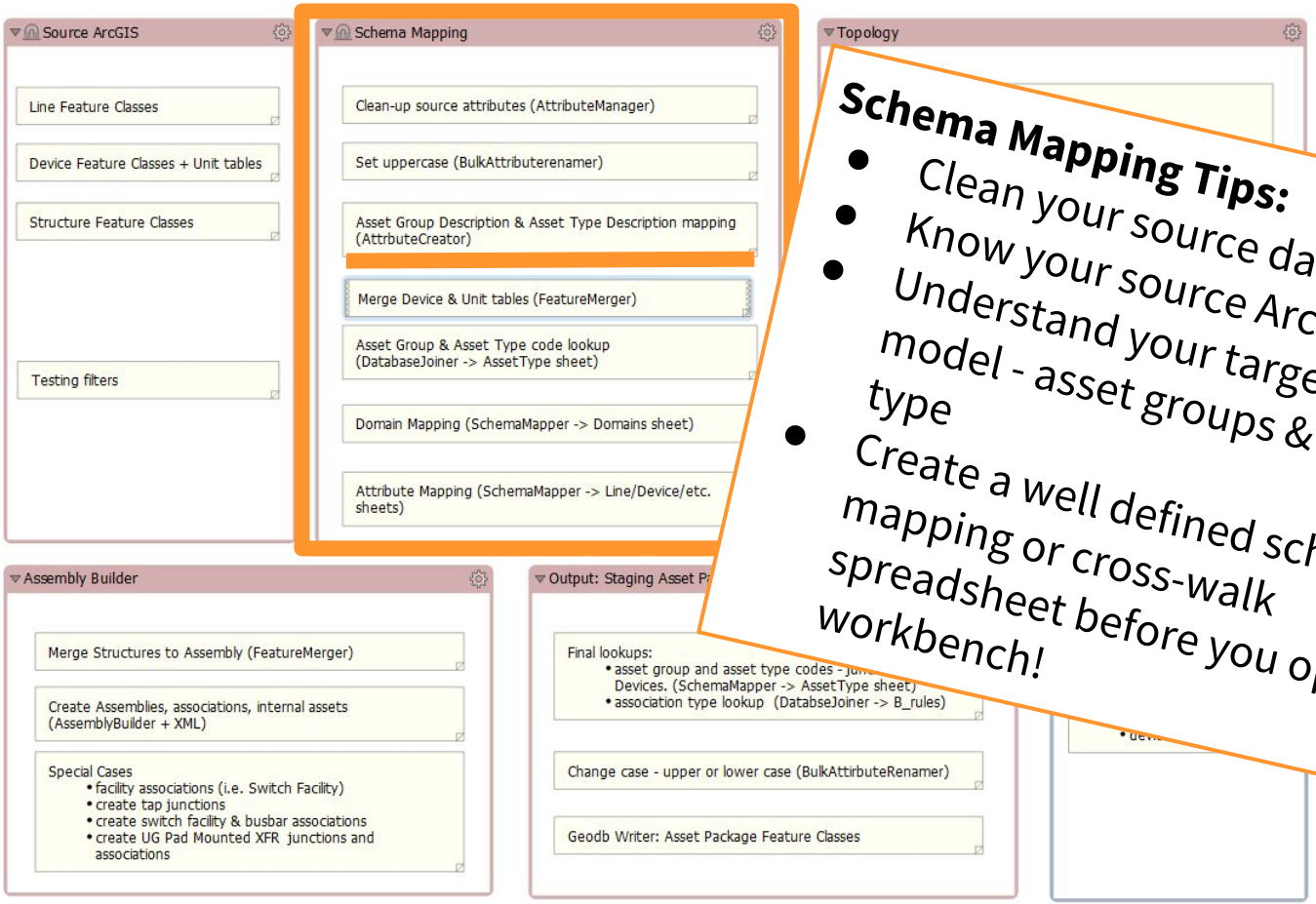
Electric Migration Workspace



Electric Migration Workspace



Electric Migration Workspace



Schema Mapping Tips:

- Clean your source data
- Know your source ArcGIS data
- Understand your target UN data model - asset groups & asset type
- Create a well defined schema mapping or cross-walk spreadsheet before you open workbench!

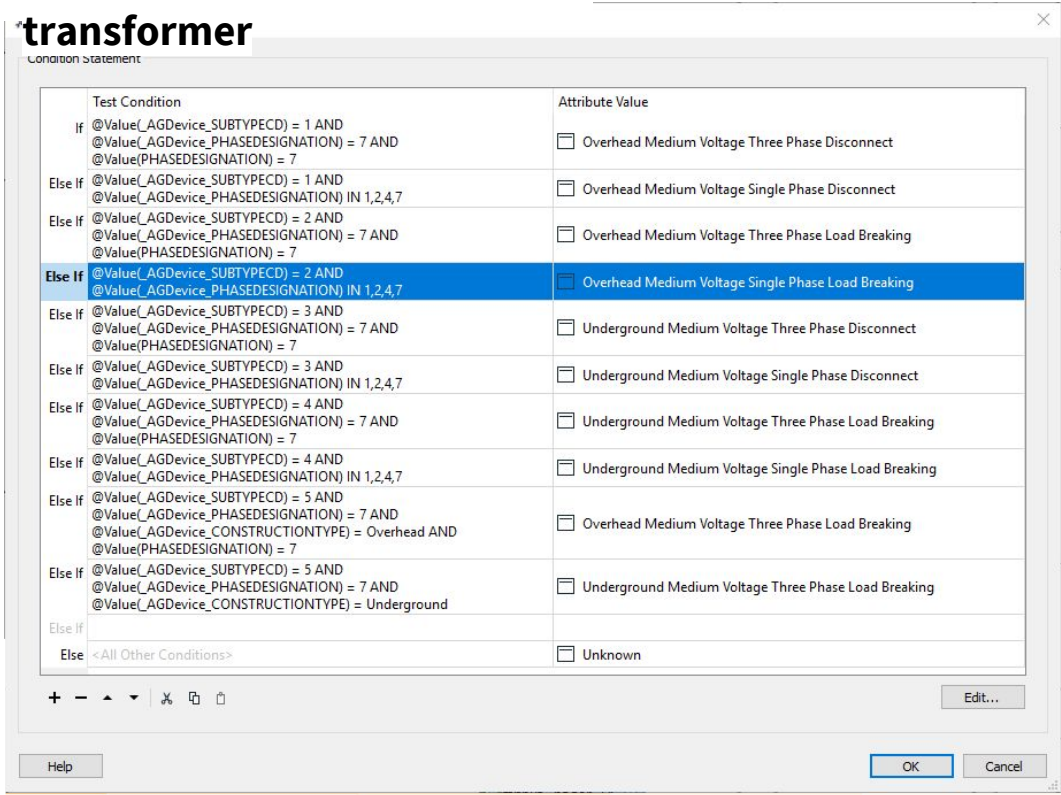
Schema Mapping: Setting Asset Group & Asset Type

More complex conditionals

	A	Y	Z
1	ElectricDistribution Device		
2		Switch	
3	FieldName	Attribute or Value	Filter
4	ASSETGROUP	14 - Switch	
5	ASSETTYPE	485 - Overhead Medium Voltage Single Phase Disconnect	subtype = 1 and phasedesignation <> 7
6	ASSETTYPE	493 - Underground Medium Voltage Three Phase Disconnect	Subtype = 2 and Phasedesignation = 7
7	ASSETTYPE		
8	ASSETTYPE	487 - Overhead Medium Voltage Three Phase Disconnect	subtype = 1 and phasedesignation = 7

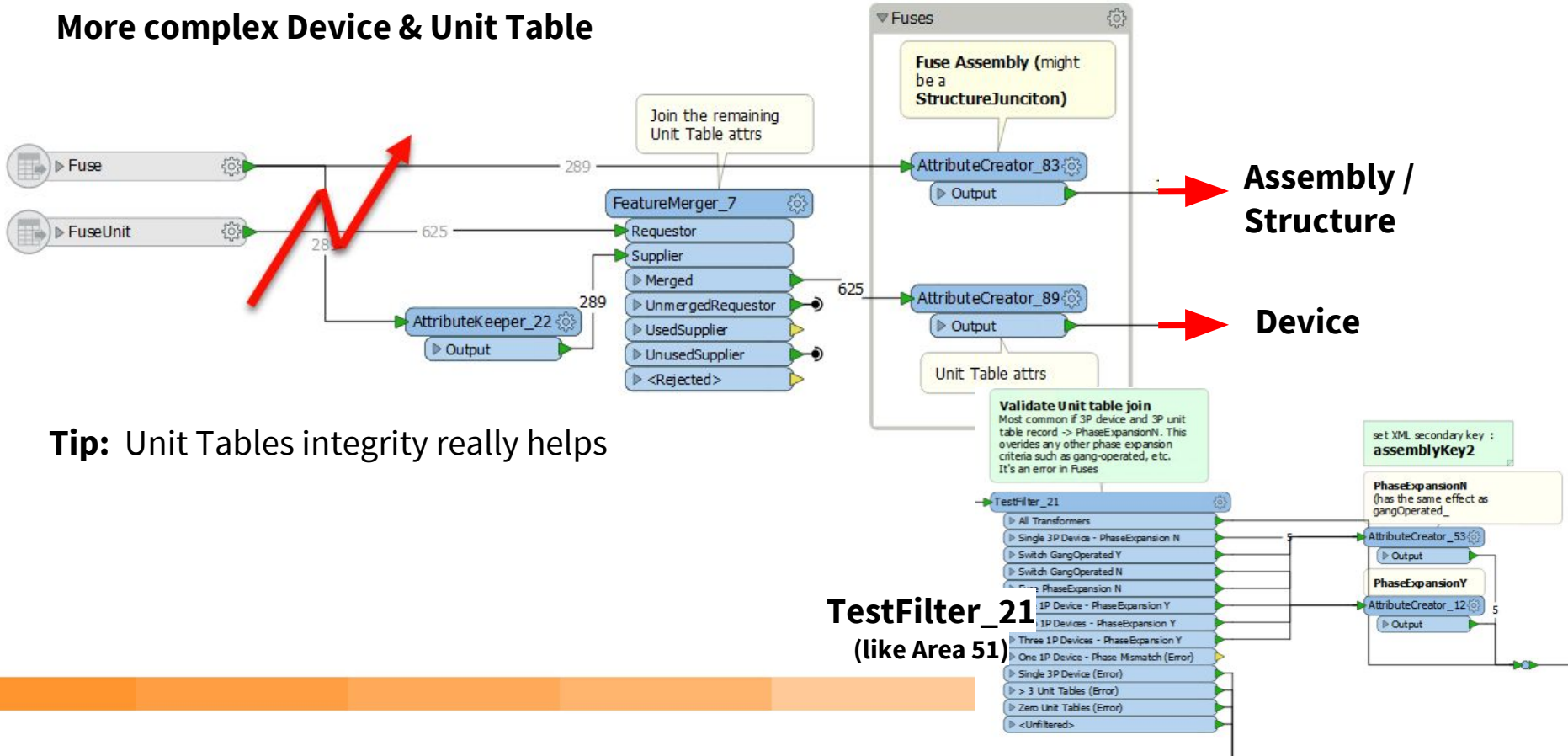
Tip: Accurate mapping to asset group & asset type for both device (assembly) and unit tables (devices) really helps

AttributeCreator transformer



Schema Mapping: AG Device & Unit Table

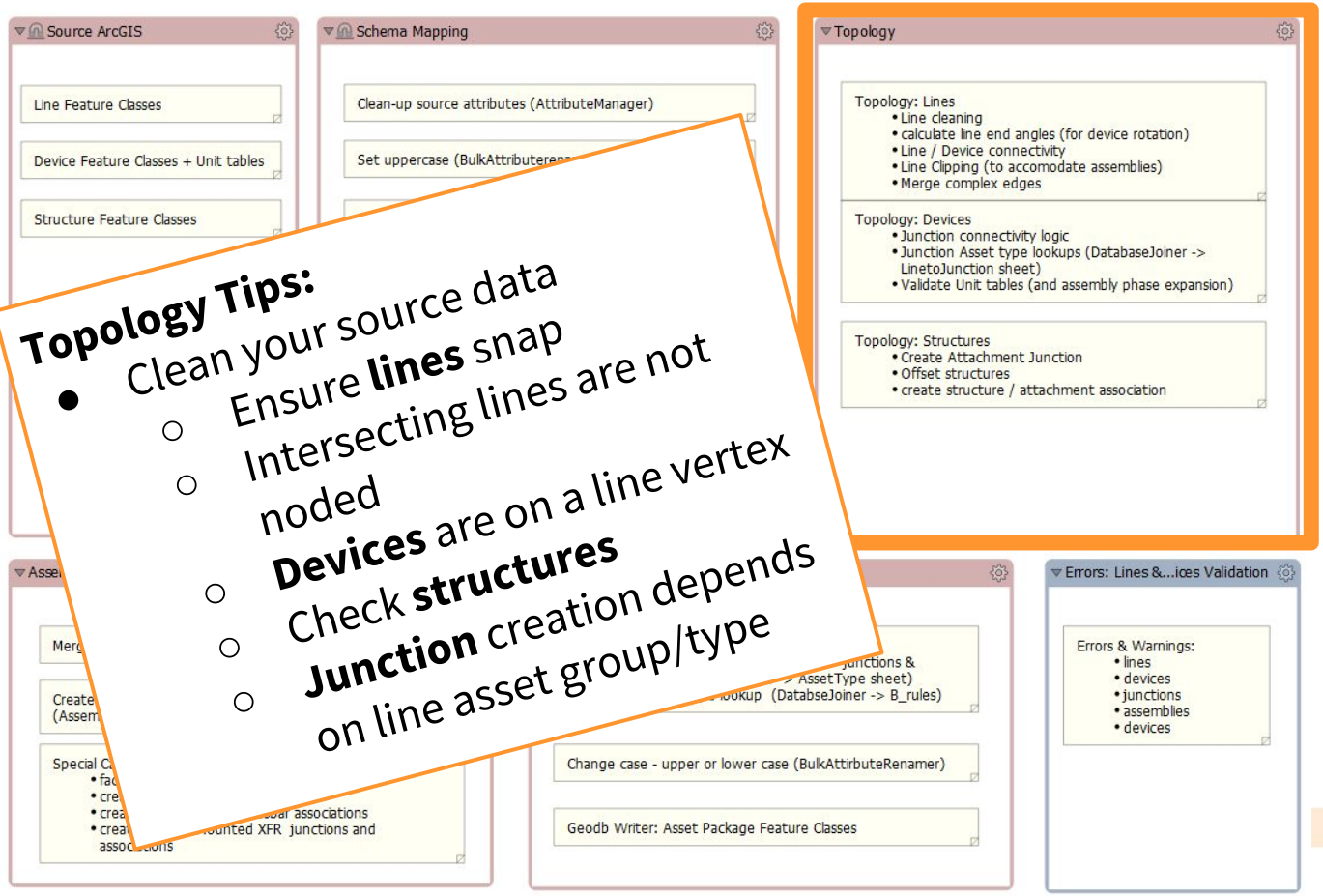
More complex Device & Unit Table



Tip: Unit Tables integrity really helps

TestFilter_21
(like Area 51)

Electric Migration Workspace

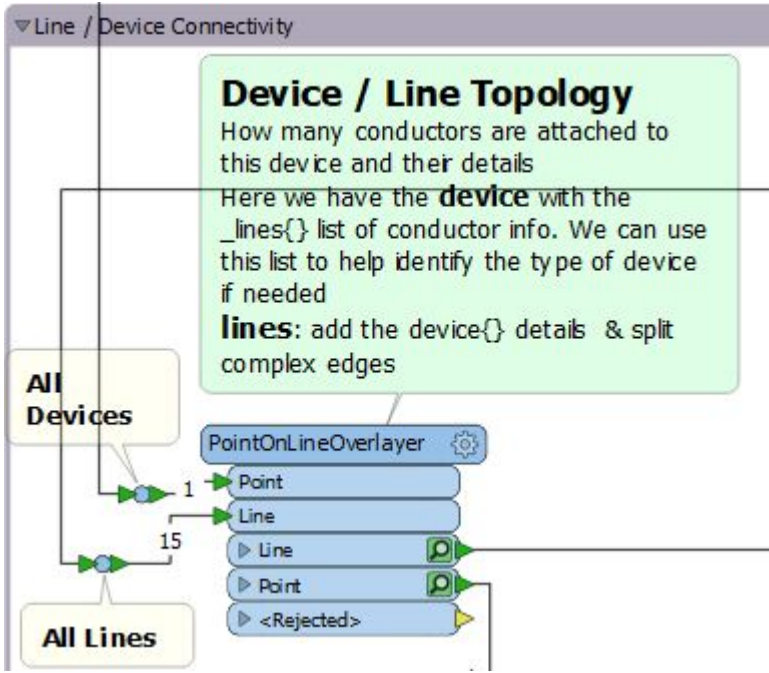


What Topology?

Devices

- Device Attributes
  - AssetGroupDesc / AssetTypeDesc
  - GlobalID
  - _AG<*original attrs*>
  - _unit_table{}.<*attrs*>
  - Junction<n>AssetGroupDesc
  - STRCT_<*attrs*>
- Connected Lines
  - _lines{}.AssetGroupDesc / AssetTypeDesc
  - _lines{}.GlobalID
  - _lines{}._assembly_rotation
  - _lines{}._clip_flag

Topology



What Topology?

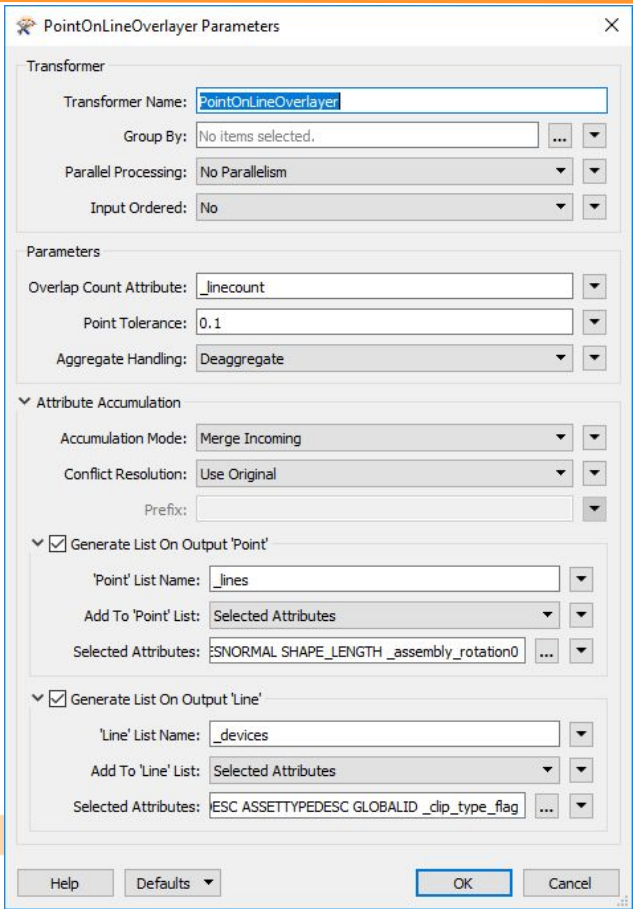
Topology

Lines

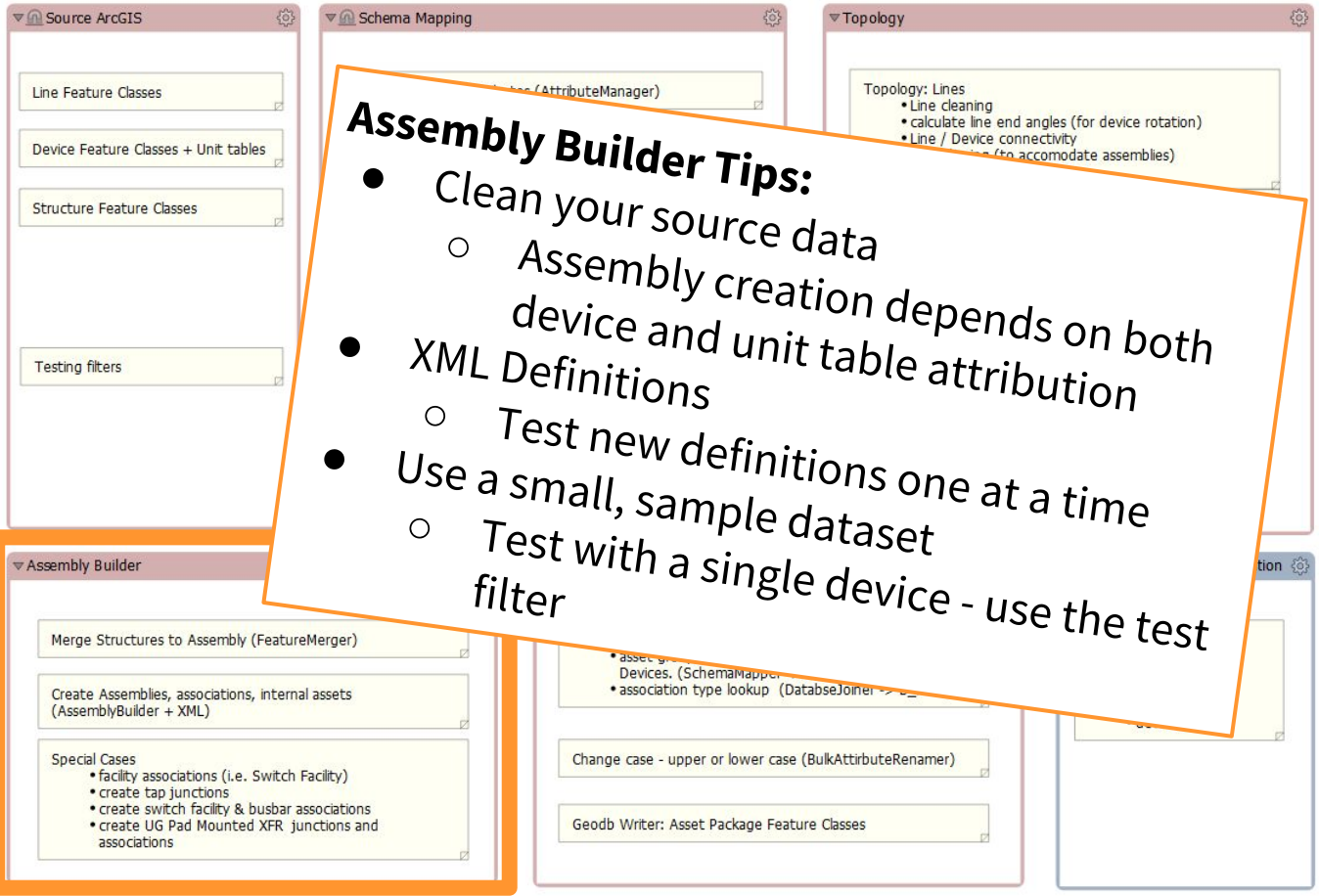
- Line Attributes
  - AssetGroupDesc / AssetTypeDesc
  - GlobalID
  - PhasesNormal
  - _ohug / _voltagelevel
- Connected Devises
  - _devices{}.AssetGroupDesc / AssetTypeDesc
  - _devices{}.GlobalID

Line Clipping

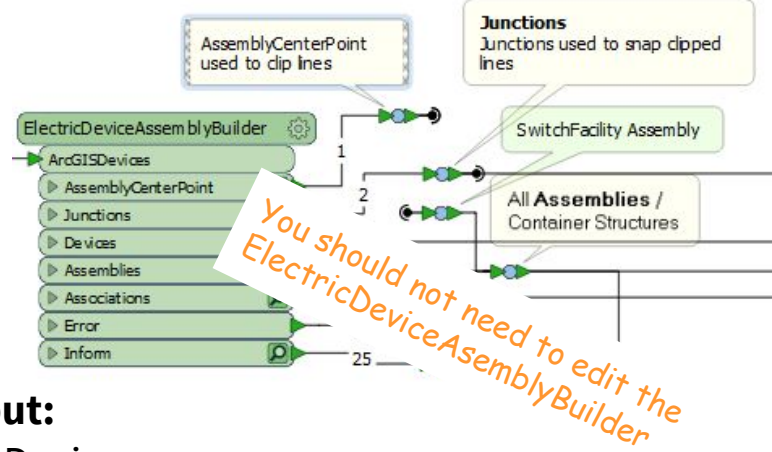
- Clip appropriate lines for assembly
  Warning - very short lines (<0.1 ft) can cause assembly placement errors



Electric Migration Workspace



Assembly Builder



Merges:

- Device Features
- XML Assembly Definitions

Keys:

ASSETGROUPDESC	<assemblyGroupDesc>
ASSETTYPEDESC	<assemblyTypeDesc>
assemblyKey2	<assemblyKey2>
cabinetKey	<assemblyCabinetKey>

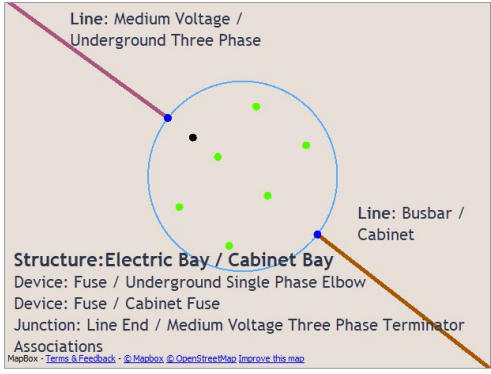
Documentation:

Esri Utility Network_ Assembly XML Doc.pdf

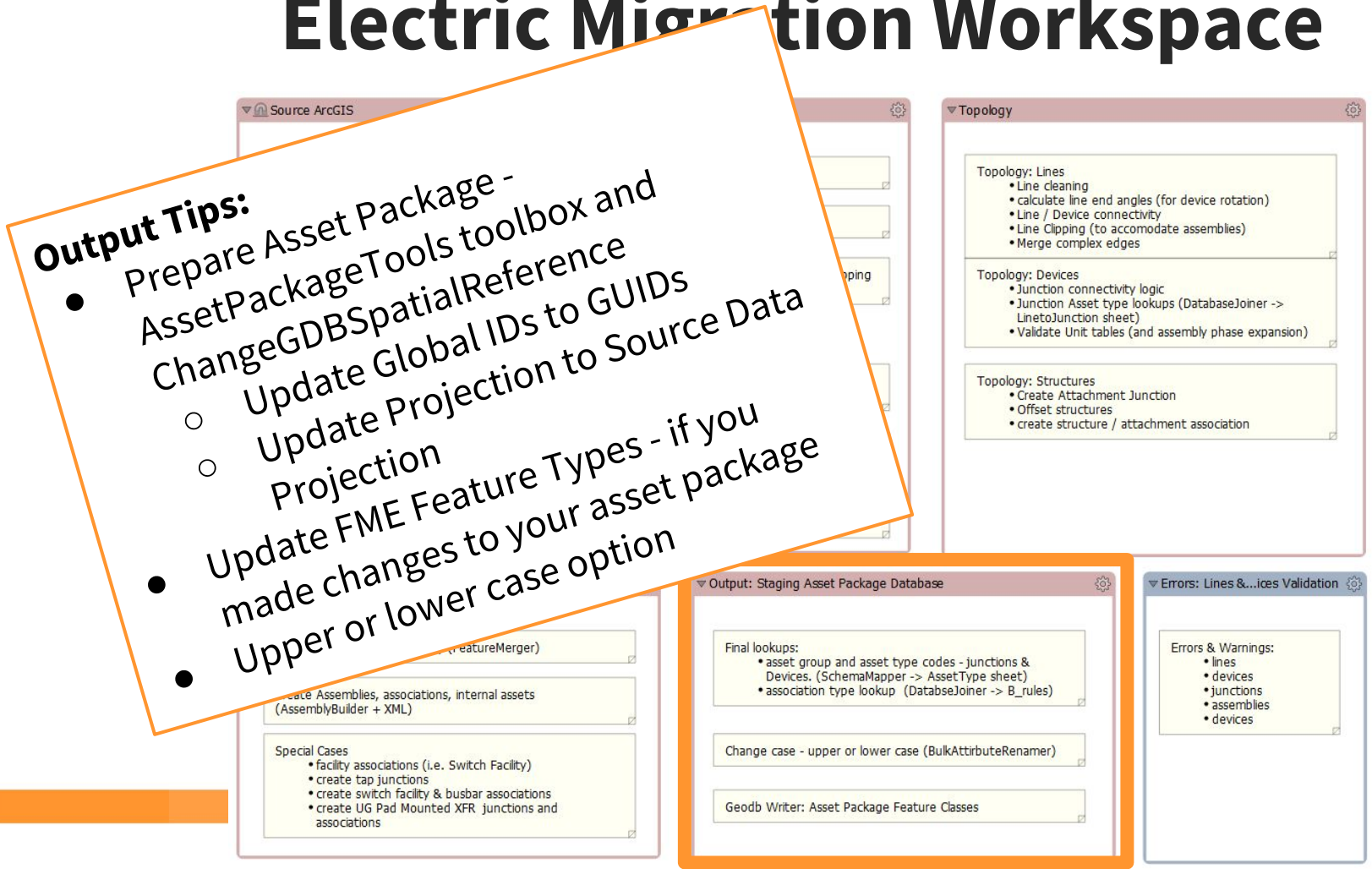
Output:

- Device
- Assembly / StructureJunction
- Associations
- Junctions
- AssemblyCenterPoint
- Error / Inform

Assembly scale parameter...



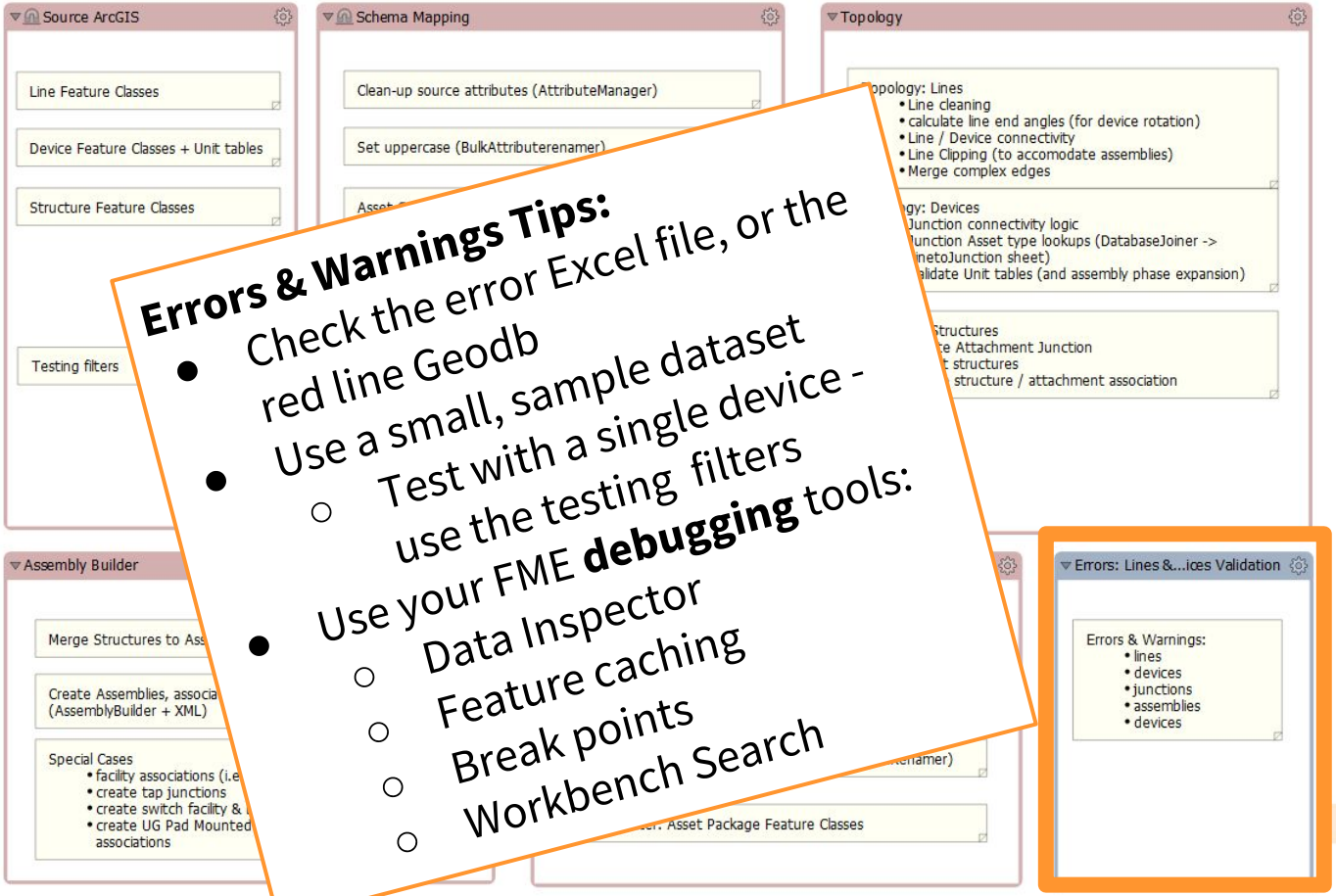
Electric Migration Workspace



Output Tips:

- Prepare Asset Package - AssetPackageTools toolbox and ChangeGDBSpatialReference
  - Update Global IDs to GUIDs
  - Update Projection to Source Data Projection
- Update FME Feature Types - if you made changes to your asset package
- Upper or lower case option

Electric Migration Workspace



Exercise - Fuse data error

Open workspace: "..\Basic\1.Fuse_Exercise\Begin_Fuse.fmw"

Configure to test a single Fuse:

Fuse Global ID: {DA309538-67AA-4CC2-8185-145D75E2DA8E}

SubtypeCD: 1
PhaseDesignation: 7
ConstructionType = Overhead

Run workbench with Feature Caching ON + Test Data only

Check error Excel - note error transformer: TestFilter_21

Open original ArcGIS data and check the data:

ArcGIS feature class list for easy viewing in Data Inspector:

BusBar Fuse PriOHElectricLineSegment PriUGElectricLineSegment SecOHElectricLineSegment SecUGElectricLineSegment SupportStructure SurfaceStructure Switch SwitchingFacility Transformer UndergroundStructure DynamicProtectiveDevice FuseUnit

Just copy this list into the Table List of the GeoDB reader

Re-Run with corrected data

Exercise - DynamicProtectiveDevice missing source Feature Class

Open workspace:
"..Basic\2.DynamicProtectiveDevice_Exercise\DynamicProtectiveDevice - Begin.fmw"

Import Feature Types:

- DynamicProtectiveDevice
- RecloserUnit
- SectionalizerUnit

Connect them.

Copy transformers from similar objects - switches?

Exercise cont… - DynamicProtectiveDevice missing source Feature Class

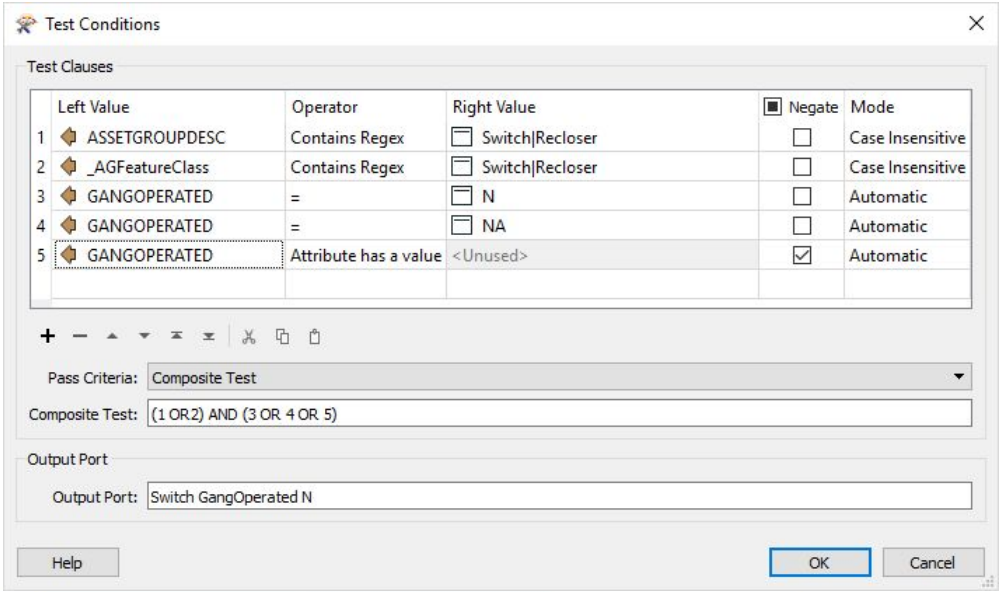
Add tests:

Recloser GlobalID: {CD229437-CEA2-4225-85F6-CBFB0A272C35}

Support Structure: {D406A179-64C5-42F9-B991-AB4390C0CA5F}

Check **TestFilter_21**

(like Area 51 -strange things happen here…)



Exercise - Updating Assembly XML Definitions

Open workspace:
"..\EsriUN\Basic\2.DynamicProtectiveDevice_Exercise\Begin_Recloser.fmw"

Set-up for testing with the Test Filter

- Recloser GlobalID: {320E0040-04E4-4E0D-B5BA-09253A19E3C3}
- Switch Gear GlobalID: {B732B5E5-3D7D-478D-A795-774CFF49F32B}

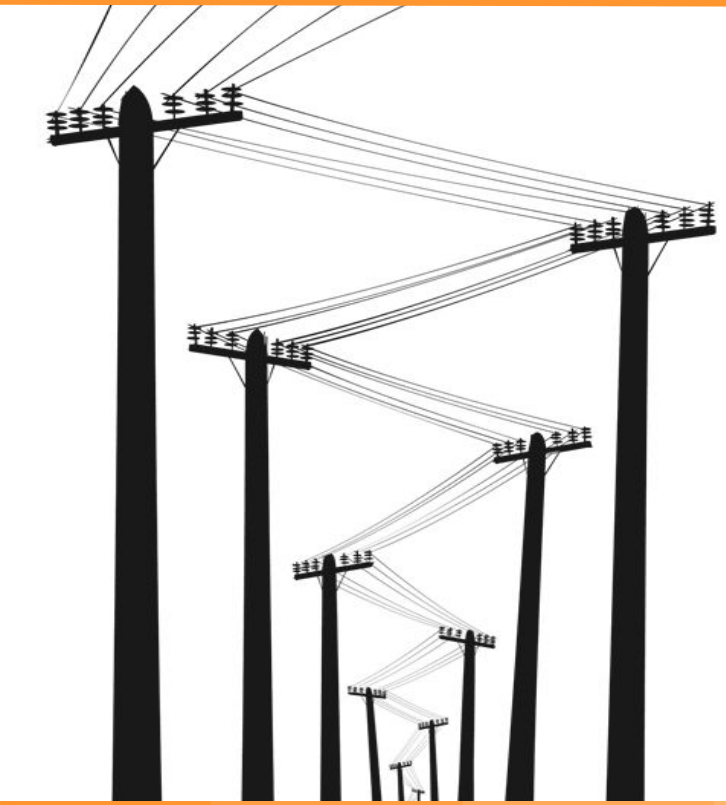
SubtypeCD = 7
PhaseDesignation = 7
Unit tables = 3 i.e. one per phase
GangOperated = NA

Check results and error reports.

Update XML definitions - check documentation

- Open XML definition in NotePad++ & search for “Recloser”
  - PadMountRecloser_definition - Begin.xml
- Create new assembly definition
- Re-run with either fixed XML or PadMountRecloser_definition - End.xml

Wrap-up



Thanks for attending...

Editing the migration workspaces

- If you make ***changes***, please share them with us
- ***Need help*** - feel free to contact us

Next steps:

- Release the Electric migration workspace
- Esri UN Reader/Writer Feature Service
- Validation Workspace

That’s all folks!

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Jovita Chan
Nampreet Singh

Thanks also to John Long & John Alsup at Esri