

GLOUCESTER COUNTY TRANSITIONS FROM CAD TO ESRI'S LOCAL GOVERNMENT MODEL & PARCEL FABRIC

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History of Gloucester GIS

- **Enhanced 911 Program**

- Gloucester County has been using AutoCAD Map as the primary GIS system since the adoption of the Enhanced 911 project in the early 90s.

- **Need for more robust GIS**

- As the county started moving to more enterprise oriented software across other departments, the need to migrate to ESRI became apparent for integration purposes.
- After a tumultuous county assessment, county administration made the decision to utilize GIS data to assist in making improvements to the process.



History of Gloucester GIS

- **Funding**

- Gloucester County purchased an ELA (Enterprise License Agreement) for small governments from ESRI in June 2013.
- In 2014, Timmons Group made us aware of a funding opportunity through VITA's PSAP grant program. We were awarded a grant to do a full system conversion.



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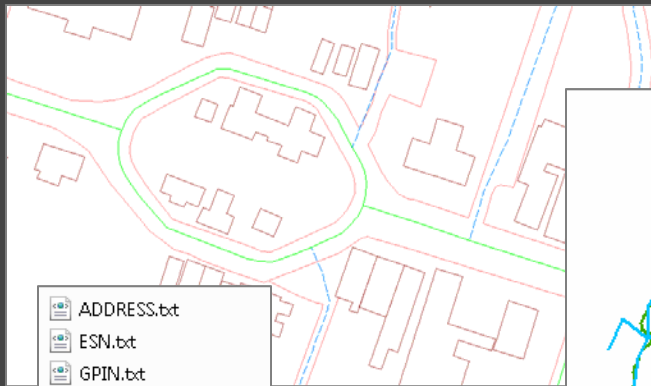
History of Gloucester GIS

- **Goals**

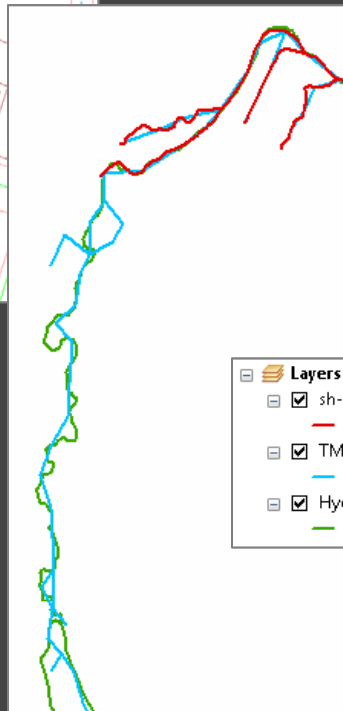
- Improve processes within the GIS department
- Improve workflow to increase efficiencies across departments.
- Allow end users to create simple presentation maps and perform basic analysis without having to wait on an GIS staffer to become available.
- Create web services to be consumed by our vendors to eliminate the need for constant updates.
- So many goals, so little space on the slide. 😊



Gloucester County



- ADDRESS.txt
- ESN.txt
- GPIN.txt
- GPIN-TAB.txt
- JOIN INFORMATION
- MONUMENT.txt
- PU_HYDRANTS.txt
- PU_MANHOLES.txt
- PU_STREETLIGHTS.txt
- PU_WATERLINES.txt
- ROADCL.txt
- STREET_EOP.txt



- Layers**
- sh-003.dwg Polyline
- TM-WATER.DWG Polyline
- Hydrology.dwg Polyline

- CAD data
- Assets maintained as tables
 - Must join table to separate CAD layer to see in map

Project Goals

- Convert all CAD data into Esri's Local Government Data Model
 - Including Parcel Fabric
- Set up Enterprise GIS databases and configure maintenance tools
 - Workflow Manager, Task Assistant Manager, Data Reviewer and Attribute Assistant
- Develop mapbooks with Data Driven Pages



The Project Process

Convert AutoCAD to Esri Enterprise

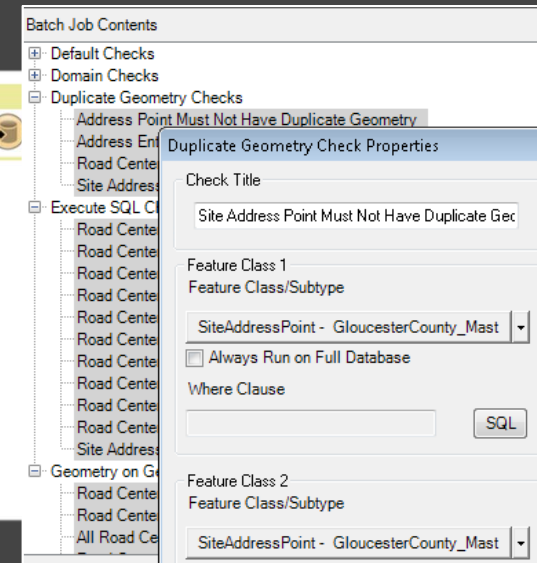
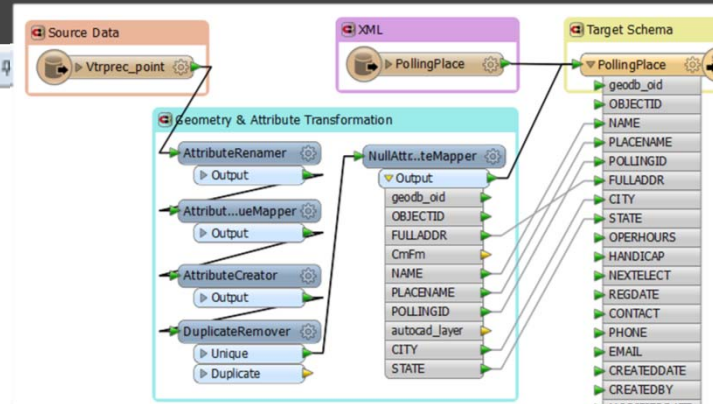
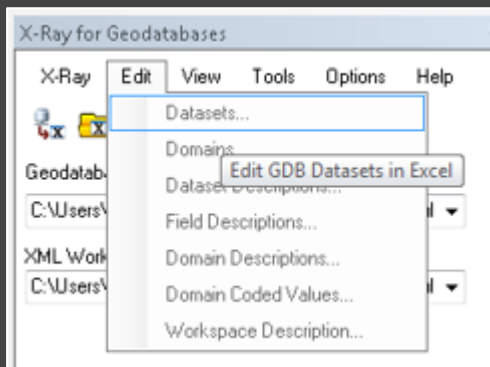
Data Model



Process Data



QAQC



Data Modeling w/ X-Ray

- Esri Add-in
- Develop, refine and document geodatabase designs

The screenshot displays the X-Ray for Geodatabases interface. On the left, a metadata table provides details for a feature class named 'SiteAddressPoint'. The table includes fields such as FeatureClassName, DatasetType, Description, FeatureDataset, Tags, ShapeType, FeatureType, AliasName, HasM, HasZ, SubtypeFieldName, DefaultSubtype, and DSID. Below this, a detailed 'Fields' table lists attributes like SITEADDID, ADDRPTKEY, PREADDRNUM, ADDRNUMSUF, ADDRNUM, ADDRRRANGE, UNITYTYPE, UNITID, ALTUNITYTYPE, and ALTUNITID, along with their data types, lengths, and descriptions.

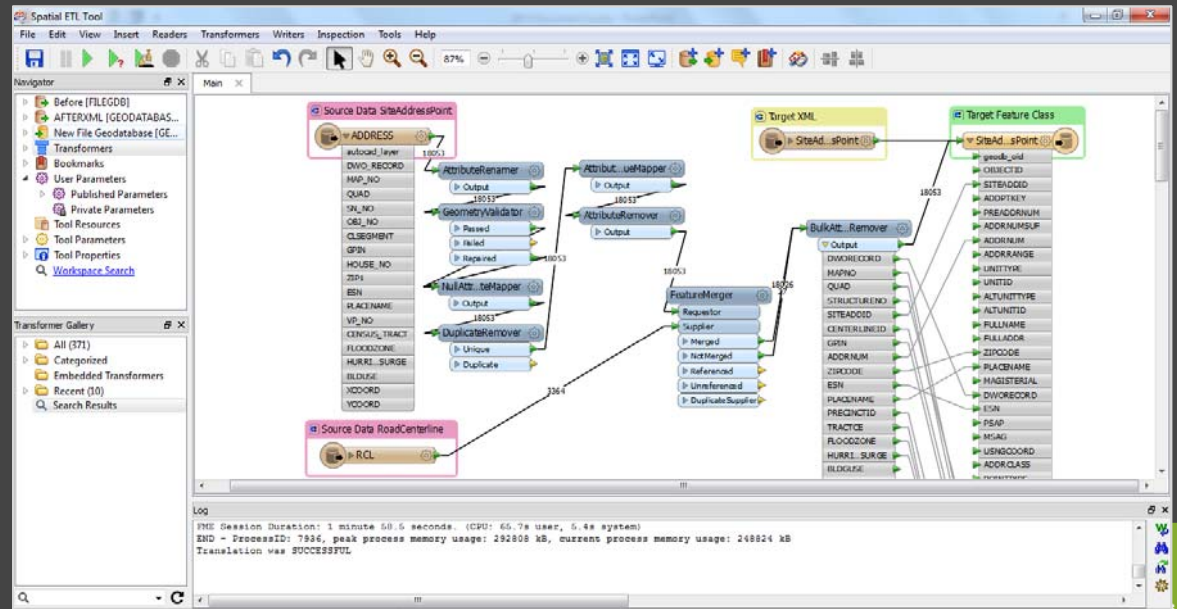
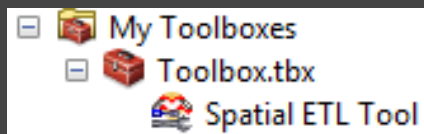
The central window shows the 'X-Ray for Geodatabases' application with a menu open for 'XRayTools.tbx'. The menu options include 'Import Using Geoprocessing', 'Reorder Fields', 'Reorder Fields (No Validation)', 'Replace Field', and 'Replace Field (No Validation)'. The interface also shows the current geodatabase path as 'C:\LocalGovernment.gdb' and the XML workspace document as 'C:\LocalGovernment.xml'.

On the right side, a list of geodatabases is displayed, including Address, AdministrativeArea, BMP, ElectionAdministration, EmergencyOperations, FacilitiesStreets, InfrastructureOperations, LandUsePlanning, ParcelEditing, ParcelPublishing, ReferenceData, SewerStormwater, WaterDistribution, DynamicValue, GenerateId, MasterStreetName, PostalAddress, and TaxParcelCondo.

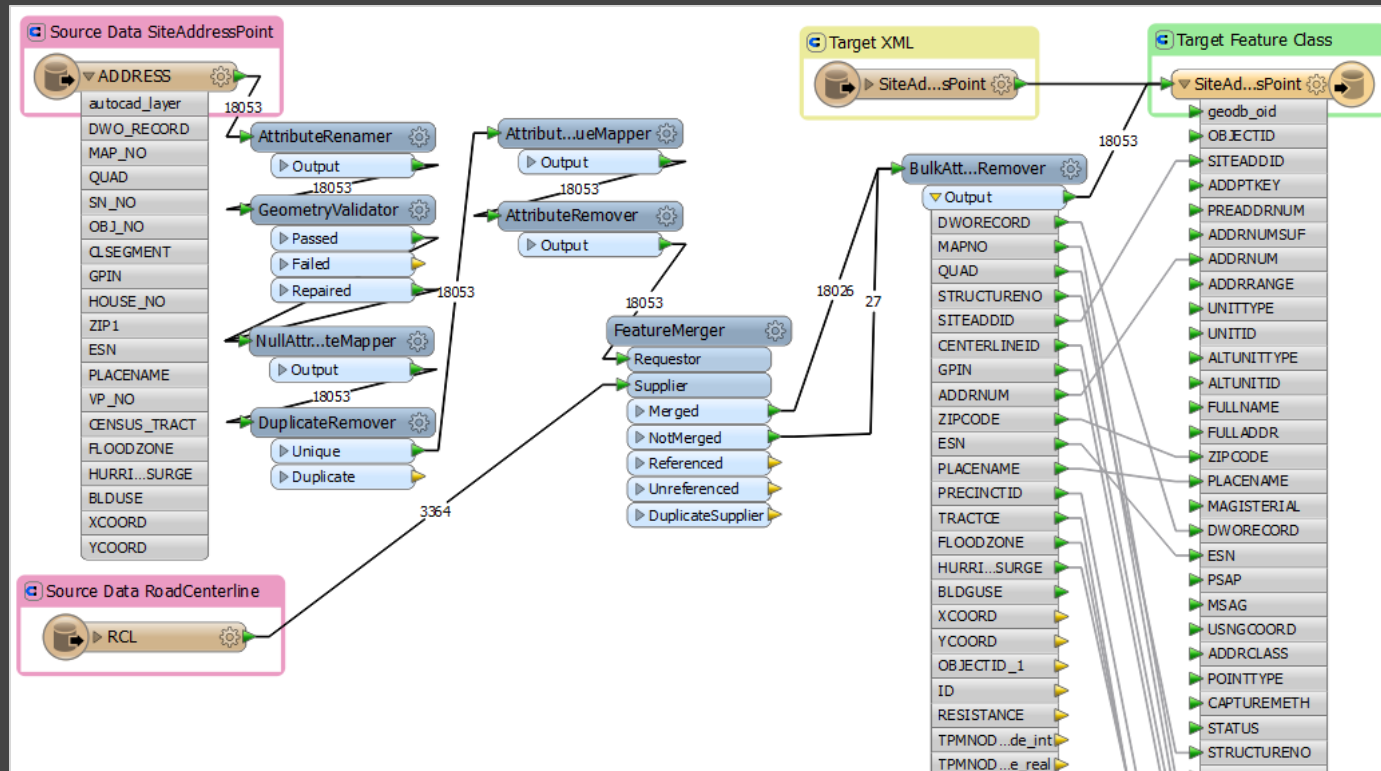
FieldName	Type	Length	Description	AliasName	DomainName	DefaultValue	IsNullable	Precision	Scale	Required
SITEADDID	String	20	Locally assigned site address point identifier	Site Address ID	null	null	true	0	0	null
ADDRPTKEY	String	20	Unique address point identifier - Foreign Key	Address Point ID	null	null	true	0	0	null
PREADDRNUM	String	5	The address number prefix	Address Number Prefix	null	null	true	0	0	null
ADDRNUMSUF	String	5	The address number suffix	Address Number Suffix	null	null	true	0	0	null
ADDRNUM	String	20	The full address number	Full Address Number	null	null	true	0	0	null
ADDRRRANGE	String	50	Address range when a point describes a set of addresses	Address Range	null	null	true	0	0	null
UNITYTYPE	String	10	The address unit type	Address Unit Type	AddressUnitType	null	true	0	0	null
UNITID	String	10	The address unit designation	Address Unit Number	null	null	true	0	0	null
ALTUNITYTYPE	String	10	The alternate or secondary address unit type	Alternate Address Unit	AddressUnitType	null	true	0	0	null
ALTUNITID	String	10	The alternate or secondary address unit designation	Alternate Address Unit	null	null	true	0	0	null

ETL w/ Data Interoperability Extension

- Safe Software's FME (Feature Manipulation Engine)
- Extract - Transform – Load
- Simple format translations to complex transformations that restructure geometry and attributes.
- 100+ supported formats & 300+ transformers

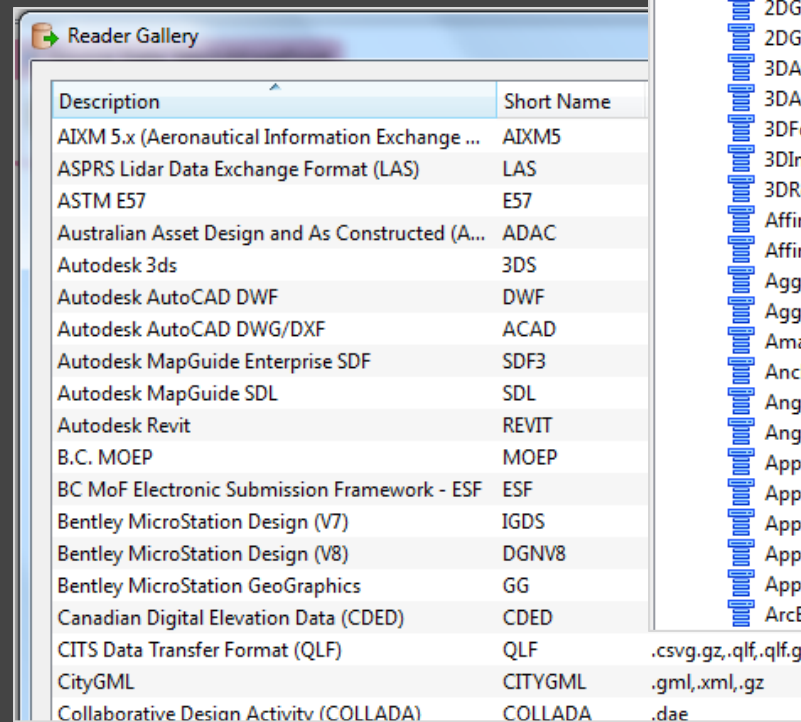


Powerful Stuff

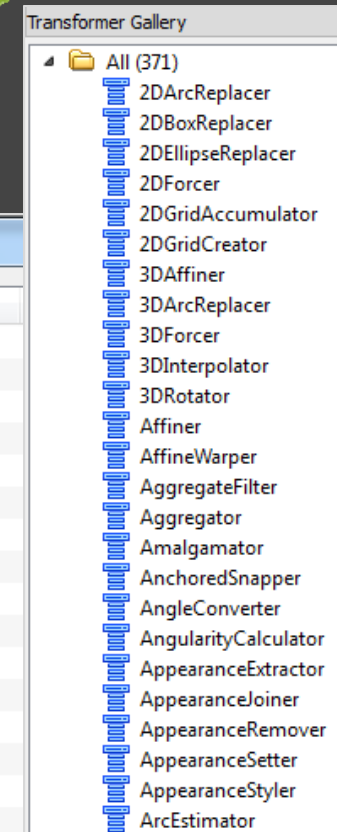


Spatial ETL Versus...

- Simple Data Loader or Append
 - Transforming Data?
- Model Builder
 - Data Formats
 - Complexity



Description	Short Name	
AIXM 5.x (Aeronautical Information Exchange ...	AIXM5	
ASPRS Lidar Data Exchange Format (LAS)	LAS	
ASTM E57	E57	
Australian Asset Design and As Constructed (A...	ADAC	
Autodesk 3ds	3DS	
Autodesk AutoCAD DWF	DWF	
Autodesk AutoCAD DWG/DXF	ACAD	
Autodesk MapGuide Enterprise SDF	SDF3	
Autodesk MapGuide SDL	SDL	
Autodesk Revit	REVIT	
B.C. MOEP	MOEP	
BC MoF Electronic Submission Framework - ESF	ESF	
Bentley MicroStation Design (V7)	IGDS	
Bentley MicroStation Design (V8)	DGNV8	
Bentley MicroStation GeoGraphics	GG	
Canadian Digital Elevation Data (CDED)	CDED	
CITS Data Transfer Format (QLF)	QLF	.csvg.gz,.qlf,.qlf.gz
CityGML	CITYGML	.gml,.xml,.gz
Collaborative Design Activitv (COLLADA)	COLLADA	.dae



Transformer Name
2DArcReplacer
2DBoxReplacer
2DEllipseReplacer
2DForcer
2DGridAccumulator
2DGridCreator
3DAffiner
3DArcReplacer
3DForcer
3DInterpolator
3DRotator
Affiner
AffineWarper
AggregateFilter
Aggregator
Amalgamator
AnchoredSnapper
AngleConverter
AngularityCalculator
AppearanceExtractor
AppearanceJoiner
AppearanceRemover
AppearanceSetter
AppearanceStyler
ArcEstimator

Quality Control w/ Data Reviewer


- Simplify QAQC
- 40+ Checks
 - Spatial checks
- Tools
 - Detect anomalies
 - Results logged in a Reviewer session

Batch Job Contents

- Execute SQL Checks
 - Facility ID of Valve is Null
 - Diameter of Valve is Null
 - Valve Type of Valve is Null
 - Currently Open Status of Valve is Null
 - Install Date of Valve is Null
- Geometry on Geometry Checks
 - Commercial Service Points not connected to Commercial Laterals
 - Domestic Service Points not connected to Domestic Laterals
 - Hydrants not connected to Hydrant Laterals
 - Diameter mismatch between Valve and Mains
 - Diameter mismatch between Valves and Laterals
 - Overlapping Water Mains
 - Overlapping Water Laterals
 - Orphan Water Valves
- Unique ID Check
 - Water Unique ID Check
- Valency Checks
 - Reducers not connected to exactly 2 pipes
 - Reducers connected to 2 pipes of same size
 - Missing reducers
 - Cap not connected to exactly 1 pipe
 - Missing Tees

Table Checks

Execute SQL Finds features based on a SQL query WHERE clause



Regular Expression Finds features with attribute values that violate the regular expression

FIELD	REGULAR EXPRESSION	YEAR
YEAR	(19 20)/D	1805
YEAR	(19 20)/D	1972
YEAR	(19 20)/D	2005
YEAR	(19 20)/D	200A

Table to Table Attribute Returns rows whose attributes match those of a feature class or table and/or comply with a user-defined WHERE clause comparing the attributes between feature classes and/or tables


FEATURE CLASS	OID	SCALE	SCALE
1	10,000	20,000	
2	20,000	30,000	
3	10,000	30,000	
4	30,000		

Unique ID Checks the values of a set of fields across a set of tables and feature classes for uniqueness within a given workspace


FEATURE CLASS 1	FEATURE CLASS 2
7 25	
8 18	1 36
9 18	2 21
	3 18

Polygon Checks


Evaluate Polygon Perimeter and Area Searches for polygon, part, ring, or segment features whose area or perimeter is within a specified range



Invalid Hole Feature Finds features that intersect polygon feature holes



Polygon Sliver Finds polygons below a specified thinness ratio (t) and optionally whose area is within a specified threshold



POWERFUL STUFF



X-Ray

Spatial ETL

Data Reviewer



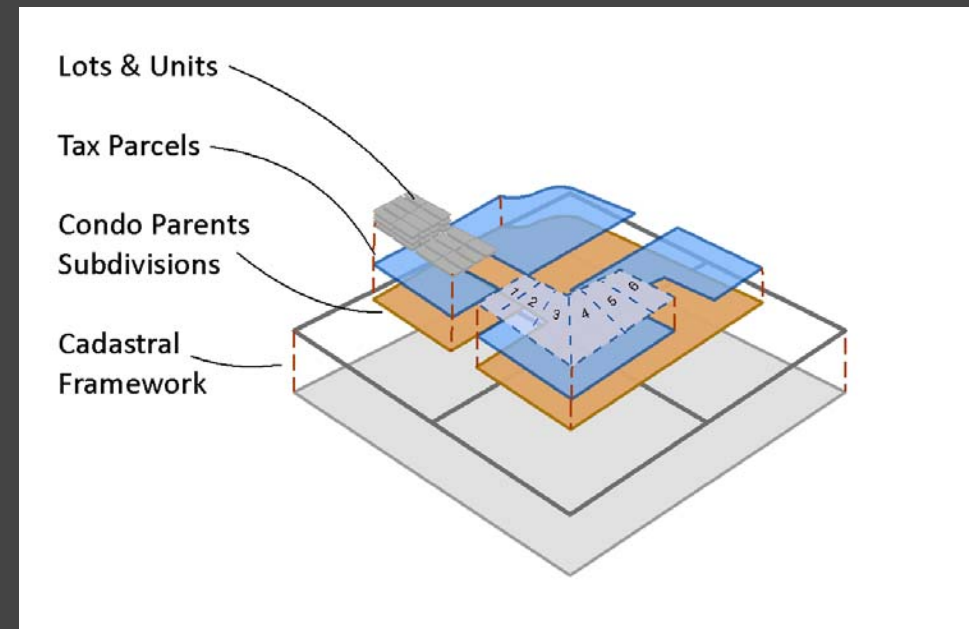
Efficient Processes

Maintains Data Integrity

Minimizes Manual Work

Parcel Fabric

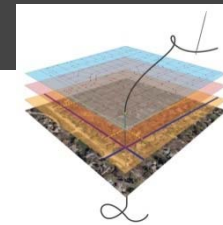
- Utilized Esri's Local Government Data Model
 - Optimized for eastern land practices
- Incorporated all land types
 - Tax and Insert Maps
 - Double Circles
 - Blocks
 - Subdivisions & Condo Parents
 - Tax Parcels
 - Right-of-Ways



Tools for Migrating

1. Understanding of Parcel Fabric
 - Start with Esri's whitepaper on parcel fabric
2. FME
 - A powerful ETL tool
3. Python – a lot of python...
 - Automates so many processes!
4. A process
 - Know which steps to do in order!

```
#####  
## Load into Parcel Fabric  
#####  
arcpy.SetProgressor("step","Loading into Parcel Fabric...",0,len(dataList),1)  
for topoFC in dataList:  
    arcpy.SetProgressorLabel("Loading into Parcel Fabric - %s"%topoFC)  
    if int(arcpy.GetCount_management(topoFC).getOutput(0)) > 0:  
        arcpy.LoadTopologyToParcelFabric_fabric(targetPF,topoFC,'','','',  
            "JOINED_GROUP","DEGREES_MINUTES_SECONDS","QUADRANT_BEARING",  
            "COMPUTE_AREA","SQUARE_US_FEET",'',"2_AFTER_1980")  
  
    arcpy.SetProgressorPosition()  
arcpy.ResetProgressor()
```



What's in store for the future of Gloucester?

About the Presenters

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Questions?

