WELCOME

2019 ESRI EUROPEAN GEOCONX CONFERENCE
Data Models, Asset Packages & Migration
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The utility network data model is designed for standardization and efficiency

- Three structure network feature classes
- Five domain network feature classes
  - One set for each commodity or segregation of commodity (transmission & distribution)
  - One feature class (SubnetLine) is system managed

Industry specific data models are best practice structure network and domain network template modeling configurations for defined commodities

- Six defined commodities
  - Electric - transmission & distribution
  - Gas - gathering, transmission & distribution
  - Sewer
  - Stormwater
  - Water - transmission & distribution
  - Telecommunications (coming in 2020)
Data Models

Business benefits for Esri industry models
- Vetted with core functionality
- Support merging multiple domain models

Other modeling considerations for your industry
- Business partner models
  - Supports partner tools and functions
  - Pre-defined integrations fields
- Consortium models
  - Regionalized
  - Community consensus
  - Standardized approach
- Custom develop your own
  - Considerable configuration
    - Defining asset groups / asset types
    - Define connectivity rules
  - More costly
  - Slower to production
Utility Network Industry Configurations

- Recommended starting place
  - Fully usable out of the box
  - Not intended to be all encompassing
  - Extend as necessary to fit your needs
- Each configuration includes a data model, maps, instructions, and workflows
- No cost and supported, like all ArcGIS Solutions
**Asset Package**

A file geodatabase used to move data, schema, rules, and utility network properties to and from a utility network

- Best practices modeling of asset groups / asset types
- Intended to be extended / modified for your utility’s requirements

Contains a foundational data model

- Domain feature classes
- Subtypes and domains
- Subnetwork configurations with tiers
- Network rules
- Network configurations
- Sample data
## Modifying Model and Configuration Components

<table>
<thead>
<tr>
<th>Action</th>
<th>Asset Package</th>
<th>Utility Network</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add Asset Groups and Asset Types</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Remove Asset Groups or Asset Types</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Remove Subnetwork Definition</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Add Subnetwork Definition</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Change order of tiers</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Add network attribute</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Add user attribute</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Add network category</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Remove network category</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>
Utility Network Solution Tools

Include the following:

- **Utility Network Package Tools**
  - Python toolbox to automate the creation and configuration of a utility network

- **Utility Network Configuration**
  - Complete asset package
  - Maps for publishing and editing

- **Data Modeling Tools** (undocumented)
  - Rules matrix tool
  - Data dictionary tool
  - Rename table
Data Migration
Strategy and Tools
Determine a Migration Pattern

- **Where are you going and do you have the data to support getting there?**
  - **Simple** - data migrated in its current form from the geometric network
  - **Basic** - includes modeling and representing the real world to support better analytics within and outside the GIS
  - **Advanced** - a step beyond basic to support planning, design and extended modeling within the GIS

Do you want to here (simple)?

Or here (advanced)?
Pre-Migration

- Prepare Source Data
  - QC the Data
  - Resolve inconsistent Unit Records
  - Resolve Poor Data Integrity
  - Assets Located in Polygon Containers
    - Service Territory
    - Substation

Basic Integrity
- Attributes
  - Null Values (existing required fields)
  - Relationship Class
  - Unique ID
  - Subtype Checks
  - Domain Check
    - Geometry
      - Invalid Geometry
      - Multipart Lines
      - Short Segments
      - Self Intersecting Lines

Spatial Integrity
- Geometry
  - Duplicate Lines & Devices
  - Overlapping Lines
  - Disconnected Lines & Devices
  - Features outside service area

Tracing Integrity
- Connectivity
  - Disconnected Lines & Devices
  - Missing Devices
    - Transformer
    - Regulator
    - Pumps

Learn the Target Asset Package
- Data Schema
  - Feature Classes
  - Asset Groups / Asset Types
  - Domains
  - Attributes
- Rules
- Associations

Know the Source Data
- Feature Classes
- Domains
- Subtypes
- Attributes
- Annotation Classes
- Relationship Classes
UN Migration Strategies

One time cutover
- Requires extensive piloting
- Risks include change management and data quality

Parallel deployment
- Maintaining 2 systems
- Enable long event horizon for data conversion/cleanup

Extra complexity requires specialized tools
- Safe Software FME / Esri Data Interoperability Extension
- SSP, Similix, Avineon, RMSI, UDC, Power Engineers, RAMTeCH, and several other partners

All strategies benefit from early piloting and data quality!
What is Needed?

• **ArcGIS Data Interoperability Extension**
  - ArcGIS Pro 2.3.2
  - Safe Software FME 2017.1.1.0 build 17650

• **Python setup**
  - Python environment
  - Solution deployment tool
  - Utility network solutions tools

• **Solutions**
  - Domain specific asset package(s)
  - Domain specific utility network workbench template(s)

• **Skilled Operator**
  - FME and Python experience
  - Knowledge of platform functionality and UN configuration
  - Patience
Migration Process Overview

ArcGIS Data Interoperability Extension

Geometric Network Geodatabase

Source / Target Schema Mapping
- Asset Group / Asset Type
- Attributes
- Domains

Update Reader & Writer
- Point to Source Data
- Updated Asset Package
- Connect Translators

Migrated Asset Package & QA/QC
- Staging Database
- Validation Python Script

Domain Specific Asset Package

Load

Utility Network

Utility Network Migration Tools
Workbench Input Parameters

Source Features
- Existing Geodatabase

Schema Mapper File (Microsoft Excel)
- Asset Group / Asset Type Mapping
- Attribute Mapping
- Domain Mapping

FME Workbench
- Expect to modify this

Assembly Builder (Basic Representations Only)
- XML

Asset Package
- Used as template
- Preconfigured with changes
UN Migration Strategies

Esri Whitepaper on Data Migration Strategy*
- High level description
  - General QC errors and remediation
  - Tool references

- Non-linear process
  - QC happens in multiple places
  - Leverage built in validation at various stages

- End-to-End migration steps and strategies
  - From real-world examples

*To be released soon