

Understanding the Impact and Value of Esri's Utility Network for Network Management

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Esri GeoConX 2017



Presentation Outline

Pasadena Water and Power

- Electric System
- GIS

Esri's Utility Network

- Technology Impact and Value
- Business Impact and Value

Proof of Concept

- Scope and Objectives
- Findings so far
- Upcoming Webinar



Pasadena Water and Power

- **City of Pasadena**

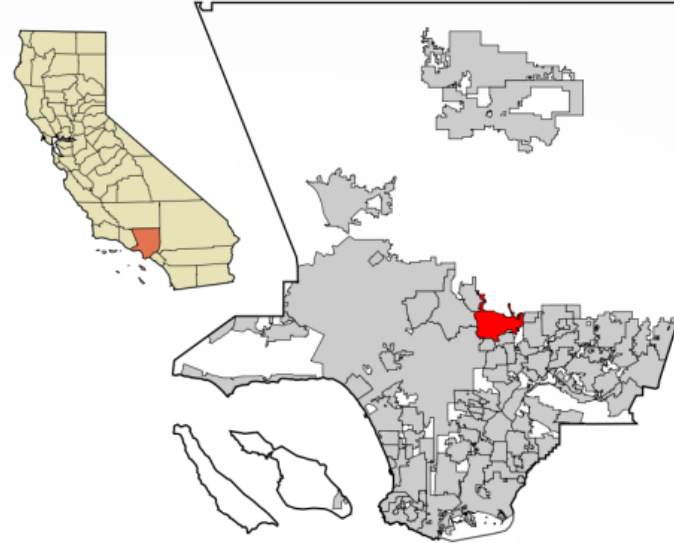
- Incorporated 1886
- 23 square miles
- Los Angeles County
- 142,059 Residents

- **Power System**

- 169 Circuits (34 kV, 17 kV, 4kV)
 - 8,294 Transformers
 - 1,652 Switches
 - 1,672 miles of Conductor
 - 771 miles of Conduit
 - 11,155 Poles
- Load (370 mW Peak)
 - 66,026 Customers

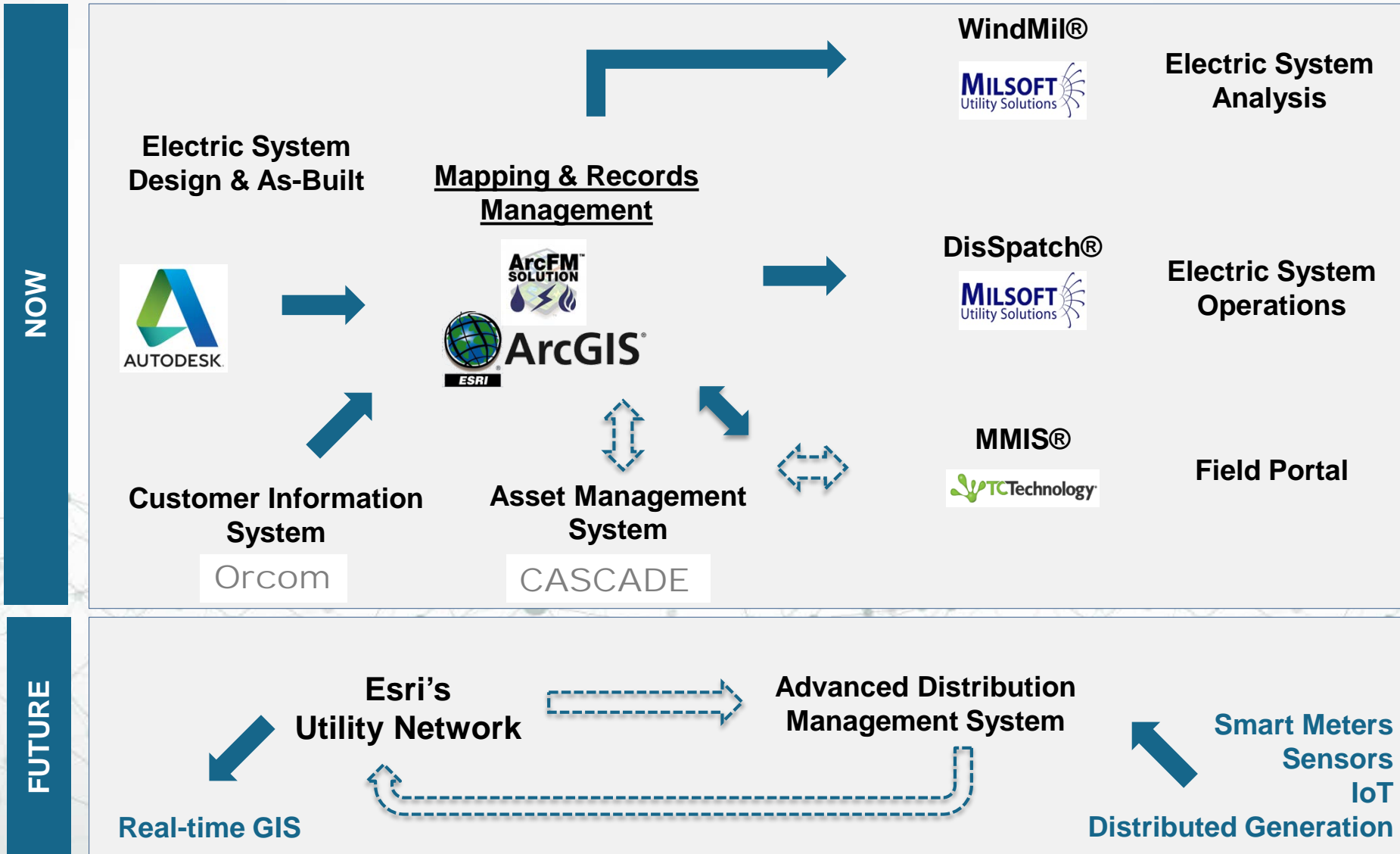
- **GIS**

- 50 Power Users (Desktop and Web)



Mike Chiasson
GIS Coordinator

GIS's Role at PWP

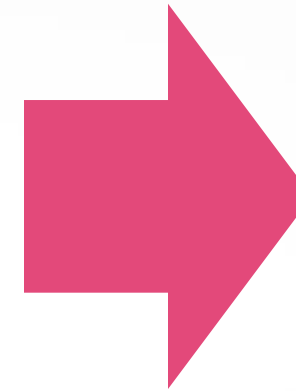


Esri's Utility Network



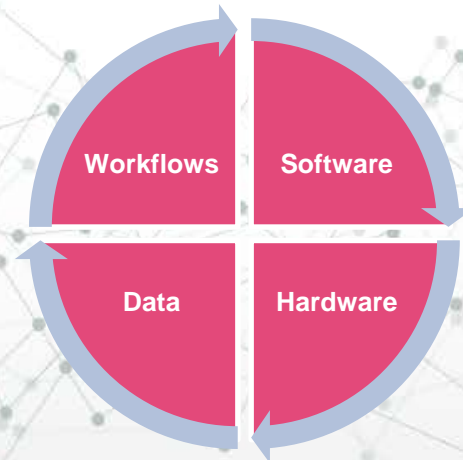
- Data Integrity
- Higher performance
 - Advanced analysis of network
 - Modeling all components of the system
 - Comprehensive views of the network
- Representing dense areas
- Robustness

Measurable
Value



Customers
Investors
Employees

System of Record
System of Engagement



System of Insights
System of Actuation

Impact

Esri Utility Network

- **Business Impact and Value**

- **Typical GIS End User in the Field and Office**

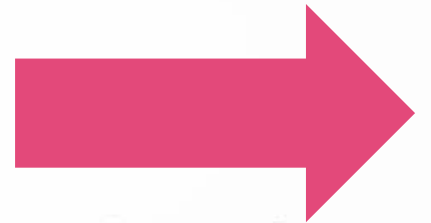
Web access to all GIS functionality	⇒	Device agnostic access
3D Maps and Diagrams will detail and connectivity	⇒	Less number of field trips
Historical and Real-time Web Maps	⇒	Fully transition to self-service
Advanced Network Analysis within GIS	⇒	Structural, Electrical, Environmental

- **GIS Editors and Data Administrators**

Transition to ArcGIS Pro	⇒	Change in editing practices
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- **IT Support Personnel**

More out-of-the box functionality	⇒	Less dependency on third-party
Reduced customization and integration efforts	⇒	Lower cost-of-ownership



Measurable
Business
Outcomes

Utility Network: Proof of Concept

Scope

- Washington Circuit (17kv)
 - Sierra Bonita Circuit (4kv)
- 15k Features

Step down Circuits

Objectives

- **Gain a better understanding**

- **Data**

- Model Changes
- Level of Detail
- Migration Preparation

- **Software Functionality**

- Data Editing | Data Analysis
- Electrical Tracing
- Feeder Manager | Conduit Manager
- Data Exchange

Start Evaluating Choices
Change Data Editing Practices

Redefine GIS Value Proposition
Prioritization of GIS Improvements

Proof of Concept: Data Model, Data, and Functionality

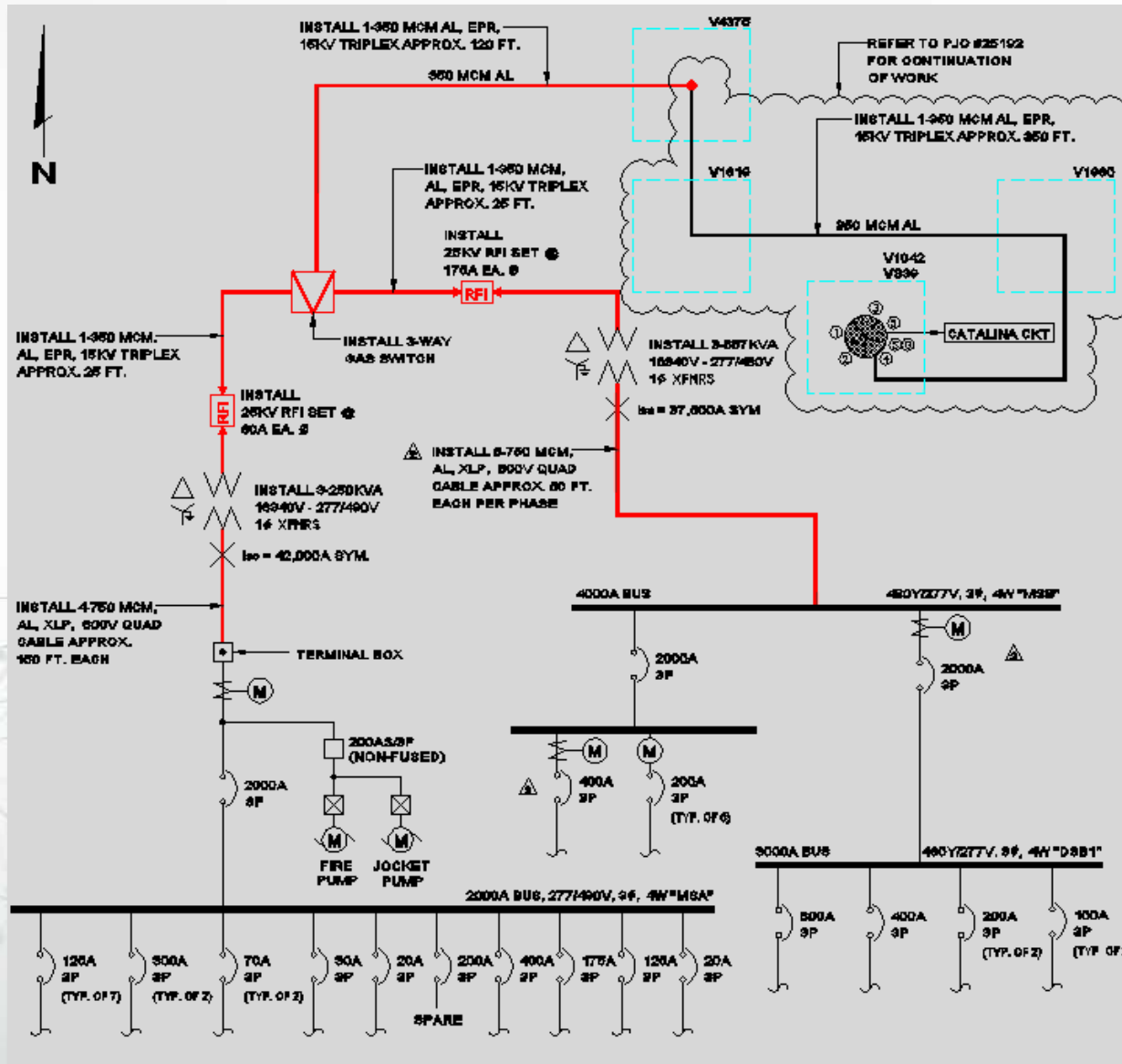
1. **Feature Classes** ⇒ **Asset Groups/Types**
2. **Object Classes** ⇒ **Asset Groups/Type**
3. **Domains** ⇒ **Domains and Asset Type Domains**
4. **Fields** ⇒ **Keep | Drop | Merge | Add**
5. **Relationships**
 - ⇒ Relationships
 - ⇒ Associations (Connectivity, Structural, Container)
6. **Current 2D Map and Schematics**
 - ⇒ Future 2D Map, 2D Content, 2D Diagram
 - ⇒ Future 3D Map
7. **ArcFM Configurations** ⇒ **ArcGIS Pro/ ArcFM XI**
 - ⇒ Stored Displays, Snapping Rules, Auto Updaters, QA/QC Rules
 - ⇒ Feeder Manager
 - ⇒ Conduit Manager

**Choices &
Decisions**



**Impact &
Value**

Proof of Concept: Enhancing Connectivity in GIS



Transformer Vault

- Transformer
- Primary/Service Conduits
- Bus and Air Duct
- Thermostat Switch
- Vault Lights
- Disconnect Switch
- Pumps
- Manual Starter
- Blower
- Enclosure Drain
- Grounding Rods
- Manhole Opening
- Vault Cover
- Terminal Box

Esri Utility Network

- 2D Map
- 2D Container
- 2D Diagram
- 3D Map

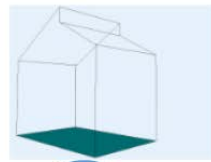
Impact & Value

Proof of Concept: Details to model, view, and analyze in GIS

Example CityGML



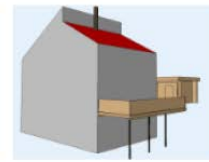
Real Building



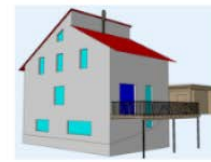
CityGML LOD0



CityGML LOD1



CityGML LOD2



CityGML LOD3

Level of Detail (LOD)	2D/3D Utility Network		
	Structures	Devices	Lines
LOD 0 (Horizontal Footprint)	↓	↓	↓
LOD 1 (Vertical)			
LOD 2 (Outer Surfaces)			
LOD 3 (Detailed Outer Surface)			
LOD 4 (Interior)			

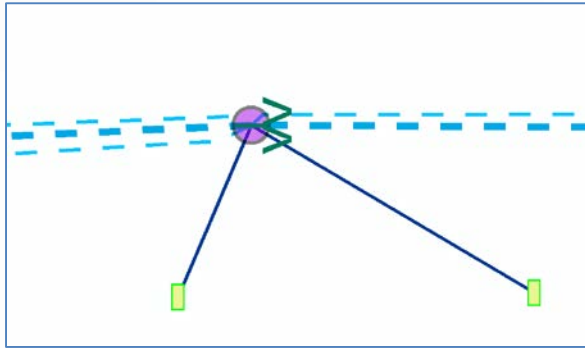
Distributed Energy Resources (DER), Internet of Things (IoT), Augmented Reality (AR)

- How much detail and connectivity to capture and view in GIS?
 - 2D Map | 2D Container | 2D Diagram | 3D Map

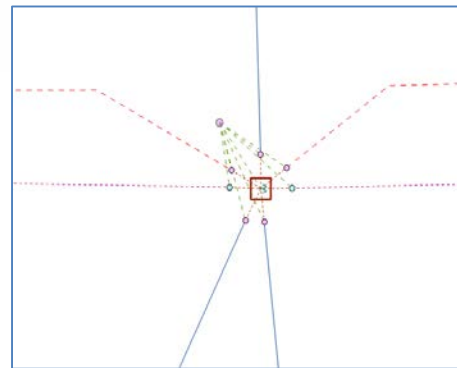
Proof of Concept: Modeling Electric System in GIS

Migrating to Utility Network – Above Ground

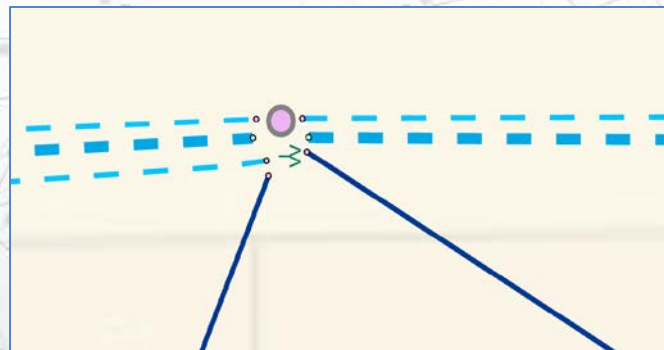
Now



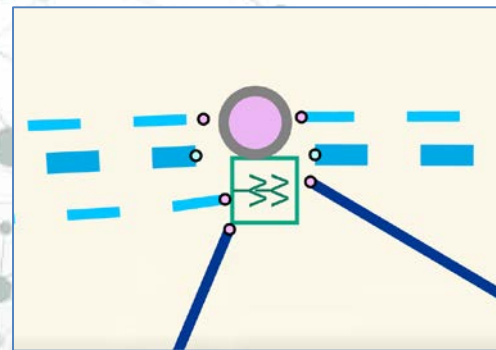
Utility Network



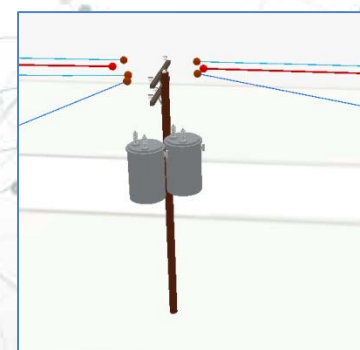
Pole with two
Transformer Units and
Services



2D Map View



2D Map Container View

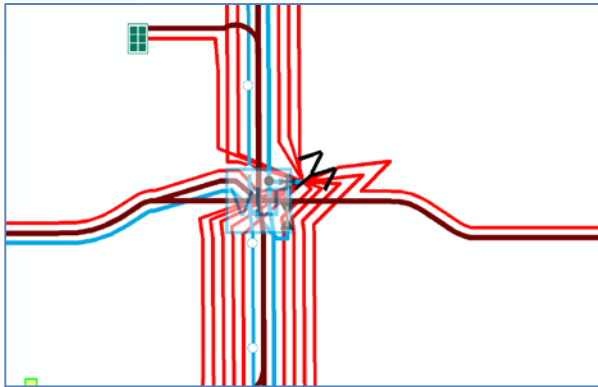


3D Map View

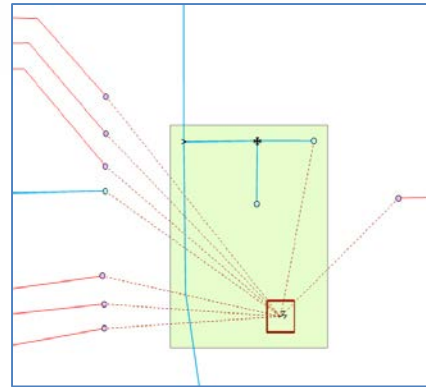
Proof of Concept: Modeling Electric System in GIS

Migrating to Utility Network – Below Ground

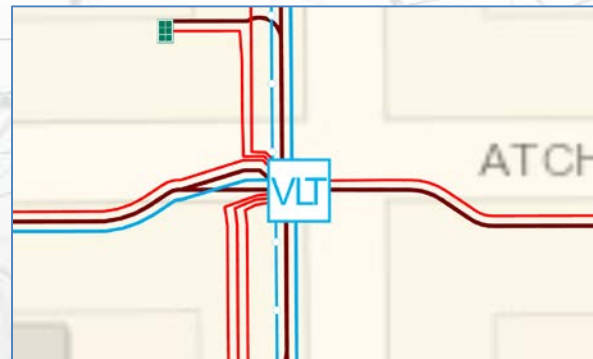
Now



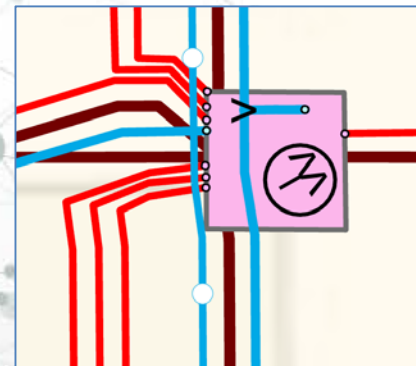
Utility Network



Vault with Transformer,
Switch and Services



2D Map View

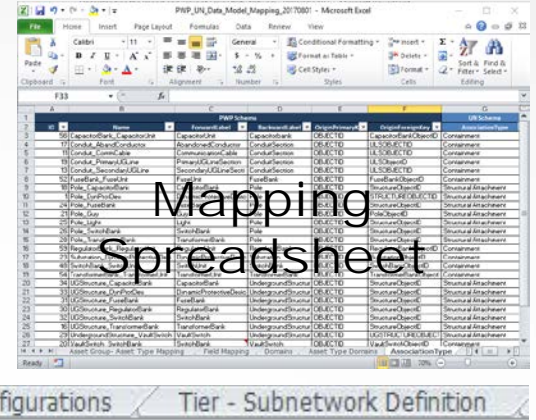


2D Map Container View

Proof of Concept: Findings So Far

- Data Model**

- Around 80% Reduction in Feature Classes
- Around 50% Reduction in Object Classes
- Around 50% Conversion of Relationships to Associations

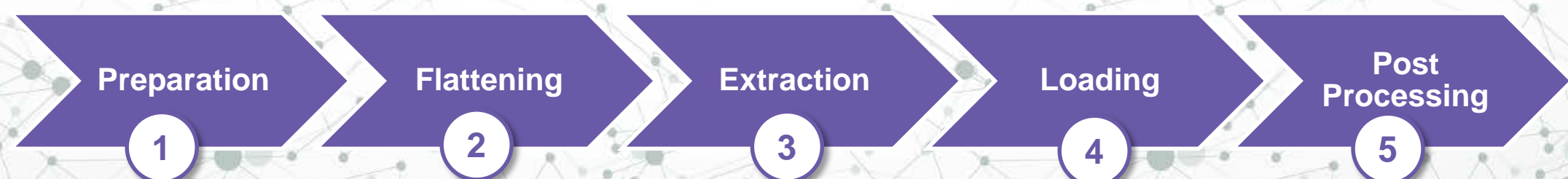


Mapping Spreadsheet

Name	Asset Group	Asset Type	Mapping	Object Class	Association	URB Scheme
101 CapacitorBank	CapacitorBank	CapacitorBank	OBJECTID	OBJECTID	CONNECTION	CONNECTION
102 CapacitorBank	CapacitorBank	CapacitorBank	OBJECTID	OBJECTID	CONNECTION	CONNECTION
103 CapacitorBank	CapacitorBank	CapacitorBank	OBJECTID	OBJECTID	CONNECTION	CONNECTION
104 CapacitorBank	CapacitorBank	CapacitorBank	OBJECTID	OBJECTID	CONNECTION	CONNECTION
105 CapacitorBank	CapacitorBank	CapacitorBank	OBJECTID	OBJECTID	CONNECTION	CONNECTION
106 CapacitorBank	CapacitorBank	CapacitorBank	OBJECTID	OBJECTID	CONNECTION	CONNECTION
107 CapacitorBank	CapacitorBank	CapacitorBank	OBJECTID	OBJECTID	CONNECTION	CONNECTION
108 CapacitorBank	CapacitorBank	CapacitorBank	OBJECTID	OBJECTID	CONNECTION	CONNECTION
109 CapacitorBank	CapacitorBank	CapacitorBank	OBJECTID	OBJECTID	CONNECTION	CONNECTION
110 CapacitorBank	CapacitorBank	CapacitorBank	OBJECTID	OBJECTID	CONNECTION	CONNECTION
111 CapacitorBank	CapacitorBank	CapacitorBank	OBJECTID	OBJECTID	CONNECTION	CONNECTION
112 CapacitorBank	CapacitorBank	CapacitorBank	OBJECTID	OBJECTID	CONNECTION	CONNECTION
113 CapacitorBank	CapacitorBank	CapacitorBank	OBJECTID	OBJECTID	CONNECTION	CONNECTION
114 CapacitorBank	CapacitorBank	CapacitorBank	OBJECTID	OBJECTID	CONNECTION	CONNECTION
115 CapacitorBank	CapacitorBank	CapacitorBank	OBJECTID	OBJECTID	CONNECTION	CONNECTION
116 CapacitorBank	CapacitorBank	CapacitorBank	OBJECTID	OBJECTID	CONNECTION	CONNECTION
117 CapacitorBank	CapacitorBank	CapacitorBank	OBJECTID	OBJECTID	CONNECTION	CONNECTION
118 CapacitorBank	CapacitorBank	CapacitorBank	OBJECTID	OBJECTID	CONNECTION	CONNECTION
119 CapacitorBank	CapacitorBank	CapacitorBank	OBJECTID	OBJECTID	CONNECTION	CONNECTION
120 CapacitorBank	CapacitorBank	CapacitorBank	OBJECTID	OBJECTID	CONNECTION	CONNECTION
121 CapacitorBank	CapacitorBank	CapacitorBank	OBJECTID	OBJECTID	CONNECTION	CONNECTION
122 CapacitorBank	CapacitorBank	CapacitorBank	OBJECTID	OBJECTID	CONNECTION	CONNECTION
123 CapacitorBank	CapacitorBank	CapacitorBank	OBJECTID	OBJECTID	CONNECTION	CONNECTION
124 CapacitorBank	CapacitorBank	CapacitorBank	OBJECTID	OBJECTID	CONNECTION	CONNECTION
125 CapacitorBank	CapacitorBank	CapacitorBank	OBJECTID	OBJECTID	CONNECTION	CONNECTION
126 CapacitorBank	CapacitorBank	CapacitorBank	OBJECTID	OBJECTID	CONNECTION	CONNECTION
127 CapacitorBank	CapacitorBank	CapacitorBank	OBJECTID	OBJECTID	CONNECTION	CONNECTION
128 CapacitorBank	CapacitorBank	CapacitorBank	OBJECTID	OBJECTID	CONNECTION	CONNECTION
129 CapacitorBank	CapacitorBank	CapacitorBank	OBJECTID	OBJECTID	CONNECTION	CONNECTION
130 CapacitorBank	CapacitorBank	CapacitorBank	OBJECTID	OBJECTID	CONNECTION	CONNECTION

- Data Migration**

- At least 25% Increase in Content and Details and 40% Increase in Spatial Features
- Process (~60% Automated Tools, 20% Semi-Automated/Manual, 20% YTD*)



- Software Functionality**

* Based on Jun 2017 Utility Network Beta Release

Upcoming Webinar: 1 Hour



Mike Chiasson
GIS Coordinator

- **Utility Network Proof of Concept**

- Live Demonstration (ArcGIS Pro and Utility Network Portal Widgets)
- Comprehensive Findings List
 - Data Model
 - Data
 - Software Functionality
- Opportunities and Risks
- Recommendations
 - Short and Long Term
- Preparations
- Next Steps

Tuesday
November 14, 2017
10:00 AM Pacific

