Realizing New Possibilities
The Utility Network at Duquesne Light

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Duquesne Light Company

- Located in Pittsburgh, PA
- Investing $2.9B in infrastructure and technology
- 817 square miles in Allegheny and Beaver counties
- 175 Company Owned Substations
- 650 Distribution and Sub-Transmission Feeders
  - 4kV – Distribution
  - 23kV – Distribution & Sub-Transmission
- 600,000 Electric Customers
- Over 1,500 full time employees
- Current GIS group – 5 Technicians/5 GIS Analysts
Current State of DLC GIS

Ad-Hoc GIS System

- Regulated Inspections
  - 1 SDE Instance and Hosted Data
    (ArcGIS Collector & Survey 123)
  - Annually
    - 18,000 Pole Inspections
  - 15% of our at or below grade Transformers
  - 15% of our Manholes
  - Downtown Network Inspections
  - 20% Overhead Primary Circuits

- Point and Line Asset Data
  - 3 SDE Instances
    (Managed in ArcMap)
  - 30,000+ Poles
  - 20,000+ Below Grade Transformers
  - 4,000+ Switchable Devices
  - 75% of Overhead Primary Distribution Line Locations
  - Overhead Transmission Facilities
  - Underground Transmission Facilities
  - Third Party Attachment Data

- Portal for ArcGIS
  - Visualization for Point and Line Asset Data
  - Enable business workflows
  - Vehicle electrification
  - Landslide aggregation & Analysis
  - Engineering Transmission facilities risk mitigation study
  - Smart meter antenna connectivity Analysis

ArcGIS Enterprise 10.5.1 System – Over 470 Users
System Silos – Current State of mapping at DLC

Human Glue

- Ad-Hoc GIS Data Model
  - No Connectivity or Rules
- 10 Types of AutoCAD Maps
  - All Non-spatial in nature
- Construction Drawings
  - Non-Spatial in nature
- No Secondary or Service Mapped
  - Customer to Transformer
  - Relationship unknown
- Sub Optimal
  - As-built\As Designed
  - Mapping process

Isolated Systems

- Oracle CC&B
  - Customer Information System
- Oracle WAM
  - Work Management System
  - (Asset component not used)
- Oracle Primavera P6
  - Construction Scheduling
- IBM Maximo
  - Work, Asset and Scheduling

Sept ‘19
ADMS Program

Advanced Distribution Management System – 6 Projects

Distribution SCADA
(Holistic SCADA)

Electrical Model

Engineering Design

Outage Management

Field Survey

Distribution Management
Decision to Adopt the Utility Network

Partnering with Schneider on the Journey

Utility Network Risks

- Product maturity
- No Electric Production Implementations
- ArcFM Suite maturity
- Placing DLC on the “Bleeding Edge” and not being a preferred “Fast Follower”
- Downstream projects would not have mature integrations developed against the UN

Utility Network Reward

- No initial GN Data Model or Data
- ESRI Product Influencer
- ArcFM Suite product influencer
- No data migration project
- ESRI projecting 20+ years of development for Utility Network
- Systems integrations which will not have to migrate
Implementation

The UN at Duquesne Light Company
The Journey So Far…

System Architecture
- ArcGIS Enterprise, Utility Network, ArcFM XI Ecosystem
- DLC IT Standards, Enterprise Systems and In-flight projects

Data Model
- Core Team Training
- Data Model Workshops & model iterations

Implementation
- Business & Technical Workshops
- Establish Non-Prod & Prod Environments

Support Distribution Field Inventory
- Prepare Surveys, Redlines for QA of Field Inventory
- Data Load and Validation of Asset Packages

Integrations
- Deployed Document Management System Integration
- CC&B, Maximo Integrations past Design stage-gate
Solution Overview

• GIS Editing Solution
  - ArcGIS Pro w/ ArcFM Editor XI
  - ArcGIS Enterprise based Authentication

• Field Mobility Solution
  - ArcFM Mobile XI
  - ArcGIS Runtime App
  - ArcFM XI SSO
  - ArcGIS Enterprise based Auth
  - Survey123 Integration
Solution Overview

- **Web Viewer**
  - ArcFM Web XI
    - ArcGIS JavaScript based
    - ArcGIS Enterprise based Auth

- **Integrations**
  - Duquesne Light Azure Service Bus
  - ArcFM XI Job Services Framework

- **GIS Administration Interface**
  - ArcGIS Enterprise
  - ArcFM XI Solution Center
Utility Network Data Model

- **Core team Training**
  - Familiarize Team with UN & ArcFM XI
  - Hand-On using Azure based ArcFM EXI Training

- **Data Model**
  - Spreadsheet based Business Review
  - Asset Package Generator
  - Defined additional Asset Groups/Type for
    - OH/UG facilities
    - Substation Internals
  - Defined per Circuit Subnetwork Summaries for
    - Conductors (OH/UG)
    - Customer Count & Load
    - Transformer kVA
Map Products

Circuit Map

Duquesne Light Company

East End Substation

Substation Layout

Not To Scale

Sheet 1 of 1

180 N. Beatty St. Pittsburgh, PA
Support Distribution Field Inventory
Field Surveys and Redlines

- Identify at Asset Group Level
- Select Survey
- Launch Integrated Survey123
- Automated Field population
Support Distribution Field Inventory

Redlines – From Field to Enterprise

- **Field Redlines**
  - Captured offline/connected mode using ArcFM Mobile XI built in ArcGIS Runtime
  - Synced when connected

- **Enterprise Redline Workflow**
  - Available in ArcFM Editor XI Redline pane for GIS Editor built in ArcGIS Pro
  - Task completion provides automated In-App notification to field user
Map Display across Applications
GIS Integrations

Map Products based on Circuit change detection

Managing customer to transformer relationship
- CIS integration to place & manage service point installation and removals

Maximo & Maximo Spatial integration
- Utilize ArcFM XI Session Manager for Maximo initiated work
- Provide UN data within Maximo Spatial
GIS Integrations

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Maximo & Maximo Spatial integration
  - Utilize ArcFM XI Session manager for Maximo initiated work
  - Provide UN data within Maximo Spatial
**Identified Benefits**

**ArcGIS Pro w/ ArcFM Editor XI deployment**
- Maintain data model
- Automated map products based on updates to the UN

**ArcFM Mobile XI deployment**
- Perform QA of field inventory
- Support Operations field activities

**ArcFM Web XI deployment**
- Support Back Office & Operations activities

**Automated App Updates**
- New features, Enhancements and Bug fixes (e.g. Vector TPK Support, App Integrations)

**Future Enhancements**
- Underground Duct management
- Offline Tracing
- Web Tracing
Looking Ahead

- Upgrades
  - ArcGIS Enterprise 10.7.x
  - ArcGIS Pro 2.4
  - ArcFM Editor XI
  - Implement ArcFM XI Session Manager

- Deploy Integrations
  - Maximo Integration
  - CC&B Integration
  - ADMS Integration?

- Support Field Inventory work
  - Load 600+ Circuits in the Utility Network model
Questions?