Managing Massive Updates

*Using GIS to Fuel Gas Compliance*

Esri User Conference 2015

EXECUTION 2015

NIPSCO

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Managing Massive Updates – Using GIS to Fuel Gas Compliance

Agenda

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**Introductions**

**Jill Gehrig | NIPSCO**
- Leader of Maps & Records
- PM for the Data Mining Gas Asset Integrity & Pipeline Safety Project
- 39 Years of experience in gas and electric utility industry
- Involved with NIPSCO mapping from Linens to Esri ArcGIS / ArcFM

**Skye Perry | SSP Innovations**
- Founder & Principal Consultant
- Esri & Schneider Electric Technical Architect
- Began work with NIPSCO in 2004
- NIPSCO was SSP’s Founding Customer
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### Business Drivers

**Project Objectives**

- Reduce excavation damage driven from incomplete records information
- Achieve continual and sustainable improvement in the quality and content of gas system condition and performance data used for integrity decision making

**Project Approach**

- Establish a data collection, storage and retrieval framework that defines GIS and Maximo as the primary “Sources of Truth”
- Define the key data element required to fulfill the project objectives
- Migrate existing paper records and disparate data sources to the GIS/MAXIMO framework
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Project Background

The following steps were completed in 2014:

• Initial Planning and Scoping Effort
• Source Data Matrix
• Data Model Changes in Test Environment (GIS)
• Conversion Specification
• GIS Sessions Cleanup
• GIS Transmission Main Centerline Rectification
• Selection of Data Vendor to Digitize Data from Linens into GIS for entire service territory
### Data Vendor will apply edits to the following GIS record types:

- Gas Main Locations
- Abandoned Gas Main Locations
- Controllable Fittings
- Non Controllable Fittings
- Drips
- Gas Valves
- Pipe Changes (based on WO/Material/etc.)
- Regulator Stations
- Vertical Pipe (aka Risers)

- Dimensions
- Foreign Utility Lines
- Gas Main
- Gas Pipe Casings
- Service Lines
- Crossings
- CP Circuits
- Excess Flow Valves
- Various Relationships between features
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Data Vendor will create up to 20 versions per Month

- Working in a copy of the NIPSCO geodatabase
- Up to 40 Data Vendor editors in India
- Desire to work without ArcFM
- Expected Duration of ~30 months
- Deliveries back to NIPSCO each month
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**Business Challenges**

*High Volume of External Data Vendor Edits* + *High Volume of Ongoing Internal Edits*
- Production Updates Cannot Stop
- Need a Process to Merge Data Vendor Edits into Production GDB
- Need ArcFM AutoUpdaters and QAQC Validation to Fire
- Need to pass all pertinent updates back to Maximo Asset Management via existing interface
- Need to do it all while minimizing any production downtime

A True Challenge of Massive Data Updates and Moving Parts...

*Engaged SSP Innovations to assist*
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**Solution Overview**

**SSP Proposed to Use Existing “SSP All Edits State 0 Technology”**
- Used with other utilities to extract all versions in a geodatabase
- Allows for compress to state 0 for any activities requiring state 0 including dropping the network
- Automatically recreates all geodatabase versions from scratch
- Re-synchronizes all ArcFM Sessions and Designer Designs
- System comes back online as if versions were intact the whole time

**New Process Created as the “SSP All Edits Replay”**
- Versioned Edits extracted from Data Vendor’s copy of the geodatabase each month
- Automatically replayed into ArcFM Sessions over a weekend each month
- Replayed with ArcFM AutoUpdaters On
- Sessions reviewed and posted per normal QAQC
- Maximo Interface Enabled for all Assets
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Solution Overview - Process

1. Take a Copy of GDB
2. Data Vendor Creates up to 20 Versions
3. Data Vendor Edits Version for ~1mo+
4. SSP Extracts Edits into SSP All Edits Format
   *For each version
5. Create NIPSCO ArcFM Sessions/Versions
6. SSP Replays Edits into ArcFM Sessions
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Solution Overview – Workflow & QAQC

Diagram showing the workflow:

1. RAMTeCH delivers Data
2. First Time or Redelivery
   - Redelivery
   - Whole Area or Individual Session(s)
3. IBM Loads Data
4. IBM Refreshes Data
5. SSP Creates All Edits Oracle Tables and Feature Classes
6. SSP Performs All Edits Replay
7. NIPSCO Reviews Data
8. Accept/Reject
   - Accept
   - Reject
9. NIPSCO Posts Data

GUI for Session Manager:

- Available Tasks: Change Session Owner
- Session Manager with sessions listed:
  - My Sessions
    - RAMTECH_DEL1_1
    - RAMTECH_DEL1_2
    - RAMTECH_DEL1_3
    - RAMTECH_DEL1_4
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**Solution Overview – Additional Challenges**

*The following Issues Arose During The Project:*

- Maximo interface was too slow to handle the volume of edits over a weekend
  - Expected time was 24-30 hours of processing
  - The interface was refactored resulting in an improvement of 5000%
- Additional QAQC Reports Desired to Drive Faster Review
  - Reports being developed on “before” and “after” data elements
  - Validates NULL attribute values now populated and number of features created by Data Vendor
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**Business Benefits**

*The following Technical Benefits Have Been Achieved:*

- Pulling a Version When Needed (Just In Time) Reduces Performance Impact on Production
- Allows NIPSCO to Review the Edits Prior to Posting
- Allows Maximo to be Updated Per Each Data Vendor Edit
- Allows Edits to be Applied as if an Editor Applied the Edit in Real Time
- Edits Are Applied en masse to Production Allowing for the Process to be Closely Monitored
- Allows Data Vendor To Edit without Any ArcFM Technology in Place
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**Business Benefits**

The following are Benefits of the Overall Data Mining Project:

- Elimination of widely dispersed and disparate sources of asset condition and performance information
- Reduction in excavation damage due to inadequate data
- Improved efficiencies in collecting data to support risk assessments… and subsequent increased awareness of all threats and risks to pipeline safety
- Enables linkage between Asset Health and Condition, Risk and Capital Investment / O&M Spending Portfolio optimization
- Efficient integration of enabling IT Platforms (e.g.; GIS and MAXIMO)
- Streamlined asset data retrieval, dissemination and storage practices for Field personnel

**Clearly understood and communicated “single source of truth”**
Questions?

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