“When these layers are drawn on top of one another, undetected spatial trends and relationships often emerge. This allows us to gain insight about relevant characteristics of a location.”
SDI – Tremendous benefit….. but not without its challenges
Spatial Data Infrastructure

Why else build a SDI?

• Billions $$$ Spent on...
  • Redundant Systems, Processes and Workflows
    • Little Coordination between organizations, offices & programs
  • Occurs at all Levels of Government (Local, State, National)
    • City → County → State → Country

• New Requirements require collaboration
  • NG911, ARNOLD/HPMS

• Integration Challenges
Michigan SDI

• Integrate Multiple Layers
  • Roads, Addresses, Boundaries
• Validate
• Change Detection
• Integration
**Data Validation**
Automate manual, time-consuming, subjective QA tasks. Certification required for proof of data quality (SLA’s, legislation)

**Data Integration**
Maximize ROI through re-use, integration of data across the enterprise

**Data Enhancement**
Automate cleaning tasks, create new data, construct repeatable, non-subjective corrective actions.
Rules-based Processing Paradigm

1. Fact – Pattern – Action

2. Given some facts, if they meet any of the patterns/rules, perform the defined action

3. Declarative – rule separated from processing - *Positive Declarative Approach*

4. Pluggable actions – reporting/reconciliation
• Connects to many enterprise systems (CAD, CRM, BI, GIS, Asset Management…)

• Run centrally managed business rules against multiple sourced spatial and non spatial data

• Scalable Data Management – queue added
Use Case: Road Validations

Validations
- Geometric Checks – Spikes, Dup Feats
- Attributes Checks: Street Names not NULL & Valid
- Street Length
- Overshoots, Undershoots, Overlaps
- Branching

Corrections
- Auto-Fix Geometric Errors
- Update Branching
Use Case: Road Validations
Data Submission Portal

• User Interface for data providers to submit data
• Validates submitted data
• Provides reports on data submitted
• Returns Markups showing problematic locations for the data provider to fix
Use Case: Change Detection

• City → County → State → Country
• NOT Same Schema
• Only Edit Changed Features
• Use 1Spatial COTS products to detect and update only what’s changed
Use Case: Facilities GIS

- CAD to GIS Geometric Errors
  - CAD schematic representations
  - Data Alignment

- Traditionally Manual Process
  - Can take months getting everything geometrically correct

- Leverage 1Integrate to identify and fix issues - Automated
Use Case: CAD → Alignment

- Converting CAD to GIS
  - CAD isn’t always in Projected Space
  - WLD files provided (sometimes only one or two reference points)
- CAD doesn’t align to GIS
- Shifting the Data
  - 1Integrate has Shifting algorithms
  - Generates Shift Vectors
  - Shift all data with Shift Vectors
Create & Find Objects

- Schematic
- Subset Lines
- Manhole Floor
- Missing Regions
- Create Floor

- Feeder Info
- Wires
- Ducts
- Find Banks
- Find Walls
Shift, Scale, Rotate
Connect Wires & Add Splices
GIS to Geo-schematic

• Issues
  • GIS great for analysis not always for visualization
  • GIS Objects can be cluttered
  • Difficult to read

• 1Integrate\1Generalise
  • Generalize Features
  • Spread out objects
  • Rules Based Generalization
Electricity substation cable approach

1. Create simplified square asset
2. Identify low voltage cables
3. Re-route in to correct side, in correct order, spread out evenly
4. Add numbering for each connection
Water Network

1. Pipe straightening
2. Pipe separation
3. Point asset separation
4. Create perpendicular valve symbols as lines
5. Label generation and intelligent placement
6. Gap creation at crossing pipes
Network Rail

GIS to Schematic

• Auto Generate 5 Mile Line Diagrams
• Assets placed at the correct LRS
Use Case: Across the Enterprise
Spatial Data Infrastructure
Questions?

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