

Spatial Data Infrastructure

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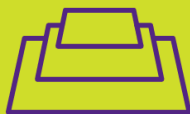
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over **45 years**
 innovation + development
 in Geospatial solutions

Industry Sectors



Transportation



Spatial Data
Infrastructure



Telecommunications



Utilities



Mapping
Authorities



Government

Australia Customers



Global offices



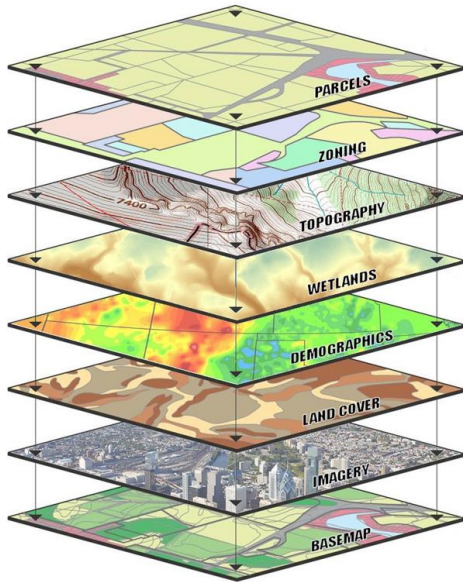
Global Customers



Technology Partners

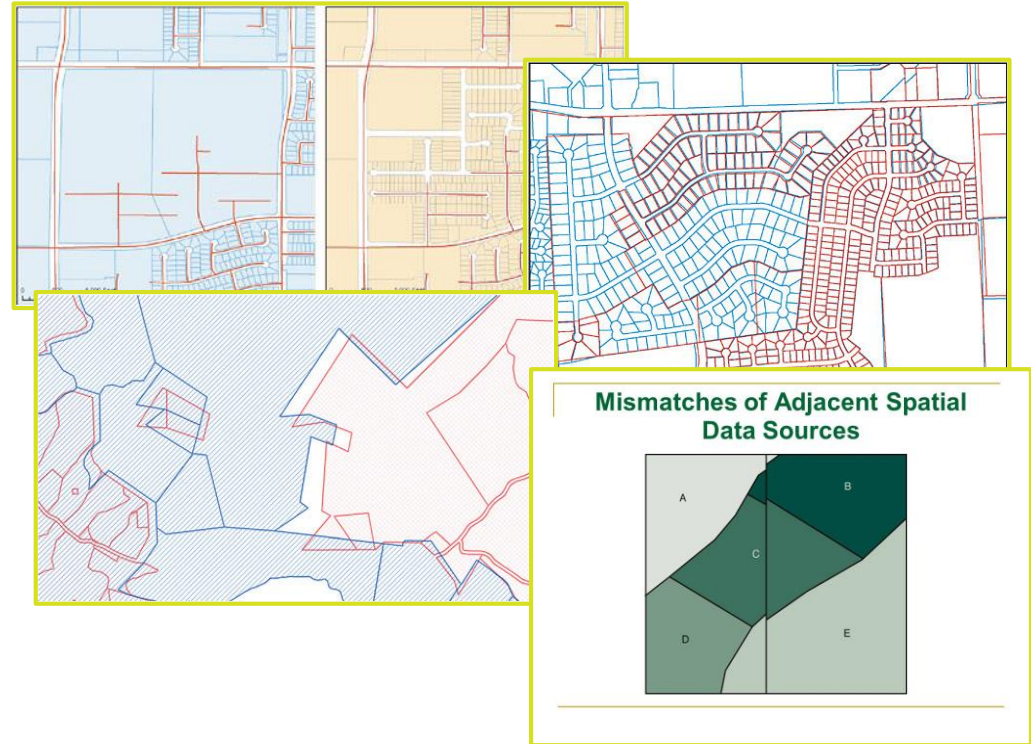
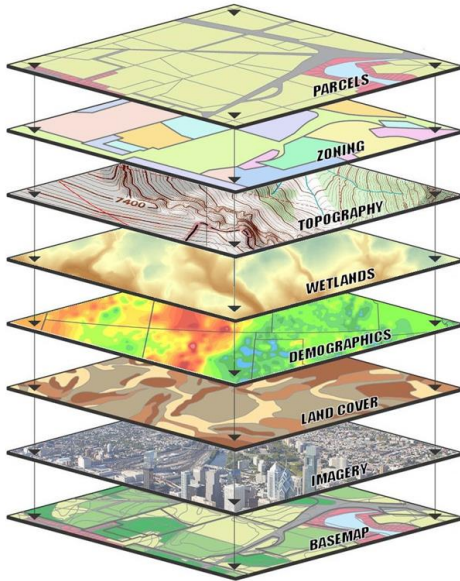


SDI – Tremendous benefit.....



“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

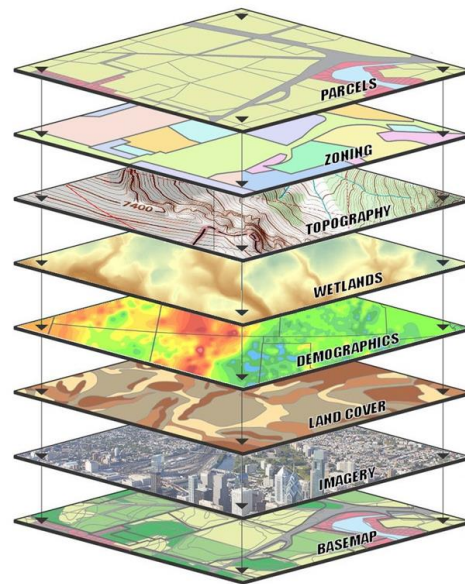


Spatial Data Infrastructure



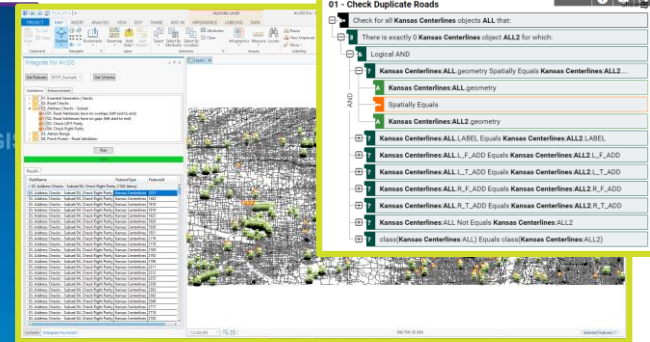
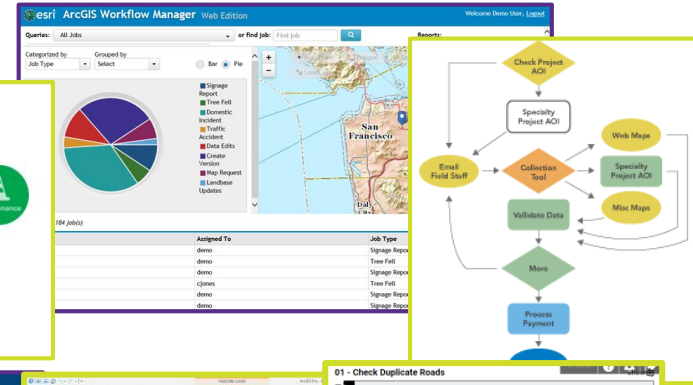
Why else build a SDI?

- 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

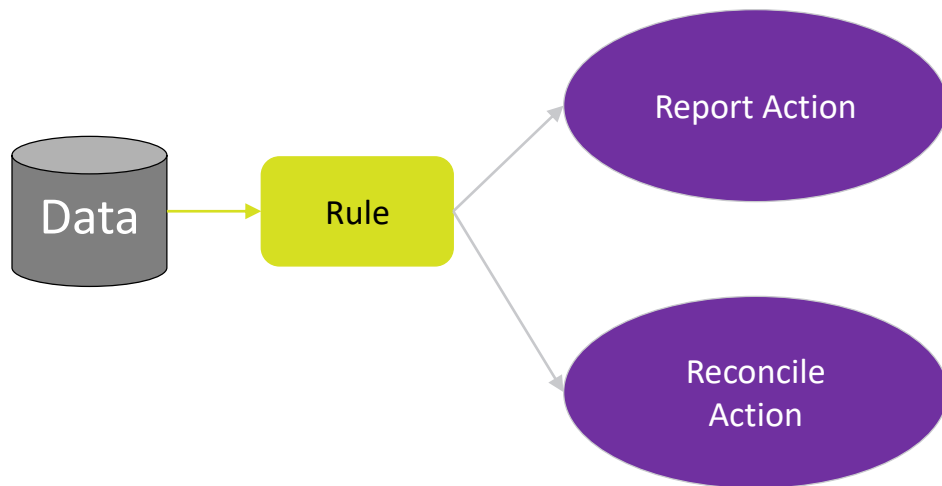
Maximize ROI through re-use, integration of data across the enterprise

Data Enhancement

Automate cleaning tasks, create new data, construct repeatable, non-subjective corrective actions.

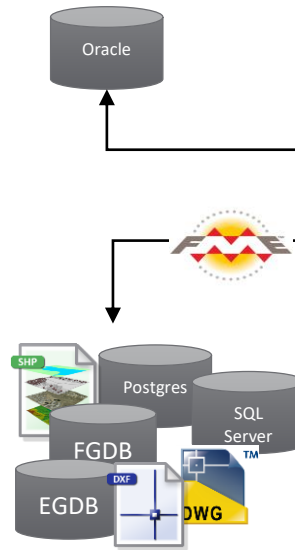
Rules-based Processing Paradigm

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





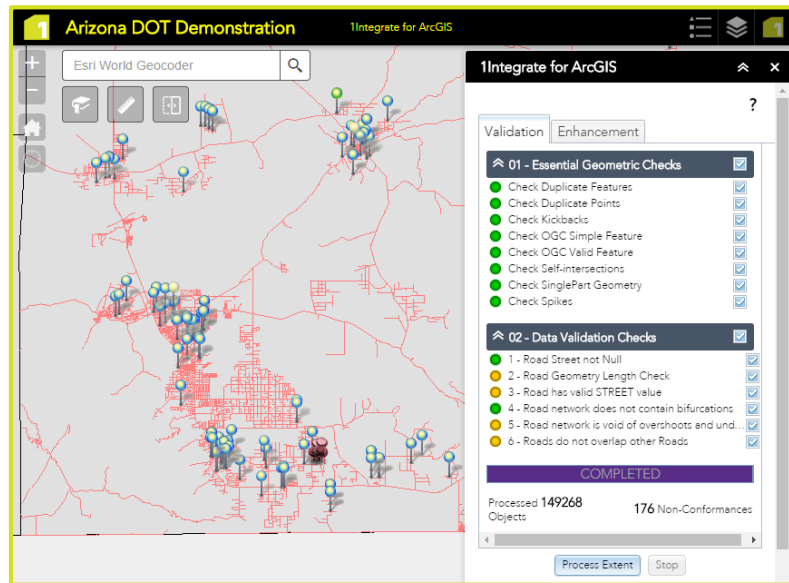
Use Case: Road Validations

Validations

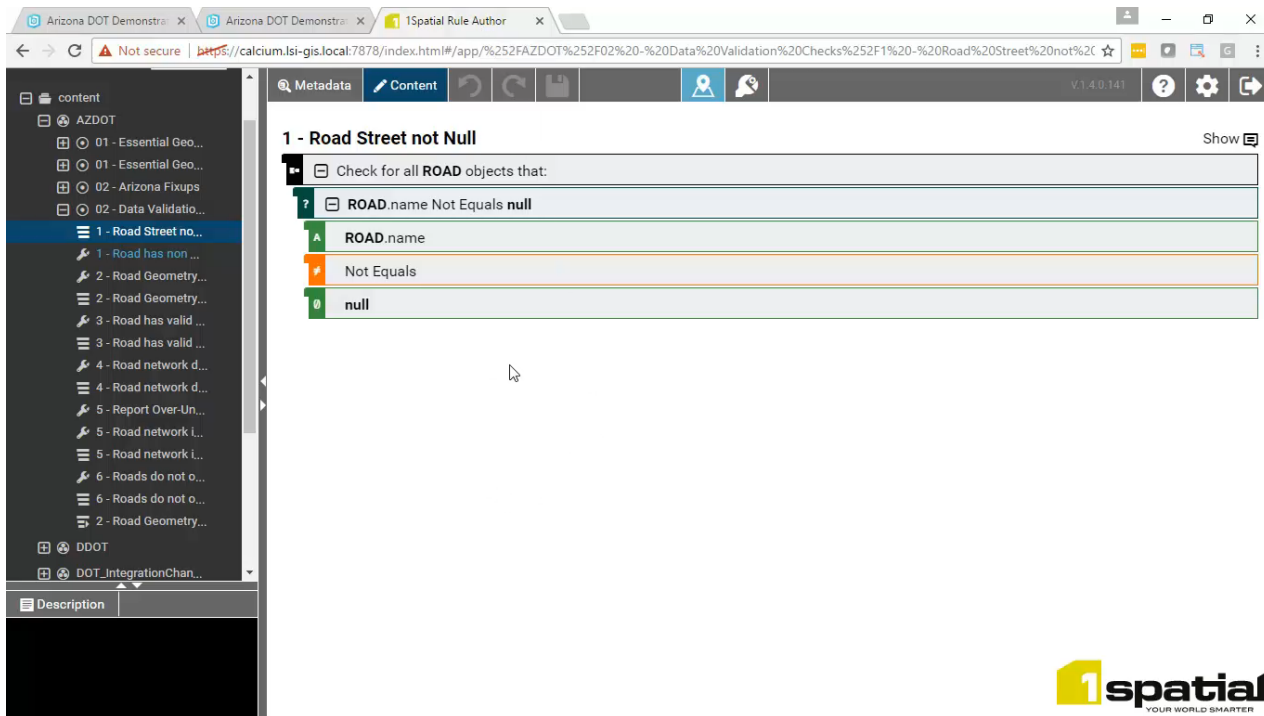
- Geometric Checks – Spikes, Dup Feats
- Attributes Checks: Street Names not NULL & Valid
- Street Length
- Overshoots, Undershoots, Overlaps
- Branching

Corrections

- Auto-Fix Geometric Errors
- Update Branching



Use Case: Road Validations



The screenshot displays the 1Spatial Rule Author web application. The browser address bar shows a URL from calcium.isi-gis.local. The interface includes a left-hand navigation pane with a tree view of content, including folders like 'AZDOT' and 'DDOT', and various rule categories. The main workspace is titled '1 - Road Street not Null' and contains a rule configuration. The rule is defined as 'Check for all ROAD objects that:' followed by a condition 'ROAD.name Not Equals null'. The condition is broken down into three parts: 'ROAD.name', 'Not Equals', and 'null'. The interface also features a top navigation bar with 'Metadata' and 'Content' tabs, and a bottom section for 'Description'.

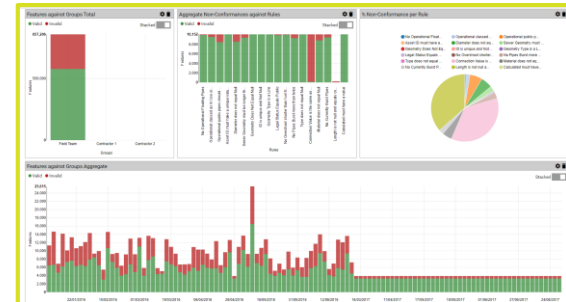
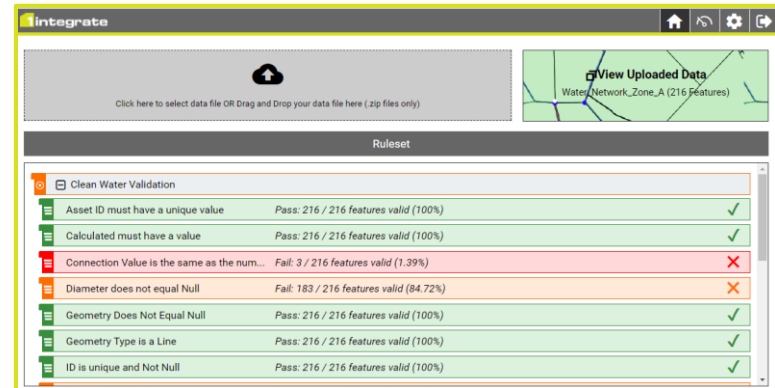
1 - Road Street not Null

Check for all ROAD objects that:

- ROAD.name Not Equals null
- ROAD.name
- Not Equals
- null

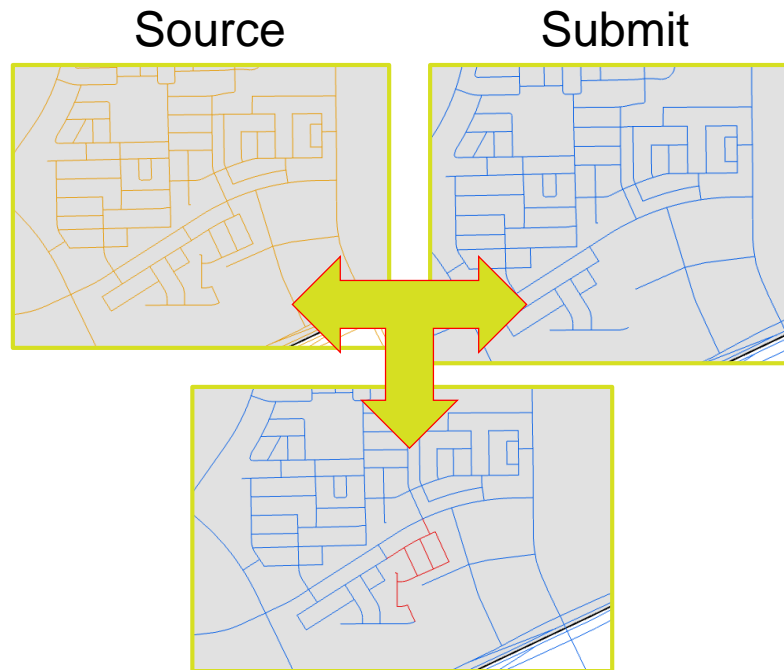
Data Submission Portal

- 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



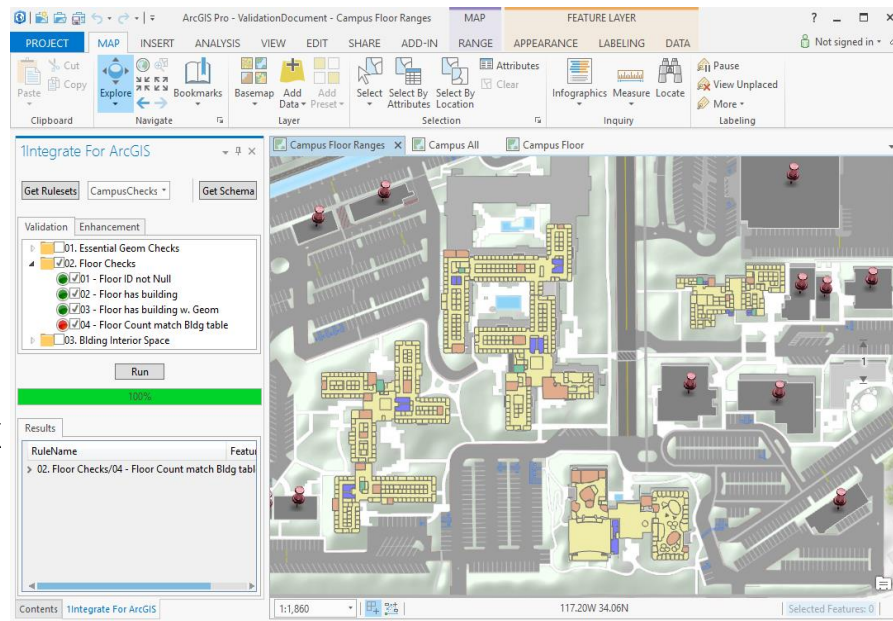
Use Case: Change Detection

- City → County → State → Country
- **NOT** Same Schema
- Only Edit Changed Features
- Use 1Spatial COTS products to detect and update only what's changed



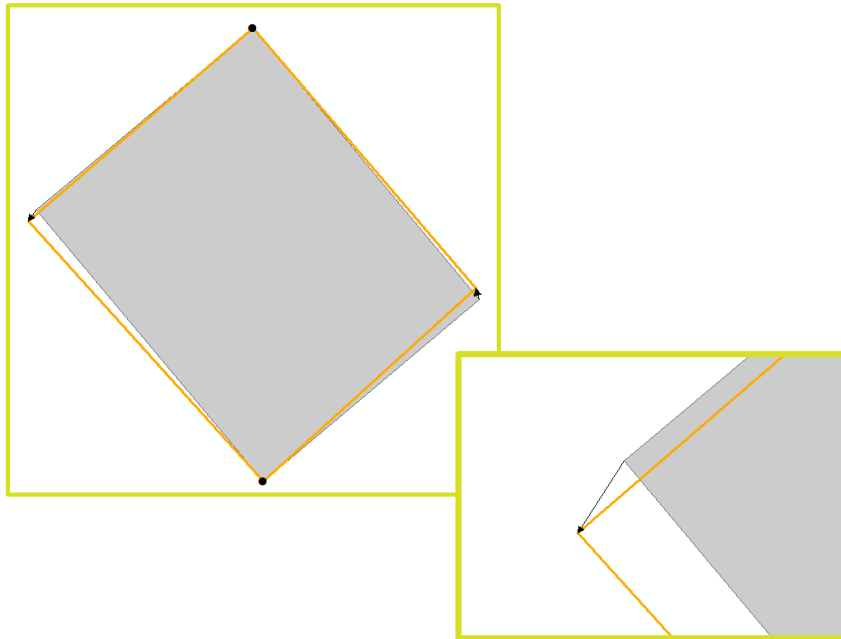
Use Case: Facilities GIS

- 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

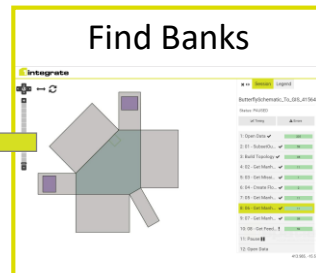
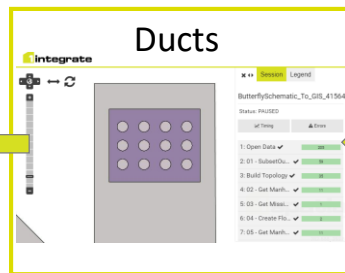
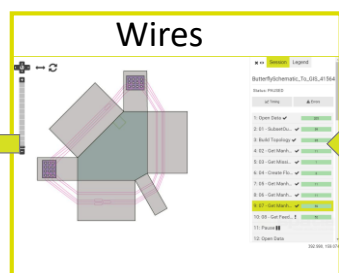
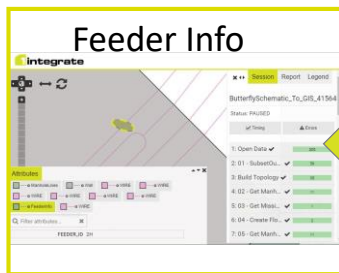
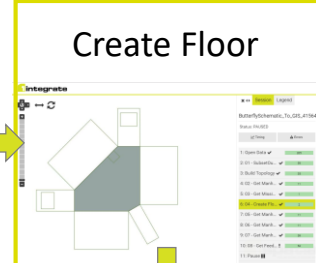
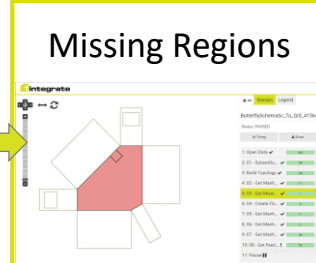
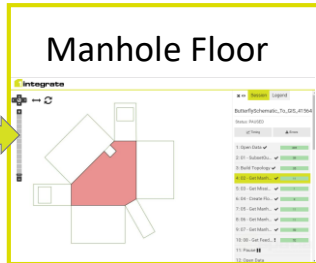
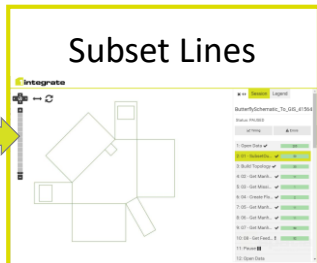
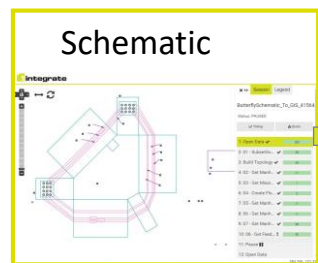


Use Case: CAD → Alignment

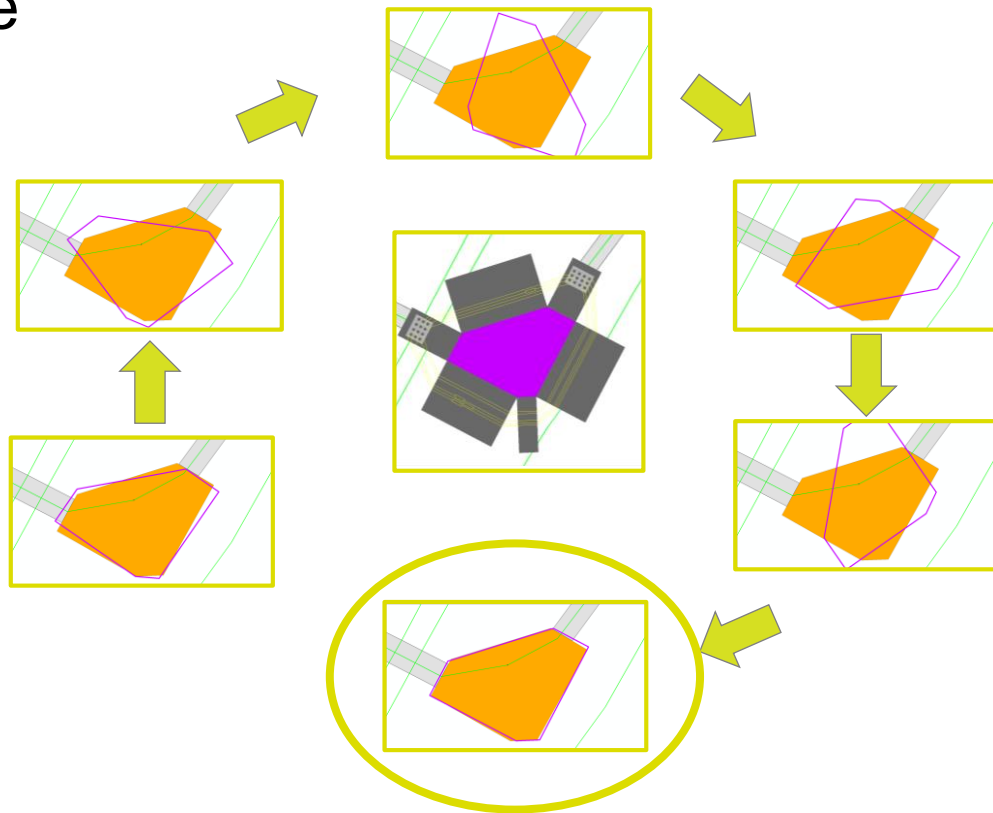
- Converting CAD to GIS
 - CAD isn't always in Projected Space
 - WLD files provided (sometimes only one or two reference points)
- CAD doesn't align to GIS
- Shifting the Data
 - 1Integrate has Shifting algorithms
 - Generates Shift Vectors
 - Shift all data with Shift Vectors



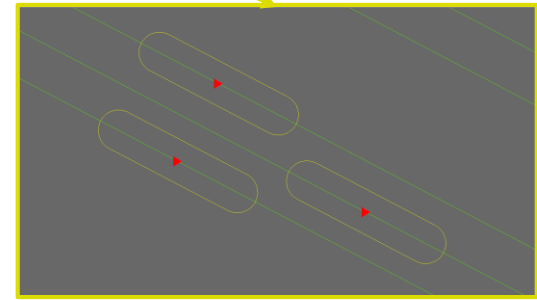
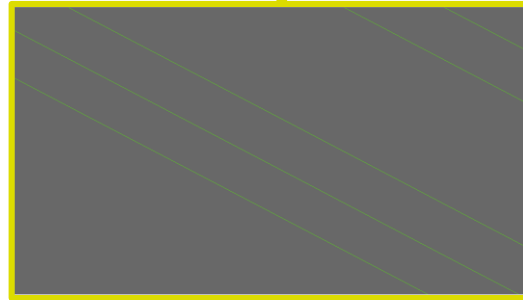
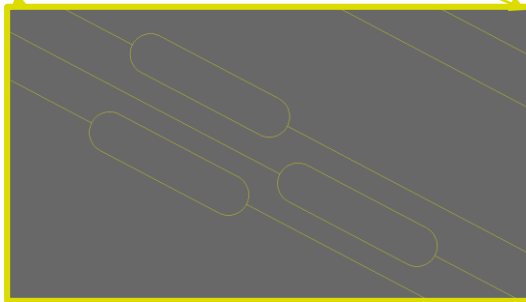
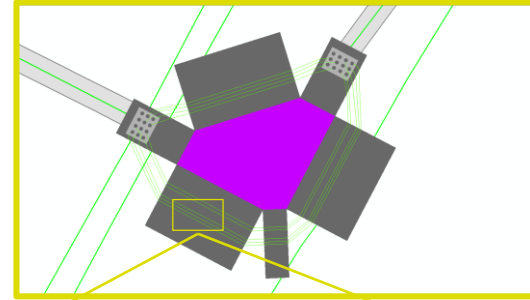
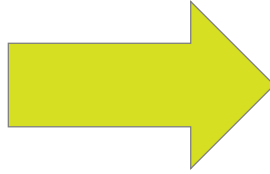
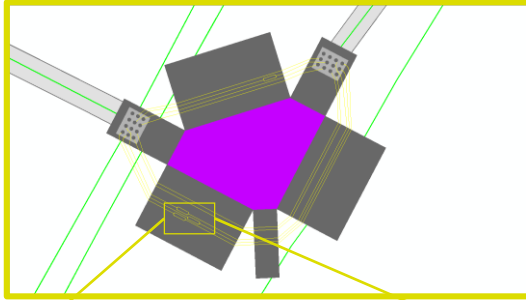
Create & Find Objects



Shift, Scale, Rotate



Connect Wires & Add Splices



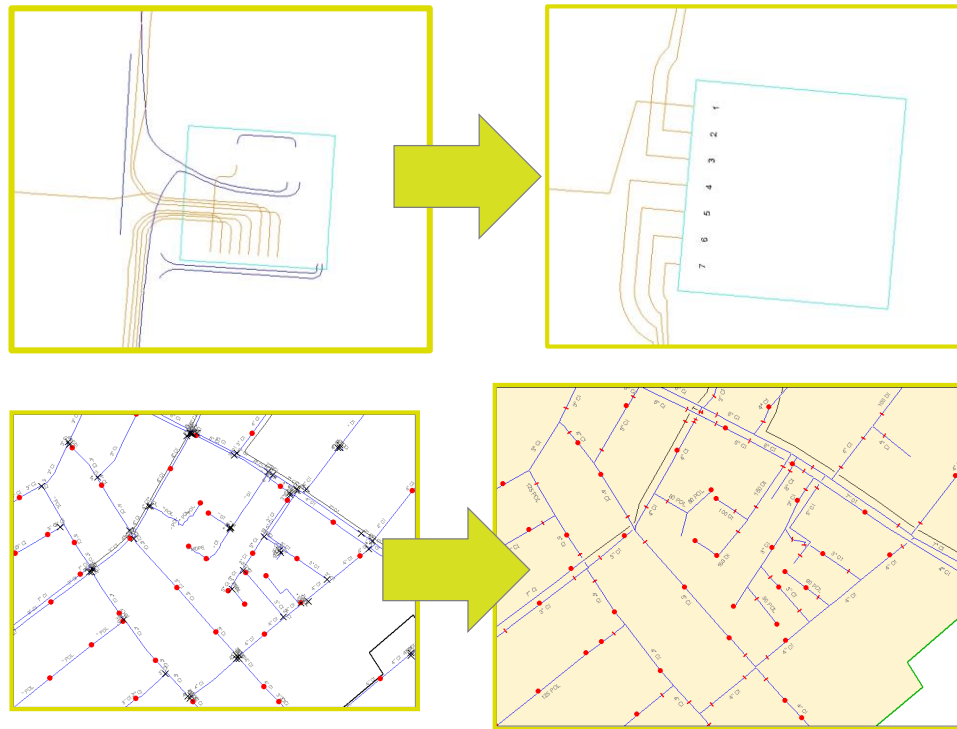
GIS to Geo-schematic

- Issues

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

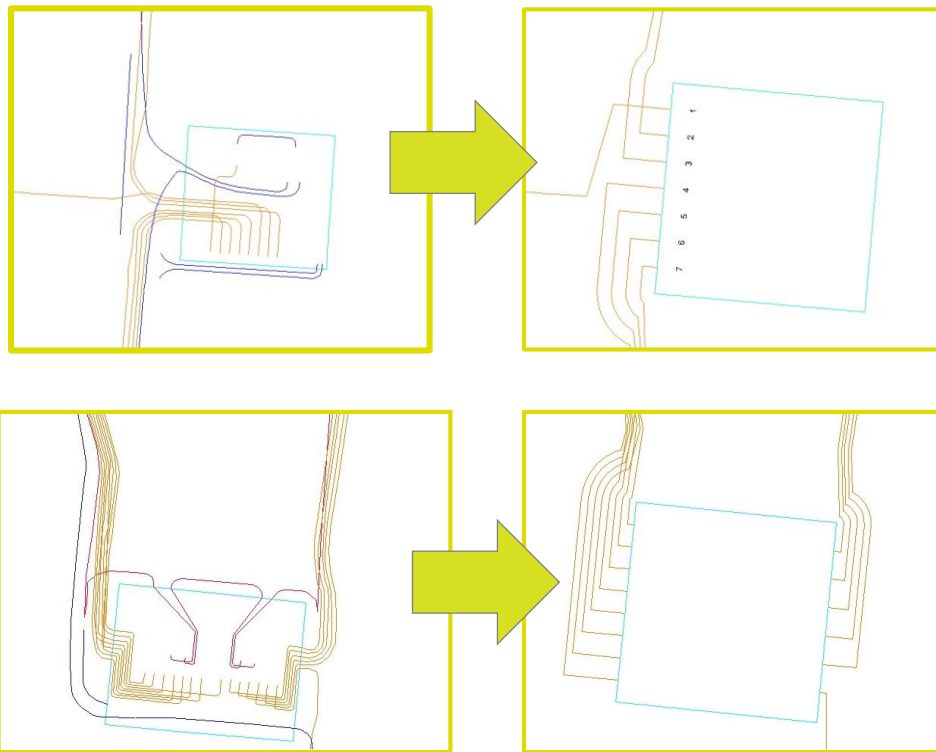
- **1Integrate\1Generalise**

- Generalize Features
- Spread out objects
- Rules Based Generalization



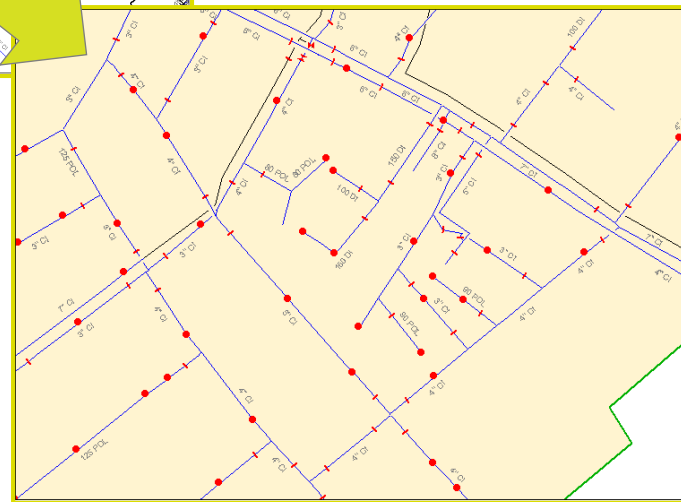
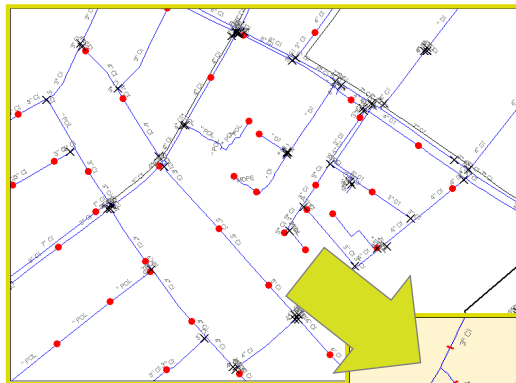
Electricity substation cable approach

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

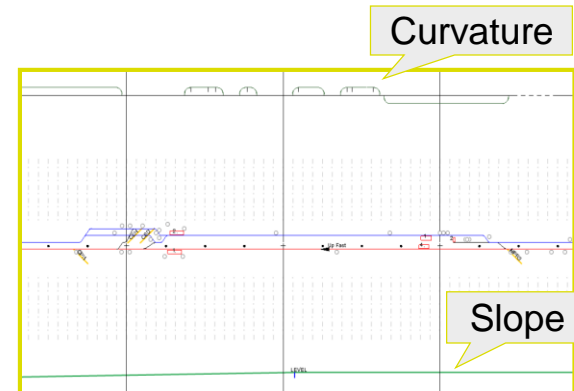
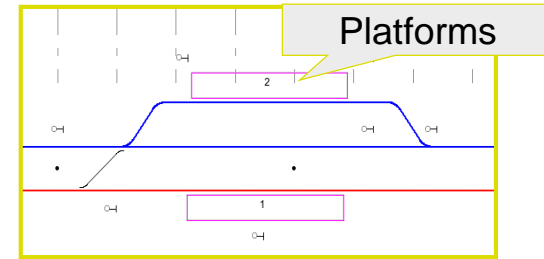
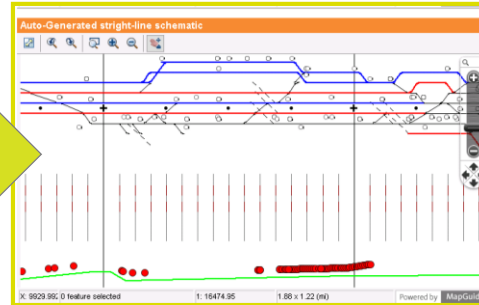
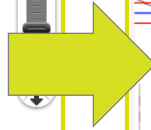
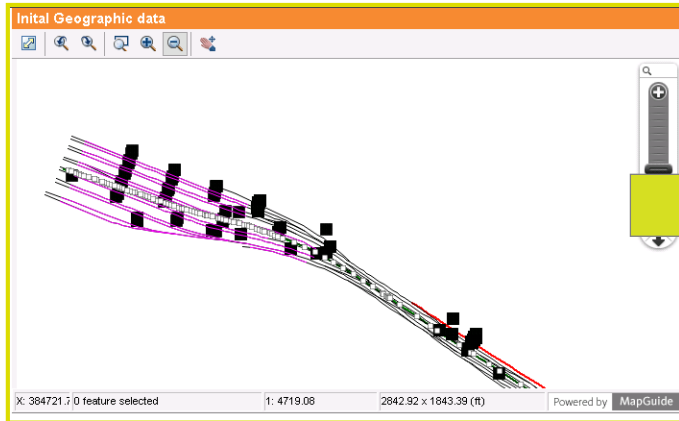




Network Rail

GIS to Schematic

- Auto Generate 5 Mile Line Diagrams
- Assets placed at the correct LRS





Use Case: Across the Enterprise

The screenshot displays the 1integrate web application interface. The browser address bar shows the URL `bromine:8080/1integrate/jsp/integrateFrames.jsp#session`. The application has a top navigation bar with tabs: Data Stores, Rule Discovery, Rules, Actions, Action Maps, Sessions, Admin, 1Spatial, Logout, and Help. A left sidebar contains a tree view of sessions, with 'ValidateTrips' highlighted under the 'JLL' session. The main content area is titled 'General Tasks' and shows a list of tasks with their status and actions.

Task	Conformance	Action	Status
Open Data: { JLL / Oracle Facility Information }		Rewind	✓
Open Data: { JLL / Campus Data FGDB }		Rewind	✓
Pause		Rewind	✓
Check Rules: { JLL / View Table Rules / 01 - Employee Information }	Conformance: 0%	Rewind	✓
Check Rules: { JLL / View Table Rules / 02 - Room Information }	Conformance: 0%	Rewind	✓
Pause			
Check Rules: { JLL / Employee Info Validation Checks / Employee has corresponding Interior Space Point }			
Pause			
Apply Action Map: { JLL / Employee Records Maps / Report 2 on Employee Missing Records }			
Check Rules: { JLL / View Table Rules / 04 - View Join Table }			
Pause			
Apply Action Map: { JLL / Employee Records Maps / Fix Mismatch Employee Records }			
Check Rules: { JLL / View Table Rules / 03 - Subset Steve Monohan }			
Check Rules: { JLL / Employee Info Validation Checks / Employee has corresponding Interior Space Point }			
Pause			
Check Rules: { JLL / View Table Rules / 05 - View Room Table }			
Check Rules: { JLL / RoomChecks / Space Area is Correct }			
Check Rules: { JLL / RoomChecks / Space Area is Correct Advance }			
Pause			

1integrate 1.4.1

Spatial Data Infrastructure Questions?

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