Process-driven Architecture for Workflow Automation and GIS Integration

Jeff Puuri, GISP
Senior GIS Consultant

In cooperation with: Gas Technology Institute

Agenda Topics

- What is a '**Process-driven Architecture**'?
- How is it used **for Workflow Automation**?
- And Importantly, **GIS Integration**?

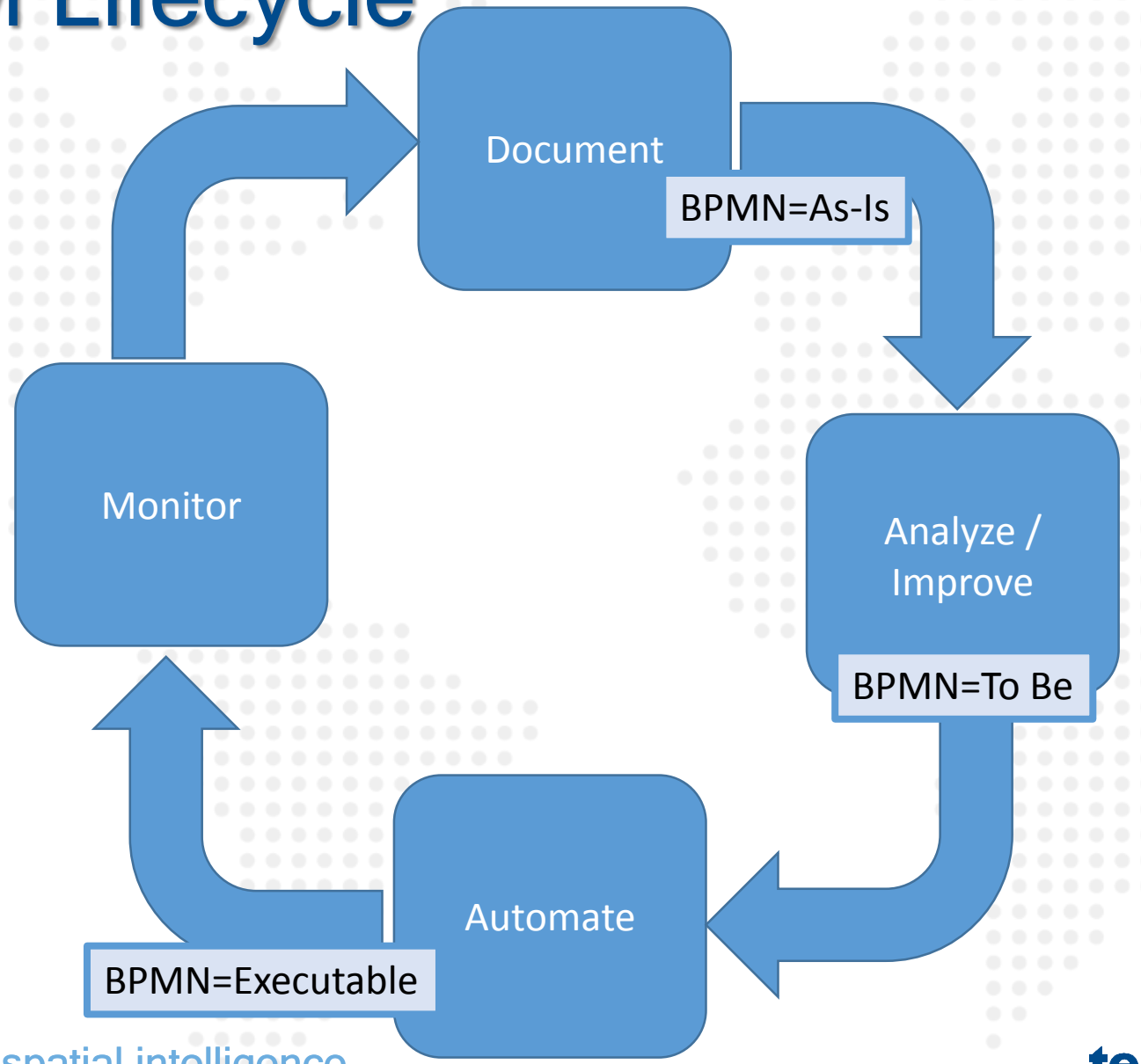
- Why? What are the Business Benefits?
- Case Study
  - Regulatory Compliance
- Final Thoughts - Implementation Approach

Business Processes (in a GIS Context)

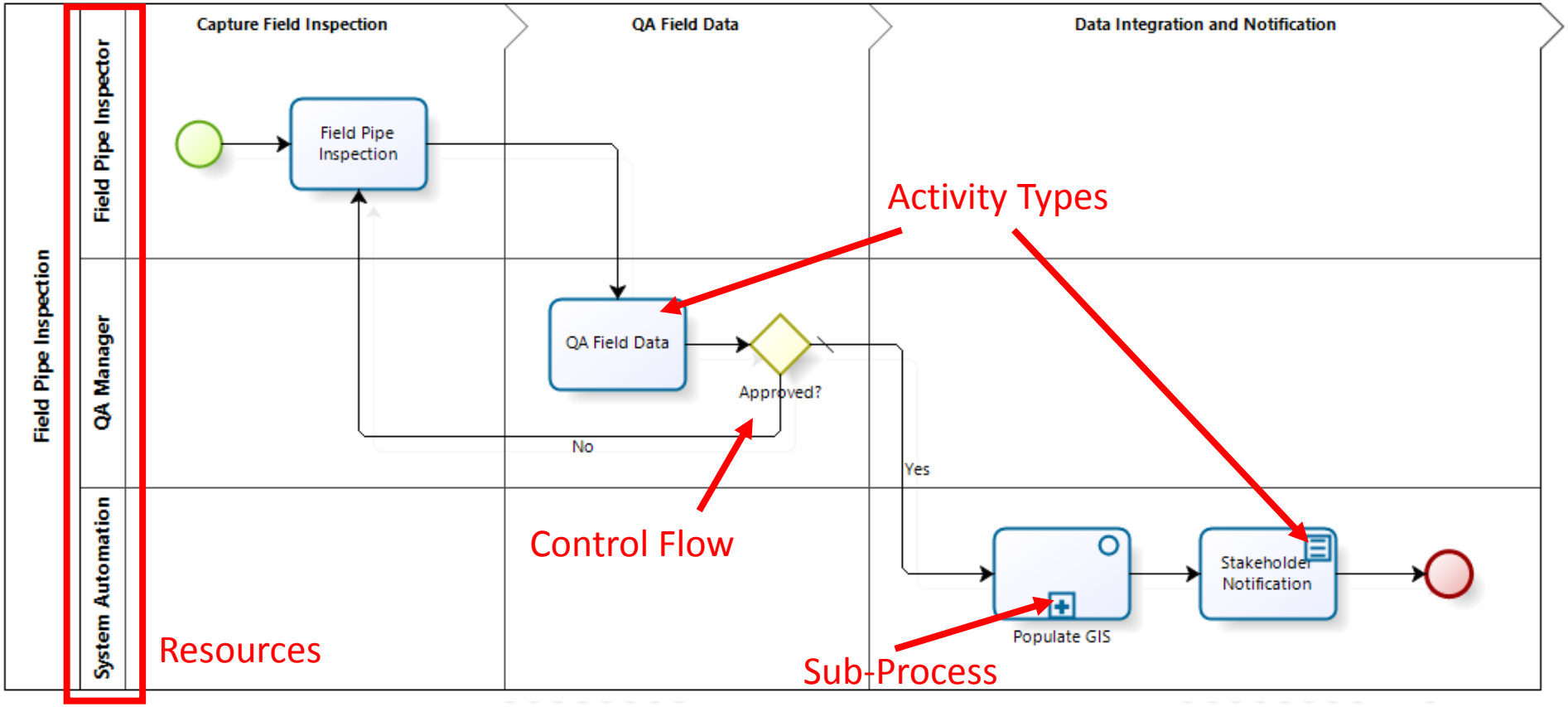
- Esri - 5 Components of a GIS
  - IT System + Geographic Data = GIS

- Other Key Component
  - Workflows - automated Business Processes

BPM Lifecycle



BPMN - Documenting



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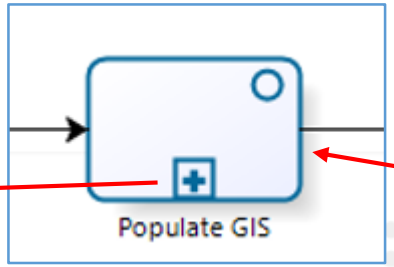
BPMN - Process Abstraction

From Previous 'Parent' Process Diagram:



Field Inspection to GIS

System

FIP Doc Pt

Pop FIP and related objs

FIP Doc Pt

Notify FIP DP Success

Notify FIP DP Error

FIP Related Object

FIP Object

Notify FIP Object Success

Notify FIP Object Error

FIPE and Notes Collections

FIPE Collection to GIS

Field Inspection Notes

FIP and related objects in GIS

Why BPMN?

- Open **Standard** (OMG)
  - Supported by Numerous Software Vendors
  - Cross plaform
- Intuitive and Collaborative
  - Graphic models + Shape Metadata
  - Production of Process Documentation

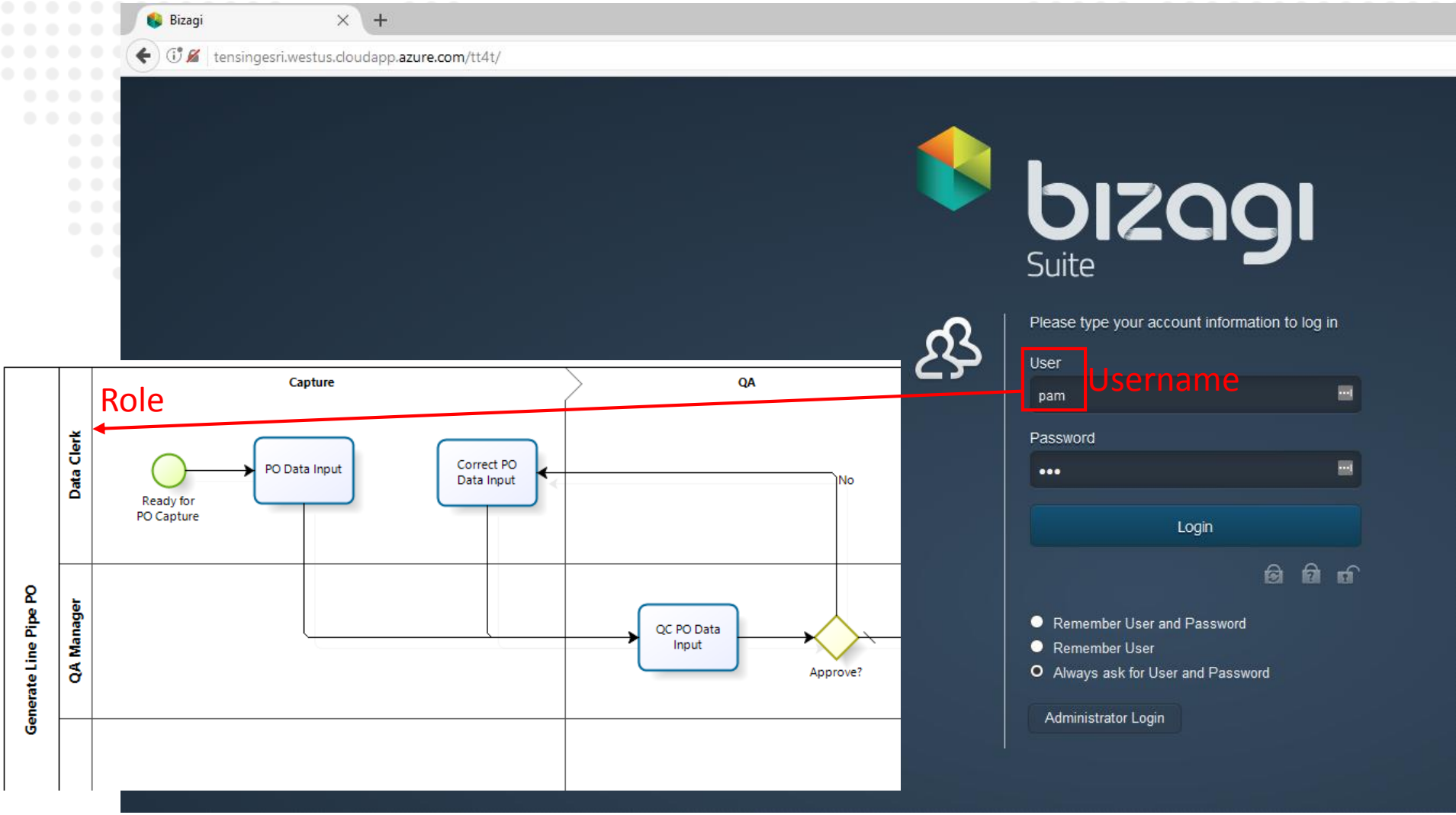
BPMS – Configure, Automate, Integrate

- Emerging Class of Software Tools
  - Gartner iBPMS Category
- "Low Code" Application Platform - **Automate**
  - Underlying Data Model
  - Data Entry Forms
  - Business Rules
  - Users and their Roles
  - External System **Integration**
    - via Web Services

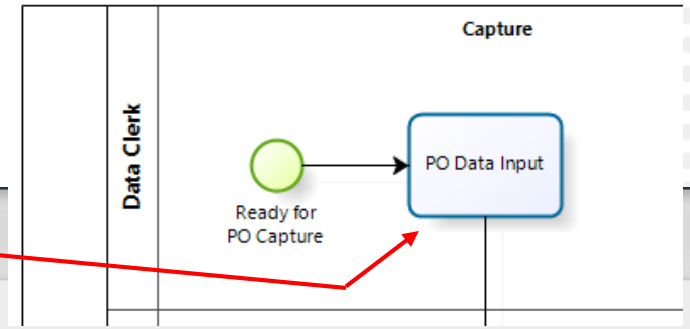
BPMN for GIS - Case Study

- Support Regulatory Compliance
  - Tracking & Traceability
- Improve Operational Knowledge
- Leading to Better Customer Service

Login - Role-based Security



Form-based Data Entry



App > Processes > Generate Line Pipe PO > PO Data Input

PO Specification | PO Contact Info | PO Notes

Purchase Order Number: Pull from SAP

PO Issued Date: M/d/yyyy

PO Items

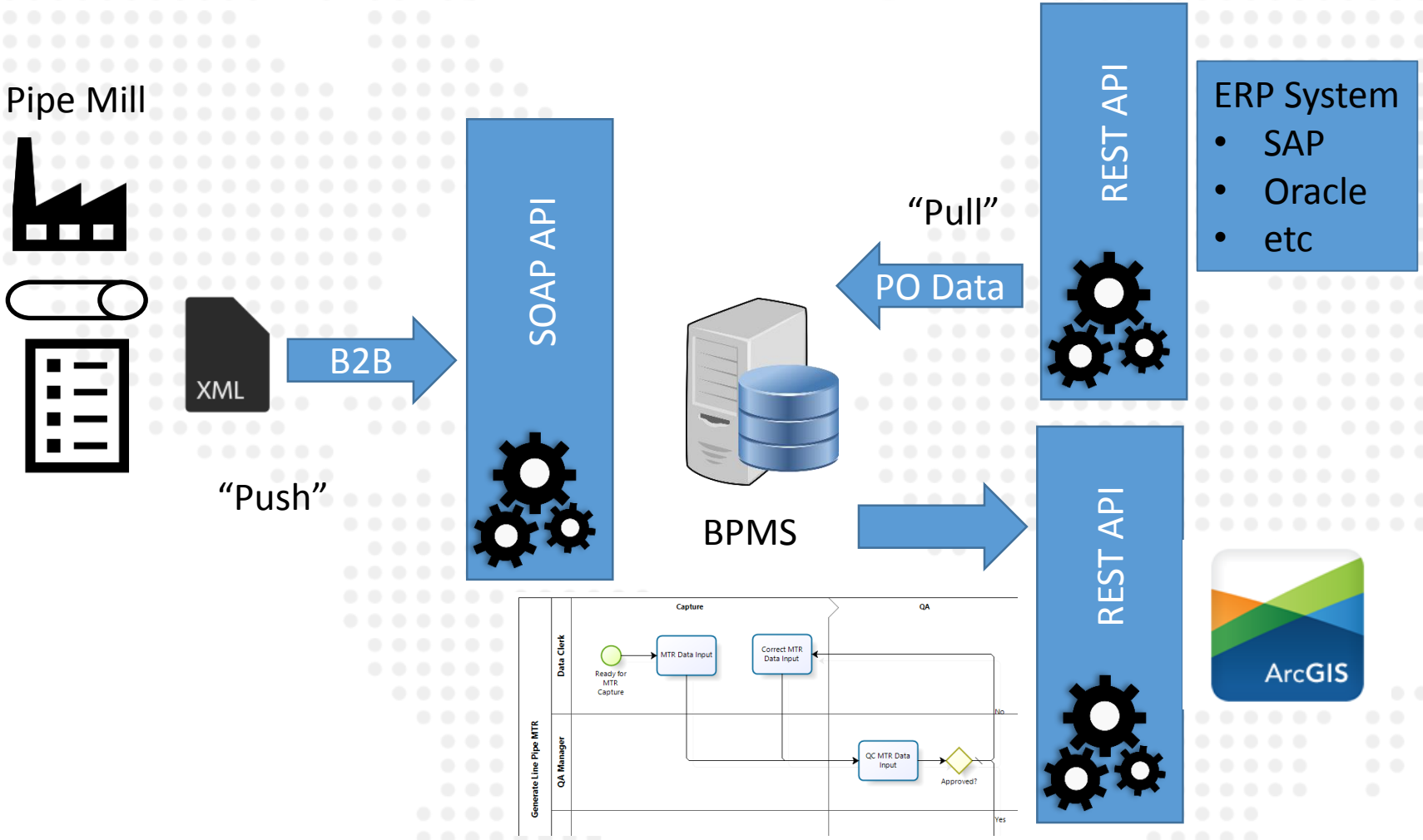
No records

File Upload: No files uploaded

POGeolocation: 42.019735 -87.9216588

Save | Next

External System Integration



Harvesting Location Data

App > Processes > Generate Line Pipe PO > PO Data Input

PO Specification | PO Contact Info | PO Notes

Buyer

Buyer Name:	Pam Buyer
Buyer Phone:	847-555-1212
Buyer Email:	pam.buyer@tt4t.org
Buyer Billing Address:	1700 Mount Prospect Rd,

Supplier

Supplier Name:	Sam Supplier
Supplier Company:	Pipeline Distributors Ltd
Supplier Phone:	847-555-1414
Supplier Email:	sam.supplier@tt4t.org
Supplier Address:	PO Box 23237, Houston, TX 77228-3237

Receiving

Shipping Contact Name:	Mel Mateng
Shipping Contact Phone:	847-555-1313
Shipping Contact Email:	mel.mateng@tt4t.org
Shipping Address:	555 Wille Rd, Des Plaines, IL 60018

Addresses

App > Processes > Generate Line Pipe PO > PO Data Input

PO Specification | PO Contact Info | PO Notes

Purchase Order Number:	4270163
PO Issued Date:	6/16/2017

Pull from SAP

PO Items

PO Item ID	Quantity Length	PSL Type	Grade	Specified Outside Diameter
3230456	10,259.00	PSL 2	X42	8.625

File Upload:	PO_4270163.pdf
POGeolocation:	37.03689380000001 -80.16424479999999

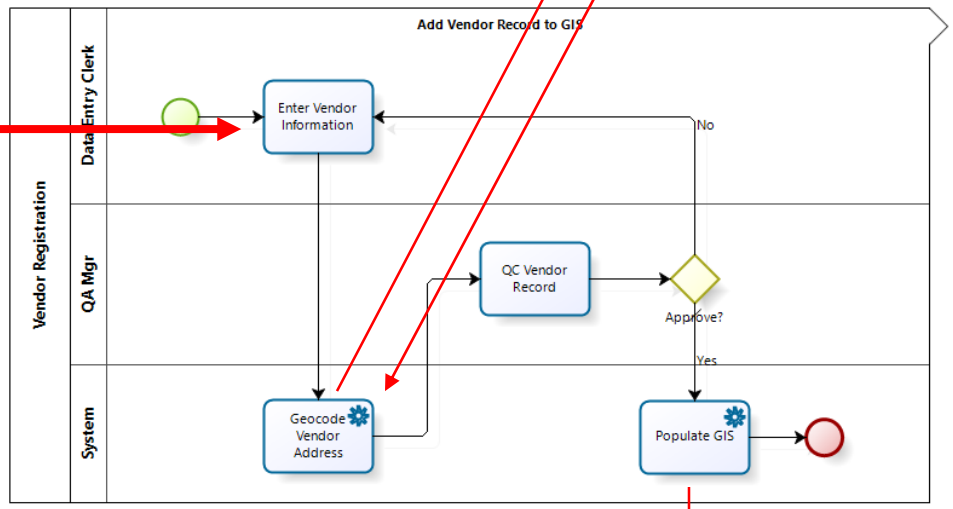
Geolocation

Integrating Harvested Locations

BPMS – across the board
- External System Integration support
- via web services, esp. REST API

- Address
- Geolocation
- Dates and Times
- GIS Attributes

BPMS Data Entry



Send Address

Return Lat/Lon

Geocoding API

World Geocoder

ArcGIS

what3words

Google

GIS Features API

REST API Call
Populate GIS
2 x LatLon + Attr

Integrating Harvested Locations

App > Processes > Vendor Registration > QC Vendor Record

Vendor Registration

Company Name:	Tensing USA
Street Address:	9900 Belward Campus Dr, Rockville, MD, 20850
Date Added:	9/13/2016

QC

Geocode Longitude:	(77.20856950)
Geocode Latitude:	39.10469910
Is Approved:	Yes No
Rejection Reason:	

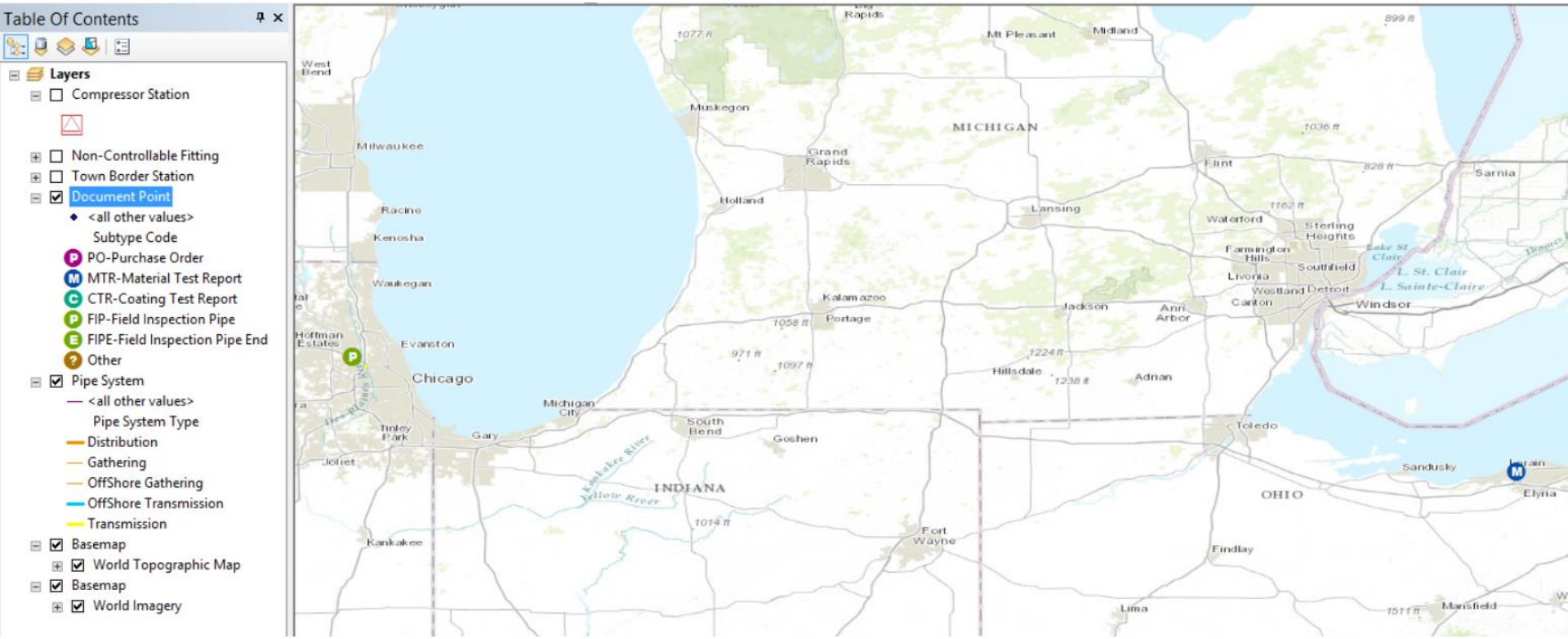
Save Next

Entered Address
Converted to Lat/Lon via
Google Geocode API

Send to ArcGIS
REST API

Information Products - Maps

- DocumentPoint Locations



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Information Products - Maps

- Two-way Traceability with UPDM

Notifications w/Attachments

Tue 9/13/2016 6:20 PM

tensingusa@gmail.com

Field Inspection Pipe Attachment Upload Successful

To Jeff Puuri | Tensing

Message cdv_photo_003.jpg (498 KB)

For Pipe ID: 3

Pipe Marking Type: Stencil
Marking Location: Exterior

Inspected Pipe Attributes:

Length	38.70
Grade	X42
Outside Diameter	8.63
Wall Thickness	0.32
Geolocation	37.03660640304174 -80.16461087776418

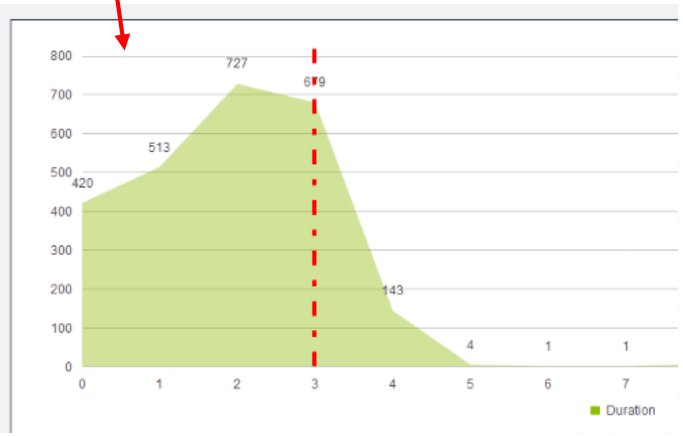
Attachment ObjectID: 802
Attachment Post Code: 200
Attachment Post Message: success

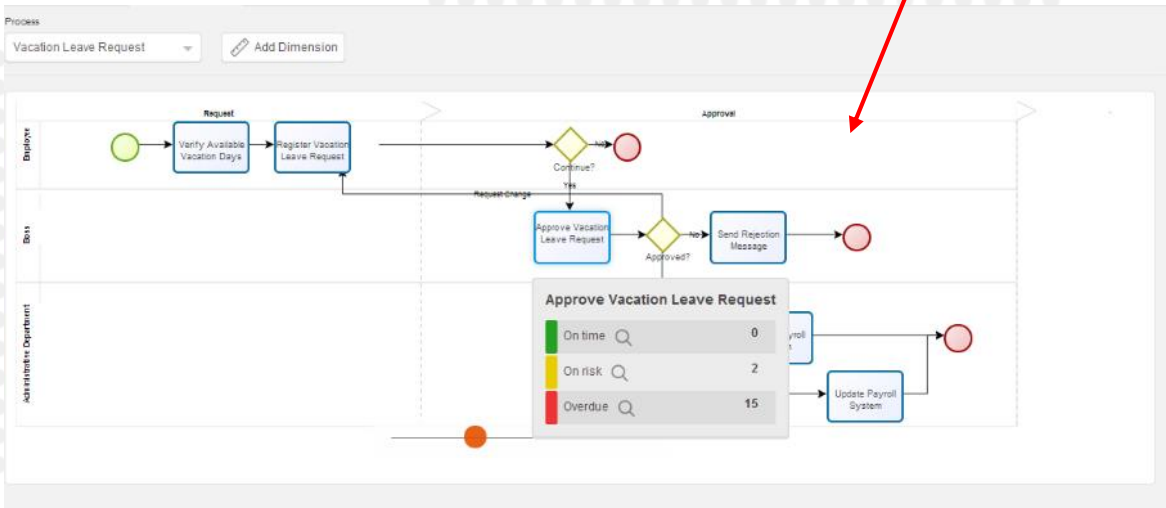
Uploaded Filename: cdv_photo_003.jpg

This is an automated message from the BPMN Process Manager
Please do not reply

Improving Operations

- Process Monitoring Information Products
  - Case and Task Duration
  - Task Status
- Containing Business Intelligence
- Decision Basis for Process Improvements





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Implementation Strategy

- Start Small
  - Pick 1 - 2 processes
  - Lower complexity w/Highest Impact
- Demonstrate **success** to build **support**
- Complements Agile Approach

Jeff Puuri

jpuuri@tensing.com

Special Thanks to:
Gas Technology Institute