Linking PMS Software with ESRI Roads and Highways

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LADOTD PMS Software (dTIMS)

- Managing LADOTD Pavement Management Data since 1993
- Updating to full enterprise wide web-based asset management system
- Functionality is available to integrate ESRI Roads and Highways with dTIMS BA
- Allows users to maintain their transportation network definition within dTIMS allowing users to adjust the road network for changes in alignments, changes in jurisdiction, changes in measurement accuracy and other changes that effect the underling data

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ESRI Roads and Highways

- Used to effectively manage Authoritative highway network definition
- Allows agency to maintain the official highway network definition and any location reference systems that are used by the agency to manage data
- Rule-based location management is used to define how events on the network change with changes to the roadway network

Why Integrate the LADOT-PMS Software with Road and Highways Software (LADOT-GIS)?

- Reduce time maintaining and managing the PMS data whenever network changes occur.
- The data would always be up-to-date with the current definition of the highway network.
- Exposes PMS data to more users through the web server and mapping services to the rest of the department

INTRODUCTION

- DOTD's existing dTIMS Version 8 database will be upgraded to the latest web version of dTIMS which will include Business Analytics (BA) and Business Intelligence (BI) modules.

Business Analytics is a decision support tool to aid in making consistent, accurate, and informed decisions concerning the life cycle of pavement management which includes plans for future maintenance, prediction of sustainability costs and cost estimates relative to maintaining a certain pavement management level.

Business Intelligence is a dashboard tool that enables increased productivity and increased data sharing between departments.

UPCOMING CHANGES TO dTIMS AT DOTD IN 2018-19

- Deploy the reports in DOTD's server environment and to perform user testing of the reports on-site at DOTD.

- Establishing a connection between dTIMS and DOTD's Esri's Roads and Highways integration. The major benefit of this task will be the use of one authoritative LRS for both Roads and Highways in dTIMS, allowing all highway network changes to be done in a GIS environment that dTIMS consumes as needed.

WHAT IS THE FIRST ACTIVITY?

Send a copy of LADOTD's latest version of DTIMS 8

- Before sending, remove all un-needed perspectives:
  - Sections Imported to merge Friction Texture data with Friction Skid data for LSU Student
  - Health Index perspectives to import Treatment data to set ages and update Treatment History Perspective
  - Lafayette University Sections researching Treatment Life
  - Perspectives added to use our quarterly Lettings to commit Treatments
  - Removed out dated Surface Type Log

Send a copy of the Regression Utility Created by Deighton in 2012, since it will be updated in the project.

DECISION TO MAKE

I was asked which of the perspectives can be pooled from other LADOTD databases in ROADS and HIGHWAYS.

Bridge_Analysis
BRIDGE_RECALL
CSECT_MANUAL
GEOGRAPHIC_FEATURES
RIGHTSIZE_SECTIONS
SURFACE_TYPE_LOG

DECISION TO MAKE

I also decided to remove the assets collected in 2011 that were in DTIMS because they were already in ROADS and HIGHWAYS under surface type log data set.

STL_CURBS
STL_CURB_LEFT
STL_GRADE
STL_HORIZONTAL_CURVE
STL_INTERSECTIONS
STL_LADOTD_POINT_ASSETS
STL_LADOTD_POINT_ASSETS_LEFT
STL_LANE_WIDTH
STL_LANES_NUMBER
STL_MEDIANS
STL_ON_ROUTE_PARKING
STL_PAVEMENT_TYPE
STL_POSTED_SPEED
STL_RAIL_ROAD_CROSSING
STL_SHOULDERS
STL_SIDEWALKS_AND_RAMPS
STL_SIDEWALKS_AND_RAMPS_LEFT
STL_SIGHT_DISTANCE
STL_SPEED_LIMIT_SIGNS
STL_TERRAIN_TYPE
STL_TOLLS_CTL_ISSUES
STL_TURN_LANES
STL_VERTICAL_CURVES

DECISION TO MAKE

Option 1- Make DTIMS the main source where data is stored and thus where you make changes to the Location method when LADOTD adds, gives a road to a city or municipality or changes route. This would mean most probably getting a list of changes from Road and Highways and manually changing the locations like I currently do now. Advantage, I am already familiar with this process.

Option 2- Make ROADS and HIGHWAYS the main source where data is stored and thus be where changes to Location method when LADOTD adds, gives a road to a city or municipality or changes route. This would mean in theory, that ROADS and HIGHWAYS would automatically make those changes for you.

FIRST PROBLEM AFTER DECISION

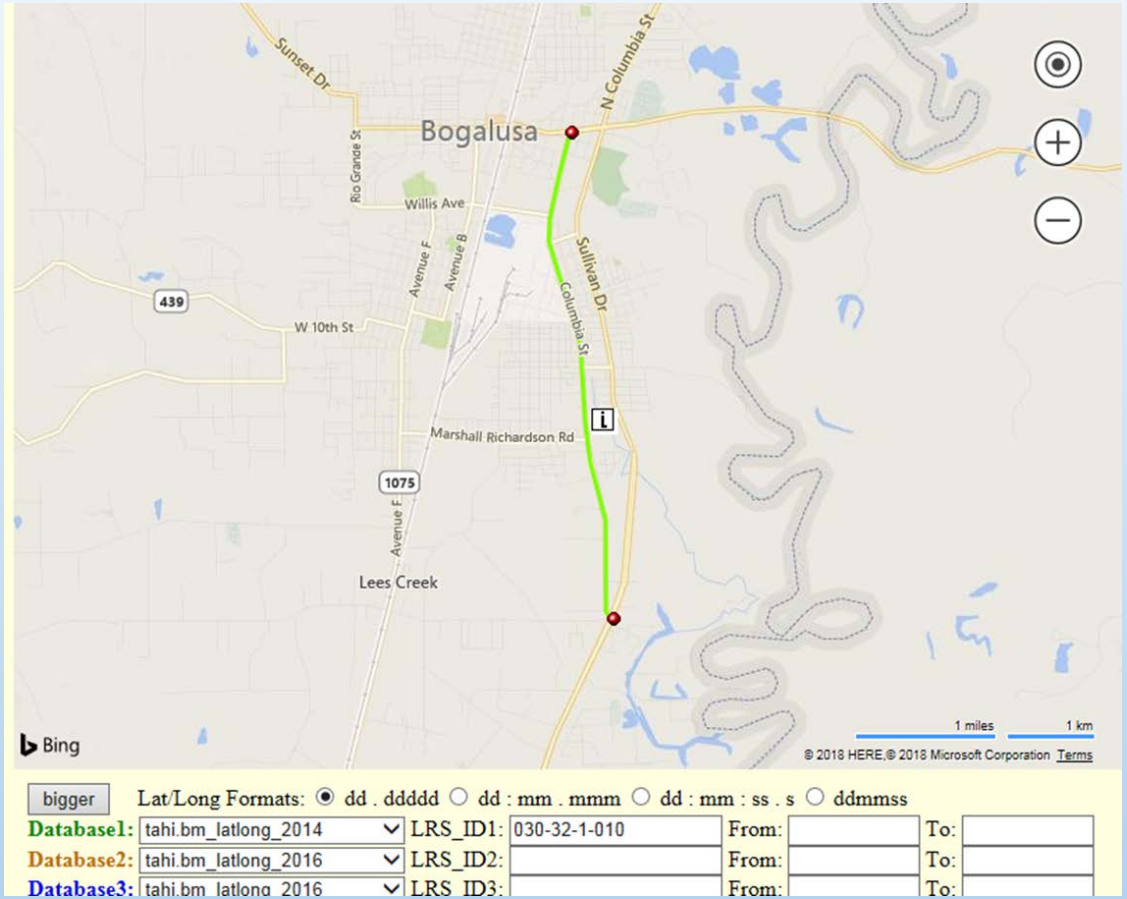
ROADS and HIGHWAYS basemap starting date is 2017 which means that LADOTD needed to go through the manual process of converting all sections from 2014 to 2017 locations for every historic perspective.

The first step was to compare a Control Section Manual from 2014 to the Control Section Manual of today.

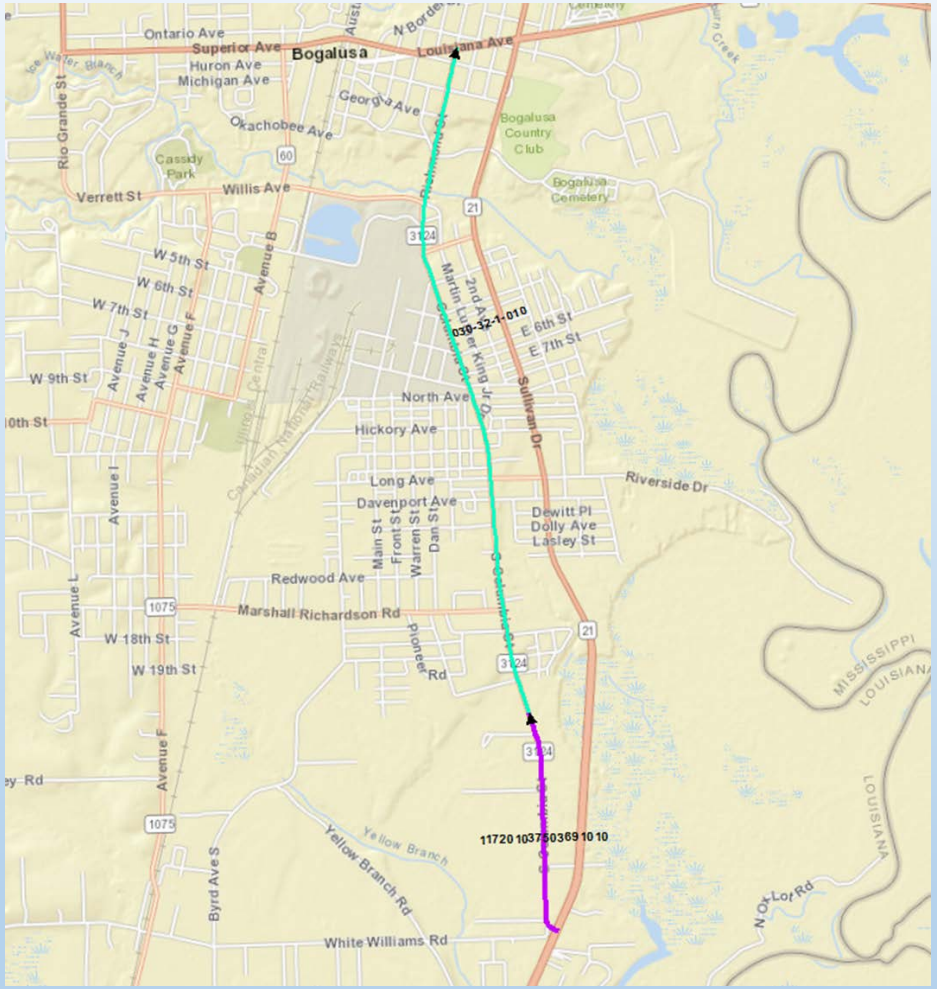
- If the length of a Control changed by more than 0.30 of a mile, review the Control
- If the begin or end description changed, review
- If the route changed from one name to another

EXAMPLE 1

Location 2014



Location 2017



LRS_ID_2014	FROM_2014	TO_2014	LENGTH_2014
030-32-1-010	0	0.9024	0.9024
030-32-1-010	0.9024	3.6479	2.7455

LRS_ID_2017	FROM_2017	TO_2017	LENGTH_2017
117201037503691010	0	0.9024	0.9024
030-32-1-010	0	2.7455	2.7455

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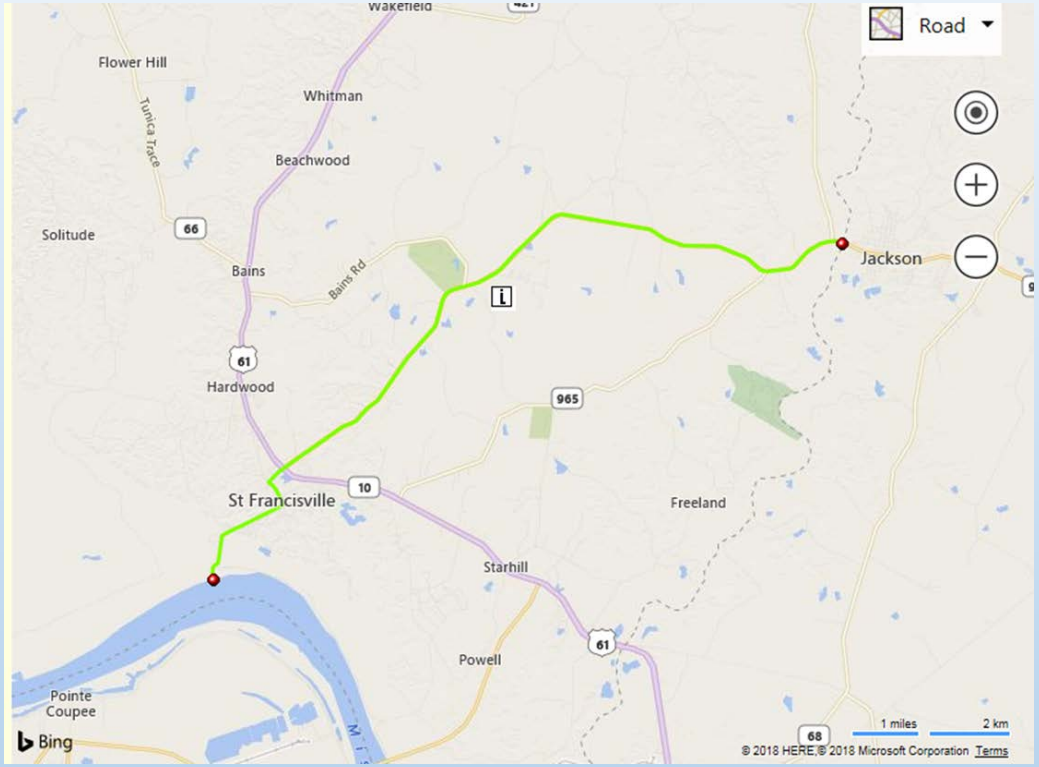
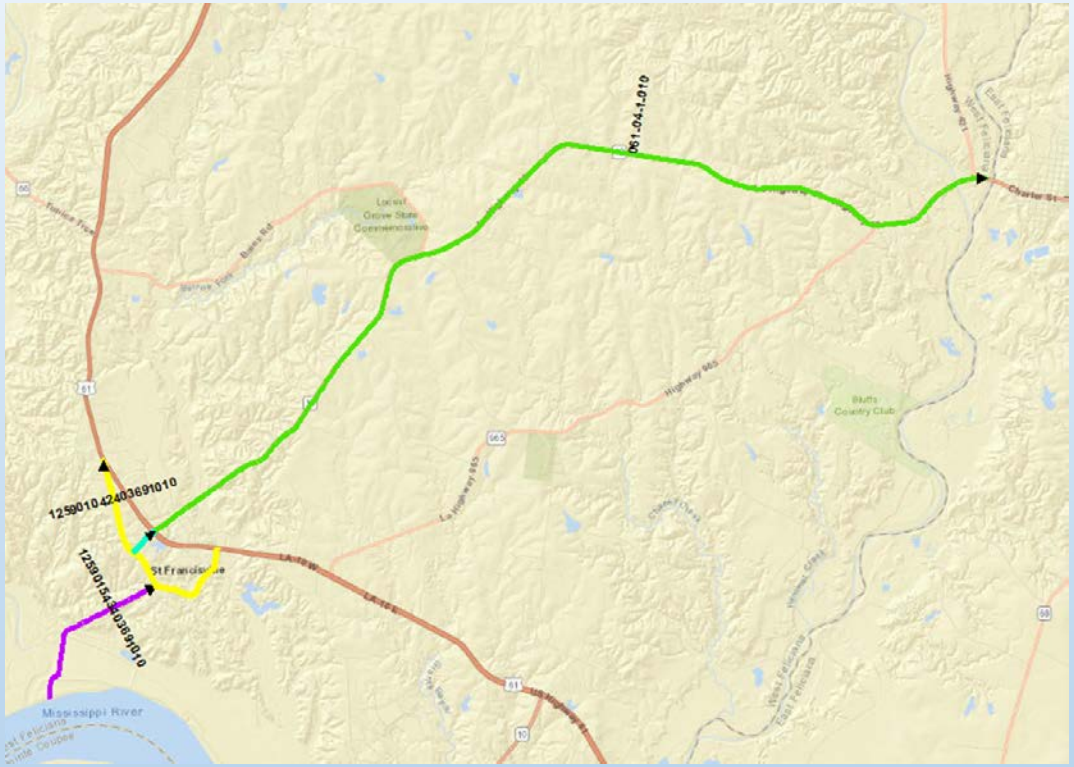
EXAMPLE 2

Location 2014



LRS_ID_2014	FROM_2014	TO_2014	LENGTH_2014
061-04-1-010	0	1.81	1.8100
061-04-1-010	1.81	2.25	0.4400
061-04-1-010	2.25	2.5710	0.3210
061-04-1-010	2.5710	13.507	10.9360

Location 2017



LRS_ID_2017	FROM_2017	TO_2017	LENGTH_2017
1259015434036910 10	0	1.81	1.81
1259010424036910 10	1.035	1.475	0.44
1259021538029910 10	0	0.321	0.321
061-04-1-010	0	10.9360	10.9360

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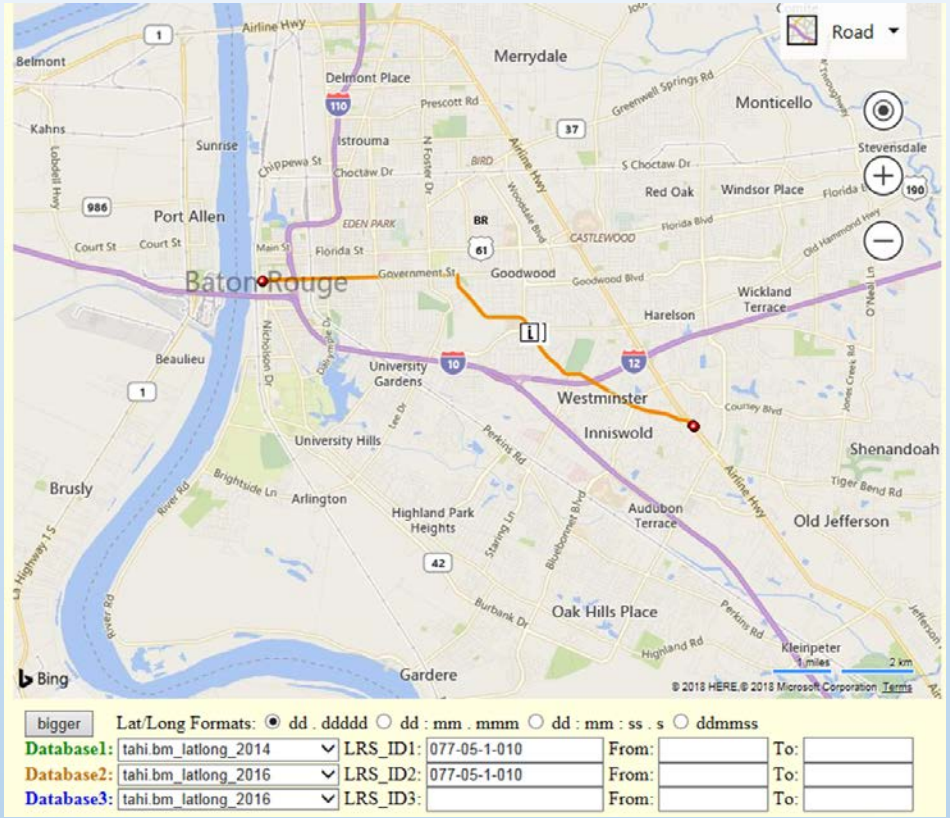
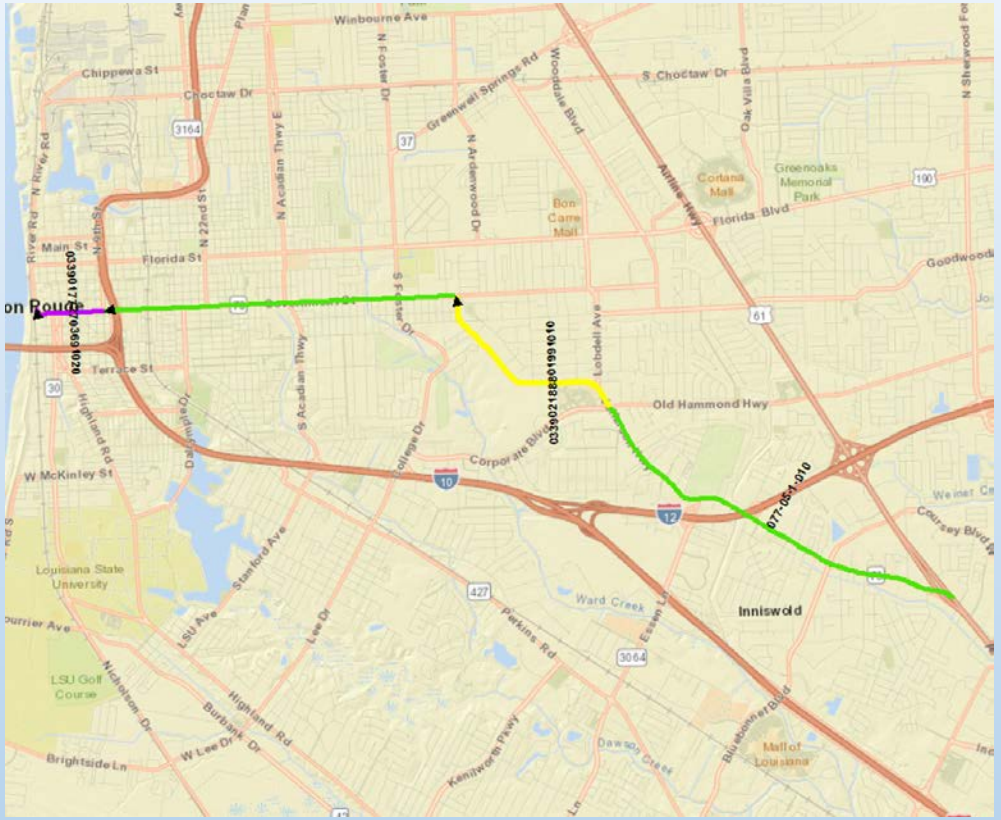
EXAMPLE 3

Location 2014



Location 2017



LRS_ID_2014	FROM_2014	TO_2014	LENGTH_2014
077-05-1-010	0	3.457	3.457
077-05-1-010	3.457	5.286	1.829
077-05-1-010	5.286	8.256	2.97
077-05-1-010	8.256	8.747	0.491

LRS_ID_2017	FROM_2017	TO_2017	LENGTH_2017
077-05-1-010	0	3.457	3.457
033902188801991010	0	1.829	1.829
077-05-1-010	3.457	6.427	2.97
033901772703691020	0	0.491	0.491

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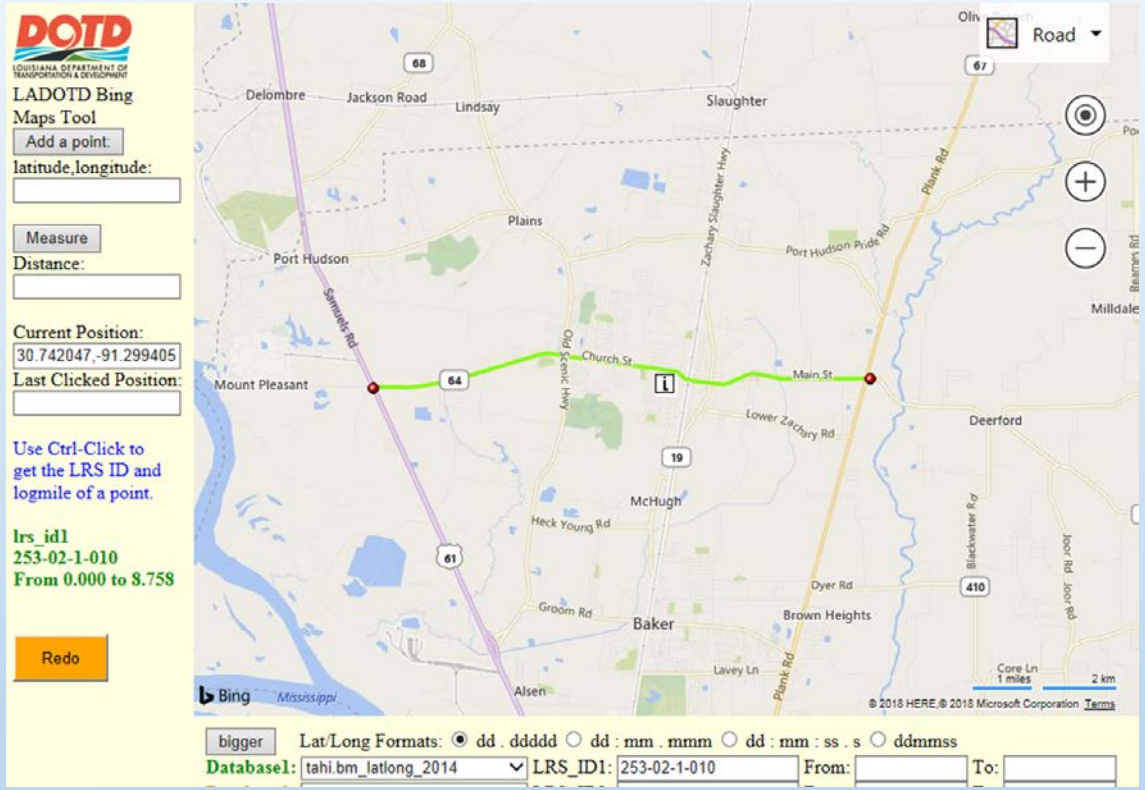
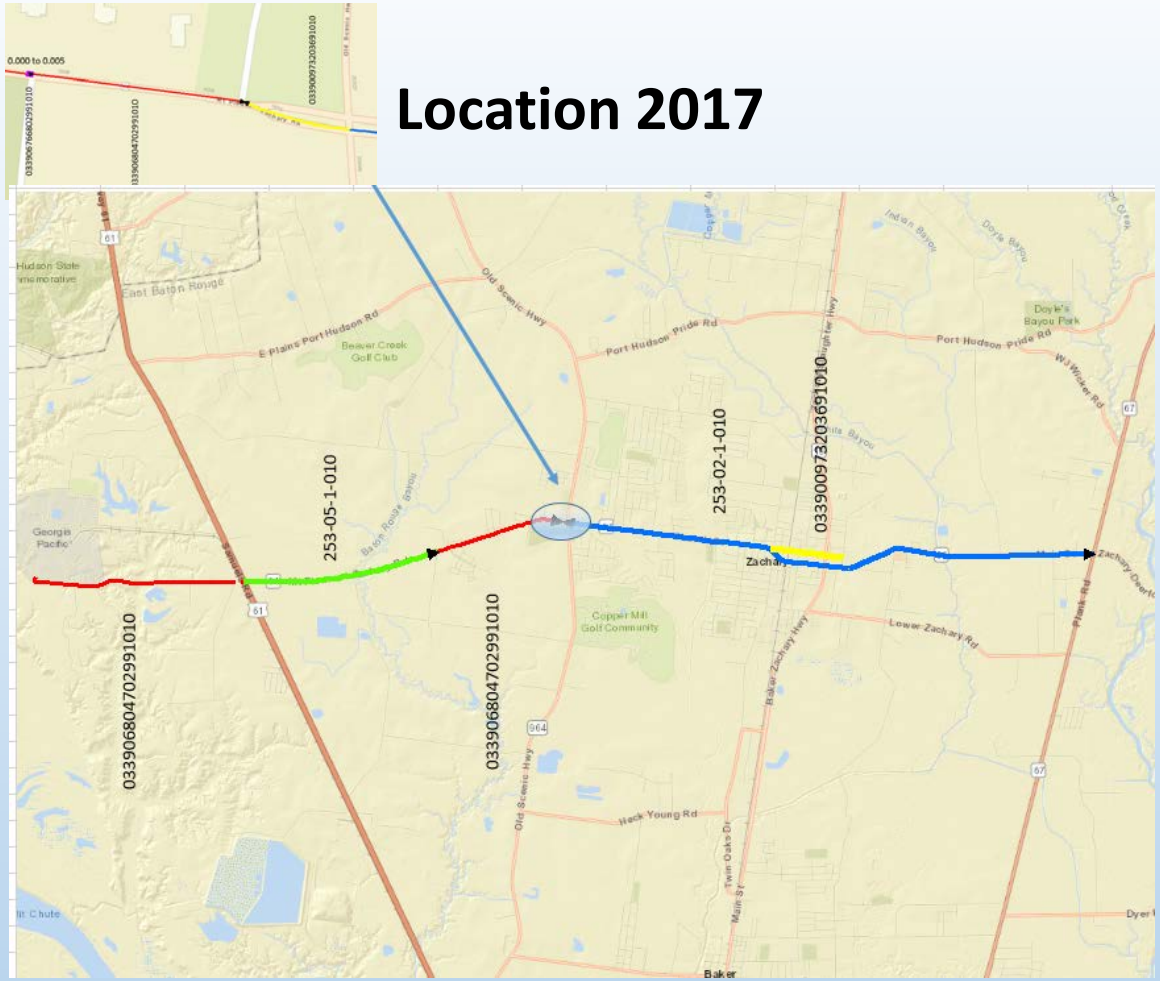
EXAMPLE 4

Location 2014



LRS_ID_2014	FROM_2014	TO_2014	LENGTH_2014
253-02-1-010	0	1.983	1.983
253-02-1-010	1.983	3.139	1.156
253-02-1-010	3.139	3.144	0.005
253-02-1-010	3.144	3.272	0.128
253-02-1-010	3.272	3.393	0.121
253-02-1-010	3.393	8.758	5.365
			8.758

Location 2017



LRS_ID_2017	FROM_2017	TO_2017	LENGTH_2017
253-05-1-010	0	1.983	1.983
033906804702991010	2.09	3.246	1.156
033906766802991010	0	0.005	0.005
033906804702991010	3.246	3.374	0.128
033900973203691010	0	0.066	0.066
253-02-1-010	0	5.365	5.365
			8.703

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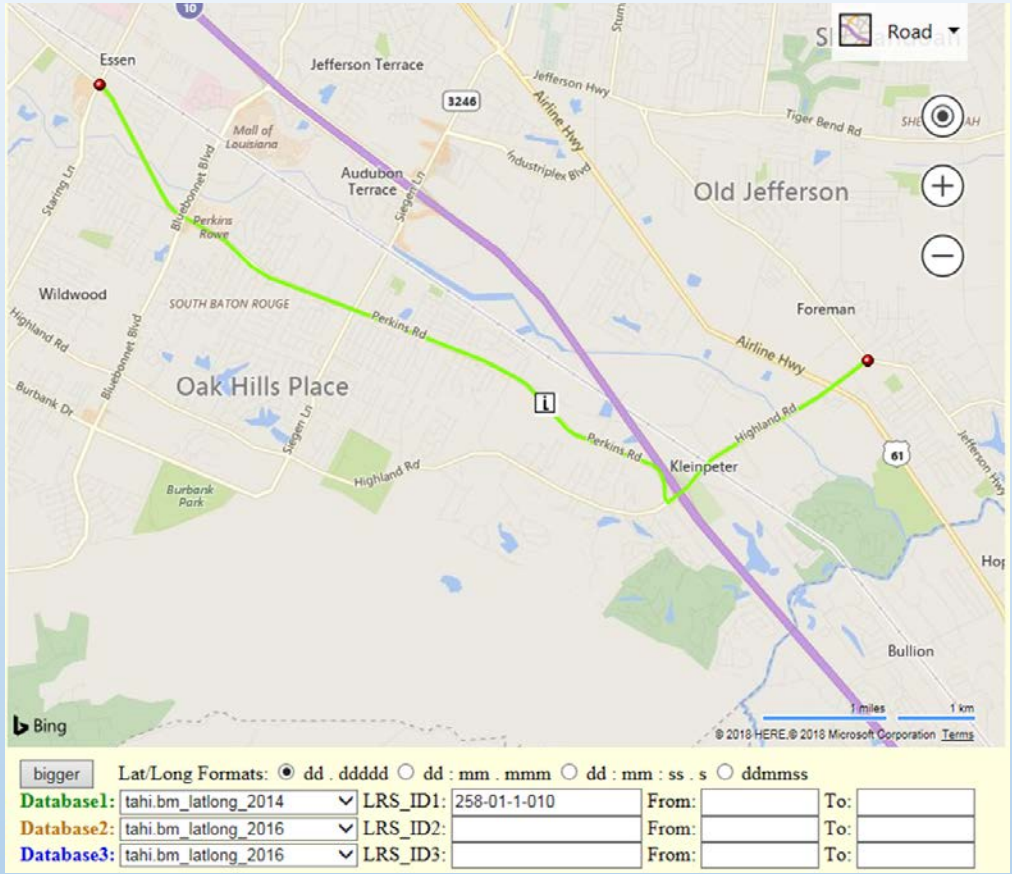
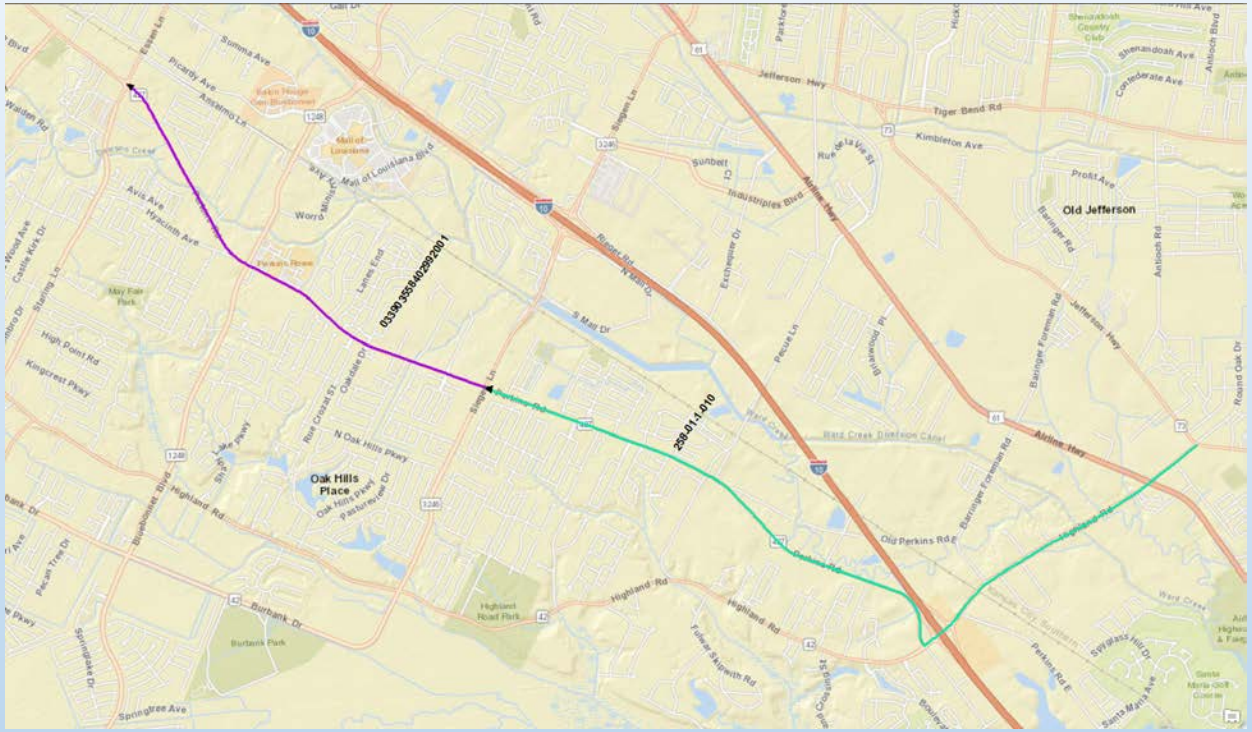
EXAMPLE 5

Location 2014



Location 2017



LRS_ID_2014	FROM_2014	TO_2014	LENGTH_2014
258-01-1-010	0	5.1913	5.1913
258-01-1-010	5.1913	8.1083	2.9170

LRS_ID_2017	FROM_2017	TO_2017	LENGTH_2017
258-01-1-010	0	5.1913	5.1913
033903558402992001	0	2.917	2.917

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Location 2014

LRS_ID_2014	FROM_2014	TO_2014	LENGTH_2014
030-32-1-010	0	0.9024	0.9024
030-32-1-010	0.9024	3.6479	2.7455
061-04-1-010	0	1.81	1.8100
061-04-1-010	1.81	2.25	0.4400
061-04-1-010	2.25	2.5710	0.3210
061-04-1-010	2.5710	13.507	10.9360
077-05-1-010	0	3.457	3.457
077-05-1-010	3.457	5.286	1.829
077-05-1-010	5.286	8.256	2.97
077-05-1-010	8.256	8.747	0.491
253-02-1-010	0	1.983	1.983
253-02-1-010	1.983	3.139	1.156
253-02-1-010	3.139	3.144	0.005
253-02-1-010	3.144	3.272	0.128
253-02-1-010	3.272	3.393	0.121
253-02-1-010	3.393	8.758	5.365
258-01-1-010	0	5.1913	5.1913
258-01-1-010	5.1913	8.1083	2.9170

Location 2017

LRS_ID_2017	FROM_2017	TO_2017	LENGTH_2017
117201037503691010	0	0.9024	0.9024
030-32-1-010	0	2.7455	2.7455
125901543403691010	0	1.81	1.81
125901042403691010	1.035	1.475	0.44
125902153802991010	0	0.321	0.321
061-04-1-010	0	10.9360	10.9360
077-05-1-010	0	3.457	3.457
033902188801991010	0	1.829	1.829
077-05-1-010	3.457	6.427	2.97
033901772703691020	0	0.491	0.491
253-05-1-010	0	1.983	1.983
033906804702991010	2.09	3.246	1.156
033906766802991010	0	0.005	0.005
033906804702991010	3.246	3.374	0.128
033900973203691010	0	0.066	0.066
253-02-1-010	0	5.365	5.365
258-01-1-010	0	5.1913	5.1913
033903558402992001	0	2.917	2.917

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LADOTD Perspectives That Needed To Be Exported

CONTROL
FRICTION
FRICTION_HISTORIC
CORE_LOG
GPR
GPR_CORE_VERIFICATION
HEALTH_INDEX
PMS_SECTION_2015
PMS_TENTH_1996
PMS_TENTH_1998
PMS_TENTH_2000
PMS_TENTH_2003
PMS_TENTH_2005
PMS_TENTH_2007
PMS_TENTH_2009
PMS_TENTH_2011
PMS_TENTH_2013
PMS_TENTH_2015
PMS_TREATMENT_HISTORY
PMS_TENTH_IDENTIFY
RWD_COLLECTED

Control Sectioning Exported From Perspective Where The Location Needs Conversion

TOPS__ROUTE	Road	From	From_Description	To	To_Description	Length
LA3124	030-32-1	0	Jct LA 21 - Begin Control	3.89		3.89
LA 10	061-04-1	0	Begin Control at E Ferry Ramp	13.57	E Fel Line - W End Br - End Control on LA 10	13.57
LA 64	253-02-1	0	Jct US 61 - Begin Control	8.77	Jct LA 67 - End Control	8.77
LA 948	258-01-1	0	Jct LA 73 - Begin Control	8.112		8.112
LA 73	077-05-1	0	N Jct US 61 - Begin Control	8.8		8.8

CONTROL SECTION PERSPECTIVE (BASE)

EXAMPLE OF LADOTD CONTROL SECTION MANUAL

Control Section	District	Parish	Length	Route	Limit From	Limit To
030-32	62	59	2.746	LA 3124	Bogalusa Corporate Limits (0.146 miles S of Pioneer St)	Bogalusa (Jct LA 10, on Richmond St at Louisiana Ave W bound)
061-04	61	63	10.937	LA 10	St. Francisville (Jct US 61 SB)	Jackson (E Feliciana Ph Line, W end Thompson Creek Br)
077-05	61	17	6.431	LA 73	Acadian Place (Jct US 61 N bound)	Baton Rouge (Jct Local Rd, on Government St at East Blvd)
253-02	61	17	5.365	LA 64	Zachary (Jct LA 964)	Fred (Jct LA 67, E of Zachary)
258-01	61	17	5.191	LA 42 LA 427 LA 948	Old Jefferson (Jct LA 73, on Highland Rd at Jefferson Hwy)	Village of St. George (Jct LA 3246, on Perkins Rd at Siegen Ln)
253-05	61	17	1.983	LA 64-1	Jct US 61 S Bound (W of Zachary)	Zachary (Jct Local Rd, on E Mt. Pleasant-Zachary Rd at Barnett Rd)

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CONTROL SECTION PERSPECTIVE (BASE)

Update the Control Section With New Location Information and Description Information from Control Section Manual

TOPS__ROUTE	Road	From	From_Description	To	To_Description	Length	
LA3124	030-32-1	0	Bogalusa Corporate Limits (0.146 miles S of Pioneer St	2.746	Bogalusa (Jct LA 10, at Louisiana Ave W bour	2.746	(
LA3124	117201037503691010-1	0	Jct LA 21 - Begin Control	0.9024		0.9024	1
LA 10	125901543403691010-1	0	Begin Control at E Ferry Ramp	1.81	E Fel Line - W End Br - End Control on LA 10	1.81	1
LA 10	125901042403691010-1	1.035	Begin Control at E Ferry Ramp	1.475	E Fel Line - W End Br - End Control on LA 10	0.44	1
LA 10	125902153802991010-1	0	Begin Control at E Ferry Ramp	0.321	E Fel Line - W End Br - End Control on LA 10	0.321	1
LA 10	061-04-1	0	St. Francisville (Jct US 61 SB)	10.936	Jackson (E Feliciana Ph Line, W end Thomps	10.936	(
LA 73	077-05-1	0	Acadian Place (Jct US 61 N bound)	3.457		3.457	(
LA 73	033902188801991010-1	0	N Jct US 61 - Begin Control	1.829		1.829	(
LA 73	077-05-1	3.457		6.427	Baton Rouge (Jct Local Rd, on Government S	2.97	(
LA 73	033901772703691020-1	0	N Jct US 61 - Begin Control	0.544		0.544	(
LA 64	253-05-1	0	Jct US 61 S Bound (W of Zachary)	1.983	Zachary (Jct Local Road at Barnett Rd)	8.77	2
LA 64	033906804702991010-1	2.09	Jct US 61 - Begin Control	3.374	Jct LA 67 - End Control	1.289	(
LA 64	033900973203691010-1	0	Jct US 61 - Begin Control	0.066	Jct LA 67 - End Control	0.066	(
LA 64	253-02-1	0	Zachary (Jct LA 964)	5.365	Fred (Jct LA 67, E of Zachary)	5.365	2
LA 948	258-01-1	0	Old Jefferson (Jct LA 73, on Highland Rd at Jefferson H	5.1913	Village of St. George (Jct LA 3246 at Siegen)	5.1913	2
LA 948	033903558402992001-1	0	Jct LA 73 - Begin Control	2.917		2.917	(

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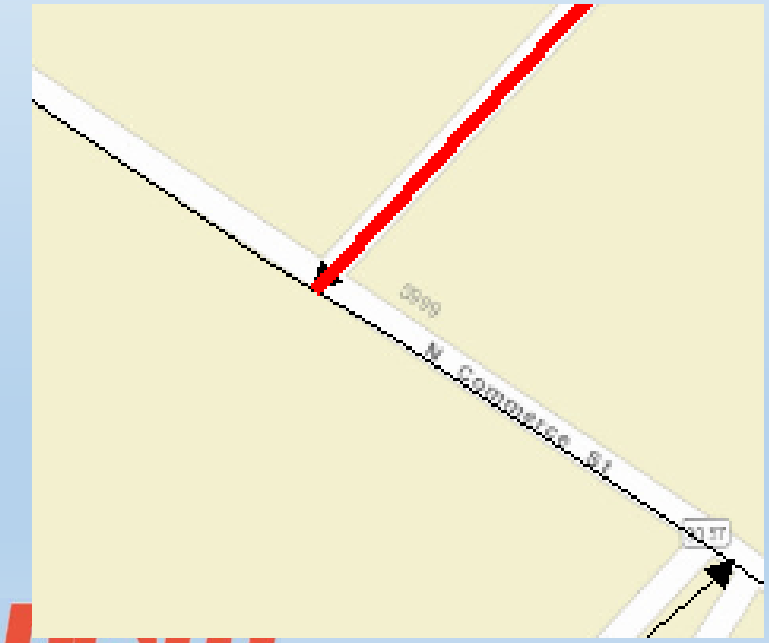
CONTROL SECTION PERSPECTIVE (BASE)

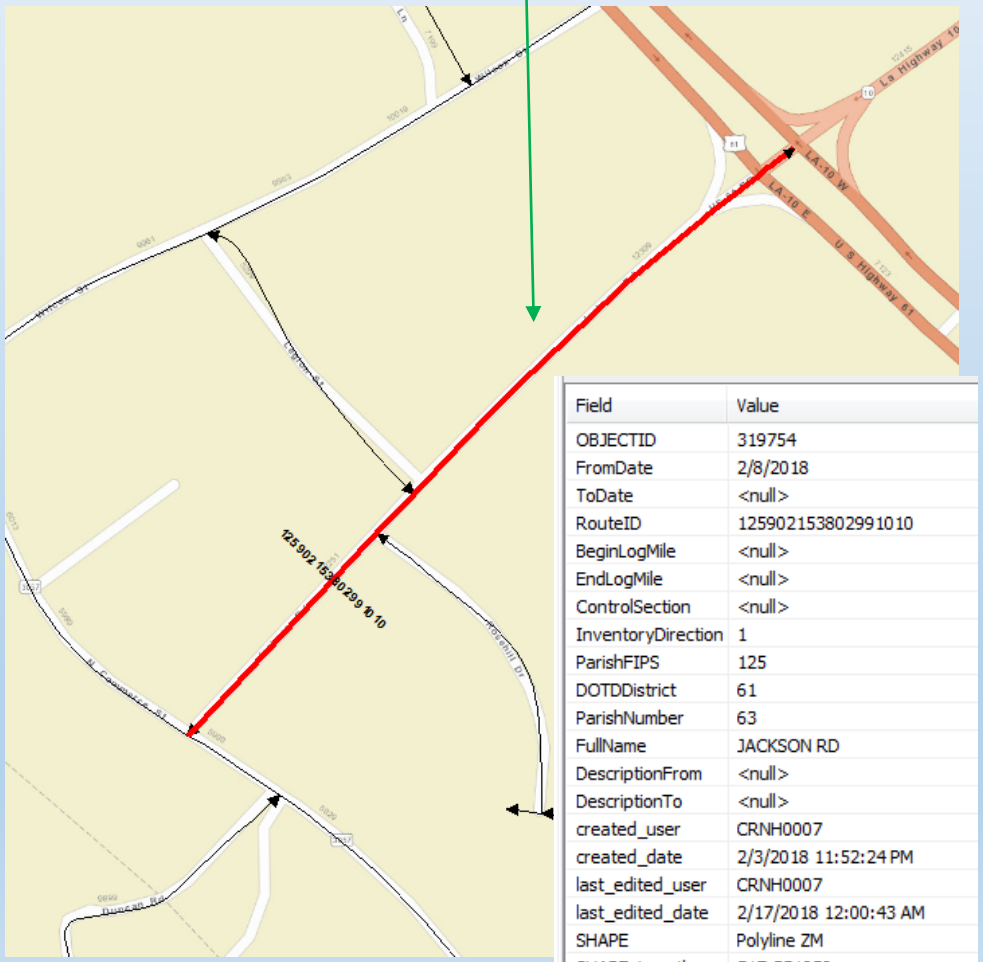
City Street Name, From Description and To Description

Used ArcGIS basemap from LADOTD Mapping unit for each city street LRS_ID.

Zoom To beginning



Click on LRS line and get street name



Field	Value
OBJECTID	319754
FromDate	2/8/2018
ToDate	<null>
RouteID	125902153802991010
BeginLogMile	<null>
EndLogMile	<null>
ControlSection	<null>
InventoryDirection	1
ParishFIPS	125
DOTDDistrict	61
ParishNumber	63
FullName	JACKSON RD
DescriptionFrom	<null>
DescriptionTo	<null>
created_user	CRNH0007
created_date	2/3/2018 11:52:24 PM
last_edited_user	CRNH0007
last_edited_date	2/17/2018 12:00:43 AM
SHAPE	Polyline ZM
SHAPE_Length	517.551959

Zoom To Ending

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CONTROL SECTION PERSPECTIVE (BASE)

EXAMPLE OF LIST OF CITY STREET DESCRIPTION FOUND FROM MAP

Road	STREET	From_Description	To_Description
1172010375036910 10-1	S Columbia St	LA 21	Bogalusa City Limits
1259015434036910 10-1	Ferdinand St	Dead End 0.18 Miles S of River Road	Commerce St
1259010424036910 10-1	Commerce St	South Jct US 61	North Jct US 61
1259021538029910 10-1	Jackson Rd	N Commerce St	LA-10 W
0339021888019910 10-1	Jefferson Hwy	Corporate Blvd	Government St
0339017727036910 20-1	Government St	East Blvd	River Rd
0339068047029910 10-1	E Mount Pleasant Zachary Rd	Church St (Gap in section)	W Mount Pleasant Zachary Rd
0339009732036910 10-1	Church St	Old Scenic Hwy	E Mount Pleasant Zachary Rd
0339035584029920 01-1	Perkins Rd	Staring Ln	Siegen Ln

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CONTROL SECTION PERSPECTIVE (BASE)

Update the Control Section With New Location Information and Description Information from Basemap

TOPS__ROUTE	Road	From	From_Description	To	To_Description	Length	
S Columbia St	117201037503691010-1	0	LA 21	0.9024	Bogalusa City Limits	0.9024	1
LA3124	030-32-1	0	Bogalusa Corporate Limits (0.146 miles S of Pi	2.746	Bogalusa (Jct LA 10, at Louisiana Ave W bour	2.746	0
Ferdinand St	125901543403691010-1	0	Dead End 0.18 Miles S of River Road	1.81	Commerce St	1.81	1
Commerce St	125901042403691010-1	1.035	South Jct US 61	1.475	North Jct US 61	0.44	1
Jackson Rd	125902153802991010-1	0	N Commerce St	0.321	LA-10 W	0.321	1
LA 10	061-04-1	0	St. Francisville (Jct US 61 SB)	10.936	Jackson (E Feliciana Ph Line, W end Thomps	10.936	0
LA 73	077-05-1	0	Acadian Place (Jct US 61 N bound)	3.457		3.457	0
Jefferson Hwy	033902188801991010-1	0	Corporate Blvd	1.829	Government St	1.829	0
LA 73	077-05-1	3.457		6.427	Baton Rouge (Jct Local Rd, on Government S	2.97	0
Government St	033901772703691020-1	0	East Blvd	0.544	River Rd	0.544	0
LA 64	253-05-1	0	Jct US 61 S Bound (W of Zachary)	1.983	Zachary (Jct Local Road at Barnett Rd)	8.77	2
E Mount Pleasant Zachary Rd	033906804702991010-1	2.09	Church St (Gap in section)	3.374	W Mount Pleasant Zachary Rd	1.289	0
Church St	033900973203691010-1	0	Old Scenic Hwy	0.066	E Mount Pleasant Zachary Rd	0.066	0
LA 64	253-02-1	0	Zachary (Jct LA 964)	5.365	Fred (Jct LA 67, E of Zachary)	5.365	2
LA 948	258-01-1	0	Old Jefferson (Jct LA 73, on Highland Rd at Jef	5.1913	Village of St. George (Jct LA 3246 at Siegen)	5.1913	2
Perkins Rd	033903558402992001-1	0	Staring Ln	2.917	Siegen Ln	2.917	0

Increased Text Size to 30 because street names are longer

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FRICTION HISTORIC Exported From Repeating Point Perspective That Location Needs Conversion

Then, I calculate the From and To based on the information we collected while looking at maps between 2014 and 2017. Increase width of CSECT and ROUTE to accommodate CITY LRS and street name

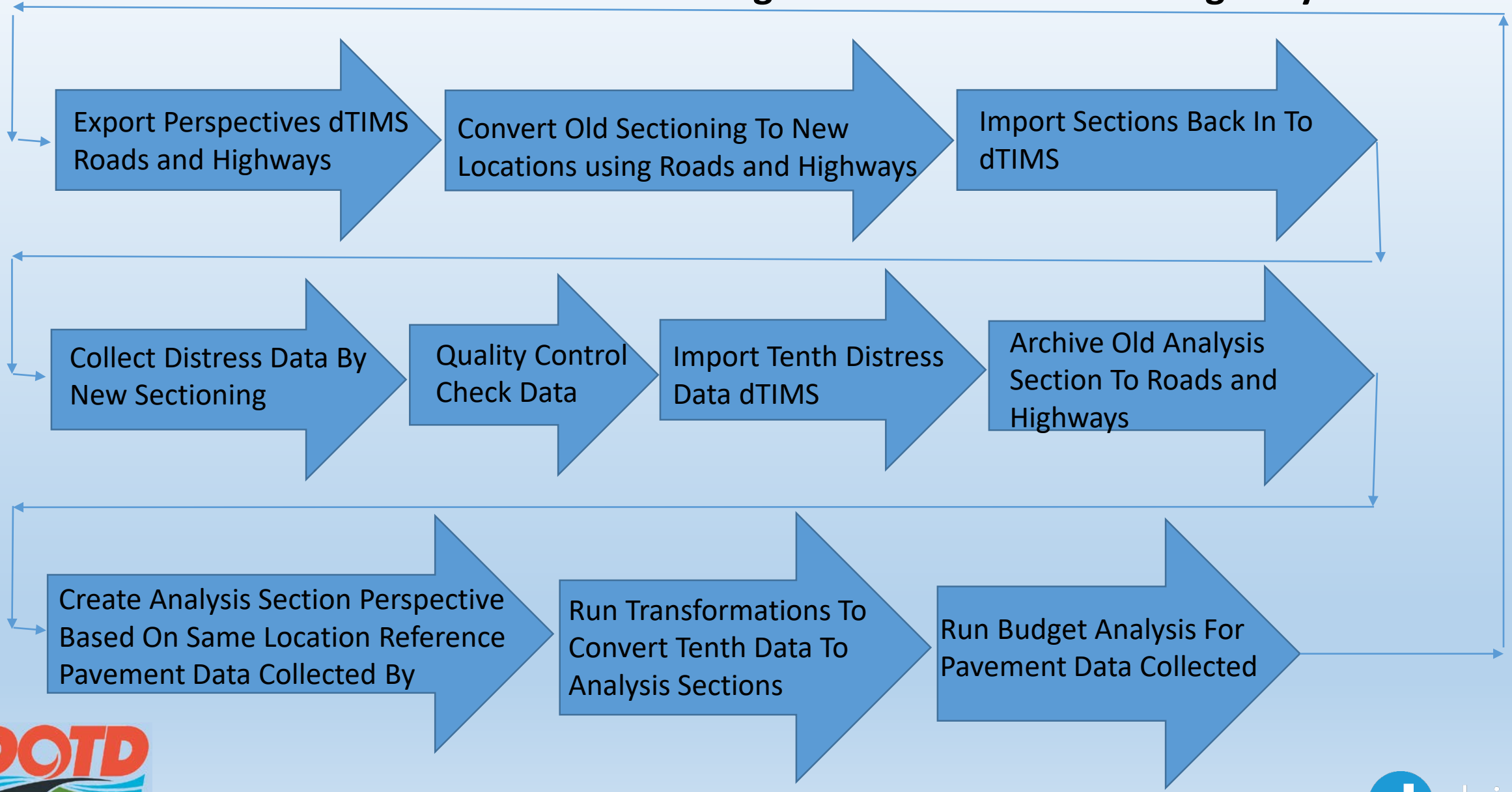
Road	From	ElementID	CSECT	DIRECTION	LOGMILE	ROUTE
117201037503691010-1	0.08	117201037503691010-1-00.09_2013	117201037503691010	1	0.08	S Columbia St
117201037503691010-1	0.23	117201037503691010-1-00.24_2013	117201037503691010	1	0.23	S Columbia St
117201037503691010-1	0.51	117201037503691010-1-00.52_2013	117201037503691010	1	0.51	S Columbia St
117201037503691010-1	0.77	117201037503691010-1-00.78_2013	117201037503691010	1	0.77	S Columbia St
030-32-1	0.1076	030-32-1-00.11_2013	030-32	1	0.1076	LA3124
030-32-1	0.3576	030-32-1-00.36_2013	030-32	1	0.3576	LA3124
030-32-1	0.6076	030-32-1-00.61_2013	030-32	1	0.6076	LA3124
030-32-1	0.8576	030-32-1-00.86_2013	030-32	1	0.8576	LA3124
030-32-1	1.0976	030-32-1-01.10_2013	030-32	1	1.0976	LA3124
030-32-1	1.3676	030-32-1-01.37_2013	030-32	1	1.3676	LA3124
030-32-1	1.8676	030-32-1-01.87_2013	030-32	1	1.8676	LA3124
030-32-1	2.1176	030-32-1-02.12_2013	030-32	1	2.1176	LA3124
030-32-1	2.3476	030-32-1-02.35_2013	030-32	1	2.3476	LA3124
030-32-1	2.5976	030-32-1-02.60_2013	030-32	1	2.5976	LA3124

Subtracted 0.9024 from the original From location and LOGMILE fields.

LRS_ID_2014	FROM_2014	TO_2014	LENGTH_2014
030-32-1-010	0	0.9024	0.9024
030-32-1-010	0.9024	3.6479	2.7455

LRS_ID_2017	FROM_2017	TO_2017	LENGTH_2017
117201037503691010	0	0.9024	0.9024
030-32-1-010	0	2.7455	2.7455

The Process After dTIMS Integration With Roads and Highways



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Process Agenda

- Interoperability
- Legacy situation
- Solution Overview – Case Study
- Questions

dTIMS Enterprise

- Interoperability
- Authoritative LRS

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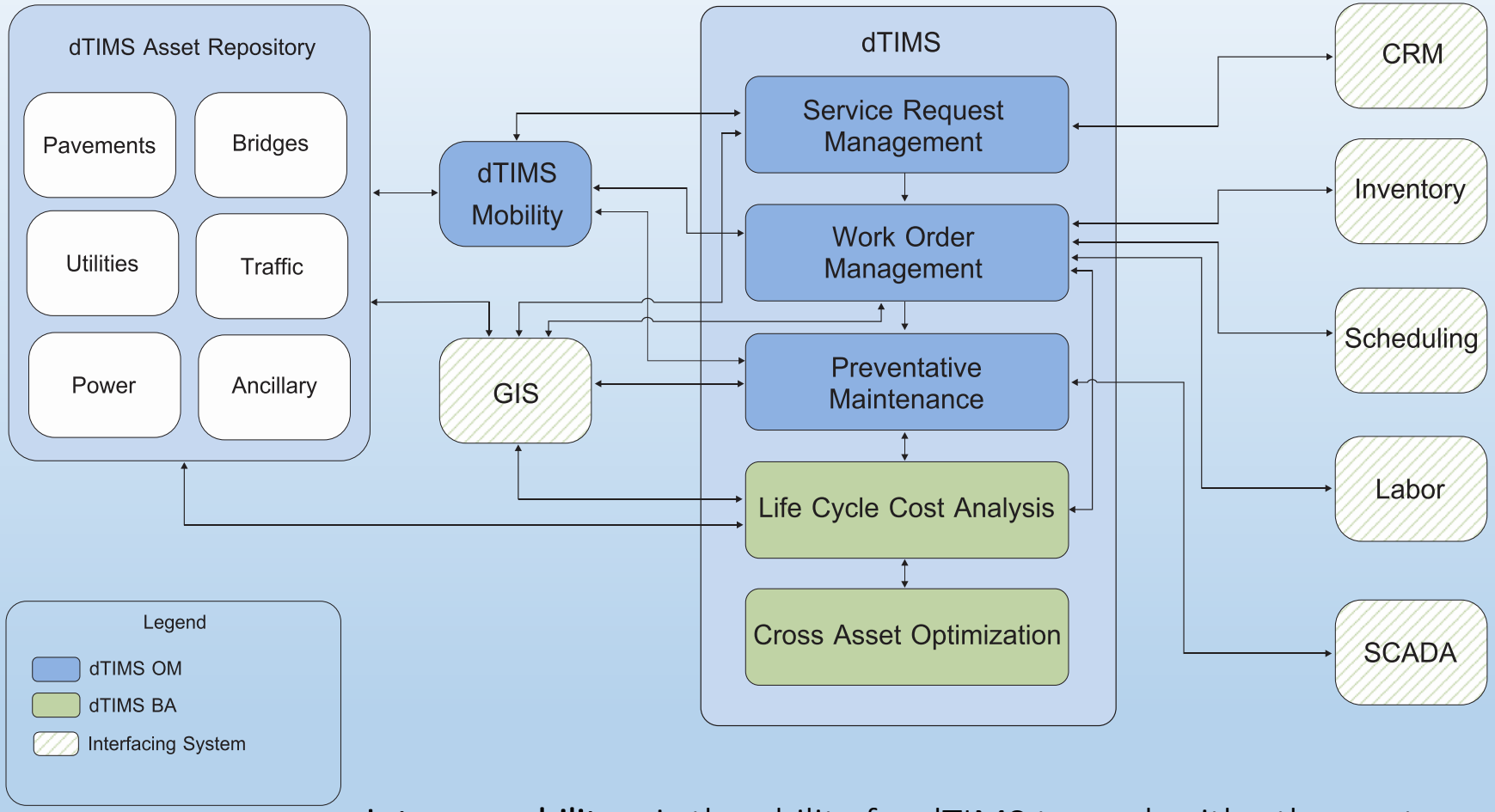
Interoperability

dTIMS Enterprise



Interoperability - is the ability for dTIMS to work with other systems or products without special effort on the part of the user.

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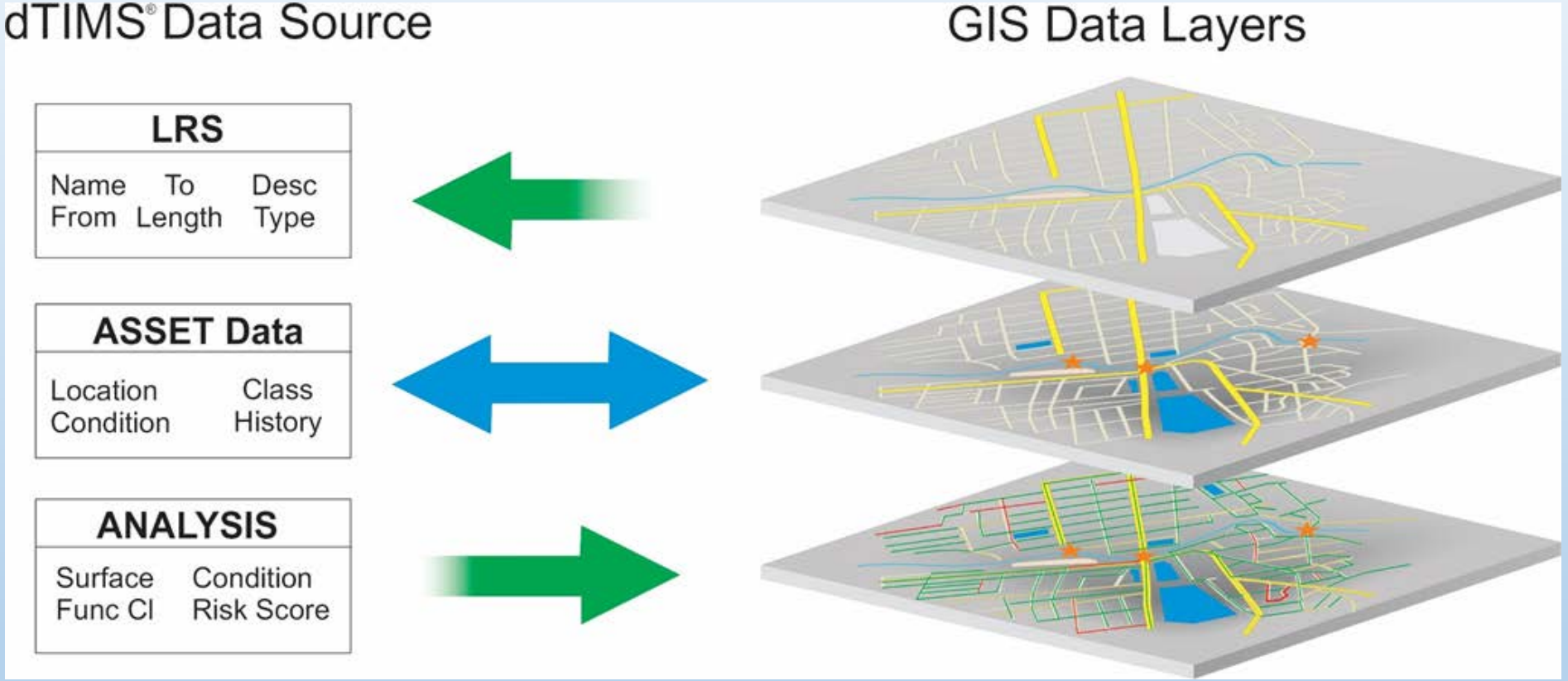
Authoritative LRS

dTIMS Enterprise



dTIMS has the ability to seamlessly **connect to an agency's authoritative LRS** and GIS system

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Why Integrate?

- GIS & Linear referencing Issues
- Move to the Enterprise
- Standardized Enterprise Reference
- Integrated Business Records
- Manage Change

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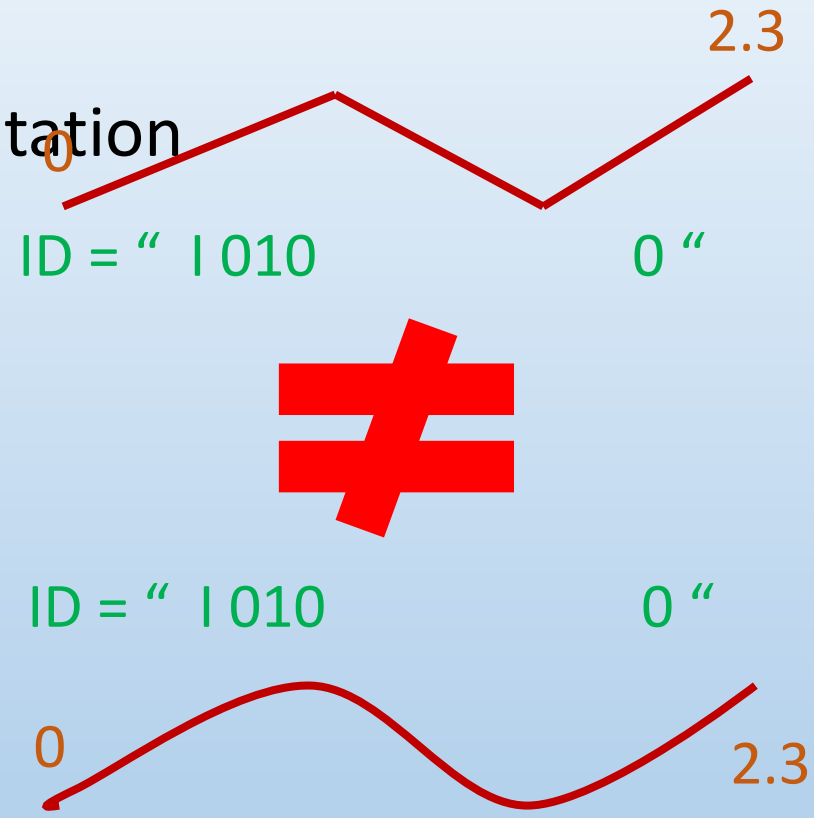
Why Integrate?

GIS & Linear Referencing Issues

- Multiple Networks, Multiple Representation
  - Mix of Route ID-ing
  - GIS Keeps Changing
  - Different Measures/Calibration
  - Temporality/History
  - Different Underlying Networks (Disconnected)
  - Delete/Replace Alters Analysis



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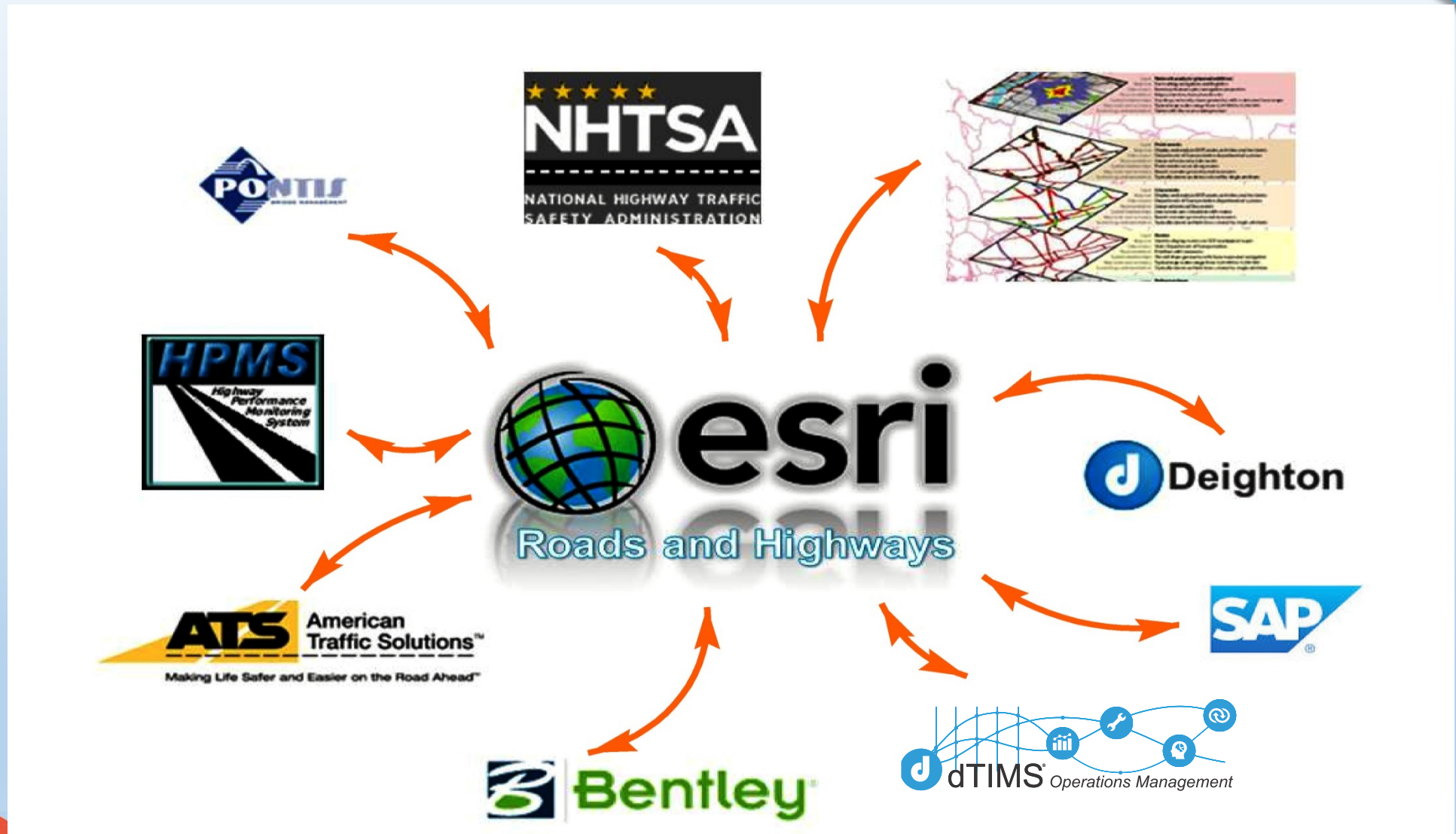
Move to the Enterprise

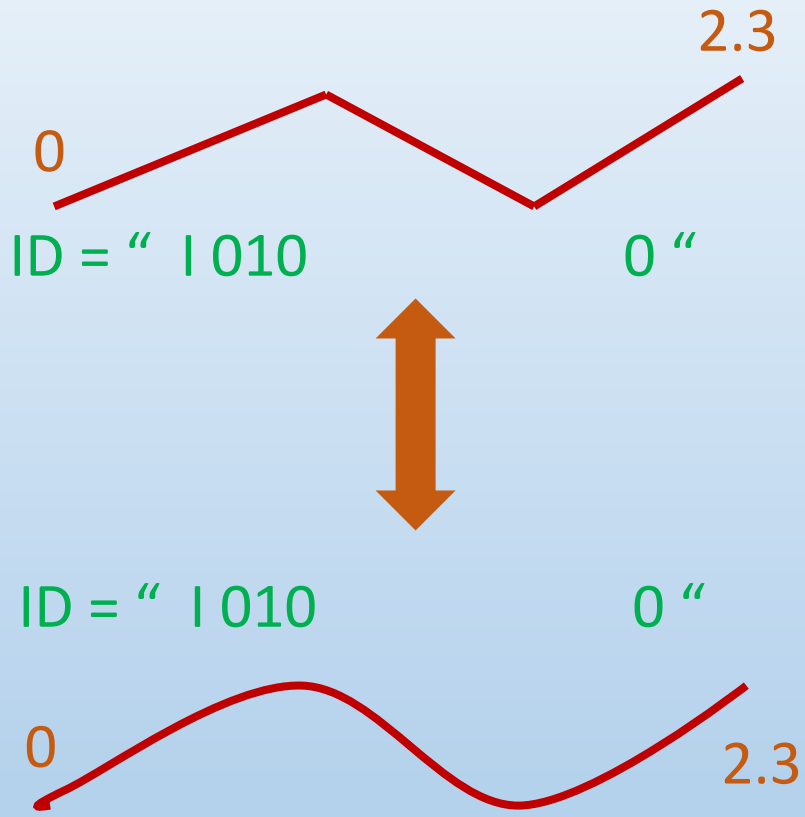
Why Integrate?



Why Integrate?

Standardized Enterprise Reference

- 1 Road, 1 Representation
  - Route ID (Agency Naming Standard)
  - Multiple Linear Measuring/Referencing System (LRS)
  - Geographic Length/Calibrated Length
  - Beginning and Ending Referents & Offsets



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Why Integrate?

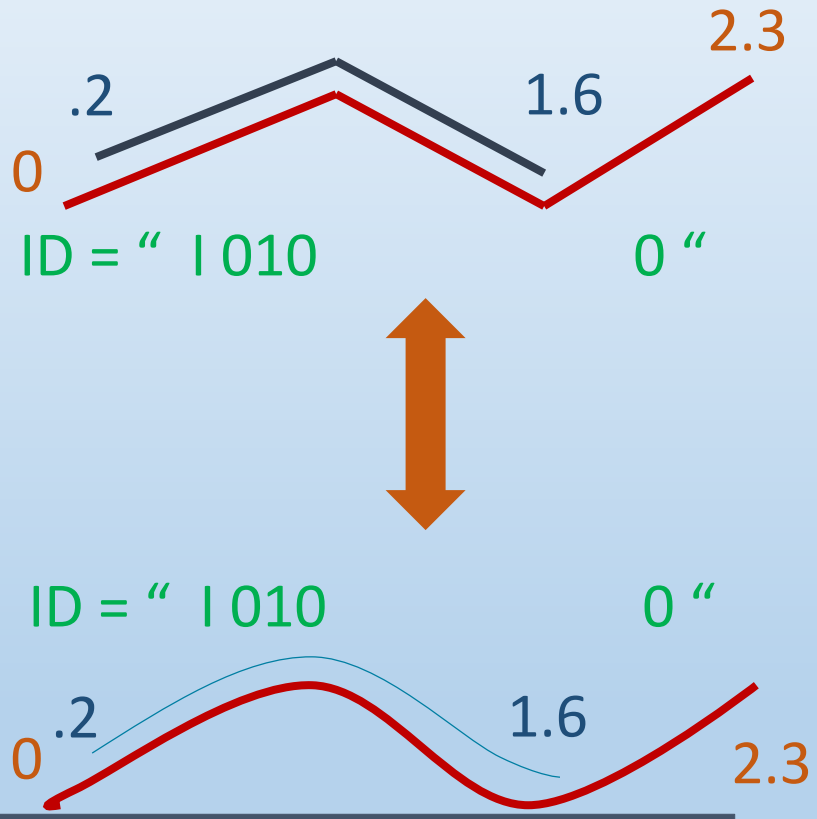
Integrated Business Records (Events)

- Business Data Tied Together

  Established Business Data

  - Pavement
  - Traffic
  - Assets
  - Characteristics

  Assigned Event Behaviors



Business Data Tied Together

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Why Integrate?

Manage Change

- What happens to business data when the underlying route network/LRS is changed?
  - Change in route measures
  - Change in route geometry (shape)
  - Retired portions of / complete routes
- Features
  - Maintain All Transactions
  - Maintain Temporality of Transactions
  - Time-Slicing History
  - Configure Event Behavior

Integrate not Replicate

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Benefits

- Better Data Management
- Seamless User Experience

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Benefits

Better Data Management

- Automated Procedures/Batch Processes
- More Frequent Execution/Updates
- Web Services – Thin Client
- Distributed Data Ownership – Reduced Maintenance
- Access to Other Systems Data

Integrate not Replicate

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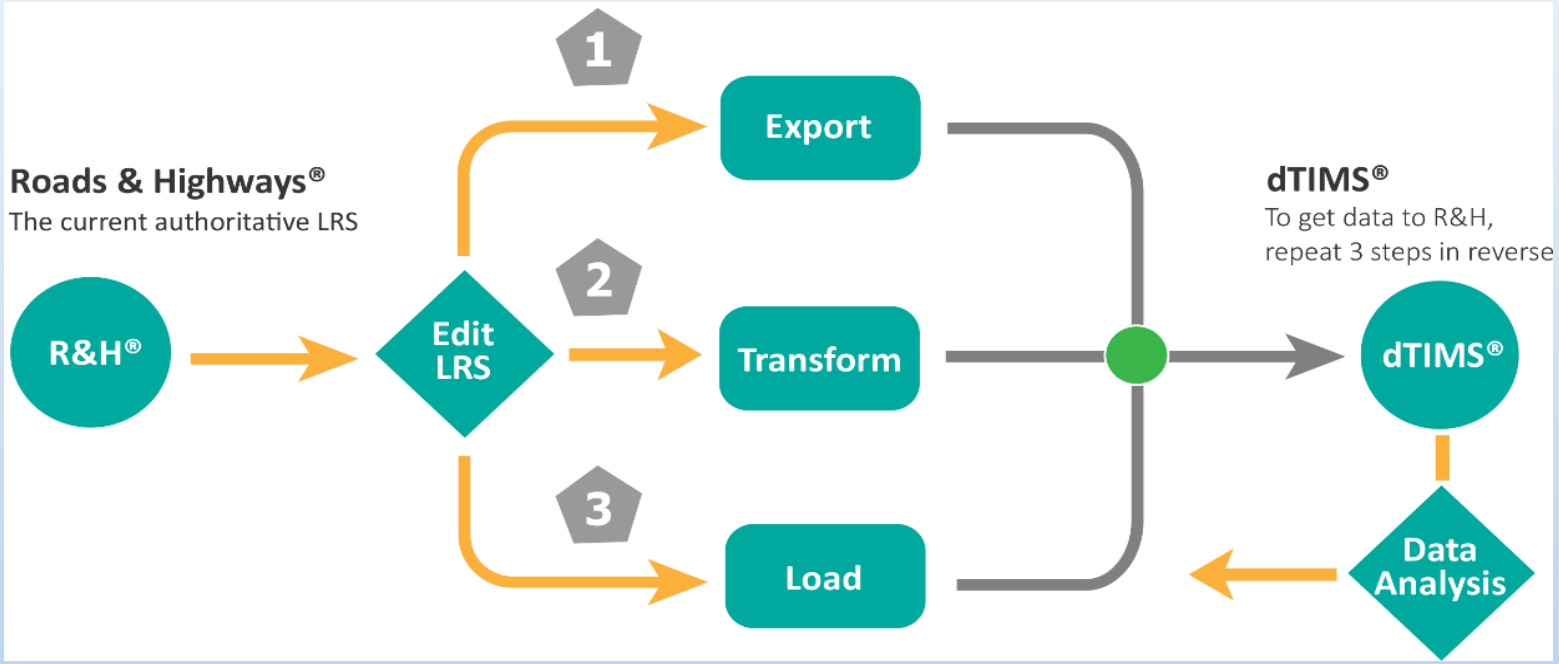
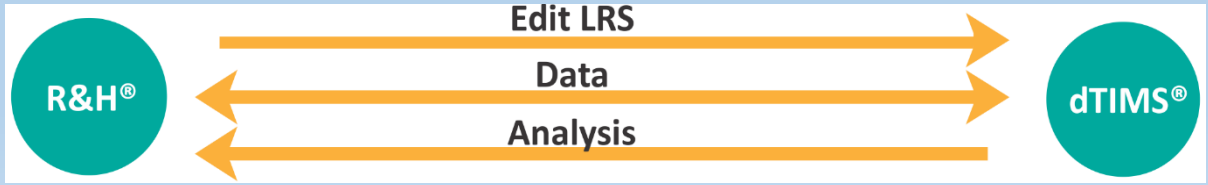
Seamless User Experience

Benefits

Before



After



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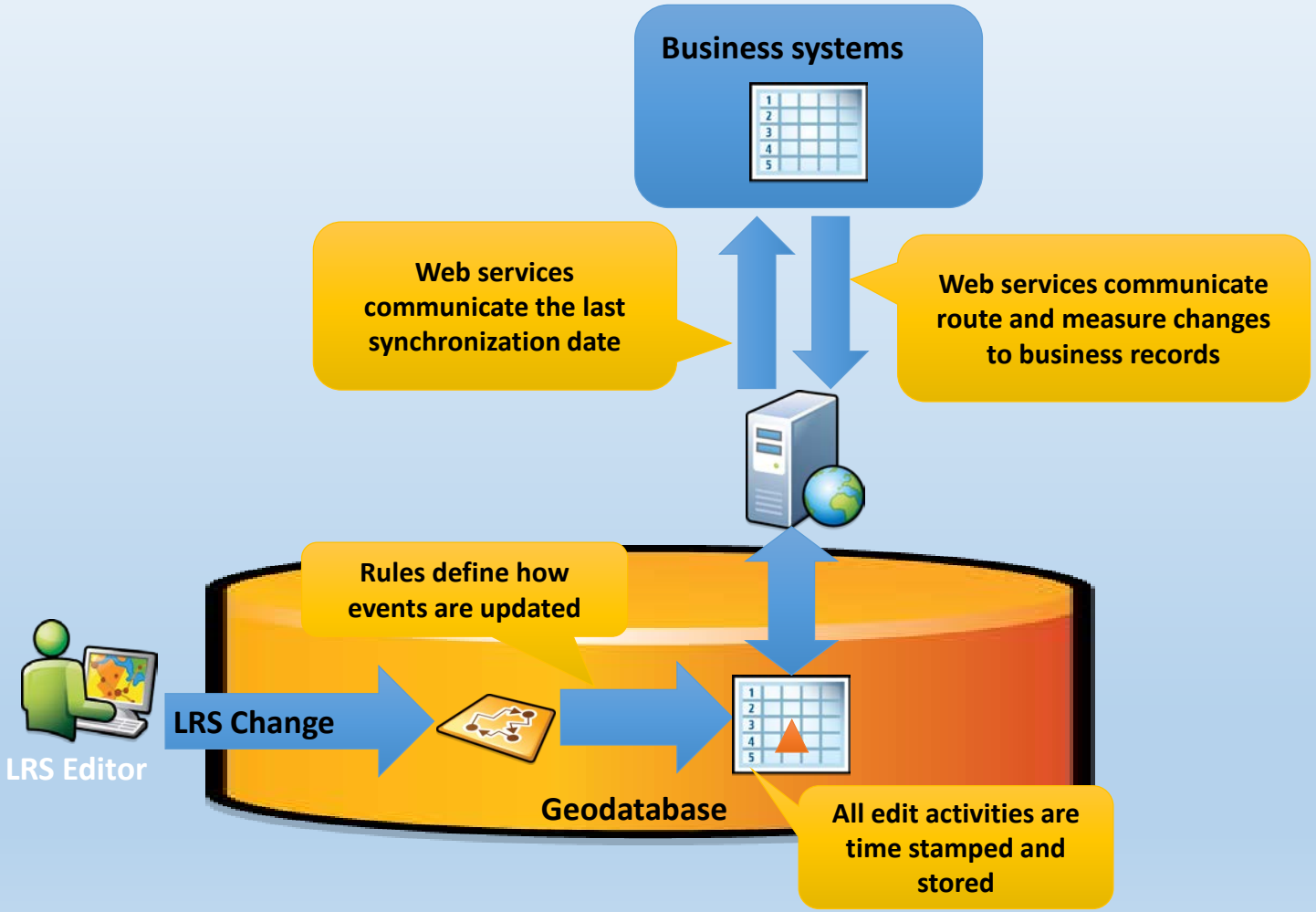
Process

- Integration Profile
- Roads & Highways Basic Concepts
- R&H External System Integration

Process

Integration Profile



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Roads & Highways Basic Concepts

Process

Routes_RoadName

SystemCode	RouteNameFull	FeatureTypeCode	SequenceNumbe	RoadNameID *
USH	US 61	Cross-over between carriageways of roadways	080	USH_US 61_X_080
USH	US 61	Cross-over between carriageways of roadways	180	USH_US 61_X_180
USH	US 65	opposite direction of control section or roadway	010	USH_US 65_2_010
USH	US 90 BUS	main direction of control section or roadway	010	USH_US 90 BUS_1_010
USH	US 90	frontage road in the main direction of control section or road	100	USH_US 90_3_100
USH	US 90	frontage or service road in the opposite direction of control s	040	USH_US 90_4_040

RHDEV.DBO.CenterlineSequence

OBJECTID *	FromDate	ToDate	NetworkId	RouteId	RoadwayIdGuid
608681	9/9/2015	<Null>	Routes_RoadName	001_10 SPOT DR_1_010	{C8D7809D-DEB4-4D9D-9794-A28E8CE92E84}
608682	9/9/2015	<Null>	Routes_RoadName	001_10TH ST_1_010	{5CA4BB32-77AC-4D29-A047-803E7E83E479}
608683	9/9/2015	<Null>	Routes_RoadName	001_10TH ST_1_010	{F6E3CD7A-FD04-496D-960D-908FE41C4209}
608684	9/9/2015	<Null>	Routes_RoadName	001_10TH ST_1_020	{593A379D-345F-419C-A377-D2451C31387E}
608685	9/9/2015	<Null>	Routes_RoadName	001_11TH ST_1_010	{AD8D2AE3-19F1-46BD-9EE3-6F47E00518D7}
608686	9/9/2015	<Null>	Routes_RoadName	001_11TH ST_1_010	{E4CD30FC-7FD4-4200-B662-E98E1E302B80}

RHDEV.DBO.Centerline

OBJECTID *	FromDate	ToDate	RoadwayIdGuid	SHAPE *
1	9/9/2015	<Null>	{010CE82A-2A91-414F-8DAB-F1E4343073A3}	Polyline Z
2	9/9/2015	<Null>	{87F4F39C-D912-4252-825F-9961CD59628C}	Polyline Z
3	9/9/2015	<Null>	{FC3E568F-BFE7-45E6-AECA-BEE1FDAF1ECC}	Polyline Z
4	9/9/2015	<Null>	{CEA8AD87-5209-42A4-AFB7-D5B878CB1AEC}	Polyline Z
5	9/9/2015	<Null>	{CC23A8A5-4EC5-484E-8B04-F922FA079EE9}	Polyline Z
6	9/9/2015	<Null>	{4AD4C275-5567-448A-8EDA-0FE5C7D7A95E}	Polyline Z

RHDEV.DBO.CalibrationPoint

OBJECTID *	FromDate *	ToDate *	NetworkId *	RouteId *	Measure	SHAPE *
640401	9/9/2015	<Null>	Routes_RoadName	001_10 SPOT DR_1_010	0	Point Z
640402	9/9/2015	<Null>	Routes_RoadName	001_10 SPOT DR_1_010	0.055514	Point Z
640403	9/9/2015	<Null>	Routes_RoadName	001_10TH ST_1_010	0	Point Z
640404	9/9/2015	<Null>	Routes_RoadName	001_10TH ST_1_010	0.169596	Point Z
640405	9/9/2015	<Null>	Routes_RoadName	001_10TH ST_1_020	0	Point Z
640406	9/9/2015	<Null>	Routes_RoadName	001_10TH ST_1_020	0.059026	Point Z

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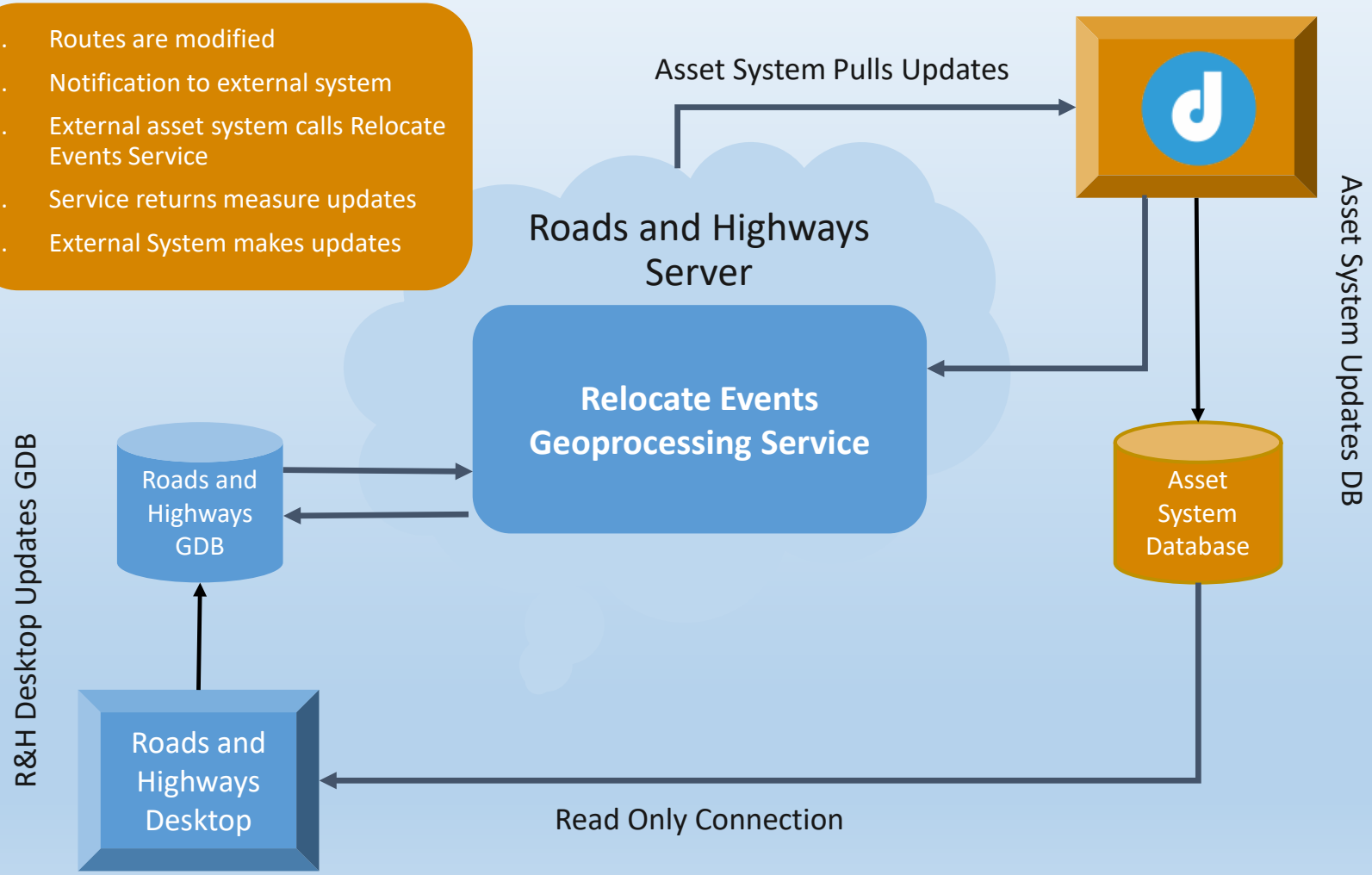
Process

R&H External System Integration

1. Routes are modified
2. Notification to external system
3. External asset system calls Relocate Events Service
4. Service returns measure updates
5. External System makes updates



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R&H REST Services

Process

ArcGIS REST Services Directory

Home > services > RCE1021 (MapServer) > LRSServer

JSON | SCHEMA

LRSServer

currentVersion: 10.21

capabilities:

networkLayers: (1)

- ATIS Routes

eventLayers: (6)

- Alias
- Functional Class
- Speed Limit
- Lanes
- MMS_Org_Segments
- Count Stations ADOT

ArcGIS REST Services Directory

Home > services > RCE1021 (MapServer) > LRSServer > networkLayers: 11 > *geometryToMeasure*

geometryToMeasure(networkLayers: 11)

locations

tolerance

temporalViewDate

inSR

gdbVersion

Format (f) html

geometryToMeasure (GET) geometryToMeasure (POST)

Supported Operations: geometryToMeasure measureToGeometry queryAttributeSet checkEvents

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Case Study

- Indiana Department of Transportation
- Challenges
- Enterprise Integration Service

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INDOT Case Study - Overview

Case Study

The case study consists of two main components: *services* and *software*.

Services:

1. Develop integration path between R&H and dTIMS so both applications use the same LRS.

2. Build on the LRS integration to allow dTIMS to consume data directly from R&H or any other external data warehouse built on the same LRS. This reduces the need to import data directly into dTIMS.

3. Allow dTIMS to push data directly back to R&H reducing the need to export data directly from dTIMS.

Software:

1. Integration service (workflows and execution requests).

2. dTIMS Business Analytics

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Challenges

Case Study

1. Data Size
   - Number or records
   - One Location
2. Time
   - Import and export
   - Load then error check
3. System of Record
   - Multiple copies of same data
   - Updating data
   - How do you update in other systems
4. Working with External Data
   - Spatial vs Linear
   - Dynamic Segmentation
5. Temporal Network Definition
   - Same network at different times
   - Same storage for spatial and linear data
6. Enterprise Integration
   - Need dTIMS features
   - Central Data Repository
   - Need better reporting

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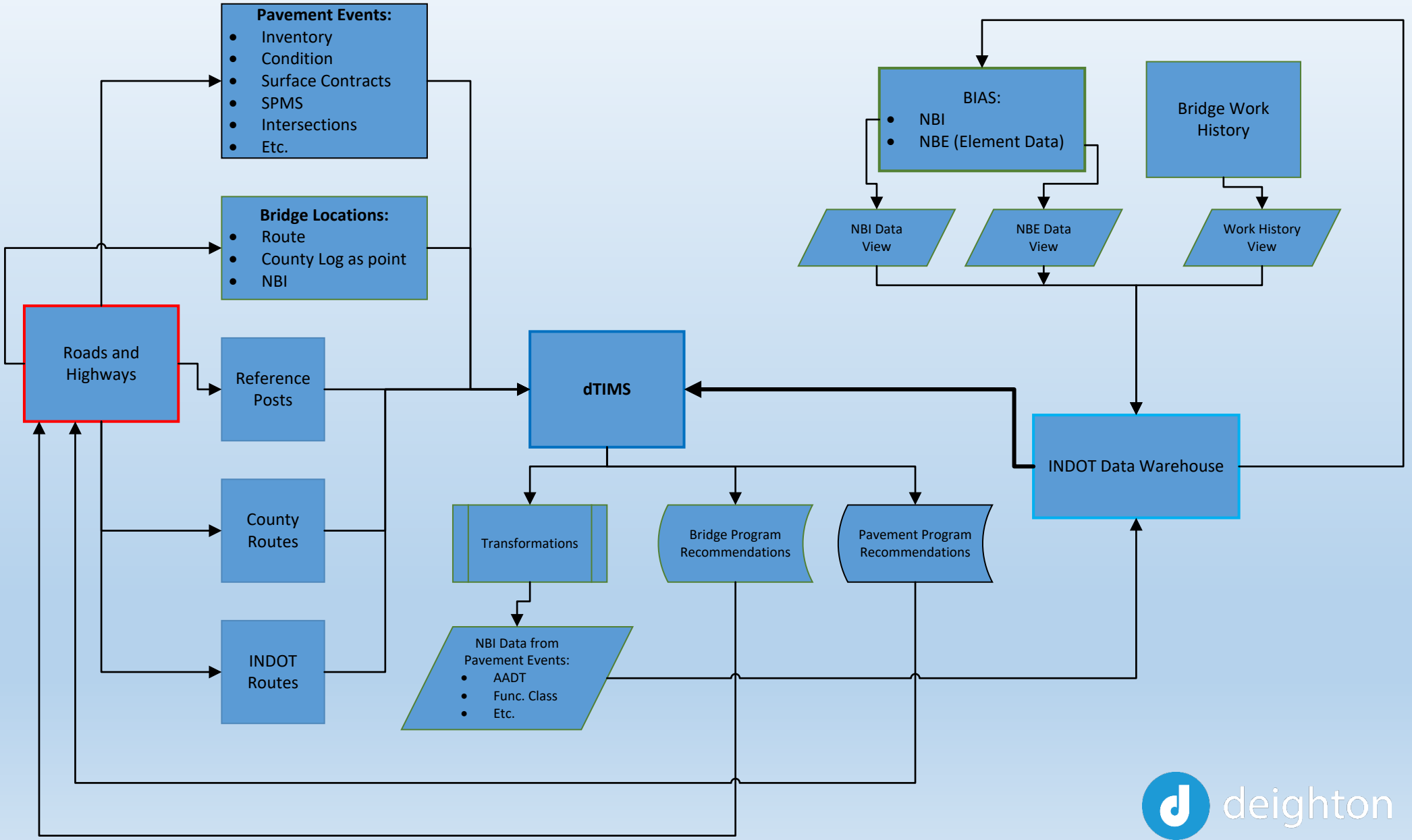
INDOT Data Workflow



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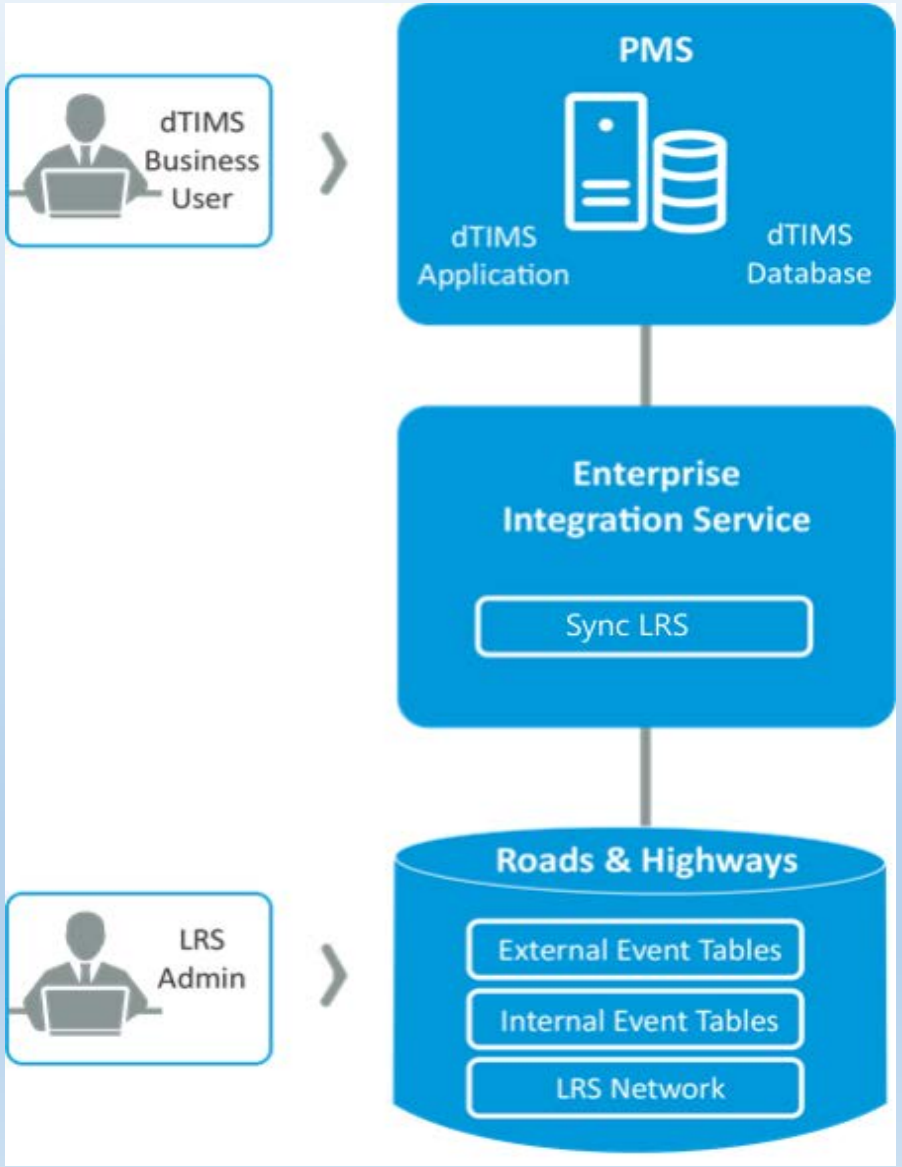
Enterprise Integration Service

Case Study



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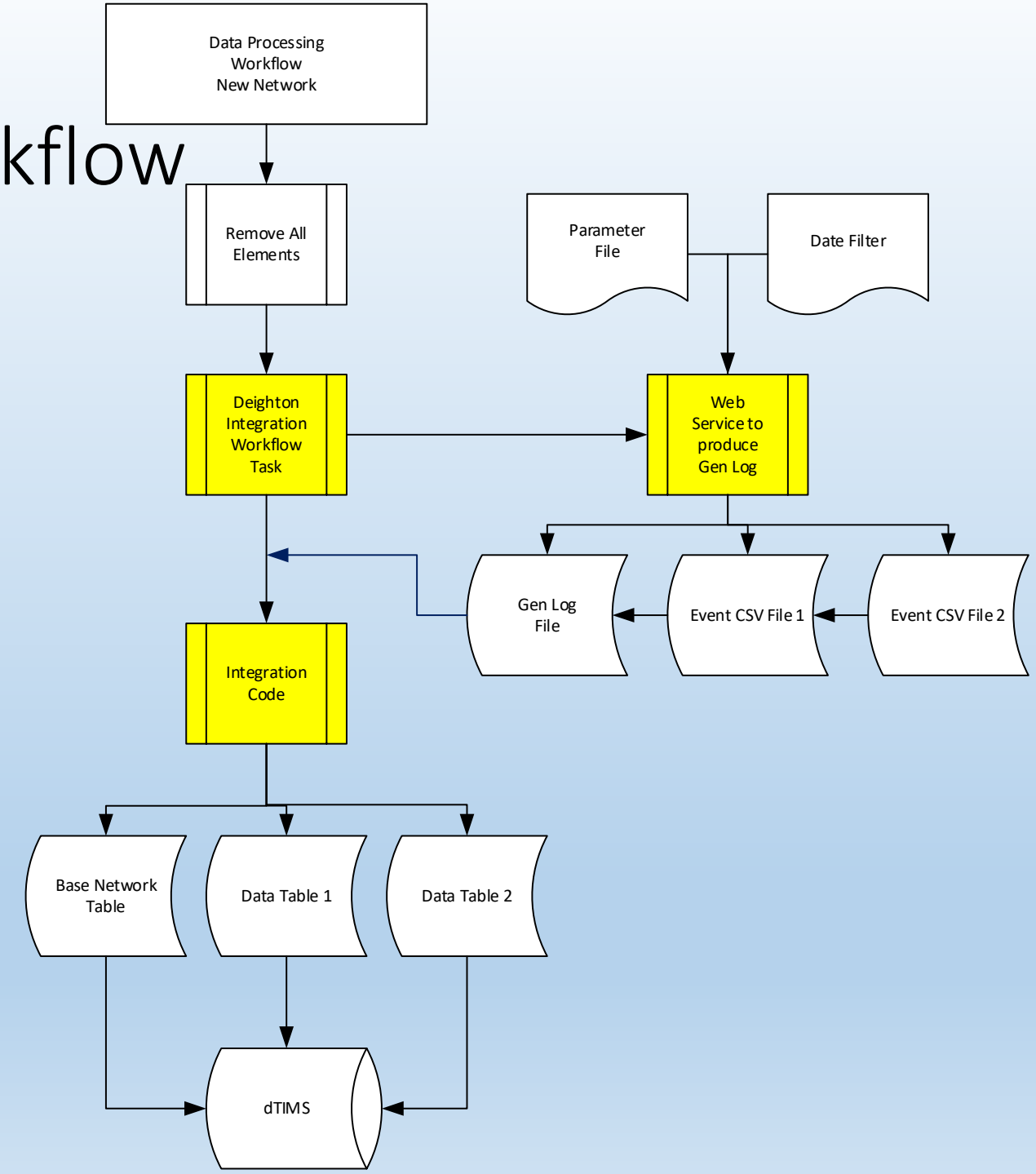
Data Processing Workflow



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Enterprise Integration Service-Execution Requests

Case Study

dTIMS Business Analytics

Gis Integrations

Home / Gis Integrations

- Analysis Results
- Map
- Asset Data
- Reports
- Database Configuration
- Analysis Configuration
- Transformation Configuration
- Query Configuration
- Action Requests
  - Data Import
  - Export Strategies
  - Integrations
  - Spatial Import
  - Execution Requests
- Workflows

+ Add | Edit | Delete | Execute | Export to Excel | Import

Drag a column header and drop it here to group by that column

Display Name	Name	Description	Target Table	Integration Action	Data Type	Connection String	Created By
GIS_INVENTORY_FUNC_CLASS_LOCATIONS	GIS_INVENTORY_FU...	Setup Functional Class Locations	GIS_INVENTORY_FU...	SetupDataLocations	EsriService	http://gisweb/gis/rest/servic...	dTIMSAdmin
GIS_INVENTORY_FUNC_CLASS_VALUES	GIS_INVENTORY_FU...	Sync Functional Class Values	GIS_INVENTORY_FU...	SyncDataValues	EsriService	http://gisweb/gis/rest/servic...	dTIMSAdmin
GIS_INVENTORY_LANE_LOCATIONS	GIS_INVENTORY_LA...	Setup Inventory Lanes Locations	GIS_INVENTORY_LA...	SetupDataLocations	EsriService	http://gisweb/gis/rest/servic...	dTIMSAdmin
GIS_INVENTORY_LANE_VALUES	GIS_INVENTORY_LA...	Sync Lane Values	GIS_INVENTORY_LA...	SyncDataValues	EsriService	http://gisweb/gis/rest/servic...	dTIMSAdmin
GIS_INVENTORY_LOCATIONS	GIS_INVENTORY_LO...	GIS Inventory Locations	GIS_INVENTORY	SetupDataLocations	Shape	\\gisrhstage\PMS_Output\ST...	dTIMSAdmin
GIS_INVENTORY_NHS_LOCATIONS	GIS_INVENTORY_NH...	Sync NHS Locations	GIS_INVENTORY_NHS	SetupDataLocations	EsriService	http://gisweb/gis/rest/servic...	dTIMSAdmin
GIS_INVENTORY_NHS_VALUES	GIS_INVENTORY_NH...	Sync NHS Values	GIS_INVENTORY_NHS	SyncDataValues	EsriService	http://gisweb/gis/rest/servic...	dTIMSAdmin
GIS_INVENTORY_SHOULDER_LEFT_WIDTH_LOCATIONS	GIS_INVENTORY_SH...	GIS Inventory Shoulder Width Left	GIS_INVENTORY_SH...	SetupDataLocations	EsriService	http://gisweb/gis/rest/servic...	dTIMSAdmin
GIS_INVENTORY_SHOULDER_LEFT_WIDTH_VALUES	GIS_INVENTORY_SH...	GIS Inventory Shoulder Width Left Values	GIS_INVENTORY_SH...	SyncDataValues	EsriService	http://gisweb/gis/rest/servic...	dTIMSAdmin
GIS_INVENTORY_SHOULDER_RIGHT_WIDTH_LOCATIONS	GIS_INVENTORY_SH...	GIS Inventory Shoulder Width Right Locations	GIS_INVENTORY_SH...	SetupDataLocations	EsriService	http://gisweb/gis/rest/servic...	dTIMSAdmin
GIS_INVENTORY_SHOULDER_TYPE_LEFT_LOCATIONS	GIS_INVENTORY_SH...	Shoulder Type L Locations	GIS_INVENTORY_SH...	SetupDataLocations	EsriService	http://gisweb/gis/rest/servic...	dTIMSAdmin
GIS_INVENTORY_SHOULDER_TYPE_LEFT_VALUES	GIS_INVENTORY_SH...	Shoulder Type Left Values	GIS_INVENTORY_SH...	SyncDataValues	EsriService	http://gisweb/gis/rest/servic...	dTIMSAdmin
GIS_INVENTORY_SHOULDER_TYPE_RIGHT_LOCATIONS	GIS_INVENTORY_SH...	Shoulder Type Right	GIS_INVENTORY_SH...	SetupDataLocations	EsriService	http://gisweb/gis/rest/servic...	dTIMSAdmin
GIS_INVENTORY_SHOULDER_TYPE_RIGHT_VALUES	GIS_INVENTORY_SH...	Shouder Type Right	GIS_INVENTORY_SH...	SyncDataValues	EsriService	http://gisweb/gis/rest/servic...	dTIMSAdmin
GIS_INVENTORY_SHOULDER_WIDTH_RIGHT_VALUES	GIS_INVENTORY_SH...	GIS Inventory Shoulder Width Right Values	GIS_INVENTORY_SH...	SyncDataValues	EsriService	http://gisweb/gis/rest/servic...	dTIMSAdmin
GIS_INVENTORY_VALUES	GIS_INVENTORY_VA...	GIS Inventory Values	GIS_INVENTORY	SyncDataValues	Shape	\\gisrhstage\PMS_Output\ST...	dTIMSAdmin
GIS_MILEPOSTS	GIS_MILEPOSTS	GIS Mileposts	Network_MP	SetupDataLocations	EsriService	http://gis.azdot.gov/gis/rest/...	dTIMSAdmin
GIS_MILESPOSTS_DATA	GIS_MILEPOSTS_DA...	GIS Milepost Data	Network_MP	SyncDataValues	EsriService	http://gis.azdot.gov/gis/rest/...	dTIMSAdmin
GIS_PAVEMENT_LOCATIONS	GIS_PAVEMENT_LO...	GIS Pavement Locations	GIS_PAVEMENT	SetupDataLocations	Shape	\\gisrhstage\pms_output\Ev...	dTIMSAdmin
GIS_PAVEMENT_VALUES	GIS_PAVEMENT_VAL...	GIS Pavement Values	GIS_PAVEMENT	SyncDataValues	Shape	\\gisrhstage\pms_output\Ev...	dTIMSAdmin
GIS_STRUCTURE_LOCATIONS	GIS_STRUCTURE_LO...	GIS Structure Locations	GIS_BRIDGE	SetupDataLocations	Shape	\\gisrhstage\pms_output\Ev...	dTIMSAdmin
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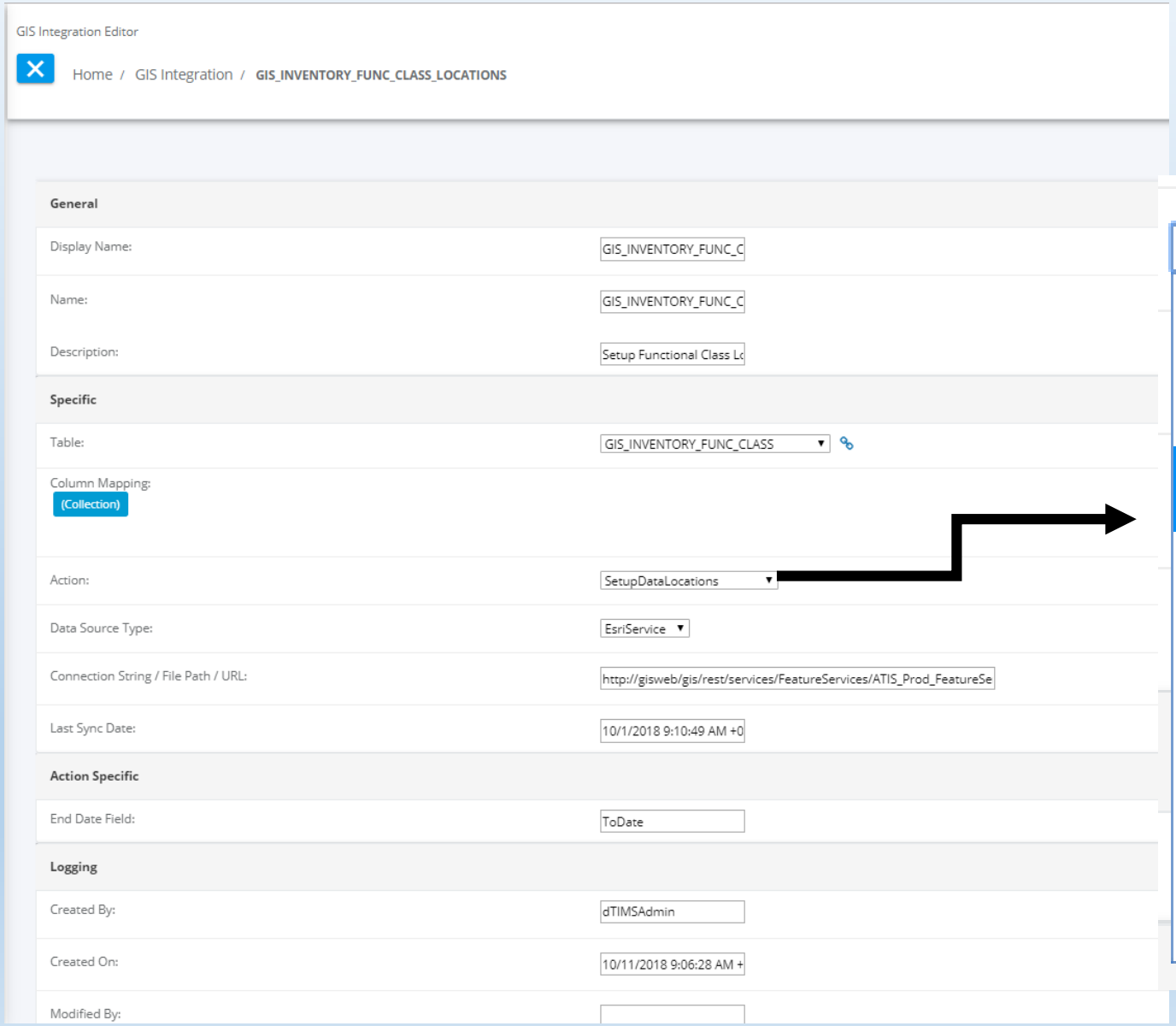
NETWORK_FULL	NETWORK_FULL	Load Full Network	Network	SetupNetwork	Shape	\\gisrhstage\pms_output\Ex...	dTIMSAdmin
NETWORK_MP_LOCATIONS	NETWORK_MP_LOC...	Network MP Locations	Network_MP	SetupDataLocations	Shape	\\gisrhstage\pms_output\Ev...	dTIMSAdmin
NETWORK_MP_VALUES	NETWORK_MP_VAL...	Network MP Values	Network_MP	SyncDataValues	Shape	\\gisrhstage\pms_output\Ev...	dTIMSAdmin

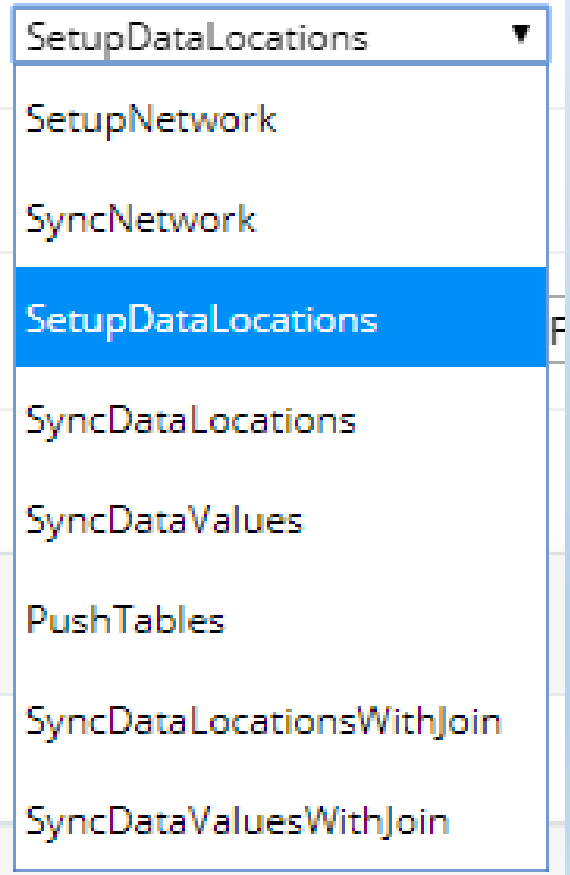
1 2

1 - 25 of 28 items

Enterprise Integration Service-Event Configuration

Case Study





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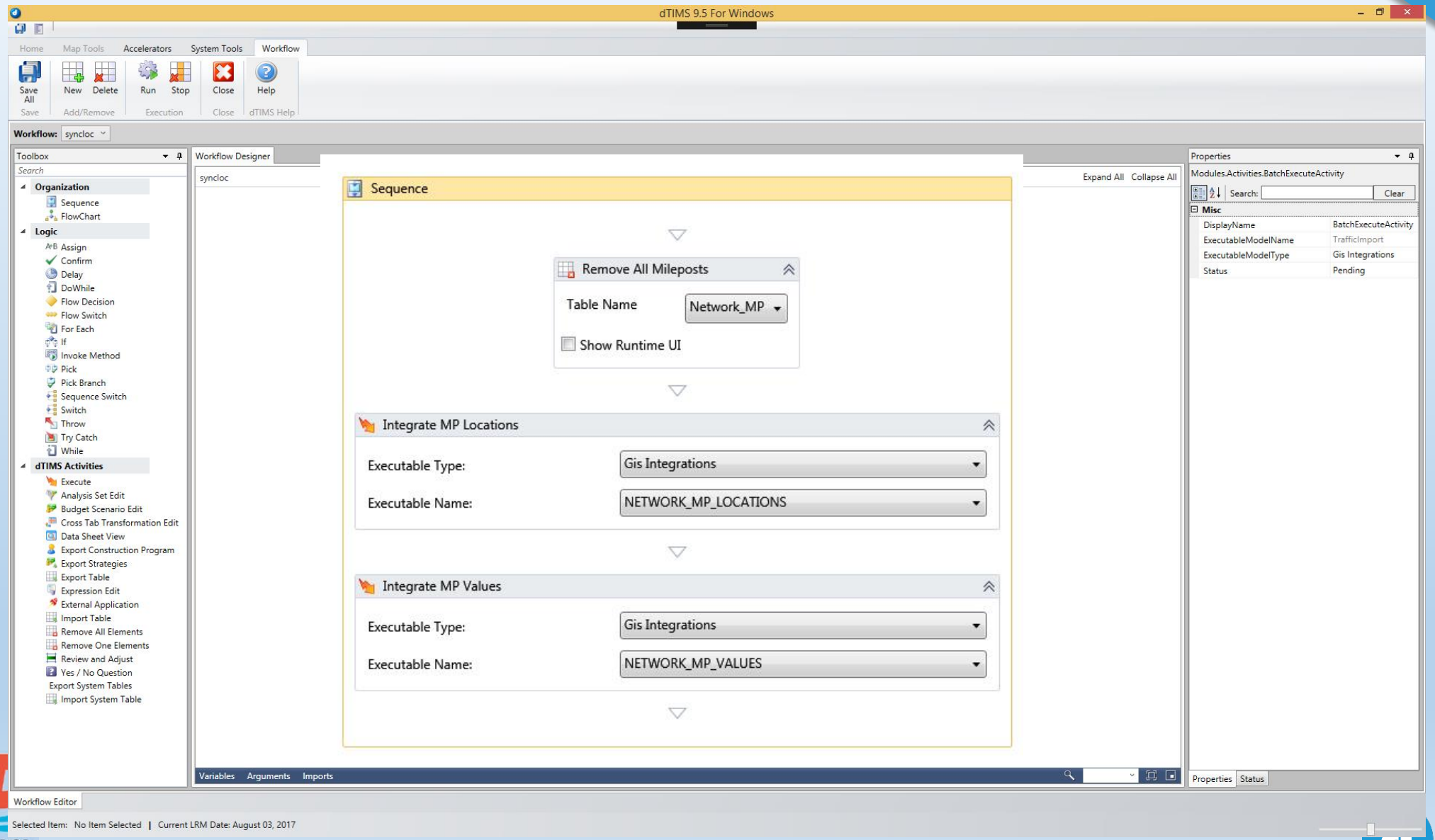
Enterprise Integration Service – Workflow

Case Study



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Concluding Remarks

- LADOTD expects to save a substantial amount of time required to load their Pavement Management system
- This savings in time will allow us to spend more time on model development and QA/QC of our data
- Having an authoritative system of record for the LRS and corresponding data means there is less ambiguity regarding where the most current network and data definition resides
- I hope this presentation gives you an idea of what you as a DOTD might have to do to get ready for a Roads and Highways and the advantages linking your PMS Software with Road and Highways.

Questions

Thank You!

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