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Esri Highway Data Maintenance Solutions: An Introduction

Adrien Litton

Majunu Seran

Overview of Highway Data

Multiple datasets across multiple agencies

- Pavement
- Maintenance
- Traffic
- Safety
- Signs
- Freight
- Snowplowing
- Etc.

Esri Road and Highways Solution

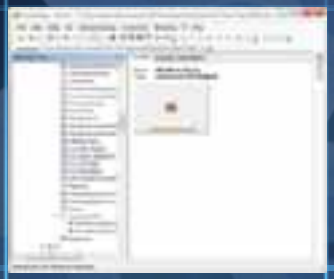
We're changing the way we think about highway data

Roads and Highways Data Model

Data Model

- Based on Esri Roads & Highways model
- Supports Advanced Linear Referencing
  - Multiple LRMs
  - Dynamic Features
  - Location Management
  - History
- Extends to client data requirements
- Loosely coupled with business data

Roads and Highways Data Model



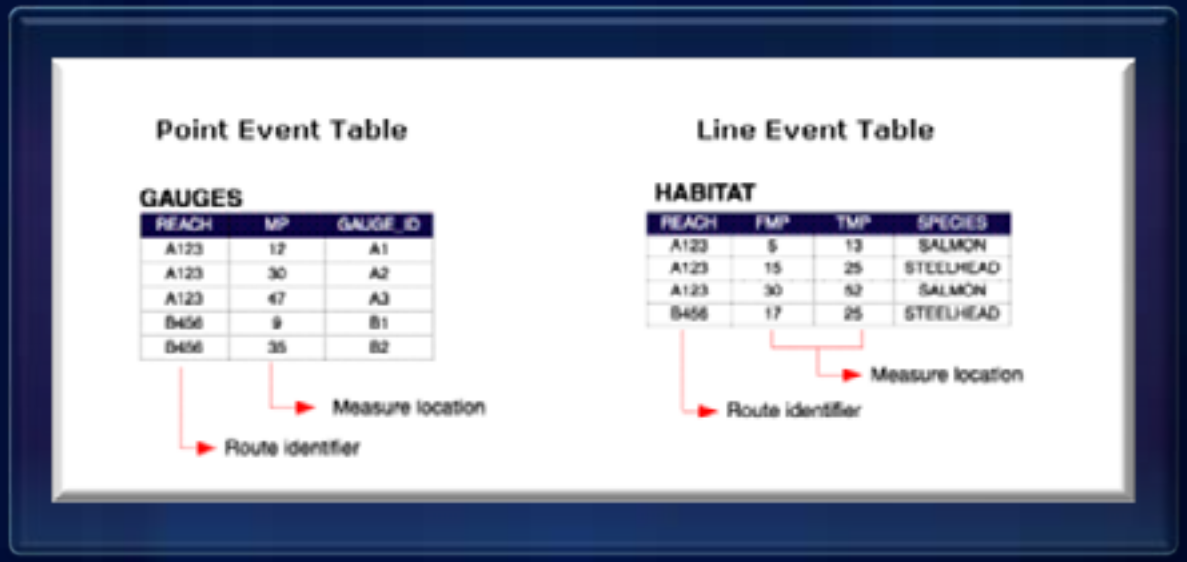
Introduction to Linear Referencing Systems

What is LRS?

- **Method for locating assets along linear facilities**
- **Distinguishes *position* from *location***
  - ***Position* represents an XY coordinate on a map**
  - ***Location* represents a distance along a linear feature**
- **Most highway departments' method of choice for managing asset data**

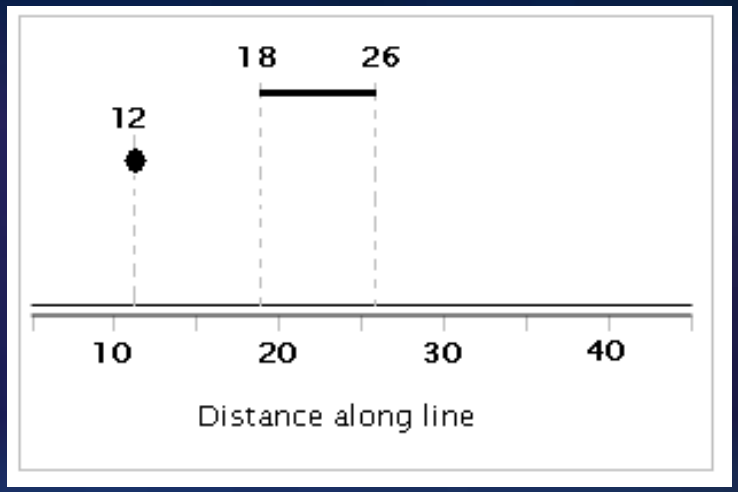
Highway data is managed using linear referencing

- A route reference and a measure value



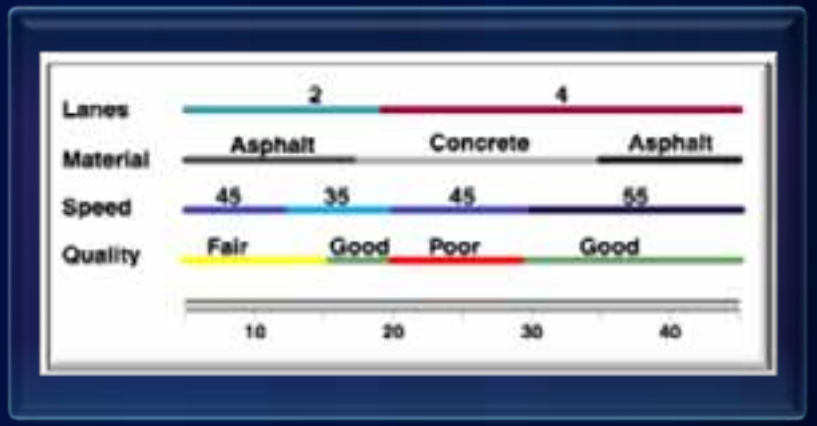
Highway data is managed using linear referencing

- A route reference and a measure value
- **One measure creates point events**
- **Two measures create line events**



Highway data is managed using linear referencing

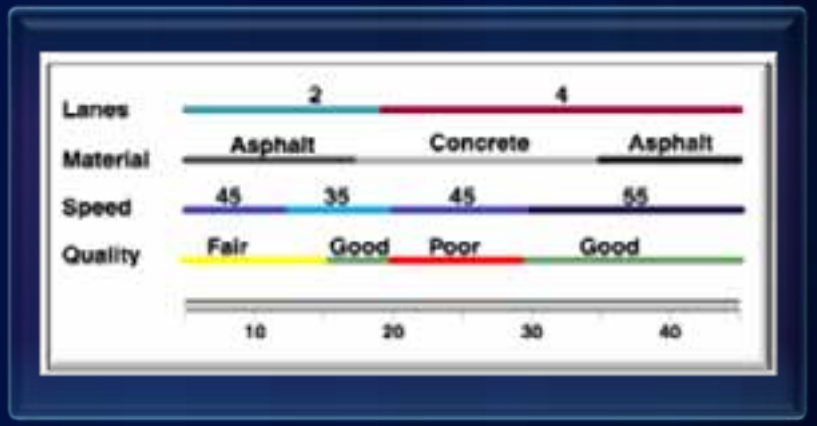
- A route reference and a measure value
- One measure creates point events
- Two measures create line events
- **Allows non-spatial data to be overlaid for advanced analysis**



A one-dimensional location system

Highway data is managed using linear referencing

- **A route reference and a measure value**
- One measure creates point events, two measures line events
- **Allows non-spatial data to be overlaid for advanced analysis**



A one-dimensional location system

Advanced Linear Referencing Systems

Advanced Linear Referencing

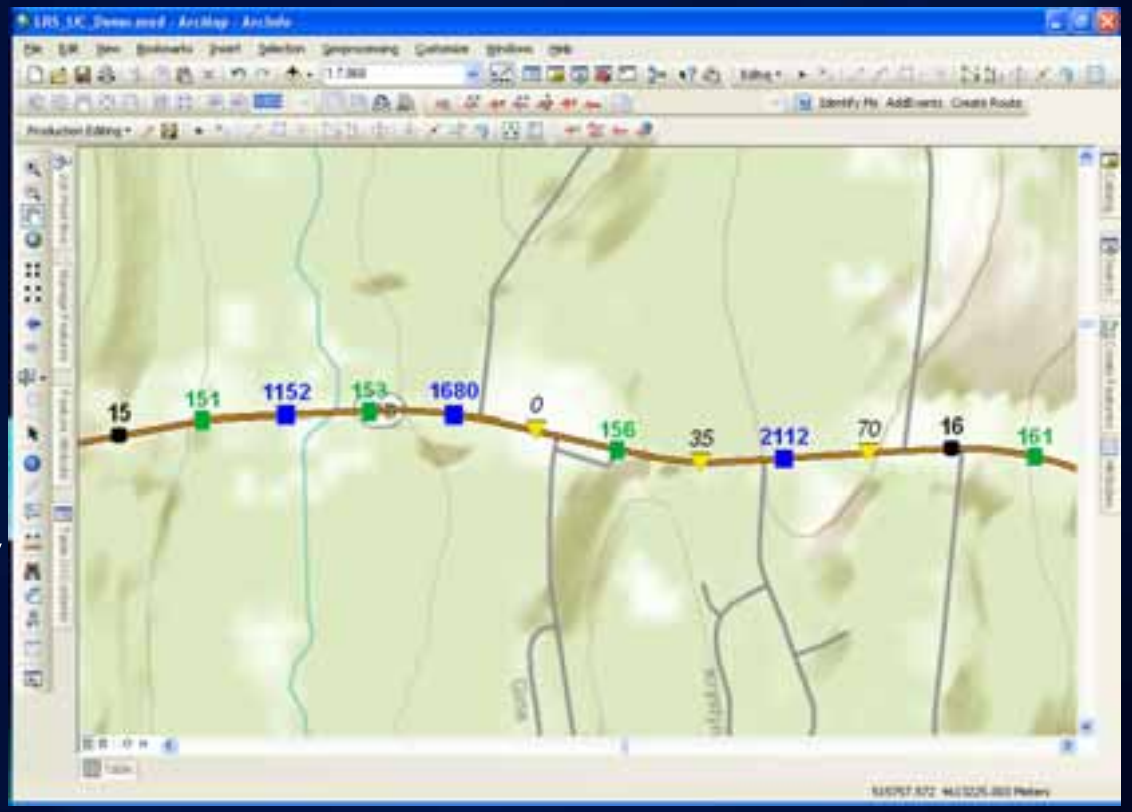
- Multiple Linear Referencing Methods
- Dynamic Route Representations
- Time Aware LRS
- Rule-based Event Behavior

By making LRS more robust we make highway data more interoperable

Multiple Linear Referencing Methods

Multiple Linear Referencing Methods

- Reference Markers
- Project Stationing
- Mile Posts
- Road Inventory

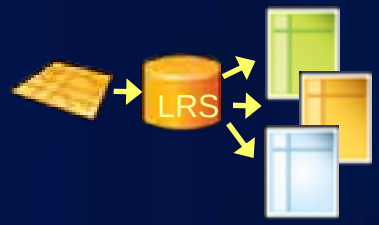


LRMs are like map projections; users need to be able to translate seamlessly from one to another

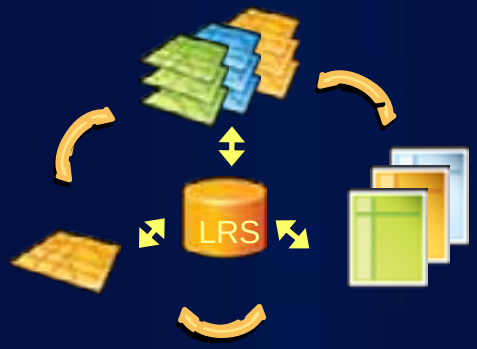
Traditional approaches to multiple LRMs

- Multiple Route Geometries

- Transformed Measures in Event Tables



- Reference Datum

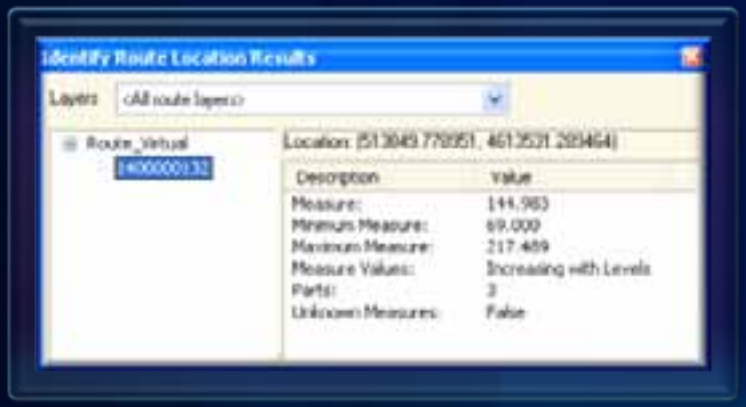


Our solution is closer to the Reference Datum approach

Dynamic Route Representations

Dynamic Route Representations

- Routes are defined in the data model
- Dynamic routes are real features that are managed as tabular data
- Dynamic route live in the map

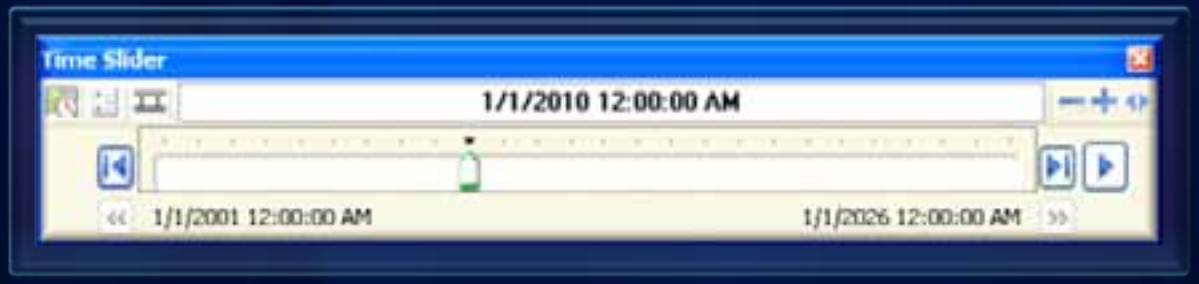


Different users have different definitions of a route

Time Aware LRS

Time Aware LRS

- Present – We need to see the current state of our highways
- Past – We need to see what our highways looked like when incidents occurred
- Future – We need the ability to add planned highways to our data



By capturing time we add a whole new dimension to highway data

Location Management

Esri Roads and Highways manages location

Four possible things that happen to events.

Esri Roads and Highways manages location

1. The event moves (preserves location)

Esri Roads and Highways manages location

1. The event moves
2. The event stays put (preserves position)

Esri Roads and Highways manages location

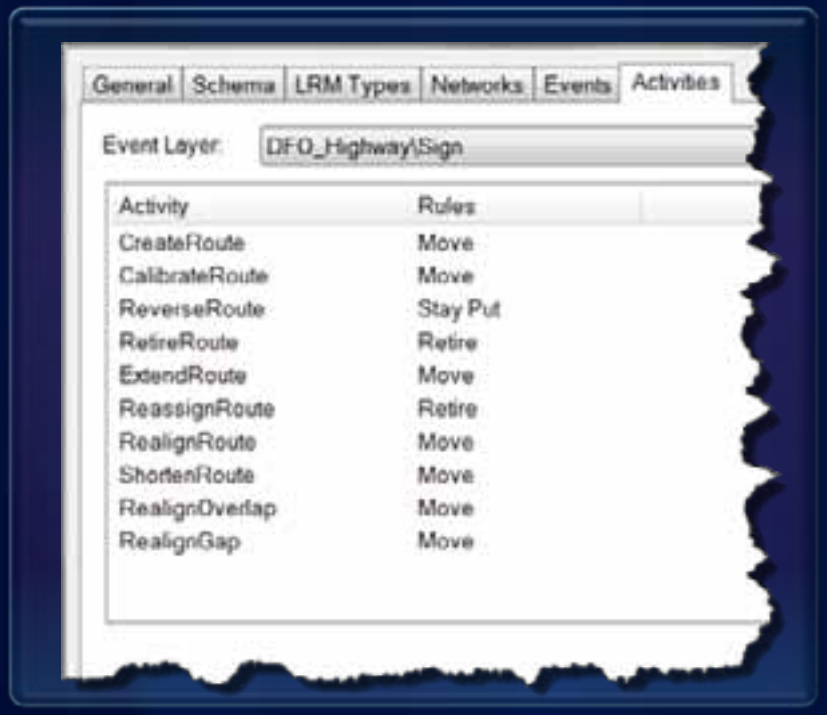
1. The event moves
2. The event stays put
3. The event goes away (preserves both location and position)

Esri Roads and Highways manages location

1. The event moves
2. The event stays put
3. The event goes away
4. The snaps to another route (preserves proportion)

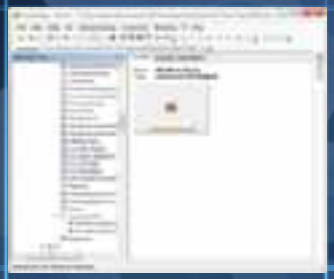
Esri Roads and Highways manages location

Events are configured based on the type of work being performed



By updating events based on maintenance activities you control the LRS rather than react to it

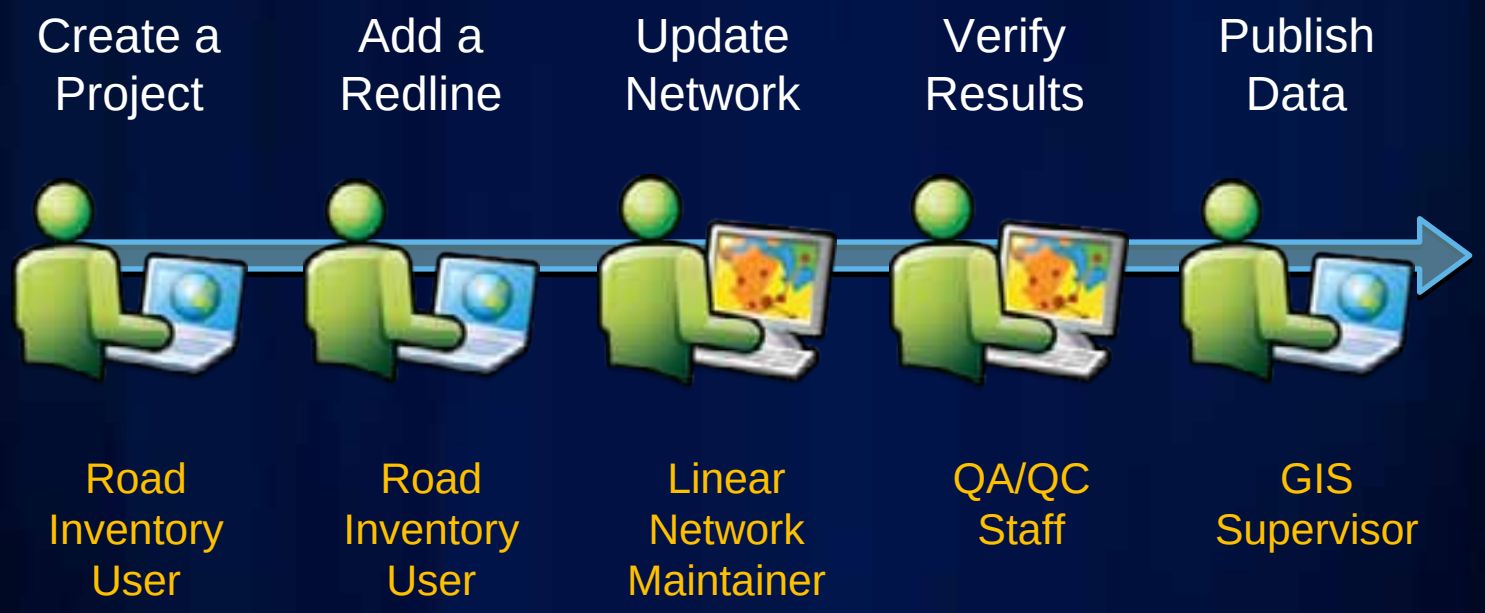
Configuring the ALRS



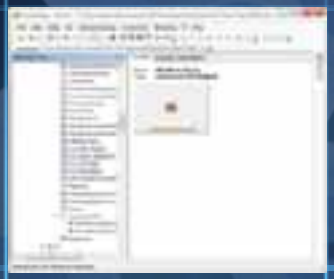
Managing Workflow

What is a Workflow?

Esri Roads and Highways Workflow



Editing and Validating Data



Summary

Summary

- Esri Roads and Highways is a world class highway data management solution
- Supports Advanced Linear Referencing
- Workflow driven
- Easy to use editing tools
- Incorporates data validation
- Scheduled for release Q4 2011

Questions?

- Adrien Litton – alitton@esri.com
- Majunu Seran – mseran@esri.com
- Transportation Team – transportation_info@esri.com
- Roads and Highways Resource Center - http://resources.arcgis.com/content/roads-highways/about
- Transportation Blog - http://blogs.esri.com/Info/blogs/transportation/default.aspx
- Transportation Forum - http://forums.arcgis.com/forums/63-Transportation

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