



Esri Roads and Highways An Introduction

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Roads and Highways

Linear Referencing for the Transportation Enterprise

GIS-enabled LRS platform

- LRS management
- LRS editing & maintenance
- LRS web services
- Information model
- Workflow
- Quality control
- GIS analysis
- Mapping
- Cloud collaboration



Roads and Highways

Linear Referencing for the Transportation Enterprise

Roadway Inventory



- Web event editing
- Quality checks
- Information model

GIS-enabled LRS platform



Roads and Highways

Linear Referencing for the Transportation Enterprise

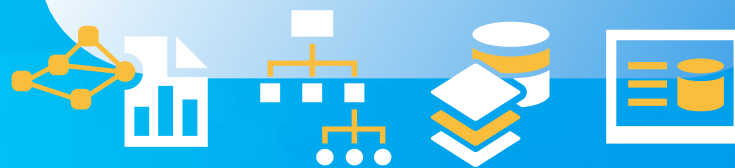


HPMS



- Data product creation
- Quality checks and correction
- Information model

GIS-enabled LRS platform



Roads and Highways

Linear Referencing for the Transportation Enterprise



Roadway Reporting



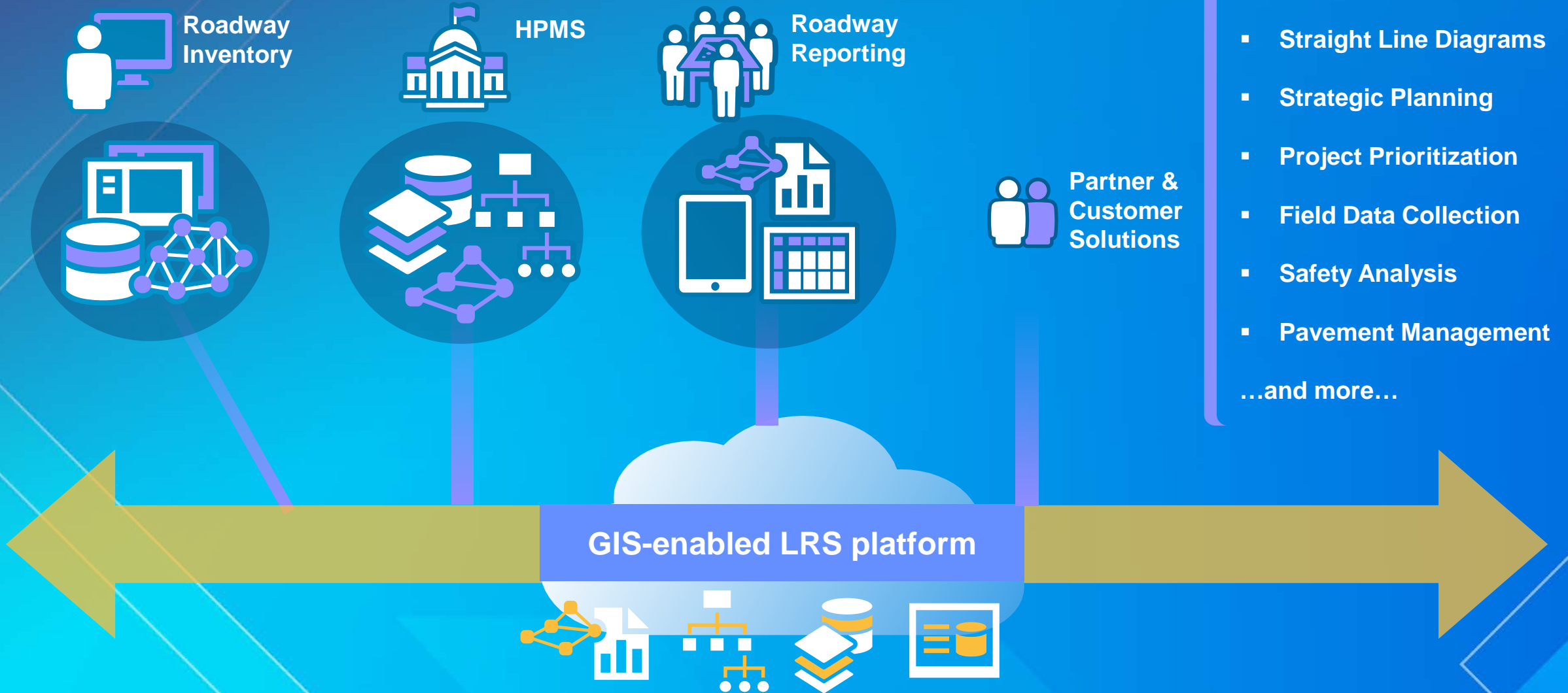
- Mileage summary reports
- Location & segment reports
- Tabular, maps, data products
- Transformation tools

GIS-enabled LRS platform



Roads and Highways

Linear Referencing for the Transportation Enterprise



Product Overview

- **Desktop**

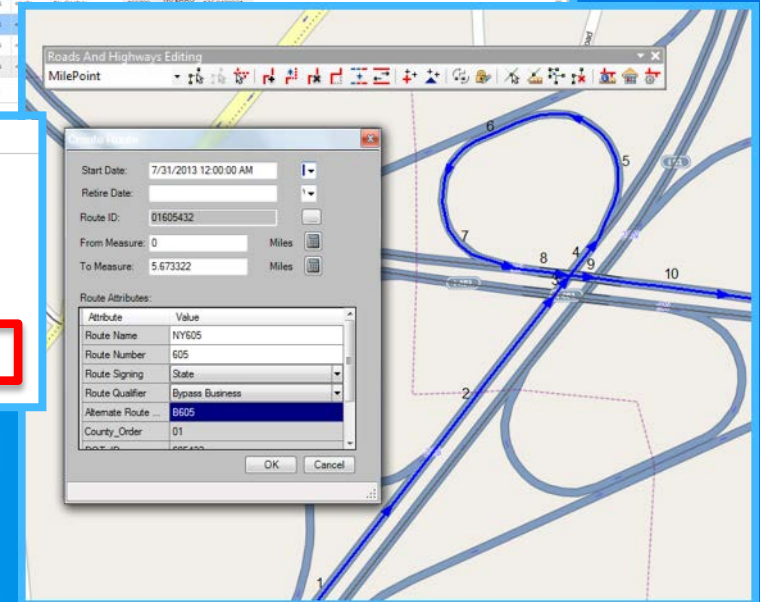
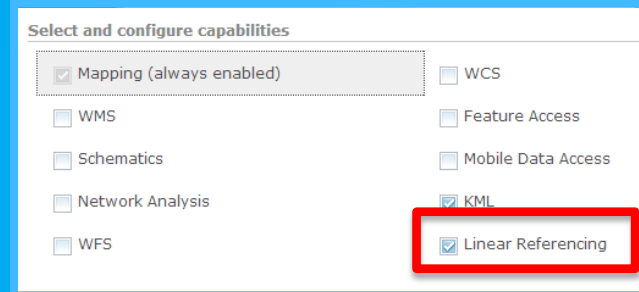
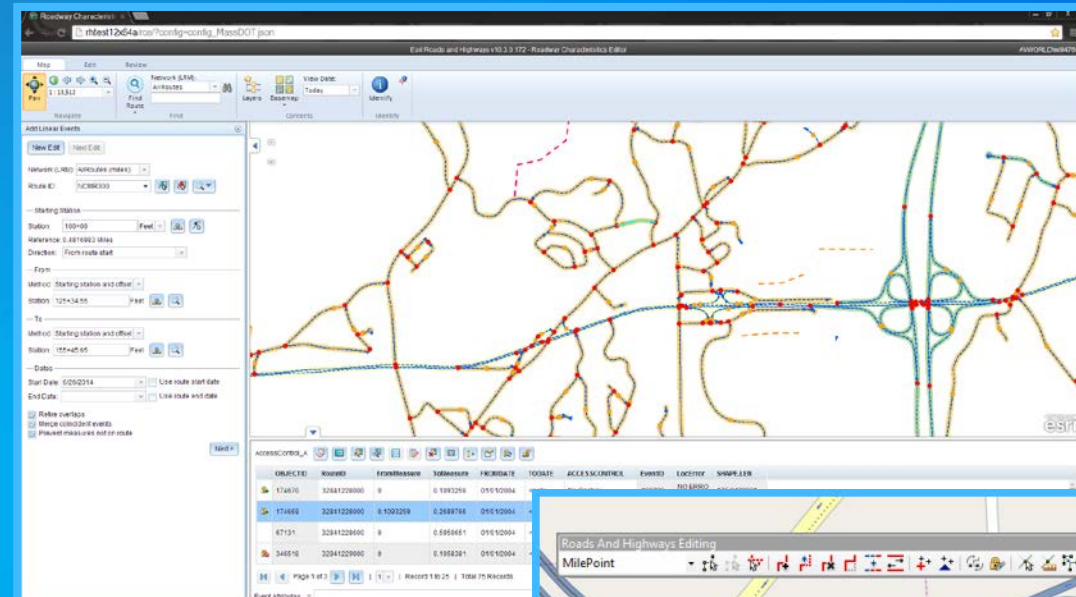
- ArcMap LRS network editing toolbar
- ArcCatalog management tools
- Route & event feature class support
- Geodatabase LRS dataset
- Geoprocessing tools

- **Server**

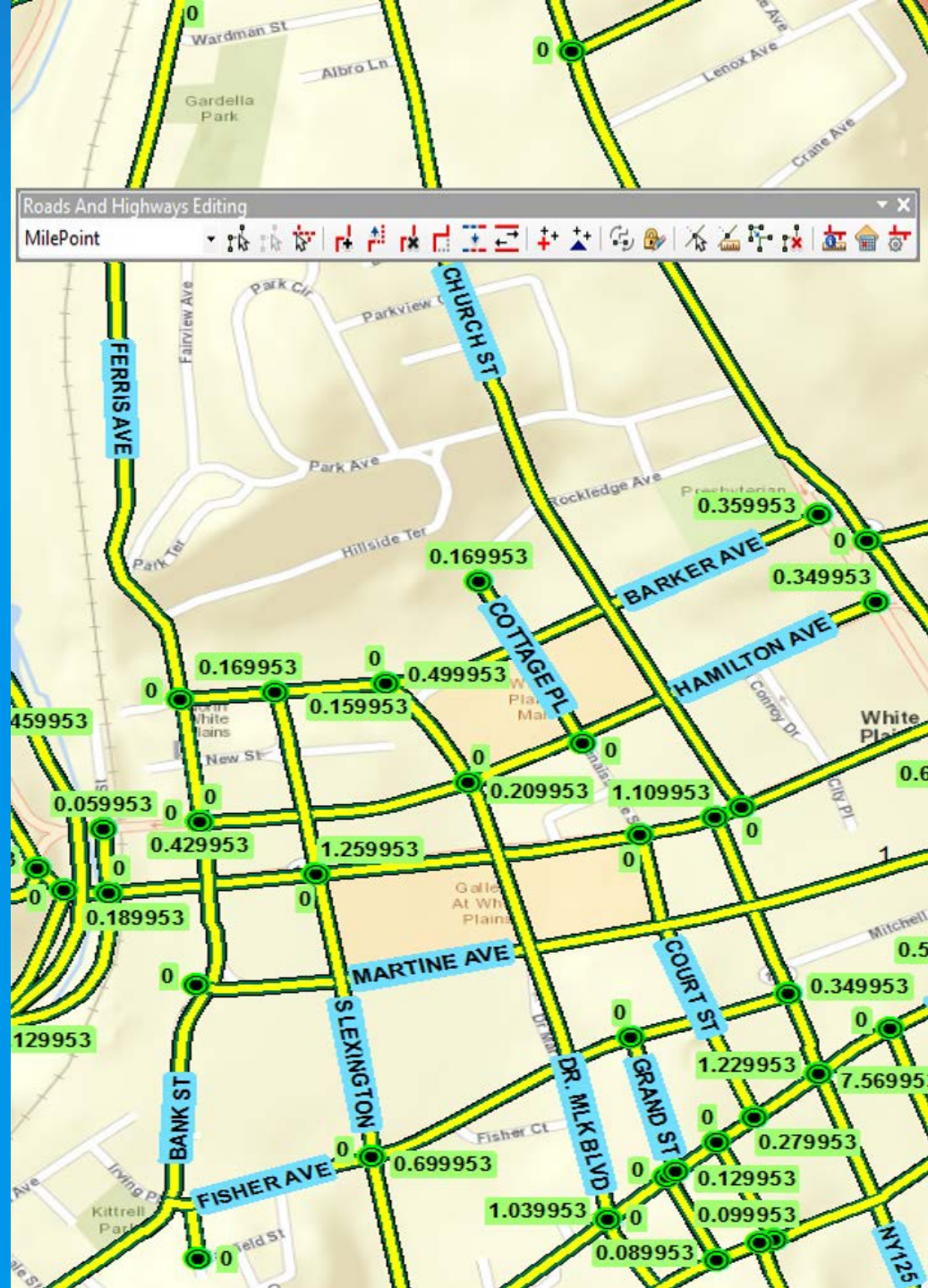
- LRS web services
- Developer samples

- **Apps**

- Roadway Characteristics Editor
- Roadway Reporter

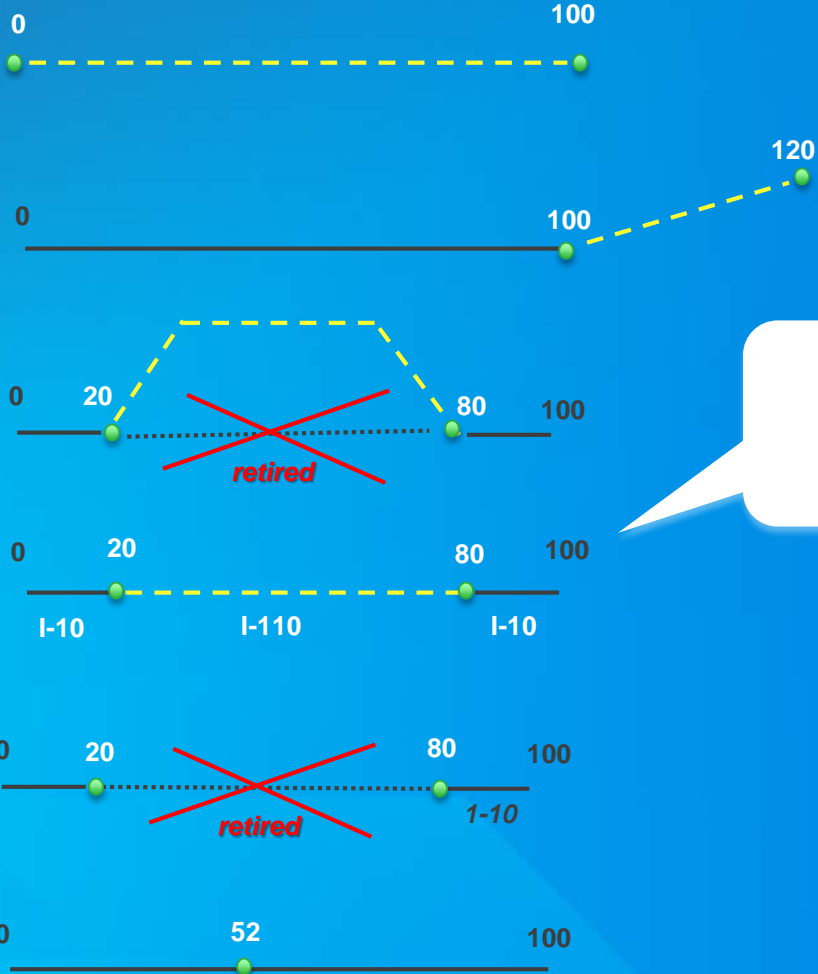


Roads and Highways for Desktop



Route Editing Activities

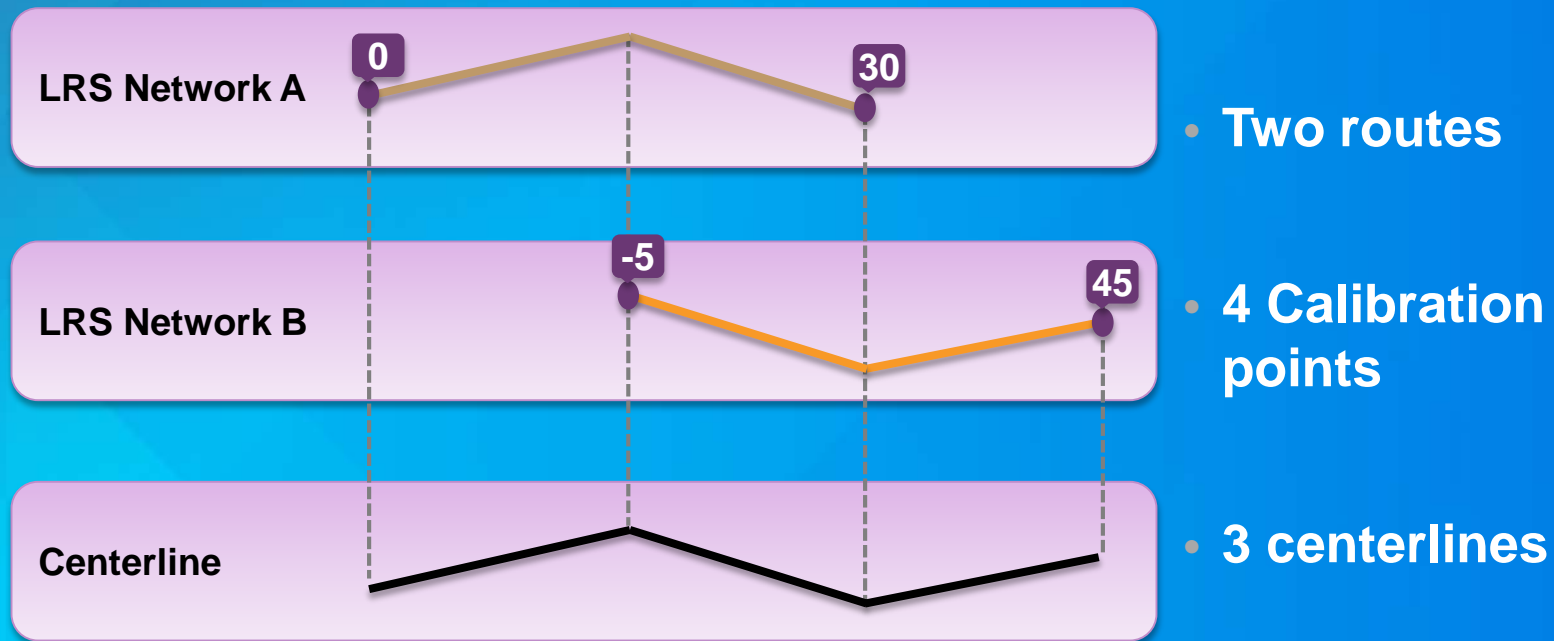
- Create Route
- Extend Route
- Realign Route
- Reassign Route
- Retire Route
- Calibration



Can also serve to **split** routes and **merge** routes.

Multi-LRM Support

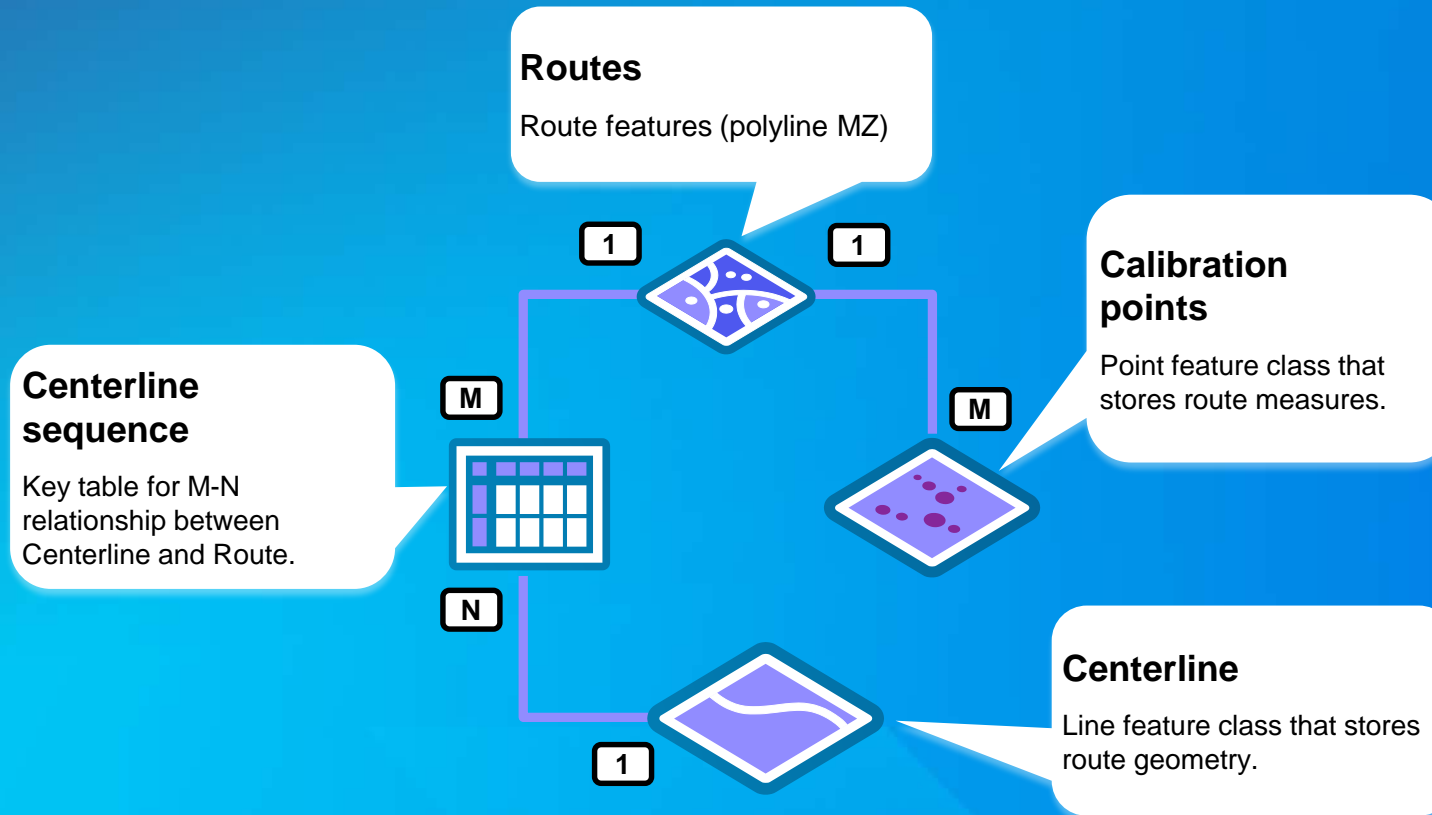
- Route features are generated from centerline geometry and calibration point measures



The two routes above are derived from three centerline lines

Location Model

Schema for route centerline management

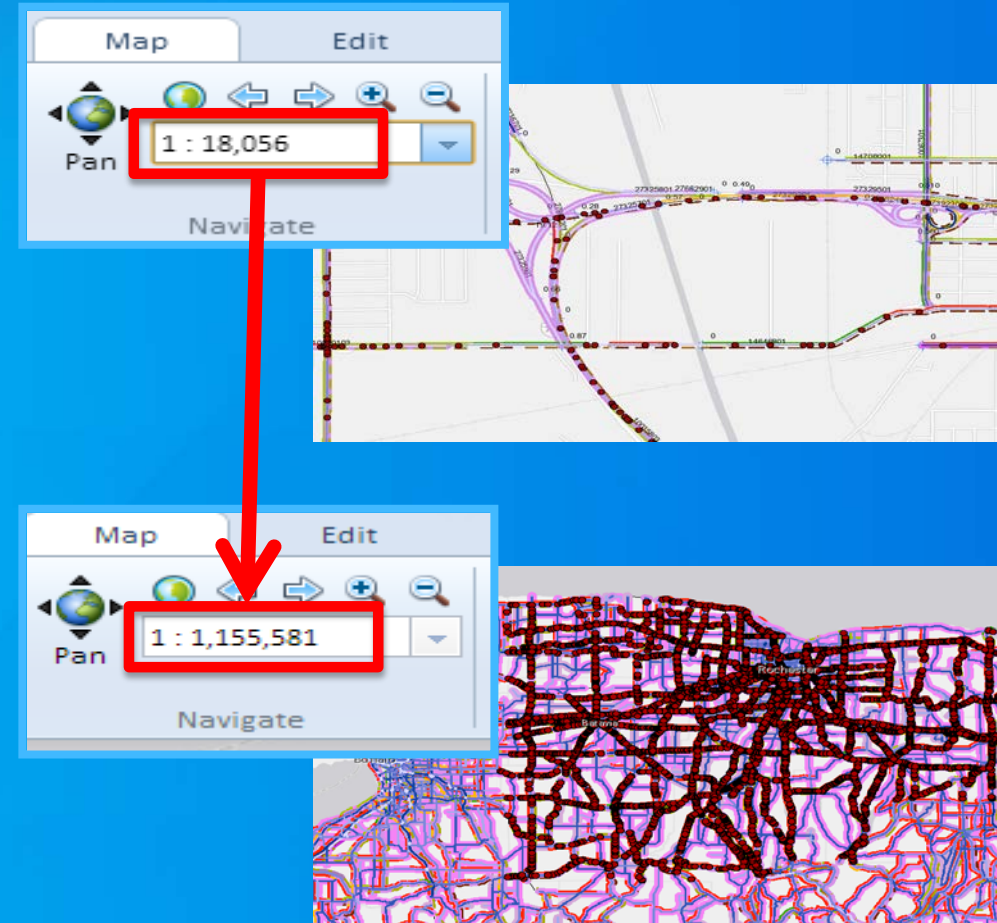


Route features are generated from three feature classes and a table

Event Feature Class

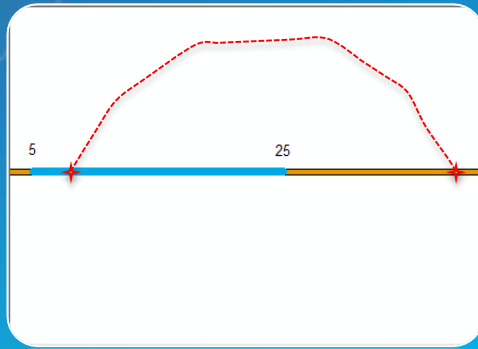
LRS Events with a shape, managed by Roads and Highways, driven by route and measure

- Persist shape column
- Shape managed
- Improved performance for ...
 - Map navigation
 - Spatial query

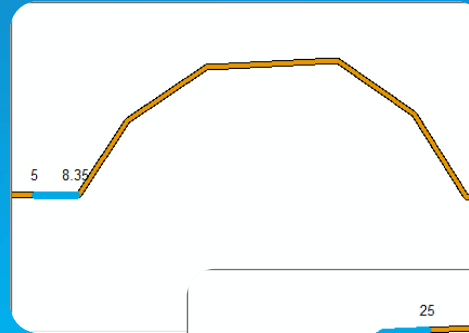


Event Measure Behaviors

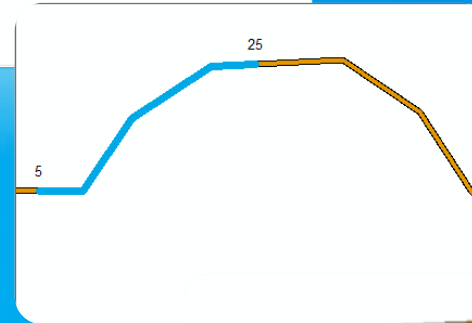
Automatically keep event measure behaviors in sync with route edits



Before Realignment



Stay Put

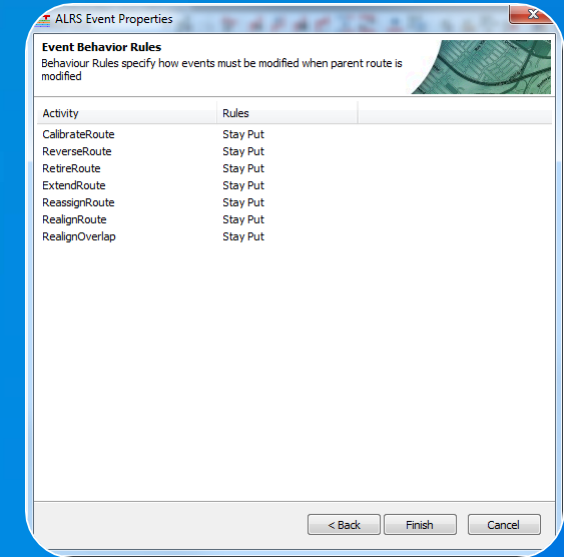


Move



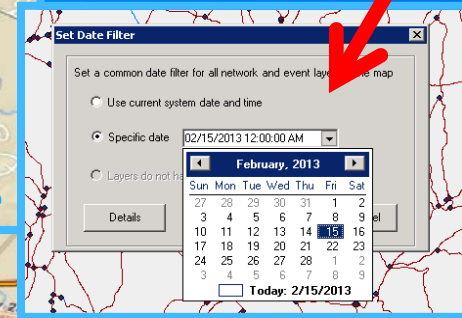
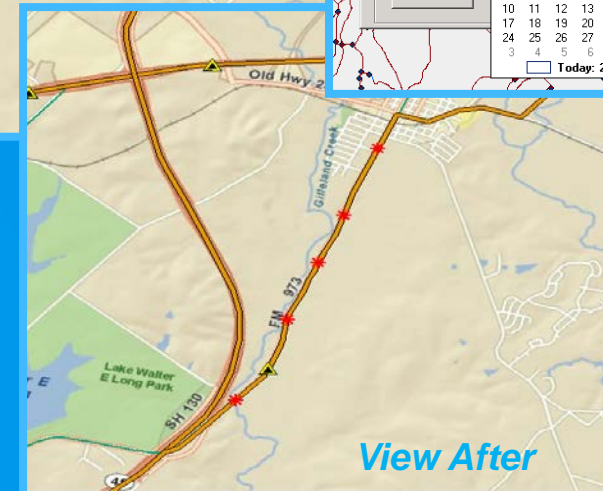
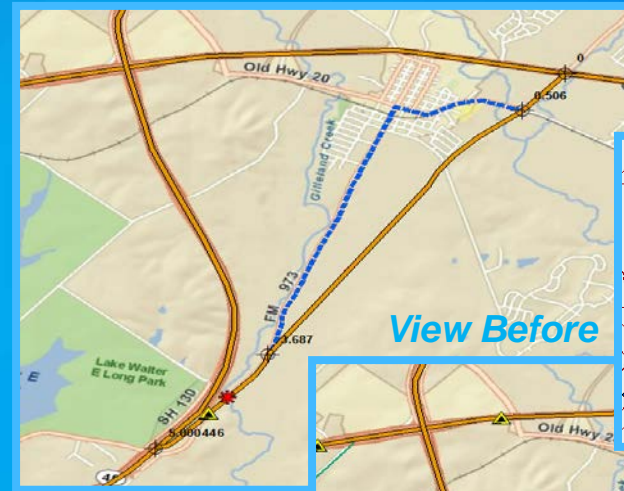
Retire

- When the LRS routes are edited, measure behavior rules can be applied to events.
- Events can have a different behavior for each type of LRS edit



Time Aware LRS

- Date ranges applied to edits
- Event measure updates reflect date range of edits
- Historical event measures that change due to edits are “retired”
- Network and events can be visualized and queried for any moment in time



Intersection Support

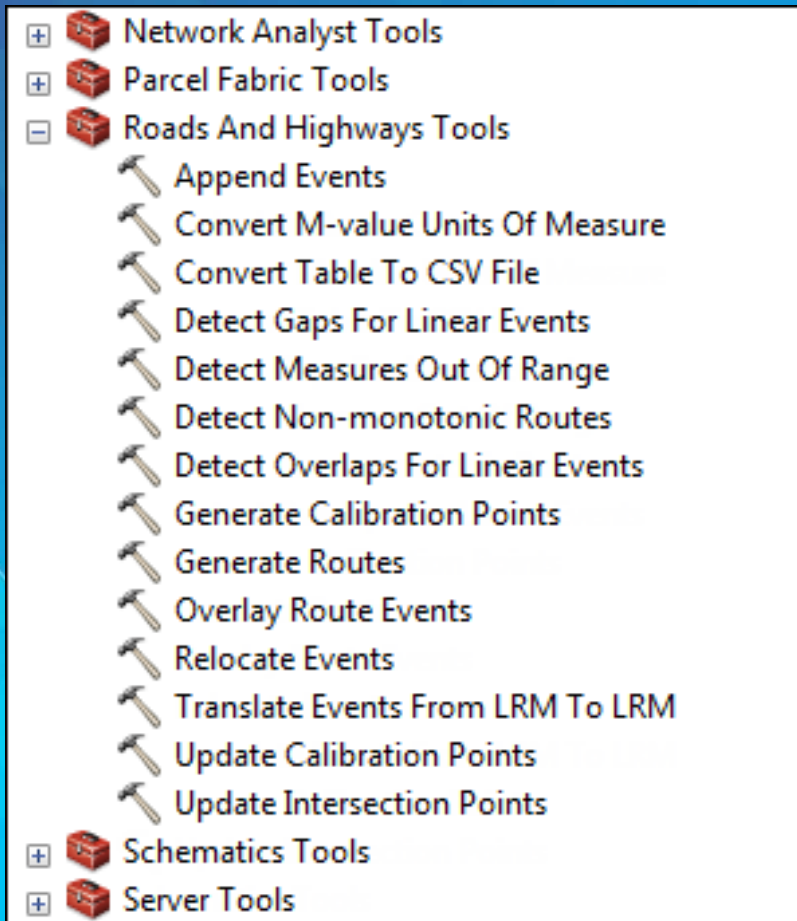
- Tools to generate and manage
- Polyline to polyline
 - Example: Route to Route
- Polygon to polyline
 - Example: County to Route
- Support for event offsetting

The screenshot displays the ArcGIS interface for creating linear events. The 'Add Linear Events' tool is active, showing the 'Method' set to 'Intersections offset' and the 'Location' as 'SWAN ST and NY16'. The 'Offset' is set to 'SE' with a value of '255' feet. The 'Identify Results' window shows details for the intersection of NY16 and ELLICOTT ST, including Route ID (10009702) and Feature ID (16346701). The 'Intersection Class Properties' dialog box is open, showing the 'Intersection Inputs' section with 'RouteId' as the description field and a cluster tolerance of 0 feet. Below this, a table lists feature classes to intersect the network.

Feature Class	ID Field	Description Field	Name Separator	Edi	Tra
Community_Health_Net...	CHNA_NUM	CHNA_NAME	AND CHNA:	Yes	
Counties	FIPS_ID	COUNTY	AND County:	Yes	
Elementary_School_Dist...	DISTRICTID	DISTNAME	AND Elementa...	Yes	
FEMA	DFIRM_ID	FLD_ZONE	AND FEMA Zone:	Yes	
High_School_District	DISTRICTID	DISTNAME	AND High Sch...	Yes	
Hydrology	ID	MINOR_TOT	AND Hydrology:	Yes	
Legislative_Districts	DIST_CODE	REP_DIST	AND Legislativ...	Yes	
Middle_School_District	DISTRICTID	DISTNAME	AND Middle Sc...	Yes	
Senate_2012	SENDISTNUM	SEN_DIST	AND Senate_2...	Yes	

Geoprocessing Tools

Roads and Highways toolbox



- Append Events
- Convert M-value Unit of Measure
- Detect Measures Out Of Range
- Detect Overlaps For Linear Events
- Detect Gaps For Linear Events
- Detect Measures Non-monotonic Routes
- Generate Routes
- Overlay Route Events
- Translate Events From LRM to LRM
- Update Calibration Points
- Update Intersections

...and growing.

Roads and Highways for Server



Roads and Highways for Server

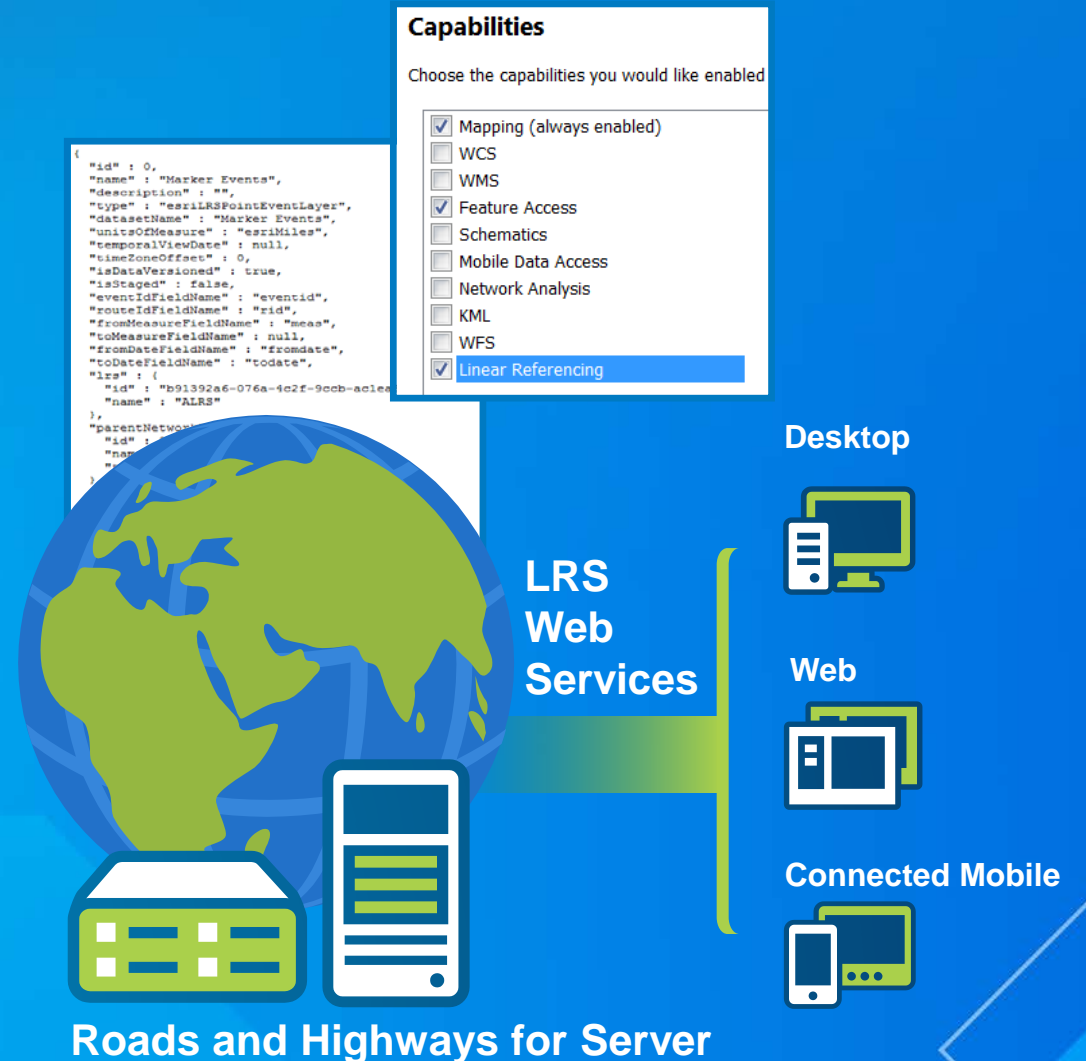
Linear Referencing capability for the ArcGIS Server

- **ArcGIS for Server**

- Mapping, Query, Geoprocessing

- **Roads and Highways for Server**

- Event editing
- Coordinate to measures
- Measure to coordinate
- Query attribute sets
- Check events (*gaps, overlaps, invalid measures*)
- Measure translation
- Measure updates for external systems



Demo

REST Services



Roadway Characteristics Editor

Event editing web application

• Editing

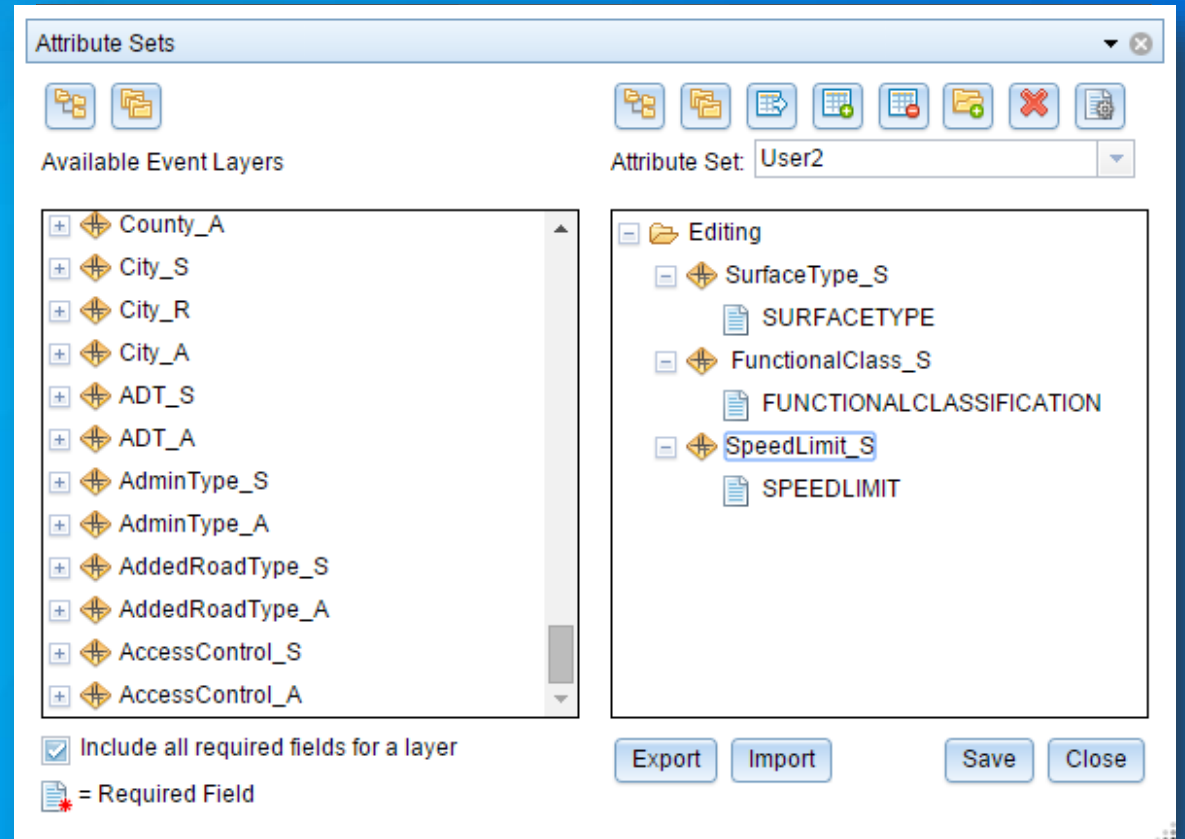
- Line events
- Points events
- Event Attributes
- Attribute set results

• Selection

- Select by route, attribute, geometry, proximity
- Single layer results or attribute sets

• QC

- Gaps, overlaps, invalid measures
- Data Reviewer batch checks



Event Location Model

Flexibility in event location referencing

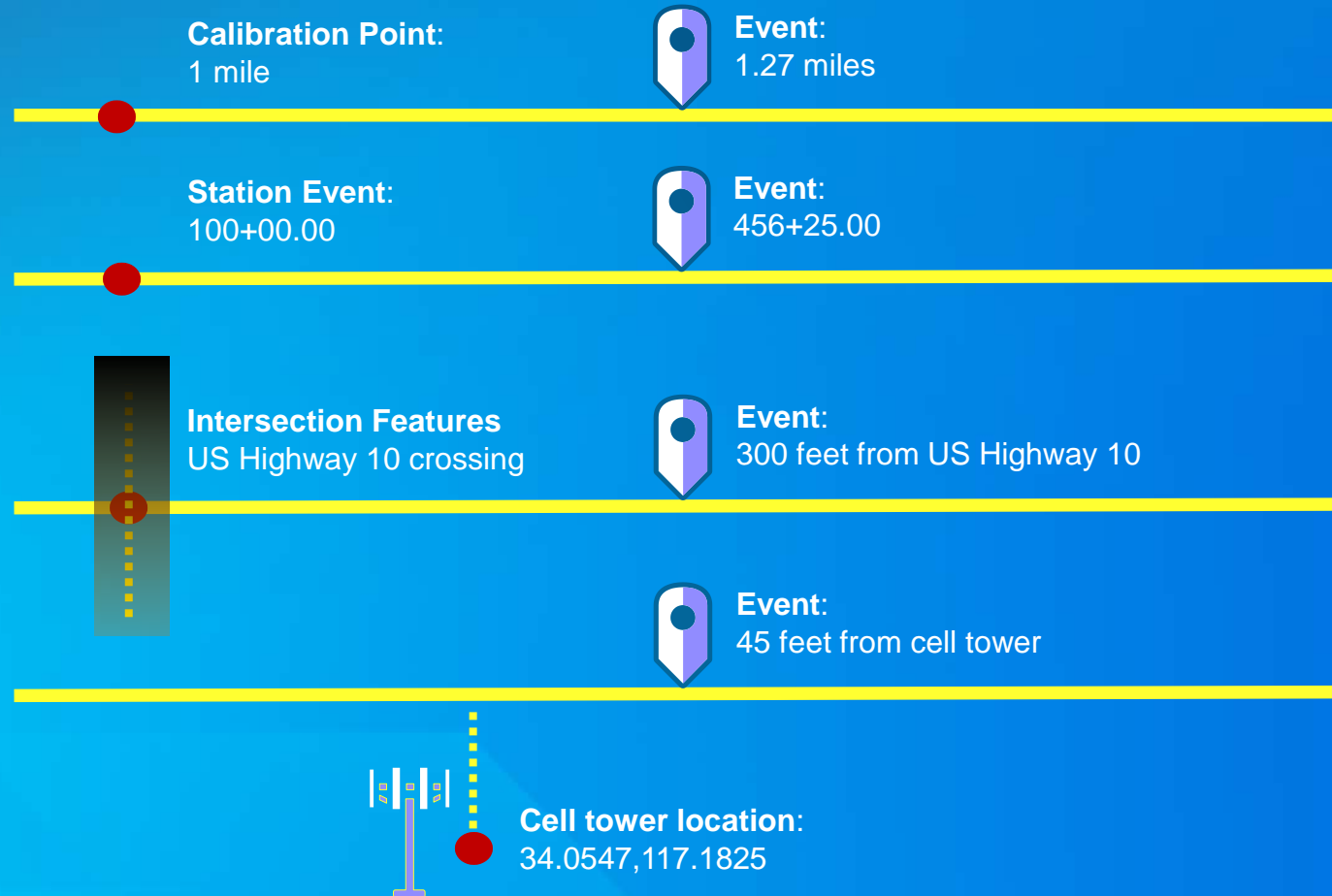
- Route and measure

- Stationing

- Referent and offset

- Intersections
- Events
- Features

- Coordinates and offset



Demo

Roadway Characteristics Editor



Roadway Reporter

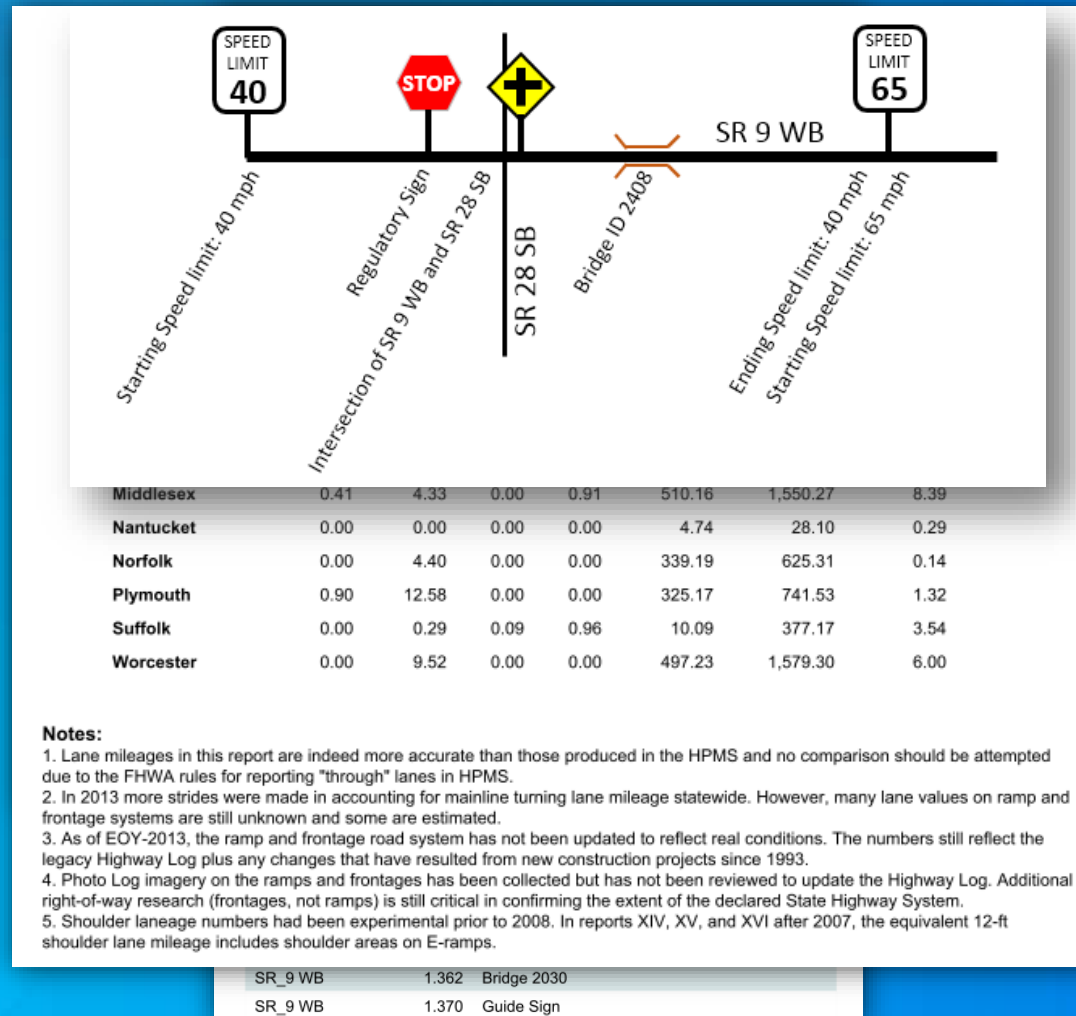
Reporting available across the enterprise from a web application

- Report Types

- Road Mileage Reports
- Road Segment Reports
- Road Log Reports

- File Types

- PDF
- CSV



Demo

Roadway Reporter

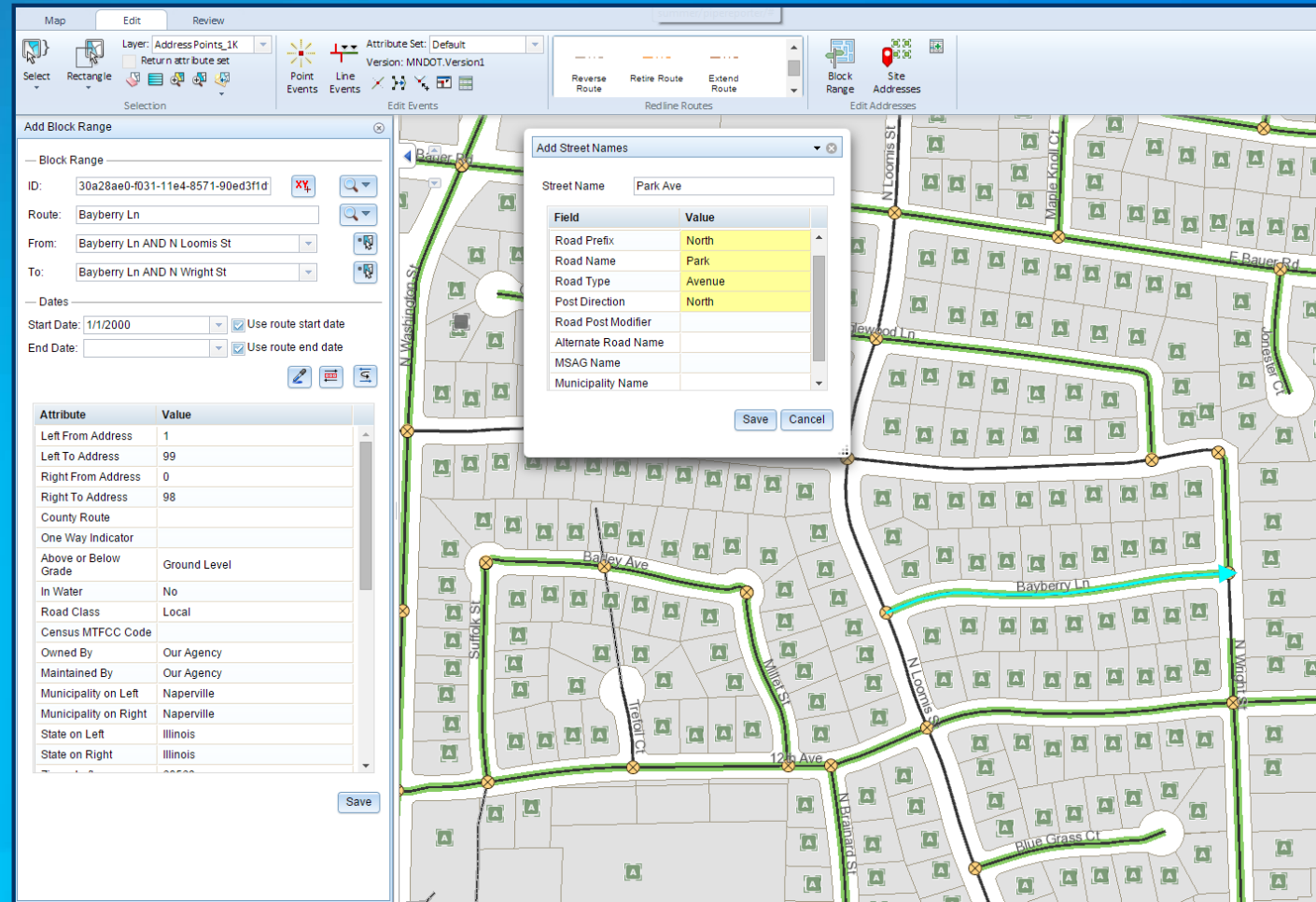


Address Management

Managing address information using Roads and Highways

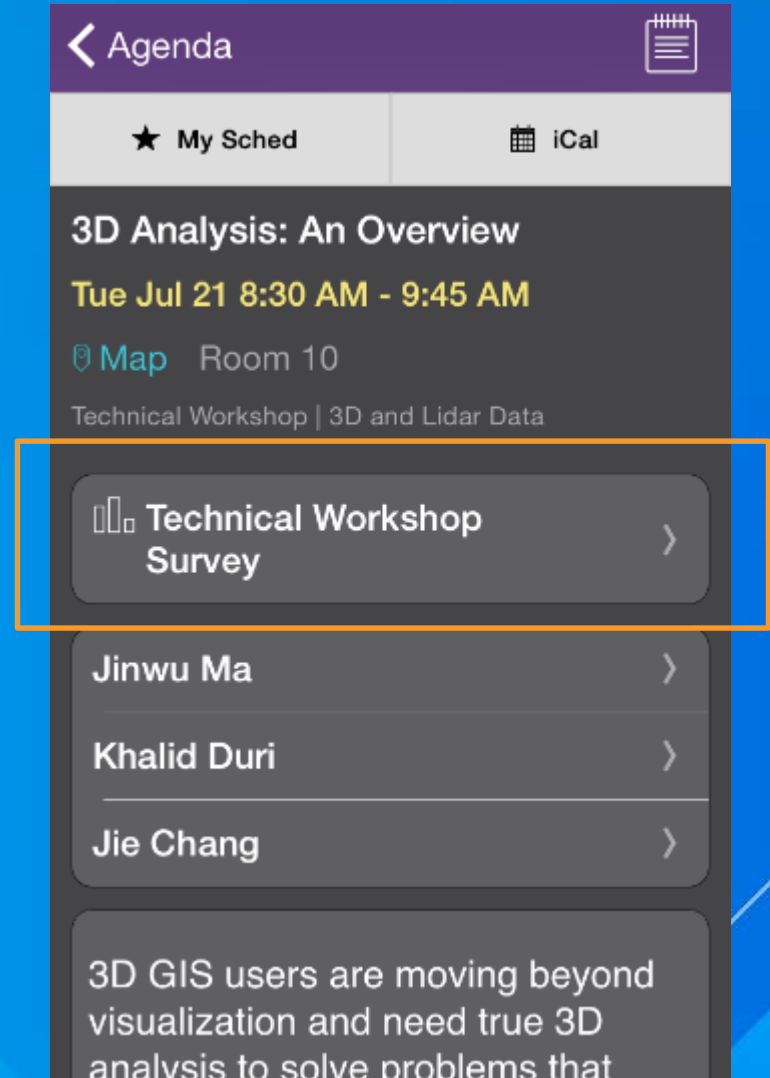
- **Tools**

- Add Street Names
- Add or Edit Block Ranges
- Add or Edit Site Address



Thank you...

- Please fill out the session survey in your mobile app
- Select Esri Roads and Highways: An Introduction in the Mobile App
 - Use the Search Feature to quickly find this title
- Click “Technical Workshop Survey”
- Answer a few short questions and enter any comments



Additional Roads and Highways sessions

- **Roads and Highways for Server: Web Services for Linear Referencing**
 - Wednesday, 10:30 AM, Demo Theater 7
- **Roads and Highways: Address Management on the LRS**
 - Wednesday, 10:30 AM, Demo Theater 6
- **Roads and Highways: Using Intersections for Locating Data**
 - Wednesday, 11:30 AM, Demo Theater 6
- **Roads and Highways: Building Infrastructure that lasts**
 - Wednesday, 2:30 PM, Demo Theater 2





Understanding our world.