ArcGIS Pipeline Referencing

An Introduction

Anjali Bhangay | Johum Khushk
Pipeline Referencing Overview

Information Model

- Networks, Routes
- Events
Information Model

Schema for route centerline management

**Routes** *(Network)*
Route features

**Centerline Sequence**
Key table for M-N relationship between Centerline and Route

**Centerline**
Line feature class that stores route geometry

**Calibration Points**
Point feature class that stores route measures

Separate feature class for each LRM

...with support for Engineering Stationing
Time Aware Linear Referencing Model

Users can view and analyze how routes, events, and intersections change over time…
Industry Data Models

• Supports:

- Esri Utility and Pipeline Data Model (UPDM)

- Pipeline Open Data Standard (PODS) Lite

- Or any schema that implements the location model.

...making pipeline data more inter operable
Pipeline Referencing Overview

**Information Model**
- Networks, Routes
- Events

**ArcGIS Desktop**
- LRS Network editing
- LRS management tools
- Geoprocessing tools
- Internationalized
Geoprocessing Tools

- Configuring
- Loading
- Transformations
  - Event Measure Behaviors
  - Dynamic Segmentation
  - Measure Translation
ArcGIS Pro Ribbon Toolbar

Route, Calibration Point and Centerline editing…
Pipeline Referencing Overview

Information Model
- Networks, Routes
- Events

ArcGIS Desktop
- LRS Network editing
- LRS management tools
- Geoprocessing tools
- Internationalized

ArcGIS Enterprise
- LRS web services
- Developer API samples
Pipeline Referencing for ArcGIS Enterprise

Linear Referencing capability for ArcGIS Enterprise

ArcGIS Enterprise
- Mapping
- Query
- Geoprocessing
- Enterprise security
- Scalability

Pipeline Referencing Server Features

LRS Web Services
- Linear Referencing Service
- Event Layer
  - Geometry to Station
  - Station to Geometry
- Redline Layer
- Centerline Layer
- Calibration Point Layer
- Intersection Layer
- Non-LRS Layer
- Locks
  - Query
  - Acquire
  - Release

Desktop
- Apply Edits
- Create Version
- Delete Version
- Reconcile Version

Web
- All Layers
- Network Layer
  - Geometry to Measure
  - Measure to Geometry
  - Translate
  - Concurrences
  - Query Attribute Set
  - Check Events

Connected Mobile
Developer Samples

- **REST API:**

- **Samples:**
  http://pipelinesample.esri.com/pipeline/samples/
Pipeline Referencing Overview

**Information Model**
- Network, Routes
- Events

**ArcGIS Desktop**
- LRS Network editing
- LRS management tools
- Geoprocessing tools
- Internationalized

**ArcGIS Enterprise**
- LRS web services
- Developer API samples

**Web Application**
- Event editing
- Event query
- Event QC
Event Editor

- **Editing**
  - Lines and Points events
  - Tabular selection results
  - Attribute set results
  - Bulk Event Replacement

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

- **Error Checking**
  - Gaps, overlaps, invalid measures
  - Data Reviewer batch checks
Pipeline Referencing Overview

Information Model
- Networks, Routes
- Events

ArcGIS Desktop
- LRS Network editing
- LRS management tools
- Geoprocessing tools
- Internationalized

ArcGIS Enterprise
- LRS web services
- Developer API samples

Web Application
- Event editing
- Event query
- Event QC
Enough Slides...
Let’s see some demos
Update Calibration Points

- Input Polyline Features
- Route Identifier Field
- Calibration Point Features
- Linear Referencing System (LRS)
- Network
- Calculation Method
  - M_ON_ROUTE_2D
  - M_ON_ROUTE_3D
  - GEOMETRY_LENGTH_2D
  - GEOMETRY_LENGTH_3D
  - ATTRIBUTE_FIELDS_2D
  - ATTRIBUTE_FIELDS_3D
  - INTERPOLATE_EXISTING
- Update Method
  - UPDATE_NONE
- Search Tolerance
- Measure Tolerance
- From Date Field (optional)
- To Date Field (optional)
When the LRS routes are edited, measure behavior rules can be applied to events.
Event Location Methods

- Route and measure
- Stationing
- Referent and offset
  - Intersections
  - Events
  - Features
- Coordinates and offset

Calibration Point: 1 mile
Event: 1.27 miles
Station Event: 100+00.00
Event: 456+25.00
Intersection Features: US Highway 10 crossing
Event: 300 feet from US Highway 10
Event: 45 feet from cell tower
Wellhead location: 34.0547, 117.1825
Event Replacement

Supports “Pipe Replacement” operation by retiring and replacing events in bulk using a single tool!

<table>
<thead>
<tr>
<th>Pipes</th>
<th>DOT Class</th>
<th>Operating Pressure</th>
<th>Valve</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Pipe</td>
<td>DOT Class (Retire)</td>
<td>Operating Pressure (New)</td>
<td>Valve (Retire)</td>
</tr>
<tr>
<td>Existing Pipe</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3) Event Replacement in Pipeline

- New Pipe
- Existing Pipe
- Valve (Retire)
- DOT Class (Retire)
- Pipes (As is)
- Operating Pressure (New)
Resources

• ArcGIS Pro Pipeline Referencing Help

• Enterprise Help
  (http://pipelinesample.esri.com/pipeline/)

• Utility and Pipeline Data Model (UPDM)

• GeoNet
  (https://community.esri.com/community/electric-and-gas)

• Esri Support Services
  (https://support.esri.com/en)

• Esri Online training
  (https://www.esri.com/training/)
Pipeline Referencing Solution Roadmap*

**Near Term**
- RESTful API
  - Network editing using REST API

**Medium Term**
- ArcGIS Pro
  - Utility Network integration
  - ArcGIS Pro REST network
  - Editing and conflict prevention

**Long Term**
- Utility Network

*Product releases, dates, and availability are estimates and subject to change*
Join Us for Other PRESENTATIONS

ArcGIS Pipeline Referencing: An Introduction
Tuesday, July 10
2:30 pm - 3:30 pm | SDCC - Room 30 A

ArcGIS Pipeline Referencing: What's New
Tuesday, July 10
2:30 pm - 3:15 pm | SDCC - Demo Theater 03

ArcGIS Pipeline Referencing: Advanced Data Management Workflows
Thursday, July 12
10:00 am - 11:00 am| SDCC - Room 31 C
Come See Us!
Thank you for attending!

- Questions?
- ¿Preguntas?
- 问题吗？
- Vragen?
- Des questions?
- Fragen?
- प्रश्न?
- Le domande?
- 質問ですか？
- Pytania?
- Questões?
- Вопросов?
- Frågor?
- 有問題嗎？
- Sorular?
- İh niAV
Please Take Our Survey on the App

Download the Esri Events app and find your event

Select the session you attended

Select the Feedback tab

Complete answers and select “Submit”