

FME and ARNOLD: Superman to the Rescue!

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Outline

I. ARNOLD Challenges & Processes

II. FME Toolbox

III. Use Case Walk Through



ARNOLD Technical Challenges

Quotes from FHWA-Sponsored ARNOLD study -

“Linear referencing systems are among the most important and complex datasets within a DOT.”

“Development and maintenance of a statewide, all roads network containing LRS is an involved and complex process.”

“ARNOLD amplifies the challenges because of its scope.”



ARNOLD Technical Process

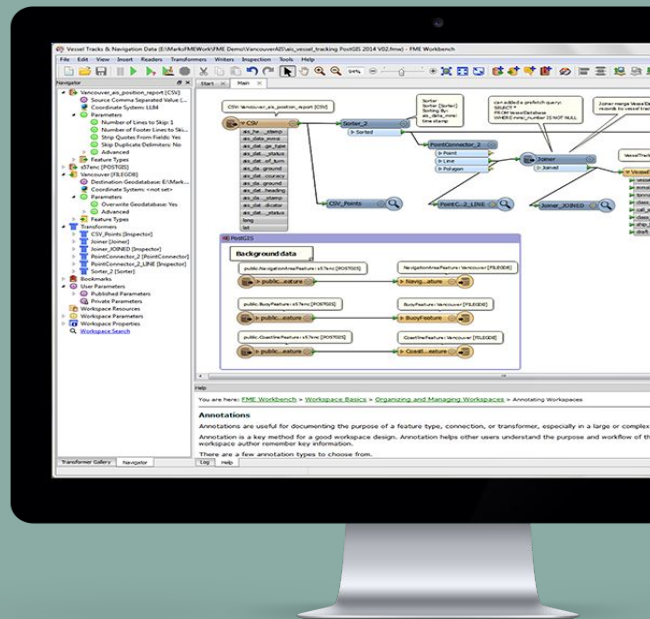
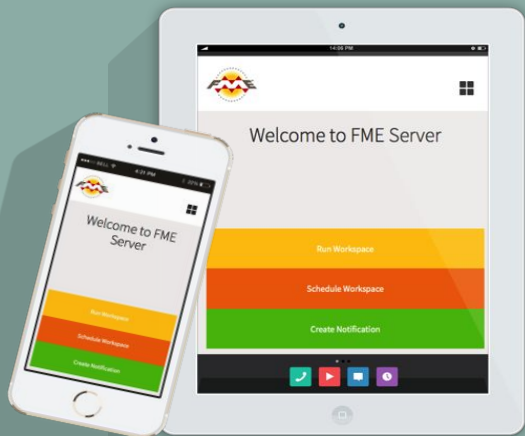


An Introduction to

FME Desktop

- and -

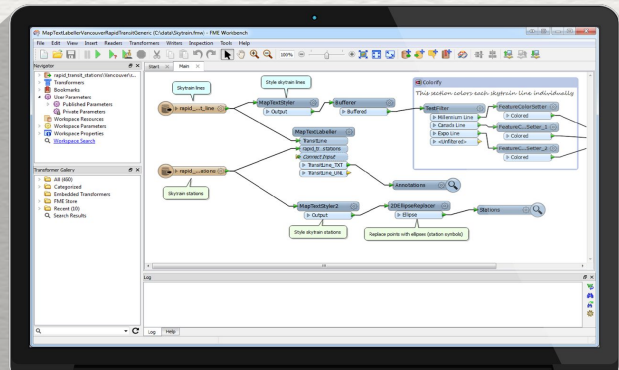
FME Server



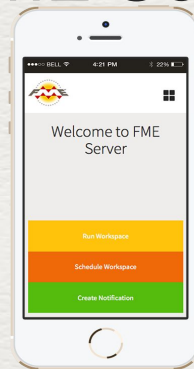
Safe Software

3 Core Products

FME Server



FME Desktop



FME Cloud



FME Desktop

Intuitive Workflow
Authoring



FME Server

Enterprise Automation

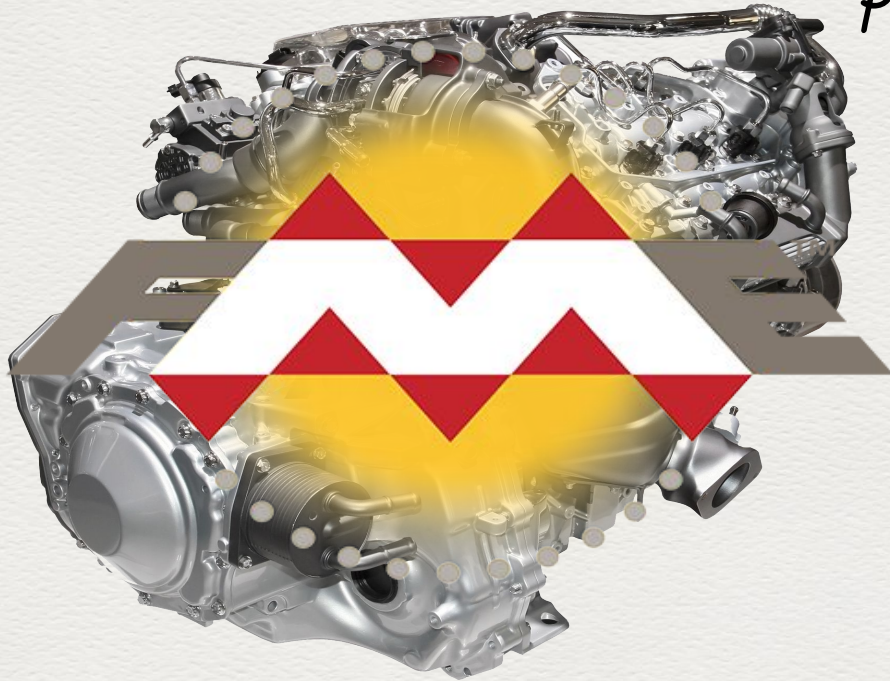


FME Cloud

Take Automation to the
Cloud

FME Engine

All Safe products share a common platform

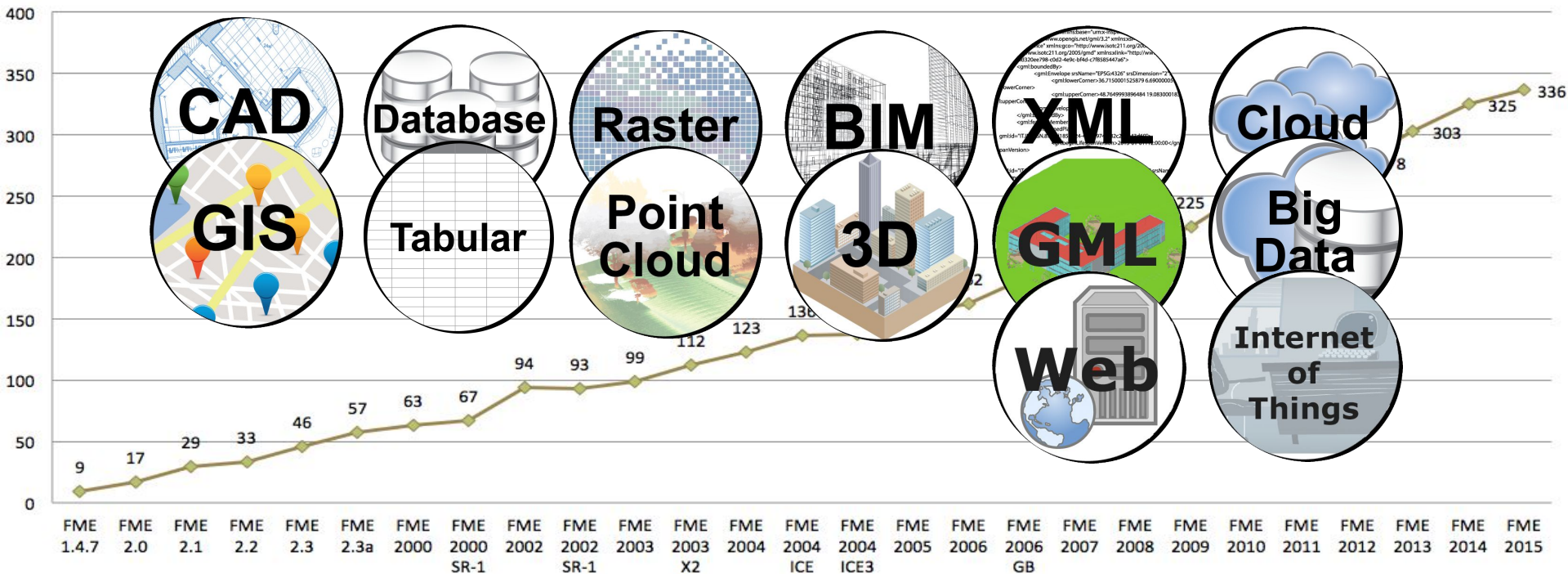


*Powered by FME Engine...
...driven by FME Workspaces*

- Choice of operating platform:
 - Windows
 - Linux
 - MAC OS
- 32 or 64 bit FME



CONNECT HUNDREDS OF FORMATS WITH FME



INTEROPERABILITY

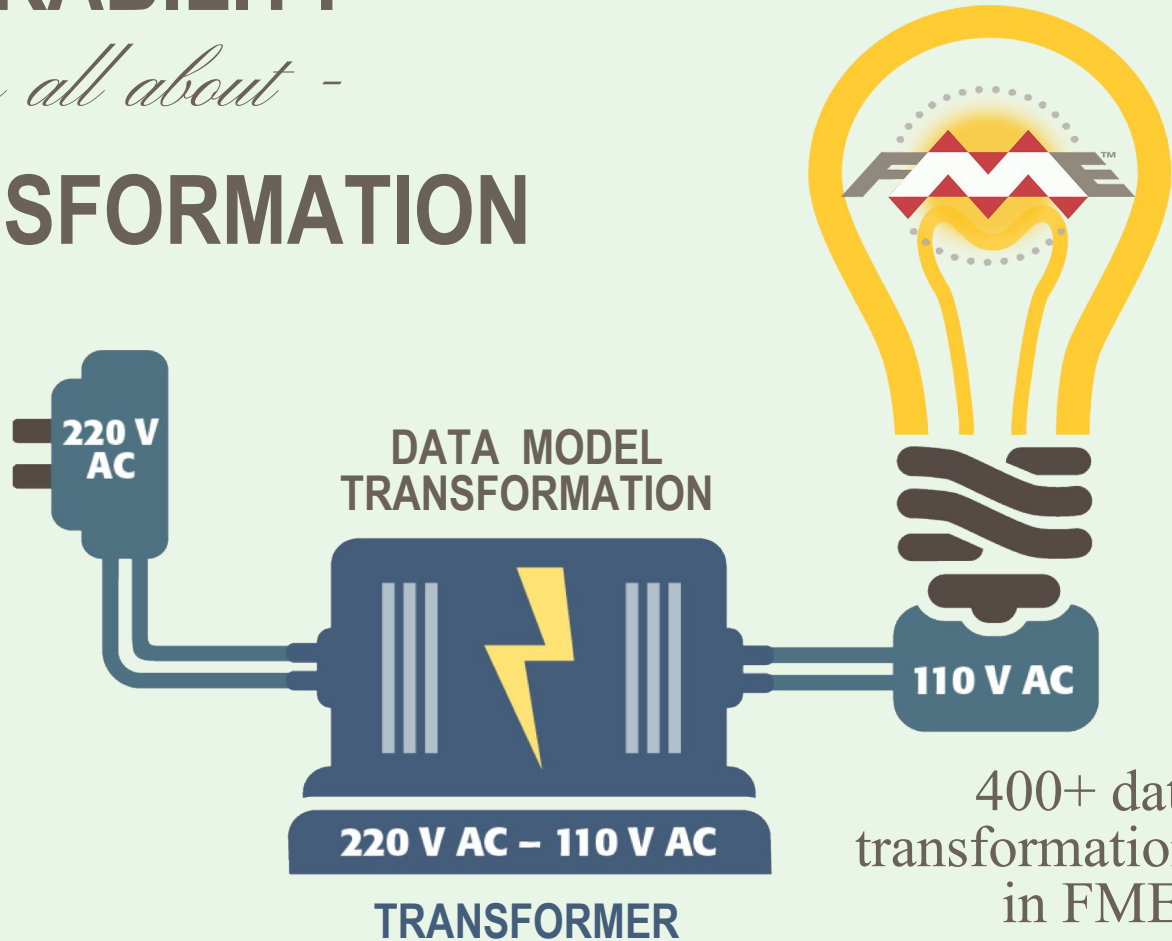
- *is all about* -

TRANSFORMATION

Connect to your
format

- *and* -

Transform the data
model

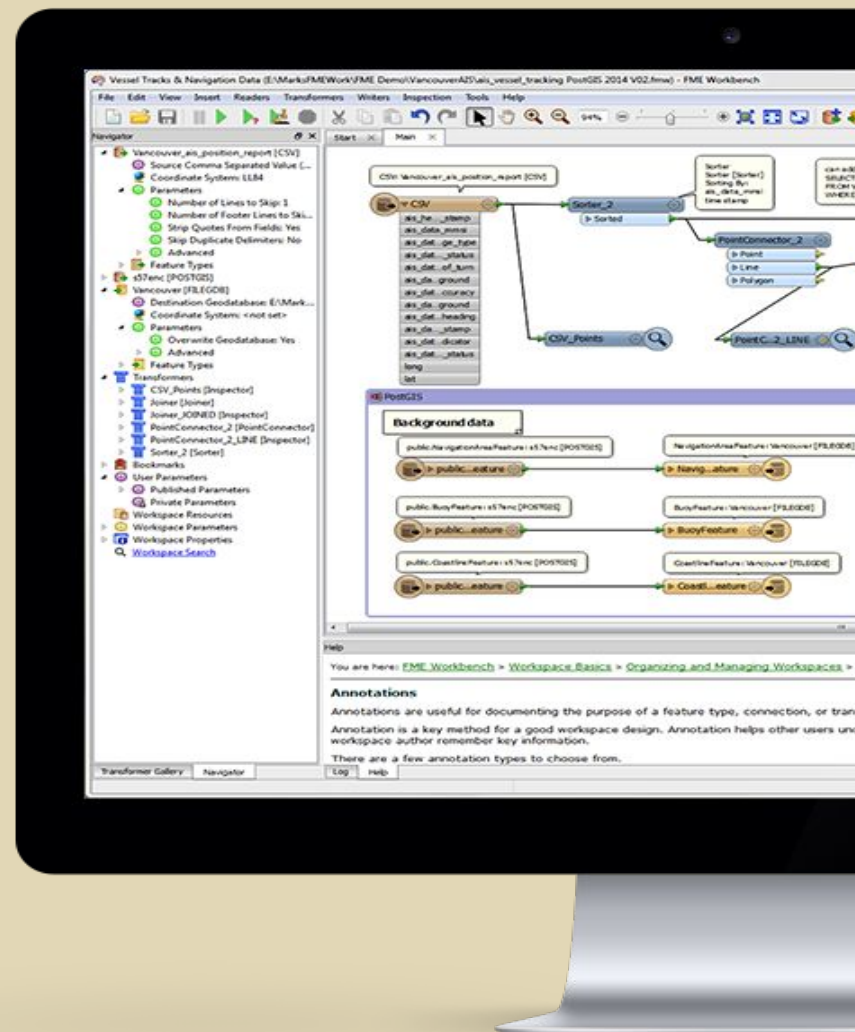


400+ data
transformation tools
in FME



WORKBENCH

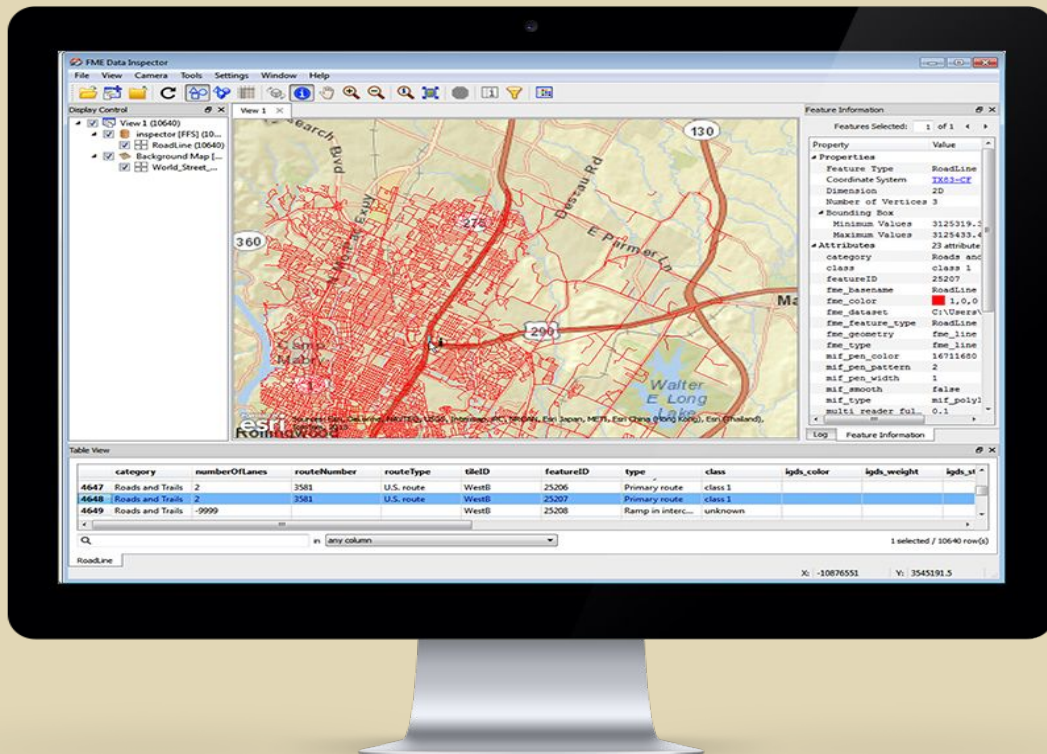
- Everything FME starts here
- A graphical authoring environment used to create repeatable workflows
- Author FME workflows with a library of 400+ powerful data transformers





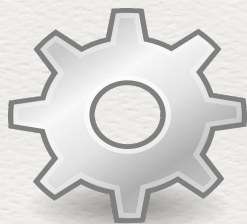
DATA INSPECTOR

Inspect data structure -
before, during, and after
transformation.



FME Server

FME Engine workhorse and runs FME Workspaces



Automate



Deliver Data



Download Data



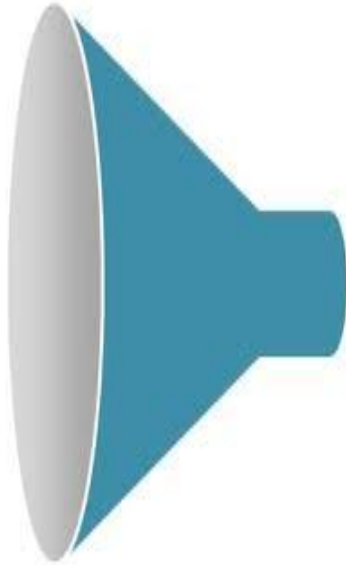
Real Time Data



Scale

Event Based Real-Time

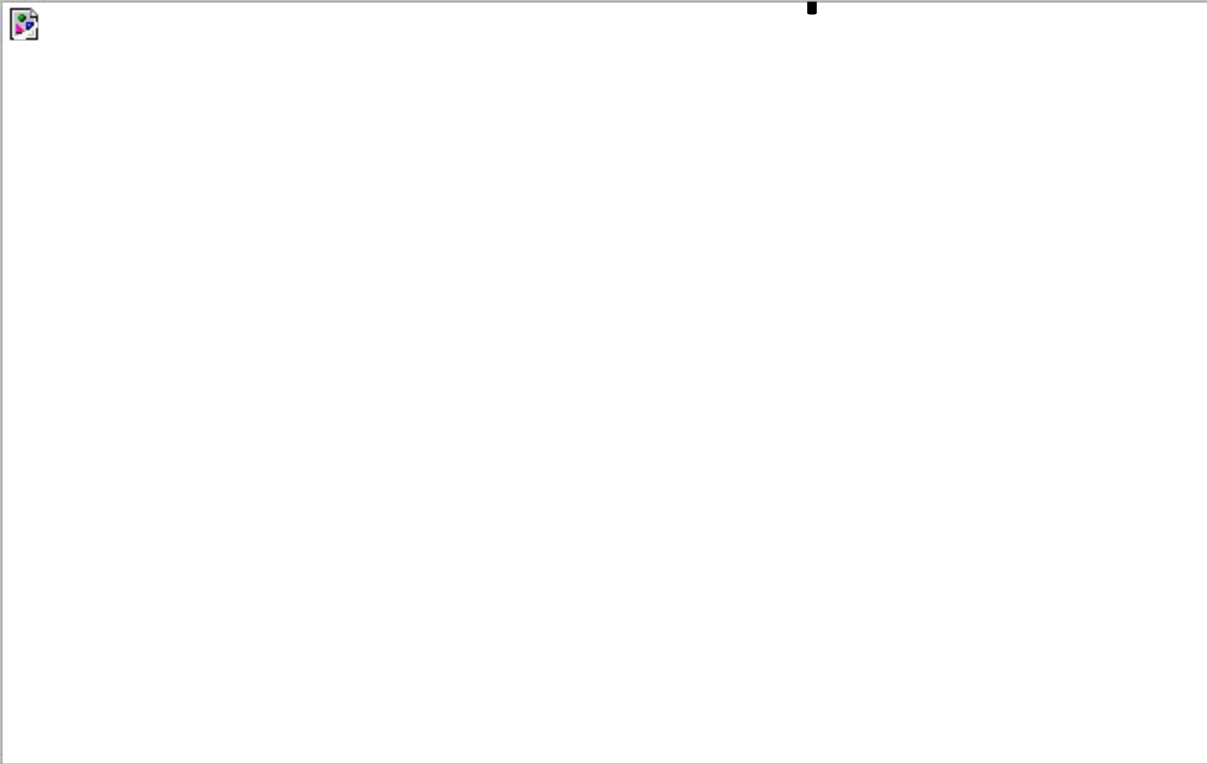
(Publishers/Triggers)



TOPIC



FME in Enterprise



What FME Is and Isn't

Data Functions	Capability	Notes
ETL	Yes	Supports 400+ formats
Projection	Yes	2000+ predefined CS
QC	Yes	
Batch CRUD	Yes	Can write SQL as well
Interactive Editing	No/Yes	With FME Server + Web App
Analysis	Yes	
Services	Yes	Through FME Server
Presentation	No	Inspection viewer



FME ...

Geospatial Data ETL Tool

ModelBuilder on Steroids

Crosses different geospatial ecosystems

Versatile,

Efficient,

Elegant!

Knows LRS & ARNOLD!



ARNOLD Software Requirements & FME

Task Categories	Task	FME
Centerline Maintenance	Interactive editing	No/Yes
	Data import/export	Yes
	ETL	Yes
	Conflation	Yes/No
LRS Maintenance	Calibrating the LRM	Yes
	Applying an LRM	Yes
	Events handling	Yes
LRS Data Sharing	Ability to publish web services	Yes
	Programmatic access to LRS via APIs	Yes
	Download of LRS information	Yes



Most Wanted Use Case Demos

Category	Task Description	Group 1	Group 2	Group 3
Centerline Network	Combining local centerlines	H		H
LRS Route Network	Route Reference / Intersection Table	H		H
Event	Propagate measure changes	H	H	M
Event	Gap/Overlap rule	M	H	H
ARNOLD Delivery	Schema Mapping / WKB	M		H



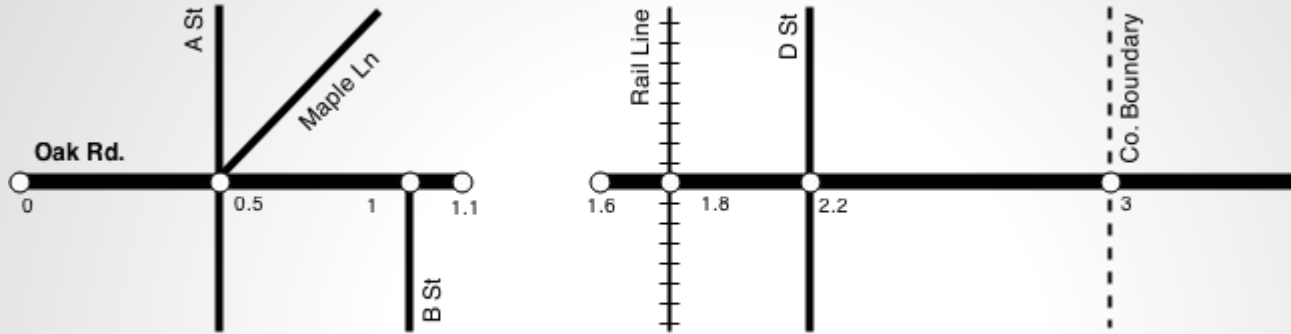
Use Case I - Deliverables

All-roads with LRS in the ARNOLD schema:

Column	Notes
Route_ID	Unique road ID number
Road Name	
Functional Classification	(7 classifications)
Ownership	(27 ownership types)
Facility Type	(7 types)
State Code	
Year_Record	
Source	Entity providing the data
Geometry	WKB using (x,y,m), w/ measures in miles to 1/1000 of a mile (Missing CS)



Use Case II - Route Reference



Route	Meas	XType	XName	XTopo	Address
Oak Rd	0	Node		Begin	1
Oak Rd	0.5	Route	Maple Ln	Left	500
Oak Rd	0.5	Route	A St	Cross	500
Oak Rd	1	Route	B St	Right	1000
Oak Rd	1.1	Node		End	1100
Oak Rd	1.6	Node		Begin	1600
Oak Rd	1.8	Rail	Rail Tracks	Cross	1800
Oak Rd	2.2	Route	D St	Cross	2200
Oak Rd	3	Boundary	Co. Boundary	Cross	3000
...

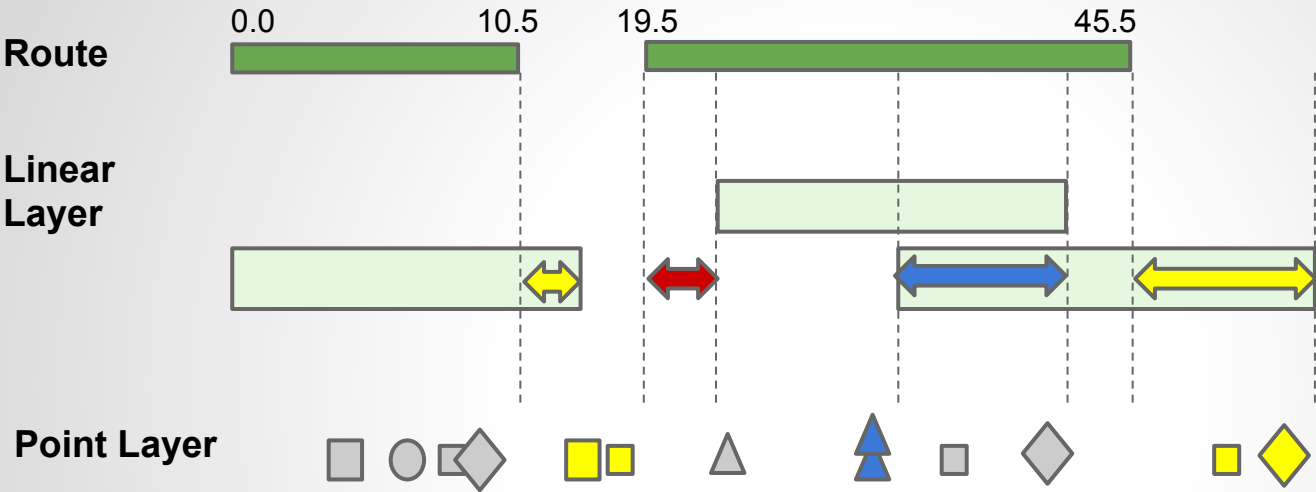





Use Case III - Measure Propagation

Assuming due to realignment projects, an events located beyond measure 76.5 be assigned measures one-mile less.



Use Case IV - Event QC



 Domain rule	Mandatory	Mandatory
 Gap rule	Optional	NA
 Overlap rule	Optional	Optional



Use Case IV - Merging Local Data & Change Detection

