

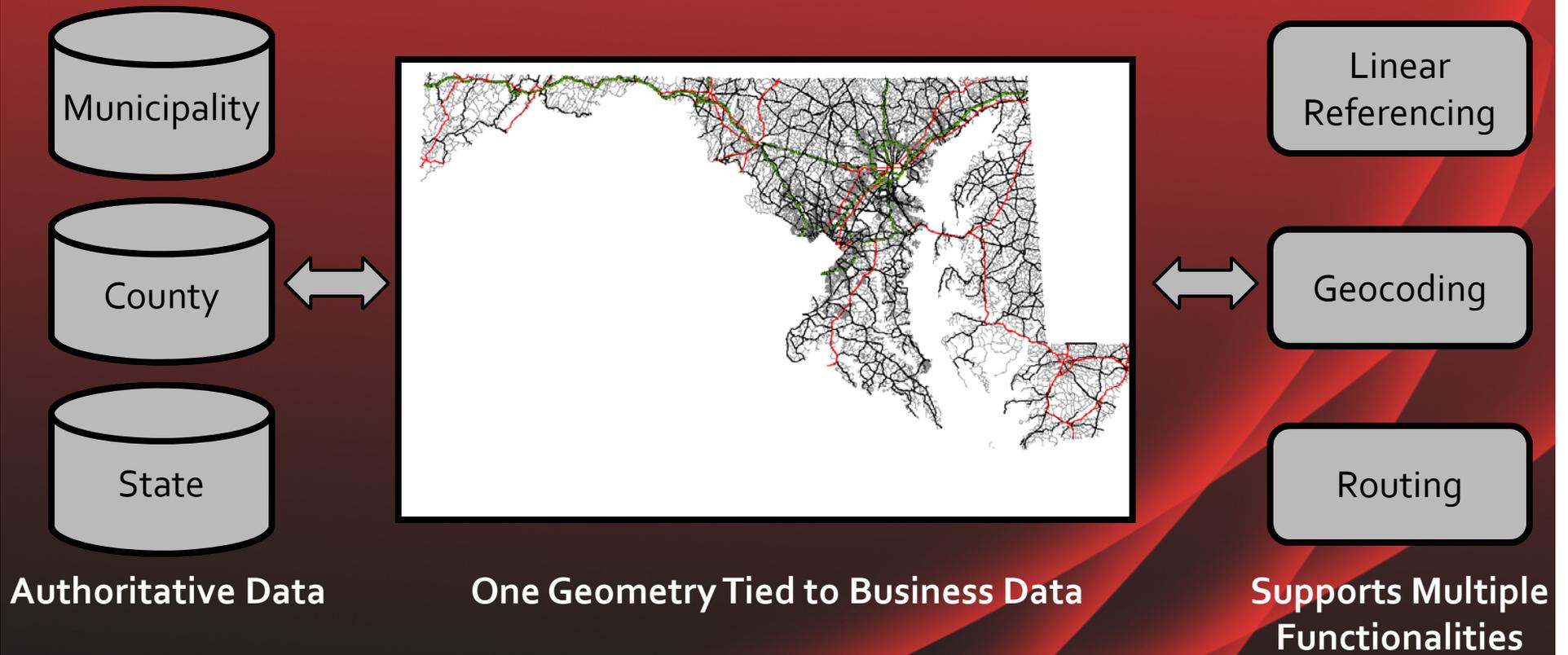
*one* **MARYLAND**  
*one* **CENTERLINE**  
collaborative. authoritative. seamless.

TRCC  
Traffic Records Coordinating Committee (TRCC) Technical Council  
March 11, 2015

Michel Sheffer, SHA GIS Coordinator

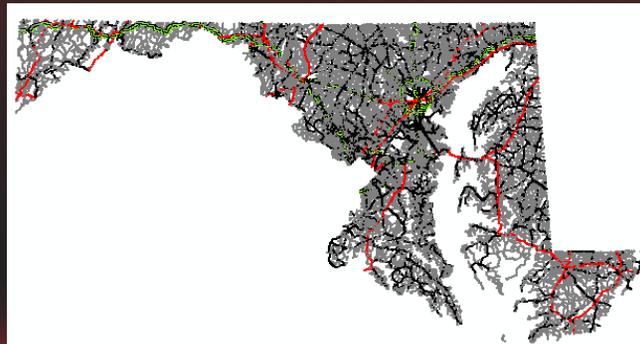


# One Maryland One Centerline (OMOC)



# Current SHA Centerlines

- SHA maintains a seamless, statewide centerline
  - Represents state and local public roads
  - Supports the FHWA HPMS Program
    - Yearly requirement to submit an inventory of publicly-maintained roads, including accurate mileage, lane mileage and travel information.
    - Data used in the apportionment of Federal-Aid Highway Funds to the states
  - Supports Highway User Revenue Fund



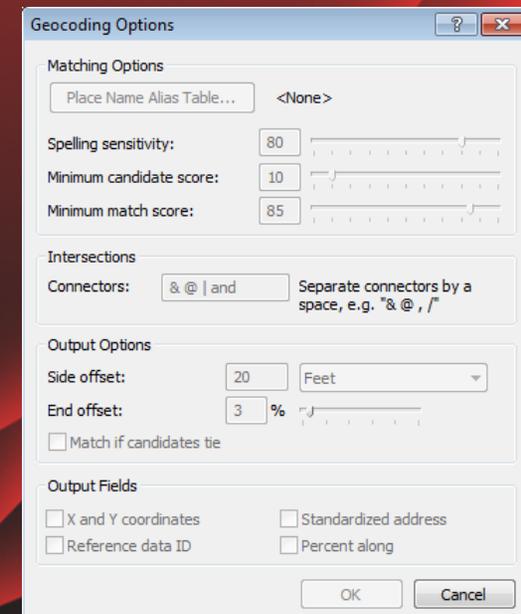
# Current SHA Centerline Update Process for Publically-Maintained Roads

- SHA's Road Improvement Process
  - Paper-based submission to local jurisdictions
    - 23 counties plus Baltimore City
    - 159 incorporated municipalities
  - Paper-based submission of updates back to SHA
    - GIS updates added manually by SHA staff
    - Field verification and GPS capture



# Other Current Centerlines in MD

- Local governments maintain jurisdiction centerlines
  - Represents state/local public and private roads
  - Supports local government operations
    - e.g. E-911, Addressing, DPW
- Compiled to create statewide geocoder



The screenshot shows a 'Geocoding Options' dialog box with the following settings:

- Matching Options:**
  - Place Name Alias Table...: <None>
  - Spelling sensitivity: 80
  - Minimum candidate score: 10
  - Minimum match score: 85
- Intersections:**
  - Connectors: & @ | and
  - Separate connectors by a space, e.g. "& @ , /"
- Output Options:**
  - Side offset: 20 Feet
  - End offset: 3 %
  - Match if candidates tie
- Output Fields:**
  - X and Y coordinates
  - Standardized address
  - Reference data ID
  - Percent along

Buttons: OK, Cancel

# Why Change?

- 2012 MAP-21 Legislation, ARNOLD
  - States are required to include dual carriageways and all publicly maintained roads as part of their HPMS Submission
- Leverage authoritative centerline data
- Duplication of centerline maintenance in Maryland
- Centerline data needed on daily/weekly basis instead of yearly
- Statewide cartographic best practices
- Public Safety (e.g. mutual aid agreements)
- LRS for local governments
- One authoritative-based dataset can lead to more coordinated initiatives, e.g. state-wide road closure reporting



# Outreach

- Met with every MD county and some larger municipalities
- Established partnerships



# Educational Materials

## PROGRAM OVERVIEW

## CENTERLINES



The One Maryland One Centerline (OMOC) Program is a collaborative effort between federal, state, and local entities to create an authoritative, statewide roadway dataset that meets the needs of a diverse community.

### WHAT IS A LINEAR REFERENCING SYSTEM?

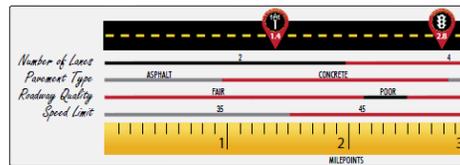
A linear referencing system (LRS) is a set of methods for specifying a location as a distance, or offset, along a linear feature (e.g. centerline) from a site with a known location. This ability is made possible through the use of route features that have unique identifiers and a measure system (e.g. distance, time, etc.). The concept is similar to a ruler, in which each tick mark represents a distance from another tick mark for a given unit of measurement.

### MARYLAND STATE HIGHWAY LRS IMPLEMENTATION

The Maryland State Highway Administration's (SHA) LRS is based on county, route and milepoint and uses a distance-based measure system. Distances are measured in 1/1000ths of a mile along a route, beginning and ending at jurisdictional boundaries. For a more accurate measurement, SHA uses driven mileage to calculate the distance of a route.

### HOW DOES MD SHA USE LINEAR REFERENCING?

SHA uses linear referencing to manage highway-related assets and roadway characteristics that do not have explicit x,y coordinates. Recording asset location in terms of relative distance along a line allows for multiple sets of overlapping attributes to be assigned roadway measurements without also requiring the roadway feature to be segmented where an attribute value changes.



### CONTACT US

Please contact us with questions at [1md1cline@sha.state.md.us](mailto:1md1cline@sha.state.md.us)



**BENE**  
Local Programs  
this list  
to ma  
and e  
the sit  
jurisdi

**DATA**  
The us  
to acc  
charac  
locati  
as pav  
numbe  
roadw  
locati

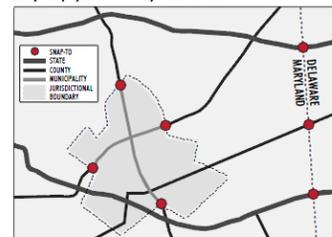


The One Maryland One Centerline (OMOC) Program is a collaborative effort between federal, state, and local entities to create an authoritative, statewide roadway dataset that meets the needs of a diverse community.

### WHAT ARE SNAP-TO POINTS?

Snap-to points, also known as touch points, are used to help with edge-matching of roadway centerline geometry between neighboring jurisdictions to establish a seamless roadway network. These points are used to identify transition in authoritative centerline geometry between federal, state, county and municipal roadways.

The locations of snap-to points are reviewed and mutually agreed upon between representatives in neighboring jurisdictions to reflect where maintenance of authoritative road centerline geometry starts and stops. These points do not represent political boundaries, and may or may not represent jurisdictional responsibility for physical roadway maintenance.



Many local jurisdictions within central Maryland have completed a snap-to point spatial dataset as part of a project coordinated by the Baltimore Metropolitan Council (BMC). The Maryland State Highway Administration (SHA) will leverage these efforts into an edge-matched regional road centerline dataset through use of existing snap-to points and expansion of the collaborative process to the remaining Maryland counties, neighboring states, and the District of Columbia.

### CONTACT US

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The One Maryland One Centerline (OMOC) Program is a collaborative effort between federal, state, and local entities to create an authoritative, statewide roadway dataset that meets the needs of a diverse community.

### BACKGROUND INFORMATION

The Maryland State Highway Administration (SHA) is responsible for maintaining a statewide road centerline dataset

### SNAP-TO POINTS

### BENEFITS

- ✓ An edge-matched regional road centerline dataset.
- ✓ Streamlined data conflation, integration, and maintenance processes.
- ✓ A seamless cartographic product for visual representation or mapping.
- ✓ More accurate addressing and routing data.
- ✓ Continuous flow of address ranges between jurisdictions.

### CREATION PROCESS

1. SHA uses existing centerlines to generate potential snap-to points along jurisdictional lines.
2. Local jurisdictions review, collaborate and provide revised point locations as needed.
3. Accepted statewide snap-to point dataset is distributed.
4. Data managers edit their respective centerlines to coincide at established snap-to points.

### PROGRAM GOALS

- ✓ Create a collaborative, state-wide, seamless centerline based on authoritative data.
- ✓ Meet MAP-21 requirements and enhance the HPMS reporting process.
- ✓ Coordinate roadway cartographic and data model recommendations.
- ✓ Provide mutual benefits to State and Local jurisdictions
- ✓ Support Transportation for the Nation (TFN), which promotes a publically available, high quality road centerline that is coordinated across all levels of government.

Application  
safety and asset management systems  
in near real-time  
Local applications



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representation of the center of a roadway network. In addition, data tables, or attributes, that roadway such as: route number, prefix, etc) limit, number of lanes, etc), maintainer, functional class, etc) postal code, etc) rates, etc) maintenance records, etc) in incidents, etc) lighting, etc) directions, etc)

### USES

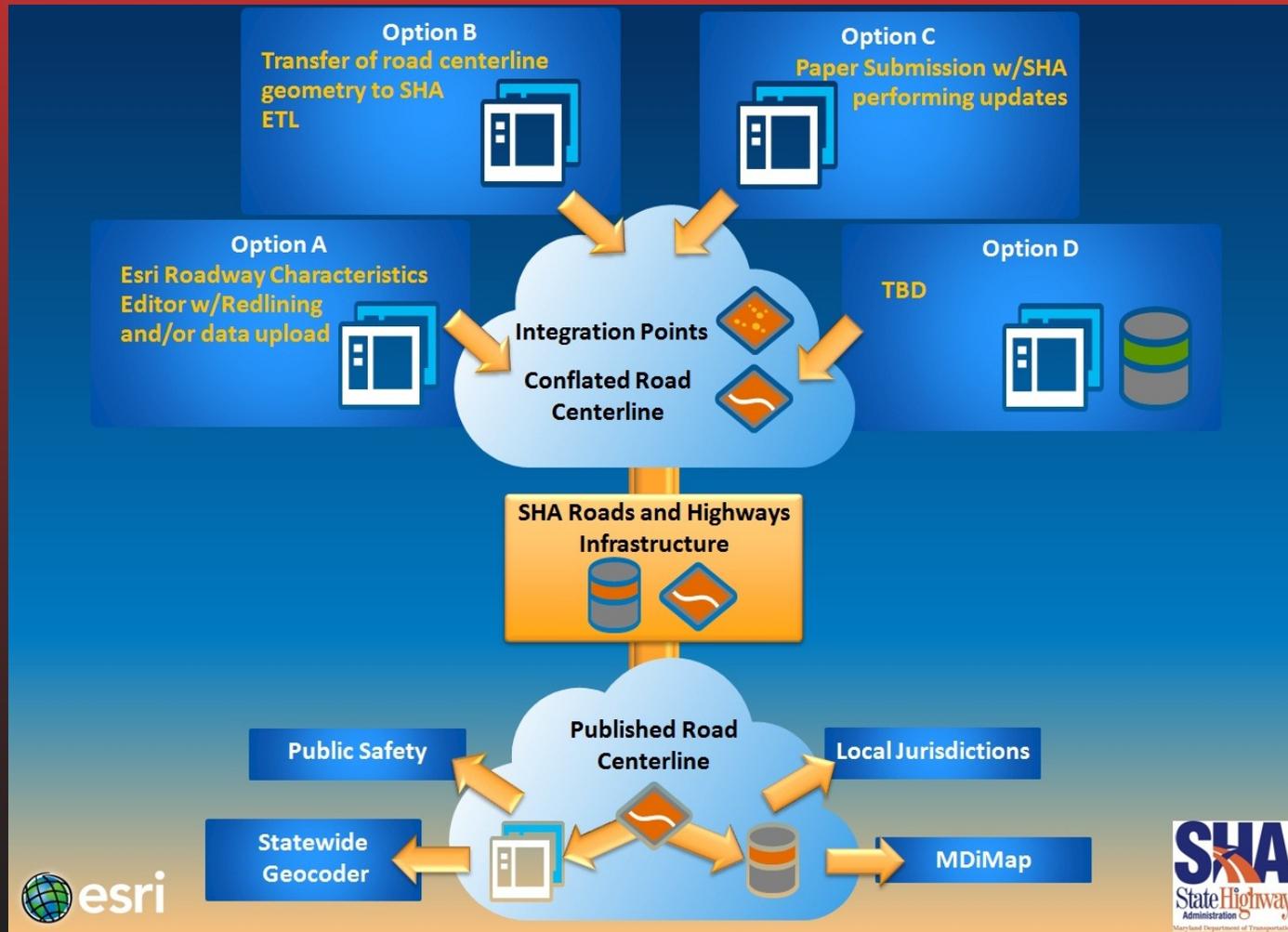
- ✓ Mapping and visual representation
- ✓ Routing and driving directions
- ✓ Geo-locating address information, also known as geocoding
- ✓ Transportation planning, traffic studies and safety assessments
- ✓ Asset and maintenance management
- ✓ Analysis of driving times and distances
- ✓ Emergency planning, preparedness and response



SHA is jointly owned, operated and maintained by the Maryland State Highway Administration (SHA), the Maryland Transportation Authority (MDTA), Baltimore and 159 incorporated municipalities. The One Maryland One Centerline is a sustainable, current, authoritative, and multi-use centerline partnership between these entities.



# Implementation Flexibility



# Centerline Cartographic Rendering Workshop

- Determine definitions for roadway features / configurations
- Determine level of granularity
- Inclusive list of use cases for centerline rendering
- Identify industry best practices (MD) for each use case
- Acknowledge/understand implications for routing and linear referencing (may need individual meetings for these)
- Publish guide



The image shows a printed agenda for the Maryland Centerline Cartographic Rendering Workshop. At the top left is the 'one MARYLAND one CENTERLINE' logo with the tagline 'collaborative. authoritative. seamless.' At the top right is the SHA State Highway Administration logo. The title 'Maryland Centerline Cartographic Rendering Workshop' and date 'November 21, 2014' are centered. The agenda is organized into sections: Registration (7:30 a.m. - 8:30 a.m.), Continental Breakfast and Networking (5th Floor Loft), Opening Session (4th Floor, Room 4310, 8:30 a.m. - 9:45 a.m.), SME Presentations (4th Floor, Room 4310, 9:45 a.m. - 11:30 p.m.), Pre-Breakout Session (4th Floor, Room 4310, 11:30 a.m. - 12:15 p.m.), Lunch (5th Floor Loft, 12:15 p.m. - 12:45 p.m.), Breakout Sessions (Location Varies, 12:45 p.m. - 3:45 p.m.), and Closing Session (4th Floor, Room 4310, 3:45 p.m. - 4:30 p.m.). A list of speakers is provided for the Opening Session. The contact email '1md1cline@sha.state.md.us' is at the bottom right.

**one MARYLAND one CENTERLINE**  
collaborative. authoritative. seamless.

**SHA**  
State Highway Administration

**Maryland Centerline Cartographic Rendering Workshop**  
November 21, 2014

**AGENDA**

**Registration—2<sup>nd</sup> Floor (parking garage entrance) 7:30 a.m. – 8:30 a.m.**

**Continental Breakfast and Networking – 5<sup>th</sup> Floor Loft**

**Opening Session— 4<sup>th</sup> Floor, Room 4310 8:30 a.m. – 9:45 a.m.**

Dean Terry Cooney, Towson University College of Liberal Arts  
Kenny Miller, Deputy Geographic Information Officer, State of Maryland  
Greg Slater, Director of Planning & Preliminary Engineering, Maryland State Highway Administration  
Joe Hausman and Tom Roff, Federal Highway Administration  
Gary Waters and Tom Brenneman, Esri

**SME Presentations – 4<sup>th</sup> Floor, Room 4310 9:45 a.m. – 11:30 p.m.**

Linear Referencing – Al Butler (MPzero)  
Addressing & Next Generation 911 - Patrick Melancon and Chris Knights (GeoComm)  
Routing – Patrick Melancon (GeoComm)  
Data Management & Conflation – Richard Sunderland and Duncan Guthrie (ISpatial)

**Pre-Breakout Session - 4<sup>th</sup> Floor, Room 4310 11:30 a.m. – 12:15 p.m.**

**Lunch – 5<sup>th</sup> Floor Loft 12:15 p.m. – 12:45 p.m.**

After retrieving your lunch, please arrive in your assigned room by 12:45 p.m! You may eat in your assigned room.

**Breakout Sessions – Location Varies 12:45 p.m. – 3:45 p.m.**

**Closing Session – 4<sup>th</sup> Floor, Room 4310 3:45 p.m. – 4:30 p.m.**

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# Snap-To-Points

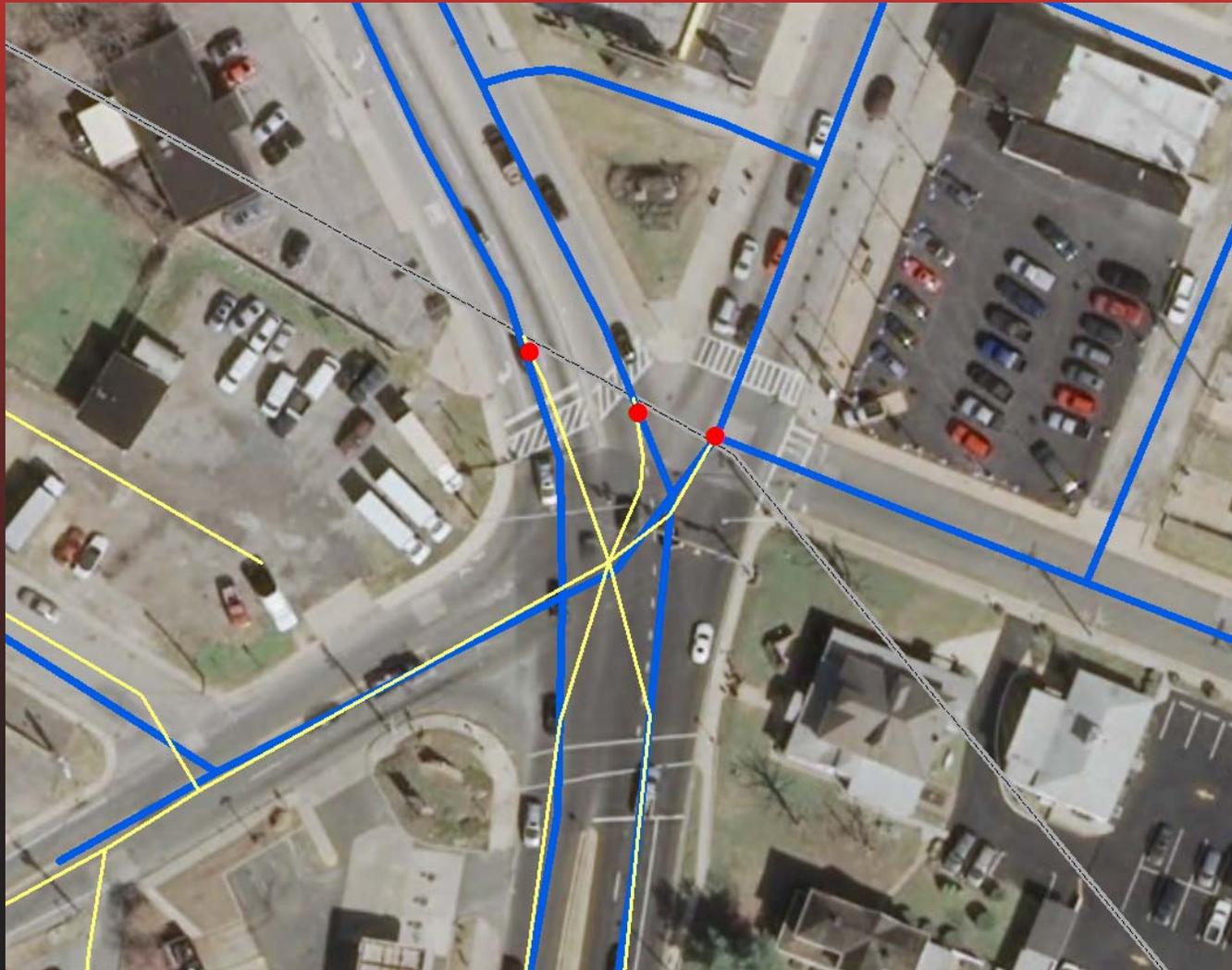
- Edge-matching between neighboring jurisdictions



# Snap-To-Point Example



# Snap-To-Point Example



# Snap-To-Point Reviewer

**one MARYLAND one CENTERLINE**  
collaborative, authoritative, seamless.

## Centerline Snap-To Point Reviewer

Allows users to verify and approve jurisdiction centerline touchpoints.

User: erin.lesh  
Jurisdiction: Montgomery

**SNAP\_TO\_POINTS\_EDIT - Snap To Points**

- Approved
- Moved
- Not Reviewed

**2013 State & Local Roads**

**DC Boundary**

**DC Roads**

Map labels: Chevy Chase, Towson Park, Rock Creek Golf Course, Fort Detrick, etc.

# Snap-To-Point Reviewer

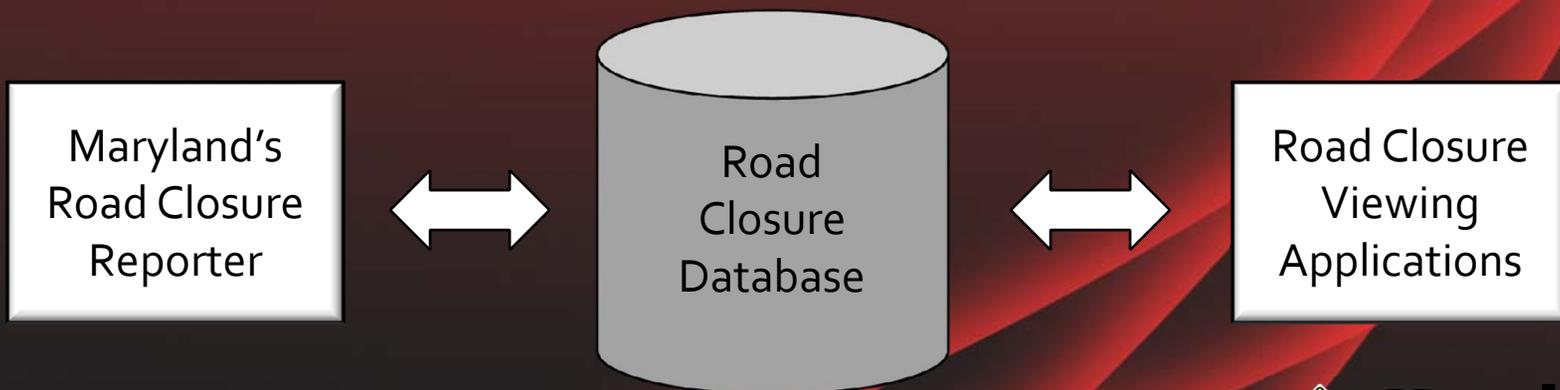
The screenshot displays the 'Centerline Snap-To Point Reviewer' web application. The interface includes a header with the 'one MARYLAND one CENTERLINE' logo and the text 'Centerline Snap-To Point Reviewer' and 'Allows users to verify and approve jurisdiction centerline touchpoints.' The user information 'User: erin.lesh' and 'Jurisdiction: Montgomery' is shown in the top right. A left sidebar contains navigation icons and a legend for 'SNAPTO\_POINTS\_EDIT - Snap To Points' (Approved, Moved, Not Reviewed), '2013 State & Local Roads', 'DC Boundary', and 'DC Roads'. The main map area shows an aerial view of a residential neighborhood with yellow lines for roads and green lines for boundaries. A blue dot on a road indicates a 'Not Reviewed' touchpoint. The bottom right corner features the text 'POWERED BY esri' and a list of data sources: 'VITA, Esri, HERE, DeLorme, Intermap, iPC, TomTom, USGS, NGA, USDA, EPA, NPS | SHA, various Maryland counties'.

# Snap-To-Point Reviewer

The screenshot displays the 'Centerline Snap-To Point Reviewer' web application. The interface includes a header with the 'one MARYLAND one CENTERLINE' logo and the title 'Centerline Snap-To Point Reviewer'. Below the title is a subtitle: 'Allows users to verify and approve jurisdiction centerline touchpoints.' The user information 'User: erin.lesh' and 'Jurisdiction: Montgomery' is shown in the top right corner. A left-hand navigation pane contains icons for home, settings, and a menu, along with a legend for 'SNAPTO\_POINTS\_EDIT - Snap To Points' (Approved: green dot, Moved: yellow dot, Not Reviewed: blue dot) and map layers for '2013 State & Local Roads' (yellow line), 'DC Boundary' (green line), and 'DC Roads' (green line). The main map area shows an aerial view of a residential neighborhood with yellow and green lines overlaid. A context menu is open over a yellow dot on a road, with options: 'Approve this point.', 'Click to approve this location Or, drag the point to a new location' (with a green 'Approve' button), and 'Zoom closer to location' (with a blue button). The bottom right corner of the map area contains the text 'POWERED BY esri' and a list of data providers: 'VITA, Esri, HERE, DeLorme, Intermap, iPC, TomTom, USGS, NGA, USDA, EPA, NPS | SHA, various Maryland counties'.

# Maryland's Road Closure Reporter

- Data capture system
  - GIS Centric Back-End
  - Mobile and PC
- Common Data Model
- Data Publication System



# Maryland's Road Closure Reporter

The screenshot shows the desktop version of the Maryland's Road Closure Reporter web application. At the top left is a yellow diamond-shaped icon with the text "ROAD CLOSED" and the application title "Maryland's Road Closure Reporter". A search bar and a "Sign in" link are at the top right. Below the title is a navigation bar with "Maryland's Road Closure Reporter" and a blue button labeled "I want to...". The main content area is divided into two columns. The left column contains a "Welcome to Maryland's Road Closure Reporter" message followed by a numbered list of instructions for reporting a road closure. The right column displays a map of the Hagerstown, Maryland area, showing streets, parks, and landmarks. A scale bar at the bottom indicates 0, 0.5, and 1 mile. The map is credited to Esri, HERE, DeLorme, MapmyIndia, and OpenStreetMap contributors.

**ROAD CLOSED** **Maryland's**  
*Road Closure Reporter*

Maryland's Road Closure Reporter

**Welcome to Maryland's Road Closure Reporter**

1. Click on **Submit a Road Closure**
2. The tool will ask you to "Select your road closure event location on the map" or "Search by street name", e.g. Bayline.
3. Once the street point and segment to be closed has been identified and highlighted you will be prompted to select the the following:
  - o "Reason" e.g. Construction, Weather, Parade, Seasonal or Special Event
  - o "Starting" start date and time of the event
  - o "End" scheduled or estimated end time of the event
  - o "Type" e.g. Closed, Limited Public Access, Emergency Vehicle Only Access
4. If available you will then be asked if you would like to attach a photo.
5. You can then create another road closure event or click "No, I'm Finished"

DISCLAIMER

Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors | Lo...

The screenshot shows the mobile version of the Maryland's Road Closure Reporter application. It features a similar layout to the desktop version but is optimized for a smaller screen. The "I want to..." button is prominent at the top. The map shows the same Hagerstown area as the desktop version. The instructions list is also present but with a scrollable area for the detailed steps.

**ROAD CLOSED** **Maryland's**  
*Road Closure Reporter*

Maryland's Road Closure Reporter

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  - o "Type" e.g. Closed, Limited Public Access, Emergency Vehicle Only Access
4. If available you will then be asked if you would like to attach a photo.

# Lessons Learned

- Leverage experience of others
- Everyone has an equal voice
- Acceptance of local geometry and attribution
- Collaboration goes a long way
- Top-down support

Thank You

[1md1cline@sha.state.md.us](mailto:1md1cline@sha.state.md.us)

[msheffer@sha.state.md.us](mailto:msheffer@sha.state.md.us)

