



Applications of Enterprise GIS in Transportation (AEGIST) California Road Sharing (CaRS)

2025 CalGIS Conference

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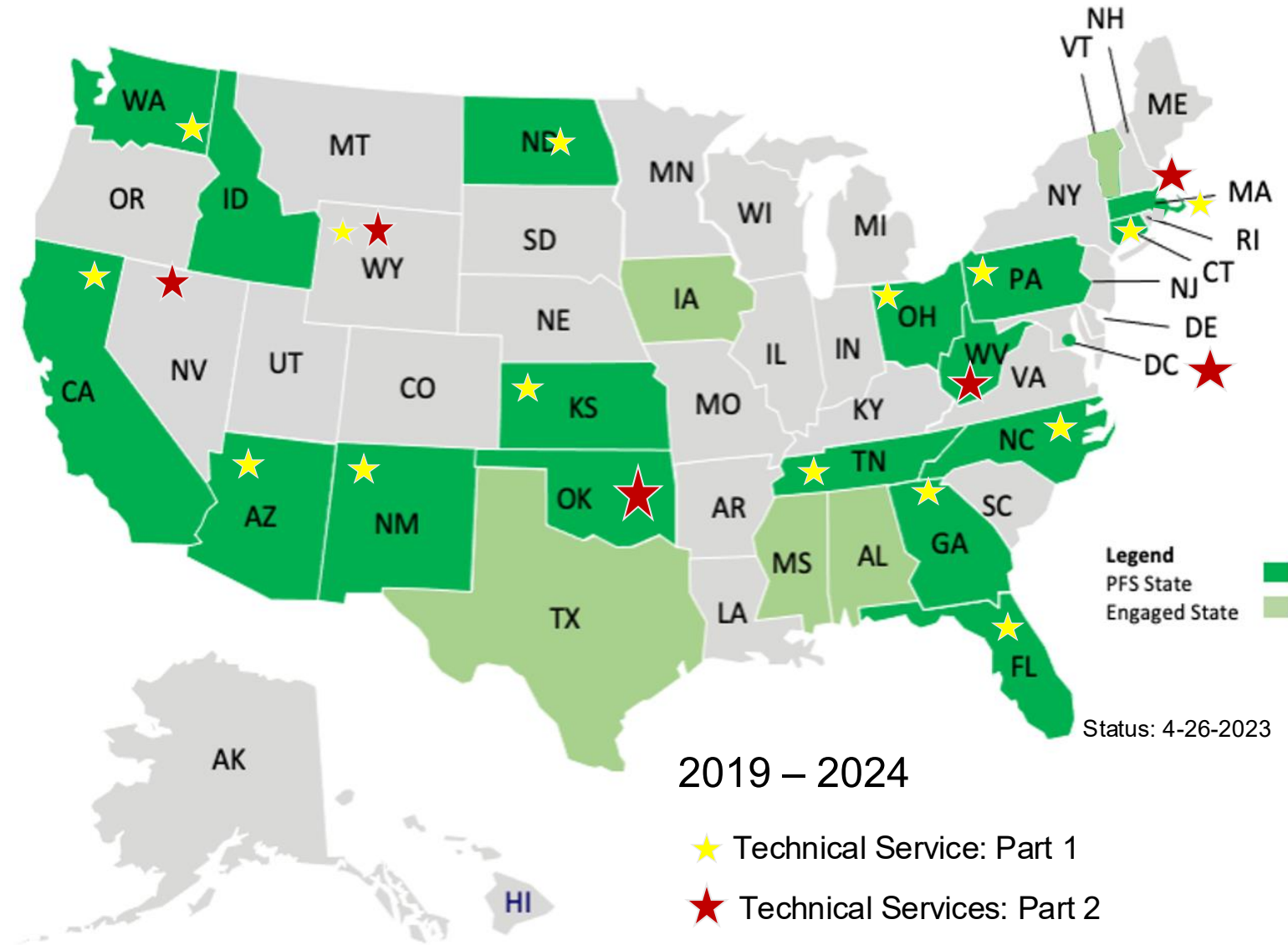
AGENDA

1. Roads Data Collaboration: National Goals
2. CaRS Goals, Vision, Mission, Timeline and California Roads Dataset
3. NG911 Data Integration with Caltrans Roads Data – Results
4. Envision Roads Data Management with CaRS
5. Open Discussion

AEGIST Transportation Pooled Fund Study, FHWA

Roads data collaboration in various States:

- Georgia
- Arizona
- Massachusetts
- Maryland
- Pennsylvania

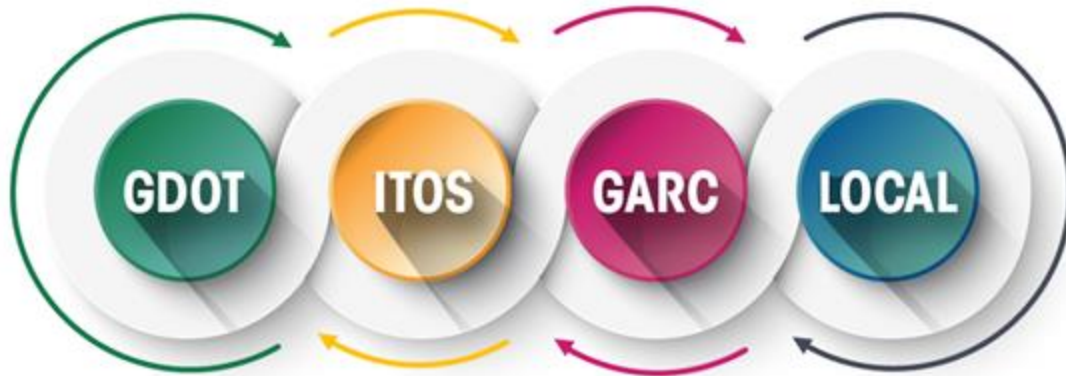


Roadway Characteristics Data

Agreements with Local Agencies to Collect and Integrate Data

Georgia Department of Transportation (GDOT)

- GDOT Creates Routes for All Roads
- GDOT Coordinates with University of Georgia Information Technology Outreach Services (UGA ITOS), and the Georgia Association of Regional Commissions (GARC) to collect Road Characteristics Information from Local Agencies
- Statewide Road Data Model created using Georgia Roadway Element Validation and Mapping Program (REVAMP)



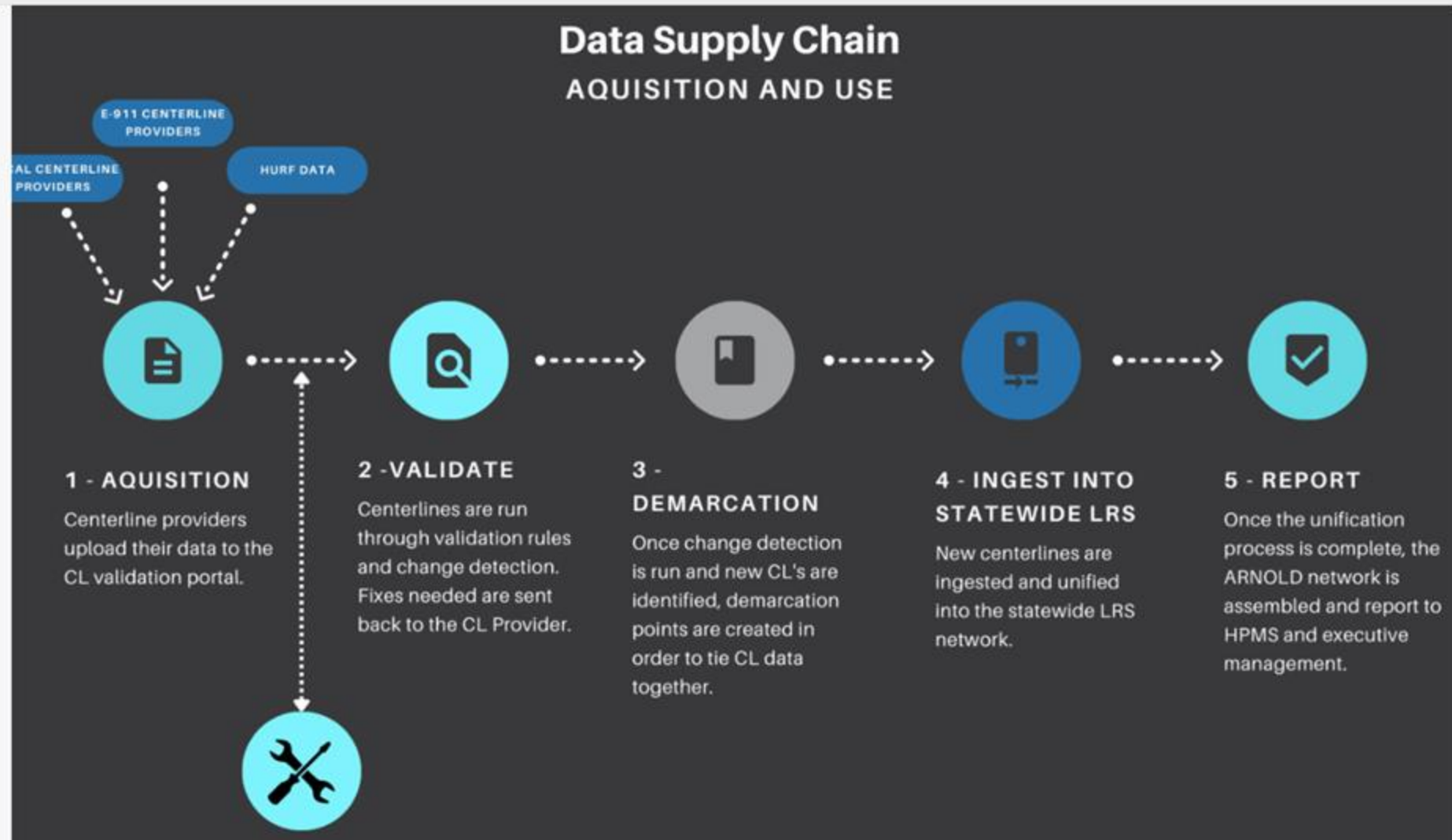
LRSE_ASSIGNED_CITY	LRSE_NHS
LRSE_AUX_LANE	LRSE_OPENED_TO_TRAFFIC
LRSE_BARRIER	LRSE_OPERATION
LRSE_BICYCLE_LANE	LRSE_OWNERSHIP
LRSE_BRIDGE_LINEAR	LRSE_PARKING
LRSE_BRIDGE_LOC	LRSE_RAIL_XING
LRSE_CONGRESSIONAL_DISTRICT	LRSE_RAMP
LRSE_COUNTY	LRSE_RCLINK
LRSE_FUNCTIONAL_CLASS	LRSE_ROAD_NAME
LRSE_GRIP	LRSE_ROUTE_TYPE
LRSE_HONORARIUM_LINEAR	LRSE_RUMBLE_STRIP
LRSE_HONORARIUM_POINT	LRSE_SHOULDER
LRSE_HPMS_ACCESS_CONTROL	LRSE_SIDEWALK
LRSE_HPMS_CRACKING	LRSE_SPEED_LIMIT
LRSE_HPMS_FAULTING	LRSE_STATE_FREIGHT
LRSE_HPMS_IRI	LRSE_SURFACE
LRSE_HPMS_RUTTING	LRSE_TEMP_STATE_ROUTE
LRSE_HPMS_SEGMENT	LRSE_THRU_LANES
LRSE_HPMS_SIGNAL	LRSE_TRAFFIC_CONTROL
LRSE_INTERMODAL_CONNECTOR	LRSE_TRAFFIC_SEGMENT
LRSE_LINEAR_FACILITY	LRSE_TRAFFIC_STATION
LRSE_MANAGED_LANE	LRSE_TRAVEL_WAY
LRSE_MEDIAN	LRSE_TURN_LANE
LRSE_NAT_TRUCK_NETWORK	LRSE_URBAN_CODE
	LRSE_US_ROUTE
	LRSE_VARIABLE_SPEED_LIMIT
	LRSE_INTERSECTIONS

REVAMP Phase 1

REVAMP Phase 2

REVAMP Phase 3

Once the state is unified with all new local centerline data, the ARNOLD network is assembled and reported as part of the annual HPMS report as well as reported for other facets of agency wide transportation needs.



Goals and Vision of CaRS



Create a statewide
ARNOLD and NG911
compliant network



Mutually benefit state
and local jurisdictions



Allow for
coordination across
agencies

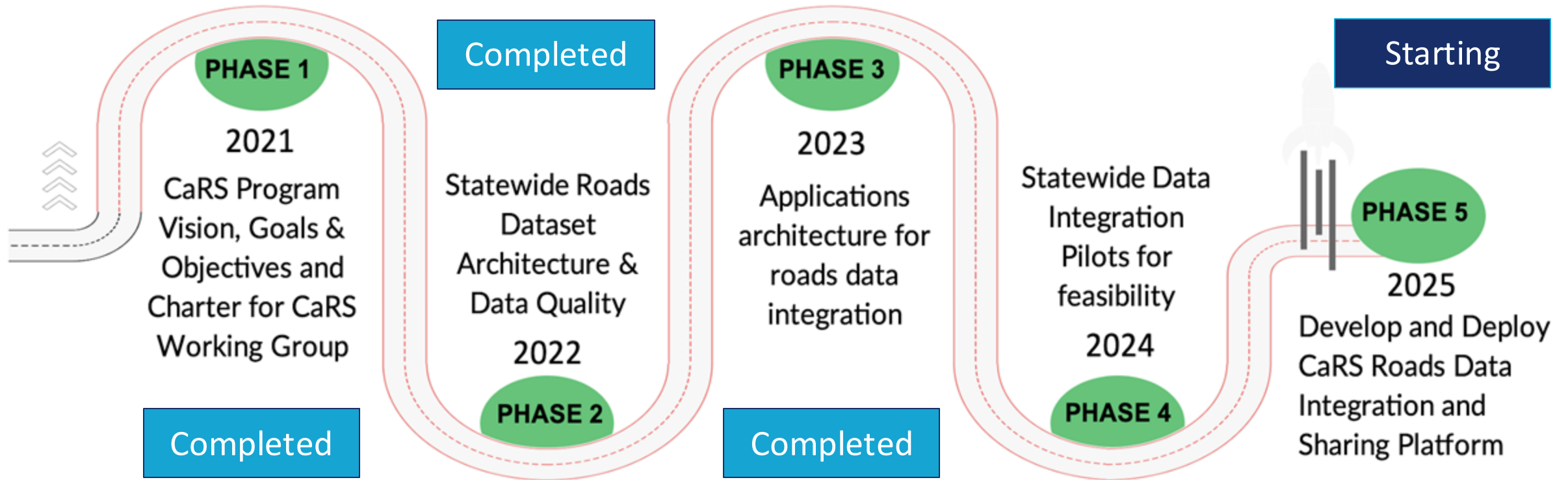


Support
Transportation for the
Nation initiative



Support a machine-
readable data
model

California Roads Sharing Timeline



Caltrans All Roads Dataset Development

**Federal Highway
Administration**

HPMS Data

Caltrans

California Statewide
Roads Dataset

**CalOES & Local
Agencies**

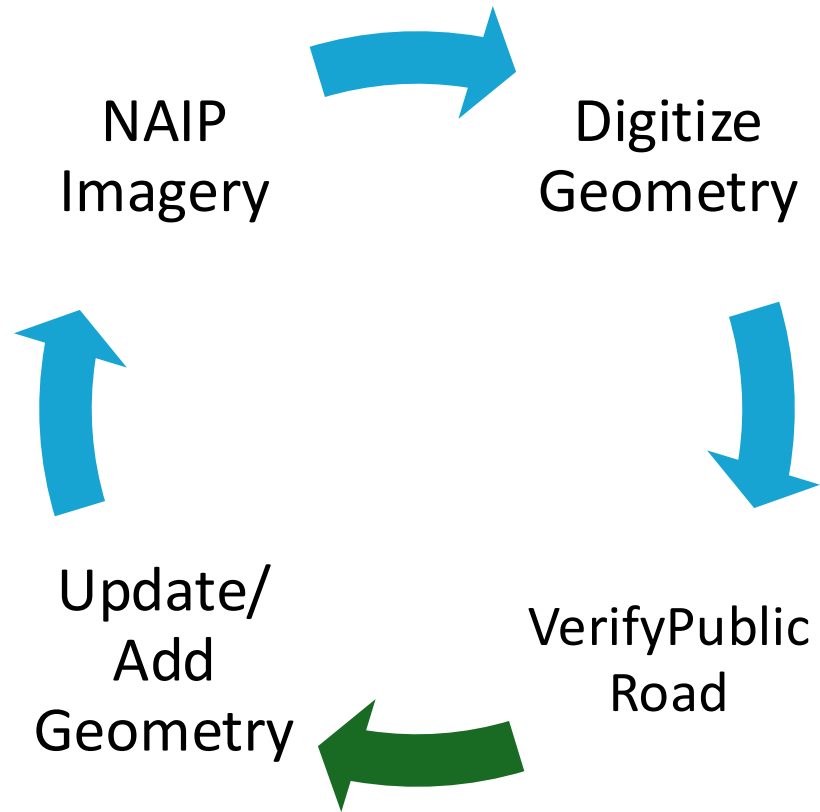
NG9-1-1 Roads Data

Caltrans All Roads Dataset Challenge

- County roads and city streets lack frequency of updates and maintenance due to the size and undefined update process
- State Highway System was well developed with defined update processes



Caltrans All Roads Data Digitization Process



➤ **Time and labor intensive**

➤ **Updates are delayed**

Merced County Roads Data Management Program



SaaS Solution
NG911 Compliant
Road Centerlines Schema



MRAD
Master Road &
Address Database



Web Services
AGOL & ArcGIS Portal



Web Services
To Asset
Management
Systems

DATAMARK
(Roads Data
Management
System)

Merced County
Geodatabase
(DataMark Copy)

Enterprise GIS
Deployment
(Multi-Agency
Access)

3rd Party
Applications
(Public Safety,
Permitting,
Planning)

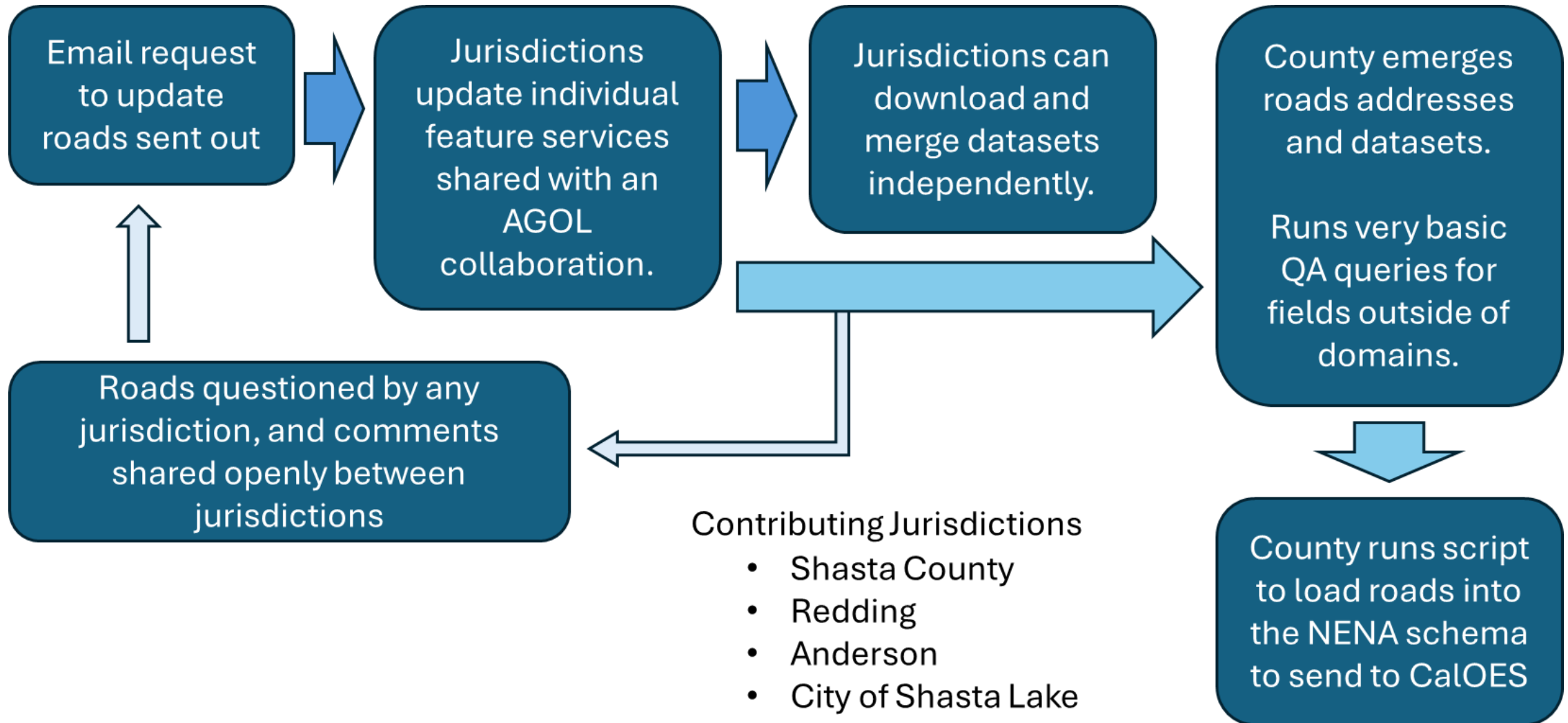
Local Jurisdiction
Data Submission

Local Jurisdiction
Web Service
Consumption

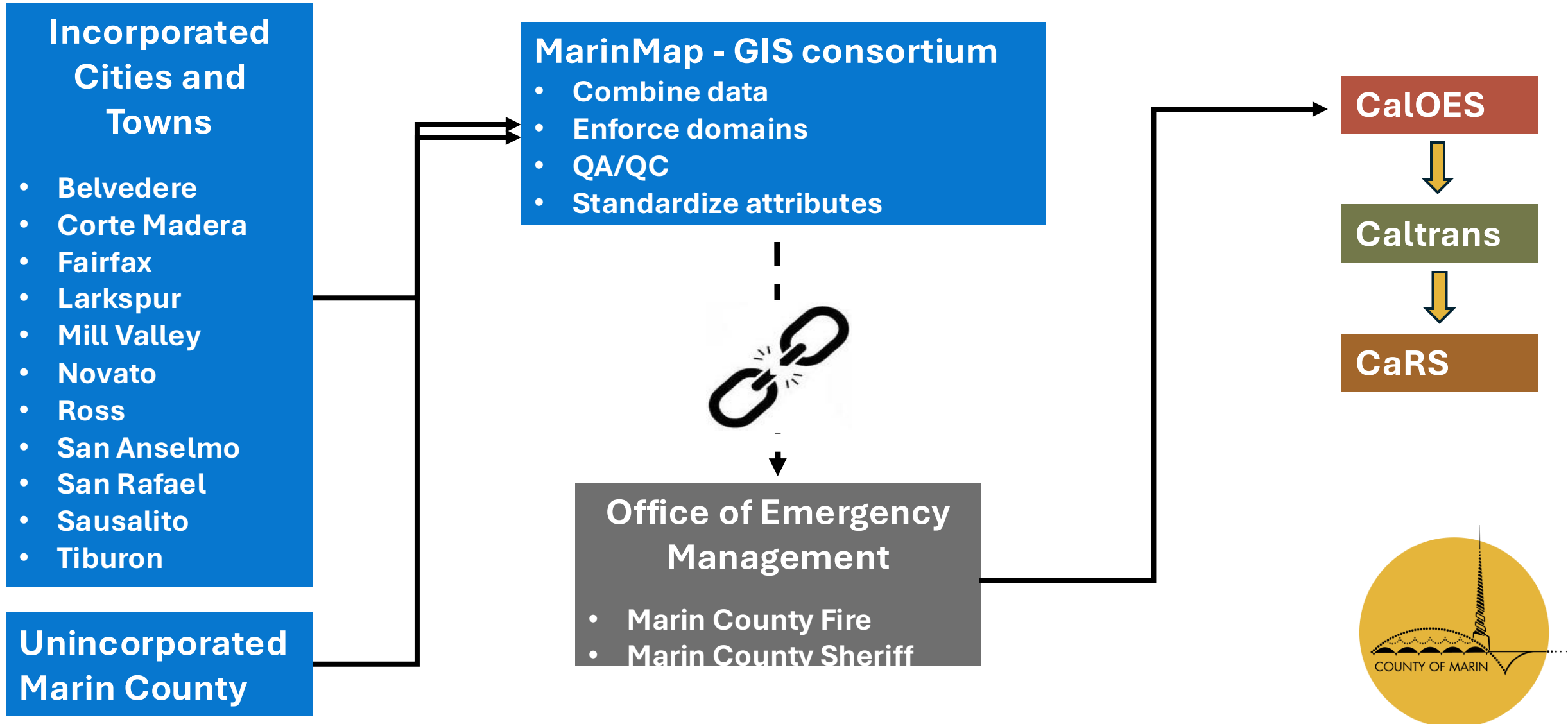


1810 1105 N Hwy 99	057-200-089	New address for new bldg. with gas station & fast food	7/10/20	cm	n/a	Corner of Santa Fe and N Hwy 99	
1811 1111 N Hwy 99	057-200-091	New address for new bldg for car wash	7/10/20	cm	n/a	Corner of Santa Fe and N Hwy 99	
1812 945 W 23rd St (Existing Address)	030-192-009	New APN from parcel split	7/13/20	cm	n/a	New Duplex-7/13/2020 Parcel split from 030-192-01	
	030-192-009	New APN from parcel split	7/13/20	cm	n/a	New Duplex-7/13/2020 Parcel split from 030-192-01	
	030-192-008	New APN from parcel split	7/13/20	cm	n/a	Existing address-7/13/2020 Parcel split from 030-192-01	
	224-270-060	New APN from parcel split	7/13/20	cm	n/a	Old APN 224-270-031	
	224-270-064	New APN from parcel split	7/13/20	cm	n/a	Old APN 224-270-030	
	058-090-005	Assign site # to existing unit	8/17/20	cm	n/a	For La Michiocana business	Sent 8/12/2020
	034-240-030	Baker Dr was re-oriented	8/4/20	cm	2217 Yosemite Parkway	Property no longer on Yosemite Pkwy	
	259-281-005	517 was not a valid address - out of sequence	8/26/20	cm	517 Barroso Av		Sent 9/18/2020
	006-124-004	New address for attached ADU	10/6/20	cm	n/a	Existing address 439 E Olive Av for new SFR	
	224-230-042	Corner Lot/house facing Lindsey Ln not Andrea Dr	10/13/20	cm	631 Andrea Dr		
	030-013-018	Added existing address (not in system)	11/3/20	cm	n/a	Lorenzi bldgs M & 26th St	Sent 11/6/2020
	031-152-017	Added suite F	11/10/20	cm	n/a	Permit 02-1875 (T1) added 11 suites to bldg.	
	061-013-027	new IT warehouse	11/10/20	cm	n/a	IT Warehouse	

Shasta County Roads Data Management



MARIN COUNTY ROADS DATA MANAGEMENT

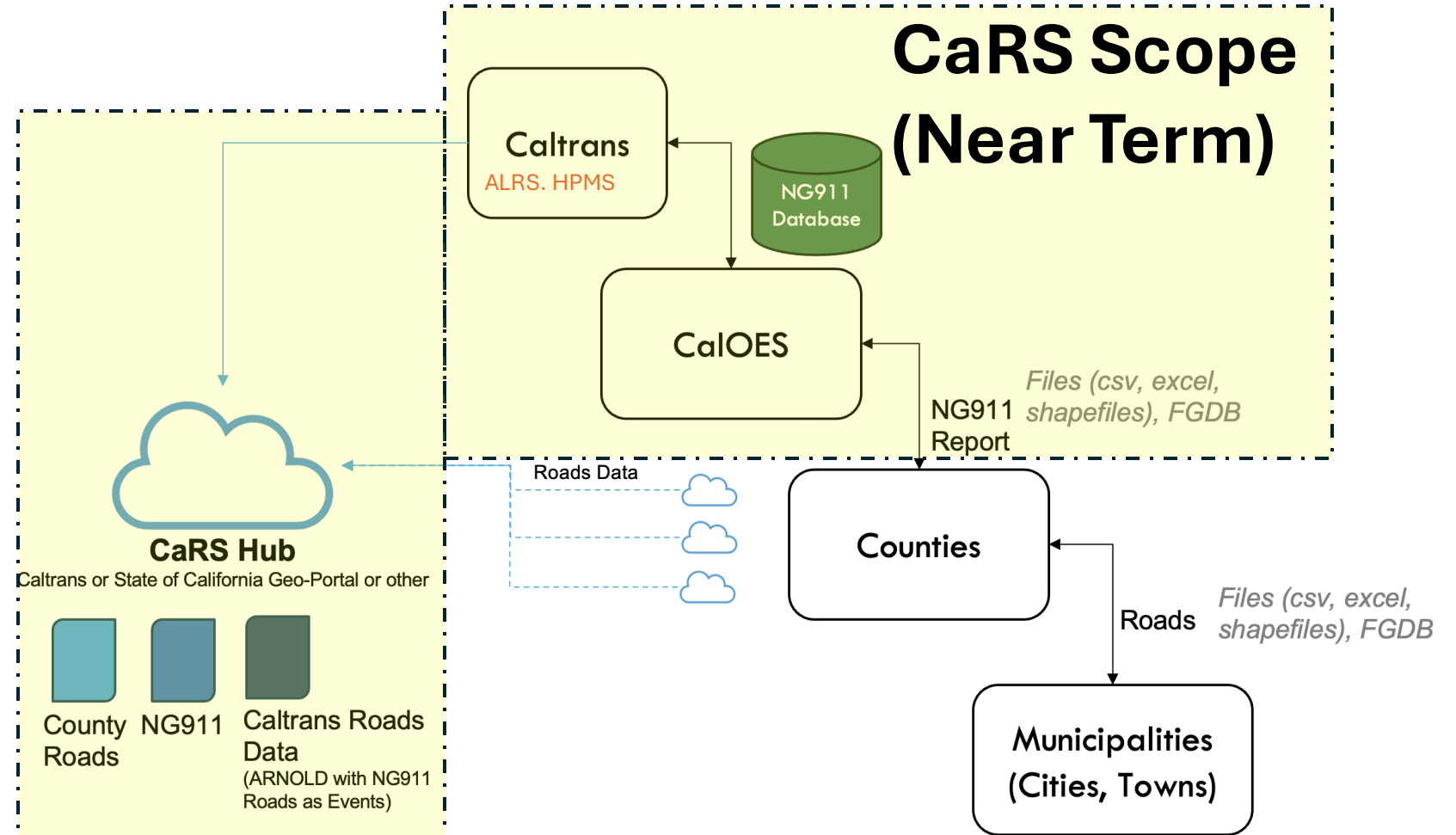


California Multi-agency Collaboration For Road Data Sharing

Municipalities → Counties

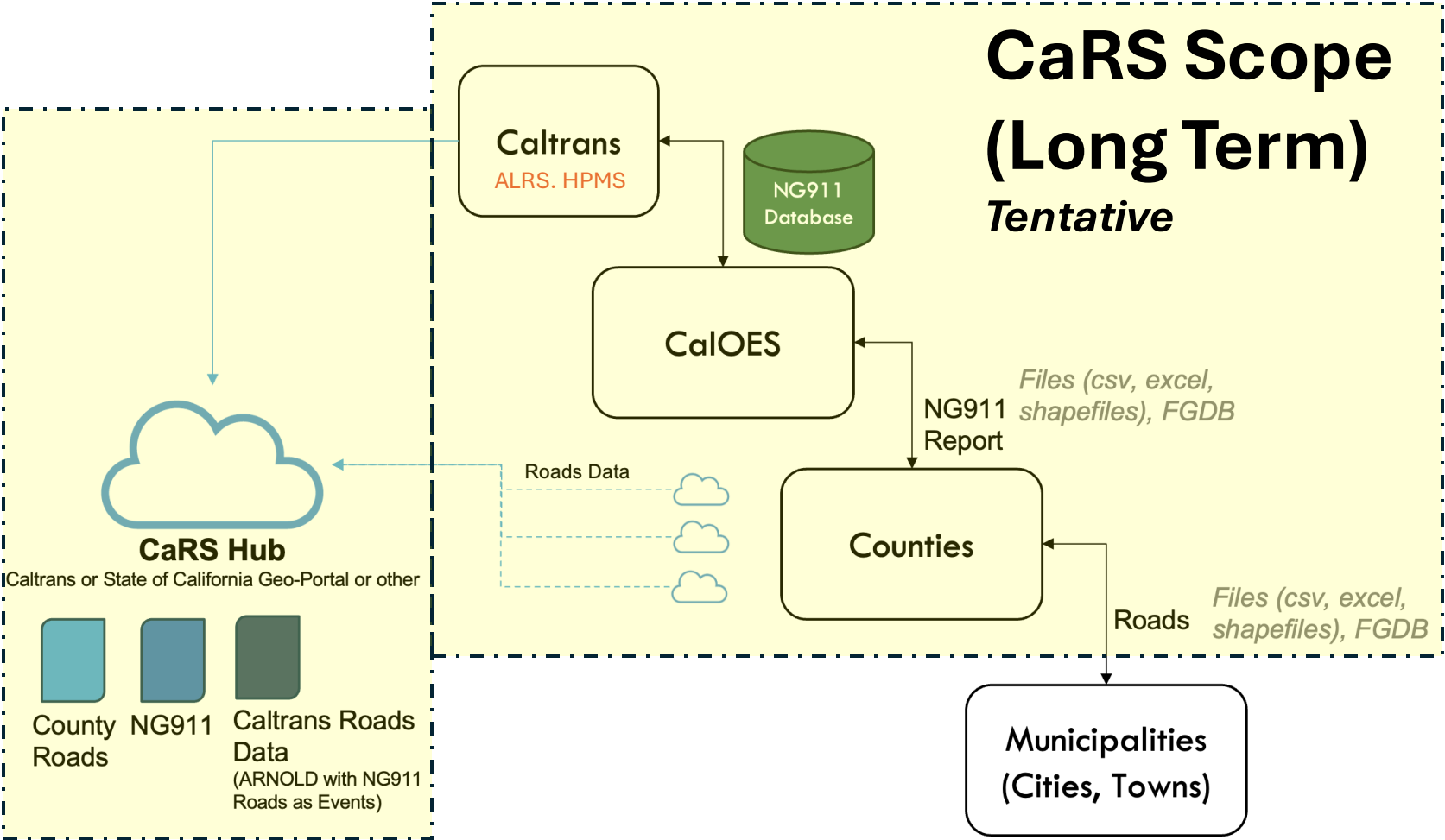
Counties → CalOES NG911

NG911 → Caltrans All Roads

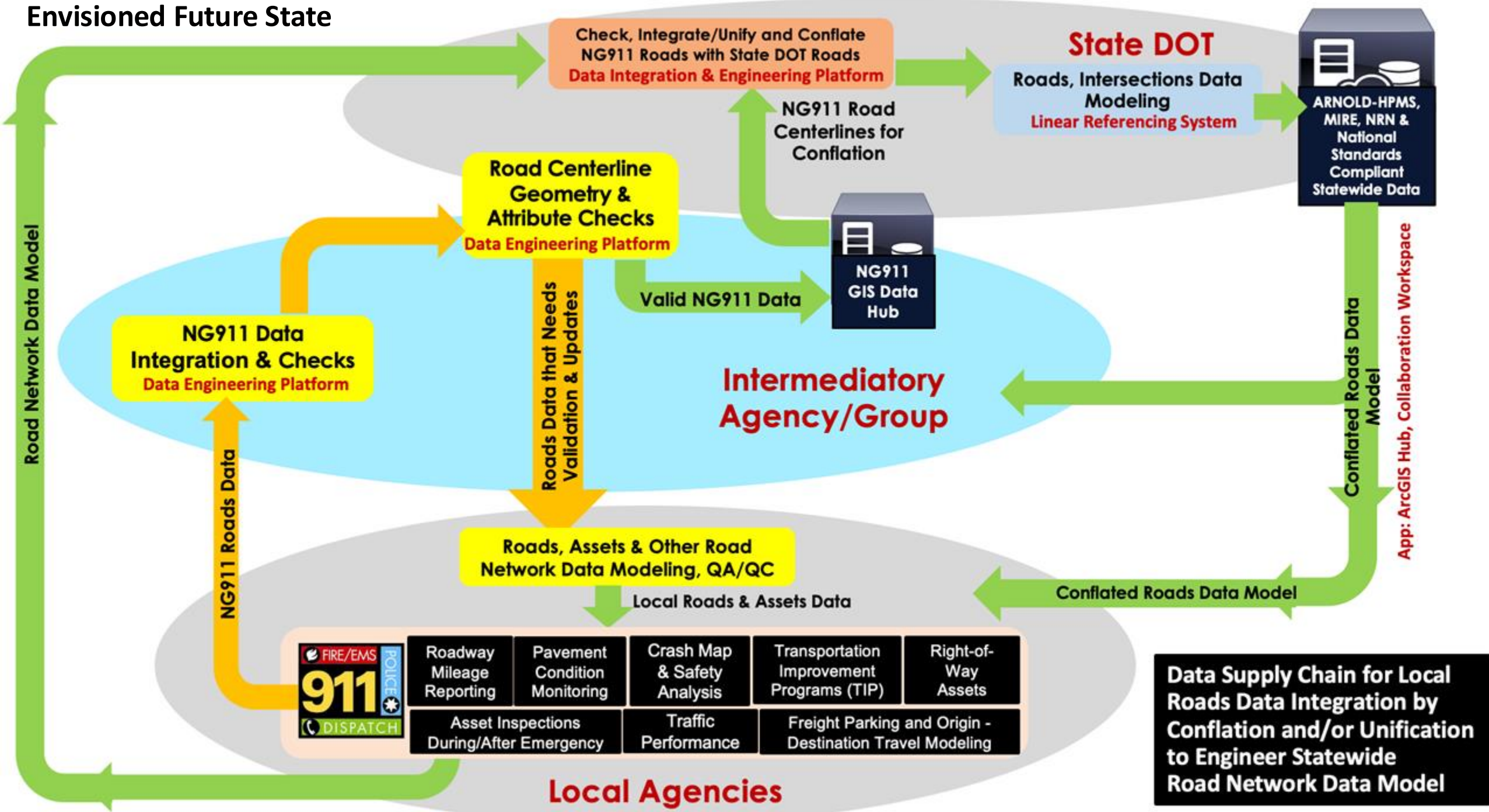


California Multi-agency Collaboration For Road Data Sharing

Municipalities → Counties
Counties → CalOES NG911
NG911 → Caltrans All Roads



Envisioned Future State



Multi-Agency California Road Sharing (CaRs) Working Group

- **California Road Sharing (CaRS) Working Group Counties in Roads Data Integration Pilot**

- Merced County
- Fresno County
- Solano County
- Marin County
- San Luis Obispo County
- Shasta County
- Los Angeles County
- San Benito County

- **Other Counties in CaRS Working Group**

- Yolo County
- Placer County
- Santa Barbara County
- Ventura County
- Humboldt County
- El Dorado County

CaRS Working Group: Address Challenges and Pain Points

- **Lack of transparency** on who owns the data, what is the right source of data
- **Lack of consistent data** – multiple versions of data from different agencies
- **Lack of communication** about data: State Data, Local Data Data Preparation approach, Issues, Edits/Updates,

How can My County Participate?

1. Make your county's roads data available to CaRS.
 - Authorize CalOES to share your NG911 roads data submission with CaRS
2. Join the CaRS conversation
 - Join the CaRS Working Group Monthly Meetings
3. Take Away the Integrated Statewide Roads Data
 - Your County and Caltrans All Roads



Source: <https://storymaps.arcgis.com/stories/19abd0c0c16144efa53db6c75585b8f5>

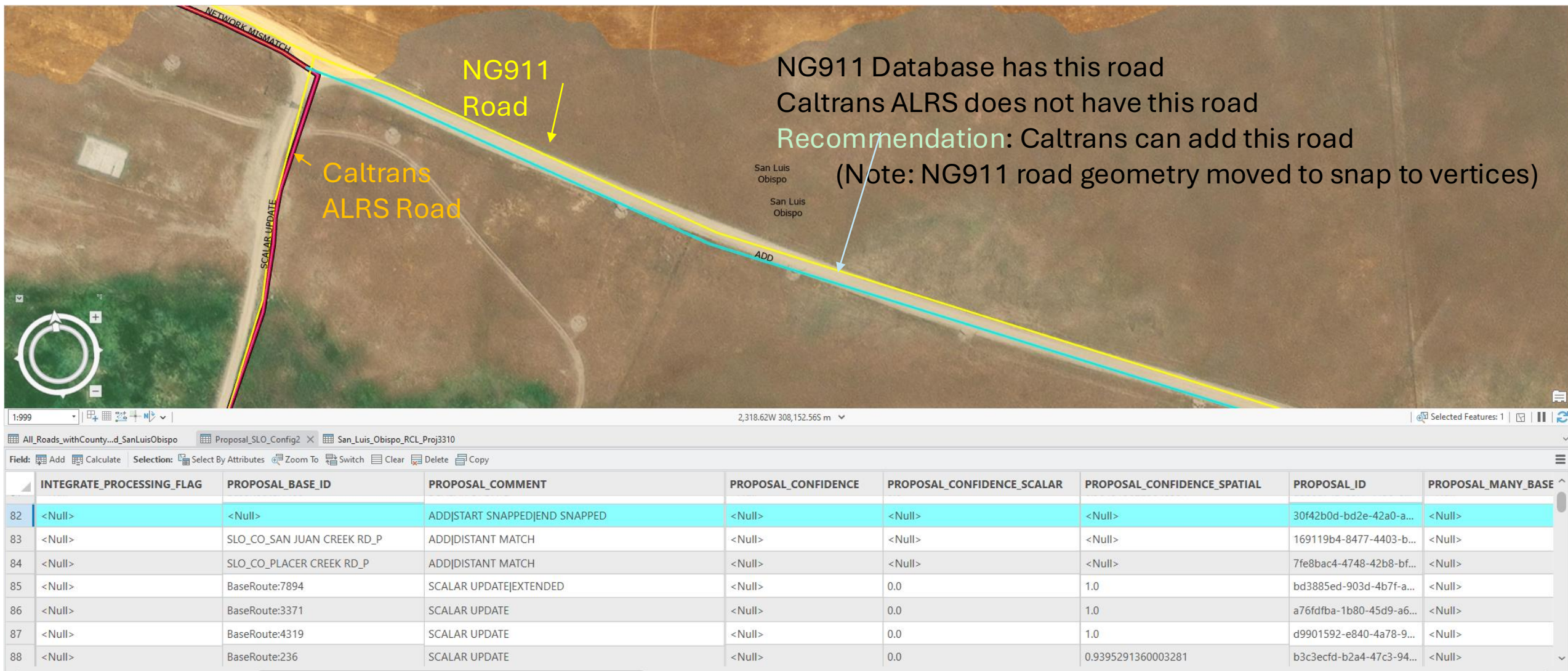
Geometry Change Proposal Types

Base Dataset: Caltrans ALRS All Roads

Target Dataset: NG911 Roads

TERMINOLOGY	DEFINITION
MATCH	If both road datasets contain the feature and the attributes are the same, the proposal is a MATCH.
SCALAR UPDATE	If there are spatial matches between the two road datasets, but key attributes do not match, a SCALAR UPDATE is detected.
ADD	If the Target Dataset has a feature at this location but the feature is not present in the older (original) vintage, then the proposal is an ADD.
DELETE	If the Target Dataset does not have a feature at this location but a feature is present in the older (original) vintage, the proposal is a DELETE.
GAP	If there is no proposal of any other type created for this segment, then a GAP is assumed. This is usually found as part of a route.
NETWORK MISMATCH	A NETWORK MISMATCH occurs when features from both datasets are present but are not within tolerance to be considered a MATCH. It is expected that there is a spatial change between vintages.

Creating Proposal Geometry for ADD recommendations to ALRS (Based on County Geometry)



Caltrans and Local Roads Data Comparison

Pilot Counties: Data Integration and Comparison of Road Geometry

No Geometry Match

Road Geometry Matched

	Total Local Roads (NG911)	Total Caltrans ALRS Segments	Add to Caltrans ALRS (Add)	Add to Local NG911 Roads Data (Delete)	Gap	Network Mismatch	Match	Scalar Update
Merced	13,670	6,057	290	1,559	202	901	93	12,623
Marin	16,763	5,620	2,292	170	196	2,428	395	11,899
Solano	39,158	11,723	5,305	289	365	11,256	519	23,479
SLO	25,219	10,249	3,169	2,556	475	2,807	336	19,490
Fresno	76,235	13,086	14,585	3,747	1,239	9,941	1,842	50,847
Total	171,045	46,735	23,641	11,079	8,321	2,477	27,333	118,338

NG911 Roads dataset has these roads, but Caltrans does not

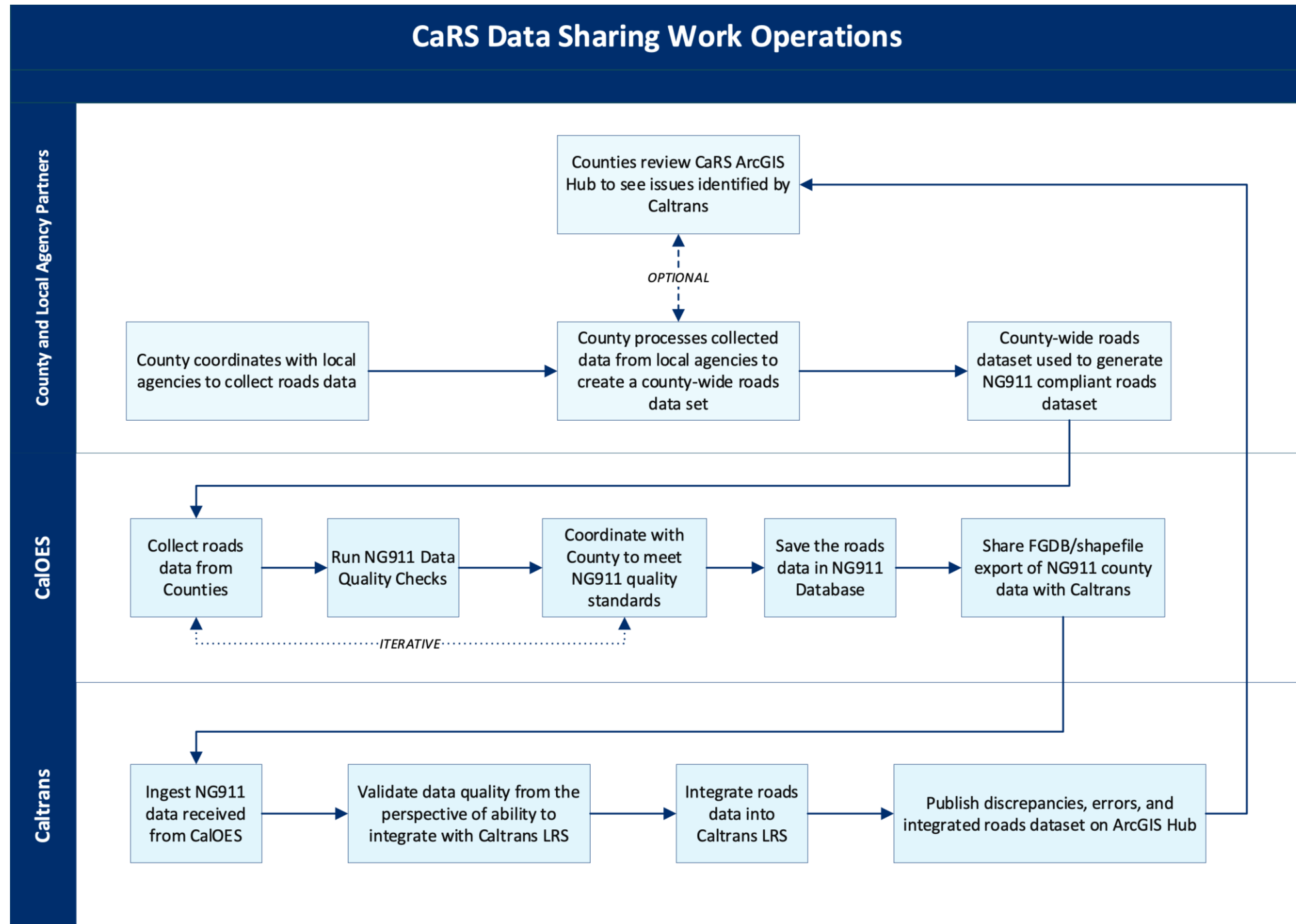
Caltrans has these roads, but NG911 dataset does not

Change Proposals Generated

For the Roads where Geometry did not match, change proposals were generated

	Total Local Roads	Proposals Generated	Gap	Network Mismatch	Geometry Match (Match + Scalar Update)	
Merced	13,670	15,668	202	901	12,716	81%
Marin	5,620	15,380	196	2,428	12,294	80%
Solano	39,158	41,213	365	11,256	23,998	58%
SLO	25,219	28,833	475	2,807	19,826	69%
Fresno	76,235	82,201	1,239	9,941	52,689	64%
Total	171,045	183,295	8,321	2,477	121,523	

Envisioned Road Data Management Workflows

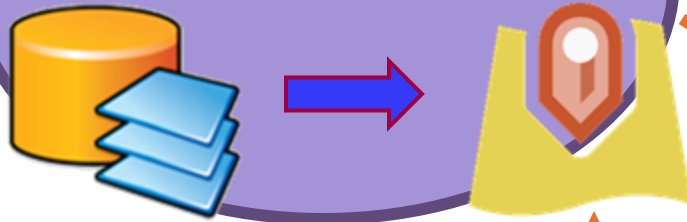


Merced County Roads Data Management with CaRS

Envisioned Process

Data as a Service Approach (DaaS)

Publish GIS data feature service from an Enterprise Geodatabase server



Data Rest API from local jurisdiction is consumed into web-based validation engine account

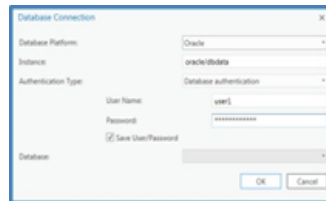


Web Based Solution
Run Rules-Based Validation Engine to Publish Results as a Service

Rest API's of local agency's GIS data and Rules-Based validation results are provided to State Agencies for use in respective programs.



Data edits saved to Enterprise geodatabase server where data Rest API is updated real time.



View validation results from Spatial Interface and edit GIS data



Validation results consumed by local jurisdiction via data Rest API for use in data remediation

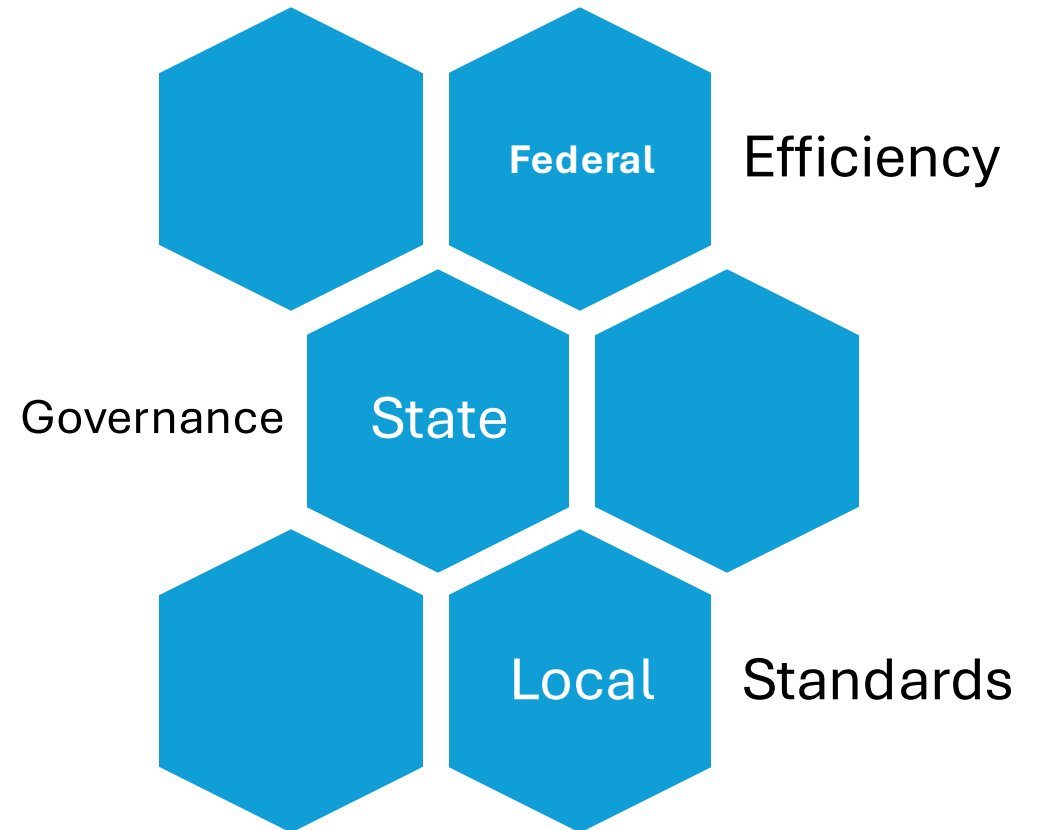


Key Benefits:

- Validations run independently of web-based validation engine user login
- Eliminates time consuming upload/download of data
- Data Rest API allows for near real time view of validation results in PC or Cloud GIS mapping software
- Workflow allows for greater integration of local jurisdiction's GIS Software to perform key updates.
- Functions to support timely updates of State's NG 911/All Roads LRS program.
- Support greater State/ Local collaboration
- Allows greater County/City collaboration for data maintenance

CaRS Program Benefits and Participation Incentives

- Road Inventory Tracking
- Asset Management
- Highway Safety
- Project Planning & Programming
- Emergency Management
- Routing & Traffic Flow Studies
- California Road User Charging
- **Win – Win – Win** for Everyone
 - Improves Reporting to the Federal Government
 - Updated All Roads LRS
 - Better Collaboration Between State and Local Governments



Mentimeter Discussion

- Tell us more about how your county uses roads data
- Learn how you can attend the next CaRS Monthly Meeting

