An explanation of the relationship of the software toolchain to the FHWA Work Zone Data Initiative (WZDI)

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WZDI Background

- Work zone management is increasingly data-driven, transitioning to more data-centric workflows.
- Knowledge of detailed of work zone activity is “nice to have” for some applications, critical for others.
- Integration of consistent, reliable information on work zone activity is an important component of achieving full TSMO capability maturity.

Work Zone Data Initiative (WZDI)

Objective

National deployment of a consistent language for communicating **work zone activity data** (WZAD) across departmental, organizational, and jurisdictional boundaries and throughout project life cycles

Strategies

- Collaborative, open specification for the **data**
- Accelerate adoption through targeted deployment of work zone data **system** framework

WZDI Project Workflow

State of the Practice

- Understand current uses for WZAD
- Understand range of stakeholders; data generators and users.
- Challenges to adoption / barriers to deployment of better WZAD

Framework

- Document WZAD workflows in context of current and future uses.
- Describe a model Work Zone Data System that organizations can use to build out their own capabilities

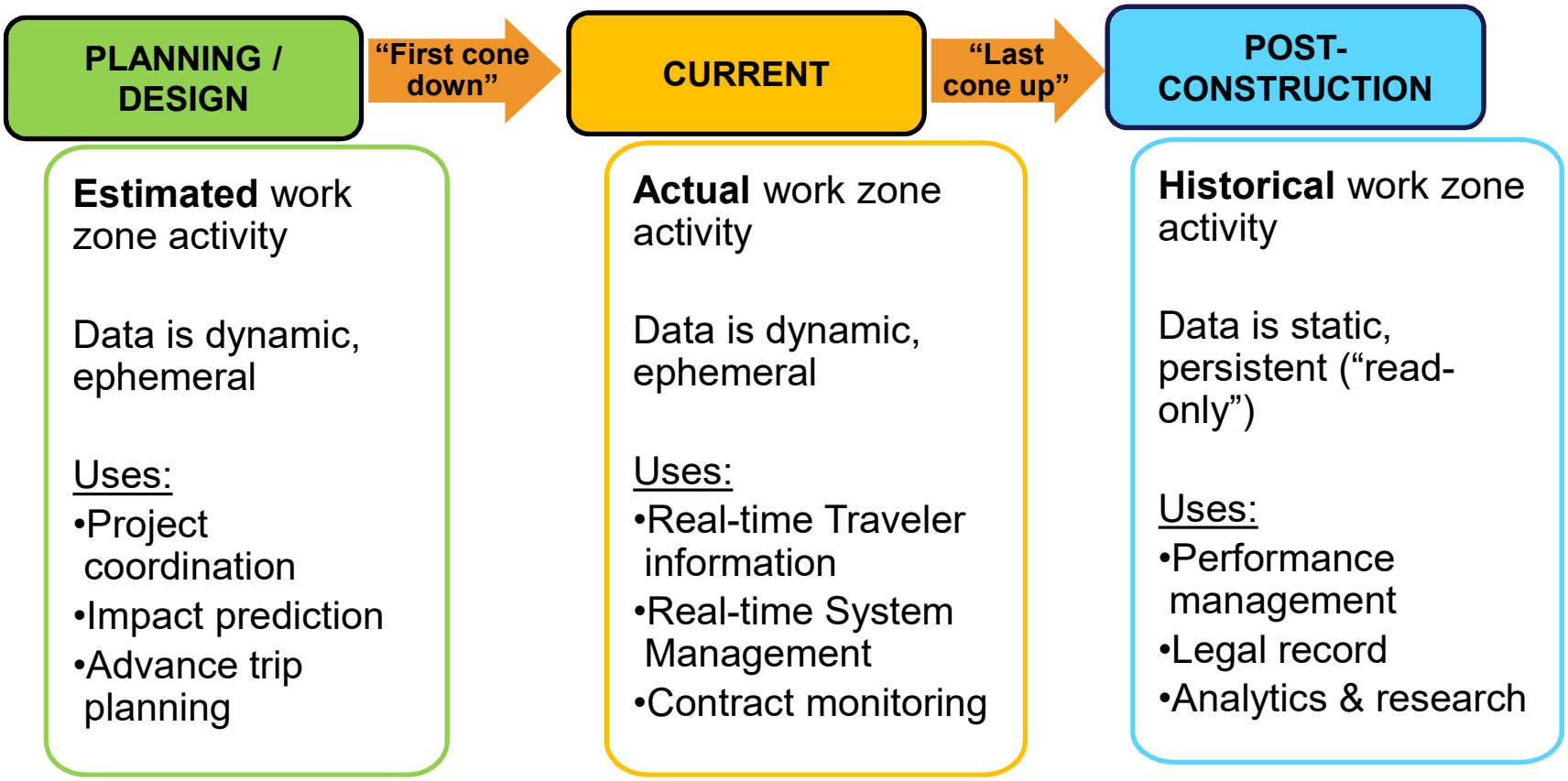
Data Dictionary

- Standard data model that addresses range of use cases in Framework
- Drives ongoing development of WZDx specification

WZDI Pilots

- "Learn by doing"
- Direct technical and/or financial assistance by USDOT to your organization
- Tech transfer activities including peer exchange, workshops
- **Deploy WZDx feed**

WZAD through the project life-cycle



“Work Zone Activity Data” Use Case Categories

- Planning and Coordination
- Impact Prediction
- Contract Monitoring
- Real-time System Management
- Performance Measurement
- Law Enforcement and Emergency Service Providers
- Automated Vehicles

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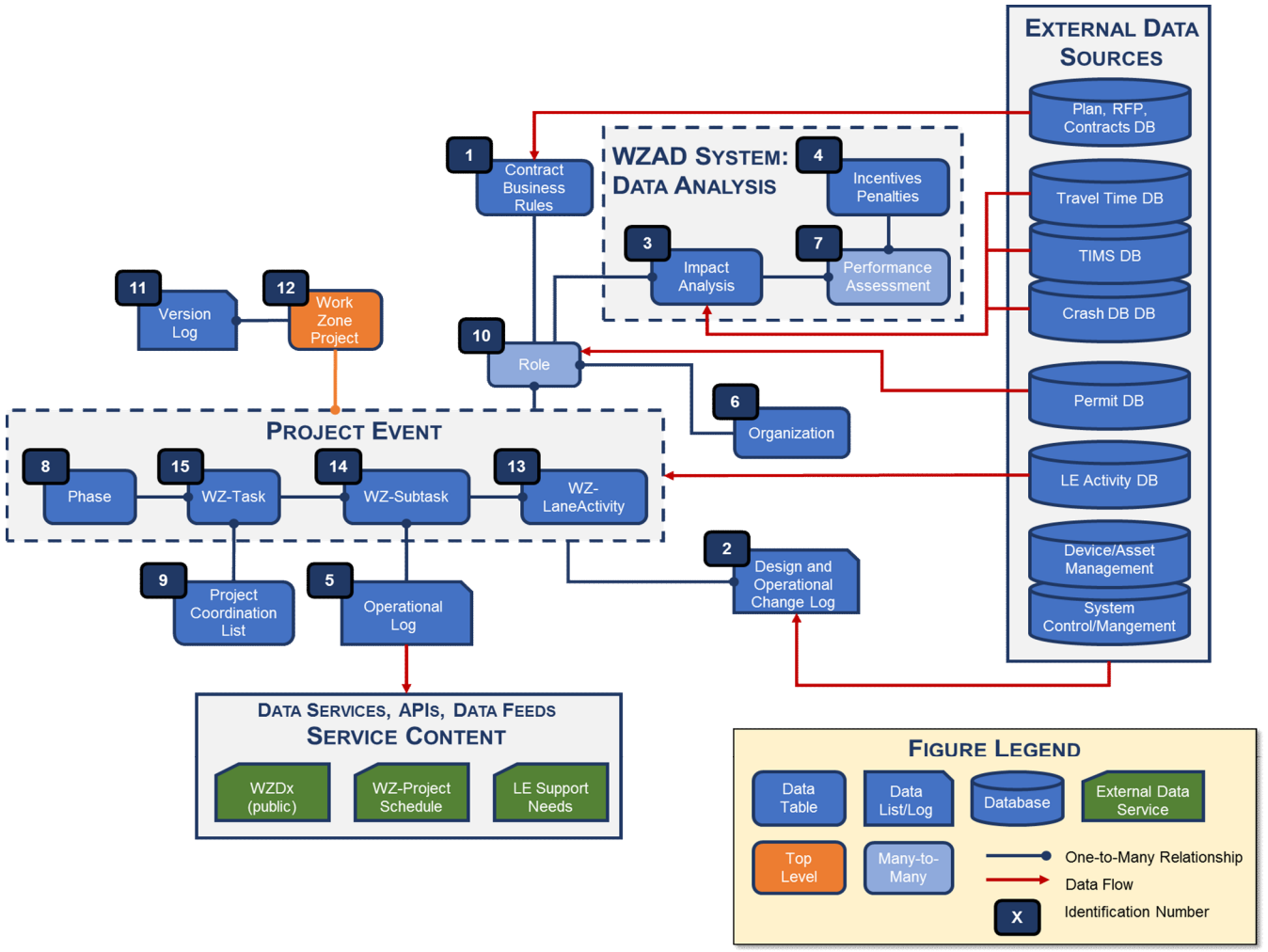
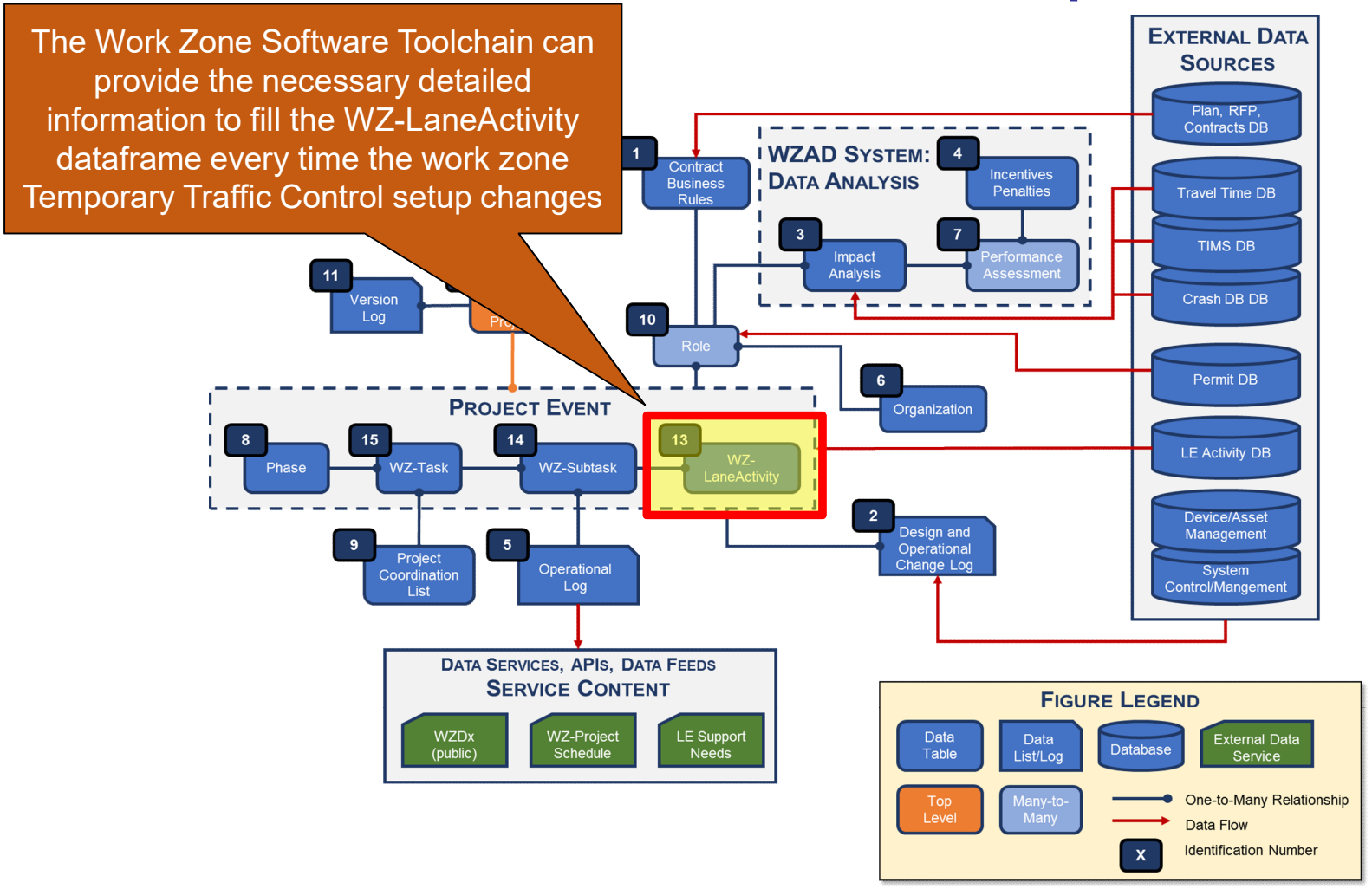
Potential overlap with Work Zone Software Toolchain

Work Zone Data Concept Model

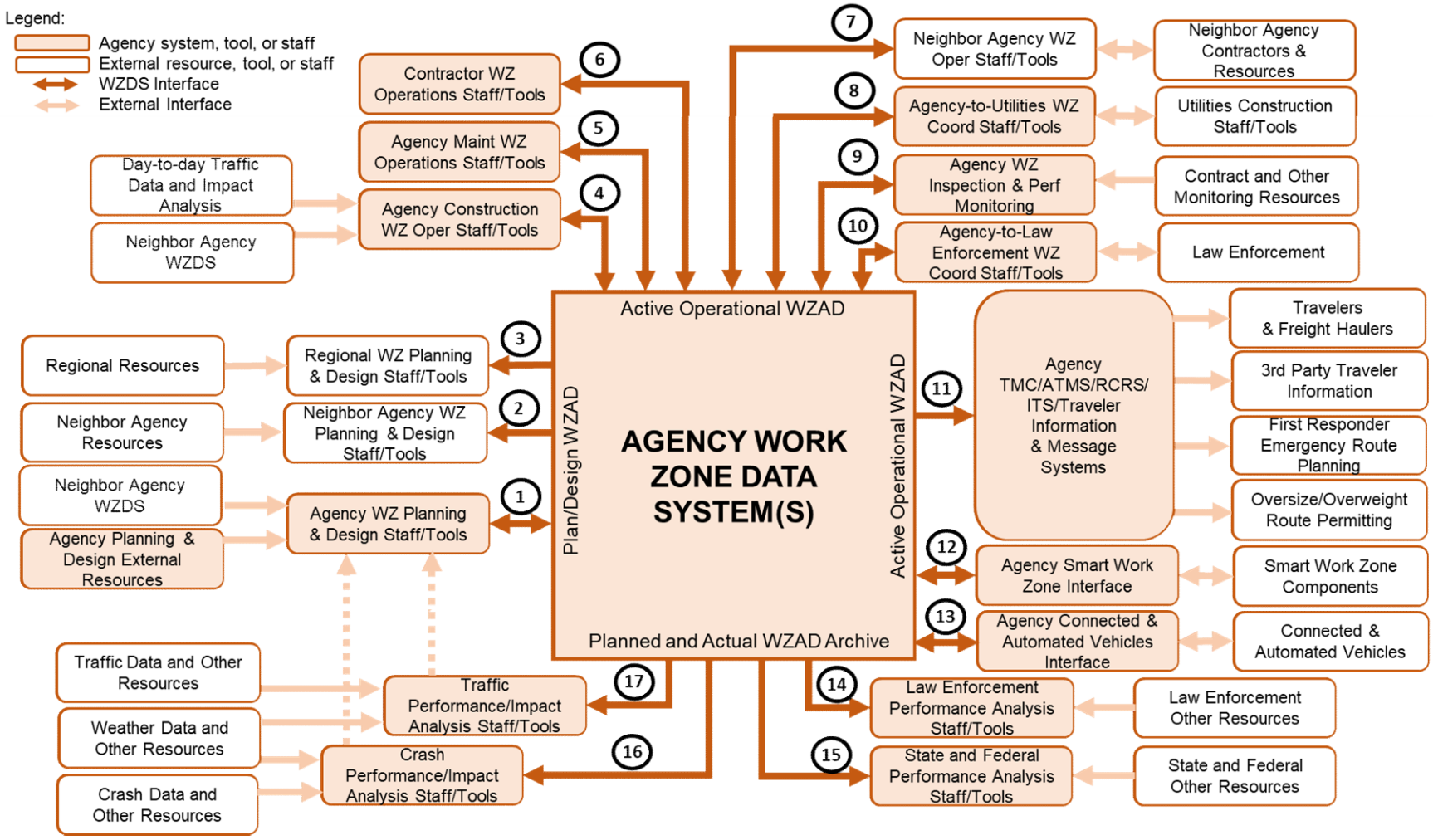


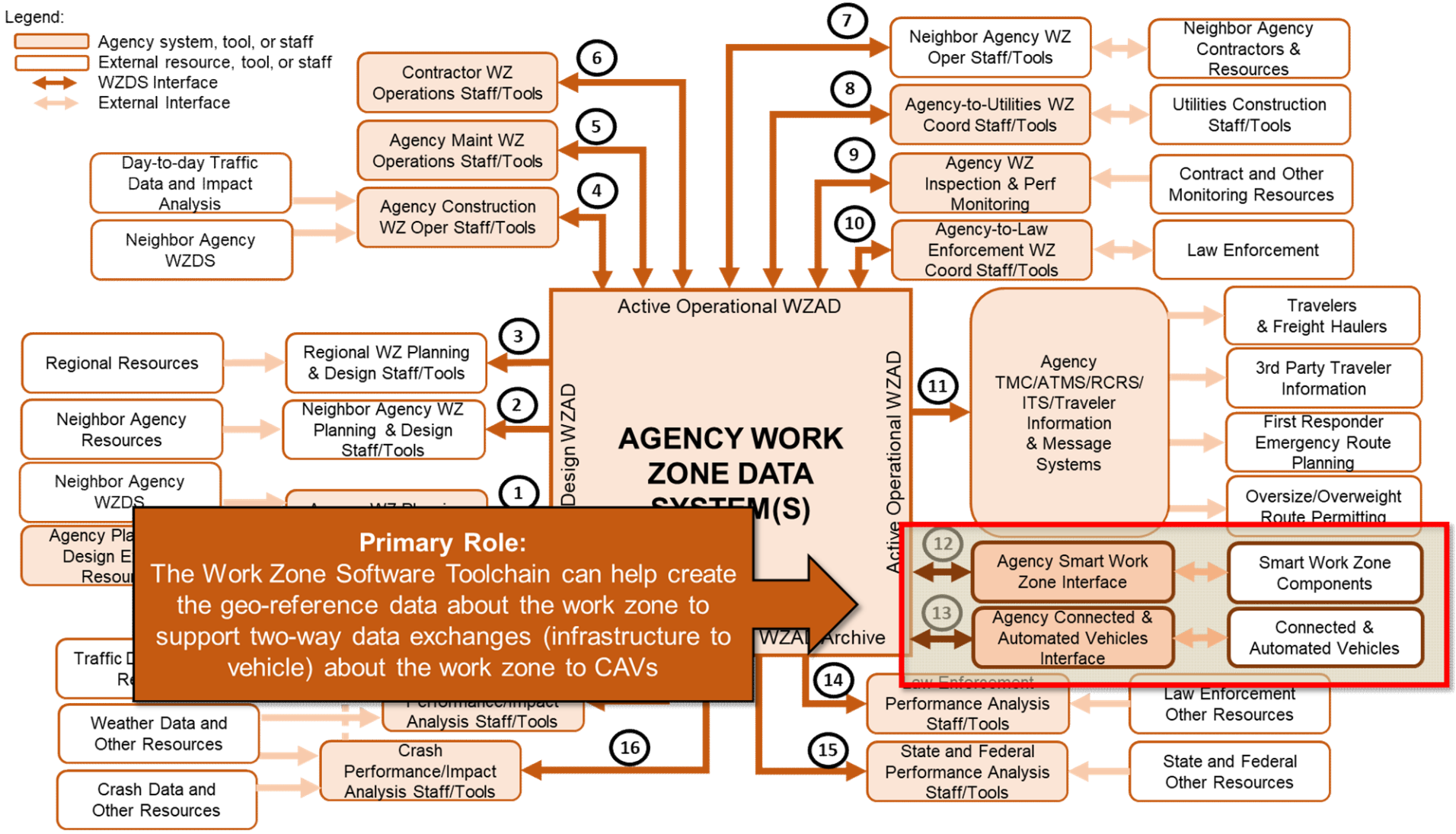
Work Zone Data Concept Model

The Work Zone Software Toolchain can provide the necessary detailed information to fill the WZ-LaneActivity dataframe every time the work zone Temporary Traffic Control setup changes



Work Zone Data System Framework




Legend:
Agency system, tool, or staff
External resource, tool, or staff
WZDS Interface
External Interface
Contractor WZ Operations Staff/Tools
Agency Maint WZ Operations Staff/Tools
Day-to-day Traffic Data and Impact Analysis
Agency Construction WZ Oper Staff/Tools
Neighbor Agency WZDS
Neighbor Agency WZ Oper Staff/Tools
Neighbor Agency Contractors & Resources
Agency-to-Utilities WZ Coord Staff/Tools
Utilities Construction Staff/Tools
Agency WZ Inspection & Perf Monitoring
Contract and Other Monitoring Resources
Agency-to-Law Enforcement WZ Coord Staff/Tools
Law Enforcement
Active Operational WZAD
Design WZAD
AGENCY WORK ZONE DATA SYSTEM(S)
Active Operational WZAD
Regional Resources
Regional WZ Planning & Design Staff/Tools
Neighbor Agency Resources
Neighbor Agency WZ Planning & Design Staff/Tools
Neighbor Agency WZDS
Agency TMC/ATMS/RCRS/ ITS/Traveler Information & Message Systems
Travelers & Freight Haulers
3rd Party Traveler Information
First Responder Emergency Route Planning
Oversize/Overweight Route Permitting
Agency Smart Work Zone Interface
Smart Work Zone Components
Agency Connected & Automated Vehicles Interface
Connected & Automated Vehicles
Primary Role:
The Work Zone Software Toolchain can help create the geo-reference data about the work zone to support two-way data exchanges (infrastructure to vehicle) about the work zone to CAVs
WZAD Archive
Performance Analysis Staff/Tools
Law Enforcement Other Resources
State and Federal Performance Analysis Staff/Tools
State and Federal Other Resources
Weather Data and Other Resources
Crash Data and Other Resources
Crash Performance/Impact Analysis Staff/Tools
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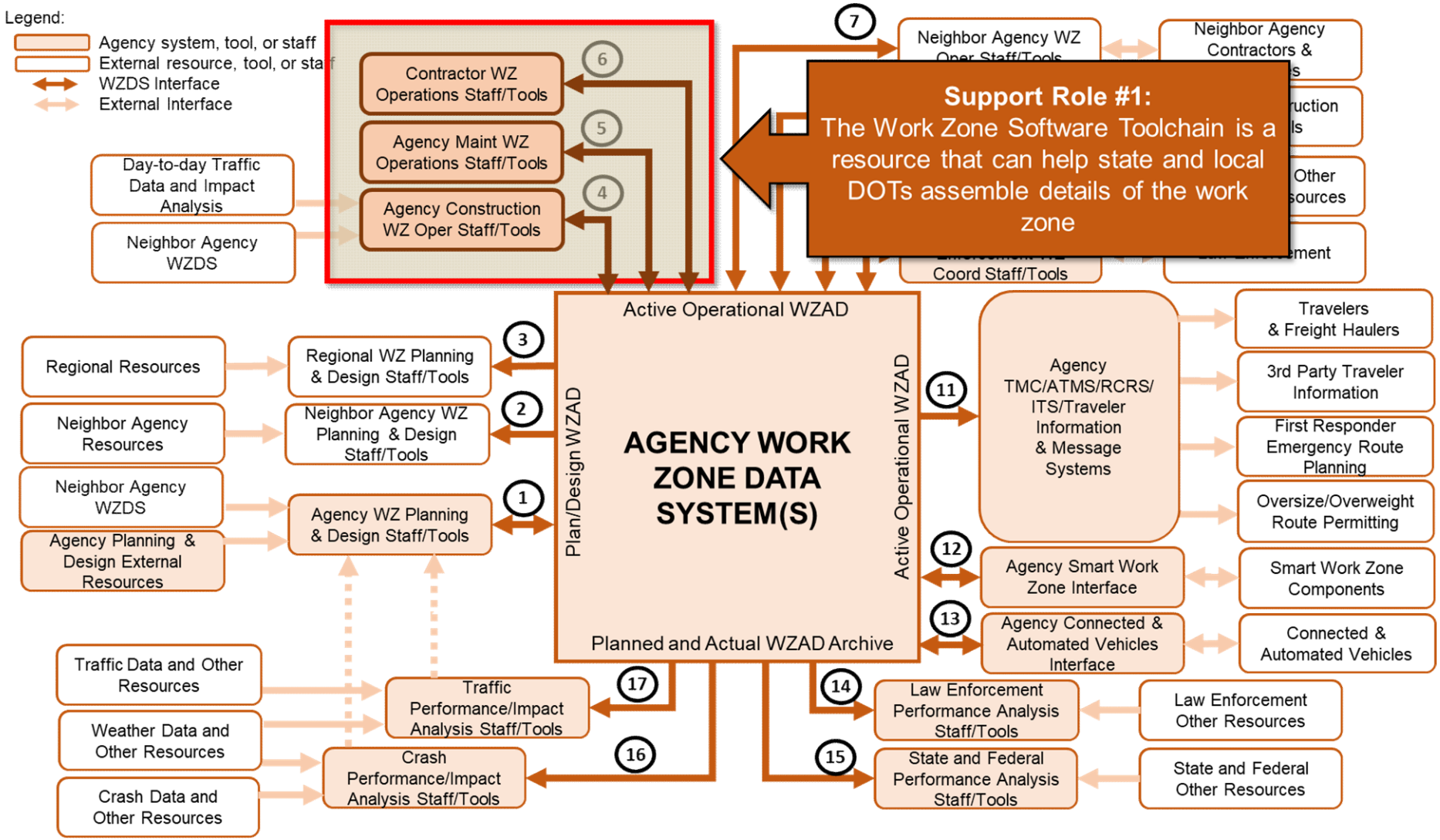
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WZDS Interface
External Interface
Support Role #1:
The Work Zone Software Toolchain is a resource that can help state and local DOTs assemble details of the work zone
Contractor WZ Operations Staff/Tools
Agency Maint WZ Operations Staff/Tools
Agency Construction WZ Oper Staff/Tools
Day-to-day Traffic Data and Impact Analysis
Neighbor Agency WZDS
Neighbor Agency WZ Oper Staff/Tools
Neighbor Agency Contractors &
Other
Coord Staff/Tools
Active Operational WZAD
AGENCY WORK ZONE DATA SYSTEM(S)
Plan/Design WZAD
Active Operational WZAD
Planned and Actual WZAD Archive
Regional Resources
Neighbor Agency Resources
Neighbor Agency WZDS
Agency Planning & Design External Resources
Regional WZ Planning & Design Staff/Tools
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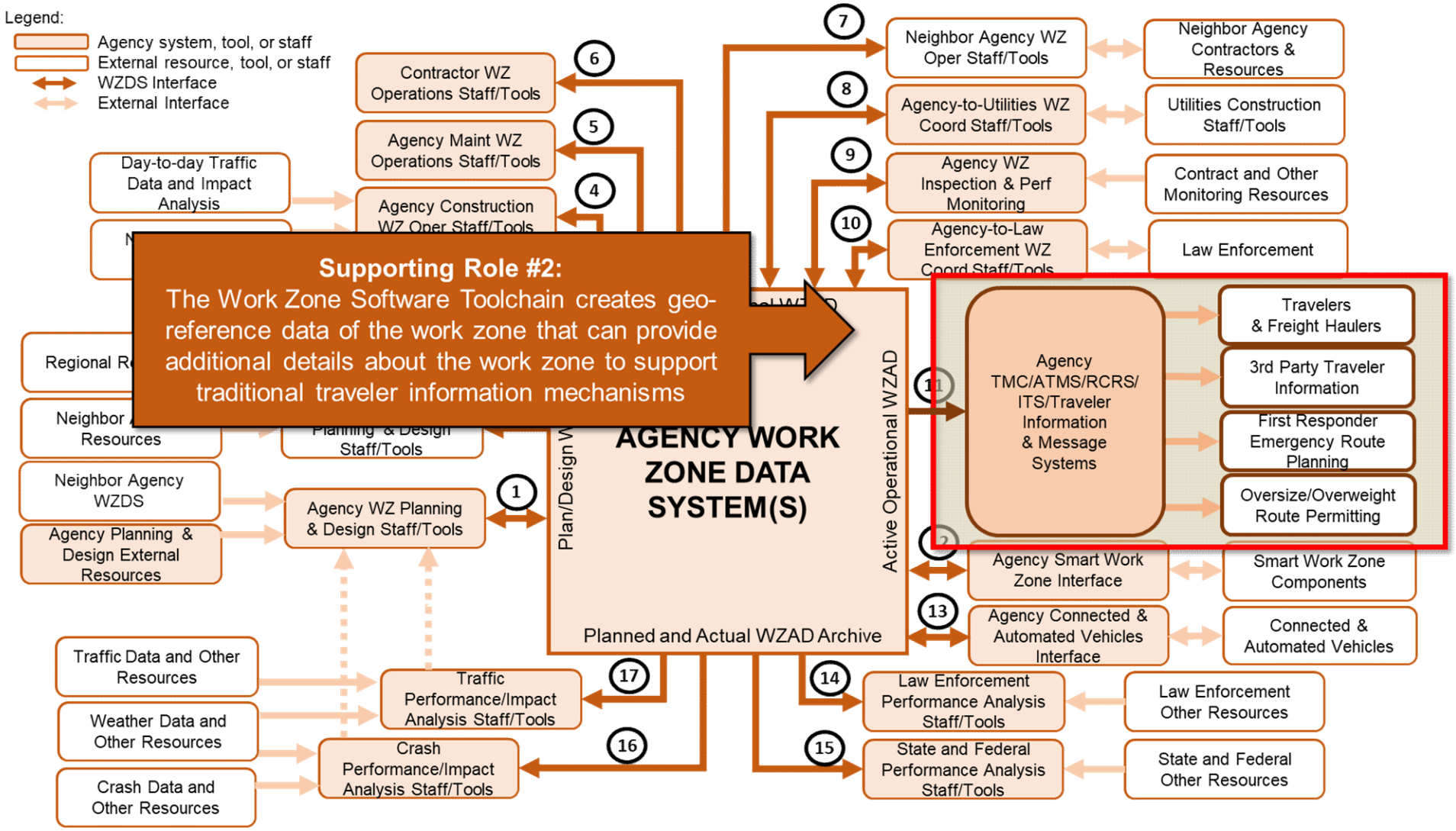
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WZDS Interface
External Interface
Supporting Role #2:
The Work Zone Software Toolchain creates geo-reference data of the work zone that can provide additional details about the work zone to support traditional traveler information mechanisms
AGENCY WORK ZONE DATA SYSTEM(S)
Planned and Actual WZAD Archive
Plan/Design WZAD
Active Operational WZAD
Contractor WZ Operations Staff/Tools
Agency Maint WZ Operations Staff/Tools
Agency Construction WZ Oper Staff/Tools
Day-to-day Traffic Data and Impact Analysis
Regional R
Neighbor Resources
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Agency WZ Planning & Design Staff/Tools
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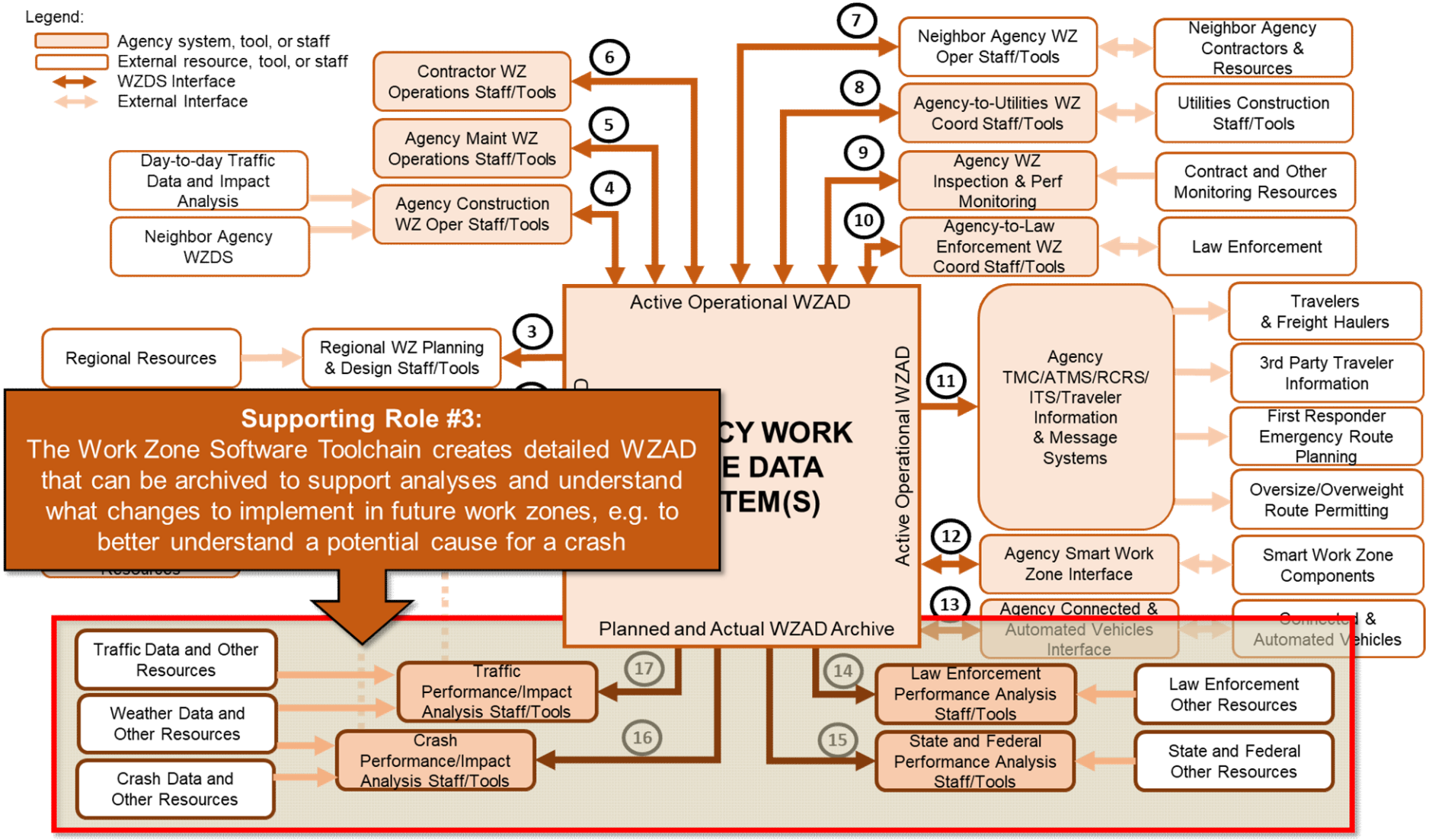

Supporting Role #3:
The Work Zone Software Toolchain creates detailed WZAD that can be archived to support analyses and understand what changes to implement in future work zones, e.g. to better understand a potential cause for a crash

WZ Mapping Toolchain Applications

To be explored through WZDI Pilots and ongoing research surrounding applications of work zone activity data:

Primary function: ***Generate detailed (high-fidelity) work zone geometry to upgrade lane activity dataframe for inclusion in WZDx feeds.***

<u>Potential Applications</u>

1. Validation of ***work zone physical elements*** – including tapers, merge points, equipment locations, reduced speed zones, etc.
2. Augment traveler information WZAD use case to ***facilitating navigation of work zones by CAVs.***
3. Field ***identification of variations*** from approved WZ geometry.
4. Historical ***record of detailed work zone geometry*** for forensics or analytics.