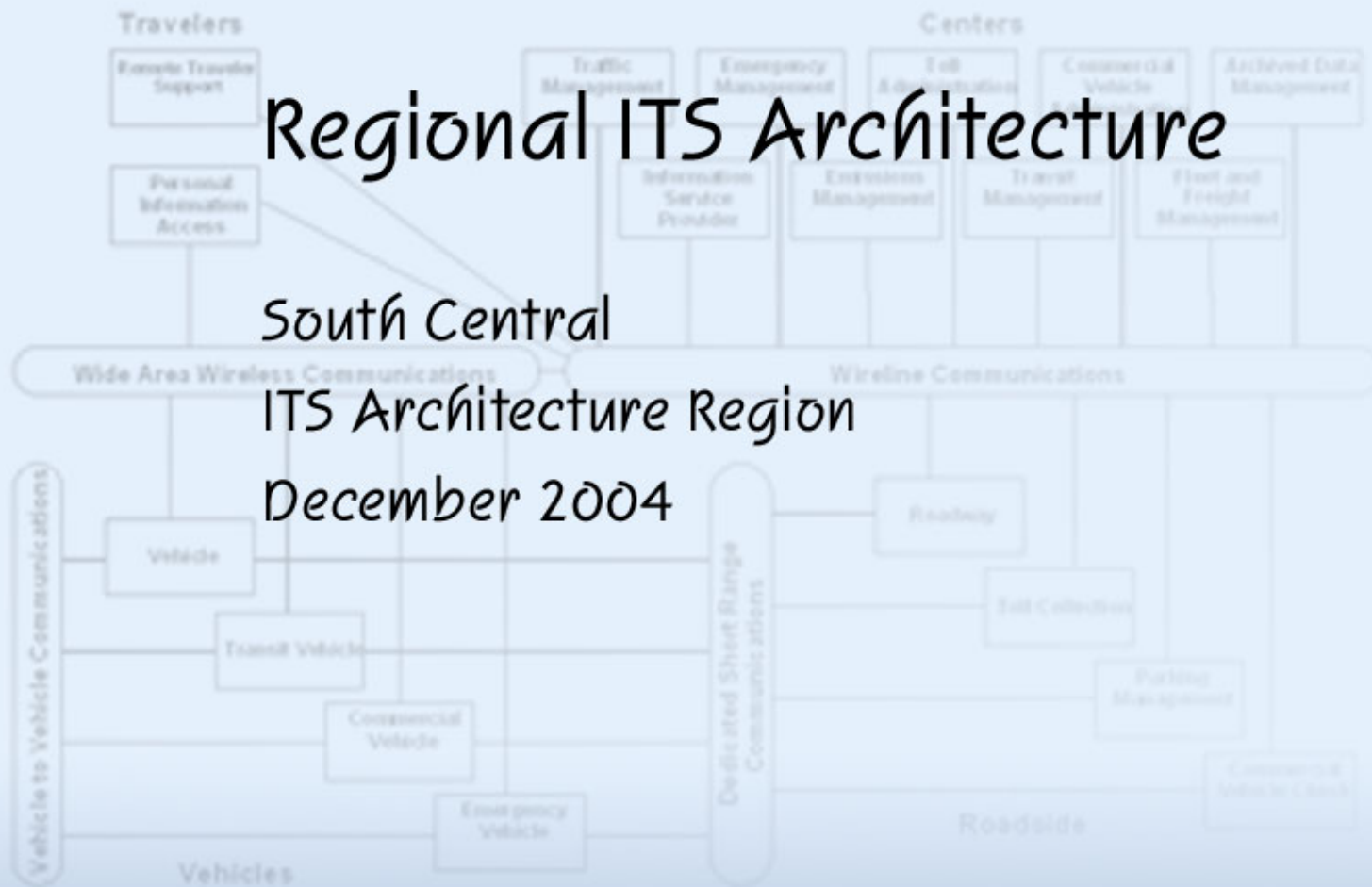


Regional ITS Architecture

South Central
ITS Architecture Region
December 2004



PA

r e n i t e c t u r e



TABLE OF CONTENTS

1	INTRODUCTION	1
1.1	ARCHITECTURE PROCESS	2
1.2	USING THIS DOCUMENT	3
1.3	UTILITY OF THE ARCHITECTURE	7
1.4	ITS STANDARDS.....	8
1.5	MAINTAINING THE ARCHITECTURE	10
1.6	MOVING FORWARD/INSTITUTIONALIZING ITS	16
2	ARCHITECTURE SCOPE	23
2.1	SCOPE OF SERVICES	23
2.2	CONFORMITY MATRIX	23
2.3	DESCRIPTION OF THE REGION	26
2.4	REGIONAL STAKEHOLDERS	30
2.5	REGIONAL ITS PROJECTS	34
3	REGIONAL SYSTEMS INVENTORY, NEEDS, AND SERVICES	47
3.1	ELEMENT DESCRIPTIONS	47
3.2	SYSTEMS INVENTORY.....	55
3.3	NEEDS	81
3.4	SERVICES	101
4	REGIONAL ITS ARCHITECTURE.....	119
4.1	SUBSYSTEM INTERCONNECT DIAGRAM	121
4.2	REGIONAL SUBSYSTEM INTERCONNECT DIAGRAM SHOWING ELEMENTS	123
4.3	INTERCONNECT MATRIX.....	127
4.4	ITS ARCHITECTURE	132
	REFERENCES.....	485
	APPENDIX A: ACRONYMS	486
	APPENDIX B: ITS DEFINITIONS	488
	APPENDIX C: SUBSYSTEM AND TERMINATOR DEFINITIONS	491
	APPENDIX D: ARCHITECTURE FLOW DEFINITIONS	499
	APPENDIX E: OPERATIONS COVERAGE.....	510
	APPENDIX F: BOOKEND I MEETING I MINUTES	513
	APPENDIX G: VALIDATION MEETING MINUTES	524
	APPENDIX H: BOOKEND II MEETING MINUTES	625

LIST OF TABLES

TABLE 2-1: SOUTH CENTRAL ITS ARCHITECTURE REGION POPULATION BY COUNTY.....	27
TABLE 2-2: COMPARISON OF KEY POPULATION DEMOGRAPHICS SOUTH CENTRAL ITS ARCHITECTURE REGION, PENNSYLVANIA, AND THE UNITED STATES	27
TABLE 2-3: COMPARISON OF COMMUTING PATTERNS AMONG WORKERS 16 & OVER SOUTH CENTRAL ITS ARCHITECTURE REGION, PENNSYLVANIA, AND THE UNITED STATES.....	28
TABLE 2-4: SOUTH CENTRAL ITS ARCHITECTURE REGION LINEAR MILES	28
TABLE 2-5: SOUTH CENTRAL DAILY VEHICLE MILES OF TRAVEL.....	29
TABLE 2-6: SIGNIFICANT HIGHWAY CORRIDORS.....	29
TABLE 2-7: REGIONAL ITS PROJECTS	34
TABLE 3-1: REGIONAL SYSTEMS INVENTORY	56
TABLE 3-2: REGIONAL NEEDS TABLE	82
TABLE 3-3: REGIONAL SERVICES TABLE	102
TABLE 4-1: REGIONAL SUBSYSTEMS/TERMINATORS.....	125
TABLE 4-2: REGIONAL INTERCONNECT MATRIX	128

TABLE OF FIGURES

FIGURE 1-1: PENNDOT ITS ARCHITECTURE REGIONS	1
FIGURE 1-2: PENNSYLVANIA ITS ARCHITECTURE PROCESS SCHEMATIC.	3
FIGURE 1-3: PENNSYLVANIA ITS ARCHITECTURE WEB SITE.....	6
FIGURE 1-4: PENNDOT DISTRICT MAP	17
FIGURE 1-5: PENNSYLVANIA MPO/RPO MAP	17
FIGURE 2-1: SOUTH CENTRAL ITS ARCHITECTURE REGION.....	26
FIGURE 4-1: SUBSYSTEM INTERCONNECT DIAGRAM	122
FIGURE 4-2: REGIONAL SUBSYSTEM INTERCONNECT DIAGRAM SHOWING ELEMENTS	124

Harrisburg – Metropolitan Planning Organization

*Adopted by the Technical Committee on December 3, 2004
Adopted by the Coordinating Committee on December 17, 2005*

York – Metropolitan Planning Organization

*Adopted by the Technical Committee on February 8, 2005
Adopted by the Coordinating Committee on February 24, 2005*

Lancaster – Metropolitan Planning Organization

*Adopted by the Technical Committee on February 9, 2005
Adopted by the Coordinating Committee on February 24, 2005*

Lebanon – Metropolitan Planning Organization

*Adopted by the Technical Committee on January 11, 2005
Adopted by the Coordinating Committee on February 10, 2005*

Adams – Rural Planning Organization

Adopted by the ACTPO on February 16, 2005

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Statewide Working Group

The Statewide Working Group guided the Commonwealth through the development of the Architectures. Their principal role was to ensure that the Regional Architectures were reasonably uniform and consistent.

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Mike Herron – Federal Highway
Administration (FHWA)

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Program Development Division

Regional Champion

The Regional Champions supported the RAP by facilitating the RAP meetings and played a critical role in coordinating with the Statewide Working Group for merging statewide visions with Regional characteristics. The Champions for this Region were:

Chip Millard – Tri-County Regional Planning Commission

Glenn Rowe – PennDOT District 8-0

Regional Advisory Panel

The Regional Advisory Panel lead and guided the Regional ITS Architecture development in the Southwest ITS Architecture Region. The Architecture was developed with input from regional stakeholders, channeled and focused by the RAP.

Mark Berkheimer – Harrisburg International Airport

Lee Meyer – Lebanon County Planning Commission

Don Bubb – York County Planning Commission

Allison Morris – Metro Networks

Lou Cortelazzi – Pennsylvania Turnpike Commission (PTC)

Devang Patel – PennDOT District 8-0

John Fitzkee – Lebanon County Planning Commission

Dave Royer – Lancaster County Planning Commission

Lee Groff – Hershey Medical Center

Jim Runk – Pennsylvania Motor Trucking Association (PMTA)

Dan Lamar – Pennsylvania Emergency Management Agency (PEMA)

Phil Turquino – Franklin County Planning Commission

Andy Merkel – Adams County Planning Commission

Parsons Brinckerhoff

The principal role of Parsons Brinckerhoff was to oversee and produce the Regional ITS Architectures. The PB Team consisted of:

Mike Harris – PB Farradyne – Project Manager

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Larry Bankert – PB Farradyne – South Central Region Lead

JD Schneeberger – PB Farradyne – Turbo

Steve Kimble – PB Farradyne – South Central Region Support

Conformity Statement

The South Central Region of the Commonwealth of Pennsylvania is in compliance with the requirements of the “Intelligent Transportation Systems Architecture and Standards,” as mandated by the Federal Highway Administration (23 CFR 940) and supported by the policy of the Federal Transit Administration.

The following policy objectives are enumerated in 23 CFR 940.5: “ITS projects shall conform to the National ITS Architecture and standards in accordance with the requirements contained in this [Federal rule]. Conformance with the National ITS Architecture is interpreted to mean the use of the National ITS Architecture to develop a [R]egional ITS Architecture, and the subsequent adherence of all ITS projects to that [R]egional ITS Architecture. Development of the [R]egional ITS Architecture should be consistent with the transportation planning process for Statewide and Metropolitan Transportation Planning.”

The South Central Region’s ITS Architecture was developed to address these specific policy objectives. The resultant Regional ITS Architecture is consistent with Pennsylvania’s statewide and metropolitan transportation planning processes.

1 Introduction

This document, developed under the *Pennsylvania Intelligent Transportation Systems (ITS) Architecture* initiative, presents the ITS Architecture for Pennsylvania's South Central Region, which is comprised of eight counties in the South Central part of the state. The South Central Region encompasses PennDOT Engineering District 8-0. The document is the result of intensive data-gathering, research, and planning activities conducted between March 2003 and December 2004. The current version of the ITS Architecture was generated in December 2004.

The South Central Regional ITS Architecture was prepared under the auspices of a Regional Advisory Panel (RAP), a panel of experts drawn from transportation stakeholder organizations across the Region and State. Additional stakeholder organizations participated in the process of "validating" the Architecture. PB Farradyne, a division of Parsons Brinckerhoff, Inc., executed development of the Architecture under contract to the Pennsylvania Department of Transportation (PennDOT). PennDOT appointed an ITS Statewide Working Group to establish statewide ITS Architecture standards, advise and guide the statewide process, and ensure consistency across the Regions.

The South Central Regional ITS Architecture is one of nine Regional Architectures being developed across the Commonwealth of Pennsylvania, as shown in Figure 1-1, below:

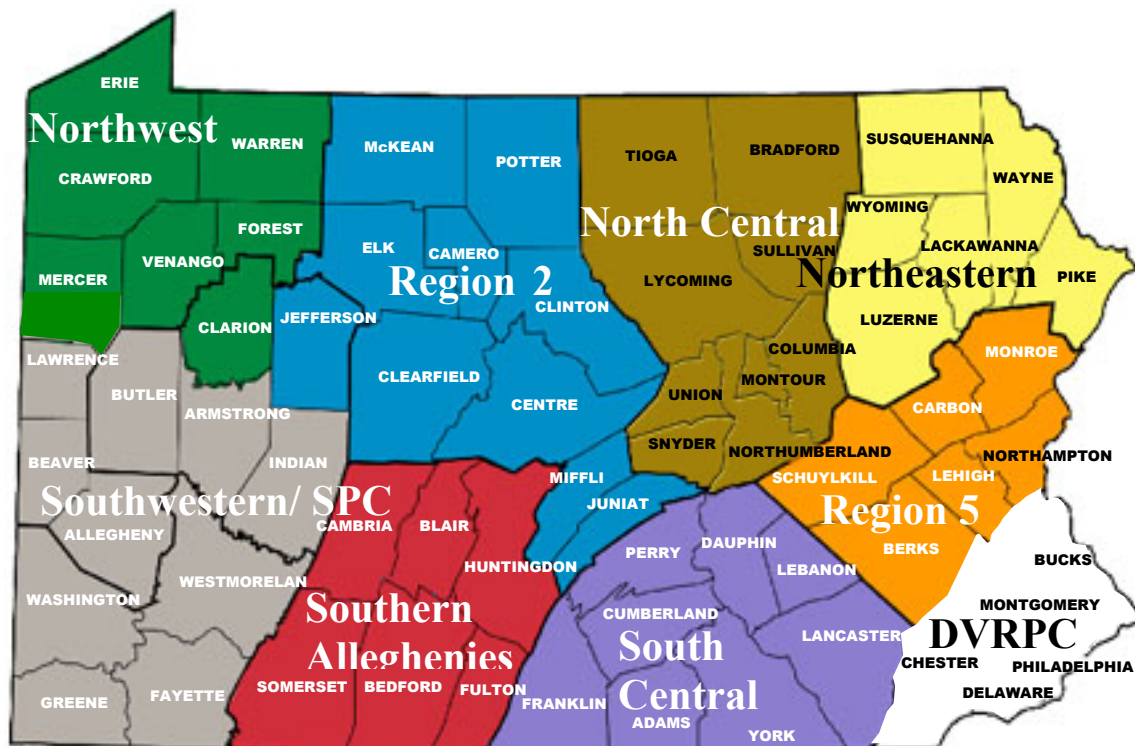


Figure 1-1: PennDOT ITS Architecture Regions

1.1 Architecture Process

PennDOT took a structured approach to developing Regional ITS Architectures throughout the State. The Regional ITS Architecture development process was defined and documented in the “Pennsylvania ITS Architecture Phase I Report,” dated February 2003. PennDOT, the Federal Highway Administration (FHWA), the Pennsylvania State Police (PSP), and the Planning Partners championed the former effort.

The Phase I Report describes PennDOT’s approach towards developing Regional ITS Architectures in Pennsylvania while utilizing the national guidance. The approach ensures that the resultant Architectures depict the ITS infrastructure in the Region and conform to the National ITS Architecture. The process developed is inherently flexible and adaptable so that special conditions and circumstances in each Region can be effectively addressed or otherwise accommodated, while maintaining consistency statewide.

The development process was specifically designed to support the preparation and refinement of Regional ITS Architectures across Pennsylvania. The process benefits the Pennsylvania environment, optimizes the national guidance, and creates an efficient and effective response to regional needs and circumstances.

The complete process for developing Regional ITS Architectures in Pennsylvania, as described in the Phase I Report, is:

- Task 1.0 — Define Architecture Scope
- Task 2.0 — Inventory Systems and Define Needs, Services, and Operations Concept
- Task 3.0 — Generate Strawman Regional ITS Architecture
- Task 4.0 — Conduct Outreach to Validate Regional ITS Architecture
- Task 5.0 — Finalize the Regional ITS Architecture

The process is depicted in further detail in the following schematic:

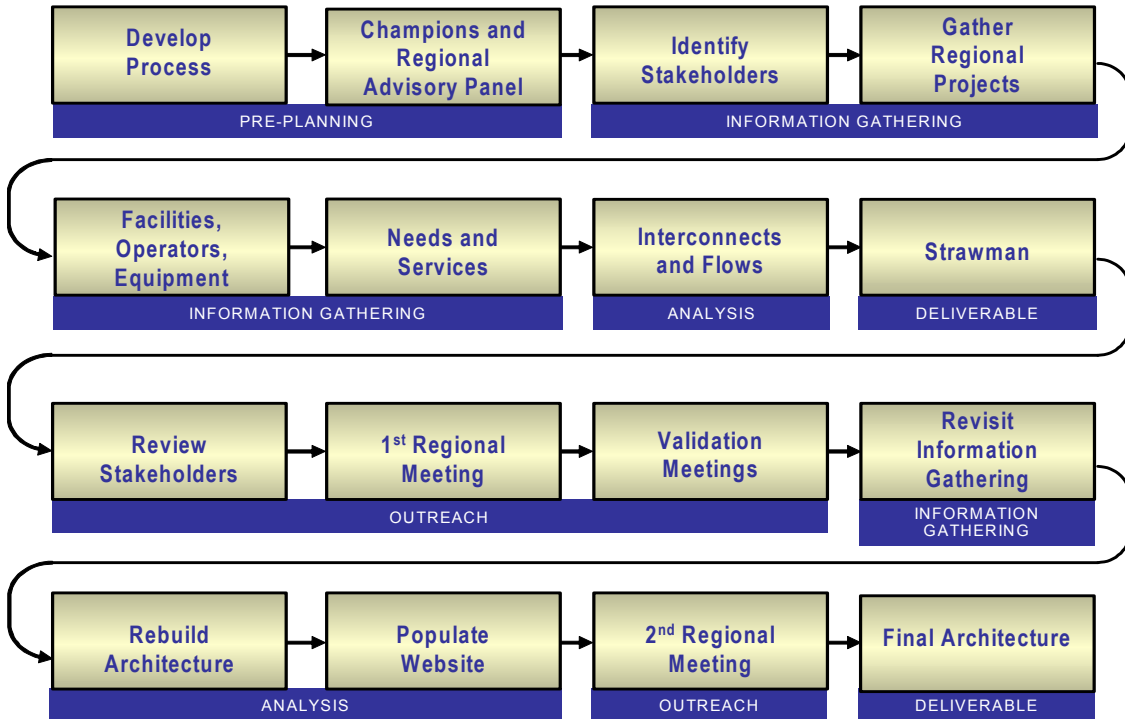


Figure 1-2: Pennsylvania ITS Architecture Process Schematic

1.2 Using this Document

This document is, principally, a resource instrument, designed to assist engineers, planners, designers, developers, managers, and decision-makers in defining a regionally-integrated surface transportation infrastructure that promotes safety, maximizes operational efficiencies, and utilizes appropriate technologies. Materials in the document are targeted at traditional surface transportation organizations, transit agencies, and the host of entities that interface with the transportation infrastructure. The latter include incident and emergency management personnel, commercial vehicle operators, shippers, operators of tourist destinations, event managers, traveler information providers, etc.

The document is a resource instrument to be consulted during the planning process. It is not intended as a textbook to be read from cover-to-cover.

The term “ITS” implies the use of technologies or other innovations to achieve new operational efficiencies in transportation. Yet, an ITS Architecture is, itself, technology-independent; that is, it identifies *who and what* need to connect, but not *how* those connections ought to best be accomplished.

An ITS Architecture describes the interrelationships that exist—or ought to exist—among transportation “elements” across the Region. It distinguishes between those

relationships that exist now and those planned for the future. However, the Architecture does not judge the efficacy, or utility, of those relationships or assess whether the technologies or procedures supporting those linkages are optimized.

These sorts of judgments will need to be made after the Regional ITS Architecture is finalized.

Document Organization and Access Strategies

The ITS Architecture is presented in five primary sections:

- Section 1 — *Introduction*
- Section 2 — *Architecture Scope*
- Section 3 — *Regional Systems Inventory, Needs, and Services*
- Section 4 — *Regional Architecture*
- *Appendices*

Section 1, *Introduction*, contains important background information and establishes the “context” for the Architecture effort. This section defines key concepts and terms, examines the utility of a Regional ITS Architecture, the importance of maintaining the Architecture, ITS standards, and strategies for mainstreaming, or institutionalizing, ITS. This section should be read in its entirety.

Section 2, *Architecture Scope*, summarizes the general scope and magnitude of the Regional ITS Architecture effort. It describes the South Central Region, emphasizing those characteristics that potentially impact transportation activities and performance. It further identifies major ITS stakeholders and existing and planned ITS projects across the Region. This section of the document should also be read in its totality.

Section 3, *Regional Systems Inventory, Needs, and Services*, contains the essential “building blocks” of the ITS Architecture. It identifies and defines each pertinent ITS “element” in the Region. “Elements” are the organizational entities (e.g., the PennDOT District Offices, 911 Communications Centers, and Regional Transit Agency Offices) that operate in the transportation environment. Additionally, the section presents the ITS Systems Inventory, organized by element and linked back to the Projects List in Section 2. The Needs and Services tables establish the interrelationships among the Region’s ITS elements. Each element in the Needs Table is defined in terms of the “inputs” it requires from the other elements with which it interacts; similarly, each element in the Services Table is defined in terms of the “outputs” it furnishes to other elements.

Users of the ITS Architecture should familiarize themselves with the general content of Section 3. Thereafter, when they are engaged in ITS deployment planning or related

activities, they can generally proceed directly to Section 4. Users can return to Section 3, as needed, for descriptions of the elements being investigated, identification of the pertinent roadway corridors, and more comprehensive understanding of the interrelationships across elements.

Section 4, *Regional Architecture*, graphically displays the details of the ITS Architecture. Notably, Figure 4-2, *Regional Subsystem Interconnect Diagram Showing Elements*, identifies the systems and subsystems with which each regional ITS element is associated; elements are color-coded—here and throughout the remainder of the document—according to which of the four primary systems they fall under (i.e., Centers, Roadside, Vehicles, or Travelers). Similarly, Table 4-2, *Regional Interconnect Matrix*, specifies which elements gather inputs from—or furnish outputs to—other elements. The remainder of Section 4 is a compendium of the ITS elements. Each element is depicted in terms of the other elements with which it interfaces, and then each “element pair” is examined in detail. The detailed pairings show the types of information that pass between the elements, the direction of the information flow, and whether the flow currently exists or is planned.

Practitioners consulting the Regional ITS Architecture can use Table 4-2 to determine those elements pertinent to their investigations and proceed directly to the corresponding interconnect diagrams. From the diagrams, practitioners can gather the essential information.

The *Appendices* contain a wealth of supplemental materials to assist practitioners in comprehending the Architecture. These include: (1) ITS acronyms; (2) definitions of ITS terminology; (3) definitions of subsystems/terminators and architecture flows identified and defined in the National ITS Architecture; (4) “operations coverage” across the Region; and (5) summaries of Outreach and Validation meetings.

Sample Access Scenario

The Regional ITS Architecture is a valuable planning tool. The following sample scenario defines how a stakeholder in the Region might utilize the material presented in this document:

A transit agency planner in Pennsylvania’s South Central Region preparing to deploy an automatic vehicle location (AVL) system on its buses can learn a great deal from consulting the Regional ITS Architecture. By turning to the Regional Transit Agency Offices’ Interconnect Diagram, the transit planner can immediately grasp the range of stakeholders potentially interested in receiving pertinent vehicle location and more detailed transit data (e.g., 911 Communication Centers, PennDOT Traffic Management Centers, Personal Traveler Information Devices, etc.). The planner would discover that connections between 911 Communication Centers are generally in place; that the remaining interfaces do not currently exist, but are planned for the future.

By consulting the interconnect and information flow diagrams, the transit planner would further learn that AVL inputs might effectively be used to improve the detail, precision,

and timeliness of transit emergency data that already pass to other agencies in the Region. The diagrams further show that future “hooks” are planned for communicating bus status data to other agencies. For example, PennDOT would like to use the transit vehicles as probe data to identify congested corridors in the Region. Other stakeholders might be interested in broadcasting vehicle status or delay data to their users.

Access to the ITS Architecture enables users to view the pertinent infrastructure before new ITS projects are undertaken. Existing and planned interrelationships can be quickly viewed and grasped, and the realm of agencies and other entities with a potential stake in the subject matter can be easily identified. Details about the information passing between stakeholders offer insight into optimizing future deployments and concretizing the range of possibilities for important new projects.

Accessing the Architecture On-Line

Key sections of the Regional ITS Architecture—notably Section 4 of the hardcopy document—are accessible on-line. To access the South Central Regional Architecture, go to:

www.paits.org/sc

When you access this location, the web screen shown in Figure 1-3 will be displayed:

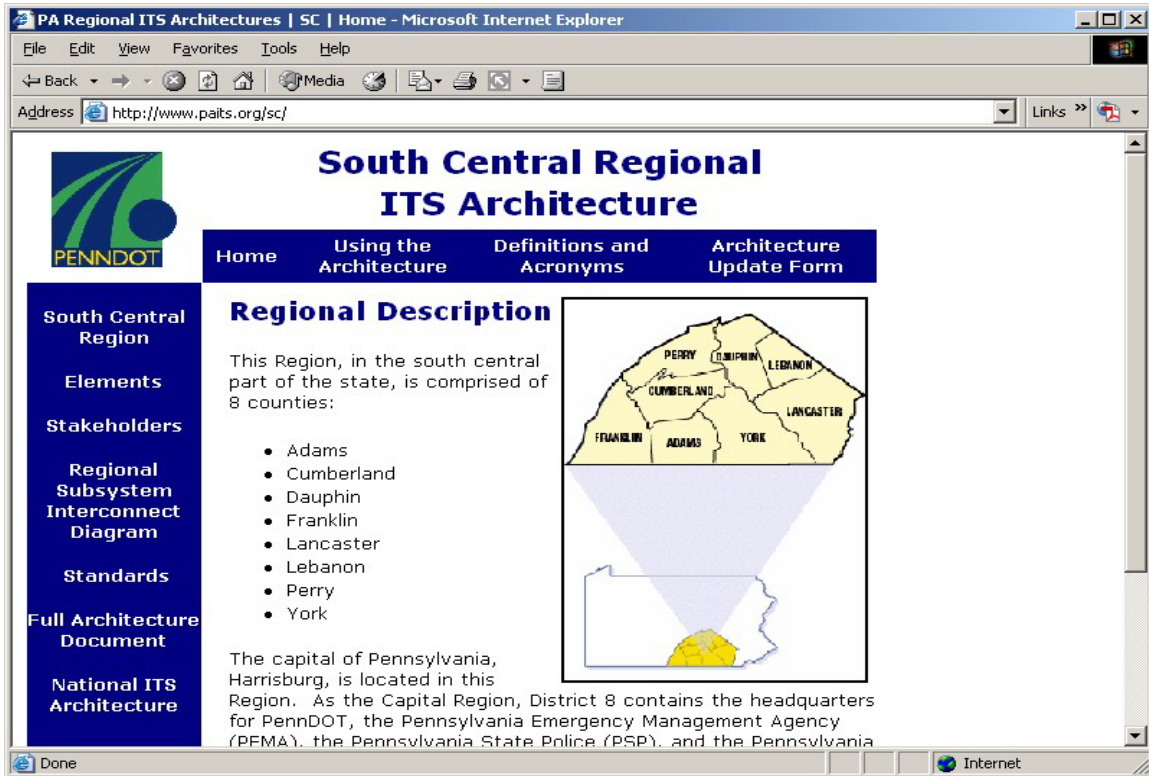


Figure 1-3: Pennsylvania ITS Architecture Web Site

From the South Central Regional ITS Architecture Homepage (www.paits.org/sc), there are three ways to access information about a specific element:

1. Click on “Elements” and select any element from the list.
2. Click on “Stakeholders” and select the correct stakeholder, and then select an element.
3. Click on the “System Interconnect Diagram” for a sausage diagram of the Region that lists the elements grouped by type. Clicking on the element in the diagram will take you to page associated with the selected element.

After locating the page for a given element, users can download a PDF file that includes the interconnect diagram and architectural flow diagrams.

Definitions of Architecture terms, acronyms, information flows, and subsystem terminators are also included on the website.

1.3 Utility of the Architecture

Developing, maintaining, and utilizing the ITS Architecture offers a range of significant benefits to the adopting Region. These benefits include the following:

- A Regional ITS Architecture enables planning and deployment to occur in an organized and coordinated manner. It offers a framework for systematically identifying and evaluating prospective solutions to the transportation problems in the Region. It establishes an environment for inter-agency cooperation and coordination. Stakeholders across the Region may use the Architecture to plan their ITS projects to support regional goals and priorities. Utilization of the Architecture also helps to ensure consistency among the state, regional, and local planning processes.
- A Regional ITS Architecture establishes institutional mechanisms that promote the development and deployment of ITS projects. The Architecture compels the Region to set up forums for the discussion of regional transportation requirements. These forums, in turn, encourage the building of relationships among transportation professionals and stakeholders across the Region—these professionals are thereby given opportunities to understand the needs, issues, constraints, etc. of other transportation sectors. As the regional dialogue expands, institutional barriers tend to crumble and the integration of disparate goals, concepts, approaches, and solutions is increasingly possible. With this institutional integration comes the sharing of technologies and information, so that innovative, region-wide thinking becomes a guiding principle in transportation planning and new, synergistic relationships take hold. Additionally, the Architecture provides the basis for updating the Transportation Plan, the Transportation Improvement Program (TIP), the Statewide TIP, and the State Implementation Plan (SIP).

- A Regional ITS Architecture promotes interoperability. The Architecture reveals to stakeholders the key interrelationships presently established in the Region and those planned for the future. These interrelationship requirements identify those areas where operational or technology bridges to multiple agencies are needed. In this way, the Architecture helps to anticipate and plan for the integration requirements between state, regional, and local systems. Significantly, the Architecture promotes adherence to consistent and uniform standards across the Region. By its very nature, it also ensures consistency in documentation of ITS elements across the Region.

- A Regional ITS Architecture encourages efficient investment. As prospective new ITS projects are identified in the Region, they can be “plotted” on the Regional Architecture and their interrelationships with existing and planned components assessed. This lessens the probability that a particular project will result in a “dead-end” investment. It also helps planners to identify and invest in projects capable of addressing multiple needs, such as automated vehicle location (AVL) systems that can both improve on-road performance and inform customers of status conditions. In general, the Architecture offers regional stakeholders a basis for prioritizing ITS projects and making sound investment choices.

- A Regional ITS Architecture satisfies the Federal mandate. The mandate of the U.S. Federal Highway Administration (FHWA) requires that Regional ITS Architectures be completed by April 2005, in order for stakeholders in the Region to continue using Federal funds for the development and deployment of ITS projects. Consequently, promulgation of Regional ITS Architectures is necessary for continued access to Federal funds for ITS deployment.

1.4 ITS Standards

ITS standards are industry-consensus standards that define how system components operate within a consistent framework. By specifying how systems and components interconnect, ITS standards promote interoperability.

A seamless transportation system relies on clear communication between agencies, systems, and individuals. To ensure that different entities can communicate, the systems must be designed according to standards. For PennDOT, this might mean systems that can exchange data between regional and statewide centers. At the local level, this can mean data exchanges between jurisdictions concerning incidents, congestion, and signal timing plans.

An interoperable and seamless transportation system provides several benefits. Transportation agencies are now increasingly communicating with law enforcement, as police are usually the first to learn of incidents. Many transportation agencies are linking their transportation management centers with police dispatch. When systems are interoperable, police and emergency units can respond faster to crashes; this often

relieves congestion and improves safety. In an emergency, quick and reliable communication is even more crucial.

To accrue the benefits noted above, systems and the underlying equipment must be designed according to standards that enable interoperability. Future systems and equipment should be designed to meet these standards. Existing systems and equipment, additionally, should be updated to meet the standards.

The USDOT's ITS Standards Program is working with existing standards development organizations (SDO's) to establish a national collection of ITS standards. The following organizations participate in ITS standards activities:

- AASHTO (American Association of State Highway and Transportation Officials)
- ASTM (American Society for Testing and Materials)
- IEEE (Institute of Electrical and Electronics Engineers)
- ITE (Institute of Transportation Engineers)
- NEMA (National Electrical Manufacturers Association)
- SAE (Society of Automotive Engineers)

The following organization oversees the development of ITS standards:

- ANSI (American National Standards Institute)

For more information on ITS standards, visit www.standards.its.dot.gov or www.ntcip.org.

To identify ITS standards applicable to the South Central Regional ITS Architecture, visit the National ITS Architecture website. This site provides a listing of all National ITS Architecture information flows and their associated standards. A South Central ITS Architecture user can access applicable ITS standards by:

1. Viewing the information flow diagrams in the South Central Regional ITS Architecture document.
2. Visiting the National ITS Architecture website:
<http://itsarch.iteris.com/itsarch/html/af/padde.htm>
3. Identifying a specific Architecture Flow, by name, in the Regional ITS Architecture document, clicking on that Architecture Flow name on the National ITS Architecture website, and the reviewing the details under "Standard Activities."

The current ITS standards—or pertinent standards activities—will be displayed for the information flow that the user specifies.

1.5 Maintaining the Architecture

As ITS projects are planned and implemented, the Regional ITS Architecture will need to be updated to reflect the new ITS priorities and strategies emerging through the transportation planning process. The Regional ITS Architecture is not a static document, but rather is a “living” document. The ITS Architecture must grow and adapt as plans change, ITS projects are implemented, and ITS needs and services evolve in the Region.

In order to serve as a regional framework, the Regional Architecture must be maintained so that it continues to reflect the current and planned ITS systems, interconnections, etc. The following circumstances or conditions may all trigger the need to make changes to the Architecture:

- Changes in Regional needs. Regional ITS Architectures are created to support transportation planning in addressing regional needs. Over time, these needs can change and the corresponding aspects of the Regional ITS Architecture that address these needs may have to be updated. These changes in needs will also typically be expressed in updates to planning documents, such as regional transportation plans.
- New stakeholders. As new stakeholders become active in ITS, the Regional ITS Architecture should be updated to reflect their place in the regional view of ITS elements, interfaces, and information flows. Why might new stakeholders emerge? The stakeholders might represent new organizations that were not in place during the original Architecture development. Maybe the geographic scope of the Architecture is being expanded, bringing in new stakeholders. Perhaps additional transportation modes or transportation services are being considered that touch the systems of additional stakeholders.
- Changes in scope of services considered. The range of services considered by the Regional ITS Architecture expands. This might happen because the National ITS Architecture has been expanded and updated to include new user services or to better define how existing elements satisfy the user services. A Regional ITS Architecture based on an earlier version of the National ITS Architecture should take into consideration these changes as the Regional ITS Architecture is updated. The National ITS Architecture may have expanded to include a user service that has been discussed in the Region, but not included in the Architecture, or was included in a cursory manner. Changes in the National ITS Architecture are not, of themselves, a reason to update a Regional ITS Architecture, but the Region may want to consider new services in the context of their regional needs.
- Changes in stakeholder or element names. An agency’s name, or the name used to describe their element(s), undergoes change. Transportation agencies occasionally merge, split, or just rename themselves. In addition, element names may evolve as projects are defined. The Regional ITS Architecture

should be updated to use the current names for both stakeholders and elements.

- Changes in other Architectures. A Regional ITS Architecture covers not only elements and interfaces within the Region, but also interfaces to elements in adjoining Regions. Changes in the Regional ITS Architecture in one Region may necessitate changes in the Architecture in an adjoining Region to maintain consistency between the two.

There are also several changes relating to project definition that will cause the need for updates.

- Change due to project definition or implementation. When actually defined or implemented, a project may add, subtract, or modify elements, interfaces, or information flows from the Regional ITS Architecture. Because the Regional Architecture is meant to describe the current (as well as future) regional implementation of ITS, it must be updated to accurately reflect how the developed projects integrate into the Region.
- Change due to project addition/deletion. Occasionally a project will be added or deleted through the planning process, or even during project delivery. Some aspects of the Regional ITS Architecture that are associated with the project may be expanded, changed, or removed.
- Change in project priority. Due to funding constraints or other considerations, the planned project sequencing may change. Delaying a project may have a ripple effect on other projects that depend on it; conversely, raising the priority for a project's implementation may impact other projects that are related to it.

The purpose of maintaining the Architecture is to keep it current and relevant, so that stakeholders will use it as a technical and institutional reference when developing specific ITS project plans. In order to maintain the Architecture, three decisions must be discussed:

- Who — Who will lead and implement the maintenance effort?
- When — When will the Regional ITS Architecture change be updated?
- What — What parts of the Regional ITS Architecture will be maintained?
- How — How will the Architecture be maintained?

Who Will Maintain the Architecture?

In cooperation with the Pennsylvania ITS Architecture Regions, PennDOT Central Office expects to utilize a statewide approach to maintaining the Commonwealth's nine Regional ITS Architectures. Although PennDOT Central Office will lead the

maintenance effort in the South Central Region, *all* stakeholders will still need to participate in the process. Maintenance of the Architecture is a recurring, long-term effort that requires inputs from all stakeholders in the Region.

When Will the Architecture be Updated?

The Regional ITS Architecture is expected to be updated every four years to coincide with updates to long-range plans throughout the Commonwealth. There will be a process planning effort prior to the update in order to ensure statewide consistency of the updates. This timeframe will be used throughout the state. The next update to the South Central Regional ITS Architecture is projected to be completed by Autumn 2008.

What Will be Maintained?

The constituent parts of the Regional ITS Architecture that will be maintained is referred to as the “baseline.” The baseline of the Regional ITS Architecture for the South Central Region includes:

- Description of the Region. This description includes the geographic scope, functional scope, and architecture horizon. Geographic scope defines the ITS elements within the Region. Functional scope defines which services are included. Architecture horizon is the distance (in years) into the future that the Architecture will consider.
- Regional ITS Projects Matrix. The matrix includes a list of existing and planned ITS projects for the Region.
- List of stakeholders. The listing and description of ITS Stakeholders in the Region should be revised as stakeholders evolve, consolidate, or separate.
- List of elements. The inventory of ITS elements is a key aspect to the Architecture. Changes in stakeholders, as well as operational concepts, may impact the inventory of elements. Furthermore, implementation and planning status may change (i.e., change from planned to existing).
- Systems Inventory. Links the ITS Projects Matrix to Regional elements. Additionally, the Systems Inventory defines the functionalities of the elements.
- Needs and Services Tables. The Needs and Services Tables define the existing and future flow of information being shared between elements. The Needs and Services tables serve as the building blocks for the programming/building of the Architecture.
- Interconnect diagrams. Interfaces between elements define the interactions between one another. They provide information on “who” is talking to “whom.”

- Information flow diagrams. Information flows between elements define the details of the Architecture. They are the detailed description of how elements interact or will interact in the future. This is the key aspect of the baseline and will likely see the greatest amount of change.
- Applicable ITS Standards. The selection of standards depends on the information exchange requirements. The maintenance process should consider how ITS standards may have evolved and matured since the last update.

How Will the Architecture be Maintained?

PennDOT Central Office will be responsible for updating the aforementioned parts of the Regional ITS Architecture. In order to document the necessary changes to the Regional ITS Architecture, the Pennsylvania ITS Architecture website (www.paits.org) will be utilized as a tool for tracking changes to the Architecture.

All stakeholders in the Region involved in ITS project activity will be responsible for documenting additions, changes, and updates to the ITS Architecture.

To document an update, go to the South Central Regional ITS Architecture Homepage (www.paits.org/sc) and follow these steps:

1. Select the “Architecture Update Form” at the top of the screen. This link takes you to the requisite form.
2. Complete the “Architecture Update Form.” The form, shown on the following page allows a stakeholder to suggest an update to the Architecture. The form is broken into five sections: (1) Contact Information, (2) New ITS Project, (3) New Stakeholder, (4) New Element, and (5) Other Changes. Each section is described below:
 - Contact Information — Contains contact information (name, organization, email, and phone number) so that the stakeholder submitting the form can be contacted in the future.
 - New ITS Project — Future ITS projects considered for State and/or Federal funding should be documented in this section. Project name, stakeholder, type of funding requested, location, deployment date, and a brief description of the project should be inputted here.
 - New Stakeholder — Requests for new stakeholders and changes to stakeholder names/descriptions should be identified in this section of the form. The status, existing or planned, should also be identified.
 - New Element — Requests for a new element and changes to element names/descriptions should be identified in this section of the form. The status, existing or planned, should also be identified.

- Other Changes — Other changes to the Regional ITS Architecture can be documented in this section.
3. Submit the “Architecture Update Form.” The form can be submitted by clicking on the “Submit” button on the bottom of the webpage. Once submitted, the form will be sent to the webmaster who will compile the information. The information will be utilized for the next update to the Regional ITS Architecture.
 4. Once the “Architecture Update Form” has been submitted, the information will be sent to the webmaster. The webmaster will compile the information and post it on the Architecture website. Once posted, the information can be accessed by (1) clicking on the “update list” link at the top of the “Architecture Maintenance Form” webpage or (2) going to <http://paitis.org/sc/update.htm>.

South Central ITS Architecture Maintenance Form

Contact Information

Name of Submitter:	Submission Date:
Organization:	Phone Number:
Email Address:	

New ITS Project

Project Name:	
Stakeholders:	Funding: <input type="checkbox"/> Local Funding <input type="checkbox"/> State Funding <input type="checkbox"/> Federal Funding Details:
Location:	Deployment Date:
Project Description:	

New Stakeholder

Stakeholder Name:
Status: <input type="checkbox"/> Existing <input type="checkbox"/> Planned
Stakeholder Description:

New Element

Element Name:	Stakeholder:
Status: <input type="checkbox"/> Existing <input type="checkbox"/> Planned	
Element Description:	

Other Changes

Other Changes:

Contact the [PAITS Webmaster](#) with questions and comments.

1.6 Moving Forward/Institutionalizing ITS

Across the State, PennDOT has enjoyed strong commitment to ITS deployment initiatives, some through traditional funding mechanisms and most through federal funds earmarked for ITS. In virtually all Regions, there is an increasing emphasis on regional deployments and coordination among public agencies, illuminated by the cooperative effort displayed by the creation of Regional ITS Architectures. An integral part of the ITS planning, agency coordination, and program development activities is the cooperation and coordination with PennDOT Districts, MPO's and/or RPO's throughout the State that overlap, and regional stakeholders.

The application of advanced technologies to solve some of the transportation-related problems was first initiated by staff from DVRPC in the Philadelphia Region a few decades ago. Since then, there is a fully integrated system in place in Pittsburgh and operation centers are being explored in many other areas of the State. However, only since 2002, has there been a concerted effort to consolidate all of the individual ITS efforts by each agency and jurisdiction into a comprehensive and consolidated plan, starting with the creation of Regional ITS Architectures for each Region of the State that are coordinated and have statewide consistency.

Each regional agency represented in these Regional ITS Architectures has unique responsibilities for planning, operating, maintaining, or monitoring the transportation system.

Responsibility for, and involvement with, ITS by key agencies in the South Central Region has become a joint effort between PennDOT Districts, MPO's, and regional stakeholders. These groups, together, have assumed responsibility for coordinating regional ITS planning and deployment.

Figure 1-4 shows a map of the current PennDOT district boundaries by county. Figure 1-5 shows a map of the current MPO and RPO boundaries by county. The purpose of these figures is to give the reader context into the PennDOT district and MPO boundaries.

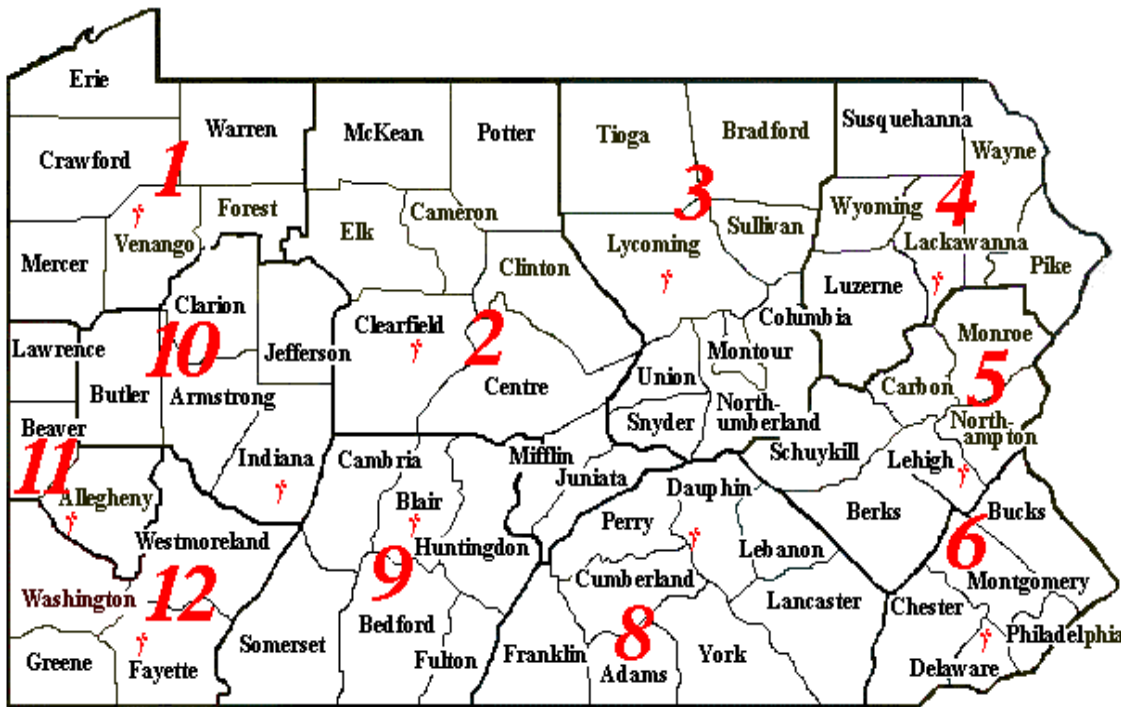


Figure 1-4: PennDOT District Map

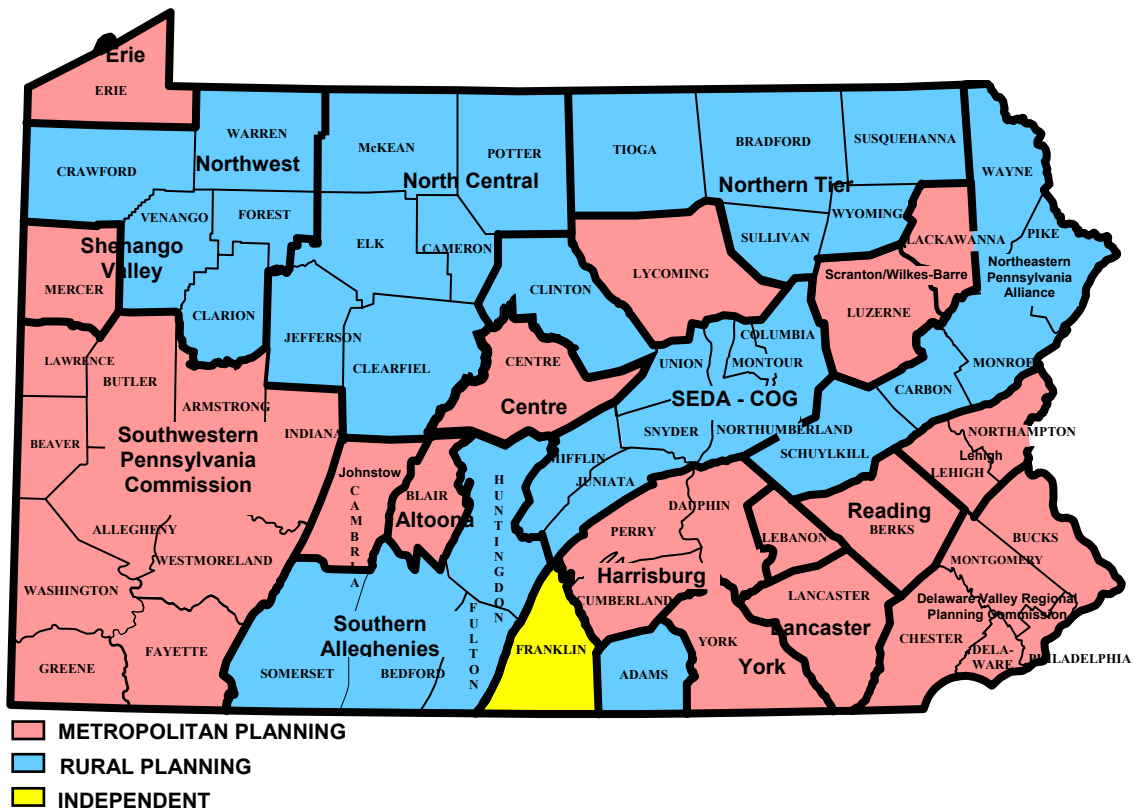


Figure 1-5: Pennsylvania MPO/RPO Map

Mainstreaming

To date, there have been ITS plans in place to cover a few metropolitan areas across the Commonwealth of Pennsylvania. These early plans have led to isolated, non-integrated ITS equipment being scattered throughout the State, except for in the Pittsburgh and Philadelphia Regions. The current deployments have primarily been PennDOT led. The ITS projects deployed to date have already produced important benefits for PennDOT and the traveling public. Unfortunately they have also led to questions about integration across boundaries and the costs, in labor and resources, associated with operating and maintaining these technology deployments.

The Regional ITS Architecture effort has helped to begin addressing these issues by, first, bringing regional agencies to the table to discuss regional technology deployment. Secondly, the Architectures have built a regional foundation for understanding the needs, applications, and linkages to the technologies that are currently deployed or scheduled to be deployed. Lastly, the ITS Architectures will set the stage for “mainstreaming” to occur.

“Mainstreaming” is, simply, getting technology issues in the transportation environment in front of the representative regional bodies for discussion, analysis, and decision making, in the same way that traditional transportation improvements are processed. ITS and operations can no longer be considered just a PennDOT initiative, but must now be viewed as requiring regional input.

Throughout the State, MPO’s and RPO’s will work with PennDOT and other regional stakeholders to include ITS as part of long-range plans that eventually spill into regional and statewide Transportation Improvement Programs (TIP’s). MPO’s and RPO’s should strive to go beyond the basic federal requirement of including transportation projects receiving certain types of federal funds in a Region’s TIP and use the TIP to highlight ITS projects. Project evaluation criteria used to select projects might now be modified in order for ITS projects to be fairly evaluated. Most traditional selection processes to date have excluded valuable ITS projects by not considering the regional needs and benefits associated with technology projects.

There are key factors that can contribute to increased coordination and mainstreaming of ITS within the transportation planning process throughout the Commonwealth of Pennsylvania:

- Creating and utilizing committees or task forces that foster ITS discussions and open communications.
- Cultivating support for ITS deployments, coordination, and integration from the administrators of influential state and regional transportation agencies.
- Creating committees to target coordination, integration, technical, and policy issues.

- Learning from previous ITS deployments.
- Instilling trust in representatives of area agencies in the responsibilities and performance of the MPO, RPO, PennDOT, and regional stakeholder staff that enable them to mainstream ITS and coordinate the area's ITS/Operations efforts.
- Encouraging advocacy for ITS initiatives among top managers.
- Incorporating ITS projects in the Region's long-range transportation plans.
- Developing ITS programs and plans.
- Utilizing the Regional ITS Architecture.
- Including ITS projects within the TIP.
- Utilizing enhanced criteria for selecting ITS projects for inclusion in the TIP.
- Educating elected officials and agency administrators in ITS terminology and strategies.
- Educating other prime stakeholders (beyond traditional transportation agencies) about ITS.
- Educating MPO and RPO staff about ITS.
- Conducting scanning reviews to ITS deployments in external regions and states.

MPO, RPO, and PennDOT Role

Throughout the State, transportation officials can look to the MPO/RPO to function in the role of ITS facilitator, ITS educator, and ITS project funding prioritizer. The MPO/RPO is often best able to provide a regional context for projects in geographic areas with many political boundaries and to better understand the experiences of a traveling public that tends to have minimal interest in the jurisdictions they pass through. The MPO/RPO has historically been able to recognize the different philosophies of sub-regions and fuse these philosophies into common goals and priorities when working on regional projects. In addition, the MPO/RPO offers a direct conduit to the politicians and is, therefore, seen as the only entity fully capable of educating elected officials about ITS regional applications.

MPO/RPO staff members must recognize, however, that their involvement with specific ITS projects relies on invitations to participate from the sponsoring agencies, such as PennDOT. Inclusion in non-planning activities is generally possible because the MPO/RPO staff have an established record of being knowledgeable, cooperative, and trustworthy. The MPO/RPO staff has earned the respect of the Region not only from their collective knowledge and responsiveness, but also because they have not

overreached their authority. Indeed, when the MPO/RPO staff is knowledgeable about ITS applications, good listeners, and not prone to pressing a narrow agenda, the process to mainstreaming ITS products and services is much simpler since the agency most attuned to the transportation planning process is also the agency most trusted. These conditions may prove to be the most critical toward mainstreaming ITS in the transportation planning process.

Regional ITS Coordination Committees

Regional agencies should consider coordinating all regional ITS efforts into a single regional operations plan. To do this, a committee composed of transportation agencies and operators should be formed. There should be a policy body and a technical body to the committee. This plan should then be used as input into the regional long-range plan.

Elected officials and transportation managers sometimes use or form committees through which they act as regional advocates for ITS. These can be non-profit government organizations composed of elected officials, as well as business interests. The primary goal of these committees is generally to use technology to improve mobility through political and project advocacy. On an annual basis, the committee members adopt a set of projects with regional significance; these include ITS products and services promoted to municipal managers and local transportation officials.

In some metropolitan areas around the country, elected officials and transportation managers have personally taken on the responsibility to act as advocates for ITS products and services. Strong leadership from top management of transportation providers can elevate ITS throughout the Region.

ITS technologies tend to be most useful when planned and deployed from a regional perspective that cuts across geographic boundaries, agencies, and transportation modes. A wide range of stakeholders should have input into ITS planning and deployment activities since many of these agencies will be required to operate these systems or provide coordination and information to enable these systems to function efficiently. This requires elected officials and staff within—and across agencies—to communicate and coordinate with one another. It can, however, be difficult to plan for and deploy ITS within a Region, especially in areas comprised of many local autonomous communities.

One role of a regional committee is to aid in coordinating ITS activities across jurisdictions and agencies. In keeping with the coordinating role, the committee can form a workgroup to improve procedures for incident clearance and make the procedures more uniform within the Region. The workgroup can consist of law enforcement personnel, MPO staff, DOT staff, and officials from select municipalities.

Endorsement of ITS

Public endorsement of ITS products and services demonstrates to all regional stakeholders that ITS is accepted as a tool to solve transportation problems and will be seriously considered as a funding option in the Region's transportation planning process. Elected officials are the most important people from whom to garner support for ITS since they make funding decisions and can influence support by other stakeholders. It is also important for mid- and upper-level transportation managers to support ITS since they inform elected officials and guide funding decisions within their respective transportation organizations. To gain their support, elected officials and transportation managers need to be provided with data and information that define ITS products and services, explain how the technologies are used, and detail the benefits of ITS that can potentially accrue.

In the South Central Region, regular updates from the MPO's to elected officials should be considered during ITS program planning, and implementation. For example, to secure support, the MPO's can brief officials on the logical arguments supporting freeway management in order to receive congestion information and show relationships among incidents, congestion, and air pollution. Local problems can be highlighted and then examined in terms of how ITS products and services can help solve these problems. The message is that transportation professionals in the Region should aggressively manage traffic and focus on reliability and mobility.

Education

Education can improve coordination across jurisdictions and modes in several ways, including increasing awareness of ITS products and services, reducing tensions between agencies representing different transportation modes, and getting planners and operations staff to understand each other's responsibilities and terminology. A lack of awareness of ITS products and services, and their associated benefits, hinders the routine consideration of ITS technologies in a Region's planning and deployment processes. Until a few years ago, ITS education was primarily the responsibility of each agency considering ITS. However, MPO staff should consider taking the lead in creating and providing programs to educate regional stakeholders.

There are many forums available for educating and training transportation professionals in ITS, and not all require a formal classroom setting. For instance, "scanning tours" take place outside a classroom. These tours enable participants to learn how to use the technologies and then interject some first-hand knowledge about the equipment being analyzed into the ITS discussion. Invitees to these scanning tours can consist of:

- County commissioners,
- Executive boards,
- Policy boards,
- Transit operations staff,
- MPO staff,
- Politicians, and

- Public safety officials.

A mixture of upper management, operations, and policy people should be considered. Scanning tours should be taken at the beginning of regional planning efforts or when exposure is needed in advance of a specific project to help decision-makers conceptualize what they need. Elected officials and transportation managers can also become educated about ITS technologies, products, and services by participating on regional, statewide, or national committees, especially those established to consider ITS solutions.

Training courses are available for stakeholders in the Region to learn more about ITS. Such courses are available through the National Highway Institute (NHI) at the following website:

<http://www.nhi.fhwa.dot.gov/default.asp>

National ITS Architecture and Turbo Architecture training are available through the U.S. Department of Transportation. Information on training can be found at the following website:

<http://itsarch.iteris.com/itsarch/html/training/training.htm>

2 Architecture Scope

This section summarizes the study's scope of services and identifies the matrix used to assess "conformity." The Conformity Matrix, developed by the Statewide Working Group, is specific to Pennsylvania and has been used in every Region across the Commonwealth to ensure statewide consistency. Descriptions of the Region, regional stakeholders, and existing regional ITS projects are also included in this section.

2.1 Scope of Services

At the outset of the study, the South Central Architecture Region's Regional Advisory Panel (RAP) determined that the Region would need to work through all five of the study tasks required to develop the Regional ITS Architecture. The five tasks are:

- Define an Architecture Scope,
- Inventory Systems and Define Needs, Services, and an Operations Coverage,
- Generate a Strawman Regional ITS Architecture,
- Conduct Outreach to Validate the Regional ITS Architecture, and
- Finalize the Regional ITS Architecture.

Consistent with its mandate, the RAP oversaw execution of the Architecture development methodology.

2.2 Conformity Matrix

The Pennsylvania Architecture Checklist, specified in the Phase I Report, that preceded the Architecture study, was used to verify compliance of the South Central Regional ITS Architecture with the prescribed methodology. By checking off the bulleted list of outputs and considerations in the checklist tables, below, a Region and State ensures conformity with the Federal Mandate and consistency among the Architectures.

Compliance of the South Central Regional ITS Architecture with the Pennsylvania Architecture Checklist is validated in the following tables:

Checklist Table #1

Key Task To Complete	Key Outputs from Task to Include in Regional ITS Architecture (Do we have?)	Considerations and Conformity & Validation Checks (Did we consider and address?)
Define the Regional Architecture Scope	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Description-of-region map and text, that includes: <ul style="list-style-type: none"> ✓ Geographic area (Districts, Counties, Cities, Corridors) ✓ Service boundaries, major roadway systems ✓ Relationship among jurisdictions within Region ✓ Relationship to adjacent Regions and jurisdictions <input checked="" type="checkbox"/> Existing projects matrix (key projects only), that includes: <ul style="list-style-type: none"> ✓ Project description ✓ Impacts on Region ✓ ITS components ✓ Timetables <input checked="" type="checkbox"/> Scope of services summary (If Not Previously Developed), that includes: <ul style="list-style-type: none"> ✓ Regional stakeholders list ✓ Owners and operators of ITS systems in Region ✓ Entities with stake or interest in Regional transportation issues ✓ Conformity requirements matrix 	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Has a Regional Champion been identified? <input checked="" type="checkbox"/> Have traditional, existing, transportation planning documentation been reviewed? <input checked="" type="checkbox"/> Is there consistency between regional scope and transportation plans? <input checked="" type="checkbox"/> Is there consistency between Regional scope and National ITS Architecture

Checklist Table #2

Key Task To Complete	Key Outputs from Task to Include in Regional ITS Architecture (Do we have?)	Considerations and Conformity & Validation Checks (Did we consider and address?)
Develop an Inventory of Regional Systems & Define Regional Needs, Services, and Operational Concept	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> System inventory, that includes: <ul style="list-style-type: none"> ✓ System name(s) ✓ Descriptions ✓ Status (existing or planned) ✓ Associated subsystems/terminators in National ITS Architecture ✓ System owner/operator (stakeholders and system elements) <input checked="" type="checkbox"/> Needs and services summary, that includes: <ul style="list-style-type: none"> ✓ Regional needs ✓ ITS services (planned or implemented) <input checked="" type="checkbox"/> Operations coverage that includes: <ul style="list-style-type: none"> ✓ Operational roadways. ✓ Assignment of operational coverage 	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Is there completeness and consistency of the inventory among stakeholders? <input checked="" type="checkbox"/> Is the conformity to and compatibility with the Architecture? <input checked="" type="checkbox"/> Has the Region considered the following: <ul style="list-style-type: none"> ✓ System operations that extend beyond Regional boundaries ✓ Impacts on contiguous Regions or jurisdictions ✓ Operational characteristics along corridors and at local levels ✓ Locations and operational characteristics of planned traffic operations centers (TMC) ✓ Working relationship among stakeholder organizations

Checklist Table #3

Key Task to Complete	Key Outputs from Task to Include in Regional ITS Architecture (Do we have?)	Considerations and Conformity & Validation Checks (Did we consider and address?)
<p>Generate Strawman (Rough Draft) Architecture</p>	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Develop a Regional systems interconnect summary, that includes: <ul style="list-style-type: none"> ✓ Diagram of actual and potential connections between subsystems ✓ Connection status (existing or planned) for each connection <input checked="" type="checkbox"/> Develop Regional information flow diagrams, that include: <ul style="list-style-type: none"> ✓ Descriptive name for the information ✓ Information flow status (existing or planned) ✓ Direction of information flow <input checked="" type="checkbox"/> Develop a Regional Strawman Architecture, that includes: <ul style="list-style-type: none"> ✓ Architecture approach ✓ Needs & services ✓ Systems inventory ✓ Interconnects ✓ Information flows 	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Have the interconnections and information exchanges across Regional boundaries been identified? <input checked="" type="checkbox"/> Has the ability of the communications infrastructure to support the proposed interconnections been addressed at a high-level? <input checked="" type="checkbox"/> Is there completeness and consistency in the interconnects summary? <input checked="" type="checkbox"/> Is there completeness and consistency among the information flow diagrams? <input checked="" type="checkbox"/> Is there consistency and compatibility with the completed or evolving Architectures in other Regions in the state? <input checked="" type="checkbox"/> Is there conformity and compatibility with the National ITS Architecture?

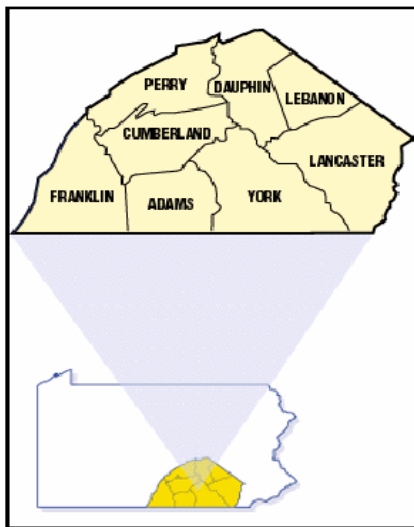
Checklist Table #4

Key Task to Complete	Key Outputs from Task to Include in Regional ITS Architecture (Do we have?)	Considerations and Conformity & Validation Checks (Did we consider and address?)
<p>Conduct Outreach to Validate Architecture</p>	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Develop Stakeholders' guide to Regional Architecture, that could include: <ul style="list-style-type: none"> ✓ Background on Regional Architecture project ✓ Stakeholder review and validation process ✓ Glossary of technical terms <input checked="" type="checkbox"/> Documentation of stakeholder inputs <input checked="" type="checkbox"/> Refined and validated Architecture 	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Have real-world and program issues been considered? <input checked="" type="checkbox"/> Have any unusual institutional Issues been identified? <input checked="" type="checkbox"/> Have any specialized data-sharing requirements been identified? <input checked="" type="checkbox"/> Have political considerations been identified? <input checked="" type="checkbox"/> Have any other unique conditions, circumstances, or issues in the Region been identified? <input checked="" type="checkbox"/> Have Stakeholders from areas contiguous to the Region been involved? <input checked="" type="checkbox"/> Is there conformity with FHWA Regional ITS Architecture Assessment Criteria?

Checklist Table #5

Key Task to Complete	Key Outputs from Task to Include in Regional ITS Architecture <i>(Do we have?)</i>	Considerations and Conformity & Validation Checks <i>(Did we consider and address?)</i>
Finalize the Regional Architecture	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Final Regional ITS Architecture Document <input checked="" type="checkbox"/> Statewide Operations Framework Input <ul style="list-style-type: none"> ✓ Regional Architecture overview ✓ High-level Regional operations summary ✓ Relationship between Region and State 	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Is there consistency and compatibility among the Regional ITS Architectures?

2.3 Description of the Region



This Region, in the south central part of the state, is comprised of 8 counties: Adams, Cumberland, Dauphin, Franklin, Lancaster, Lebanon, Perry and, York. The Region is depicted in Figure 2-1.

The capital of Pennsylvania, Harrisburg, is located in this Region. As the Capital Region, South Central contains the headquarters for PennDOT, the Pennsylvania Emergency Management Agency (PEMA), the PSP, and the PTC.

Figure 2-1: South Central ITS Architecture Region

(Source: PennDOT District 8-0 Web site)

Table 2-1 reveals that 1.7 million people – or nearly fourteen percent of statewide residents of the Commonwealth of Pennsylvania – live in the South Central ITS Architecture Region. Nearly one-half of the Region’s population resides in Lancaster and York, with the remainder scattered among the other six counties of the Region. The population of the city of Harrisburg is 48,950.

Table 2-1: South Central ITS Architecture Region Population by County

County	% Population
Adams	5%
Cumberland	12%
Dauphin	15%
Franklin	8%
Lancaster	28%
Lebanon	6%
Perry	3%
York	22%
Total Population in the South Central Region	1,702,415

(Source: U.S. Census Bureau, 2000)

Table 2-2 compares specific population traits in the South Central ITS Architecture Region to those across Pennsylvania and the U.S. generally. For instance, the residents of the Region are somewhat more homogeneous than are their statewide and national counterparts. Whereas 9.2 percent of the residents of the South Central ITS Architecture Region are characterized as minorities, the minority population is 15 percent statewide and 25 percent nationwide. Also, the population in South Central skews marginally younger than the statewide median, but older than the nation. Mean family size and per capita income are similar to the corresponding state and national populations.

Table 2-2: Comparison of Key Population Demographics South Central ITS Architecture Region, Pennsylvania, and the United States

Demographic Factor	SC Region	Pennsylvania	United States
Total Population	1,702,415	12,281,054	281,421,906
% Minority Population	9.2%	14.6%	24.9%
Median Age (In Years)	37.4	38.0	35.3
Mean Family Size	3.02	3.04	3.14
Per Capita Income	\$20,842	\$20,880	\$21,587

(Source: U.S. Census Bureau, 2000)

Table 2-3 examines commuting patterns in the Region to the state and national commuting conditions. Nearly four-out-of-five South Central workers drive to work alone, just a bit higher than the state and national “drive-alone” rates. Ten percent of workers in the Region carpool to work, comparable to the statewide average. Approximately 0.9 percent of workers use public transportation; considerably less than state and national transit usage trends. The average one-way commute time for South Central ITS Architecture Region workers is 22 minutes, which compares favorably to the 25-26 minutes for Pennsylvania and U.S. workers generally.

Table 2-3: Comparison of Commuting Patterns Among Workers 16 & Over South Central ITS Architecture Region, Pennsylvania, and the United States

Commuting Pattern	SC Region	Pennsylvania	United States
Total Workers 16 & Over	839,511	5,556,311	128,279,228
% Commuters Driving Alone	80.7%	76.5%	75.7%
% Commuters Carpooling	10.4%	10.4%	12.2%
% Commuters Using Public Transportation	0.9%	5.2%	4.7%
Mean Travel Time to Work (Minutes)	21.8	25.2	25.5

(Source: U.S. Census Bureau, 2000)

As shown in Table 2-4, the South Central Region encompasses a substantial network of roadways. As reported in PennDOT's 2002 Highway Statistics, the Region contains 16,660.2 linear miles of roadway, signifying 13.8 percent of the Commonwealth's total linear mileage. This includes 5,266.4 linear miles of roadway maintained by PennDOT, with the remaining road miles maintained by the PTC, municipalities, etc.

Table 2-4: South Central ITS Architecture Region Linear Miles

County	PennDOT Linear Miles	Total Linear Miles
Adams	544.6	1,397.7
Cumberland	556.1	1,892.3
Dauphin	557.3	1,868.7
Franklin	613.8	1,706.8
Lancaster	1,064.1	3,834.5
Lebanon	373.8	1,165.9
Perry	419.5	1,085.5
York	1,137.2	3,708.8
Regional Total	5,266.4	16,660.2
Statewide Total	39,905.5	120,297.7

Table 2.5 depicts the daily vehicle miles of travel (DVMT) across the Region, which is substantial. Total DVMT on all roadways in the Region, as reported in the 2002 Highway Statistics was approximately 45.8 million miles. The DVMT on PennDOT roadways was approximately 35.7 million miles.

Table 2-5: South Central Daily Vehicle Miles of Travel

County	PennDOT DVMT	Total DVMT
Adams	2,000,157	2,292,127
Cumberland	5,541,535	7,502,792
Dauphin	6,394,113	8,217,955
Franklin	3,029,796	3,992,186
Lancaster	8,141,834	10,666,476
Lebanon	2,424,612	3,171,473
Perry	1,284,235	1,506,528
York	6,899,954	8,456,445
Regional Total	35,716,236	45,805,982
Statewide	217,331,036	287,203,348

The South Central ITS Architect Region contains significant highway corridors as defined by the RAP, including:

Table 2-6: Significant Highway Corridors

Interstates	United States (U.S.) Routes	Pennsylvania (PA) Routes
Interstate 76 (I-76)	US Route 11 (US-11)	PA Route 34 (PA-34)
Interstate 78 (I-78)	US Route 15 (US-15)	PA Route 41 (PA-41)
Interstate 81 (I-81)	US Route 22 (US-22)	PA Route 72 (PA-72)
Interstate 83 (I-83)	US Route 30 (US-30)	PA Route 74 (PA-74)
Interstate 283 (I-283)	US Route 209 (US-209)	PA Route 94 (PA-94)
	US Route 222 (US-222)	PA Route 97 (PA-97)
	US Route 322 (US-322)	PA Route 147 (PA-147)
	US Route 422 (US-422)	PA Route 283 (PA-283)
	US Route 11/15 (US-11/15)	PA Route 501 (PA-501)
	US Route 22/322 (US-22/322)	PA Route 581 (PA-581)

The South Central Region contains intermodal facilities and service providers that support passenger and freight, including:

- Amtrak Rail/Intermodal Passenger,
- Amtrak's Passenger Rail Services,
- Enola Rail Yard,
- Harrisburg Transportation Center,
- Lancaster Train Station,
- Lucknow Intermodal Yard,
- Rutherford Intermodal Yard, and
- The Harrisburg International Airport (HIA).

The South Central ITS Architecture Region contains tourist attractions and travel destinations, including:

- Hershey Attractions,
- Lancaster County Attractions,
- Historical Gettysburg in Adams County, and
- Capital City Attractions.

The South Central ITS Architecture Region contains three of the nine nuclear units in Pennsylvania at two locations, Three Mile Island and Peach Bottom. Because nuclear power accounts for 36 percent of the electricity generated in Pennsylvania, it is a critical asset to the region.

The South Central ITS Architecture Region encompasses multiple transit providers, including:

- Capitol Area Transit (CAT),
- Chambersburg Transit Authority (CTA),
- County of Lebanon Transit Authority (COLT),
- Rabbit Transit, and
- Red Rose Transit Authority (RRTA)
- Various on-demand paratransit and senior transit service providers.

2.4 Regional Stakeholders

This section documents the Regional stakeholders defined by the RAP for inclusion and participation in the Regional ITS Architecture effort. Stakeholders are generally identified in terms of agencies and specific individuals in those agencies responsible for policy and operations. Agencies were selected by assessing the mission of operation of services related to the transportation system. Therefore Emergency Management Services (EMS), Incident Management (IM), ITS, Transit, and enforcement activities were all included. Planning agencies were included as well because capital and some Operations & Maintenance (O&M) funds are programmed through these agencies.

Attractions and Event Promoters: Regional attractions or events generating large traffic events that have a significant impact on the local and regional transportation system. Regional Attractions and Event Promoters include Hershey Attractions, Lancaster County Attractions, Historical Gettysburg in Adams County, and Capital City Attractions.

Commercial Vehicle Companies: Privately owned trucking companies responsible for the safe and efficient movement of goods using the transportation system in the Region. Services provided by various commercial vehicle agencies include the delivery of intermodal shipments (containers and trailers), bulk materials (including chemical and HAZMAT products), and specialized cargo (legal, over-dimensional, and heavy haul shipments).

Counties: Adams, Cumberland, Dauphin, Franklin, Lancaster, Lebanon, and York county government operations are included within the Region. Departments typically participating in emergency management operations include county police, fire, EMS, 911, and emergency management agencies.

General Public: The community or the people as a whole using the transportation system. The general public may be an automobile driver, transit passenger, computer, or cell-phone user obtaining travel information, or any other person interacting with the transportation system in the Region.

Information Service Providers: Private companies that provide real-time traffic and logistics information solutions for consumers, businesses, and transportation agencies.

Maryland Emergency Management Agency (MEMA): The Maryland Emergency Management Agency (MEMA) coordinates state agency emergency response to support county and local governments in the areas of civil defense, disaster mitigation and preparedness, planning, and response to and recovery from man-made and natural disasters. For more information, visit MEMA's website (<http://www.mema.state.md.us>).



Maryland Department of State Police (MDSP): The Maryland Department of State Police is a full service statewide law enforcement agency that fulfills the law enforcement needs of the general public across Maryland. For more information, visit the Maryland Department of State Police website (<http://www.mdsp.maryland.gov/mdsp/default.asp>).

Maryland State Highway Administration (MDSHA): The Maryland State Highway Administration is Maryland's statewide transportation agency responsible for building, maintaining, and operating the state's roads, bridges and tunnels. For more information, visit the MDSHA website (<http://www.sha.state.md.us>).



Municipalities: Pennsylvania cities, boroughs, or townships incorporated for local governments throughout the Region. Municipalities are responsible for local roads, which account for 70 percent of the Pennsylvania road system. Municipalities are also responsible for various local operations within its limits, including public safety (police, fire, and EMS) and traffic signal systems.



Pennsylvania Department of Transportation (PennDOT):

The Pennsylvania Department of Transportation is the Commonwealth's statewide transportation agency responsible for building, maintaining, and operating the state's roads, bridges and tunnels. PennDOT consists of a single Central Office and 11 District Offices throughout the state.

PennDOT's Central Office consists of several internal organizations, including the Bureau of Maintenance and Operations (BOMO), Motor Carrier Division, Bureau of Planning and Research (BPR), Bureau of Highway Safety and Traffic Engineering (BHSTE), Bureau of Licensing, Bureau of Motor Vehicles, Bureau of Freights and Rails, Bureau of Information Systems, Communication Office of Information Technology, and Press Office. PennDOT's Central Office oversees statewide operations and is responsible for coordination of transportation services between the 11 Districts.

PennDOT's District Offices are responsible for the design, operation, maintenance, and construction of state highways and bridges in their respective districts.

For more information, visit PennDOT's website (<http://www.dot.state.pa.us>).



Pennsylvania Emergency Management Agency (PEMA):

The Pennsylvania Emergency Management Agency (PEMA) coordinates state agency emergency response, including the Office of the State Fire Commissioner and Office of Homeland

Security, to support county and local governments in the areas of civil defense, disaster mitigation and preparedness, planning, and response to and recovery from man-made and natural disasters. For more information, visit PEMA's website (<http://www.pema.state.pa.us>).

Pennsylvania Office of Homeland Security:

Pennsylvania Homeland Security addresses the security needs of the state. Developed in response to 9/11 the Homeland Security Office is focusing on a range of important security needs and services, including transportation-related issues. Potential high-threat topics — e.g., nuclear power plants, DOE shipments, chemical industry, major distribution of gas and electric utilities, and other target infrastructure — are all covered through the Office's Homeland Security mission. Initially, the ITS Architecture focuses on security issues as part of incident management. In the future, as the Office's mandate is



refined, additional security services and needs are likely to be reflected in the Architecture.

Pennsylvania State Police (PSP): The Pennsylvania State Police is a full service statewide law enforcement agency that fulfills the law enforcement needs of the general public across the Commonwealth of Pennsylvania. Transportation services provided by the Pennsylvania State Police include: (1) incident response, (2) commercial vehicle inspections, and (3) law enforcement on state highways. For more information, visit the Pennsylvania State Police website (<http://www.psp.state.pa.us>).



Pennsylvania Turnpike Commission (PTC): The Pennsylvania Turnpike Commission maintains and operates the 531-mile Pennsylvania Turnpike. The Pennsylvania Turnpike is a key transportation route within the state and a vital link in the transportation network of the eastern United States. The Turnpike contains 57 fare-collection facilities, 21 service plazas and two traveler information centers, 21 maintenance facilities, 8 State Police barracks, and 5 tunnels. For more information, visit the PTC's website (<http://www.paturnpike.com>).

Regional Media: The regional media consists of all regional/local television and radio stations that provide weather, traffic, and other information to the general public via means of mass communication.

Regional Transit Agencies: Agencies operating public transportation services within the Region. Regional Transit Agencies include Capitol Area Transit (CAT), Chambersburg Transit Authority (CTA), County of Lebanon Transit Authority (COLT), Rabbit Transit, Red Rose Transit Authority (RTA), and various on-demand paratransit and senior transit service providers.

Spill Centers: These agencies are responsible for environmental clean up after incidents, particularly when hazardous materials are involved. Spill Centers include the Department of Environmental Protection, Department of Agriculture, and others who respond to incidents on the roadway.

Towing Industry: The towing industry consists of privately owned towing agencies in the Region responsible for incident cleanup and removal of vehicles at incident sites.

TRANSCOM: TRANSCOM is a coalition of 16 transportation and public safety agencies in the New York - New Jersey - Connecticut metropolitan region. It was created in 1986 to provide a cooperative, coordinated approach to regional transportation management. For more information, visit TRANSCOM's website (<http://www.xcm.org/index.html>)

Various Stakeholders: This stakeholder represents several stakeholders within the Region working in conjunction to initiate, own, operate, and/or maintain transportation infrastructure within the Region.

2.5 Regional ITS Projects

The Regional ITS Projects Matrix identifies ITS projects in the Region and provides a high-level description of the projects. The matrix denotes the status of each project, as follows:

- Existing — An ITS project that is deployed and operational.
- Planned 1 — A future ITS project that is programmed or formally documented by the MPO, DOT, transit agency, police, or other transportation stakeholder.
- Planned 2 — A future ITS project that is not programmed or documented.

The information on projects shown in the matrix (see Table 2-7) was collected from Regional or Municipal planning documents, or otherwise enunciated by members of the RAP. Regional stakeholders went through a process of defining projects as existing, planned 1, or planned 2. A planning horizon of 20 years was used as a criterion in determining those projects to include in the matrix.

Table 2-7: Regional ITS Projects

Stakeholder	Project	Status	Project Description
Attractions and Event Promoters (Farm Show)	Coordinated Traffic Signals	Existing	This project involves deploying coordinated traffic signals timing plan to manage the traffic during Farm show events.
Attractions and Event Promoters (Hershey Area)	Coordinated Traffic Signals	Existing	This project involves deploying coordinated traffic signals timing plan to manage the traffic during major events.
Attractions and Event Promoters	Video Sharing	Planned 2	Event promoters would like to share traffic video images during events.
Attractions and Event Promoters	Traffic Signal Control	Planned 2	Event promoters would like to coordinate with event-affected-municipalities to control traffic signals in and around the event region.

Stakeholder	Project	Status	Project Description
Attractions and Event Promoters	Traffic Data Sharing	Planned 2	Event promoters would be willing to share historic traffic data with the planning bodies within the Region.
Commercial Vehicle Companies	Private Carrier Commercial Vehicle Tracking System	Existing	Commercial Vehicle Tracking System provides tracking information of all the trucks using the system. Commercial vehicles also have communication devices to communicate with the trucking agency on-route.
Commercial Vehicle Companies	Private Carrier Fleet Maintenance Management	Existing	This program provides capabilities to administer preventive maintenance schedules.
Commercial Vehicle Companies	FHWA Carrier Compliance Review	Existing	The FHWA Compliance Review process involves examining carrier records to ensure that the carrier meets all safety-related regulations and does not have unsafe operating practices.
Counties	County 911 Communications Centers	Existing	The County Communication Centers dispatch and manage resources for incidents.
Counties	County Emergency Management Agency (EMA) Centers	Existing	The County EMA's maintain an emergency operations center that can be activated to coordinate incident actions.
Counties	Local EMS Fire and Police Vehicles	Existing	These vehicles respond to the incident emergencies.

Stakeholder	Project	Status	Project Description
Counties	County Live Web-CAD	Existing	The Lancaster County-Wide Communications website provides access to live incident status that includes the type of incident, location of the incident and units assigned to the incident. The website also includes a separate area for traffic incidents.
Counties	County/Regional Planning Departments	Existing	This program provides planning services to various transportation related activities.
General Public	E-Z Pass Toll Collection	Existing	E-Z Pass is an electronic toll collection system used on the Pennsylvania Turnpike and other toll roads in the Commonwealth. E-Z Pass allows passenger vehicles to pay tolls at toll both without stopping.
General Public	Personal Traveler Information Devices	Existing	Includes personal computers, PDA's, cell phones, etc. that allow users to access transportation related information.
General Public	Regional Personal Traveler Card	Planned 2	This program would allow the users to pay for the transportation related services using a single traveler card.
Information Service Providers	Traffax Command Center/Clear Channel	Existing	Traffax command center acts as information service providers for weather, traffic, construction activities, and incident information for the general public.

Stakeholder	Project	Status	Project Description
Municipalities	Traffic Signal Systems	Existing and Planned 1	Numerous new closed-loop and traffic responsive traffic signal systems are planned for the region. District currently has approximately 1400 signals and about 50% of those are part of a closed-looped system.
Municipalities	Public Safety Services	Existing	These services include fire trucks, ambulances, trooper vehicles and others that are dispatched to the incident site.
Municipalities	Gettysburg ITS Project	Planned 1	This project will involve the deployment of coordinated traffic signal systems and ITS devices (DMS). The municipality will be able to control both the traffic signal systems and ITS devices. PennDOT will also be able to control the ITS devices.
Municipalities (City of Lancaster)	Fiber Optics Communication	Planned 1	This project involves installation of fiber optics communication across the city.
PennDOT (Central Office)	Winter Road Condition Hotline for Interstate Highways	Existing	A hotline phone service that disseminates seasonal statewide road conditions including road closures, detours, alternative routes, work zone/ construction events, and road surface conditions.
PennDOT (Central Office)	Roadway Weather Information System (RWIS)	Existing	Road Weather Information Systems collect weather information/images throughout the state. RWIS information is made available to the public and transportation agencies via a webpage.

Stakeholder	Project	Status	Project Description
PennDOT (Central Office)	PennDOT Performance and Registration Information Systems Management (PRISM)	Existing	This project began as an effort to explore the potential of linking the Commercial Vehicle registration process to motor carrier safety.
PennDOT (Central Office)	PennDOT Safety and Fitness Electronic Record (SAFER)	Planned 1	SAFER is a software program that enables the enforcement community to transmit and receive data on CVO safety, credential, and inspection to and from the roadside.
PennDOT (Central Office)	PennDOT Transportation Management Centers (TMC's)	Planned 2	PennDOT intends to enhance existing Transportation Management Centers (TMC's), and establish new TMC's, to monitor and control the transportation system in partnership with other transportation operations providers.
PennDOT (Central Office)	PennDOT "Wizard" Work Zone Alert Radio	Planned 1	The alert radio alerts truck drivers to work zone conditions.
PennDOT (Central Office)	Statewide Telecommunication	Planned 2	This project would develop a statewide telecommunication system
PennDOT (Central Office)	Construction Projects (current and future)	Existing	This projects allows for road closure, work zone and construction information dissemination through PennDOT website.
PennDOT (Central Office)	Central Repository	Planned 2	This project would involve developing a central repository for information. The central repository information would include work zone information, real time traffic information, and accident information among others. The central repository will facilitate better coordination among various PennDOT offices and the customers.

Stakeholder	Project	Status	Project Description
PennDOT (Central Office)	Real -time Traffic Information Website	Planned 2	This project would include deployment of a real time traffic information website which would disseminate the following real time information: traffic information, incident information, work zone information and weather advisory information.
PennDOT (Central Office)	Statewide GIS based Incident Detour Map	Planned 2	This project would develop a statewide GIS based incident detour map for various major interstate routes. The statewide GIS based data would be consistent with the Counties' GIS data.
PennDOT (Central Office)	Video Sharing	Planned 2	This project would involve sharing of video images among various PennDOT Districts, PSP, PEMA, and other coordinating agencies.
PennDOT (Central Office)	Web site Portal for Assisting Commercial Vehicle Operators	Planned 2	In addition to the real time traffic information, this website would assist the commercial vehicle operators by providing video images, incident alerts, customized incident information/alerts, site restrictions. This website would also assist the commercial vehicle operators by reducing paper work necessary for their operations.
PennDOT (District 8-0)	Freeway Work Zone Management	Existing and Planned 1	Currently, PennDOT District 8-0 utilizes CCTV systems to monitor traffic in work zones. In the future in conjunction with PSP, PennDOT District 8-0 plans to deploy CCTV, VSL signs, and RVD systems in order to vary speed limits and automate speed enforcement.

Stakeholder	Project	Status	Project Description
PennDOT (District 8-0)	HAR Systems	Existing	HAR systems are composed of radio transmitters used to provide travel advisories to motorists.
PennDOT (District 8-0)	Overhead DMS Systems	Existing	Overhead DMS systems are composed of signs where messages can be changed in order to provide real-time travel information to motorists.
PennDOT (District 8-0)	Portable DMS Systems	Existing	Portable DMS systems are composed of signs where messages can be changed from a number of limited messages in order to provide real-time travel information to motorists. All the counties possess portable DMS for posting messages from a mobile laptop.
PennDOT (District 8-0)	Capital Beltway Service Patrol	Existing	The purpose of this contract/service is to provide for the expeditious removal of disabled or accident vehicles, and small non-hazardous debris from the Capital Beltway; thus reducing traffic delays and congestion that result from breakdowns, crashes and spills.
PennDOT (District 8-0)	Capital Beltway Task Force	Existing	This program allows various emergency response agencies to communicate and coordinate on a regular basis to improve the incident management program along the Capital Beltway. Capital Area Transit (CAT) would like to be involved in the Capital Beltway Task Force.

Stakeholder	Project	Status	Project Description
PennDOT (District 8-0)	Truck Rollover Warning Systems	Existing	Truck rollover systems utilize technology to warn drivers of heavy vehicles of impending risk of rollover due to vehicle speed, weight, and height as they approach a curve in the roadway.
PennDOT (District 8-0)	CCTV Systems	Existing	CCTV systems are composed of either permanent or portable CCTV's in the field and used for incident detection, verification, and response.
PennDOT (District 8-0)	I-83 Automated Real-Time Messaging System (ARMS)	Existing	The I-83 Automated Real-Time Messaging System project consists of the deployment of DMS's and CCTV's in order to detect and verify recurring and non-recurring congestion and automatically warn motorists of these conditions in real-time.
PennDOT (District 8-0)	Variable Speed Limit Signs	Planned 1	Variable Speed Limits Sign are used in the highways to post variable speed limits, which varies based on roadway and weather conditions.
PennDOT (District 8-0)	Incident Command Van	Existing	The purpose of this van is to effectively manage incidents. The van provides access to portable and overhead message boards to post real-time messages and alternate route information. The van is also capable of capturing and transmitting real time video to a desired location.
PennDOT (District 8-0)	Mile Marker System	Existing	The mile marker system are signs along major freeways notating the mile post by tenth of a mile in order to more easily identify motorist location in case of an incident. The mile marker system is available only for urban areas and feeder routes to the capital Beltway.

Stakeholder	Project	Status	Project Description
PennDOT (District 8-0)	I-81 Reconstruction Project ITS Deployment	Existing	This project consists of the deployment of DMS and CCTV systems along portions of I-81 in the Harrisburg region.
PennDOT (District 8-0)	US-15 / PA-581 Reconstruction Project	Planned 1	The US-15 / PA-581 Reconstruction project involves the deployment of DMS's, CCTV's, and possible communication network in order to detect, verify, and respond to incidents along and approaching the Capital Beltway.
PennDOT (District 8-0)	Park-and-Ride Lot	Existing	The park-and-ride lot facilities facilitate traffic management by providing opportunities to ride share. They also provide a critical link in auto-to-bus transfer.
PennDOT (District 8-0)	I-81 Project, Lebanon County	Planned 1	This project will deploy DMS along I-81 in Lebanon County.
PennDOT (District 8-0)	Enhanced Incident Management System	Planned 2	This project would identify and deploy various methods for improving the incident management system throughout District. This would also include identifying detours and emergency evacuation routes for major highway corridors.
PennDOT (District 8-0)	Welcome Centers and Rest Areas	Existing	These places act as a travel guide to provide information on the surrounding area including attractions, boarding and lodging, and events occurring in the area. It also provides directional maps. These facilities also provide restrooms and refreshments.
PennDOT (District 8-0)	In Pavement X-Walk Lights, Gettysburg, Carlisle Cities	Existing	This project will improve safety for pedestrians at crosswalks by providing warnings to drivers about the presence of pedestrians or to pedestrians about the presence of vehicles.

Stakeholder	Project	Status	Project Description
PennDOT (District 8-0)	Motorcycle/Bicycle Detection Study	Existing	These systems aid visibility and awareness in those situations where it is difficult to see bicyclists on the side of the road
Pennsylvania Emergency Management Agency (PEMA)	PEMA Emergency Operation Center	Existing	Emergency Operation Center provides agency coordination for significant incidents, events, and emergencies throughout Pennsylvania. Also collects/distributes information from various agencies for a Daily Incident Report webpage.
Pennsylvania Emergency Management Agency (PEMA)	PEMA Truck	Existing	PEMA truck acts as a backup to the operations of the PEMA's Emergency Operations Center. The mobility of the truck allows establishing an Emergency Operations Center at the incidence location in case of major incident.
Pennsylvania Emergency Management Agency (PEMA)	Pennsylvania Emergency Information Reporting System (PEIRS)	Existing	A statewide electronic database, the Pennsylvania Emergency Information Reporting System (PEIRS) collects information from all state agencies responding to incidents/emergencies in the Commonwealth of Pennsylvania.
Pennsylvania Emergency Management Agency (PEMA)	Regional Agile Port Intermodal Distribution System (RAPID)	Existing	This system uses global positioning satellites to keep track of any military cargo or hazardous materials moving by ship, truck or rail.
Pennsylvania State Police (PSP)	Incident Information Management System (IIMS)	Existing	The Incident Information Management System is a database used to provide PSP vehicles incident reporting and dispatching capabilities.

Stakeholder	Project	Status	Project Description
Pennsylvania State Police (PSP)	PSP Dispatch Centers	Existing	PSP Dispatch Centers are responsible for PSP operations. Dispatch Centers dispatch PSP Vehicles to incidents and emergencies on state highways.
Pennsylvania State Police (PSP)	PSP Consolidated Dispatch Center	Planned 1	PSP Consolidated Dispatch Centers will provide consolidated dispatch and management of PSP resources for incident/emergency operations throughout the coverage area.
Pennsylvania State Police (PSP)	Mobile Data Terminals (MDT's)	Existing and Planned 1	In-vehicle systems used by the vehicles to communicate and receive dispatch information from PSP and other agencies' systems. MDT's are currently being integrated with other state agencies now (i.e. PEMA) and municipal agencies in the future.
Pennsylvania Turnpike Commission (PTC)	Pennsylvania Turnpike Field Devices	Existing and Planned 1	Pennsylvania Turnpike Commission existing and planned field devices including: DMS, RWIS, HAR, CCTV, CADS, and TRWS.
Pennsylvania Turnpike Commission (PTC)	PTC ATIS Integration Project	Planned 1	The PTC will integrate DMS, RWIS, HAR, CCTV, and CADS sub-systems into an integrated traffic management system.
Pennsylvania Turnpike Commission (PTC)	PTC *11 Phone Service	Existing	The PTC *11 Phone Service allows motorists to notify the PTC of incidents and emergencies on the Pennsylvania Turnpike.

Stakeholder	Project	Status	Project Description
Pennsylvania Turnpike Commission (PTC)	PTC E-Z Pass Toll Collection System	Existing	E-Z Pass is an electronic toll collection system used on the Pennsylvania Turnpike and other toll roads in the Commonwealth. E-Z Pass allows passenger vehicles to pay tolls at toll both without stopping.
Pennsylvania Turnpike Commission (PTC)	PTC Service Plazas	Existing	PTC Service Plazas serve as a center for traveler information. Service plazas utilize scrolling message boards to broadcast weather and lodging information.
Pennsylvania Turnpike Commission (PTC)	PTC Traffic Operation Center (TOC)	Existing	The PTC Traffic Operation Center, located near Harrisburg, is responsible for detecting, monitoring, managing, operating, dispatching resources in response to incidents, events, construction and maintenance work for the entire length of the Pennsylvania Turnpike.
Regional Transit Agencies	Transit Dispatch Centers	Existing	Transit dispatch center provides fixed route transit service. The centers provide operations, maintenance, customer information, planning, and management functions for the transit property. They also provide paratransit services.
Regional Transit Agencies	Automatic Vehicle Location	Existing and Planned 2	AVL is the use of technology to track vehicles, in this case transit vehicles, for trip planning, routing, and providing real-time information to customers.
Regional Transit Agencies	Regional Trip-Planning Website	Planned 1	This project involves the development of a website to allow transit customers to plan regional trips via the Internet.

Stakeholder	Project	Status	Project Description
Regional Transit Agencies	Video monitoring for park-n-ride lots	Planned 2	This project involves deployment of surveillance CCTV's for park-n-ride lots. The images from the CCTV can be viewed through the website.
Regional Transit Agencies	Corridor One Rail Project Regional Rail Project	Planned 1	This project will provide daily rail connections linking residential areas and employment centers.
Regional Transit Agencies	Electronic fare card	Planned 2	This project would develop a single electronic fare card that can be used to pay for various transportation related services.
TRANSCOM	Regional Transportation Management	Existing	This program allows various agencies to share incident and emergency information within the Region through TRANSCOM.
Various Stakeholders	800 MHz Statewide Communication System	Existing	This project involves the deployment of a statewide 800 MHz wireless communication system for state agencies.
Various Stakeholders	511 Traveler Information Phone System	Planned 2	Project that may be initiated by PennDOT and the PTC to collect and distribute traveler information via a dedicated 511 phone number throughout the state.
Various Stakeholders	AMBER Alert Coordination	Existing	AMBER alert coordination between PennDOT Central Office, PEMA, PennDOT District Offices, and PSP.

3 Regional Systems Inventory, Needs, and Services

The National ITS Architecture provides guidance on collecting and creating ITS Architectures using regional data. Given this guidance, this section provides a common sense approach to gathering information, providing a logical flow down to this information in order to create the Regional ITS Architecture. This section documents elements (groups that operate), systems inventory (what these groups are doing), needs (information or data that these groups need or use from others) and services (information or data that these groups provide to others). This section also includes a section on operations coverage.

3.1 Element Descriptions

Element descriptions are furnished below to document the groups that operate in the transportation environment as related to ITS. These elements are described in terms of their mission and relationship to the Regional ITS Architecture. Elements refer to organizational entities that operate in the transportation environment and are stakeholders in the effort. Elements also include planning agencies that are involved in the “business” of programming ITS into the mainstream project planning process.



911 Communication Centers: County-operated locations serving as Public Safety Answering Points (PSAP's) for answering and managing 911 calls. Include systems and personnel that coordinate incident dispatch with various emergency response agencies, as well as dispatch requests from responders in the field. Municipal public safety vehicles and other specialty response vehicles, such as wreckers, ambulances, and local fire, police and EMS, and HAZMAT teams are dispatched by the 911 centers.

Adjacent PennDOT District and County Offices: This element includes existing and future PennDOT TMC's, county maintenance offices, and stockpiles located in PennDOT Districts 2-0, 3-0, 4-0, 5-0, 6-0 and 9-0, which are located around the Region. The element includes personnel and systems that coordinate with PennDOT entities within the region to perform traffic management, maintenance and construction, and incident/emergency management operations at or near district borders. PennDOT TMC's and RTMC's will coordinate responsibilities under the proposed statewide operations framework.

Attractions and Event Promoters: Regional attraction or event locations generating large traffic events that have a significant impact on the local and/or regional transportation system. Attractions and Event Promoters communicate with local/regional transportation agencies. Examples of South Central Attractions and Event Promoters include: Hershey Park, Pennsylvania Farm Show, and Gettysburg Battlefield.

Commercial Vehicle Company Offices: Commercial Vehicle Company Offices owned by private freight hauling agencies operating in the Region. This element also includes the Pennsylvania Motor Trucking Association. Includes the existing and future Commercial Vehicle Company systems which provide the capability for freight managers to furnish drivers with routing information, support safety and hazardous materials credentialing, conduct safety checks, support vehicle diagnostic checks and on-board monitoring, automate recordkeeping, etc.

Commercial Vehicles: Privately-owned freight hauling vehicles operating in the Region. This element includes existing and future in-vehicle devices enabling vehicles to communicate with (1) Commercial Vehicle Company Offices, (2) Commercial Vehicle Company systems, and (3) and other agency systems throughout Pennsylvania.



County EMA Centers: County Emergency Management Agency-operated locations where centralized emergency coordination is located during emergency situations. Includes systems and personnel at the center that provide a single point of coordination by collocating representatives from various emergency response agencies/departments.

County/Regional Planning Organizations: These agencies include all the planning bodies within South Central Region including Metropolitan Planning Organizations (MPO) including: Harrisburg MPO, Lancaster County MPO, York County MPO, and Lebanon County MPO. Also included in this element are the Adams County RPO, Franklin County (independent), and the Federal Highway Administration (FHWA).

The planning bodies are responsible for long-range planning for the future of transportation system and the short-range programming of funds for upcoming projects.

High Threat Facilities: Operations and management headquarters for major security assets located within or adjacent to the Region, which require special treatment in terms of emergency response and security. Existing/future systems include facility surveillance and secure communications with local, state, and national police and emergency management agencies.

Incident Response Agency Offices: Incident response agency offices include all the agencies that are involved in the incident clearance stage of incident management. Example: Spill centers, Department of Agriculture, Department of Environmental Protection, etc.

Information Service Providers: Information services providers include agencies, which provide real-time traffic and logistics information solutions for consumers, businesses, and transportation agencies. Information Service Providers disseminate information via the regional media outlets.

MDSHA Offices: Maryland State Highway Administration and all the Maryland Department of Transportation Offices that coordinate with PennDOT during incident response, and construction and maintenance activities. This element also includes Maryland's CHART system.

MDSP Offices: Includes all Maryland Department of State Police offices. MDSP Offices represent public safety systems that support incident management, disaster response and evacuation, security monitoring, dissemination of incident information and other security and public safety-oriented ITS applications.

MEMA Emergency Operation Center: Maryland Emergency Management Agency Emergency Operation Center stores, coordinates, and utilizes emergency response and evacuation information/plans to facilitate coordinated emergency response for all responding agencies throughout Maryland. MEMA coordinates with PEMA during emergency operations affecting both Maryland and Pennsylvania.

Municipal Field Devices: Municipality-operated traffic management field devices. Include traffic signal system components.

Municipal/Regional Public Safety Offices: This element consists of municipality-operated public safety offices and includes systems and personnel from police, fire, and EMS agencies that provide local incident response and traffic control services.

Municipal/Regional Public Safety Vehicles: Includes systems, resources and personnel operating police, fire, EMS, and other emergency response vehicles including helicopter resources and bomb squads. Also includes existing/planned in-vehicle systems including voice/data communications.



Municipal Traffic Management Offices: This element consists of municipality-operated traffic engineering and operations offices throughout the Region. It includes systems and personnel that provide existing/future monitoring, controlling, and maintaining of traffic management field devices – typically signal systems. The element also provides traffic signal timing change coordination, as well as emergency, maintenance, and construction coordination with other agencies. Operations coordinated between municipal traffic offices are also present within the Region, including existing “Traffic Information Coordination” and planned “Traffic Control Coordination” information flows.

Passenger Vehicles: This element consists of systems within all passenger vehicles, excluding commercial vehicles, owned by the general public. The element also encompasses in-vehicle systems used to communicate with other systems such as E-Z Pass toll tags and devices used to communicate with parking facilities.

PEMA Emergency Operation Center:

Systems housed at the PEMA Statewide Emergency Operation Center (Harrisburg), Western Area Office (Indiana), and Eastern Area Office (Hamburg). PEMA Western and Eastern Regional Offices serve as regional operational arms of the Statewide Emergency Operation Center in Harrisburg.



PEMA stores, coordinates, and utilizes emergency response and evacuation information/plans to facilitate coordinated emergency response for all responding agencies throughout Pennsylvania. PEMA supports county and local governments in the areas of civil defense, disaster mitigation and preparedness, planning, and response to and recovery from manmade or natural disasters. It interfaces with other emergency management agencies to support coordinated emergency response involving multiple agencies. As the response progresses, situation information including damage assessments, response status, and evacuation and resource data are shared to keep all allied agencies apprised of the response.

PennDOT Central Office Field Devices: Field devices owned and operated by PennDOT Central Office. Field devices include existing/future RWIS stations, commercial vehicle check systems, automatic traffic recorders, and other field devices distributed on and along the roadway that monitor, control, and manage traffic.

PennDOT Central Office Organizations: Systems located at the PennDOT Central Office Organizations in Harrisburg. The element consists of those Central Office Organizations operating transportations systems, including the Bureau of Maintenance and Operations (BOMO), Motor Carrier Division, Bureau of Planning and Research (BPR), Bureau of Highway Safety and Traffic Engineering (BHSTE), Bureau of Licensing, Bureau of Motor Vehicles, Bureau of Freights and Rails, Bureau of Information Systems, Communication Office of Information Technology, and Press Office.

PennDOT D8 County Maintenance Offices:

Pennsylvania Department of Transportation Engineering District 8-0 County Maintenance Offices in the entire District 8-0 Counties. This element includes personnel and existing/planned systems that provide overall coordination and support for construction and routine maintenance on PennDOT roadways, as well as management of construction and maintenance equipment.



PennDOT D8 Field Devices: Pennsylvania Department of Transportation Engineering District 8-operated field devices. Include existing/planned HAR, DMS, traffic flow

detection systems, truck rollover warning systems, and queue detection systems.

PennDOT D8 TMC: Pennsylvania Department of Transportation Engineering District 8-0 existing Traffic Management Center in Harrisburg responsible for Adams, Cumberland, Perry, Dauphin, Lancaster, Lebanon, Franklin, and York Counties. Includes personnel and existing/planned systems that provide traffic management, incident/emergency response, and maintenance and construction coordination services along PennDOT roadways. This element also represents the design and construction services and community relation coordination services provided by PennDOT District 8. The District 8-0 TMC may act as a Regional Transportation Management Center (RTMC) in the future.

PennDOT D8 Maintenance and Construction Vehicles: PennDOT-operated vehicles that perform maintenance and construction operations along PennDOT roads. Include existing/planned in-vehicle systems on snowplows and other vehicles for communication with dispatch centers and tracking maintenance activity.

PennDOT D8 Service Patrol Vehicles: PennDOT-operated vehicles that provide for the expeditious removal of disabled or accident vehicles, and small non-hazardous debris from the Capital Beltway to reduce traffic delays and congestion that result from breakdowns, crashes and spills. These vehicles also include incident command van, which provide incident command at the incident scene.

PennDOT STMC: A potential future PennDOT transportation management center for providing statewide coordination and operations. The STMC is based on the latest PennDOT Statewide Transportation Management Approach, will be located in Harrisburg, and will provide (1) traffic, incident, and emergency management operations, and (2) will be a collection/distribution point for traveler information data throughout the entire state of Pennsylvania. Additionally, the PennDOT STMC will be responsible for (1) coordinating PennDOT statewide operations, (2) coordinating among Districts and adjacent states, (3) coordinating with other state agencies (PSP, PTC, and PEMA), (4) performing political and public relations, (5) coordinating weather events, and (6) commercial vehicle operations.

PennDOT D8 Welcome Centers and Rest Areas: The South Central Region has two Welcome Centers, near the Pennsylvania-Maryland border along I-81 and I-83 that provide travelers with information. The South Central Region also has rest areas within its boundaries that provide similar services as the Welcome Centers.

Pennsylvania Office of Homeland Security: State-level department responsible for coordination of activities between other state agencies involved in security and threat management. Appropriate communications and management systems are still under development.

Personal Traveler Information Devices: This element consists of Personal Traveler Information Devices owned by the general public used to access and provide transportation information. Personal Traveler Information devices include personal computers, phones (including cell phones for reporting incidents and retrieving travel conditions en-route), and personal digital assistants (PDA's).



PSP Offices: Includes the (1) Pennsylvania State Police Headquarters located in Harrisburg Pennsylvania, (2) existing barracks, and (3) existing/future Consolidated Dispatch Centers. PSP Offices represent public safety systems that support incident management, disaster response and evacuation, security monitoring, disseminating incident information and other security and public safety-oriented ITS applications.

PSP Offices utilize several existing and future systems including mobile data terminals (MDT's) and Incident Information Management System (IIMS). MDT's are used to communicate and dispatch PSP vehicles. MDT's are currently being integrated with other state agencies now (i.e. PEMA) and municipal agencies in the future. Additionally, PSP Offices interface with other Emergency Management agencies to support coordinated emergency response. The IIMS is an all exclusive system performing dispatch and reporting functions throughout the Region and state.

PSP Troop T Highspire: Existing Pennsylvania State Police Troop T barracks currently dispatch PSP units on the Pennsylvania Turnpike. PSP Troop T Dispatch Centers represent public safety systems that support incident management, disaster response and evacuation, security monitoring, and other security and public safety-oriented ITS applications for the Pennsylvania Turnpike.

PSP Troop T Vehicles: All existing/future systems within Pennsylvania State Police Troop T vehicles. In-vehicle systems include voice communications and mobile data terminals (MDT's) used by the vehicles to communicate and receive dispatch information from PSP and other agencies' systems. MDT's are currently being integrated with other state agencies (i.e., PEMA) and will be integrated with municipal agencies in the future.



PSP Vehicles: All existing/future systems within Pennsylvania State Police vehicles. In-vehicle systems include voice communications and mobile data terminals (MDT's) used by the vehicles to communicate and receive dispatch information from PSP and other agency systems. MDT's are currently being integrated with other state agencies (i.e., PEMA) and will be integrated with municipal agencies in the future.

PTC Field Devices: Existing and future Pennsylvania Turnpike Commission Field Devices located within the Region. This element encompasses existing/future traffic detectors, HAR, RWIS, DMS, CCTV cameras, over-height vehicle detection systems, call boxes, truck rollover warning systems (TRWS), and other field devices distributed on and along the roadway that monitor, control, and manage traffic.

PTC Maintenance and Construction Vehicles: Pennsylvania Turnpike Commission-operated in-vehicle systems that perform maintenance and construction operations along the Turnpike. Includes existing/planned in-vehicle systems on snowplows and other vehicles for communicating with dispatch centers and tracking maintenance activity.

PTC Offices: The Pennsylvania Turnpike Commission offices consist of systems housed at the Operations Control Center, located in Harrisburg, as well as at all other offices/towers along the Turnpike. The PTC Offices' element serves as the focal point for Turnpike emergency management, traffic management, maintenance and construction management, toll administration, traveler information, and other activities associated with the Pennsylvania Turnpike.



- The PTC Offices support incident management, disaster response and evacuation, security monitoring, and other security and public safety-oriented ITS applications along the Turnpike. It interfaces with other emergency management agencies to support coordinated emergency response.
- Traffic management operations performed by the PTC Offices include monitoring and controlling traffic and the road network. The PTC Offices also coordinate traffic information and control strategies with neighboring agencies, including PennDOT and adjacent states.
- PTC Offices are responsible for monitoring and managing Turnpike roadway infrastructure construction and maintenance activities. The offices also manage equipment at the roadside, including environmental sensors (RWIS), and the repair and maintenance of both non-ITS and ITS equipment.
- PTC Offices also provide toll administration capabilities. Functions include general payment administration and the electronic transfer of authenticated funds from the customer to the Pennsylvania Turnpike Commission.

PTC Service Plazas: Existing/future systems housed in Pennsylvania Turnpike Commission-operated plazas along the Turnpike. The service plazas provide traveler information using scrolling message boards.

PTC Toll Plazas: Existing/future Pennsylvania Turnpike Commission-operated systems/equipment located at tolling plazas. PTC Toll plazas encompass E-Z Pass electronic toll capabilities, ticketed systems, archived toll data, and E-Z Pass video enforcement systems. CVO credentialing at PTC Toll Plazas is planned for the future.



Regional Media Outlets: Systems housed at regional television and radio stations that collect, process, store, and/or disseminate transportation information to the traveling public. The Regional Media provides basic advisories, traffic and road conditions, transit schedule information, yellow pages information, and parking information to the general public.

Regional Personal Traveler Card: Future regional fare/travel card owned by general public. Regional fare cards may be compatible with transit agency fare systems. Automated payment capabilities could be expanded to include payment for the Park-n-Ride lots, airport parking lots and other transportation related services.

Regional Transit Agency Offices: Regional Transit Agency Offices include all the transit operation centers (including the multimodal centers and airports) in the South Central Region providing fixed and paratransit operations. Include systems and personnel that provide centralized transit and emergency management, vehicle maintenance, and security operations for the transit agencies.

Regional Transit Remote Traveler Support: This system includes the security monitoring systems to be deployed in the transit facilities.

Regional Transit Vehicles: Various regional transit agency vehicles and in-vehicle systems. Include drivers and in-vehicle systems that provide existing/planned driver-to-dispatch communications, automated payment, automated passenger count, AVL, and vehicle maintenance and diagnostics tracking.

Towing Industry Responders: This element consists of privately-owned wrecker companies operating in the Region and their corresponding vehicles responsible for the towing and cleanup of traffic incidents.

TRANSCOM Center: An Information Exchange Network (IEN) to report incidents affecting the I-95 corridor to member agencies. The PennDOT District 8-0 Office is a member agency of TRANSCOM.

3.2 Systems Inventory

Using existing documentation, ITS systems in the Region — both existing and planned — were identified. The inventory is presented in tabular format by agency. The information presented here provides traceability from the systems projects initially entered into the Architecture. Because the Architecture is a “living” document, this section will need to be updated as time passes. Projects are grouped into three categories: *Existing*, *Planned 1*, and *Planned 2*. As noted previously, *Planned 1* projects refer to efforts that are currently programmed or funded, whereas *Planned 2* projects are neither funded nor programmed.

Table 3-1: Regional Systems Inventory

Element	Stakeholder	Functionality	Status	Associated Project(s)
911 Communication Centers	Counties	Supports emergency call-taker functions by collection appropriate information about the caller and the incident location and type	Existing	<ul style="list-style-type: none"> • Communications Centers • County Live Web-CAD
		Dispatches (24 hrs) all public safety vehicles (fire, police, EMS) and private wreck units through radio	Existing	
		Provides emergency unit tracking for all incidents	Existing	
		Maintains a field communications unit that can be deployed to the scene of an incident to serve as a mobile dispatch center	Existing	
		Maintains resource lists for an array of equipment including police, fire, EMS and utility notifications	Existing	
		Contacts PennDOT County Maintenance Office using telephone to coordinate during incidents/emergencies	Existing	
		Receives weather information from the internet, and the Weather Channel and share this information with other emergency agencies	Existing	
		Keeps call data for 3 years. PEMA requires 911 Center to keep audio files for 30 days	Existing	
		ISP's may query 911 Centers for emergency information over the telephone	Existing	
		Maintains accident data and can provide mapping of dangerous site utilizing the county GIS	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		Provides road closure/reduction information to the media	Existing	
		Provides live status of incident on website that anyone can view	Existing	
Adjacent PennDOT District and County Offices	Pennsylvania Department of Transportation (PennDOT)	Coordinates with District 8-OTMC in general	Existing	<ul style="list-style-type: none"> • PennDOT Transportation Management Centers (TMC's)
Attractions and Event Promoters	Attractions and Event Promoters	Coordinates with the transportation network during large events	Existing	<ul style="list-style-type: none"> • Coordinated Traffic Signals • Coordinated Traffic Signals • Video Sharing • Traffic Signal Control • Traffic Data Sharing
Commercial Vehicle Company Offices	Commercial Vehicle Companies	Provides the PennDOT Motor Carrier Division with appropriate credentials, registration, and title fees	Existing	<ul style="list-style-type: none"> • Private Carrier Commercial Vehicle Tracking System • Private Carrier Fleet Maintenance Management • FHWA Carrier Compliance Review
		Provides vehicle tracking of Commercial Vehicles	Existing	
		Provides capabilities to track cargo and freight	Existing	
		Provides capabilities to generate preventative maintenance schedule based on the vehicle miles traveled determined using vehicle tracking	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		Provides appropriate transportation and emergency agencies with hazmat and emergency information	Existing	
Commercial Vehicles	Commercial Vehicle Companies	Monitors adherence to the PennDOT Motor Carrier Division weight and safety enforcement activities	Existing	<ul style="list-style-type: none"> Private Carrier Commercial Vehicle Tracking System Private Carrier Fleet Maintenance Management FHWA Carrier Compliance Review
		Supports devices to communicate with Commercial Vehicle Company Offices. May include the addition of a cell-based radio and equipment.	Existing	
		Offer the capabilities for Commercial Vehicle Offices to track vehicles using automatic vehicle location (AVL) systems and to monitor the movement of cargo and freight	Existing	
County EMA Centers	Counties	Provides response in case of HAZMAT clearance, evacuation activity, threats to large population, and large weather events	Existing	<ul style="list-style-type: none"> County Emergency Management Agency (EMA) Centers
		Maintains an emergency operations center that can be activated to coordinate incident actions	Existing	
		Maintains resource lists for various disciplines	Existing	
		Coordinates with PEMA and other emergency agencies	Existing	
		Coordinates and sponsors training to all public service agencies in HAZMAT operations and incident command	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
County/Regional Planning Organizations	Counties	Collects traffic related data for planning purposes	Existing	<ul style="list-style-type: none"> County/Regional Planning Departments
		Includes County GIS department	Existing	
		Serves a majority of the radio and television stations providing regional traffic reports and news	Existing	
		Receives accident and construction information is provided from PennDOT, various Municipal Public Works Departments, PSP, and EMA's for planning purposes.	Existing	
High Threat Facilities	Various Stakeholders	Major facilities that require special security and/or emergency response coordination	Existing	
		Reports high threat facility information to 911 Communication and EMA Centers	Existing	
Incident Response Agency Offices	Spill Centers	Notifies PEMA in case of a major spill	Existing	
		Coordinates with PEMA in case of a HAZMAT event	Existing	
		Coordinates with PEMA in case of incidents involving food products	Existing	
Information Service Providers	Information Service Providers (ISP)	Receives traffic data, incident, construction and maintenance information from PennDOT, County 911 Communication Centers, PTC, Municipalities, and PSP	Existing	<ul style="list-style-type: none"> Traffax Command Center/Clear Channel
		Broadcasts special event and weather information	Existing	
		Provides traffic information to radio and television stations	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
MDSHA Offices	Maryland State Highway Administration (MDSHA)	Coordinates with PTC and PennDOT Counties in case of a event	Existing	
MDSP Offices	Maryland Department of State Police (MDSP)	Coordinates incident and emergency information with PSP	Existing	
MEMA Emergency Operations Center	Maryland Emergency Management Agency (MEMA)	Coordinates with PEMA in case of major disasters	Existing	
Municipal Field Devices	Municipalities	Provides coordinated traffic control	Existing	<ul style="list-style-type: none"> Traffic Signal Systems
Municipal Public Safety Offices	Municipalities	Regarding incident management, 911 calls are taken at the County EMA who dispatches state and local police.	Existing	<ul style="list-style-type: none"> Public Safety Services
		PennDOT District offices will coordinate event traffic operations with local police	Existing	
Municipal Public Safety Vehicles	Municipalities	Provides incident response	Existing	
Municipal Traffic Management Offices	Municipalities	Controls municipality owned traffic signal system	Existing	<ul style="list-style-type: none"> Traffic Signal Systems Gettysburg ITS Project Fiber Optics Communication

Element	Stakeholder	Functionality	Status	Associated Project(s)
Passenger Vehicles	General Public	Provides the capability for vehicle operators to pay toll without stopping	Existing	<ul style="list-style-type: none"> • Pennsylvania Turnpike E-Z Pass Toll System
PEMA Emergency Operation Center	Pennsylvania Emergency Management Agency (PEMA)	Notifies appropriate transportation and emergency agencies of any major disasters	Existing	<ul style="list-style-type: none"> • PEMA Emergency Operation Center • PEMA Truck • Pennsylvania Emergency Information Reporting System (PEIRS)
		Coordinates with cooperating agencies in case of major disasters	Existing	
		Runs a statewide electronic database, Pennsylvania Emergency Information Reporting System (PEIRS) that collects information from all state agencies responding to incidents/emergencies statewide	Existing	
		Gathers/provides specific incident information from/to County Emus, Pennsylvania State Police, PennDOT, and PTC	Existing	
		Gathers current and forecast road conditions and surface weather information from a variety of sources to monitor major natural disasters	Existing	
		Disseminates disaster information to the public	Existing	
		Monitors alerting and advisory systems reported by other emergency agencies	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		Develops and stores emergency evacuation plans	Existing	
		Serves as one-point contact for all the coordinating agencies during emergencies	Existing	
		Provides incident command in case of a major event	Existing	
		Contacts on-site field officers through the County EMA agencies.	Existing	
		Plans to control PTC DMS during emergencies	Planned 2	
PennDOT Central Office Field Devices	Pennsylvania Department of Transportation (PennDOT)	Monitors roadway weather conditions and provides RWIS data to PennDOT Central Office and County Maintenance Offices	Existing	<ul style="list-style-type: none"> Roadway Weather Information System (RWIS) PennDOT Commercial Vehicle Information Systems and Networks (CVISN) Project
		Collects Commercial Vehicle safety inspection and violations data	Existing	
PennDOT Central Office Organizations	Pennsylvania Department of Transportation (PennDOT)	PennDOT BHSTE coordinates with PEMA and other agencies (PennDOT Districts, PSP, County EMA's, Transit agencies, etc.) in case of major incidents	Existing	<ul style="list-style-type: none"> PennDOT Transportation Management Centers (TMC's) Winter Road Condition Hotline for Interstate Highways
		The PennDOT Central Office Press Office communicates traffic-related information to Regional Media Outlets	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		PennDOT (Motor Carrier Division) maintains commercial vehicle registrations	Existing	<ul style="list-style-type: none"> Roadway Weather Information System (RWIS) PennDOT Commercial Vehicle Information Systems and Networks (CVISN) Project PennDOT Performance and Registration Information Systems Management (PRISM) PennDOT Safety and Fitness Electronic Record (SAFER) PennDOT ITS Transportation Management Approach Construction Projects (current and future) Central Repository Real-time Traffic Information Website Statewide GIS based Incident Detour Map Video Sharing Web site Portal for
		CVO Supports the exchange of safety credential information across the jurisdictions	Existing	
		CVO Supports the collection and review of carrier safety data and determines the carrier safety rating	Planned 1	
		PennDOT Motor Carrier Division conducts roadside commercial vehicle inspections	Existing	
		PennDOT Motor Carrier Division provides appropriate credentials to motor carriers and collects necessary registration and title fees	Existing	
		PennDOT Motor Carrier Division conducts weight enforcement activities	Existing	
		PennDOT Bureau of Planning and Research owns and maintains Automatic Traffic Recorders throughout the state	Existing	
		RWIS data flows from the RWIS site to Central Office (BOMO) to a public website	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		RWIS monitor roadway weather conditions and transfer information to PennDOT BOMO	Existing	Assisting Commercial Vehicle Operators <ul style="list-style-type: none"> Statewide Telecommunication
		Receives environmental conditions information from various weather sources to aid in scheduling routine maintenance activities	Existing	
PennDOT D8 County Maintenance Offices	Pennsylvania Department of Transportation (PennDOT)	Collects and stores maintenance information	Existing	
		Collects current road and weather conditions using data collected from environmental sensors deployed on and about the roadway	Existing	
		Supports coordinated response to highway incidents	Existing	
		Recommends maintenance courses of action based on current and forecast environmental and road conditions	Existing	
		Provides overall management and support for routine maintenance on a roadway system or right-of-way	Existing	
		Receives environmental conditions information from various weather sources to aid in scheduling routine maintenance activities	Existing	
		Monitors vehicle and equipment condition, tracks maintenance history, and schedules routine and corrective maintenance.	Existing	
		Manages winter maintenance including snow plow operations	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		Provides construction activity information to other agencies	Existing	
		Provides coordination with other agencies and controls traffic in work zones	Existing	
		Disseminates traffic information through PennDOT website	Existing	
PennDOT D8 Field Devices	Pennsylvania Department of Transportation (PennDOT)	Collects traffic information for transportation planning purposes	Existing	<ul style="list-style-type: none"> • I-81 Reconstruction Project • US-15.PA 581 Reconstruction Project • I-81 Lebanon County Project • Overhead and Portable DMS Systems • HAR Systems • Truck Rollover Warning System • I-83 Automated Real-Time Messaging System (ARMS) • Freeway Work Zone Management • CCTV Systems
		Disseminates real-time traveler information using HAR and DMS. Broadcasts incident information, maintenance information, road closures, traffic advisories, and safety messages	Existing	
		Operates queue detector system on I-83, which detects backups and sends messages to portable DMS signs. The system warns travelers of slow traffic ahead; when appropriate, it can direct drivers to use the next ramp or close both ramps	Planned 1	
		Monitors vehicle speeds	Existing and Planned 1	
		Monitors roadway traffic conditions	Existing and Planned 1	
		Monitors roadway weather conditions	Existing	
		Detects vehicle intrusions in the work zone	Planned 1	
		Enforces speed limit using variable speed limit signs	Planned 1	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		Identifies over weight and over speed trucks, and warns the trucks of potential danger	Existing	<ul style="list-style-type: none"> Roadway Weather Information System (RWIS) Freeway Work Zone Management
PennDOT D8 TMC	Pennsylvania Department of Transportation (PennDOT)	Operates ITS subsystems including CCTV, DMS (both overhead and portable), HAR, and TRWS	Existing	<ul style="list-style-type: none"> PennDOT Transportation Management Centers (TMC's) Overhead and Portable DMS Systems HAR Systems RWIS Truck Rollover Warning System I-83 Automated Real-Time Messaging System (ARMS) Mile Marker System Freeway Work Zone Management Capital Beltway Service Patrol
		Operates ITS subsystems including CCTV, DMS (both overhead and portable), HAR, TRWS	Existing	
		Collects traffic surveillance data	Existing	
		Monitors and controls (if necessary) traffic signal systems	Existing	
		Provides freeway management	Existing	
		Collects special event information	Existing	
		Provides traffic control strategies to minimize traffic impacts in the work zone	Existing	
		Supports dispatch and communication with roadway service patrol vehicles.	Existing	
		Does not provide incident detection capabilities	Existing	
		Provides capability for incident response formulation	Existing	
		Maintains emergency response contracts	Existing	
Maintains incident management plan, which contains detour routes.	Existing			

Element	Stakeholder	Functionality	Status	Associated Project(s)
		Collects and processes traffic related raw data using TDUS software	Existing	
		Provides interface for information dissemination to public	Existing	
		Provides the capability to disseminate traffic and road conditions information to travelers using HAR, and DMS	Existing	
		Provides monitoring and remote diagnostics of field equipment to detect field equipment failures, issues problem reports, and tracks the repair or replacement of the failed equipment.	Existing	
		Provides proactive incident/congestion management.	Planned 2	
		Assumes control of cross-District TMC's during off-peak periods	Planned 2	
		Provides traveler information/advisories using field devices such as HAR and DMS	Planned 2	
		Monitors the roadway conditions and status using detectors and CCTV	Planned 2	
		Supports Advanced Traveler Information System	Planned 2	
PennDOT D8 Maintenance and Construction Vehicles	Pennsylvania Department of Transportation (PennDOT)	Support routine winter maintenance on the roadway system	Existing	
		Support routine non-winter maintenance on the roadway system	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		Coordinate with PennDOT County Maintenance Office using CB radio (during an incident)	Existing	
PennDOT D8 Service Patrol Vehicles	Pennsylvania Department of Transportation (PennDOT)	Provides a direct interface between the Service Patrol vehicle and incident management personnel	Existing	<ul style="list-style-type: none"> Capital Beltway Service Patrol
PennDOT STMC	Pennsylvania Department of Transportation (PennDOT)	Could potentially serve as back-up operations management to PennDOT RTMC's	Planned 2	<ul style="list-style-type: none"> PennDOT Transportation Management Centers (TMC's) Winter Road Condition Hotline for Interstate Highways Roadway Weather Information System (RWIS) PennDOT Commercial Vehicle Information Systems and Networks (CVISN) Project PennDOT Performance and Registration Information Systems Management (PRISM) PennDOT Safety and Fitness Electronic Record
		May support ATIS systems	Planned 2	
		May coordinate statewide operations (among districts and other states) and other state agencies (PSP, PTC, PEMA)	Planned 2	
		May perform political and public relations on behalf of PennDOT	Planned 2	
		May coordinate weather events throughout PennDOT	Planned 2	
		May coordinate incident, emergency, and inter/intra-state events	Planned 2	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		May act as central data repository	Planned 2	(SAFER) <ul style="list-style-type: none"> • PennDOT ITS Transportation Management Approach • Construction Projects (current and future) • Central Repository • Real -time Traffic Information Website • Statewide GIS based Incident Detour Map • Video Sharing • Web site Portal for Assisting Commercial Vehicle Operators • Statewide Telecommunication
		May coordinate Amber Alert for PennDOT	Planned 2	
		May be responsible for maintaining commercial vehicle registrations and credentials	Planned 2	
		May be responsible for maintaining the state's Motor Carrier Safety Assistance Program (MCSAP) files	Planned 2	
		May be responsible for conducting roadside inspections	Planned 2	
		May be responsible for conducting weight enforcement activities	Planned 2	
PennDOT Welcome Centers and Rest Areas	Pennsylvania Department of Transportation (PennDOT)	Acts as a travel guide to provide information on the surrounding area including the attractions, boarding and lodging, and events happening in the area.	Existing	<ul style="list-style-type: none"> • Welcome Centers and Rest Areas
Pennsylvania Office of Homeland Security	Pennsylvania Office of Homeland Security	Coordinates homeland security activities within the Commonwealth, both with local and county officials and with the federal Department of Homeland Security	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
Personal Traveler Information Devices	General Public	Provides capability to access traffic information from personal devices, including pager, cell phone, computer etc.	Existing	
PSP Offices	Pennsylvania State Police (PSP)	Receives roadway incident notification from the County 911 Centers, PennDOT Offices, and PTC Offices	Existing	<ul style="list-style-type: none"> • Pennsylvania State Police Dispatch Centers • Incident Information Management System (IIMS) • Pennsylvania State Police Consolidated Dispatch Center • 800 MHz Statewide Communication System • AMBER Alert Coordination
		Plans to receive CCTV images from PTC. PTC intends to share CCTV images with PennDOT, PEMA, and other incident management agencies	Planned 1	
		Receives work zone coverage plans and requests for troopers to cover work zones from PennDOT District Offices	Existing	
		Receives forwarded 911 calls from County 911 Communication Centers	Existing	
		Coordinates with other incident response agencies through PennDOT provided radio communication	Existing	
		Coordinates with other agencies in case of major incidents	Existing	
		Provides incident information to other agencies including PEMA, PennDOT, and radio stations	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		The 800 MHz radio is planned for the entire Region. This will create interoperability for all public service vehicles and centers	Planned 1	
		Coordinates with PennDOT County Maintenance Offices or District Offices for requesting salt and performing other maintenance operations	Existing	
PSP Troop T Highspire	Pennsylvania State Police (PSP)	Dispatches PSP Troop T Vehicles for incidents on the Pennsylvania Turnpike	Existing	<ul style="list-style-type: none"> • Pennsylvania State Police Dispatch Centers • Incident Information Management System (IIMS) • Pennsylvania State Police Consolidated Dispatch Center • 800 MHz Statewide Communication System • AMBER Alert Coordination
		Acts as first-responder at an incident site	Existing	
		Tracks and maintains PSP Troop T vehicles	Existing	
		Provides roadway incident notification to the County and Municipal 911 centers if local jurisdiction services are needed on the scene	Existing	
		Gathers/provides specific incident information from/to other PSP troopers	Existing	
PSP Troop T Vehicles	Pennsylvania State Police (PSP)	PSP Troop T Vehicles are dispatched from PTC Offices and PSP Troop T Dispatch Centers	Existing	<ul style="list-style-type: none"> • 800 MHz Statewide

Element	Stakeholder	Functionality	Status	Associated Project(s)
		Responds to incidents on the Pennsylvania Turnpike	Existing	<ul style="list-style-type: none"> Communication System Emergency Vehicle Traffic Signal Preemption Mobile Data Terminals (MDT's)
PSP Vehicles	Pennsylvania State Police (PSP)	Receive incident and dispatch information from PSP Offices	Existing	<ul style="list-style-type: none"> 800 MHz Statewide Communication System Emergency Vehicle Traffic Signal Preemption Mobile Data Terminals (MDT's)
		Coordinates with PSP Dispatch Center and other emergency management agencies during incidents	Existing	
PTC Field Devices	Pennsylvania Turnpike Commission (PTC)	Collects traffic and roadway information (vehicle counts, etc.) for transportation planning purposes	Existing	<ul style="list-style-type: none"> Pennsylvania Turnpike Field Devices PTC ATIS Integration Project
		Disseminates traffic and roadway conditions to the public using DMS, HAR and other mechanisms	Existing	
		Provides incident detection capabilities. The PTC provides call boxes for incident detection/verification	Existing	
		Monitors roadway weather conditions using RWIS that measures temperature, humidity, wind speed and direction, and rain and snow precipitation.	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
PTC Offices	Pennsylvania Turnpike Commission (PTC)	Provides freeway management including integration of surveillance information for the purpose of information sharing	Existing	<ul style="list-style-type: none"> PTC *11 Phone Service PTC ATIS Integration Project PTC Traffic Operation Center (TOC) PTC E-Z Pass Toll Collection System
		Coordinates traffic and emergency operations with agencies throughout the state	Existing	
		Provides support for special event traffic management	Planned 1	
		Monitors alerts and advisory systems reported by other agencies	Existing	
		Plans to share CCTV camera images with PennDOT Districts, PSP, various emergency management agencies, and others	Planned 1	
		Provides 24x7 capabilities to coordinate traffic and incident management with PennDOT staff	Planned 2	
		Provides incident management services including the dispatch of emergency and service vehicles and coordinates with appropriate agencies	Existing	
		Detects and verifies incidents. PTC uses a free cell phone service for incident detection.	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		Provides dispatch of emergency and service vehicles	Existing	
		Tracks PTC emergency service vehicles	Existing	
		Provides detour routes in case of incidents and shares this information with PennDOT and other transportation agencies	Existing	
		Provides capabilities to be contacted by PennDOT Districts in case of major incidents that may affect traffic on Pennsylvania Turnpike	Existing	
		Shares real-time incident information with other transportation agencies, local and state law enforcement and fire and rescue agencies	Existing	
		Provides traffic and incident information to freeway and arterial management agencies, public transit, and safety agencies	Existing	
		Distributes real-time traffic information to the public through dedicated, automated phone service, web sites, email and cell phone/automated voice methods	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		Distributes information regarding freeway travel times and speeds, incident information, special events, work zones, weather and road conditions	Existing and Planned 1	
		Stores processed data using an Archived Database Management System. PTC uses archived data for studying the impact due to work zones, capital planning/analysis, operations planning/analysis, safety analysis, and traffic control.	Existing	
		PTC collects traffic volume, vehicle classification, road conditions, weather conditions and video surveillance information	Existing	
		PTC collects route designations, current work zones, emergency/evacuation routes and procedures, and incident information from other agencies	Existing	
		Collects toll collection fees and supports electronic toll collection using E-Z Pass	Existing	
		Collects and stores toll information for operational analysis and determining pricing structure	Existing	
		Monitors current and forecasted weather conditions for issuing general travel advisories	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		Coordinates with PennDOT County Maintenance Offices to reduce the impact of traffic during work zone activities	Existing	
		Provides monitoring and remote diagnostics of field equipment failures, issues problem reports, and tracks the repairs or replacement of the failed equipment	Existing	
PTC Maintenance and Construction Vehicles	Pennsylvania Turnpike Commission (PTC)	Provides on-board systems that support routine winter maintenance on a roadway system	Existing	
PTC Service Plazas	Pennsylvania Turnpike Commission (PTC)	Provides traveler information on the Pennsylvania Turnpike	Planned 1	<ul style="list-style-type: none"> PTC Service Plazas
		Provides traveler information, weather information centers, and lodging call centers, using scrolling message boards	Existing and Planned 1	
PTC Toll Plazas	Pennsylvania Turnpike Commission (PTC)	Provides capability to automatically identify the vehicle type using tag reader and automatically perform toll collection	Existing	<ul style="list-style-type: none"> PTC E-Z Pass Toll Collection System
		Serve as electronic screening and safety inspection stations for the Pennsylvania Turnpike	Planned 2	

Element	Stakeholder	Functionality	Status	Associated Project(s)
Regional Media Outlets	Regional Media	Gathers incident information from State Police and other incident management agencies	Existing	
Regional Personal Traveler Card	Regional Transit Agencies	Allows transit users to use regional traveler cards or other electronic payment media	Planned 2	
Regional Transit Agency Offices	Regional Transit Agencies	Collects accurate ridership data for operational analysis and to determine fare structure	Existing	<ul style="list-style-type: none"> • Transit Dispatch Centers • Regional Trip Planning Website • Automatic Vehicle Location • Video monitoring for park-n-ride lots
		Collects and stores transit information for operational analysis	Existing	
		Collects and maintains vehicles operational and maintenance data	Existing	
		Collects and archives passenger counts and incident (stalled vehicles) information in real-time	Existing	
		Collects passenger information and road condition in real time	Existing	
		Collects route designation information electronically	Existing	
		Archives evacuation routes and procedures	Existing	
		Provides communications between the transit operators and the dispatch center	Existing	
		Provides planning and scheduling of fixed and flexible route transit services	Existing	
		Supports paratransit operations	Existing	
Provides current vehicle schedule adherence and optimum scenarios for schedule adjustments	Existing			

Element	Stakeholder	Functionality	Status	Associated Project(s)
		Supports the assignment of transit vehicles and operators to enhance the daily operation of a transit service considering the transit operators convenience	Existing	
		Supports schedule coordination with other transit agencies	Existing	
		Supports schedule coordination with other modes of transportation	Existing	
		Monitors schedule adherence in real-time	Existing	
		Coordinates with County EMA Centers during evacuation	Existing	
		Provides manual maintenance functions for the transit property	Existing	
		Provides capability to collect payment through electronic medium	Planned 2	
		Provides a common regional e-card for use in all the regional transit agencies	Planned 2	
		Provides transit links with other Regional Transit agencies	Existing	
		Supports on-board security devices (silent alarms)	Existing	
		Provides information dissemination (non real-time) through telephone, kiosks, email/PC etc)	Existing/Planned 1	
		Develops, prints and disseminates transit schedules (non-real time)	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		Provides transit status information to public through regional website	Planned 2	
		Supports tracking of the transit vehicles in real-time (using AVL)	Existing	
		Provides park-n-ride lot parking surveillance	Planned 1	
		Shares transit transfer clusters where transfer to other modes of transportation can be made conveniently	Existing	
Regional Transit Remote Traveler Support	Regional Transit Agencies	Provides non real time information dissemination through phone, kiosks, email/PC, in-vehicles DMS, facsimile	Existing	<ul style="list-style-type: none"> Video Monitoring for Park-n-Ride Lots
		Provides non real time information dissemination through in-vehicle navigation system, cell phone, audible enunciators	Existing	
		Monitors the transit park-and-ride lot	Planned 1	
Regional Transit Vehicles	Regional Transit Agencies	Provides capabilities to communicate with the Transit Dispatch Center	Existing	<ul style="list-style-type: none"> Transit Dispatch Centers Automatic Vehicle Location
		Provides real-time schedule adherence information to the dispatch for schedule management	Existing	
		Collects and transmits accurate ridership data for operational analysis and to determine fare structure	Existing	
		Provides communications between the transit operator and the dispatch center	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		Provides capability to track the location of the vehicles (AVL)	Existing	
Towing Industry Responders	Towing Industry	Responds to requests from various incident management agencies to dispatch specialty services and vehicles, such as wreckers and hazmat teams	Existing	
TRANSCOM Center	TRANSCOM	Collects incident information and make it available for member agencies	Existing	<ul style="list-style-type: none"> Regional Transportation Management

3.3 Needs

Sections 3.3 and 3.4 examine each element defined in Section 3.2 in terms of *needs* (what each element — i.e., agency stakeholder — needs from others) and *services* (what each element can provide to others). This information is used to program *Turbo Architecture*, the National ITS Architecture software. “Needs” refer to the information inputs from one agency operation to another; they are presented in tabular format and trace back to the systems inventory.

Table 3-2: Regional Needs Table

Element	Need (operation/data inputs from others)	Status	Origin Element
911 Communication Centers	Incident information	Existing	PennDOT D8 TMC, PennDOT D8 County Maintenance Offices, PTC Offices, County EMA Centers, PSP Offices, Municipal/Regional Public Safety Offices
		Planned 2	TRANSCOM Center
	Incident response coordination	Existing	PennDOT D8 TMC, PennDOT D8 County Maintenance Offices, PTC Offices, PEMA Emergency Operation Center, County EMA Centers, PSP Offices, Incident Response Agency Offices, Municipal/Regional Public Safety Offices
	Road network conditions	Existing	PennDOT D8 TMC, PTC Offices
	Maintenance and construction resource coordination	Existing	PennDOT D8 County Maintenance Offices, PTC Offices
	Work zone information	Existing	PennDOT D8 County Maintenance Offices, PTC Offices,
	PIERS incident data	Existing	PEMA Emergency Operation Center
	Transit incident information	Existing	Regional Transit Agency Offices
	Transit emergency response coordination	Existing	Regional Transit Agency Offices
	Emergency dispatch coordination	Existing	Towing Industry Responders
Threat information coordination	Existing	High Threat Facilities	

Element	Need (operation/data inputs from others)	Status	Origin Element
Adjacent PennDOT District and County Offices	Work zone information	Existing	PennDOT D8 TMC, PennDOT D8 County Maintenance Offices
	Work plan coordination	Existing	PennDOT D8 TMC, PennDOT D8 County Maintenance Offices
	Maintenance and construction resource coordination	Existing	PennDOT D8 TMC, PennDOT D8 County Maintenance Offices
	Incident response coordination	Existing	PennDOT D8 TMC
	Traffic information coordination	Existing	PennDOT D8 TMC
	DMS control coordination	Planned 2	PennDOT D8 TMC
	Roadway maintenance status	Existing	PennDOT D8 County Maintenance Office
Attractions and Event Promoters	Coordination during events	Planned 2	PennDOT D8 TMC, PTC Offices, PSP Offices, Regional Transit Agency Offices, Municipal Traffic Management Offices
	Maintenance and construction work plans	Planned 2	PennDOT D8 TMC, PTC Offices
	Additional toll plazas	Planned 2	PTC Offices
	DMS control	Existing	PennDOT D8 Field Devices
Commercial Vehicle Company Offices	Road network conditions	Existing	PTC Offices
	Credential status verification	Existing	PTC Offices, PennDOT Central Office Organizations
		Planned 2	PennDOT STMC
	Trip log	Existing	Commercial Vehicles

Element	Need (operation/data inputs from others)	Status	Origin Element
	On-board vehicle and safety data	Existing	Commercial Vehicles
	Driver update	Existing	Commercial Vehicles
	Compliance review report	Planned 2	PennDOT STMC
	Safety inspection report	Planned 2	PennDOT STMC
	Tax filing and Citation	Planned 2	PennDOT STMC
Commercial Vehicles	Communication with the company offices	Existing	Commercial Vehicle Company Offices
	Safety inspection (electronic)	Planned 2	PTC Toll Plazas, PennDOT Central Office Field Devices
	Electronic toll collection	Existing	PTC Toll Plazas
	Toll collection using single transponder throughout the region	Planned 2	PTC Toll Plazas
County EMA Centers	Incident information	Existing	911 Communication Centers, PennDOT D8 TMC, PennDOT D8 County Maintenance Offices, PTC Offices, PSP Offices, Municipal/Regional Public Safety Offices
		Planned 2	TRANSCOM Center
	Incident response coordination	Existing	911 Communication Centers, PennDOT D8 TMC, PTC Offices, PEMA Emergency Operation Center, PSP Offices, Incident Response Agency Offices, Municipal/Regional Public Safety Offices
	Maintenance and construction response coordination	Existing	PennDOT D8 County Maintenance Offices, PTC Offices

Element	Need (operation/data inputs from others)	Status	Origin Element
	Work zone information	Existing	PennDOT D8 County Maintenance Offices
	Road network conditions	Existing	PTC Offices
	Transit incident information	Existing	Regional Transit Agency Offices
	Transit emergency response coordination	Existing	Regional Transit Agency Offices
	Threat information coordination	Existing	High Threat Facilities
County/Regional Planning Organizations	Archived road/lane/bridge closure information	Existing	PennDOT D8 TMC, PTC Offices
	Construction project's schedule	Existing	PennDOT D8 TMC, PTC Offices
	Archived data coordination	Existing	PennDOT D8 TMC, PTC Offices, PennDOT Central Office Organizations
		Planned 2	PennDOT STMC
	Transit archived data	Existing	Regional Transit Agency Offices
High Threat Facilities	Threat information coordination	Existing	911 Communication Centers, County EMA Centers
Incident Response Agency Offices	Incident response coordination	Existing	911 Communication Centers, County EMA Centers, PTC Offices, PEMA Emergency Operation Center
Information Service Providers	Incident information	Existing	911 Communication Centers, County EMA Centers, PennDOT D8 TMC, PSP Offices
		Planned 2	TRANSCOM Center
	Events information	Existing	Attractions and Event Promoters

Element	Need (operation/data inputs from others)	Status	Origin Element
	Road network conditions	Existing	PennDOT D8 RTMC
	Road maintenance status	Existing	PennDOT D8 County Maintenance Offices
	Work zone information	Planned 2	PennDOT D8 County Maintenance Offices
	Current asset restrictions	Existing	PennDOT D8 County Maintenance Offices
	Transit incident information	Existing	Regional Transit Agency Offices
MDSHA Offices	Incident response coordination	Planned 2	PennDOT D8 TMC, PennDOT STMC
	Traffic Information Coordination	Planned 2	PennDOT D8 TMC, PennDOT STMC
	Work zone information	Existing	PennDOT D8 County Maintenance Offices
		Planned 2	PennDOT STMC
	Work plan coordination	Existing	PennDOT D8 County Maintenance Offices
	Maintenance and construction resource coordination	Existing	PennDOT D8 County Maintenance Offices
Planned 2		PennDOT STMC	
MDSP Offices	Incident response coordination	Existing	PSP Offices
	Threat information coordination	Existing	PSP Offices
MEMA Emergency Operation Center	Incident response coordination	Existing	PEMA Emergency Management Center
Municipal Field Devices	Traffic signal control	Existing	Municipal Traffic Management Offices
		Planned 2	PennDOT D8 TMC
	DMS control	Planned 1	Municipal Traffic Management Offices

Element	Need (operation/data inputs from others)	Status	Origin Element
	Video surveillance control	Planned 2	Municipal Traffic Management Offices
Municipal/Regional Public Safety Offices	Incident information	Existing	911 Communication Centers, County EMA Centers
	Incident response coordination	Existing	911 Communication Centers, County EMA Centers
	Emergency dispatch coordination	Existing	Municipal/Regional Public Safety Vehicles
	Incident command coordination	Existing	Municipal/Regional Public Safety Vehicles
Municipal/Regional Public Safety Vehicles	Emergency dispatch coordination	Existing	Municipal/Regional Public Safety Offices
	Incident command coordination	Existing	Municipal/Regional Public Safety Offices
Municipal Traffic Management Offices	Traffic archived data	Existing	County/Regional Planning Organizations
	Coordination during events	Existing	Attractions and Event Promoters
	Traffic information coordination	Existing	PennDOT D8 TMC, PTC Offices
	Incident information	Existing	PennDOT D8 TMC, PTC Offices
	Current asset restrictions	Existing	PennDOT D8 TMC, PTC Offices
Passenger Vehicles	Electronic toll collection	Existing	PTC Toll Plazas
PEMA Emergency Operation Center	Incident response coordination	Existing	911 Communication Centers, County EMA Centers, Incident Response Agency Offices, MEMA Emergency Operation Center, PTC Offices, PEMA Emergency Operation Center

Element	Need (operation/data inputs from others)	Status	Origin Element
		Planned 2	PennDOT STMC
	PIERS incident data	Existing	911 Communication Centers
	HAZMAT information	Planned 2	Commercial Vehicle Company Offices
	Incident information	Existing	PTC Offices, TRANSCOM Center
	Road network conditions	Existing	PTC Offices
		Planned 2	PennDOT STMC
	Remote CCTV control	Existing	PennDOT D8 TMC
		Planned 2	PTC Offices
	Traffic images	Planned 2	PennDOT D8 Field Devices
	DMS Control	Existing	PennDOT D8 Field Devices
Threat information coordination	Existing	Pennsylvania Office of Homeland Security	
PennDOT Central Office Field Devices	RWIS device control	Existing	PennDOT Central Office
		Planned 2	PennDOT STMC
	Safety inspection and electronic screening information	Planned 2	Commercial Vehicles, PennDOT STMC
PennDOT Central Office Organizations	PennDOT Bureau of Planning and Research collects archived data	Existing	Regional Transit Agencies, PennDOT D8 TMC, PTC Offices
		Planned 2	PennDOT STMC

Element	Need (operation/data inputs from others)	Status	Origin Element
	Incident/emergency response coordination and information	Existing	PEMA Emergency Operation Center, PennDOT D8 TMC, PSP Offices, PTC Offices, MDSHA Offices
		Planned 2	PennDOT STMC
	Work plan coordination	Existing	PennDOT D8 TMC
		Planned 2	PennDOT STMC
	Maintenance and construction coordination	Existing	PennDOT D8 TMC, MDSHA Offices
	Traffic information and roadway conditions	Existing	PennDOT D8 TMC, MDSHA Offices
		Planned 2	PennDOT STMC
	Weather information	Planned 2	PennDOT STMC
	Request for traffic and emergency information for the media	Existing	Regional Media Outlets
	PennDOT Motor Carrier Division conducts weight enforcement activities	Existing	PSP Offices
		Planned 2	PennDOT STMC
	PennDOT (Motor Carrier Division) maintains commercial vehicle registrations	Existing	Commercial Vehicle Company Offices
		Planned 2	PennDOT STMC
	Tax credentials, audits information, and ax-related enforcement activities (Motor Carrier Division)	Existing	Commercial Vehicle Company Offices
		Planned 2	PennDOT STMC
	RWIS information (BOMO)	Existing	PennDOT Central Office Field Devices

Element	Need (operation/data inputs from others)	Status	Origin Element
	Request for traffic and emergency information for the media	Existing	Regional Media Outlets
	PennDOT Motor Carrier Division conducts weight enforcement activities	Existing	PSP Offices
		Planned 2	PennDOT STMC
	PennDOT (Motor Carrier Division) maintains commercial vehicle registrations	Existing	Commercial Vehicle Company Offices
		Planned 2	PennDOT STMC
	Tax credentials, audits information, and ax-related enforcement activities (Motor Carrier Division)	Existing	Commercial Vehicle Company Offices
	Incident response coordination	Planned 2	PennDOT STMC
RWIS information (BOMO)	Existing	PennDOT Central Office Field Devices	
PennDOT D8 County Maintenance Offices	Incident Information	Existing	911 Communication Centers, County EMA Centers, Municipal Traffic Management Offices, PennDOT D8 TMC, PSP Offices
		Planned 1	PennDOT D8 RTMC, PennDOT STMC
	Incident removal request	Existing	PSP Dispatch Centers
	RWIS information	Existing	PennDOT Central Office, Adjacent PennDOT Districts, PTC Offices
PennDOT D8 Field Devices	DMS control	Planned 1	Municipal Traffic Management Offices
		Existing	Attractions and Event Promoters
	Field device maintenance	Existing	PennDOT D8 County Maintenance Offices
	Field device control	Existing	PennDOT D8 TMC, PEMA Emergency Operation Center

Element	Need (operation/data inputs from others)	Status	Origin Element
PennDOT D8 Maintenance and Construction Vehicles	Dispatch coordination	Existing	PennDOT D8 County Maintenance Offices
PennDOT D8 TMC	Incident information	Existing	911 Communication Centers, County EMA Centers, PennDOT D8 County Maintenance Offices, PTC Offices, PSP Offices, TRANSCOM Center, PennDOT Central Office Organizations
		Planned 2	PennDOT STMC
	Incident response coordination	Existing	911 Communication Centers, County EMA Centers, Adjacent PennDOT District and County Offices, MDSHA Offices, PTC Offices, PSP Offices, PennDOT Central Office Organizations
		Planned 2	PennDOT STMC
	Work zone information	Existing	Adjacent PennDOT District and County Offices, PennDOT D8 County Maintenance Offices, PennDOT Central Office Organizations
		Planned 2	PennDOT STMC
	Work plan coordination	Existing	Adjacent PennDOT District and County Offices, PennDOT D8 County Maintenance Offices, PTC Offices, PennDOT Central Office Organizations
		Planned 2	Attractions and Event Promoters

Element	Need (operation/data inputs from others)	Status	Origin Element
	Maintenance and construction resource coordination	Existing	Adjacent PennDOT District and County Offices, PennDOT D8 County Maintenance Offices, PennDOT Central Office Organizations
		Planned 2	PennDOT STMC
	Traffic information coordination	Existing	Adjacent PennDOT District and County Offices, Attractions and Event Promoters, MDSHA Offices, Municipal Traffic Management Offices, PTC Offices, PennDOT Central Office Organizations
		Planned 2	PennDOT STMC
	DMS control coordination	Planned 2	Adjacent PennDOT District and County Offices, Event Promoters
	Archived data coordination	Existing	County/Regional Planning Organizations, PennDOT Central Office Organizations
		Planned 2	PennDOT STMC
	Events information	Existing	Attractions and Event Promoters
	Current asset restrictions	Existing	PennDOT D8 County Maintenance Offices
	Road weather information	Existing	PennDOT Central Office Organizations
Planned 2		PennDOT D8 County Maintenance Offices, PennDOT STMC	
Roadway maintenance status	Planned 2	PennDOT D8 County Maintenance Offices	
Field device (DMS, HAR, CCTV) control	Existing	PennDOT D8 Field Devices	

Element	Need (operation/data inputs from others)	Status	Origin Element
	Road network conditions	Existing	PTC Offices, PSP Offices, PennDOT Central Office Organizations
		Planned 2	PennDOT STMC
	Road network probe information	Planned 2	Regional Transit Agency Offices
	Incident command coordination	Existing	PennDOT D8 Service Patrol Vehicles
	Emergency dispatch coordination	Existing	PennDOT D8 Service patrol Vehicles
PennDOT D8 Service Patrol Vehicles	Incident command coordination	Existing	PennDOT D8 TMC
	Emergency dispatch coordination	Existing	PennDOT D8 TMC
Pennsylvania Office of Homeland Security	Threat information coordination	Existing	PEMA Emergency Operation Center
PennDOT STMC	Incident/emergency information and coordination	Planned 2	PEMA Emergency Operation Center, PennDOT Central Office Organizations, PennDOT D8 TMC, PTC Offices, MDSHA Offices
	Traffic control coordination	Planned 2	PennDOT D8 TMC, MDSHA Offices
	Traffic conditions and information	Planned 2	PEMA Emergency Operation Center, PennDOT Central Office Organizations, PennDOT D8 TMC, MDSHA Offices, PTC Offices
	Archived data	Planned 2	PennDOT Central Office Organizations, PennDOT D8 TMC

Element	Need (operation/data inputs from others)	Status	Origin Element
	Weather information	Planned 2	PennDOT Central Office Organizations PennDOT D8 TMC, PennDOT Central Office Field Devices
	Work zone information	Planned 2	PennDOT D8 TMC, MDSHA Offices
	Special event information	Planned 2	Attractions and Event Promoters
	Maintenance and Construction information including snow removal	Planned 2	PennDOT Central Office Organizations
	Vehicle registrations	Planned 2	PennDOT Central Office Organizations, Commercial Vehicle Company Offices
	Credentialing information	Planned 2	PennDOT Central Office Organizations, PennDOT Central Office Field Devices, Commercial Vehicle Company Offices
	Hazmat information	Planned 2	Commercial Vehicle Company Offices
PennDOT Welcome Centers and Rest Areas	Traveler information	Existing	PennDOT D8 TMC
Personal Traveler Information Devices	Traveler information	Existing	Information Service Providers, Regional Transit Agency Offices
	Trip plan	Planned 2	Regional Transit Agency Offices
	Customized personal transit information	Planned 2	Regional Transit Agency Offices

Element	Need (operation/data inputs from others)	Status	Origin Element	
PSP Offices	Incident and emergency information and coordination	Existing	911 Communication Centers, County EMA Centers,, Municipal Public Safety Offices, PennDOT Central Office Organizations, PennDOT D8 TMC, MDSHA Offices, PSP Vehicles, PTC Offices, PSP Troop T Highspire	
		Planned 2	PennDOT STMC	
	Credentialing and safety inspection information	Existing	PennDOT Central Office Organizations	
		Planned 2	PennDOT STMC	
	Maintenance and Construction information	Existing	PennDOT D8 County Maintenance Offices	
		Planned 2	PennDOT STMC	
	Traffic conditions	Existing	PennDOT D8 TMC	
		Planned 2	PennDOT STMC	
	Weather information	Existing	PennDOT D8 TMC	
		Planned 2	PennDOT STMC	
	PSP Troop T Highspire	Incident and emergency information and coordination	Existing	PSP Offices, PTC Offices
		Weather information	Existing	PTC Offices
Traffic information/conditions		Existing	PTC Offices	
PSP Troop T Vehicles	Incident and emergency information on the Pennsylvania Turnpike	Existing	PTC Offices, PSP Troop T Highspire	
	Dispatch to incidents on the Pennsylvania Turnpike	Existing	PTC Offices, PSP Troop T Highspire	

Element	Need (operation/data inputs from others)	Status	Origin Element
PSP Vehicles	Incident and emergency information on state highways	Existing	PSP Offices
	Dispatch to incidents on state highways	Existing	PSP Offices
PTC Field Devices	DMS and HAR messages	Existing	PTC Offices
	CCTV control	Existing	PTC Offices
	Roadway treatment control	Planned 1	PTC Offices
	RWIS control	Planned 1	PTC Offices
PTC Maintenance and Construction Vehicles	Maintenance dispatch information	Existing	PTC Offices
PTC Offices	Incident and emergency information and coordination	Existing	911 Communication Centers, County EMA Centers, PEMA Emergency Operation Center, PennDOT Central Office Organizations, PennDOT D8 TMC, PSP Troop T Highspire
		Planned 2	PennDOT STMC
	Request for maintenance and construction services	Existing	911 Communication Centers, County EMA Centers
	Maintenance and Construction coordination	Existing	PennDOT D8 County Maintenance Offices
	Traffic control coordination (control of DMS along the Turnpike)	Planned 2	PEMA Emergency Operation Center, PennDOT D8 TMC, PennDOT STMC
	Traffic information and conditions	Existing	PennDOT D8 TMC, PTC Field Devices, PSP Troop T Highspire

Element	Need (operation/data inputs from others)	Status	Origin Element
		Planned 2	PennDOT STMC
	Weather conditions	Existing	PennDOT Central Office Organizations, PSP Troop T Highspire
	Work zone and plan information	Existing	PennDOT D8 County Maintenance Offices, PennDOT D8 TMC
		Planned 2	PennDOT STMC
	CVO violation information (overweight vehicles)	Existing	PTC Field Devices
	CCTV images	Existing	PTC Field Devices
	RWIS and roadway treatment data	Planned 1	PTC Field Devices
	CCTV security monitoring information	Planned 2	PTC Field Devices
	Toll information	Existing	PTC Toll Plazas
	Information for the media	Existing	Regional Media Outlets
	Hazmat information	Existing	Commercial Vehicle Company Offices
	Credentialing information	Existing	Commercial Vehicle Company Offices
PTC Service Plazas	Traveler information	Existing	Information Service Providers, PTC Offices
PTC Toll Plazas	E-Z Pass tag reader information	Existing	Passenger Vehicles, Commercial Vehicles
Regional Media Outlets	Incident information	Existing	911 Communication Centers, County EMA Centers, PennDOT D8 TMC, PTC Offices, PSP Offices, PennDOT Central Office Organizations

Element	Need (operation/data inputs from others)	Status	Origin Element
		Planned 2	PennDOT STMC
	Traveler information	Existing	Information Service Providers, PennDOT D8 TMC, PTC Offices
		Planned 2	PennDOT STMC
	Road weather information	Existing	PennDOT D8 County Maintenance Offices
		Planned 2	PennDOT STMC
	Work zone information	Existing	PennDOT D8 County Maintenance Offices, PTC Offices
		Planned 2	PennDOT STMC
	Road network conditions	Existing	PennDOT D8 TMC, PTC Offices
		Planned 2	PennDOT STMC
	Transit information	Existing	Regional Transit Agency Offices
	Transit incident information	Existing	Regional Transit Agency Offices
	Regional Personal Traveler Cards	N/A	N/A
Regional Transit Agency Offices	Transit emergency response coordination	Existing	911 Communication Centers, County EMA Centers
	Coordination during events	Existing	Attractions and Event Promoters
	Incident information	Existing	PennDOT D8 TMC
	Current asset restrictions	Existing	PennDOT D8 TMC

Element	Need (operation/data inputs from others)	Status	Origin Element
	Road network conditions	Planned 2	PennDOT D8 TMC
	Archived data coordination	Existing	County/Regional Planning Organizations, PennDOT Central Office Organizations
	Security area monitoring data (through camera)	Existing	Regional Transit Remote Traveler Support
	Fare and payment information	Existing	Regional Transit Vehicles
	Emergency notification	Existing	Regional Transit Vehicles
	Transit vehicle location	Existing	Regional Transit Vehicles
	Transit vehicle passenger and use data	Existing	Regional Transit Vehicles
	Transit vehicle schedule performance	Existing	Regional Transit Vehicles
Regional Transit Remote Traveler Support	Secured area monitoring support (through camera)	Existing	Regional Transit Agency Offices
Regional Transit Vehicles	Request for payment	Planned 2	Regional Personal Traveler Card
	Communication with the offices	Existing	Regional Transit Agency Offices
	Fare management information	Existing	Regional Transit Agency Offices
	Schedule information	Existing	Regional Transit Agency Offices
Towing Industry Responders	Incident information	Planned 2	911 Communication Centers, PTC Offices, PSP Offices
	Emergency dispatch coordination	Existing	911 Communication Centers, PTC Offices, PSP Offices

Element	Need (operation/data inputs from others)	Status	Origin Element
TRANSCOM Center	Incident information	Existing	PTC Offices, PEMA Emergency Operation Center, PennDOT D8 TMC, PennDOT Central Office Organizations
		Planned 2	911 Communication Centers, County EMA Centers, Information Service Providers, PennDOT STMC

3.4 Services

Sections 3.3 and 3.4 examine each element defined in Section 3.2 in terms of *needs* (what each element — i.e., agency stakeholder — needs from others) and *services* (what each element can provide to others). This information is used to program *Turbo Architecture*, the National ITS Architecture software. “Services” refer to the information outputs from one agency operation to another; they are presented in tabular format and trace back to the systems inventory.

Table 3-3: Regional Services Table

Element	Service (operation/data outputs to others)	Status	Destination Element
911 Communication Centers	Incident information	Existing	PennDOT D8 TMC, PennDOT D8 County Maintenance Offices, PTC Offices, County EMA Centers, PSP Offices, Regional Media Outlets, Information Services Providers, Municipal/Regional Public Safety Offices
		Planned 2	TRANSCOM Center, Towing Industry Responders
	Incident response coordination	Existing	PennDOT D8 TMC, PennDOT D8 County Maintenance Offices, PTC Offices, PEMA Emergency Operation Center, County EMA Centers, PSP Offices, Incident Response Agency Offices, Municipal/Regional Public Safety Offices
	Maintenance and construction response coordination	Existing	PennDOT D8 County Maintenance Offices, PTC Offices
	PIERS incident data	Existing	PEMA Emergency Operation Center
	Transit emergency response coordination	Existing	Regional Transit Agency Offices
	Emergency dispatch coordination	Existing	Towing Industry Responders
	Threat information coordination	Existing	High Threat Facilities
Adjacent PennDOT District and County Offices	Work zone information	Existing	PennDOT D8 TMC, PennDOT D8 County Maintenance Offices
	Work plan coordination	Existing	PennDOT D8 TMC, PennDOT D8 County Maintenance Offices

Element	Service (operation/data outputs to others)	Status	Destination Element
	Maintenance and construction resource coordination	Existing	PennDOT D8 TMC, PennDOT D8 County Maintenance Offices
	Incident response coordination	Existing	PennDOT D8 TMC
	Traffic information coordination	Existing	PennDOT D8 TMC
	DMS control coordination	Planned 2	PennDOT D8 TMC
	Roadway maintenance status	Existing	PennDOT D8 County Maintenance Offices
	Road weather information	Existing	PennDOT D8 County Maintenance Offices
Attractions and Event Promoters	Event information	Existing	PennDOT D8 TMC, PTC Offices, PSP Offices, Information Service Providers
	Coordination during events	Existing	PennDOT D8 TMC, PTC Offices, PSP Offices, Regional Transit Agency Offices, Municipal Traffic Management Offices
	DMS control	Existing	PennDOT D8 Field Devices
Commercial Vehicle Company Offices	Credential information	Existing	PTC Offices
	Hazmat information	Planned 2	PTC Offices, PEMA Emergency Operation Center, PennDOT STMC
	Fleet to driver update	Existing	Commercial Vehicles
Commercial Vehicles	On-board vehicle and safety data	Existing	Commercial Vehicle Company Offices
	Trip log	Existing	Commercial Vehicle Company Offices
	Driver to fleet update	Existing	Commercial Vehicle Company Offices

Element	Service (operation/data outputs to others)	Status	Destination Element
	Highway watch program	Planned 2	PTC Offices, PSP Offices, 911 Communication Centers, PennDOT D8 TMC
	Electronic toll tag readers	Existing	PTC Toll Plazas
	Safety inspection records	Planned 2	PTC Toll Plazas, PennDOT Central Office Field Devices
County EMA Centers	Incident information	Existing	911 Communication Centers, PennDOT D8 TMC, PTC Offices, PSP Offices, Regional Media Outlet, Information Service Providers, Municipal/Regional Public Safety Offices, PennDOT D8 County Maintenance Offices
		Planned 2	TRANSCOM Center
	Incident response coordination	Existing	911 Communication Centers, PennDOT D8 TMC, PTC Offices, PEMA Emergency Operation Center, PSP Offices, Incident Response Agency Offices, Municipal/Regional Public Safety Offices
	Maintenance and construction response coordination	Existing	PennDOT D8 County Maintenance Offices, PTC Offices
	Transit emergency response coordination	Existing	Regional Transit Agency Offices
	Threat information coordination	Existing	High Threat Facilities
County/Regional Planning Organizations	Archived data coordination	Existing	PennDOT D8 TMC, PTC Offices, Municipal Traffic Management Offices, PennDOT Central Office Organizations
		Planned 2	PennDOT STMC

Element	Service (operation/data outputs to others)	Status	Destination Element
High Threat Facilities	Threat information coordination	Existing	911 Communication Centers, County EMA Centers
Incident Response Agency Offices	Incident response coordination	Existing	911 Communication Centers, County EMA Centers, PTC Offices, PEMA Emergency Operation Center
Information Service Providers	Incident information	Existing	Passenger Vehicles, TRANSCOM Center
		Planned 2	TRANSCOM Center
	Traveler information	Existing	Personal Traveler Information Devices, Regional Media Outlet
	Event information	Existing	Passenger Vehicles, Personal Traveler Information Devices
MDSHA Offices	Incident response coordination	Planned 2	PennDOT D8 TMC, PennDOT STMC
	Traffic information coordination	Planned 2	PennDOT D8 TMC, PennDOT STMC
	Work plan coordination	Existing	PennDOT D8 County Maintenance Offices
	Work zone information	Existing	PennDOT D8 County Maintenance Offices
		Planned 2	PennDOT STMC
	Maintenance and construction resource coordination	Existing	PennDOT D8 County Maintenance Offices
Planned 2		PennDOT STMC	
MDSP Offices	Incident response coordination	Existing	PSP Offices
	Threat information coordination	Existing	PSP Offices

Element	Service (operation/data outputs to others)	Status	Destination Element
MEMA Emergency Operation Center	Incident response coordination	Existing	PEMA Emergency Operation Center
Municipal Field Devices	N/A	N/A	N/A
Municipal/Regional Public Safety Offices	Incident information	Existing	911 Communication Centers, County EMA Centers
	Incident response coordination	Existing	911 Communication Centers, County EMA Centers
	Emergency dispatch coordination	Existing	Municipal/Regional Public Safety Vehicles
	Incident command coordination	Existing	Municipal/Regional Public Safety Vehicles
Municipal/Regional Public Safety Vehicles	Emergency dispatch coordination	Existing	Municipal/Regional Public Safety Offices
	Incident command coordination	Existing	Municipal/Regional Public Safety Offices
Municipal Traffic Management Offices	Coordination during events	Existing	Attractions and Event Promoters
	Traffic signal control	Existing	Municipal Field Devices
	DMS signal control	Planned 1	Municipal Field Devices
	Video surveillance control	Planned 2	Municipal Field Devices
	Traffic information coordination	Existing	PennDOT D8 TMC, Municipal Traffic Management Offices
	Incident information	Existing	PTC Offices

Element	Service (operation/data outputs to others)	Status	Destination Element
Passenger Vehicles	Electronic toll tag readers	Existing	PTC Toll Plazas
PEMA Emergency Operation Center	Incident response coordination	Existing	911 Communication Centers, County EMA Centers, Incident Response Agency Offices, MEMA Emergency Operation Center, PTC Offices, PennDOT Central Office Organizations
		Planned 2	PennDOT STMC
	PIERS Incident data	Existing	911 Communication Centers
	Incident information	Existing	PTC Offices, TRANSCOM Center
	Traffic control coordination	Planned 2	PTC Offices
	CCTV control	Planned 2	PTC Offices
	Threat information coordination	Existing	Pennsylvania Office of Homeland Security
	DMS control	Existing	PennDOT D8 Field Devices
PennDOT Central Office Field Devices	RWIS information	Existing	PennDOT Central Office Organizations, PennDOT D8 County Maintenance Offices
		Planned 2	PennDOT STMC
	Safety inspection reports and violation notification	Existing	PennDOT Central Office Organizations
		Planned 2	PennDOT STMC
PennDOT Central Office Organizations	Request for archived data (BPR)	Existing	Regional Transit Offices, PennDOT D8 TMC
		Planned 2	PennDOT STMC

Element	Service (operation/data outputs to others)	Status	Destination Element	
	Incident and emergency information and coordination (BHSTE)	Existing	PEMA Emergency Operation Center, PennDOT D8 TMC, PSP Offices	
		Planned 2	PennDOT STMC	
	Traffic information and conditions (BHSTE)	Existing	PennDOT D8 TMC	
		Planned 2	PennDOT STMC	
	Work zone information (BOMO)	Existing	PennDOT D8 TMC	
		Planned 2	PennDOT STMC	
	Maintenance and construction coordination	Existing	PennDOT D8 TMC	
		Planned 2	PennDOT STMC	
	Commercial vehicle enforcement information (Motor Carrier Division)	Existing	PSP Offices	
		Planned 2	PennDOT STMC	
	Media information	Existing	Regional Media Outlets	
	PennDOT D8 County Maintenance Offices	Incident information	Existing	911 Communication Centers, County EMA Centers, PennDOT D8 TMC, PTC Offices, PSP Offices
		Incident response coordination	Existing	911 Communication Centers, PennDOT D8 TMC
		Maintenance and construction response coordination	Existing	911 Communication Centers, County EMA Centers, Adjacent PennDOT District and County Offices, MDSHA Offices, PennDOT D8 TMC, PTC Offices

Element	Service (operation/data outputs to others)	Status	Destination Element
	Work zone information	Existing	911 Communication Centers, County EMA Centers, Adjacent PennDOT District and County Offices, MDSHA Offices, PennDOT D8 TMC, PTC Offices, PSP Offices, Regional Media Outlets, Information Service Providers
		Planned 2	Information Service Providers
	Work plan coordination	Existing	Adjacent PennDOT District and County Offices, MDSHA Offices, PennDOT D8 TMC, PTC Offices
	Road maintenance status	Existing	PennDOT D8 TMC , Information Service Providers, Adjacent PennDOT District and County Offices, Information Service Providers
	Current asset restriction	Existing	PennDOT D8 TMC , Information Service Providers, PSP Offices, Information Service Providers
	Road weather information	Existing	PennDOT D8 TMC, PSP Offices, Adjacent PennDOT District and County Offices, Regional Media Outlet, Information Service Providers
	Maintenance and construction vehicle dispatch coordination	Existing	PennDOT D8 Maintenance and Construction Vehicles
PennDOT D8 Field Devices	DMS control	Existing	Attractions and Event Promoters, PEMA Emergency Operation Center, Event Promoters

Element	Service (operation/data outputs to others)	Status	Destination Element
	Traffic images	Planned 2	PEMA Emergency Operation Center
	Field device status	Existing	PennDOT D8 County Maintenance Offices, PennDOT D8 TMC
PennDOT D8 Maintenance and Construction Vehicles	Dispatch coordination	Existing	PennDOT D8 County Maintenance Offices
	Location data	Existing	PennDOT D8 County Maintenance Offices
	Work zone status	Existing	PennDOT D8 County Maintenance Offices
	Work zone warning	Existing	PennDOT D8 County Maintenance Offices
PennDOT D8 TMC	Incident information	Existing	911 Communications Centers, County EMA Centers, Information Service Providers, PennDOT D8 County Maintenance Offices, PTC Offices, PSP Offices, Regional Transit Agency Offices, TRANSCOM Center, Regional Media Outlets, PennDOT Central Office Organizations
		Planned 2	PennDOT STMC
	Incident response coordination	Existing	911 Communications Centers, County EMA Centers, Adjacent PennDOT District and County Offices, MDSHA Offices, Municipal Traffic Management Offices, PennDOT D8 County Maintenance Offices, PTC Offices, PSP Offices, PennDOT Central Office Organizations
		Planned 2	PennDOT STMC

Element	Service (operation/data outputs to others)	Status	Destination Element
	Road network conditions	Existing	911 Communication Centers, Information Service Providers, PTC Offices, PSP Offices, Regional Media Outlets, PennDOT Central Office Organizations
		Planned 2	PennDOT D8 County Maintenance Offices, Regional Transit Agency Offices, PennDOT STMC
	Work zone information	Existing	911 Communication Centers, Adjacent PennDOT District and County Offices, PennDOT Central Office Organizations
		Planned 2	PennDOT STMC
	Work plan coordination	Existing	911 Communication Centers, Adjacent PennDOT District and County Offices, PennDOT D8 County Maintenance Offices, PTC Offices, PennDOT Central Office Organizations
	Maintenance and construction resource coordination	Existing	911 Communication Centers, Adjacent PennDOT District and County Offices, PennDOT D8 County Maintenance Offices, PennDOT Central Office Organizations
		Planned 2	PennDOT STMC
	Traffic information coordination	Existing	911 Communication Centers, Adjacent PennDOT District and County Offices, Attractions and Event Promoters, MDSHA Offices, Municipal Traffic Management Offices, PTC Offices, PennDOT Central Office Organizations

Element	Service (operation/data outputs to others)	Status	Destination Element
		Planned 2	PennDOT STMC
	DMS control coordination	Planned 2	911 Communication Centers, Adjacent PennDOT District and County Offices, Attractions and Event Promoters
	Archived road/lane/bridge closure information	Existing	County/Regional Planning Organizations
	Coordination during events	Existing	Attractions and Event Promoters
	Traffic signal control	Planned 2	Municipal Field Devices
	Current asset restrictions	Existing	Municipal Traffic Management Offices, Regional Transit Agency Offices
		Planned 2	PennDOT STMC
	Field device control	Existing	PennDOT D8 Field Devices
	Remote CCTV control	Planned 2	PSP Offices
	Incident command coordination	Existing	PennDOT D8 Service Patrol Vehicles
	Emergency dispatch coordination	Existing	PennDOT D8 Service Patrol Vehicles
	Traveler information	Existing	PennDOT Welcome Centers and Rest Areas, Regional Media Outlets
PennDOT D8 Service Patrol Vehicles	Incident command coordination	Existing	PennDOT D8 TMC
	Emergency dispatch coordination	Existing	PennDOT D8 TMC
Pennsylvania Office of Homeland Security	Threat information coordination	Existing	PEMA Emergency Operation Center

Element	Service (operation/data outputs to others)	Status	Destination Element
PennDOT STMC	Incident and emergency information and coordination	Planned 2	PEMA Emergency Operation Center, PennDOT Central Office Organizations, PennDOT D8 TMC, MDSHA Offices, PSP Offices, PTC Offices
	Request for archived data	Planned 2	PennDOT Central Office Organizations, PennDOT D8 TMC, MDSHA Offices
	Traffic information, restrictions, and conditions	Planned 2	PennDOT Central Office Organizations, PennDOT D8 TMC, MDSHA Offices, PTC Offices
	Work zone information	Planned 2	PennDOT Central Office Organizations, PennDOT D8 TMC, MDSHA Offices, PTC Offices
	Maintenance and Construction coordination	Planned 2	PennDOT Central Office Organizations, PennDOT D8 TMC, MDSHA Offices, PTC Offices
	Commercial vehicle enforcement information	Planned 2	PennDOT Central Office Organizations, Commercial Vehicle Company Offices
	Road weather information	Planned 2	PennDOT Central Office Organizations, PennDOT D8 TMC, PTC Offices, Regional Media Outlets
	Media information	Planned 2	Regional Media Outlets
PennDOT Welcome Centers and Rest Areas	N/A	N/A	N/A

Element	Service (operation/data outputs to others)	Status	Destination Element
Personal Traveler Information Devices	Incident notification and information	Existing	911 Communication Centers, PennDOT Central Office Organizations, PTC Offices
PSP Offices	Incident and emergency information and coordination	Existing	911 Communication Centers, County EMA Centers, Municipal Public Safety Offices, PennDOT Central Office Organizations, PennDOT D8 County Maintenance Offices, PennDOT D8 TMC, MDSHA Offices, PTC Offices, PSP Troop T Highspire
		Planned 2	PennDOT STMC
	Commercial vehicle credentialing and safety information (overweight vehicles)	Existing	PennDOT Central Office Organizations
	Maintenance and Construction information	Existing	PennDOT D8 County Maintenance Offices
	Request for towing	Existing	Towing Industry Responders
	Incident and emergency dispatch of PSP Vehicles	Existing	PSP Vehicles
	Information for the media	Existing	Regional Media Outlets
PSP Troop T Highspire	Incident and emergency information and coordination	Existing	PSP Offices, PTC Offices
	Information for the media	Existing	Regional Media Outlets
	Incident and emergency dispatch of PSP Vehicles	Existing	PSP Troop T Vehicles
PSP Troop T Vehicles	Emergency dispatch information	Existing	PSP Troop T Highspire, PTC Offices
	Vehicle tracking	Existing	PSP Troop T Highspire, PTC Offices
PSP Vehicles	Emergency dispatch information	Existing	PSP Offices

Element	Service (operation/data outputs to others)	Status	Destination Element
	Vehicle tracking	Existing	PSP Offices
PTC Field Devices	CCTV images used for surveillance	Existing	PTC Offices
	Traffic flow information	Existing	PTC Offices
	RWIS data	Planned 2	PTC Offices
	CCTV images used infrastructure monitoring	Planned 2	PTC Offices
PTC Maintenance and Construction Vehicles	Maintenance and Construction information	Existing	PTC Offices
PTC Offices	Incident information	Existing	911 Communication Centers, County EMA Centers, Municipal Traffic Management offices, PEMA Emergency Operation Center, PennDOT D8 County Maintenance Offices, PennDOT D8 TMC, Regional Medial Outlets, TRANSCOM Center
	Incident response coordination	Existing	911 Communication Centers, County EMA Centers, Incident Response Agency Offices, PEMA Emergency Operation Center, PennDOT D8 TMC
	Maintenance and construction resource coordination	Existing	911 Communication Centers, County EMA Centers, PennDOT D8 County Maintenance Offices

Element	Service (operation/data outputs to others)	Status	Destination Element
	Road network condition	Existing	911 Communication Centers, County EMA Centers, Commercial Vehicle Company Offices, PEMA Emergency Operation Center, PennDOT D8 TMC, Regional Media Outlets
	Credential verification	Existing	Commercial Vehicle Company Offices
	Archived road/lane/bridge closures information	Existing	County/Regional Planning Organizations
	Constructions project's schedule	Existing	County/Regional Planning Organizations
	Archived data coordination	Existing	County/Regional Planning Organizations
	Traffic information coordination	Existing	Attractions and Event Promoters, Municipal Traffic Management Offices, PennDOT D8 TMC
	Current asset restrictions	Existing	Municipal Traffic Management Offices
	Remote CCTV control	Planned 2	PEMA Emergency Operation Center
	Traffic control coordination	Planned 2	PEMA Emergency Operation Center
	Work zone information	Existing	PennDOT D8 County Maintenance Offices
	Work plan coordination	Existing	PennDOT D8 County Maintenance Offices, PennDOT D8 TMC
	Emergency dispatch coordination	Existing	Towing Industry Responders
	Traveler information	Existing	Regional Media Outlet, Personal Traveler Information Devices
PTC Service Plazas	N/A	N/A	N/A

Element	Service (operation/data outputs to others)	Status	Destination Element
PTC Toll Plazas	Electronic toll collection	Existing	Commercial Vehicles, Passenger Vehicles
	Safety inspection (electronic)	Existing	Commercial Vehicles
Regional Media Outlets	N/A	N/A	N/A
Regional Personal Traveler Cards	Payment for transit service	Planned 2	Regional Transit Vehicles
Regional Transit Agency Offices	Transit incident information	Existing	911 Communication Centers, County EMA Centers, Information Service Providers, Regional Media Outlets
	Transit emergency response coordination	Existing	911 Communication Centers, County EMA Centers
	Transit Archived data	Existing	County/Regional Planning Organizations, PennDOT Central Office Organizations
	Coordination during events	Existing	Attractions and Event Promoters
	Road network probe information	Planned 2	PennDOT D8 TMC
	Traveler information	Existing	Personal Traveler Information Devices, Regional Media Outlets
	Trip Plan	Planned 2	Personal Traveler Information Devices
	Customized personal transit information	Planned 2	Personal Traveler Information Devices
	Secured area monitoring control	Existing	Regional Transit Remote Traveler Support
	Communication with the vehicles	Existing	Regional Transit Vehicles

Element	Service (operation/data outputs to others)	Status	Destination Element
	Fare management information	Existing	Regional Transit Vehicles
	Schedule information	Existing	Regional Transit Vehicles
Regional Transit Remote Traveler Support	Secured area monitoring data	Existing	Regional Transit Agency Offices
Regional Transit Vehicles	Fare and payment information	Existing	Regional Transit Agency Offices
	Emergency notification	Existing	Regional Transit Agency Offices
	Transit vehicle location	Existing	Regional Transit Agency Offices
	Transit vehicle passenger and use data	Existing	Regional Transit Agency Offices
	Transit vehicle schedule performance	Existing	Regional Transit Agency Offices
Towing Industry Responders	Emergency dispatch coordination	Existing	911 Communication Centers, PTC Offices, PSP Offices
TRANSCOM Center	Incident information	Existing	PTC Offices, PEMA Emergency Operation Center, PennDOT D8 TMC, PennDOT Central Office Organizations
		Planned 2	911 Communication Centers, County EMA Centers, Information Service Providers, PennDOT STMC

4 Regional ITS Architecture

The Regional ITS Architecture was created using the process discussed in Section 1.1 'Architecture Process' on this document. The development of the Regional ITS Architecture consisted of: (1) developing a Strawman document using the RAP as a source of information gathering, (2) outreaching to ITS stakeholders in the Region and validating the Strawman, and (3) revising the Architecture to reflect stakeholder inputs from the outreach process. This process is further discussed below.

Strawman

Using existing documentation and information gathered from the RAP (Section 3 tables) a Strawman, or draft, Regional ITS Architecture was developed. The RAP consisted of key stakeholders in the Region and was used to gather preliminary information for Architecture development. This information was then used to assign actual and potential "interconnects" and "information flows" between among the ITS elements. The result was this effort was a draft version of this Final Report, known as the Strawman Architecture. The Strawman Architecture document was created and submitted to PennDOT on April 22, 2004.

Outreach

Outreach is the sharing of information to stakeholders. The ITS Architecture effort was led with outreach being a central activity of the project. Stakeholders were gathered through an extensive effort working with the RAP. RAP members identified key regional persons and agencies involved in surface transportation activities that may benefit from the ITS Architecture effort. Three outreach segments were scheduled into the process to gather input and reach out to these important stakeholders:

Outreach Activity 1: Regional Meeting (called the 1st Bookend meeting) - this meeting provided an introduction to ITS, provided context for the effort and set the stage for smaller working meetings.

Outreach Activity 2: Small Working Meetings (called Validation meetings) - these were a series of meetings that were smaller in size and broken into functional areas such as; traffic, emergency management, incident management, enforcement, transit and planning. Stakeholders attending these meetings reviewed and edited a piece of the draft of the ITS Architecture that pertained directly to their agency and job function. In this way the ITS Architecture became validated by each stakeholder represented in the ITS Architecture.

Outreach Activity 3: Regional Meeting (called the 2nd Bookend meeting) - this meeting concluded the ITS Architecture effort and launched the next steps of preparing a regional operations plan, that has input into the regional long-range plan and regional transportation improvement program.

All of these activities were led by PennDOT and regional champions. In many cases RAP members championed the effort as well. The success of this regions ITS Architecture effort can be directly tied to the efforts of regional champions and the willingness of the regional stakeholders to participate to complete this effort.

Bookend Meeting #1

On July 21, 2004, a Stakeholders Bookend Meeting convened in Harrisburg Pennsylvania. The meeting began the outreach process by introducing Regional stakeholders to ITS operation, ITS planning, and the Architecture project.

Agencies represented at the Bookend Meeting included PennDOT, PTC, airports, transit agencies, counties, cities, emergency management agencies, planning offices, townships, partnership organizations, the enforcement community, and policy organizations. Detailed meeting minutes, including the stakeholders in attendance, are included in Appendix F.

Validation Meetings

Validation meetings were conducted in July and August 2004 with small intimate groups of stakeholders to validate the Strawman Architecture. These meetings were used to expand, tailor, and refine the documentation of existing and planned interconnects and information flows. Detailed meeting minutes from the Validation Meetings are contained in Appendix G.

Bookend Meeting #2

Bookend Meeting #2 was held on November 15, 2004 in Harrisburg, Pennsylvania. The meeting included many of the stakeholders that participated at the first Bookend Meeting and validation meetings. Detailed meeting minutes are included in Appendix H.

Final Architecture

This report, Final Regional ITS Architecture, was developed based on comments received from stakeholders during the outreach process. Stakeholder comments from the outreach process were reconciled and incorporated into the Strawman document, resulting in the Final Architecture. The following sections depict the final ITS Architecture diagrams. These diagrams include:

- Subsystem Interconnect Diagrams,
- Interconnect Diagrams, and
- Information Flow Diagrams.

4.1 Subsystem Interconnect Diagram

This diagram presents the Regional ITS Architecture relationships between subsystems and the communication between them. As shown this diagram provides a visual representation of data used in the development of the Regional ITS Architecture. Subsystems that do not pertain this particular Regional ITS Architecture are denoted in a light grey text. The Subsystem Interconnect Diagram is divided into four system classes; Travelers, Centers, Vehicles, and Roadside. A color scheme (green, yellow, blue, and red) links subsystems and elements back to the System Interconnect Diagram.

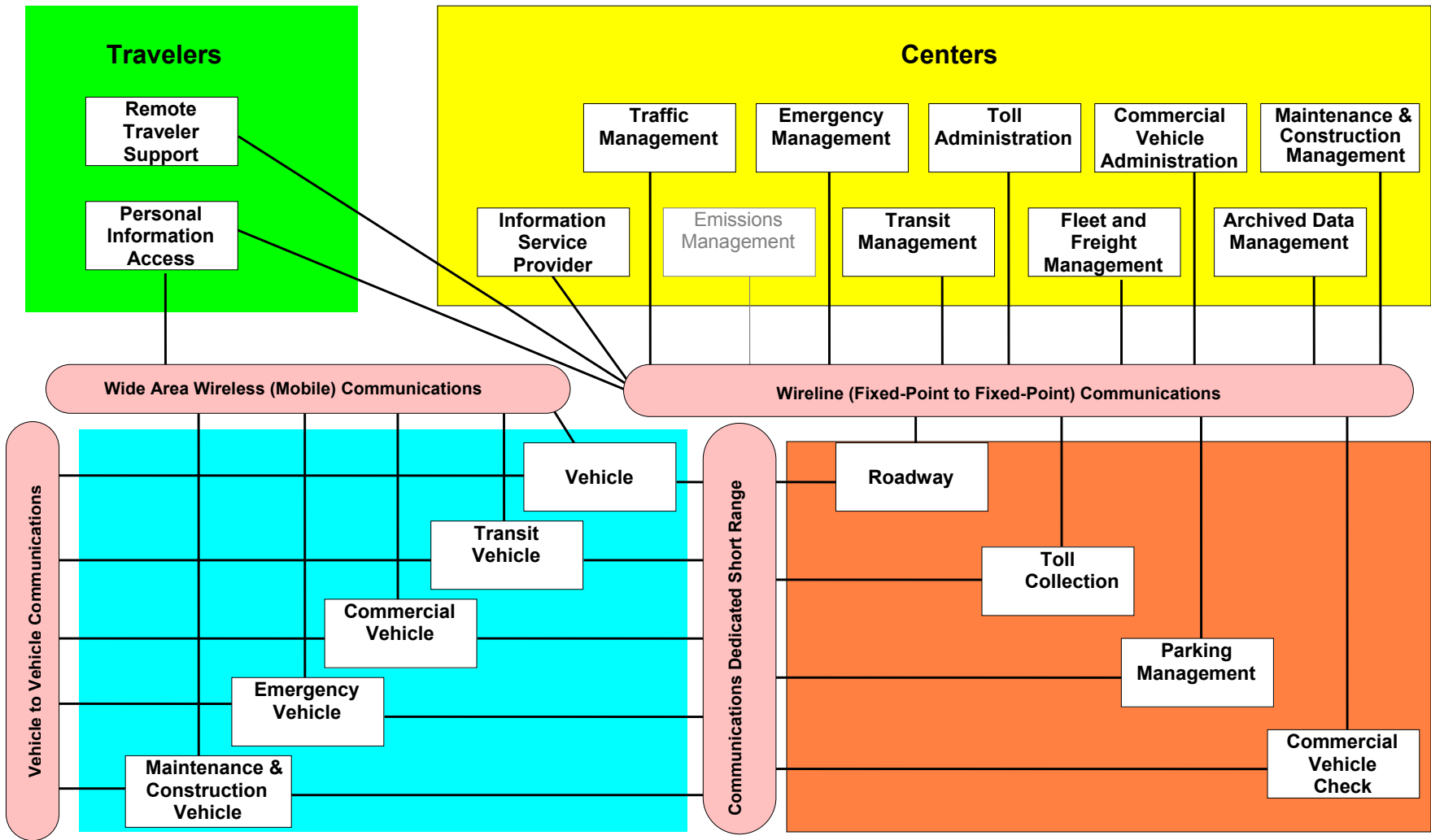


Figure 4-1: Subsystem Interconnect Diagram

4.2 Regional Subsystem Interconnect Diagram showing Elements

This diagram presents the regional ITS Architecture relationships between subsystems, the communication between them, and the elements within each subsystem. As shown this diagram provides a visual representation of data used in the development of the Regional ITS Architecture. In this diagram elements have been added to make this diagram useful for regional specificity. This information is also provided in a tabular format listed by element.

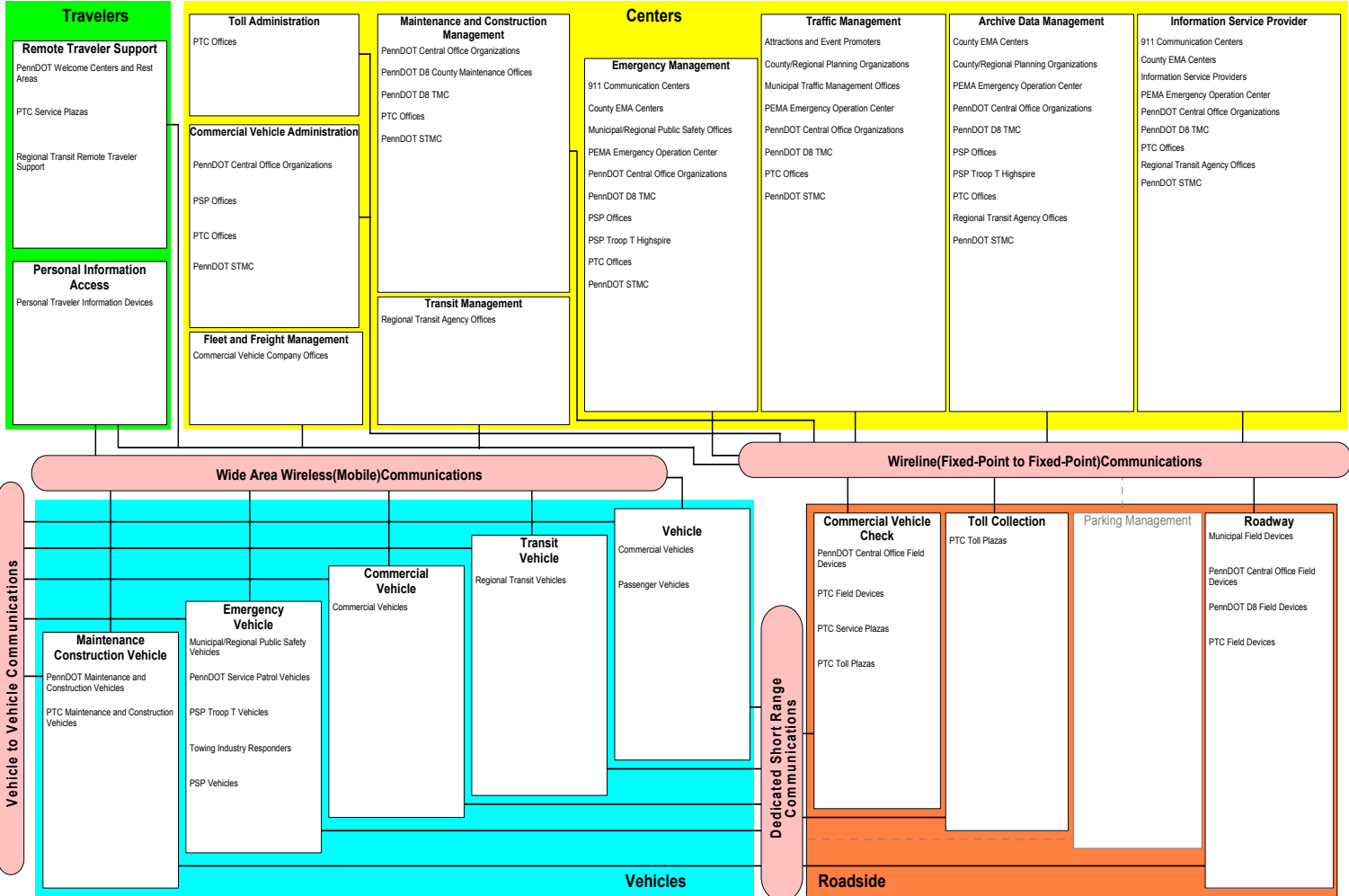


Figure 4-2: Regional Subsystem Interconnect Diagram showing Elements

Table 4-1: Regional Subsystems/Terminators

Element	Subsystem/Terminator mapped to:
911 Communication Centers	Emergency Management Information Service Provider
Adjacent PennDOT District and County Offices	Emergency Management Information Service Provider Maintenance and Construction Management Traffic Management
Attractions and Event Promoters	Event Promoters
Commercial Vehicle Company Offices	Fleet and Freight Management
Commercial Vehicles	Commercial Vehicle Vehicle
County EMA Centers	Archived Data Management Emergency Management Information Service Provider
County/Regional Planning Organizations	Archived Data Management Traffic Management
High Threat Facilities	Emergency Management
Incident Response Agency Offices	Emergency Management
Information Service Providers	Information Service Provider
MDSHA Offices	Archived Data Management Emergency Management Information Service Provider Maintenance and Construction Management Traffic Management
MDSP Offices	Emergency Management
MEMA Emergency Operation Center	Emergency Management
Municipal Field Devices	Roadway
Municipal/Regional Public Safety Offices	Emergency Management
Municipal/Regional Public Safety Vehicles	Emergency Vehicle
Municipal Traffic Management Offices	Traffic Management
Passenger Vehicles	Vehicle
PEMA Emergency Operations Center	Archived Data Management

Element	Subsystem/Terminator mapped to:
	Emergency management Information Service Provider Traffic Management
PennDOT Central Office Field Devices	Commercial Vehicle Check Roadway
PennDOT Central Office Organizations	Archived Data Management Commercial Vehicle Administration Emergency Management Information Service Provider Maintenance and Construction Management Traffic Management
PennDOT D8 County Maintenance Offices	Maintenance and Construction Management
PennDOT D8 TMC	Archived Data Management Archived Data User Systems Emergency Management Information Service Provider Maintenance and Construction Management Traffic Management
PennDOT D8 Maintenance and Construction Vehicles	Maintenance and Construction Vehicle
PennDOT D8 Service Patrol Vehicles	Emergency Vehicle
PennDOT STMC	Archived Data Management Commercial Vehicle Administration Emergency Management Information Service Provider Maintenance and Construction Management Traffic Management
PennDOT Welcome Centers and Rest Areas	Remote Traveler Support
Pennsylvania Office of Homeland Security	Emergency Management
Personal Traveler Information Devices	Personal Information Access
Private Wrecker Units	Emergency Vehicle
PSP Offices	Archived Data Management Commercial Vehicle Administration Emergency Management

Element	Subsystem/Terminator mapped to:
PSP Troop T Highspire	Archived Data Management Emergency Management
PSP Troop T Vehicles	Emergency Vehicle
PSP Vehicles	Emergency Vehicle
PTC Field Devices	Commercial Vehicle Check Emergency Telecommunications System Roadway
PTC Maintenance and Construction Vehicles	Maintenance and Construction Vehicle
PTC Offices	Archived Data Management Commercial Vehicle Administration Emergency Management Information Service Provider Maintenance and Construction Management Toll Administration Traffic Management
PTC Service Plazas	Commercial Vehicle Check Emergency Telecommunications System Remote Traveler Support
PTC Toll Plazas	Commercial Vehicle Check Toll Collection
Regional Media Outlets	Media
Regional Personal Traveler Card	Traveler Card
Regional Transit Agency Offices	Archived Data Management Information Service Provider Transit Management
Regional Transit Remote Traveler Support	Remote Traveler Support
Regional Transit Vehicles	Transit Vehicle
TRANSCOM Center	Information Service Provider

4.3 Interconnect Matrix

This section documents the actual and potential “interconnects” (i.e., interfaces) among the ITS elements. Interconnects show where one operation will connect data or information with another operation. The section is primarily documented as Turbo software output.

Table 4-2: Regional Interconnect Matrix

	911 Communication Centers	Adjacent PennDOT District and County Offices	Attractions and Event Promoters	Commercial Vehicle Company Offices	Commercial Vehicles	County EMA Centers	County/Regional Planning Organizations	High Threat Facilities	Incident Response Agency Offices	Information Service Providers	MDSHA Offices	MDSP Offices	MEMA Emergency Operation Center	Municipal Field Devices	Municipal/Regional Public Safety Offices	Municipal/Regional Public Safety Vehicles	Municipal Traffic Management Offices	Passenger Vehicles	PEMA Emergency Operation Center	PennDOT Central Office Field Devices	PennDOT Central Office Organizations	PennDOT D8 County Maintenance Offices	PennDOT D8 Field Devices	PennDOT D8 TMC	PennDOT D8 Maintenance and Construction Vehicles	PennDOT D8 Service Patrol Vehicles	PennDOT STMC	PennDOT Welcome Centers and Rest Areas	Pennsylvania Office of Homeland Security	Personal Traveler Information Devices	PSP Offices	PSP Troop T Highspire	PSP Troop T Vehicles	PSP Vehicles	PTC Field Devices	PTC Maintenance and Construction Vehicles	PTC Offices	PTC Service Plazas	PTC Toll Plazas	Regional Media Outlets	Regional Personal Traveler Card	Regional Transit Agency Offices	Regional Transit Remote Traveler Support	Regional Transit Vehicles	Towing Industry Responders	TRANSCOM Center			
911 Communication Centers						X		X	X	X					X	X			X			X		X															X				X		X				
Adjacent PennDOT District and County Offices																					X		X																										
Attractions and Event Promoters										X							X					X	X								X										X								
Commercial Vehicle Company Offices					X													X		X						X																							
Commercial Vehicles				X																X																	X												
County EMA Centers	X							X	X	X				X					X			X		X						X										X						X			
County/Regional Planning Organizations																X				X			X				X															X							
High Threat Facilities	X					X																																											
Incident Response Agency Offices	X					X													X																														
Information Service Providers	X		X			X																X	X					X	X												X						X		

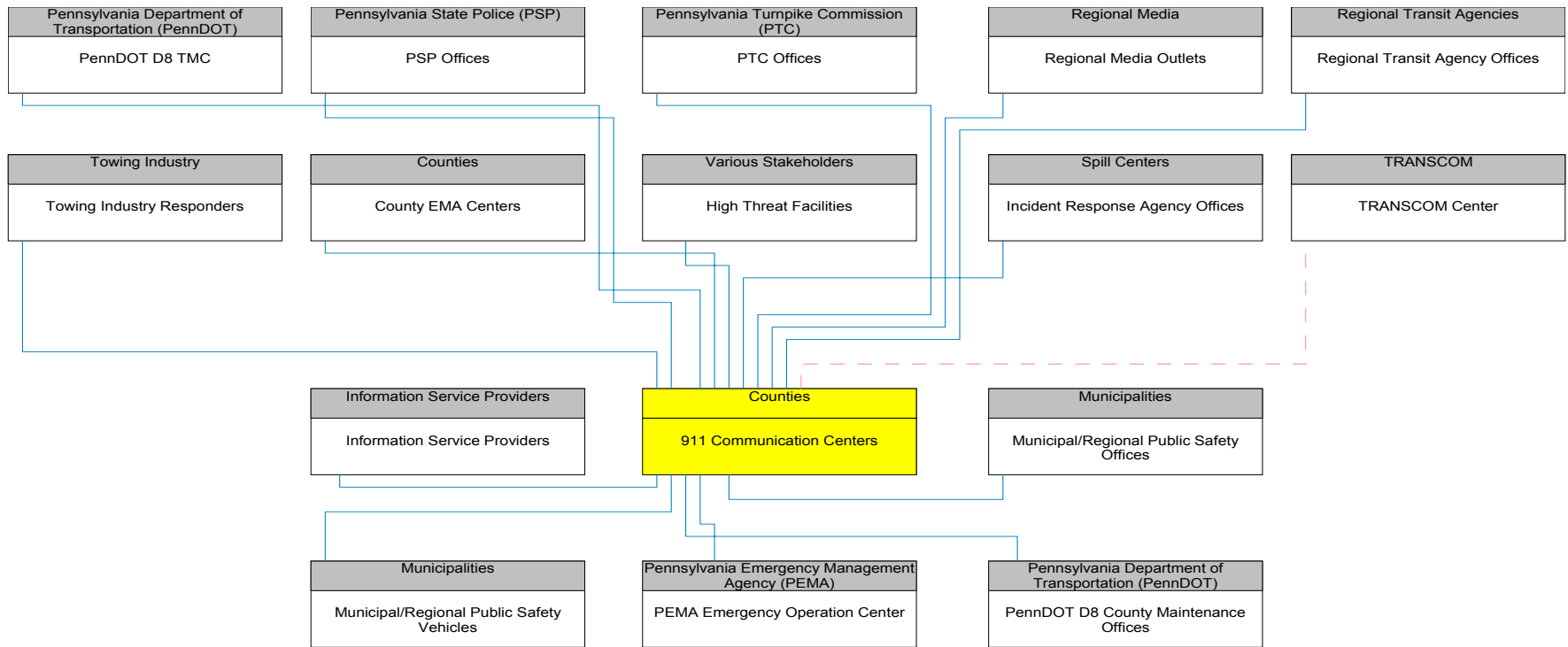
4.4 ITS Architecture

This section documents the “information flow” between the elements. The information flows describe what data or information is passing between one operation and another operation. The section is primarily documented as Turbo software outputs.

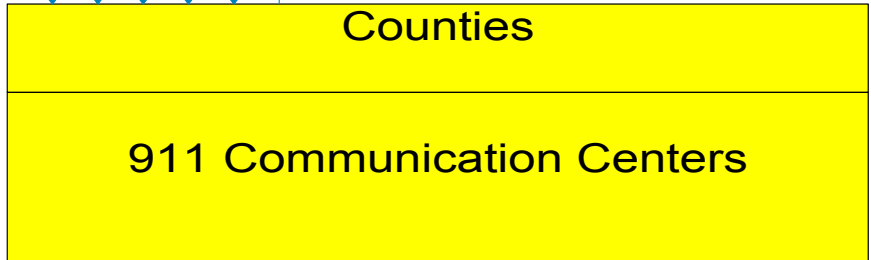
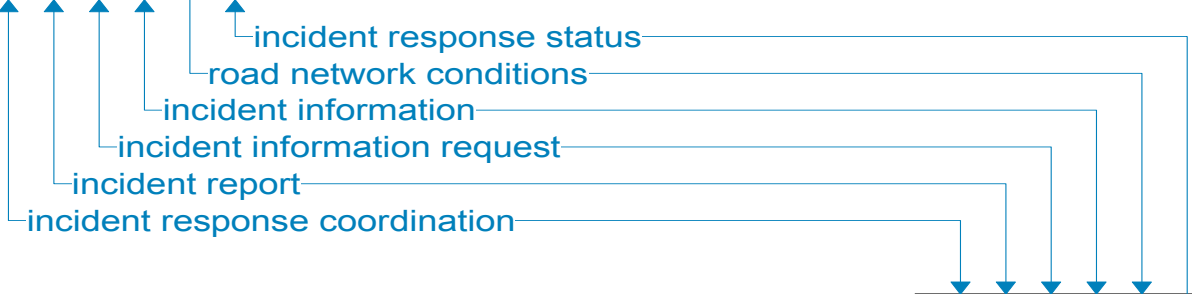
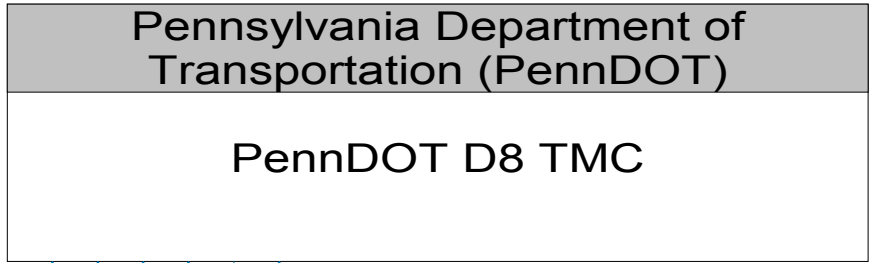
911 Communication Centers



911 Communication Centers Interconnect Diagram



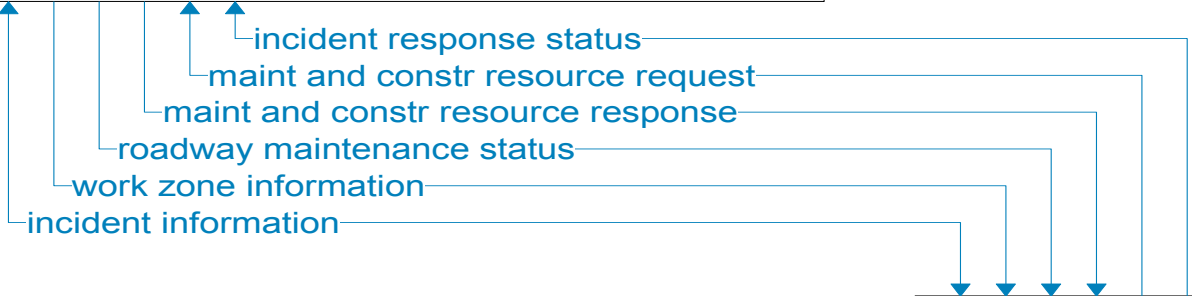
— Existing
- - - Planned



Existing
Planned

Pennsylvania Department of
Transportation (PennDOT)

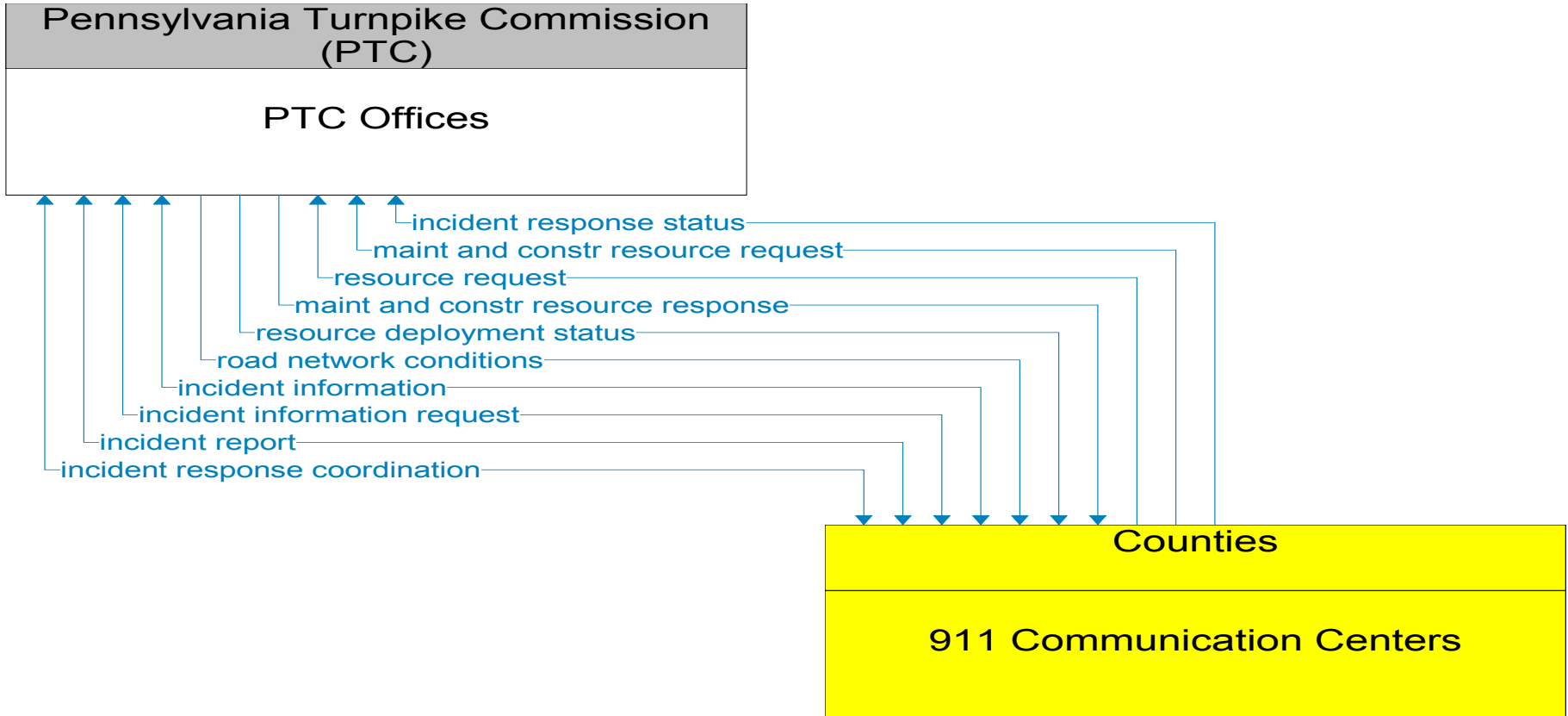
PennDOT D8 County Maintenance
Offices



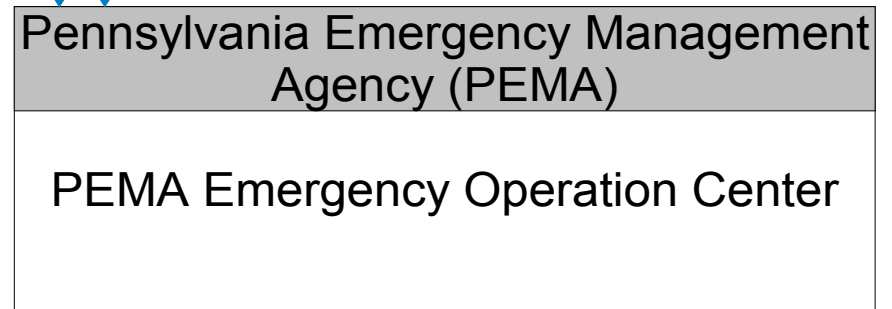
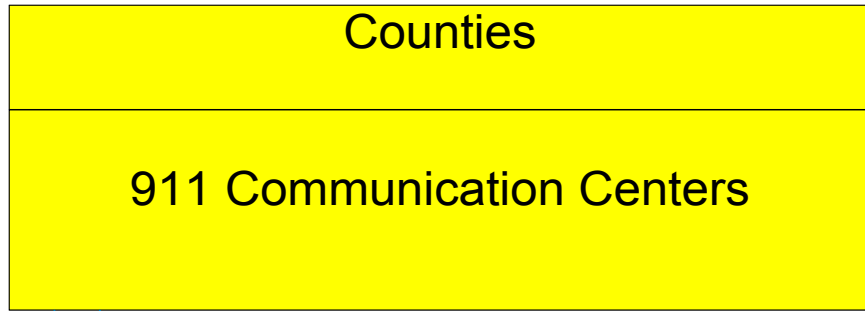
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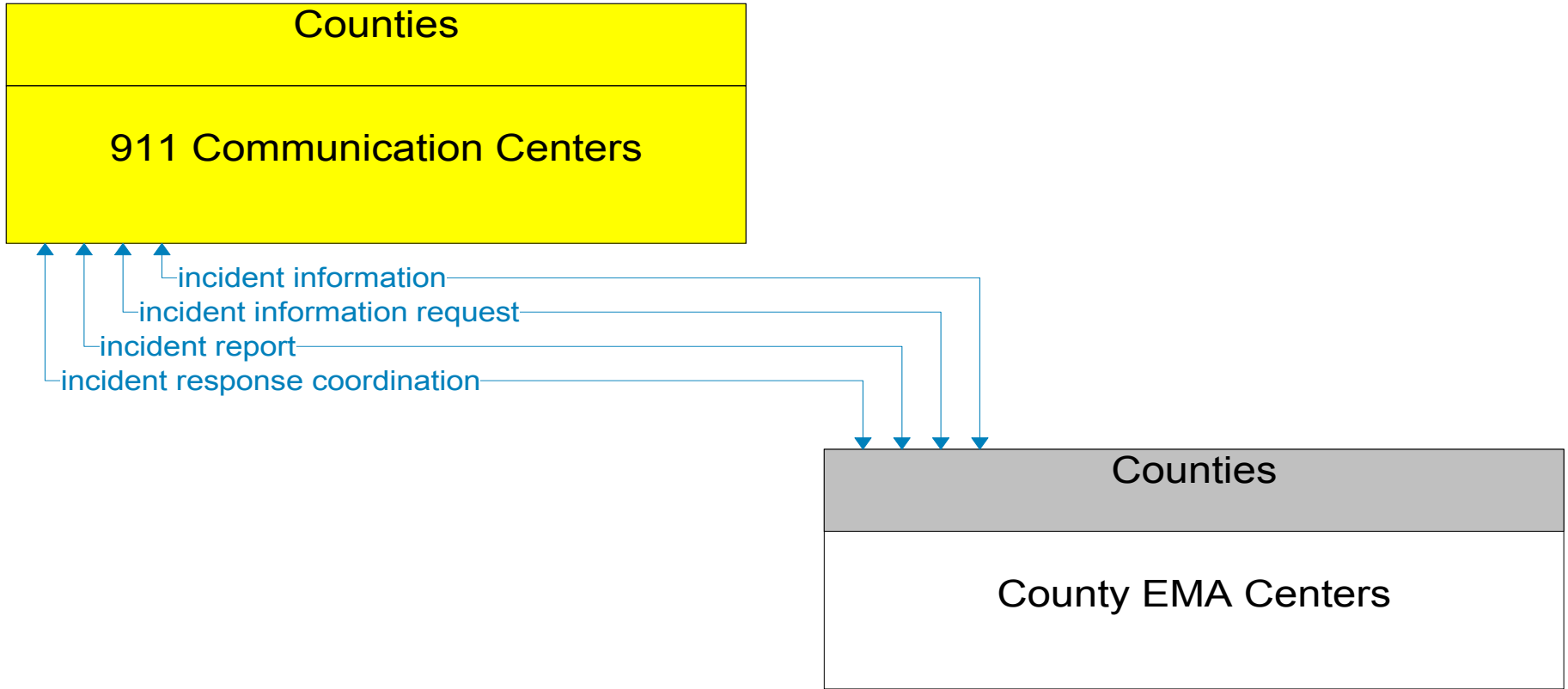
911 Communication Centers

Existing
Planned

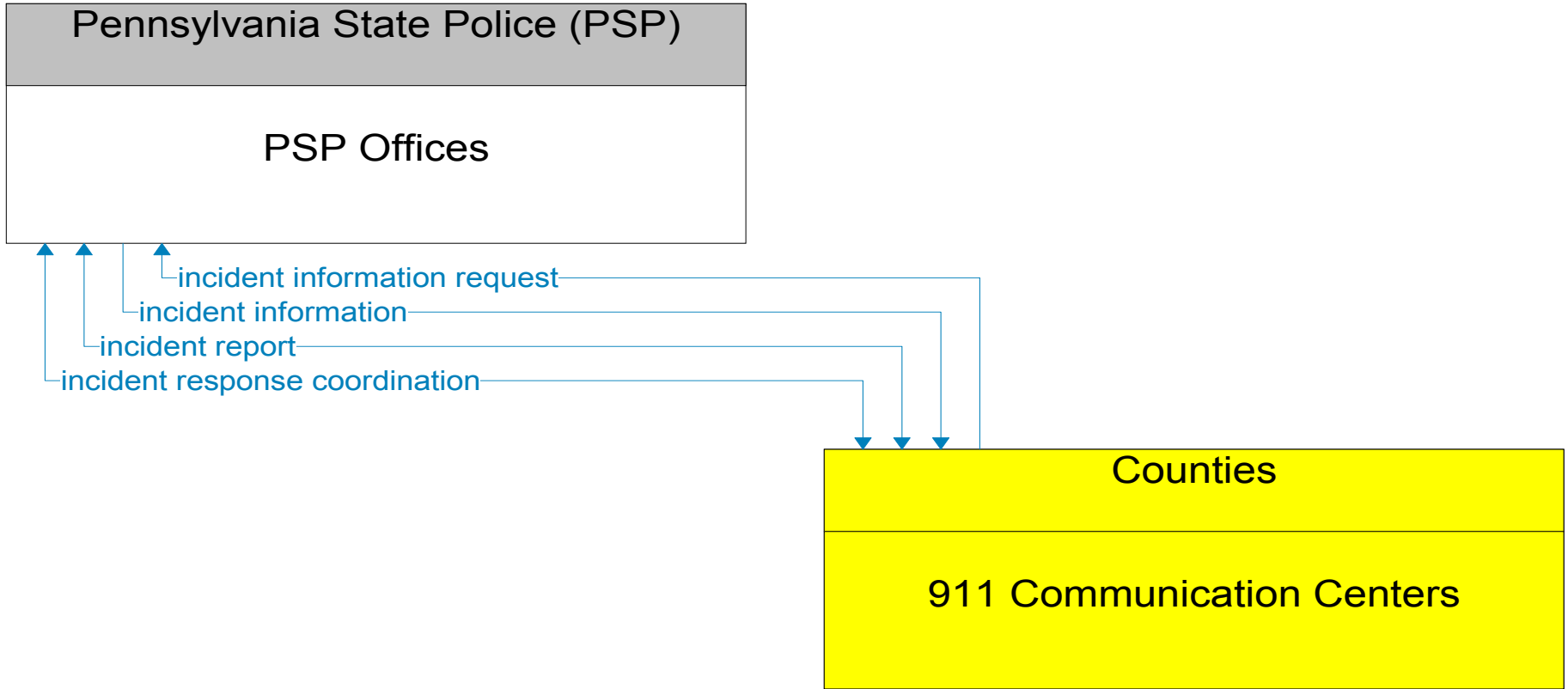


———— Existing
- - - - - Planned

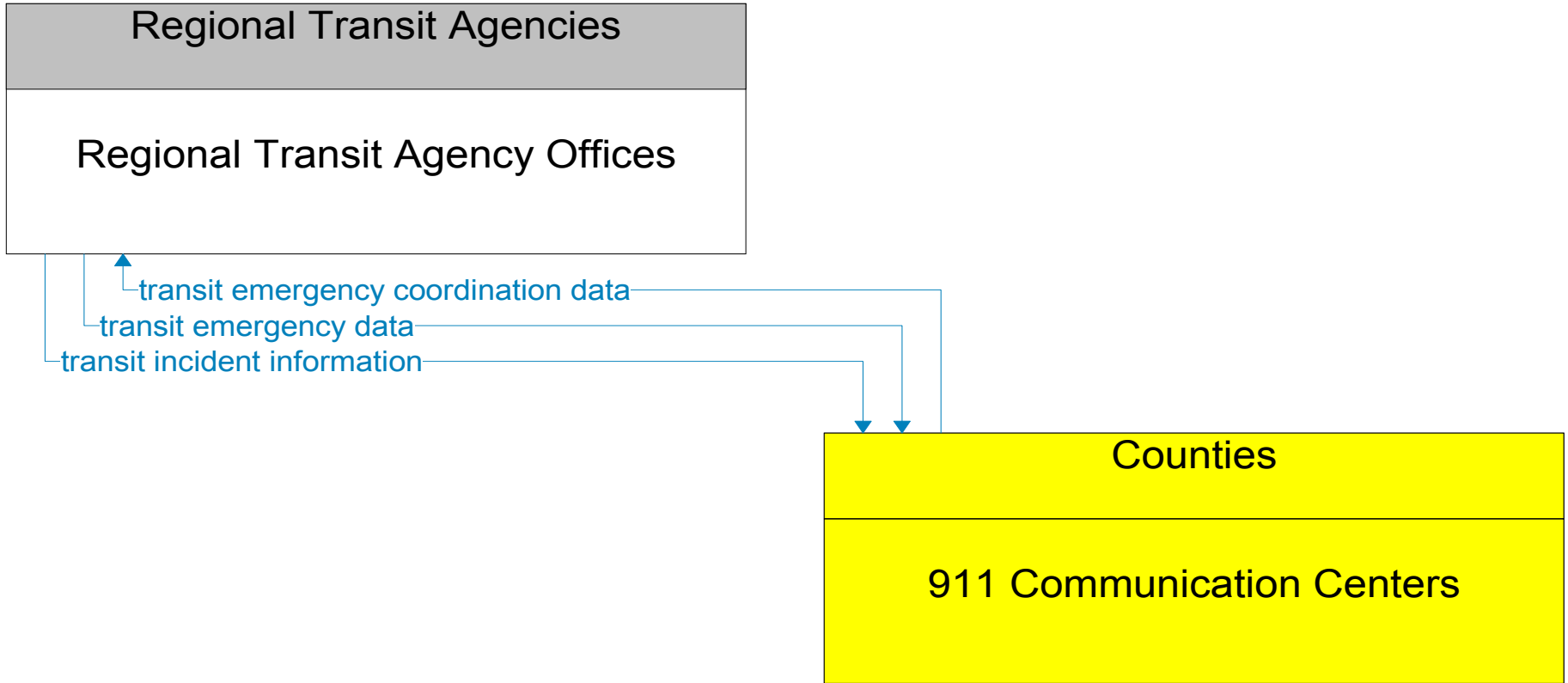




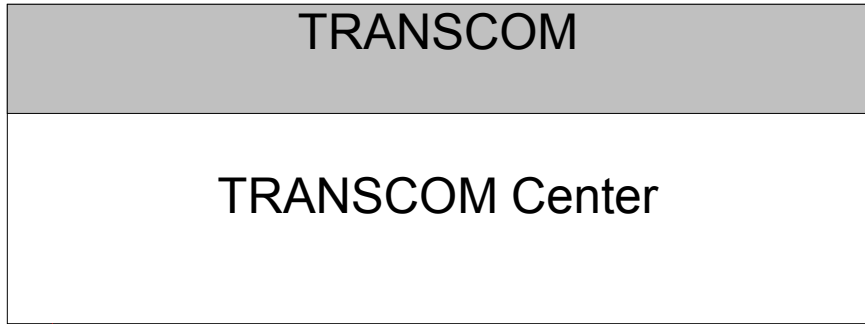
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----- Planned



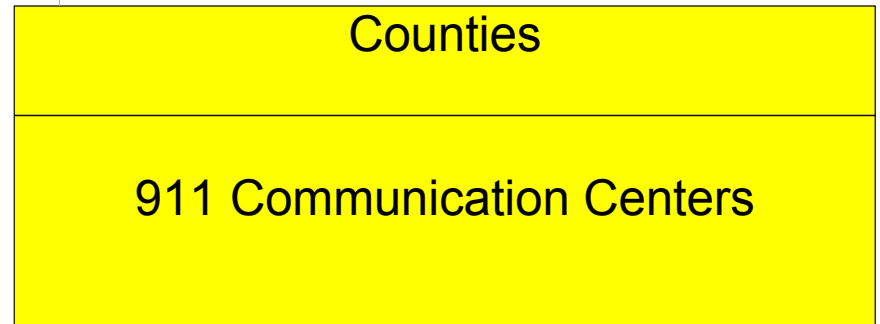
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- - - - - Planned



———— Existing
- - - - - Planned

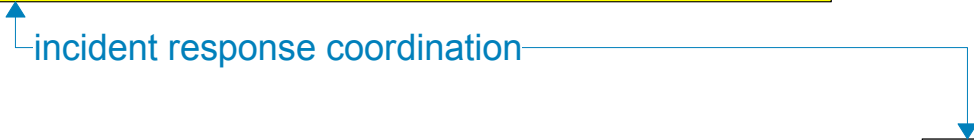
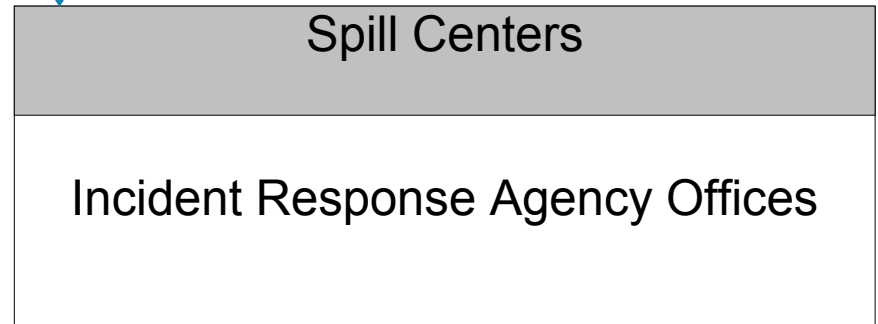
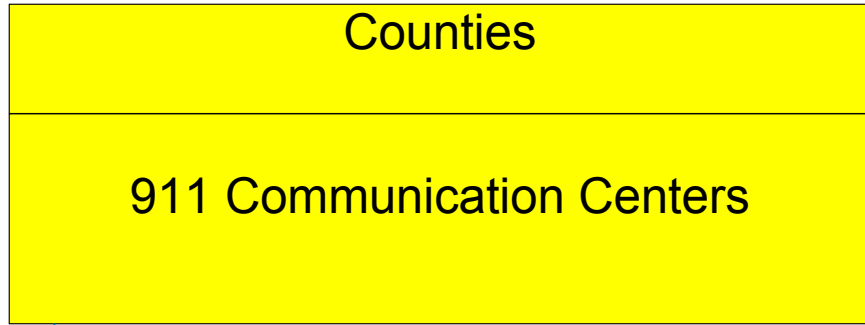


ISP coordination

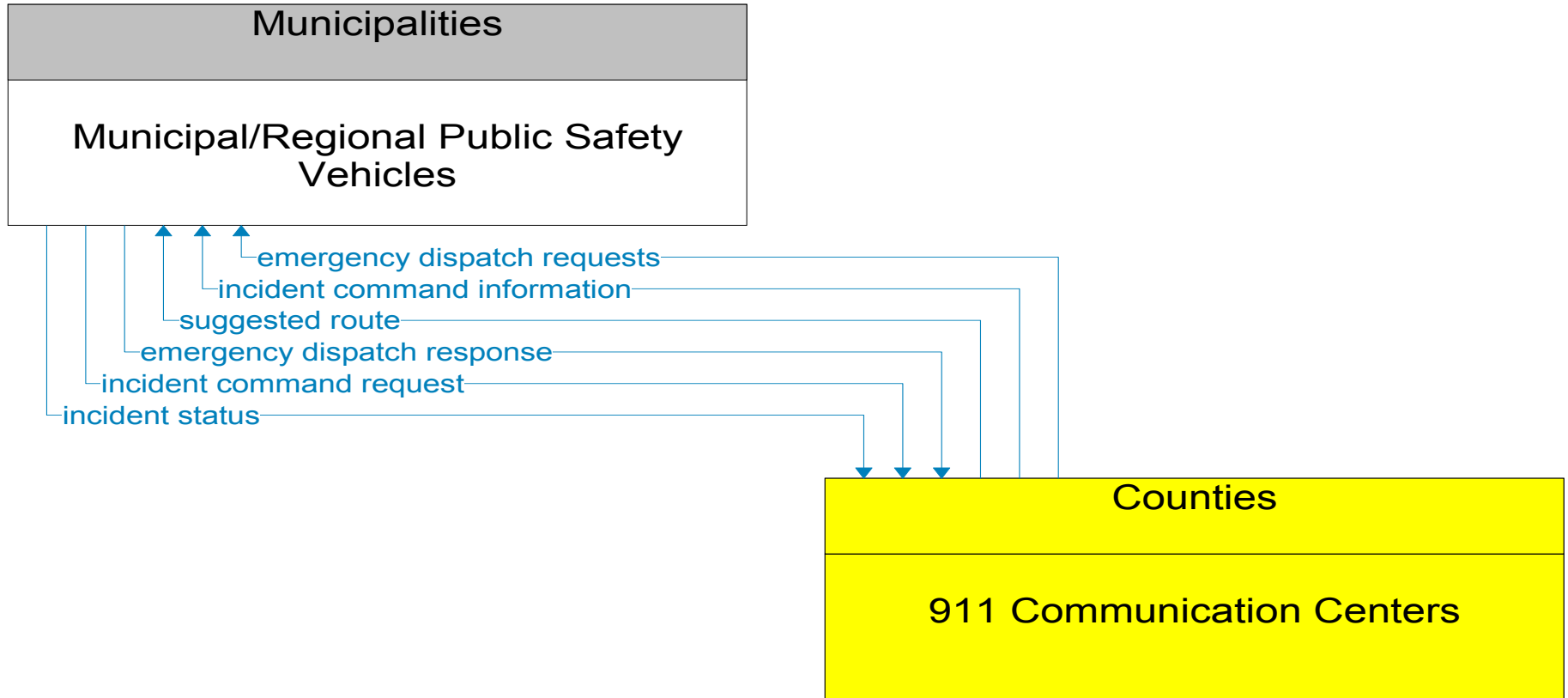


Existing
Planned

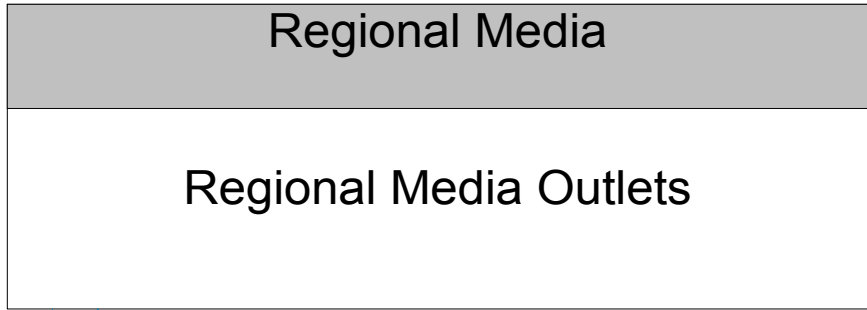




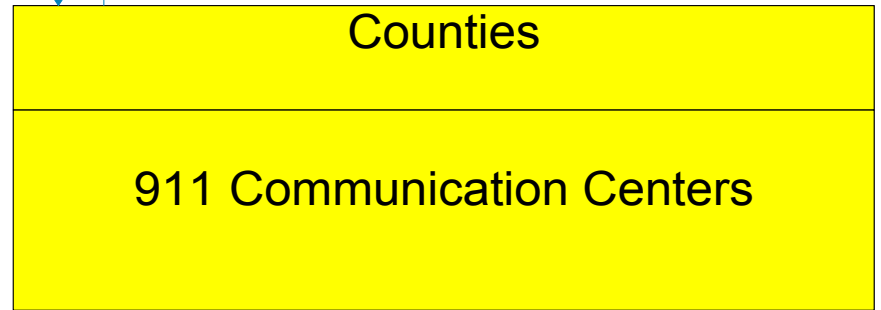
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- - - - - Planned



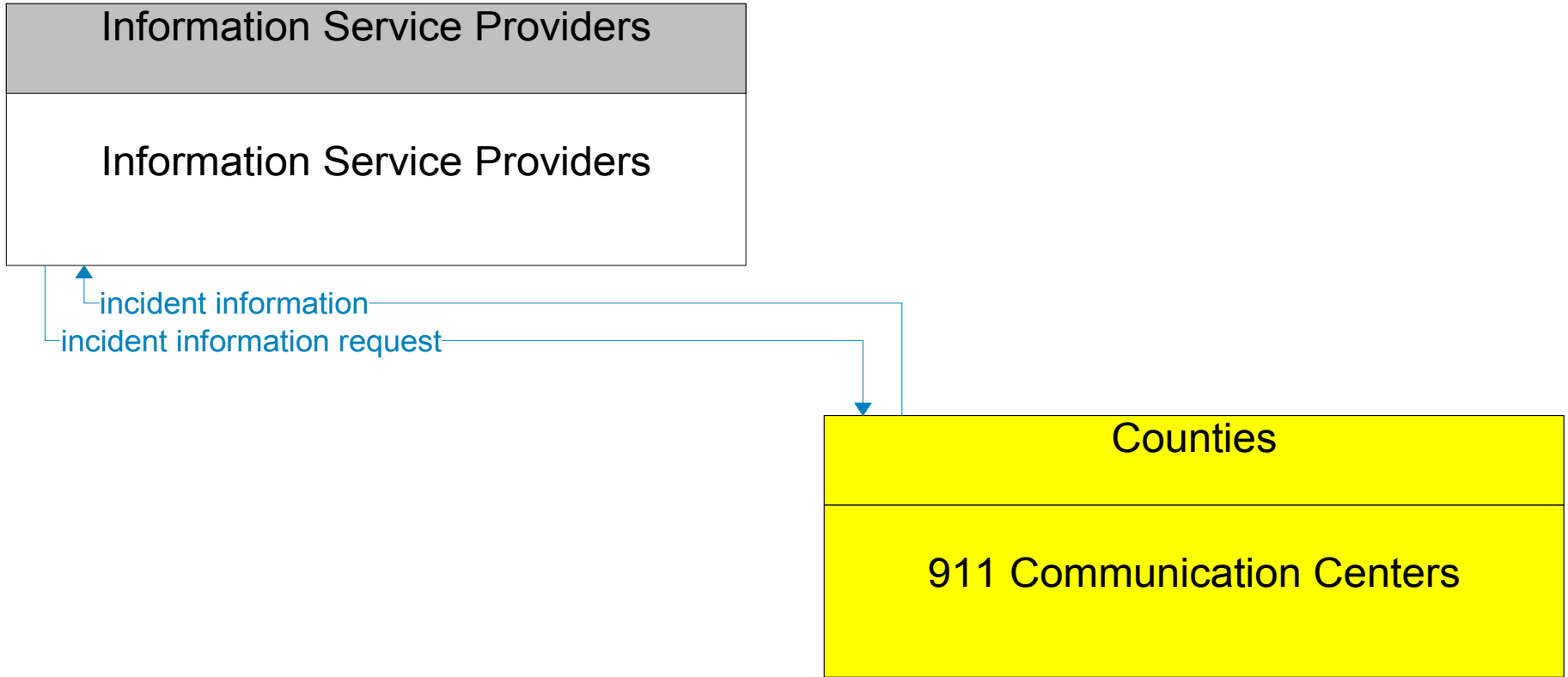
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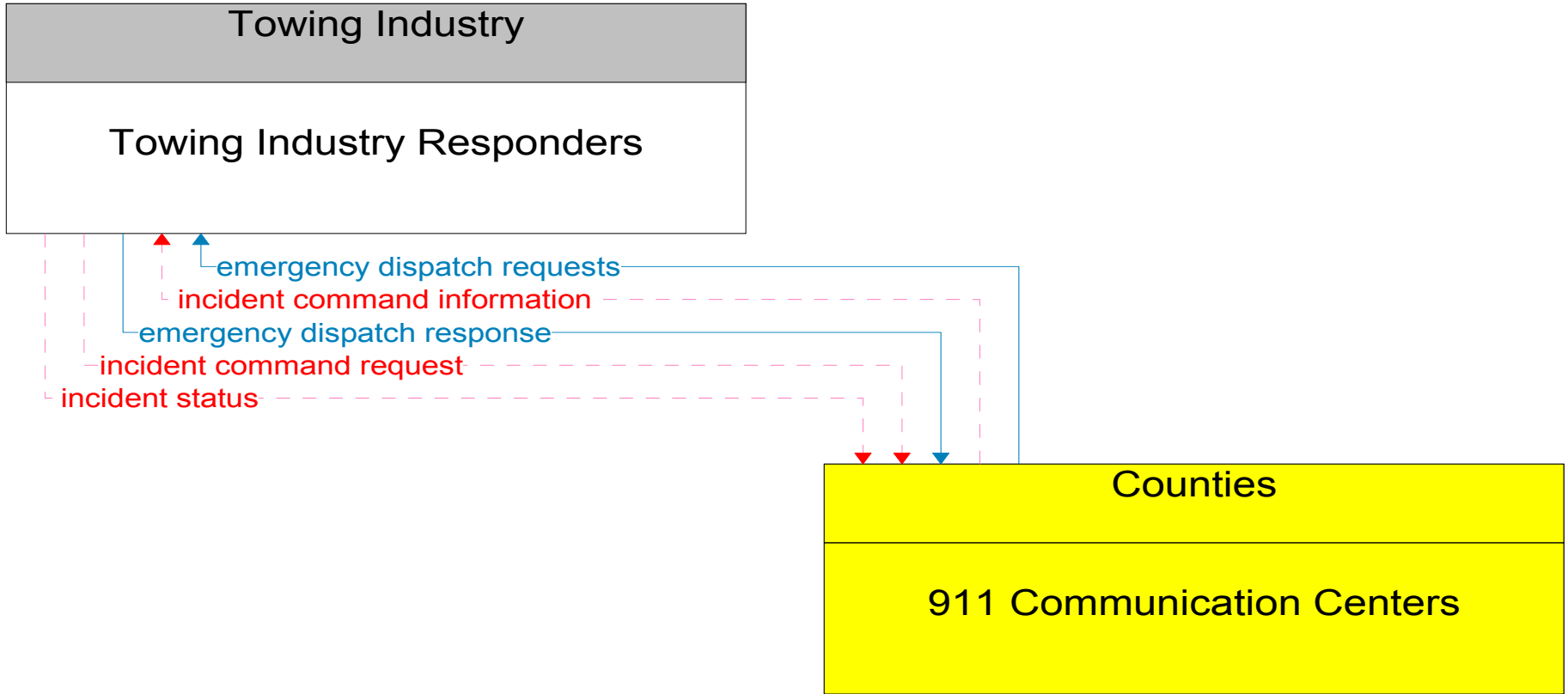
incident information for media
media information request



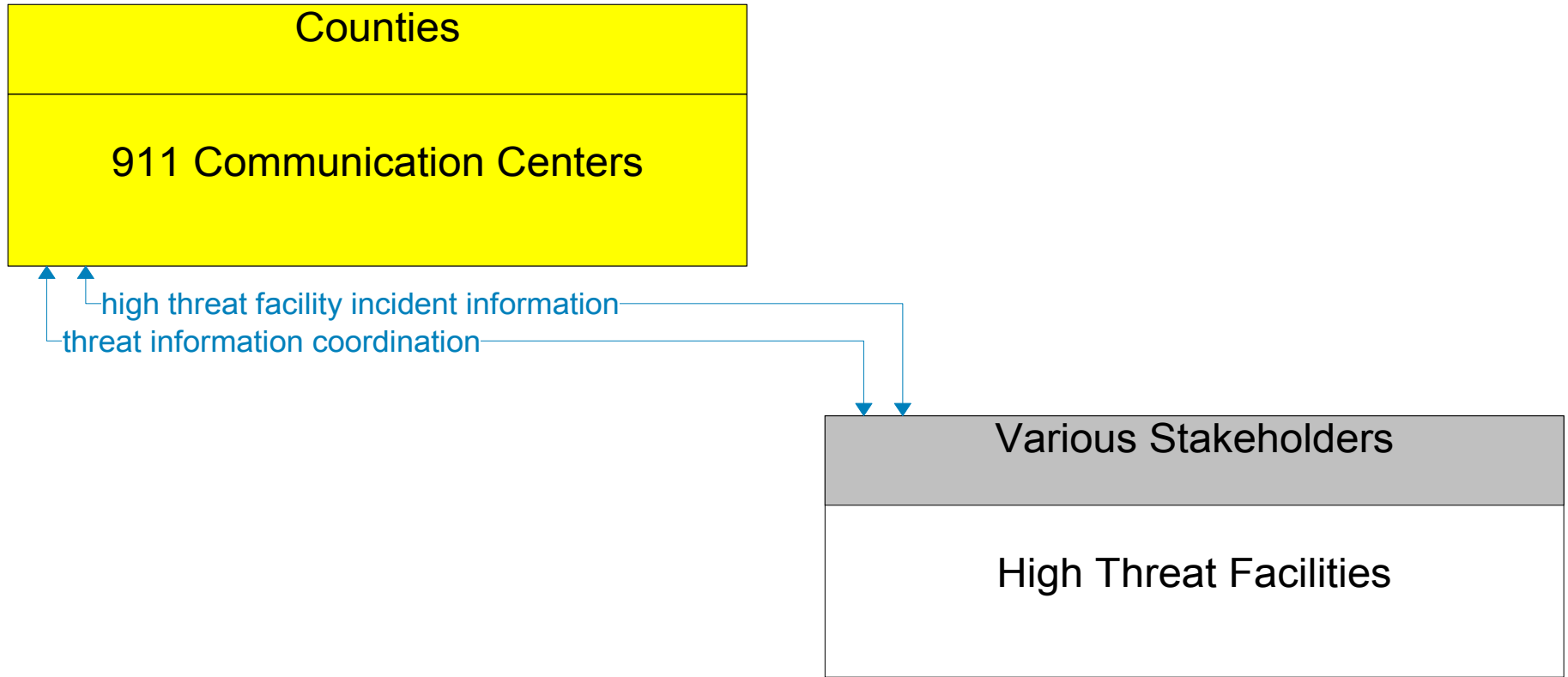
Existing
Planned

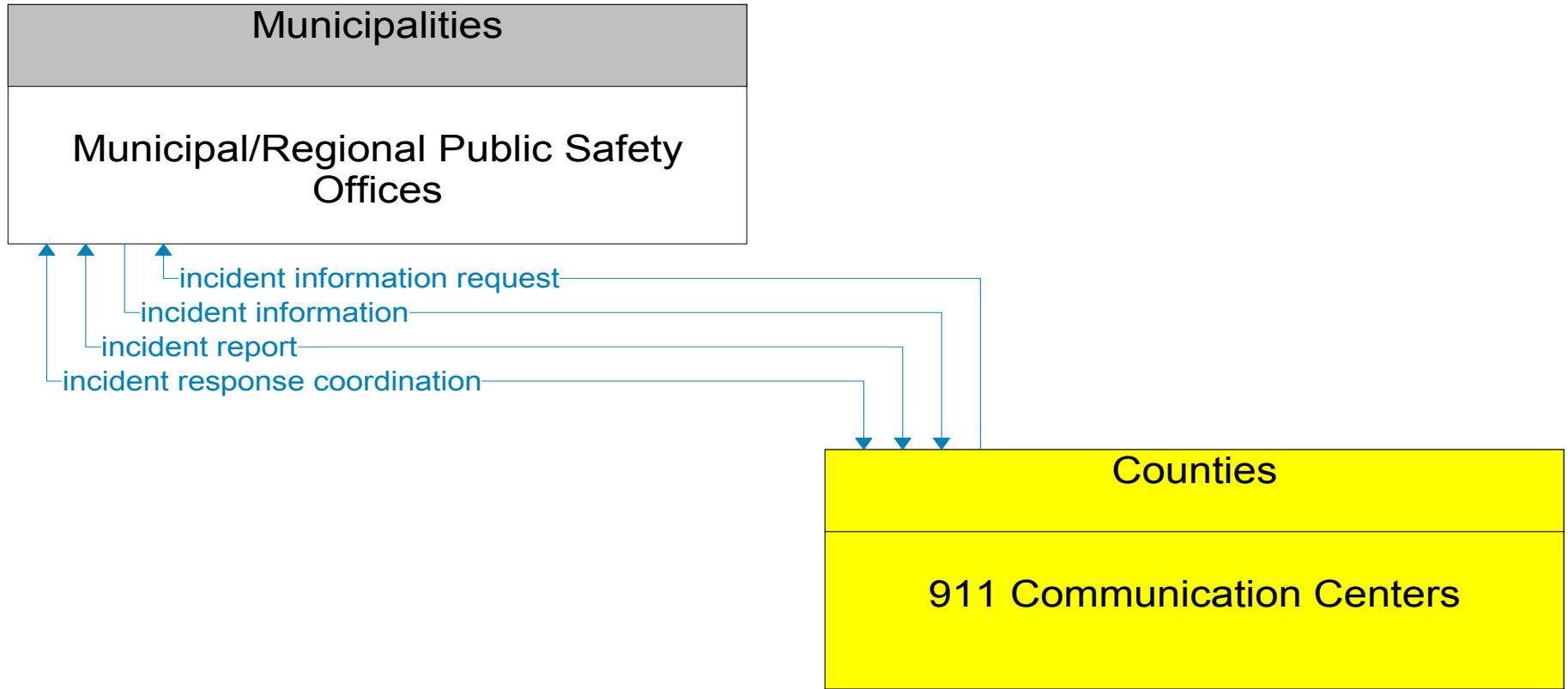


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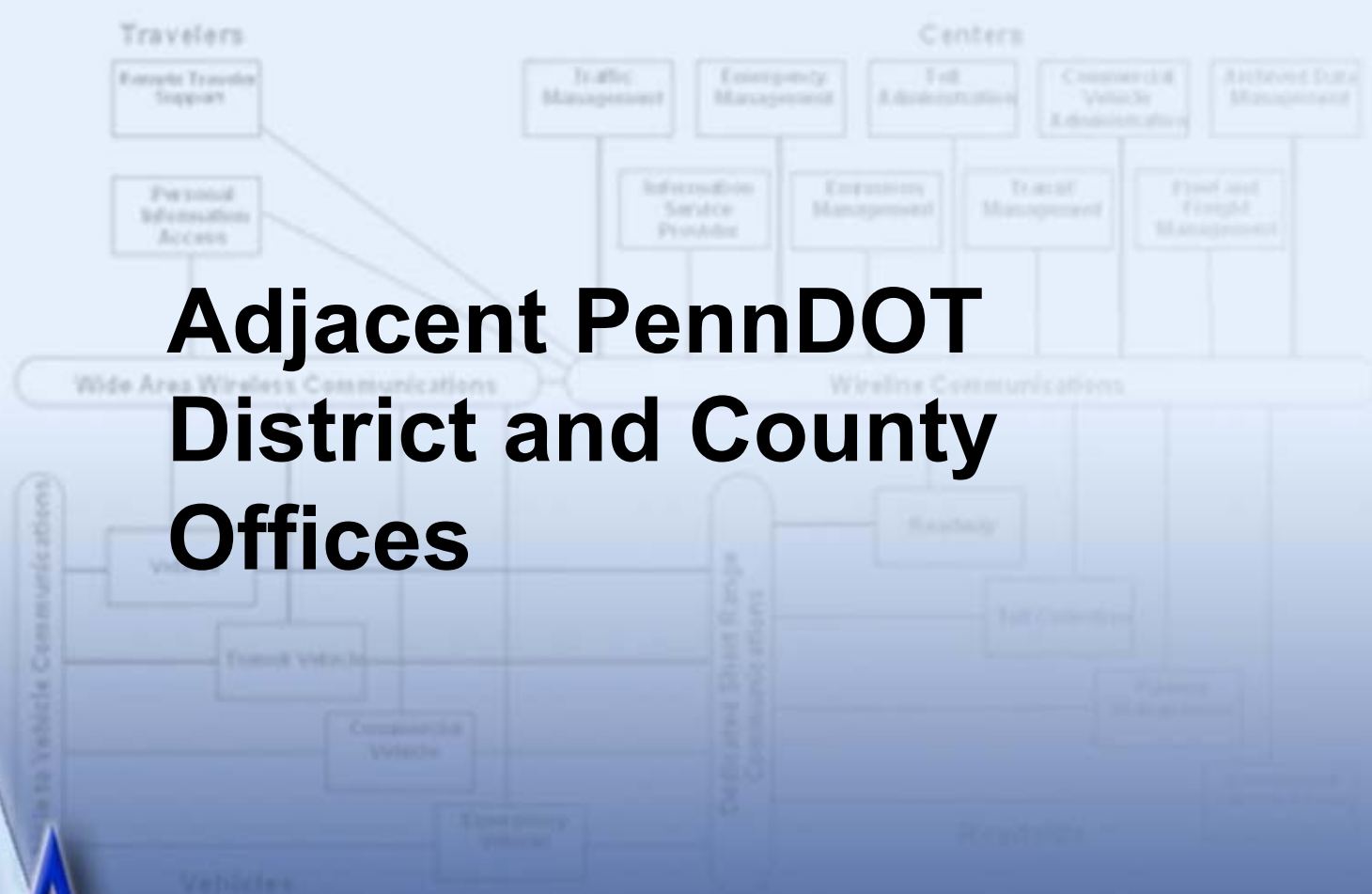
———— Existing
- - - - - Planned



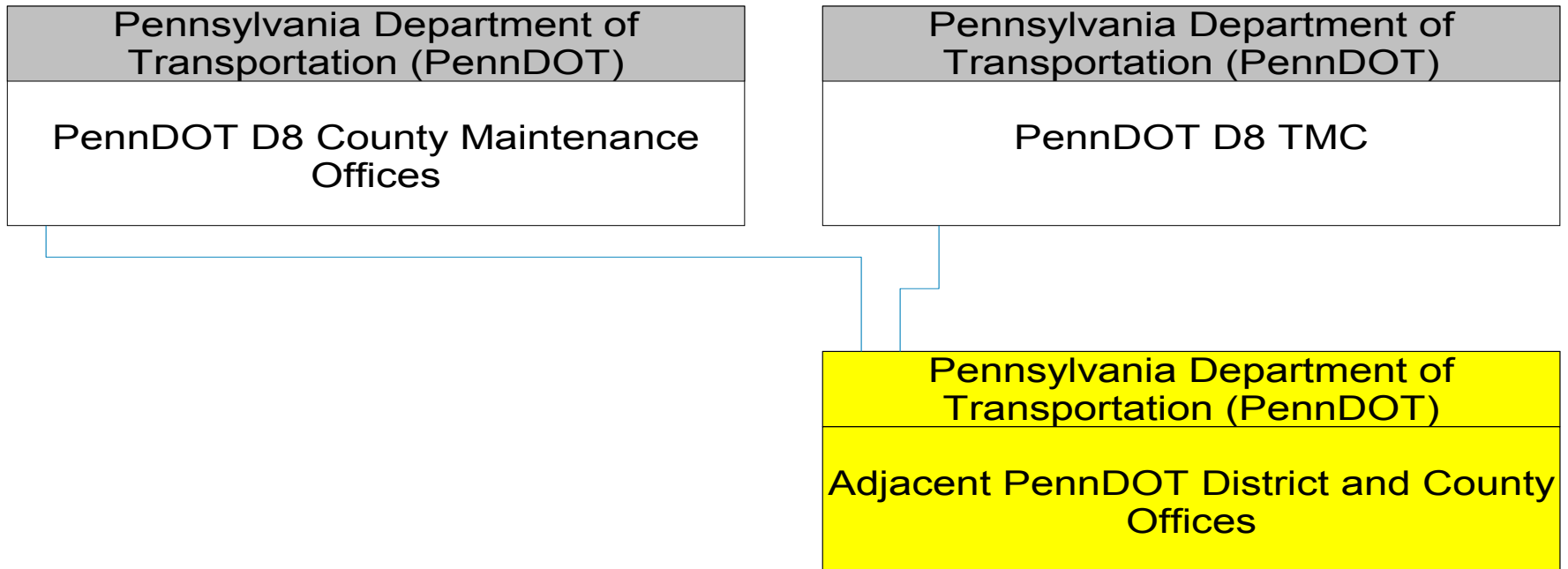


———— Existing
- - - - - Planned

Adjacent PennDOT District and County Offices



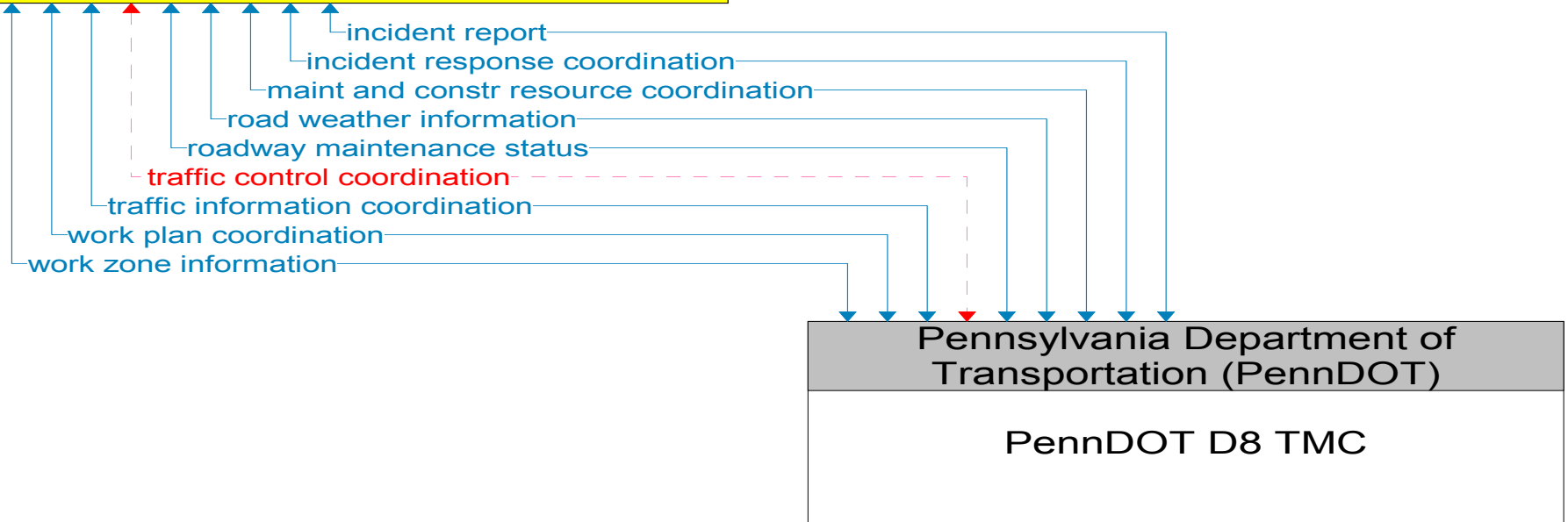
Adjacent PennDOT District and County Offices Interconnect Diagram



———— Existing
----- Planned

Pennsylvania Department of
Transportation (PennDOT)

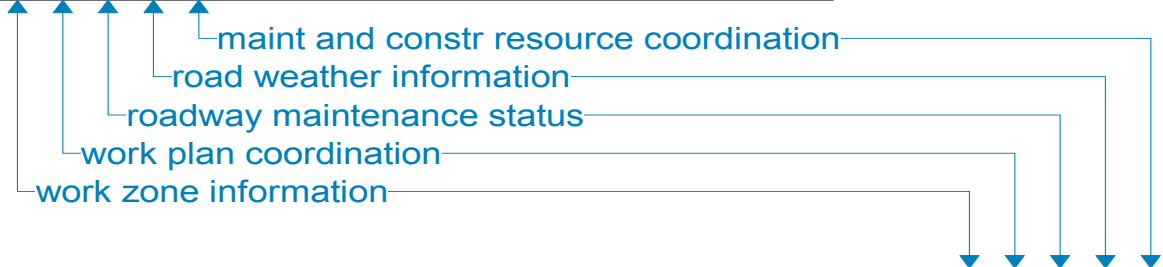
Adjacent PennDOT District and County
Offices



Existing
Planned

Pennsylvania Department of
Transportation (PennDOT)

Adjacent PennDOT District and County
Offices

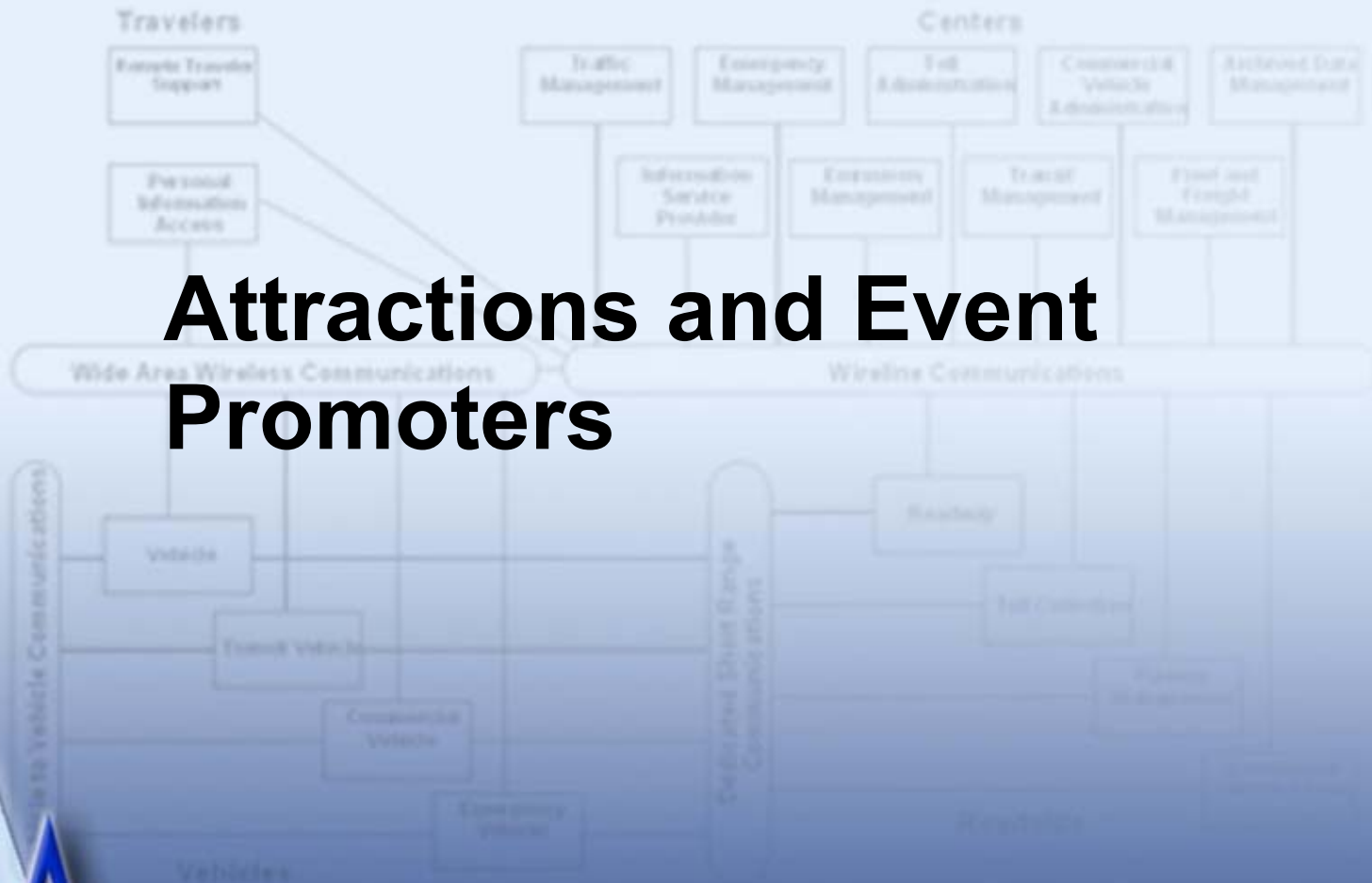


Pennsylvania Department of
Transportation (PennDOT)

PennDOT D8 County Maintenance
Offices

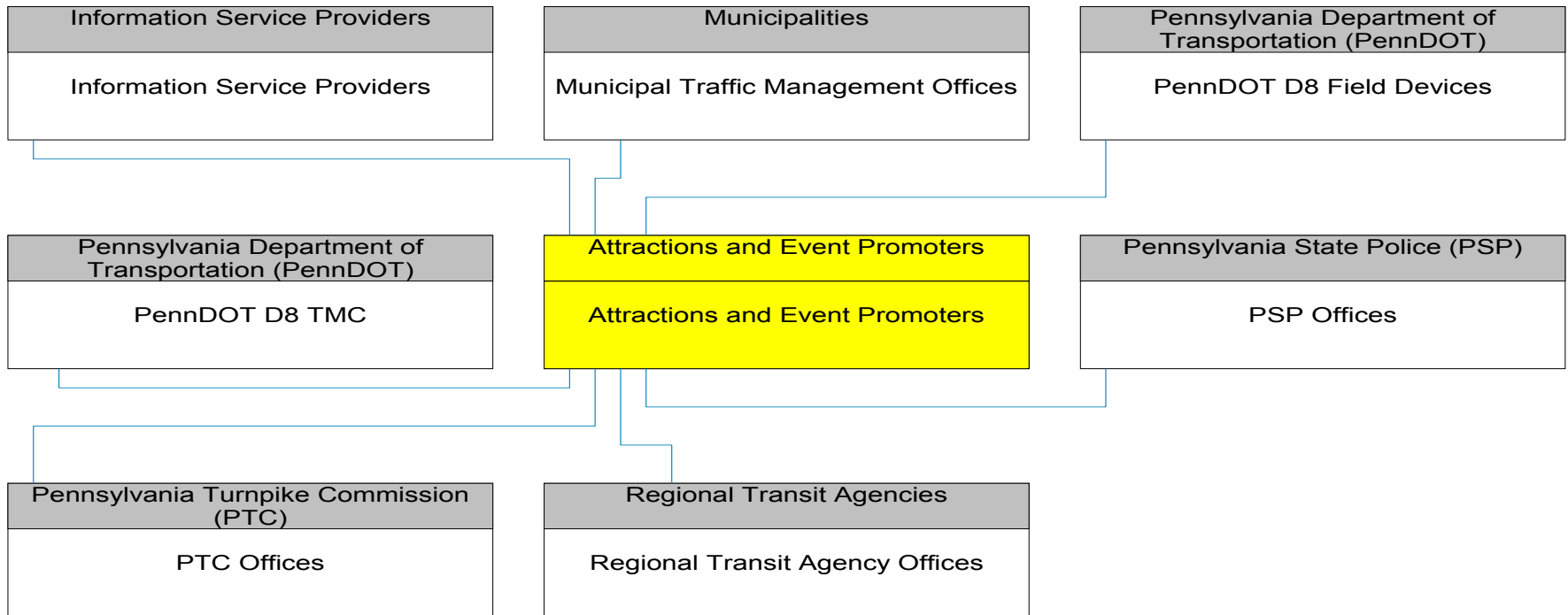
———— Existing
- - - - - Planned

Attractions and Event Promoters

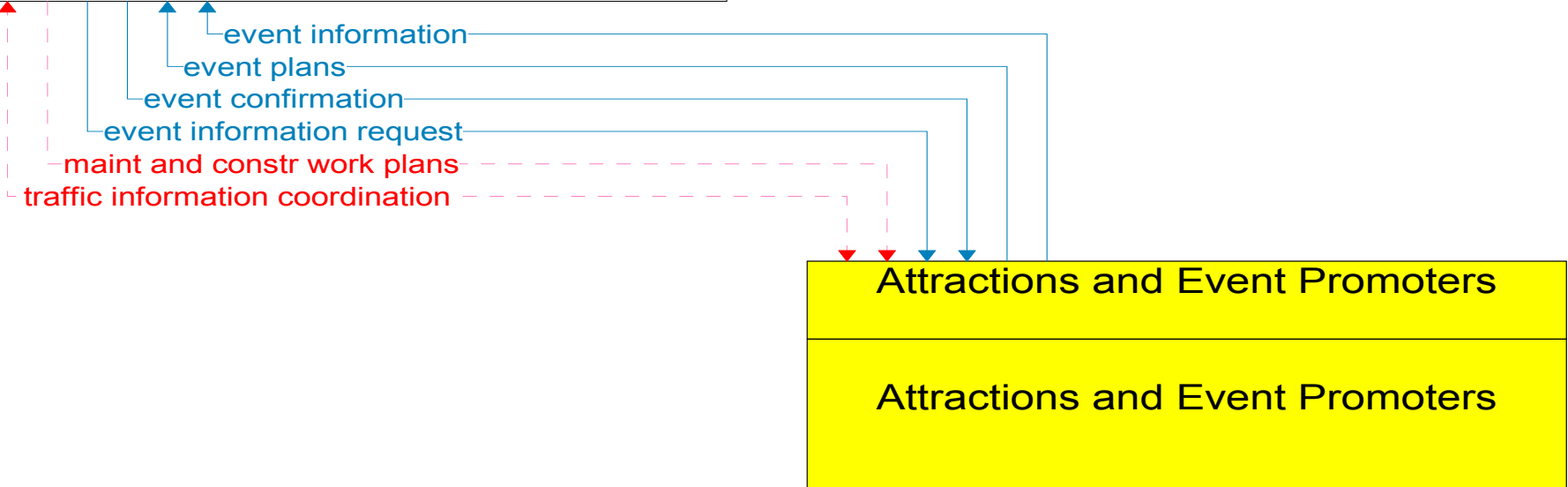
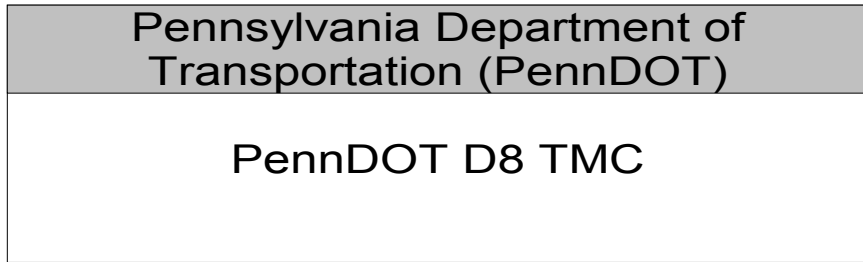


PA

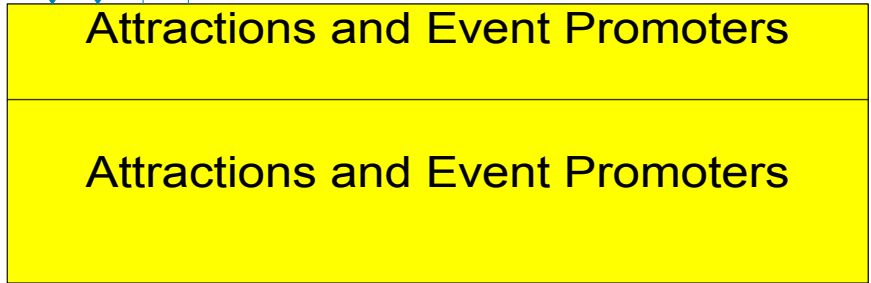
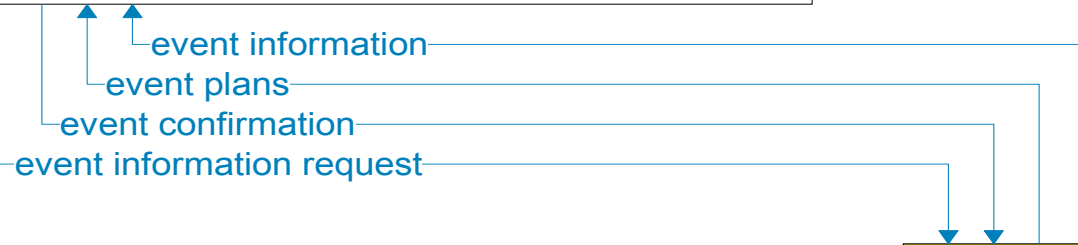
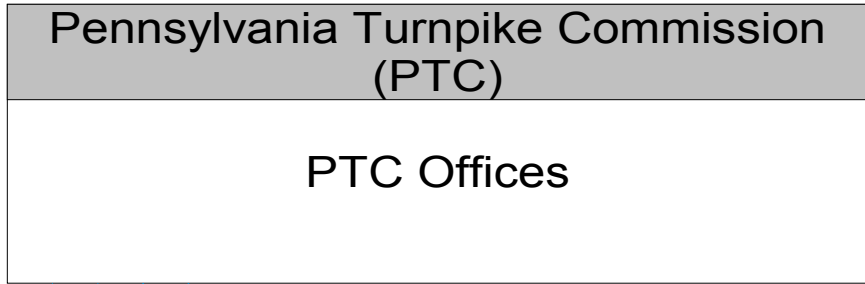
Attractions and Event Promoters Interconnect Diagram



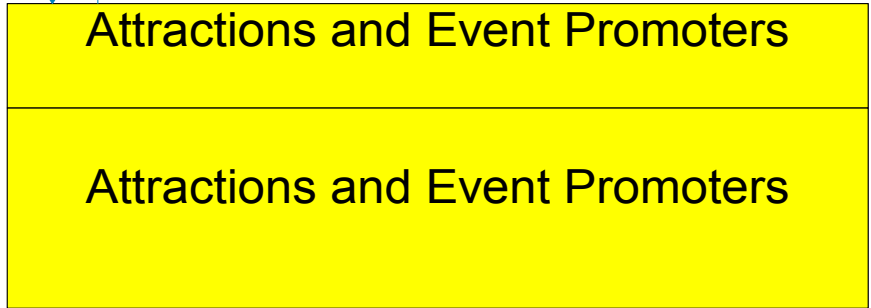
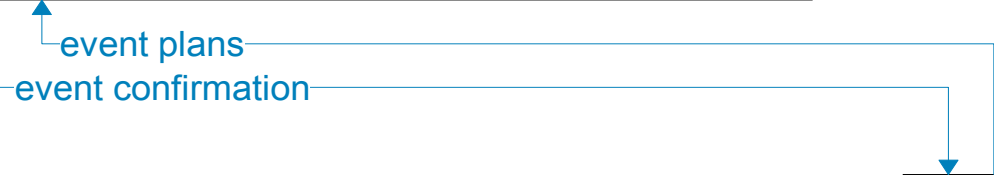
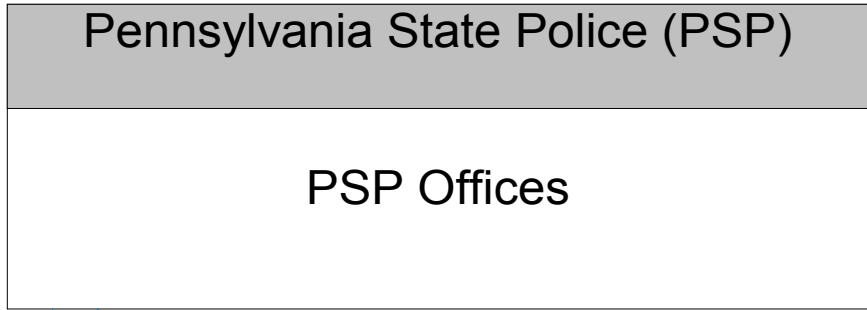
— Existing
 - - - Planned



Existing
Planned

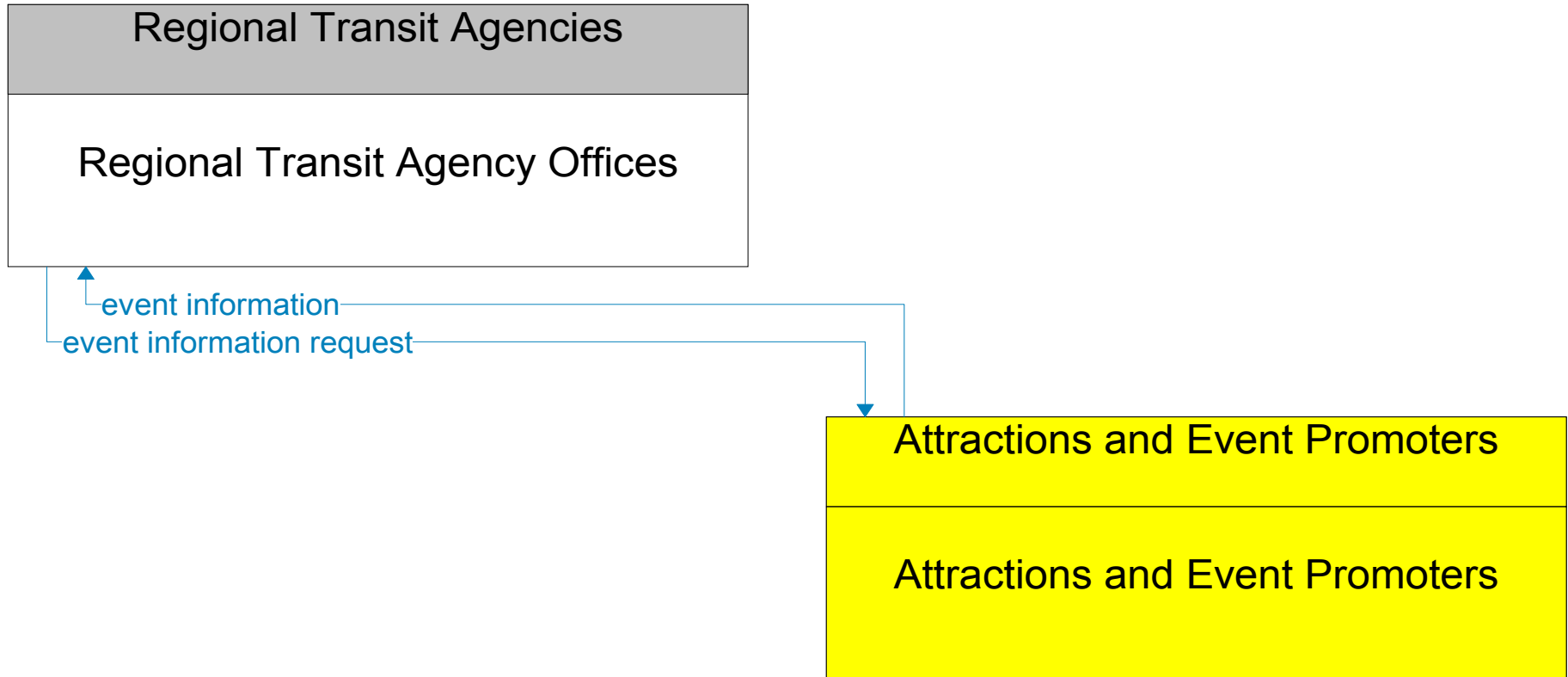


Existing
Planned

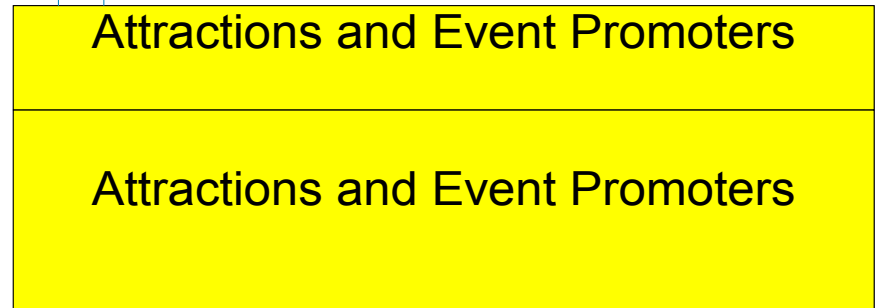
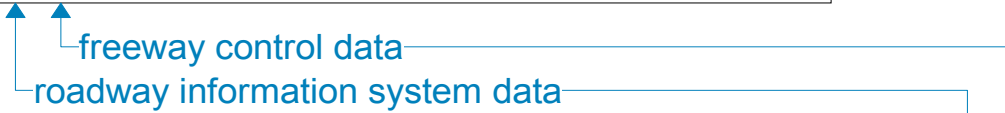
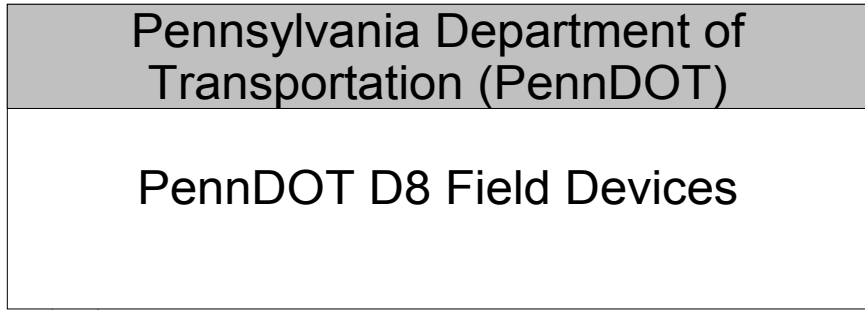


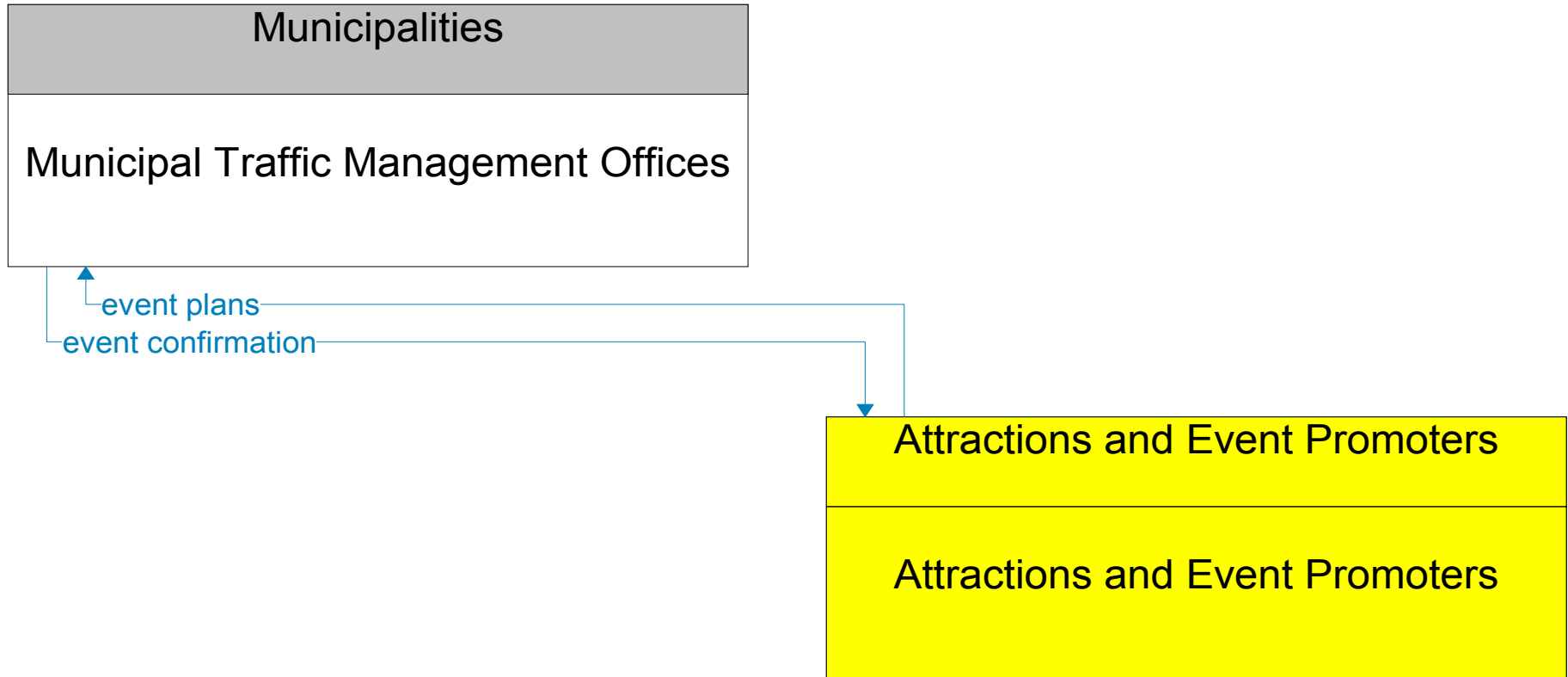
Existing
Planned

A legend showing a solid blue line for "Existing" and a dashed red line for "Planned".

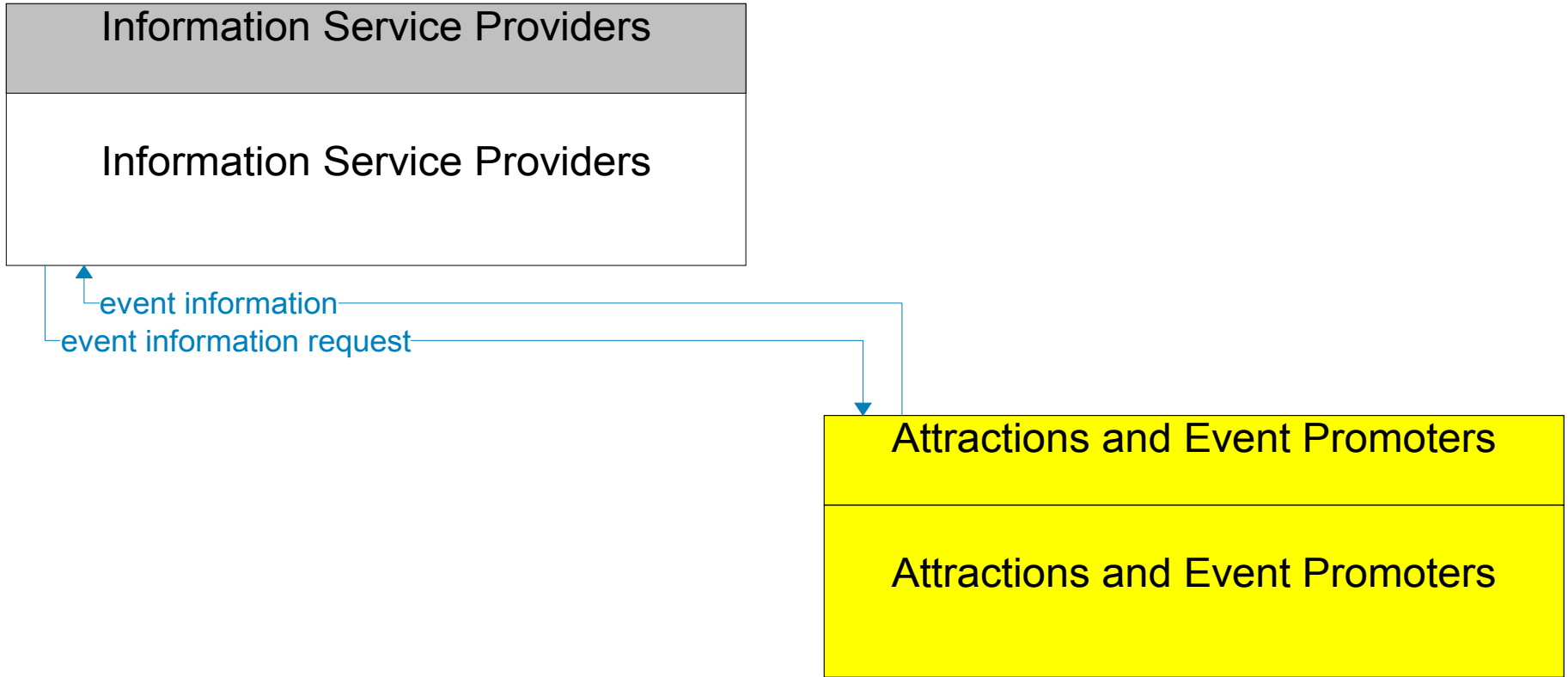


———— Existing
----- Planned





———— Existing
----- Planned

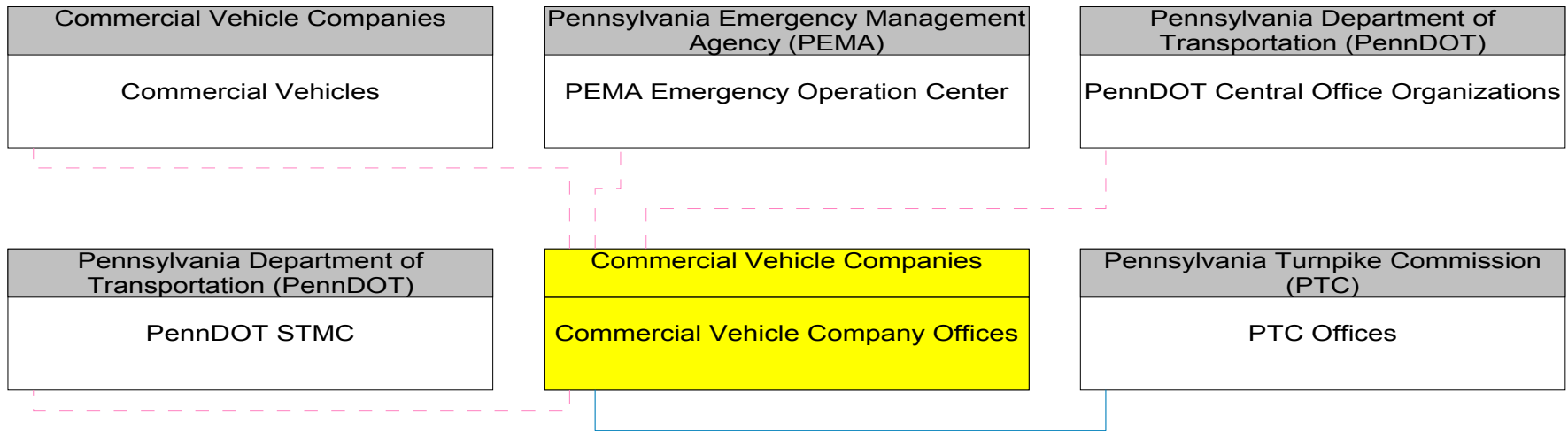


———— Existing
----- Planned

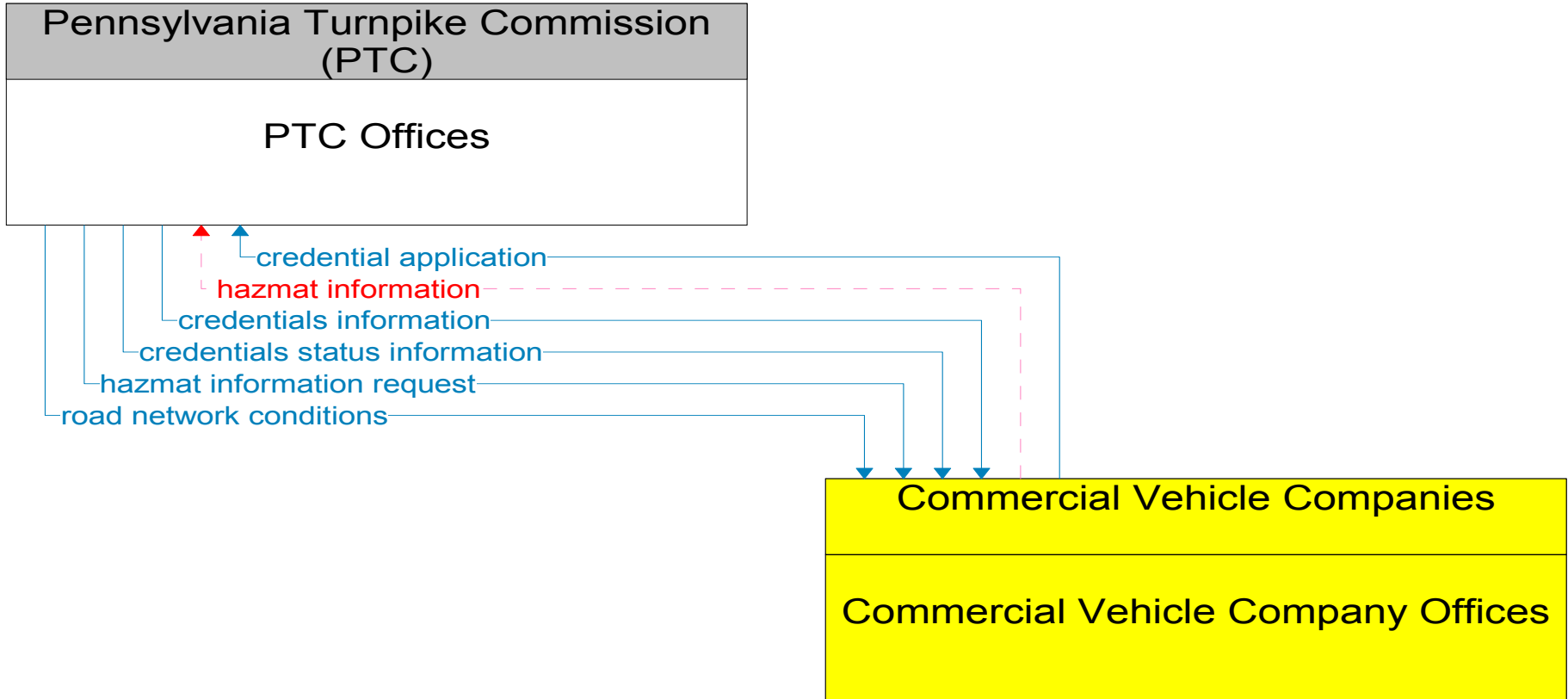
Commercial Vehicle Company Offices



Commercial Vehicle Company Offices Interconnect Diagram



Existing
Planned



Existing
Planned

Pennsylvania Emergency Management Agency (PEMA)

PEMA Emergency Operation Center

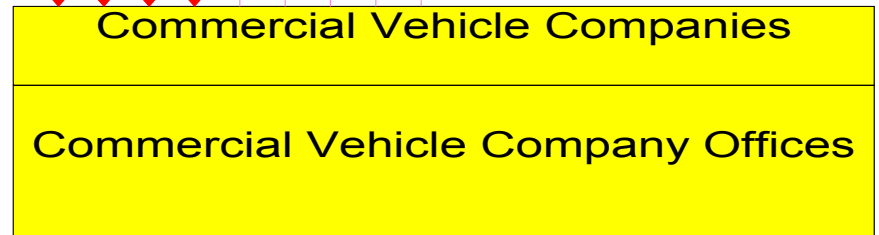
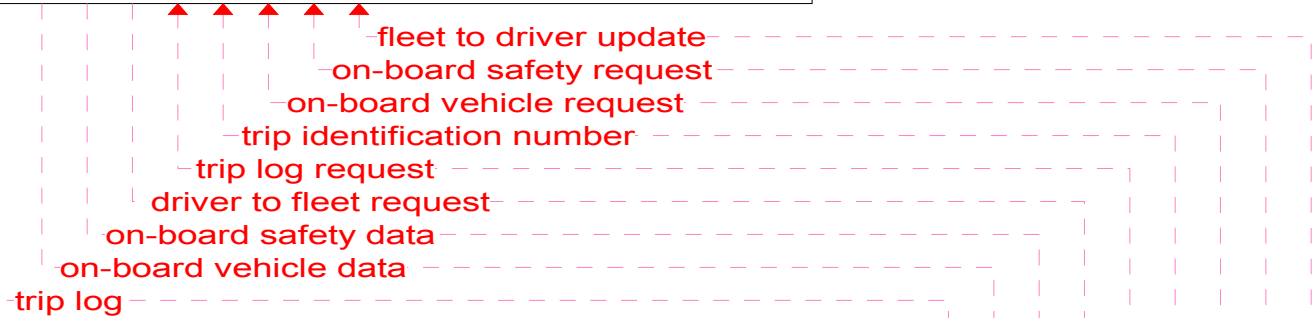
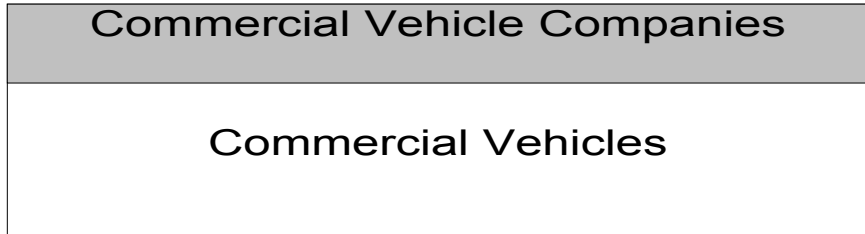


↑ hazmat information

Commercial Vehicle Companies

Commercial Vehicle Company Offices

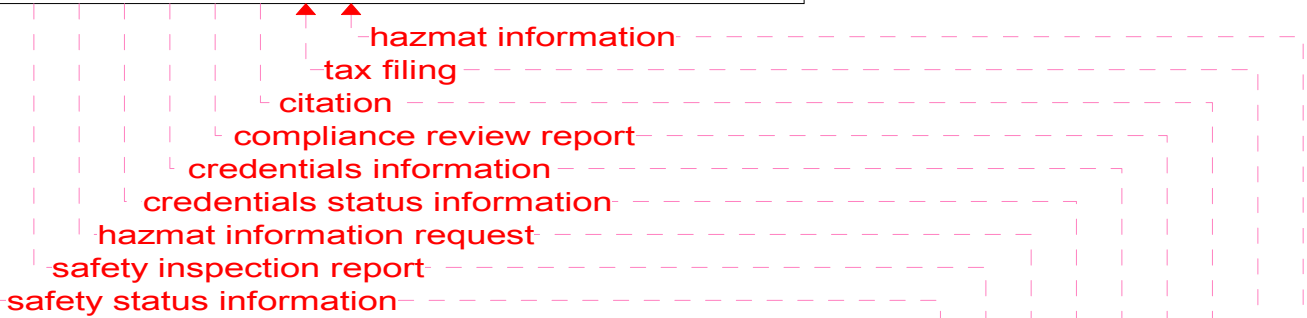
Existing
Planned



———— Existing
- - - - - Planned

**Pennsylvania Department of
Transportation (PennDOT)**

PennDOT STMC



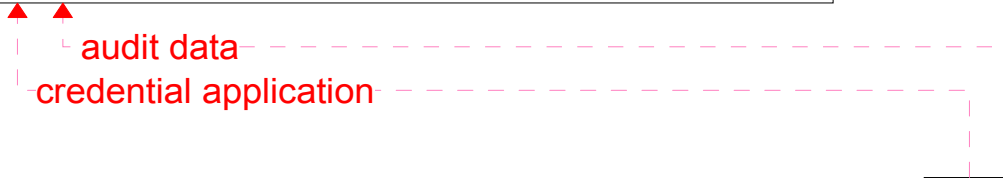
Commercial Vehicle Companies

Commercial Vehicle Company Offices

———— Existing
- - - - - Planned

Pennsylvania Department of
Transportation (PennDOT)

PennDOT Central Office Organizations

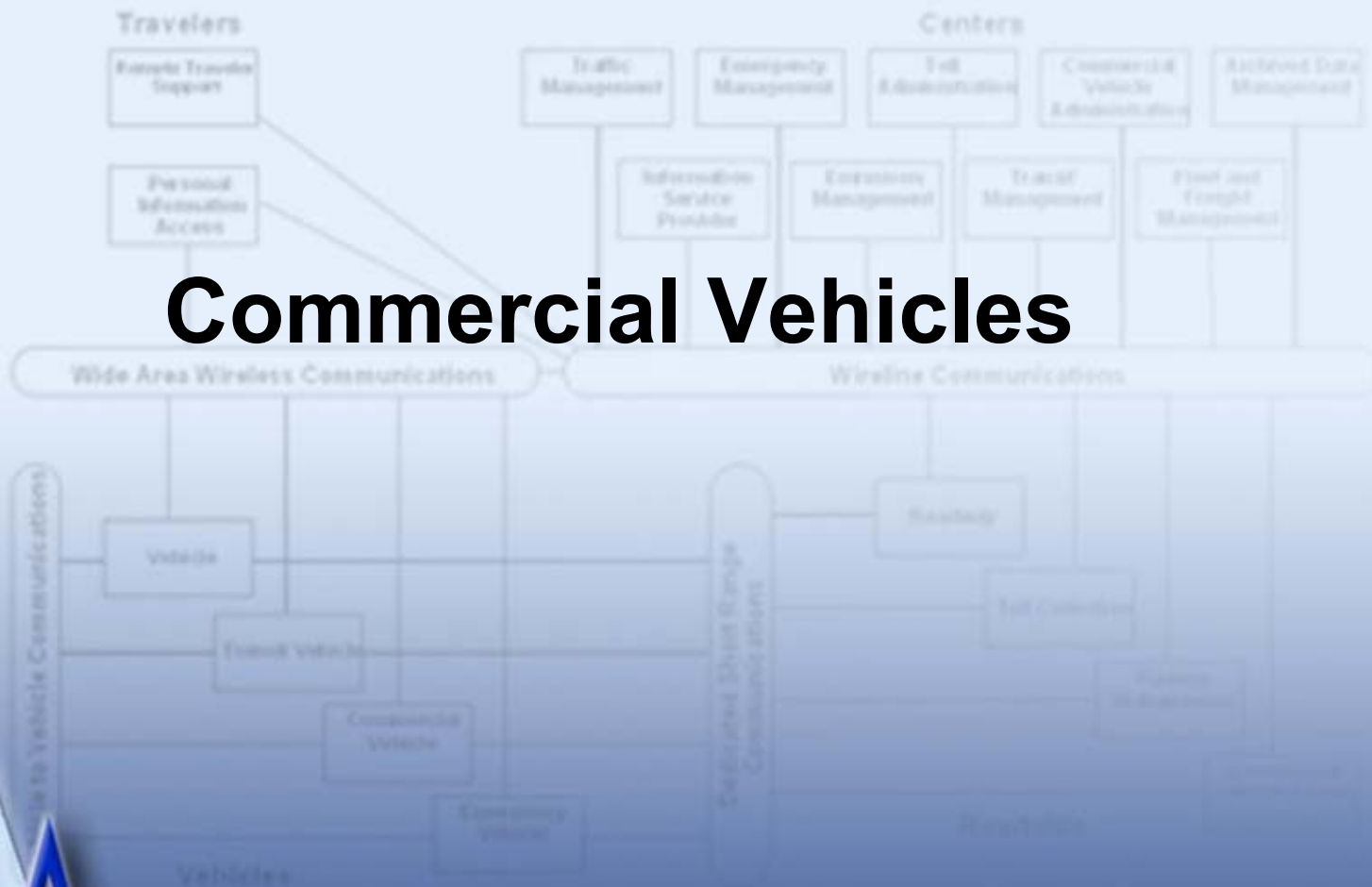


Commercial Vehicle Companies

Commercial Vehicle Company Offices

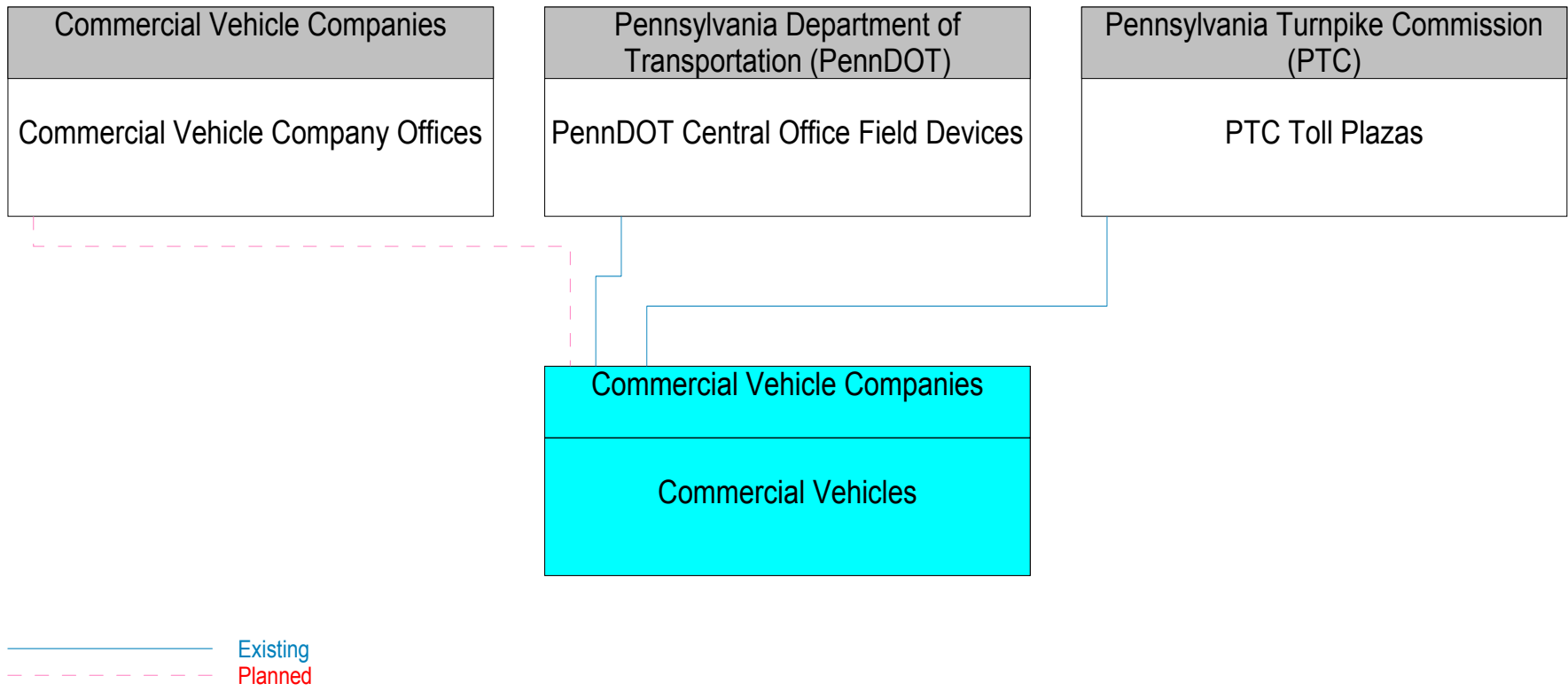
———— Existing
- - - - - Planned

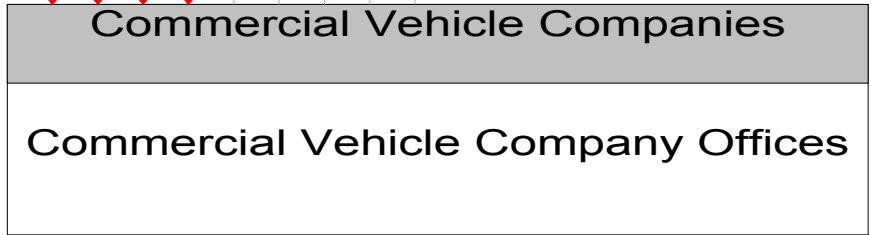
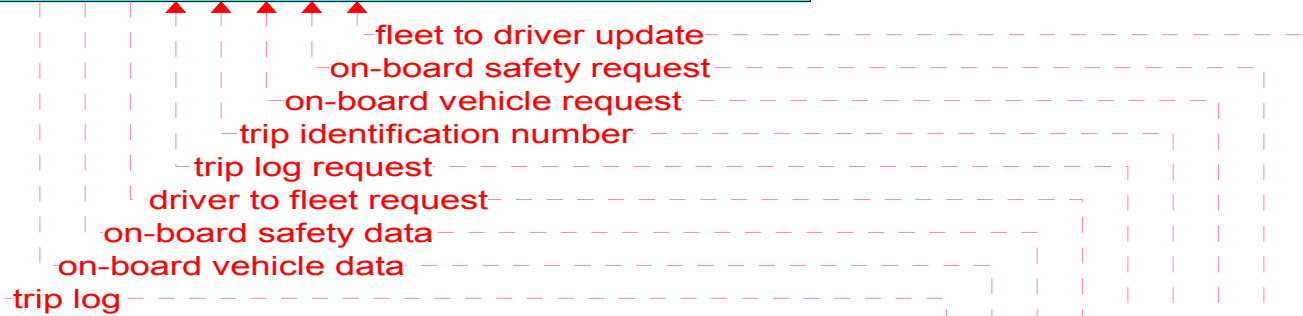
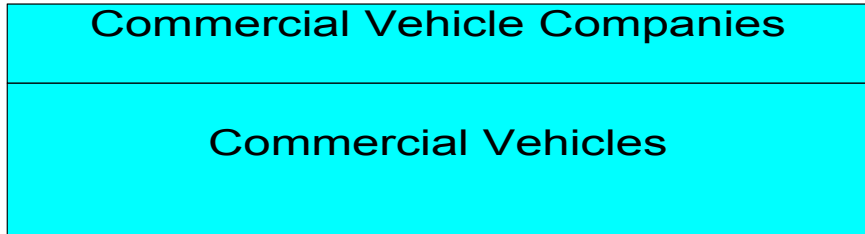
Commercial Vehicles



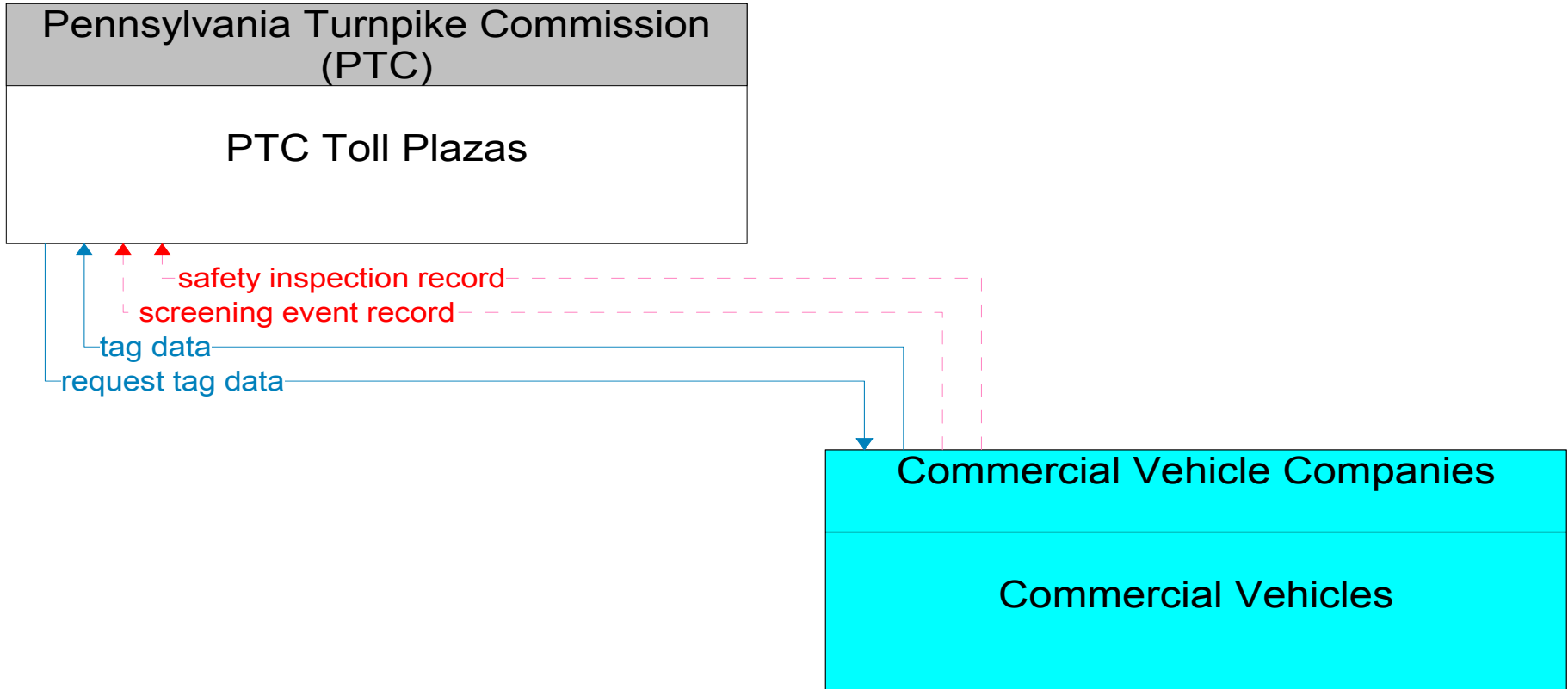
PA

Commercial Vehicles Interconnect Diagram

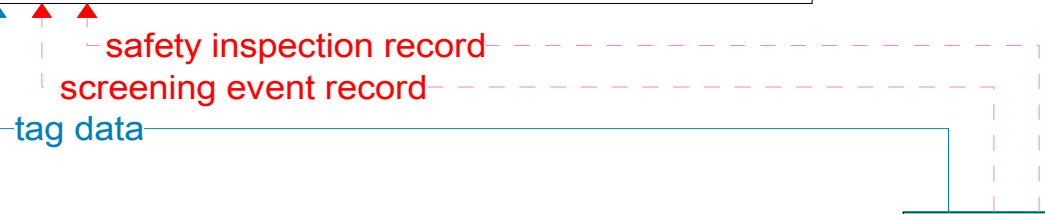
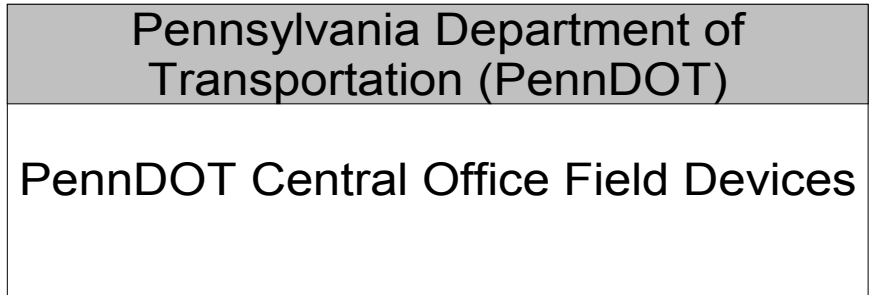




Existing
Planned

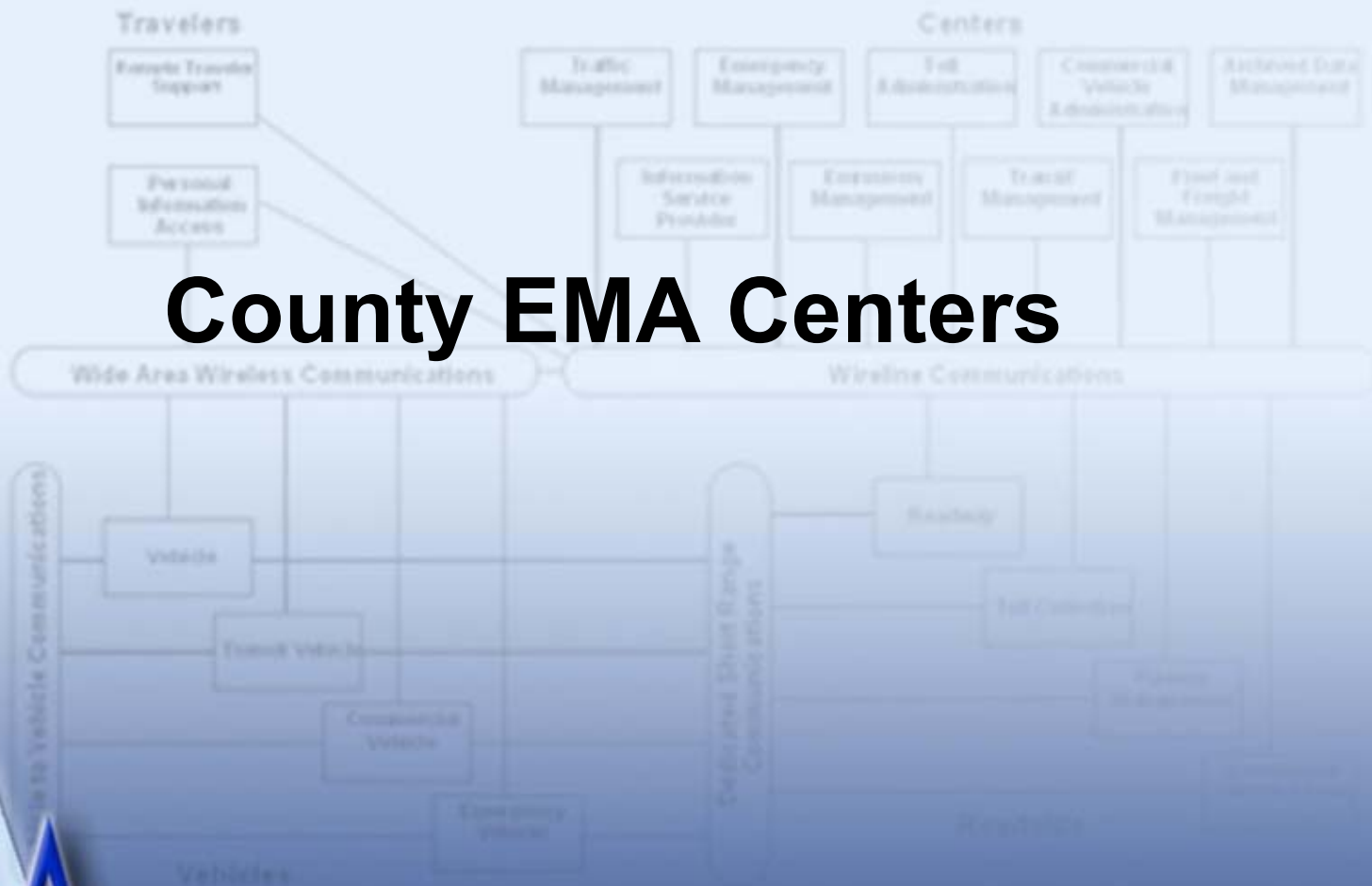


———— Existing
- - - - - Planned

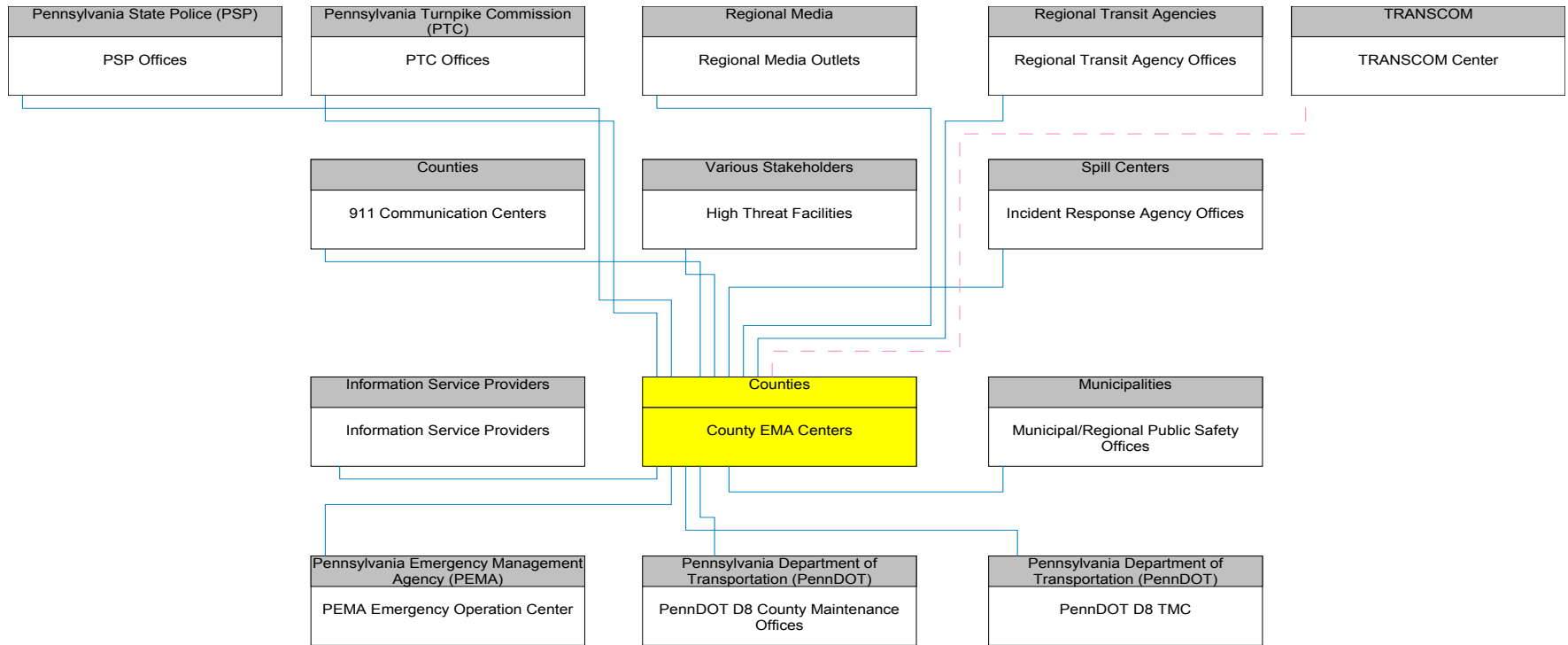


Existing
Planned

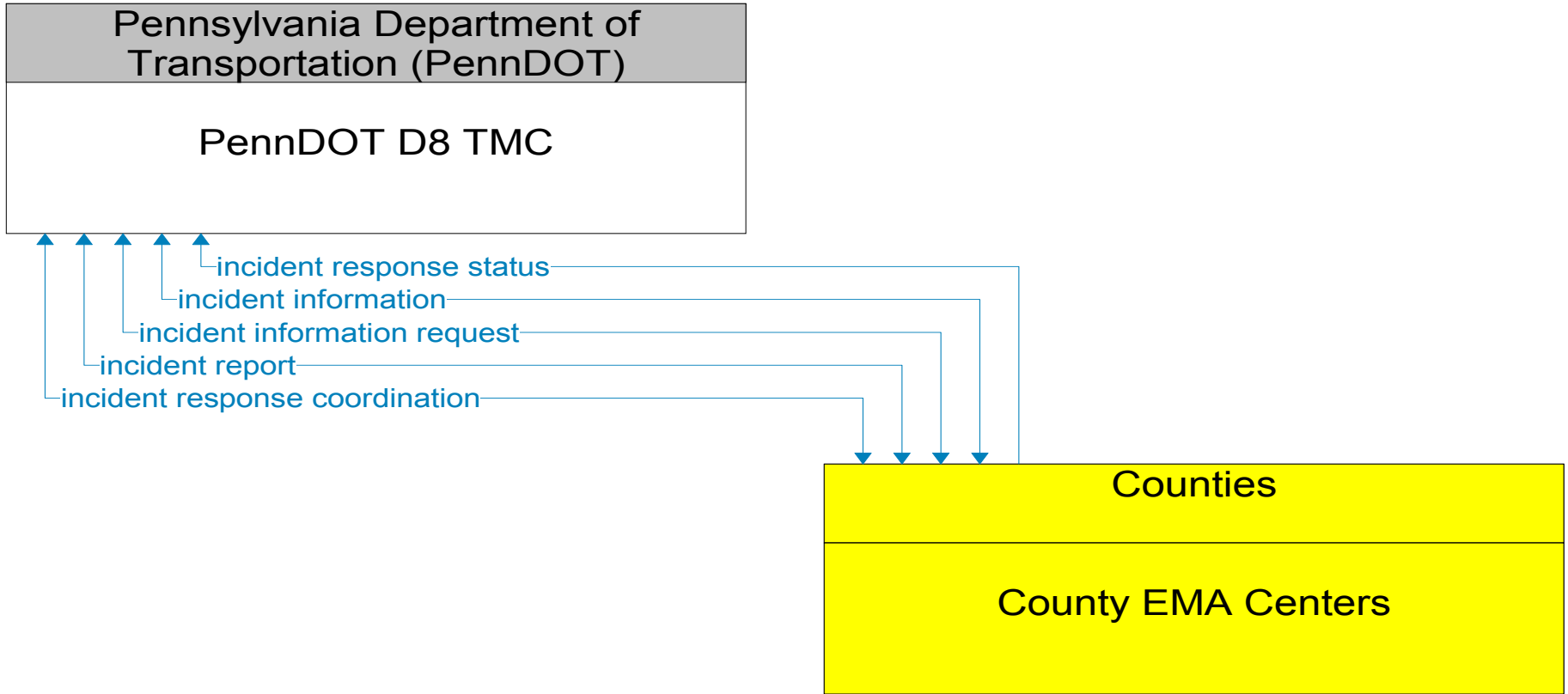
County EMA Centers

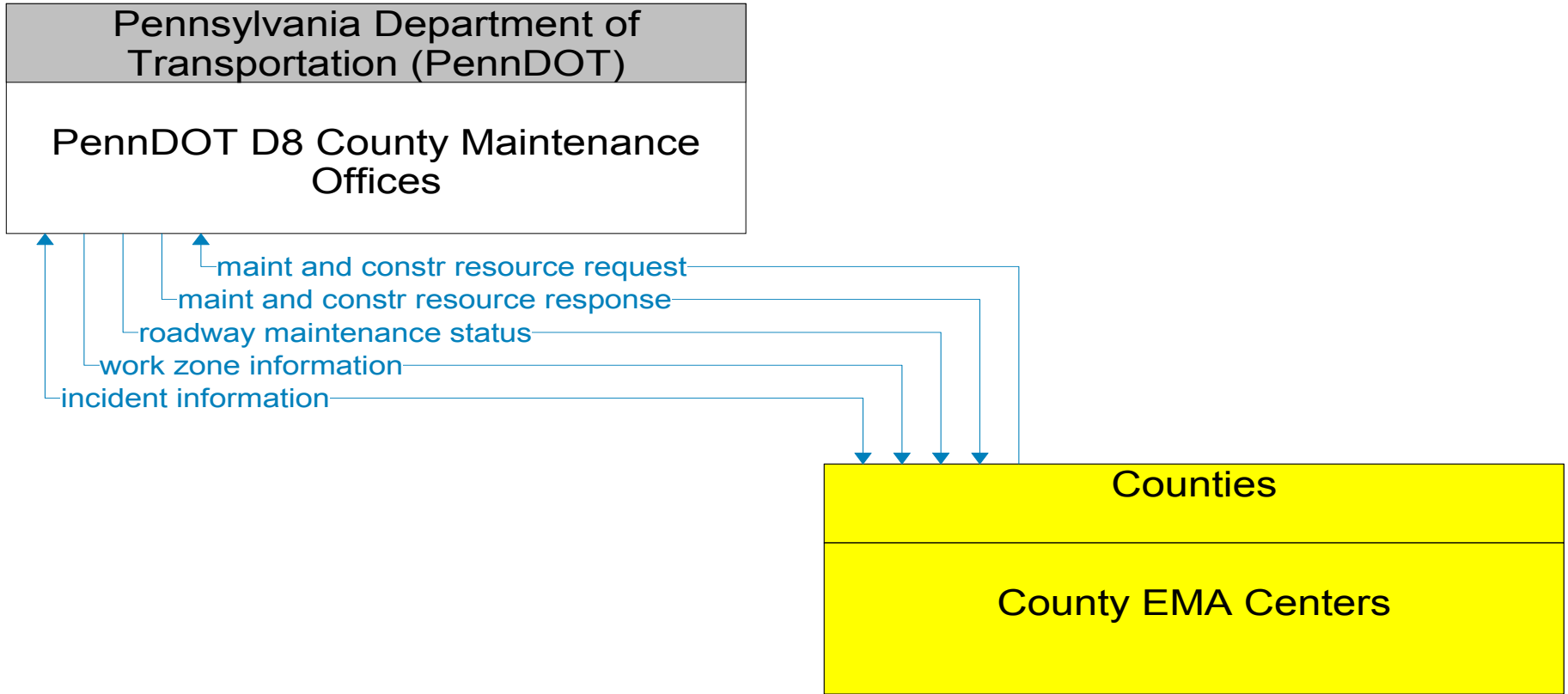


County EMA Centers Interconnect Diagram

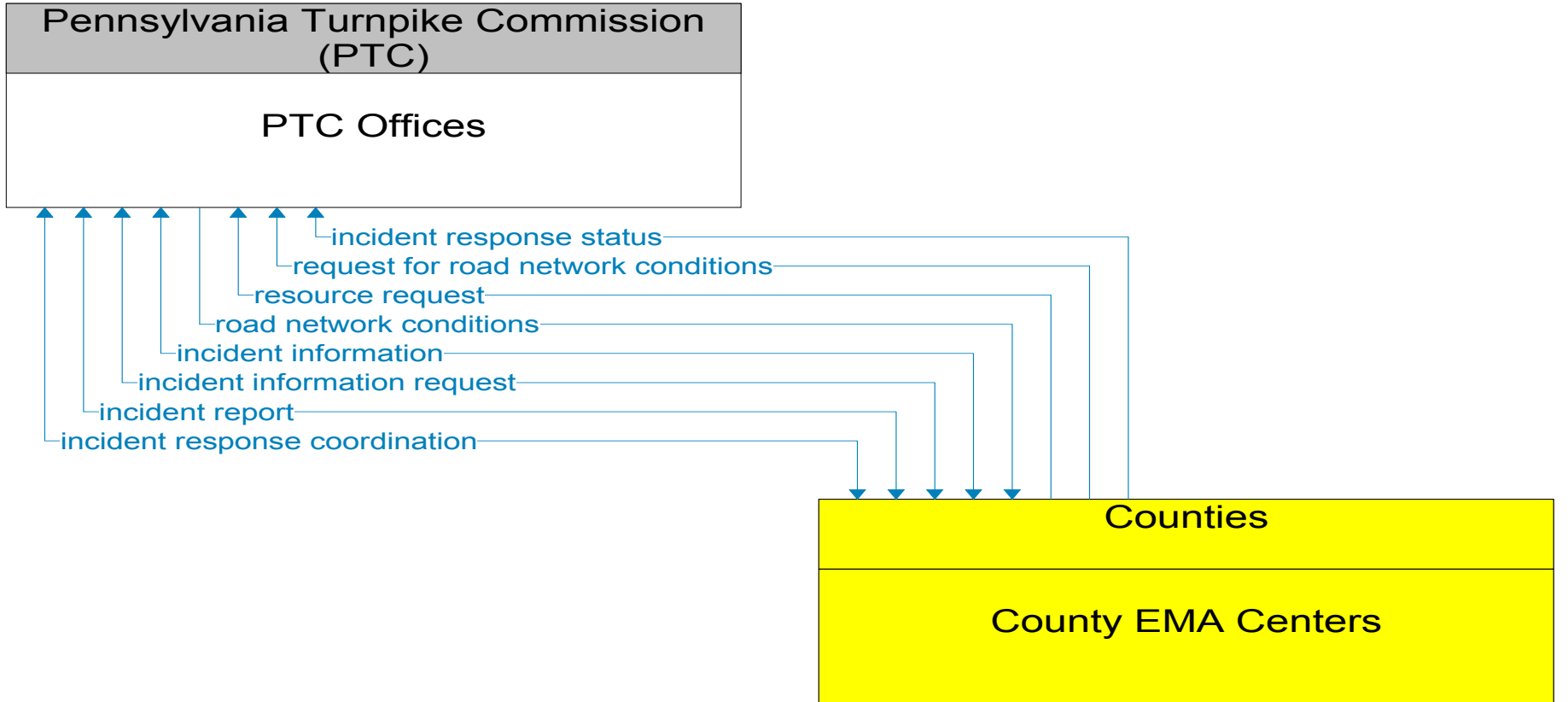


— Existing
- - - Planned

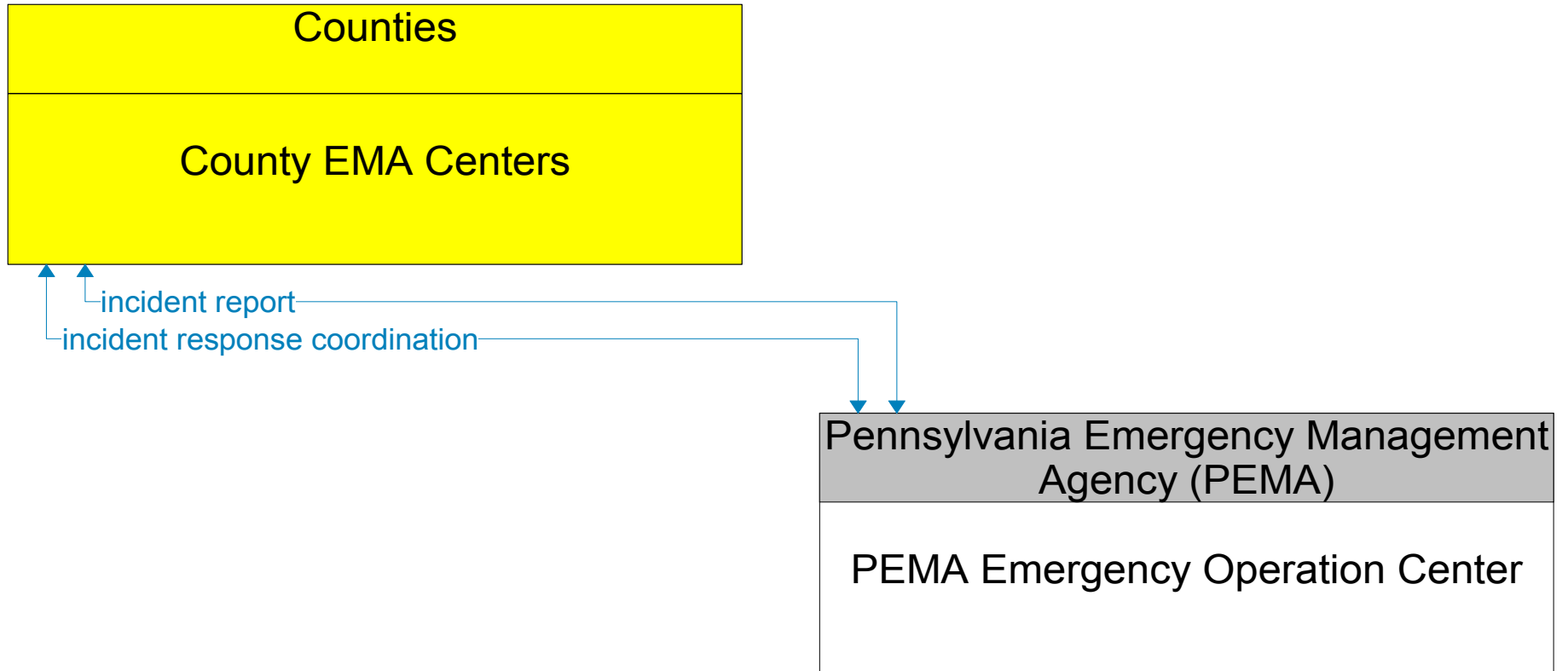




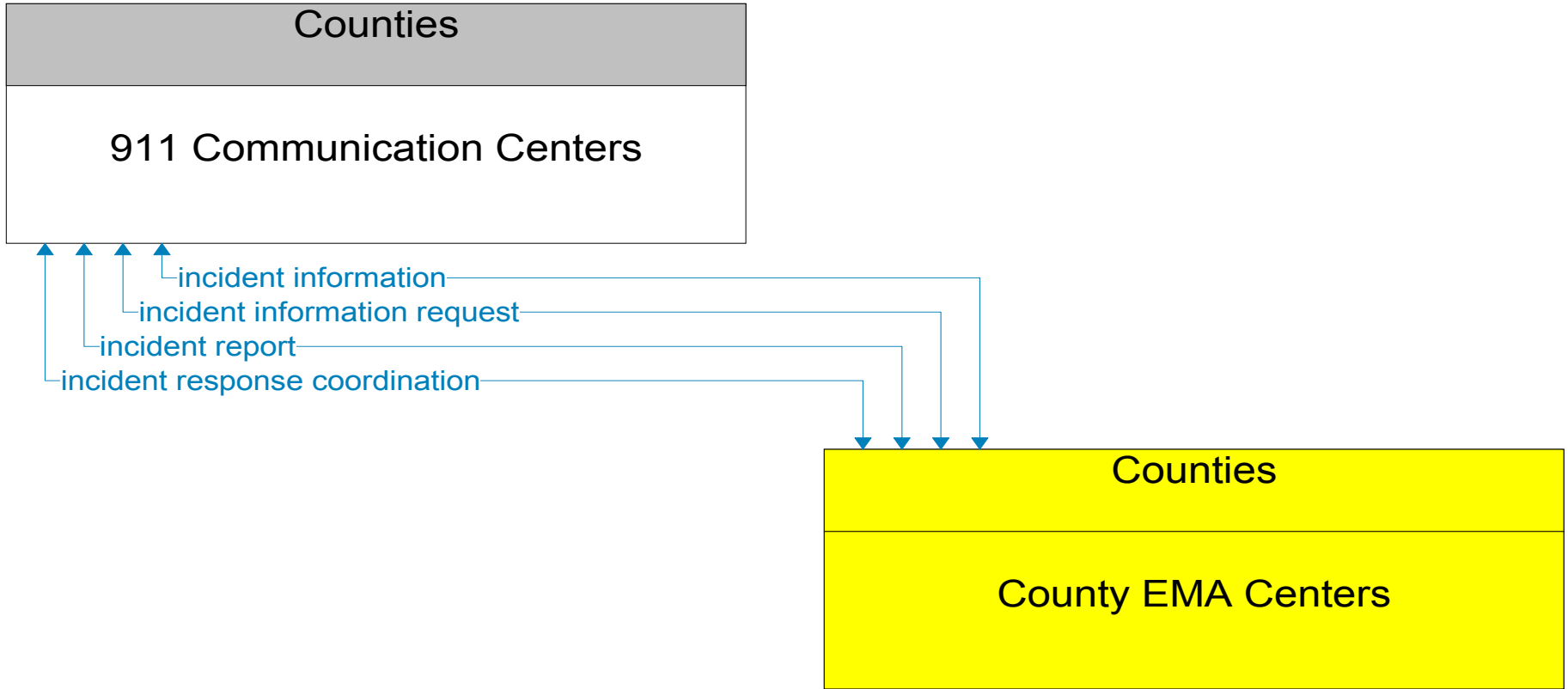
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- - - - - Planned

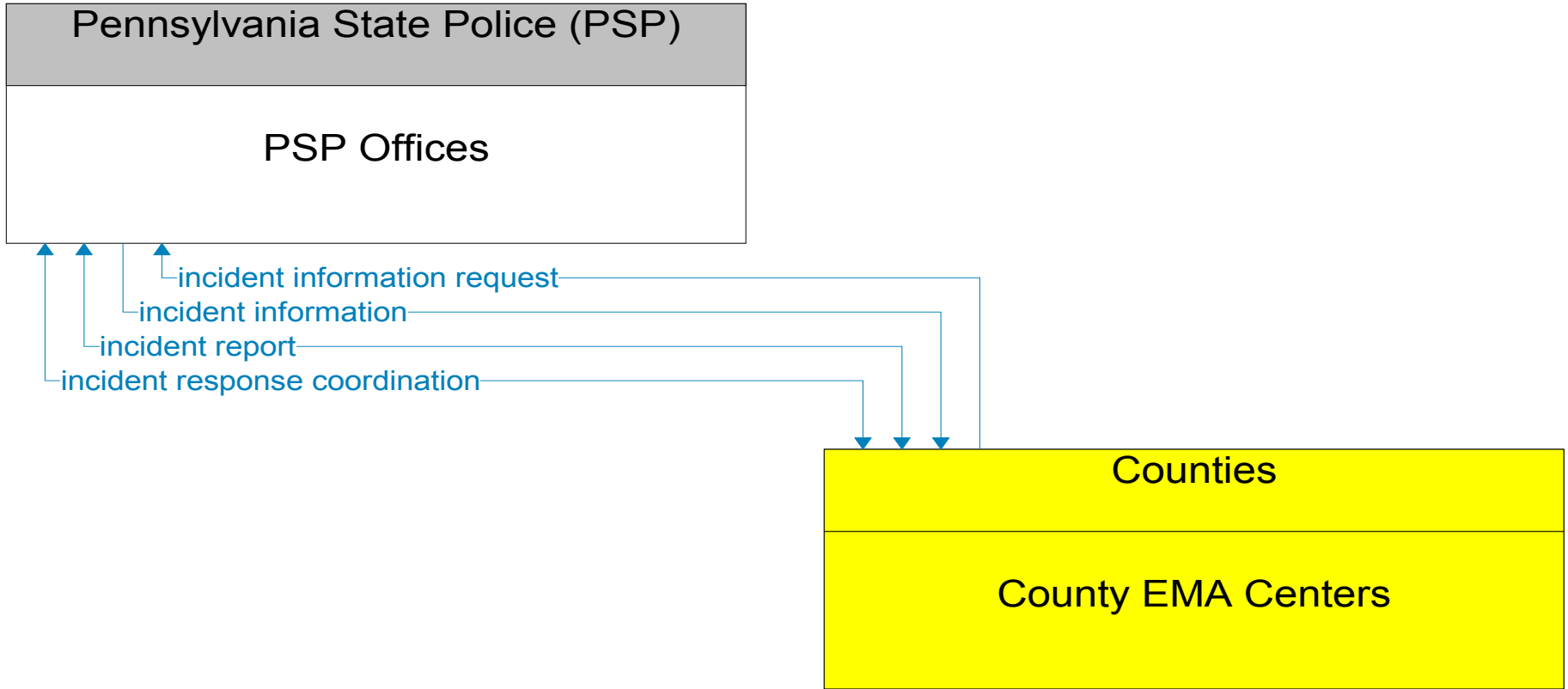


———— Existing
- - - - - Planned

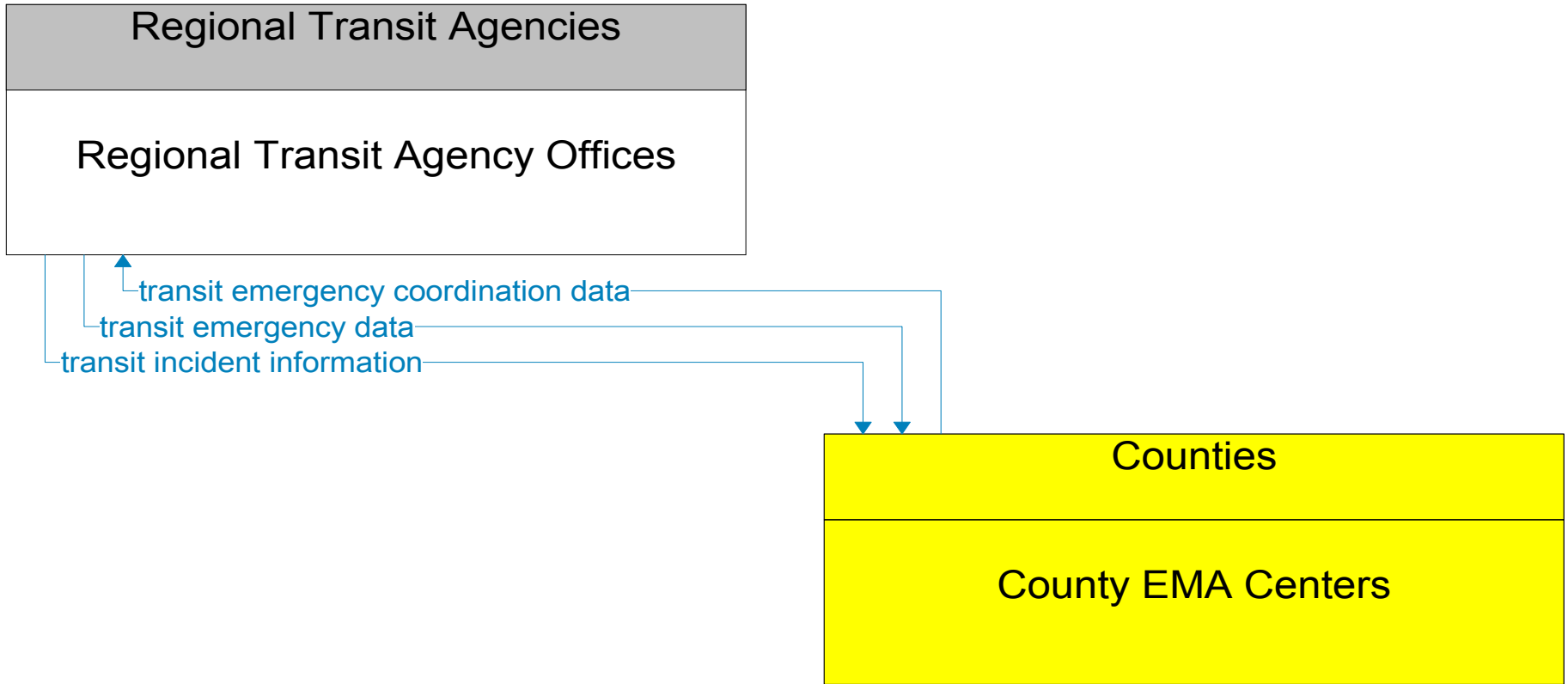


———— Existing
- - - - - Planned

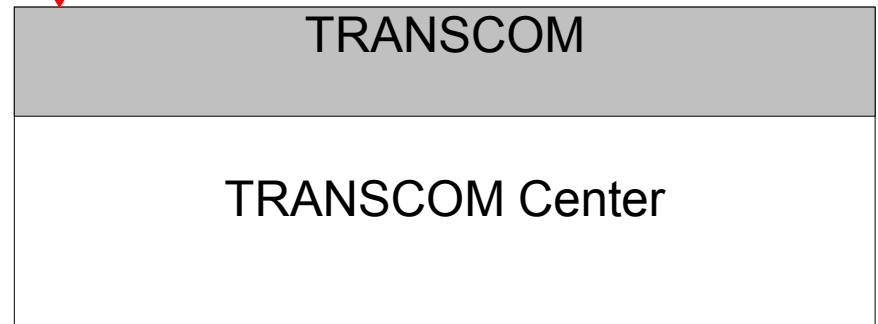
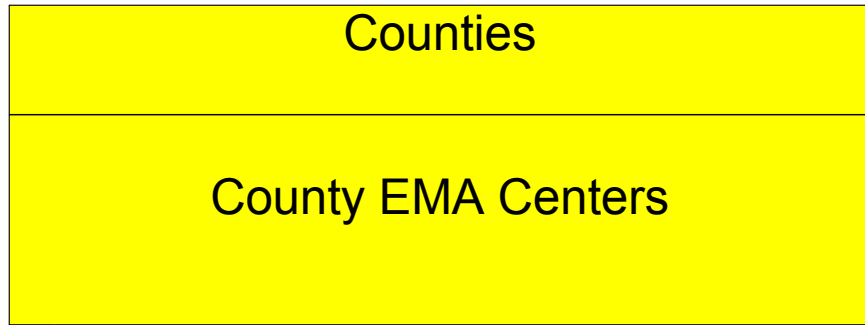


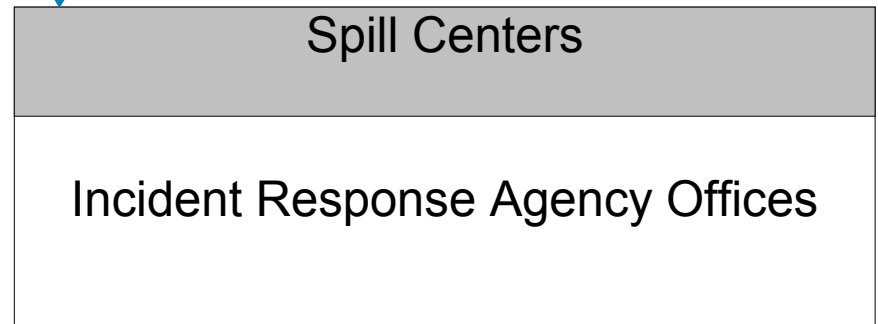
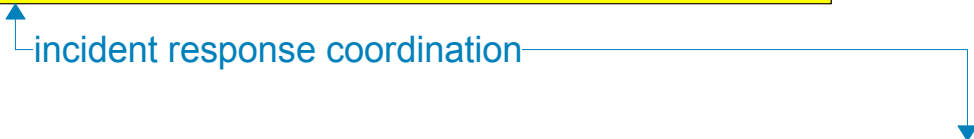
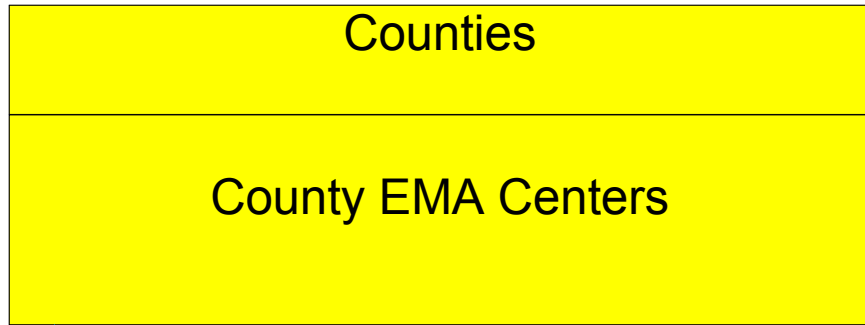


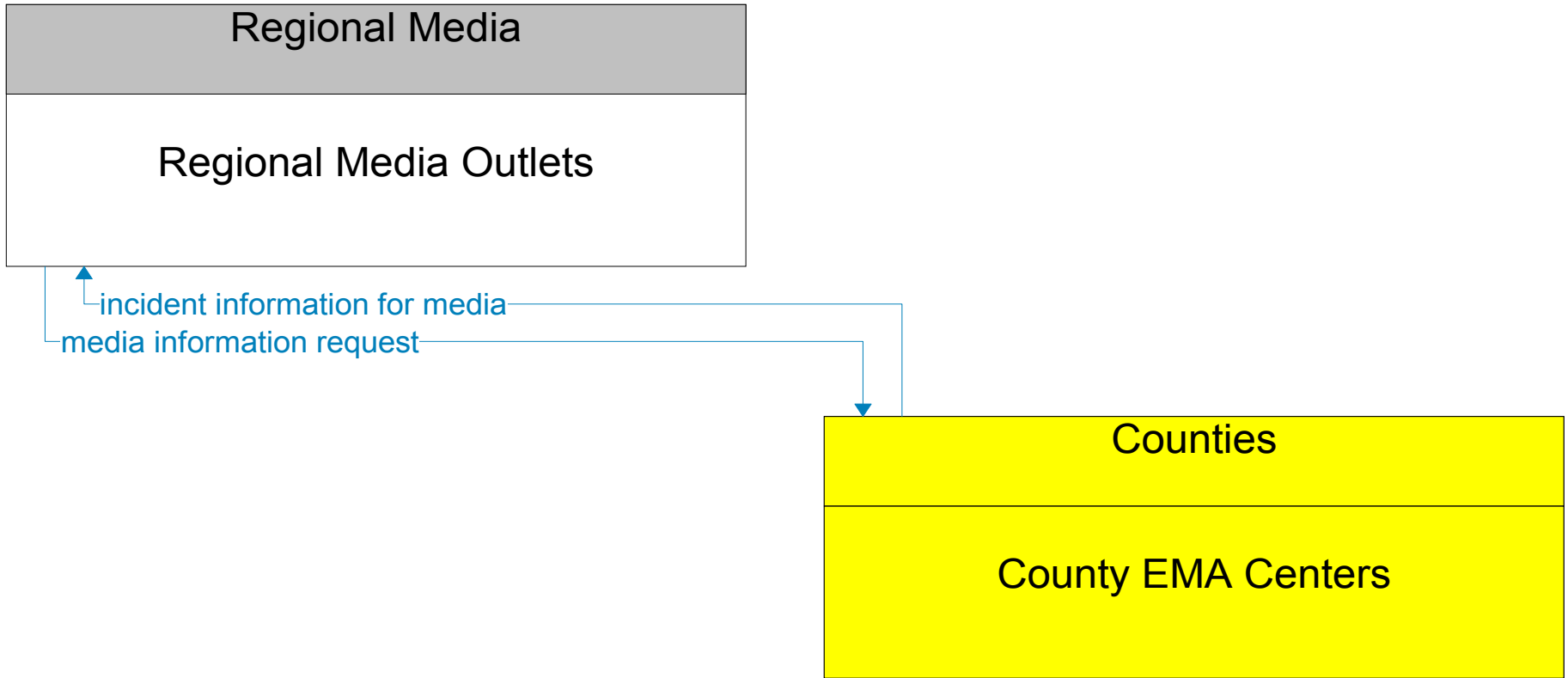
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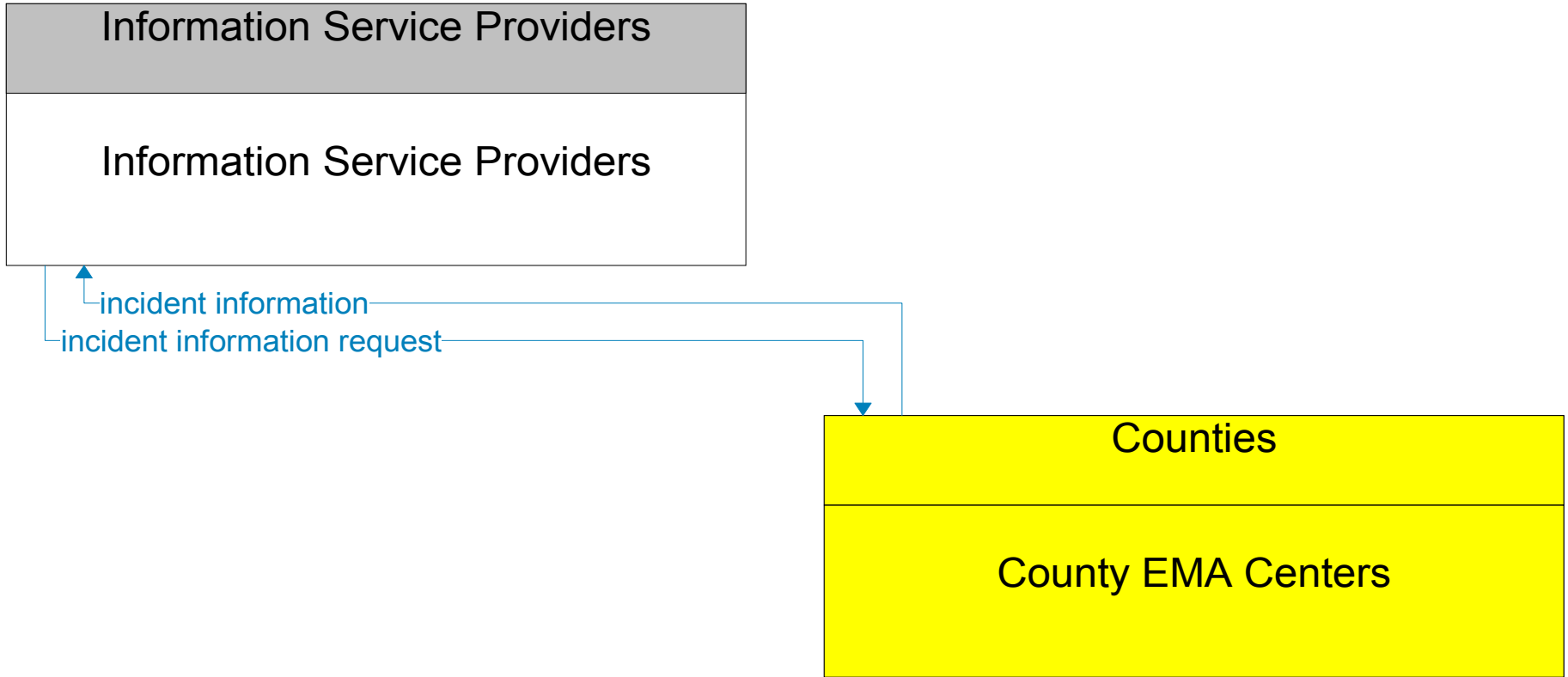
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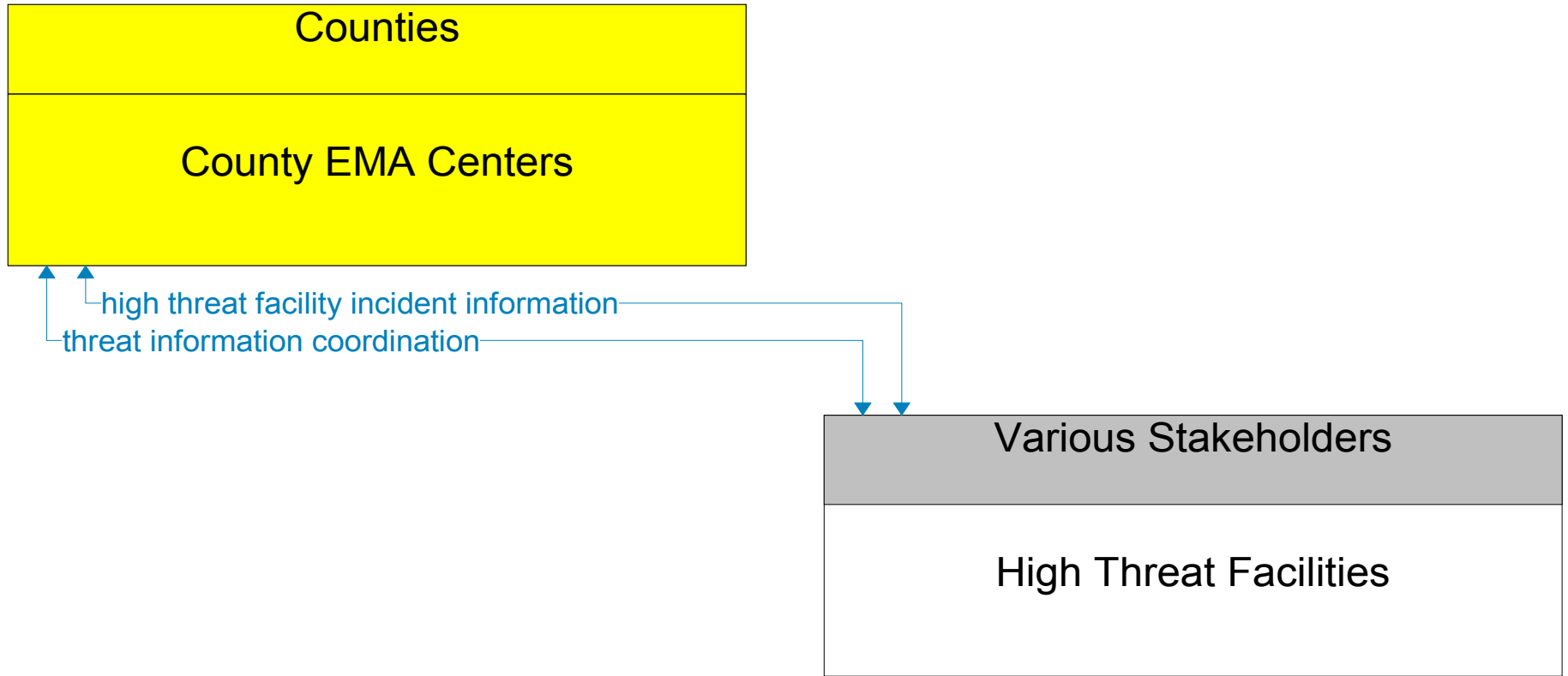


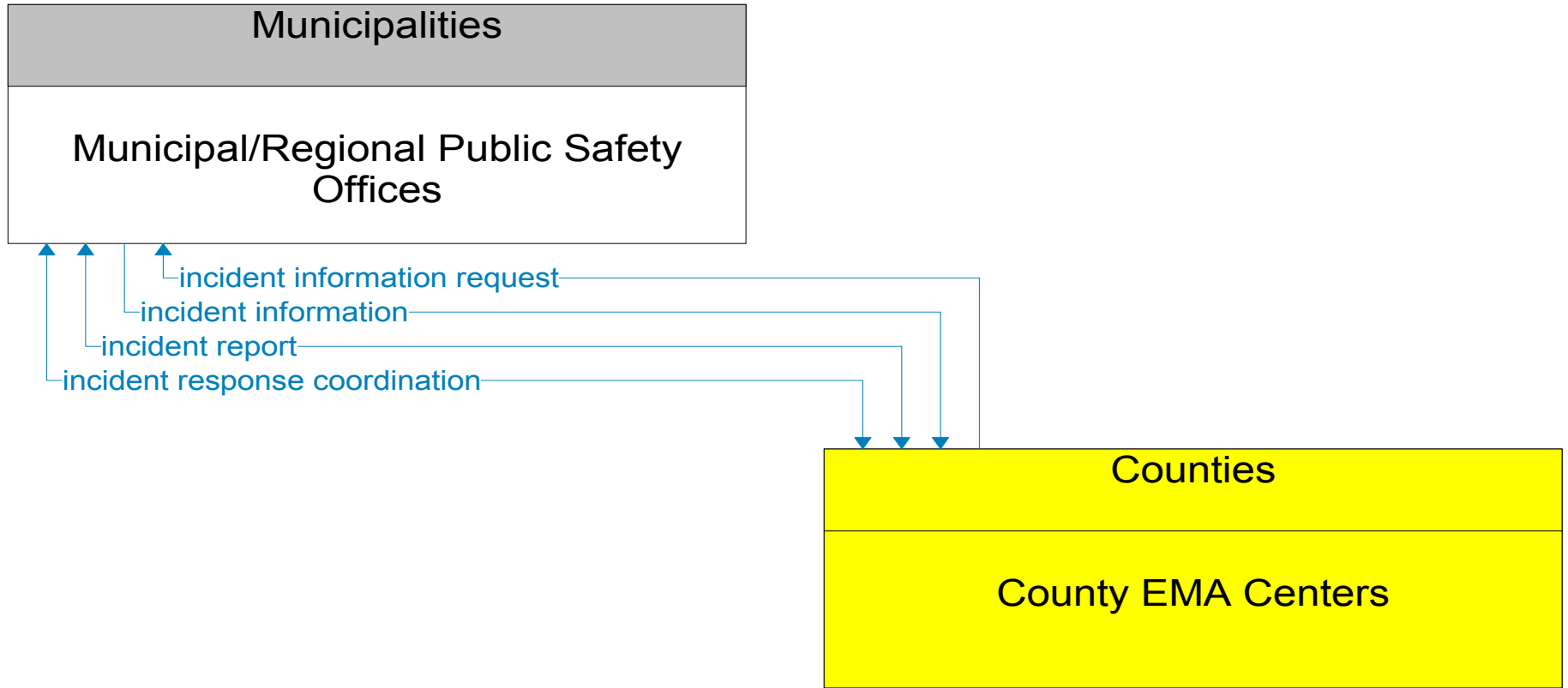


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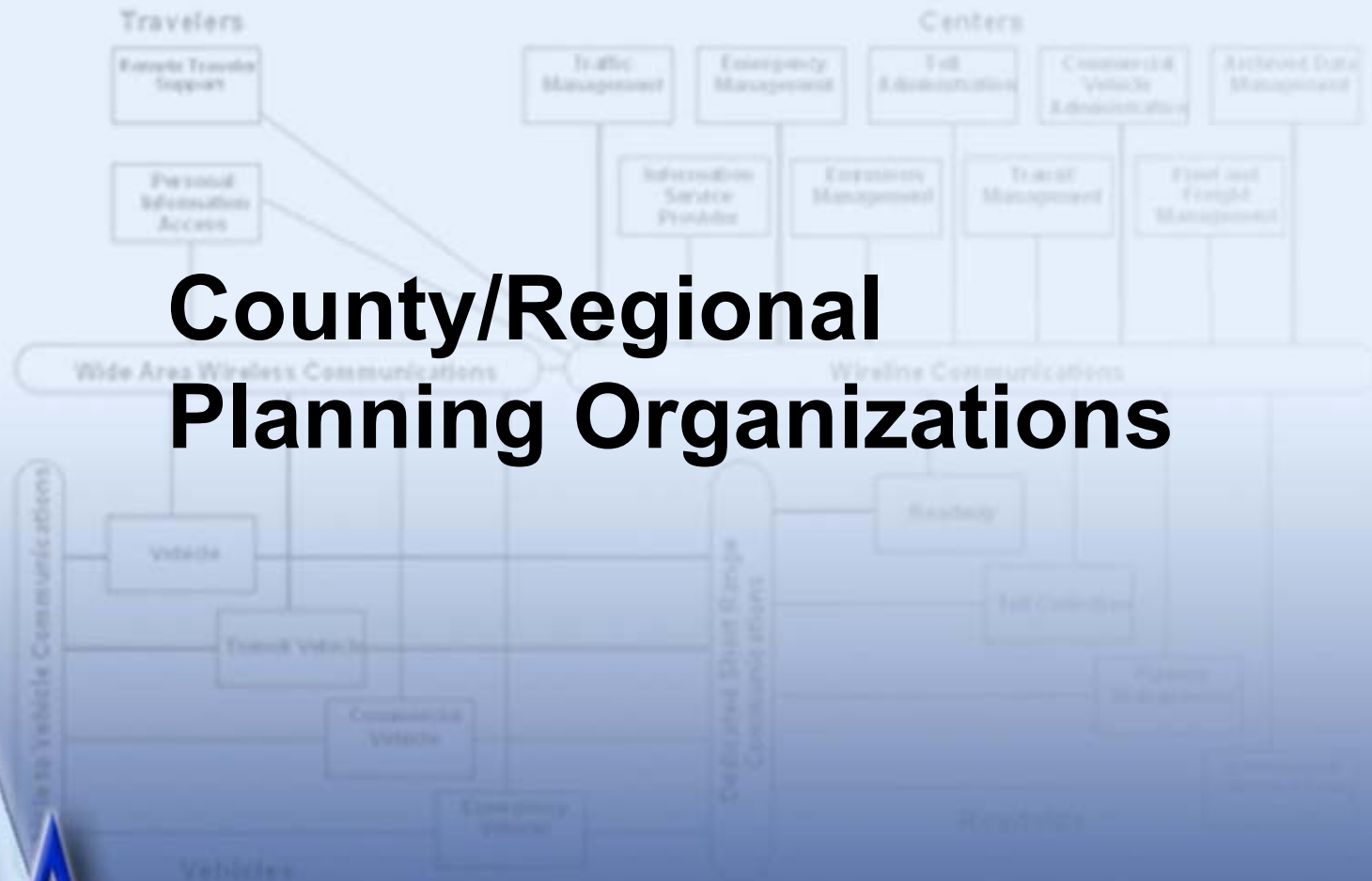
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----- Planned



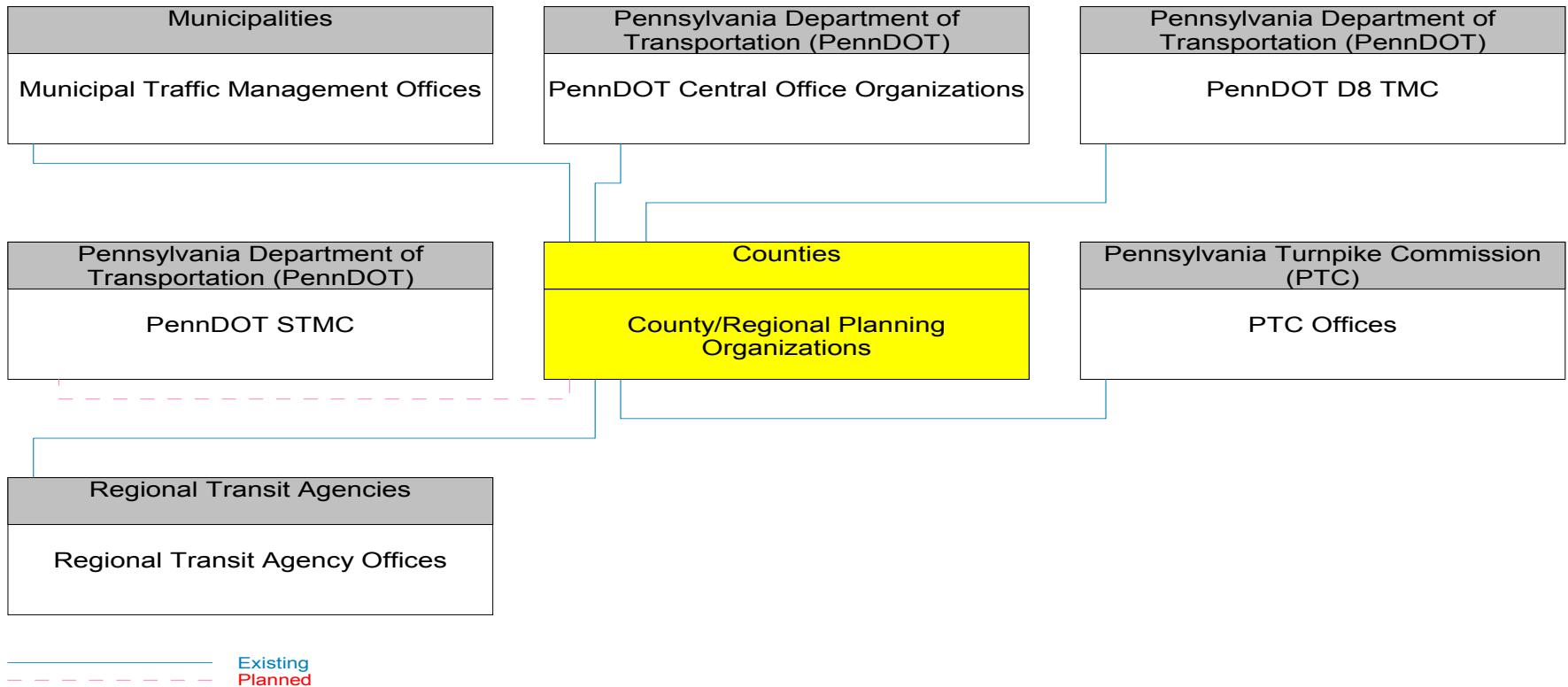


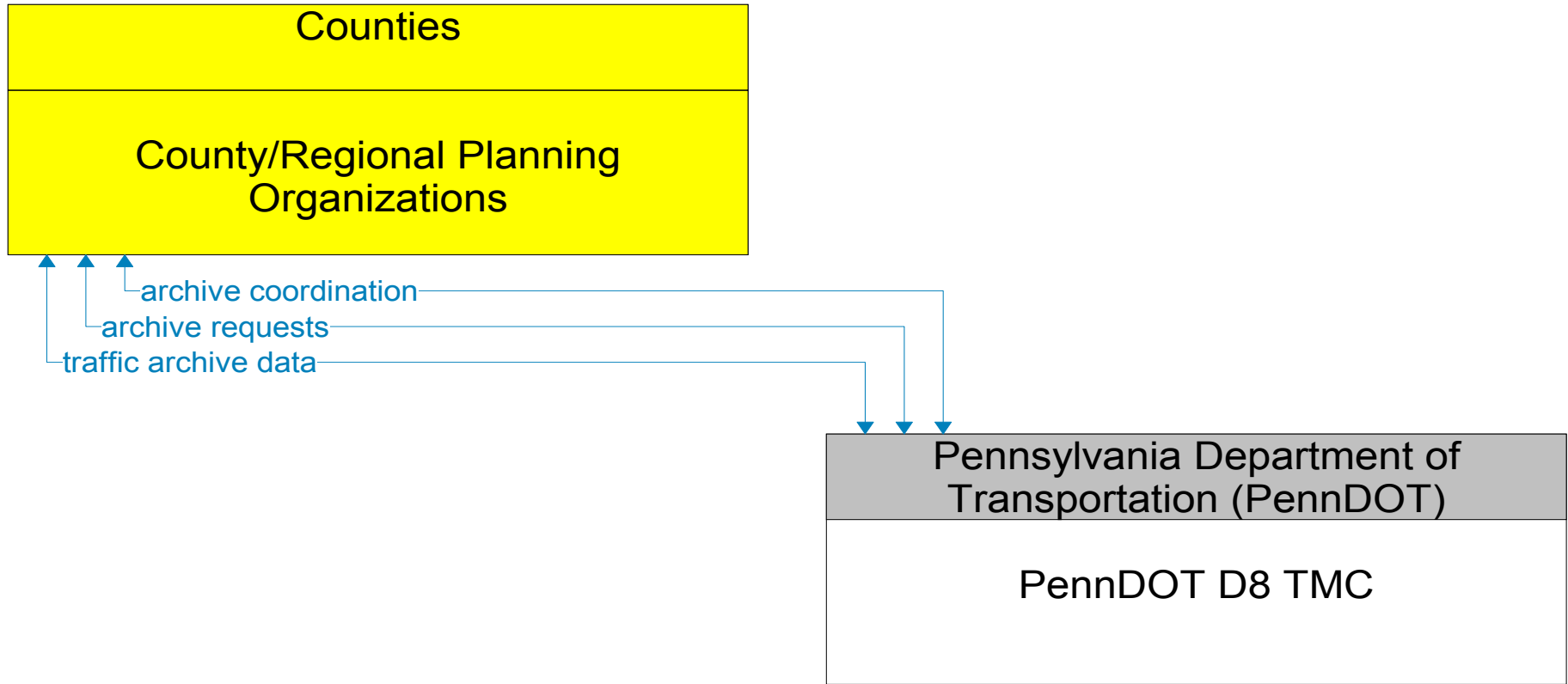
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----- Planned

County/Regional Planning Organizations

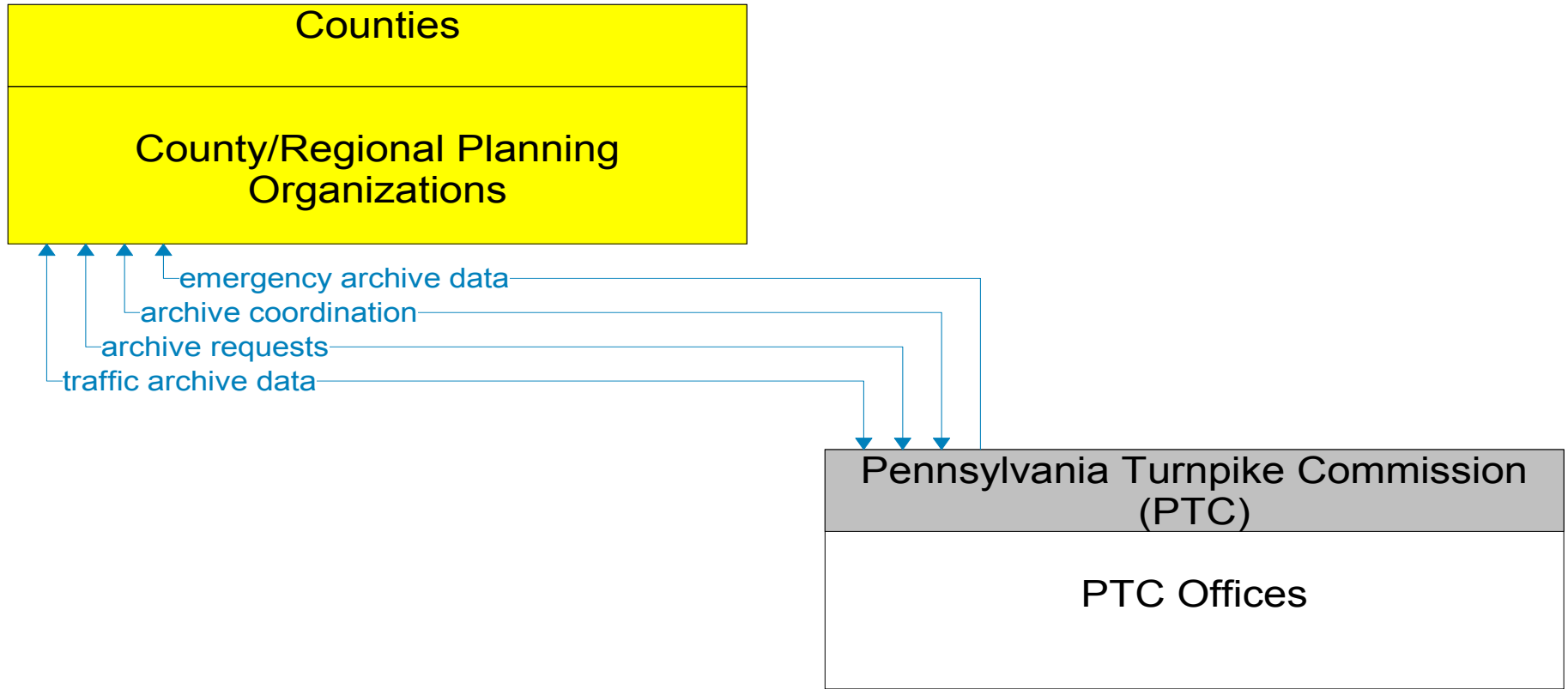


County/Regional Planning Organizations Interconnect Diagram

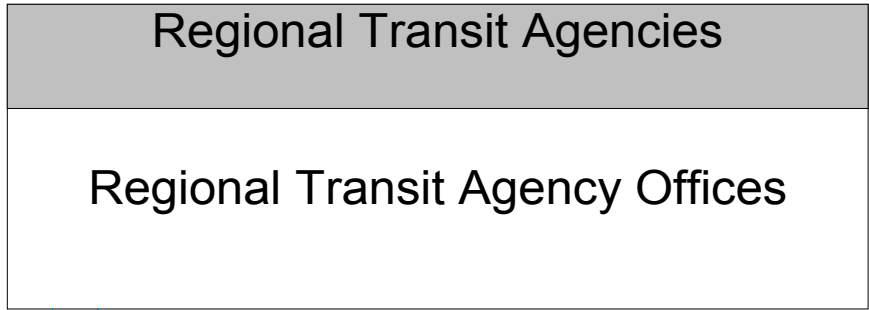




— Existing
- - - Planned



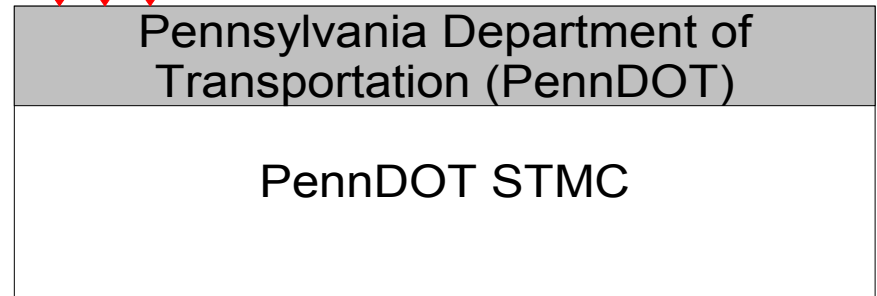
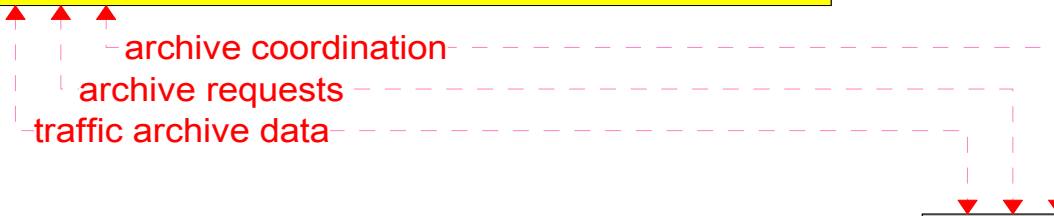
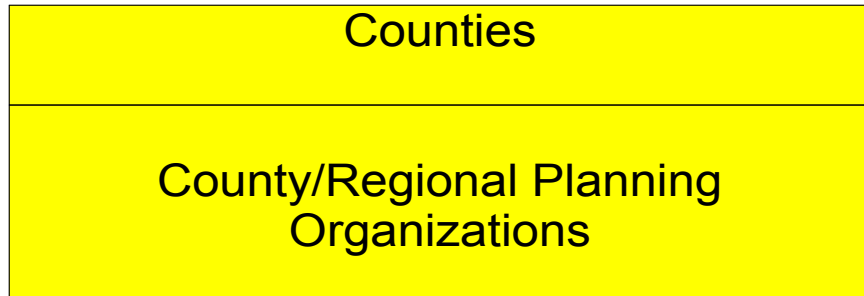
———— Existing
- - - - - Planned



archive requests
transit archive data

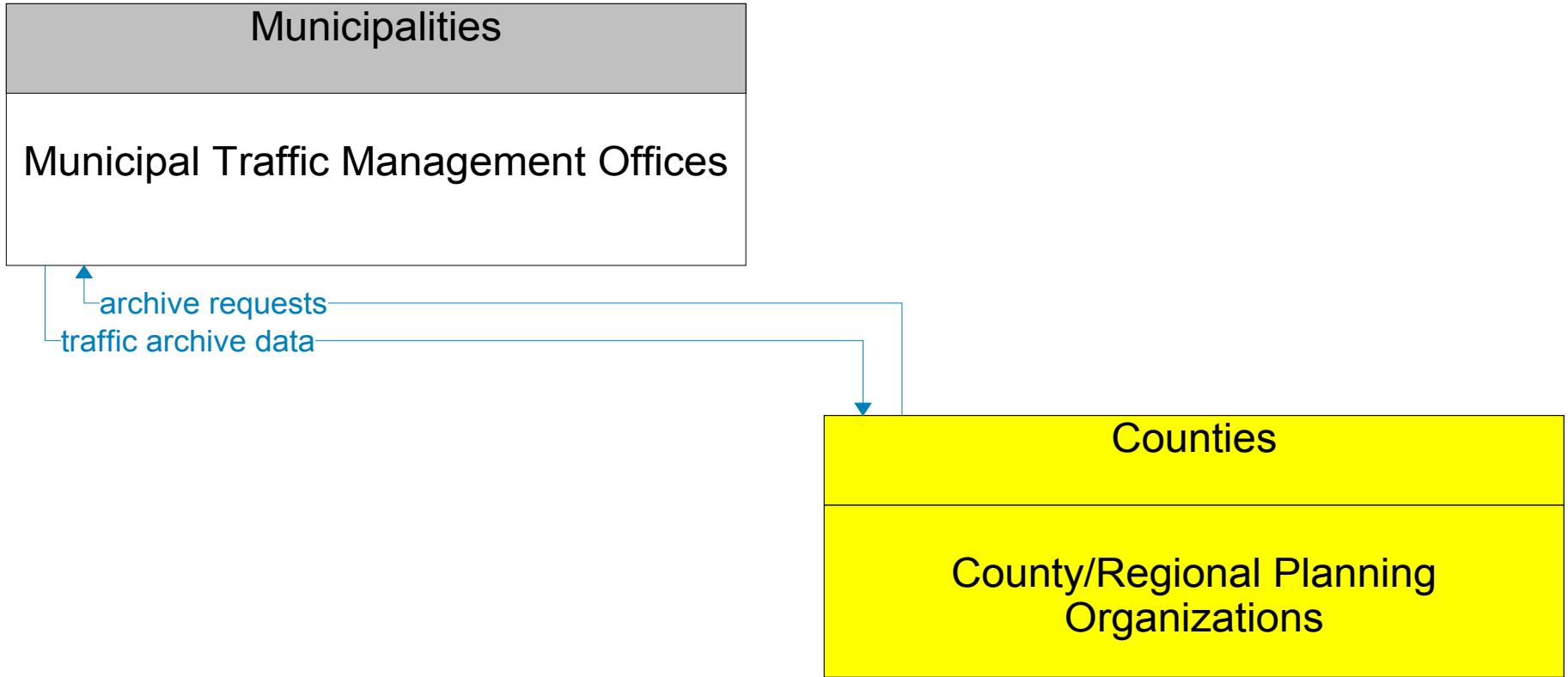


Existing
Planned

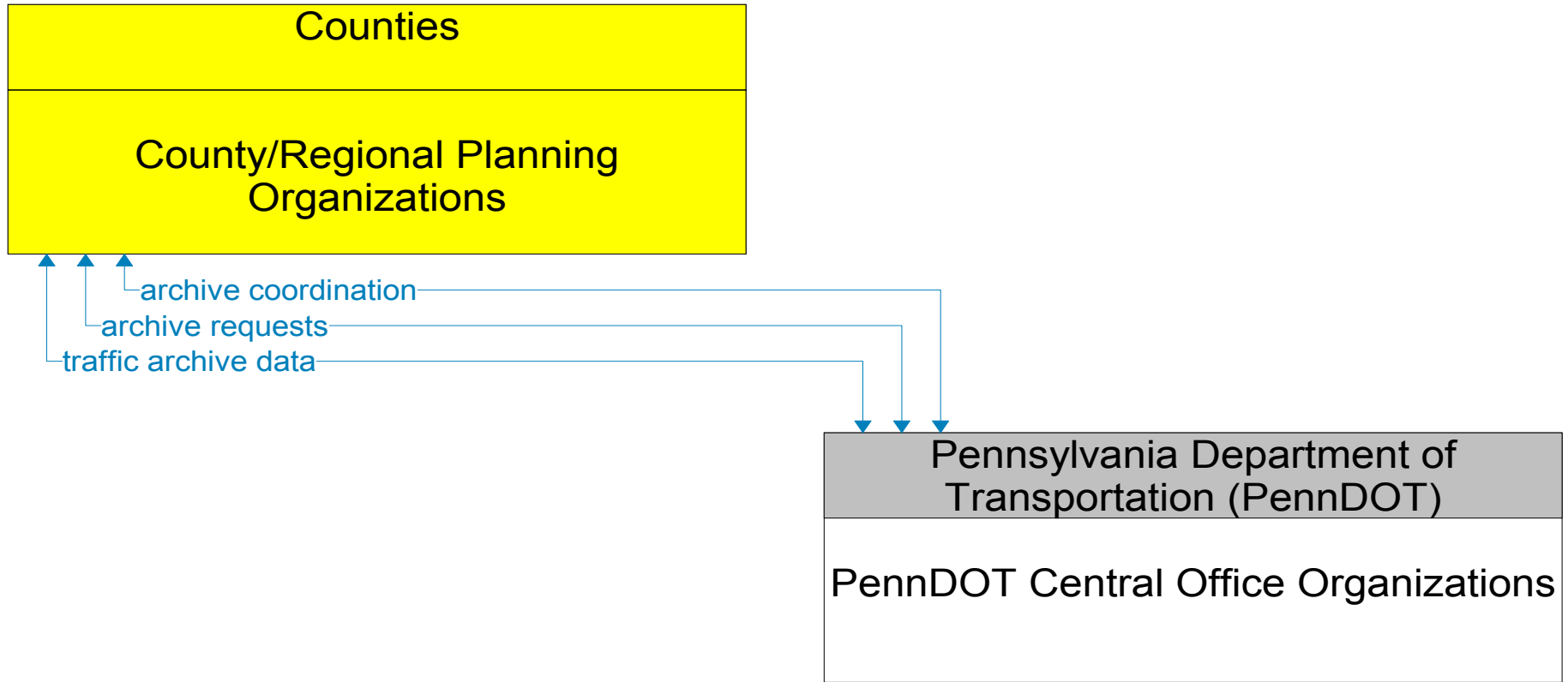


———— Existing

- - - - - Planned



———— Existing
- - - - - Planned

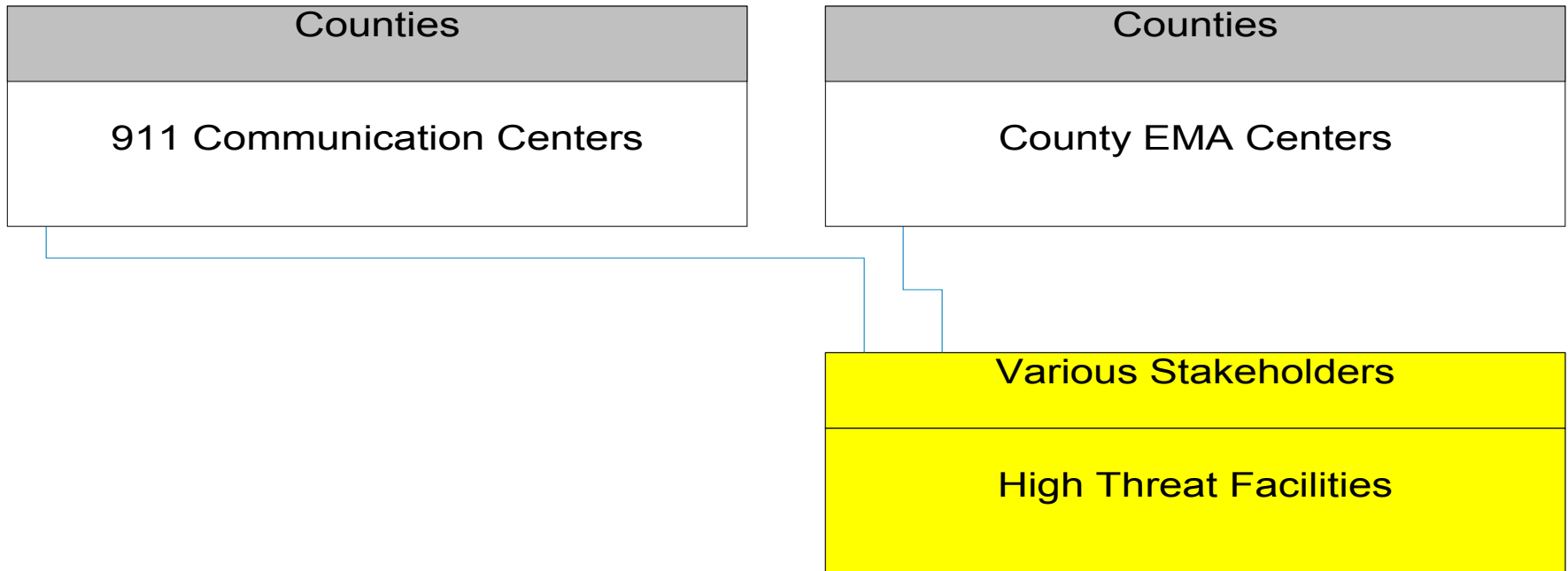


———— Existing
- - - - - Planned

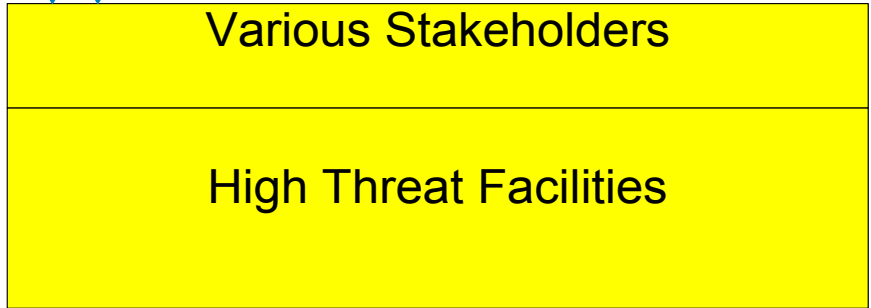
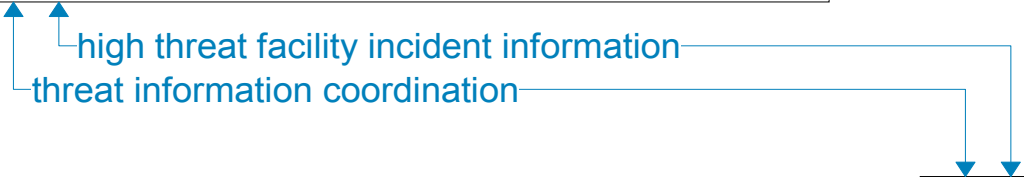
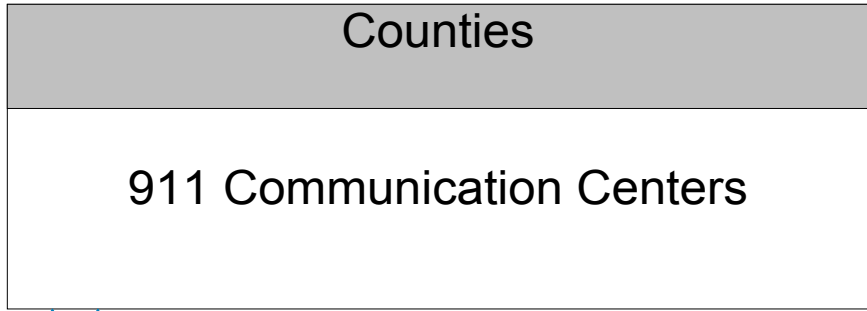
High Threat Facilities



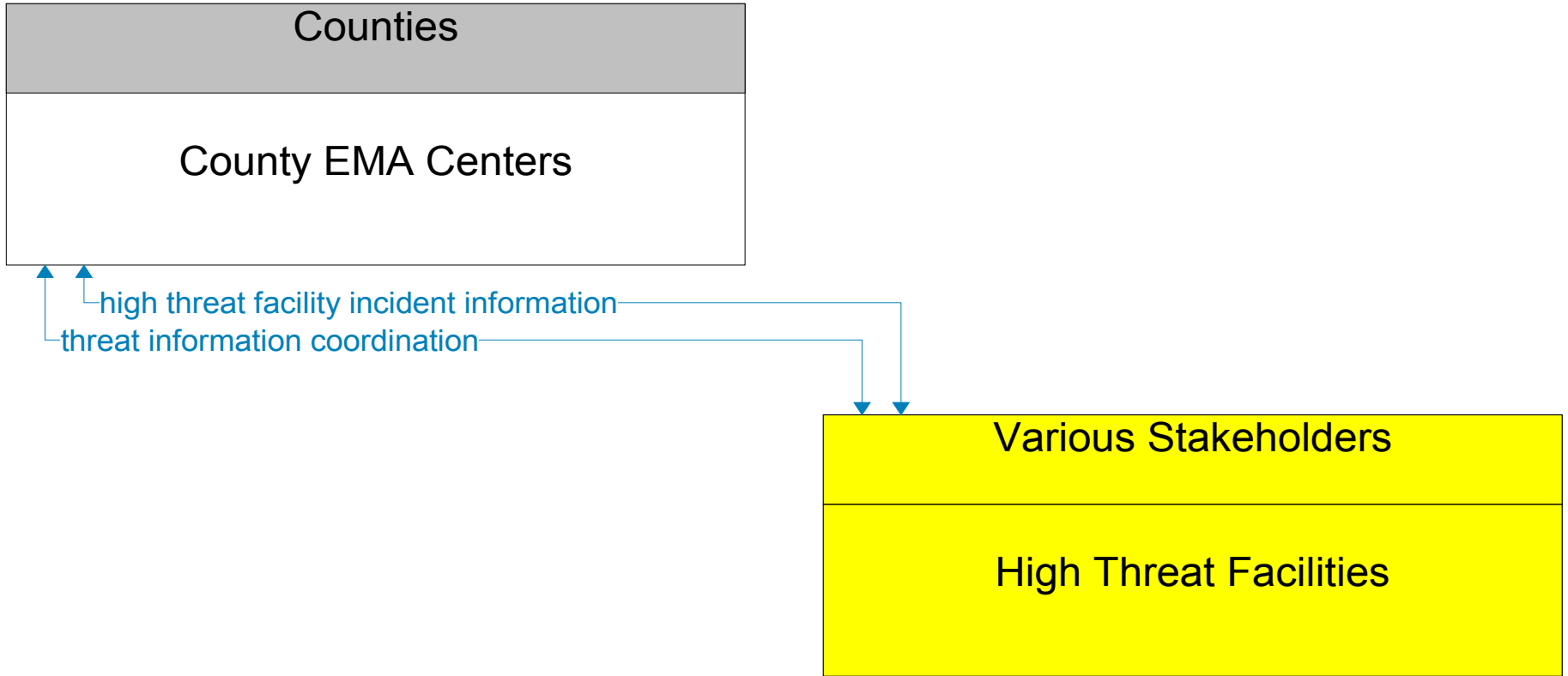
High Threat Facilities Interconnect Diagram



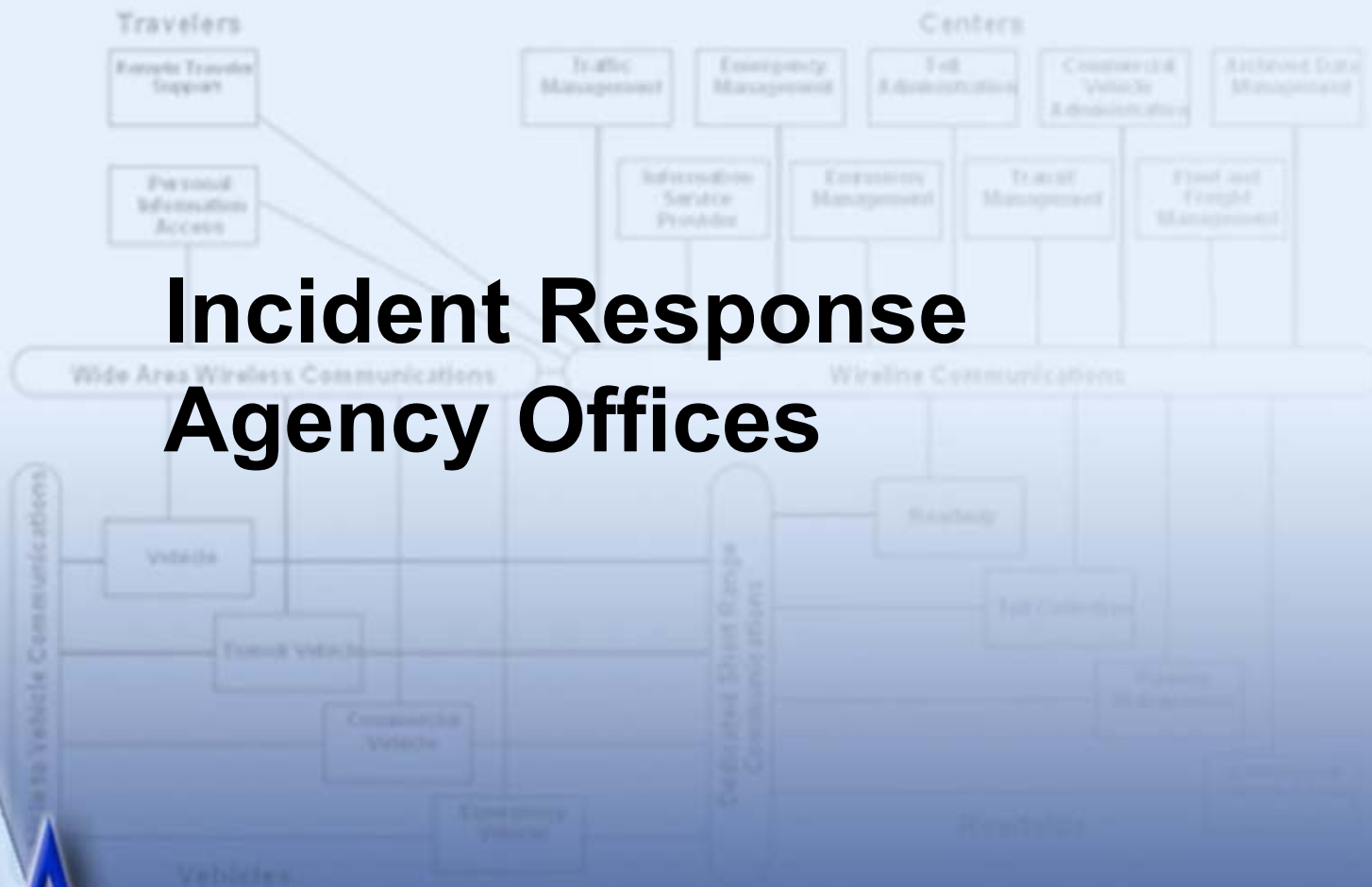
———— Existing
- - - - - Planned



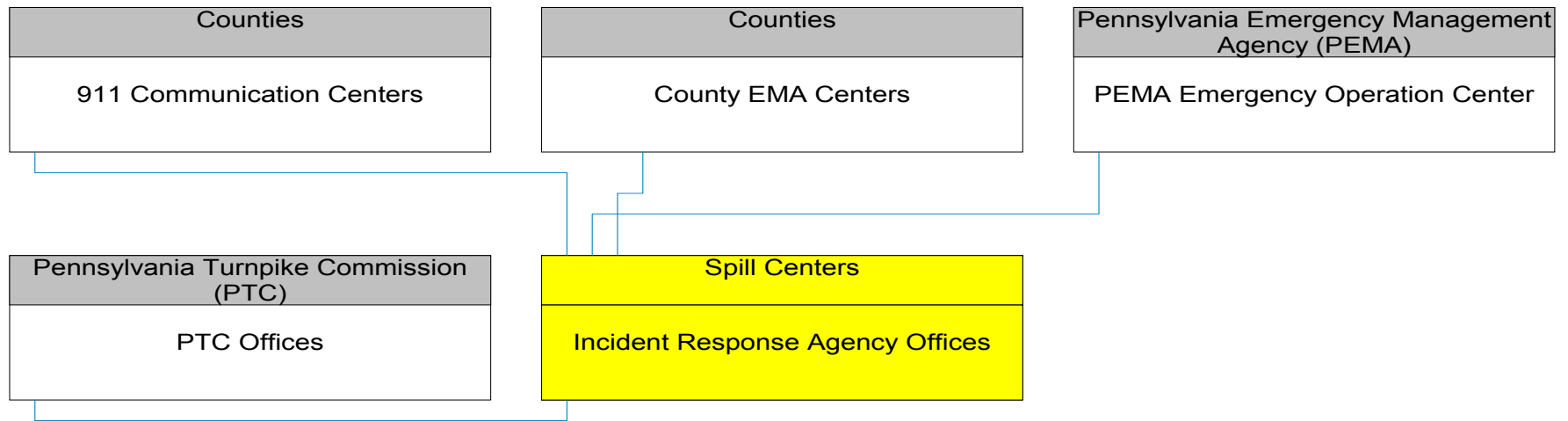
———— Existing
----- Planned



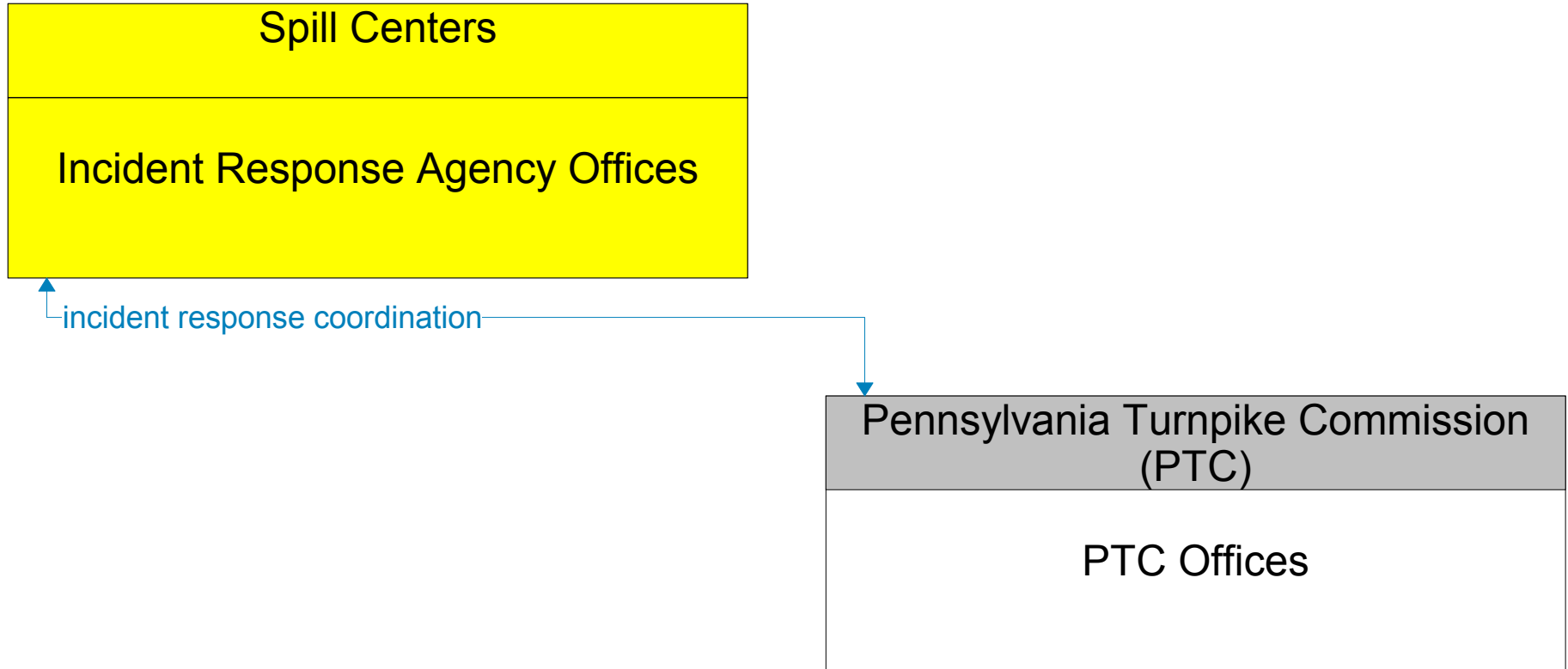
Incident Response Agency Offices



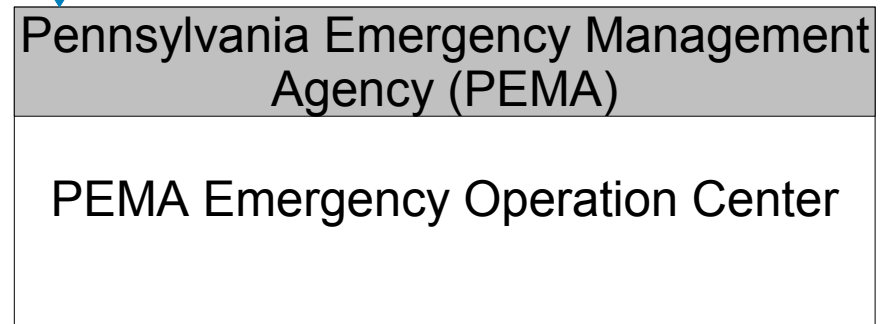
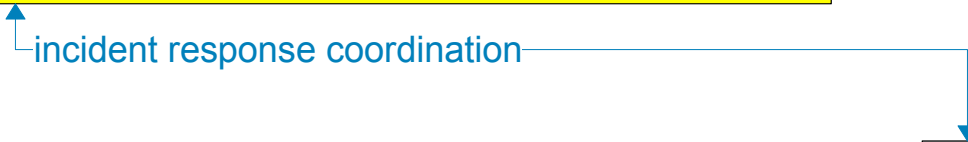
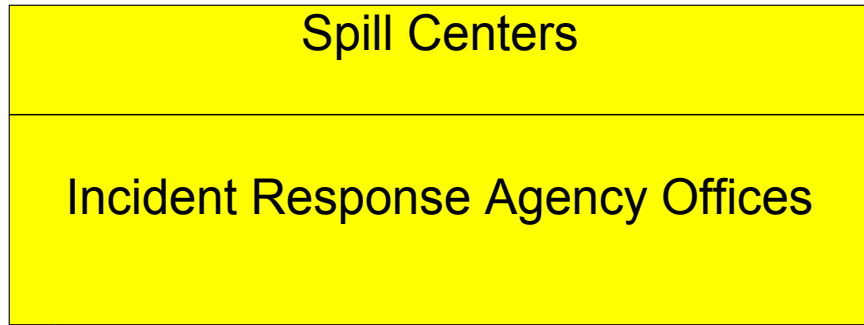
Incident Response Agency Offices Interconnect Diagram

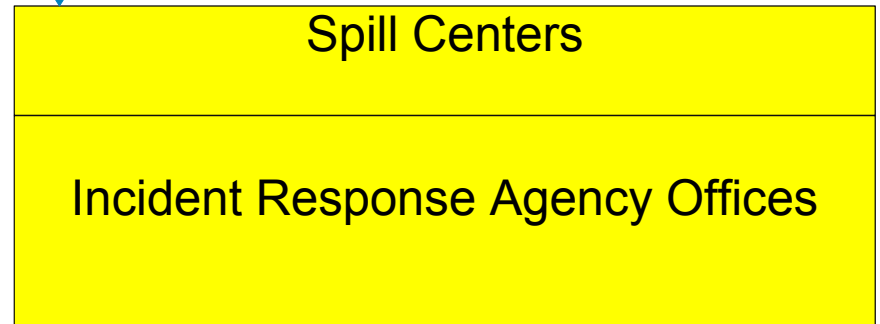
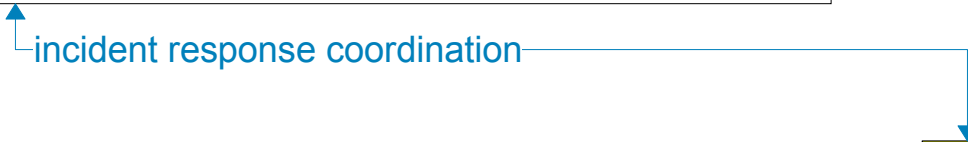
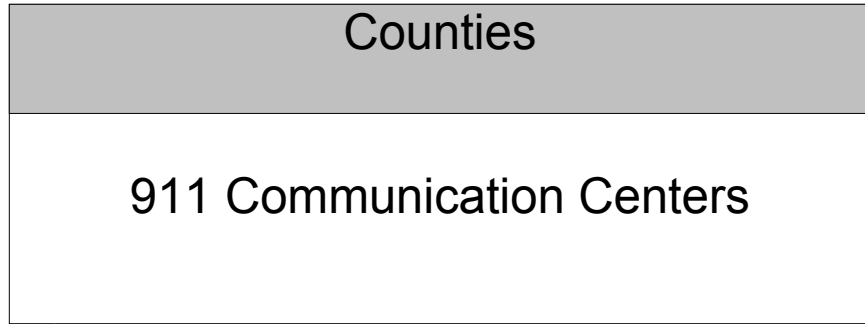


— Existing
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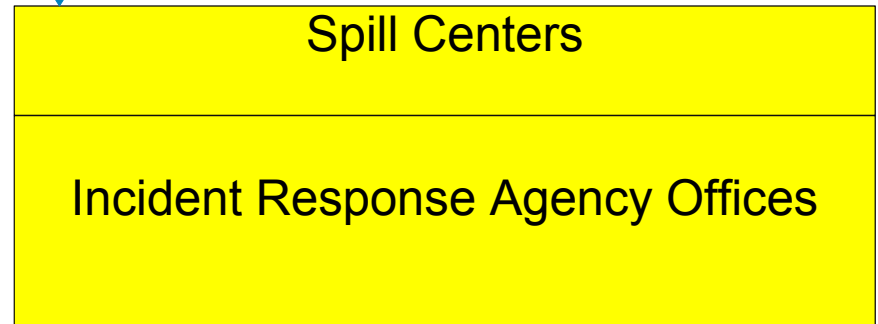
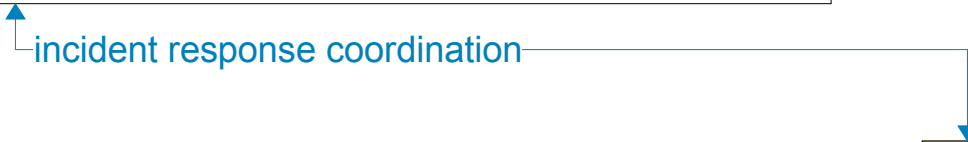
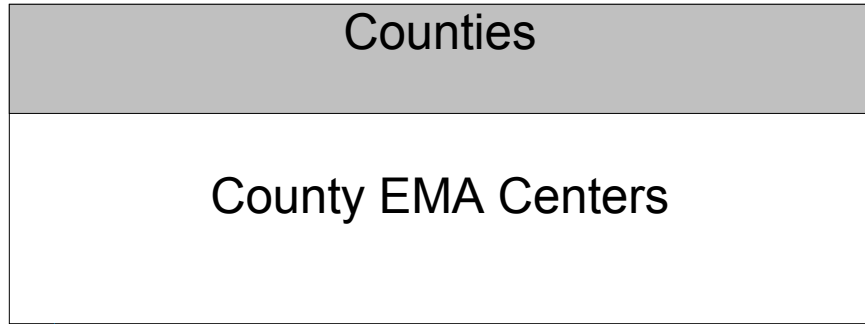


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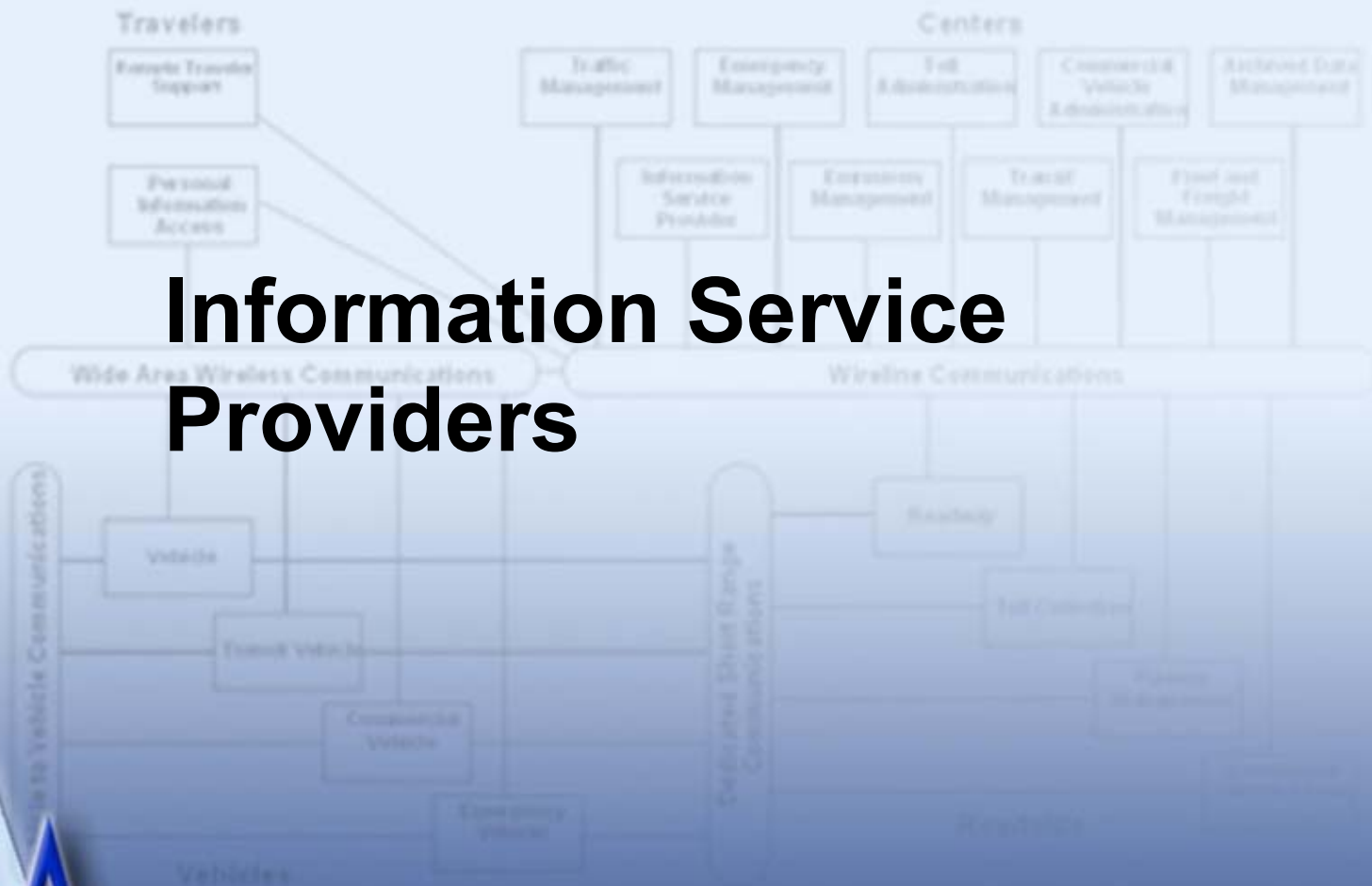


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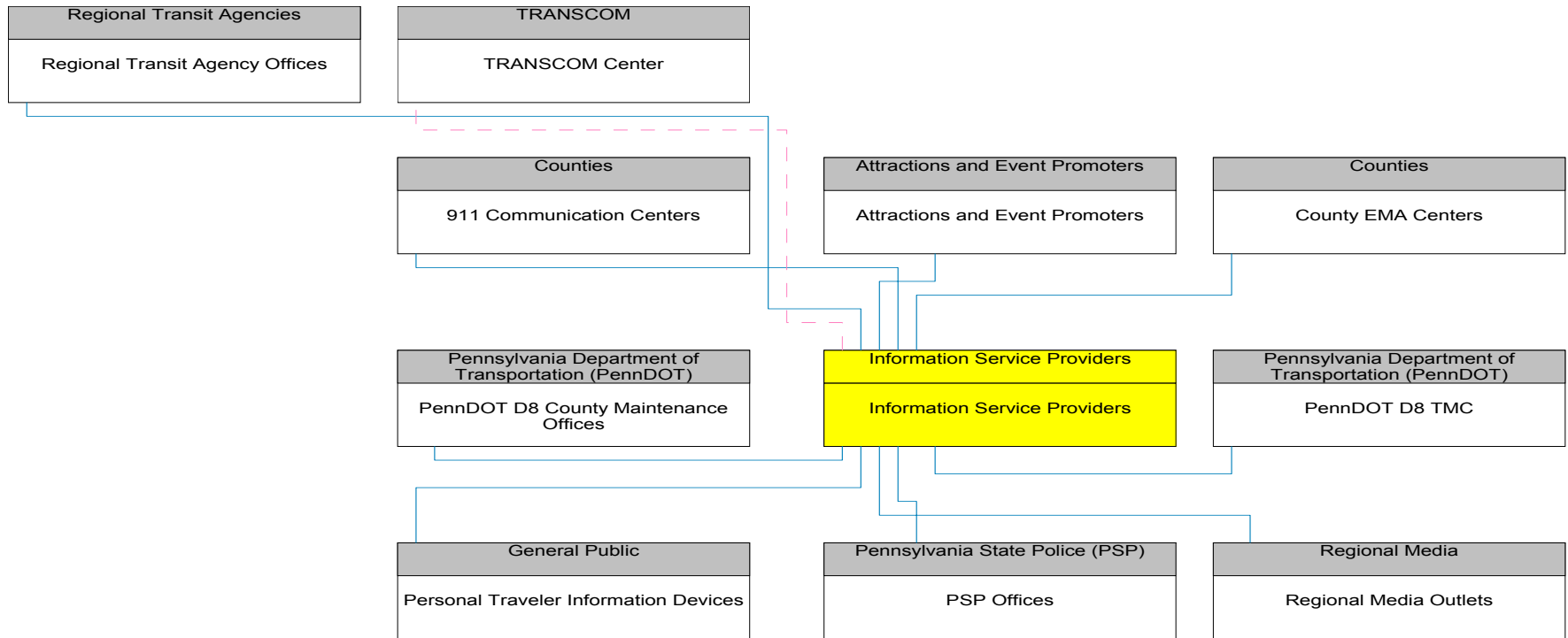
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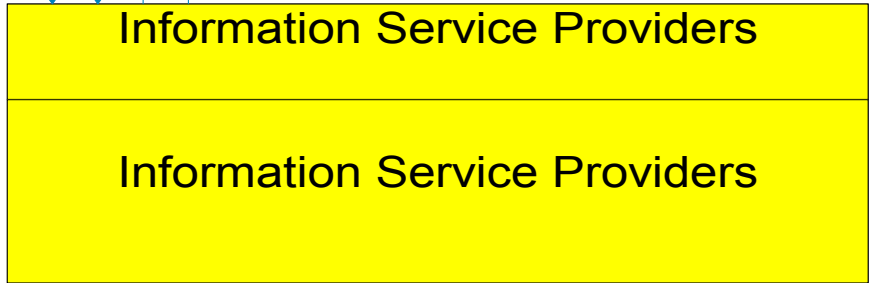
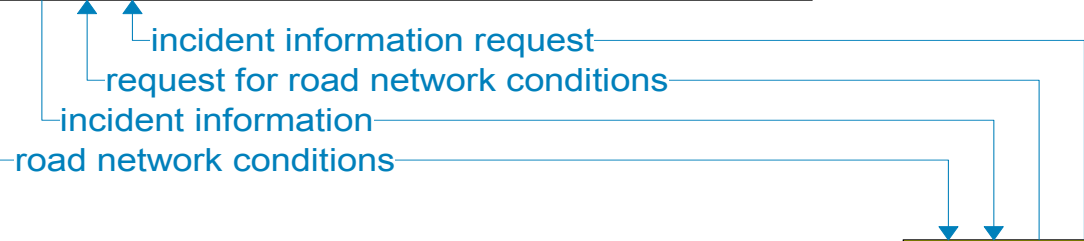
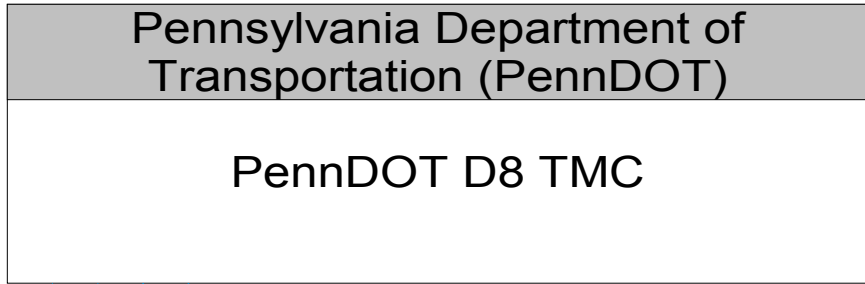
Information Service Providers



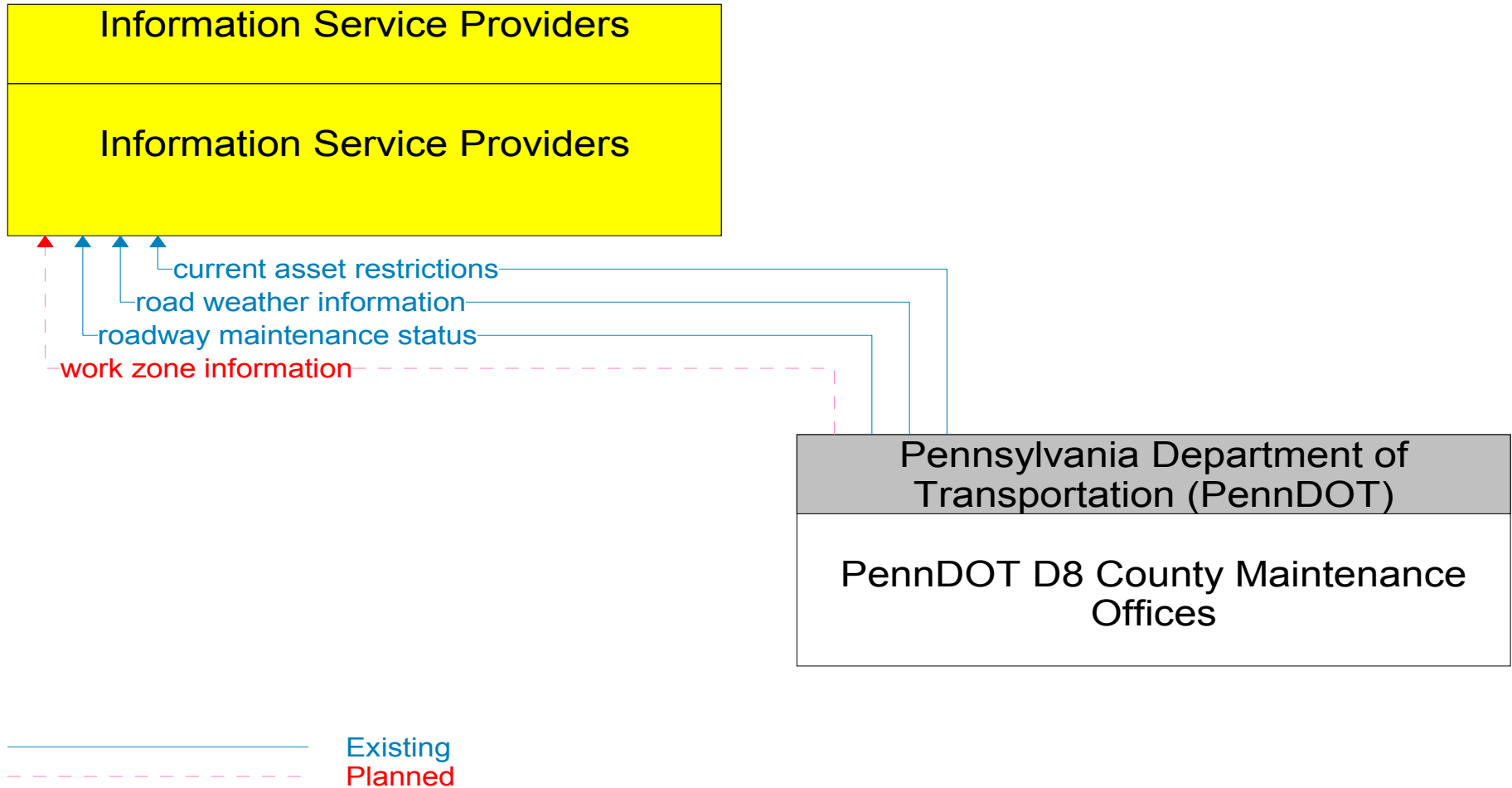
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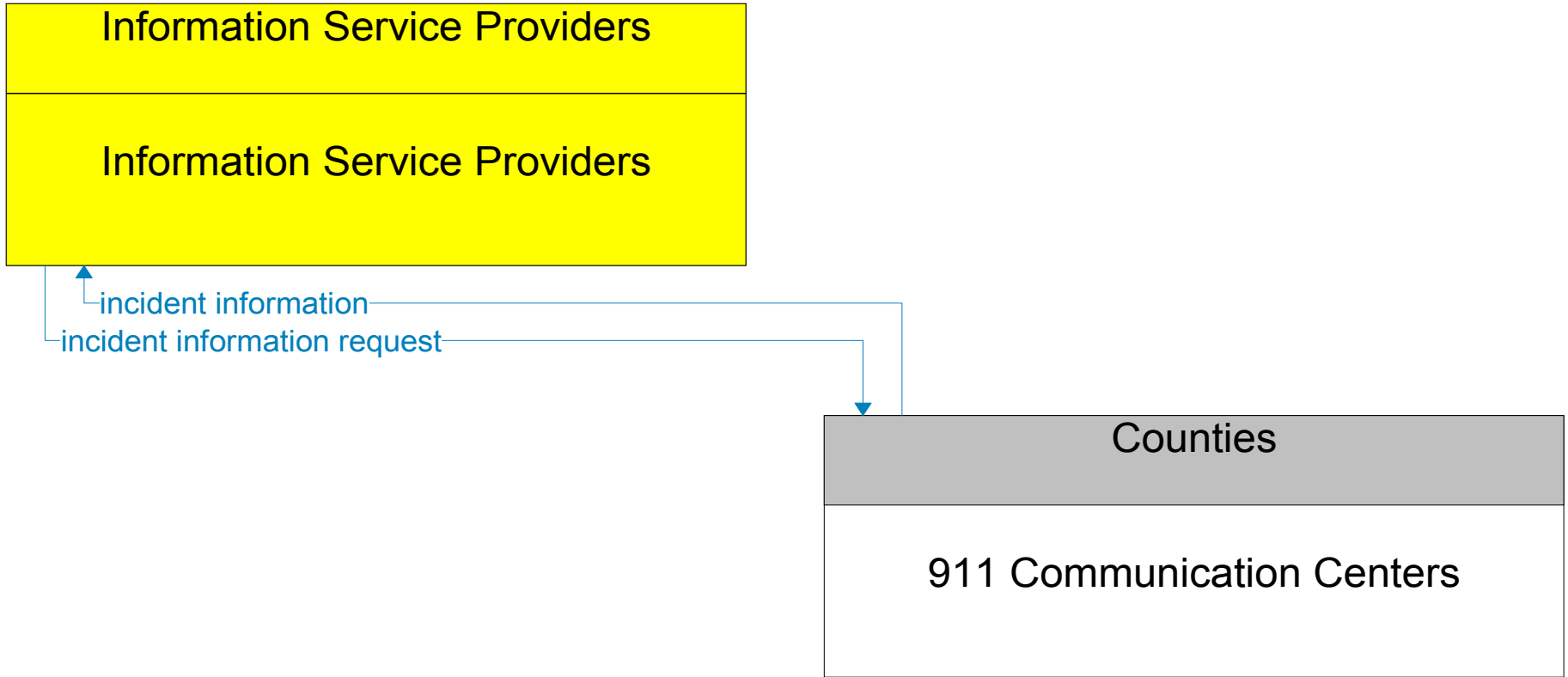
Information Service Providers Interconnect Diagram



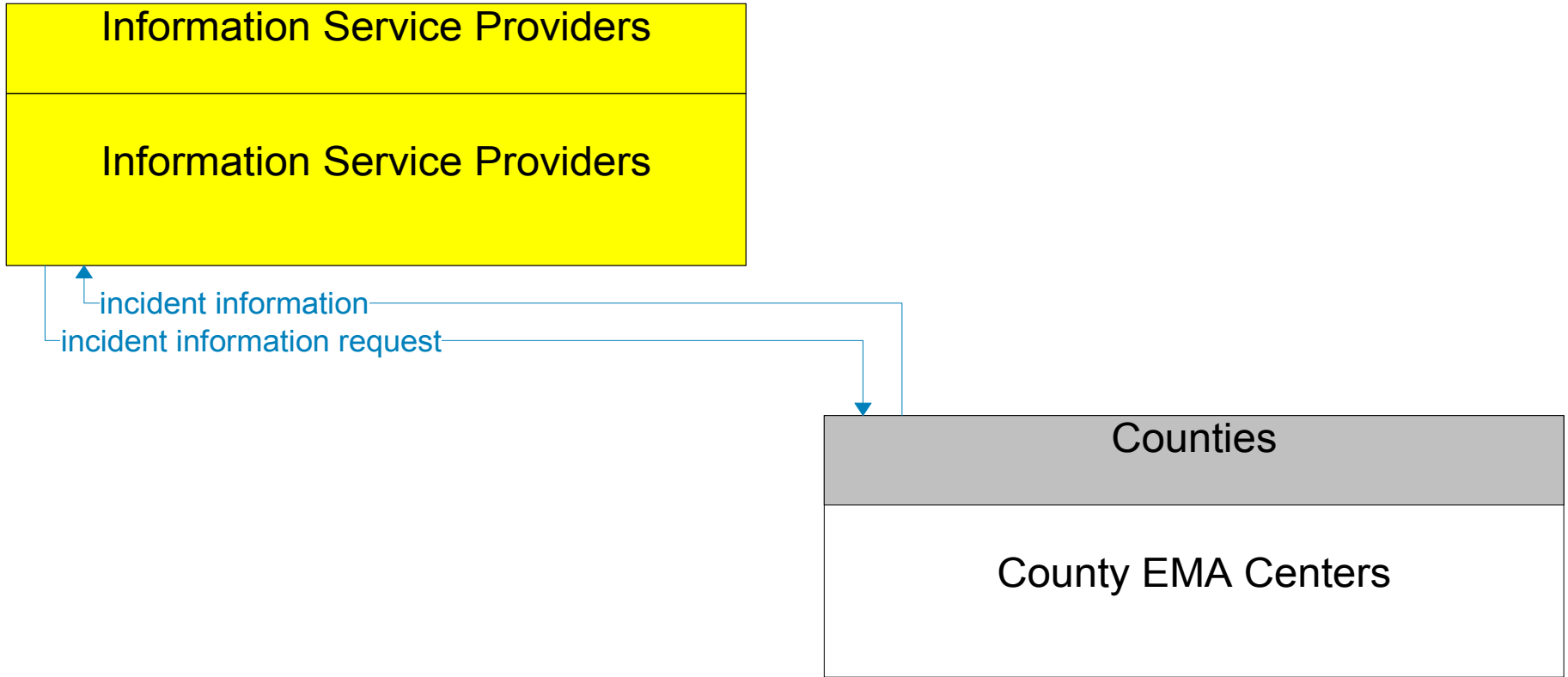


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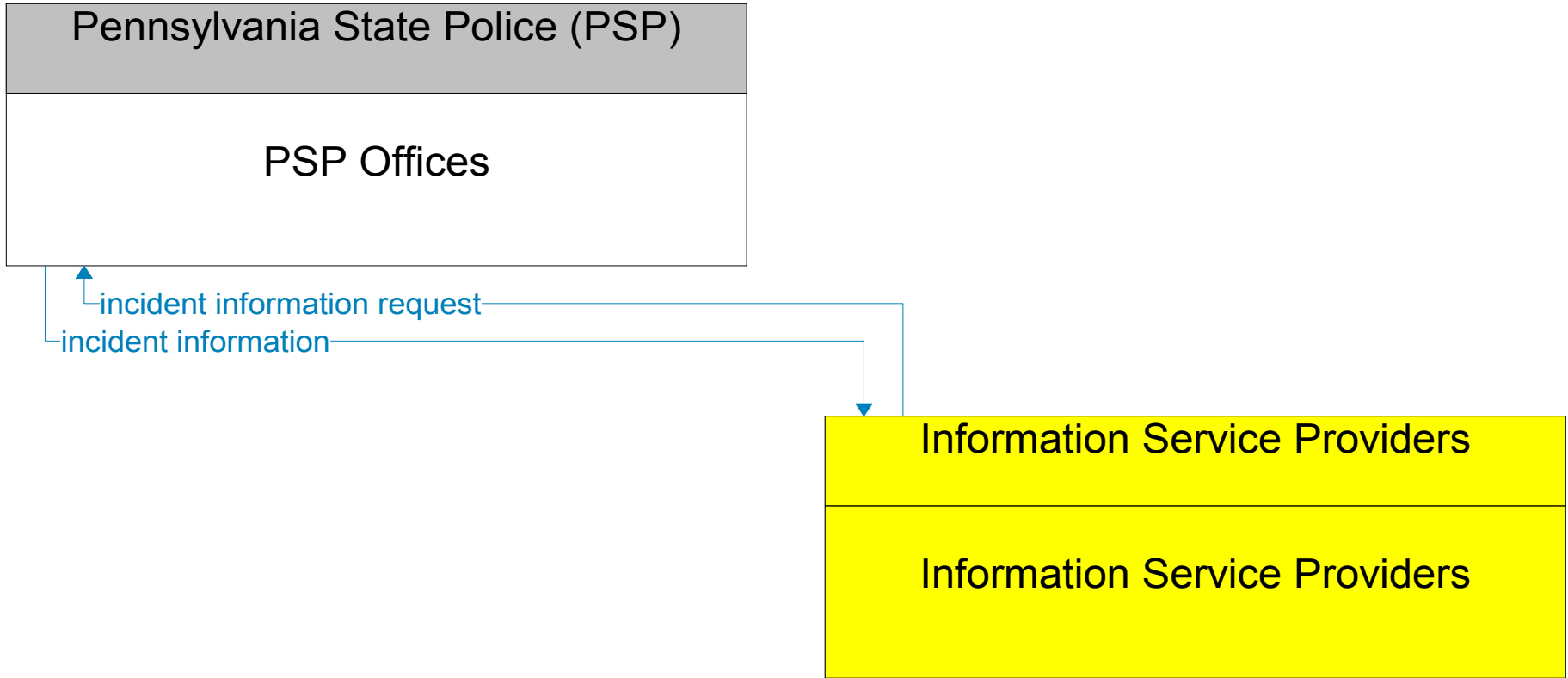




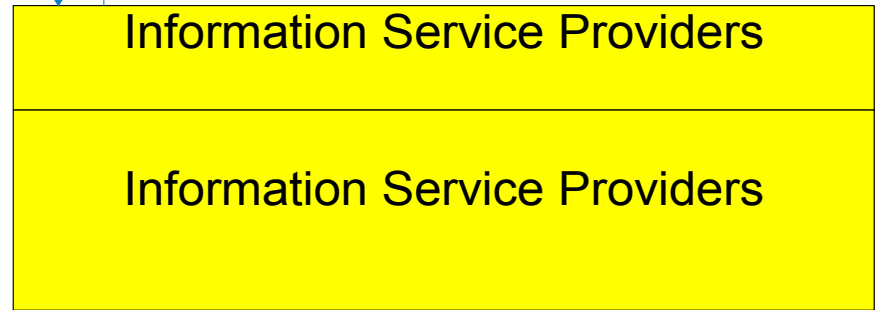
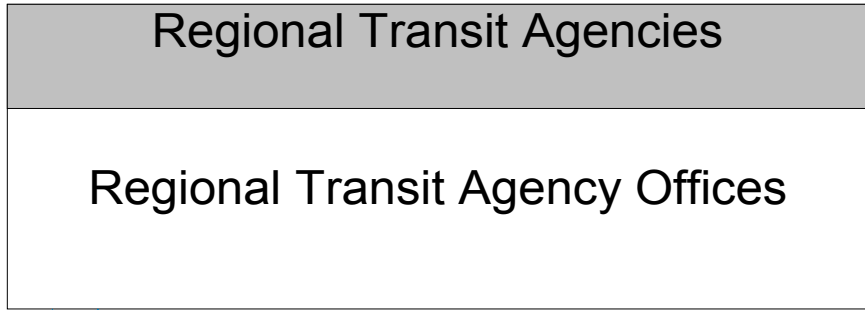
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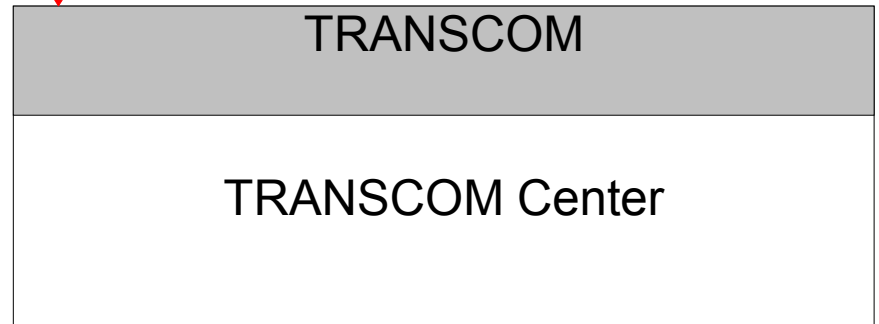
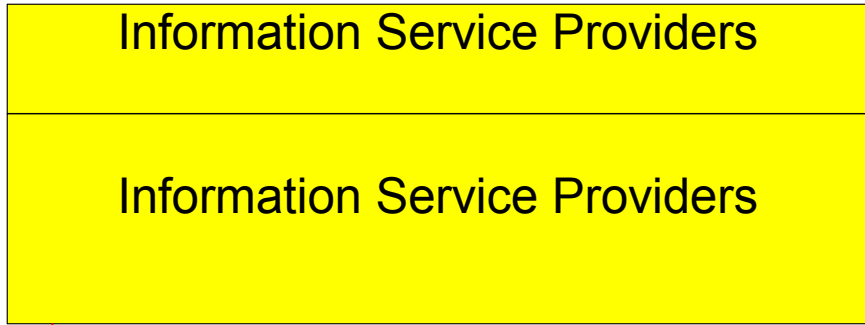


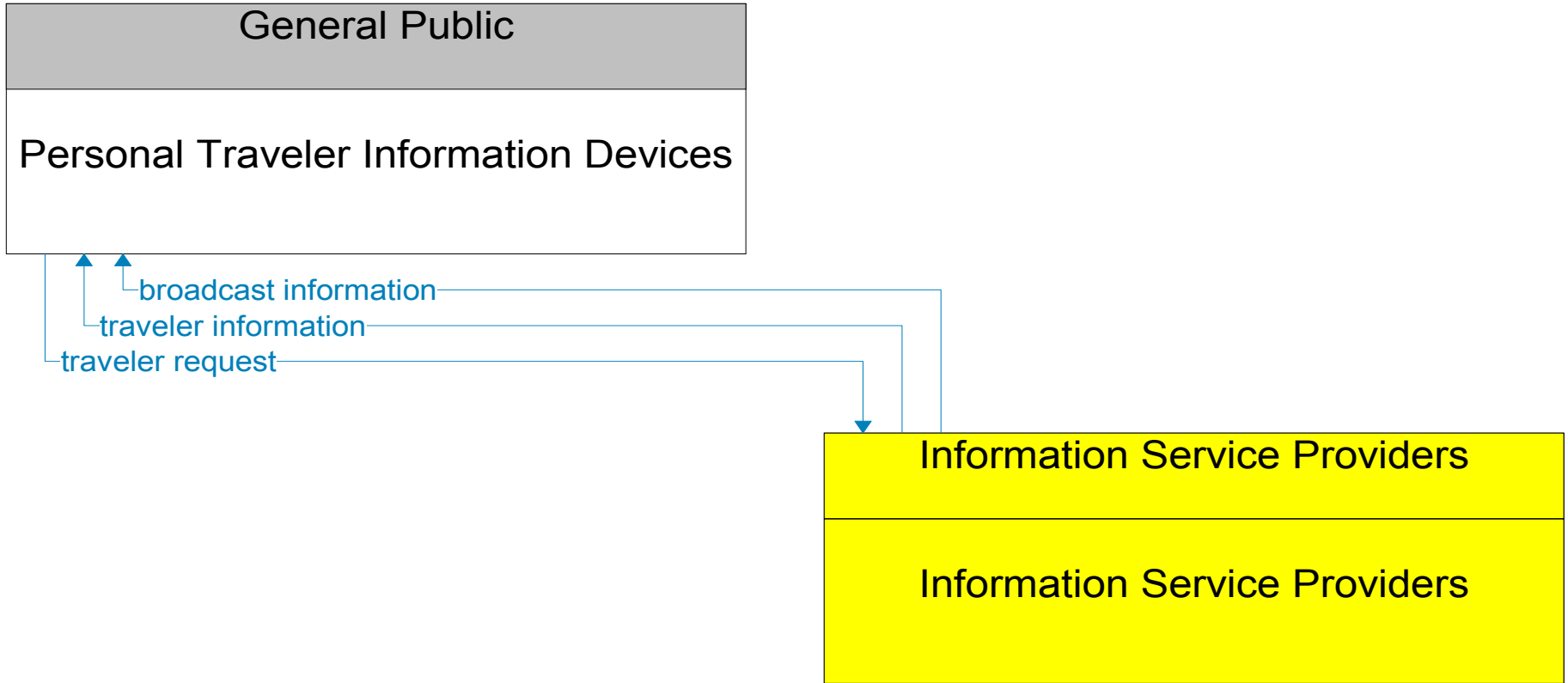
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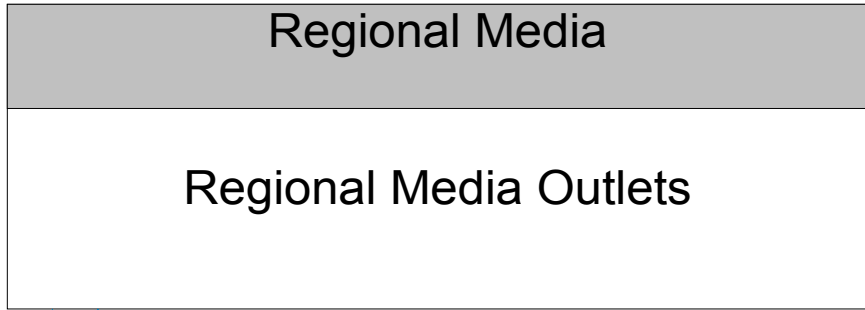
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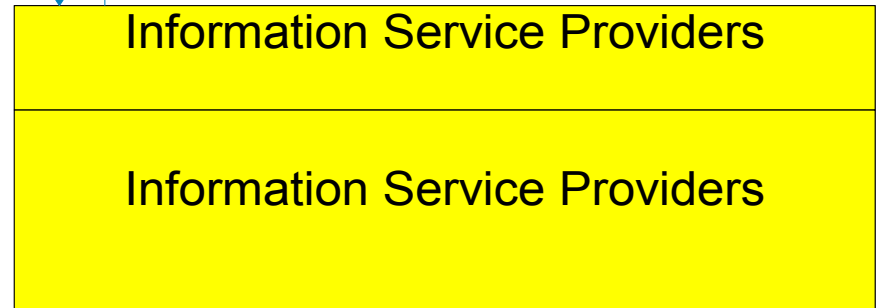




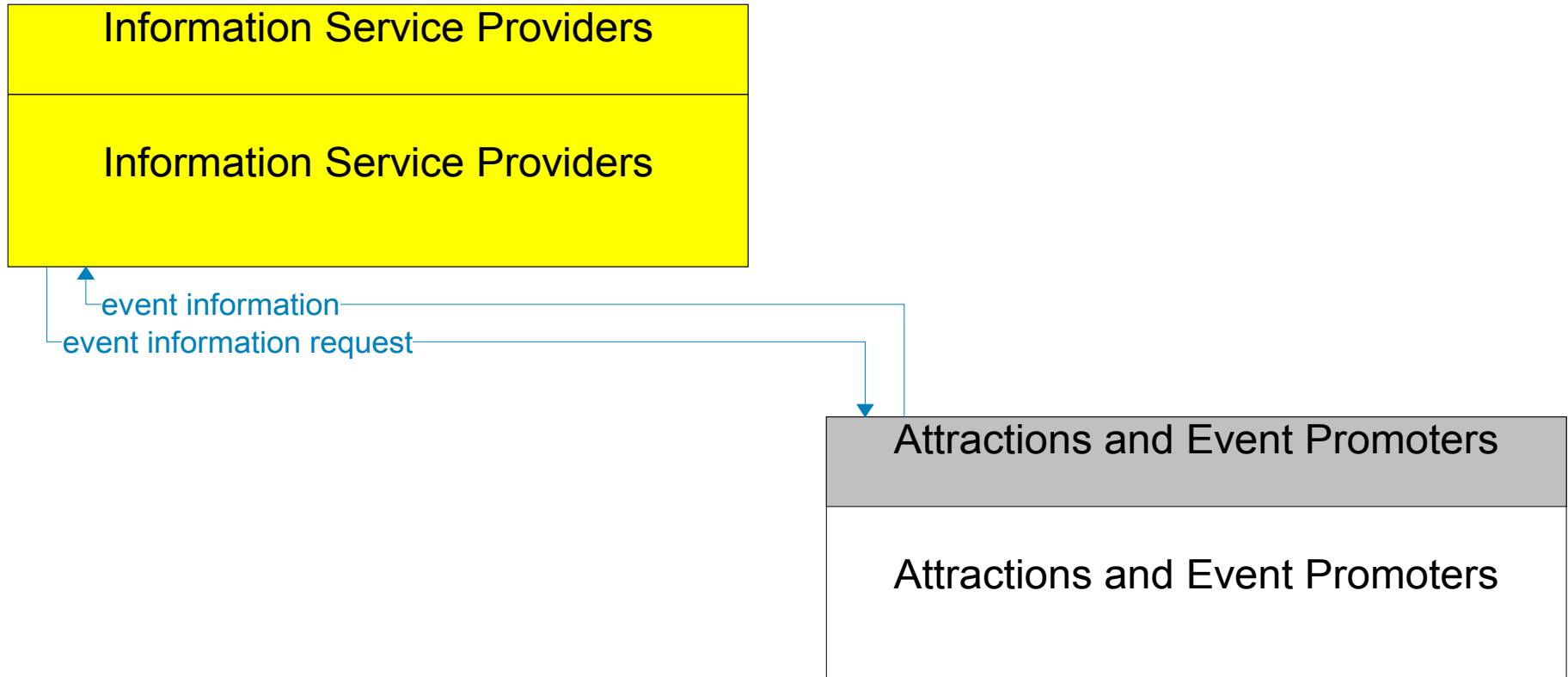
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traveler information for media
media information request

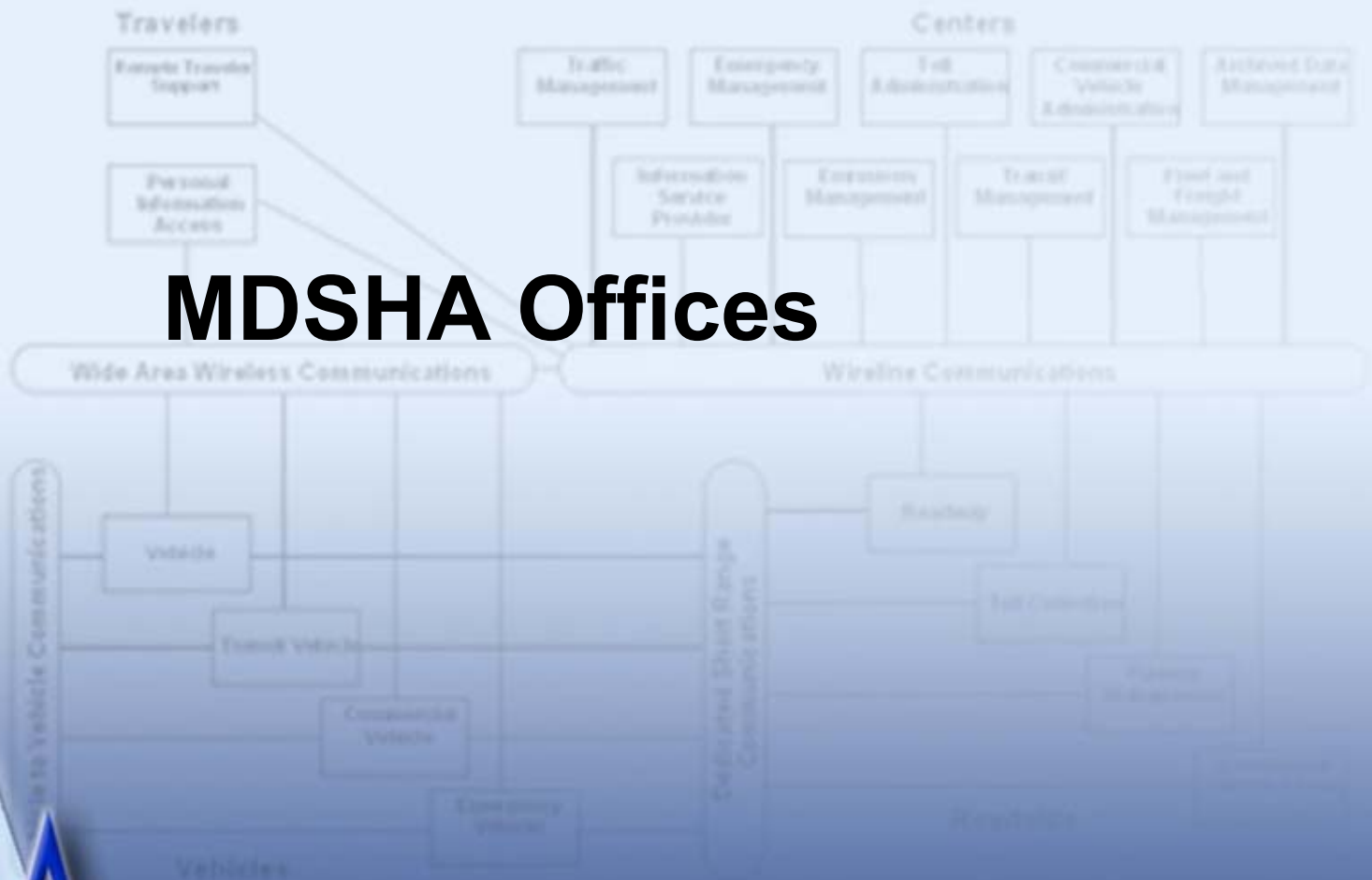


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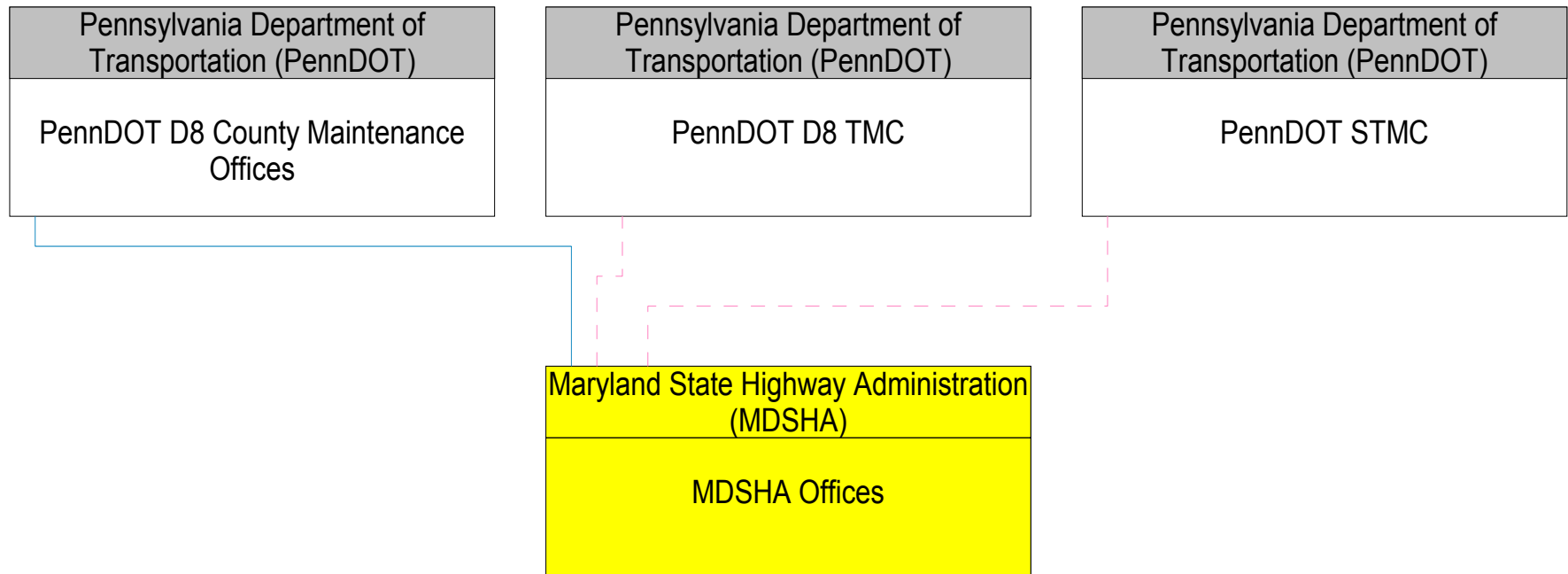


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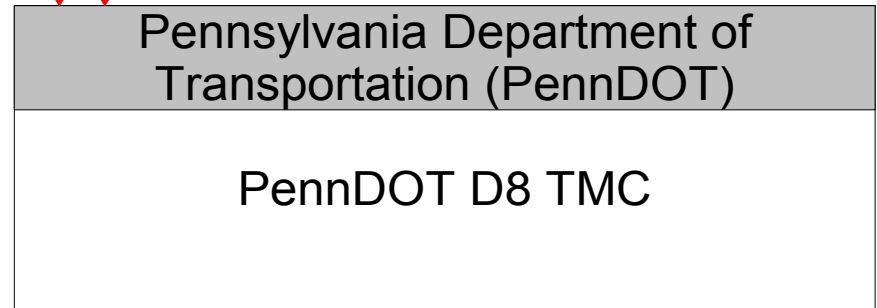
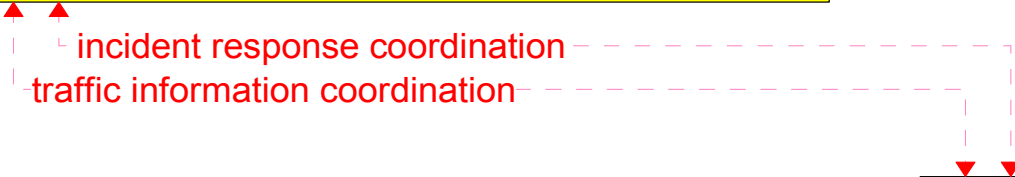
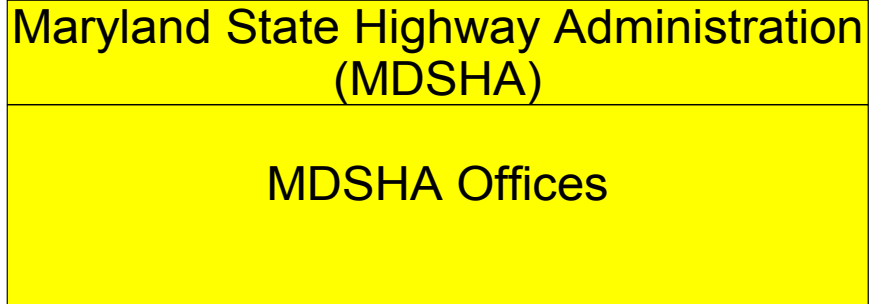
MDSHA Offices



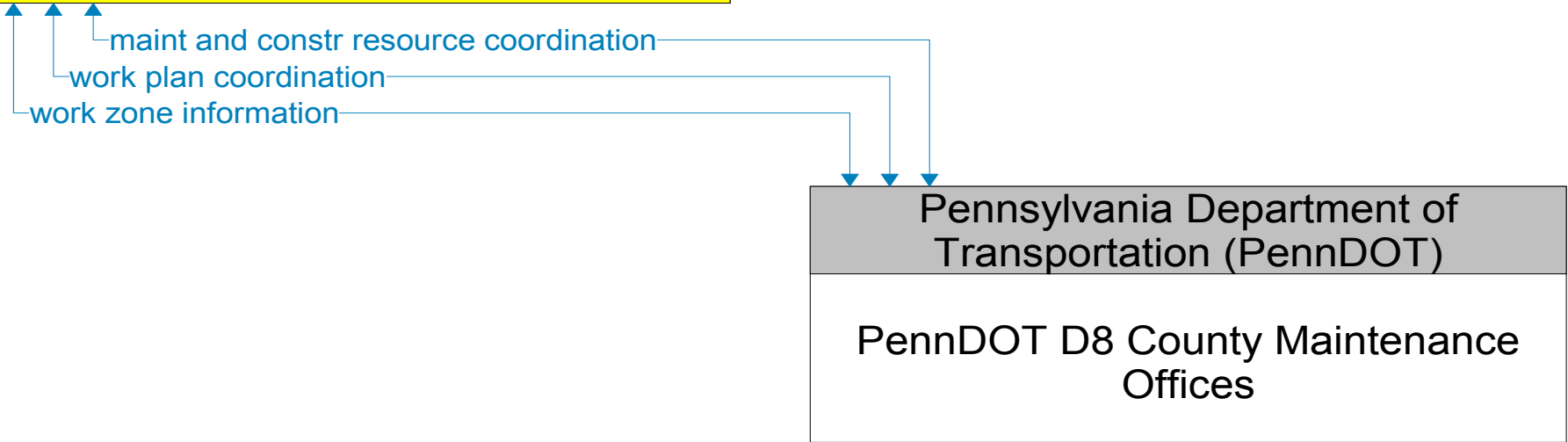
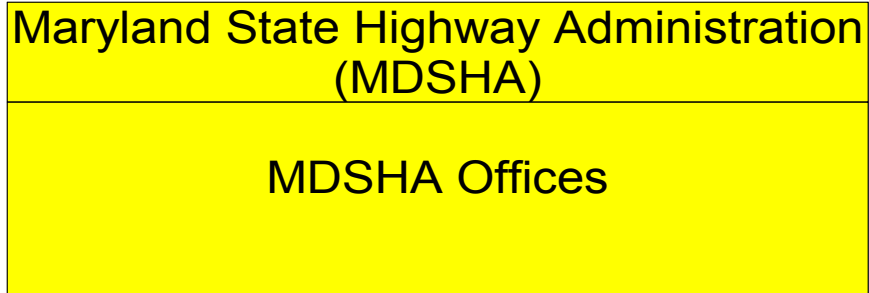
MDSHA Offices Interconnect Diagram



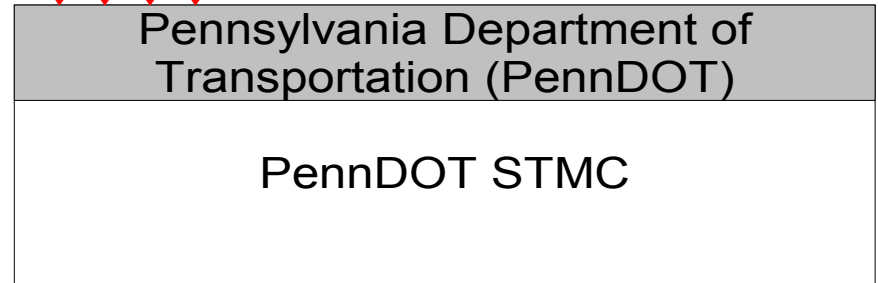
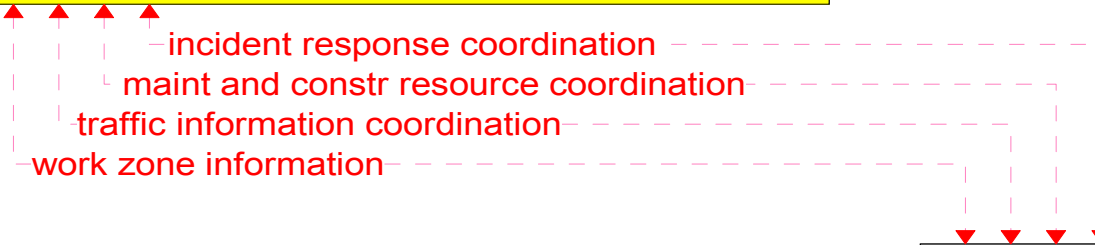
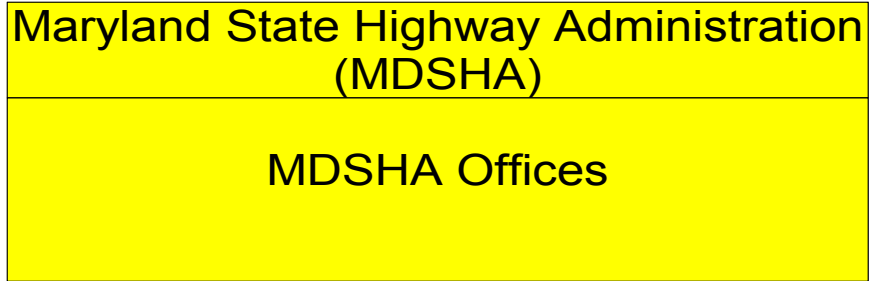
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- - - Planned



———— Existing
- - - - - Planned

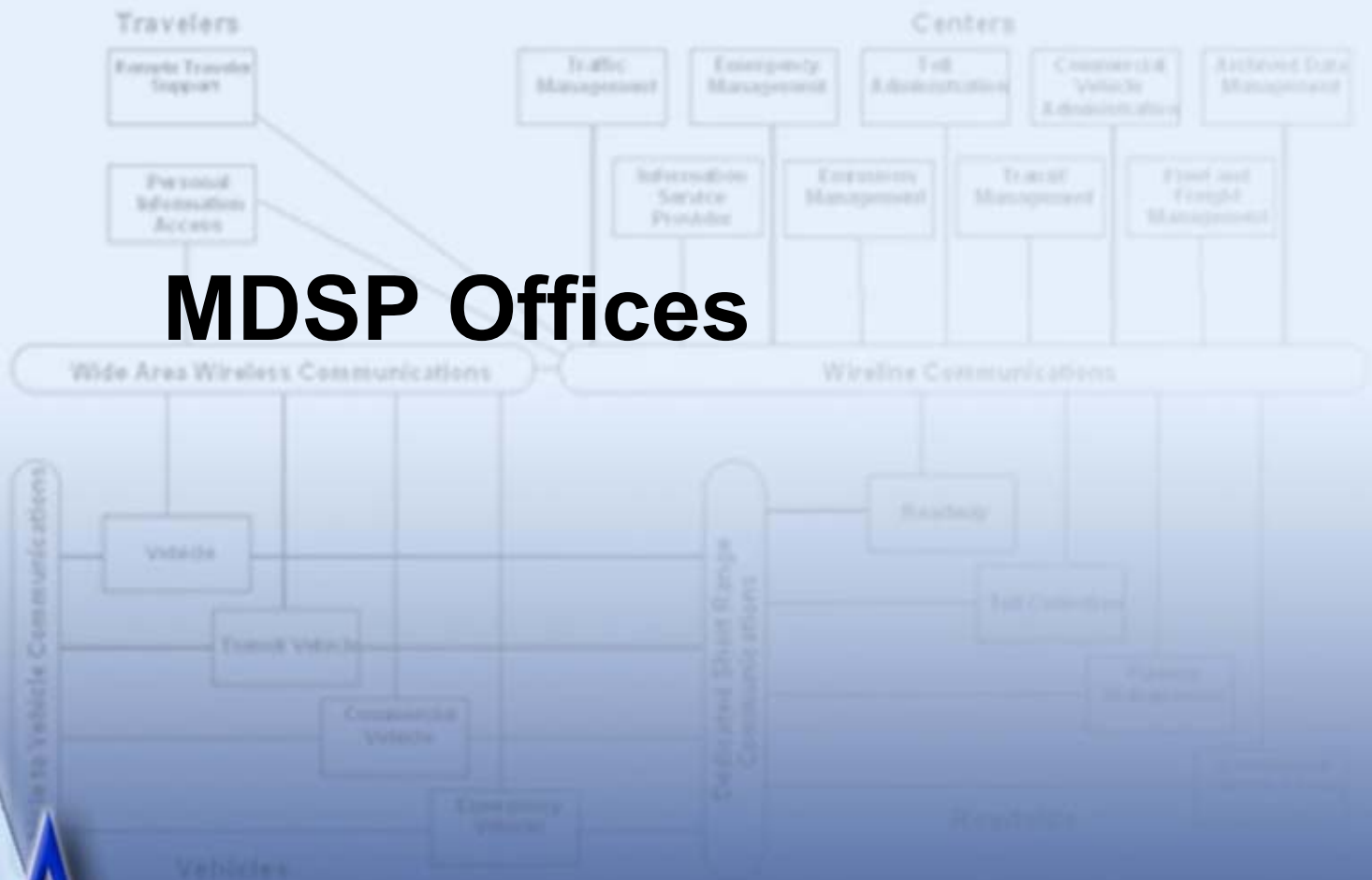


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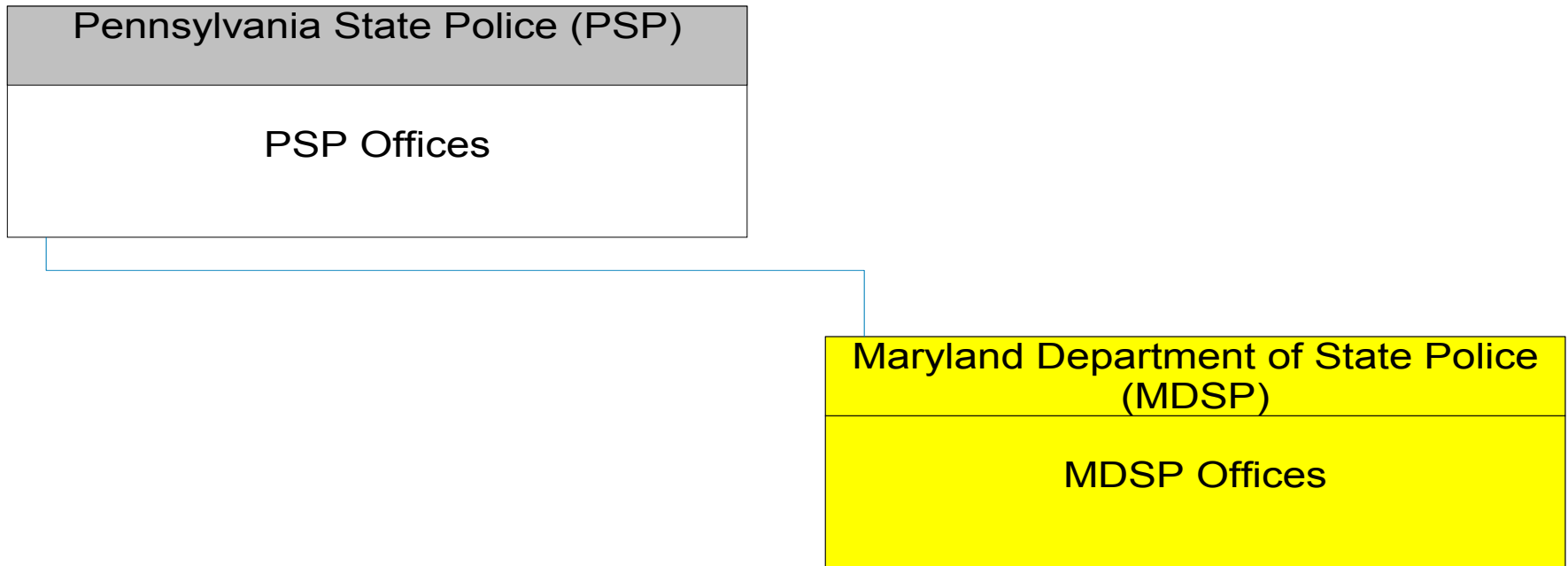
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MDSP Offices

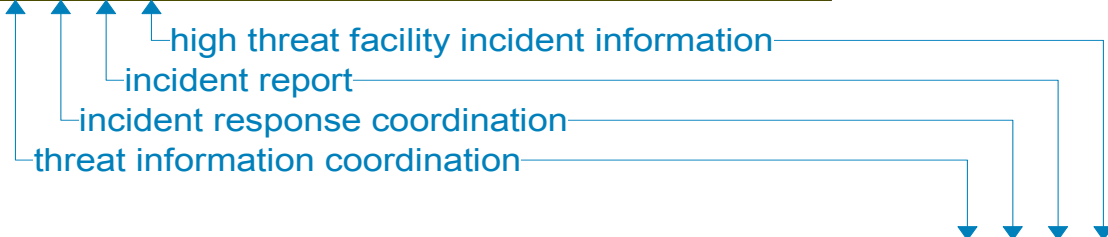
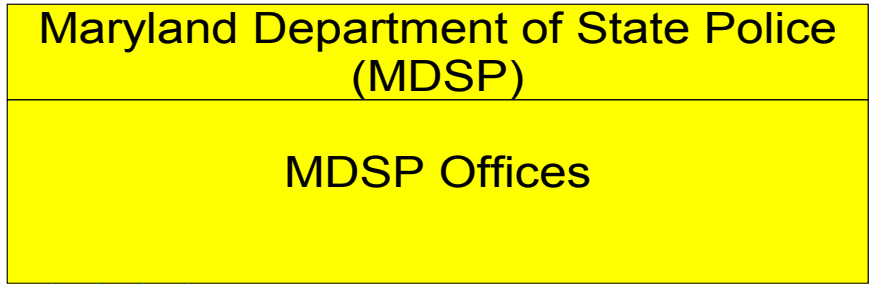


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MDSP Offices Interconnect Diagram

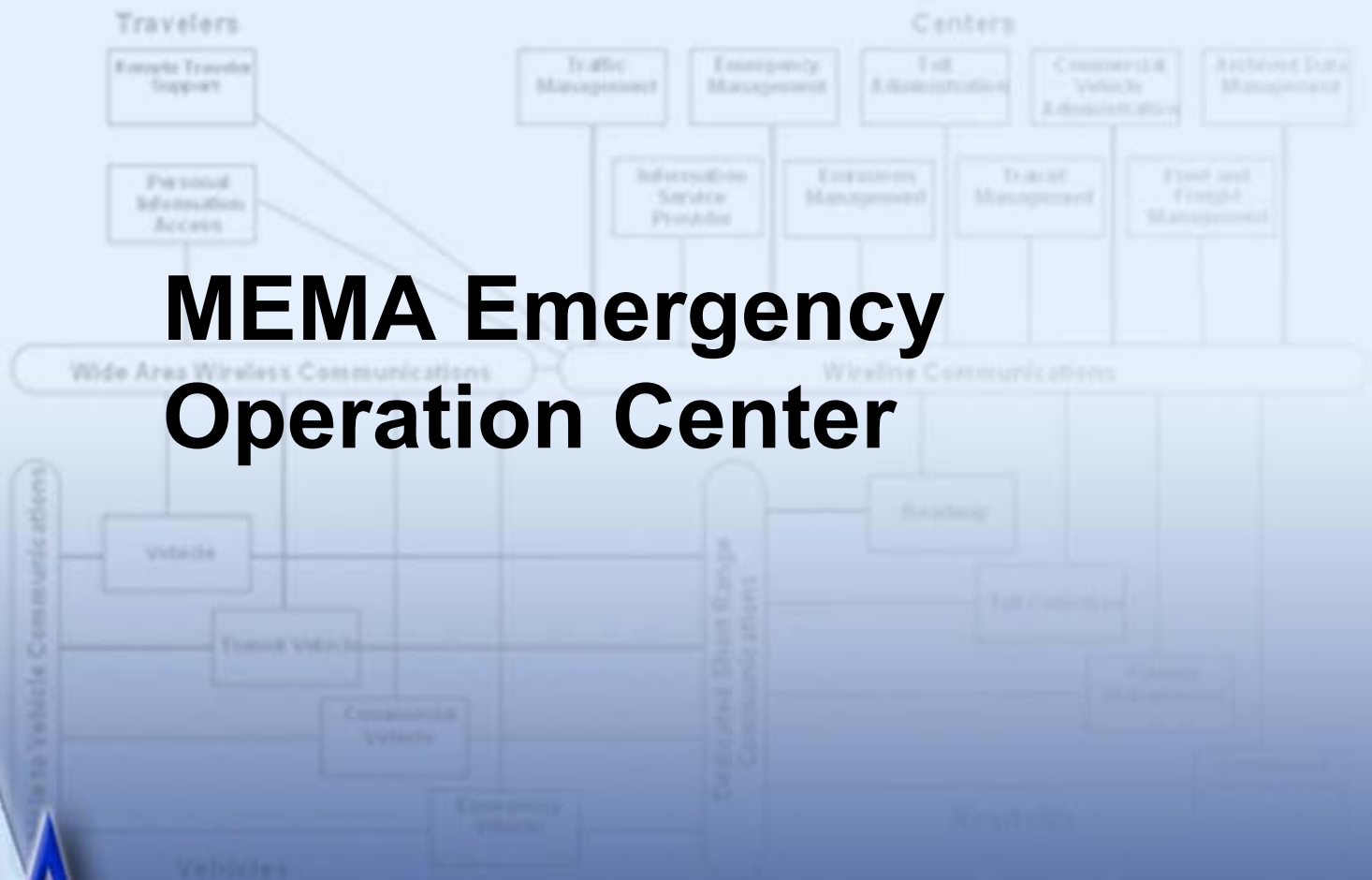


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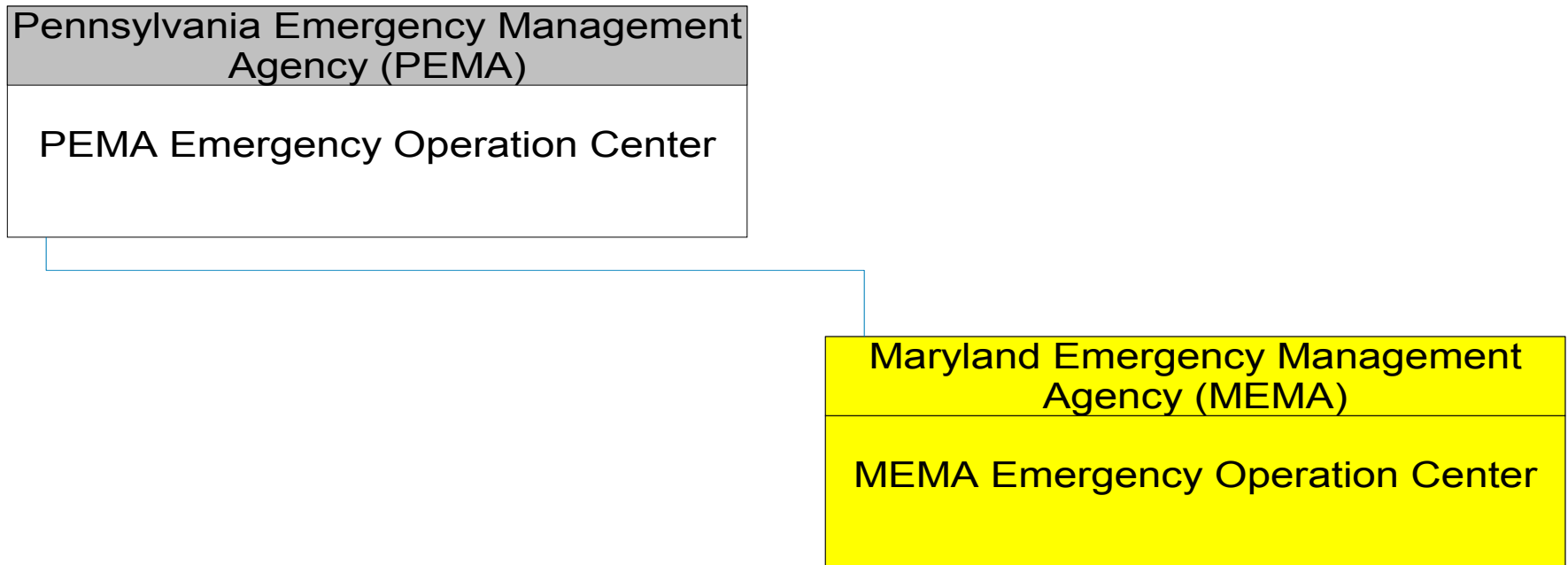


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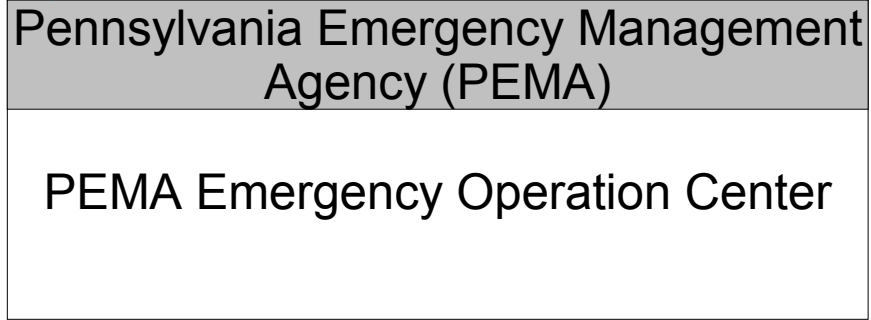
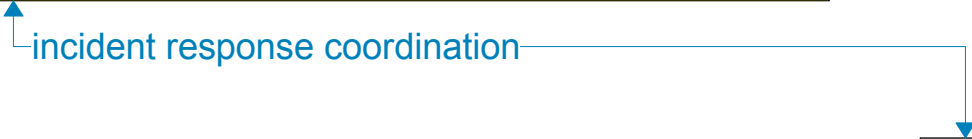
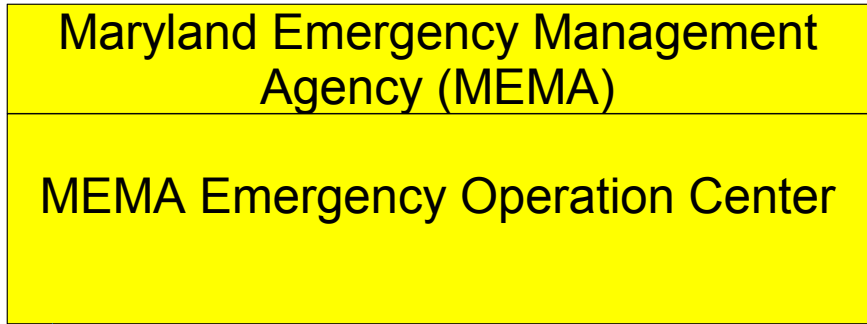
MEMA Emergency Operation Center



MEMA Emergency Operation Center Interconnect Diagram

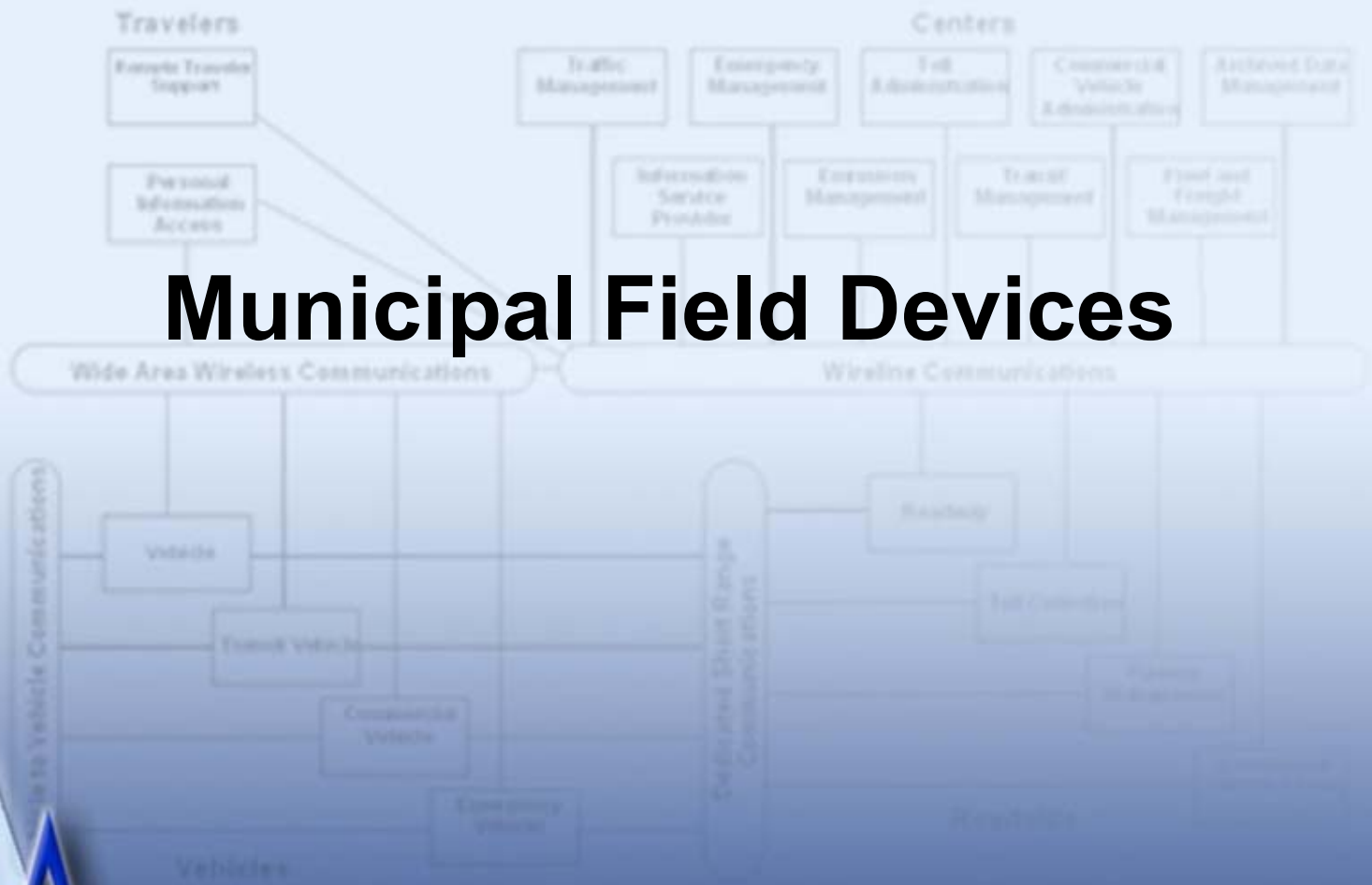


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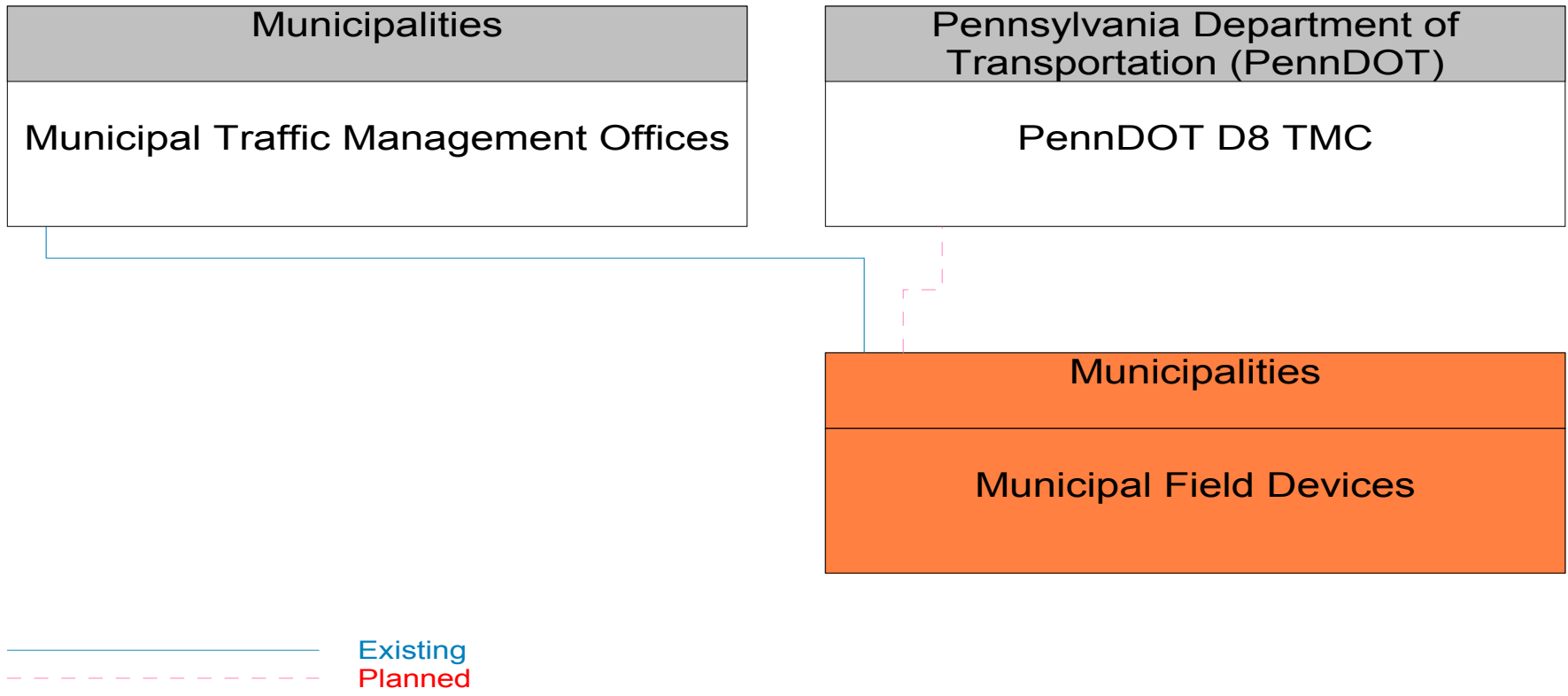


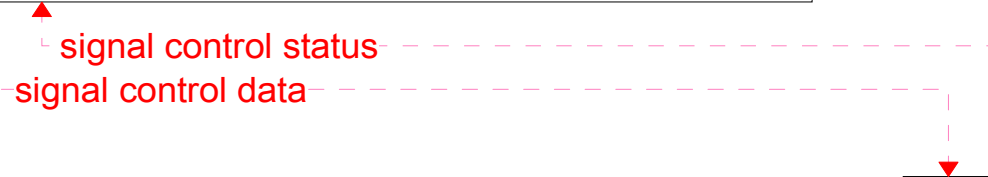
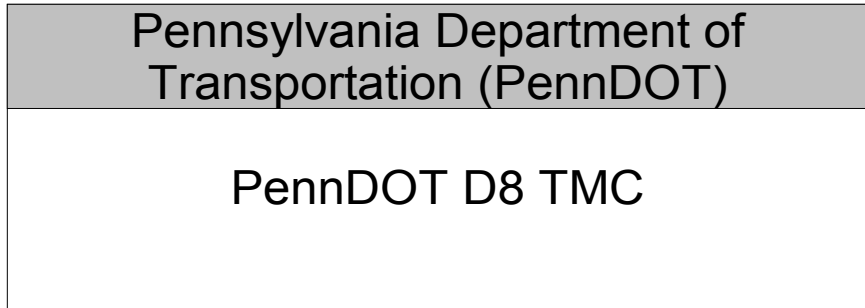
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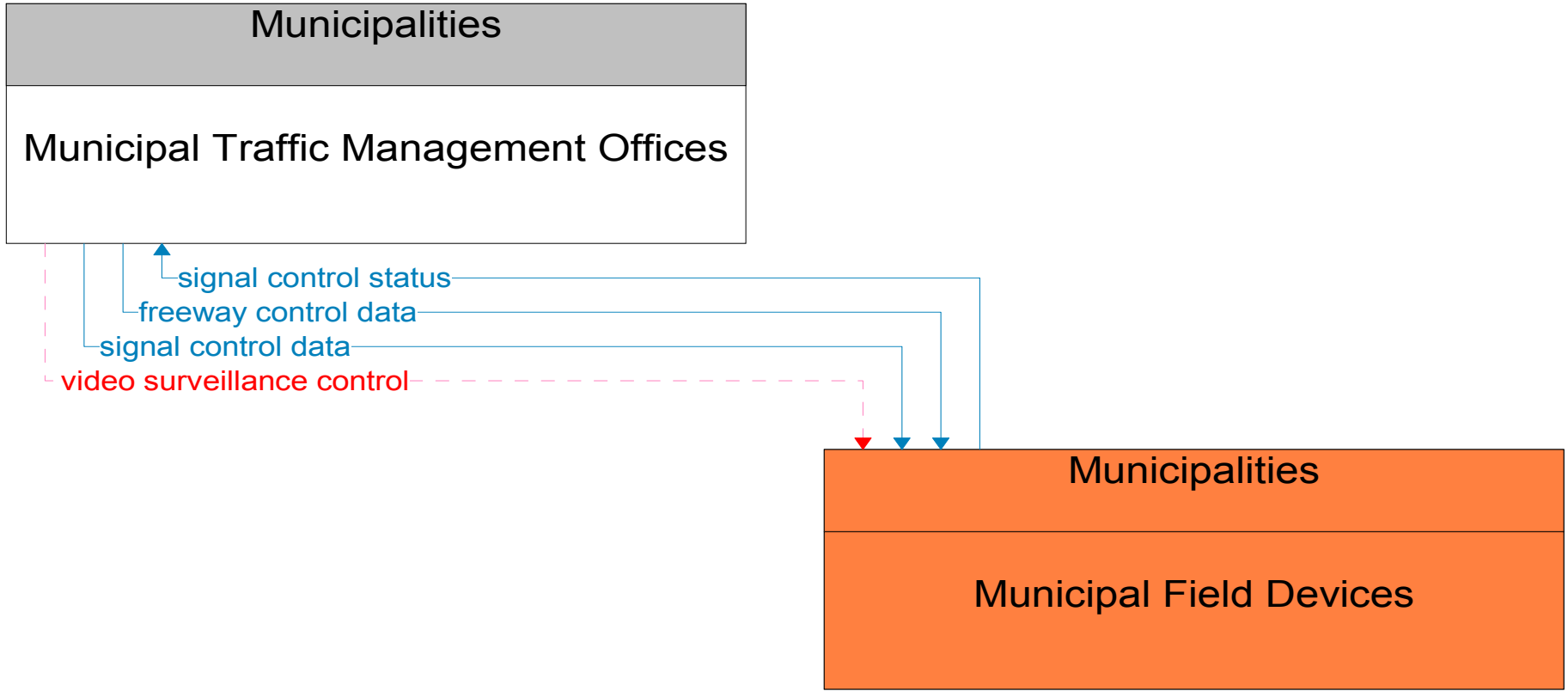
Municipal Field Devices



Municipal Field Devices Interconnect Diagram

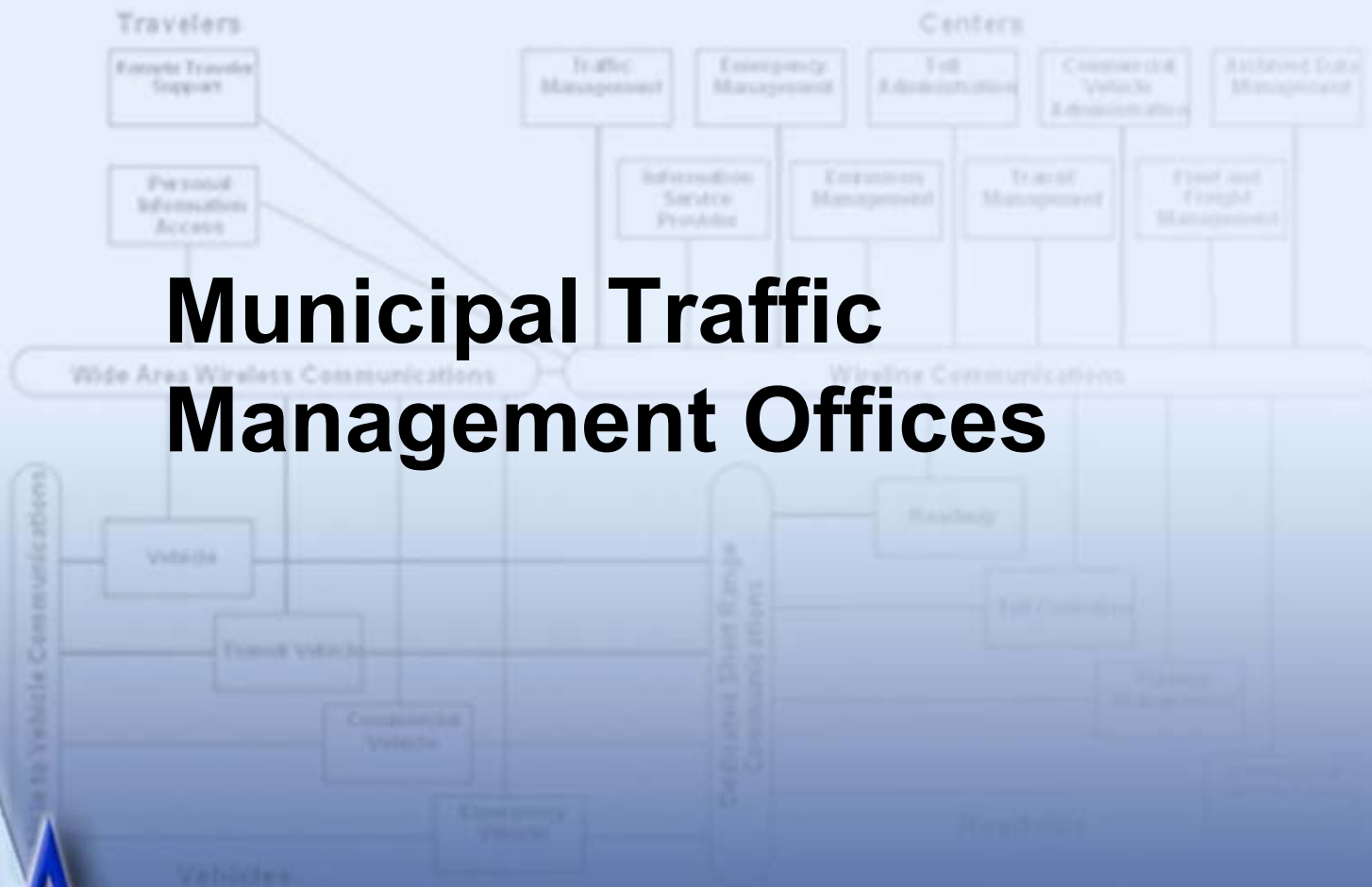




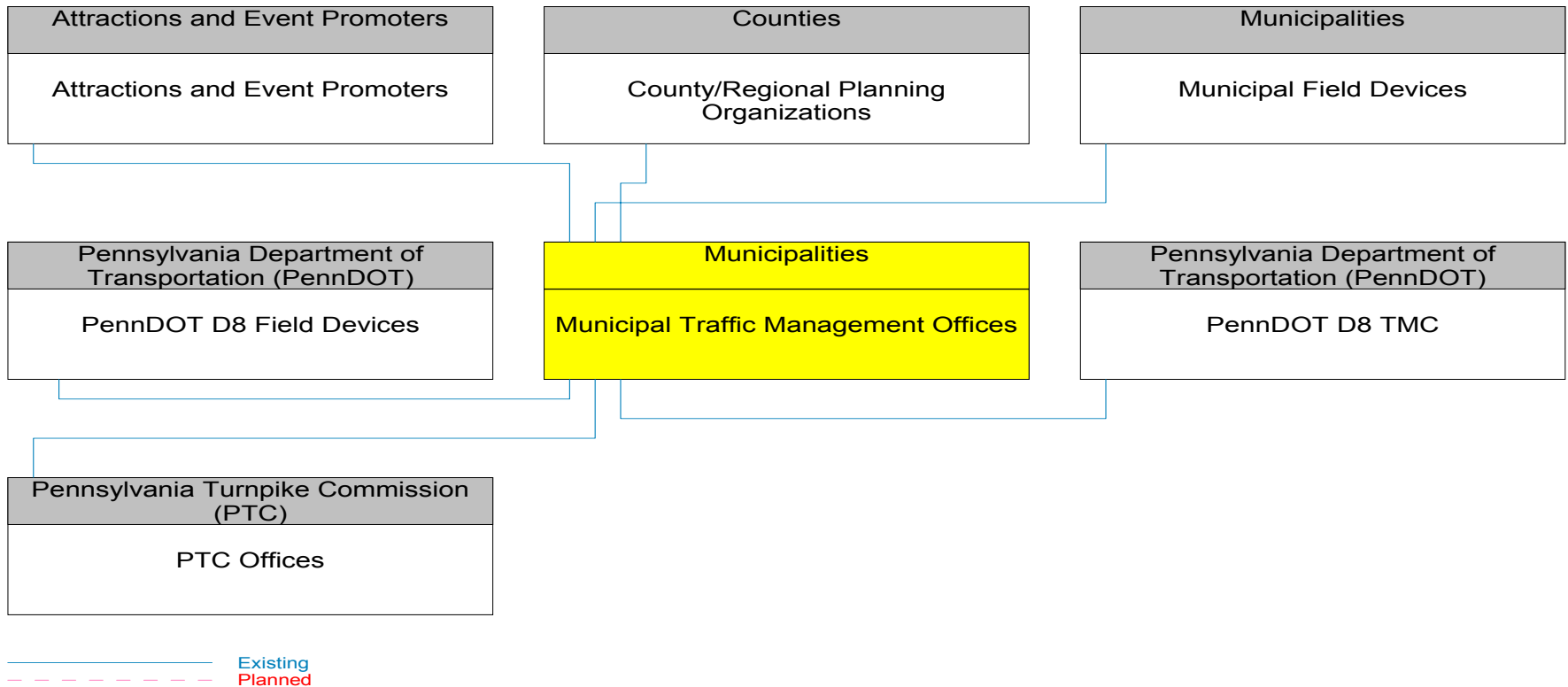


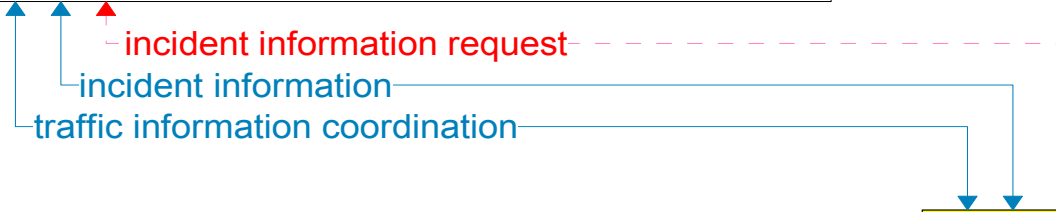
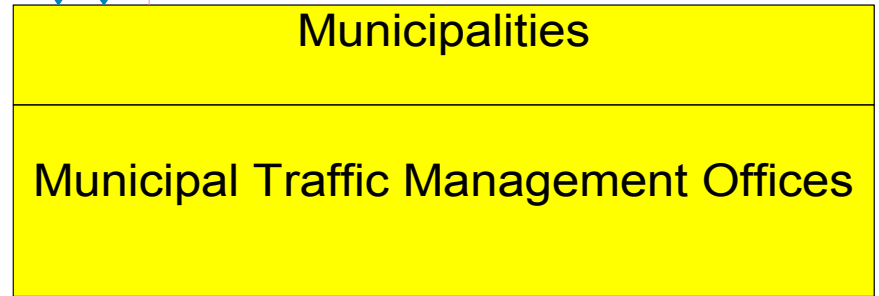
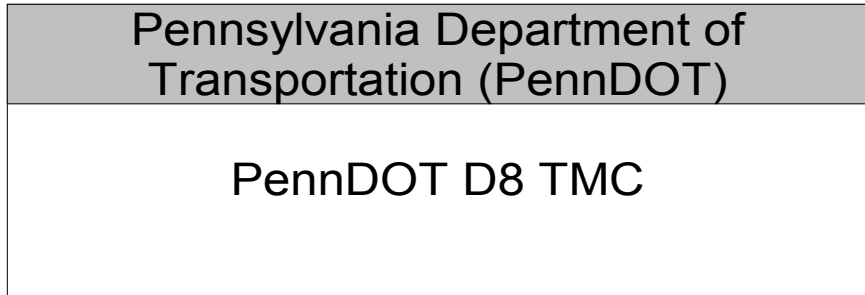
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- - - - - Planned

Municipal Traffic Management Offices

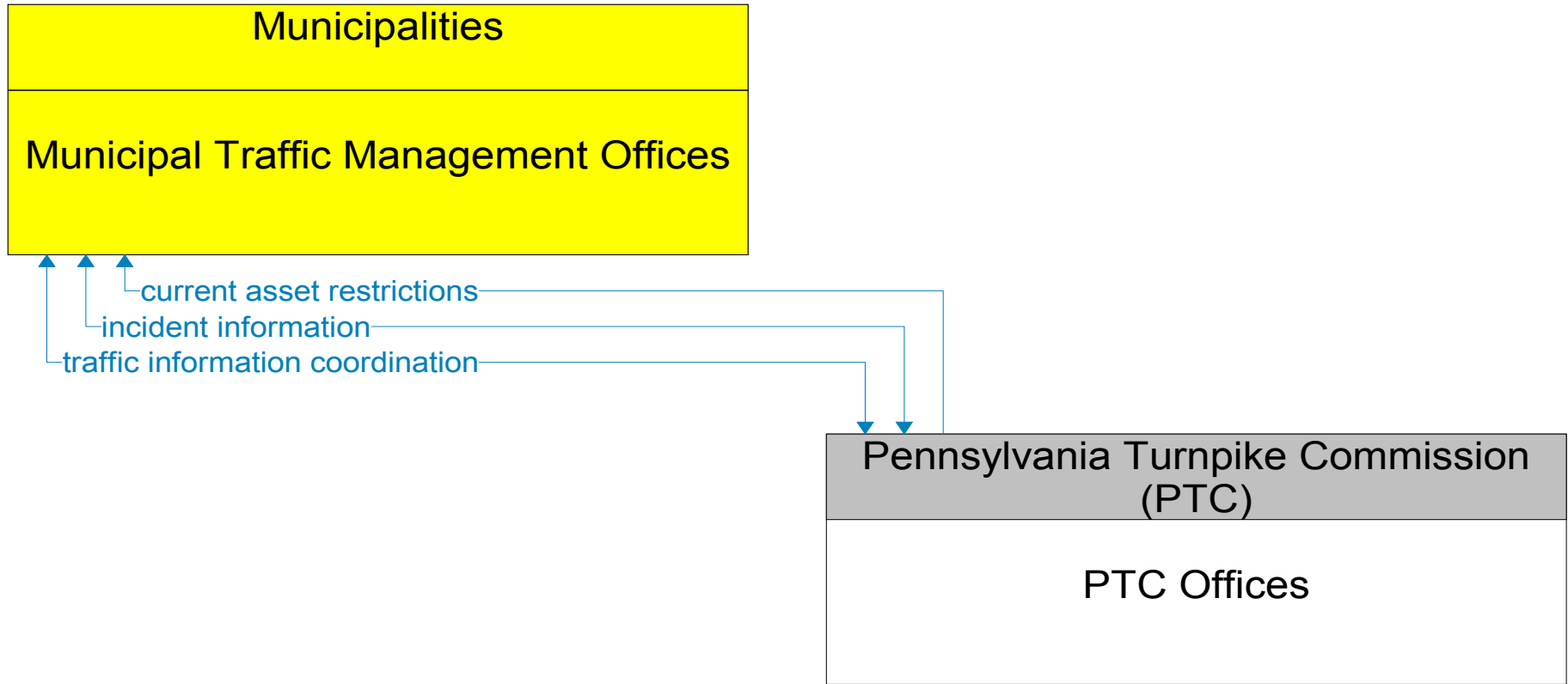


Municipal Traffic Management Offices Interconnect Diagram

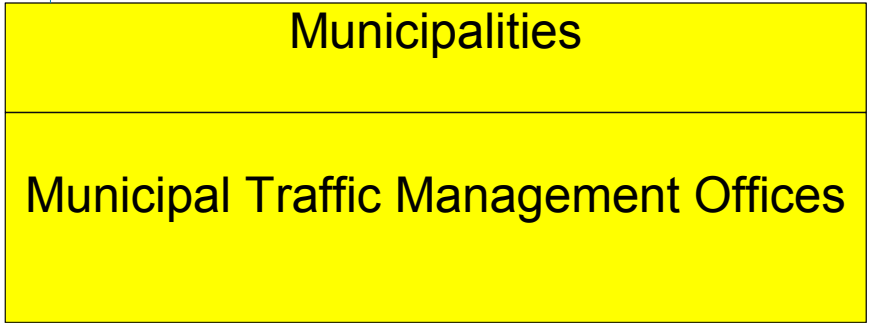
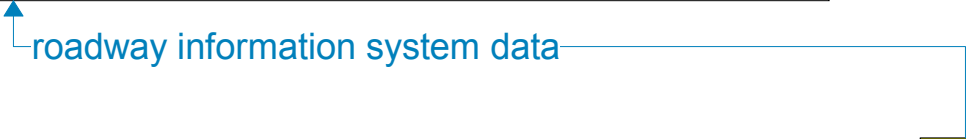
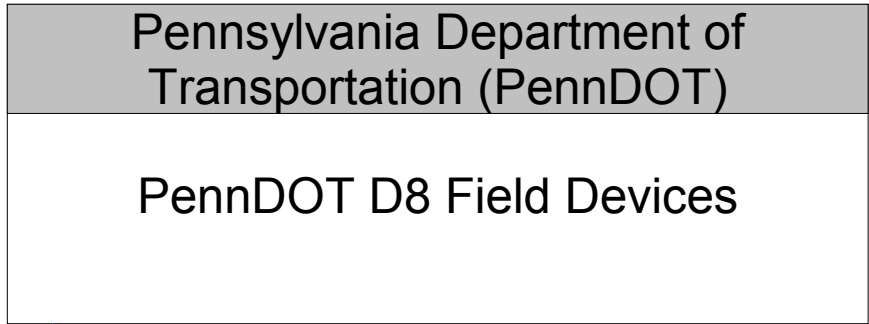




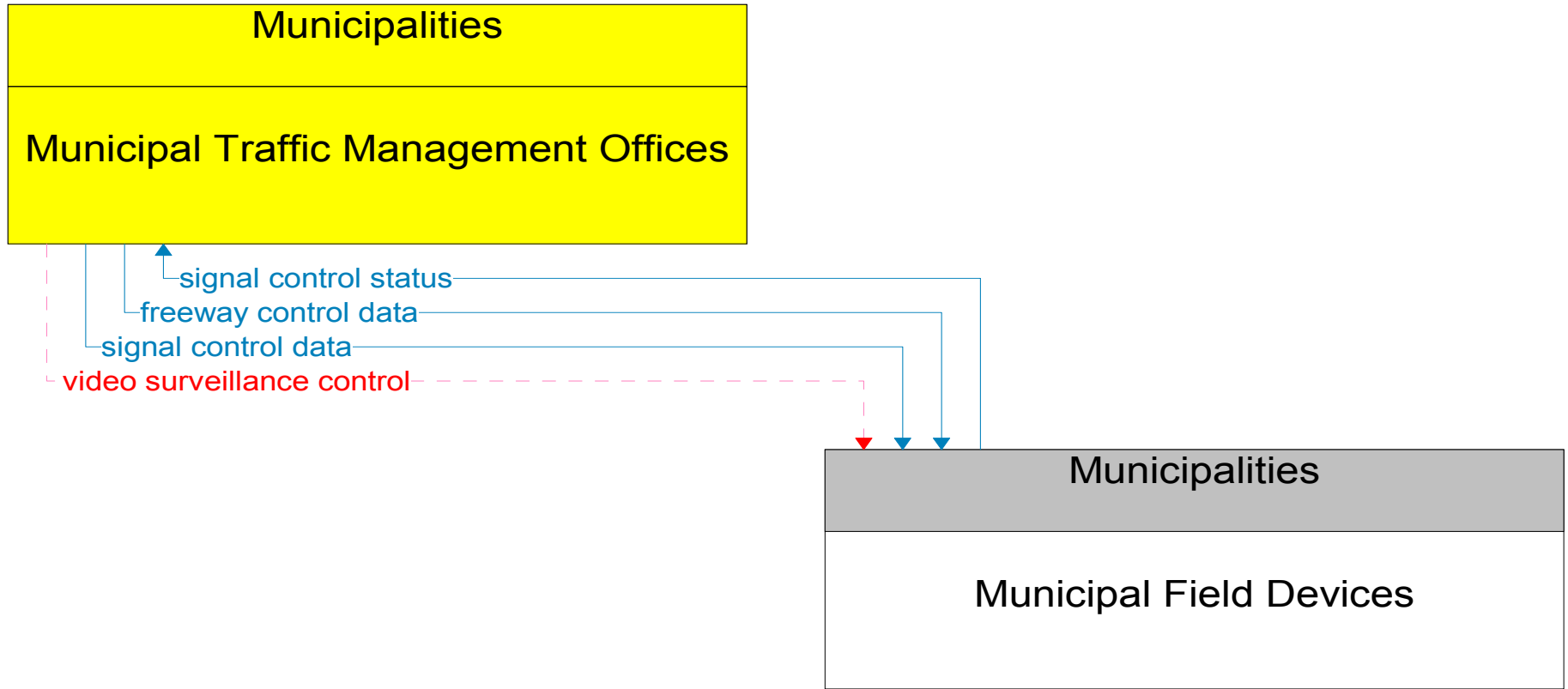
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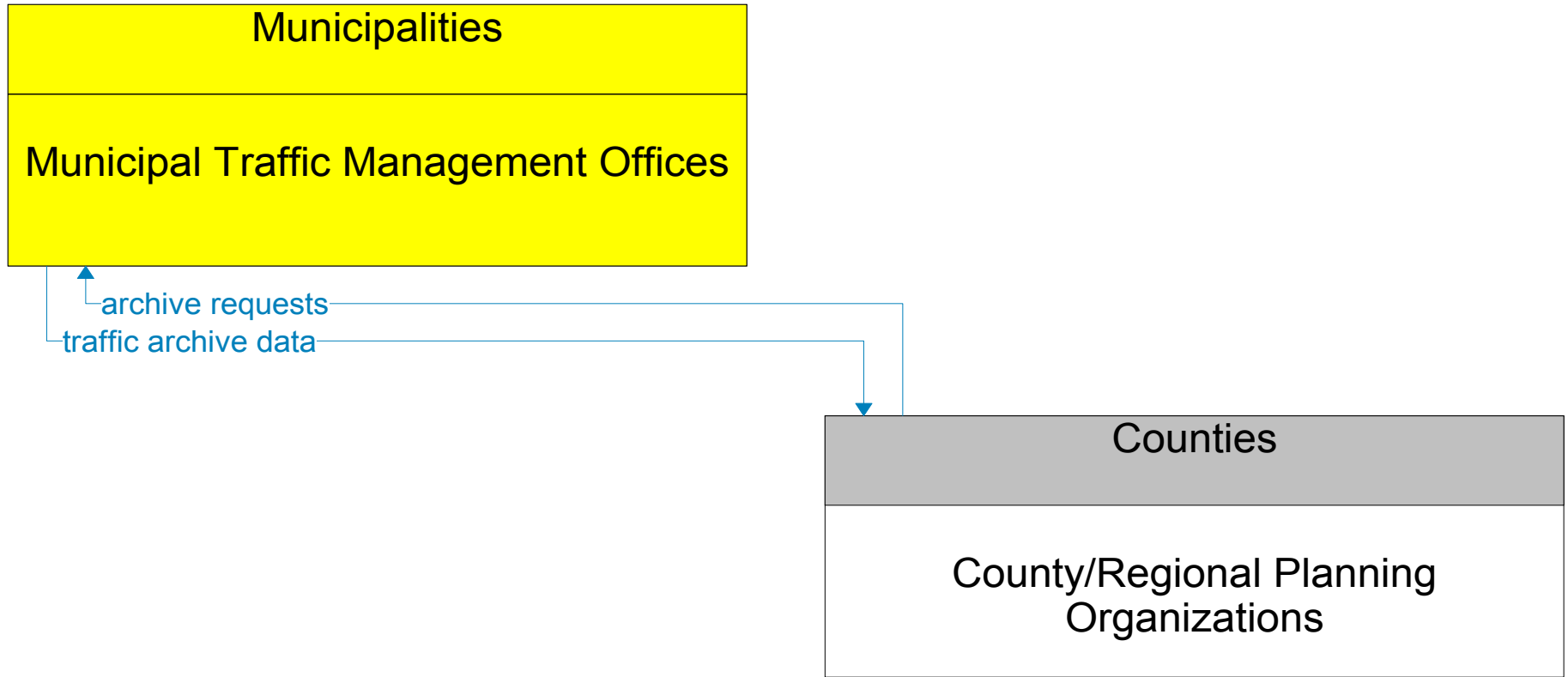
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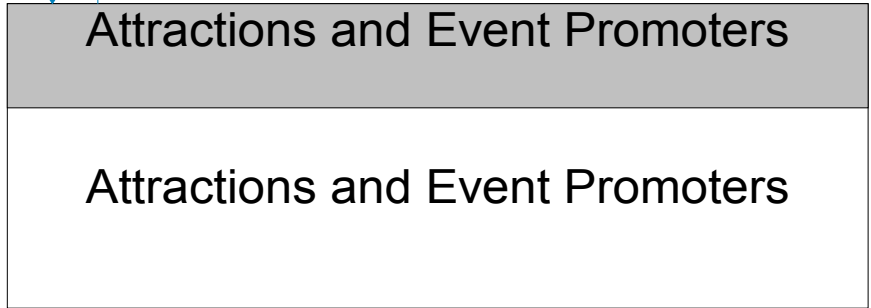
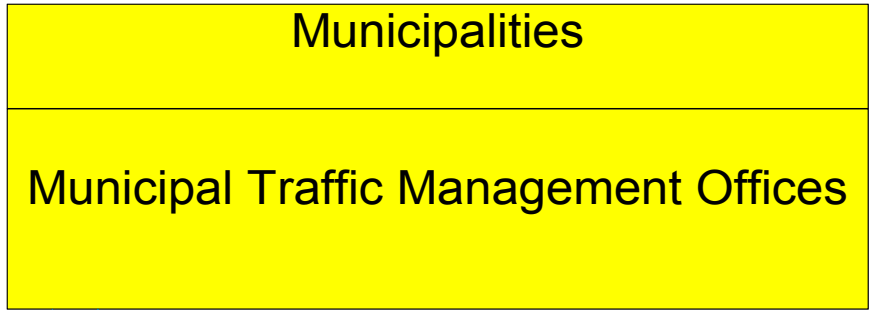
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———— Existing
- - - - - Planned



———— Existing
----- Planned

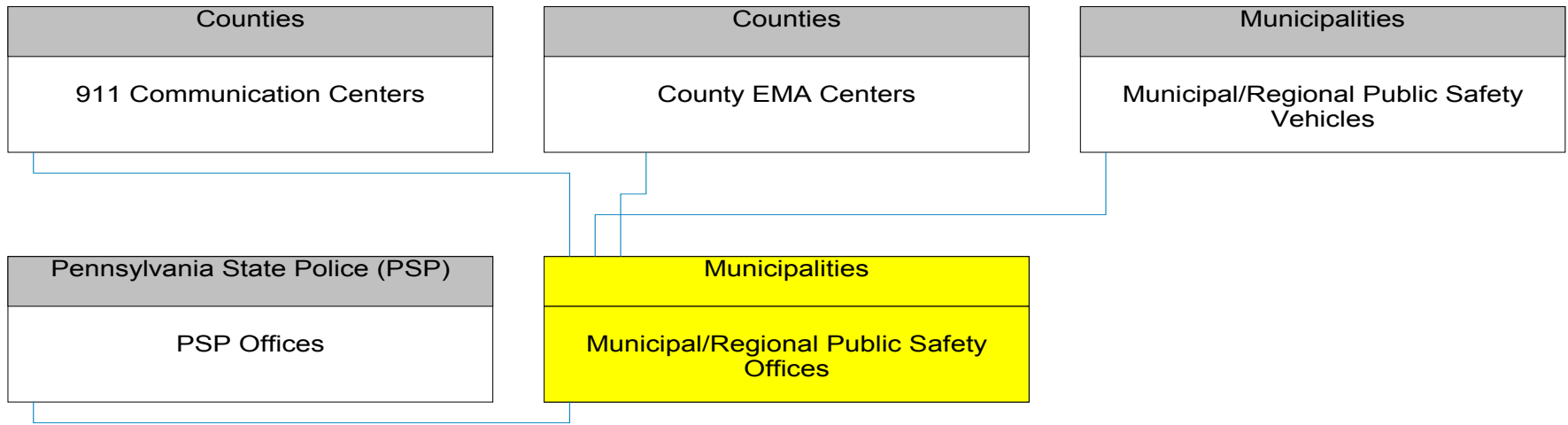


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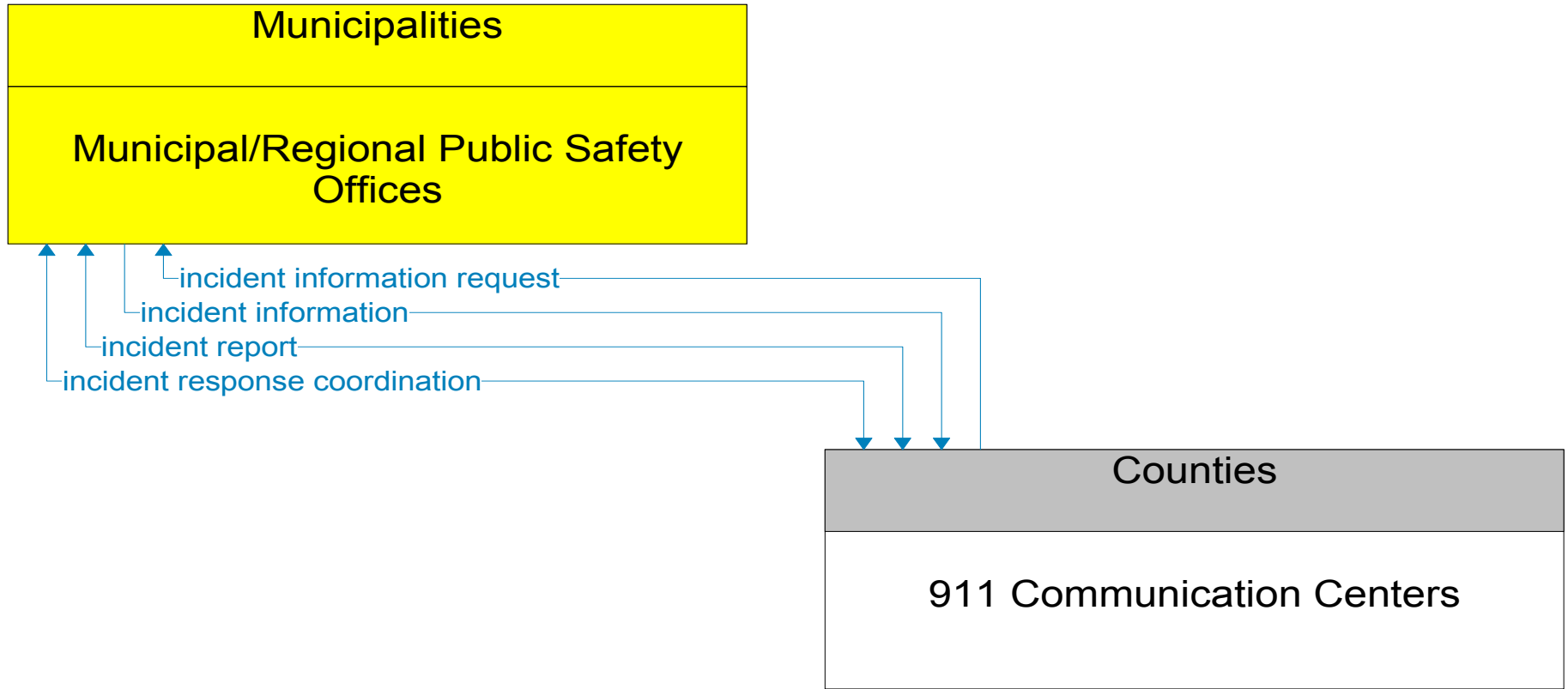
Municipal/Regional Public Safety Offices

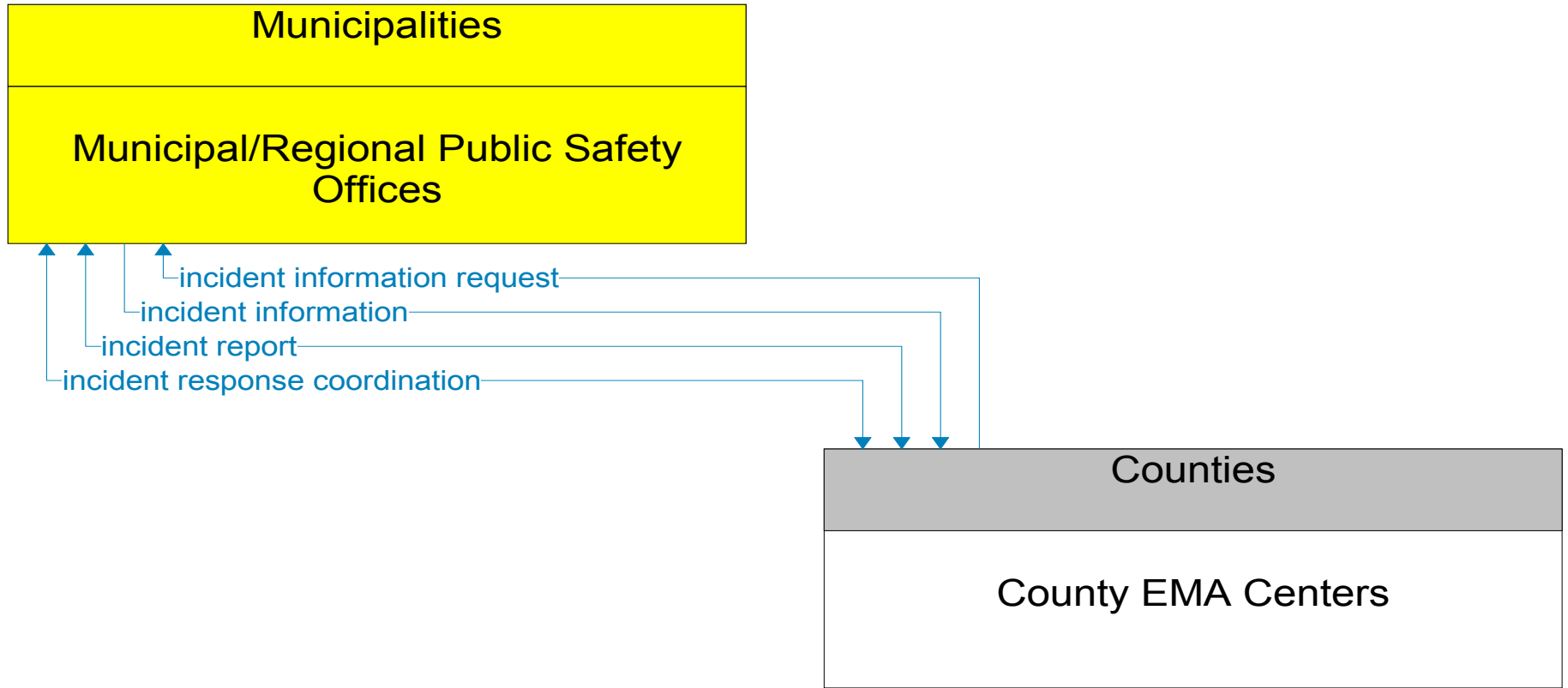


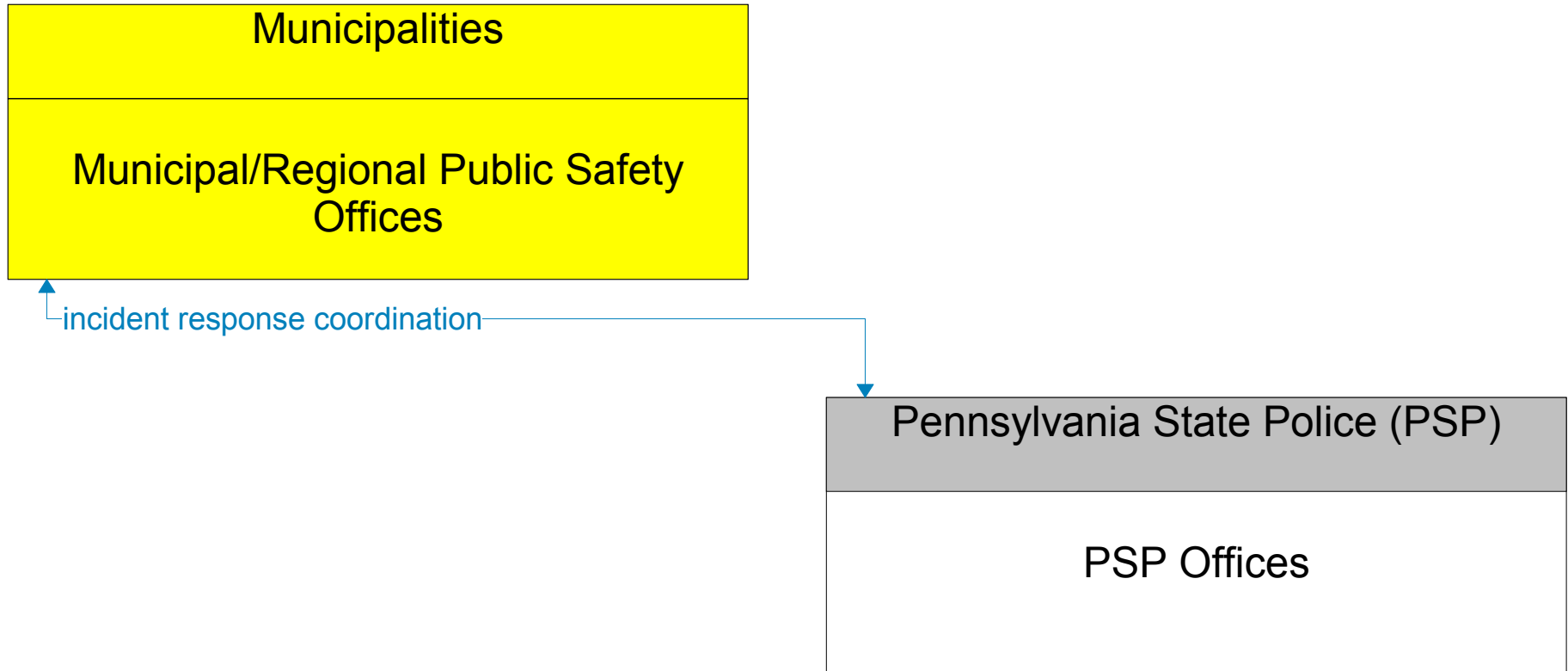
Municipal/Regional Public Safety Offices Interconnect Diagram



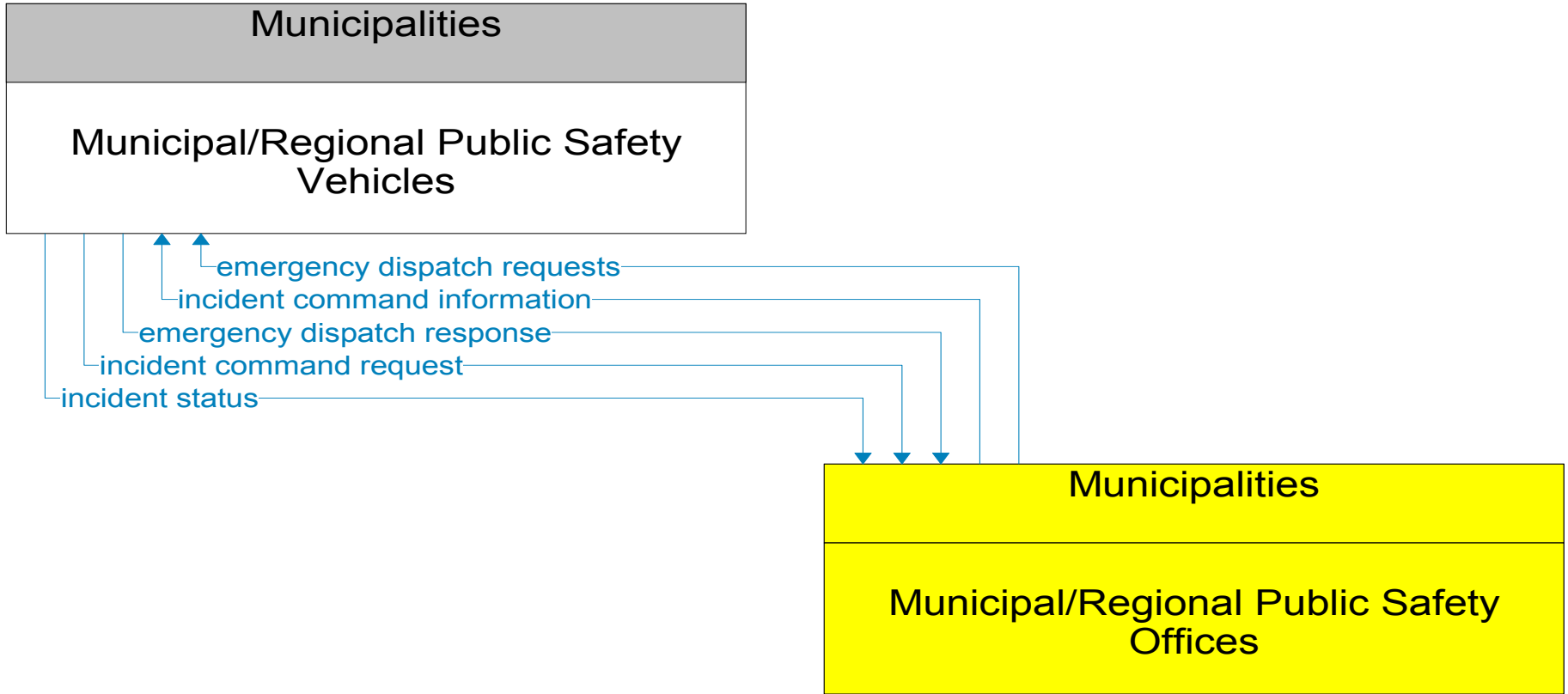
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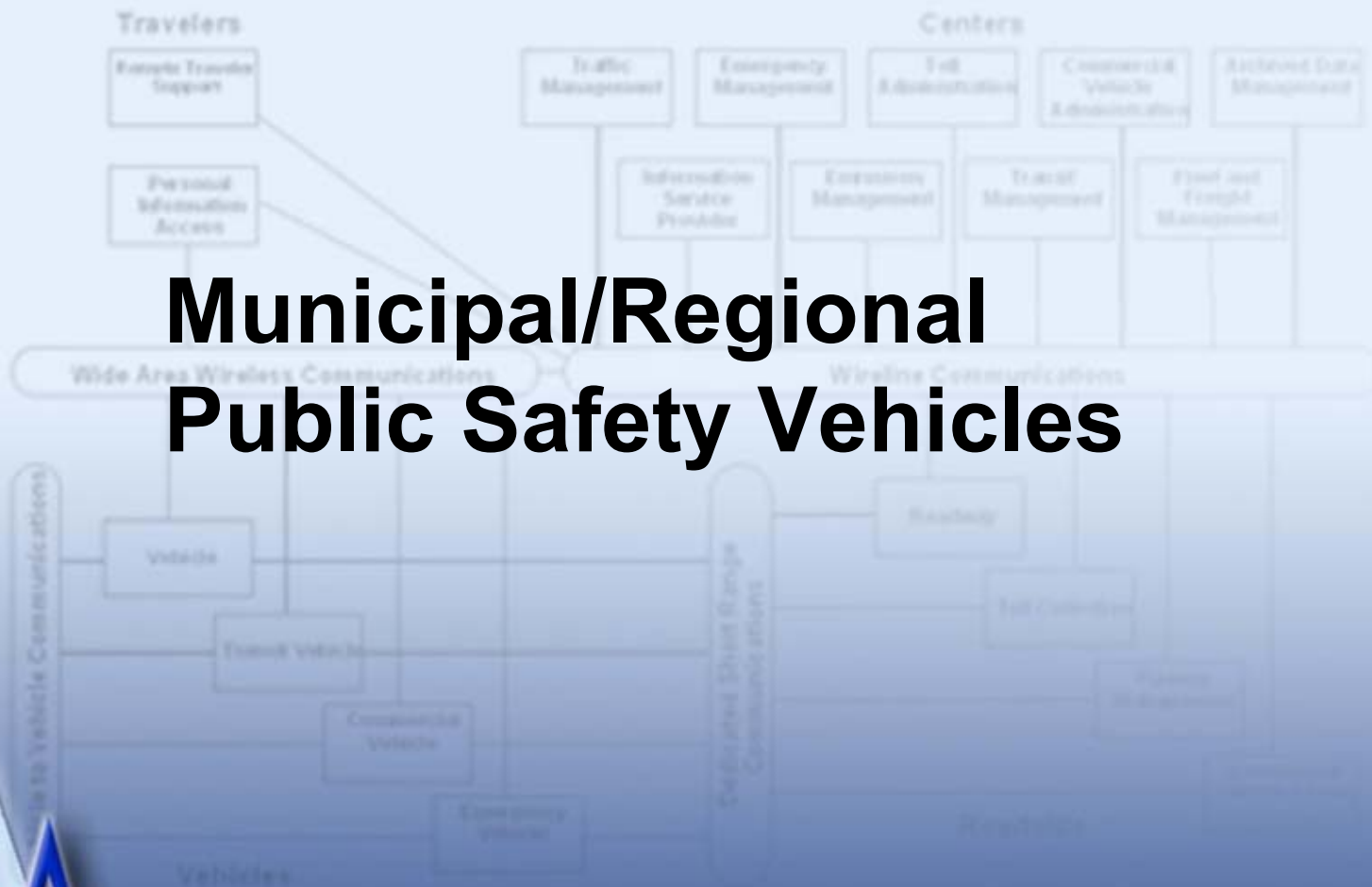


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- - - - - Planned

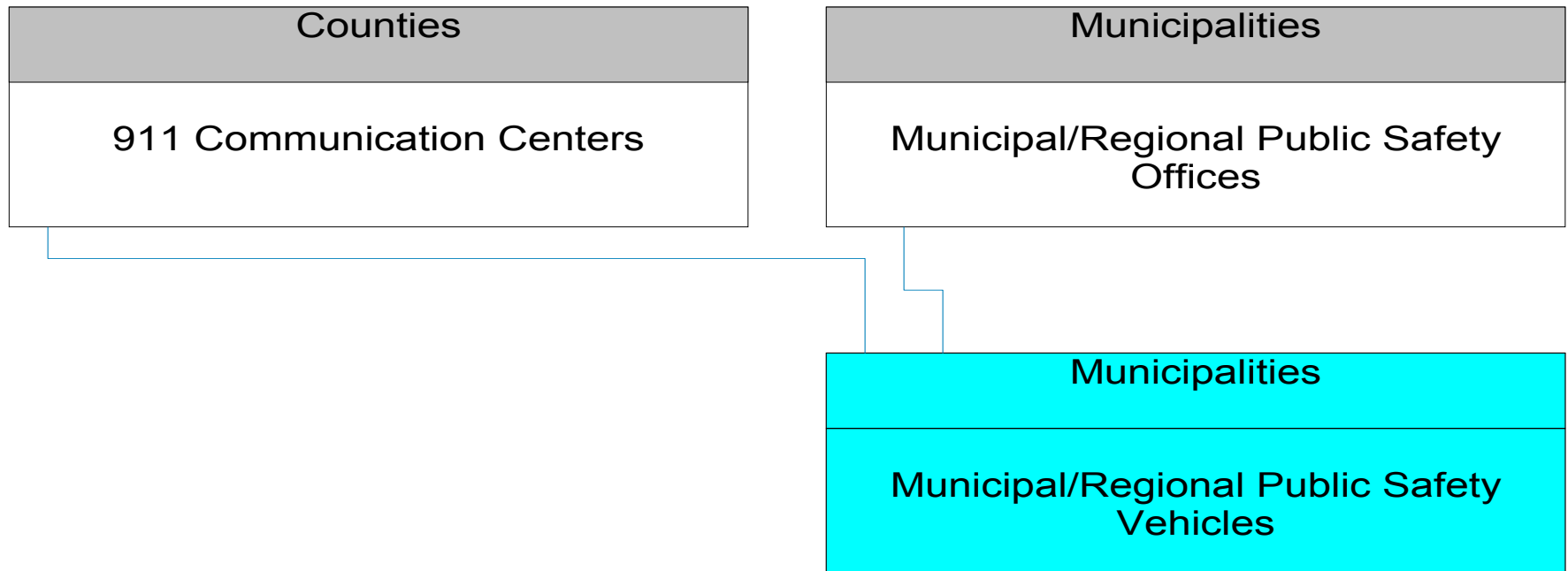


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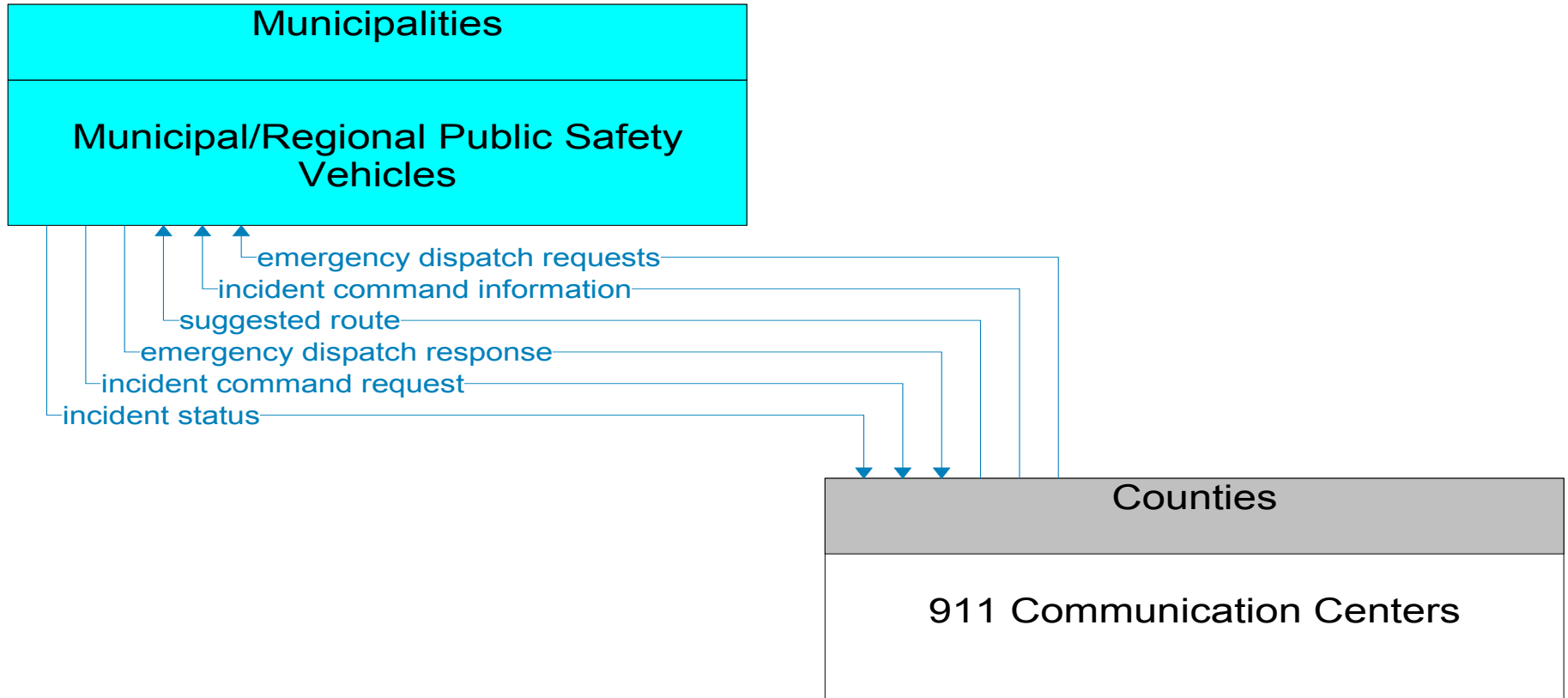
Municipal/Regional Public Safety Vehicles



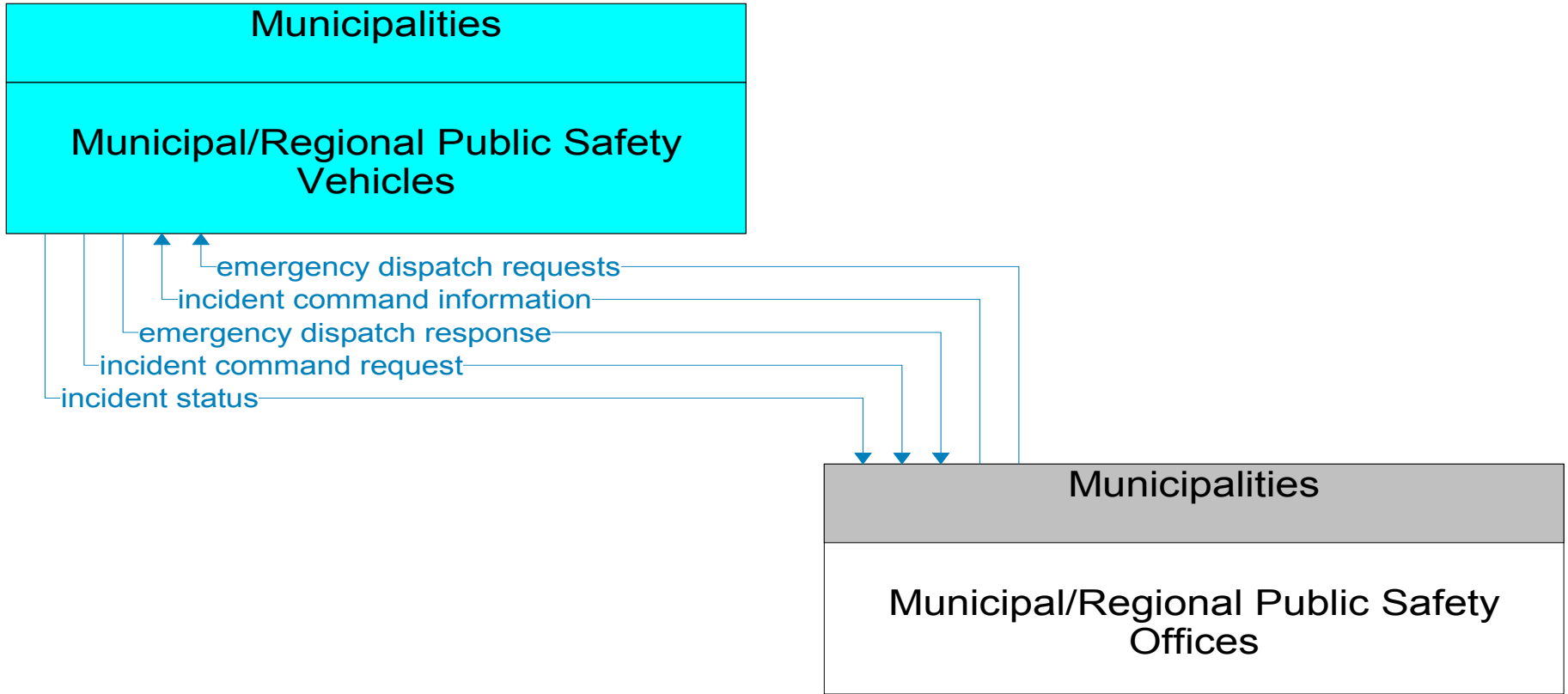
Municipal/Regional Public Safety Vehicles Interconnect Diagram



———— Existing
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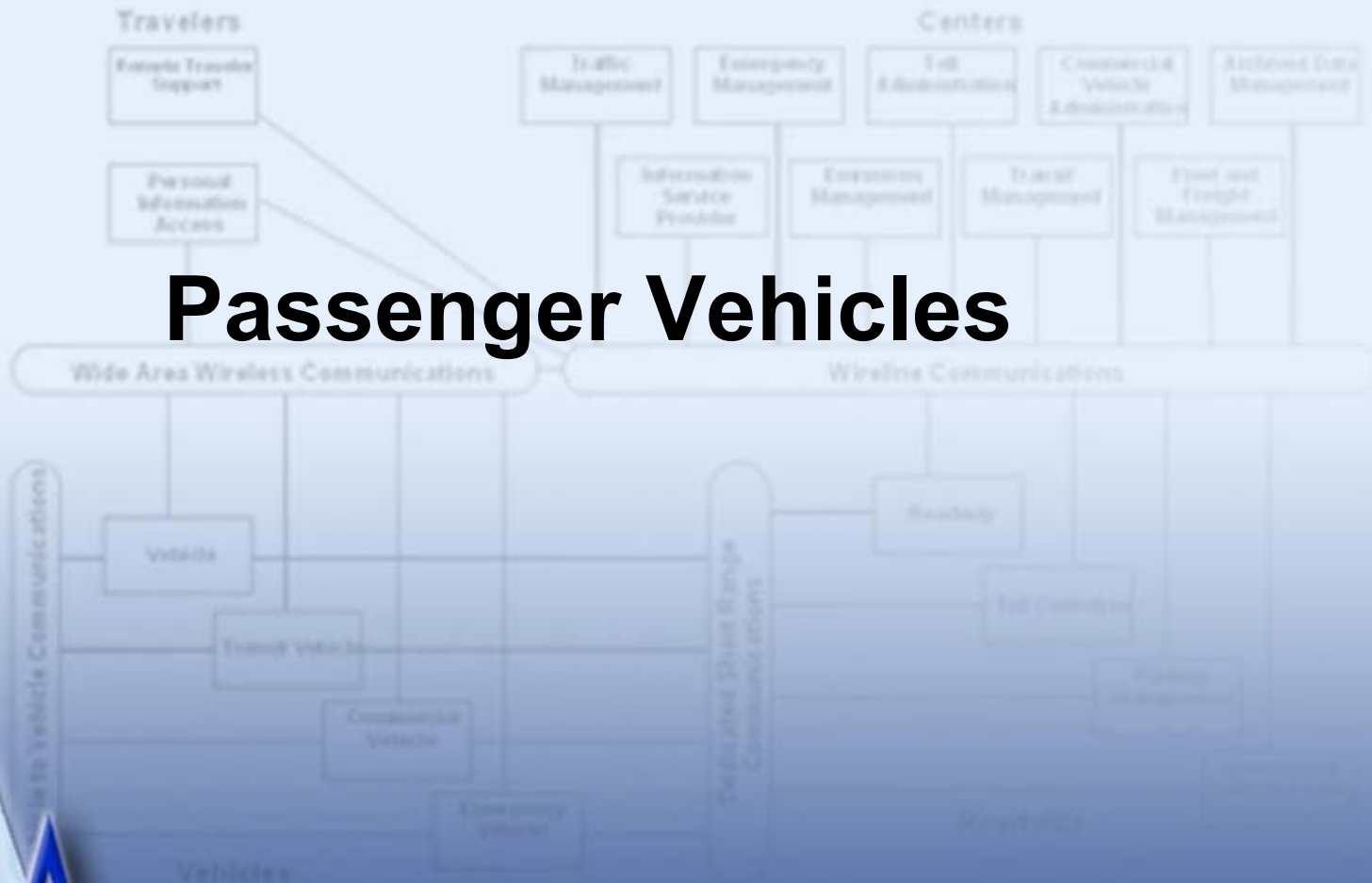


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Planned



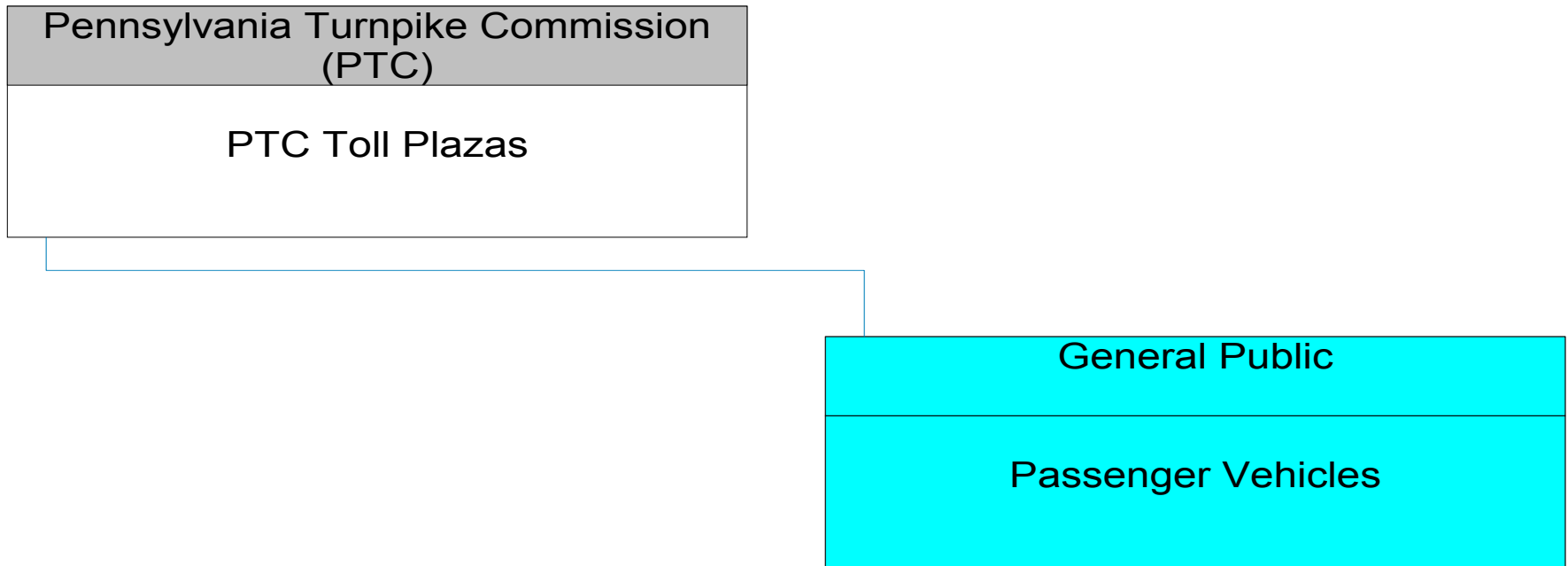
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- - - - - Planned

Passenger Vehicles

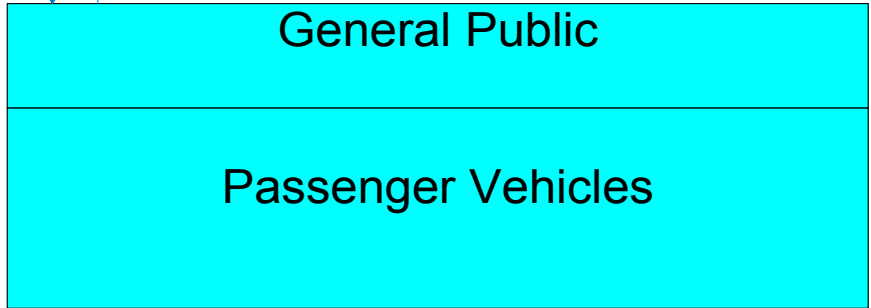
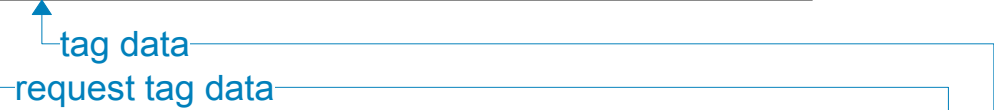
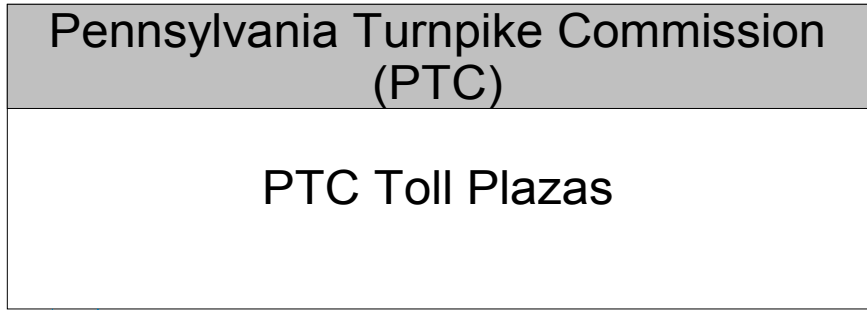


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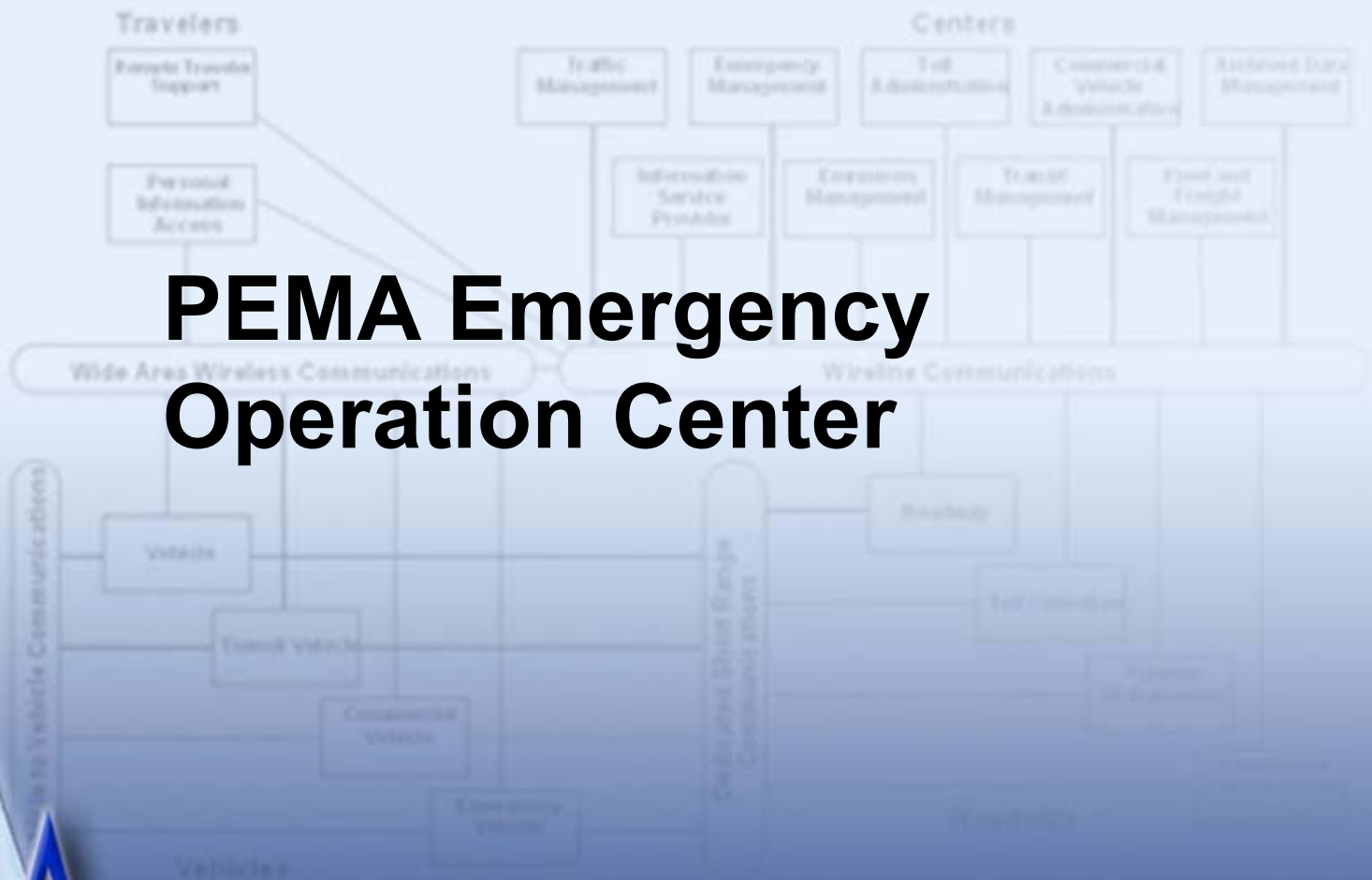
Passenger Vehicles Interconnect Diagram



———— Existing
- - - - - Planned

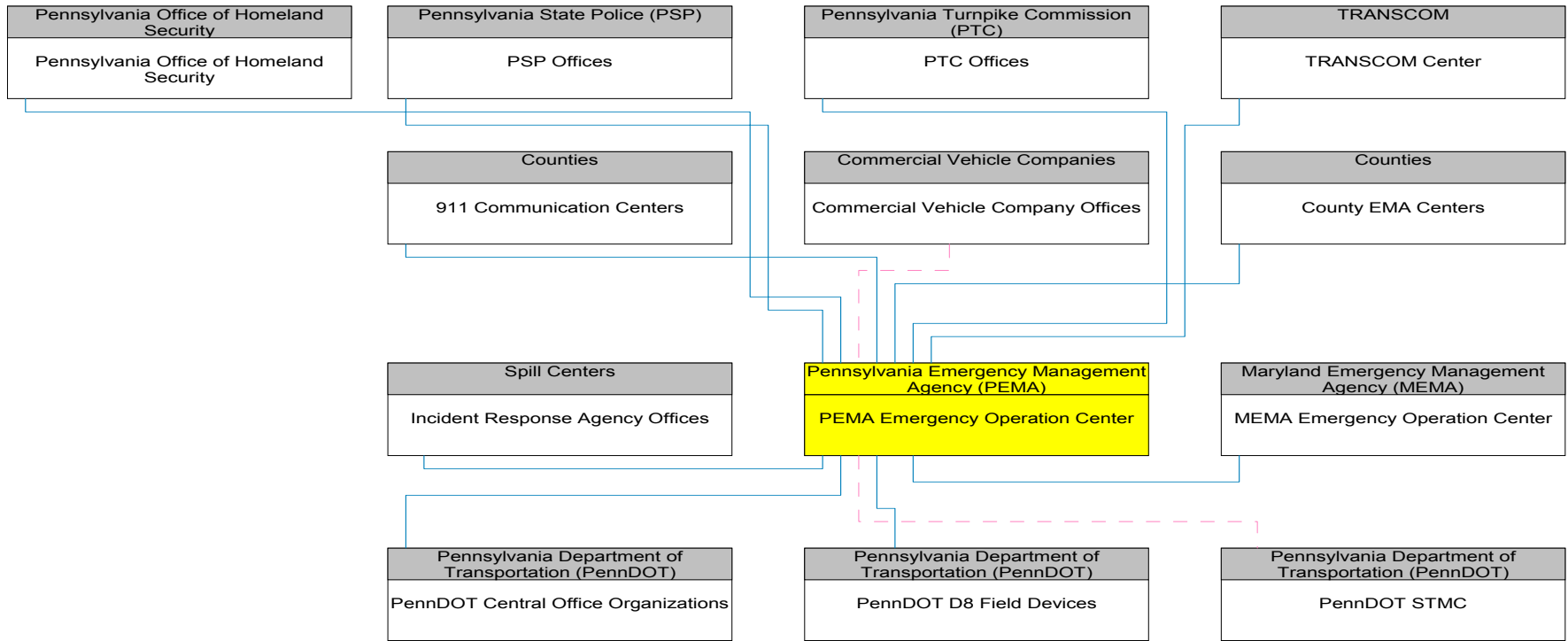


PEMA Emergency Operation Center

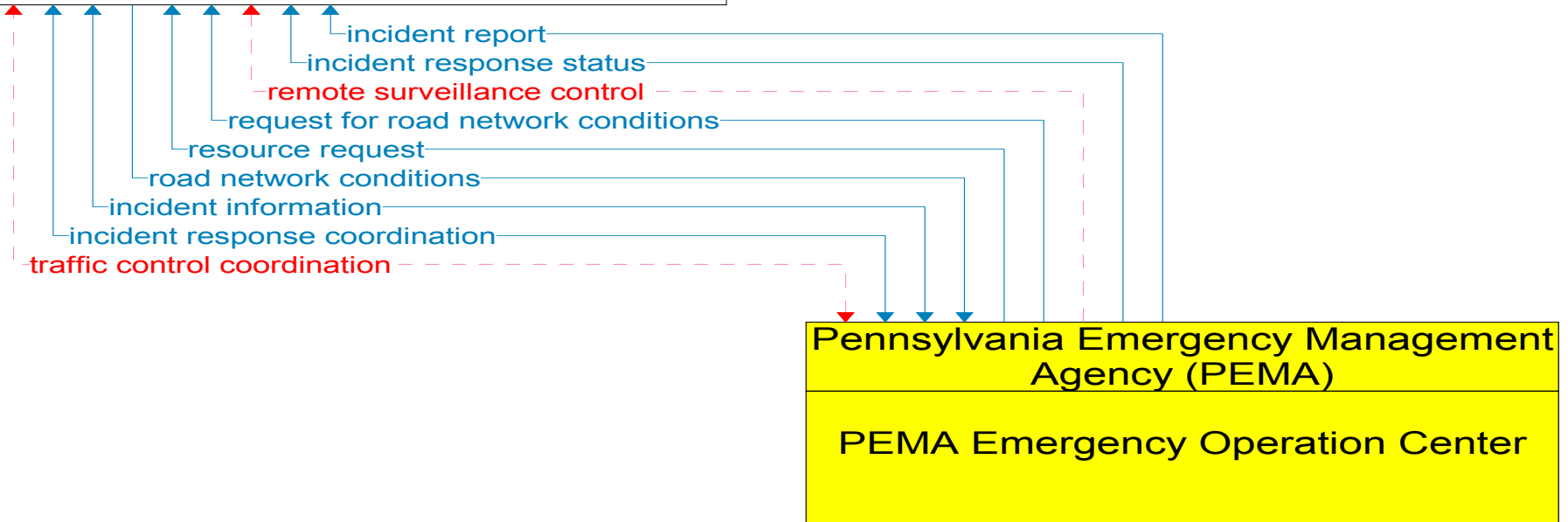
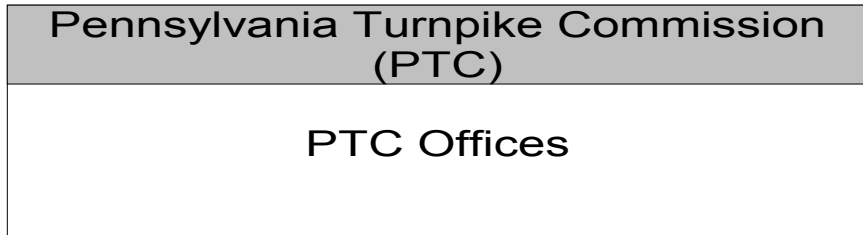


PA

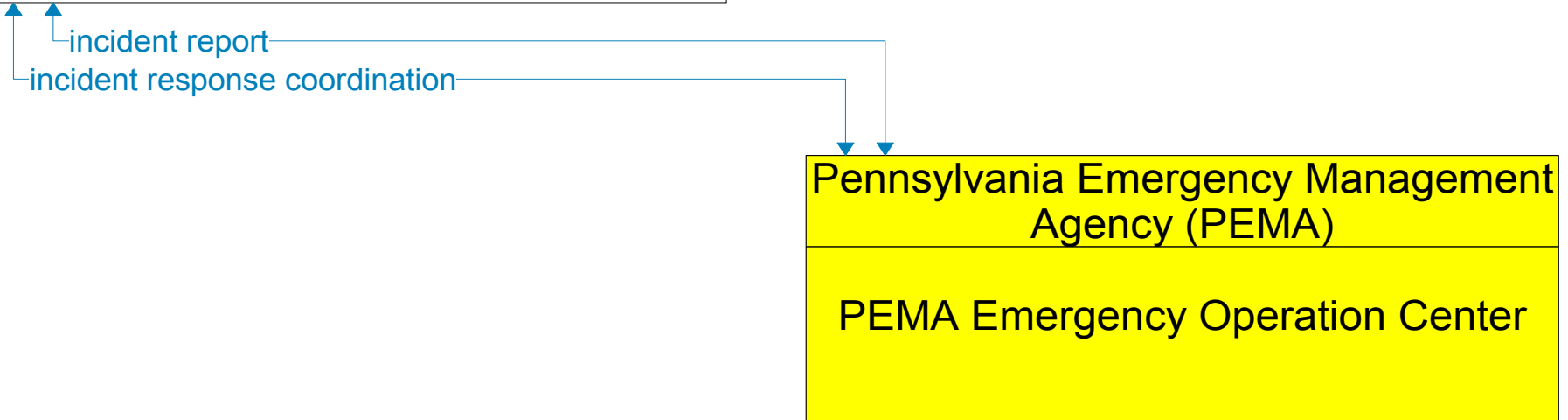
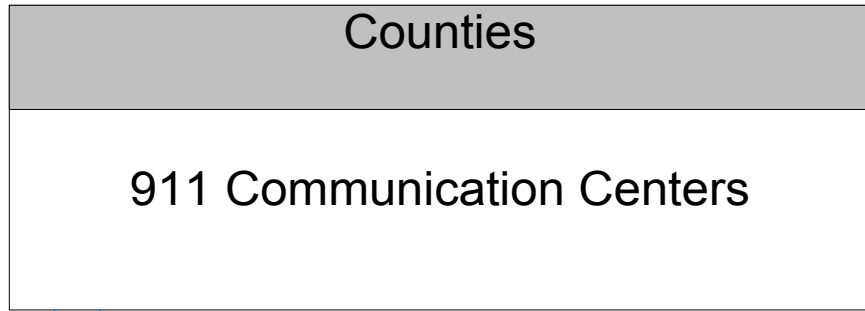
PEMA Emergency Operation Center Interconnect Diagram



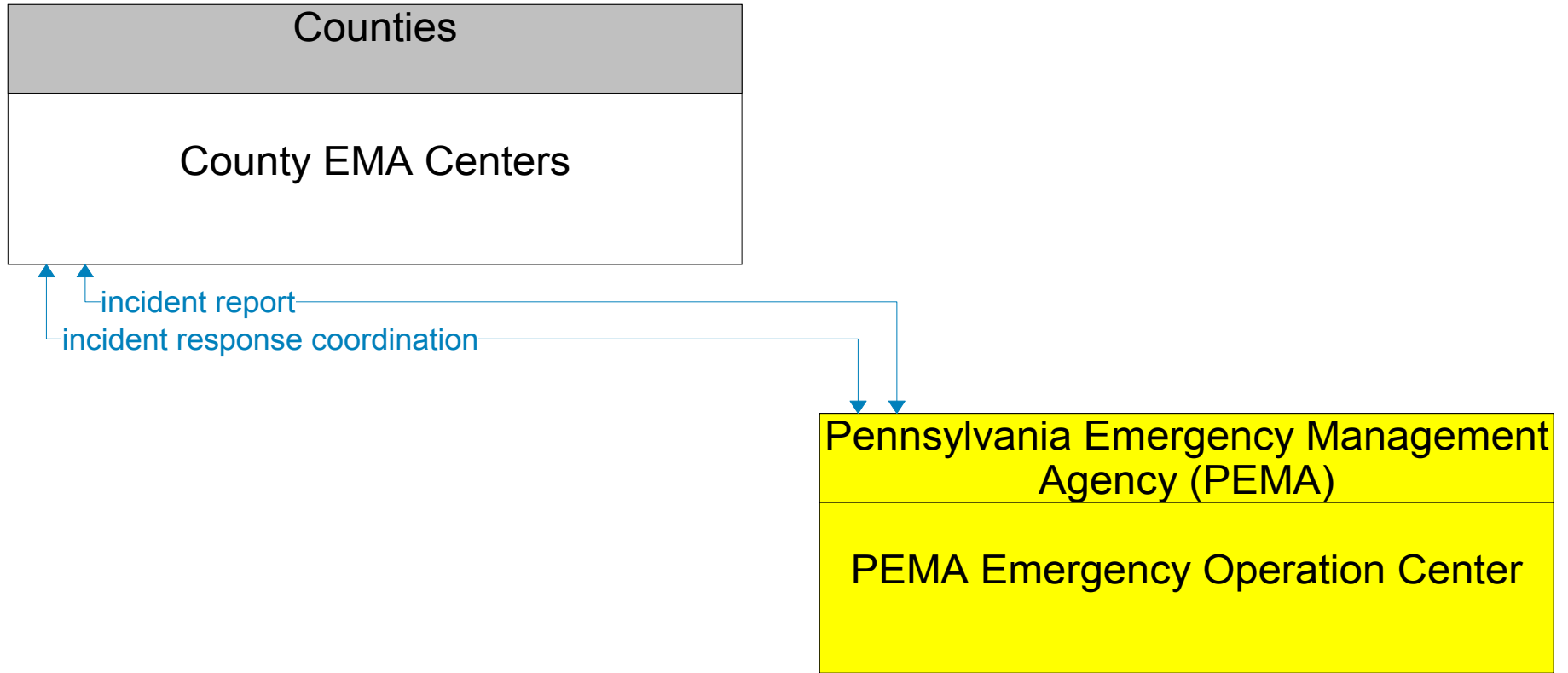
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- - - Planned



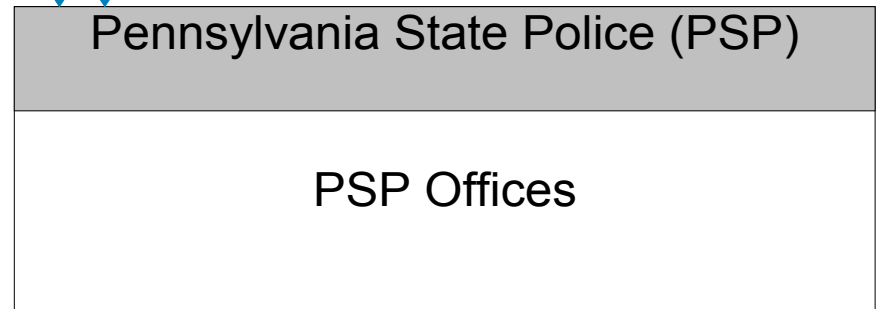
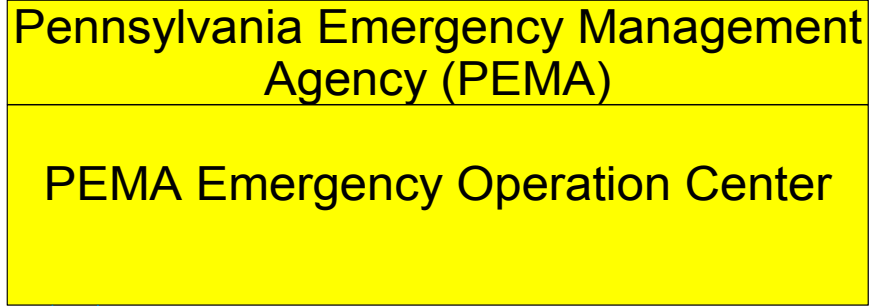
Existing
Planned



———— Existing
----- Planned



———— Existing
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Pennsylvania Emergency Management Agency (PEMA)

PEMA Emergency Operation Center

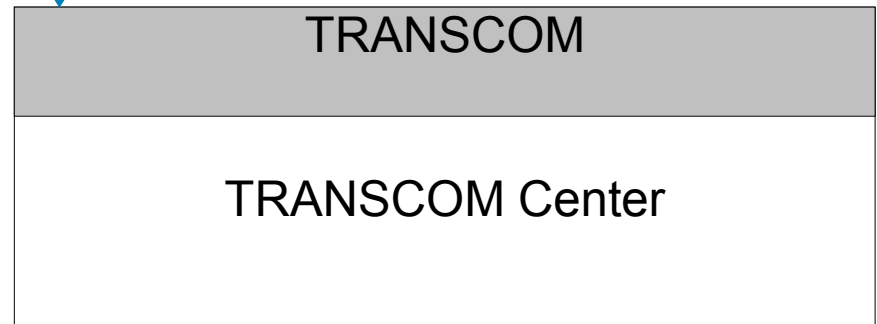
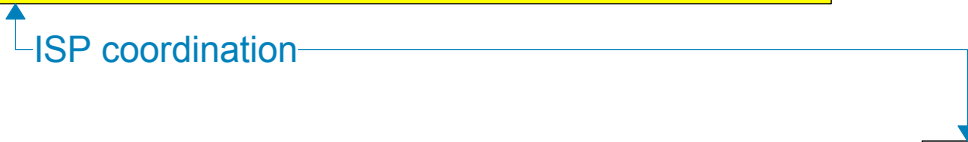
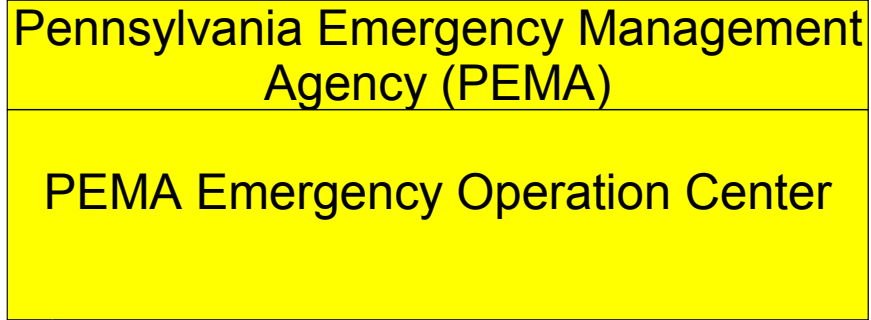


hazmat information

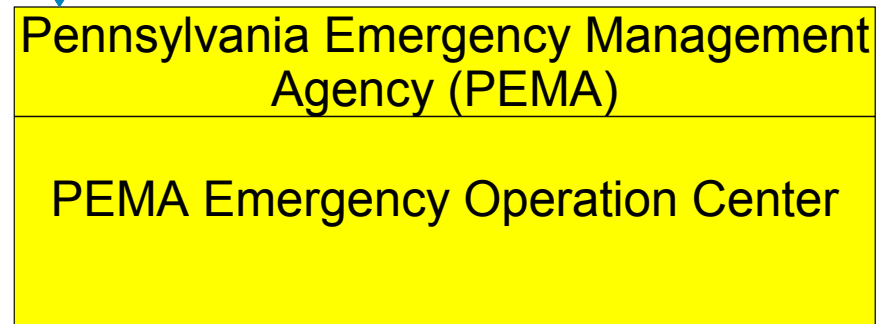
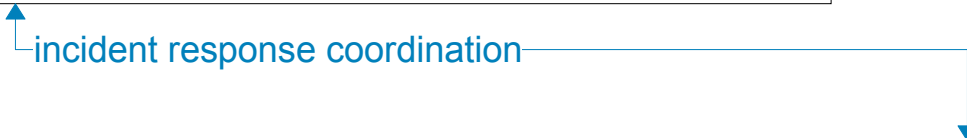
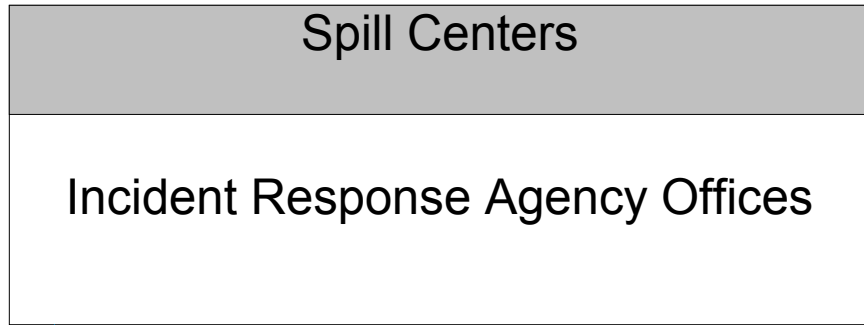
Commercial Vehicle Companies

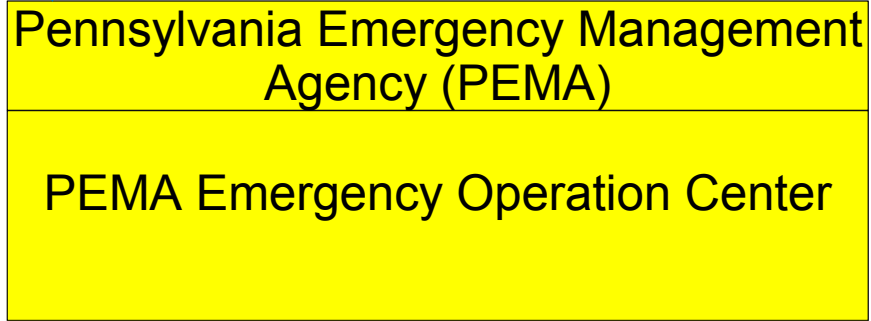
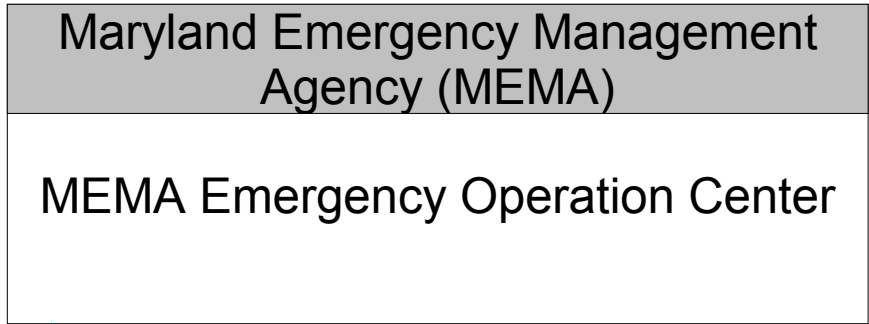
Commercial Vehicle Company Offices

Existing
Planned

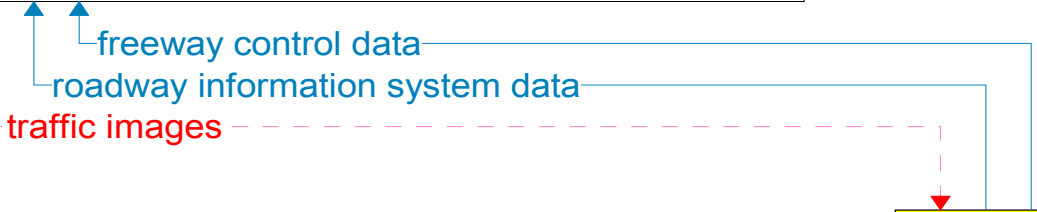
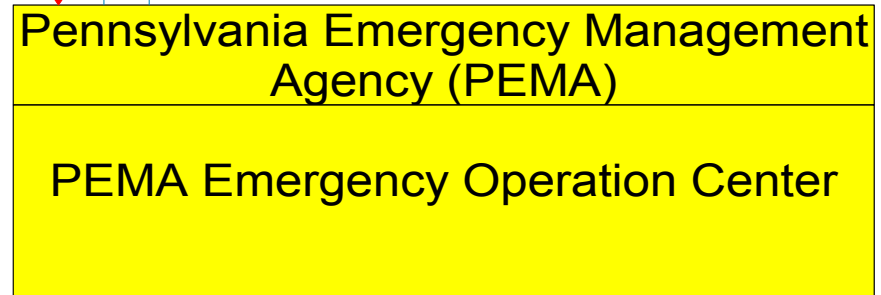
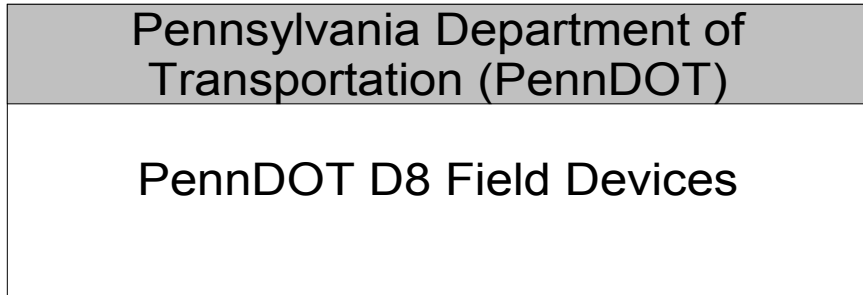


———— Existing
- - - - - Planned

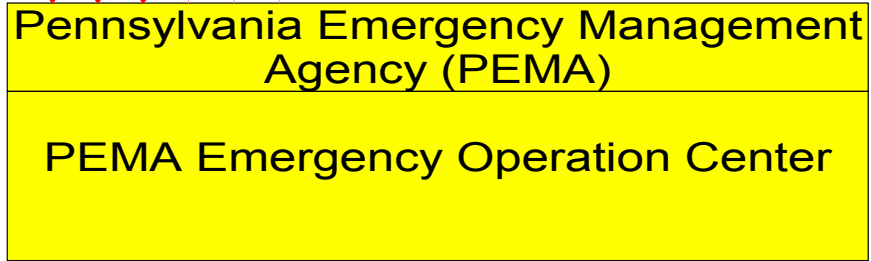
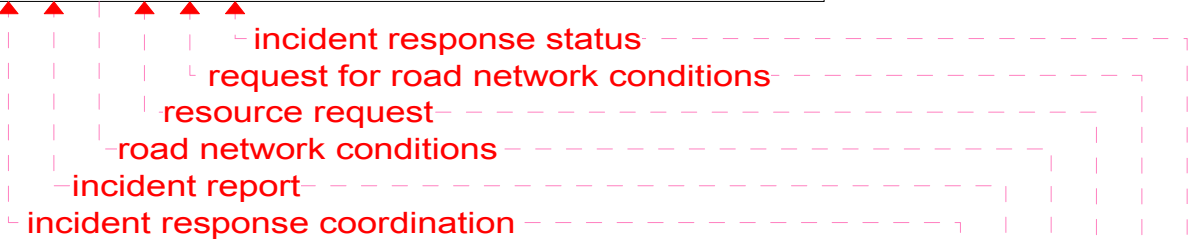
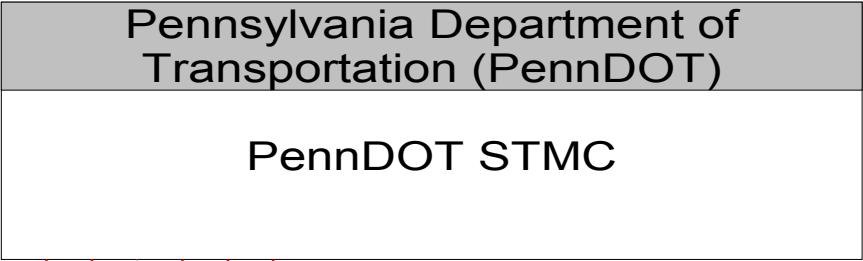




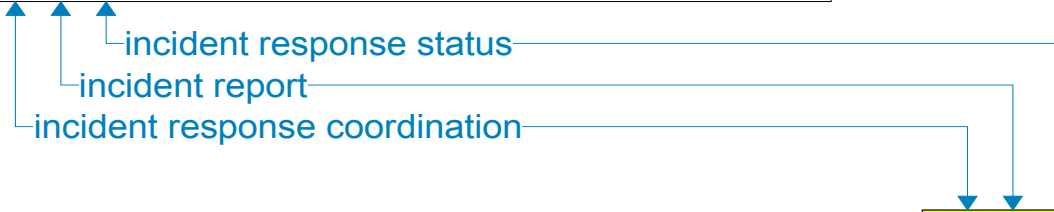
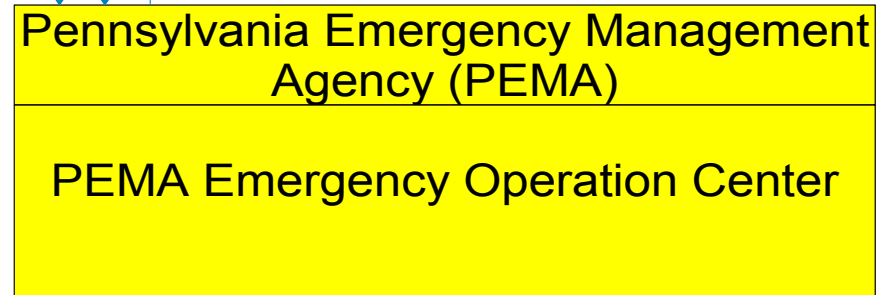
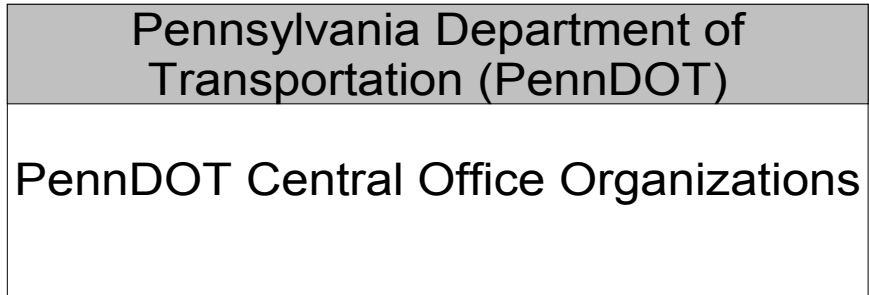
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- - - - - Planned



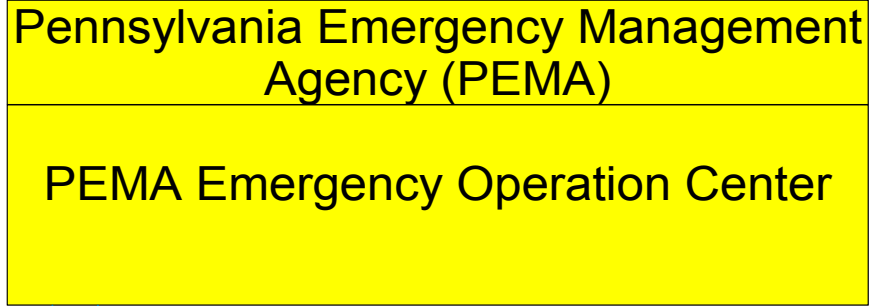
Existing
Planned



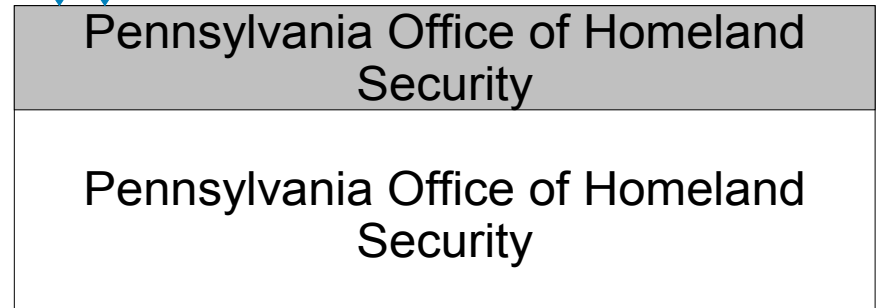
Existing
Planned



———— Existing
----- Planned

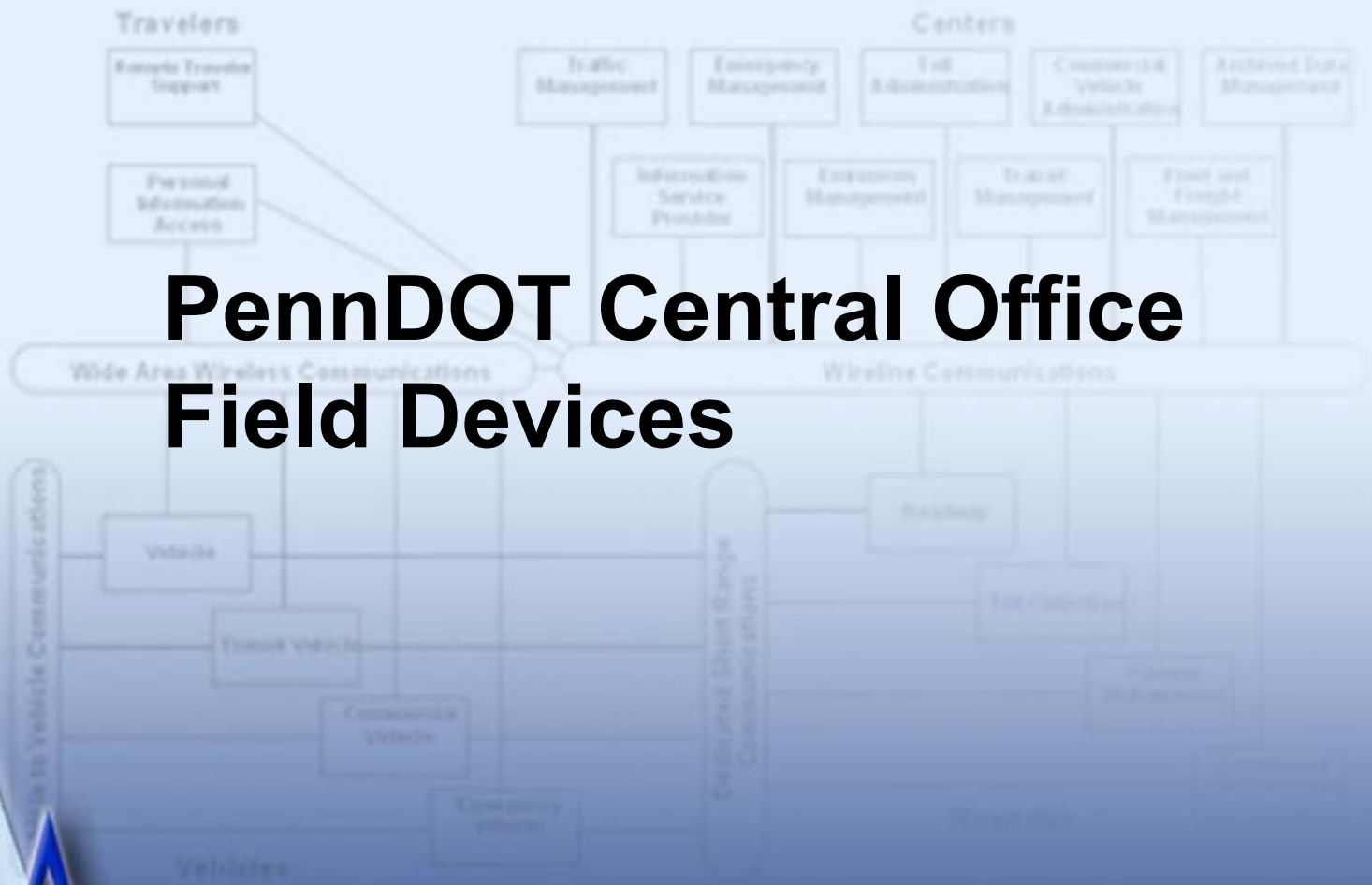


high threat facility incident information
threat information coordination

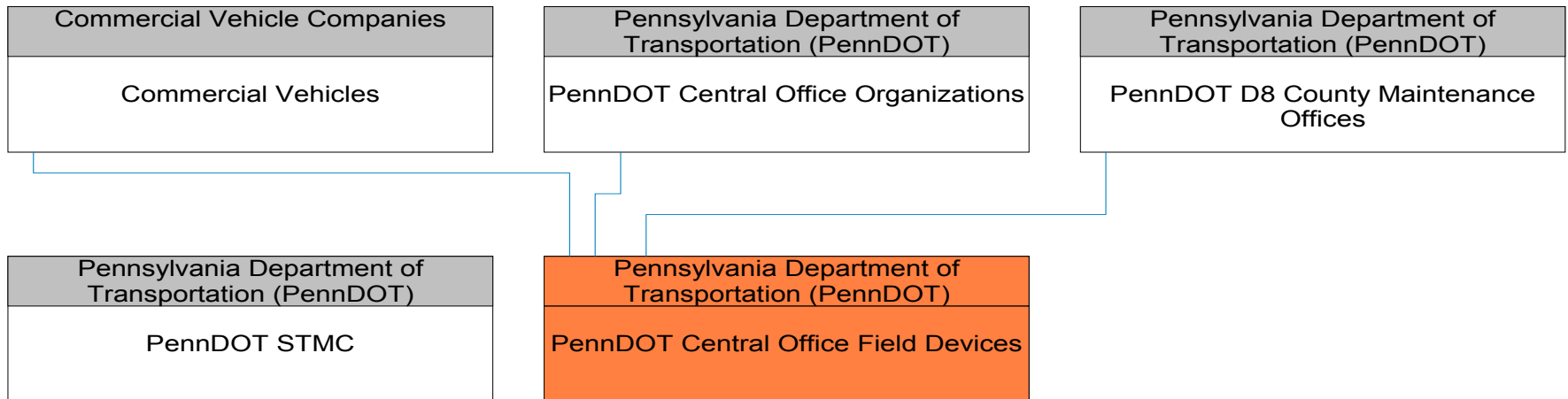


———— Existing
----- Planned

PennDOT Central Office Field Devices



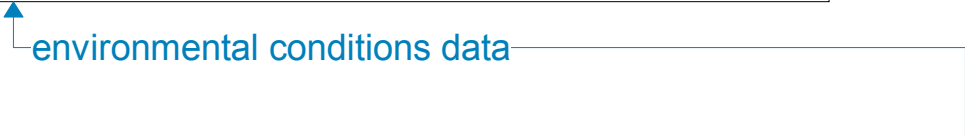
PennDOT Central Office Field Devices Interconnect Diagram



— Existing
- - - Planned

Pennsylvania Department of
Transportation (PennDOT)

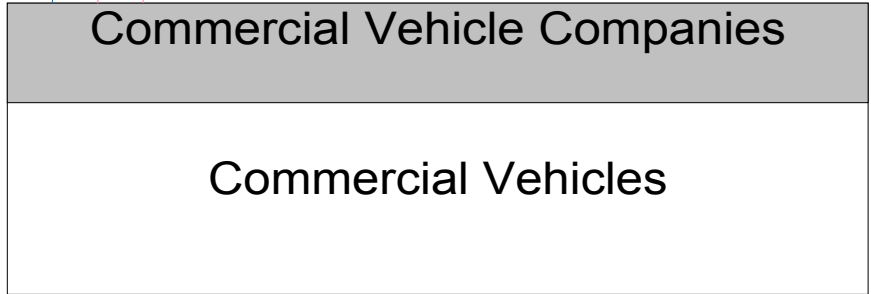
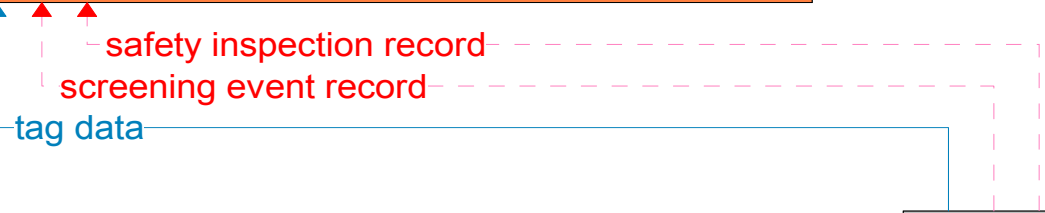
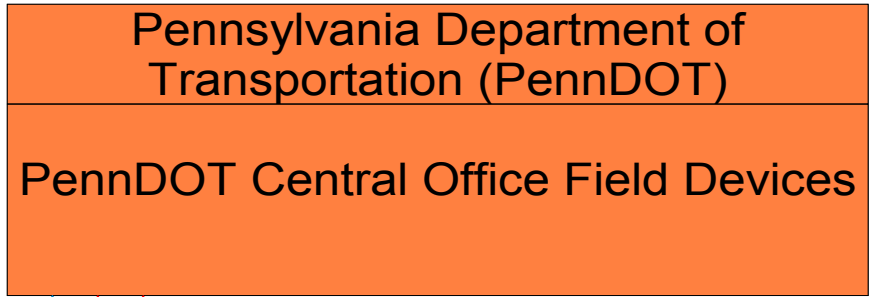
PennDOT D8 County Maintenance
Offices



Pennsylvania Department of
Transportation (PennDOT)

PennDOT Central Office Field Devices

———— Existing
- - - - - Planned



Existing
Planned

Pennsylvania Department of
Transportation (PennDOT)

PennDOT STMC

- daily site activity data -
- environmental conditions data -
- field device status -
- safety inspection report -
- violation notification -
- credentials information -
- credentials status information -
- environmental sensors control -
- safety status information -

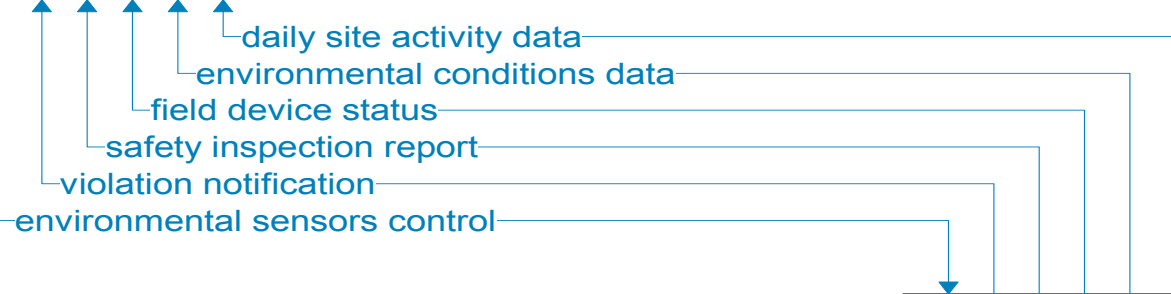
Pennsylvania Department of
Transportation (PennDOT)

PennDOT Central Office Field Devices

———— Existing
- - - - - Planned

Pennsylvania Department of
Transportation (PennDOT)

PennDOT Central Office Organizations

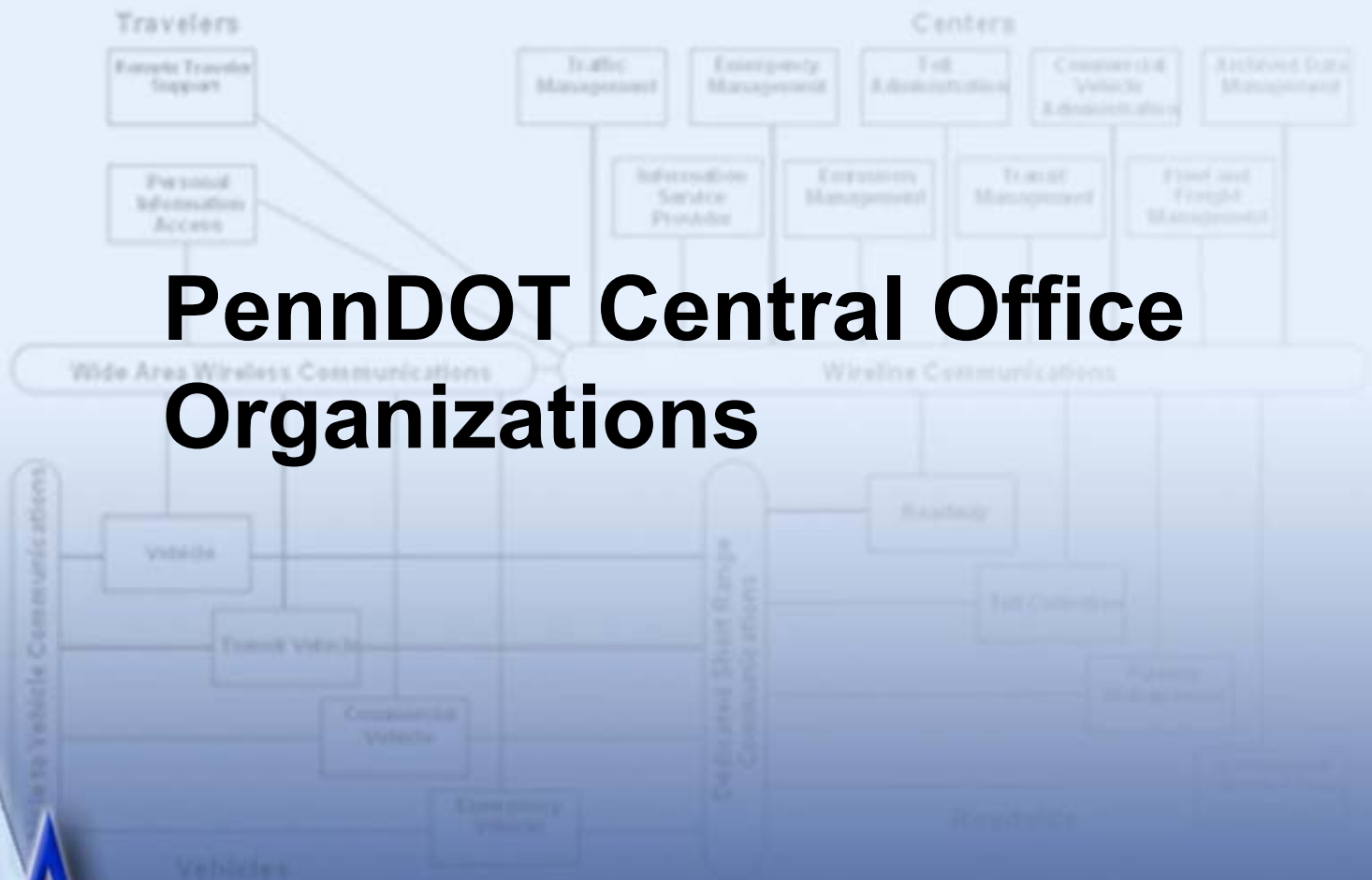


Pennsylvania Department of
Transportation (PennDOT)

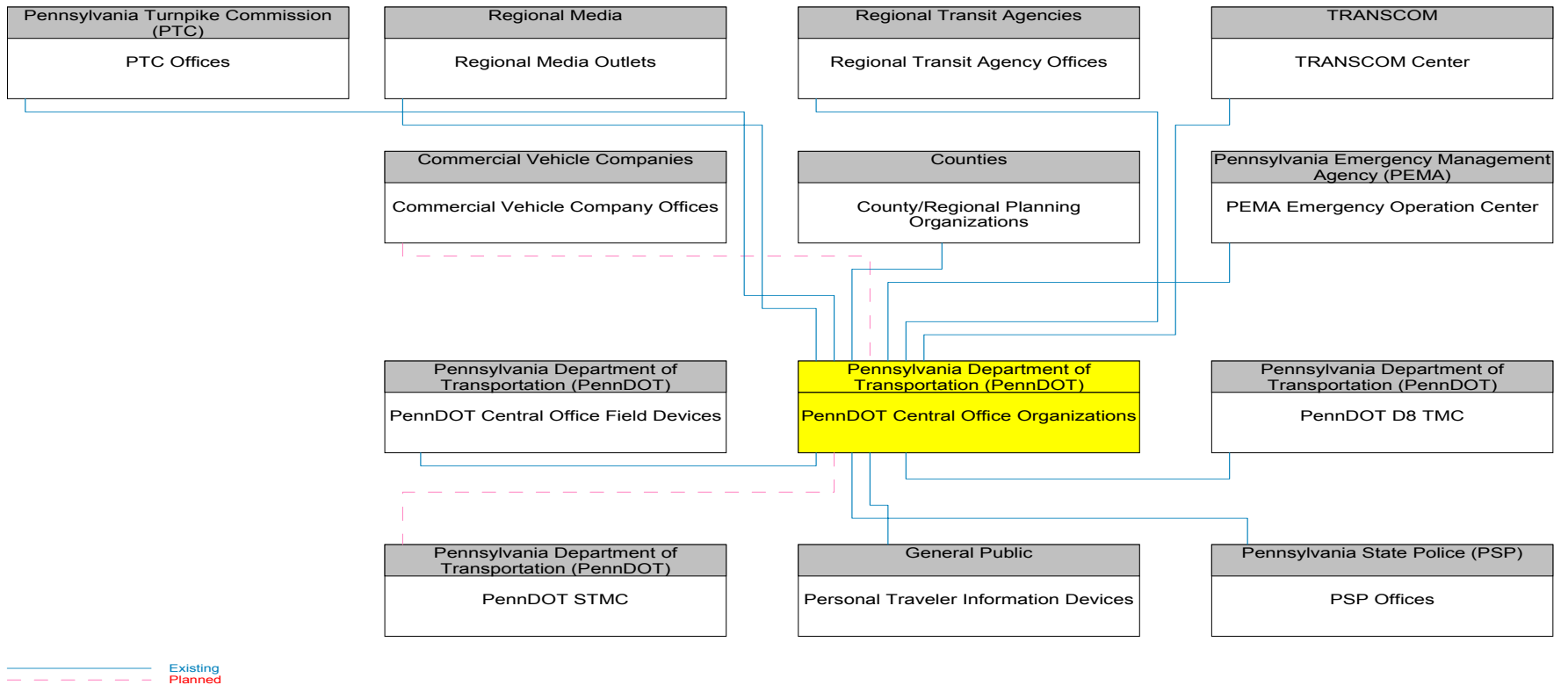
PennDOT Central Office Field Devices

Existing
Planned

PennDOT Central Office Organizations

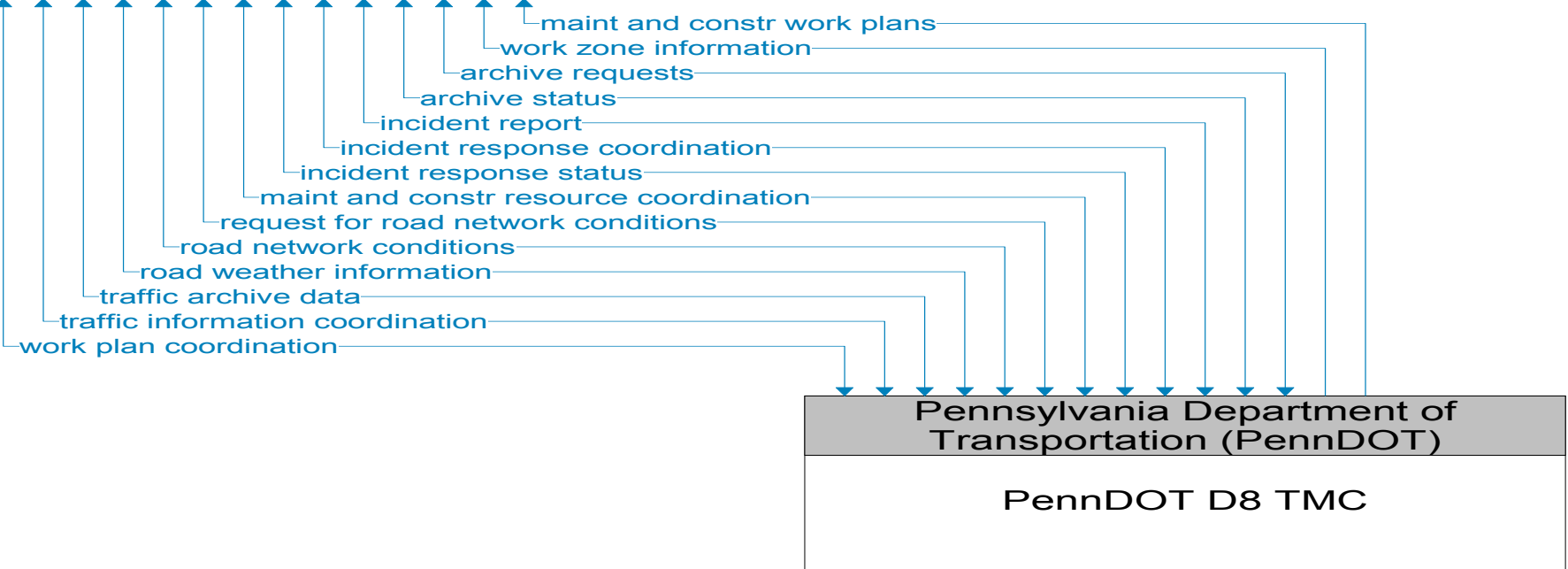


PennDOT Central Office Organizations Interconnect Diagram

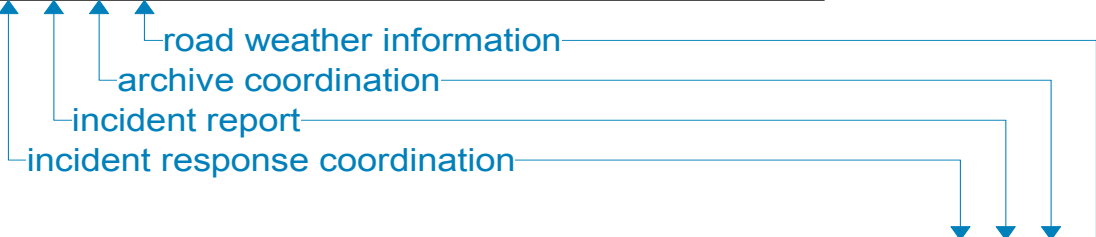
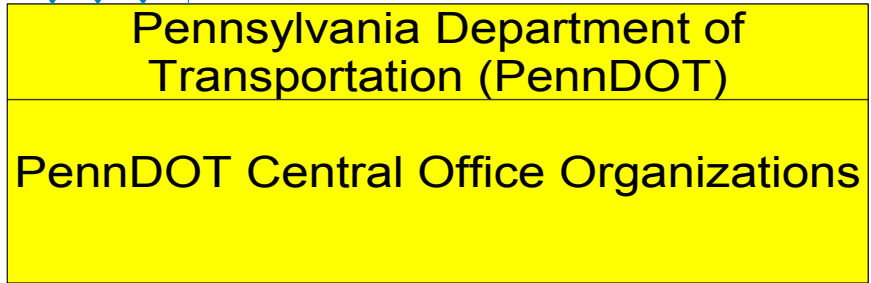
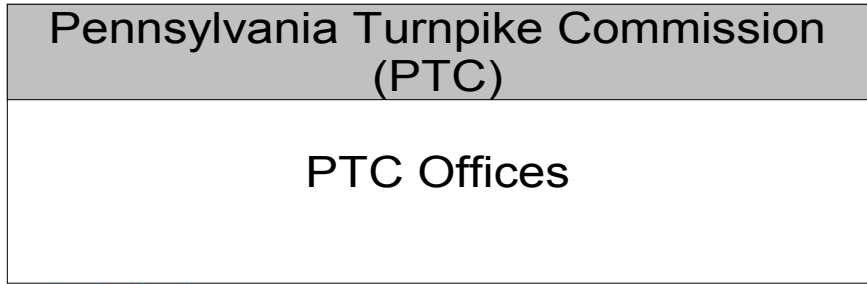


Pennsylvania Department of Transportation (PennDOT)

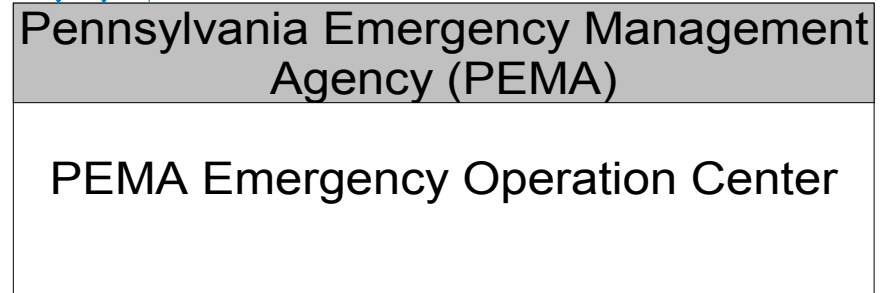
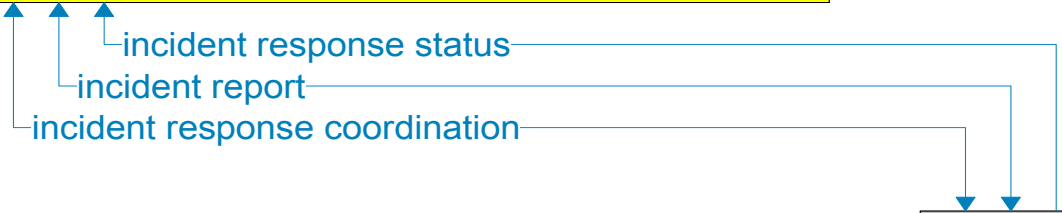
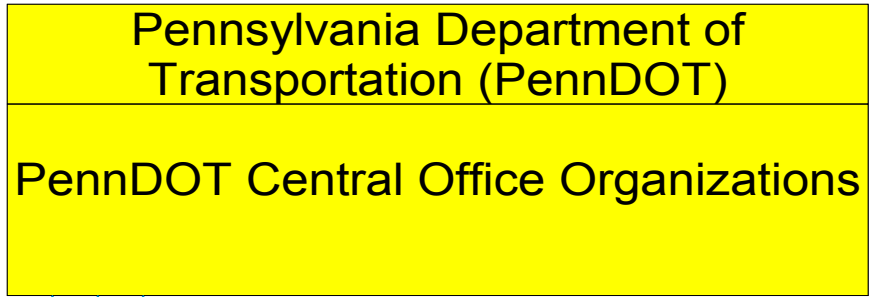
PennDOT Central Office Organizations



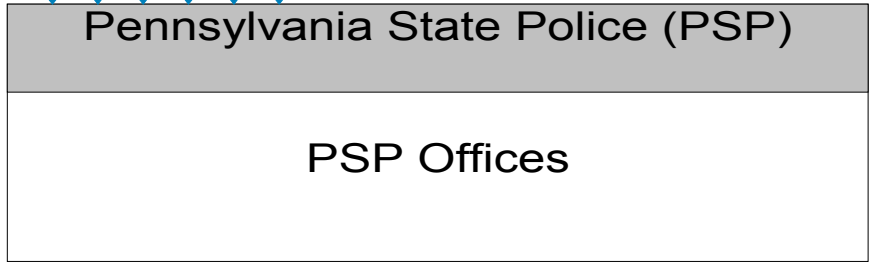
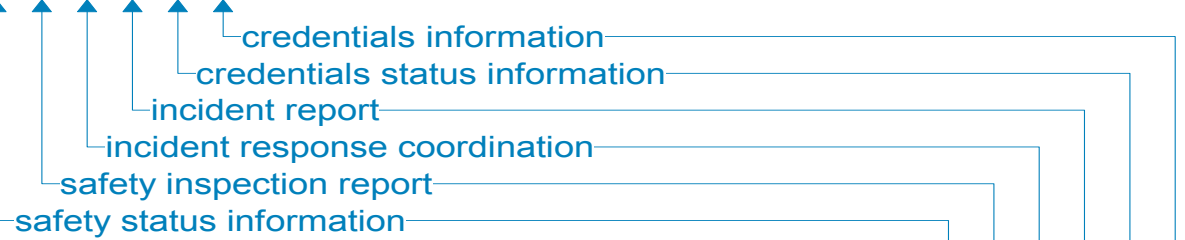
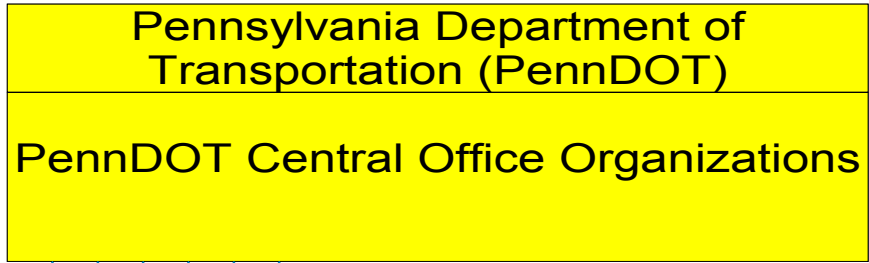
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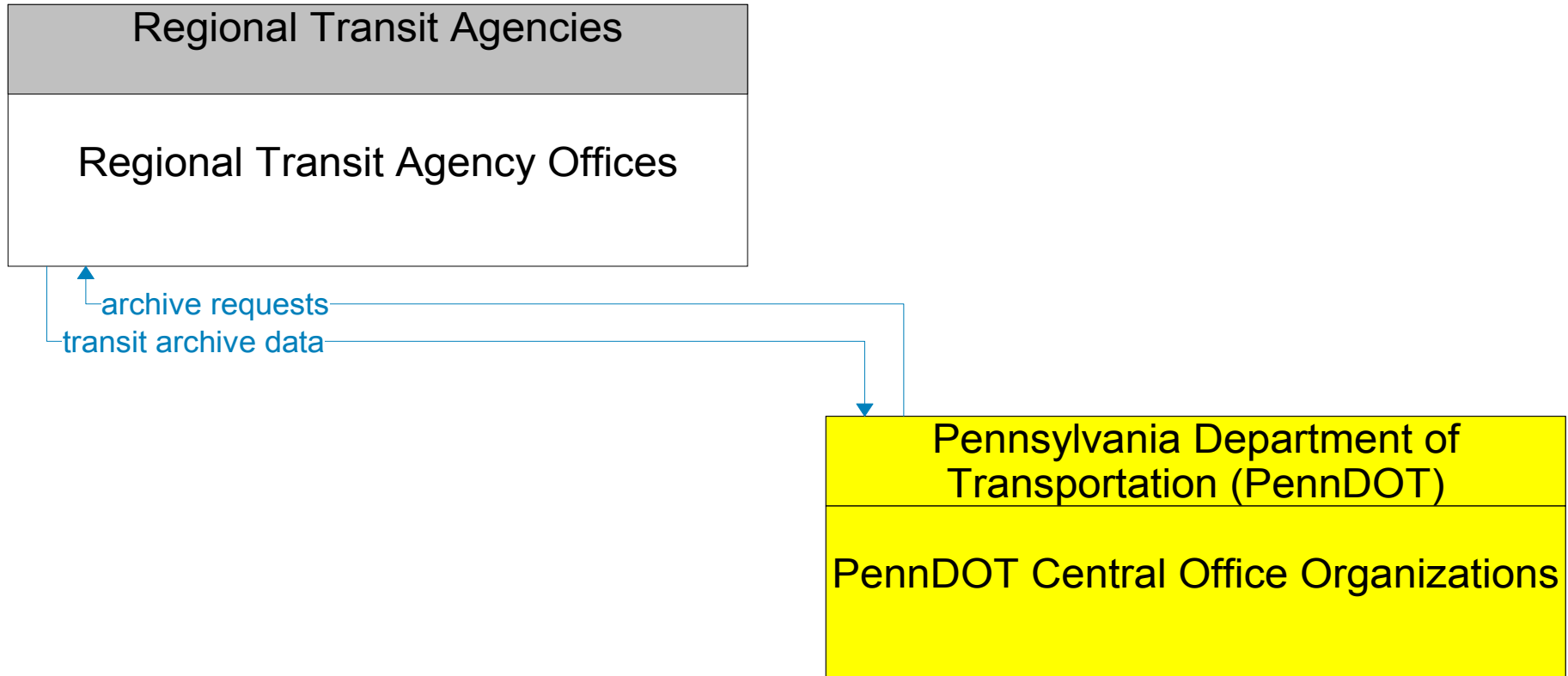


Existing
Planned

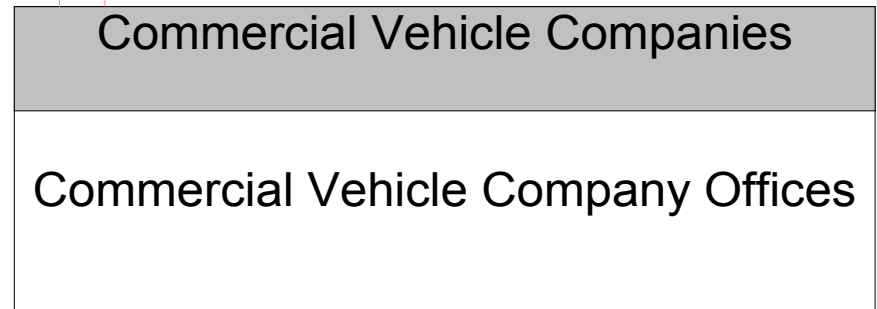
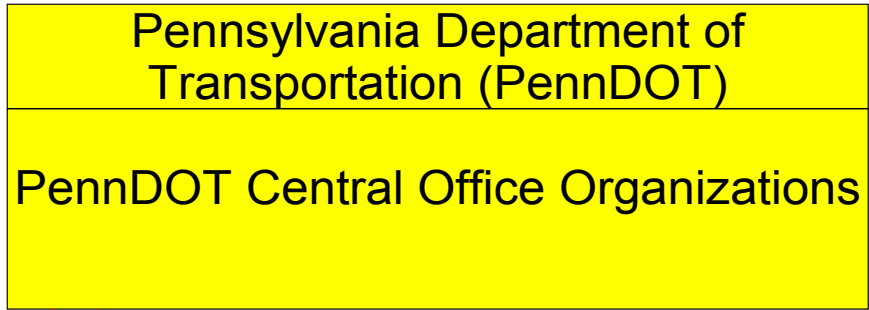


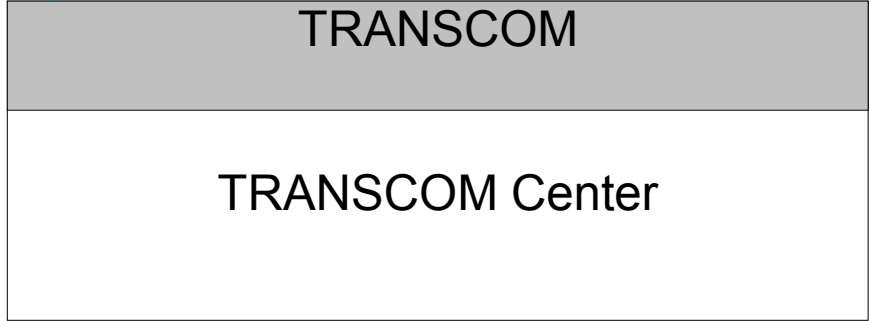
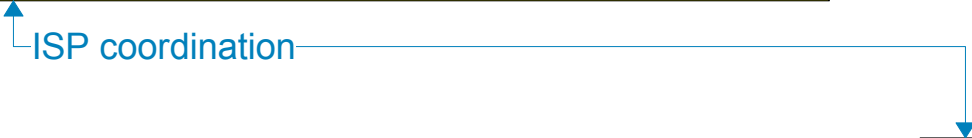
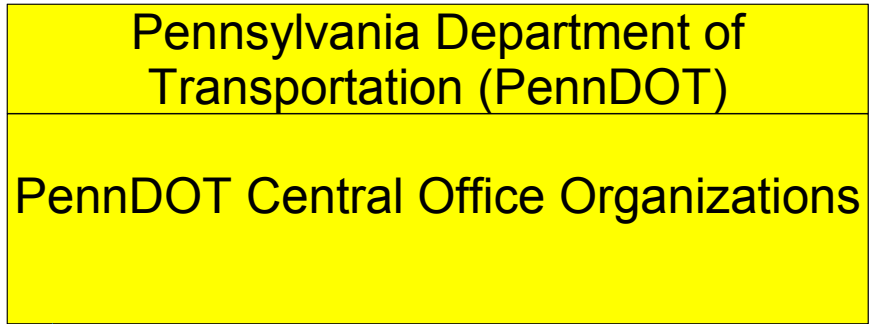
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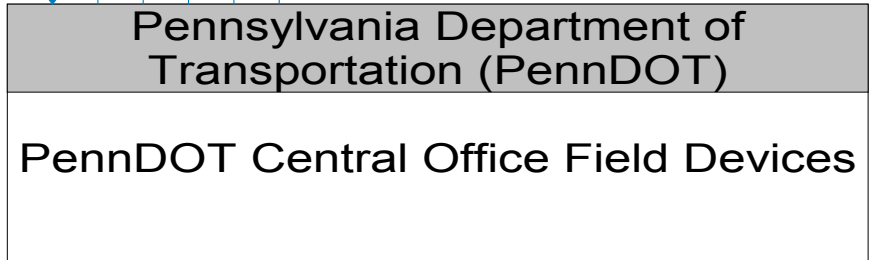
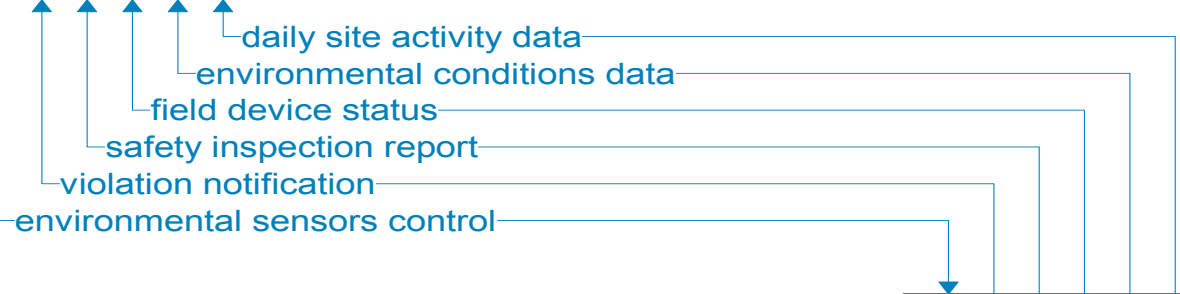
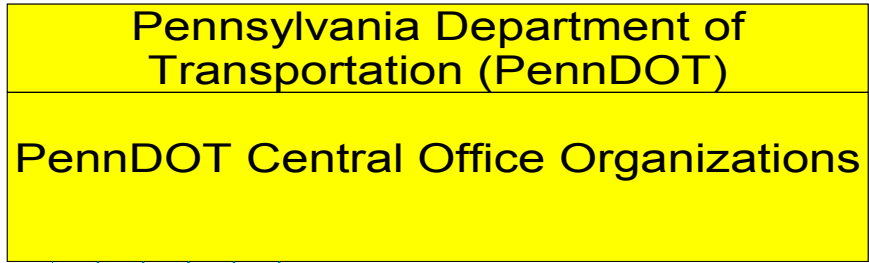




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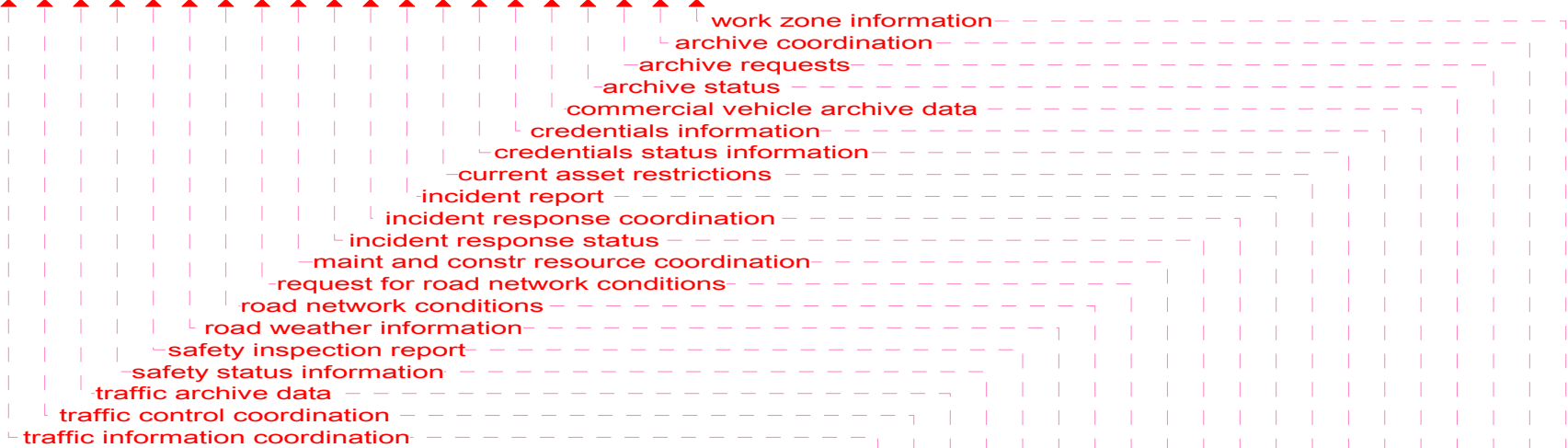






**Pennsylvania Department of Transportation
(PennDOT)**

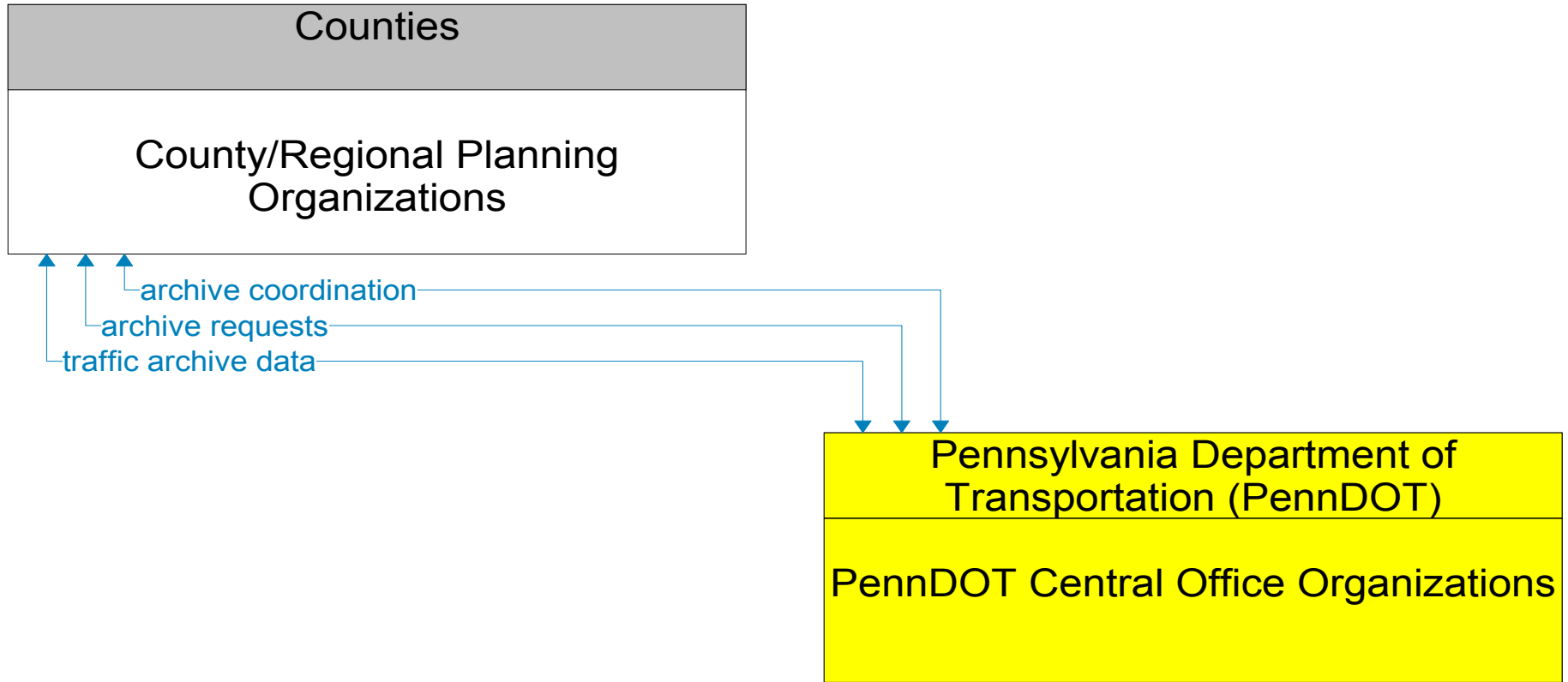
PennDOT Central Office Organizations



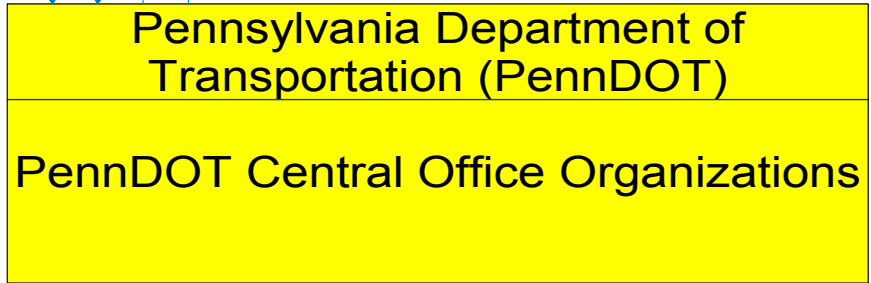
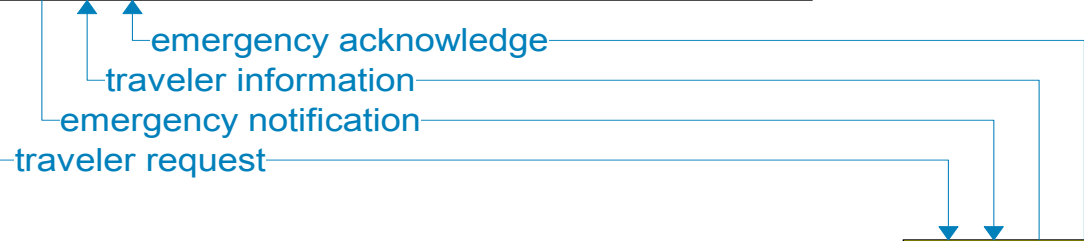
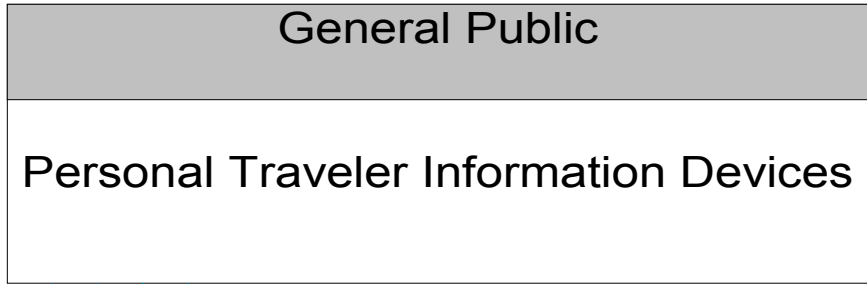
**Pennsylvania Department of Transportation
(PennDOT)**

PennDOT STMC

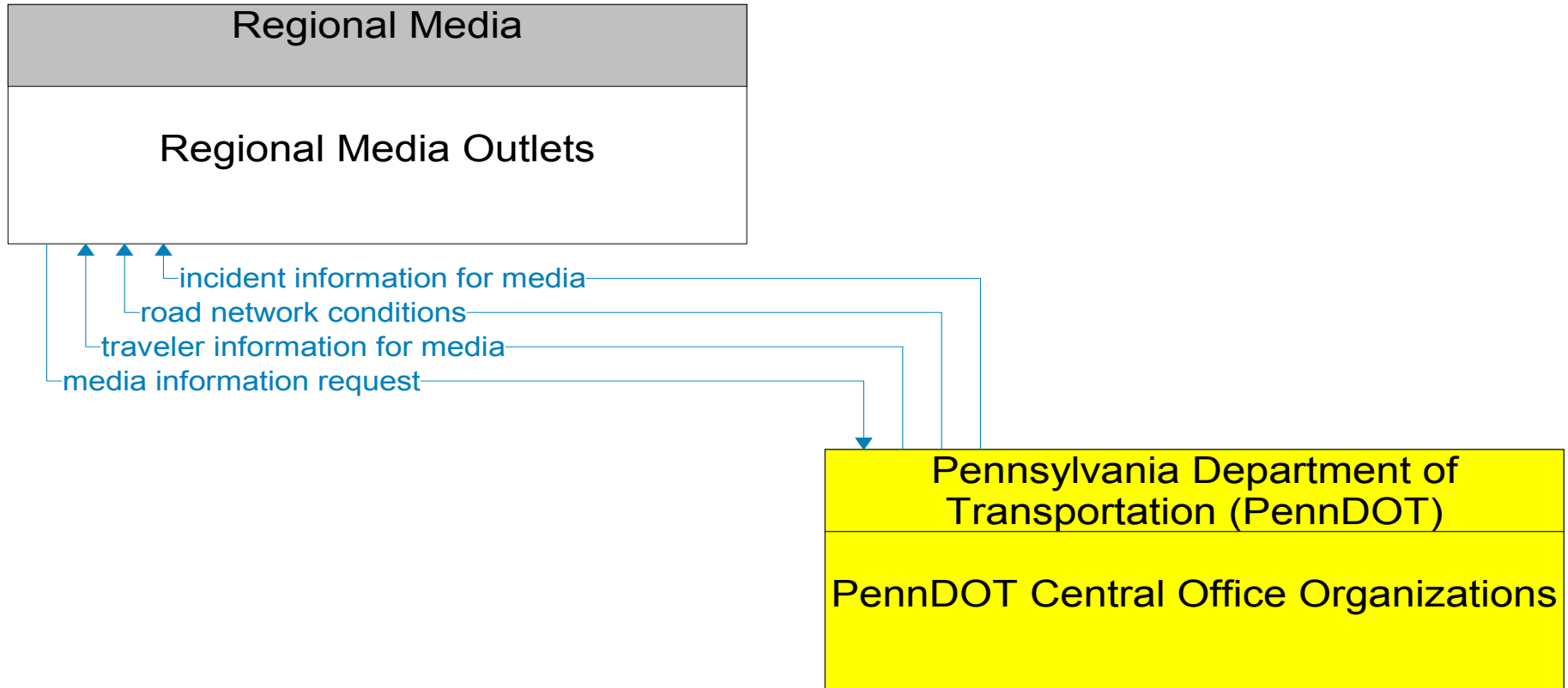
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- - - - - Planned

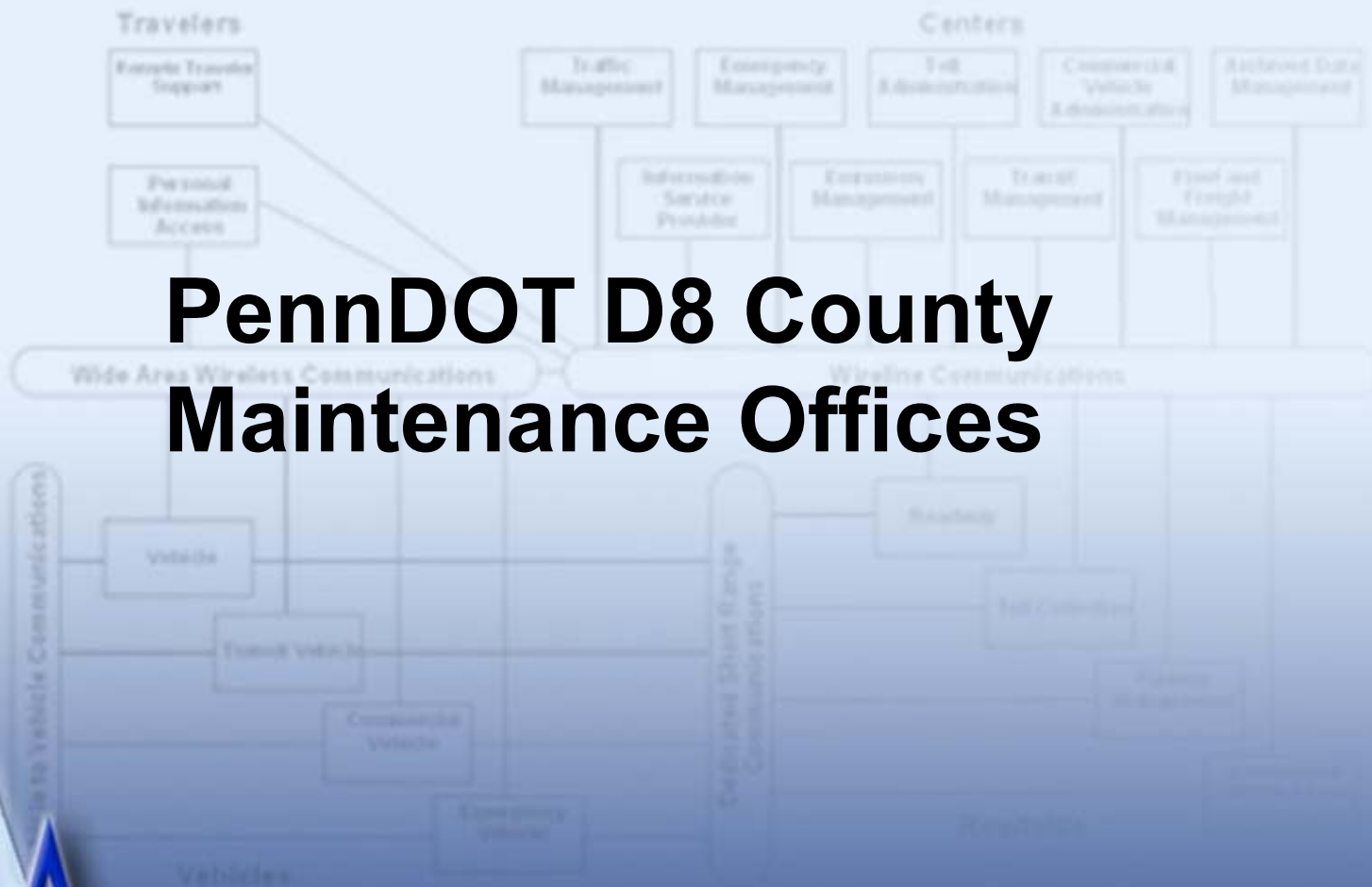


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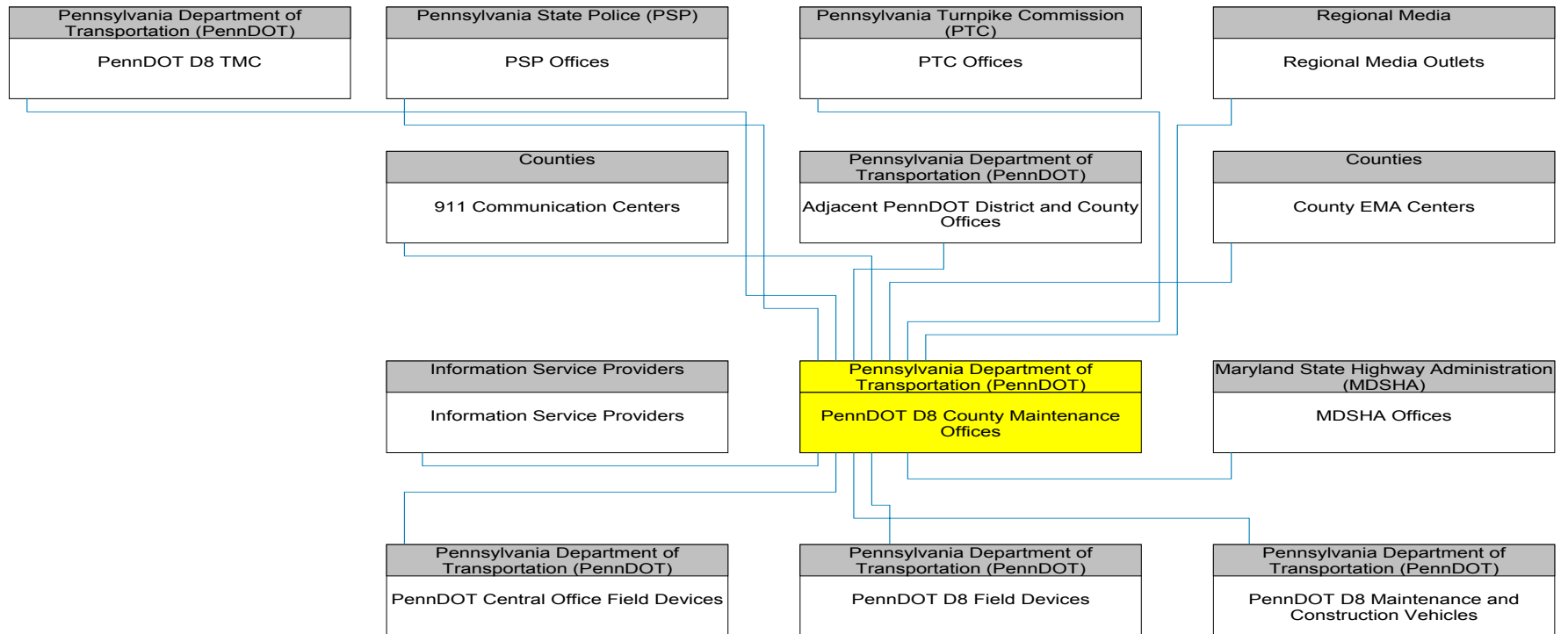


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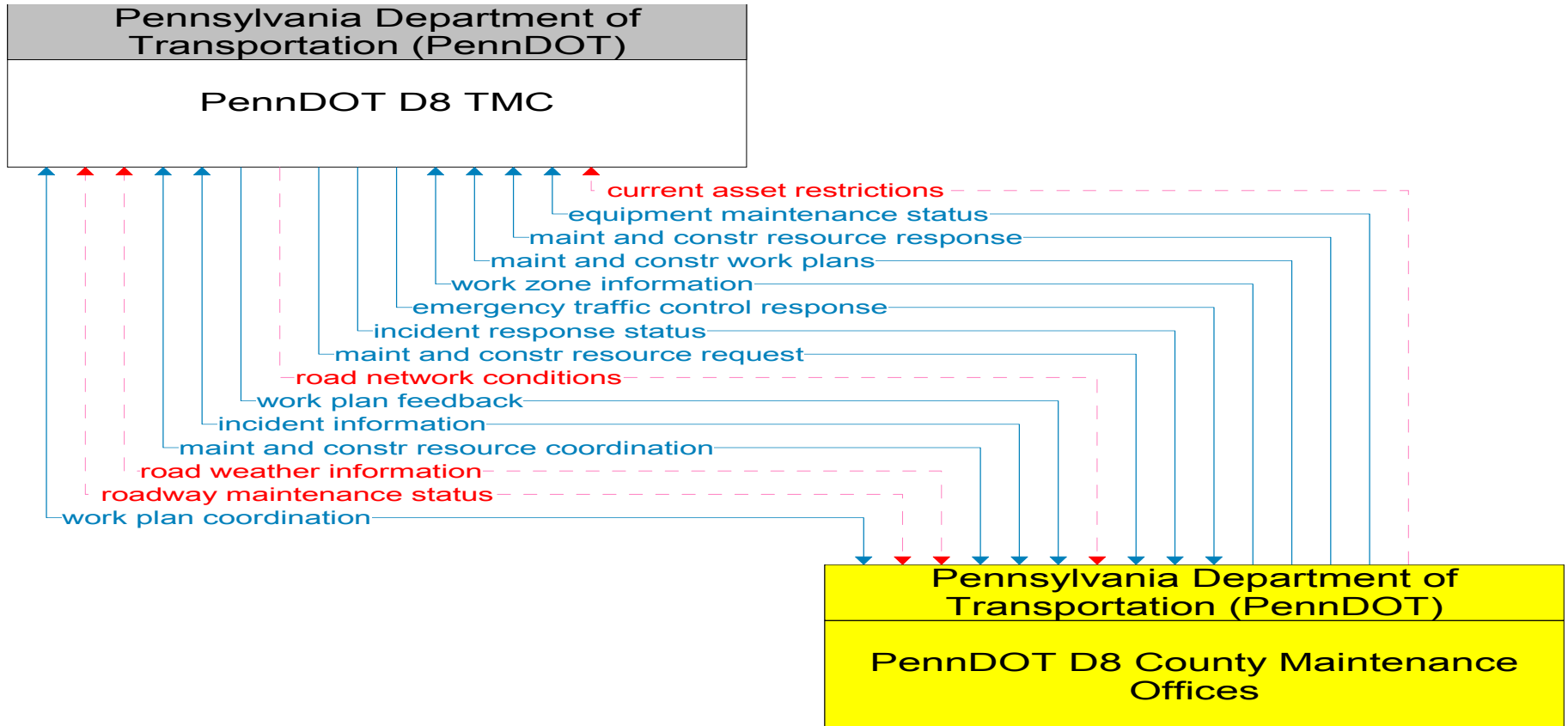
PennDOT D8 County Maintenance Offices

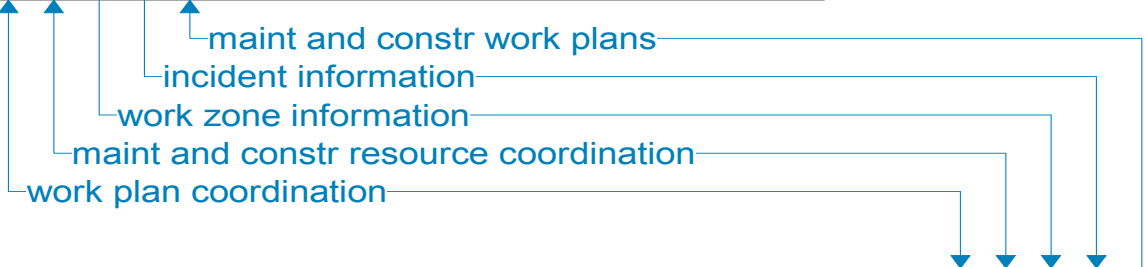
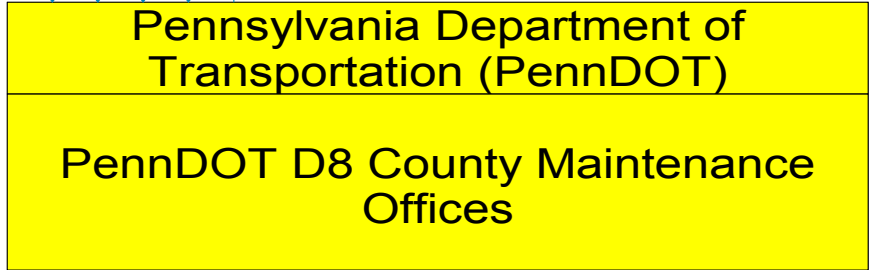
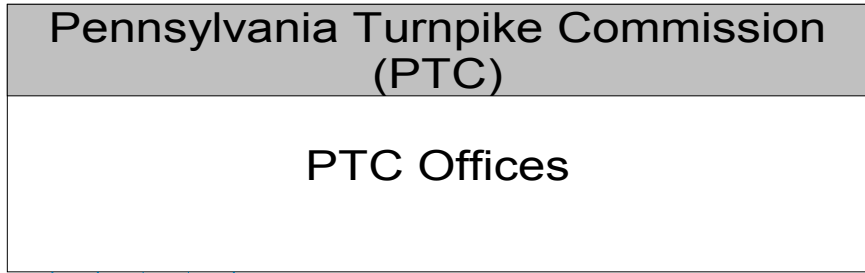


PennDOT D8 County Maintenance Offices Interconnect Diagram

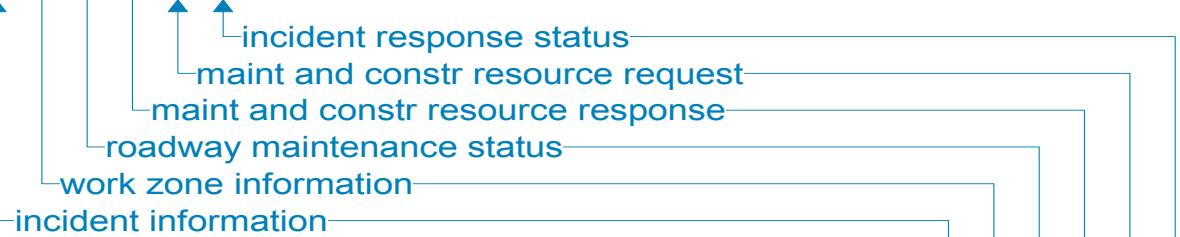
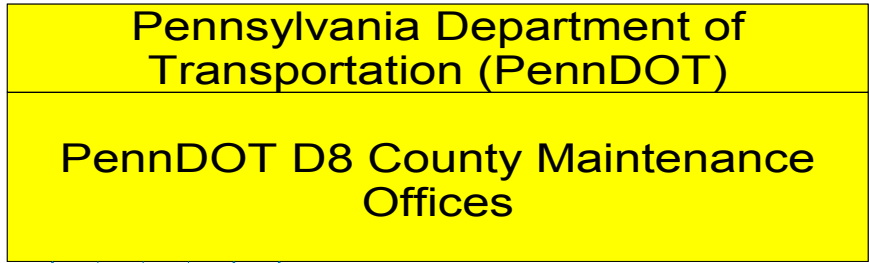


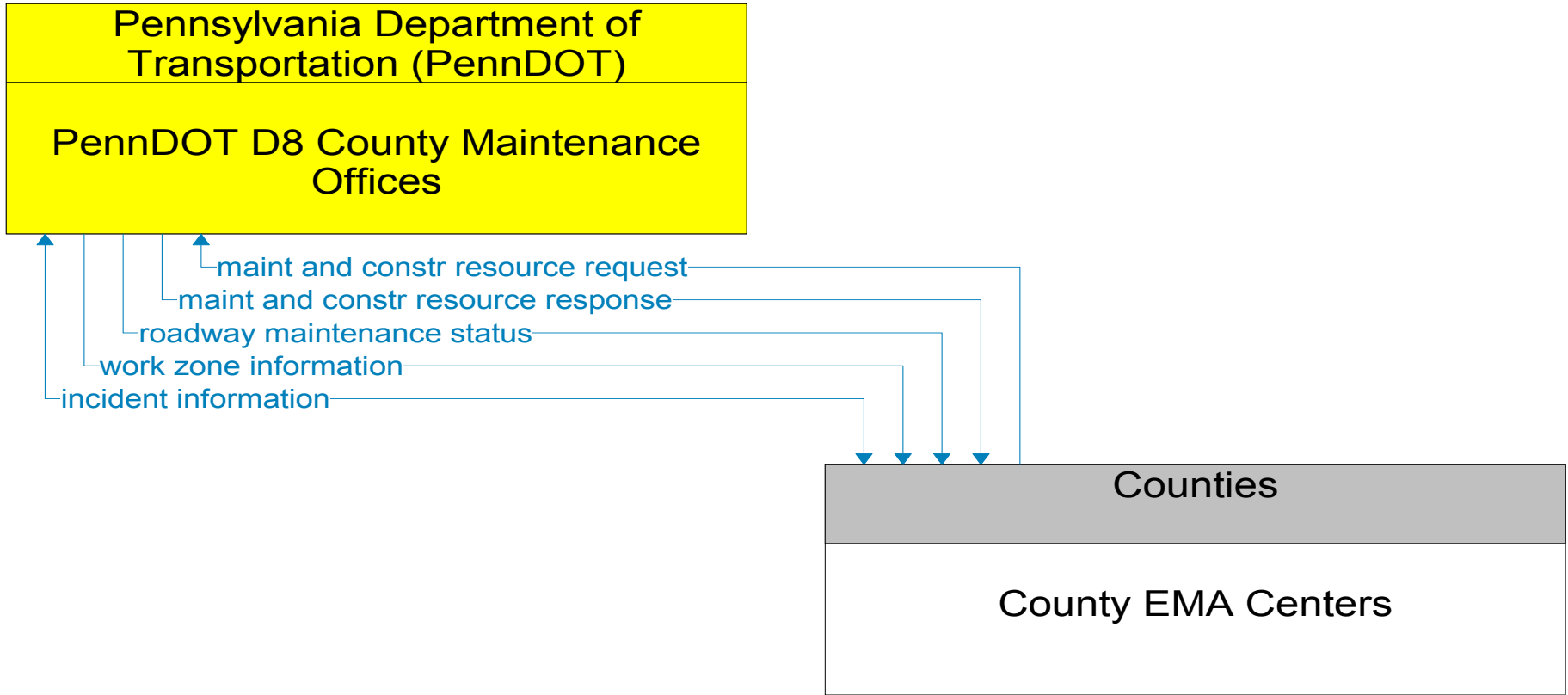
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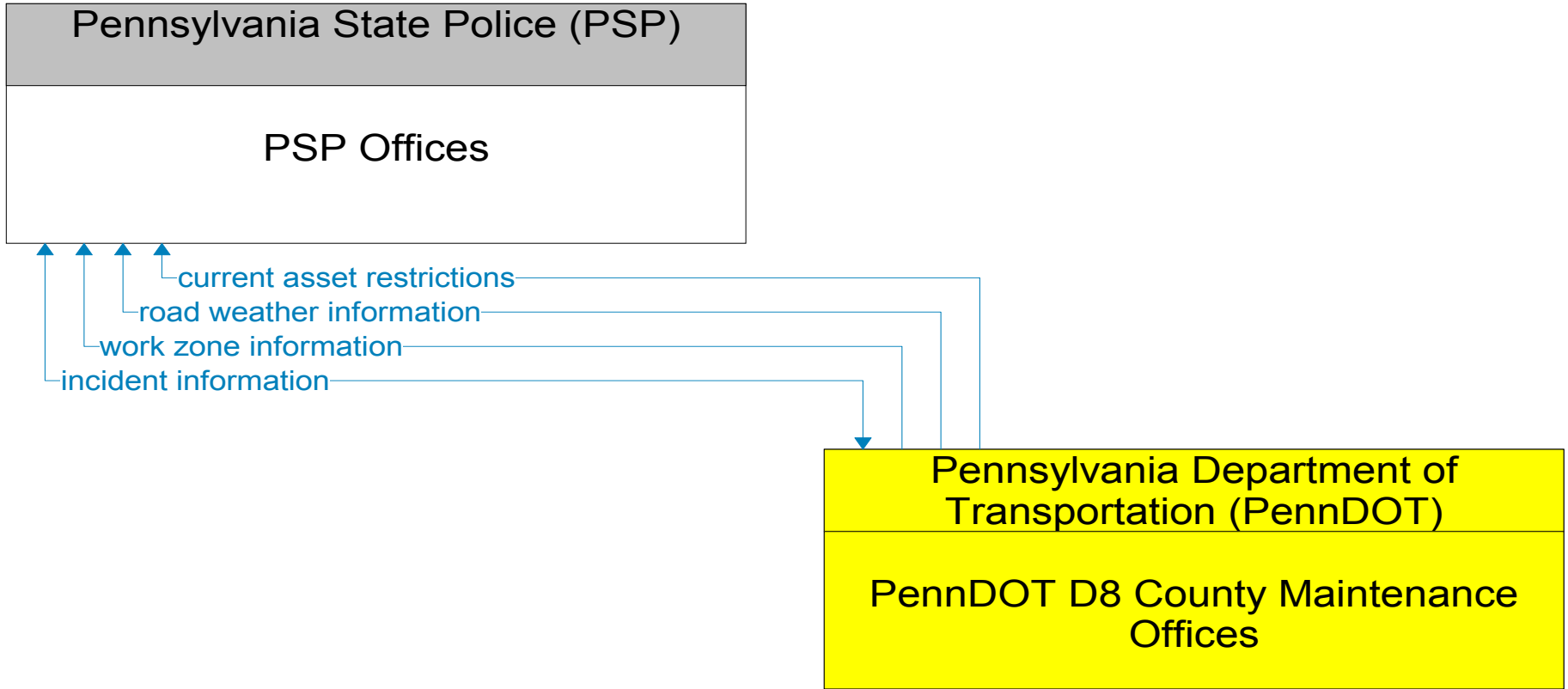


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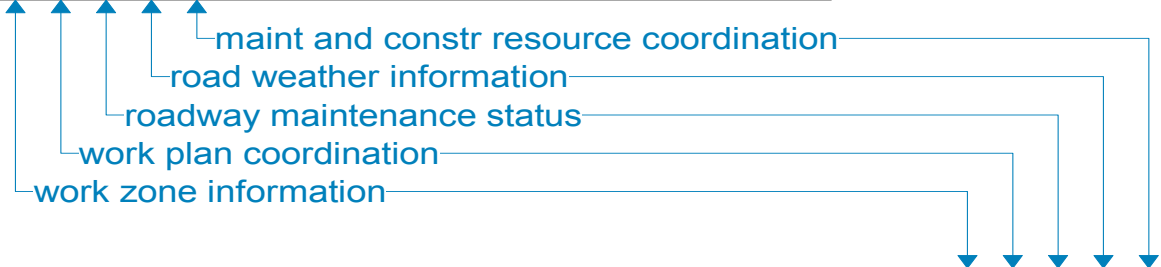
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Planned



———— Existing
- - - - - Planned

Pennsylvania Department of
Transportation (PennDOT)

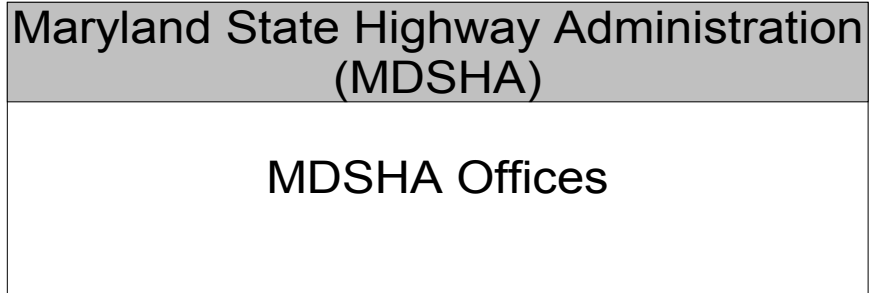
Adjacent PennDOT District and County
Offices



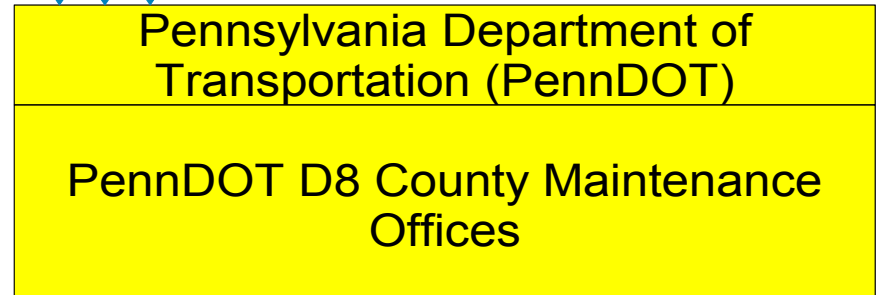
Pennsylvania Department of
Transportation (PennDOT)

PennDOT D8 County Maintenance
Offices

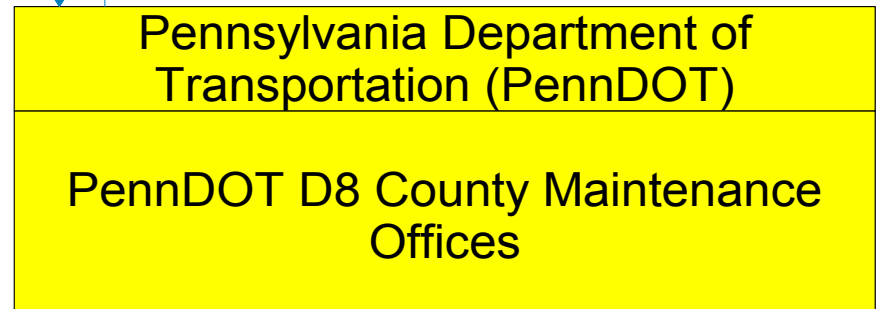
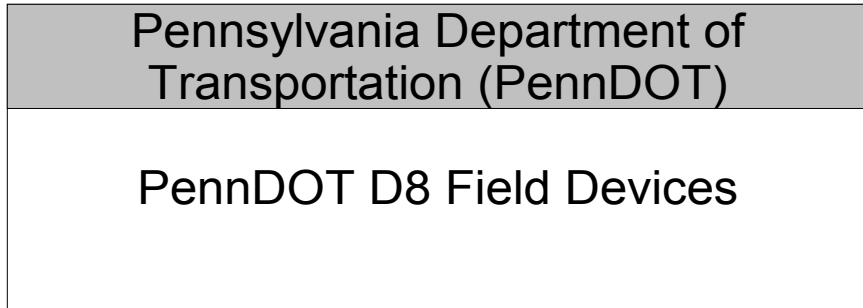
———— Existing
- - - - - Planned



maint and constr resource coordination
work plan coordination
work zone information



Existing
Planned

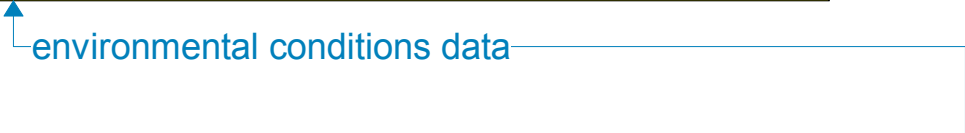
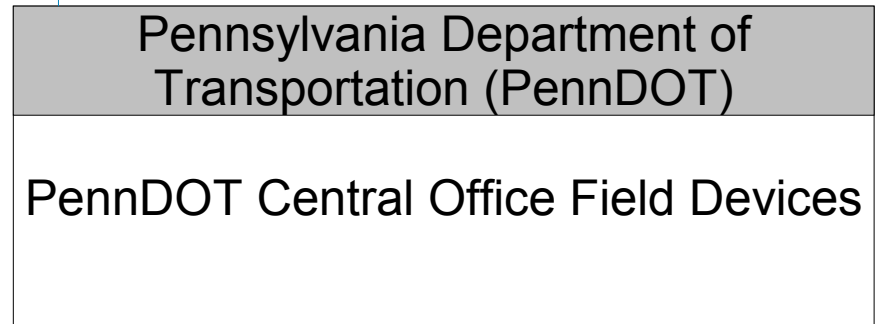
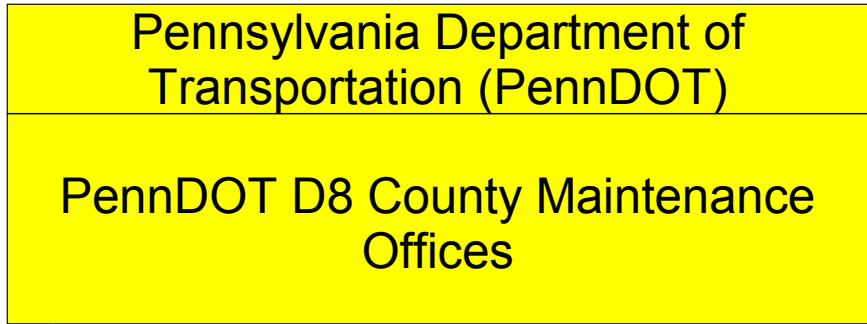


roadway information system data

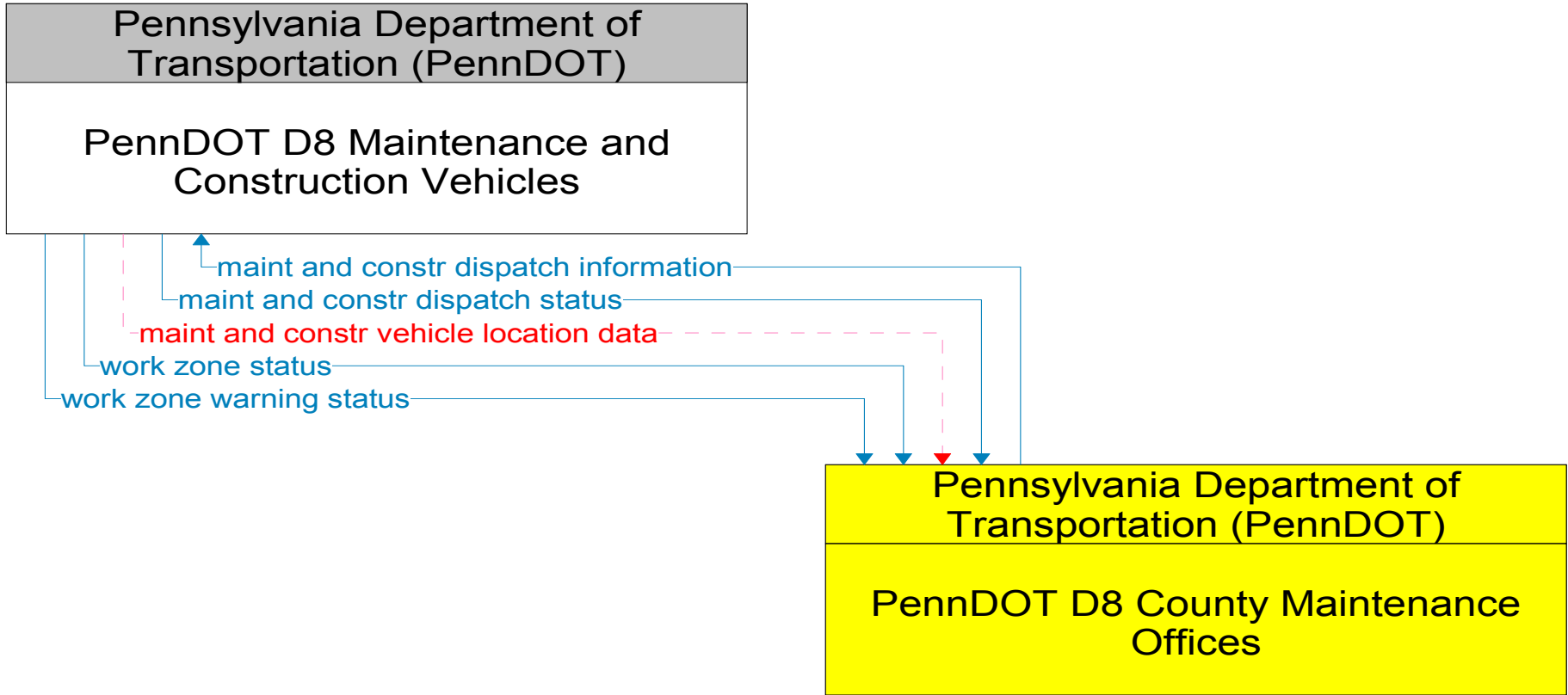
field device status

Existing

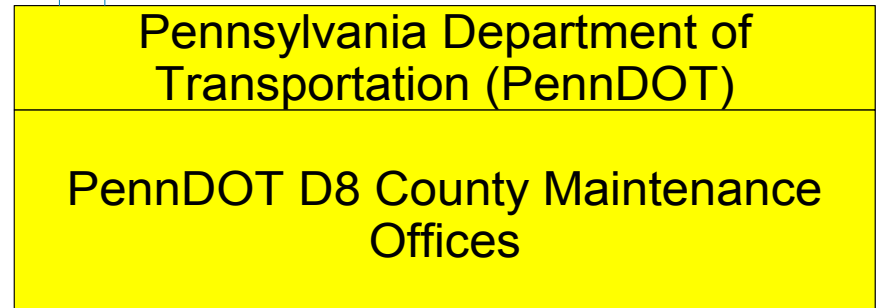
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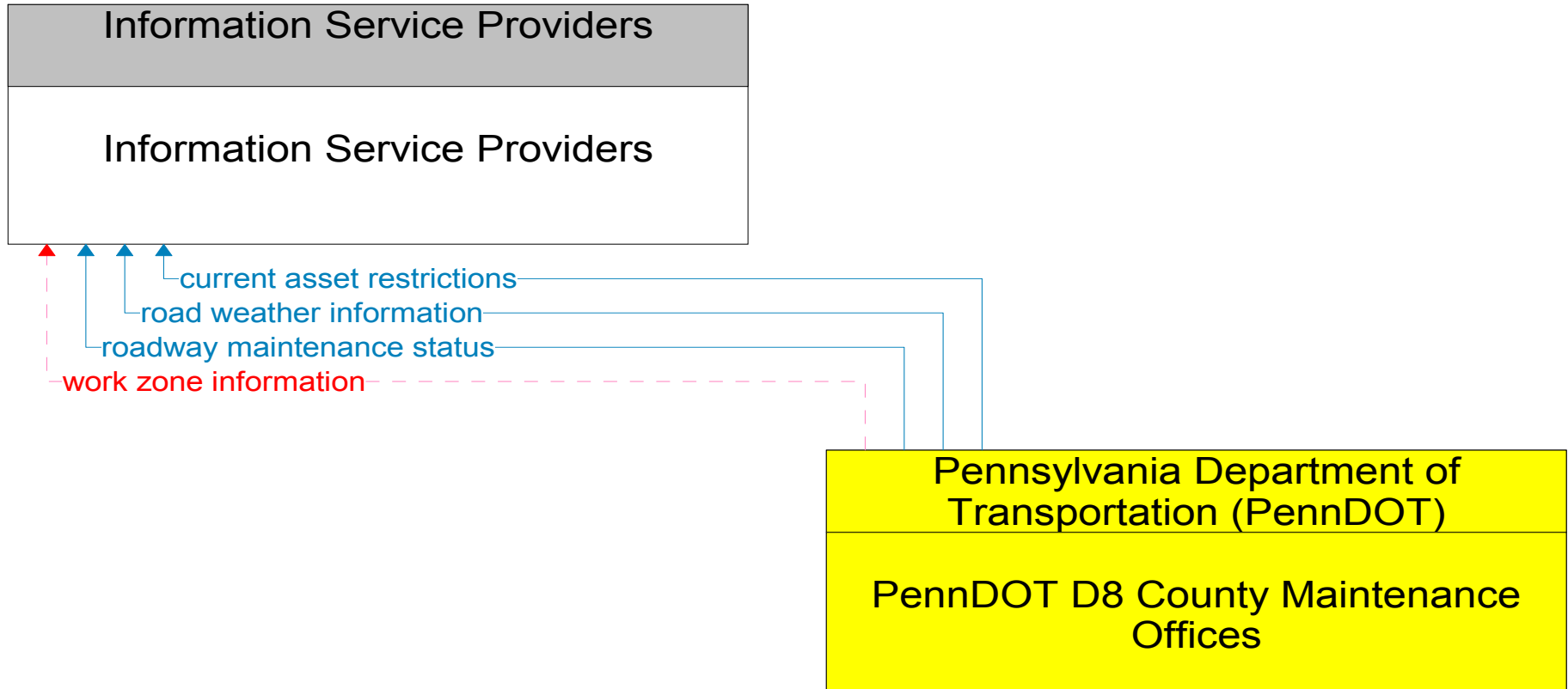


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- - - - - Planned



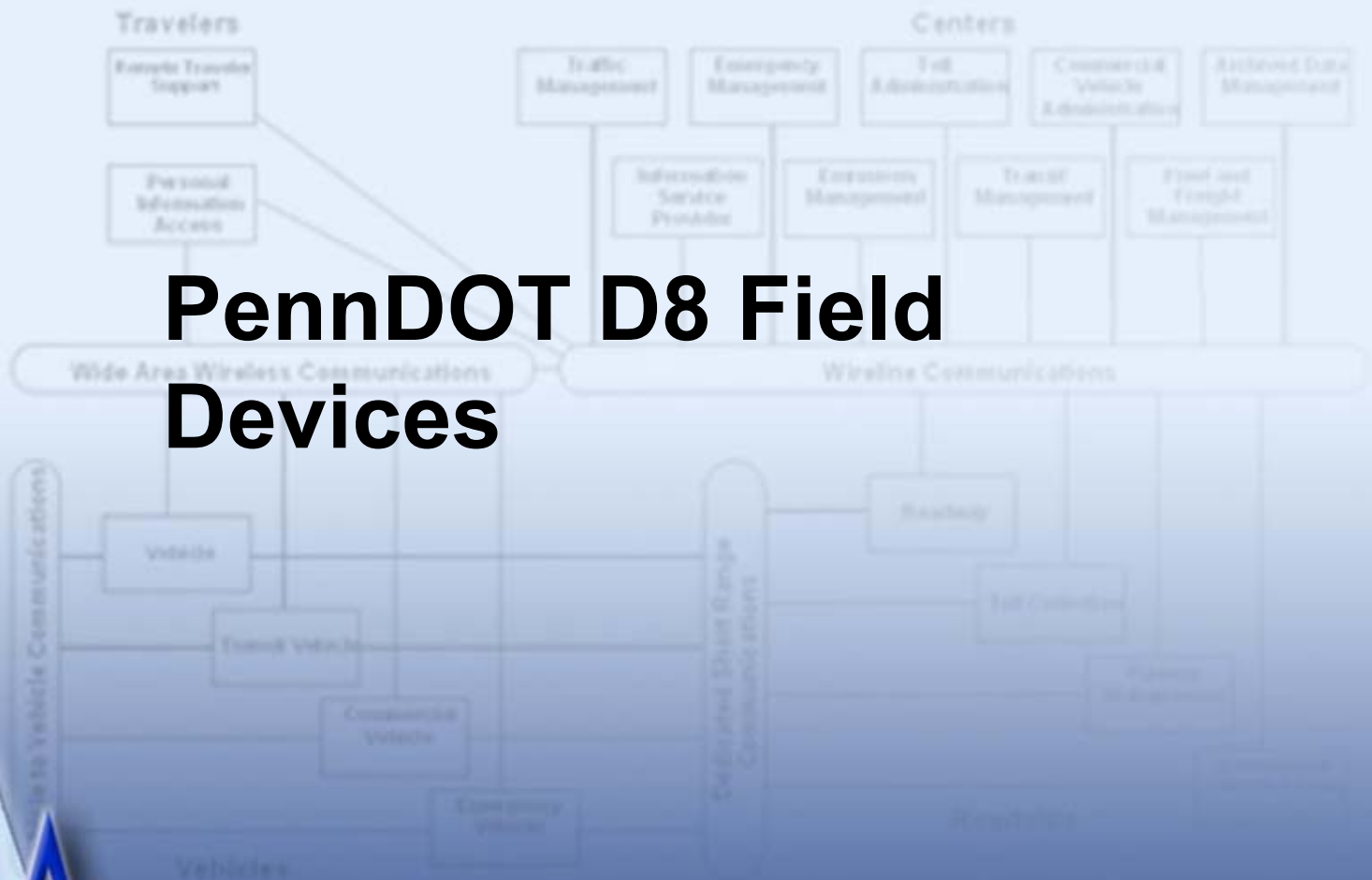
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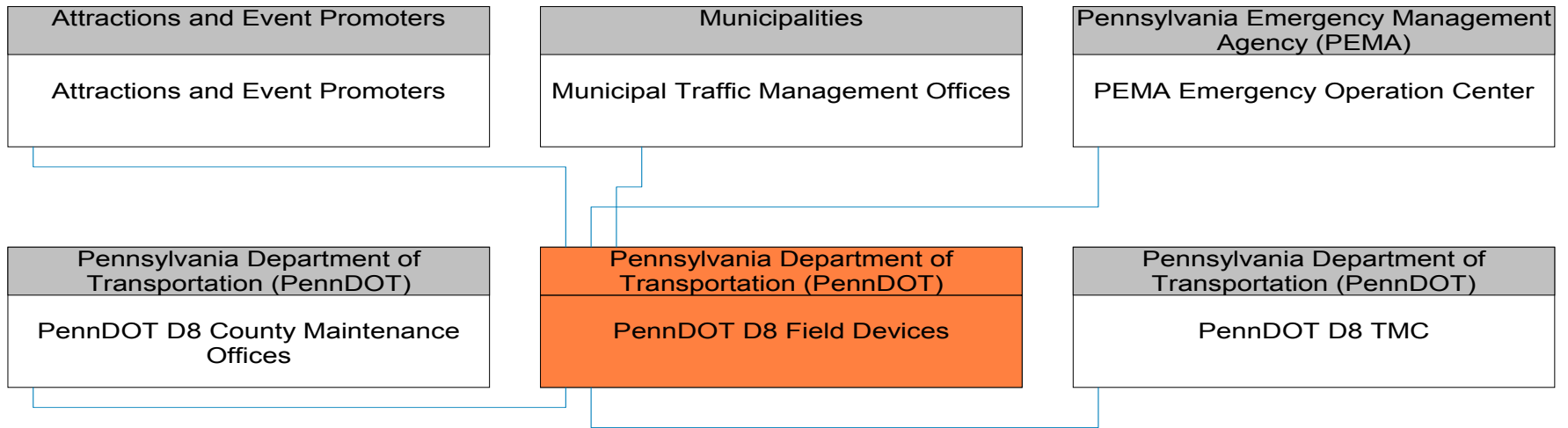


———— Existing
- - - - - Planned

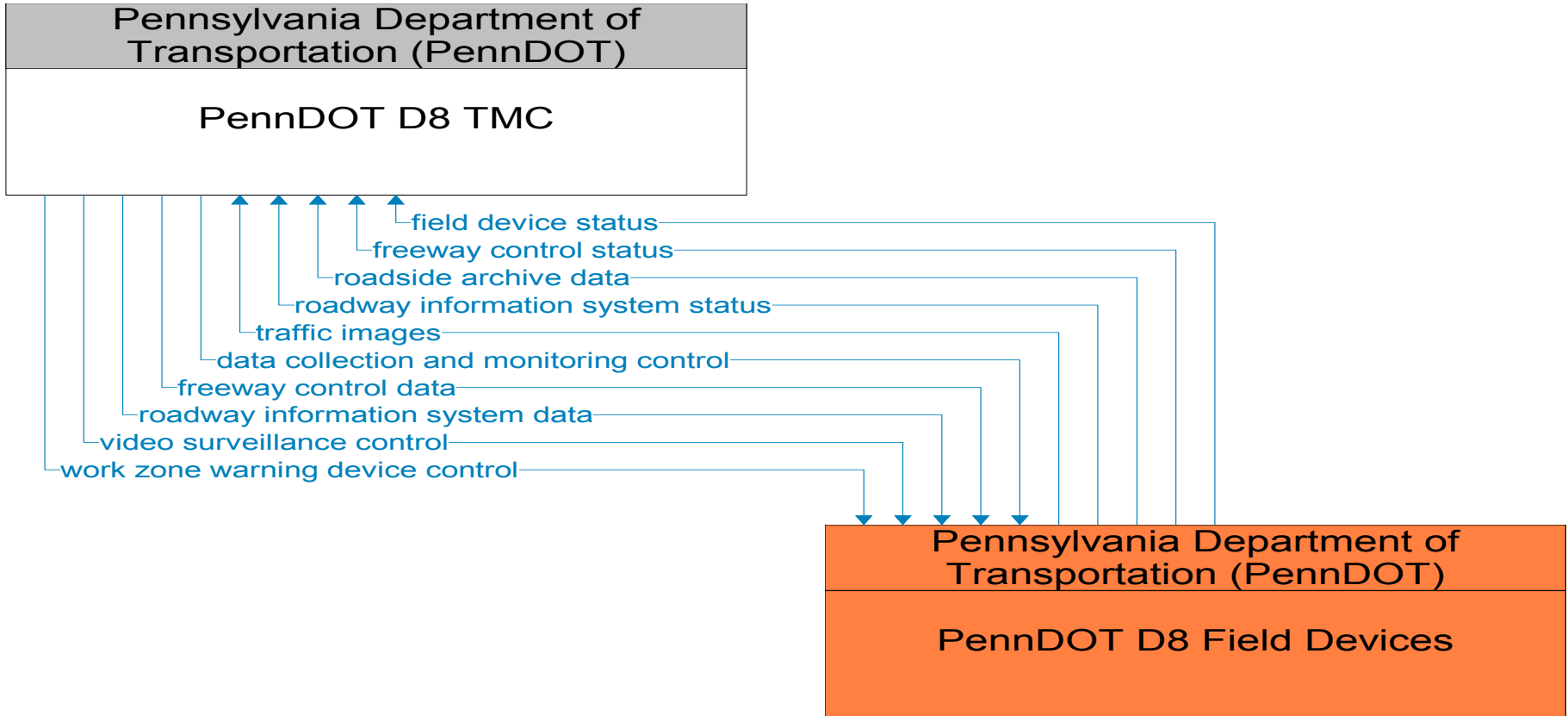
PennDOT D8 Field Devices



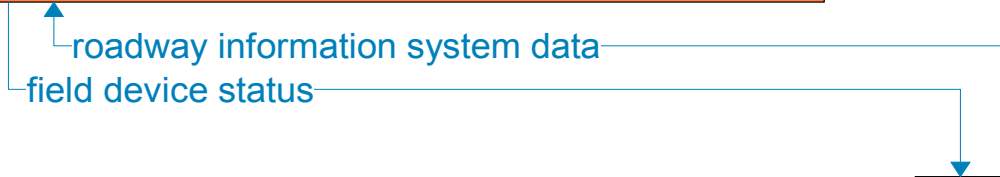
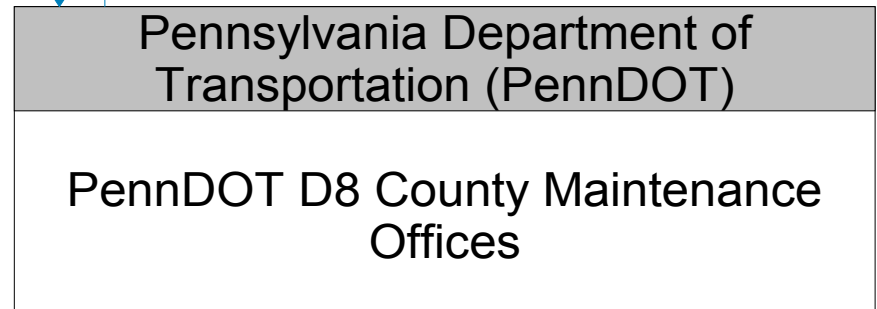
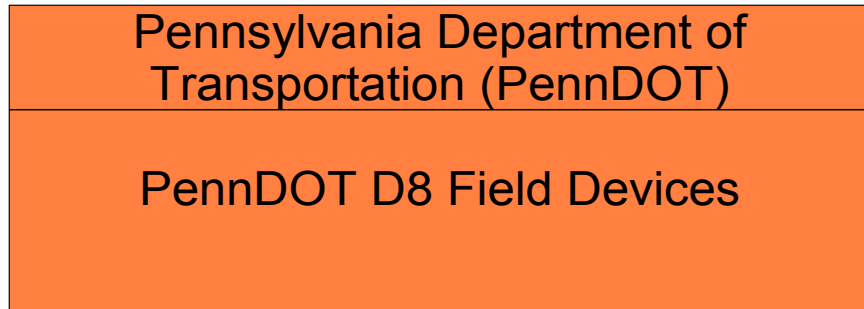
PennDOT D8 Field Devices Interconnect Diagram



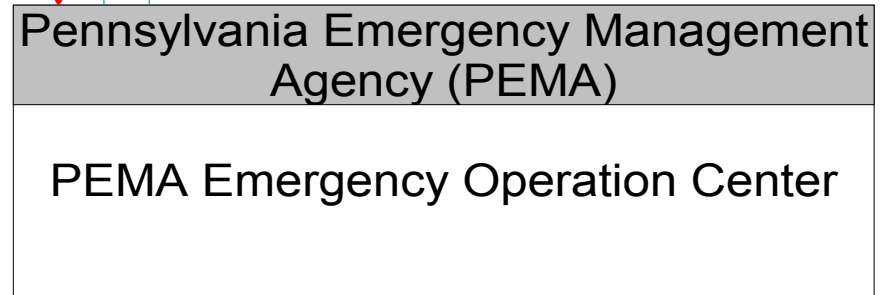
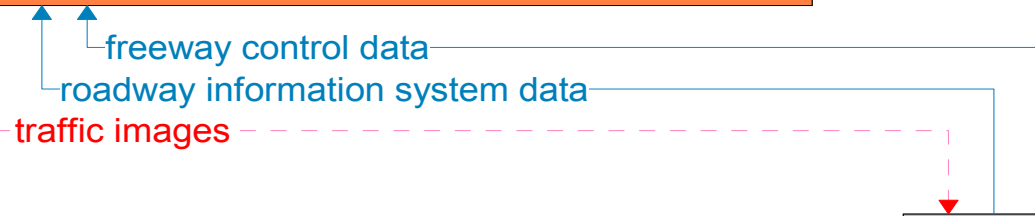
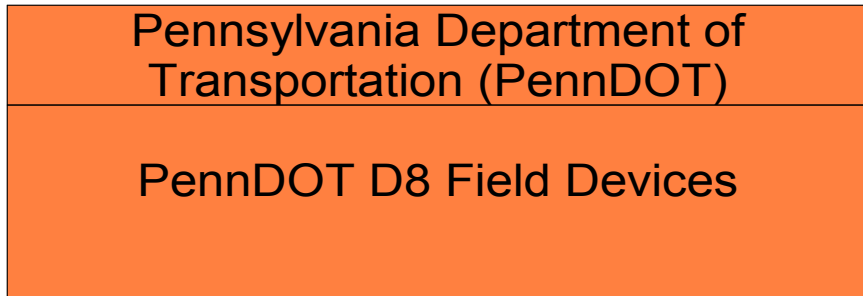
— Existing
- - - Planned

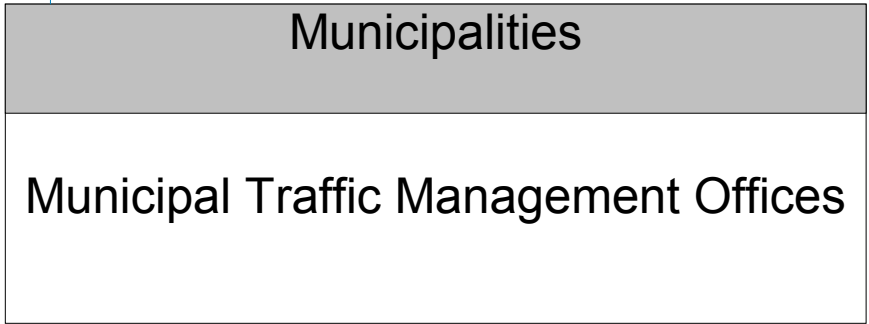
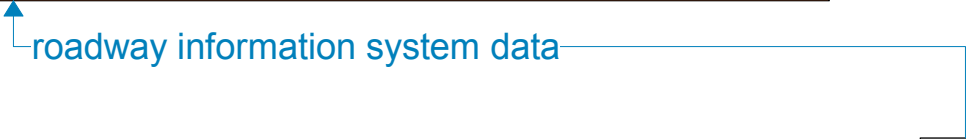
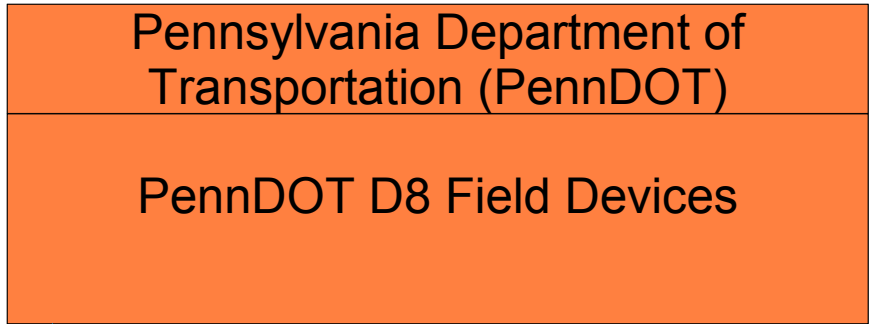


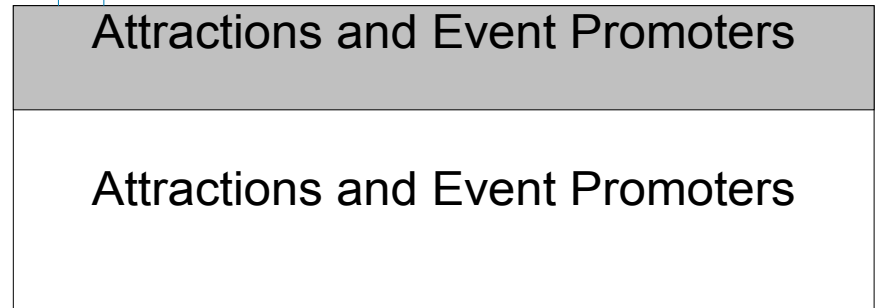
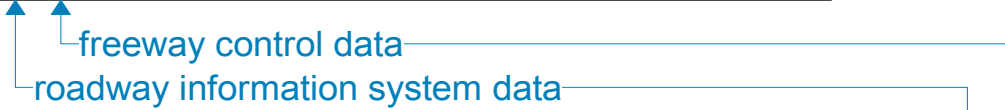
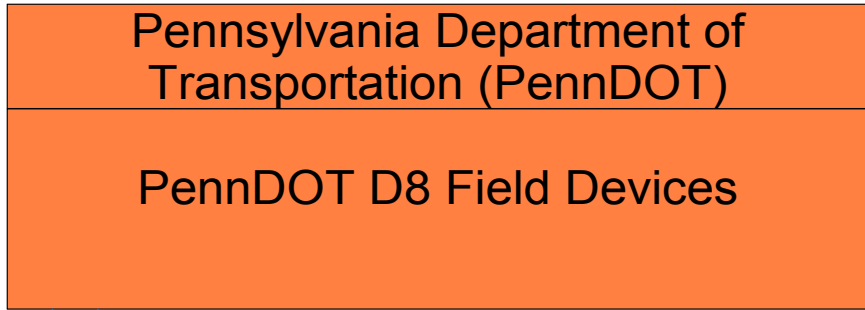
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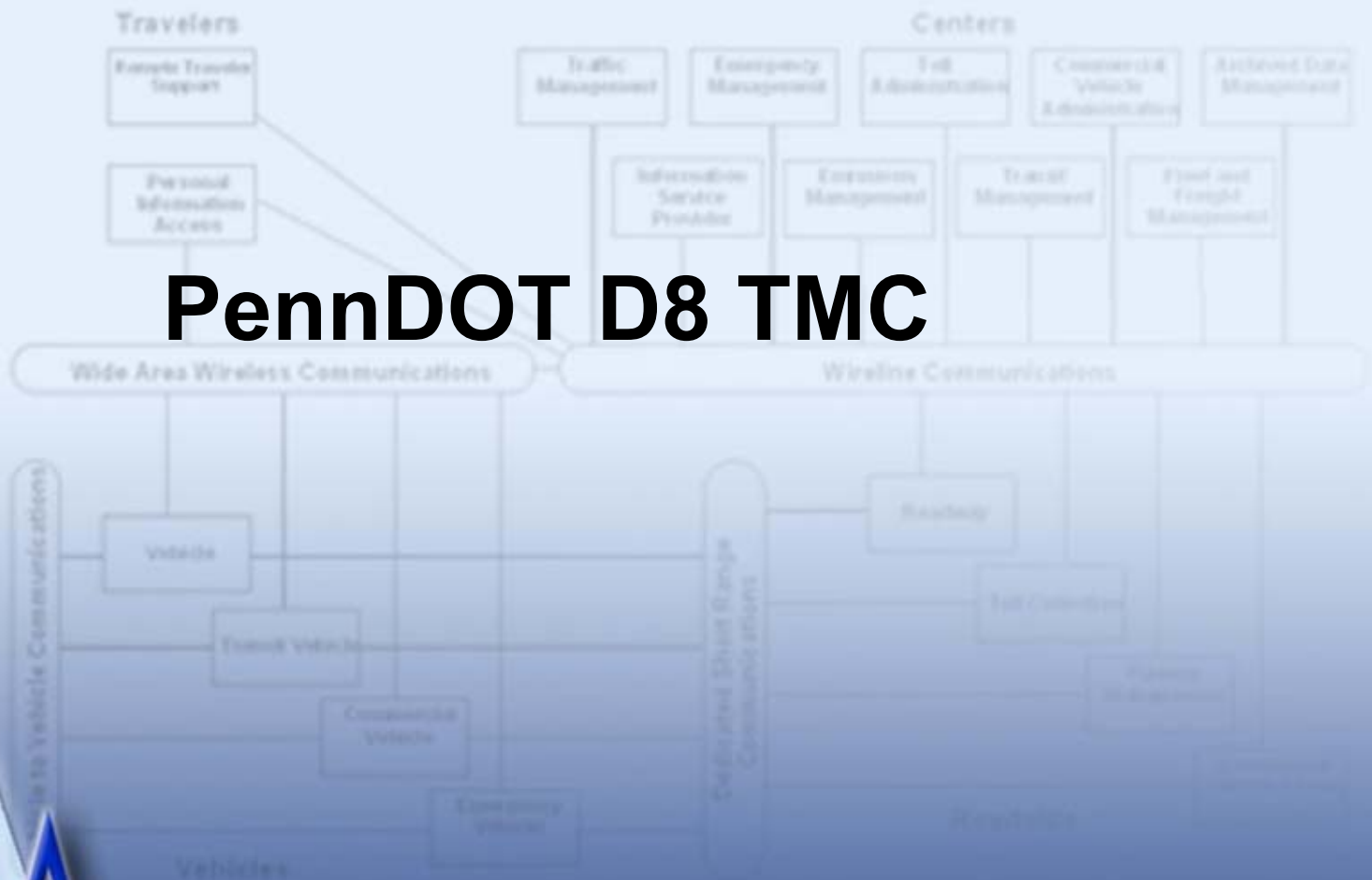
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----- Planned



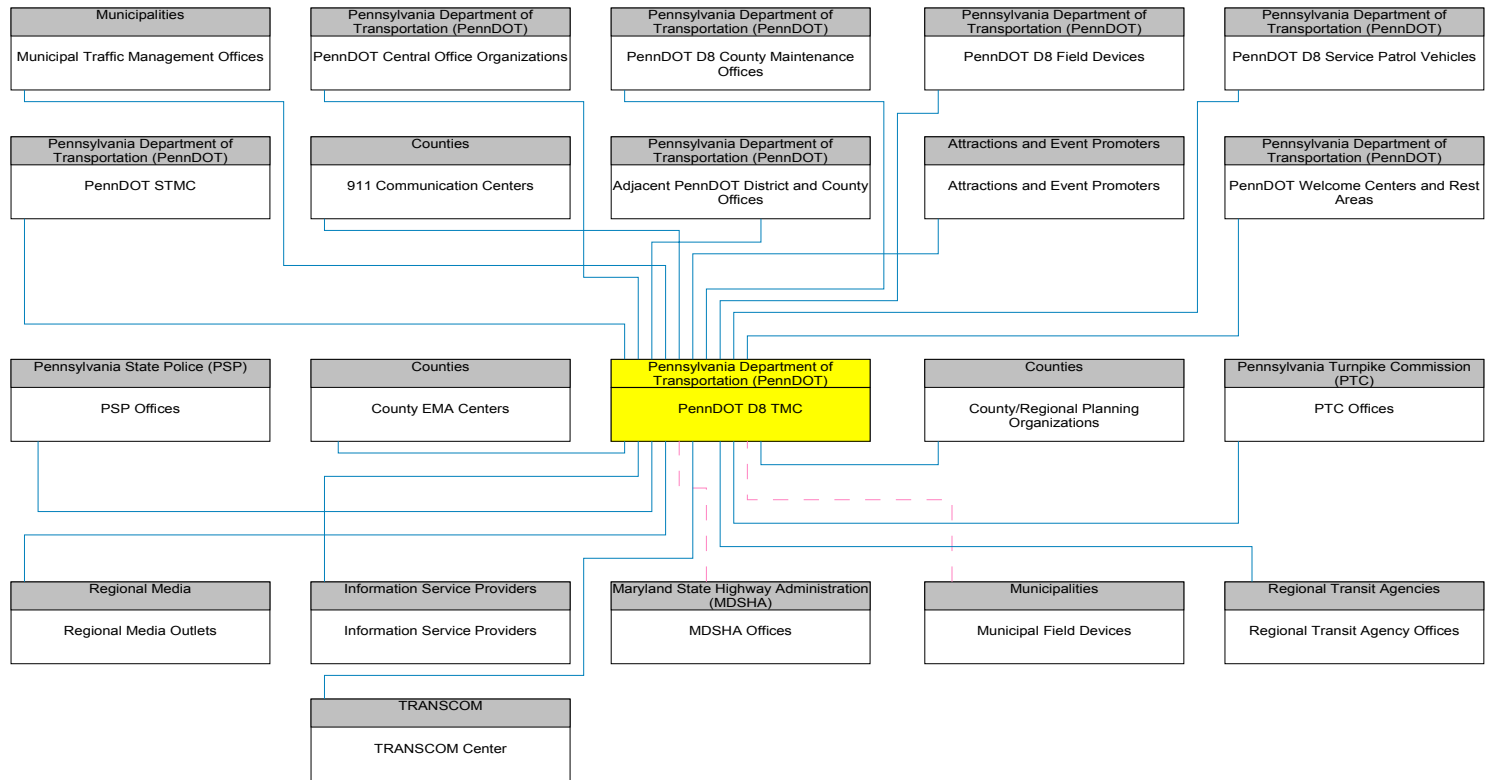


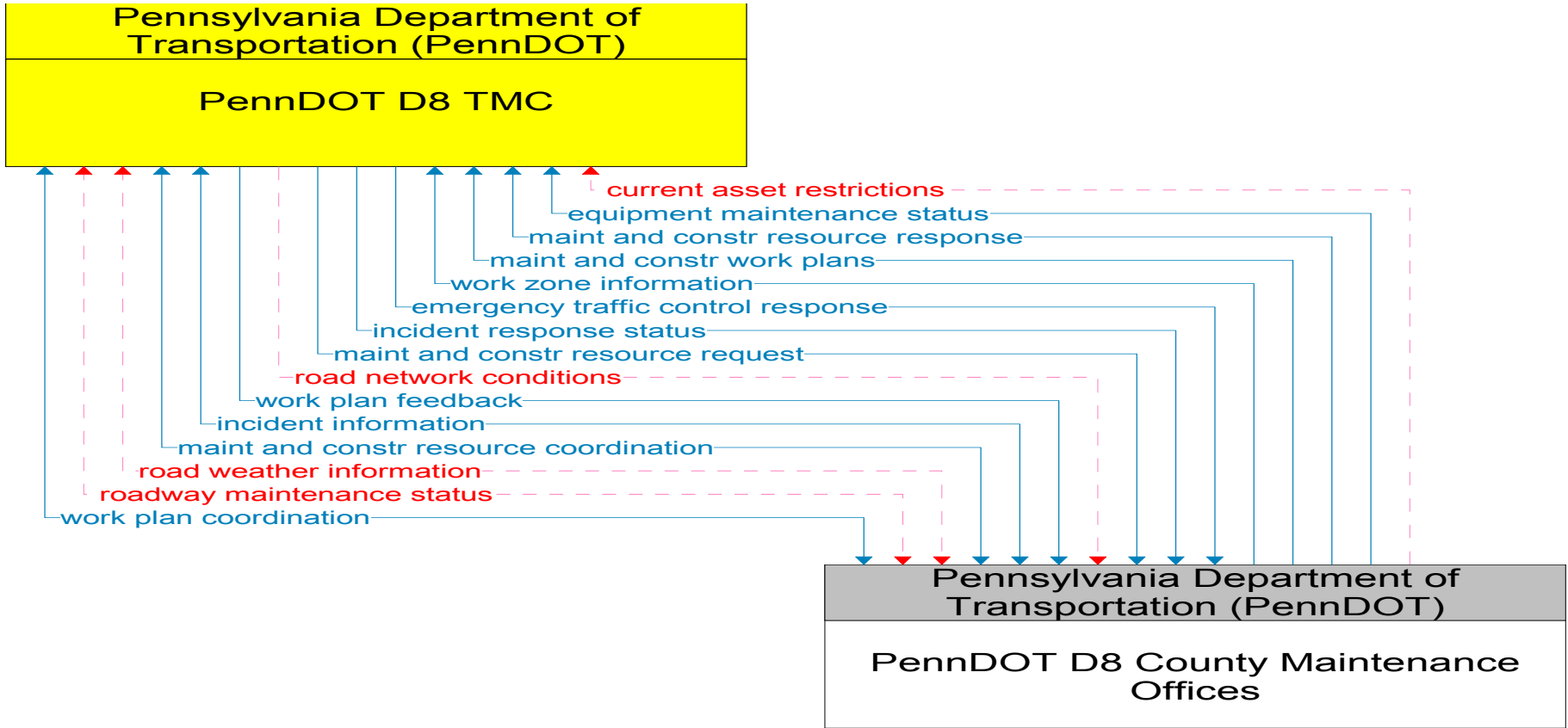


PennDOT D8 TMC

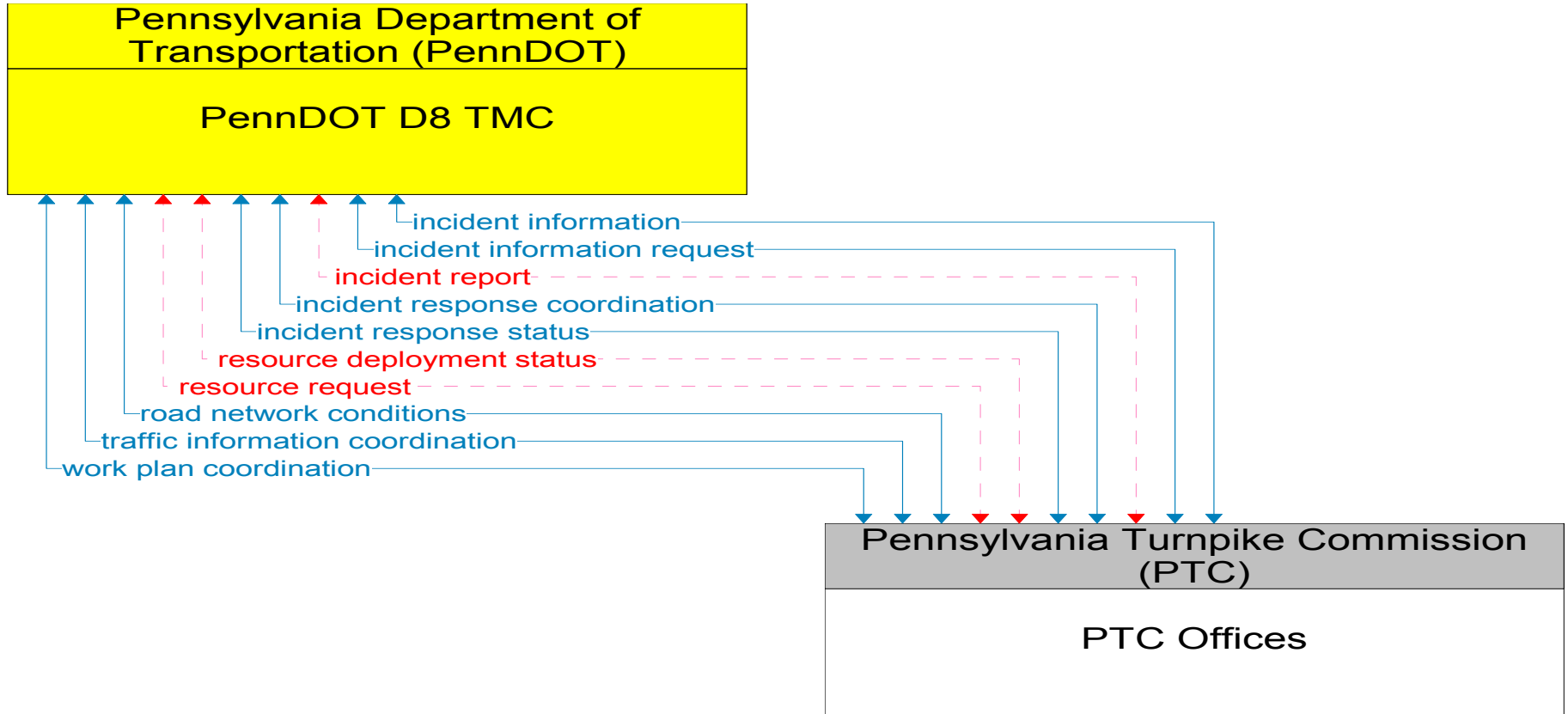


PennDOT D8 TMC Interconnect Diagram

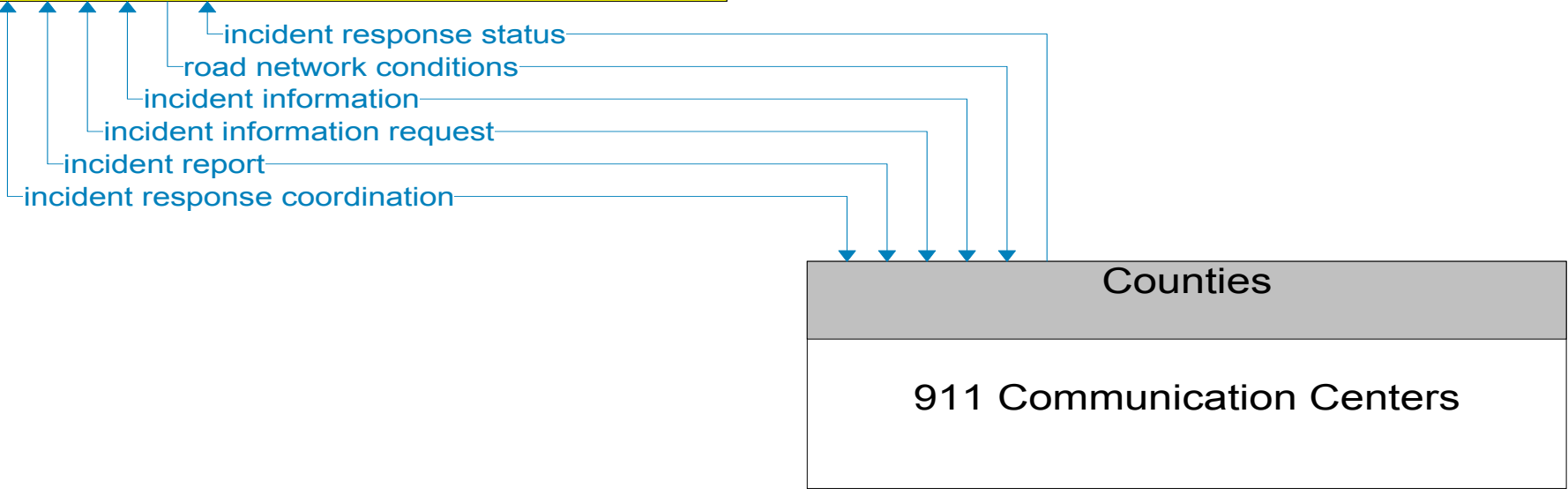
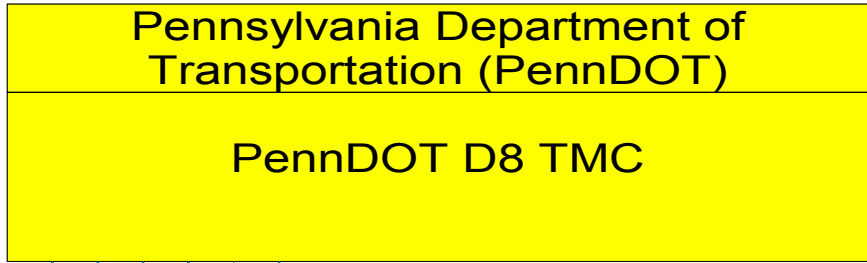




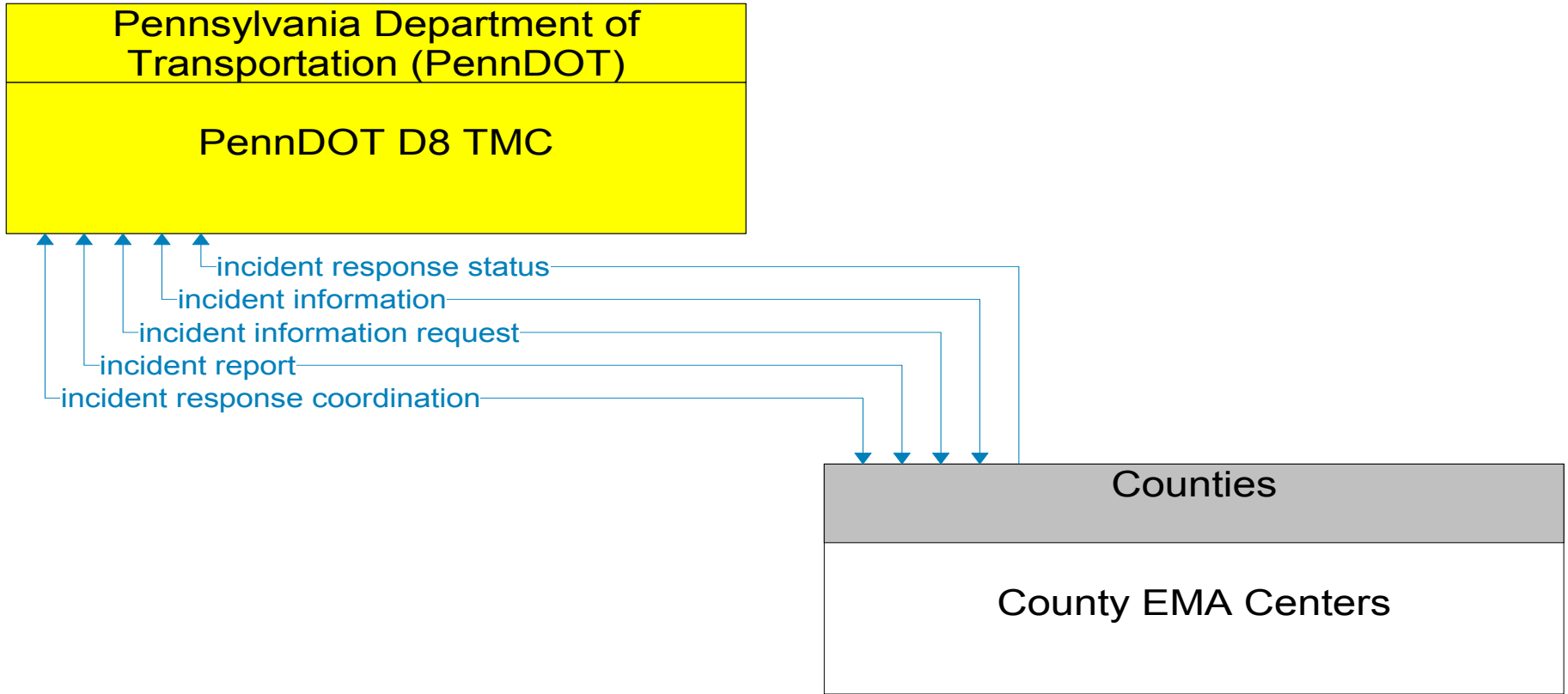
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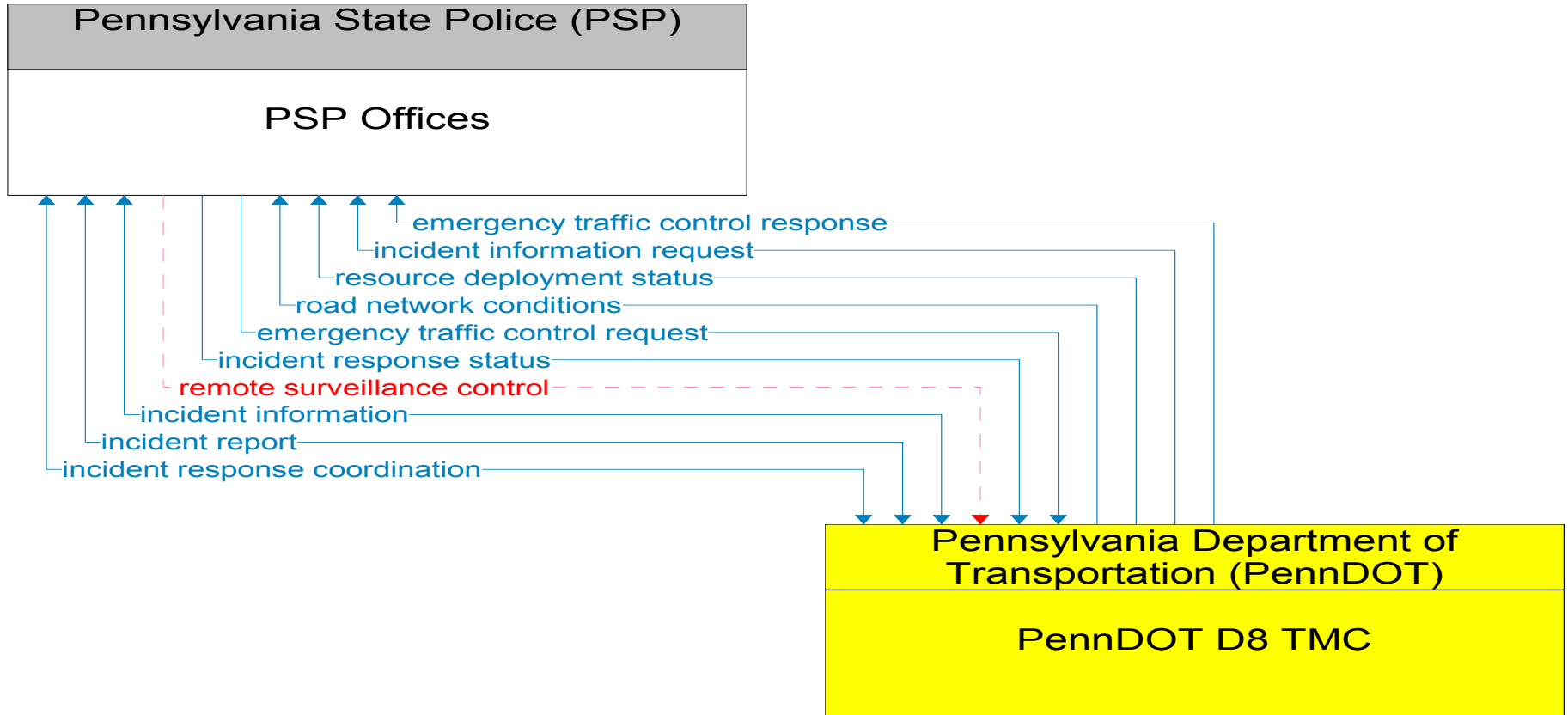
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- - - - - Planned

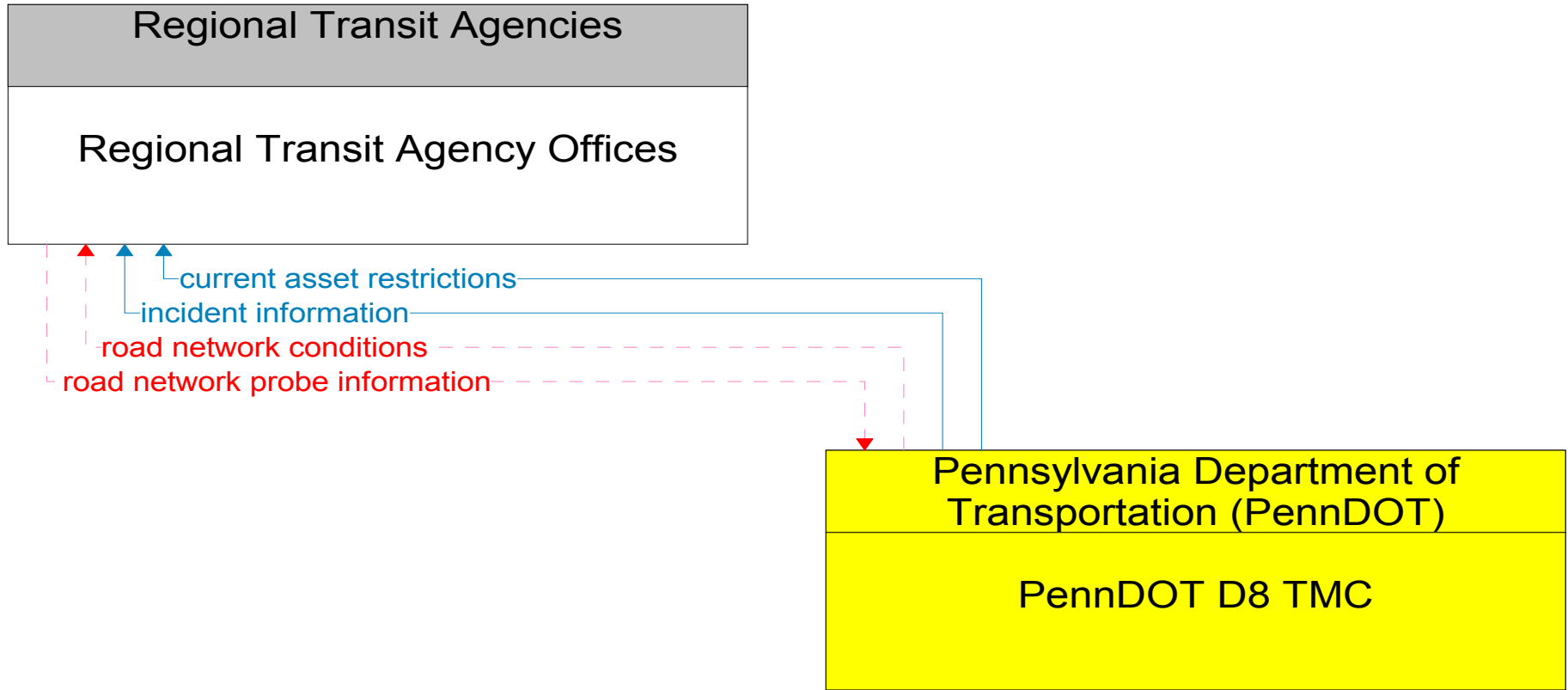


Existing
Planned

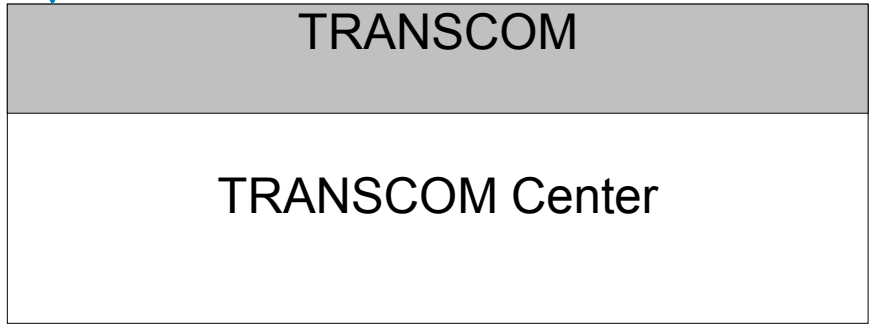
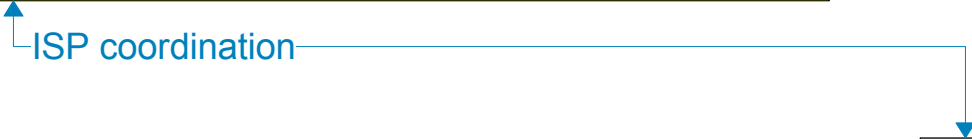
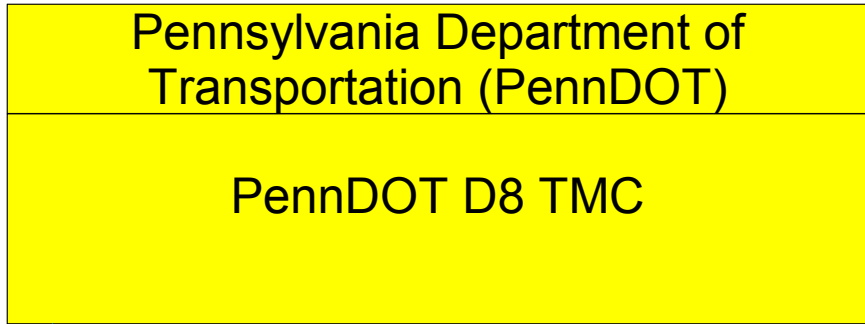


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----- Planned





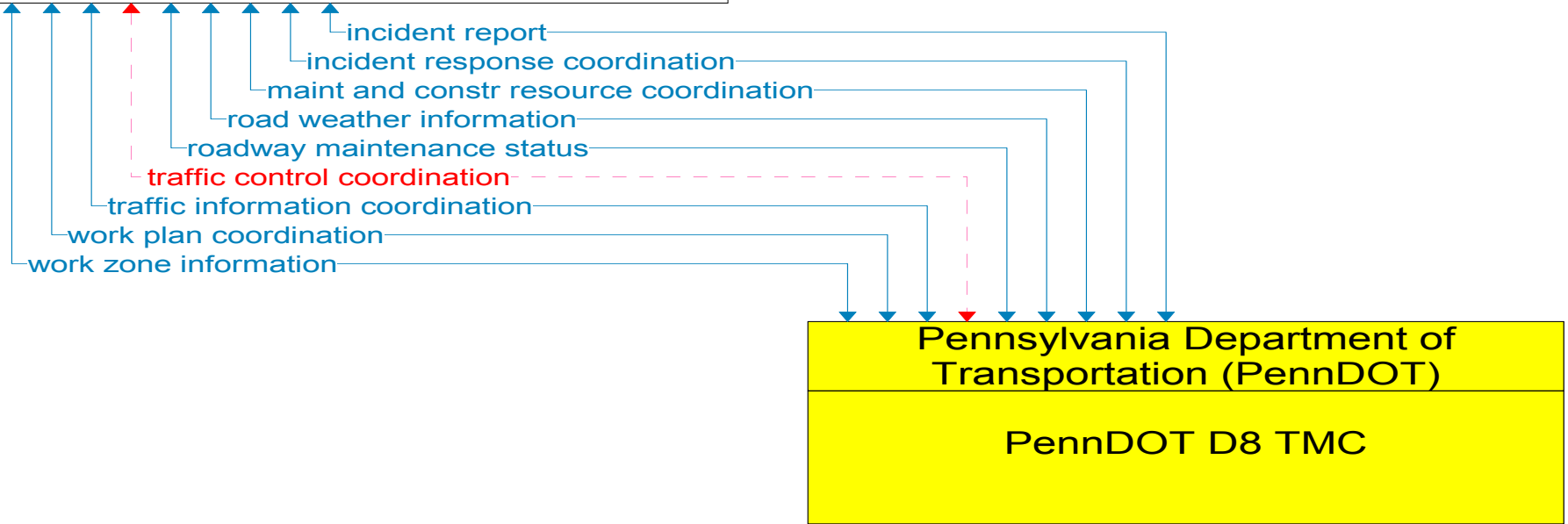
———— Existing
----- Planned



———— Existing
- - - - - Planned

Pennsylvania Department of
Transportation (PennDOT)

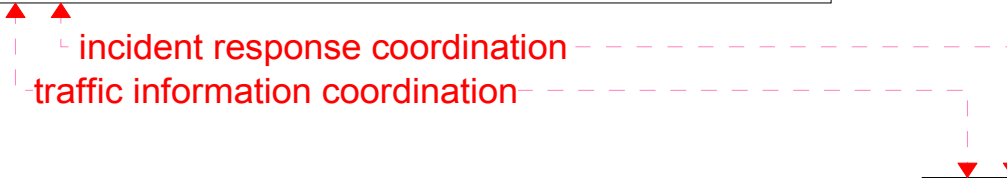
Adjacent PennDOT District and County
Offices



Existing
Planned

Maryland State Highway Administration
(MDSHA)

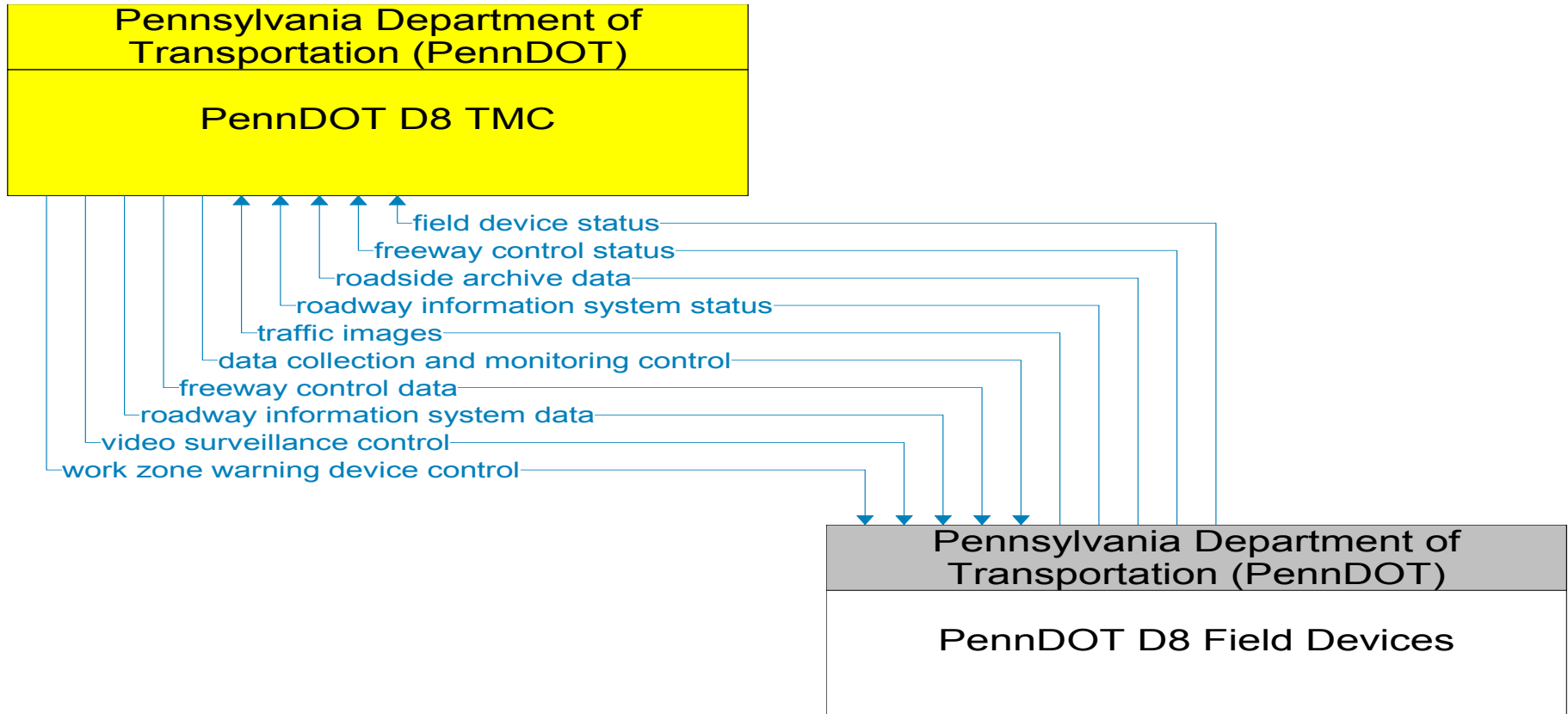
MDSHA Offices



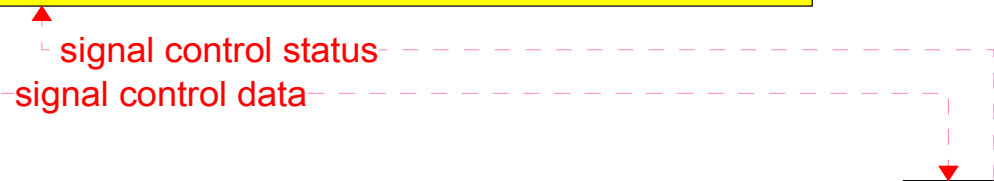
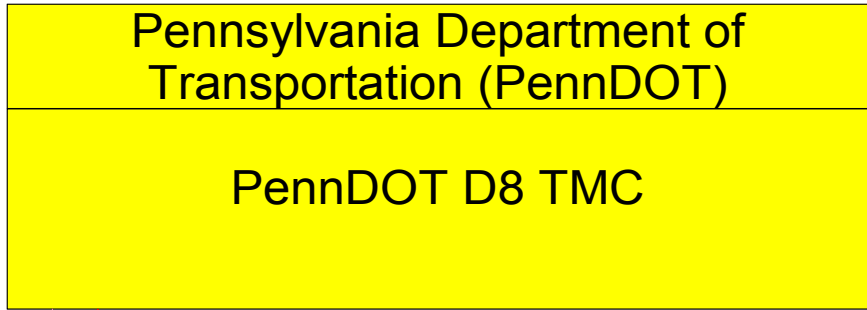
Pennsylvania Department of
Transportation (PennDOT)

PennDOT D8 TMC

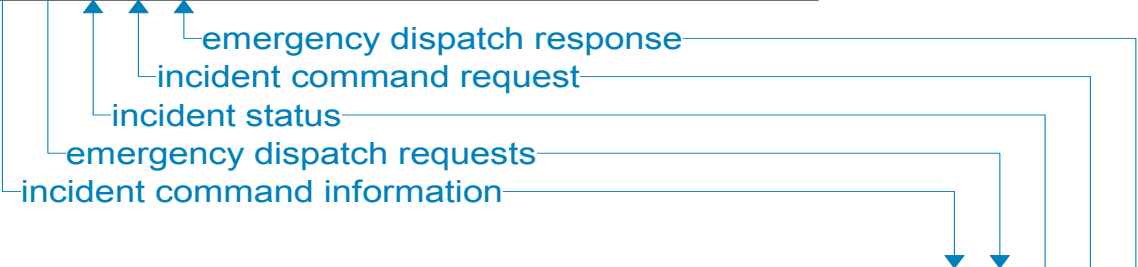
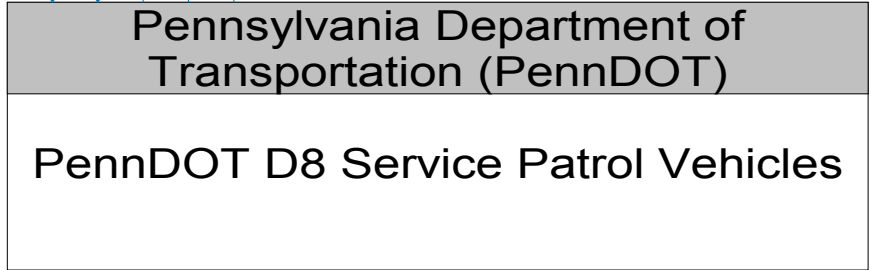
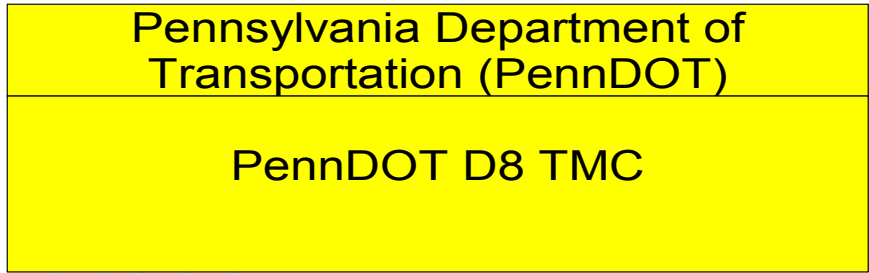
———— Existing
- - - - - Planned



———— Existing
- - - - - Planned



———— Existing
- - - - - Planned



Existing
Planned

Pennsylvania Department of
Transportation (PennDOT)

PennDOT Welcome Centers and Rest
Areas

traveler information
traveler request

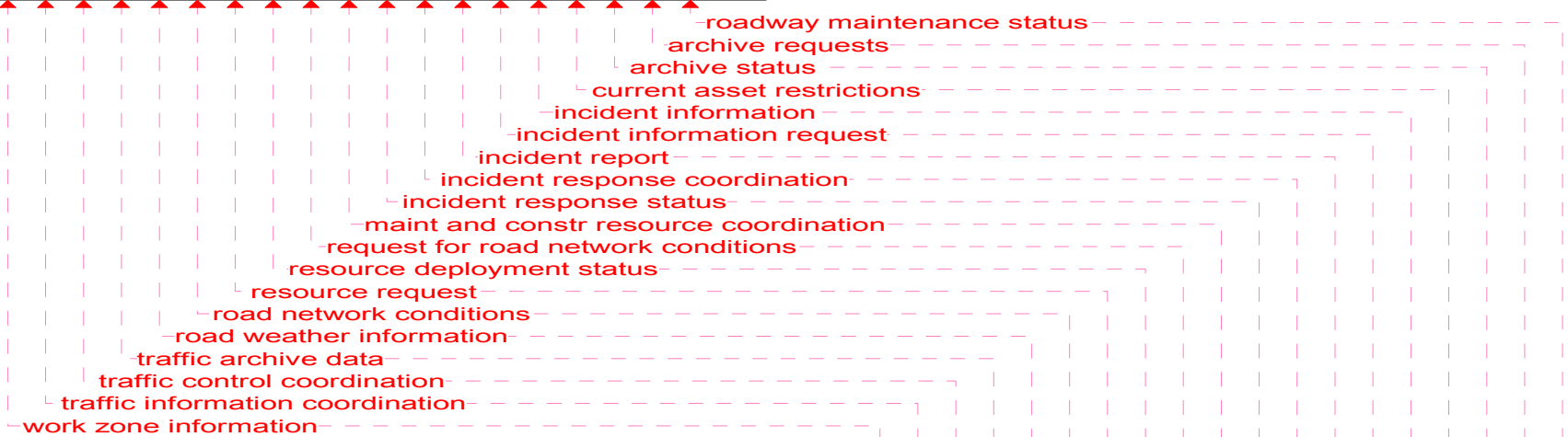
Pennsylvania Department of
Transportation (PennDOT)

PennDOT D8 TMC

Existing
Planned

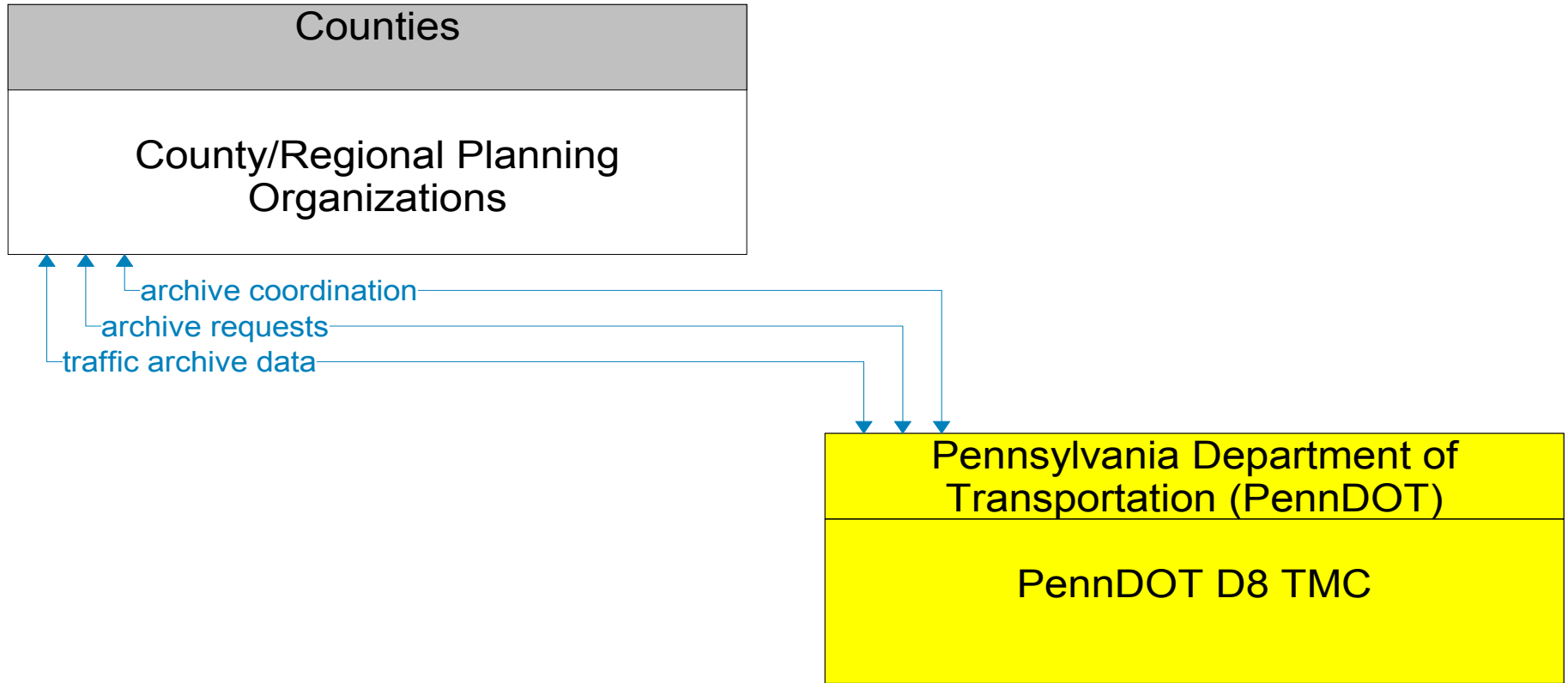


Pennsylvania Department of Transportation
(PennDOT)
PennDOT STMC

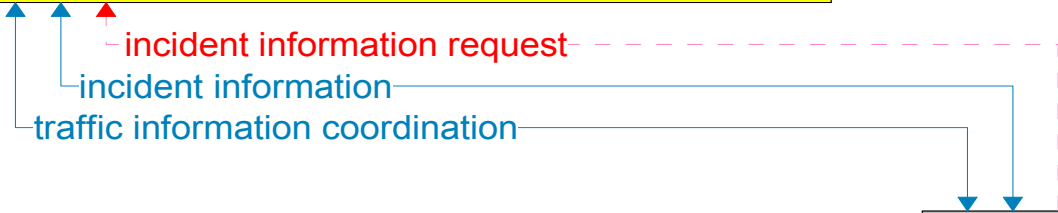
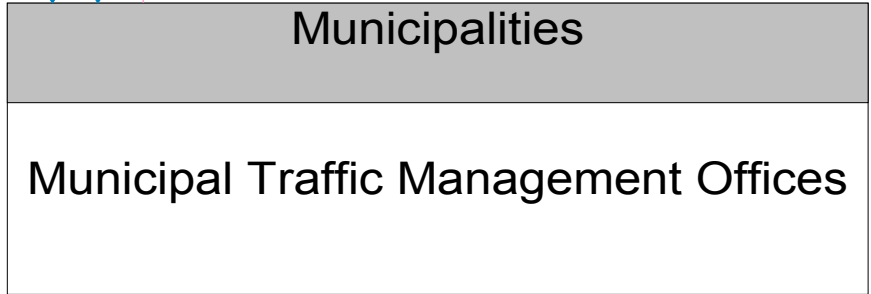
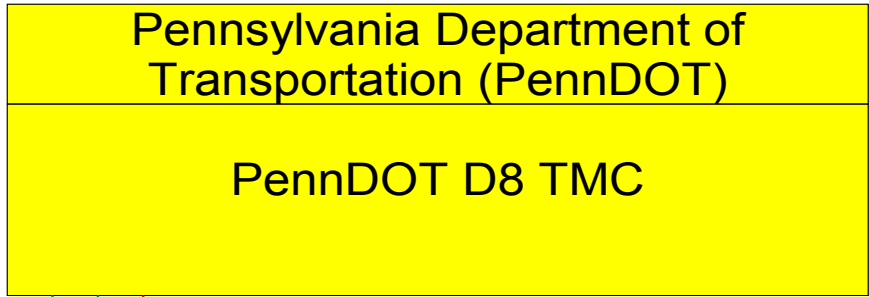


Pennsylvania Department of Transportation
(PennDOT)
PennDOT D8 TMC

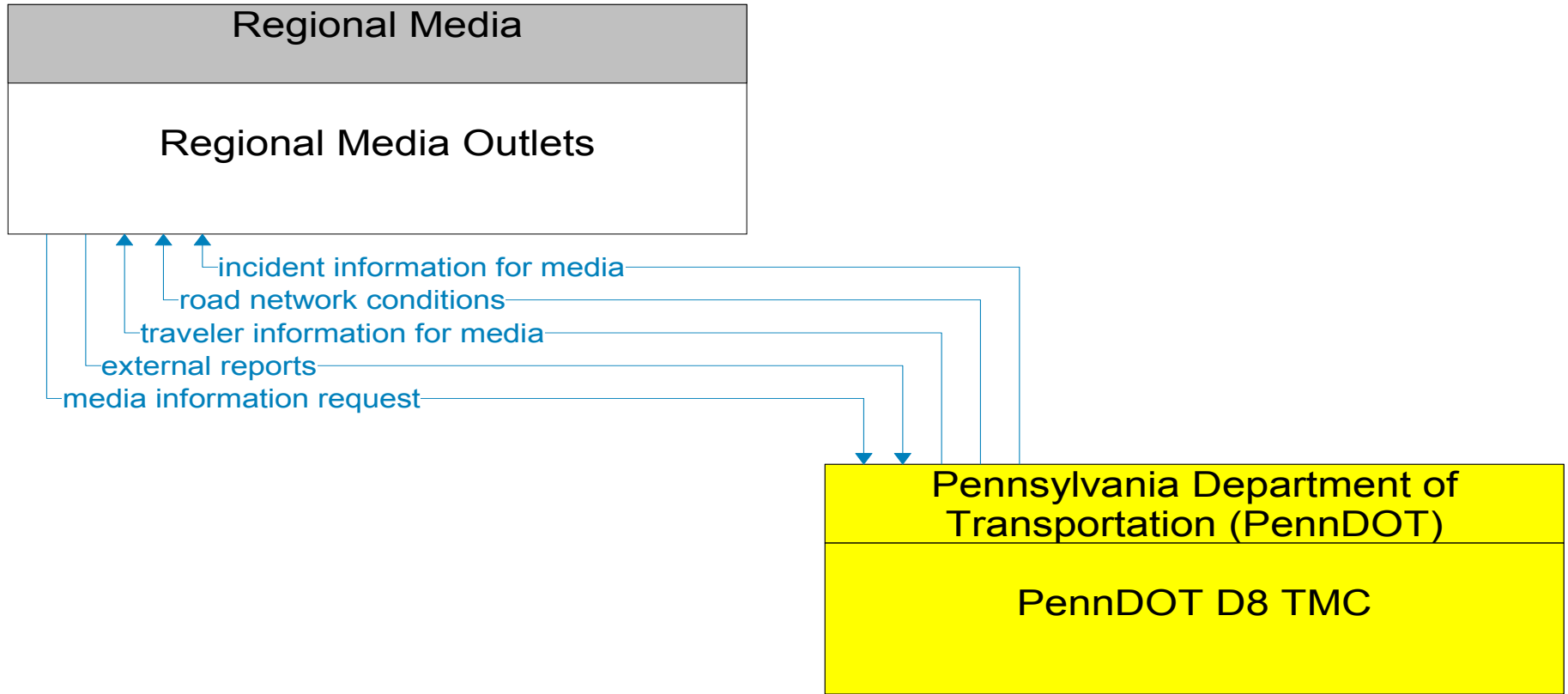
Existing
Planned



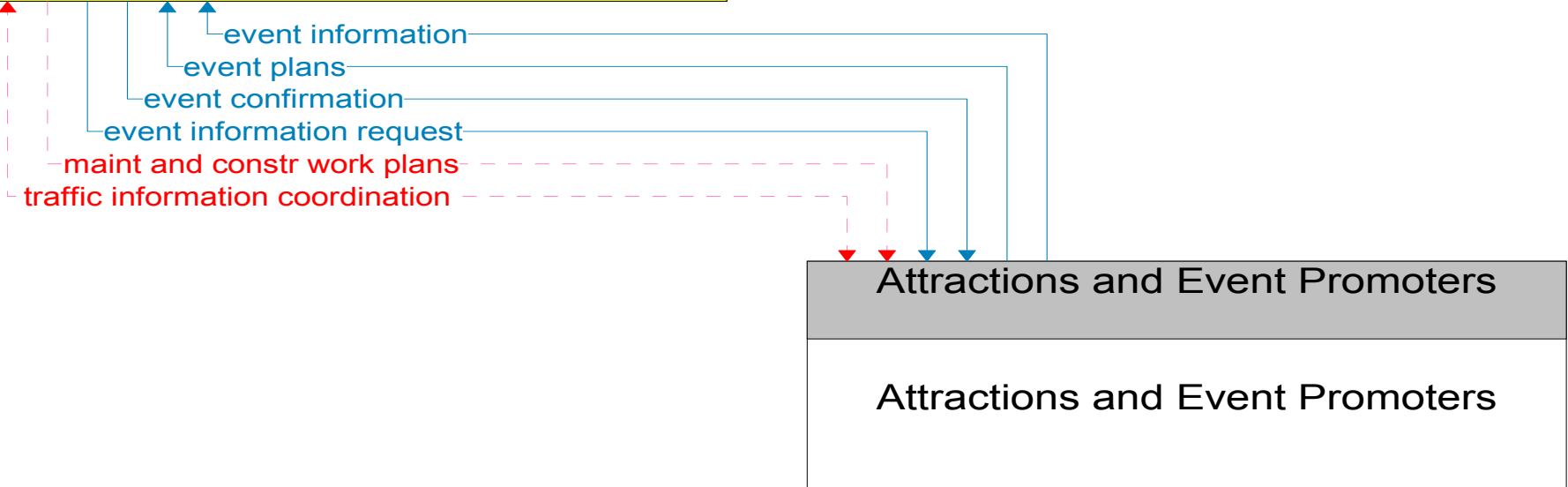
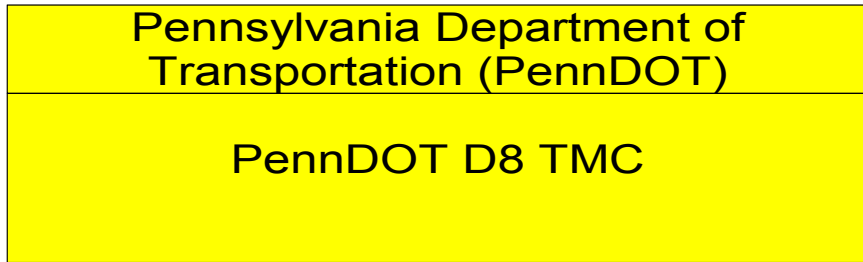
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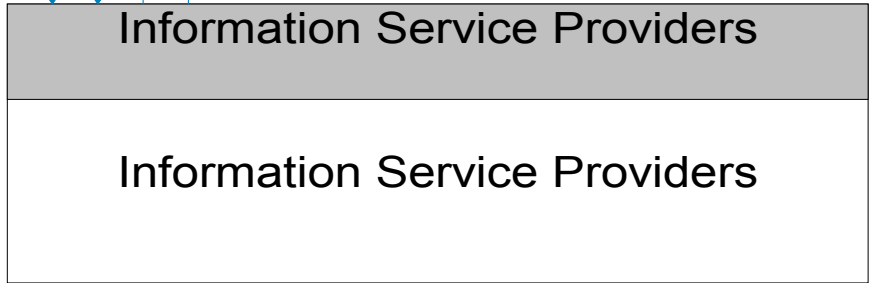
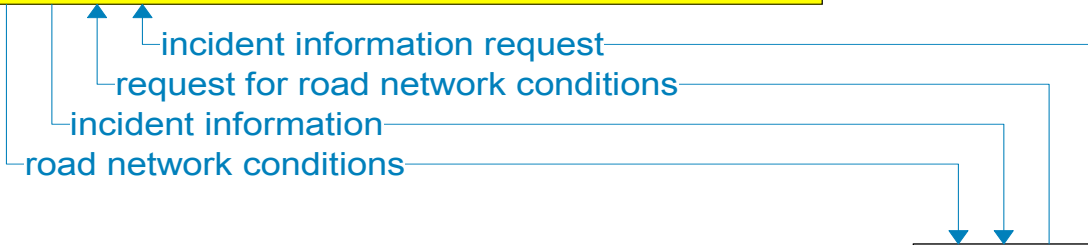
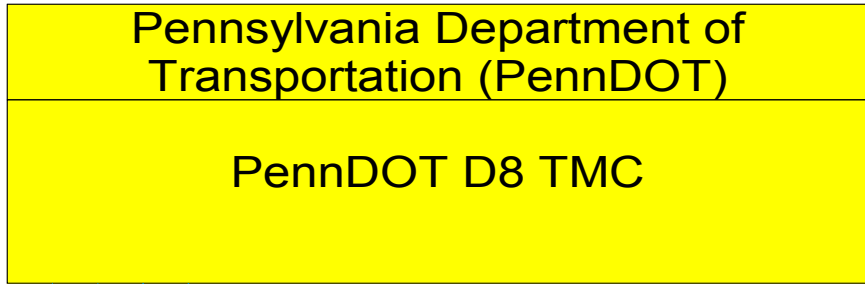
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Planned



———— Existing
- - - - - Planned

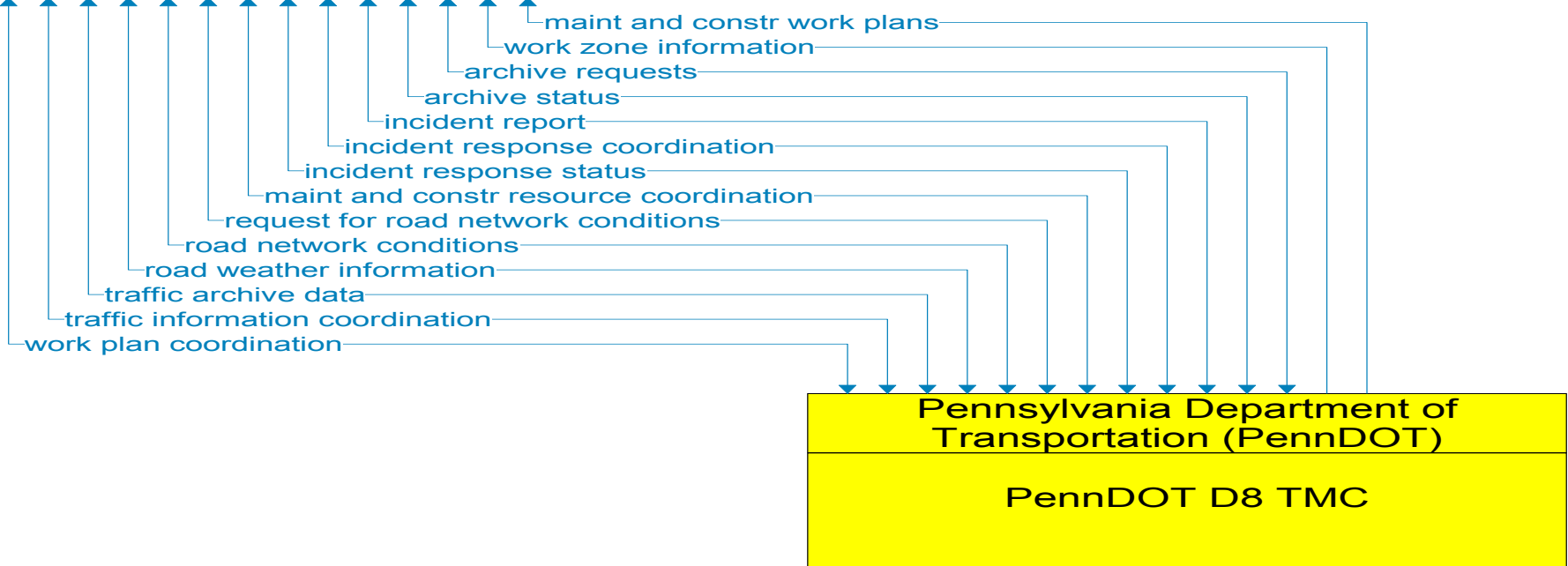


Existing
Planned



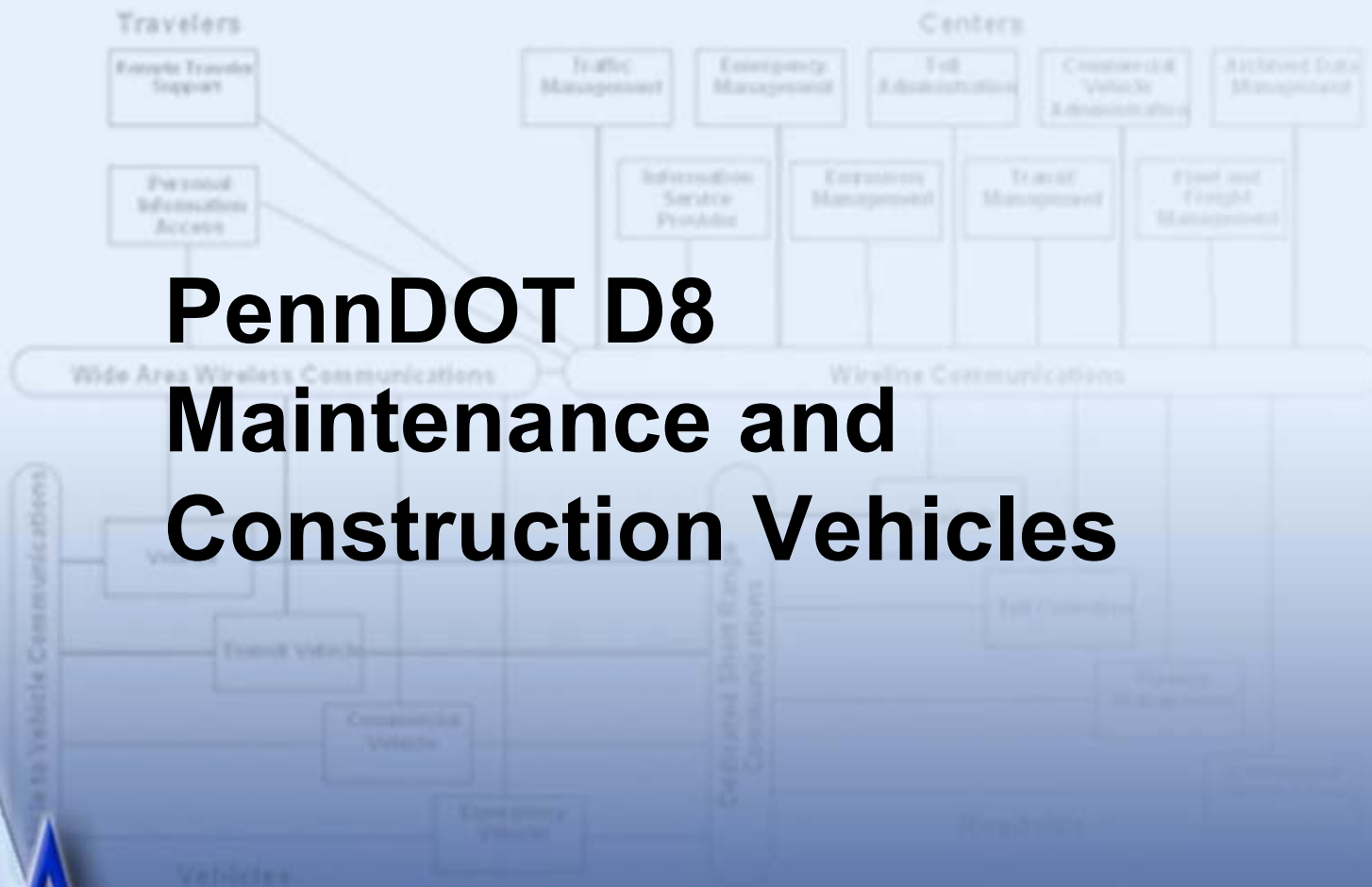
Existing
Planned

Pennsylvania Department of Transportation (PennDOT)
PennDOT Central Office Organizations

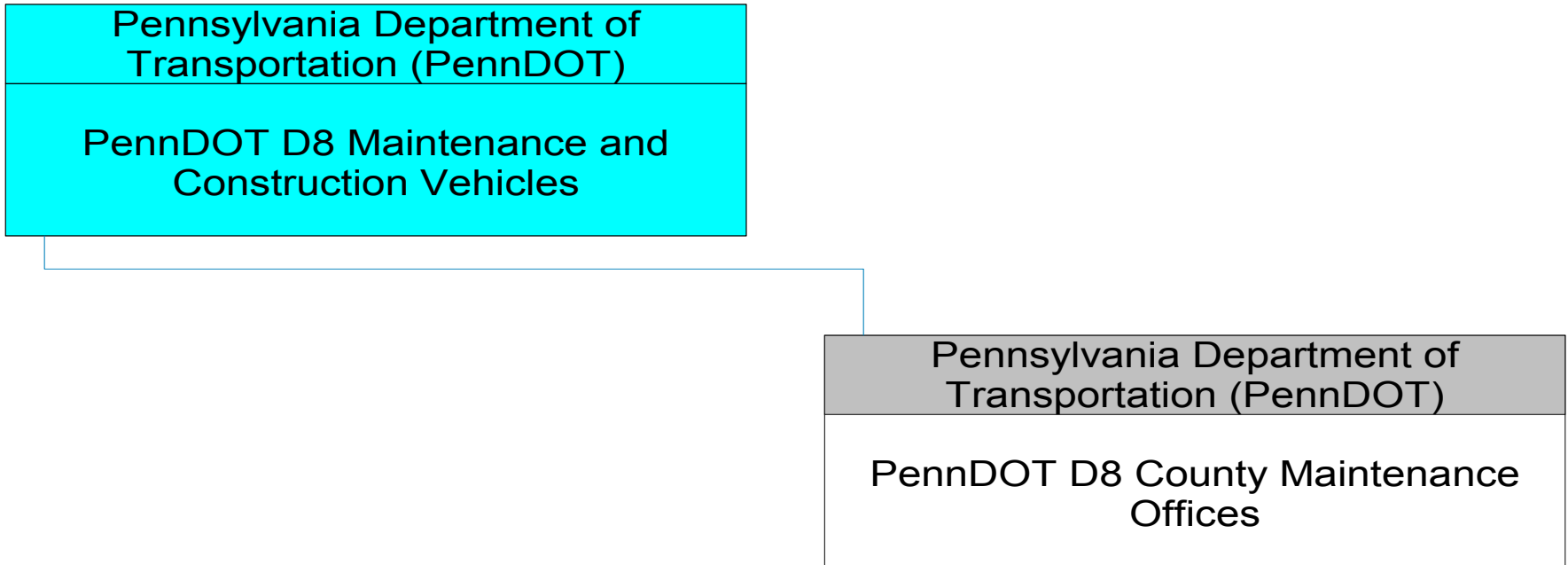


Existing
Planned

PennDOT D8 Maintenance and Construction Vehicles



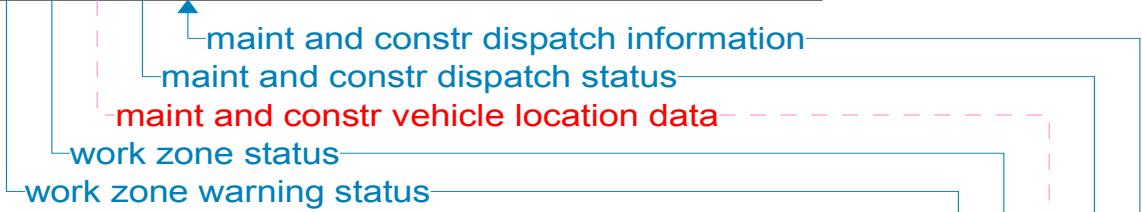
PennDOT D8 Maintenance and Construction Vehicles Interconnect Diagram



———— Existing
----- Planned

Pennsylvania Department of
Transportation (PennDOT)

PennDOT D8 Maintenance and
Construction Vehicles

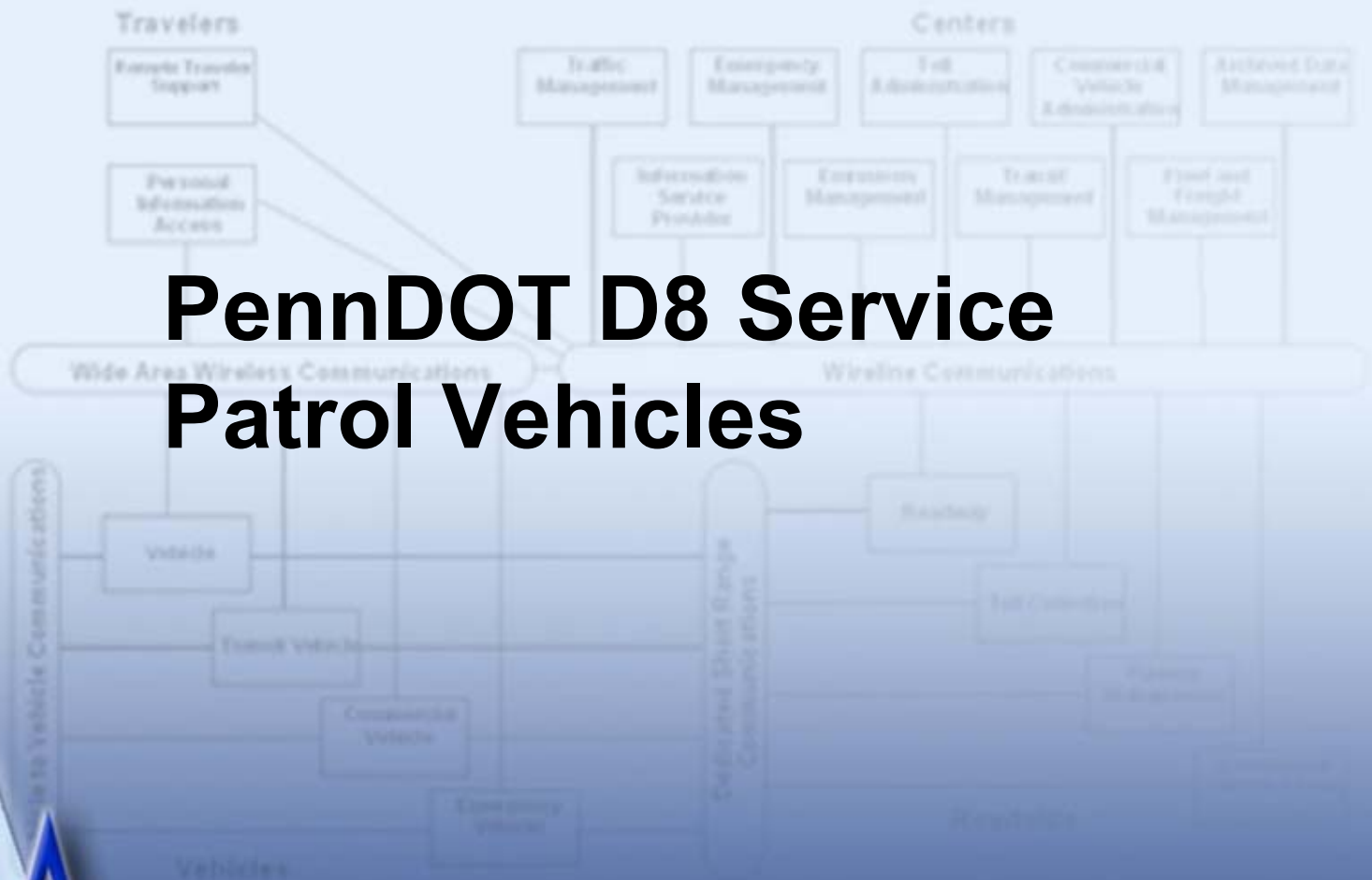


Pennsylvania Department of
Transportation (PennDOT)

PennDOT D8 County Maintenance
Offices

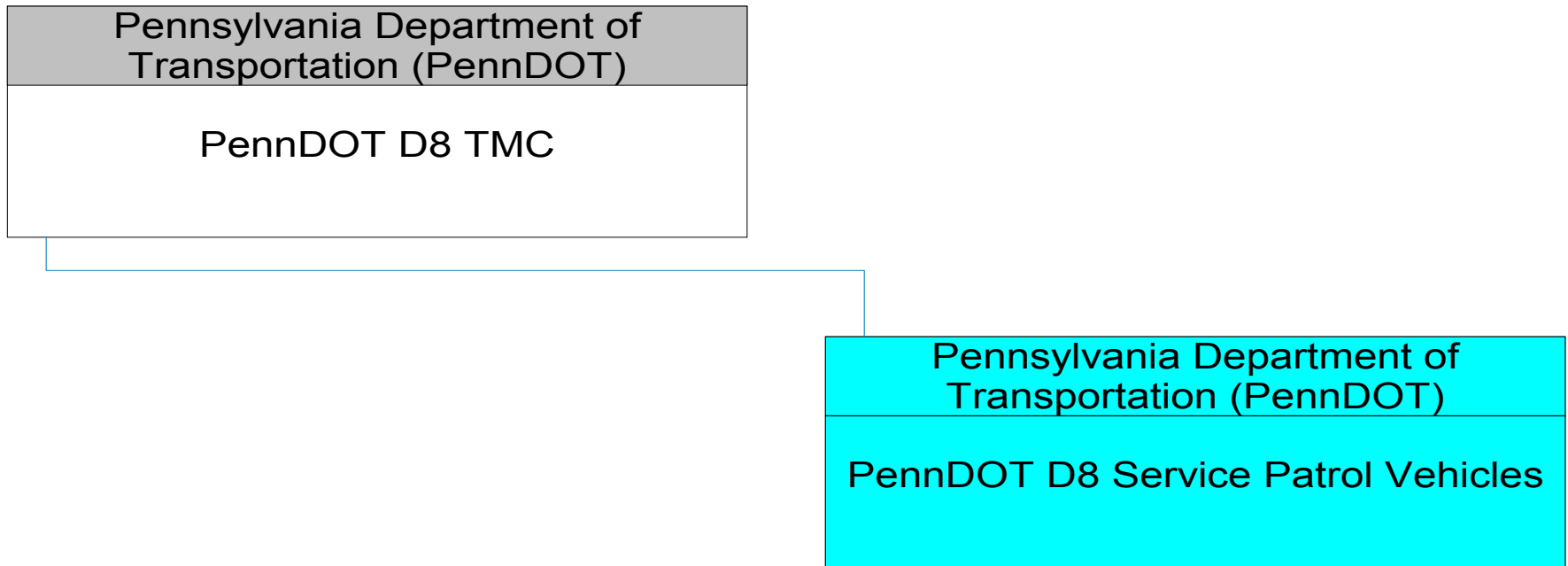
———— Existing
- - - - - Planned

PennDOT D8 Service Patrol Vehicles

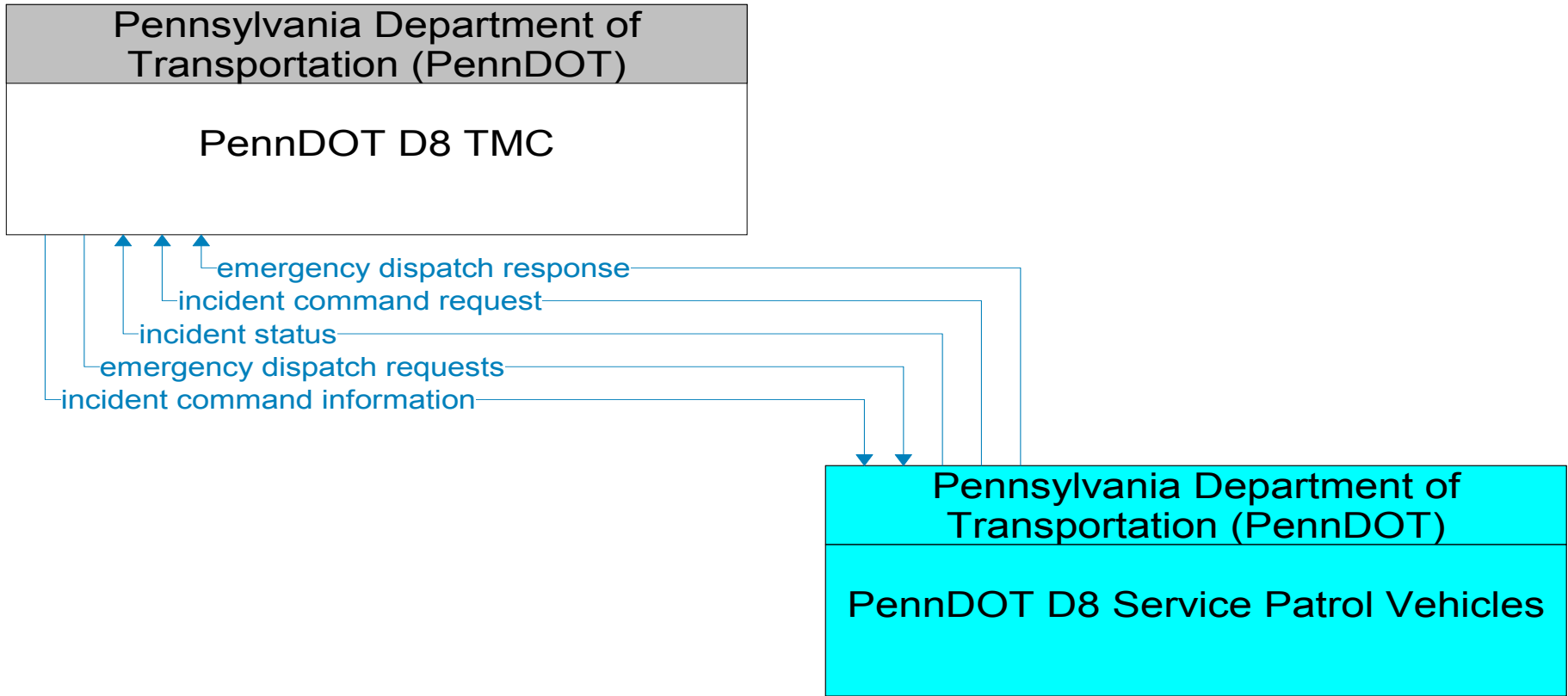


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PennDOT D8 Service Patrol Vehicles Interconnect Diagram

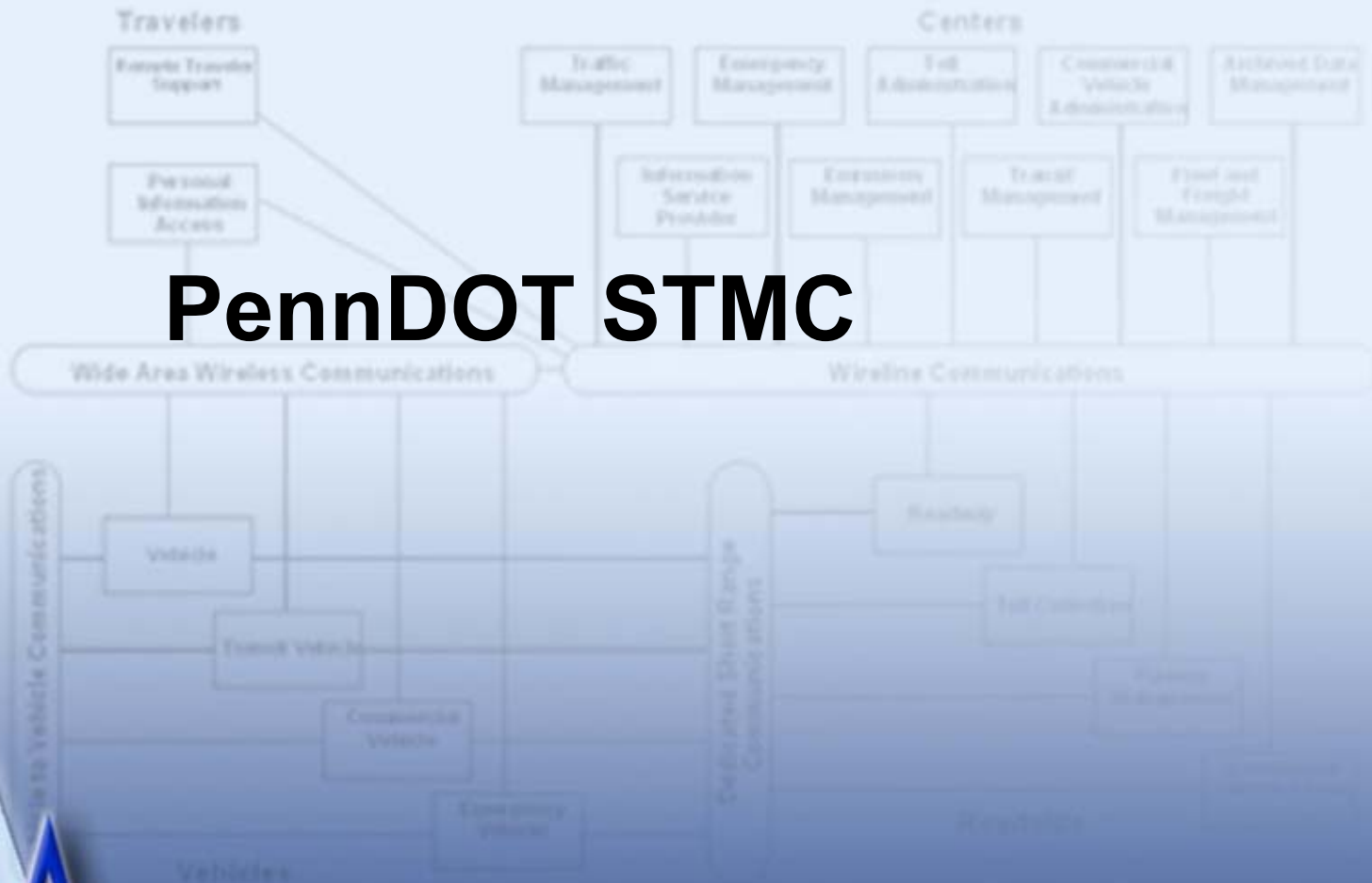


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----- Planned



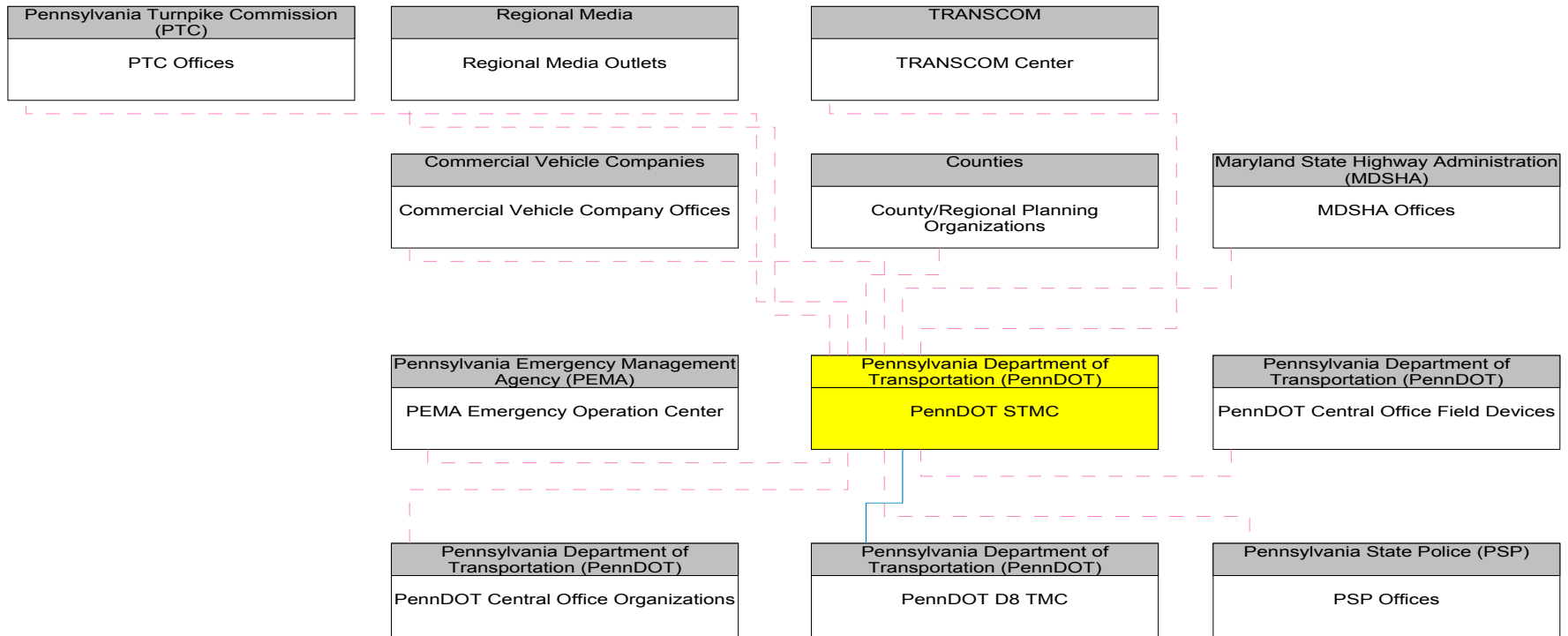
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- - - - - Planned

PennDOT STMC



PA

PennDOT STMC Interconnect Diagram

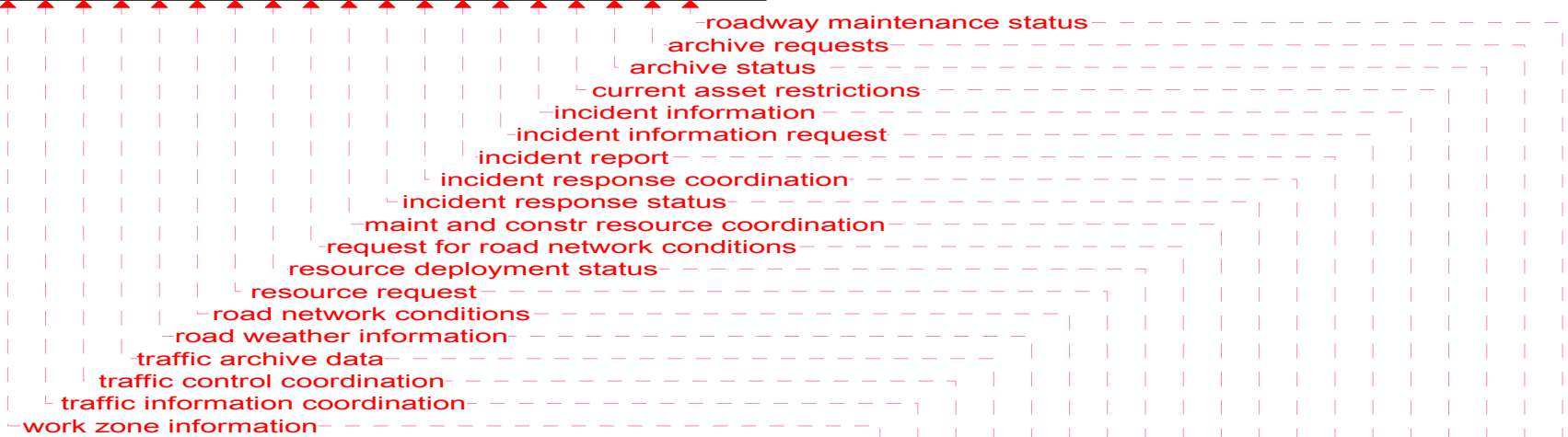


Existing
Planned



Pennsylvania Department of Transportation (PennDOT)

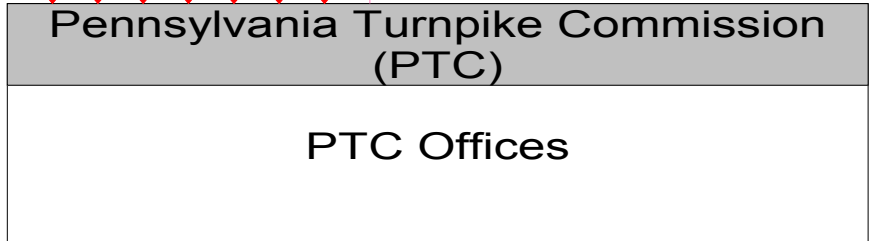
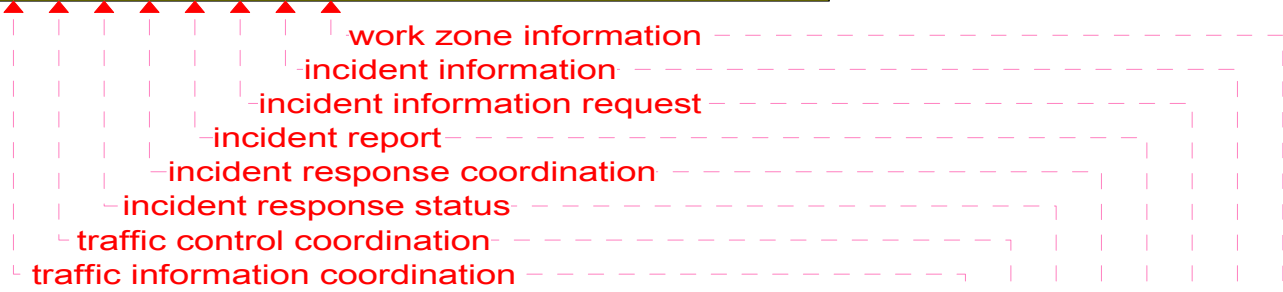
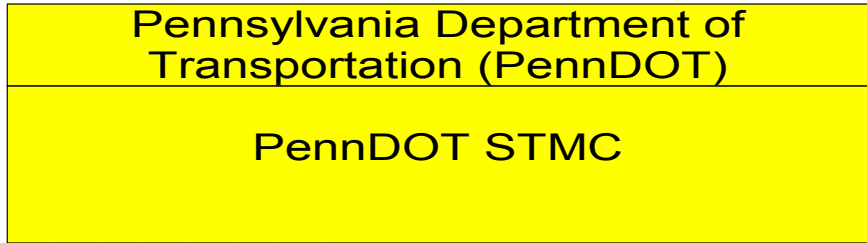
PennDOT STMC



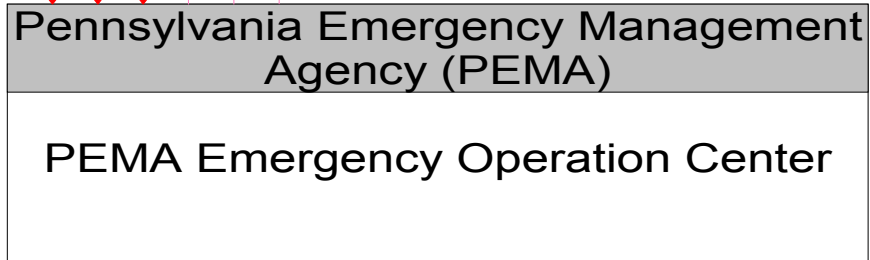
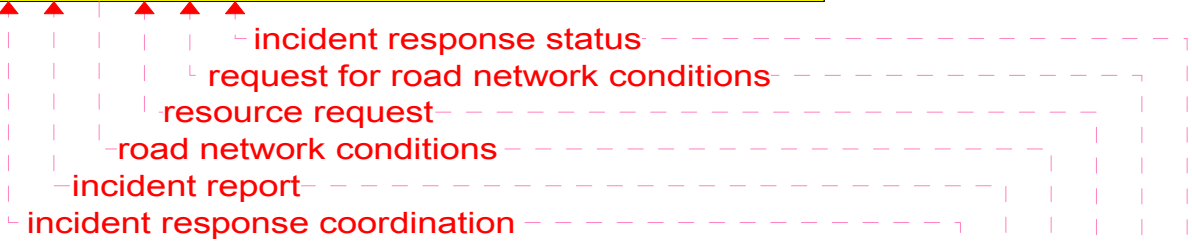
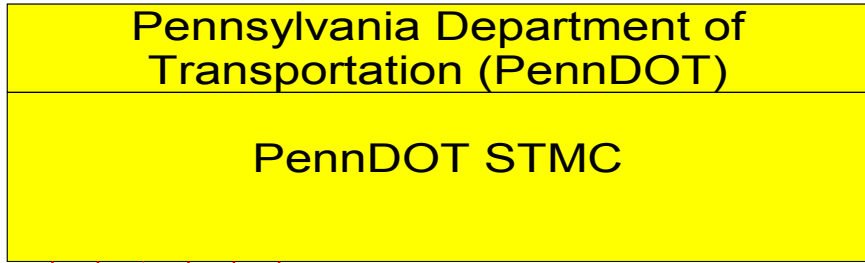
Pennsylvania Department of Transportation (PennDOT)

PennDOT D8 TMC

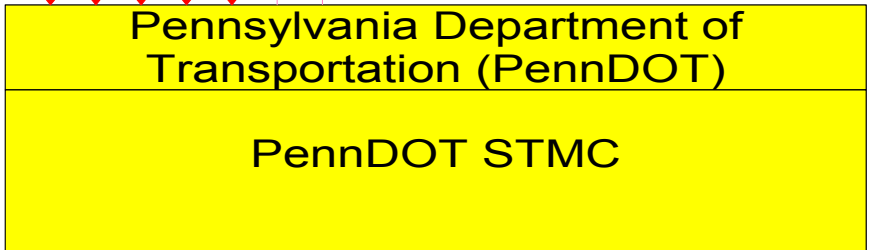
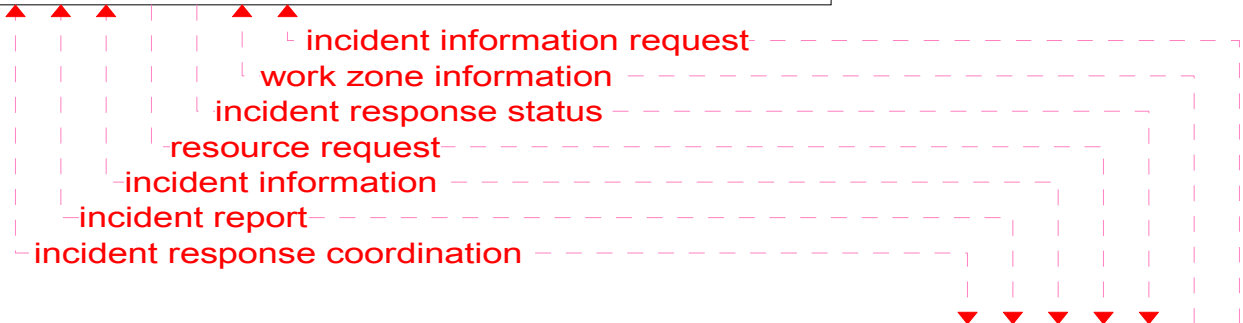
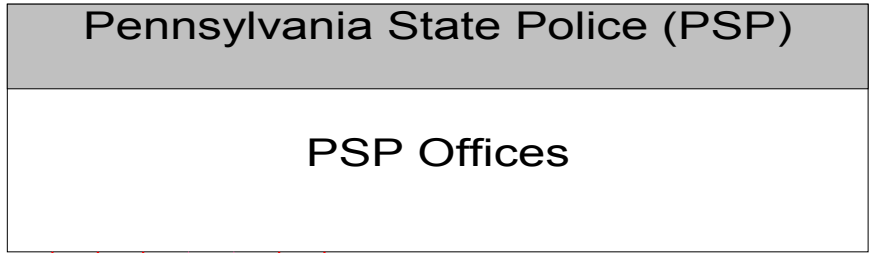
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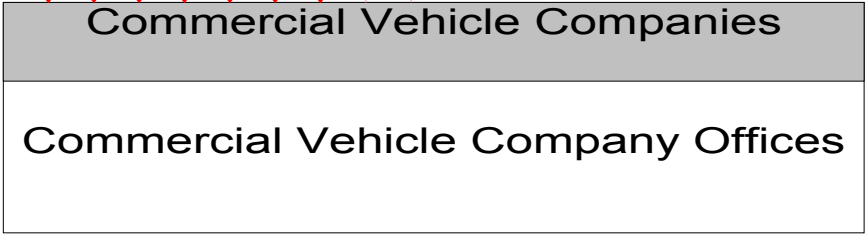
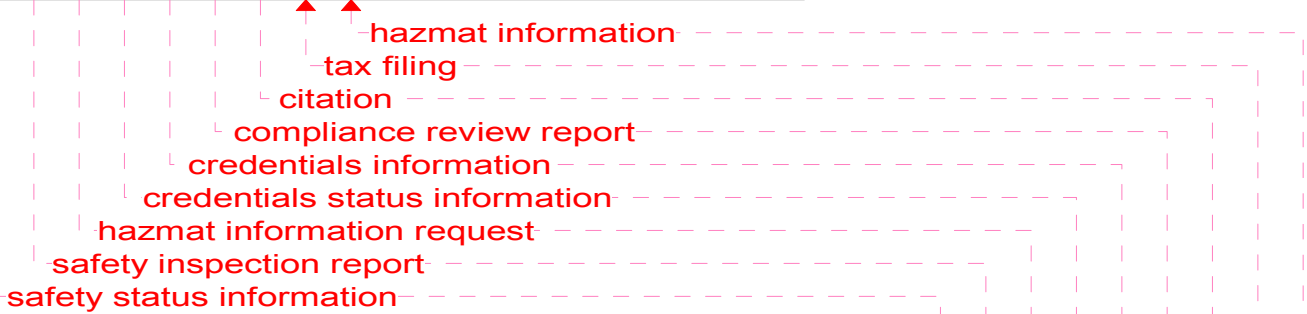
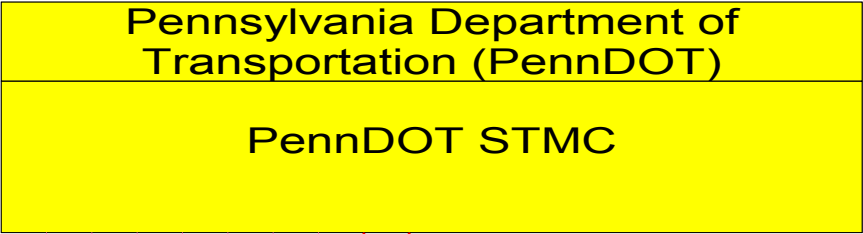
———— Existing
- - - - - Planned



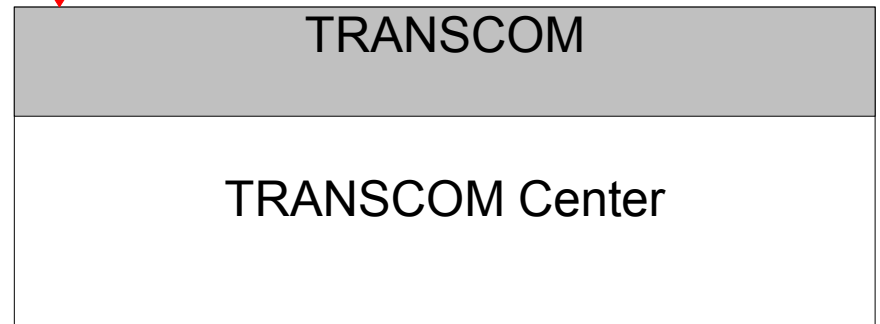
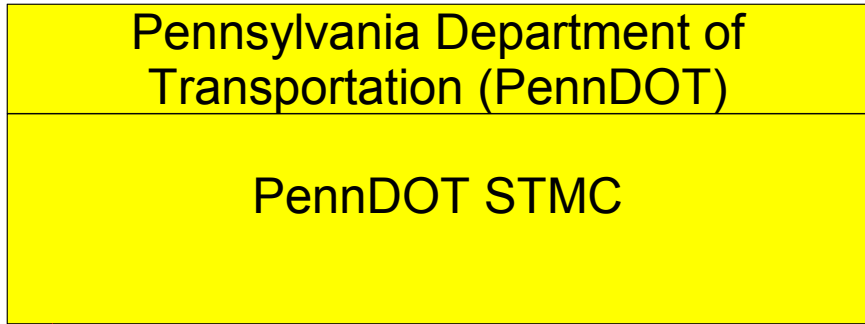
Existing
Planned



Existing
Planned

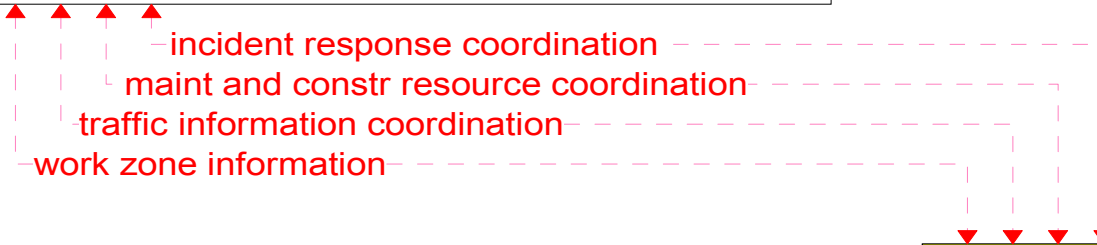


———— Existing
- - - - - Planned



Maryland State Highway Administration
(MDSHA)

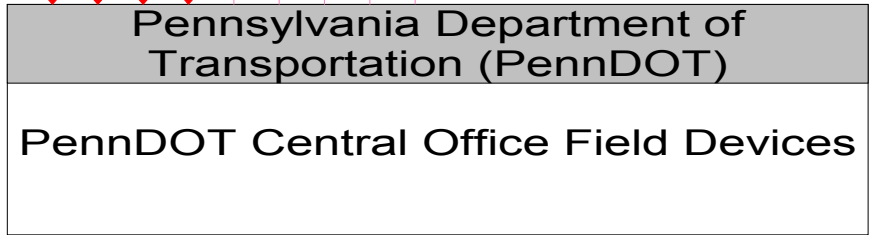
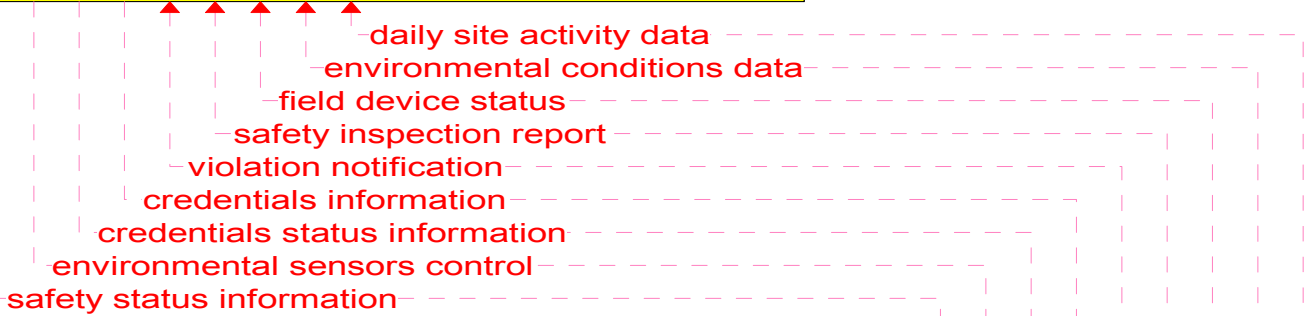
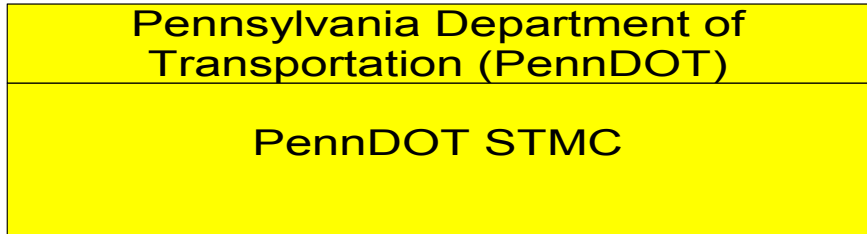
MDSHA Offices



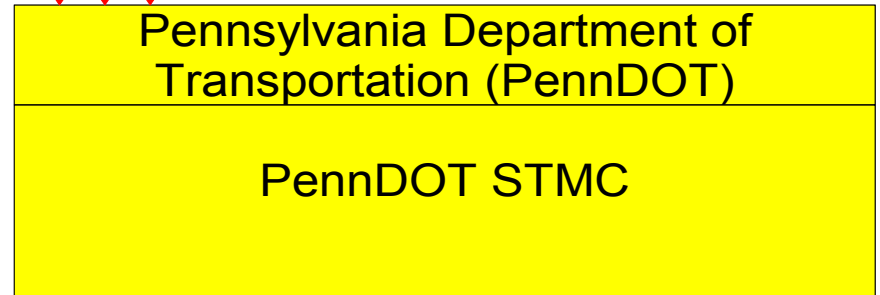
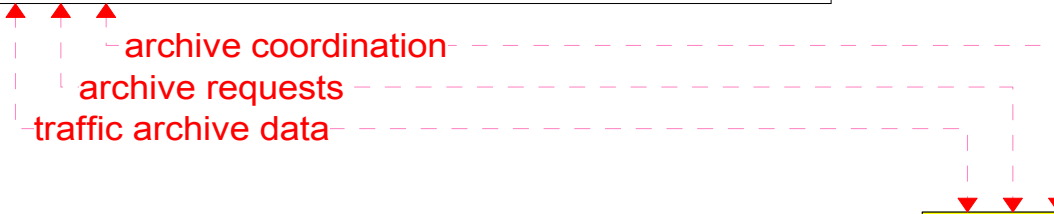
Pennsylvania Department of
Transportation (PennDOT)

PennDOT STMC

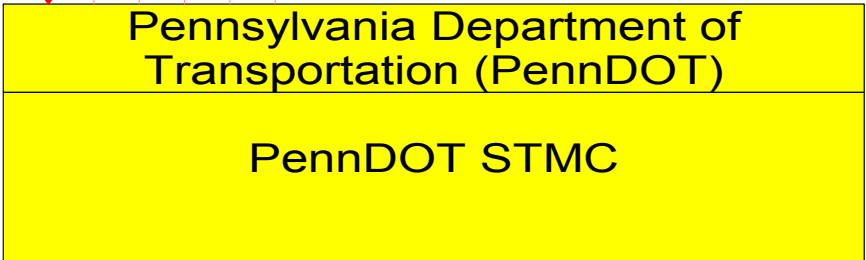
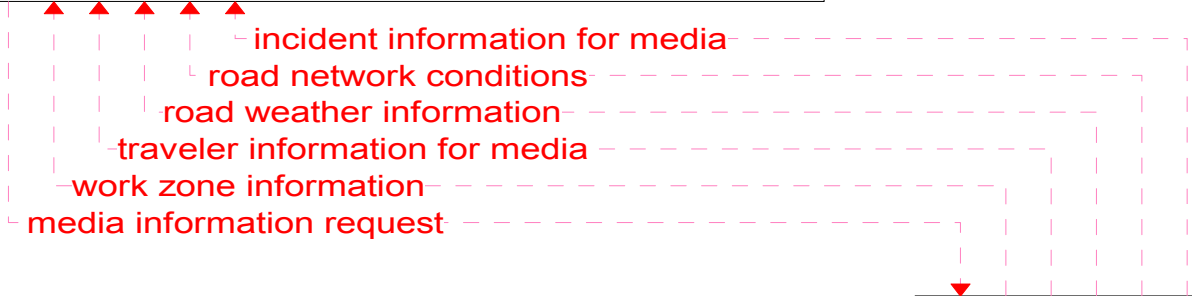
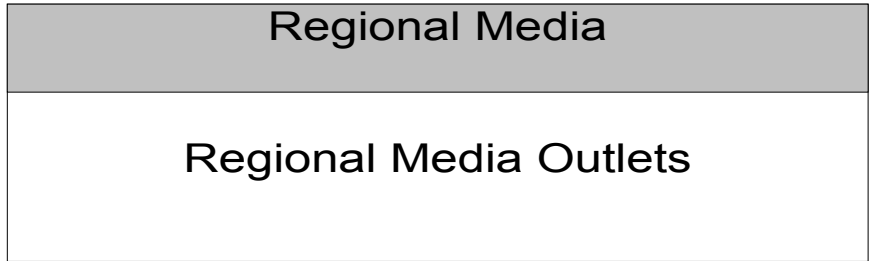
———— Existing
- - - - - Planned



———— Existing
- - - - - Planned



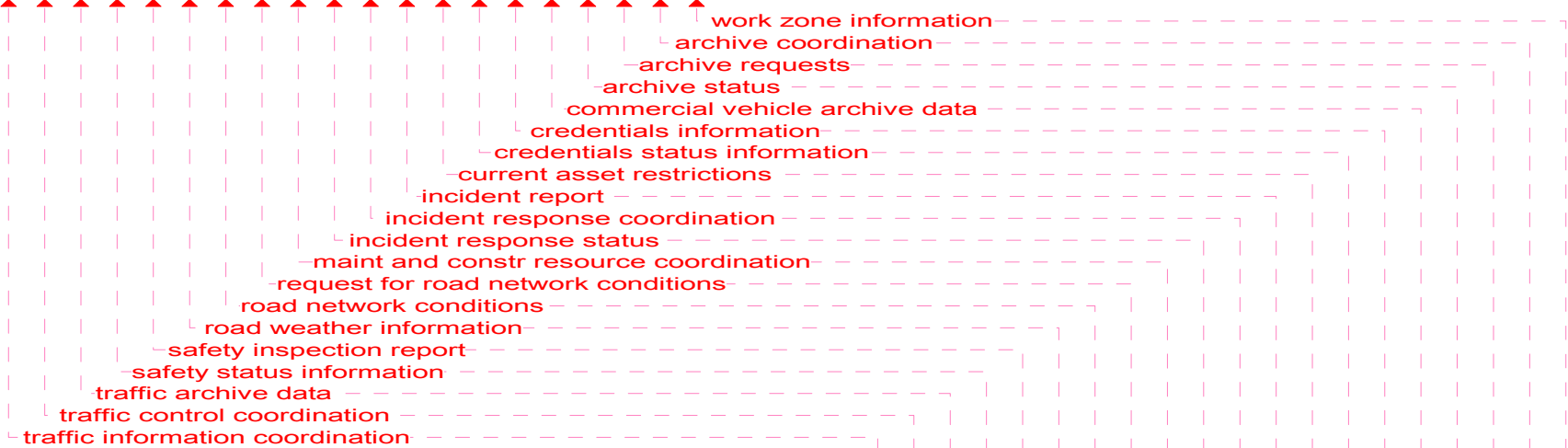
Existing
Planned



———— Existing
- - - - - Planned

**Pennsylvania Department of Transportation
(PennDOT)**

PennDOT Central Office Organizations

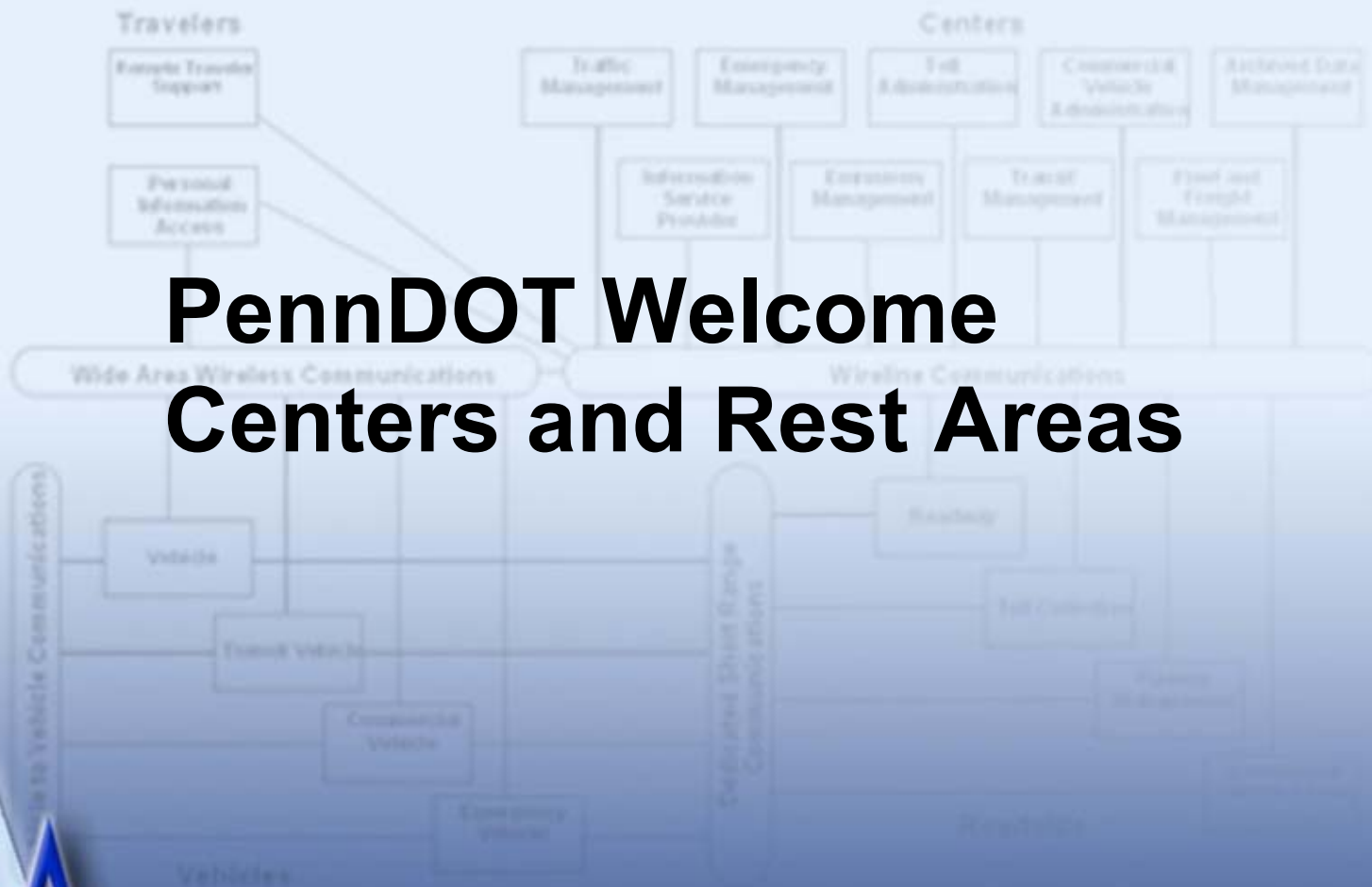


**Pennsylvania Department of Transportation
(PennDOT)**

PennDOT STMC

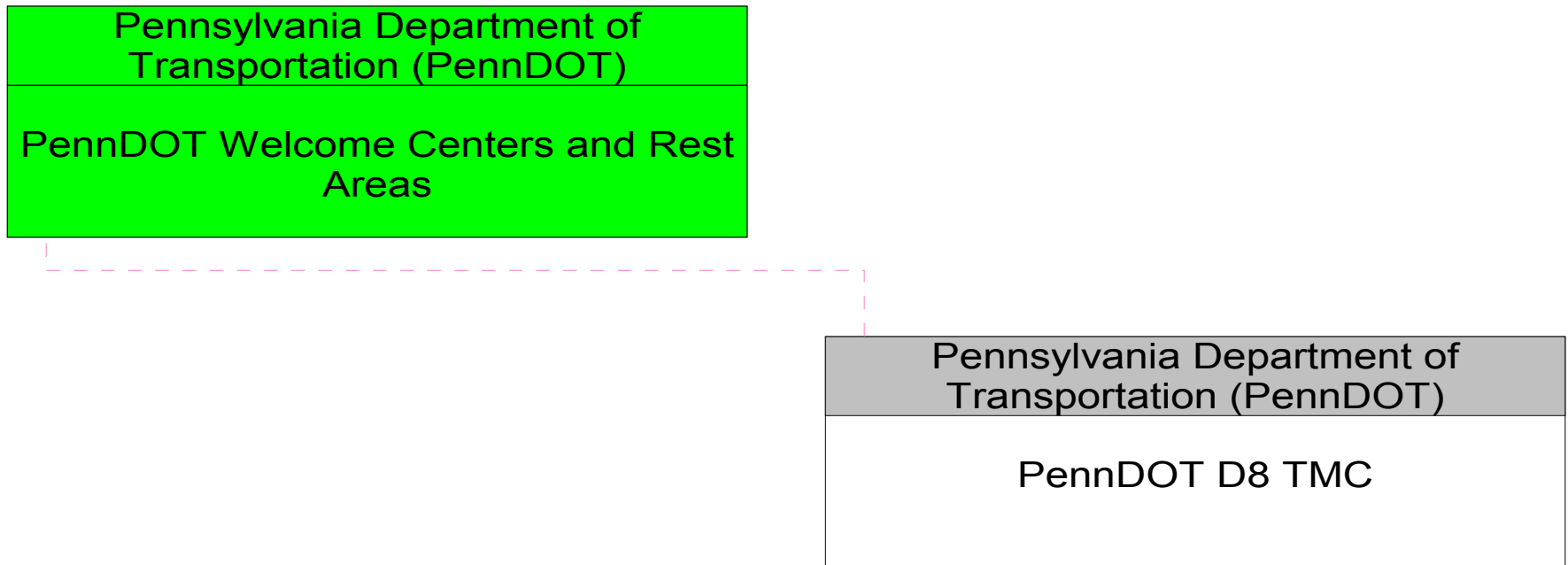
———— Existing
- - - - - Planned

PennDOT Welcome Centers and Rest Areas



PA

PennDOT Welcome Centers and Rest Areas Interconnect Diagram



———— Existing
- - - - - Planned

Pennsylvania Department of
Transportation (PennDOT)

PennDOT Welcome Centers and Rest
Areas

traveler information
traveler request

Pennsylvania Department of
Transportation (PennDOT)

PennDOT D8 TMC

Existing
Planned

Pennsylvania Office of Homeland Security

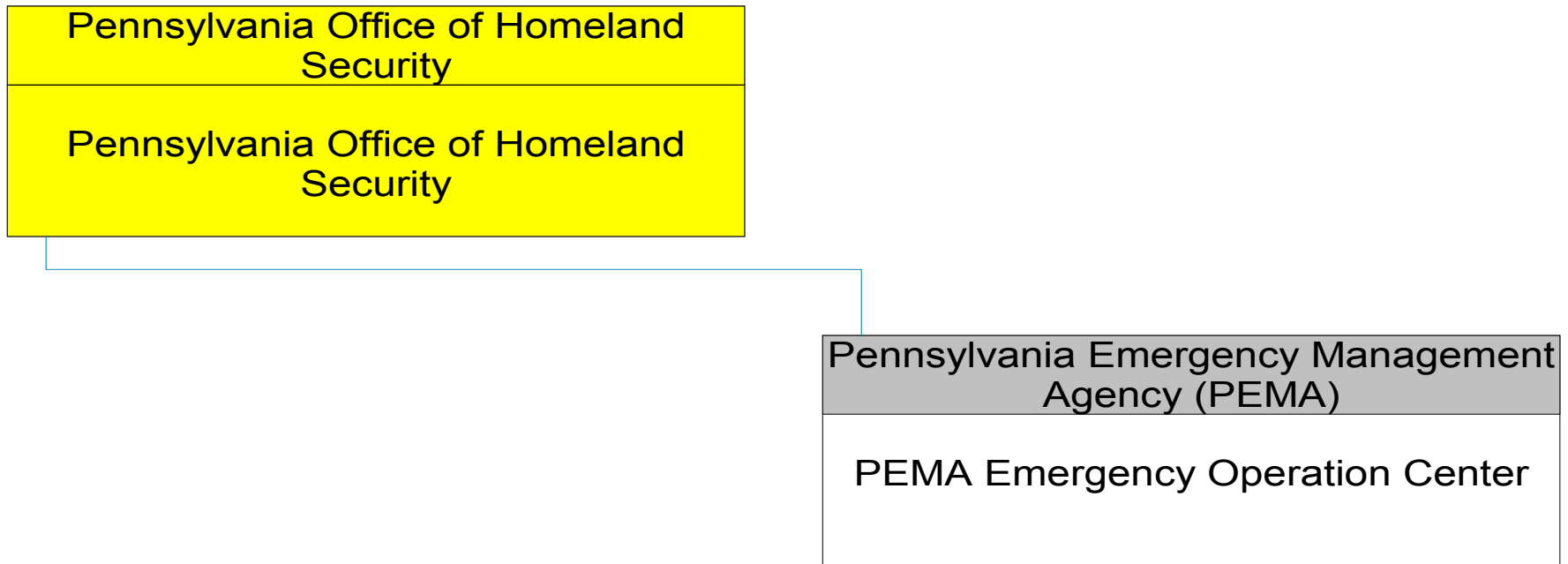


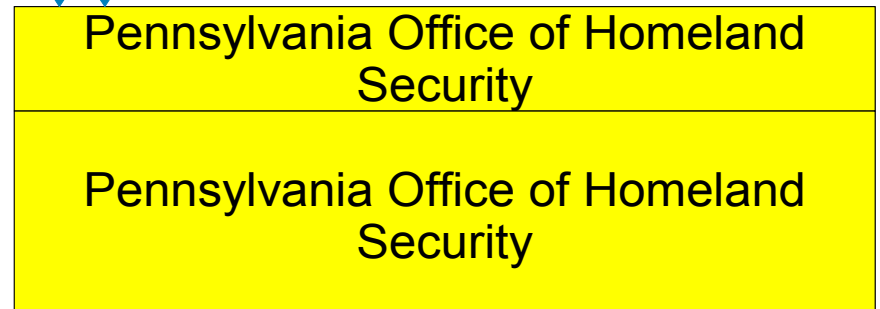
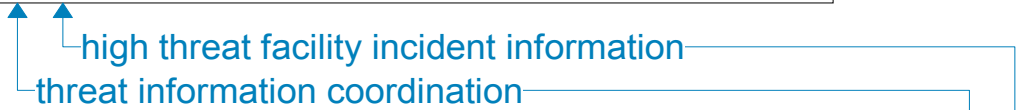
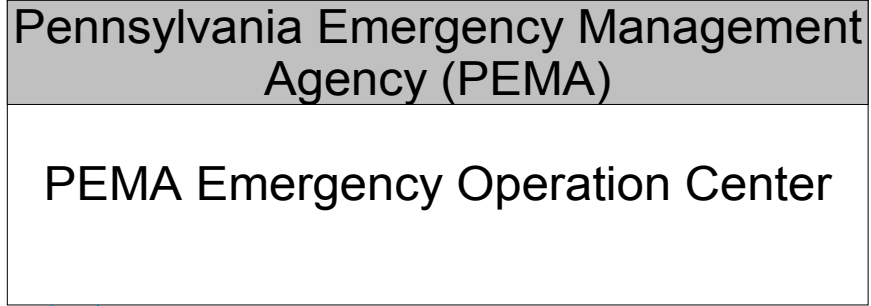
355

architecture

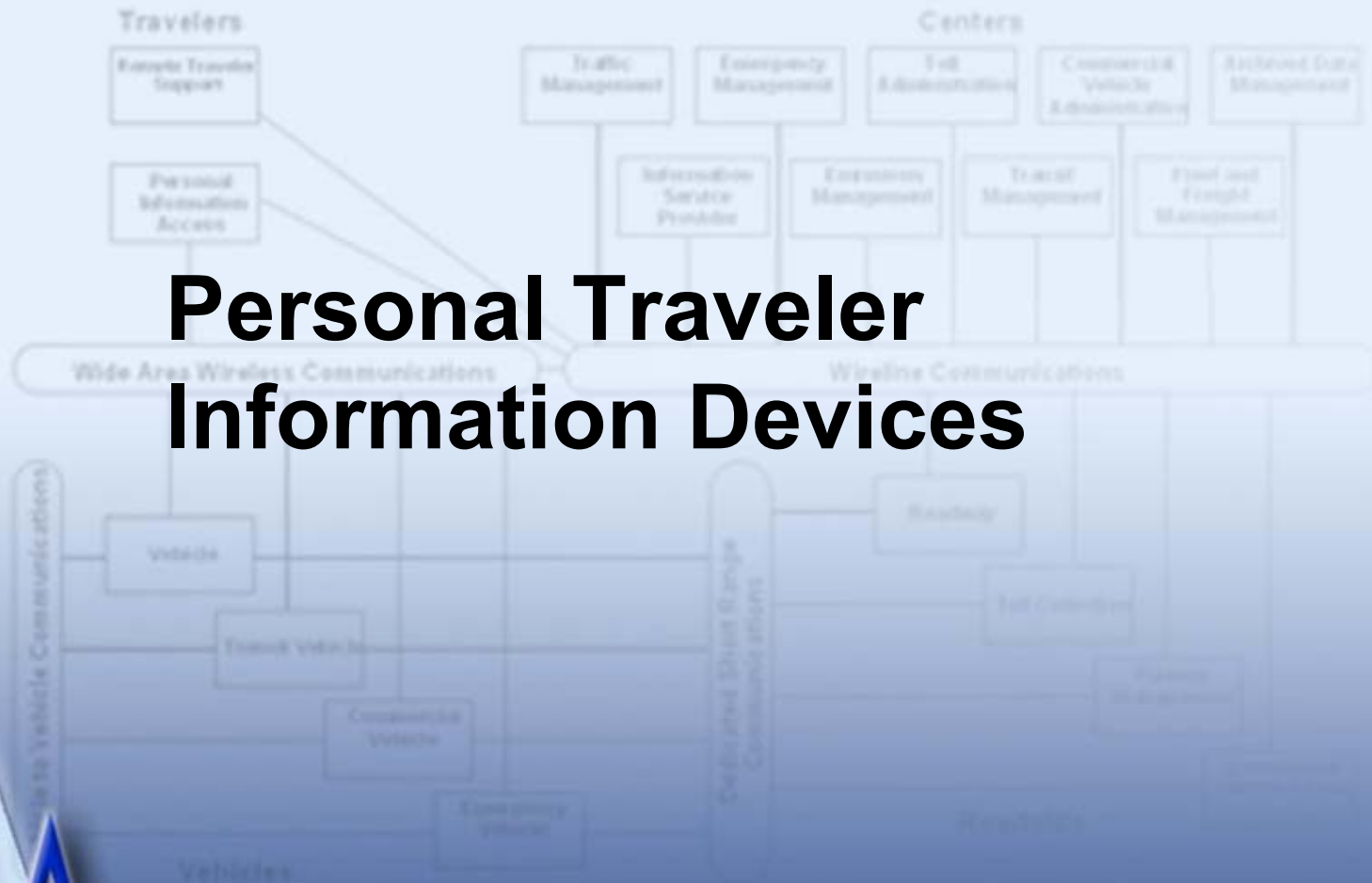


Pennsylvania Office of Homeland Security Interconnect Diagram



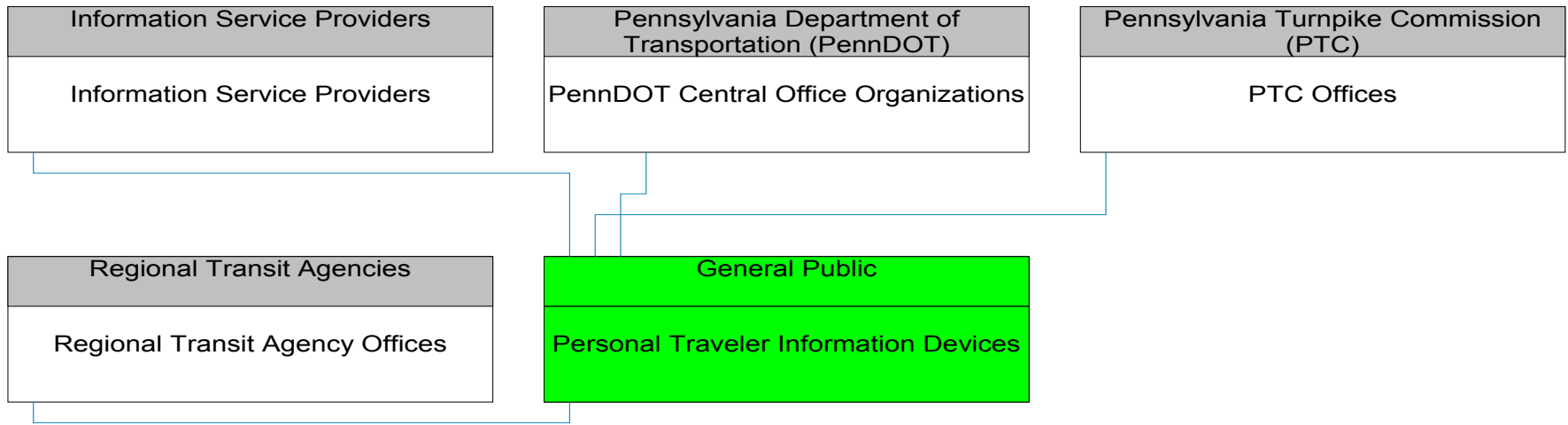


Personal Traveler Information Devices

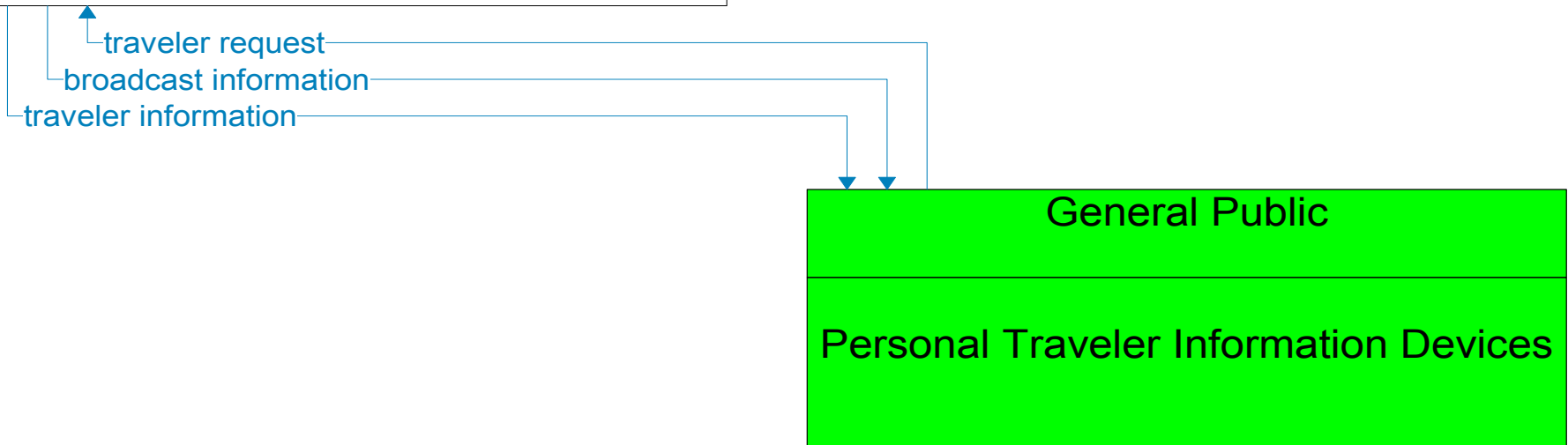
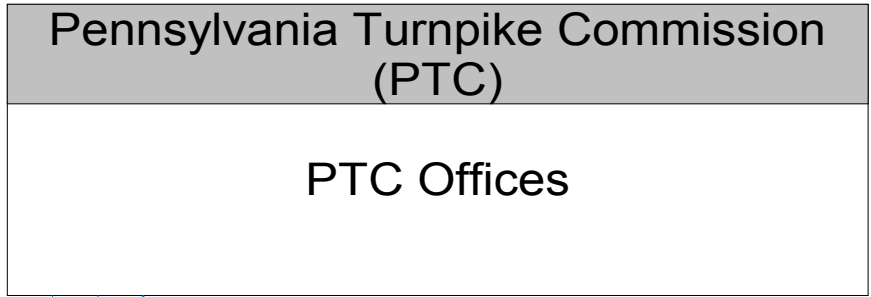


PA

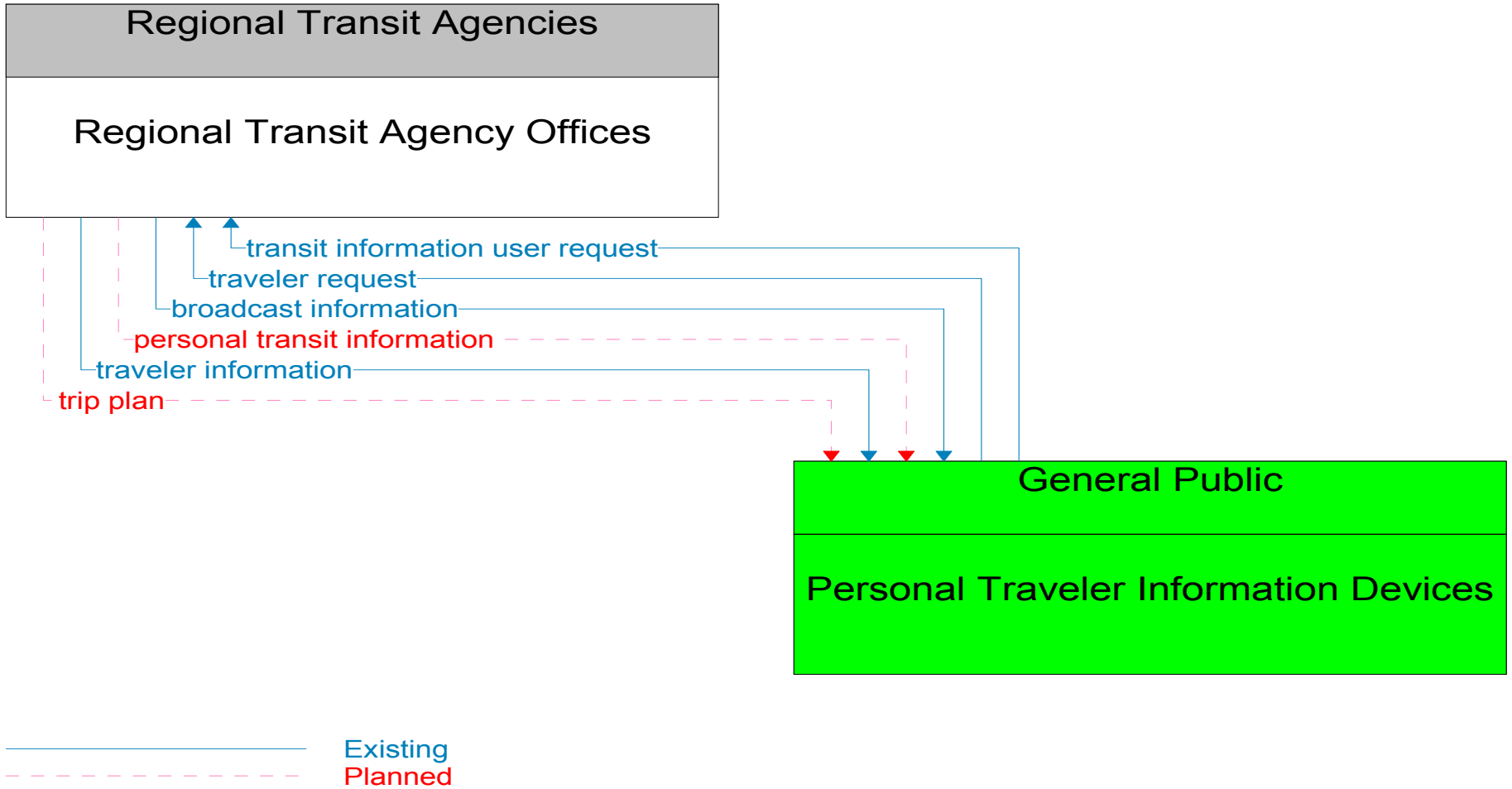
Personal Traveler Information Devices Interconnect Diagram

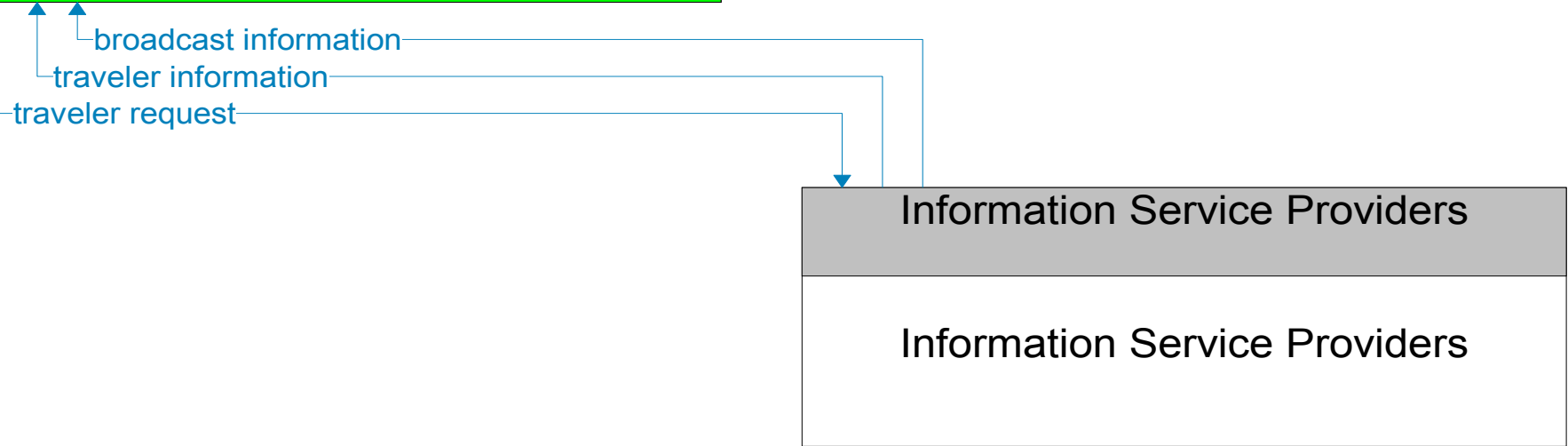
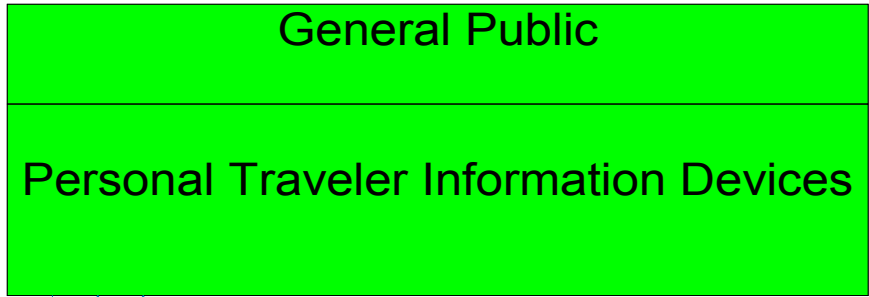


— Existing
- - - Planned

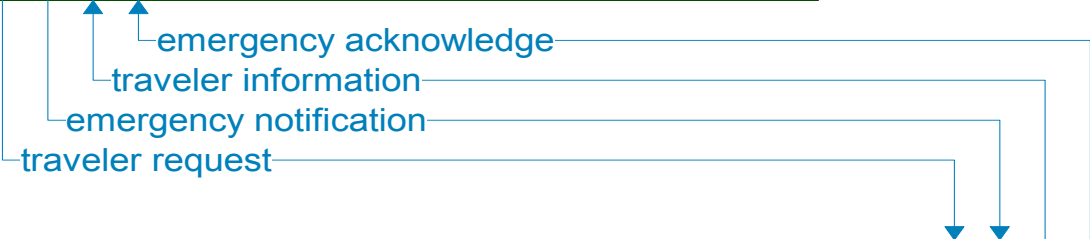
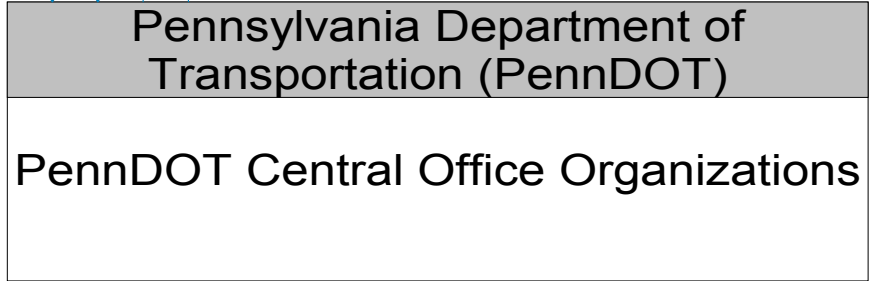
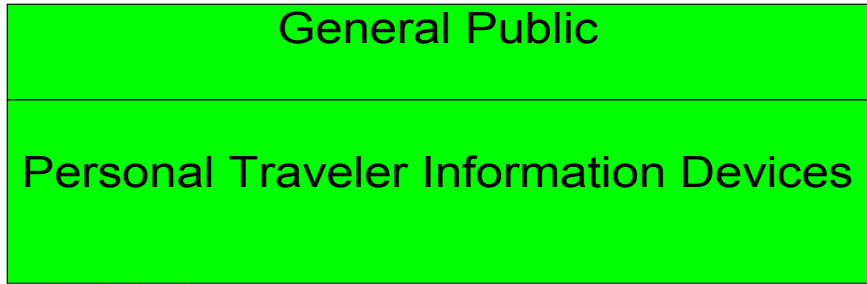


Existing
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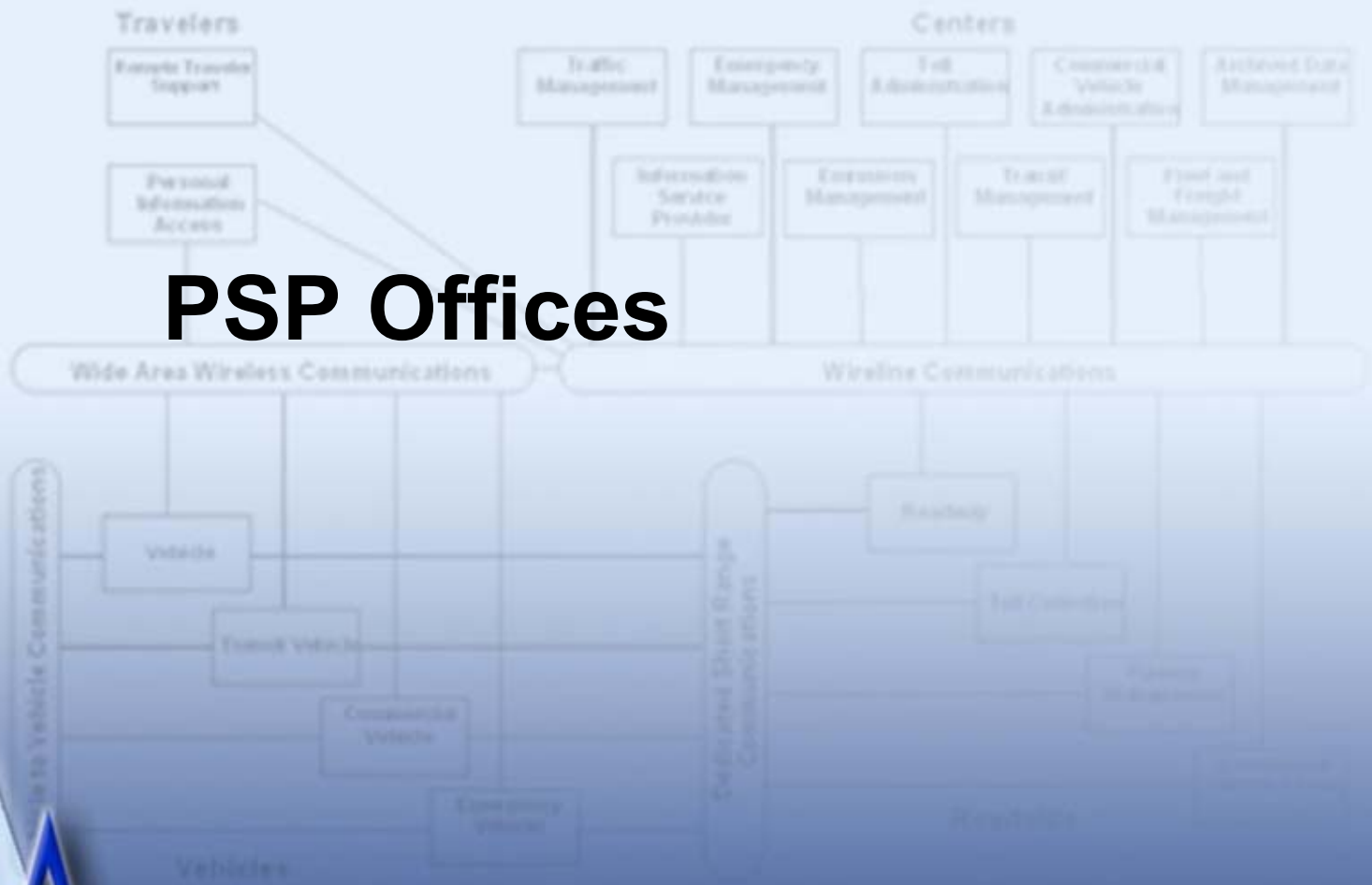


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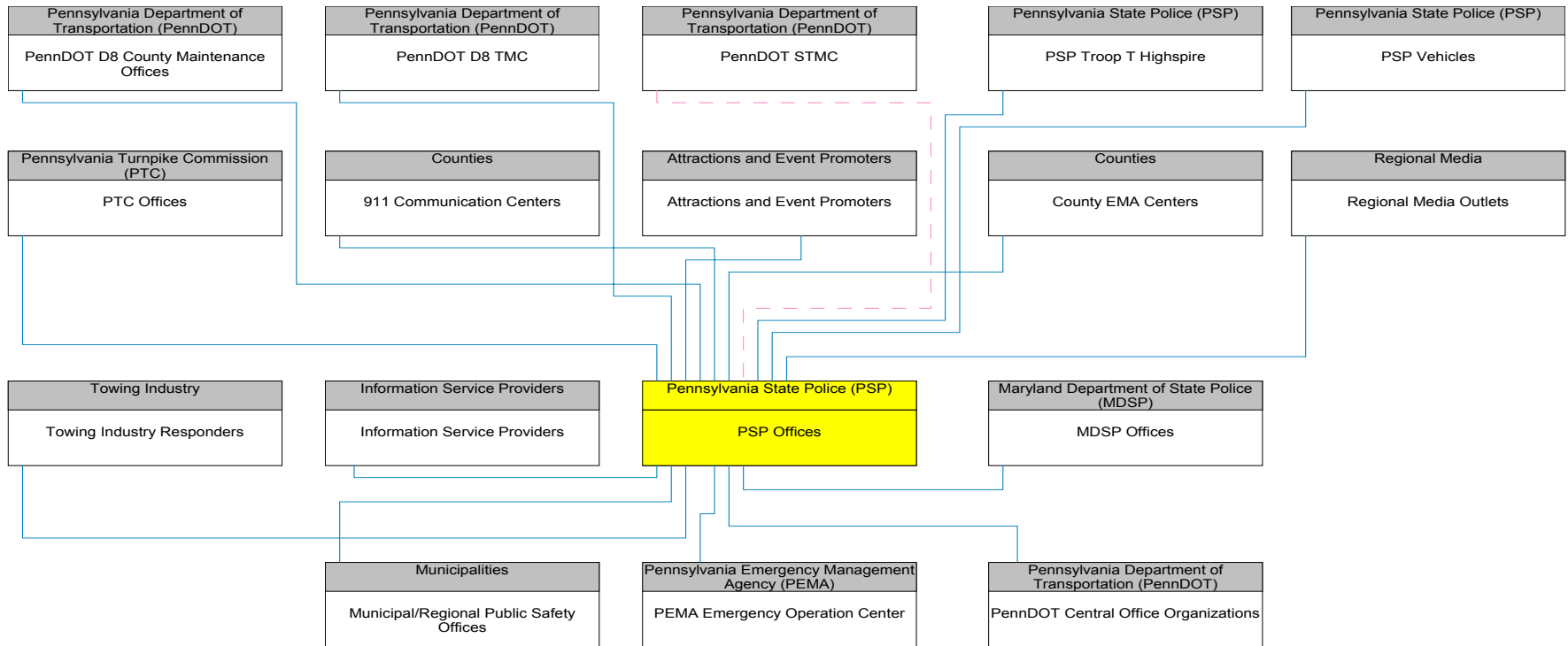
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PSP Offices

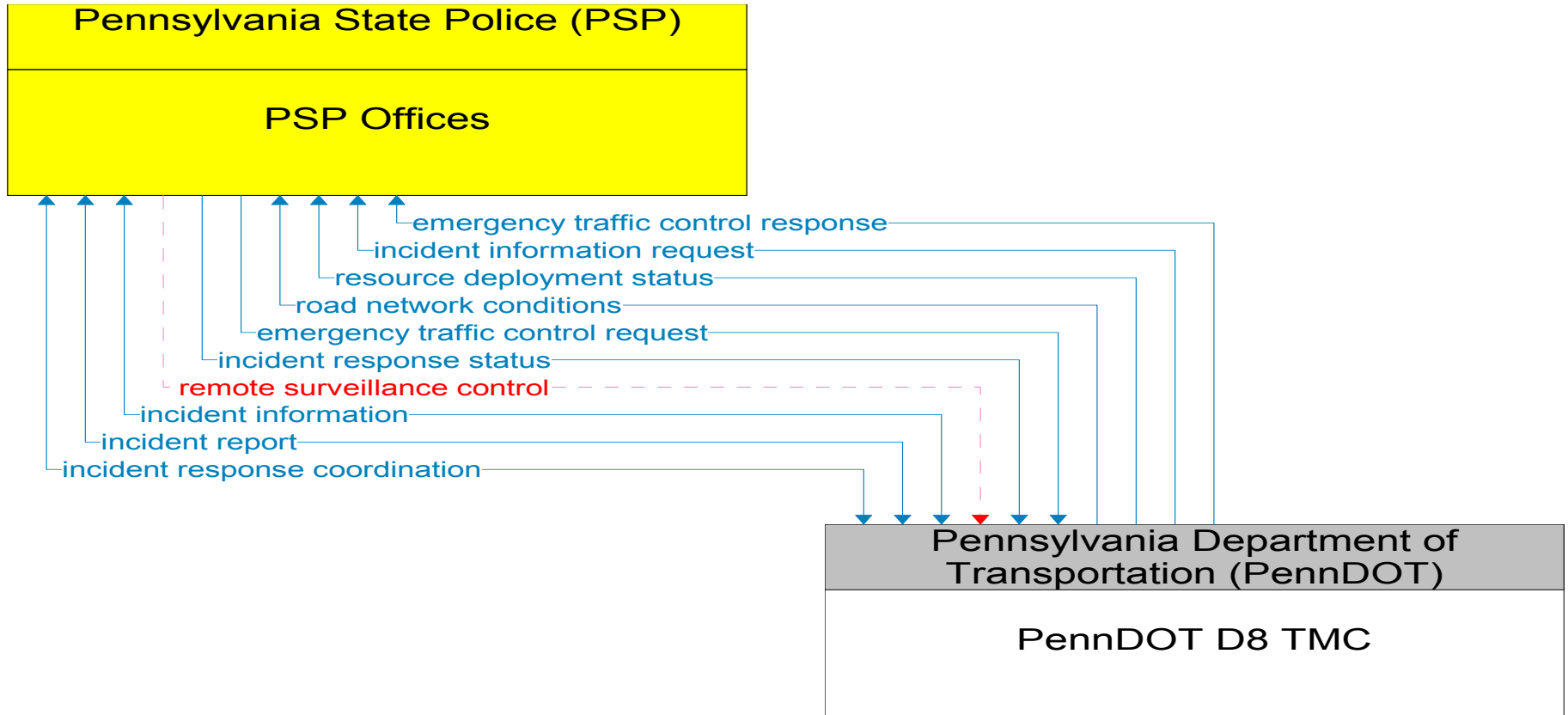


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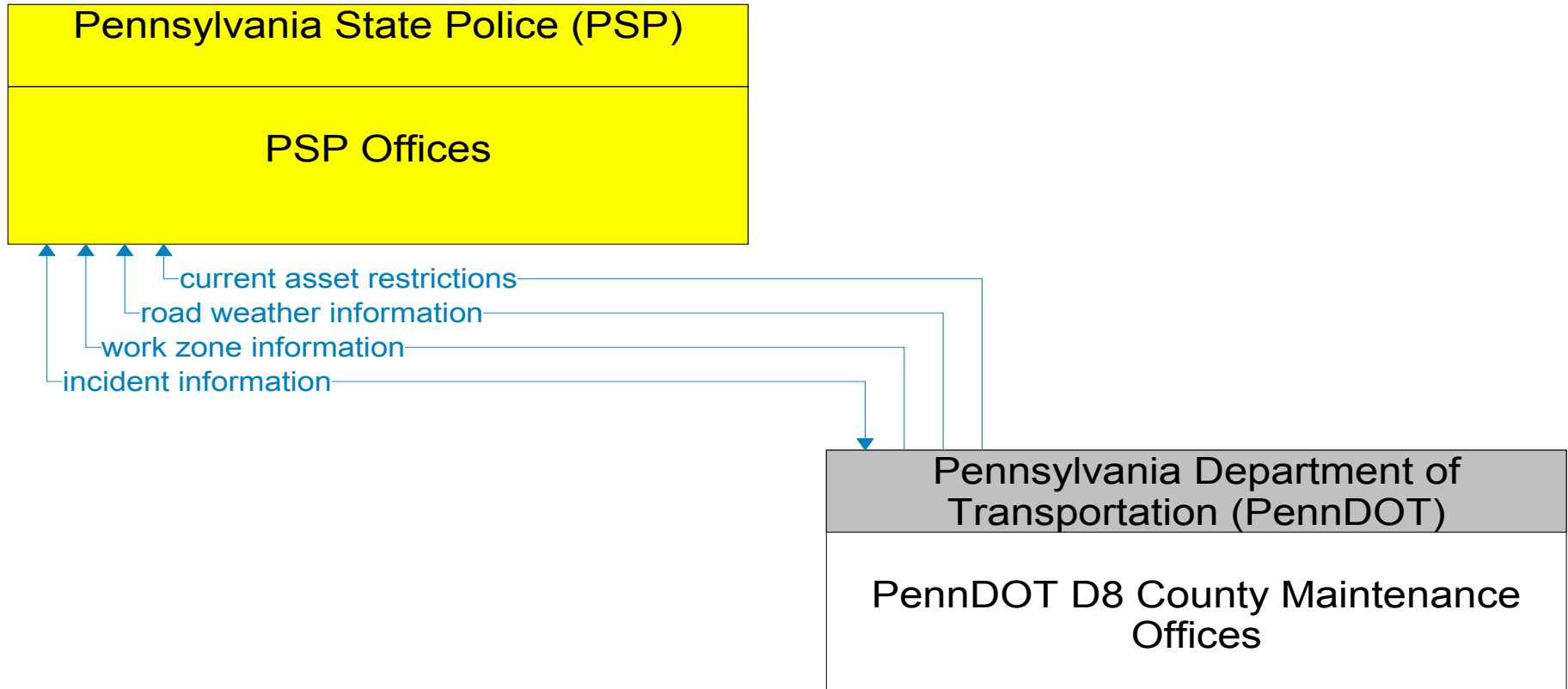
PSP Offices Interconnect Diagram



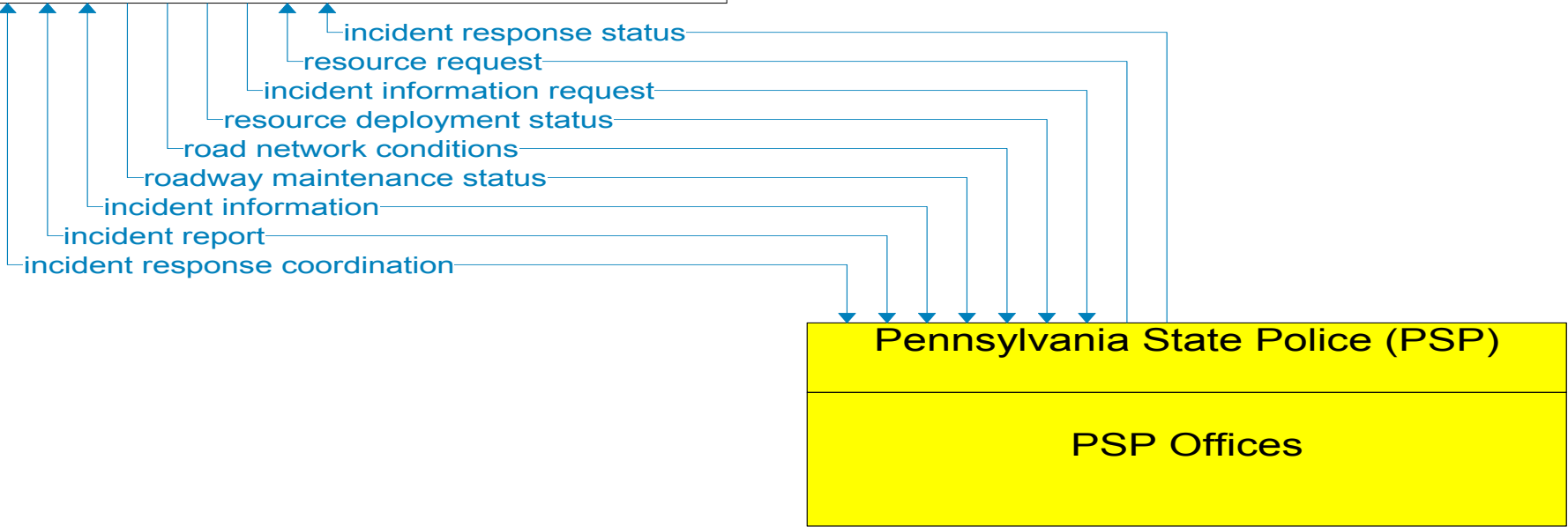
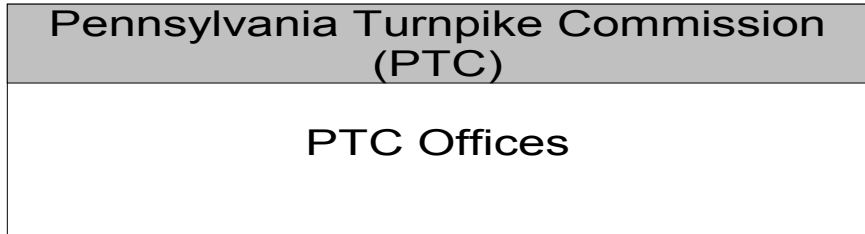
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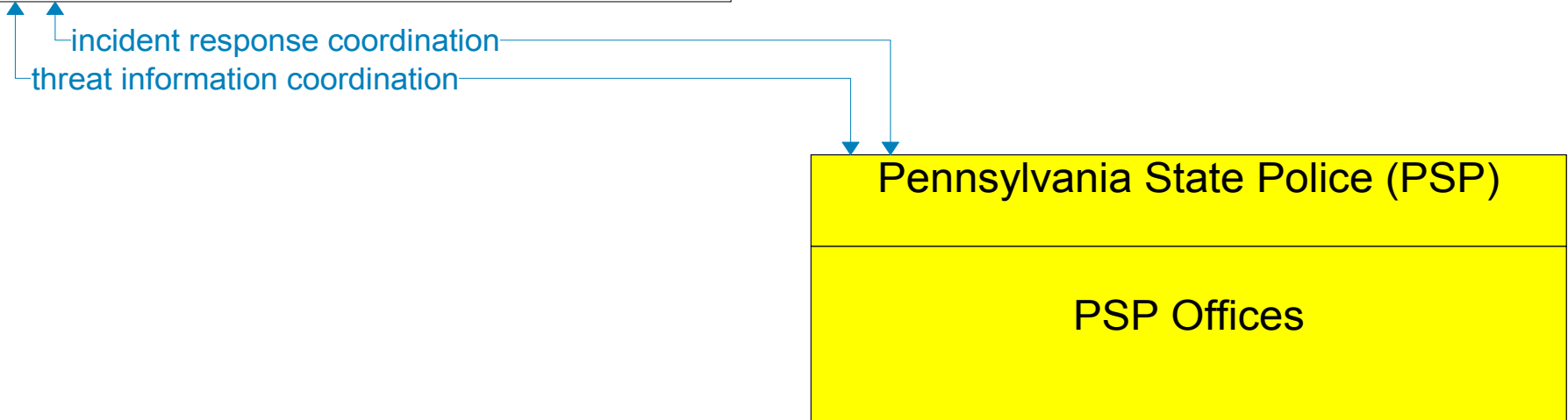
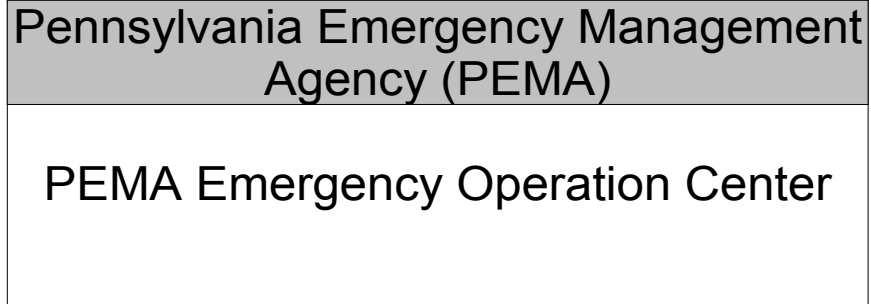
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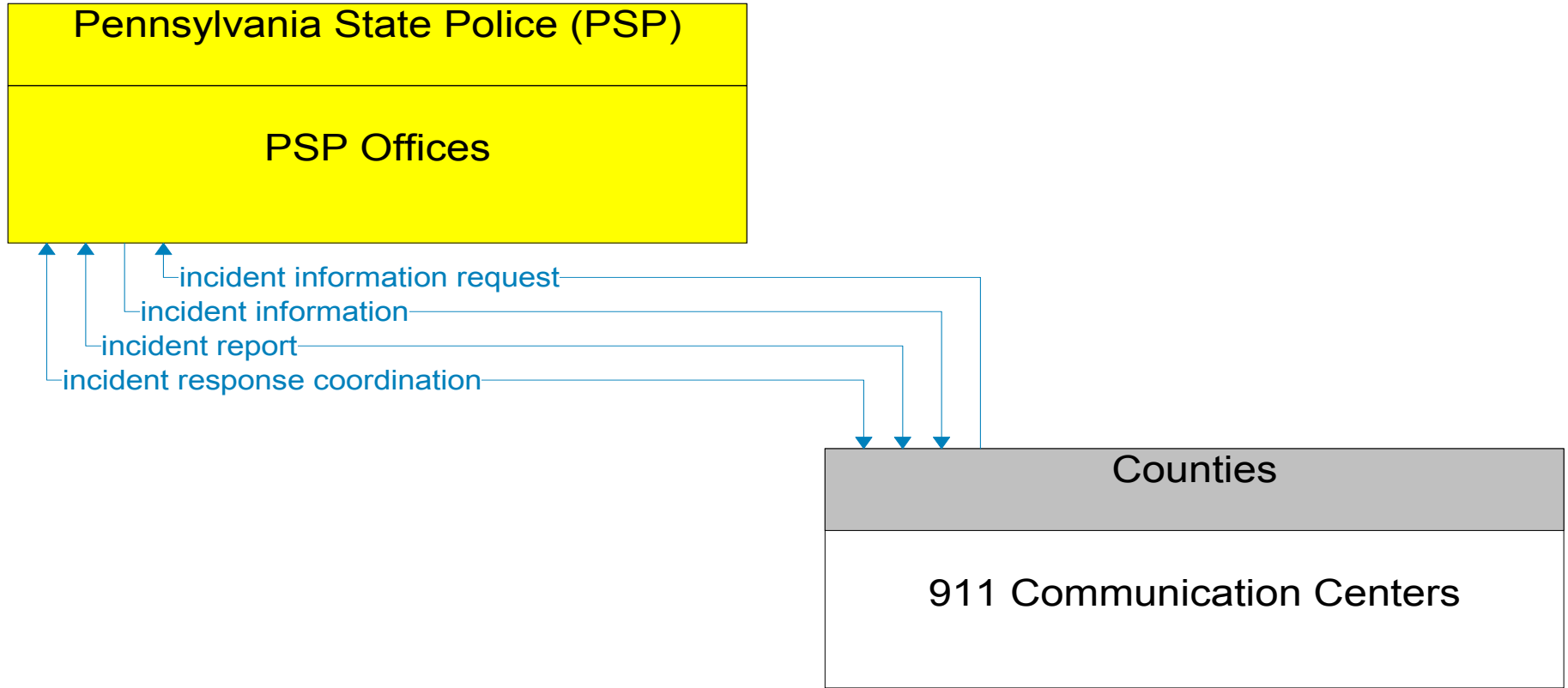
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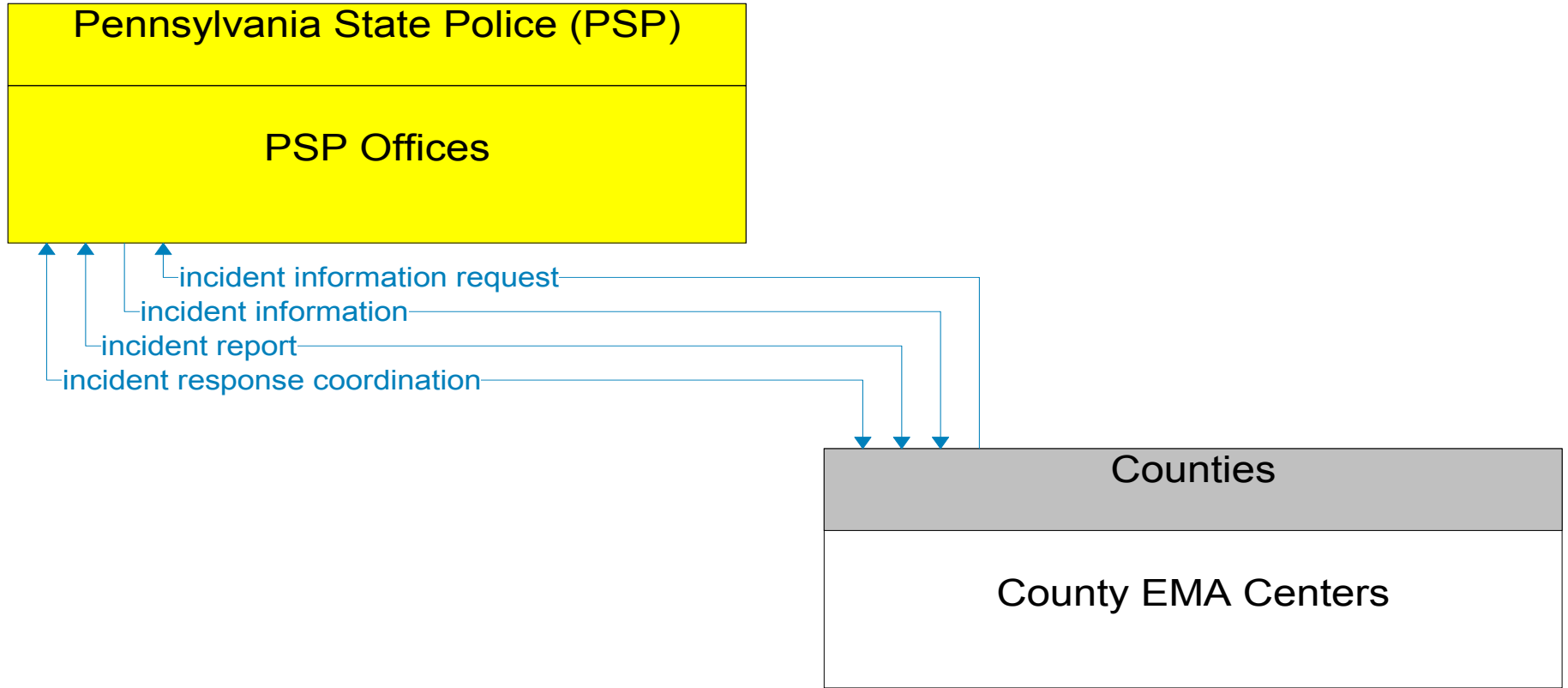


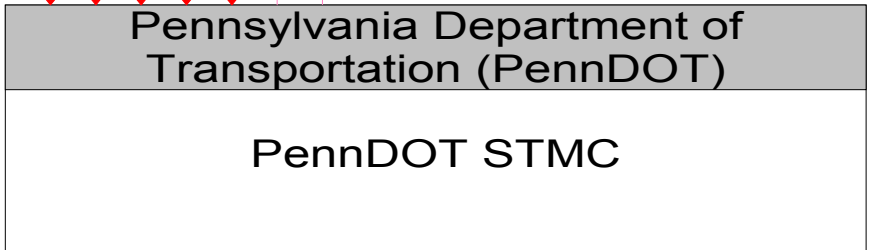
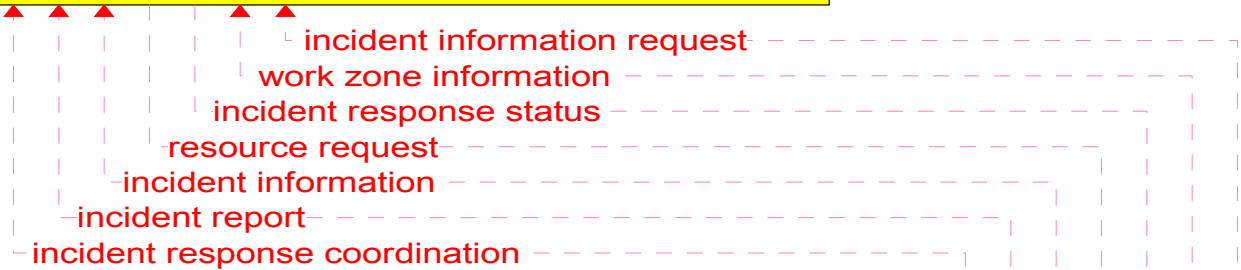
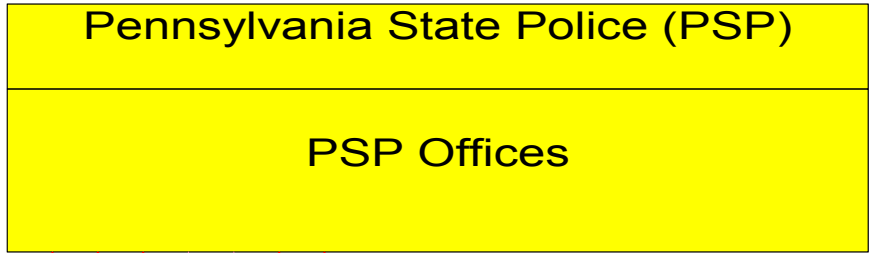
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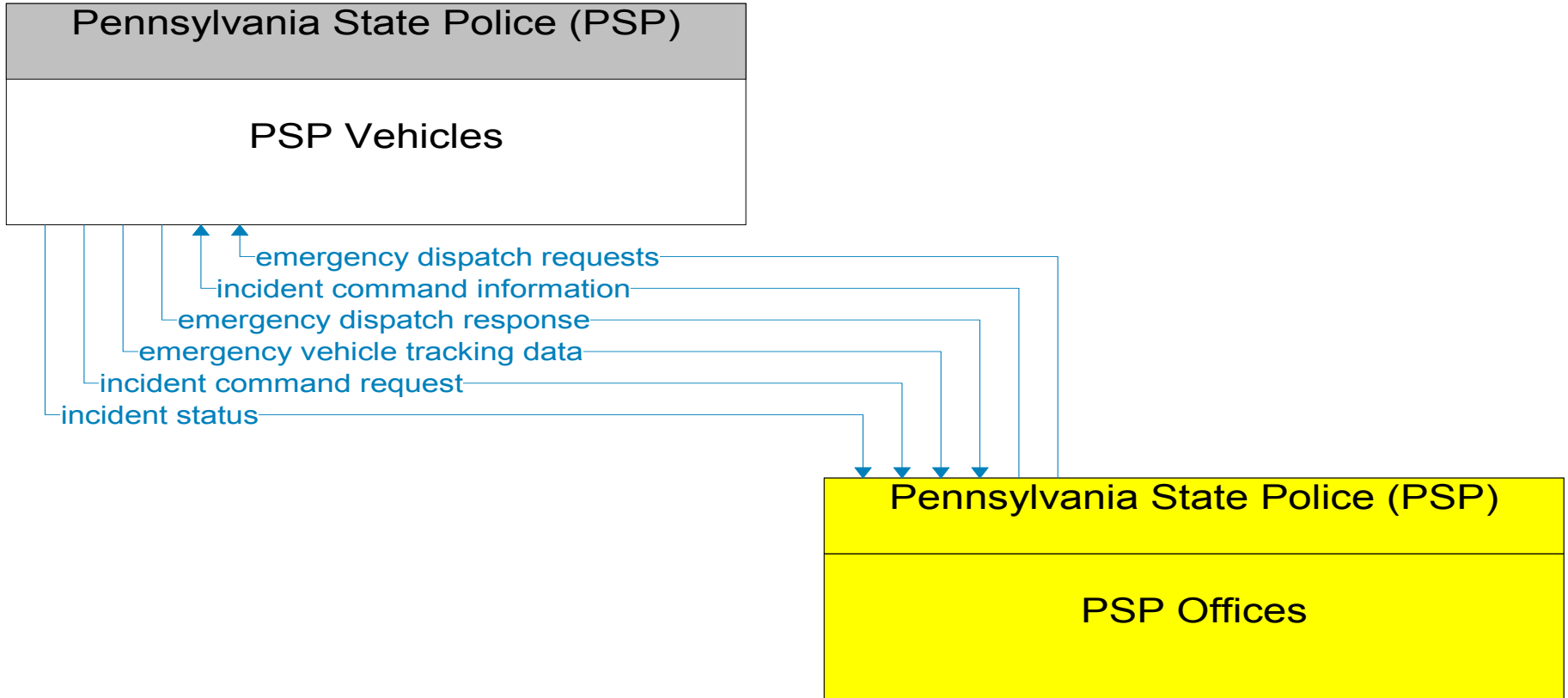
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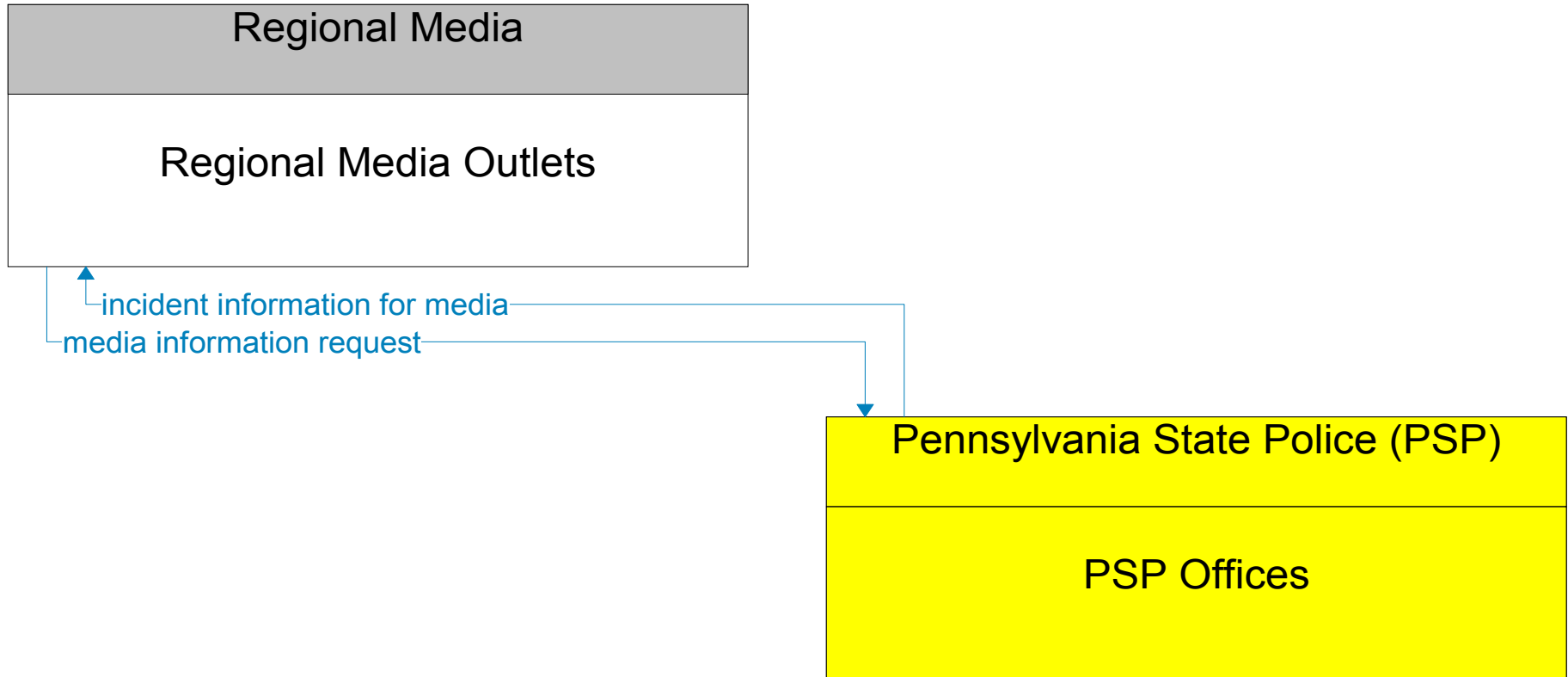




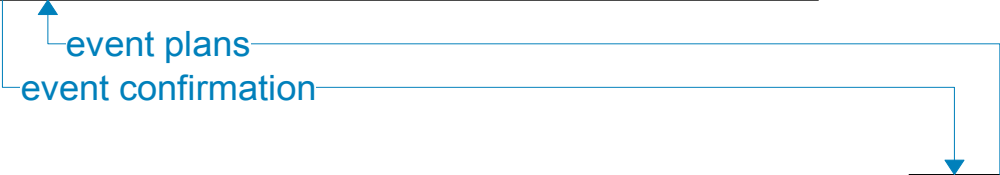
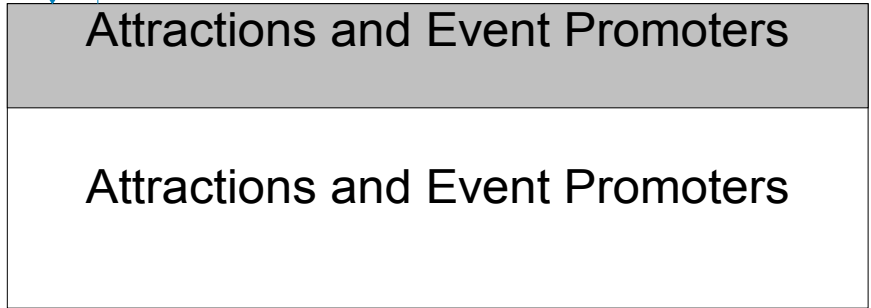
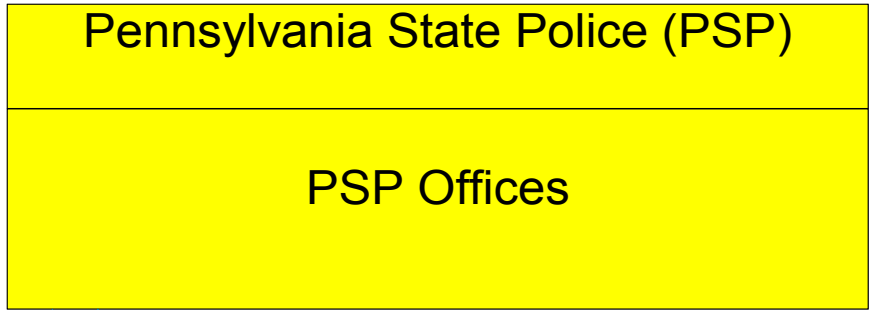
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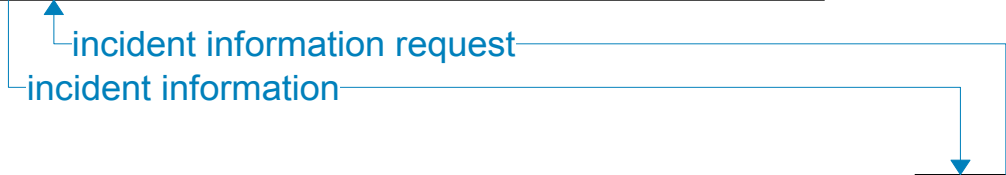
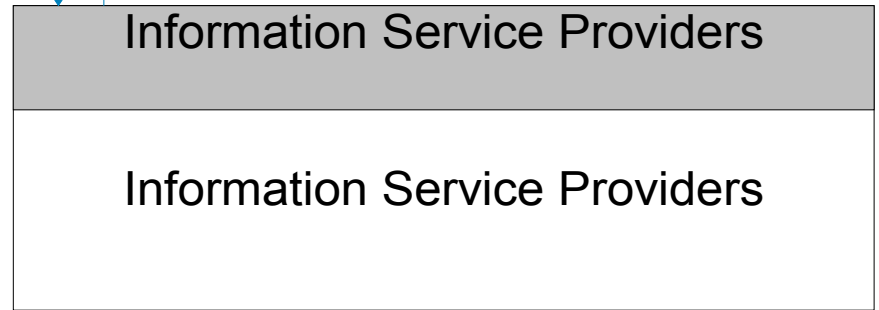
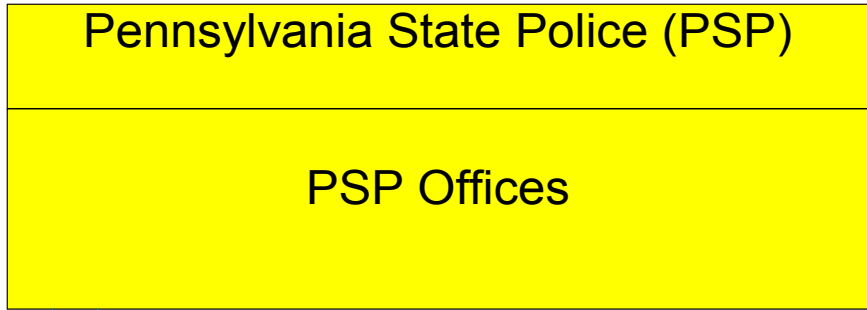
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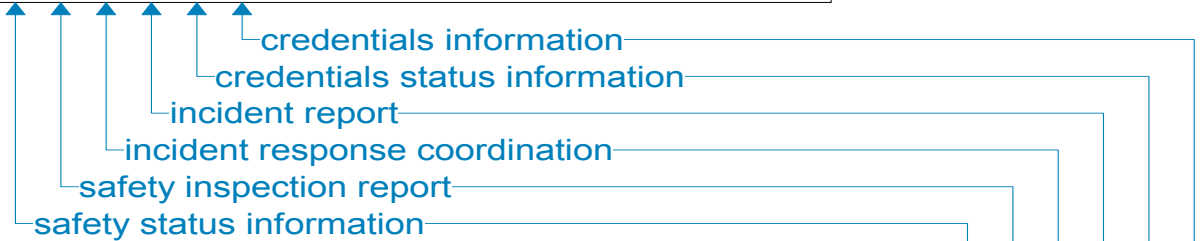
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Pennsylvania Department of
Transportation (PennDOT)

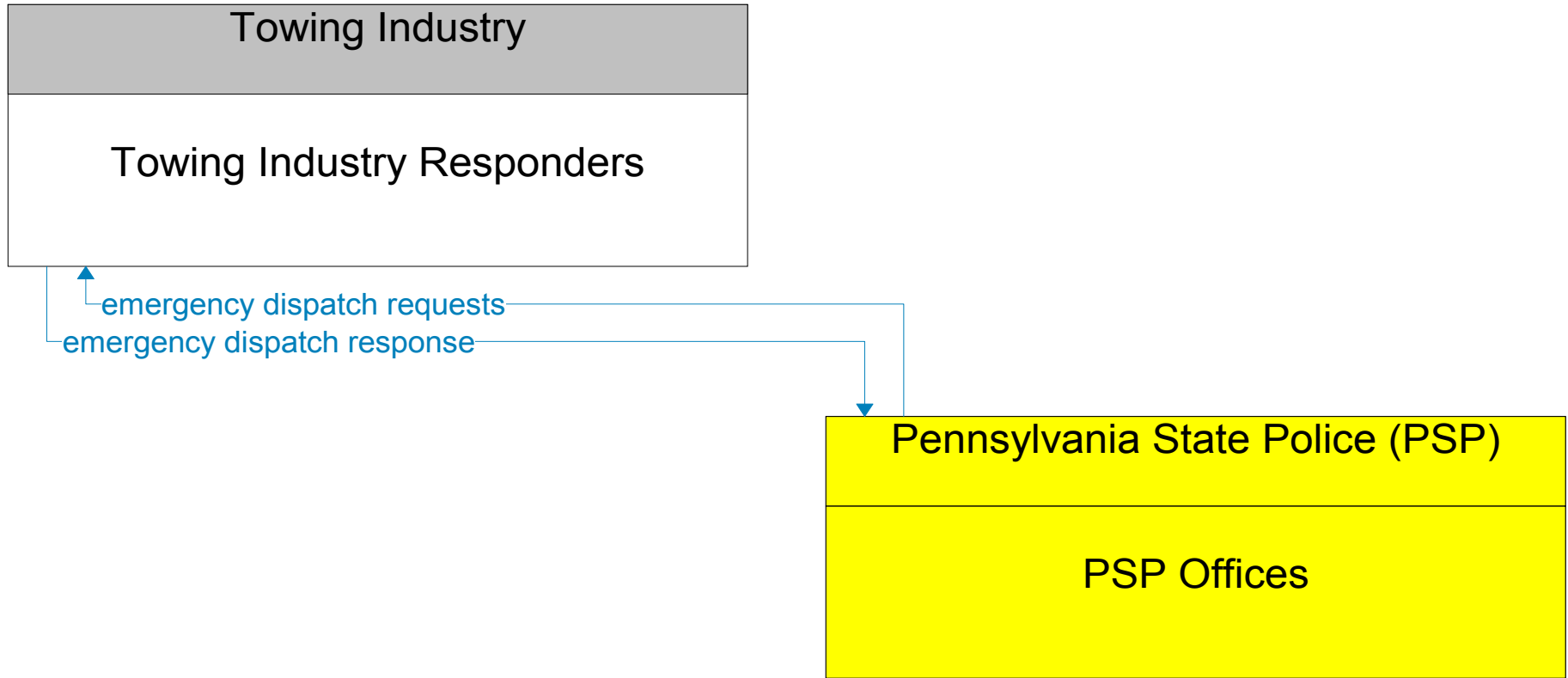
PennDOT Central Office Organizations



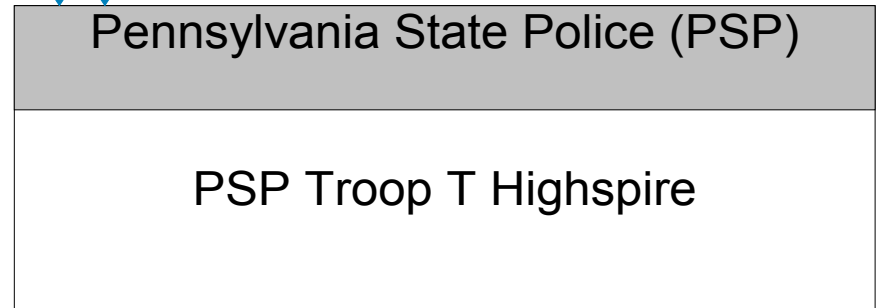
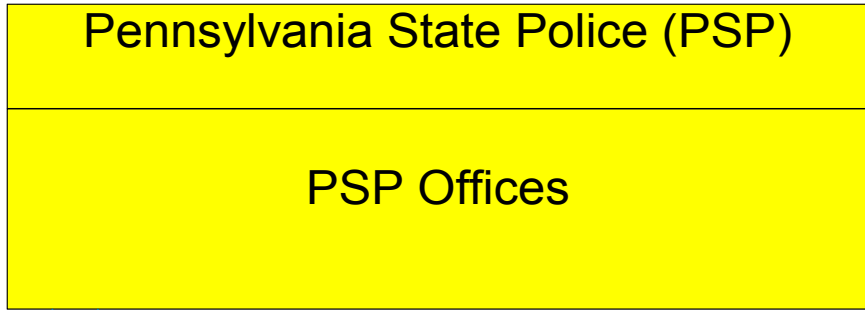
Pennsylvania State Police (PSP)

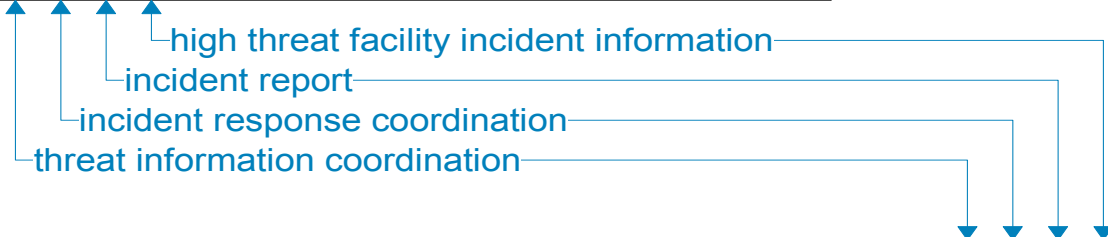
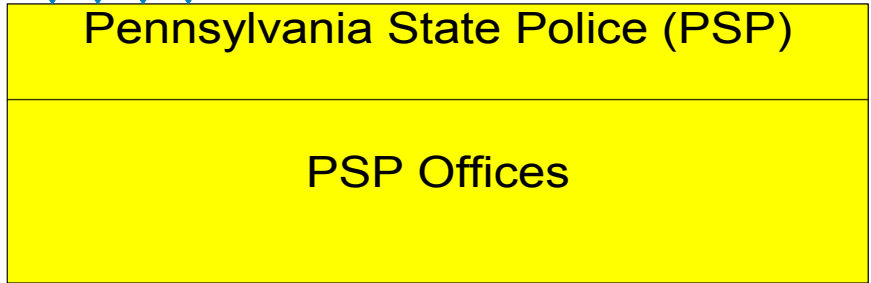
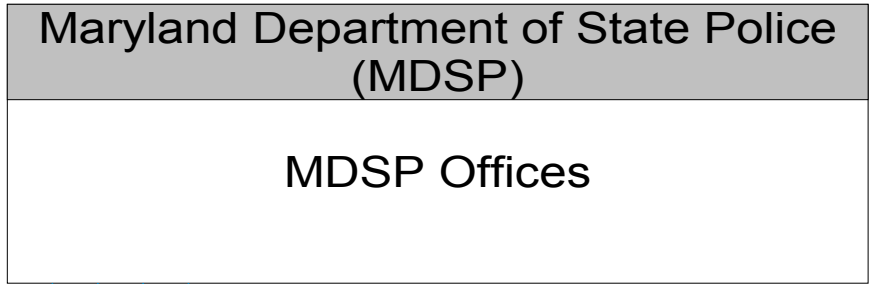
PSP Offices

———— Existing
- - - - - Planned

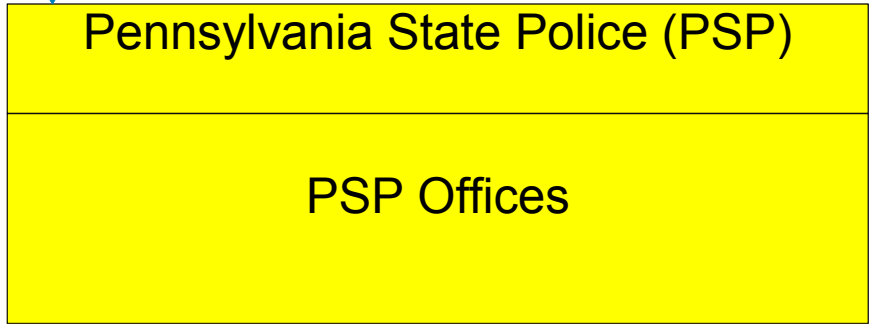


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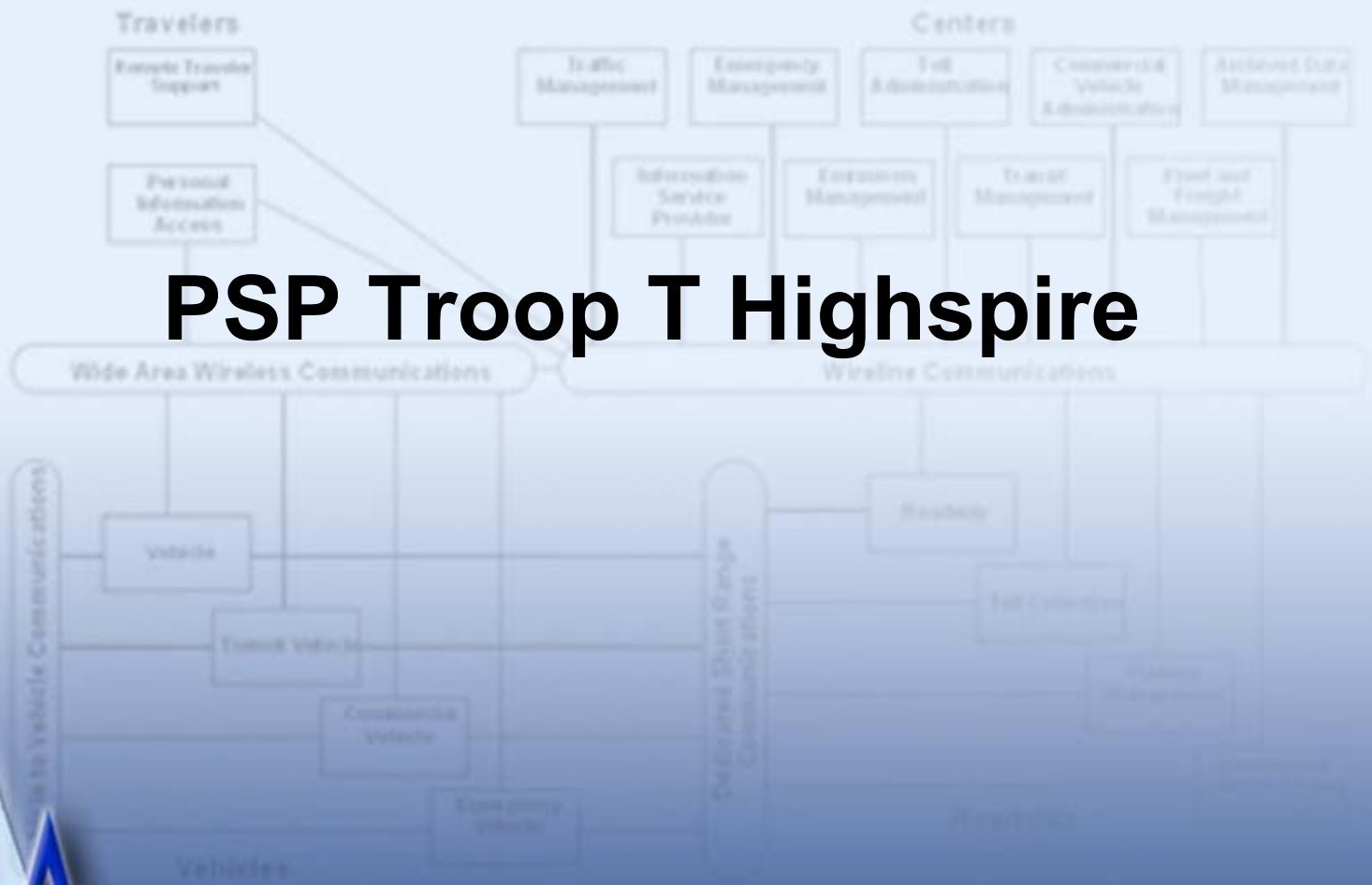


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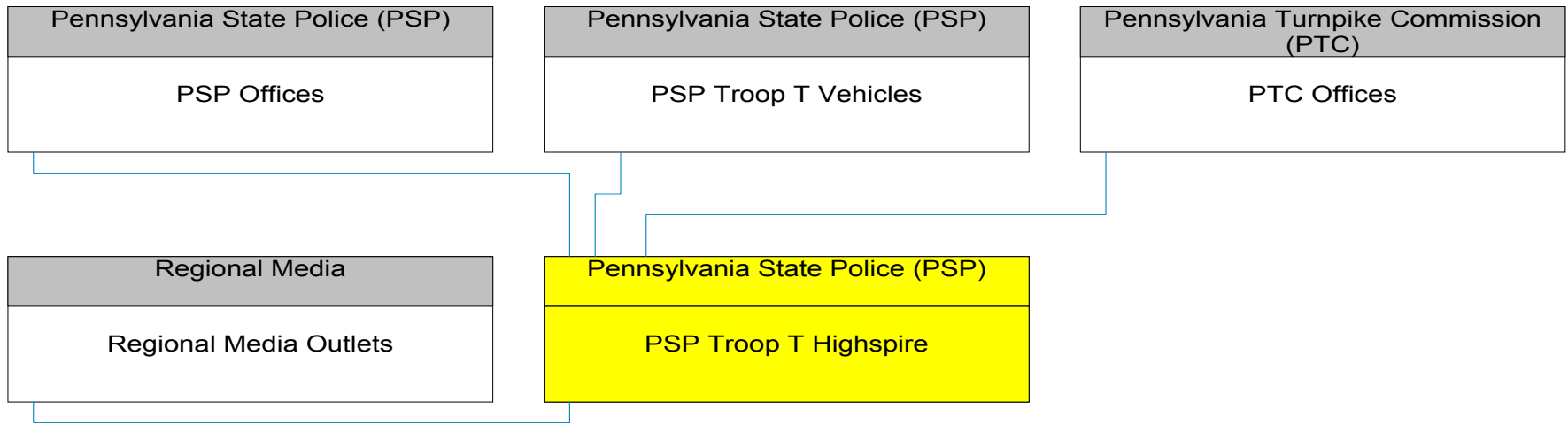
Existing
Planned

PSP Troop T Highspire



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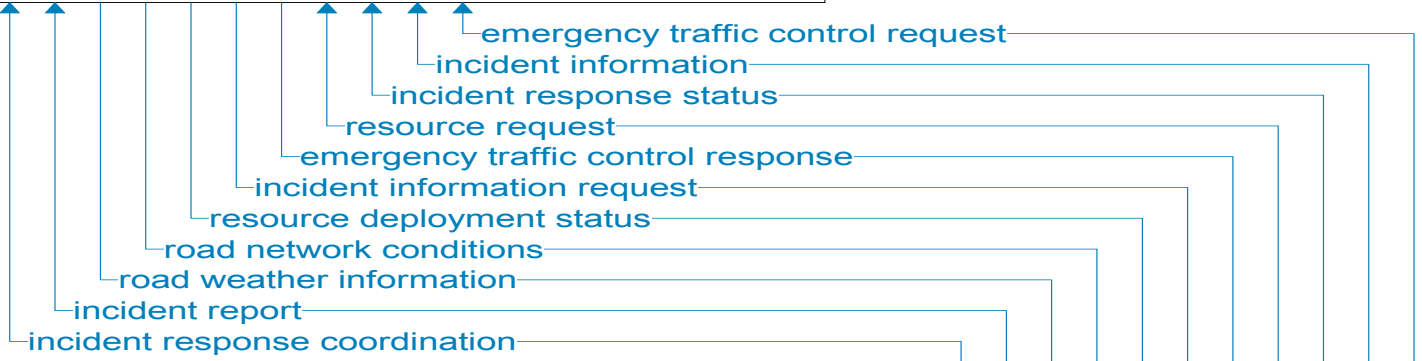
PSP Troop T Highspire Interconnect Diagram

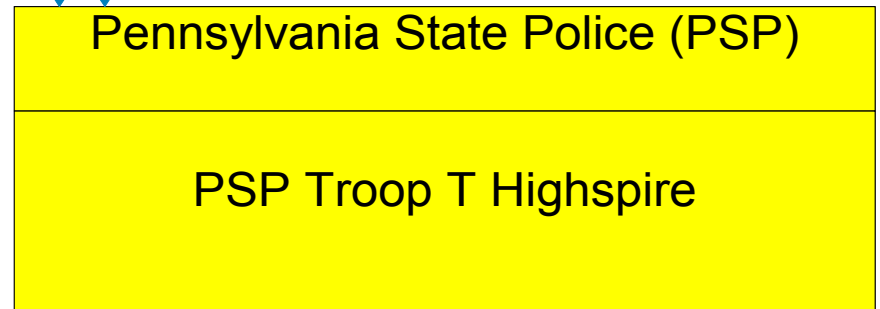
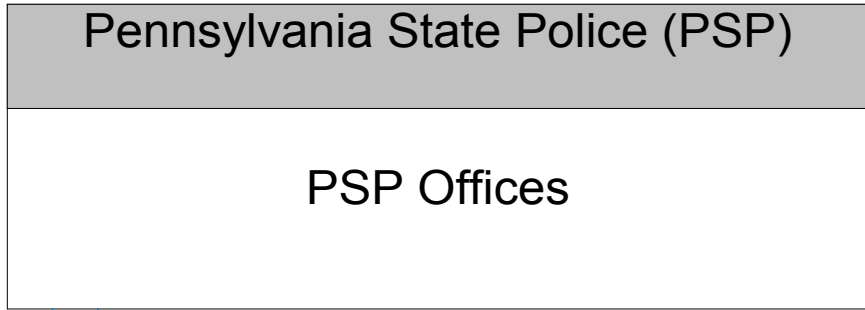


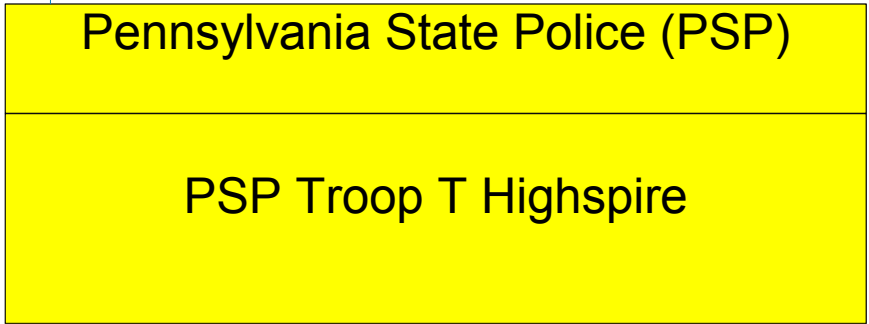
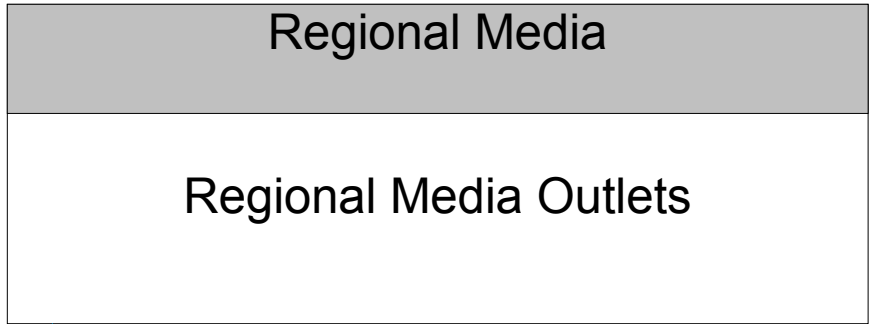
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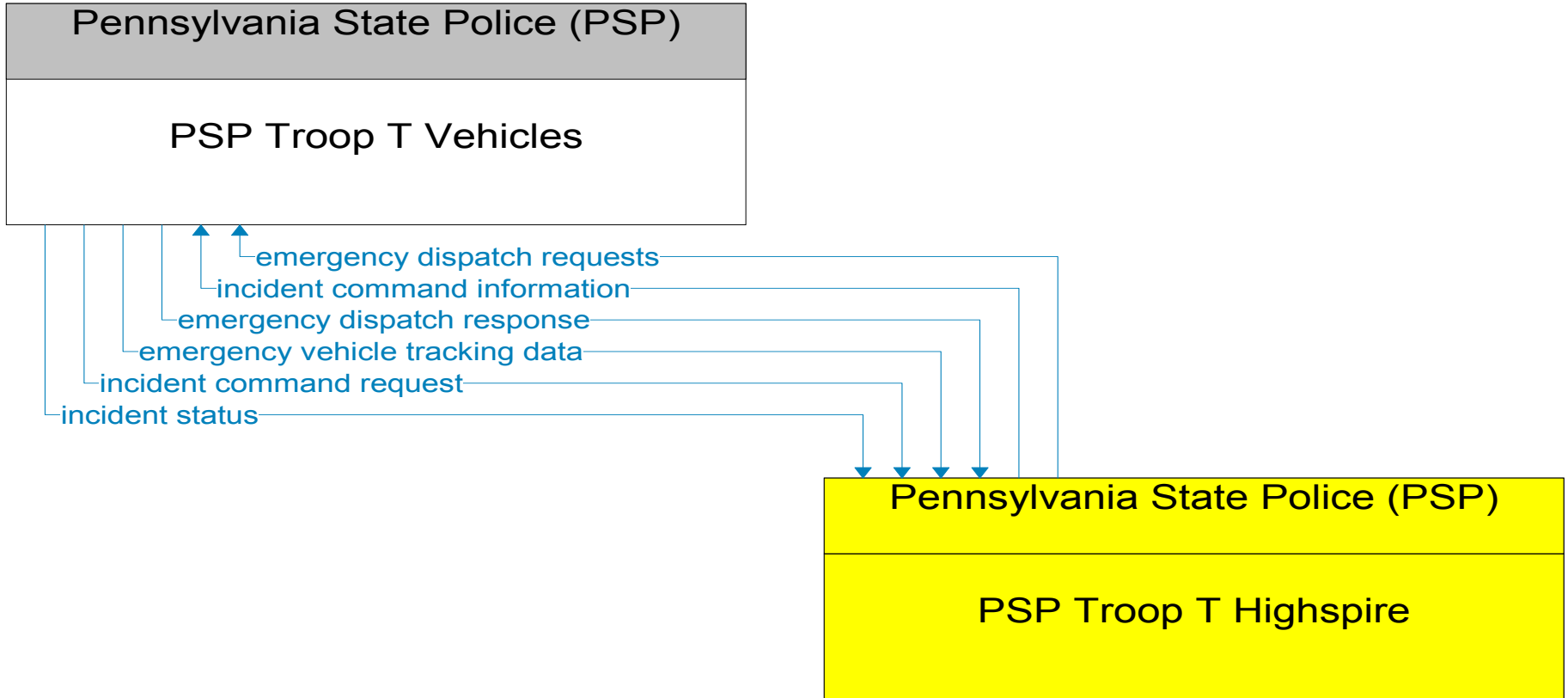
Pennsylvania Turnpike Commission (PTC)
PTC Offices

Pennsylvania State Police (PSP)
PSP Troop T Highspire



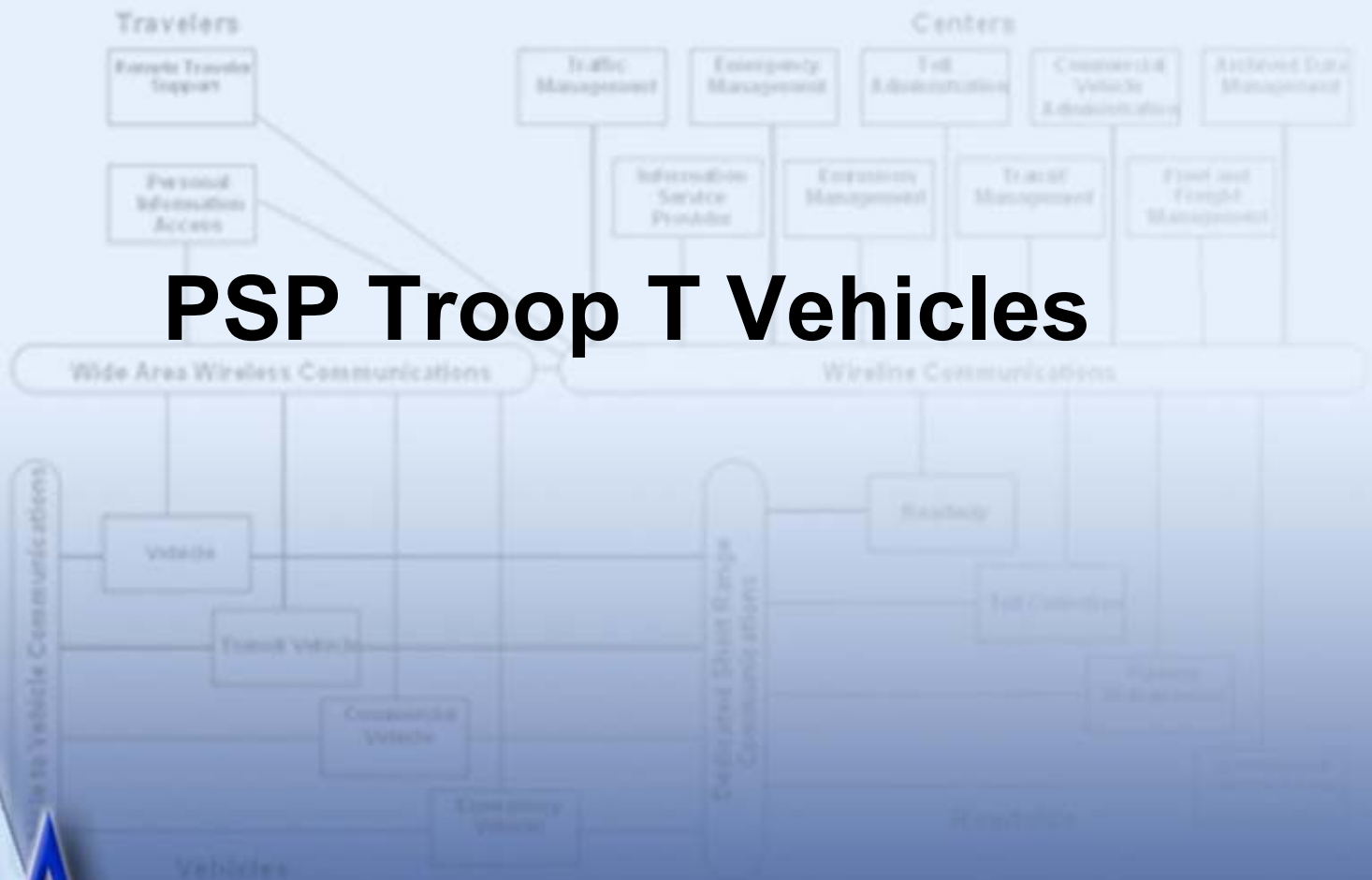






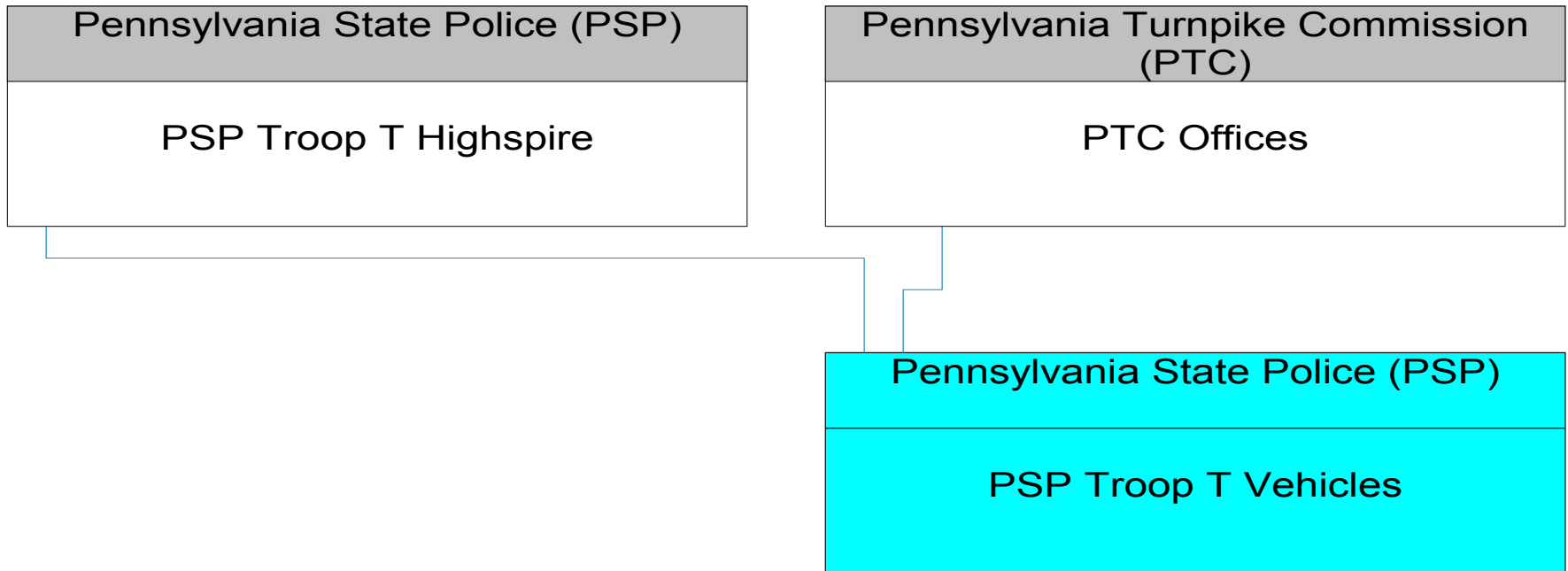
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PSP Troop T Vehicles

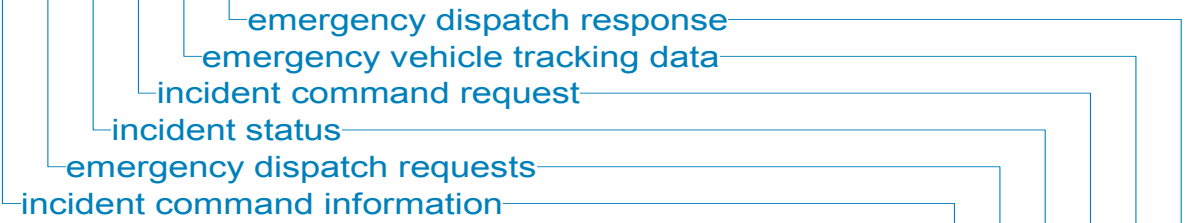
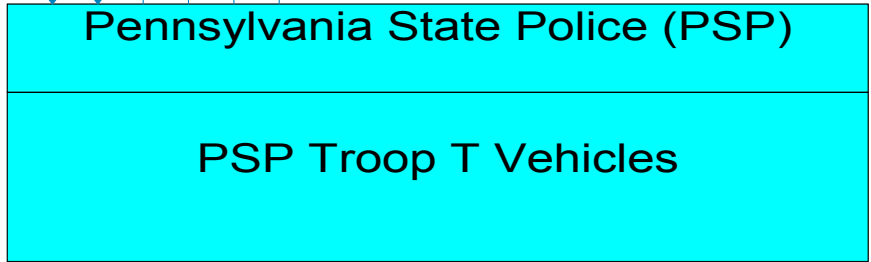
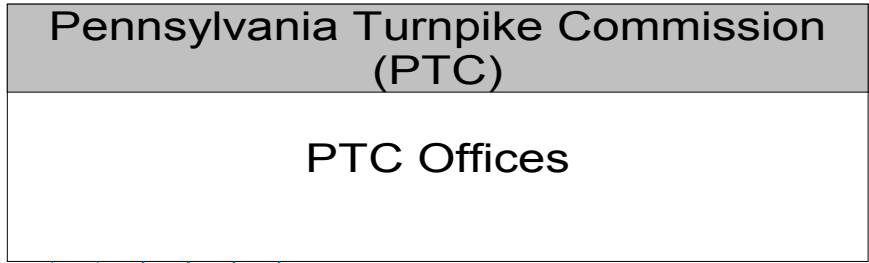


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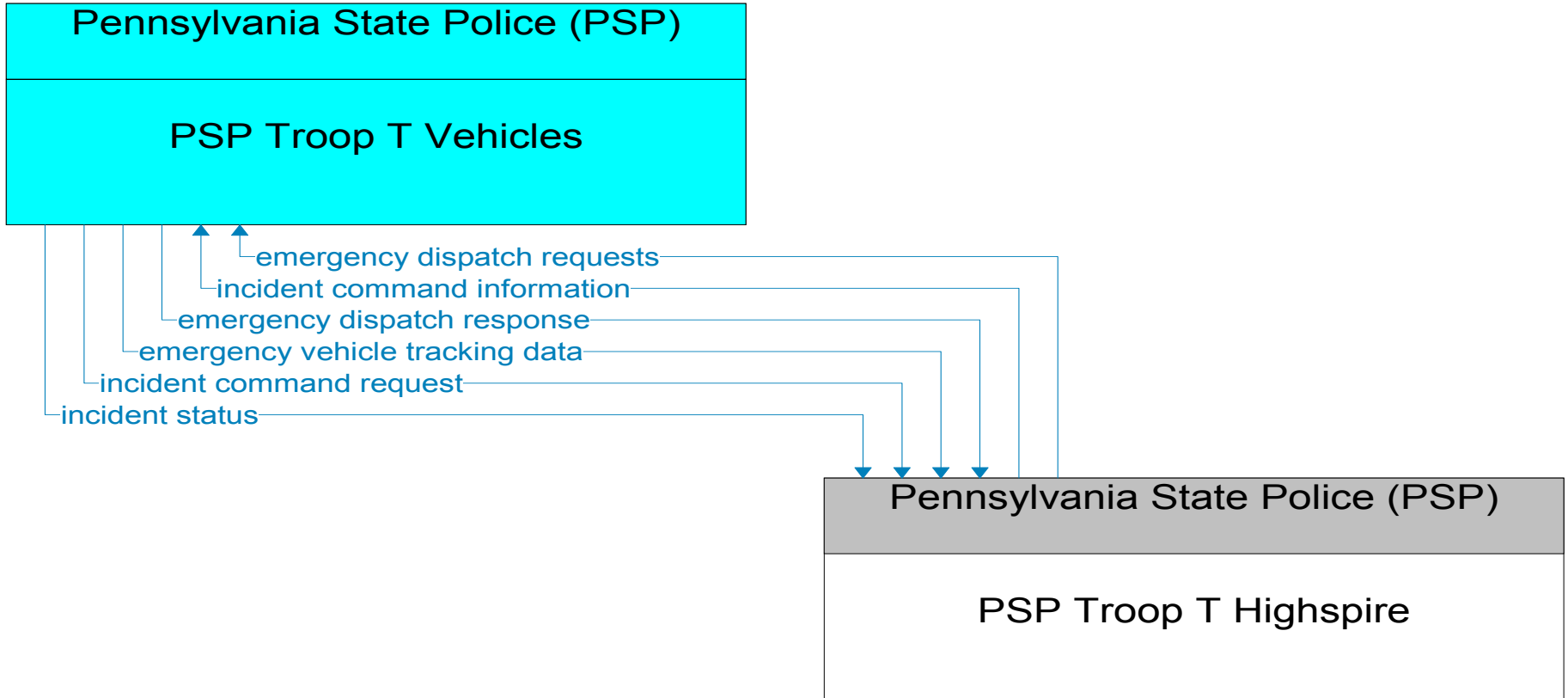
PSP Troop T Vehicles Interconnect Diagram



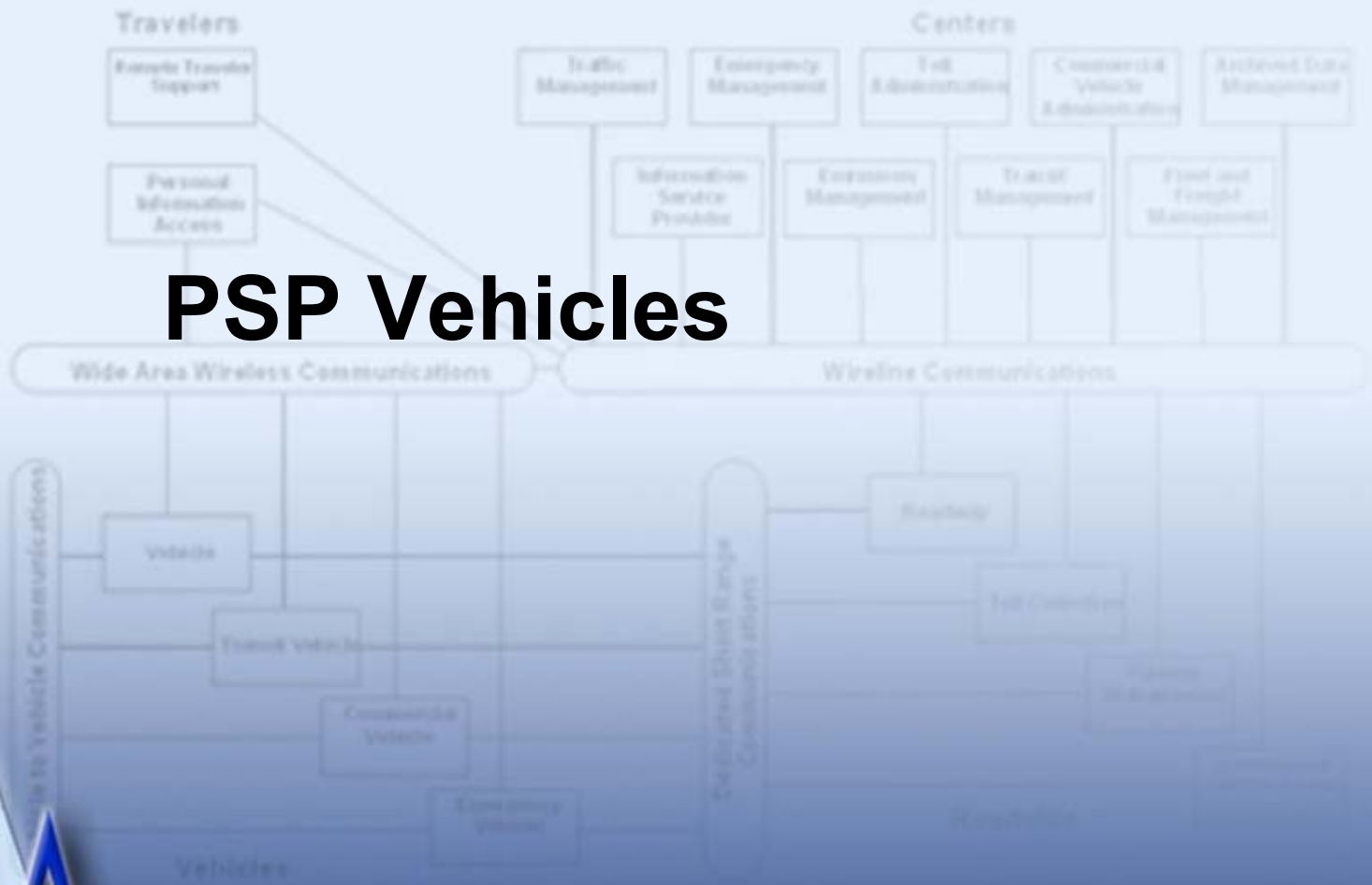
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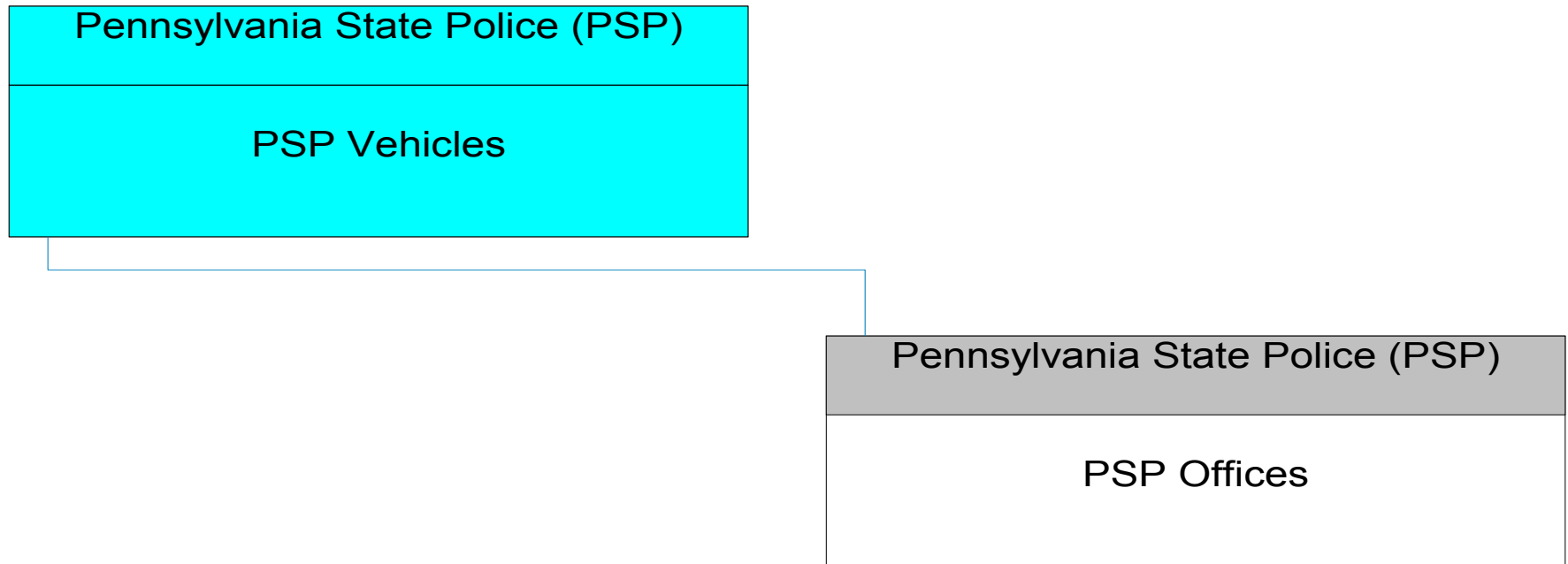


PSP Vehicles

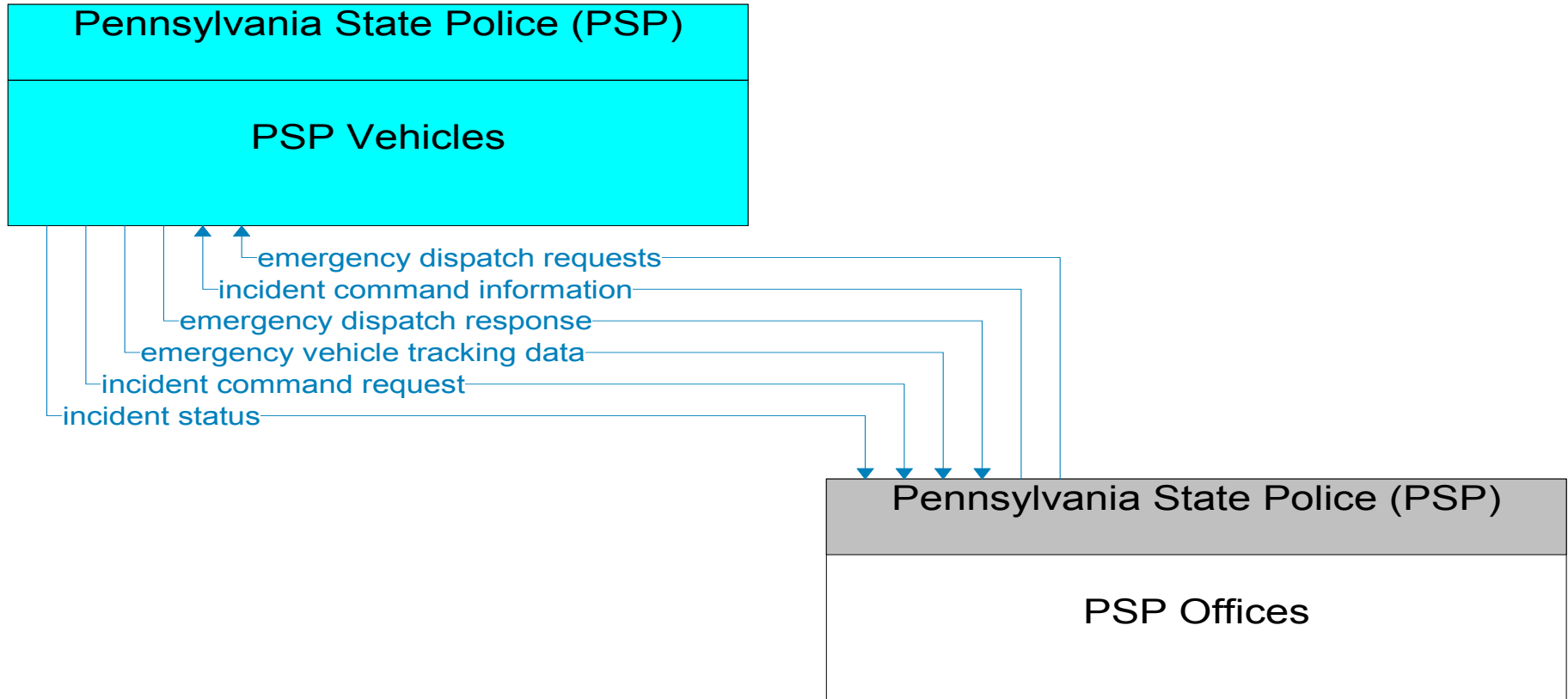


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PSP Vehicles Interconnect Diagram

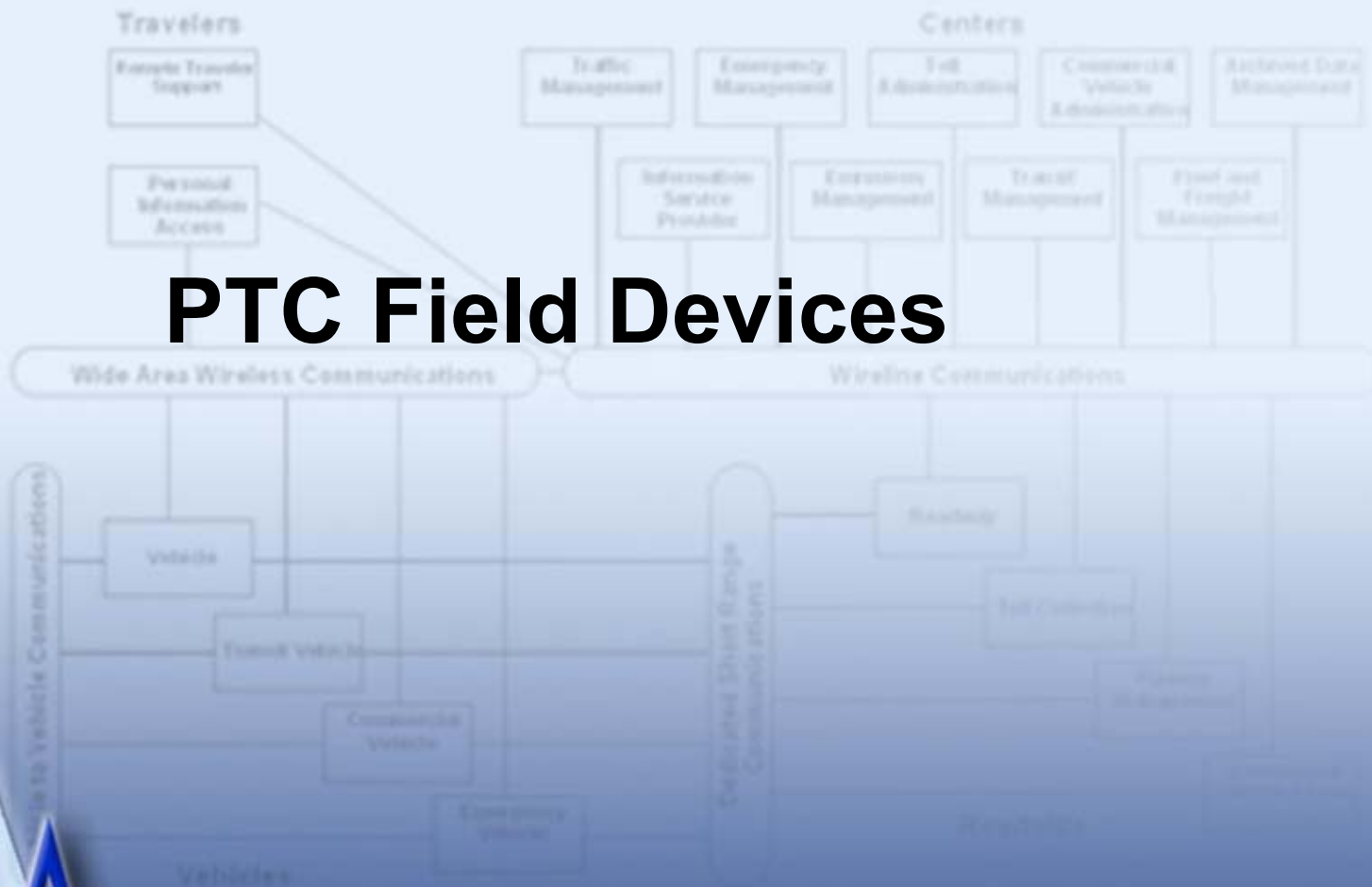


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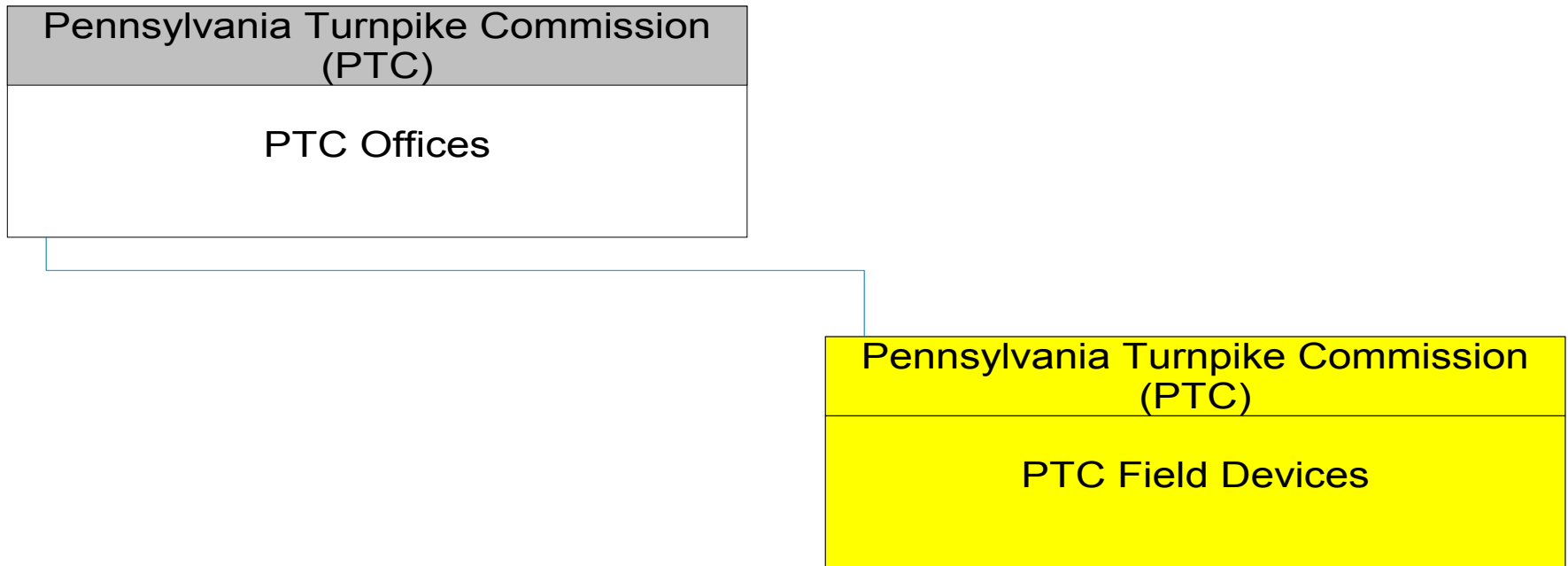


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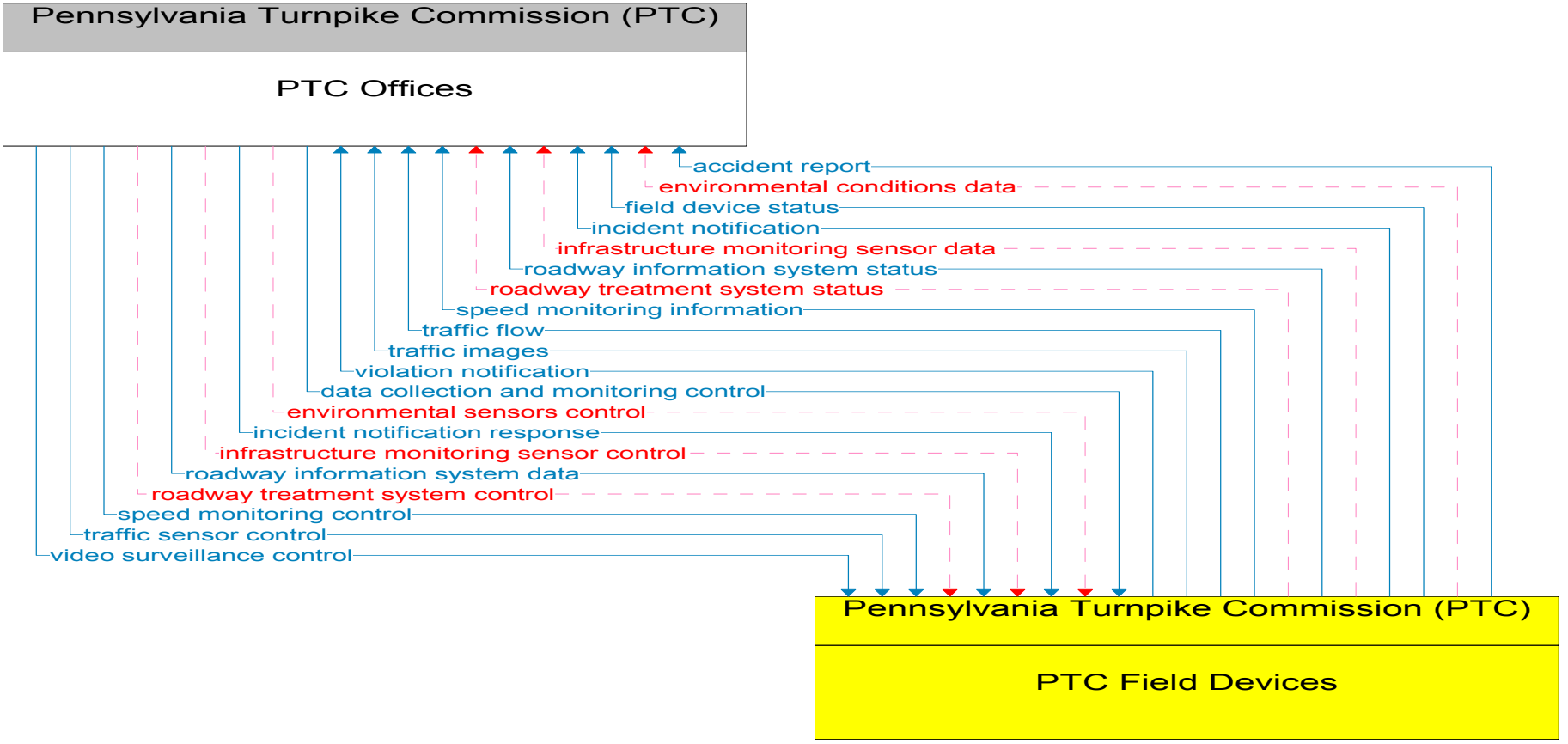
PTC Field Devices



PTC Field Devices Interconnect Diagram

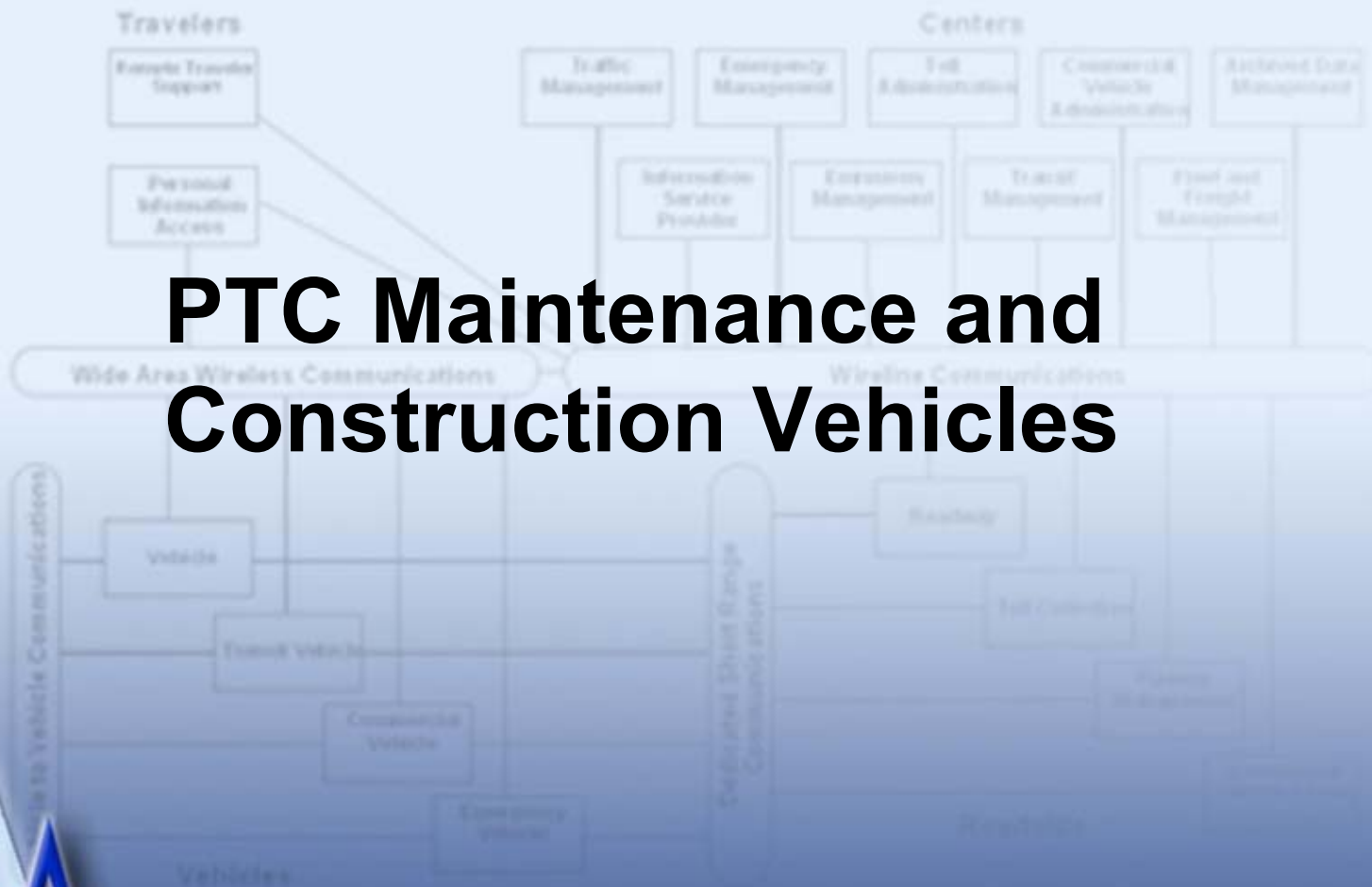


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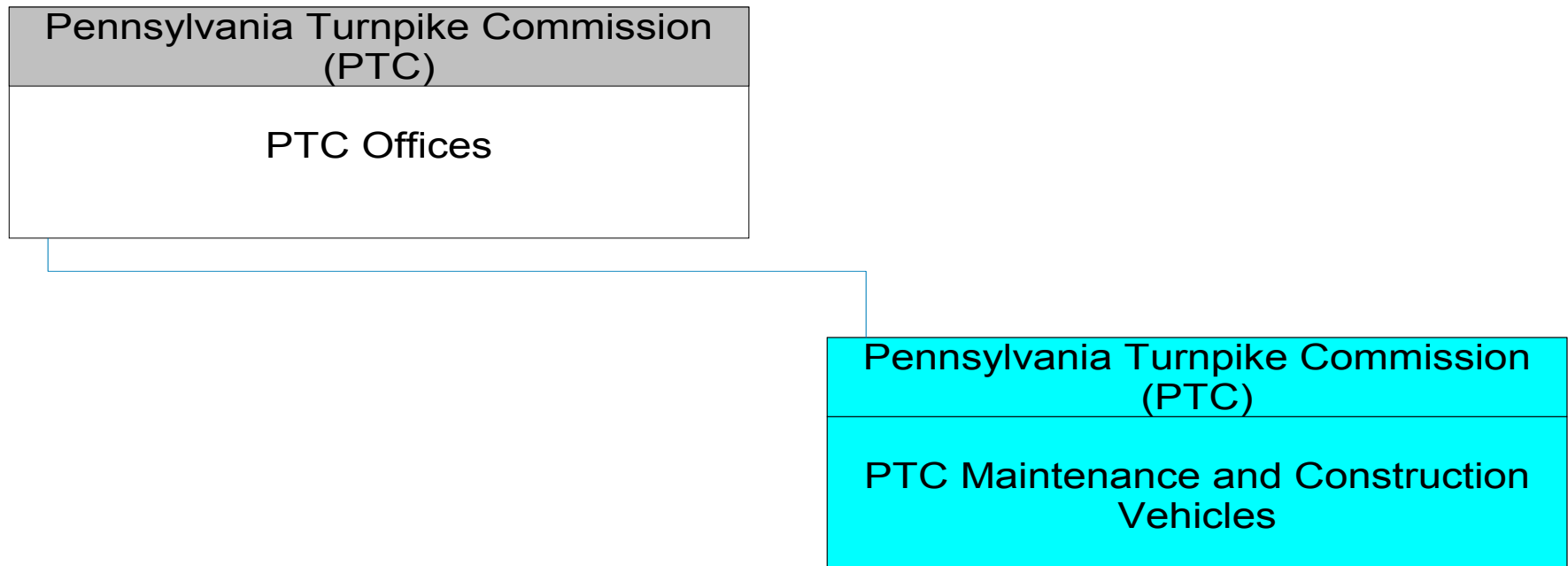


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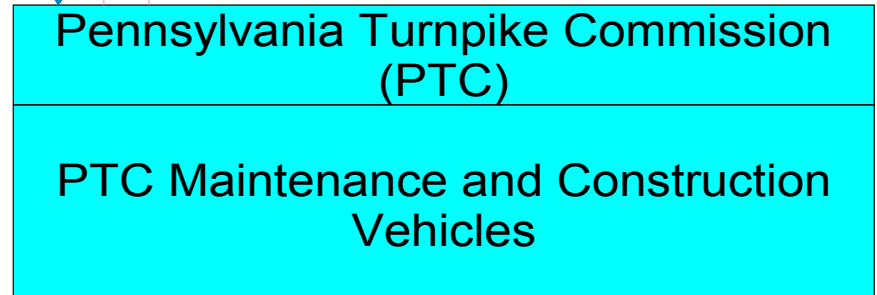
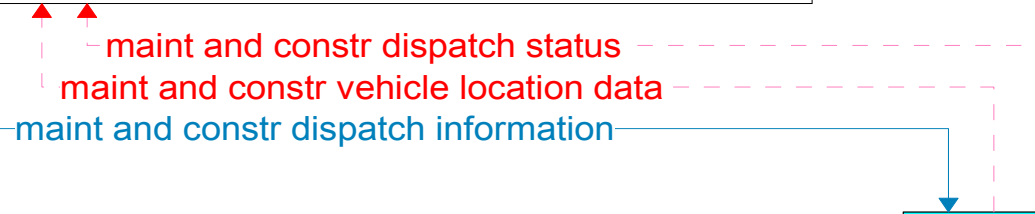
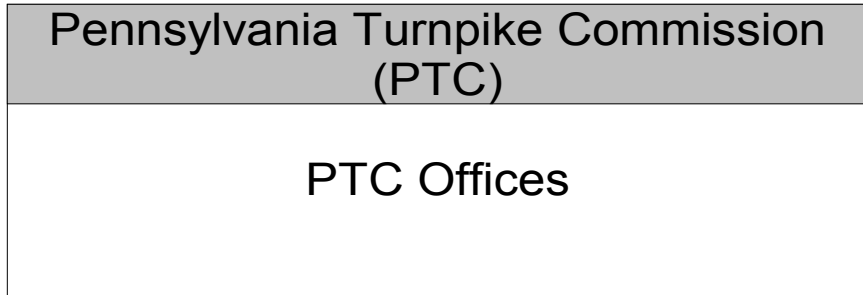
PTC Maintenance and Construction Vehicles



PTC Maintenance and Construction Vehicles Interconnect Diagram

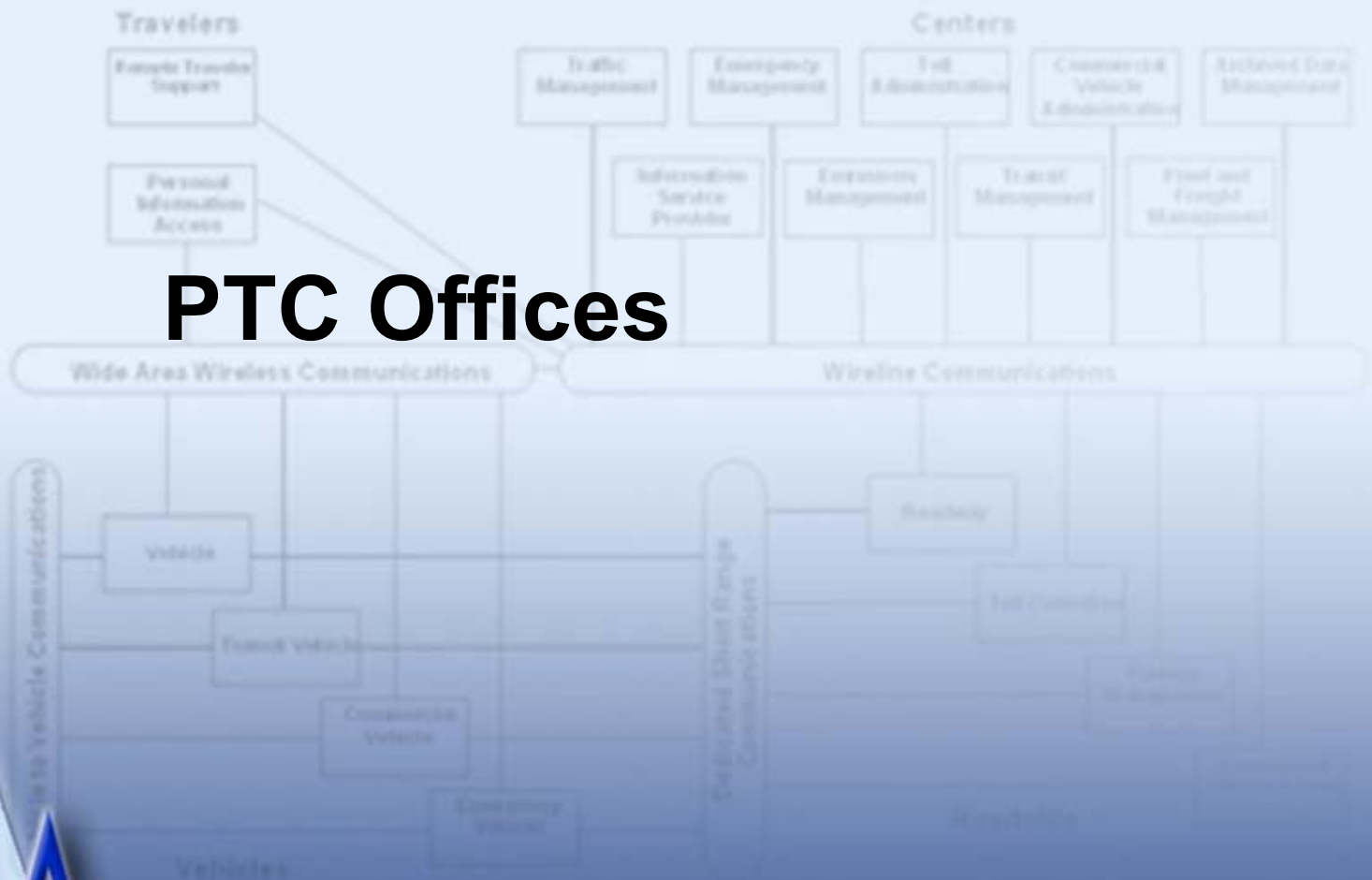


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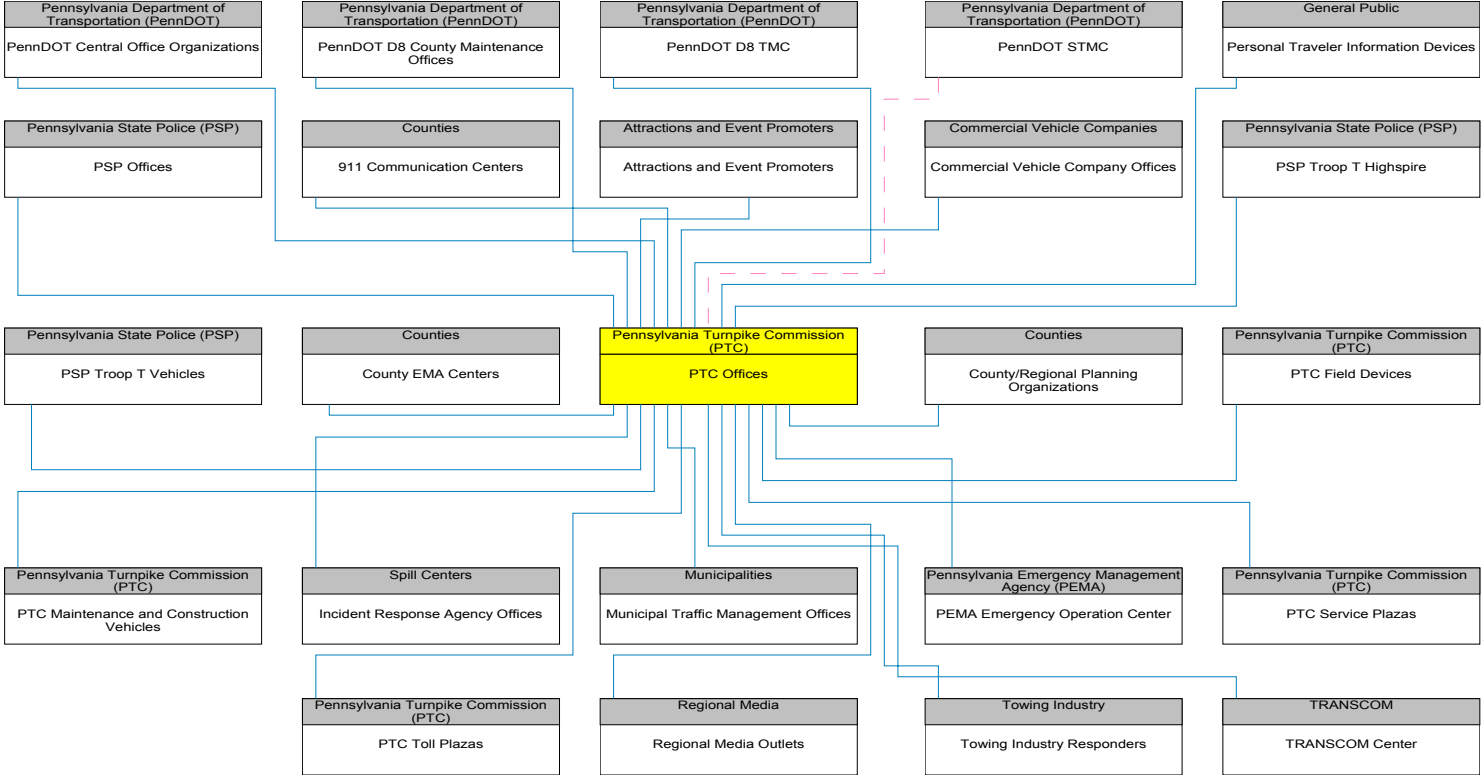
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PTC Offices

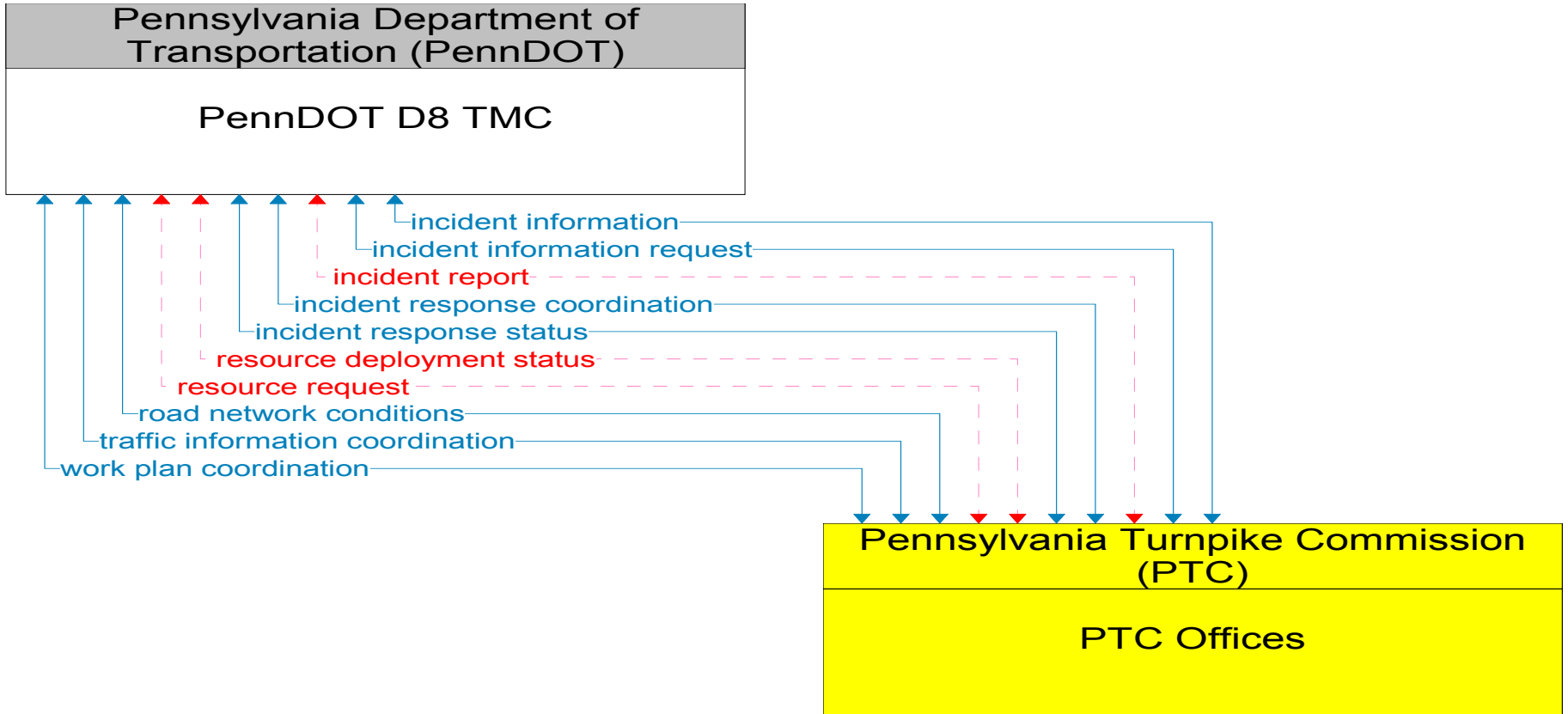


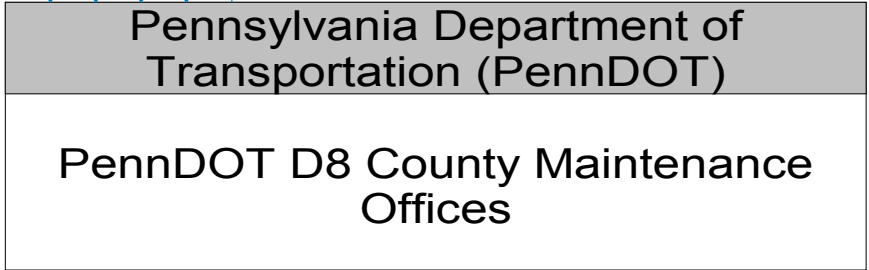
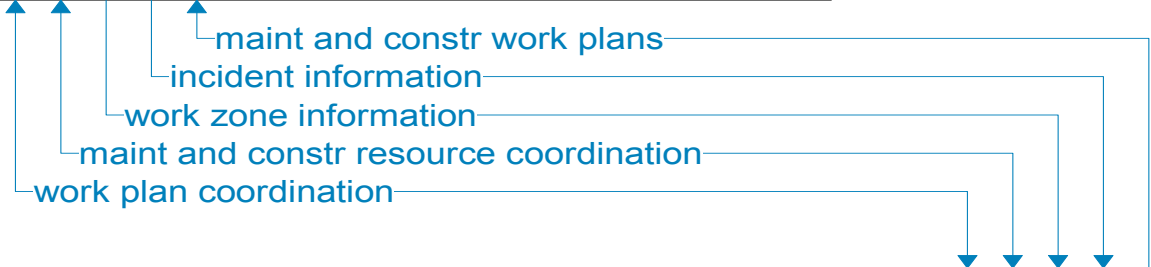
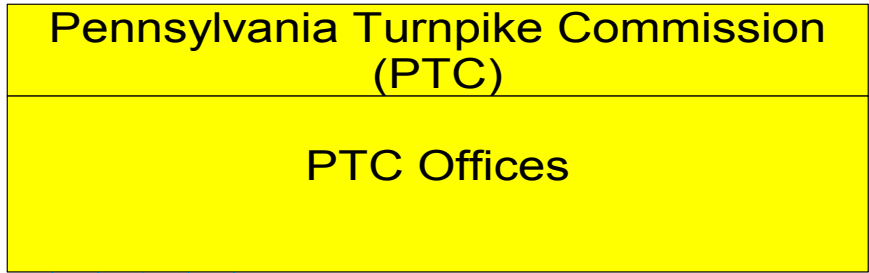
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PTC Offices Interconnect Diagram

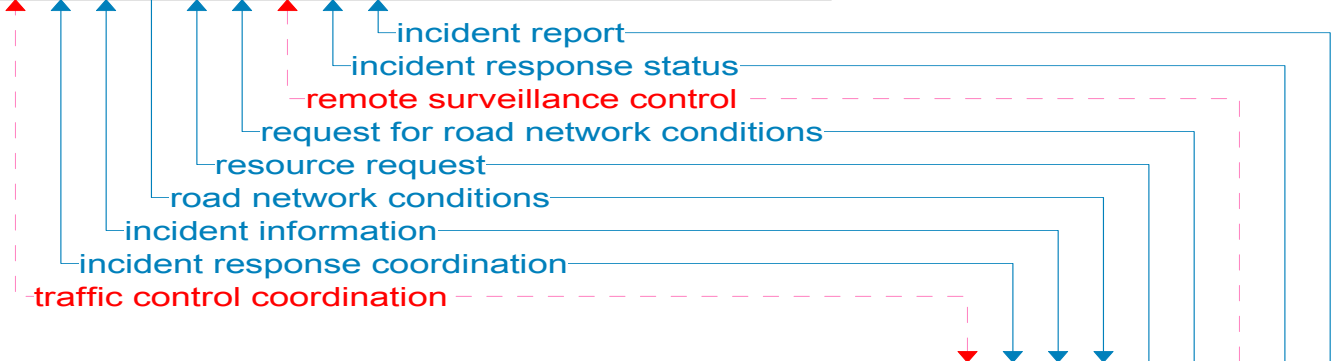
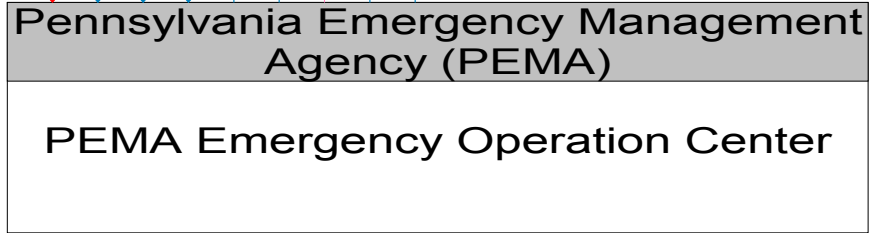
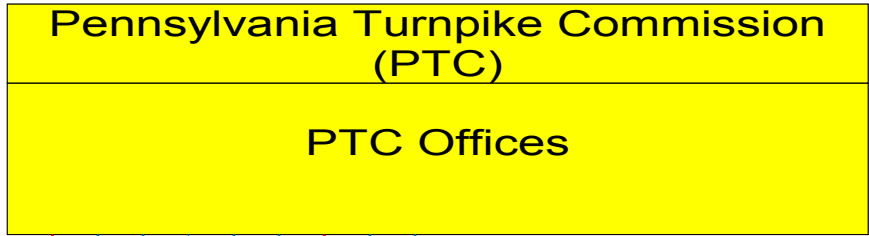


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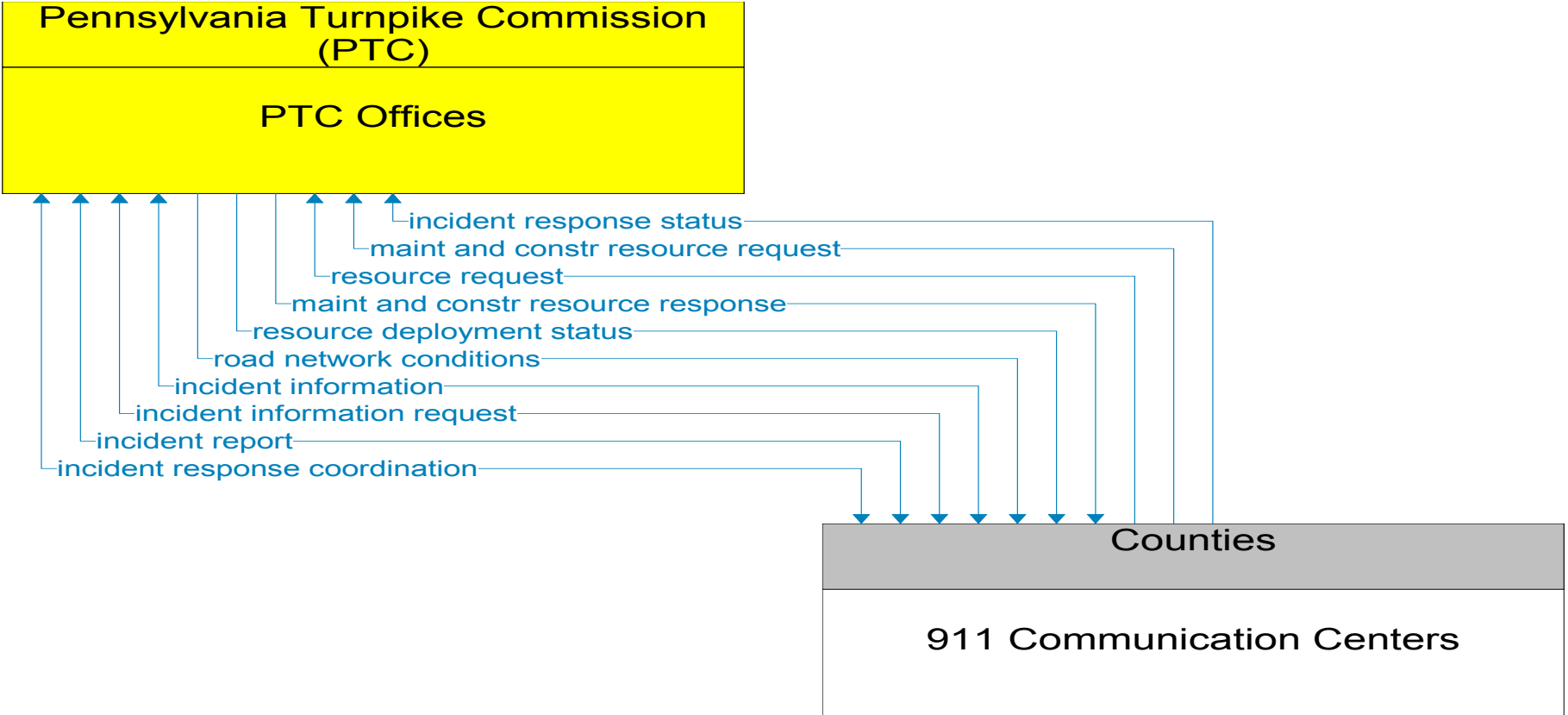




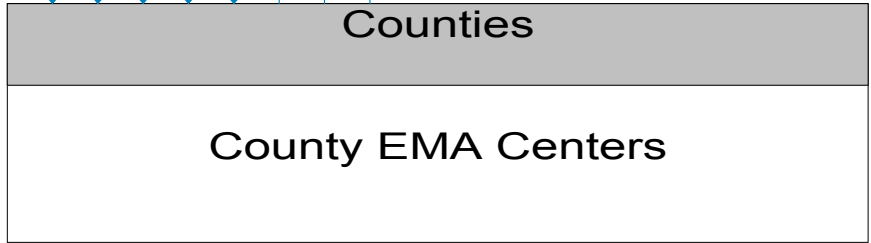
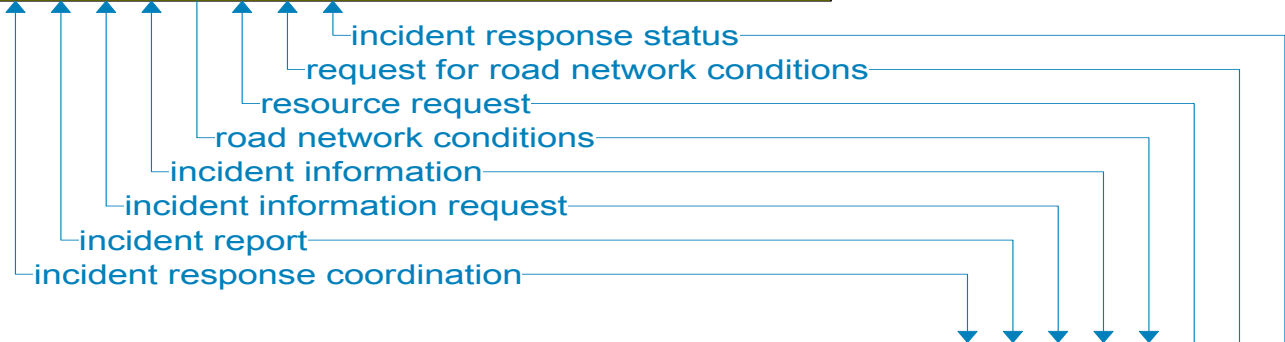
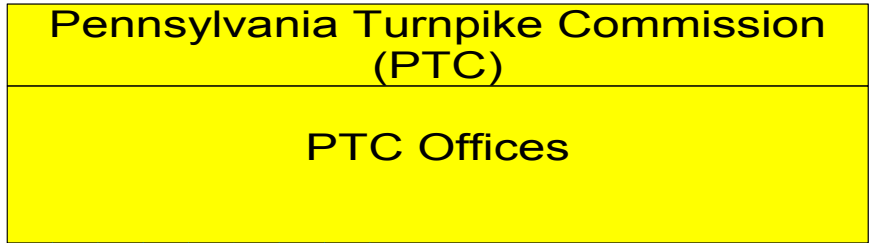
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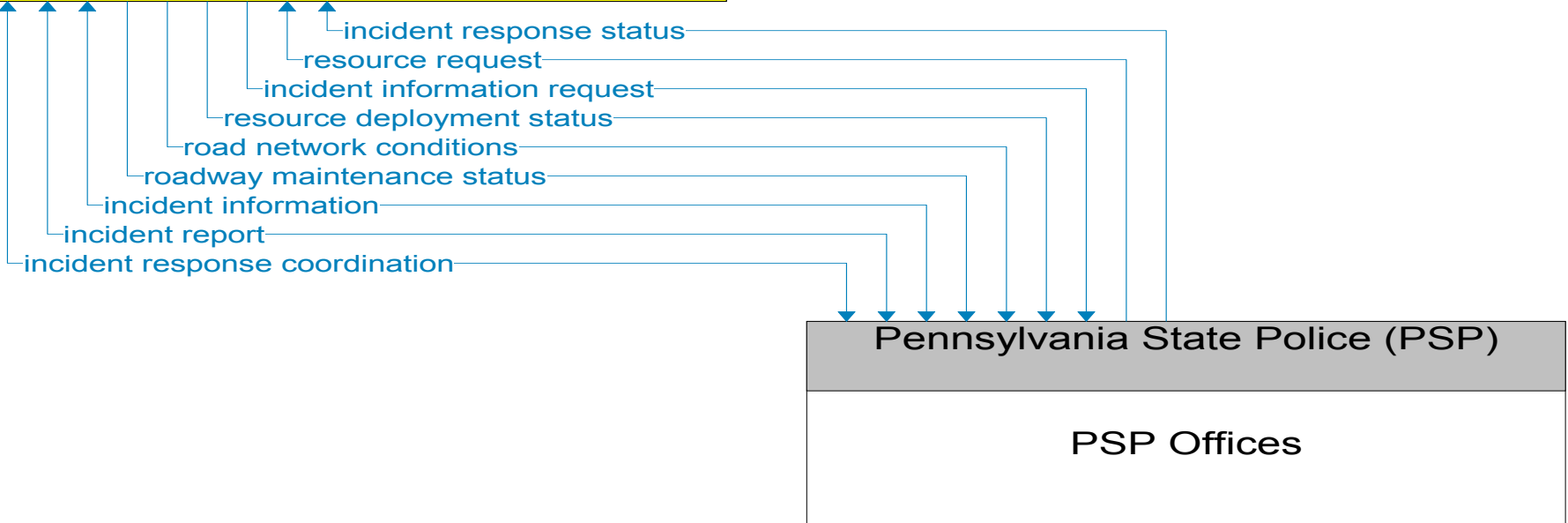
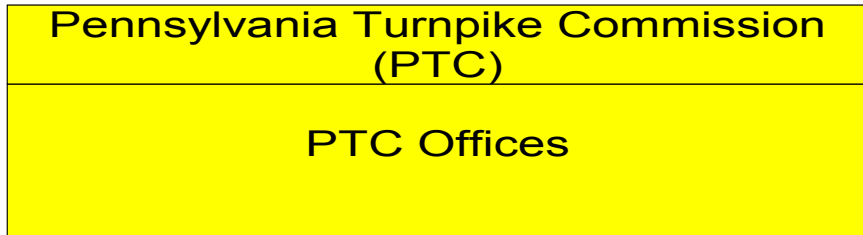
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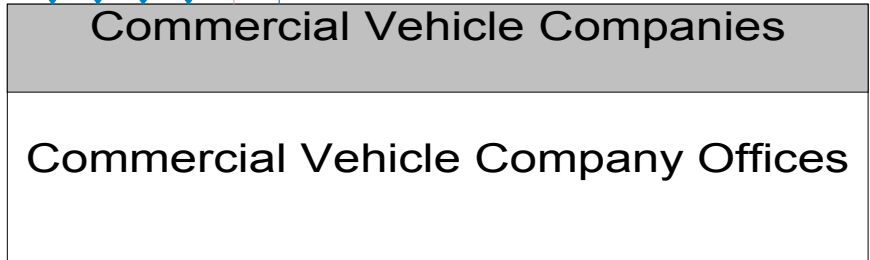
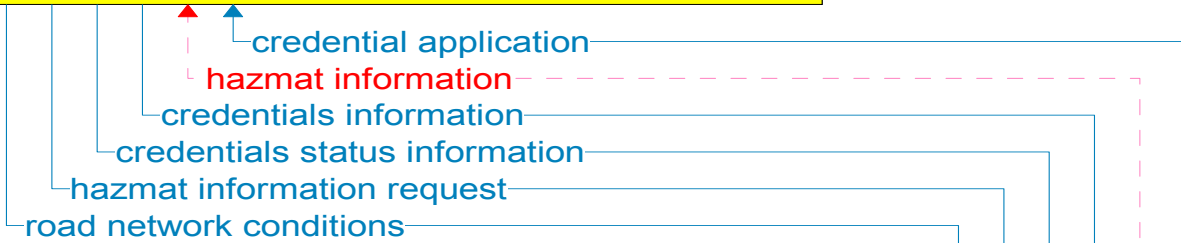
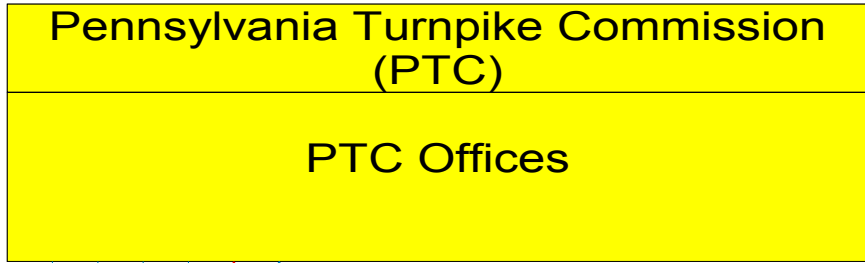
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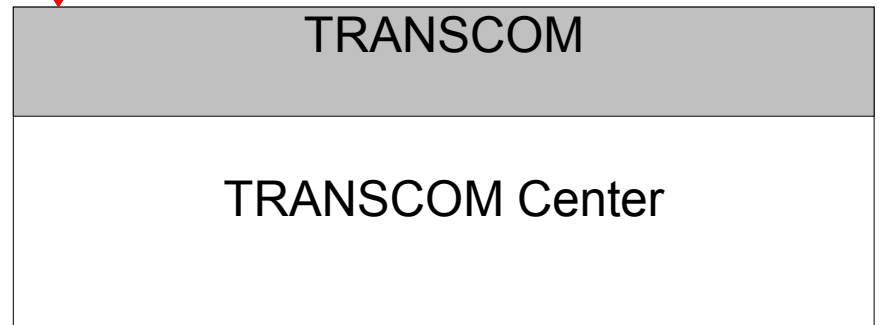
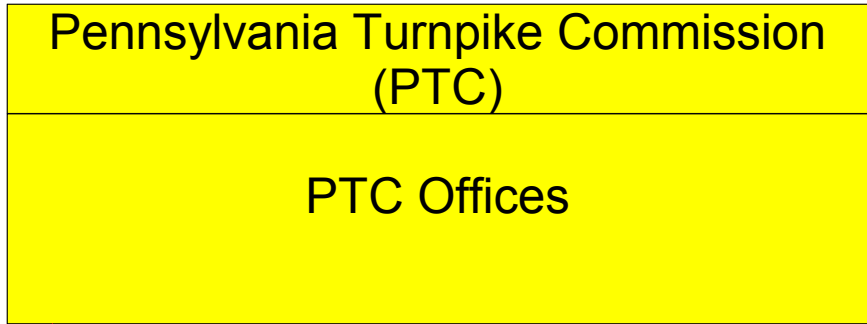


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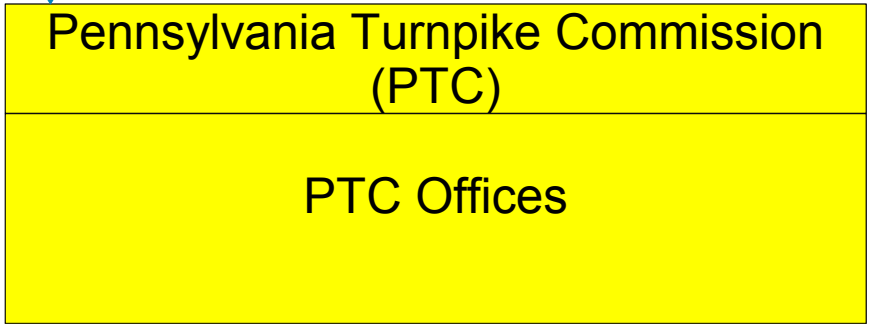
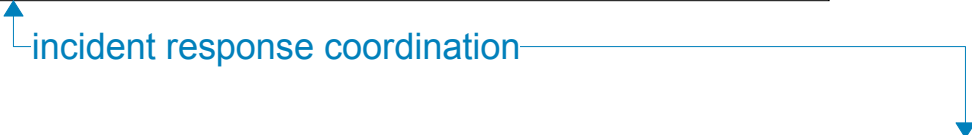
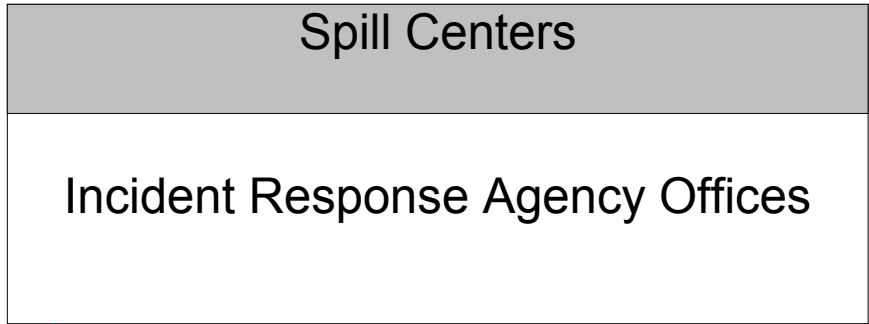


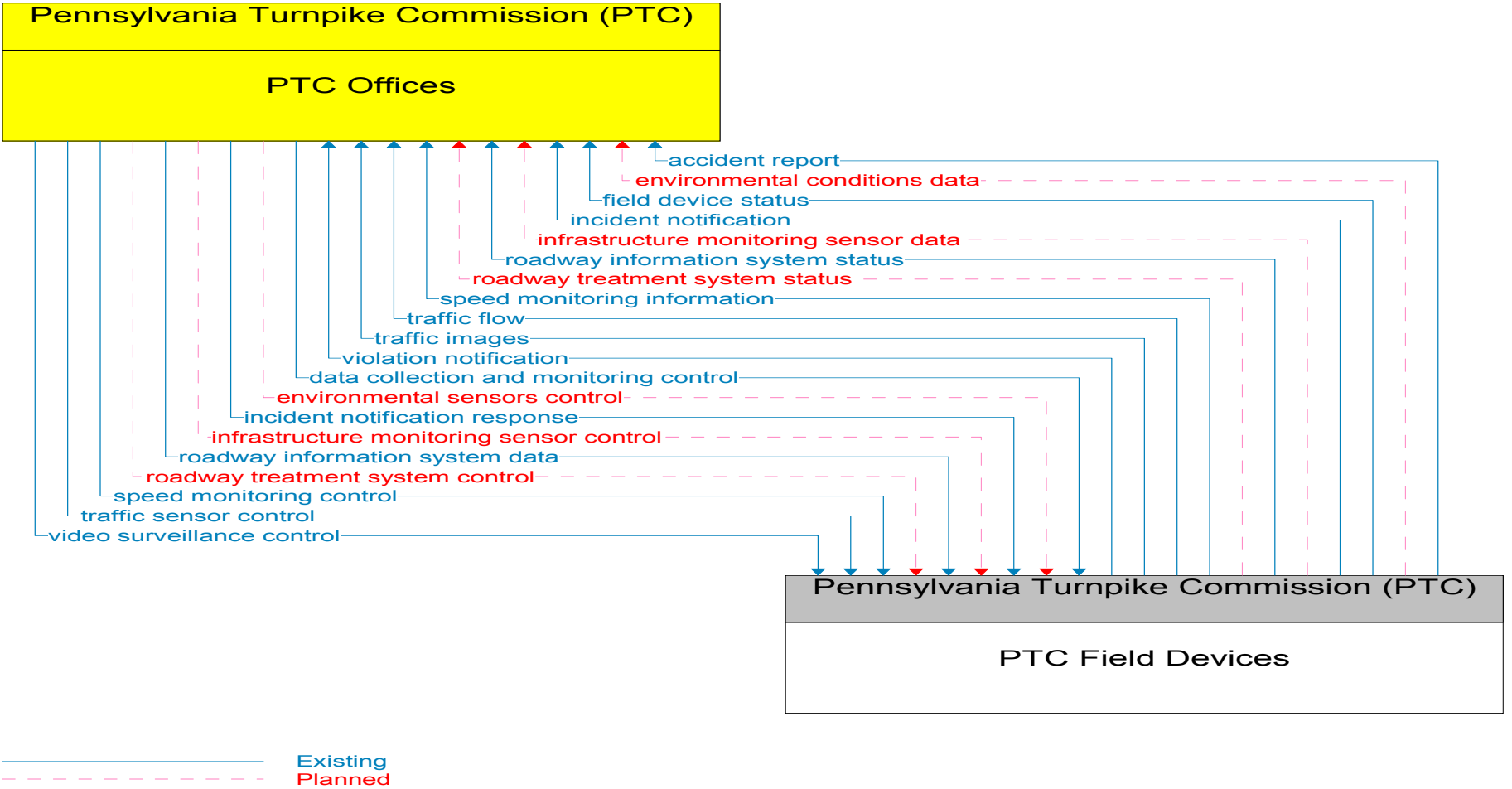
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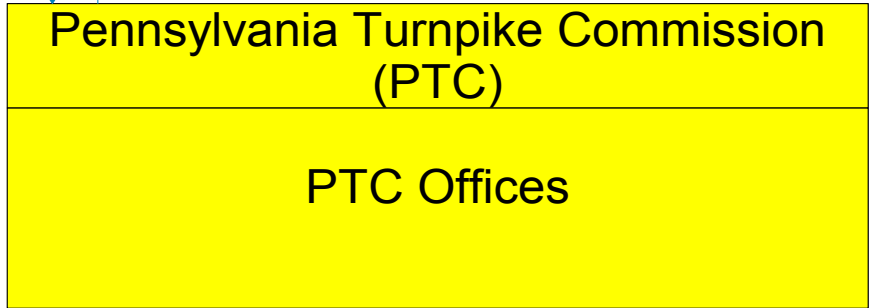
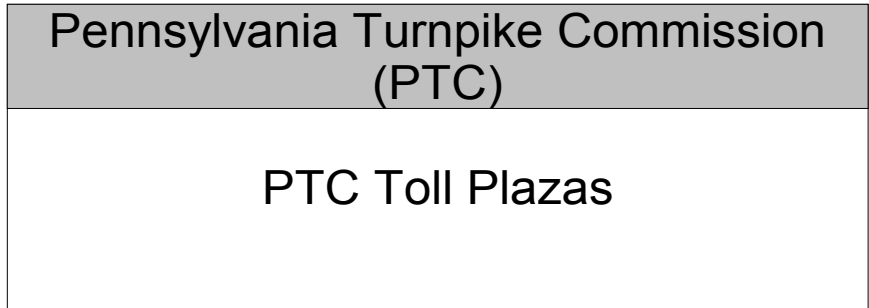




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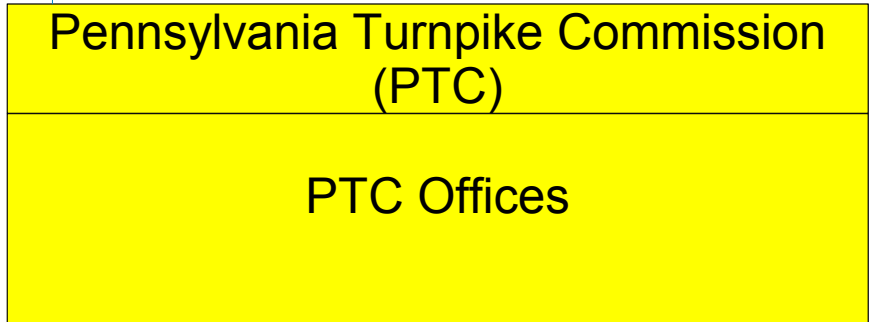
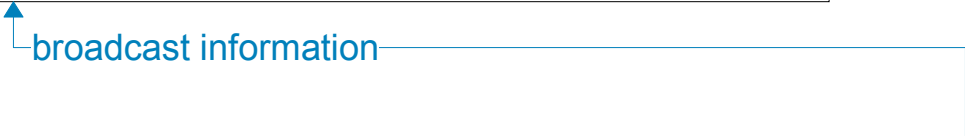
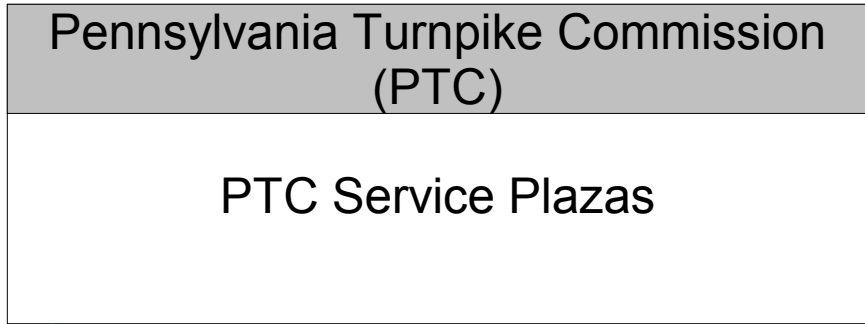




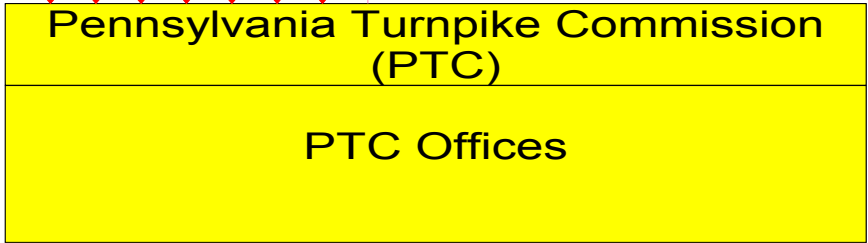
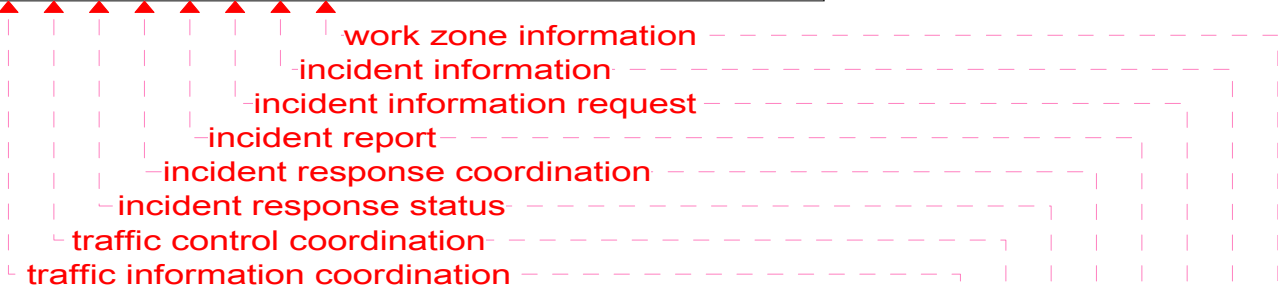
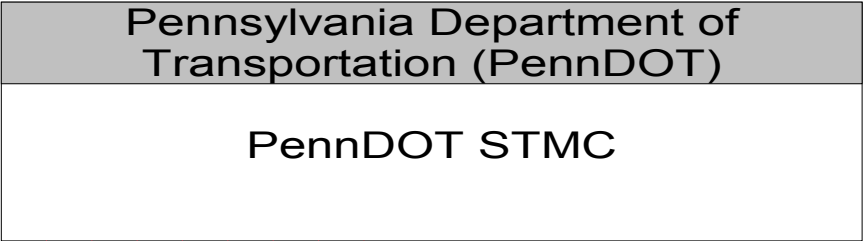


toll instructions
toll transactions

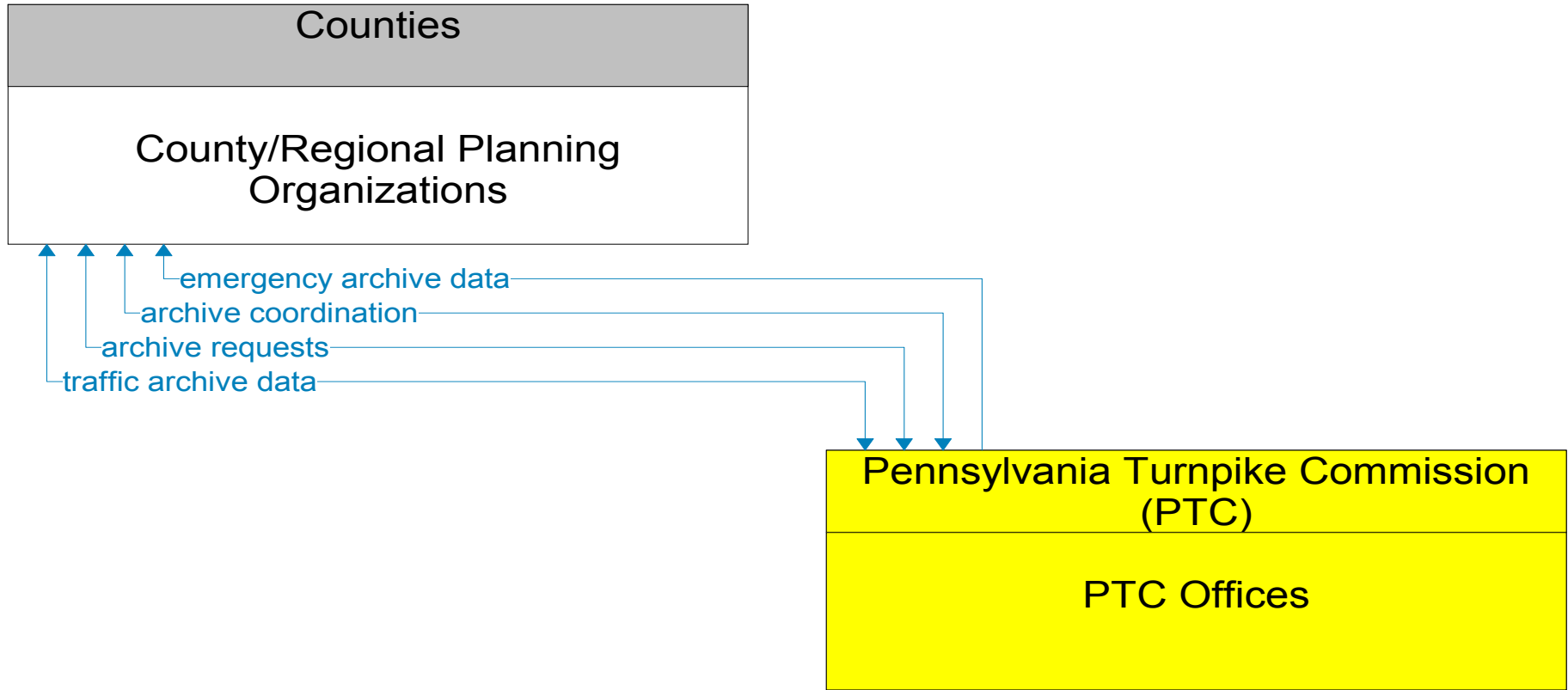
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----- Planned

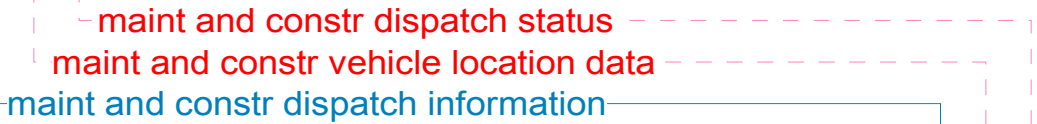
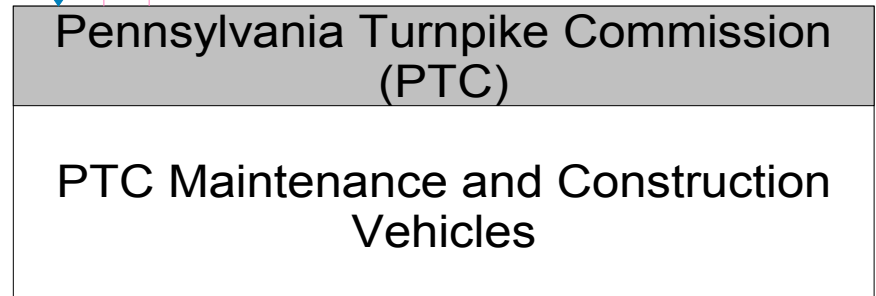
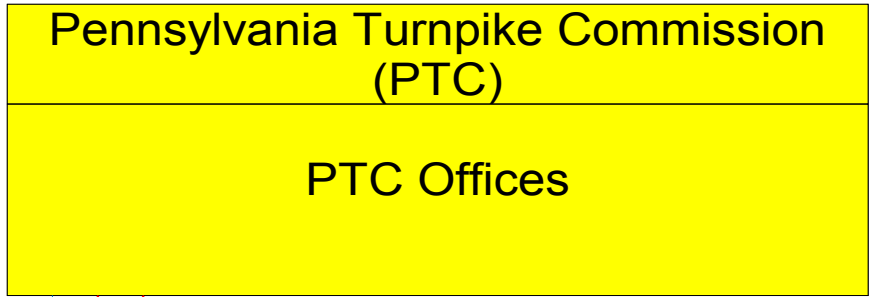


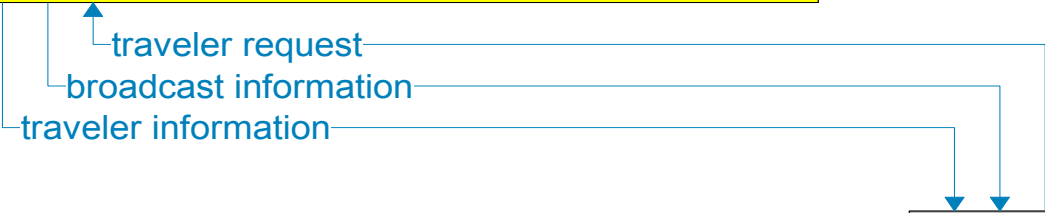
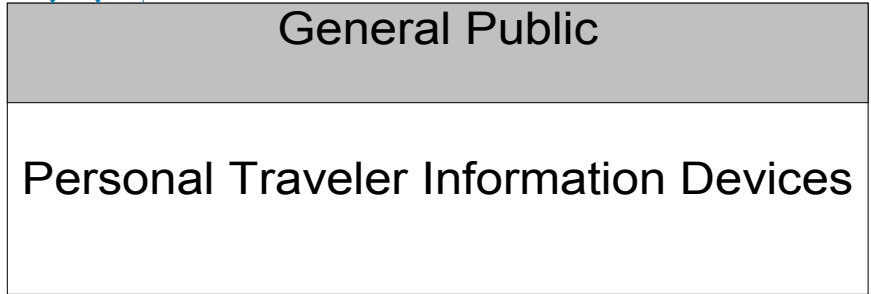
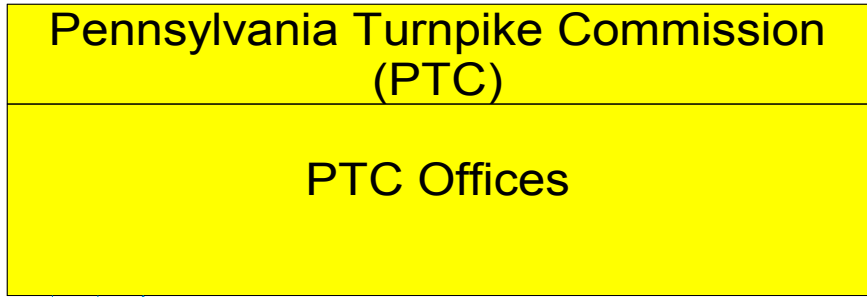
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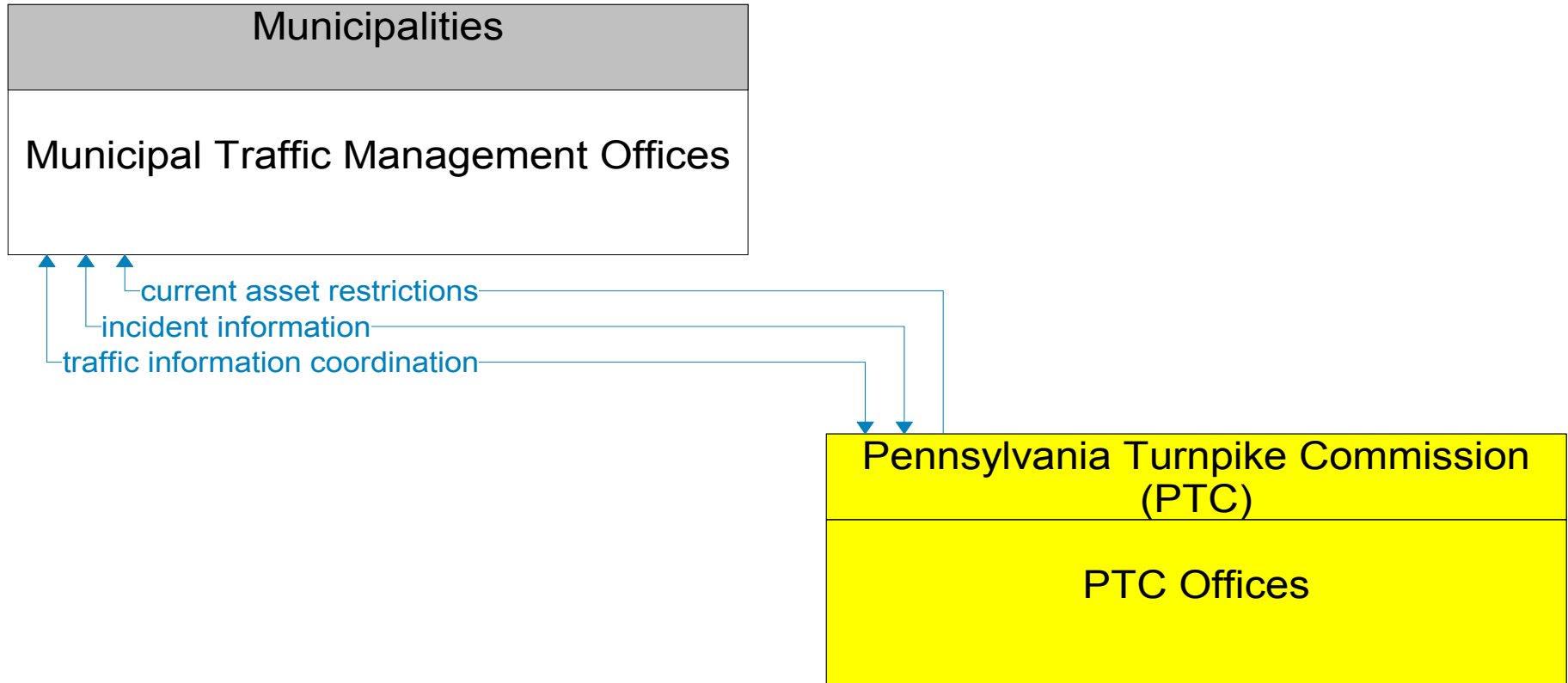
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- - - - - Planned



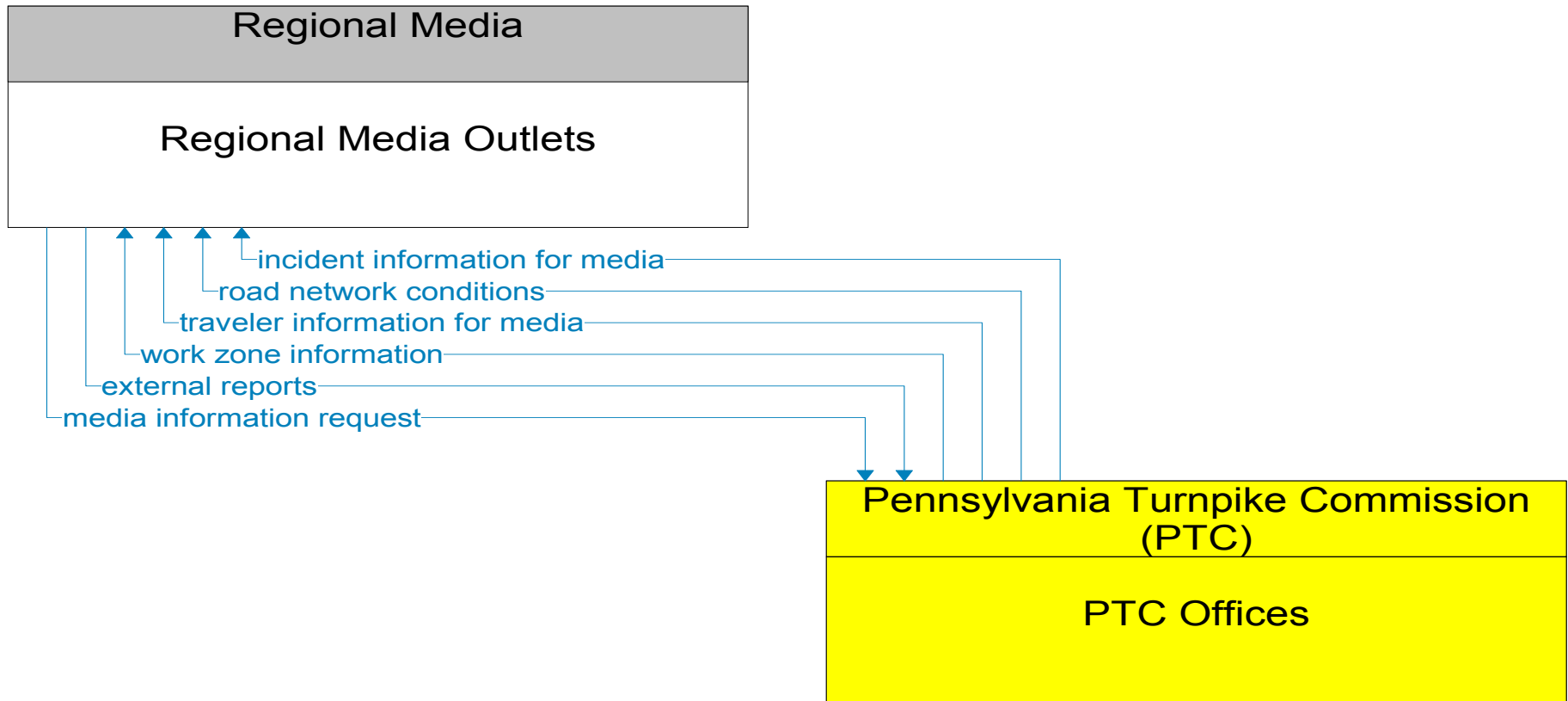




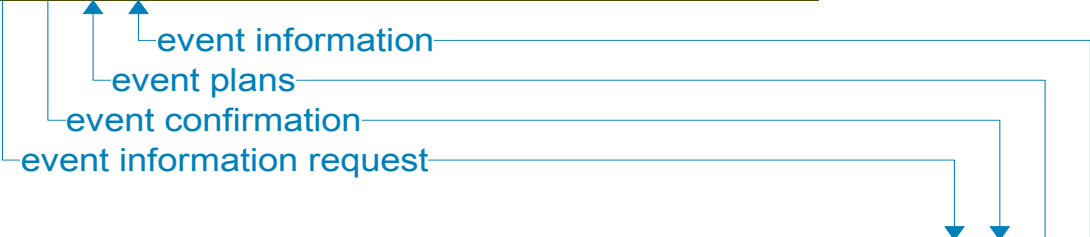
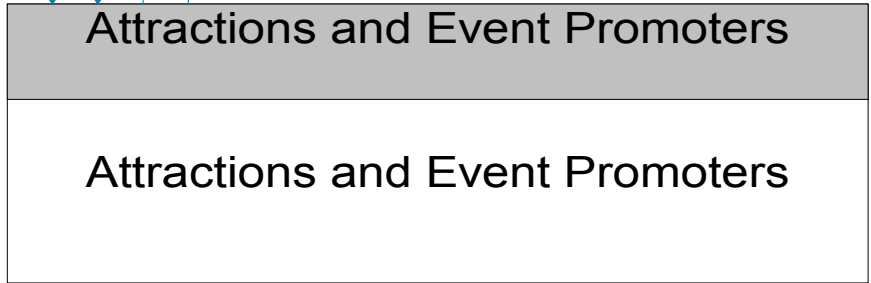
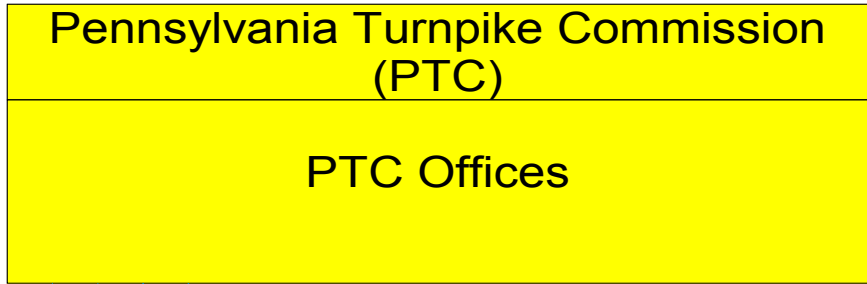
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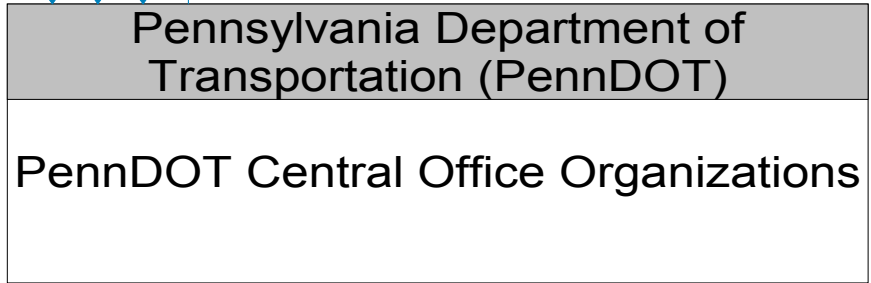
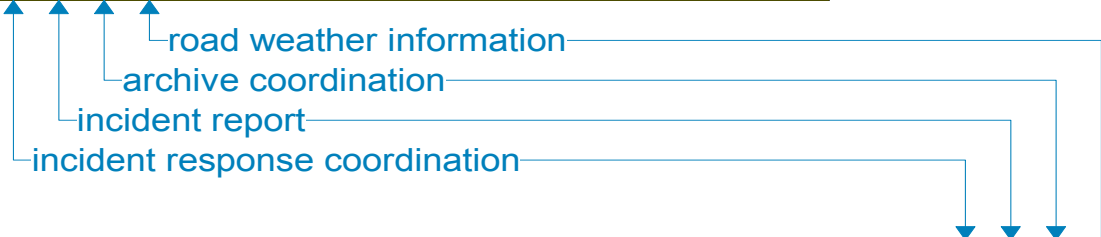
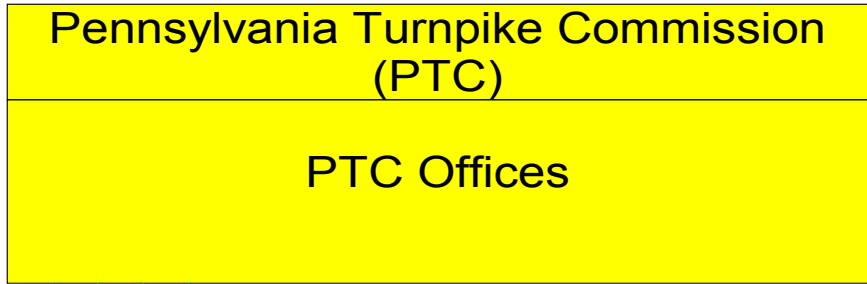
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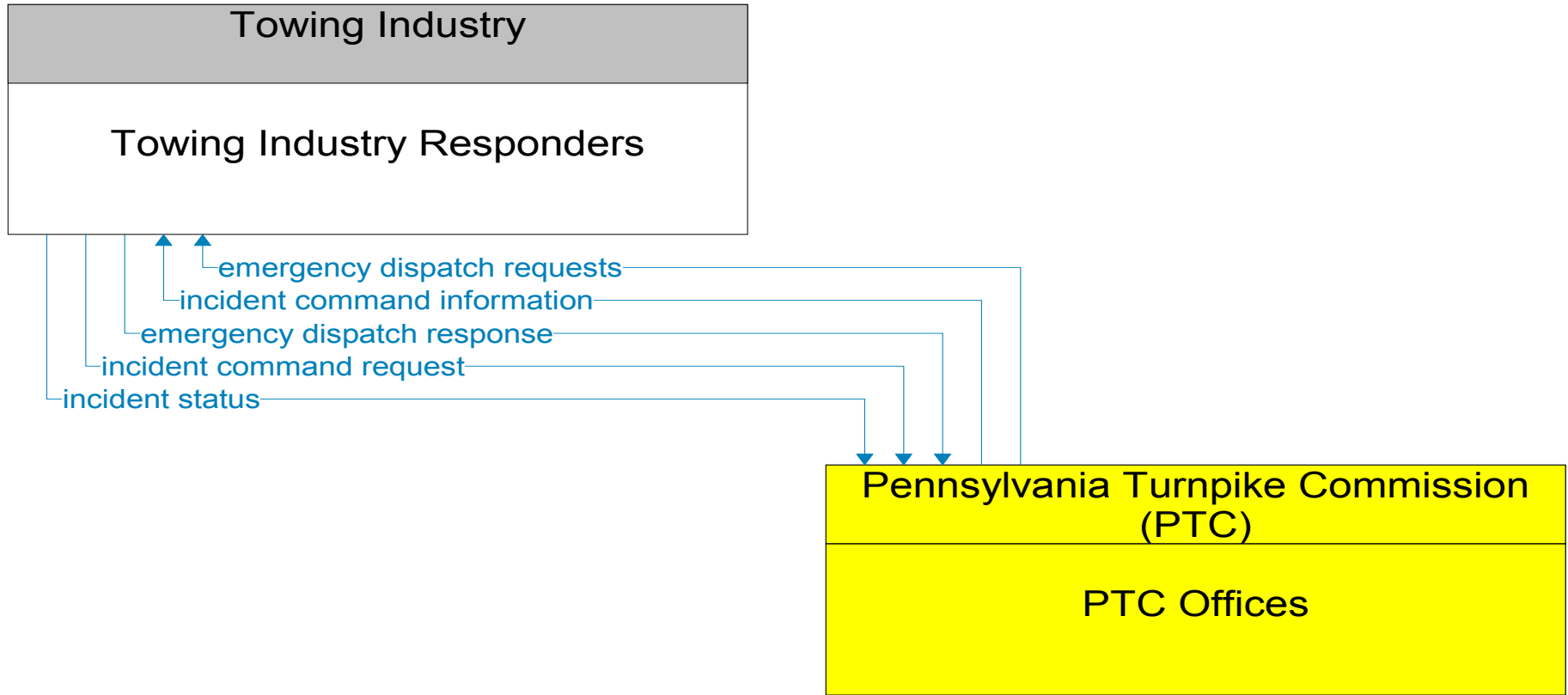
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Planned



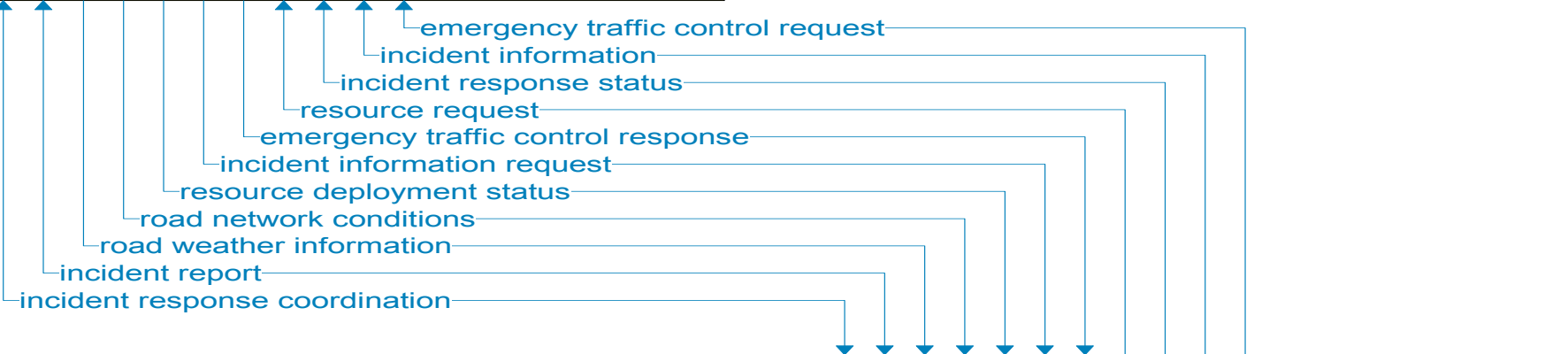
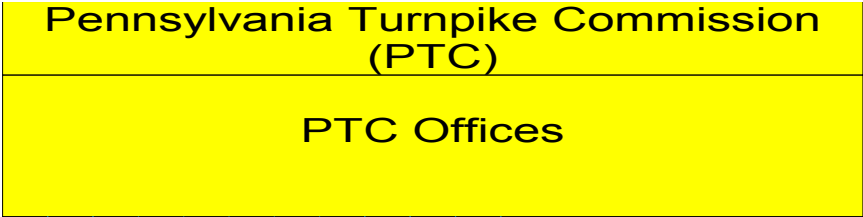
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Planned

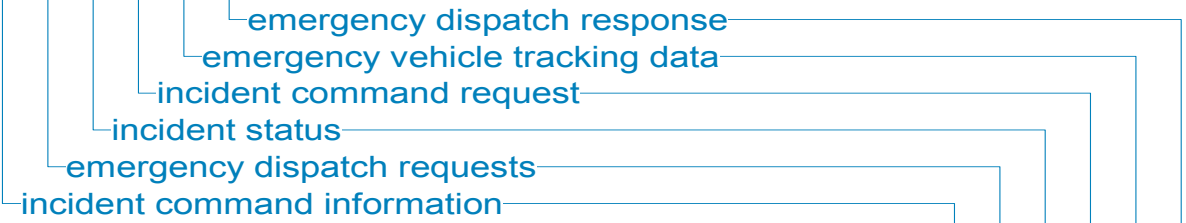
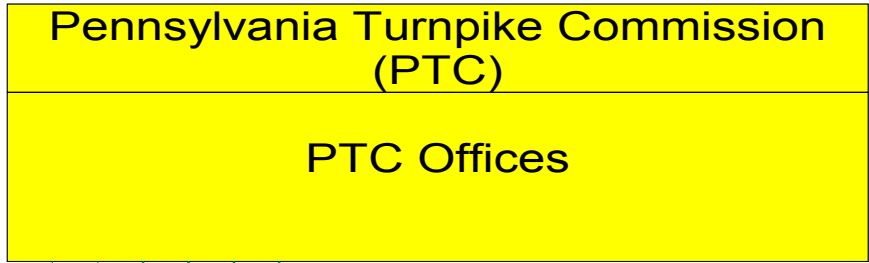


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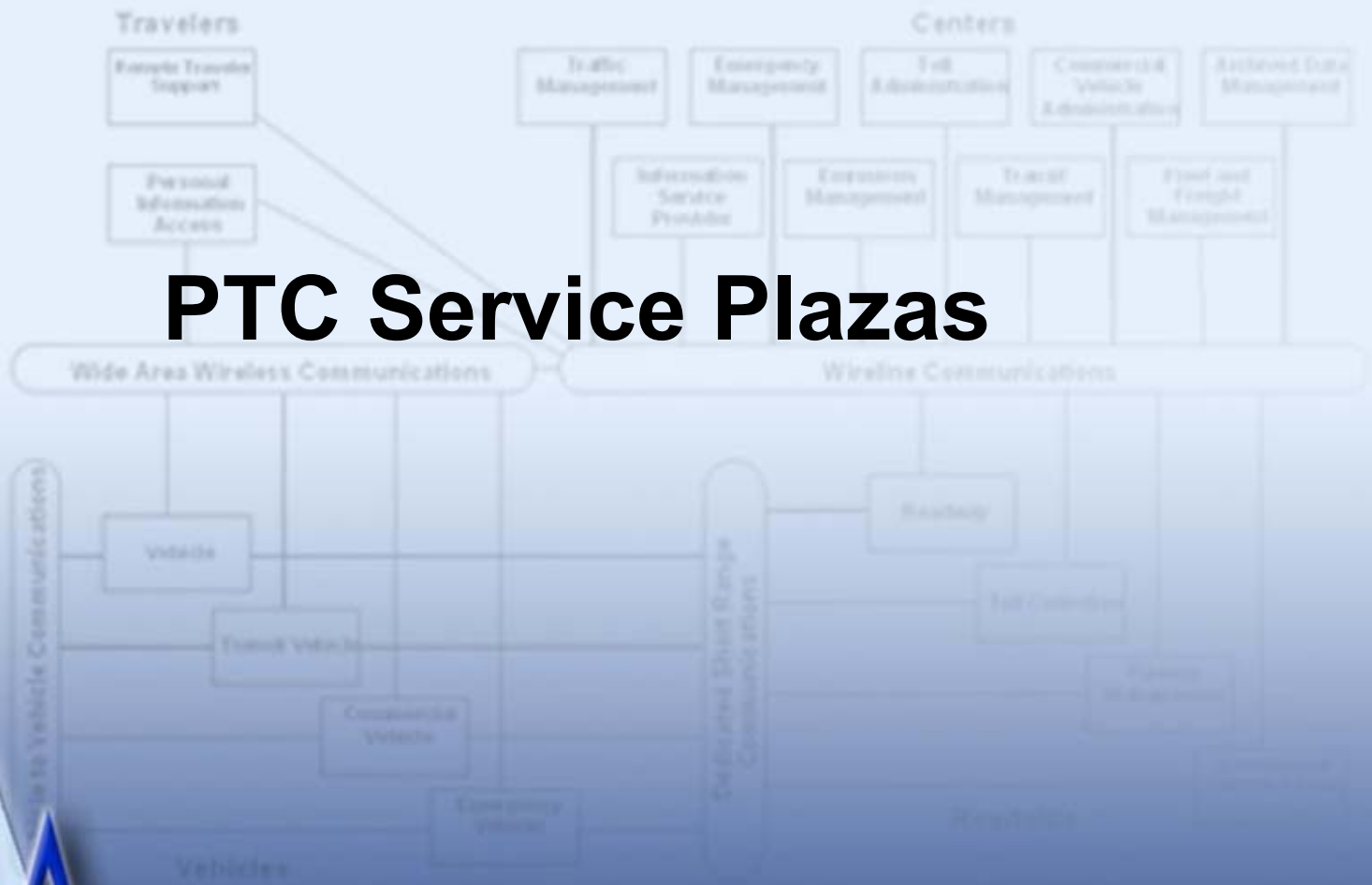
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- - - - - Planned



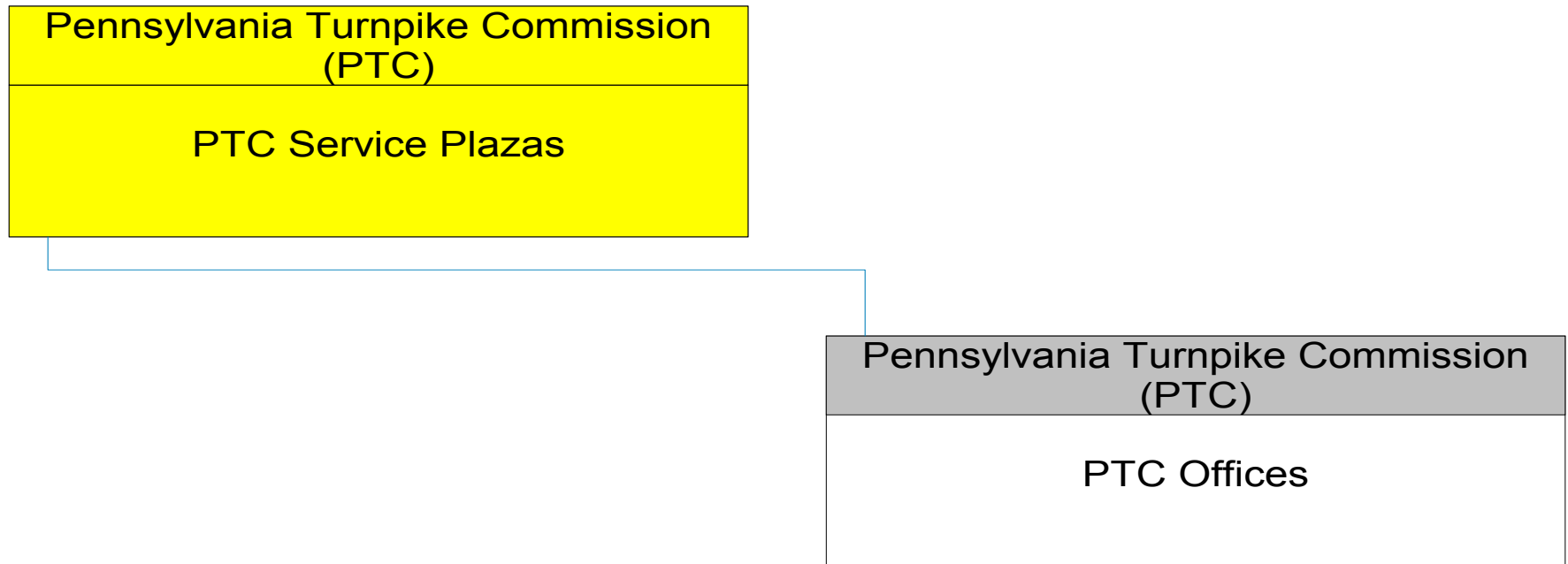


Existing
Planned

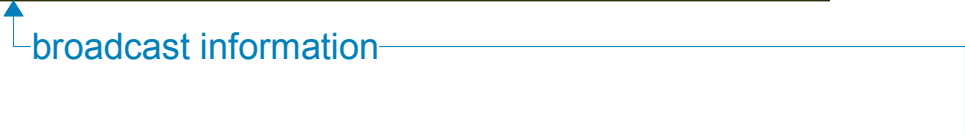
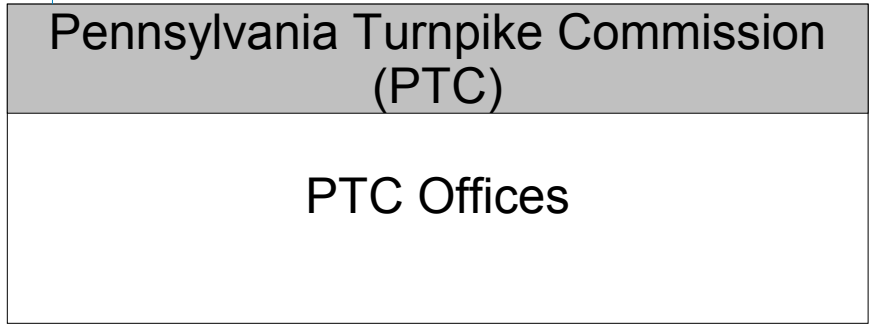
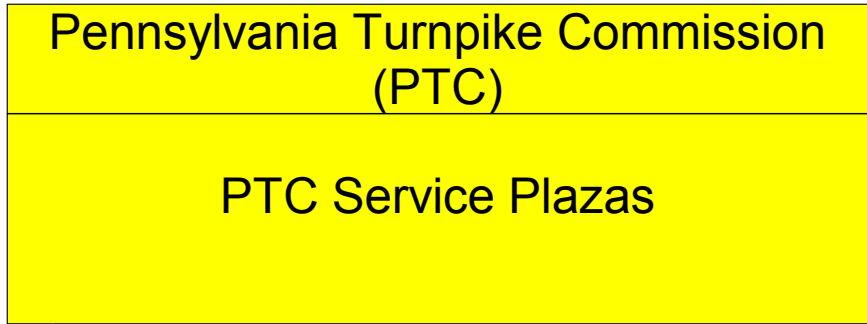
PTC Service Plazas



PTC Service Plazas Interconnect Diagram

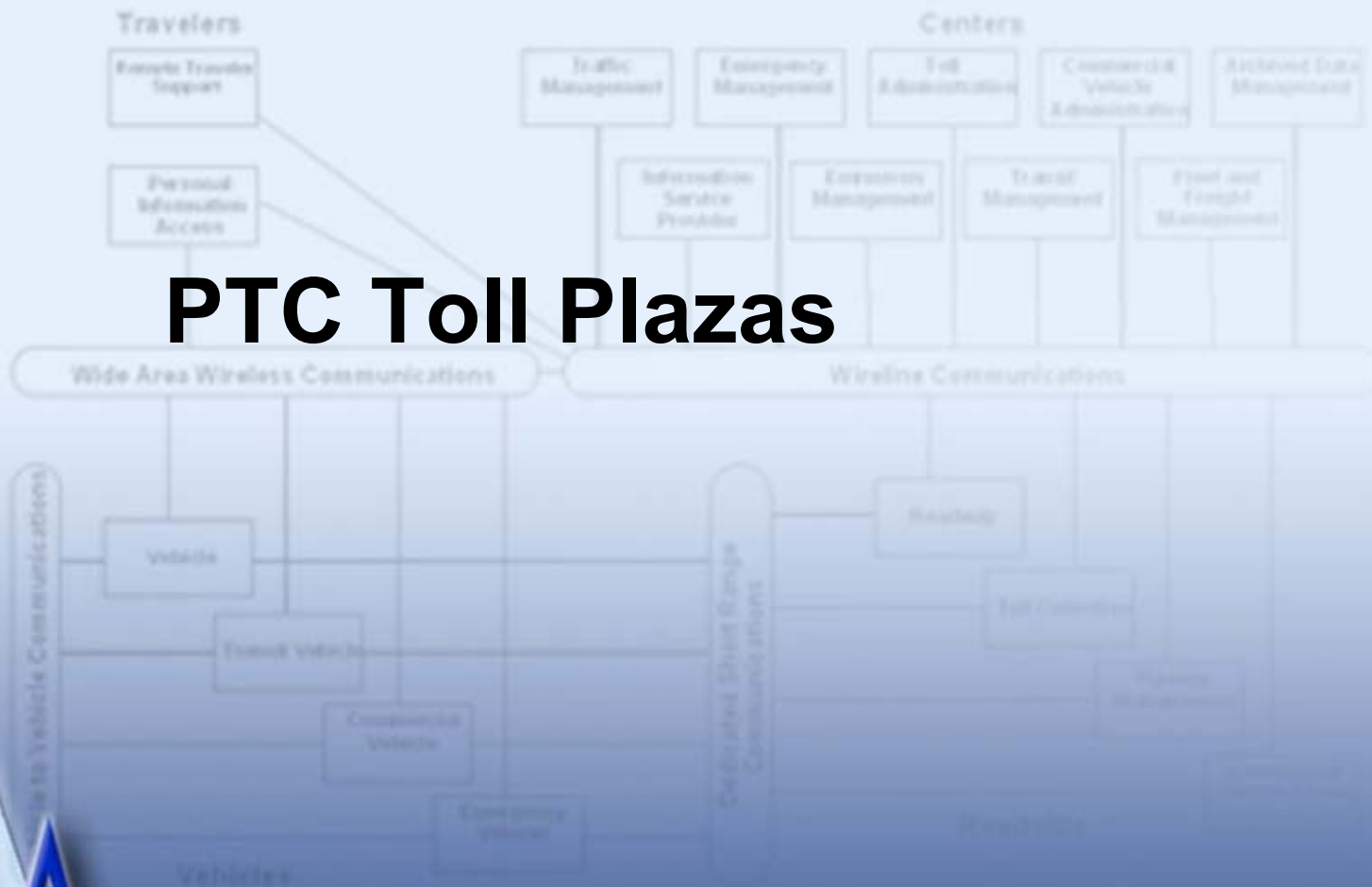


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----- Planned



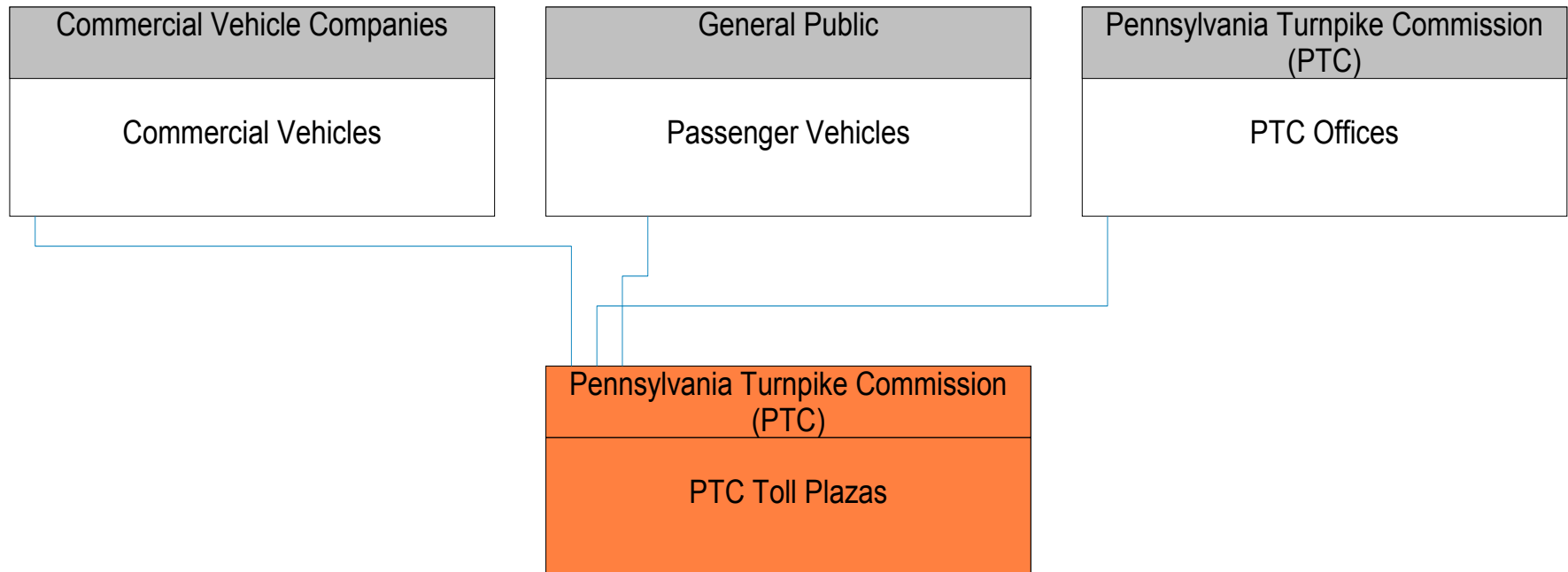
———— Existing
- - - - - Planned

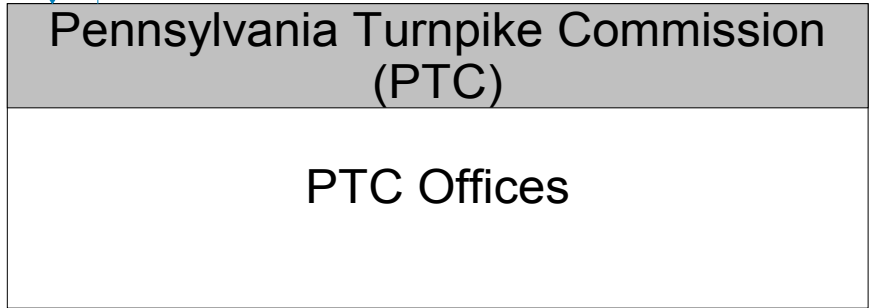
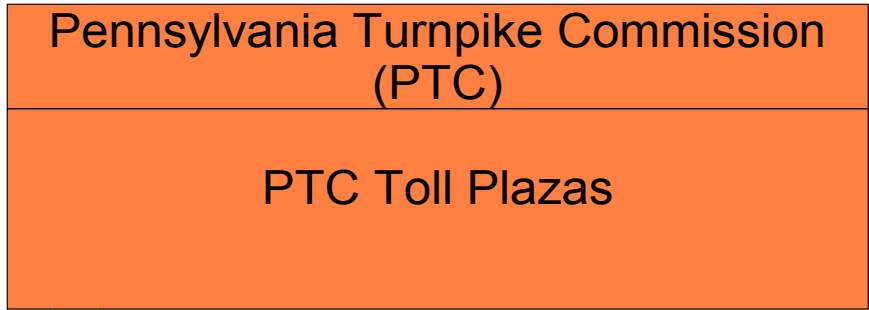
PTC Toll Plazas



PA

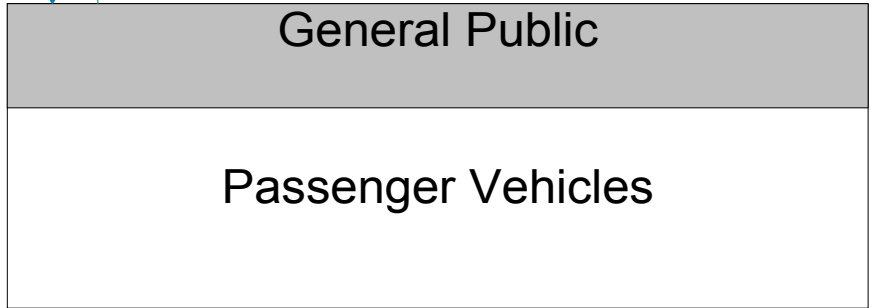
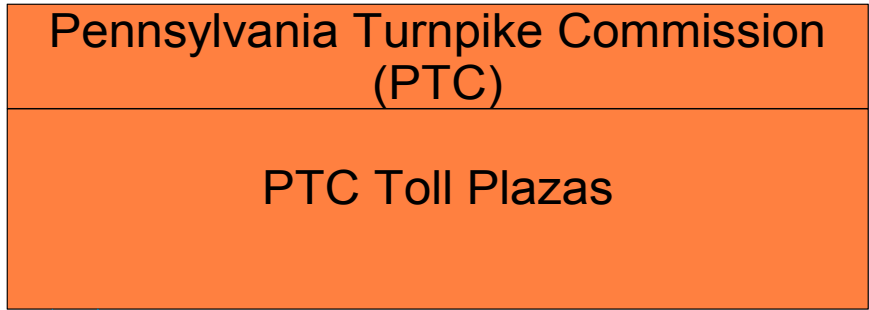
PTC Toll Plazas Interconnect Diagram





toll instructions
toll transactions

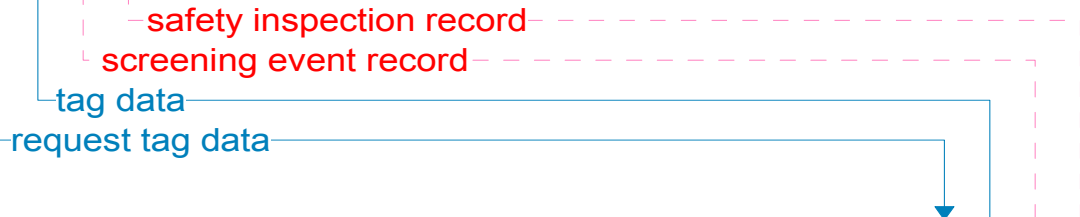
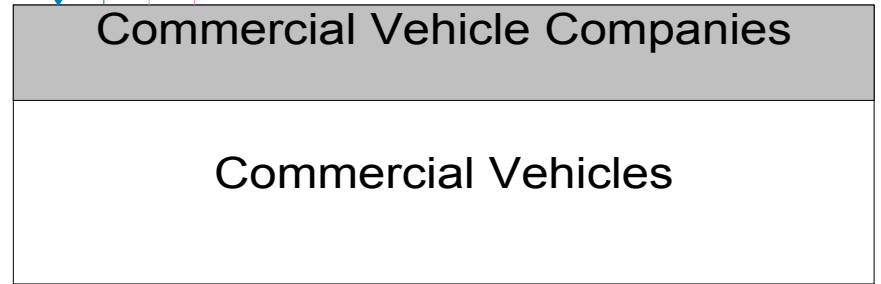
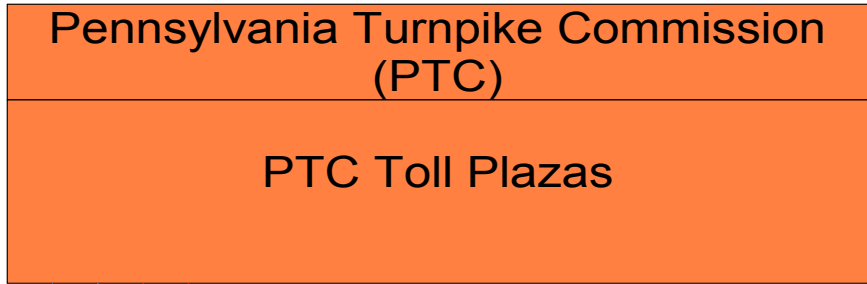
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----- Planned



tag data

request tag data

———— Existing
- - - - - Planned

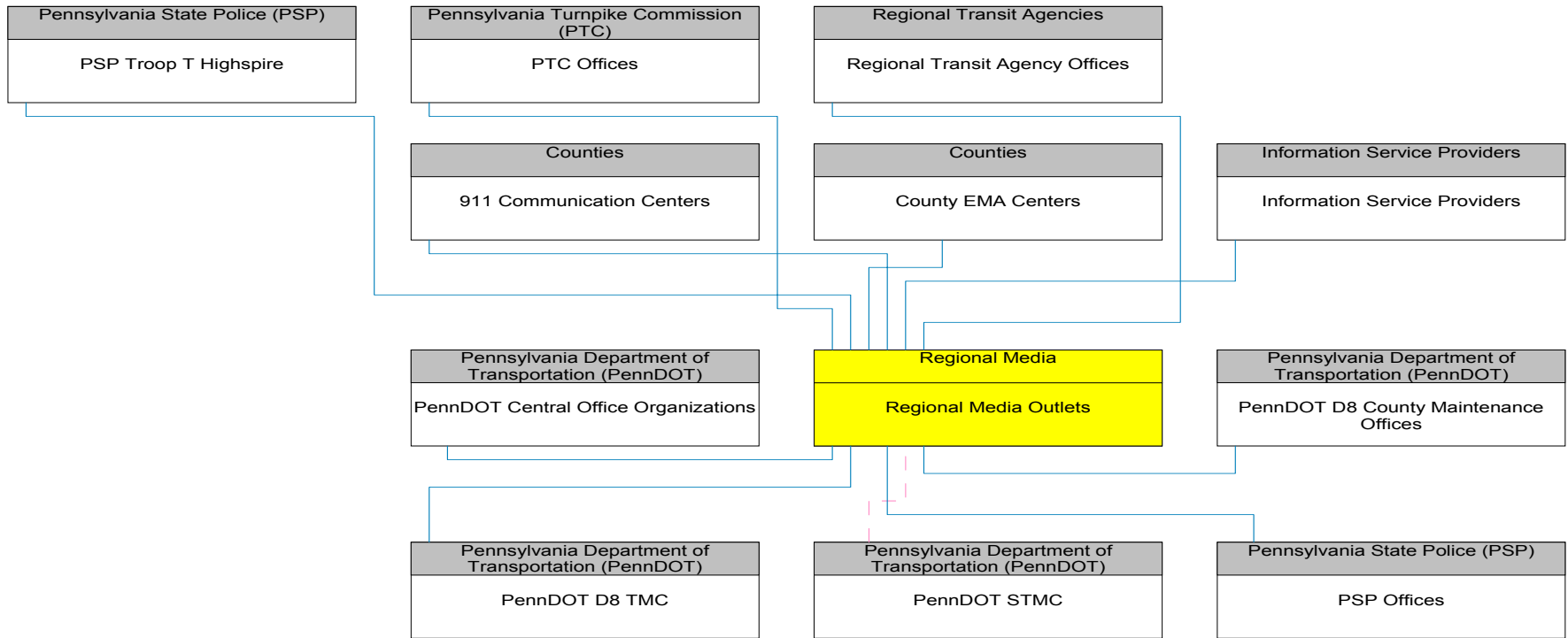


Existing
Planned

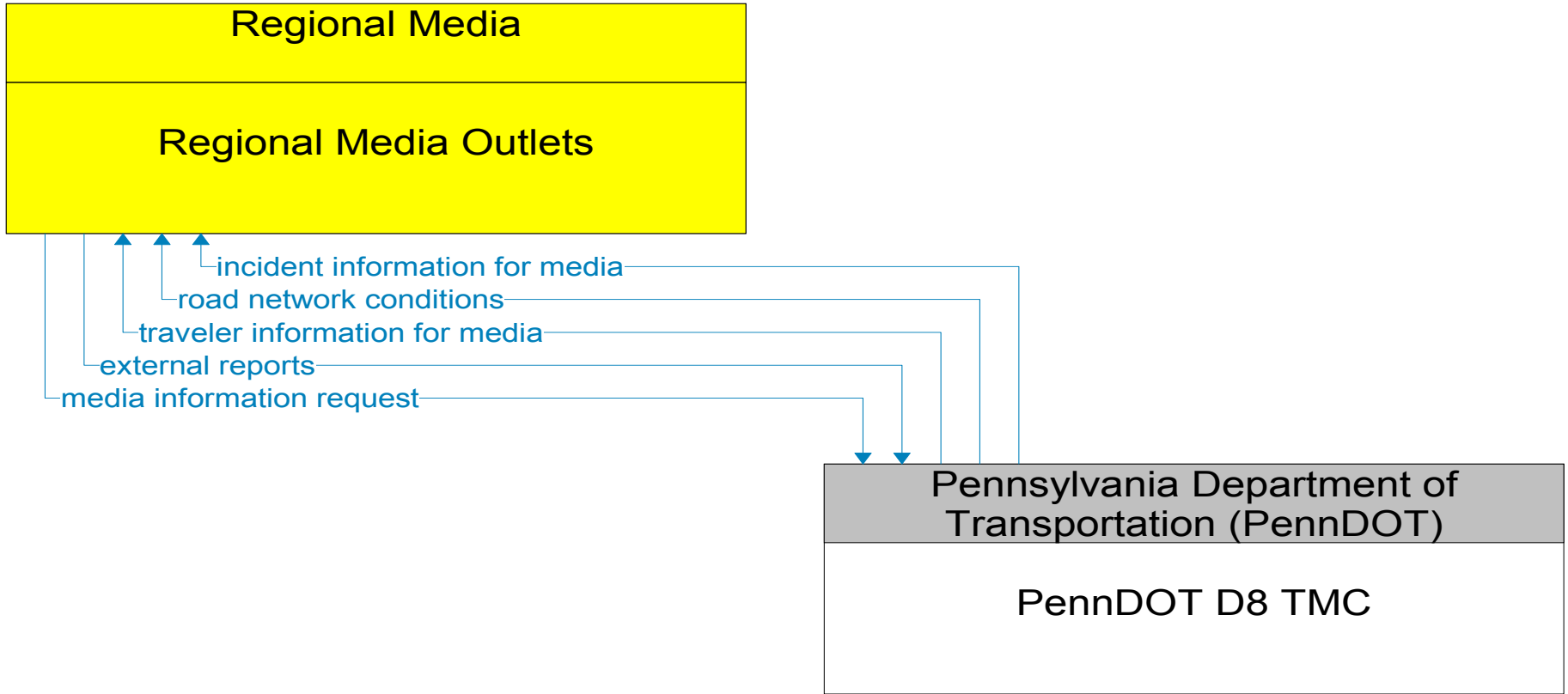
Regional Media Outlets



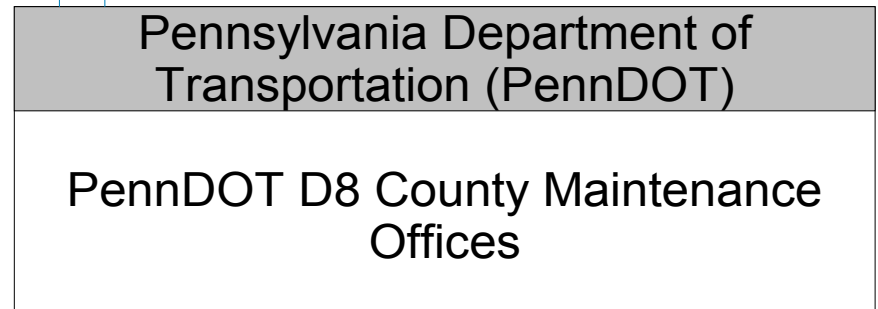
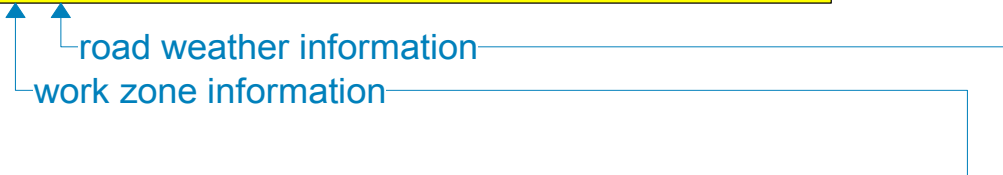
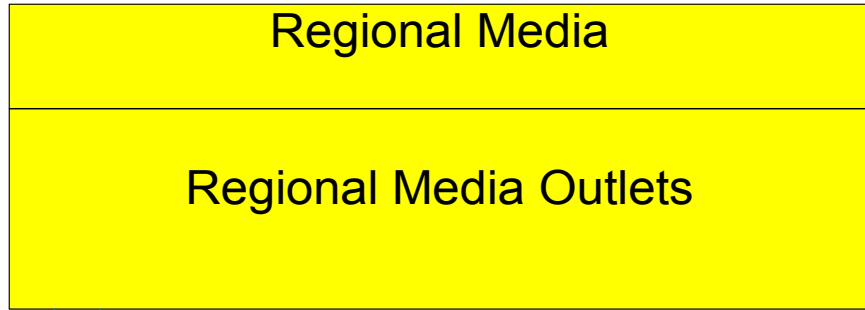
Regional Media Outlets Interconnect Diagram

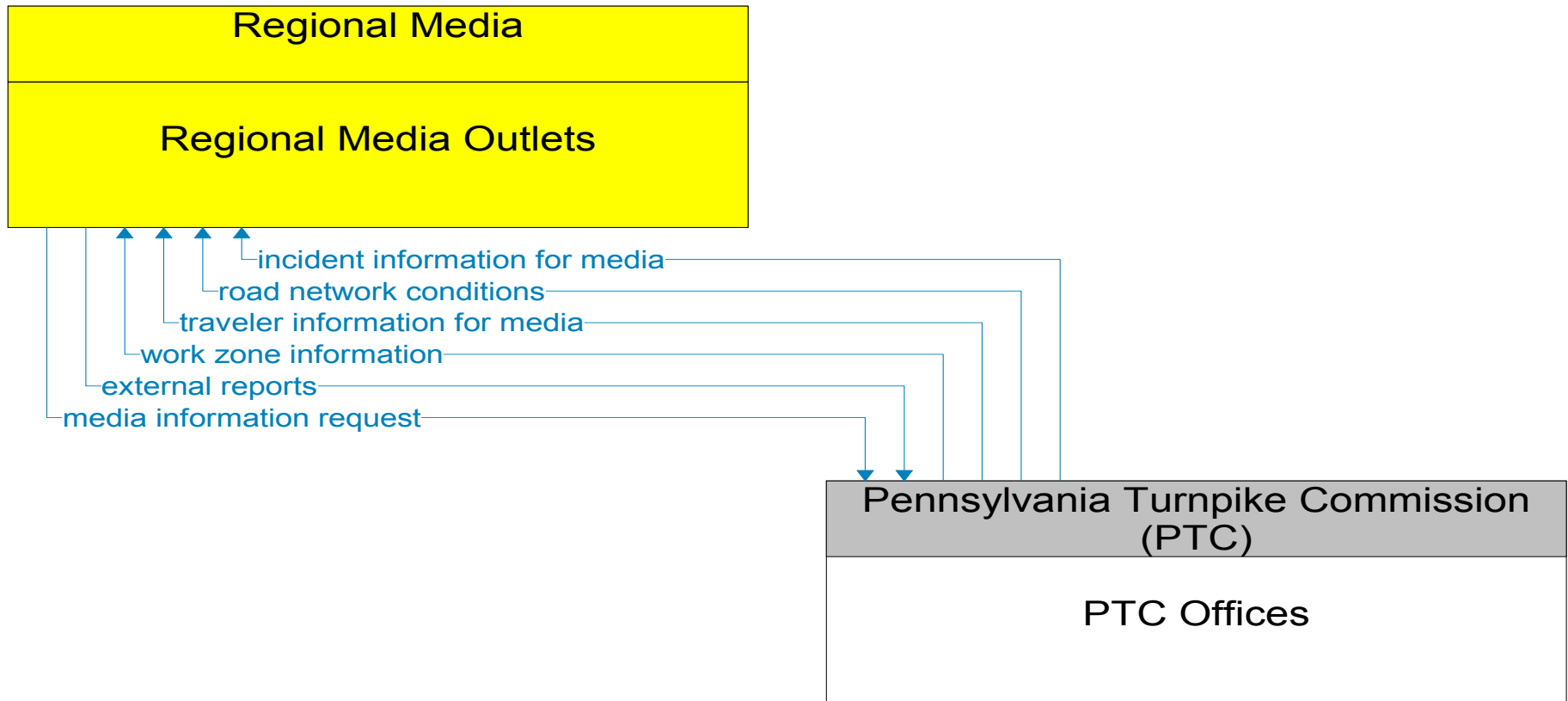


Existing
Planned

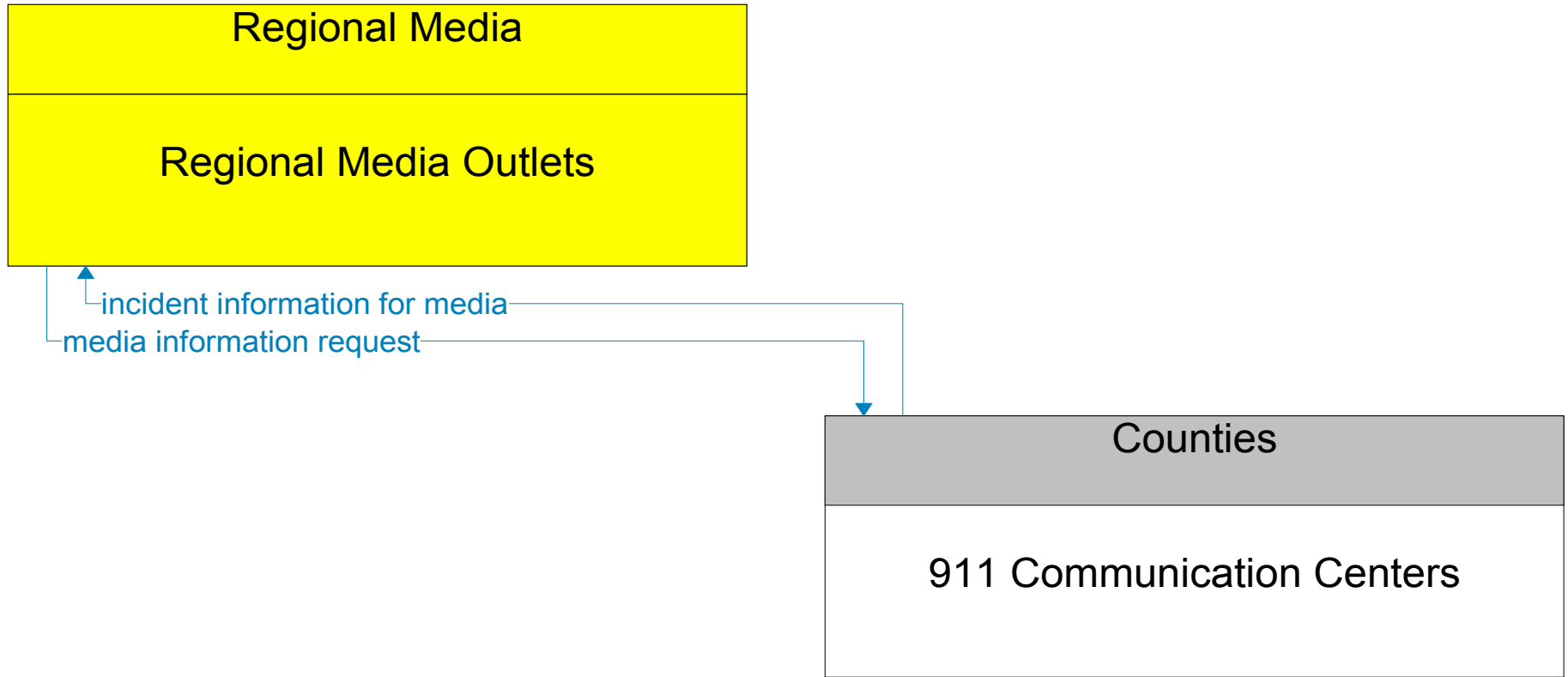


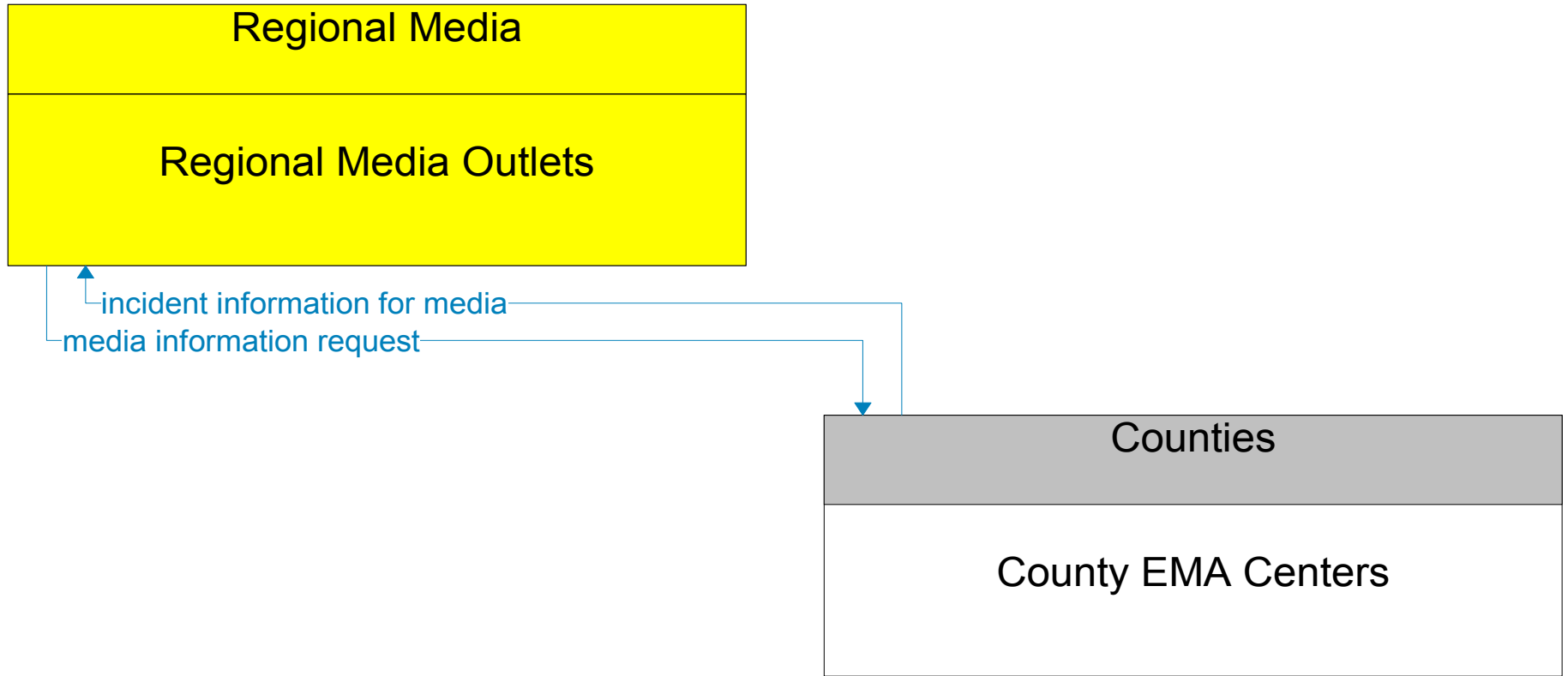
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----- Planned

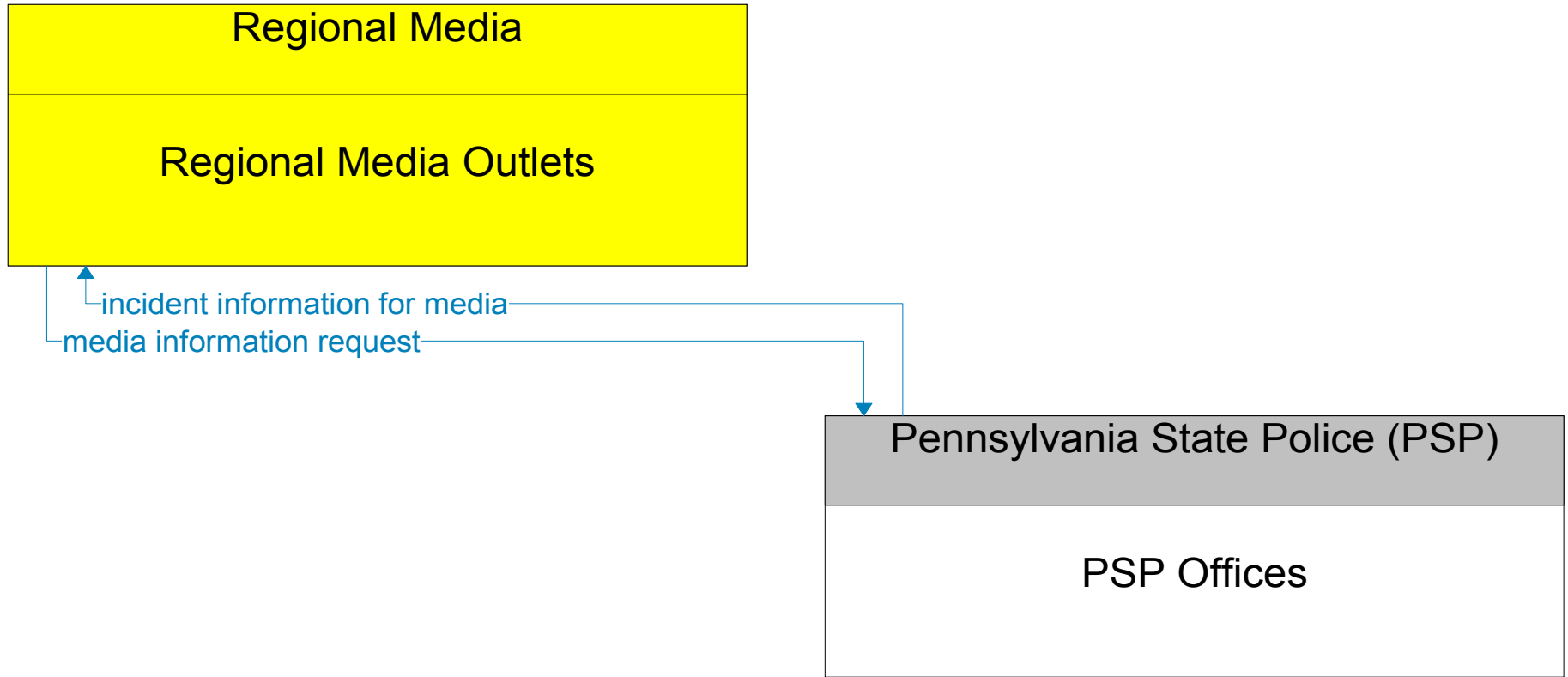




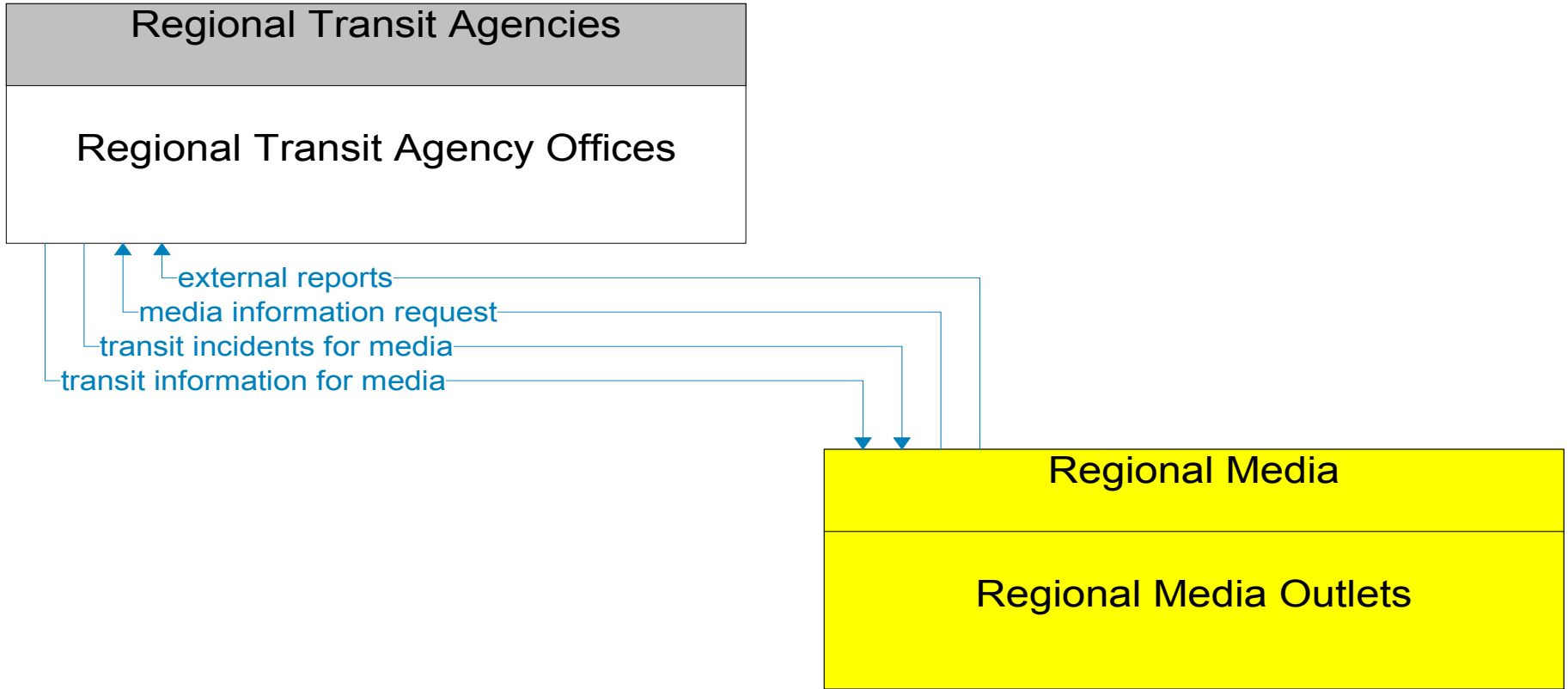
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- - - - - Planned



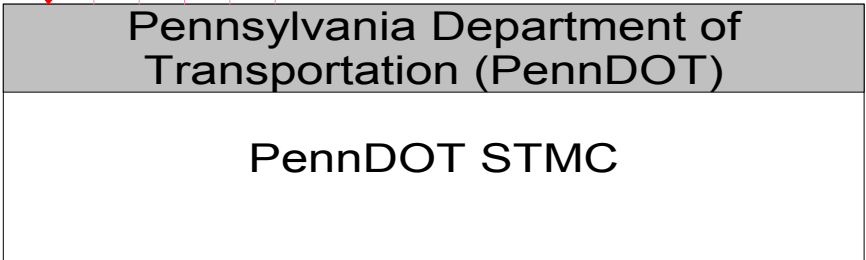
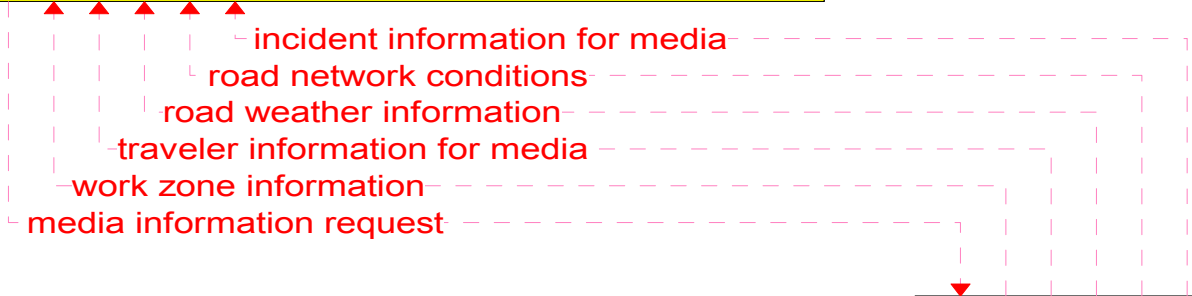




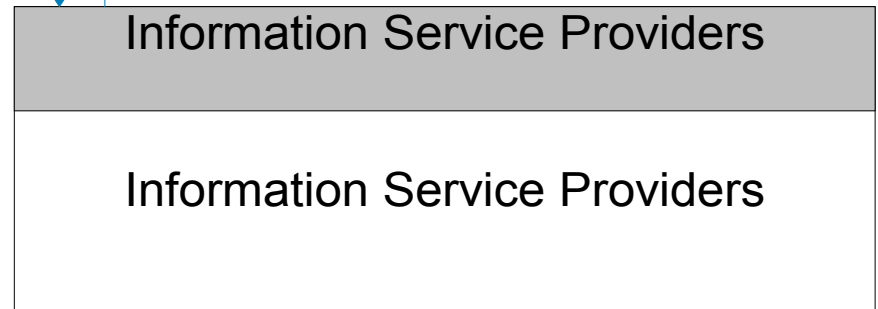
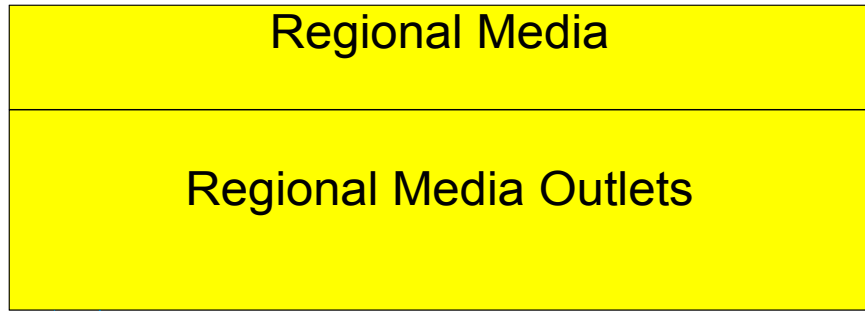
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- - - - - Planned



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----- Planned

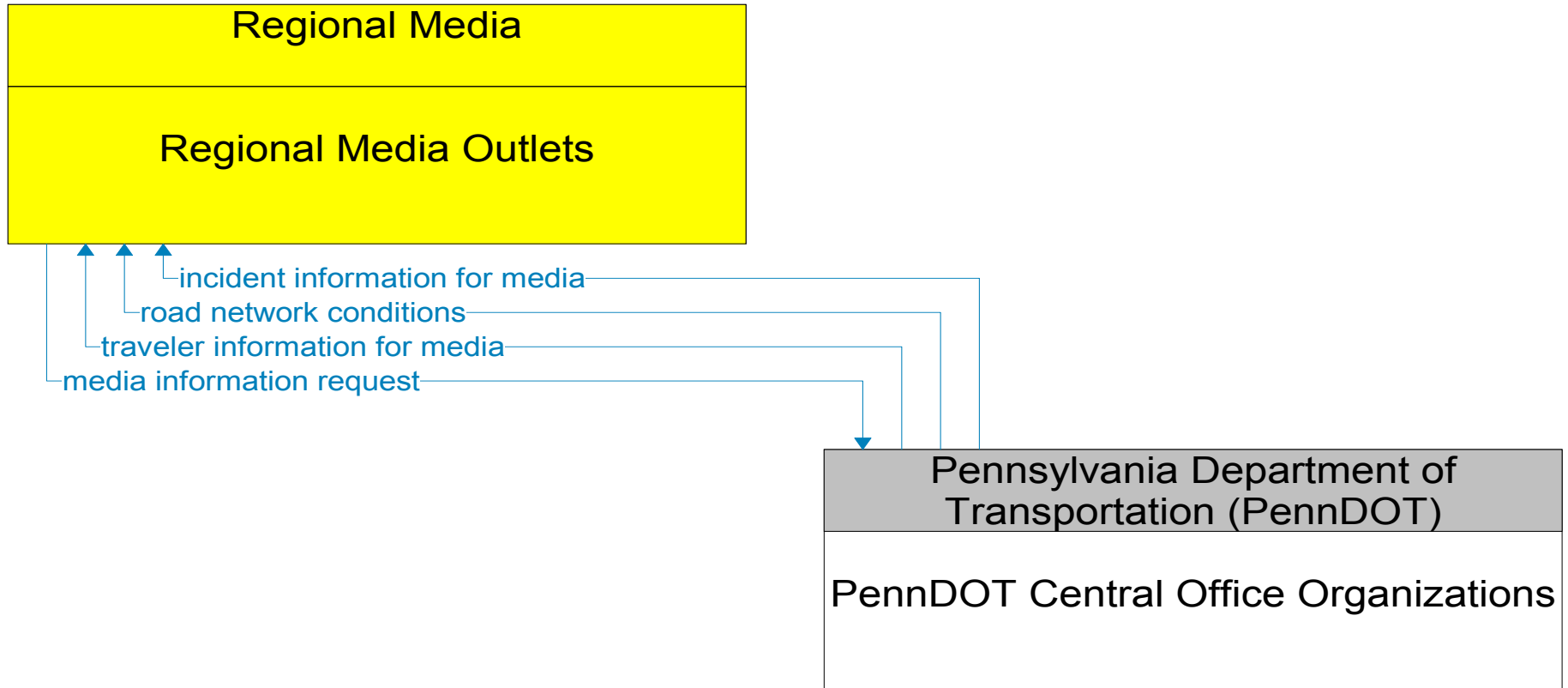


———— Existing
- - - - - Planned

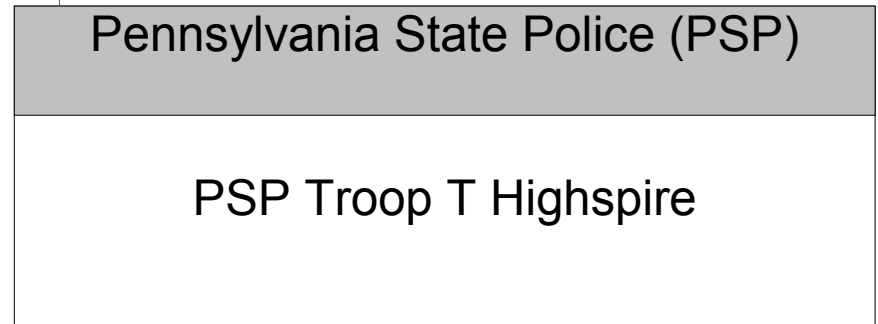


traveler information for media
media information request

Existing
Planned



———— Existing
- - - - - Planned

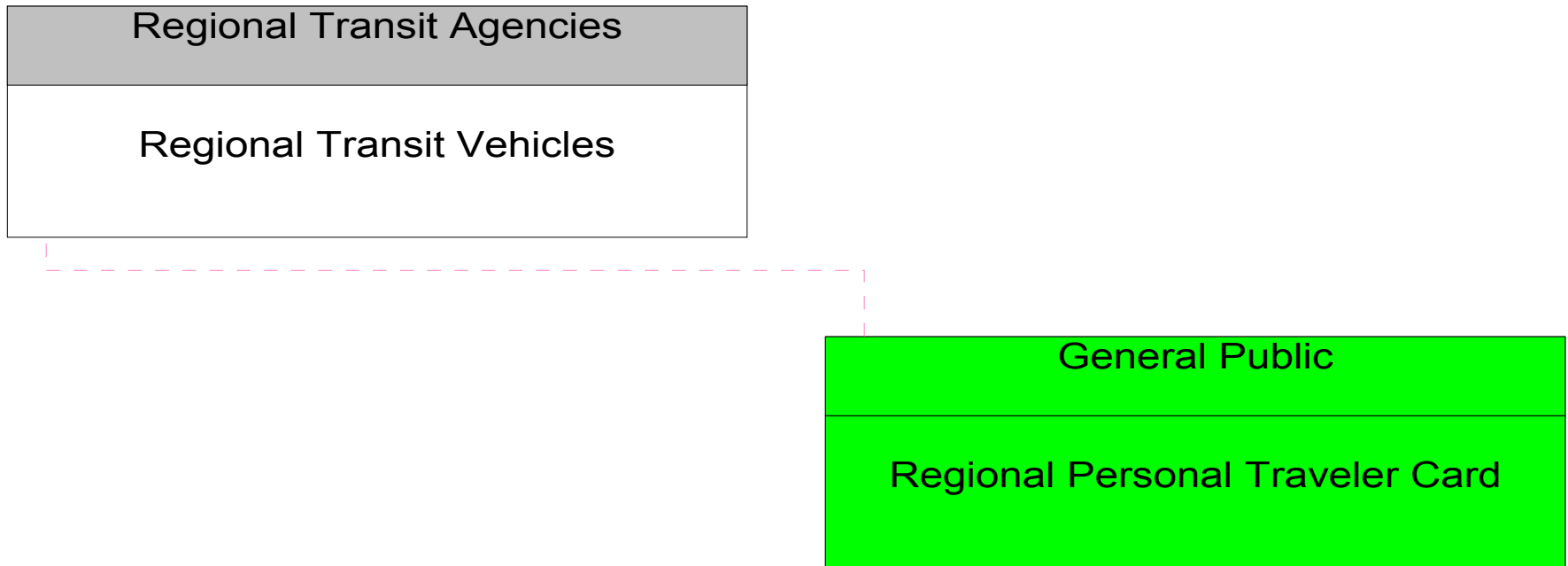


Regional Personal Traveler Card

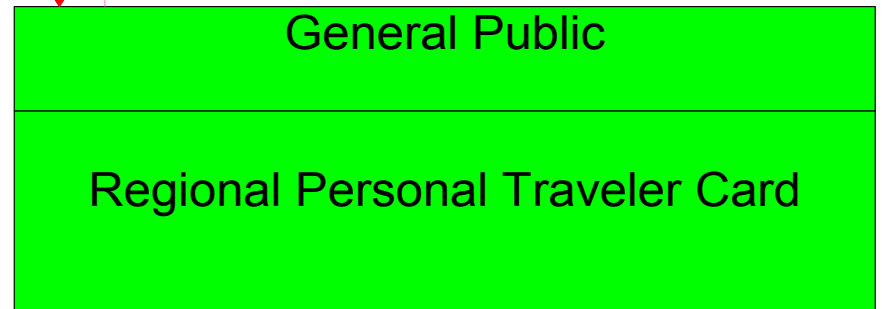
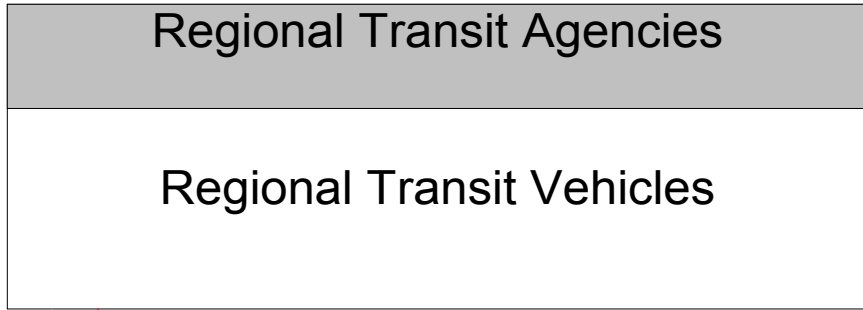


PA

Regional Personal Traveler Card Interconnect Diagram



———— Existing
----- Planned

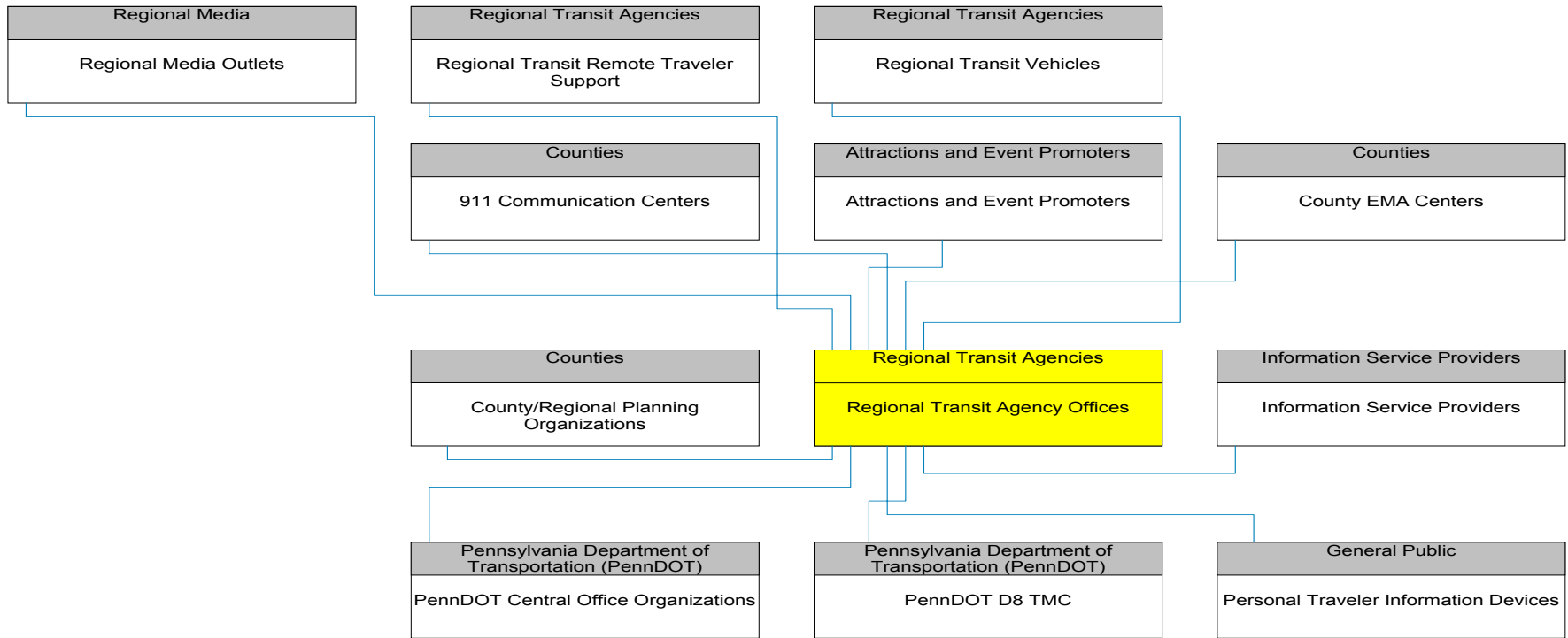


Existing
Planned

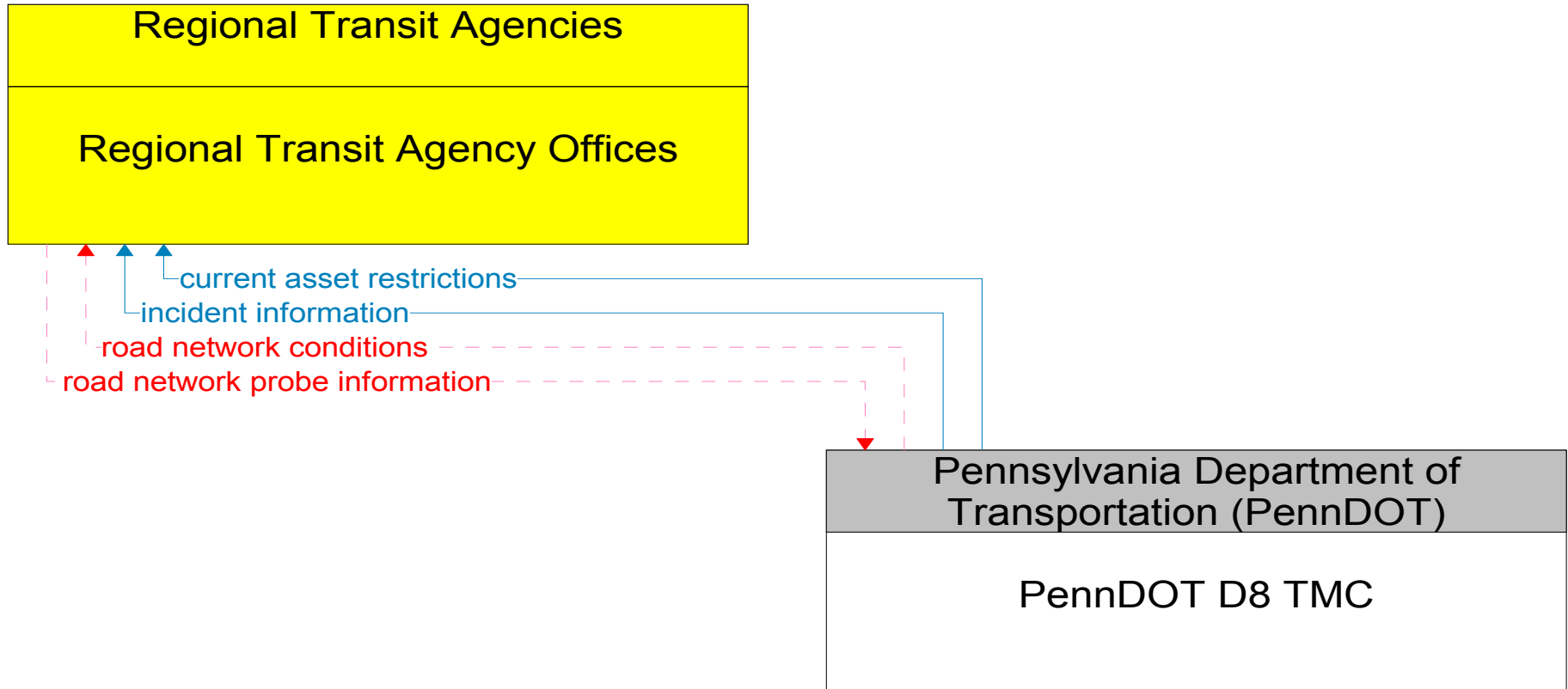
Regional Transit Agency Offices



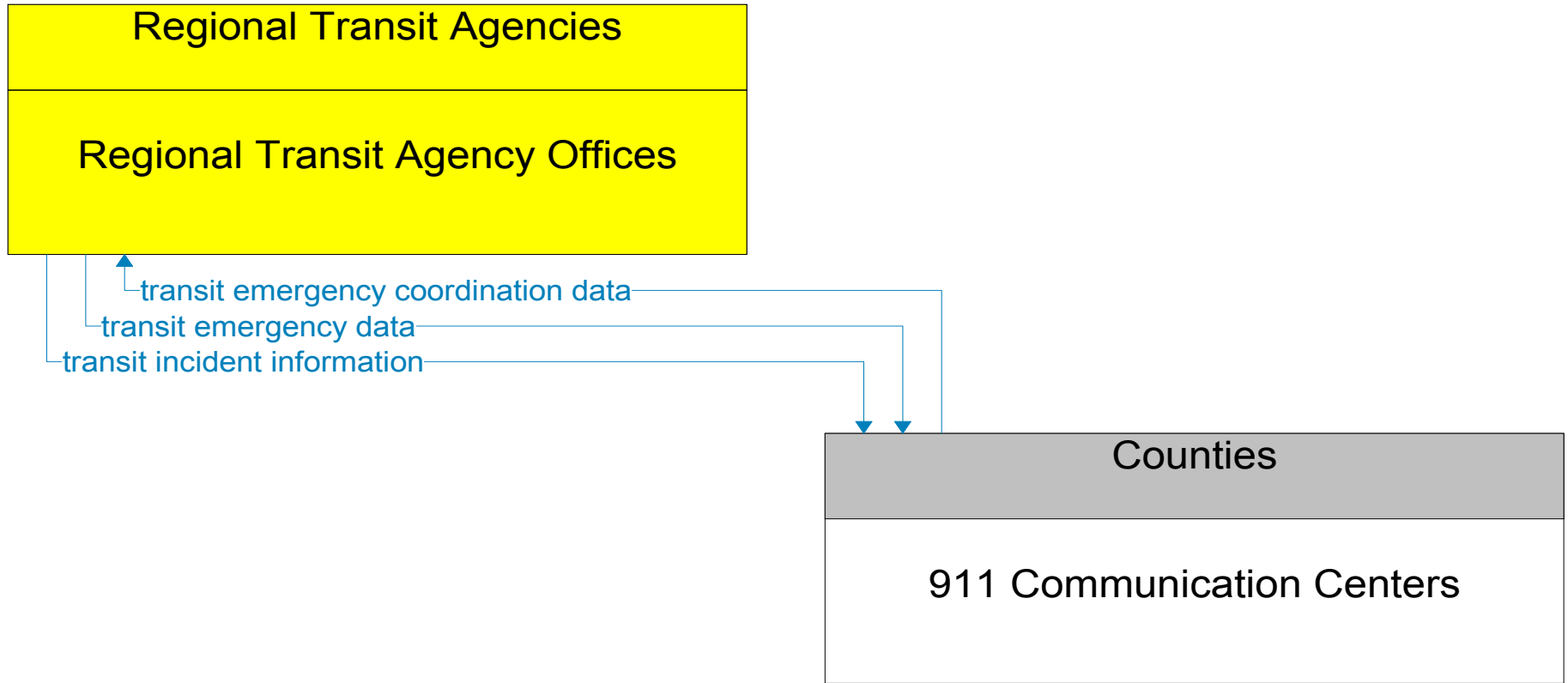
Regional Transit Agency Offices Interconnect Diagram



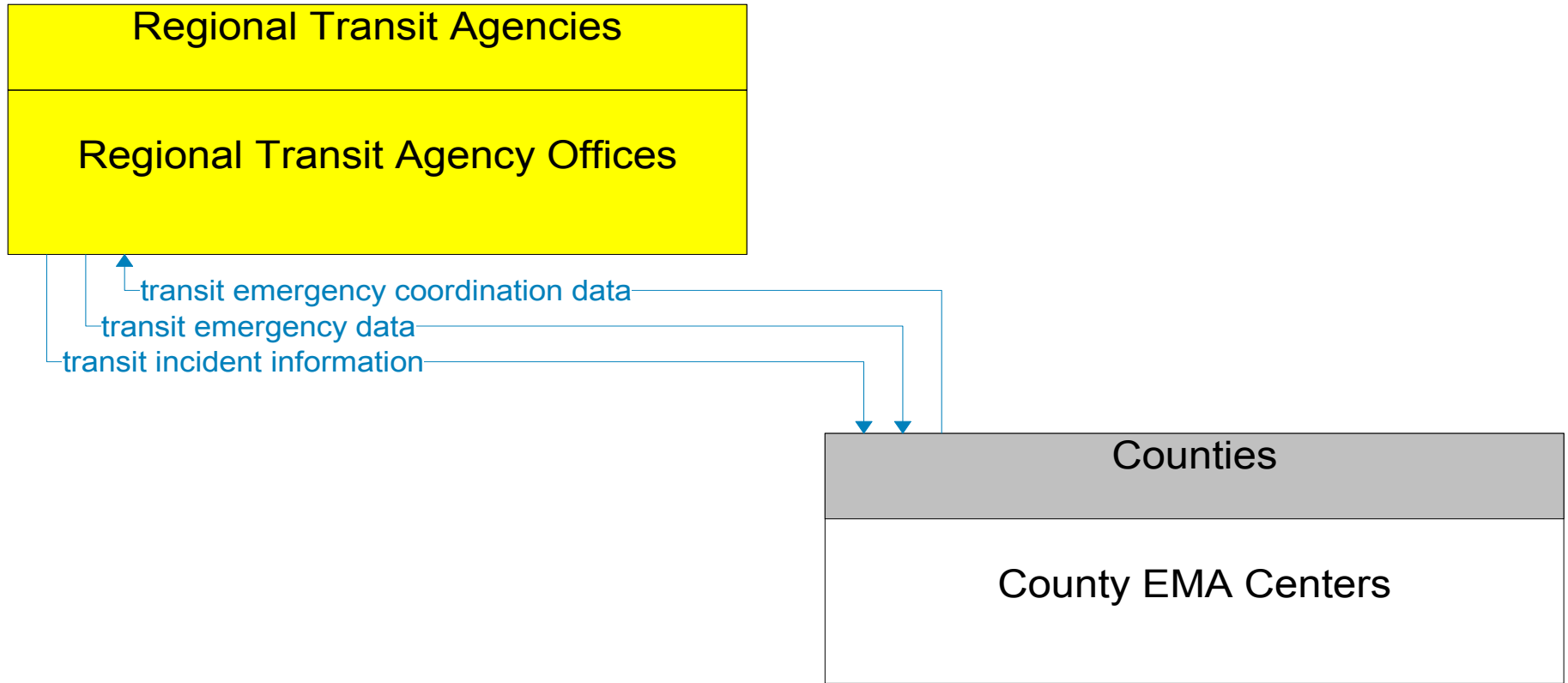
— Existing
- - - Planned



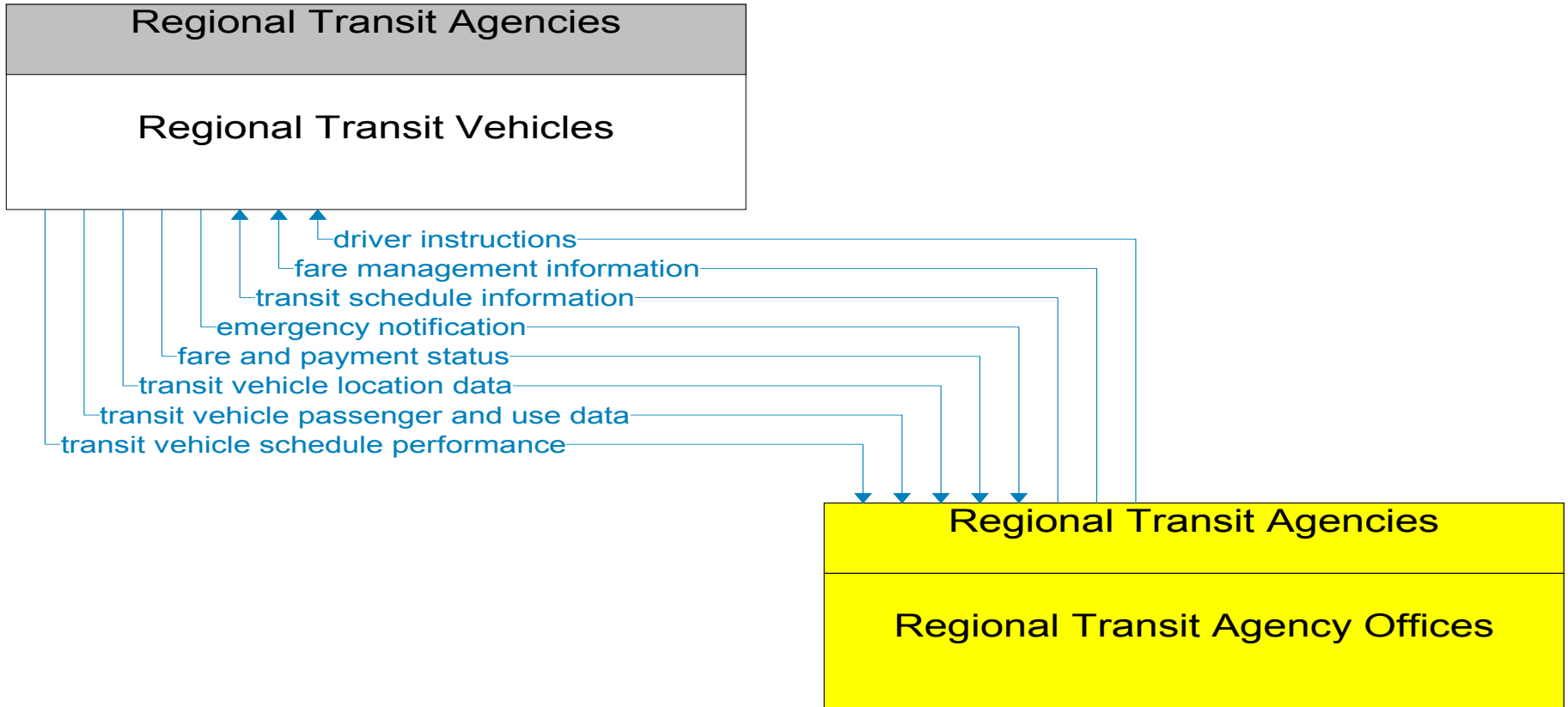
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- - - - - Planned



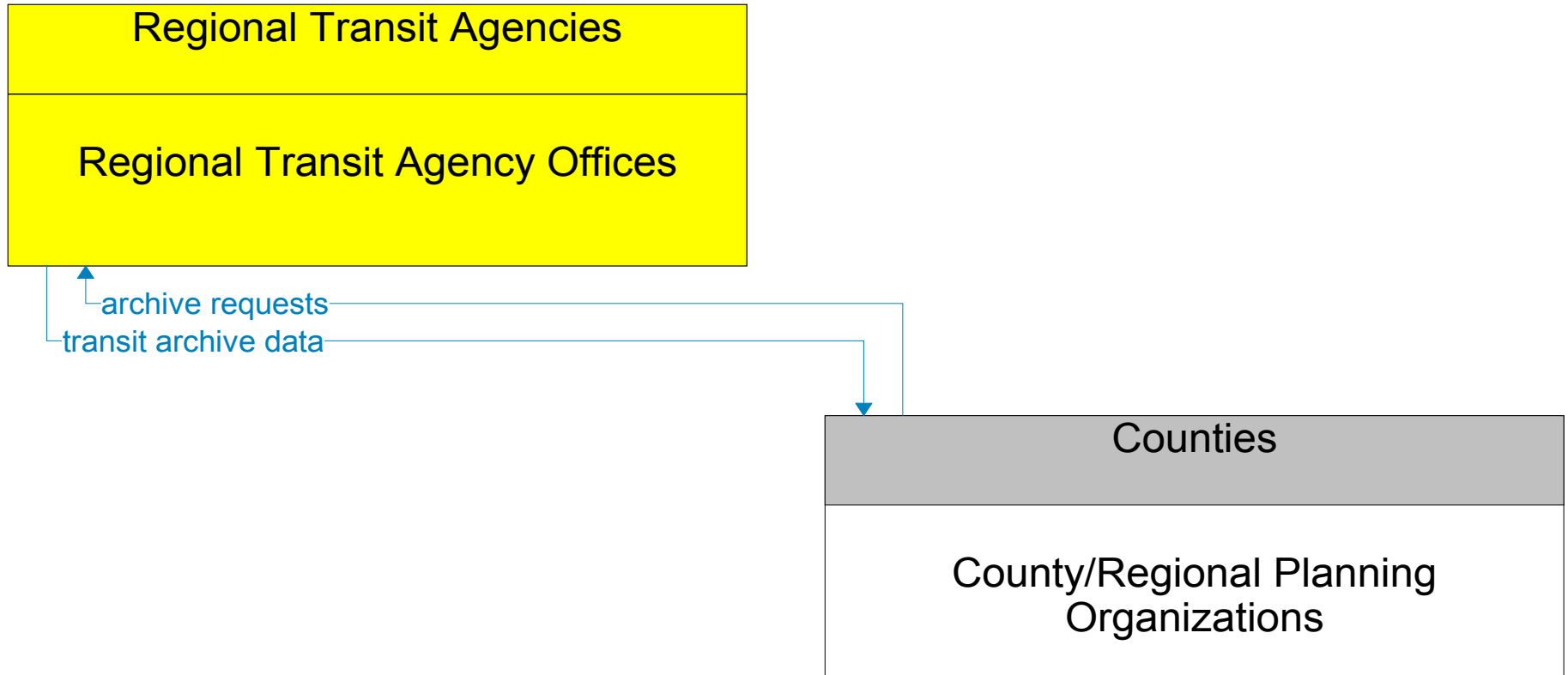
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- - - Planned



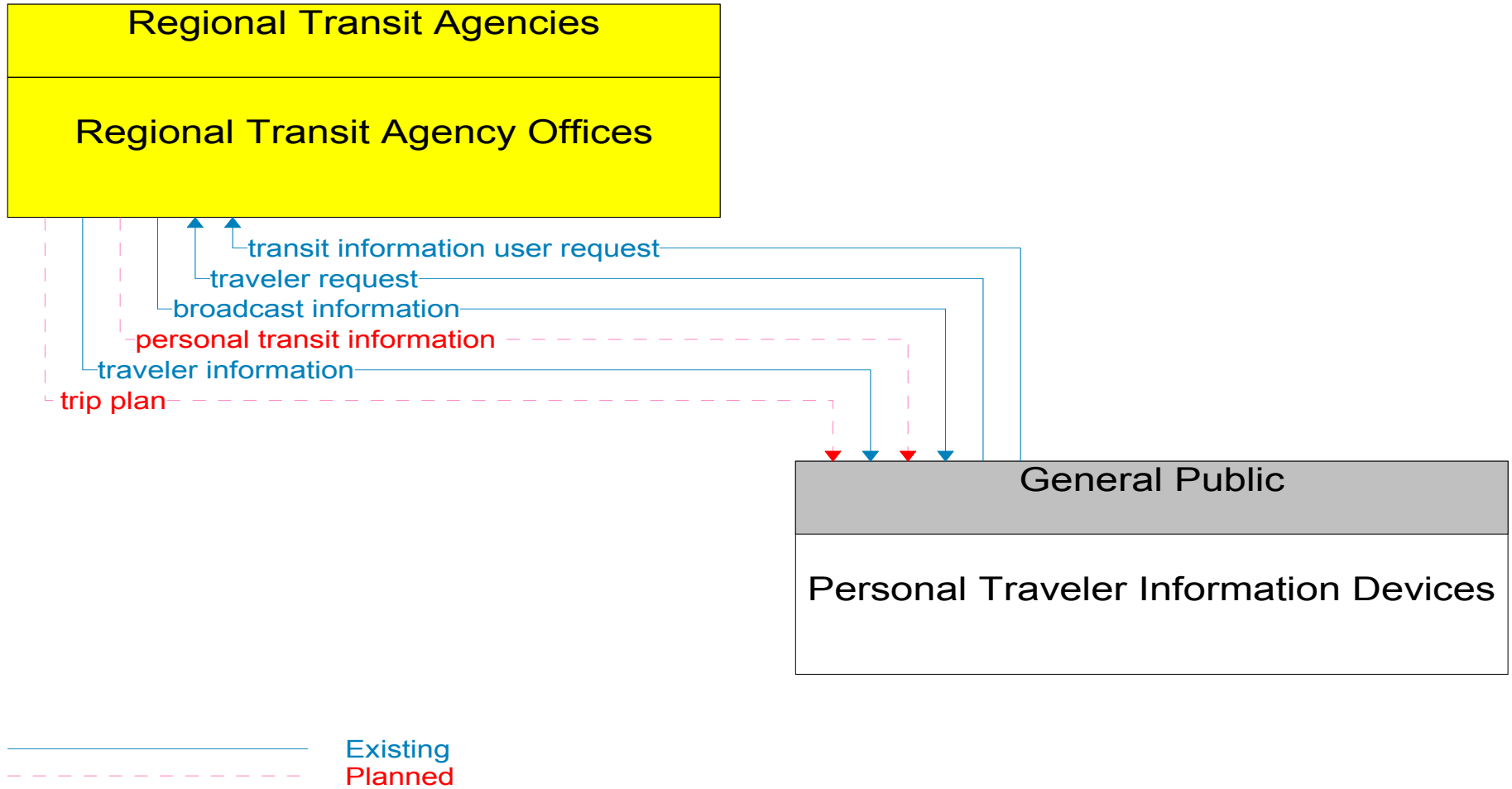
— Existing
- - - Planned

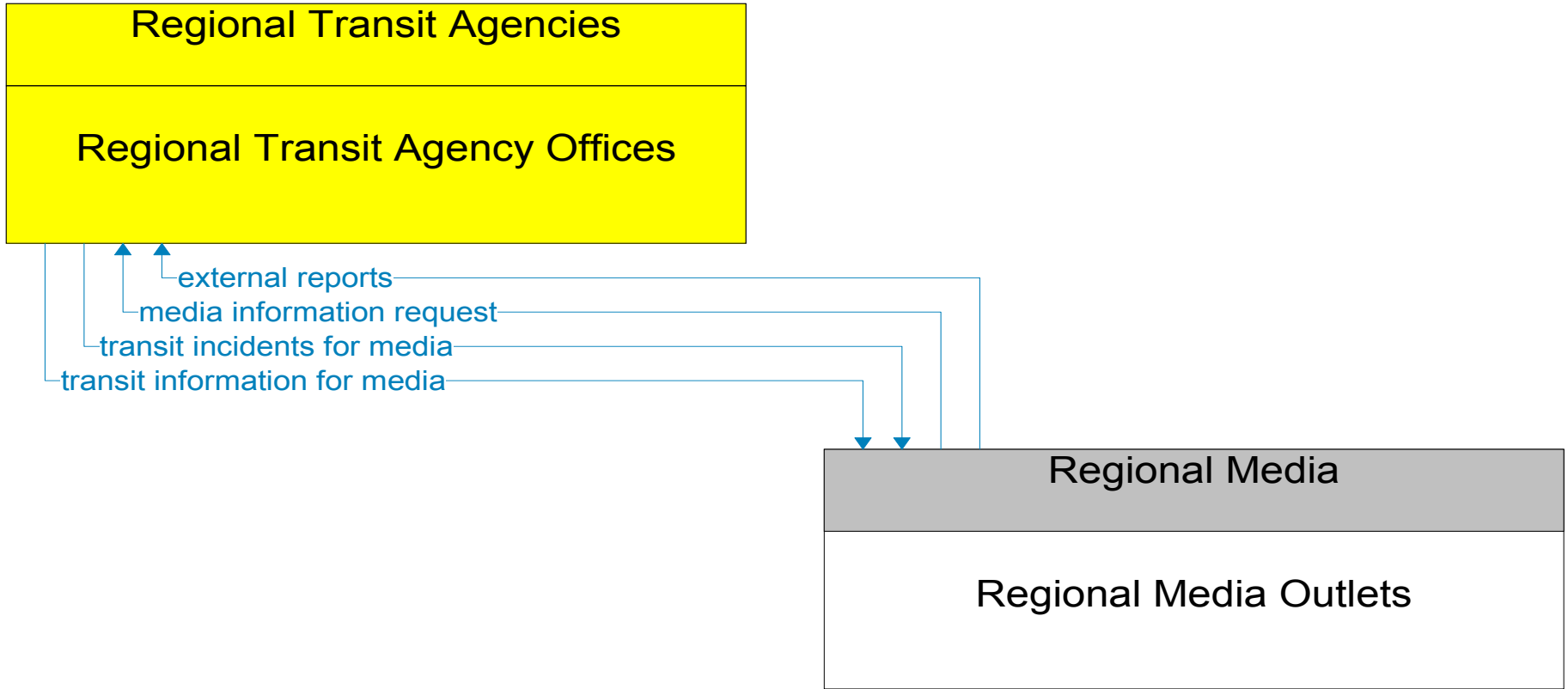


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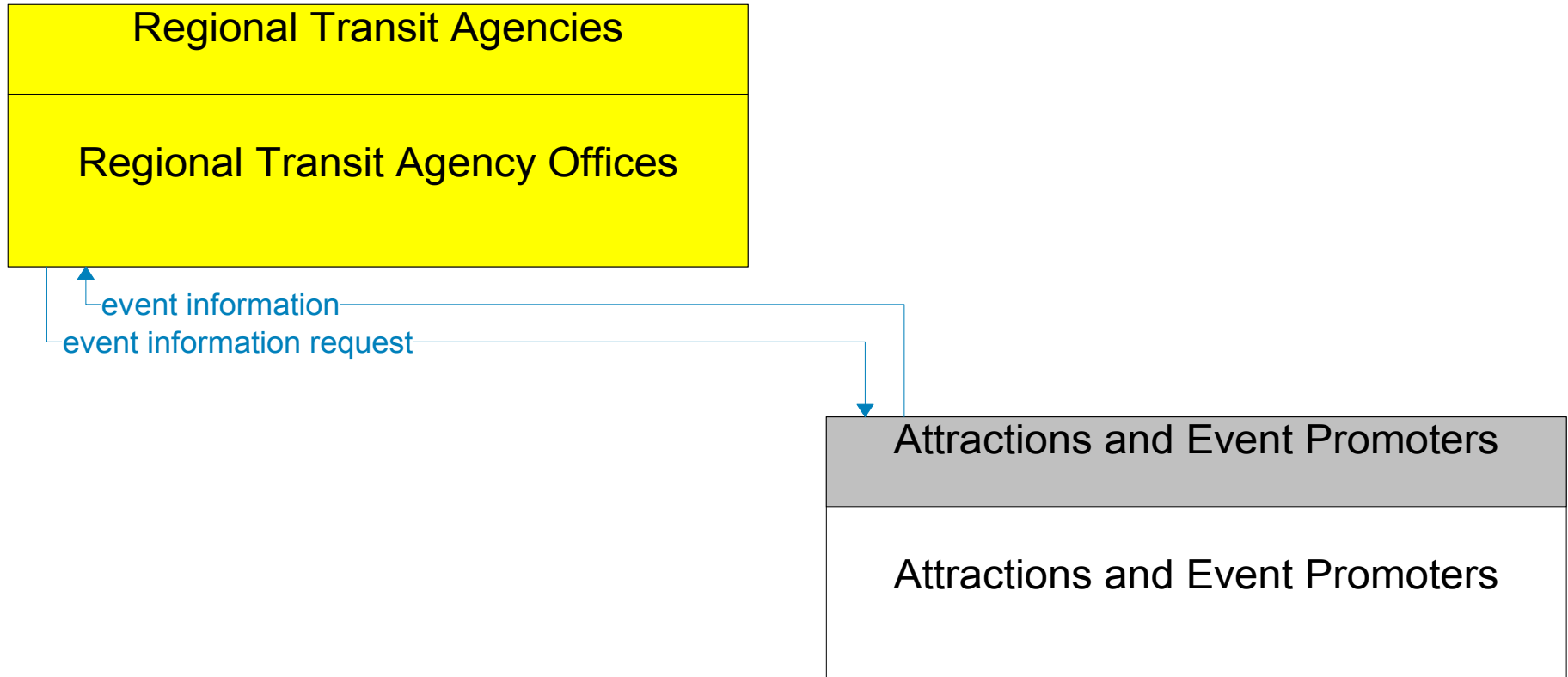


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----- Planned

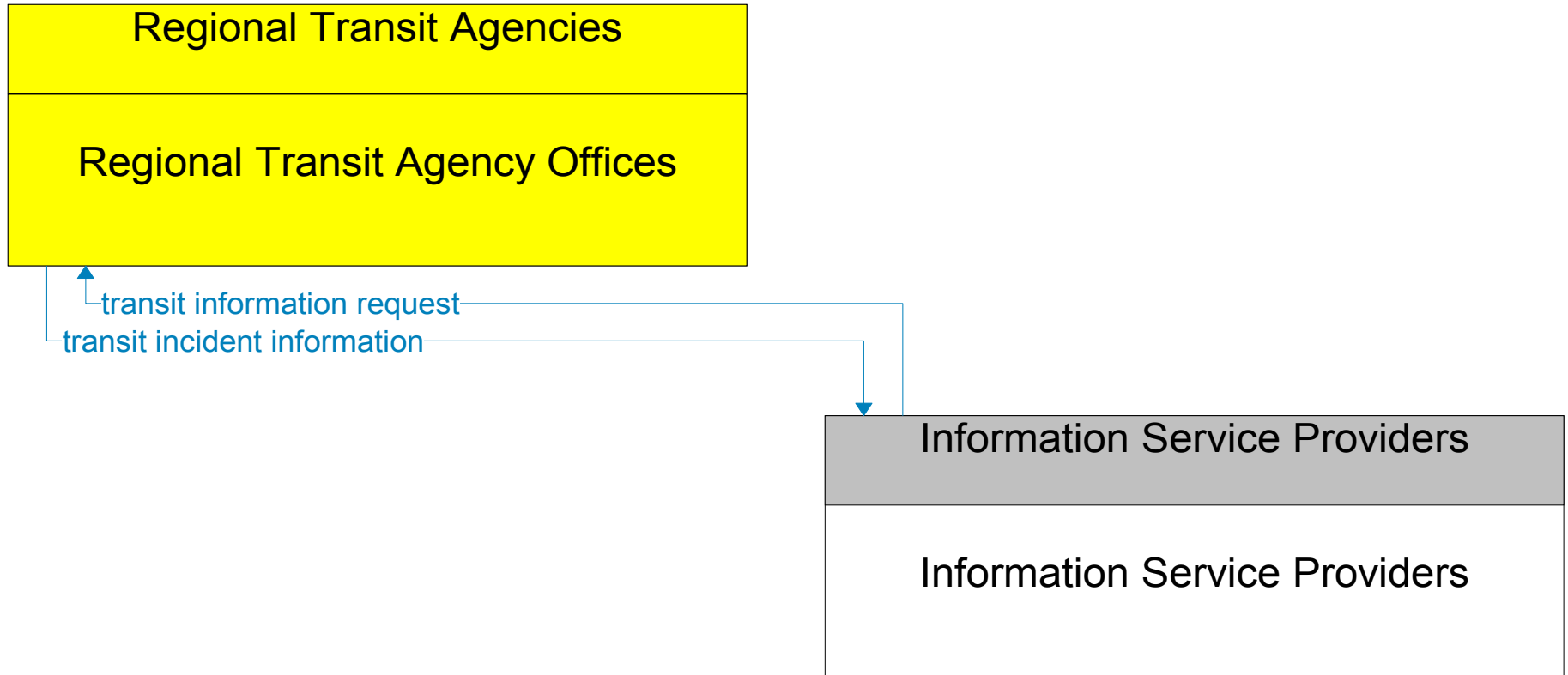




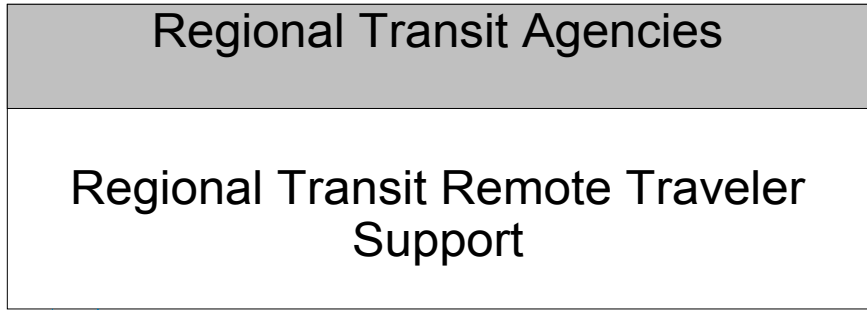
———— Existing
----- Planned



———— Existing
----- Planned

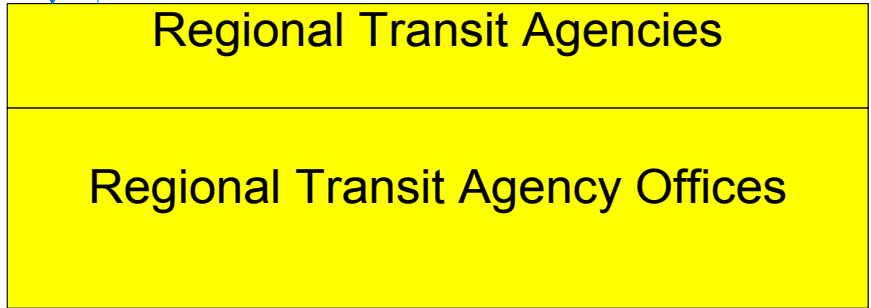


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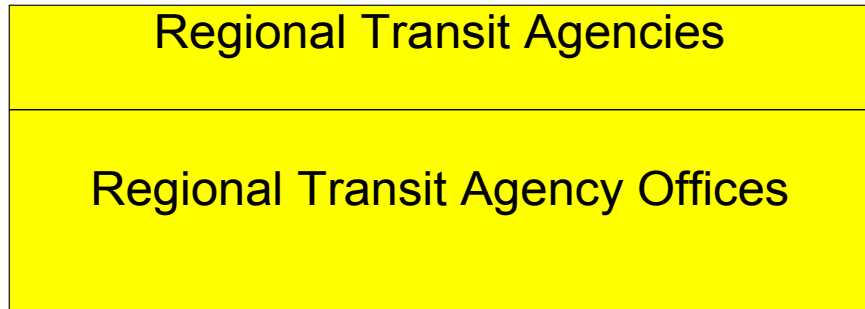
secure area monitoring support

secure area surveillance data

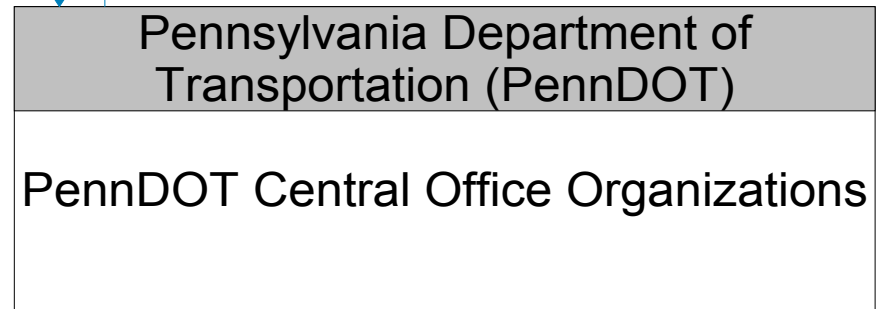


———— Existing

- - - - - Planned

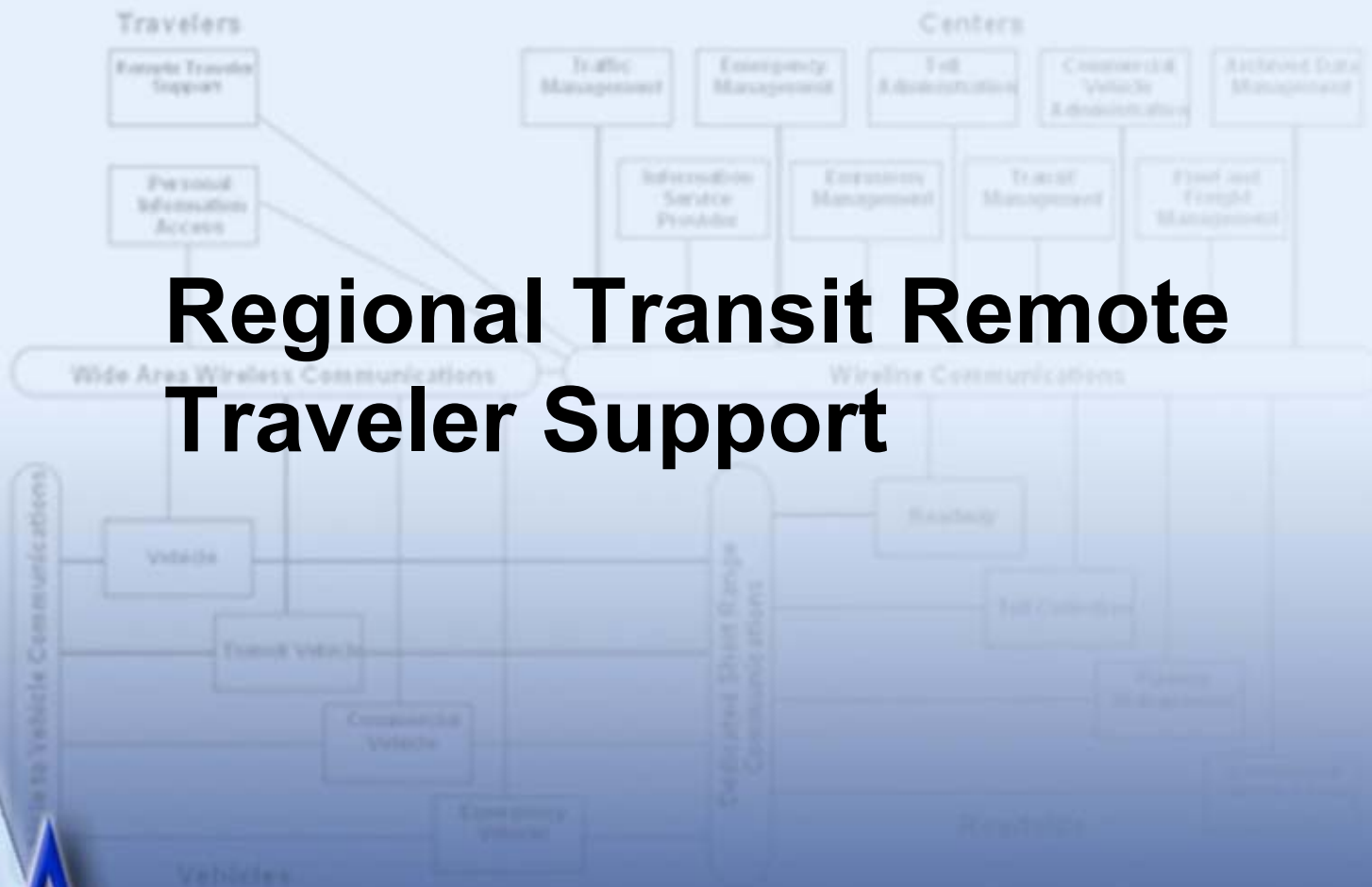


archive requests
transit archive data

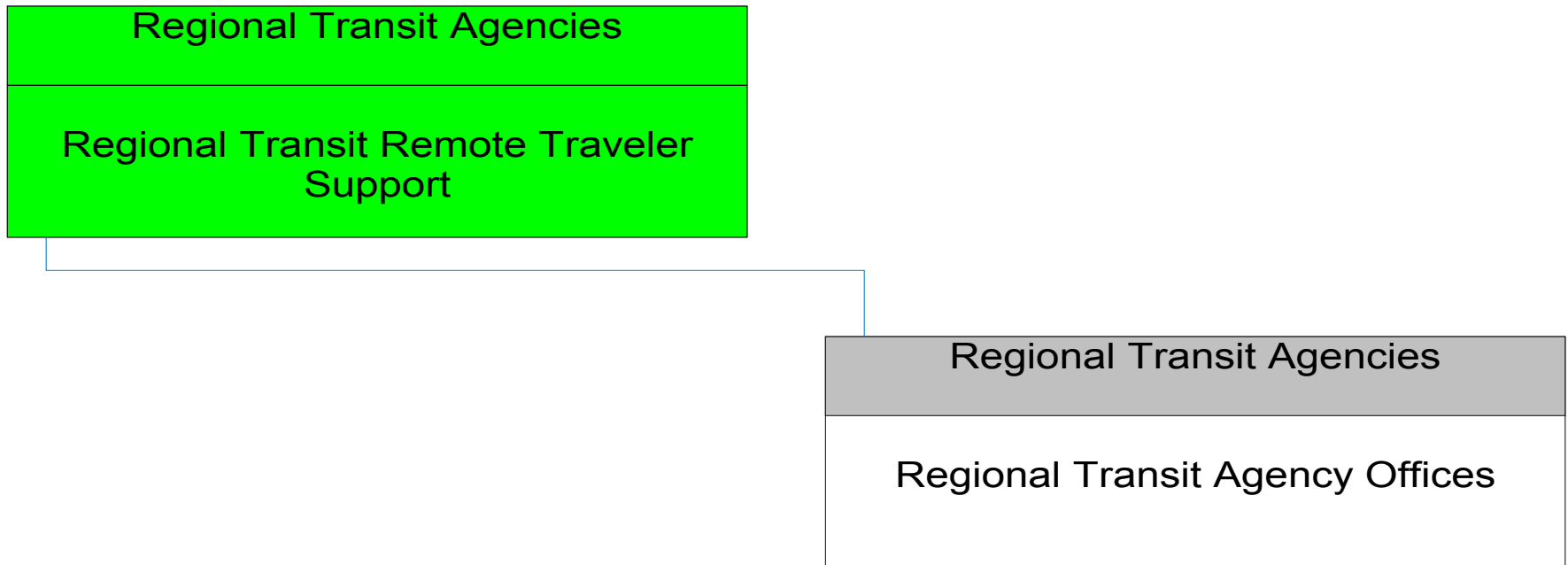


———— Existing
----- Planned

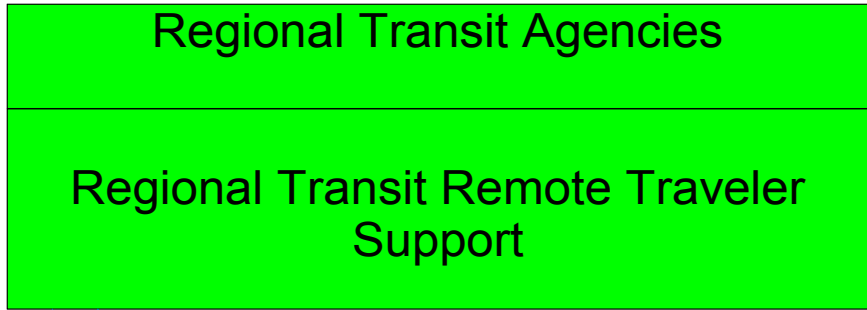
Regional Transit Remote Traveler Support



Regional Transit Remote Traveler Support Interconnect Diagram

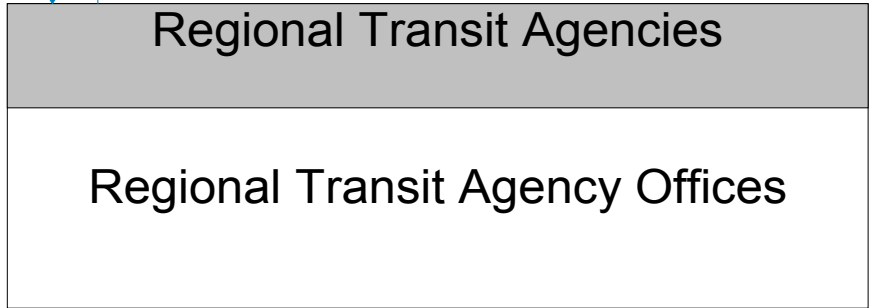


———— Existing
----- Planned



secure area monitoring support

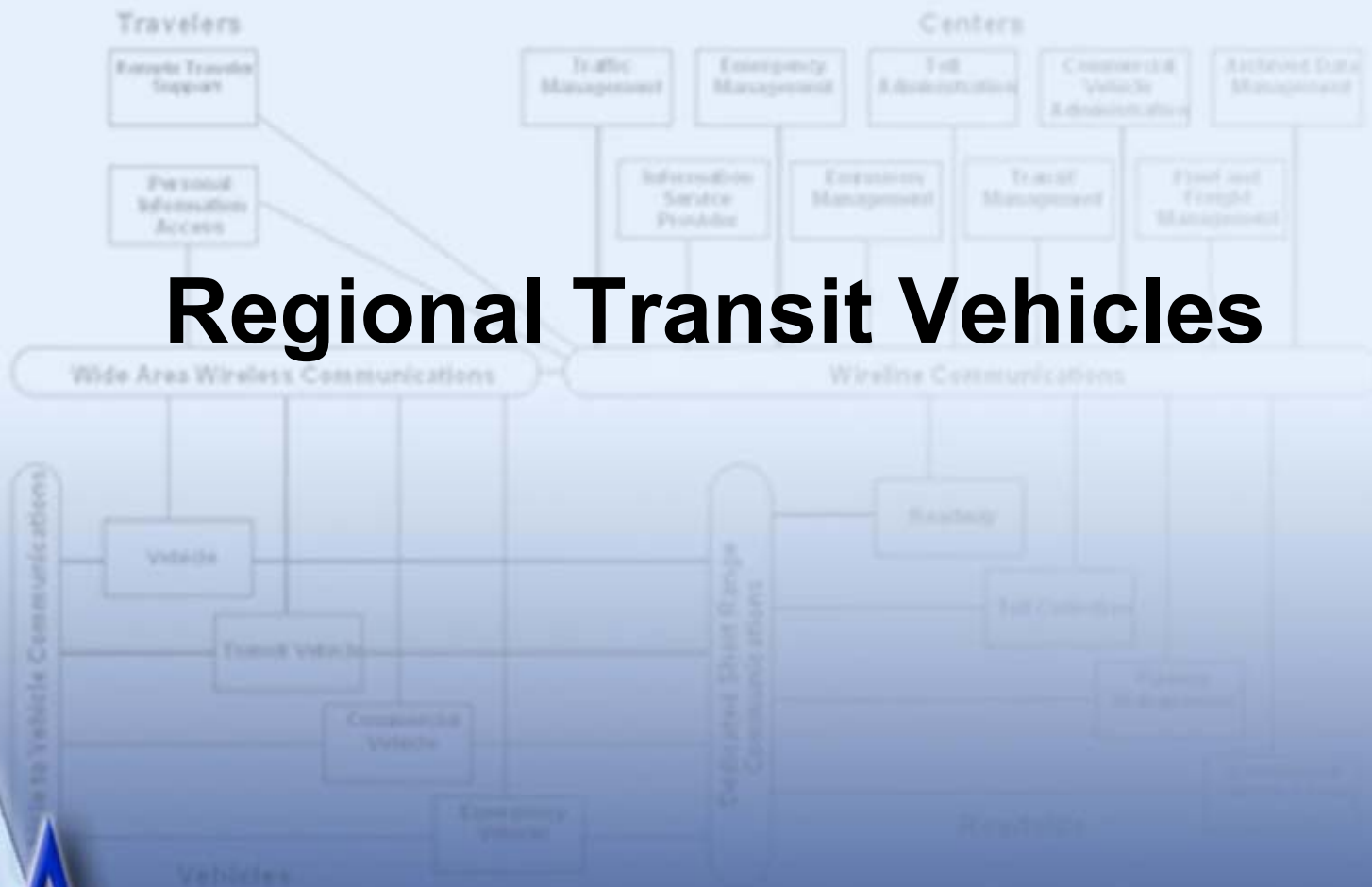
secure area surveillance data



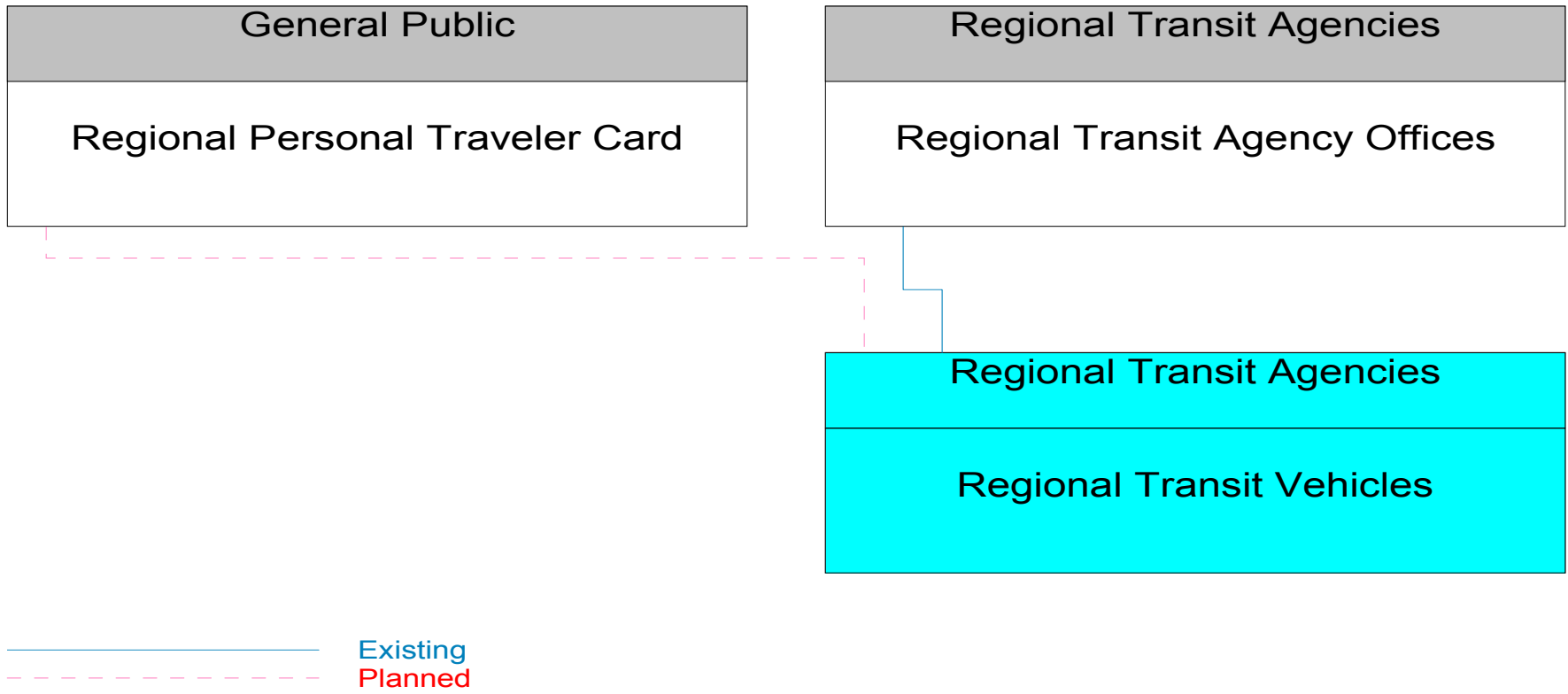
Existing

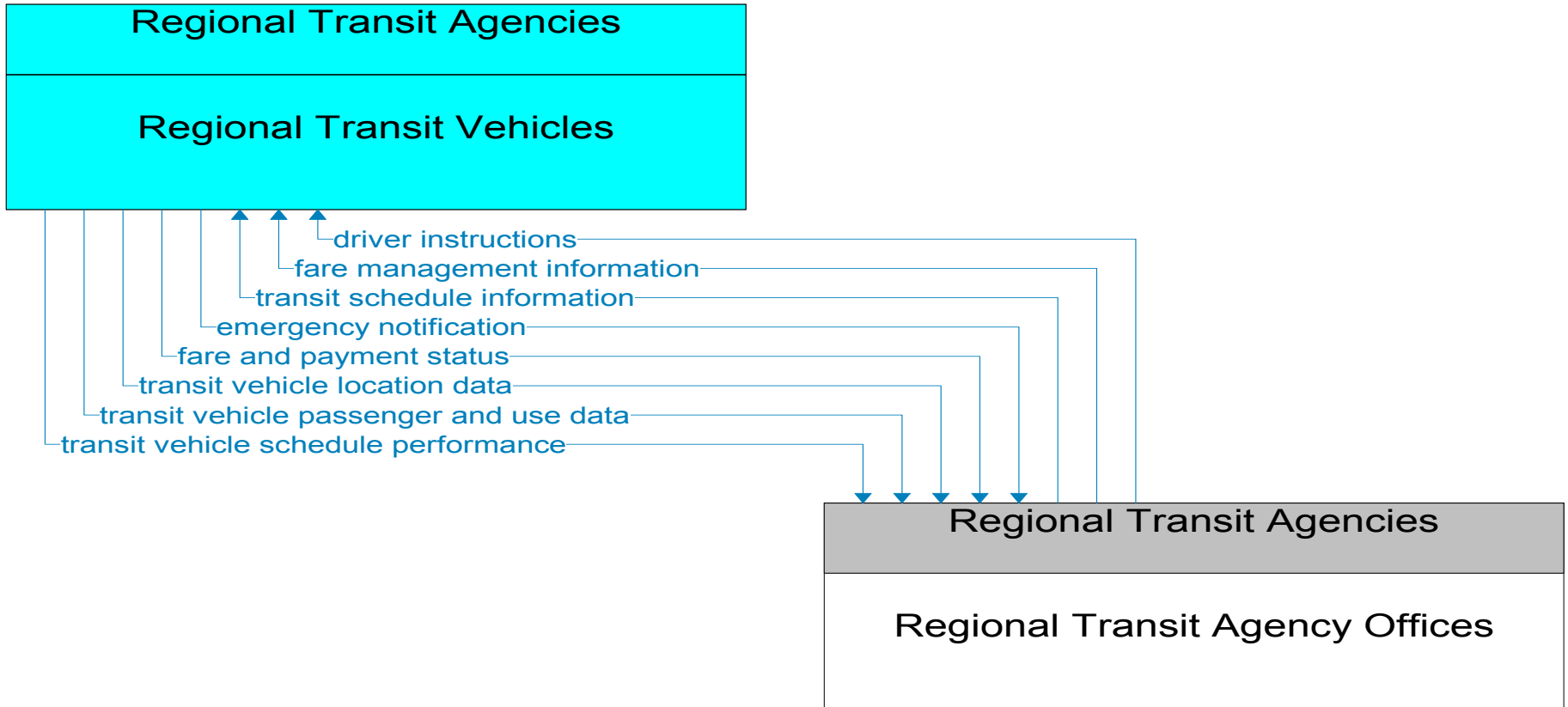
Planned

Regional Transit Vehicles

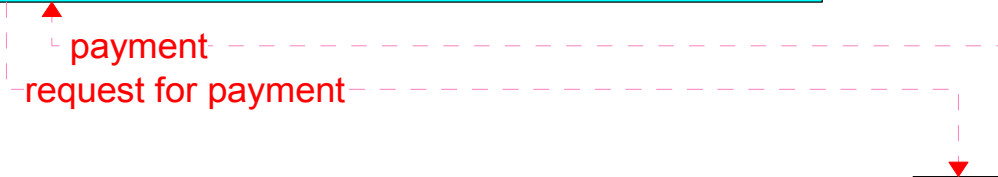
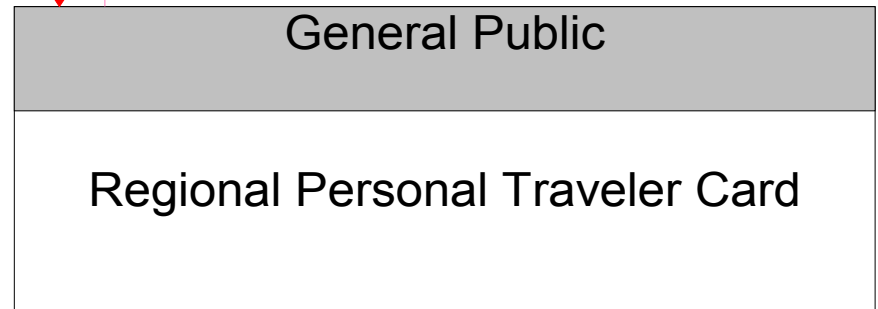
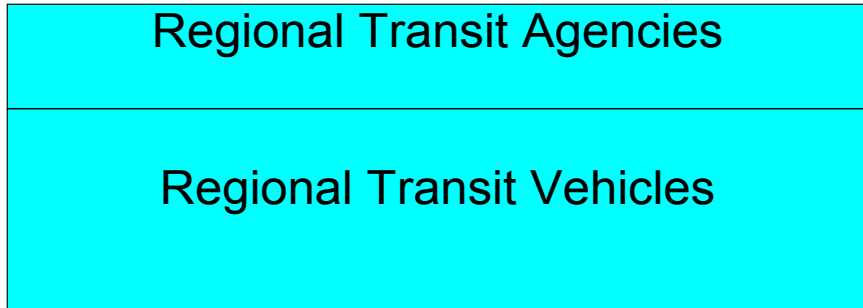


Regional Transit Vehicles Interconnect Diagram



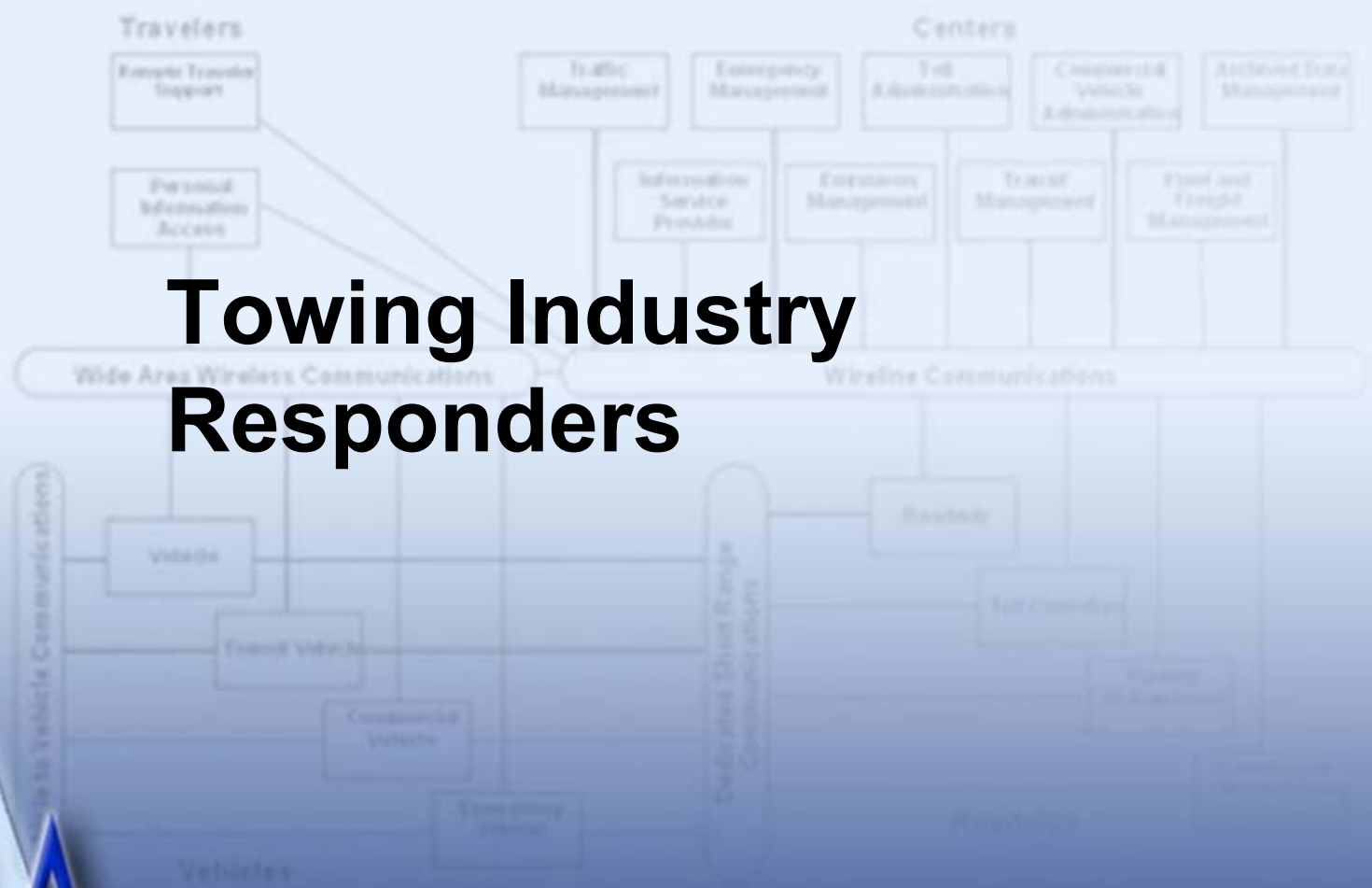


———— Existing
- - - - - Planned



Existing
Planned

Towing Industry Responders

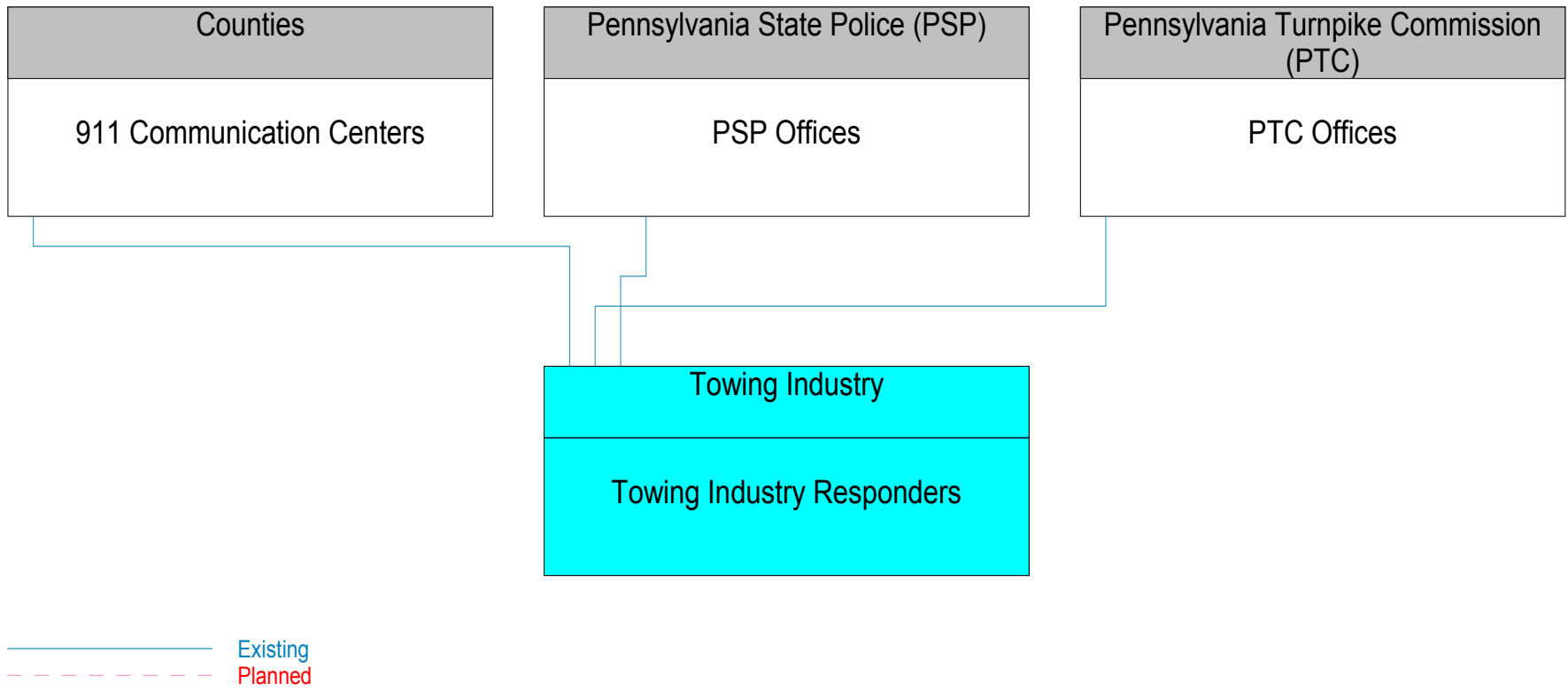


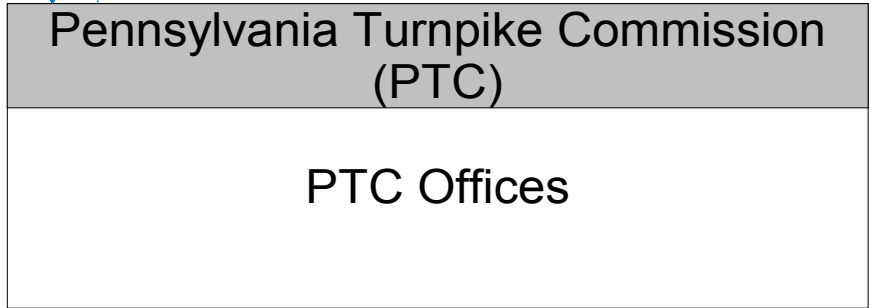
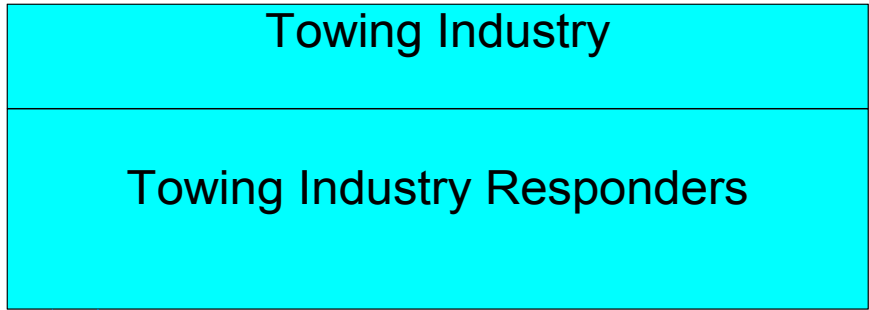
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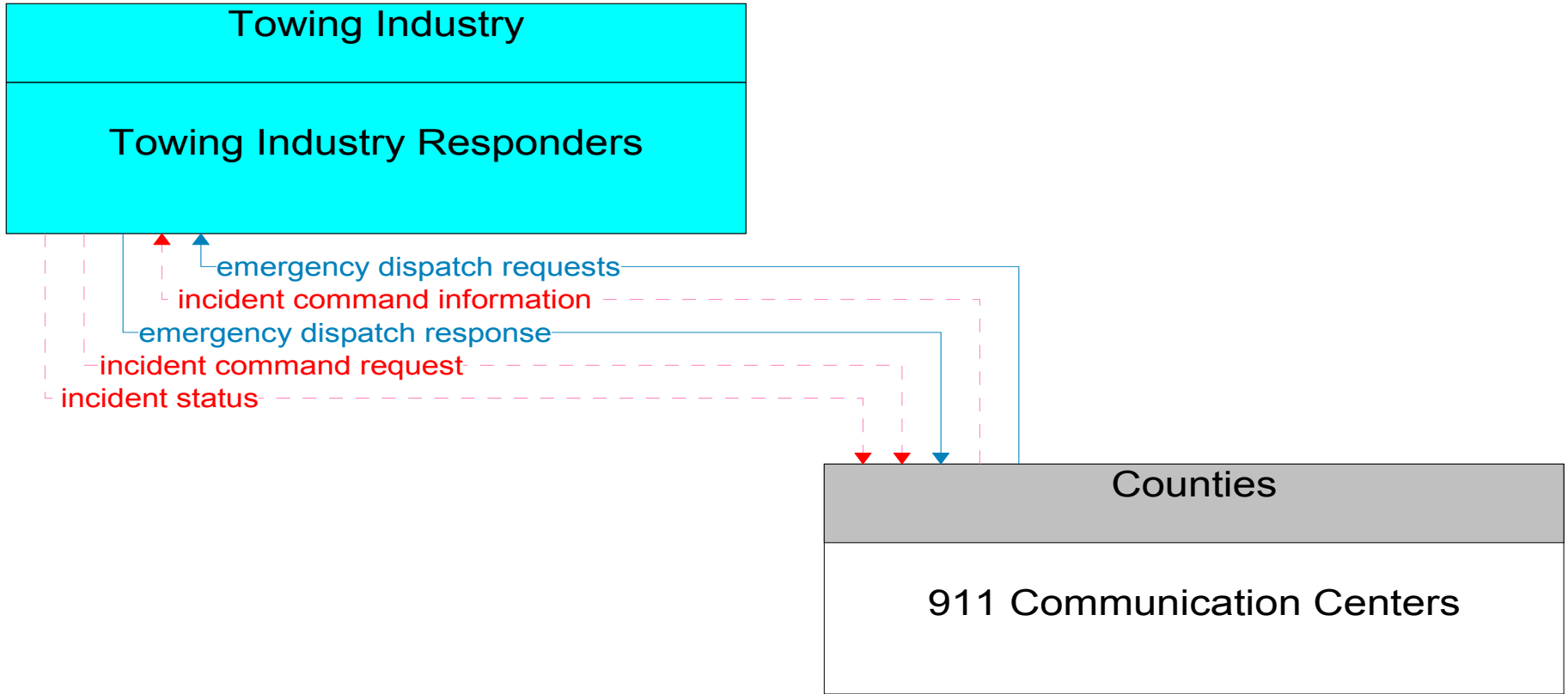
architecture



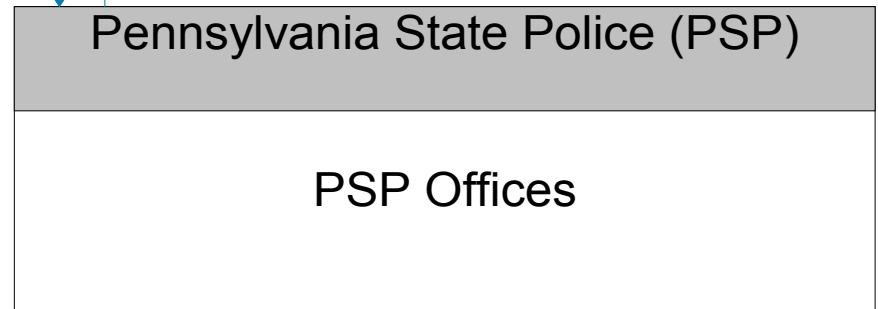
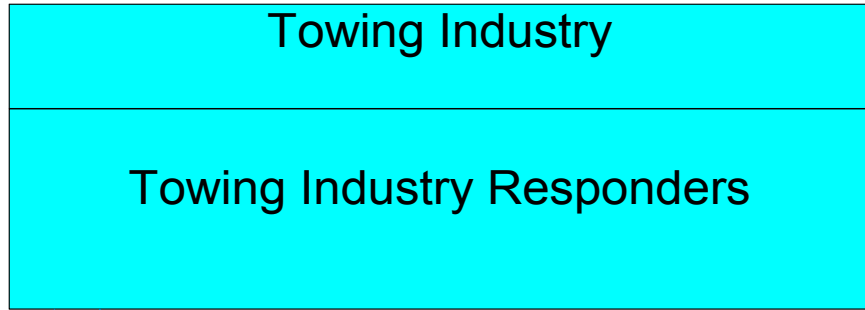
Towing Industry Responders Interconnect Diagram







———— Existing
- - - - - Planned



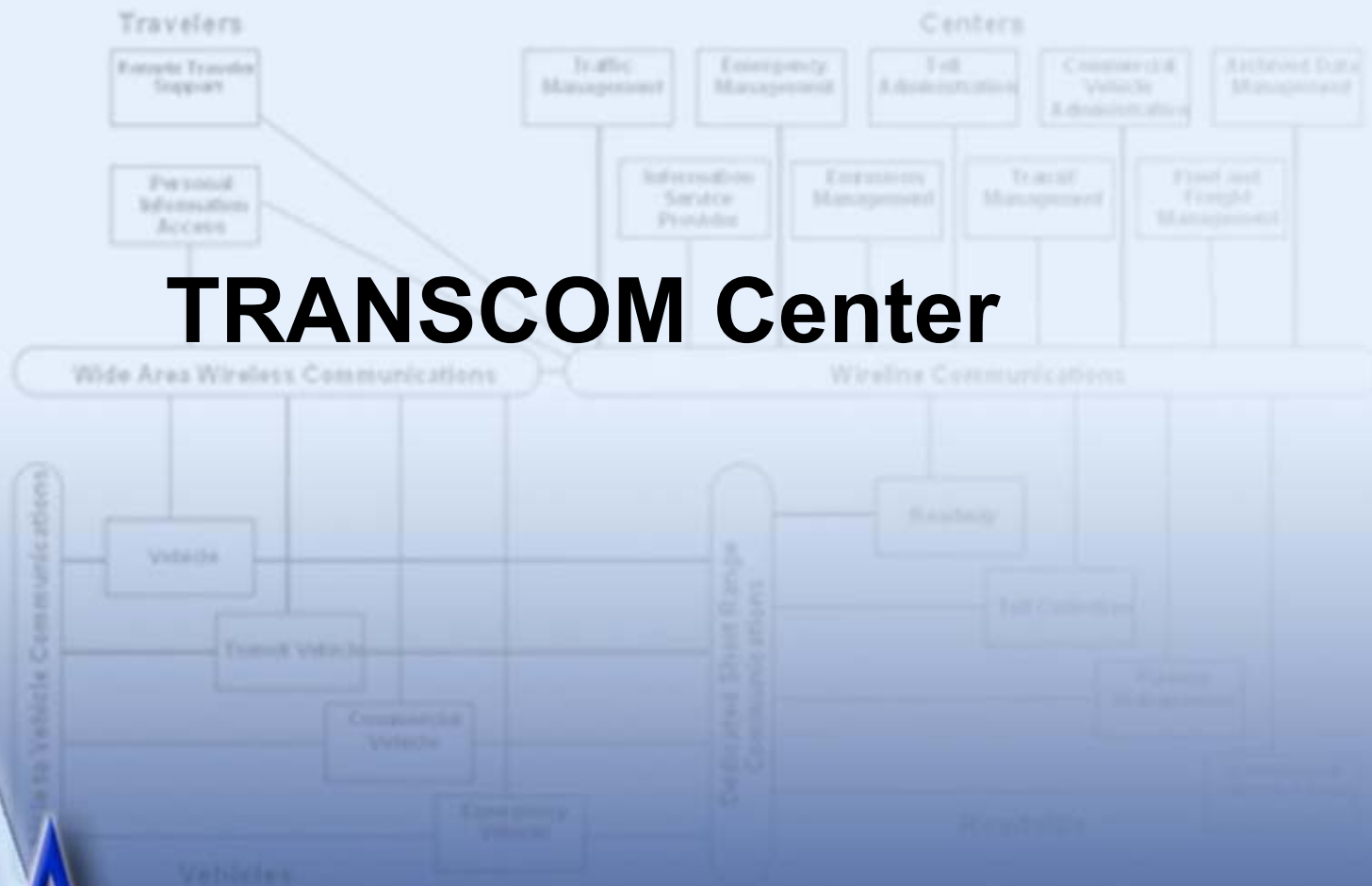
emergency dispatch requests

emergency dispatch response

Existing

Planned

TRANSCOM Center

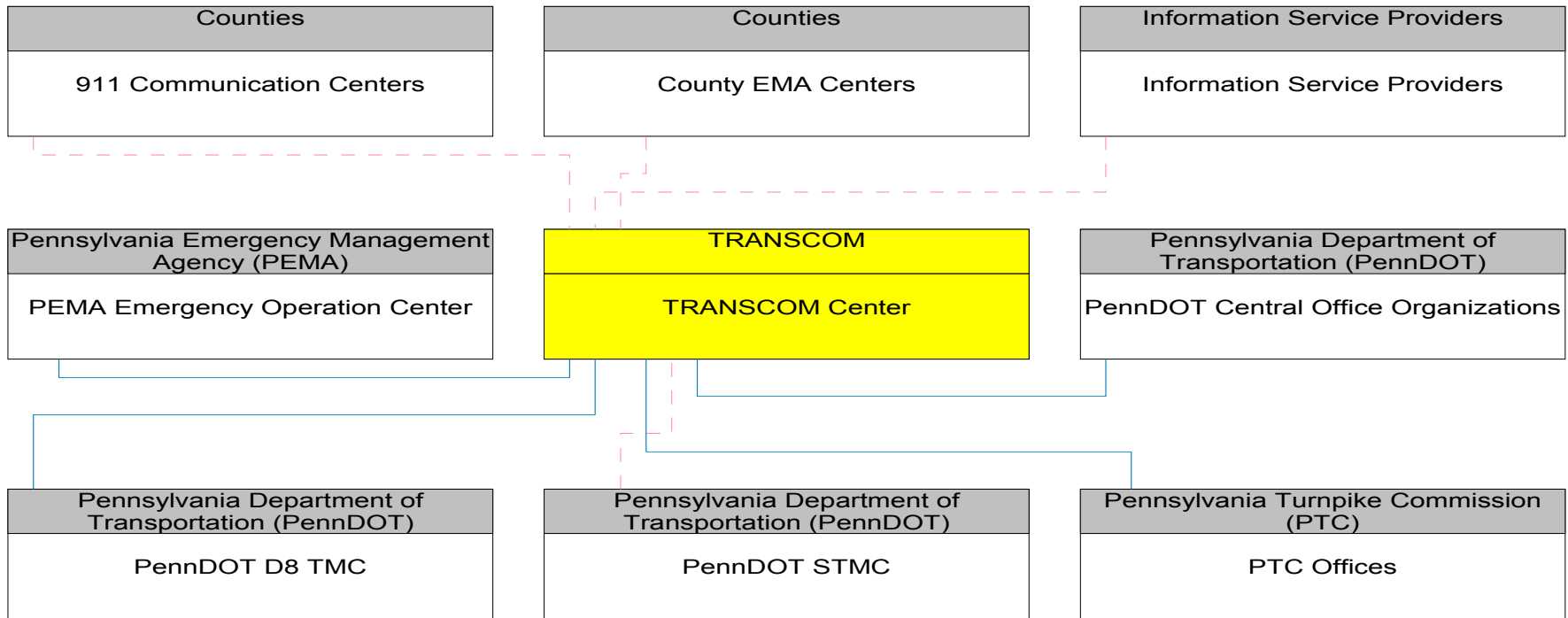


PA

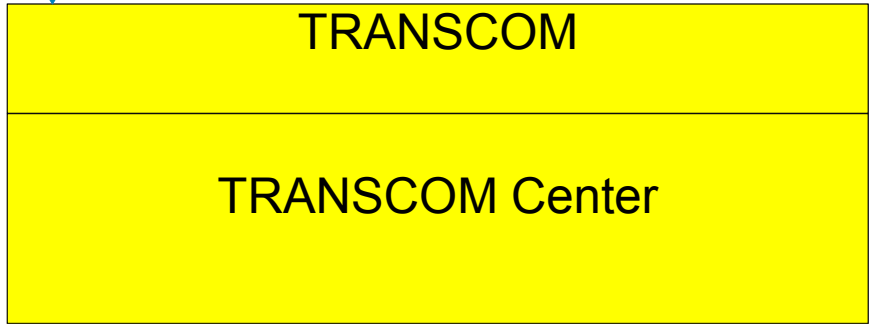
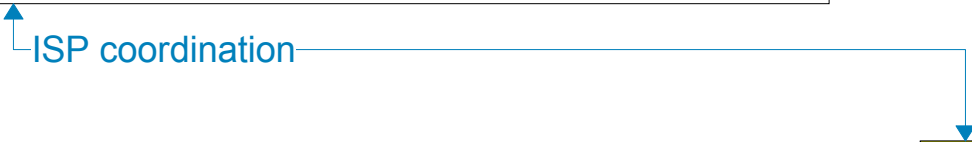
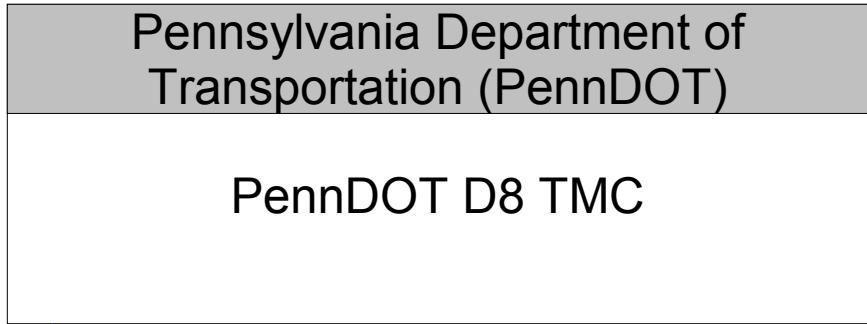
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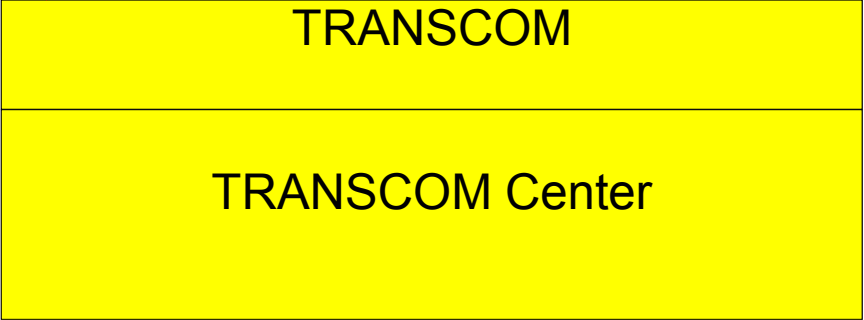
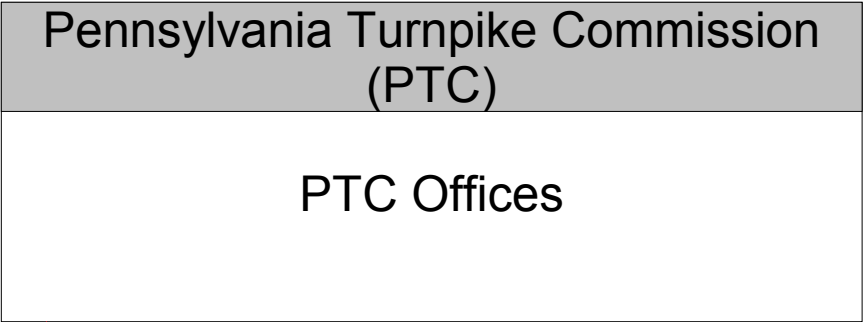
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TRANSCOM Center Interconnect Diagram

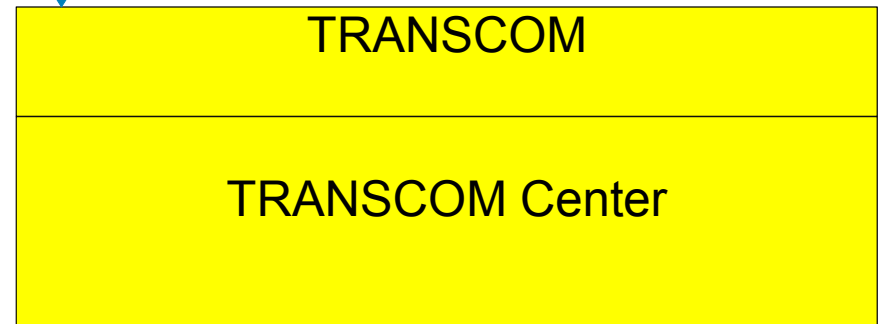
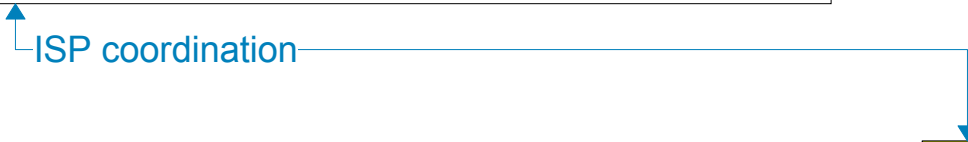
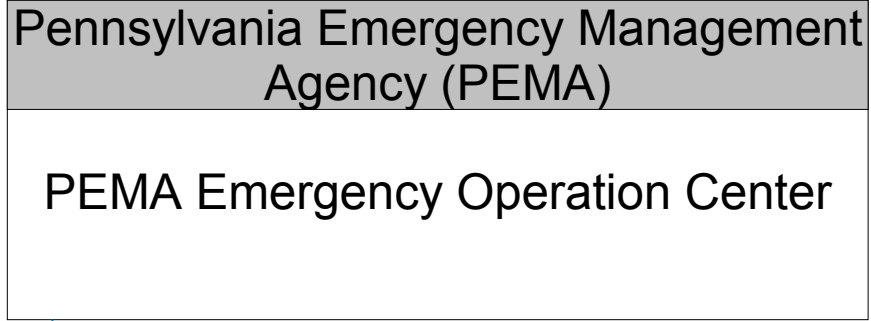


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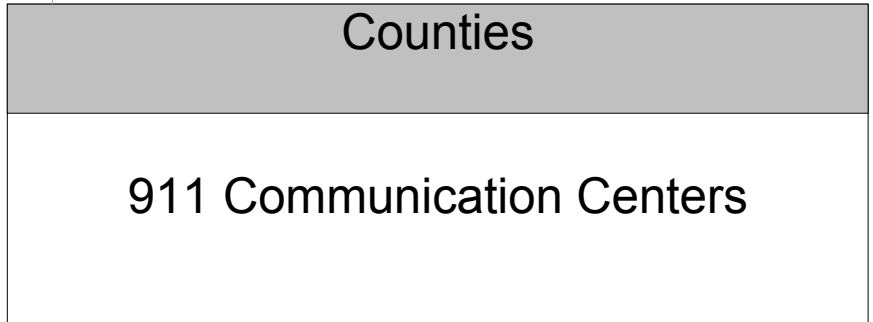
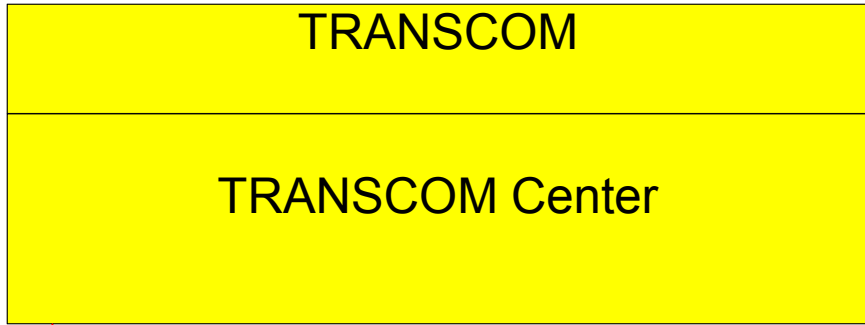




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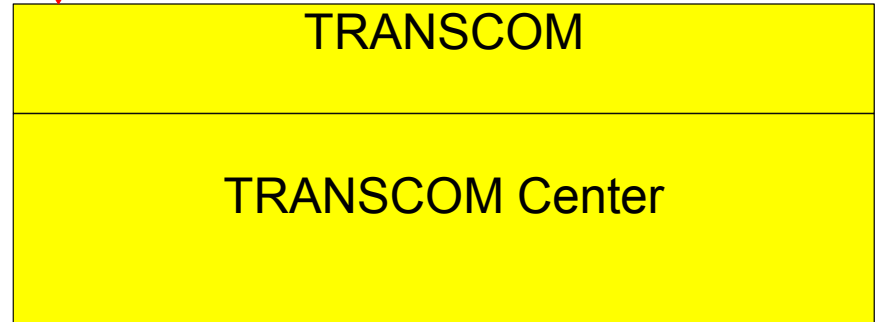
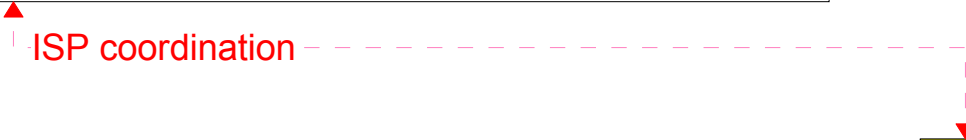
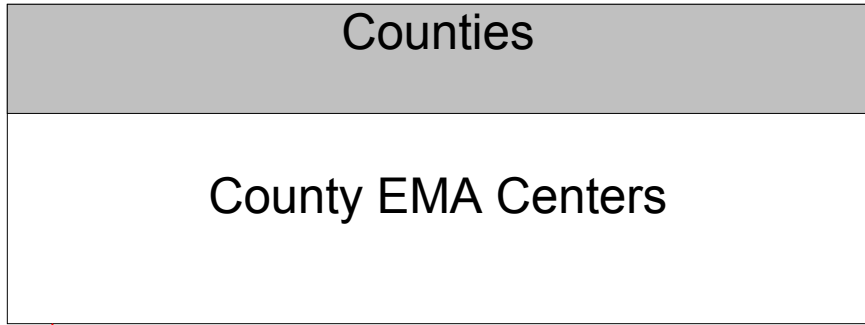


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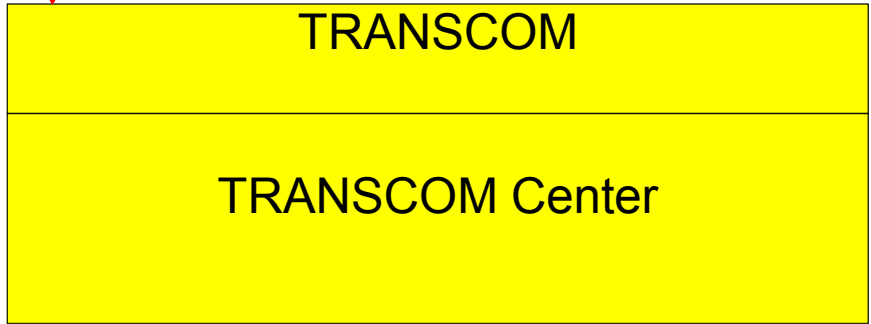
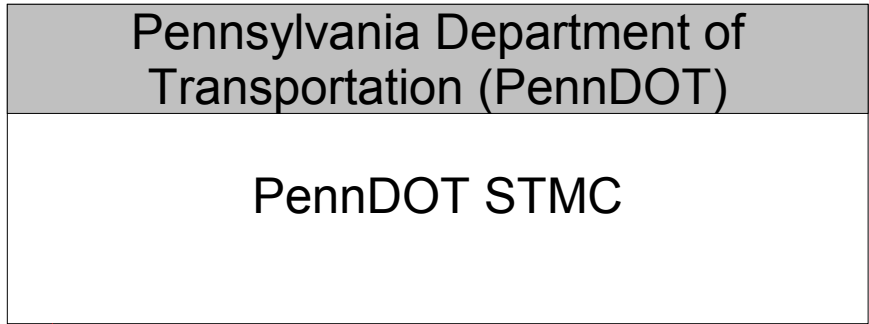


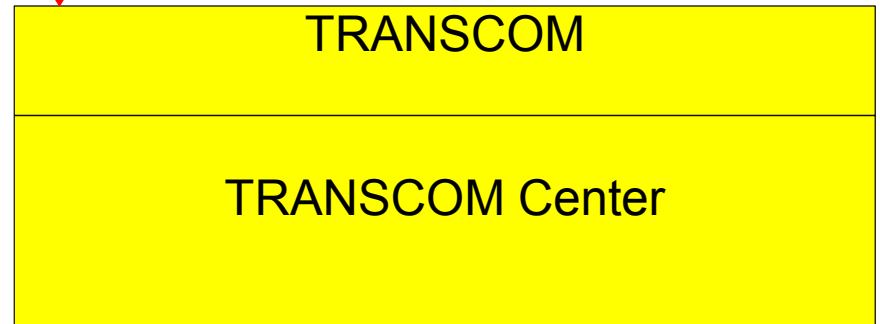
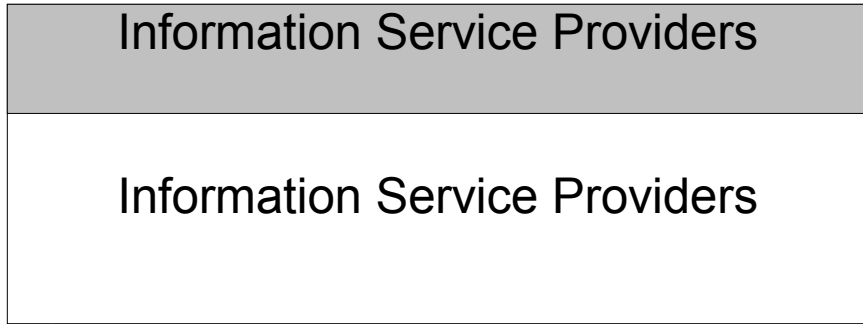
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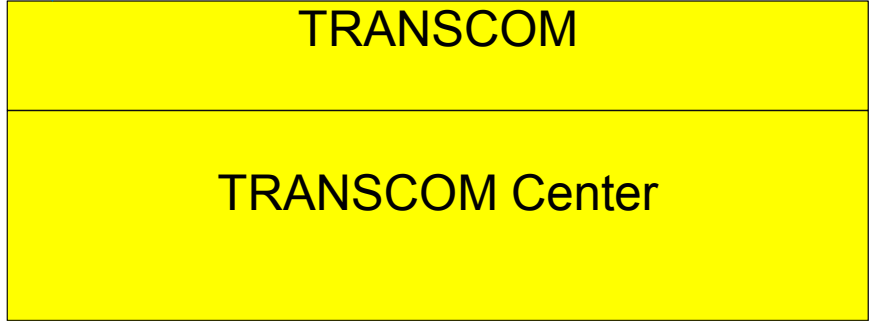
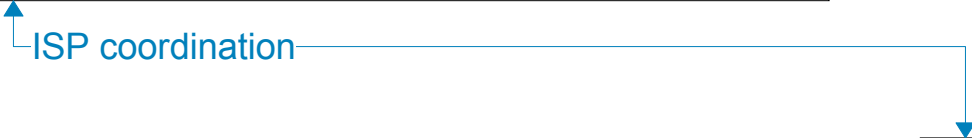
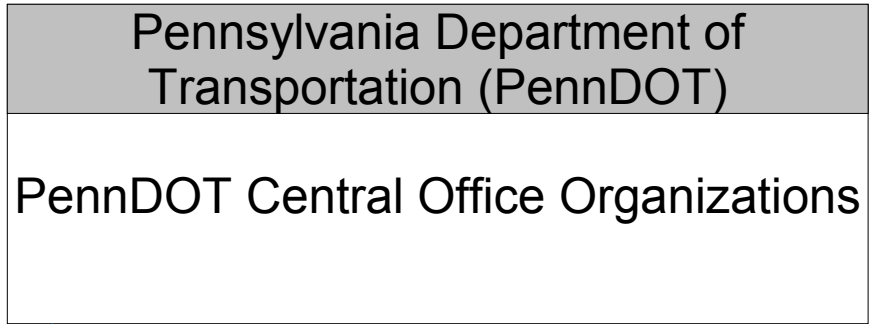
A legend showing a solid blue line for "Existing" and a dashed red line for "Planned".



———— Existing
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References

The following references were utilized in the development of the South Central Regional ITS Architecture:

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- *DVRPC Regional ITS Architecture – Version 1.0.* Delaware Valley Regional Planning Commission. Philadelphia, PA. March 2001.
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Appendix A: Acronyms

24x7	Twenty Four Hours of Operation, Seven Days a Week
AAA	American Automobile Association
AASHTO	American Association of State Highway and Transportation Officials
ADA	Americans with Disabilities Act
AHS	Automated Highway System
ANSI	American National Standards Institute
ARMS	Automatic Real-Time Messaging
ASTM	American Society of Testing and Materials
ATIS	Advanced Traveler Information System
ATR	Automatic Traffic Recorders
AVL	Automatic Vehicle Location
BHSTE	Bureau of Highway Safety and Traffic Engineering
BOMO	Bureau of Maintenance and Operations
BPR	Bureau of Planning and Research
BRT	Bus Rapid Transit
CAT	Capitol Area Transit
CCTV	Closed Circuit Television
CDC	Consolidated Dispatch Centers
CDL	Commercial Drivers License
COLT	County of Lebanon Transit
CTA	Chambersburg Transit Authority
CVC	Commercial Vehicle Check
CVISN	Commercial Vehicle Information Systems and Networks
CVO	Commercial Vehicle Operations
DARC	Data Radio Channel
DMS	Dynamic Message Signs
DMV	Department of Motor Vehicles
DOT	Department of Transportation
DSRC	Designated Short Range Communication
EMA	Emergency Management Agency
EMS	Emergency Medical Services
ESP	Emergency Service Patrol
ETC	Electronic Toll Collection
E-Z Pass	Electronic toll collection system used by a consortium of toll authorities in northeast United States
FCC	Federal Communication Commission
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
GIS	Geographic Information System
GPS	Global Positioning System
HAR	Highway Advisory Radio
HAT	Highway Advisory Telephone System
HAZMAT	Hazardous Materials

HIA	Harrisburg International Airport
HOV	High Occupancy Vehicle
HRI	Highway Rail Intersection
IEEE	Institute of Electrical and Electronics Engineers
IEN	Information Exchange Network
IM	Incident Management
IIMS	Incident Information Management System
IMMS	Incident Management Message Sets
ISP	Information Service Provider
ITS	Intelligent Transportation System
MCSAP	Motor Carrier Safety Assistance Program
MDSHA	Maryland State Highway Administration
MEMA	Maryland Emergency Management Agency
MOE	Measures of Effectiveness
MOU	Memorandum of Understanding
m.p.	Milepost
NEMA	National Electrical Manufacturers Association
NHI	National Highway Institute
NTCIP	National Transportation Communications for ITS Protocols
NWS	National Weather Service
OB	Onboard
OER	Octet Encoding Rules
O&M	Operations and Maintenance
OEM	Office of Emergency Management
PDA	Personal Digital Assistant
PEIRS	Pennsylvania Emergency Information Reporting System
PEMA	Pennsylvania Emergency Management Agency
PennDOT	Pennsylvania Department of Transportation
PRISM	Performance and Registration Information Systems Management
PSP	Pennsylvania State Police
PSAP	Public Safety Answering Point
PTC	Pennsylvania Turnpike Commission
RAP	Regional Advisory Panel
RAPID	Regional Agile Port Intermodal Distribution System
RPO	Rural Planning Organization
RTMC	Regional Transportation Management Center
RWIS	Road Weather Information System
SAFER	Safety and Fitness Electronic Record
SATIN	Service Area Travelers Interactive Network
SCADA	Supervisory Control and Data Acquisition
SCH	Scheduling/Run Cutting
SFA	Strategic Focus Area
STMC	Statewide Transportation Management Center
STMF	Simple Transportation Management Framework
T-1	High Bandwidth Telephone Line
TIP	Transportation Improvement Plan
TMC	Transportation Management Center
WIM	Weigh in Motion

Appendix B: ITS Definitions

(Source: DVRPC Regional ITS Architecture)

The following definitions for ITS terms may or may not apply specifically to the Region. They are provided as reference material to support ITS terminology found in and outside of this report.

Automatic Vehicle Location: This technology is used by various agencies, including transit and emergency management agencies, to constantly monitor the location of their vehicles. Transit agencies utilize AVL as a management tool to track the progress of buses and to determine when remedial action is required if buses are not adhering to schedule. Emergency dispatchers rely upon AVL to help guide their selection of which vehicle to dispatch to a call. AVL technology relies upon GPS or triangulation as the mechanism for locating vehicles.

Cellular Phone Number for Incident Reporting: Several toll authorities have reserved cellular phone numbers, such as *11 for the Pennsylvania Turnpike, for use by motorists to report disabled vehicles or incidents while en-route. The numbers are usually toll-free and go directly to the agency's operations center. Several highway departments have posted signs directing motorists to dial cellular 911 to report incidents.

Closed Circuit Television: CCTV is real-time video surveillance equipment, monitored and manipulated by operations personnel. For highways, CCTV's are installed at locations where accident rates and/or congestion levels are known to be high. The cameras dispatch real-time video images to the traffic operation centers so that in emergency situations a quicker response can be provided. Transit agencies deploy CCTV cameras to observe transit passengers for transit management (crowding levels), fare collection, and security purposes.

Closed Loop Traffic Signal System: For this system, traffic signals are interconnected along specified corridors to provide for ease in traffic flow. The signals may be monitored by detectors and adjusted according to current traffic conditions, or preprogrammed with a number of signal timing plans that vary by time of day and day of week.

Commercial Vehicle Electronic Administration Processes: This process allows commercial vehicle operators to obtain necessary permits via computer and supports the exchange of safety and credentials data among multiple jurisdictions and between agencies within a single jurisdiction.

Dynamic Message Sign: The purpose of the DMS's is to provide real-time en-route travel advisories to travelers. For highways, the DMS signs are either centered over travel lanes or placed alongside the roadway. Messages on permanent DMS signs typically originate from a traffic control center. For transit systems, DMS's take the form

of dynamic message boards located in waiting areas and/or platforms to provide information on train arrivals, departures, and platform locations.

Emergency Call Boxes: Emergency call boxes permit travelers who do not have cellular phones a mechanism to report accidents and other emergency situations. They are used by both highway and transit travelers. Call boxes are typically located along the side of an expressway at mile or half mile intervals. Transit agencies place them in waiting areas and on platforms to improve the security of passengers.

E-Z Pass: E-Z Pass is an electronic toll collection system developed by a consortium of toll agencies located in the northeast United States. When a vehicle passes through an E-Z Pass designated toll lane, an electronic tag, in the form of a small box mounted on a vehicle windshield, is detected by an antenna and the appropriate toll is deducted from the customer's prepaid E-Z Pass account. Because of the alliance, E-Z Pass will eventually be employed on all toll bridges and roads in the region.

Highway Advisory Radio: HAR provides travelers with real-time roadway information, including weather information, agency hotline numbers, incident information, and roadway construction advisories, directly over their car radio. The FCC reserves certain AM and FM frequencies specific to whatever jurisdiction in which they are located for public agencies to broadcast these special travel advisories.

Kiosks: A number of organizations have plans to install travel information kiosks at tourist centers, government buildings, and highway service areas. Travelers will be able to obtain current traffic and transit information, information about places to visit, route planning information, and hotel reservations. Generally kiosks will be more interactive and offer more choices than the static traveler information services currently available.

Management Center: Management centers are the focal point and communications hub of an agency's operation. Almost all transit, highway and bridge agencies in the region have their own control centers. These facilities monitor and control an agency's highway or transit network and are responsible for incident management. While the equipment in each operating center varies by agency, the typical control center consists of any number of computer workstations, radio scanners, TV monitors, audio text recording booths to record HAR messages, and fax machines for broadcasting information to other agencies. Depending on agency needs, a highway control center can include capabilities to operate computerized traffic signal systems, Dynamic message signs and highway advisory radios, monitor CCTV's, manage emergency service patrols, and coordinate incident management response teams. Composition of transit operation centers vary based upon whether rail or bus operations are involved.

Ramp Metering: Ramp metering is designed to control the rate of traffic entering a freeway. The objective is to maintain a predetermined level of service on the freeway by adjusting the on-ramp traffic volume with a traffic control signal. Typical waiting times at ramp metering signals are between 5 to 6 seconds per vehicle.

Road Weather Information System: RWIS are typically installed at locations that experience a higher-than-average number of accidents attributable to fog, snow or icy conditions. Sensor information can be used to more effectively deploy road maintenance resources, issue weather-specific warnings to drivers and general advisories to motorists. Weather sensors are connected to remote processing units located in the field which measure, collect, and pre-process environmental data and then transmit the information to an operations center where staff can act on the information.

Signal Priority: This technology allows transit vehicles to send direct control requests to signalized intersections. These messages result in preemption of the current signal control plan and grants right-of-way to the requesting transit and emergency vehicles.

Service Patrols: The Service Patrol program is designed to improve the efficiency of the highway system through the quick resolution of minor incidents, including disabled vehicles, vehicles out of gas, and minor accidents that impact traffic flow. Service Patrol vans patrol along highways and provide assistance to disabled vehicles. Service Patrol operators are equipped to perform minor repairs such as changing a flat tire or providing gasoline. When major repairs are needed, Service Patrol operators can assist the motorist in contacting a towing company to remove the disabled vehicle. Service Patrol's also reduce the risk of secondary accidents by deploying appropriate warning devices.

Traveler Cards: This technology provides the capability for the traveler to use a common fare instrument for all surface transportation services (i.e., multiple transit agencies, parking facilities, toll roads), to pay without stopping, and have the payment media automatically identified as invalid or its eligibility verified. In addition, smart cards have the capability to provide expansion into other uses as payment for retail purchases, telephone services and for off-line billing for fares paid to agencies.

Traveler Information Website: This type of website is used to access traveler information prior to starting a trip. Currently, most of the existing travel websites in the region offer only construction or special event information. Eventually, real-time, route-specific travel reports will be found on the websites. SmartRoute, under contract to PennDOT, provides real-time travel information on selected highways and transit facilities in the region.

Weigh-In-Motion Station: Weight measuring equipment, including fixed sensors embedded in the pavement, can ascertain the weight of a commercial vehicle at highway speeds to ensure the vehicle is operating within legal weight limits. Ultimately, WIM stations will be utilized to assess motor vehicle taxes on commercial carriers.

Appendix C: Subsystem and Terminator Definitions

(Source: National ITS Architecture)

Appendix C contains the subsystems and terminators from the National ITS Architecture exclusive to the Regional ITS Architecture:

Archived Data Management: The Archived Data Management Subsystem collects, archives, manages, and distributes data generated from ITS sources for use in transportation administration, policy evaluation, safety, planning, performance monitoring, program assessment, operations, and research applications. The data received is formatted, tagged with attributes that define the data source, conditions under which it was collected, data transformations, and other information (i.e. meta data) necessary to interpret the data. The subsystem can fuse ITS generated data with data from non-ITS sources and other archives to generate information products utilizing data from multiple functional areas, modes, and jurisdictions. The subsystem prepares data products that can serve as inputs to Federal, State, and local data reporting systems. This subsystem may be implemented in many different ways. It may reside within an operational center and provide focused access to a particular agency's data archives. Alternatively, it may operate as a distinct center that collects data from multiple agencies and sources and provides a general data warehouse service for a region.

Archived Data User Systems: This terminator represents the systems users employ to access archived data. The general interface provided from this terminator allows a broad range of users (e.g. planners, researchers, analysts, operators) and their systems (e.g. databases, models, analytical tools, user interface devices) to acquire data and analyses results from the archive.

Commercial Vehicle Administration: The Commercial Vehicle Administration Subsystem will operate at one or more fixed locations within a region. This subsystem performs administrative functions supporting credentials, tax, and safety regulations. It issues credentials, collects fees and taxes, and supports enforcement of credential requirements. This subsystem communicates with the Fleet Management Subsystems associated with the motor carriers to process credentials applications and collect fuel taxes, weight/distance taxes, and other taxes and fees associated with commercial vehicle operations. The subsystem also receives applications for, and issues special Oversize/Overweight and HAZMAT permits in coordination with other cognizant authorities. The subsystem coordinates with other Commercial Vehicle Administration Subsystems (in other states/regions) to support nationwide access to credentials and safety information for administration and enforcement functions. This subsystem supports communications with Commercial Vehicle Check Subsystems operating at the roadside to enable credential checking and safety information collection. The collected safety information is processed, stored, and made available to qualified stakeholders to identify carriers and drivers that operate unsafely.

Commercial Vehicle Check: The Commercial Vehicle Check Subsystem supports automated vehicle identification at mainline speeds for credential checking, roadside safety inspections, and weigh-in-motion using two-way data exchange. These capabilities include providing warnings to the commercial vehicle drivers, their fleet managers, and proper authorities of any safety problems that have been identified, accessing and examining historical safety data, and automatically deciding whether to allow the vehicle to pass or require it to stop with operator manual override. The Commercial Vehicle Check Subsystem also provides supplemental inspection services to current capabilities by supporting expedited brake inspections, the use of operator hand-held devices, on-board safety database access, and the enrollment of vehicles and carriers in electronic clearance.

Commercial Vehicle Subsystem: This subsystem resides in a commercial vehicle and provides the sensory, processing, storage, and communications functions necessary to support safe and efficient commercial vehicle operations. The Commercial Vehicle Subsystem provides two-way communications between the commercial vehicle drivers, their fleet managers, and roadside officials, and provides HAZMAT response teams with timely and accurate cargo contents information after a vehicle incident. This subsystem provides the capability to collect and process vehicle, cargo, and driver safety data and status and alert the driver whenever there is a potential safety problem. Basic identification and safety status data are supplied to inspection facilities at mainline speeds.

Emergency Management: The Emergency Management Subsystem represents public safety and other allied agency systems that support coordinated traffic incident management and emergency response. The subsystem includes the functions associated with fixed and mobile public safety communications centers includes various public safety call taker and dispatch centers operated by police, fire, and emergency medical services. This subsystem also represents other allied systems including centers associated with towing and recovery, freeway service patrols, HAZMAT response teams, mayday service providers, and security/surveillance services that improve traveler security in public areas. This subsystem interfaces with other Emergency Management Subsystems to support coordinated emergency response involving multiple agencies. The subsystem creates, stores, and utilizes emergency response plans to facilitate coordinated response. The subsystem tracks and manages emergency vehicle fleets using automated vehicle location technology and two way communications with the vehicle fleet. Real-time traffic information received from the other center subsystems is used to further aide the emergency dispatcher in selecting the emergency vehicle(s) and routes that will provide the timeliest response. Interface with the Traffic Management Subsystem allows strategic coordination in tailoring traffic control to support en-route emergency vehicles. Interface with the Transit Management Subsystem allows coordinated use of transit vehicles to facilitate response to major emergencies.

Emergency Telecommunications System: This terminator represents the telecommunications systems that connect a caller with a Public Safety Answering Point (PSAP). These systems transparently support priority wireline and wireless caller access to the PSAP through 9-1-1 and other access mechanisms like 7 digit local

access numbers, and motorist aid call boxes. The calls are routed to the appropriate PSAP, based on caller location when this information is available.

Emergency Vehicle: This subsystem resides in an emergency vehicle and provides the sensory, processing, storage, and communications functions necessary to support safe and efficient incident response. The subsystem represents a range of vehicles including those operated by police, fire, and emergency medical services. In addition, this subsystem represents other incident response vehicles including towing and recovery vehicles and freeway service patrols. The Emergency Vehicle Subsystem includes two-way communications to support coordinated response to emergencies in accordance with an associated Emergency Management Subsystem. Emergency vehicles are equipped with automated vehicle location capability for monitoring by vehicle tracking and fleet management functions in the Emergency Management Subsystem. Using these capabilities, the appropriate emergency vehicle to respond to each emergency is determined. Route guidance capabilities within the vehicle enable safe and efficient routing to the emergency. In addition, the emergency vehicle may be equipped to support signal preemption through communications with the Roadway Subsystem.

Fleet and Freight Management: The Fleet and Freight Management Subsystem provides the capability for commercial drivers and dispatchers to receive real-time routing information and access databases containing vehicle and cargo locations as well as carrier, vehicle, cargo and driver information. In addition, the capability to purchase credentials electronically shall also be provided, with automated and efficient connections to financial institutions and regulatory agencies, along with post-trip automated mileage and fuel usage reporting. The Fleet Management Subsystem also provides the capability for fleet managers to monitor the safety of their commercial vehicle drivers and fleet. The subsystem also supports application for hazmat credentials and makes information about hazmat cargo available to agencies as required. Within this subsystem lies all the functionality associated with subsystems and components necessary to enroll and participate in international goods movement programs aimed at enhancing trade and transportation safety.

Information Service Provider: This subsystem collects, processes, stores, and disseminates transportation information to system operators and the traveling public. The subsystem can play several different roles in an integrated ITS. In one role, the ISP provides a general data warehousing function, collecting information from transportation system operators and redistributing this information to other system operators in the region and other ISPs. In this information redistribution role, the ISP provides a bridge between the various transportation systems that produce the information and the other ISPs and their subscribers that use the information. The second role of an ISP is focused on delivery of traveler information to subscribers and the public at large. Information provided includes basic advisories, traffic and road conditions, transit schedule information, yellow pages information, ride matching information, and parking information. The subsystem also provides the capability to provide specific directions to travelers by receiving origin and destination requests from travelers, generating route plans, and returning the calculated plans to the users. In addition to general route planning for travelers, the ISP also supports specialized route

planning for vehicle fleets. In this third role, the ISP function may be dedicated to, or even embedded within, the dispatch system. Reservation services are also provided in advanced implementations. The information is provided to the traveler through the Personal Information Access Subsystem, Remote Traveler Support Subsystem, and various Vehicle Subsystems through available communications links. Both basic one-way (broadcast) and personalized two-way information provision is supported. The subsystem provides the capability for an informational infrastructure to connect providers and consumers, and gather that market information needed to assist in the planning of service improvements and in maintenance of operations.

Maintenance and Construction Management: The Maintenance and Construction Management Subsystem monitors and manages roadway infrastructure construction and maintenance activities. Representing both public agencies and private contractors that provide these functions, this subsystem manages fleets of maintenance, construction, or special service vehicles (e.g., snow and ice control equipment). The subsystem receives a wide range of status information from these vehicles and performs vehicle dispatch, routing, and resource management for the vehicle fleets and associated equipment. The subsystem participates in incident response by deploying maintenance and construction resources to an incident scene, in coordination with other center subsystems. The subsystem manages equipment at the roadside, including environmental sensors and automated systems that monitor and mitigate adverse road and surface weather conditions. The subsystem manages the repair and maintenance of both non-ITS and ITS equipment including the traffic controllers, detectors, dynamic message signs, signals, and other equipment associated with the roadway infrastructure. Additional interfaces to weather information providers (the weather service and surface transportation weather service providers) provide current and forecast weather information that can be fused with other data sources and used to support advanced decision support systems that increase the efficiency and effectiveness of maintenance and construction operations.

The subsystem remotely monitors and manages ITS capabilities in work zones, gathering, storing, and disseminating work zone information to other systems. It manages traffic in the vicinity of the work zone and advises drivers of work zone status (either directly at the roadside or through an interface with the Information Service Provider or Traffic Management subsystems.) It schedules and manages the location and usage of maintenance assets (such as portable dynamic message signs). Construction and maintenance activities are tracked and coordinated with other systems, improving the quality and accuracy of information available regarding closures and other roadway construction and maintenance activities.

Maintenance and Construction Vehicle: This subsystem resides in a maintenance, construction, or other specialized service vehicles or equipment and provides the sensory, processing, storage, and communications functions necessary to support highway maintenance and construction. All types of maintenance and construction vehicles are covered, including heavy equipment and supervisory vehicles. The subsystem provides two-way communications between drivers/operators and dispatchers and maintains and communicates current location and status information. A wide range of operational status is monitored, measured, and made

available, depending on the specific type of vehicle or equipment. For example, for a snow plow, the information would include whether the plow is up or down and material usage information. The subsystem may also contain capabilities to monitor vehicle systems to support maintenance of the vehicle itself and other sensors that monitor environmental conditions including the road condition and surface weather information. This subsystem can represent a diverse set of mobile environmental sensing platforms, including wheeled vehicles and any other vehicle that collects and reports environmental information.

Media: This terminator represents the information systems that provide traffic reports, travel conditions, and other transportation-related news services to the traveling public through radio, TV, and other media. Traffic and travel advisory information that are collected by ITS are provided to this terminator. It is also a source for traffic flow information, incident and special event information, and other events which may have implications for the transportation system.

Parking Management: The Parking Management Subsystem provides electronic monitoring and management of parking facilities. It supports a DSRC communications link to the Vehicle Subsystem that allows electronic collection of parking fees. It also includes the instrumentation, signs, and other infrastructure that monitors parking lot usage and provides local information about parking availability and other general parking information. This portion of the subsystem functionality must be located in the parking facility where it can monitor, classify, and share information with customers and their vehicles. The subsystem also interfaces with the financial infrastructure and broadly disseminates parking information to other operational centers in the region. Note that the latter functionality may be located in a back office, remote from the parking facility.

Personal Information Access: This subsystem provides the capability for travelers to receive formatted traffic advisories from their homes, place of work, major trip generation sites, personal portable devices, and over multiple types of electronic media. These capabilities shall also provide basic routing information and allow users to select those transportation modes that allow them to avoid congestion, or more advanced capabilities to allow users to specify those transportation parameters that are unique to their individual needs and receive travel information. This subsystem shall provide capabilities to receive route planning from the infrastructure at fixed locations such as in their homes, their place of work, and at mobile locations such as from personal portable devices and in the vehicle or perform the route planning process at a mobile information access location. In addition to end user devices, this subsystem may also represent a device that is used by a merchant or other service provider to receive traveler information and relay important information to their customers. This subsystem shall also provide the capability to initiate a distress signal and cancel a prior issued manual request for help.

Remote Traveler Support: This subsystem provides access to traveler information at transit stations, transit stops, other fixed sites along travel routes (e.g., rest stops, merchant locations), and at major trip generation locations such as special event centers, hotels, office complexes, amusement parks, and theaters. Traveler information

access points include kiosks and informational displays supporting varied levels of interaction and information access. At transit stops, simple displays providing schedule information and imminent arrival signals can be provided. This basic information may be extended to include multi-modal information including traffic conditions and transit schedules along with yellow pages information to support mode and route selection at major trip generation sites. Personalized route planning and route guidance information can also be provided based on criteria supplied by the traveler. In addition to traveler information provision, this subsystem also supports public safety monitoring using CCTV cameras or other surveillance equipment and emergency notification within these public areas. Fare card maintenance, and other features which enhance traveler convenience may also be provided at the discretion of the deploying agency.

Roadway: This subsystem includes the equipment distributed on and along the roadway which monitors and controls traffic and monitors and manages the roadway itself. Equipment includes traffic detectors, environmental sensors, traffic signals, highway advisory radios, dynamic message signs, CCTV cameras and video image processing systems, grade crossing warning systems, and freeway ramp metering systems. HOV lane management and reversible lane management functions are also available. This subsystem also provides the capability for environmental monitoring including sensors that measure road conditions, surface weather, and vehicle emissions. In adverse conditions, automated systems can be used to apply anti-icing materials, disperse fog, etc. Work zone systems including work zone surveillance, traffic control, driver warning, and work crew safety systems are also included. In advanced implementations, this subsystem supports automated vehicle safety systems by safely controlling access to and egress from an Automated Highway System through monitoring of, and communications with, AHS vehicles. Intersection collision avoidance functions are provided by determining the probability of a collision in the intersection and sending appropriate warnings and/or control actions to the approaching vehicles.

Toll Administration: The Toll Administration Subsystem provides general payment administration capabilities and supports the electronic transfer of authenticated funds from the customer to the transportation system operator. This subsystem supports traveler enrollment and collection of both pre-payment and post-payment transportation fees in coordination with the existing, and evolving financial infrastructure supporting electronic payment transactions. The system may establish and administer escrow accounts depending on the clearinghouse scheme and the type of payments involved. This subsystem posts a transaction to the customer account and generates a bill (for post-payment accounts), debits an escrow account, or interfaces to the financial infrastructure to debit a customer designated account. It supports communications with the Toll Collection Subsystem to support fee collection operations. The subsystem also sets and administers the pricing structures and includes the capability to implement road pricing policies in coordination with the Traffic Management Subsystem. The electronic financial transactions in which this subsystem is an intermediary between the customer and the financial infrastructure shall be cryptographically protected and authenticated to preserve privacy and ensure authenticity and auditability.

Toll Collection: The Toll Collection Subsystem provides the capability for vehicle operators to pay tolls without stopping their vehicles using locally determined pricing structures and including the capability to implement various variable road pricing policies. Each transaction is accompanied by feedback to the customer who indicates the general status of the customer account. A record of the transactions is provided to the Toll Administration subsystem for reconciliation.

Traffic Management: The Traffic Management Subsystem operates within a traffic management center or other fixed location. This subsystem communicates with the Roadway Subsystem to monitor and manage traffic flow. Incidents are detected and verified and incident information is provided to the Emergency Management Subsystem, travelers (through Roadway Subsystem Highway Advisory Radio and Dynamic Message Signs), and to third party providers. The subsystem supports HOV lane management and coordination, road pricing, and other demand management policies that can alleviate congestion and influence mode selection. The subsystem monitors and manages maintenance work and disseminates maintenance work schedules and road closures. The subsystem also manages reversible lane facilities, and processes probe vehicle information. The subsystem communicates with other Traffic Management Subsystems to coordinate traffic information and control strategies neighboring jurisdictions. It also coordinates with rail operations to support safer and more efficient highway traffic management at highway-rail intersections. Finally, the Traffic Management Subsystem provides the capabilities to exercise control over those devices utilized for AHS traffic and vehicle control.

Transit Management: The transit management subsystem manages transit vehicle fleets and coordinates with other modes and transportation services. It provides operations, maintenance, customer information, planning, and management functions for the transit property. It spans distinct central dispatch and garage management systems and supports the spectrum of fixed route, flexible route, paratransit services, and bus rapid transit (BRT) service. The subsystem's interfaces allow for communication between transit departments and with other operating entities such as emergency response services and traffic management systems. This subsystem receives special event and real-time incident data from the traffic management subsystem. It provides current transit operations data to other center subsystems. The Transit Management Subsystem collects and stores accurate ridership levels and implements corresponding fare structures. It collects operational and maintenance data from transit vehicles, manages vehicle service histories, and assigns drivers and maintenance personnel to vehicles and routes. The Transit Management Subsystem also provides the capability for automated planning and scheduling of public transit operations. It furnishes travelers with real-time travel information, continuously updated schedules, schedule adherence information, transfer options, and transit routes and fares. In addition, the monitoring of key transit locations with both video and audio systems is provided with automatic alerting of operators and police of potential incidents including support for traveler activated alarms.

Transit Vehicle: This subsystem resides in a transit vehicle and provides the sensory, processing, storage, and communications functions necessary to support safe and efficient movement of passengers. The Transit Vehicle Subsystem collects

accurate ridership levels and supports electronic fare collection. An optional traffic signal prioritization function communicates with the roadside subsystem to improve on-schedule performance. Automated vehicle location functions enhance the information available to the Transit Management Subsystem enabling more efficient operations. On-board sensors support transit vehicle maintenance. The Transit Vehicle Subsystem also furnishes travelers with real-time travel information, continuously updated schedules, transfer options, routes, and fares.

Traveler Card: This terminator represents the entity that enables the actual transfer of electronic information from the user of a service (i.e. a traveler) to the provider of the service. This may include the transfer of funds through means of an electronic payment instrument. The device, like a smart card, may also hold and update the traveler's information such as personal profiles or trip histories.

Vehicle: This subsystem provides the sensory, processing, storage, and communications functions necessary to support efficient, safe, and convenient travel. These functions reside in general vehicles including personal automobiles, commercial vehicles, emergency vehicles, transit vehicles, or other vehicle types. Information services provide the driver with current travel conditions and the availability of services along the route and at the destination. Both one-way and two-way communications options support a spectrum of information services from low-cost broadcast services to advanced, pay for use personalized information services. Route guidance capabilities assist in formulation of an optimal route and step by step guidance along the travel route. Advanced sensors, processors, enhanced driver interfaces, and actuators complement the driver information services so that, in addition to making informed mode and route selections, the driver travels these routes in a safer and more consistent manner. Initial collision avoidance functions provide "vigilant co-pilot" driver warning capabilities. More advanced functions assume limited control of the vehicle to maintain safe headway. Ultimately, this subsystem supports completely automated vehicle operation through advanced communications with other vehicles in the vicinity and in coordination with supporting infrastructure subsystems. Pre-crash safety systems are deployed and emergency notification messages are issued when unavoidable collisions do occur.

Appendix D: Architecture Flow Definitions

(Source: National ITS Architecture)

Appendix D contains the architecture flow definitions from the National ITS Architecture exclusive to the Regional ITS Architecture:

accident report: Report of commercial vehicle safety accident. The information may be provided as a response to a real-time query or proactively by the source. The query flow is not explicitly shown.

archive coordination: Catalog data, meta data, published data, and other information exchanged between archives to support data synchronization and satisfy user data requests.

archive requests: A request to a data source for information on available data (i.e. "catalog") or a request that defines the data to be archived. The request can be a general subscription intended to initiate a continuous or regular data stream or a specific request.

archive status: Notification that data provided to an archive contains erroneous, missing, or suspicious data or verification that the data provided appears valid. If an error has been detected, the offending data and the nature of the potential problem are identified.

audit data: Information to support a tax audit.

broadcast information: General broadcast information that contains link travel times, incidents, advisories, transit services and a myriad of other traveler information.

citation: Report of commercial vehicle citation. The citation includes references to the statute(s) that was (were) violated. It includes information on the violator and the officer issuing the citation.

commercial vehicle archive data: Information describing commercial vehicle travel and commodity flow characteristics. Content may include a catalog of available information, the actual information to be archived, and associated meta data that describes the archived information.

compliance review report: Report containing results of carrier compliance review, including concomitant out-of-service notifications, carrier warnings/notifications. The information may be provided as a response to a real-time query or proactively by the source.

credential application: Application for commercial vehicle credentials. Authorization for payment is included.

credentials information: Response containing full credentials information. "Response" may be provided in reaction to a real-time query or a standing request for updated information. The query flow is not explicitly shown.

credentials status information: Credentials information such as registration, licensing, insurance, check flags, and electronic screening enrollment data. A unique identifier is included. Corresponds to the credentials portion of CVISN "snapshots."

current asset restrictions: Restrictions levied on transportation asset usage based on infrastructure design, surveys, tests, or analyses. This includes standard facility design height, width, and weight restrictions, special restrictions such as spring weight restrictions.

daily site activity data: Record of daily activities at commercial vehicle check stations including summaries of screening events and inspections.

data collection and monitoring control: Information used to configure and control data collection and monitoring systems.

driver instructions: Transit service instructions, traffic information, road conditions, and other information for both transit and paratransit drivers.

driver to fleet request: Requests from the driver and vehicle for routing, payment, and enrollment information.

emergency archive data: Logged incident information that characterizes the identified incidents and provides a record of the corresponding incident response. Content may include a catalog of available information, the actual information to be archived, and associated meta data.

emergency dispatch requests: Emergency vehicle dispatch instructions including incident location and available information concerning the incident.

emergency dispatch response: Request for additional emergency dispatch information (e.g., a suggested route) and provision of en route status.

emergency notification: An emergency request for assistance originated by a traveler using an in-vehicle, public access, or personal device.

emergency traffic control request: Special request to preempt the current traffic control strategy in effect at one or more signalized intersections or highway segments. For example, this flow can request all signals to red-flash, request a progression of traffic control preemptions.

emergency traffic control response: Status of the special traffic signal control strategy implemented in response to the emergency traffic control request.

emergency vehicle tracking data: The current location and operating status of the emergency vehicle.

environmental conditions data: Current road conditions (e.g., surface temperature, subsurface temperature, moisture, icing, treatment status) and surface weather conditions (e.g., air temperature, wind speed, precipitation, visibility) as measured and reported by environmental sensors.

environmental probe data: Current environmental conditions (e.g., air temperature, wind speed, surface temperature) as measured by vehicle-based environmental sensors. In addition to environmental sensor inputs, this flow may also include vehicle control system information.

environmental sensors control: Data used to configure and control environmental sensors.

equipment maintenance status: Current status of field equipment maintenance actions.

event confirmation: Confirmation that special event details have been received and processed.

event information: Special event information for travelers. This would include a broader array of information than the similar "event plans" that conveys only information necessary to support traffic management for the event.

event information request: Request for special event information.

event plans: Plans for major events possibly impacting traffic.

external reports: Traffic and incident information that is collected by the media through a variety of mechanisms (e.g., radio station call-in programs, air surveillance).

fare and payment status: Current fare collection information including the operational status of the fare collection equipment and financial payment transaction data.

fare management information: Transit fare information and transaction data used to manage transit fare processing on the transit vehicle.

field device status: Reports from field equipment (sensors, signals, signs, controllers, etc.) which indicate current operational status.

fleet to driver update: Updated instructions to the driver including dispatch, routing, and special instructions.

freeway control data: Control commands and operating parameters for ramp meters, mainline metering/lane controls and other systems associated with freeway operations.

freeway control status: Current operational status and operating parameters for ramp meters, mainline metering/lane controls and other control equipment associated with freeway operations.

hazmat information: Information about a particular hazmat load including nature of the load and unloading instructions. May also include hazmat vehicle route and route update information.

hazmat information request: Request for information about a particular hazmat load.

high threat facility incident information: Threats regarding transportation infrastructure, facilities, or systems detected by a variety of methods (sensors, surveillance, threat analysis of advisories from outside agencies, etc).

incident command information: Information that supports local management of an incident. It includes resource deployment status, hazardous material information, traffic, road, and weather conditions, evacuation advice, and other information.

incident command request: Request for resources, commands for relay to other allied response agencies, and other requests that reflect local command of an evolving incident response.

incident information: Notification of existence of incident and expected severity, location, time and nature of incident.

incident information for media: Report of current desensitized incident information prepared for public dissemination through the media.

incident information request: Request for incident information, clearing time, severity. The request can be a subscription that initiates as-needed information updates as well as a one-time request for information.

incident notification: The notification of an incident including its nature, severity, and location.

incident notification response: Interactive acknowledgement and verification of the incident information received, requests for additional information, and general information on incident response status.

incident report: Report of an identified incident including incident location, type, severity and other information necessary to initiate an appropriate incident response.

incident response coordination: Incident response procedures, resource coordination, and current incident response status that are shared between allied response agencies to support a coordinated response to incidents.

incident response status: Status of the current incident response including traffic management strategies implemented at the site (e.g., closures, diversions, traffic signal control overrides).

incident status: Information gathered at the incident site that more completely characterizes the incident and provides current incident response status.

infrastructure monitoring sensor control: Data used to configure and control infrastructure monitoring sensors.

infrastructure monitoring sensor data: Data read from infrastructure-based sensors that monitor the condition of pavement, bridges, culverts, signs, and other roadway infrastructure.

ISP coordination: Coordination and exchange of transportation information between centers. This flow allows a broad range of transportation information collected by one ISP to be redistributed to many other ISPs and their clients.

maint and constr dispatch information: Information used to dispatch maintenance and construction vehicles, equipment, and crews. This information includes routing information, traffic information, road restrictions, incident information, environmental information, and decision support information.

maint and constr dispatch status: Current maintenance and construction status including work data, operator status, crew status, and equipment status.

maint and constr resource coordination: Request for road maintenance and construction resources that can be used in the diversion of traffic (cones, portable signs), clearance of a road hazard, repair of ancillary damage, or any other incident response.

maint and constr resource request: Request for road maintenance and construction resources that can be used in the diversion of traffic (cones, portable signs), clearance of a road hazard, repair of ancillary damage, or any other incident response.

maint and constr resource response: Current status of maintenance and construction resources including availability and deployment status.

maint and constr vehicle conditions: Vehicle diagnostics information that is collected, filtered, and selectively reported by a maintenance and construction vehicle. The information includes engine temperature, mileage, tire wear, brake wear, belt wear, and any warnings or alarms.

maint and constr vehicle location data: The current location and related status (e.g., direction and speed) of the maintenance/construction vehicle.

maint and constr vehicle operational data: Data that describes the maintenance and construction activity performed by the vehicle. Operational data includes materials usage (amount stored and current application rate), operational state of the maintenance equipment (e.g., blade up/down)

maint and constr vehicle system control: Configure and control data that supports remote control of on-board maintenance and construction vehicle systems and field equipment that is remotely controlled by the vehicle. For example, the data can be used to adjust material application rates.

maint and constr work plans: Future construction and maintenance work schedules and activities including anticipated closures with anticipated impact to the roadway, alternate routes, anticipated delays, closure times, and durations.

media information request: Request from the media for current transportation information.

on-board safety data: Safety data measured by on-board sensors. Includes information about the vehicle, vehicle components, cargo, and driver.

on-board safety request: Request for on-board vehicle safety data by the roadside equipment.

on-board vehicle data: Information about the commercial vehicle stored on-board (for maintenance purposes, gate access, cargo status, lock status, etc.).

on-board vehicle request: Request for on-board vehicle data.

Payment: Payment of some kind (e.g., toll, parking, fare) by traveler which, in most cases, can be related to a credit account.

personal transit information: General and personalized transit information for a particular fixed route, flexible route, or paratransit system.

remote surveillance control: The control commands used to remotely operate another center's sensors or surveillance equipment so that roadside surveillance assets can be shared by more than one agency.

request for payment: Request to deduct cost of service from user's payment account.

request for road network conditions: Request for traffic information, road conditions, surface weather conditions, incident information, and other road network

status. The request specifies the region/route of interest, the desired effective time period, and other parameters.

request tag data: Request for tag information including credit identity, stored value card cash, etc.

resource deployment status: Status of traffic management center resource deployment identifying the resources available and their current deployment status.

resource request: A request for traffic management resources to implement special traffic control measures, assist in clean up, verify an incident, etc.

road network conditions: Current and forecasted traffic information, road and weather conditions, incident information, and other road network status. Either raw data, processed data, or some combination of both may be provided by this architecture flow.

road network probe information: Aggregated route usage, travel times, environmental conditions, and other aggregated data collected from probe vehicles.

road weather information: Road conditions and weather information that are made available by road maintenance operations to other transportation system operators.

roadside archive data: A broad set of data derived from roadside sensors that includes current traffic conditions, environmental conditions, and any other data that can be directly collected by roadside sensors.

roadway information system data: Information used to initialize, configure, and control roadside systems that provide driver information (e.g., dynamic message signs, highway advisory radio, beacon systems).

roadway information system status: Current operating status of dynamic message signs, highway advisory radios, beacon systems, or other configurable field equipment that provides dynamic information to the driver.

roadway maintenance status: Summary of maintenance fleet operations affecting the road network. This includes the status of winter maintenance (snow plow schedule and current status).

roadway treatment system control: Control data for remotely located, automated devices, that affect the roadway surface (e.g. de-icing applications).

safety inspection record: Record containing results of commercial vehicle safety inspection.

safety inspection report: Report containing results of commercial vehicle safety inspection. The information may be provided as a response to a real-time query or proactively by the source. The query flow is not explicitly shown.

safety status information: Safety information such as safety ratings, inspection summaries, and violation summaries. A unique identifier is included. Corresponds to the safety portion of CVISN "snapshots." The status information may be provided as a response to a real-time query.

screening event record: Results of CVO electronic screening activity.

secure area monitoring support: Commands that control surveillance equipment and security sensors that monitor secure public transportation areas. Also includes information for general advisories and alerts intended for general dissemination in these same public areas.

secure area surveillance data: Data collected from surveillance systems used to monitor secure areas. Includes video, audio, and other security sensor outputs.

signal control data: Information used to configure and control traffic signal systems.

signal control status: Status of surface street signal controls.

suggested route: Suggested route for a dispatched emergency or maintenance vehicle that may reflect current network conditions and the additional routing options available to en route emergency or maintenance vehicles that are not available to the general public.

tag data: Unique tag ID and related vehicle information.

tag update: Update data held in tag which can be read by another roadside device (Commercial Vehicle Check Subsystem, Toll Collection Subsystem, etc.).

tax filing: Commercial vehicle tax filing data. Authorization for payment is included.

threat information coordination: Sensor, surveillance, and threat data including raw and processed data that is collected by sensor and surveillance equipment located in secure areas.

toll instructions: Demand management toll pricing information based on current congestion.

toll transactions: Detailed list of transactions from a toll station.

traffic archive data: Information describing the use and vehicle composition on transportation facilities and the traffic control strategies employed. Content may

include a catalog of available information, the actual information to be archived, and associated meta data.

traffic control coordination: Information transfers that enable remote monitoring and control of traffic management devices. This flow is intended to allow cooperative access to, and control of, field equipment during incidents and special events and during day-to-day operations.

traffic images: High fidelity, real-time traffic images suitable for surveillance monitoring by the operator or for use in machine vision applications. This flow includes the images and the operational status of the surveillance system.

traffic information coordination: Traffic information exchanged between TMC's. Normally would include incidents, congestion data, traffic data, signal timing plans, and real-time signal control information.

transit archive data: Data used to describe and monitor transit demand, fares, operations, and system performance. Content may include a catalog of available information, the actual information to be archived, and associated meta data that describes the archived information.

transit emergency coordination data: Data exchanged between centers dealing with a transit-related incident.

transit emergency data: Initial notification of transit emergency at a transit stop or on transit vehicles and further coordination as additional details become available and the response is coordinated.

transit incident information: Information on transit incidents that impact transit services for public dissemination.

transit incidents for media: Report of an incident impacting transit operations for public dissemination through the media.

transit information for media: Report of transit schedule deviations for public dissemination through the media.

transit information request: Request for transit operations information including schedule and fare information. The request can be a subscription that initiates as-needed information updates as well as a one-time request for information.

transit information user request: Request for special transit routing, real-time schedule information, and availability information.

transit schedule information: Current and projected transit schedule adherence.

transit vehicle location data: Current transit vehicle location and related operational conditions data provided by a transit vehicle.

transit vehicle passenger and use data: Data collected on board the transit vehicle pertaining to availability and/or passenger count.

transit vehicle schedule performance: Estimated times of arrival and anticipated schedule deviations reported by a transit vehicle.

traveler information: Traveler information comprised of traffic status, advisories, incidents, payment information and many other travel-related data updates and confirmations.

traveler information for media: General traveler information regarding incidents, unusual traffic conditions, transit issues, or other advisory information that has been desensitized and provided to the media.

traveler request: Request by a traveler to summon assistance, request information, make a reservation, or initiate any other traveler service.

trip identification number: The unique trip load number for a specific cross-border shipment.

trip log: Driver's daily log, vehicle location, mileage, and trip activity (includes screening, inspection and border clearance event data as well as fare payments).

trip log request: Request for trip log.

trip plan: A sequence of links and special instructions comprising of a trip plan indicating efficient routes for navigating the links. Normally coordinated with traffic conditions, other incidents, preemption and prioritization plans.

video surveillance control: Information used to configure and control video surveillance systems.

violation notification: Notification to enforcement agency of a violation. The violation notification flow describes the statute or regulation that was violated and how it was violated.

work plan coordination: Coordination of work plan schedules and activities between maintenance and construction organizations or systems. This information includes the work plan schedules and comments and suggested changes that are exchanged as work plans are coordinated.

work plan feedback: Comments and suggested changes to proposed construction and maintenance work schedules and activities. This information influences work plan

schedules so that they minimize impact to other system operations and the overall transportation system.

work zone information: Summary of maintenance and construction work zone activities affecting the road network including the nature of the maintenance or construction activity, location, impact to the roadway, expected time(s) and duration of impact, and anticipated delays.

work zone status: Current work zone status including current location (and future locations for moving work zones), impact to the roadway, required lane shifts, expected time(s) and duration of impact, anticipated delays, alternate routes, and suggested speed limits.

work zone warning device control: Data used to configure and control work zone safety monitoring and warning devices.

work zone warning status: Status of a work zone safety monitoring and warning devices. This flow documents system activations and includes additional supporting information (e.g., an image) that allows verification of the alarm.

Appendix E: Operations Coverage

The following table summarizes the operations on key highway facilities within the Region. Operations centers, whether they are a personal computer or an entire building, accommodate the intelligence for the majority of ITS applications. The location and operation of the TMC's within the Commonwealth of Pennsylvania are currently being explored through other statewide efforts. This section takes roadways of regional significance developed by the RAP in each work plan (prior project working document) and assigns ITS operations coverage for the primary and secondary role. This section although useful for other Statewide ITS effort, was not needed for the creation of the Regional ITS Architecture.

County	Highway Corridors	Primary Operations	Secondary Operations
Adams	US-30	Municipality	PennDOT D8 TMC, PennDOT STMC
	PA-97	PennDOT D8 TMC	PennDOT STMC
	PA-94	PennDOT D8 TMC	PennDOT STMC
	PA-34	PennDOT D8 TMC	PennDOT STMC
	US-15	PennDOT D8 TMC	Municipality ¹ , PennDOT STMC
Cumberland	I-81	PennDOT D8 TMC	PEMA ² , PennDOT STMC
	US-11/15	PennDOT D8 TMC	N/A
	PA-34	PennDOT D8 TMC	N/A
	PA-581	PennDOT D8 TMC	PEMA ² , PennDOT STMC
	PA-74	PennDOT D8 TMC	N/A
	I-83	PennDOT D8 TMC	PEMA ² , PennDOT STMC
	I-76	Pennsylvania Turnpike Commission	N/A
Dauphin	I-81	PennDOT D8 TMC	PEMA ² , PennDOT STMC
	PA-147	PennDOT D8 TMC	PennDOT STMC
	I-83	PennDOT D8 TMC	PennDOT STMC
	US-209	PennDOT D8 TMC	PennDOT STMC
	US-22/322	PennDOT D8 TMC	PEMA ² , PennDOT STMC
	PA-283	PennDOT D8 TMC	PEMA ² , PennDOT STMC
	US-322	PennDOT D8 TMC	PEMA ² , PennDOT STMC

County	Highway Corridors	Primary Operations	Secondary Operations
	US-22	PennDOT D8 TMC	N/A
	I-283	PennDOT D8 TMC	PEMA ² , PennDOT STMC
	I-76	Pennsylvania Turnpike Commission	N/A
Franklin	I-81	PennDOT D8 TMC	PEMA ² , PennDOT STMC
	US-30	PennDOT D8 TMC	N/A
	US-11	PennDOT D8 TMC	N/A
	I-76	Pennsylvania Turnpike Commission	N/A
Lancaster	US-30	PennDOT D8 TMC	PennDOT STMC
	US-322	PennDOT D8 TMC	PennDOT STMC
	PA-283	PennDOT D8 TMC	PennDOT STMC
	PA-41	PennDOT D6 (Automated Enforcement) ³	PennDOT D8 TMC, PennDOT STMC
	PA-501	PennDOT D8 TMC	N/A
	PA-72	PennDOT D8 TMC	N/A
	US-222	PennDOT D8 TMC	PennDOT STMC
	I-76	Pennsylvania Turnpike Commission	N/A
Lebanon	I-78	PennDOT D8 TMC	PennDOT D5-0
	PA-501	PennDOT D8 TMC	N/A
	US-322	PennDOT D8 TMC	N/A
	PA-72	PennDOT D8 TMC	N/A
	US-422	PennDOT D8 TMC	N/A
	US-22	PennDOT D8 TMC	N/A
	I-81	PennDOT D8 TMC	PennDOT STMC
	I-76	Pennsylvania Turnpike Commission	N/A
Perry	US-22/322	PennDOT D8 TMC	PennDOT STMC
	PA-74	PennDOT D8 TMC	PennDOT STMC
	PA-34	PennDOT D8 TMC	PennDOT STMC

County	Highway Corridors	Primary Operations	Secondary Operations
	US-11/15	PennDOT D8 TMC	PennDOT STMC
York	US-30	PennDOT D8 TMC	PennDOT STMC
	PA-94	PennDOT D8 TMC	N/A
	PA-74	PennDOT D8 TMC	N/A
	I-83	PennDOT D8 TMC	PEMA ² , PennDOT STMC
	I-76	Pennsylvania Turnpike Commission	

	<i>Existing</i>
	<i>Existing Portable DMS Operations</i>
	<i>Planned 1</i>

¹ Some ITS devices are planned to be deployed in Gettysburg, Adams County. The municipality will be able to control these devices in case of events

² Wherever PEMA has access to the PennDOT ITS devices (mainly in the Capital Beltway area), PEMA controls the devices between 6pm and 6am. PennDOT District 8-0 has MOU with PEMA.

³ Currently PennDOT D6-0 is controlling automated enforcement activities along PA-41. Assuming that the D5-0 TOC is 24x7 operational,

Note: Municipalities operate Traffic Signal Systems

Appendix F: Bookend I Meeting I Minutes

Date: Wednesday, July 21, 2004

Meeting of: PennDOT South Central Stakeholders' Meeting – First Regional Meeting

Location: Holiday Inn (Airport) – Harrisburg, PA

Presentation

- Barry Hoffman, PennDOT District 8-0 engineer, began the presentation with a welcome. He identified some of the agencies that would be involved in the process. This includes planning offices, townships, partnership organizations, enforcement community, transit, counties, emergency management agencies, and airport. Barry explained the regional significance of the ITS architecture and its impact on transportation of goods and people. The economy of the area has ties to transportation, and Barry said that they will not be able to build their way out of the congestion problem. It would take 10-20 years to build the capacity that they need, and in the meantime ITS should be used to manage capacity. District 8-0 is on the leading edge on goods movement and they look to other modes of transportation. Barry continues on to describe the PennDOT South Central Region. This district consists of 8 counties, and long range plans for the region include elements of ITS. Both the region and the state are responsible for the ITS architecture. He said that the stakeholders are here at the meeting because of their involvement with aspects of transportation such as planning, operation, and policy. Differences in perspective exist even within the different counties in this region. Finally, the stakeholders were told what is needed from them. This includes going to the validation meetings, telling others about ITS, and continuing the regional dialog beyond this effort.
- Michael Harris from PB Farradyne continued the presentation with a few slides defining ITS and ITS architecture. ITS is “simply technology being used in the transportation environment.” It is used to improve safety, maximize mobility, fulfill traveler needs, support enhanced security, and manage capacity. Types of ITS include CCTV, freeway service patrol, advanced signal systems, automated transit dispatching, incident management, and electronic payment. ITS architecture is “the plan for design and construction.” Mike showed two diagrams placing ITS architecture in the context of the planning process and the systems engineering process. Furthermore, the federal mandate states, “regional ITS architecture must be completed in partnership with the State and regional planning partners by April 8, 2005 for use of Federal funds for ITS.” The expectation for this process is that the mandates’ conditions are made and a process is put in place for initial architecture development and for revisiting and updating the regional architecture as necessary. Regional benefits include interoperability enhancement, implementation for planning ITS integration, ensuring institutional agreement among ITS stakeholder agencies, establishing

a common framework for future ITS operations across the region and state, and allowing integration options to be considered before investments are made.

- Craig Reed from PennDOT Central Office gave a statewide vision of ITS Architecture. He talked about the history of transportation, the current transportation problem, and how ITS Architecture will be part of the solution. The region cannot afford to build themselves out of congestion. However, efficiency in the transportation system is required for economic vitality. Transportation operation challenges for today and the foreseeable future consist of safety, security, and mobility. Congestion solution includes building capacity, better managing capacity, and reducing demand. Regional ITS architecture is a tool to use for the purposes of forming the building blocks of transportation operations and for supporting a balanced look at congestion improvement investments. In the interim (2004-2006), the statewide vision includes building an operational District 8-0 TMC, forming a PA Congestion Management Strategy, and standardizing ITS software statewide. The statewide vision in the future includes telecom implementation, statewide database, STMC/RTMC integrations, and incident management GIS.
- Dennis Lebo from PennDOT Central Office – Center for Program Development and Management, gave an overview of statewide planning. He talked about using the mandate as a planning opportunity for creating a framework for regional and statewide integration, establishing a basis sound investments, creating a regional forum for stakeholders to address ITS/Operational issues, and advancing the issue of ITS to better manage the transportation system. Then, maps were presented to show that the regional architecture boundaries will closely follow the PennDOT district map while taking the planning organizations into consideration. Subsequent slides identified the objectives and scope of the ITS Architecture program. The project objective is to “complete regional ITS architectures in partnership with planning organizations throughout the state to meet the federal mandate by April 8, 2005 for use of Federal funds for ITS operations. The scope of work will include aspects of operations and planning. Also, Dennis Lebo helped to answer questions such as “How will this be used?” and “What will we need to do?” in the slides. Dennis talked about how ITS Architecture will help determine what investments would be made in transportation. PennDOT will need to produce a statewide ITS strategic plan and regional ITS implementation plan.
- Chip Millard from Tri-County talked about regional planning. There is need for ITS planning at the regional level because they cannot afford to build themselves out of congestion. Also, this is a mandate for receiving federal funds for ITS projects in the future. Better technologies (VMS, CCTV, traffic signal systems) and better communication (between those who operate and those who rely on transportation system) make existing transportation system more efficient. This will also facilitate economic development. Engaging stakeholders, such as emergency management providers, major municipalities, and major transportation providers, helps to them make informed decisions. There is much interaction between markets within the region, and portions of

urbanized areas for one MPO area “spill over” into jurisdictions of another MPO area. Furthermore, this region is a transportation hub. The district is well connected to east coast cities, and there are significant truck and rail operations in the region. All these factors point towards a strong need for coordination between MPO/RPO areas. In order to strengthen the coordination, the following actions need to occur: 1) acceptance of ITS architecture as a regional plan; 2) build upon existing momentum to continue to work together; 3) create an ITS Task Force to work on technical and operational issues; 4) find a home for the ITS Task Force housed under policy group for the region for planning and programming; and 5) develop the regional ITS implementation plan.

- Glenn Rowe from PennDOT District 8-0 talked about regional ITS operations. He gave an overview of the Harrisburg metro area ITS study. The study focused on enhancing the region’s ability to address existing and future needs. Opportunities were identified for improved communication and management activities between regional agencies, and systems were recommended to help agency achieve their transportation management goals. The short term recommendations consist of user friendly milepost markers, enhanced driver information, improved emergency response, coordination of traffic signal systems, and study of a permanent TMC in the region. The recommendations in the medium term include building the TMC, continuing ITS equipment deployment, automatic vehicle location system, and improving commercial vehicle operations. In the long term, the recommendation is to complete the coverage of the metro area with a traffic management system, and coordinate traffic management center information with public and in-vehicle devices. The EDP/ITS Architecture is a living document that will be changing as technology changes. Other ITS activities in the metro area include the I-83 queue direction, I-83 ITS east/west shore, truck rollover warning system, and the Gettysburg signal system.
- Allen Baldwin from the Pennsylvania Turnpike Commission gave a presentation about how the turnpike functions as part of the validation outreach. The mission of the PTC is “to operate and manage a safe, reliable, cost effective, and valued toll road system.” The turnpike already has many elements of ITS, including a traffic operations center, electronic toll collection system, advanced traveler information system, coordination with other agencies, and contracted response services. PTC’s traffic operation center, located in Harrisburg, operates 24/7 and is considered the information hub. The TOC has centralized software to control ITS devices. For incident management, the TOC performs incident detection and verification. Information about the incident is dispatched to PSP, emergency services, private wrecker and maintenance units, and other agencies. Service patrol is also provided. Through efforts of teamwork, there is the unified incident command (UIC), which aids in coordinating several agencies’ response to incidents. The PTC has several ITS devices, including VMS, RTMS, CCTV, HAR Transmitters, Service Plaza Travel Boards, RWIS, and TRWS. In order to communicate with travelers, the PTC disseminates information through different media channels, including the PTC web page, traffic reporting agencies, media notifications, and traffic advisories. The

Pennsylvania Turnpike Emergency Notification System allows users, such as the PSP, to enter information about the current roadway conditions. The information will be sent to the road users' PDA, e-mail, and pagers. The PTC strives to send information to the road users before they enter the Pennsylvania Turnpike.

- Lieutenant Thomas McDaniel of the Pennsylvania State Police spoke on incident management and ITS. He began by saying how this technology will help in officer safety and resource management. Police who are not on the scene can get visuals on the event happening. He also mentioned that PennDOT has a liberal video sharing policy. Lt. McDaniel went through the process of highway incident management. The steps include detection, verification, response, scene management and information to motorists, and clearance and restoration. During verification, the precise location of the incident and the nature of the incident are determined. Furthermore, they decide which resource agencies are needed. Lt. McDaniel also elaborated on the incident scene management process. They try to ensure safety for responders, the public, and the injured. This may include clearing the lanes of debris and removal of responders from lanes. They also need to be aware of secondary crashes and traffic control. The unified command training and highway incident scene safety and traffic control training helps them to do this. The five functional sections of the ICS consists of command, operations, planning, logistics, and finance/administration. Information is disseminated to the motorists through VMS, the district TMC, upstream traffic diversion, and local media traffic reporting. Pre-planning and coordination for special events includes going to incident management meetings and establishing detour routes for major highways.
- Finally, Larry Bankert from PB Farradyne talked about the validation outreach. He told the stakeholders that they were there because their knowledge is needed to validate information that they have begun to compile. The regional perspective is valued, and the stakeholders are involved in setting transportation policy in the region. Larry went on to describe what were in the validation packets. He described what the diagrams were and how they fit into the bigger picture. Larry also talked about the validation effort, which consisted of two large stakeholder meetings and then small validation meetings by functional area. The validation meeting schedule was posted on a slide. The planned regional actions include input to support adoption, continue to advance ITS element of regional long range plans, organize ITS Task Force under the south central region umbrella group, continue ITS regional dialogue beyond this effort, and to develop the regional ITS implementation plan.

Questions and Answers

George asked if there was any municipal representation at the RAP meetings.

- Larry said that the planning commission represented the municipalities.

Dennis Lebo introduced Bob Glatzenberg from TRANSCOM, which does work in the New York and Connecticut area. The I-95 Coalition facilitates relationships in which they can put information on dynamic message signs of big events, such as 9/11.

List of Attendees

Last Name	First Name	Agency	Email	Phone
Bachman	Eric	Lancaster County EMA/911	ebachman@co.lancaster.pa.us	(717) 664-1204
Baldwin	Allen	Pennsylvania Turnpike Commission (TOC)	abalwind@paturnpike.com	(717) 939-9551
Beard	Charlie	Pennsylvania Towing Agency		
Belmonte	Louis	PennDOT District 6-0 (Traffic)	lbelmonte@state.pa.us	(610) 205-6550
Botchie	Ed	Major Trucking Agencies	ed.botchie@cresslertrucking.com	(717) 532-6315
Bubb	Don	York County Planning Commission	dbubb@ycpc.org	(717) 771-9870
Carman	Kay	York County EMA	kacarman@york-county.org	(717) 840-7494
Cesari	Joseph	Harrisburg City Policy (Traffic Safety Unit)		
Clouser	David	Lancaster Township	dclouser@twp.lancaster.pa.us	(717) 291-1213
Ellsworth	Jon	County of Lebanon Transit Authority		
Eshleman	Don	Franklin County EMA	deshleman@co.franklin.pa.us	(717) 264-2813

Last Name	First Name	Agency	Email	Phone
Esposito	Rich	Amtrak	esposir@amtrak.com	(717) 232-3329
Farabaugh	Ken	Gettysburg-Adams County Area Chamber of Commerce		
Fitzkee	Jonathan	Lebanon County Planning Commission	jfitzkee@lebcnty.org	(717) 274-2801
Flack	Mike	Pennsylvania Turnpike Commission (Construction)	mflack@paturnpike.com	(717) 939-9551
Foor	Janet	PEMA		
Ford	Les	Pennsylvania Turnpike Commission		
Giurantano	Teri	County of Lebanon Transit Authority (COLT)	liborio256@hotmail.com	(717) 274-3664
Glantzberg	Bob	TRANSCOM Center	glantzberg@xcm.org	(800) 872-3342
Hansen	Jonathan	Adams County EMA/911	jhansen@acc.pa.net	(717) 334-8603
Harman	Todd			
Herron	Mike	FHWA (Penn Division)		
Hoffman	Barry	PennDOT District 8-0		

Last Name	First Name	Agency	Email	Phone
JiYeagley	William	North Cornwall Township		
Johnson	Paul	Pennsylvania Towing Agency	foremostpri@yahoo.com	(717) 564-0360
Joy	Jeff	York County		
Karlsen	Cliff	Harrisburg City Policy (Traffic Safety Unit)		
Kisthardt	Lt. Adam	Pennsylvania State Police (Central Office)	akisthardt@state.pa.us	(717) 705-0143
Koser	Steve	PennDOT Central Office	skoser@state.pa.us	(717) 705-1443
Lawver	John	Gettysburg Borough - Highway Superintendant		
Lebo	Dennis	PennDOT Central Office	dlebo@state.pa.us	(717) 787-5246
Link	Joe	City of Harrisburg	jlink@cityofhbg.com	(717) 255-3091
Losiewicz	Joan	Union Township Board of Supervisors	WCTCP@comcast.net	(717) 865-4039
Lyle	Steve	Emergency Health Services Federation (EHSF)	syle@ehsf.org	(717) 774-7911
Marcinko	George	East Hempfield Township	manager@easthempfield.org	(717) 898-3100

Last Name	First Name	Agency	Email	Phone
Martin	Robert	Susquehanna Township	rmartin@paonline.com	(717) 909-9282
McDaniel	Lt. Thomas	Pennsylvania State Police	tmcdaniel@stateopc.us	(717) 783-5521
McQuote	Harold	Heidelberg Township Board of Supervisors		
Merkel	Andrew	Adams County Planning Commission	amerkel@acc.pa.net	(717) 337-9824
Meyer	Lee	Lebanon County Planning Commission	lcpc_srplanner@lebcnty.org	(717) 274-2801
Millard	Carl "Chip"	Tri-County Regional Planning Commission	cmillard@tcrpc-pa.org	(717) 234-2639
Mucha	Melanie	FHWA (Penn Division)		
Pack	Mike	PennDOT Central Office	mpack@state.pa.us	(717) 783-4579
Parikh	Harivadan	PennDOT District 8-0 (Bridge)	hparikh@state.pa.us	(717) 787-4774
Pastore	Mike	PennDOT D9-0 (Traffic)	mipastore@state.pa.us	(814) 696-7238
Patel	Devang D.	PennDOT District 8-0 (Traffic/ITS)	depatel@state.pa.us	(717) 783-3949
Penny	Greg	PennDOT		

Last Name	First Name	Agency	Email	Phone
Plank	Doug	ELA Group, Inc.		
Reed	Craig	PennDOT Central Office	rcreed@state.pa.us	(717) 787-7350
Rigney	John	Pennsylvania State Police (Troop J)		
Rowe	Glenn	PennDOT District 8-0 (Traffic/ITS)	glrowe@state.pa.us	(717) 783-3981
Scanlon	Tim	Pennsylvania Turnpike Commission (ITS)	tscanlon@paturndpike.com	(717) 939-9551
Schultz	Michael	PennDOT (Bureau of Planning and Research)		
Seitz	Lee	Pennsylvania Farm Show	lseitz@state.pa.us	(717) 787-5373
Shanabrook	Mike	York City Fire Rescue Services		
Shellenberger	Tim	Hershey Entertainment and Resorts Company (HERCO)	tshellen@hersheypa.com	(717) 534-3369
Simpson	Marcy	Capitol Area Trailways	msimpson@capitaoltrailways.com	(717) 233-7973
Simpson	Bill	Capital Area Transit		
Smith	Tom	Derry Township	tsmith@bh-ba.com	(717) 852-1463

Last Name	First Name	Agency	Email	Phone
Smyser	Dan	PennDOT Central Office	dsmyser@state.pa.us	(717) 787-7445
Stahle	Kathy	York City Fire Rescue Services - intern		
Steigerwalt	Richard	Pennsylvania State Police (Troop T)		
Straker	Faran	Lebanon Valley Chamber of Commerce		
Townsend	John	PennDOT District 5-0 (Traffic)		
Wagner	Bob			
Wentzel	Robert	Dauphin County EMA	rwentzel@dauphinc.org	(717) 558-6800
Wise	Theodore	Cumberland County EMA	ema@ccpa.net	(717) 240-6400

Pennsylvania Intelligent Transportation Systems (ITS) Architecture

South Central Region
First Regional Meeting
July 21, 2004



Welcome

Barry Hoffman
District 8-0 Engineer
Pennsylvania Department of Transportation



Agenda

- Welcome - Barry Hoffman, PennDOT District 8-0 Engineer
- Background – Mike Harris, PB
- Statewide Vision - Craig Reed, PennDOT
- Statewide Planning - Dennis Lebo, PennDOT
- Regional Planning - Chip Millard, Tri-County
- Regional Operations - Glenn Rowe, PennDOT D8-0
- Statewide Operations Headquartered in Capital Region
 - Pennsylvania Turnpike Commission - Allen Baldwin
 - Pennsylvania State Police - Lt. Thomas McDaniel
- Architecture - Larry Bankert, PB
- Questions and Answers



Welcome

- PennDOT
- PTC
- PEMA
- PSP
- Airport
- Transit
- Counties
- Cities
- Emergency Management Agencies
- Planning Offices
- Townships
- Partnership Organizations
- Enforcement Community
- Policy



South Central Pennsylvania

- Safe, Secure and Reliable Transportation System
- Movement of People and Goods
- Building Capacity – decreasing ability
- Managing Capacity – increasing importance



South Central Pennsylvania

- PennDOT District 8-0 Region
 - 8-County Region
 - Regional Long-Range Transportation Plans
 - ITS Section in Long-Range Plans
 - ITS Architecture is needed to meet Federal Mandate if region is to use Federal Funds for ITS
 - Regional Transportation Improvement Programs
 - Regions and State are responsible for the ITS Architecture



You are here because...

- Your knowledge is needed to validate information we have begun to compile
- Your regional perspectives is valued
- You are involved in operating a piece of the transportation system
- You are involved in planning and programming for regional transportation
- You are involved in setting transportation policy in the region
- You are creating the regional ITS forum for the future



What we need from you ...

- Attend meetings on this effort
- Validate the work presented to you
- Champion ITS
- Outreach Connection to others about ITS
- Continue ITS regional dialog beyond this effort



Background

Michael Harris, PB Farradyne



ITS?

Intelligent Transportation Systems (ITS) is simply technology being used in the transportation environment

ITS:

- Improve Safety
- Maximize Mobility
- Fulfill Traveler Needs
- Support Enhanced Security
- Manage Capacity



Types of ITS

- Freeway
 - Highway Advisory Radio
 - Dynamic Message Signs
 - 511
 - CCTV
 - HOV
 - Freeway Service Patrol
- Arterial
 - Advanced Signal Systems
- Transit
 - Advanced Vehicle Location
 - Automated Dispatching



Types of ITS

- Emergency
 - Incident Management
 - E911
- Road Weather Information
- Electronic Payment
 - EZPass
 - Smart Cards



Architecture?

Architecture – the *plan* for design and construction

Deploying ITS technology is good, but we need to do it efficiently through better *planning*, coordination, and integration



In context

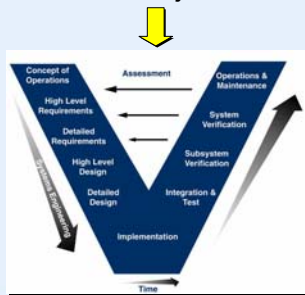


Projects



In context

ITS Project



At Issue ...

- ITS investments are made before plans are set
- Lack of interoperability of ITS systems
- Limited forum for regional agencies to plan for ITS capital and ITS Operations and Maintenance
- Federal mandate



An Opportunity ...

- Conduct Regional ITS Architectures to:
 - Provide a framework for regional integration
 - Create a forum for stakeholders to address ITS operations and functions to validate how operations will interconnect and why
 - Allow integration options to be considered before investment decisions are made
 - Conform to Federal mandate



The Federal Mandate

Regional ITS Architectures must be completed in partnership with the State and regional planning partners by April 8, 2005 for use of Federal funds for ITS



The Expectation ...

- The State and metropolitan planning organizations are ultimately responsible for ensuring that the mandates' conditions are met
- A process must be put in place for initial Architecture development and for revisiting and updating the regional Architecture as necessary



Regional Benefits

- Ensures institutional agreement among ITS stakeholder agencies.
- Implements a process for planning ITS integration.
- Enhances interoperability.



Regional Benefits

- Allows integration options to be considered before investments are made.
- Ensures that ITS activities are consistent with State and metropolitan planning processes.
- Establishes a common framework for future ITS operations across the Region & State.



Statewide Vision

Craig Reed

PennDOT Central Office
BSHTE



Transportation

- Industry evolution
 - Build
 - Build and Maintain
 - Build, Maintain and Operate
- Efficiency is required for economic vitality
 - Results focused transportation operations



Transportation Operations

- Safety
- Security
- Mobility (Congestion)

All are challenges for today and the foreseeable future



Congestion Solution

- Comprehensive, coordinated and long-term commitment to balanced investment in:
 - Building Capacity
 - Better Managing Capacity
 - Reducing Demand, through modal alternatives and changes in land-use patterns



PA
rc architecture



Regional Tool

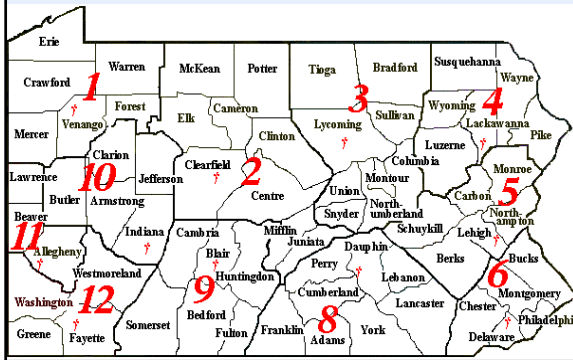
- Regional ITS Architectures
 - Form the building blocks of transportation operations
 - ITS supports managing capacity and improves safety and security
 - Supports a balanced look at congestion improvement investments



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PennDOT District Map



Statewide Vision Interim '04-'06

- Central Control Software Systems Mgr.
- Statewide Standardized ITS Software
- ITS Telecom Analysis and Design
- Update Strategic Plan Ops. Framework
- Regional ITS Architectures
- STMC and D8-0 TMC Operational
- PA Congestion Management Strategy
- 6-0 and 11-0 24 X 7 Operations



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Statewide Vision Future – '06-'09

- Incident Management GIS
- STMC/RTMC Integrations
- Statewide Database
- Telecom Implementation
- Systems Manager
- STMC / 8-0, 4-0, and 2-0
- 24 X 7 Operations



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Statewide Planning

Dennis Lebo

PennDOT Central Office
Center for Program Development
and Management

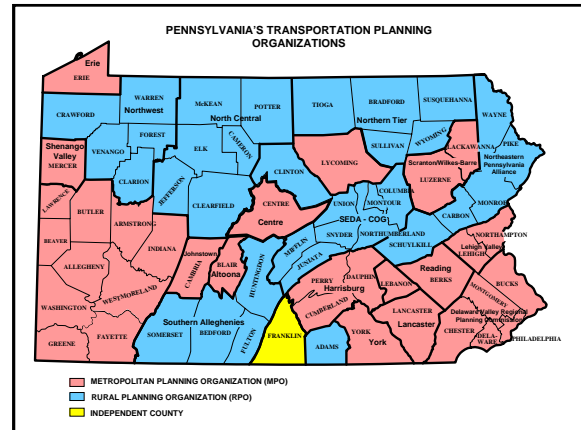


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Statewide Planning Opportunity

- Create a framework for regional and statewide integration
- Establish a basis for sound investments
- Create a regional forum for stakeholders to address ITS/Operational issues
- Advance the use of ITS to better manage our transportation system



Project Objective

Complete regional ITS Architectures in partnership with planning organizations throughout the State to meet the Federal mandate by April 8, 2005 for use of Federal funds for ITS operations



Scope of Work

- Champions
- Regional Advisory Panels
- "Strawman"
- Validation
- Regional Meetings
- Finalize

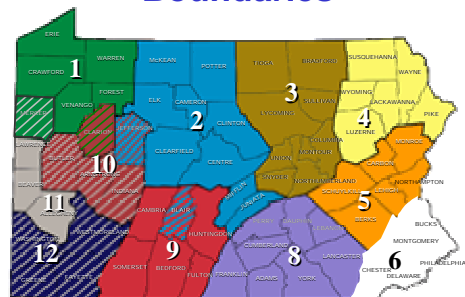


Project Organization

- Guided by a Statewide Working Group
- Each Region is led by a Regional Advisor Panel
- Each Region has identified ITS Architecture Champions



Regional Architecture Boundaries



How will the Architecture be used?

- Provides a foundation for future ITS investment discussions among stakeholders
- Provide a State business case for ITS investment in:
 - Long range plans
 - Transportation improvement programs
 - Annual work programs



What we will have ...

- Validated, accepted ITS Architecture for every region in the State
- List of projects for each region
- Working groups/stakeholders discussing ITS per region
- ITS champions in every region
- PennDOT Statewide Operations Framework Vision
- Federal Partnership



What we will need to do ...

- Statewide ITS Strategic Plan
- Regional ITS Implementation Plans
 - Project priority
 - Cost analysis for Business Planning
 - Actions to program on TIPs and Plans



Regional Planning

Chip Millard, Tri-County



MPO / RPO Involvement

Need for ITS Planning at regional (MPO/RPO) level:

- Mandate to receive federal funds for ITS projects in future
- Cannot build way out of congestion – don't have the money, negative community impacts



MPO / RPO Involvement

Need for ITS Planning at regional (MPO/RPO) level:

- Need to make existing transportation system more efficient
 - Better technologies (VMS, CCTV, traffic signal systems, etc.)
 - Better communication (between those who operate and rely on transportation system)
 - Facilitate and not inhibit economic development



MPO / RPO Involvement

Need for ITS Planning at regional (MPO/RPO) level:

- Can make more informed decisions about transportation needs by engaging:
 - Major transportation providers
 - Major municipalities
 - Emergency management providers (including law enforcement)
 - Major event generators








MPO / RPO Involvement

Need ITS Regional Architecture coordination between MPO/RPOs in region:



- Much interaction between markets (Harrisburg, Lancaster, York, Lebanon, Carlisle, etc.) within region
- Portions of urbanized areas for one MPO area "spill over" into jurisdictions of another MPO area (example – Harrisburg area and northern York County)

MPO / RPO Involvement

Need ITS Regional Architecture coordination between MPO/RPOs in region:

- Region is a transportation hub
 - "All routes lead to Harrisburg (and south central Pennsylvania)"
 - Well connected to East Coast cities, Midwest, South, and eastern Canada
 - Significant truck and rail operations in the region


MPO / RPO Involvement

Need ITS Regional Architecture coordination between MPO/RPOs in region:

- Region has significant tourist attractors
 - Gettysburg area
 - Hershey area
 - Lancaster County Amish country
 - Harrisburg – state capital
 - Other smaller or more seasonal attractors
- Above factors point towards a strong need for coordination between MPO/RPO areas





Getting there ...




- Acceptance of ITS Architecture as a regional plan
- Build upon existing momentum to continue to work together
- Create an ITS Task Force to work on technical and operational issues
- Find a home for the ITS Task Force housed under policy group for the region for planning and programming
- Regional ITS Implementation Plan






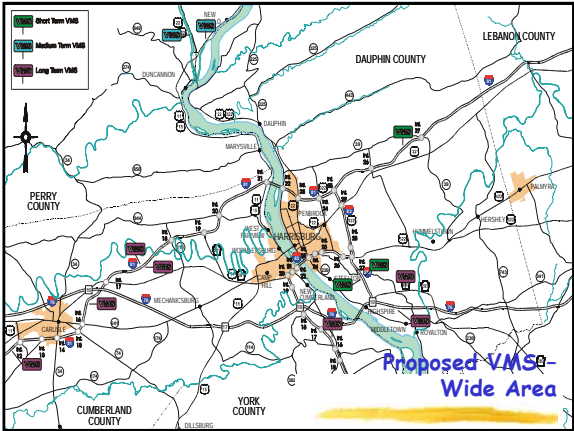
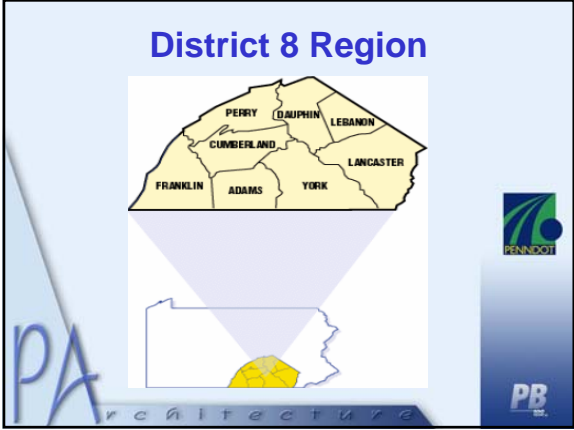
Regional Operations

Glenn Rowe, PennDOT D8-0




PENNDOT District 8-0 ITS Operations



Harrisburg Metro Area ITS Study


- **Study** focused on enhancing the region's ability address existing and future needs
- **Identified** opportunities for improved communication and management activities between regional agencies
- **Recommended** systems to achieve their transportation management goals


Short Term (0-4 Years) Recommendations

- Milepost Markers
- Enhanced driver information
- Improved emergency response
- Compatible with exit number resigning



Short Term (0-4 Years) Recommendations

- Milepost Markers
- Signed Detour Routes



Short Term (0-4 Years) Recommendations

- Milepost Markers
- Signed Detour Routes
- 7 Permanent VMS (I - 81 Reconstruction)



What we're trying to avoid!



Short Term (0-4 Years) Recommendations

- Milepost Markers
- Signed Detour Routes
- 5 Permanent VMS
- Freeway Service Patrol (FSP)



Short Term (0-4 Years) Recommendations

- Milepost Markers
- Signed Detour Routes
- 5 Permanent VMS
- Freeway Service Patrol (FSP)
- Coordination of Traffic Signal Systems



Short Term (0-4 Years) Recommendations

- Milepost Markers
- Signed Detour Routes
- 5 Permanent VMS
- Freeway Service Patrol (FSP)
- Coordination of Traffic Signal Systems
- Incident Management



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Short Term (0-4 Years) Recommendations

- Milepost Markers
- Signed Detour Routes
- 5 Permanent VMS
- Emergency Service Patrol (ESP)
- Coordination of Traffic Signal Systems
- Incident Management
- Study of Permanent TMC



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PEMA Operation Center



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Dauphin County Operation Center



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PaDOT Traffic Operation Center



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PaDOT Traffic Operation Center



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Medium Term (5-8 Years) Recommendations

- Build TMC
- Continued ITS equipment deployment
- Automatic Vehicle Location (AVL) System
- Improve Commercial Vehicle Operations



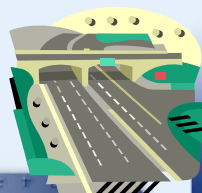
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Long Term (8-12+ Years) Recommendations

- Complete the Coverage of the Metro Area with a Traffic Management System
- Coordinate Traffic Management Center (TMC) Information with Public and In-Vehicle Devices

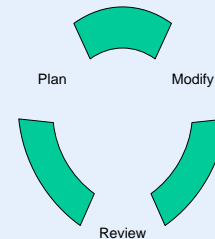


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EDP / ITS Architecture is a living document



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Other ITS activities

- I-83 Queue Detection
- I-83 ITS East / West Shore \$6 million
- I-83 Master Plan
- Truck Rollover Warning System
- Gettysburg signal ITS
- US 15 / Pa 581 CCTV and VMS



Validation Outreach

Allen W. Baldwin
Pennsylvania Turnpike Commission



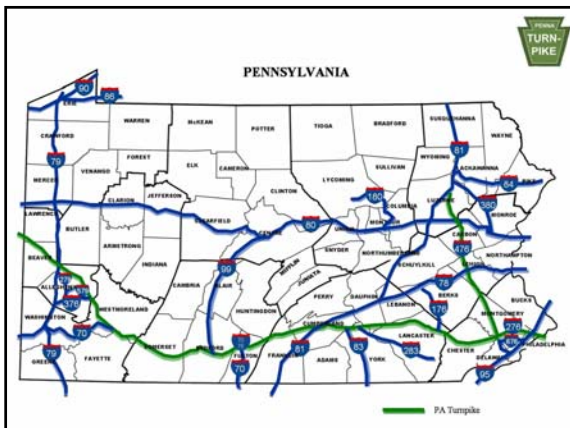
PTC's Mission

*To operate and manage a safe, reliable,
cost effective and valued toll road
system*



Unique Turnpike

- PTC Traffic Operations Center
- Electronic Toll Collection System – EZ Pass
- Advanced Traveler Information System
- Coordination with Other Agencies
- Contracted Response Services




Unique Turnpike - Traffic Operations Center

- Information hub
- Centralized operation (Harrisburg, PA)
- Operates 24/7
- Staffed by radio operators and duty officers
- Centralized software to control ITS devices




Unique Turnpike-Incident/ Emergency Management

- Performs incident detection/verification
- 911 and Traffic Operations Center
 - Takes emergency calls (911 & *11)
- Provides incident response coordination/communication
 - Dispatches PSP, Emergency Services, Private wrecker & Mtce. Units.
 - Communicates to other agencies
- Provides service patrol








Unique Turnpike - Incident Management






TEAMWORK
Unified Incident Command (UIC)

Unique Turnpike

- ITS Devices
 - VMS (21)
 - RTMS (38)
 - CCTV (15)
 - HAR Transmitters (40)
 - Service Plaza Travel Boards (21)
 - RWIS (4)
 - TRWS (1)

Unique Turnpike - Electronic Toll Collection

- Provides electronic toll collection service
- Performs toll administration






Unique Turnpike -Advanced Traveler Information System

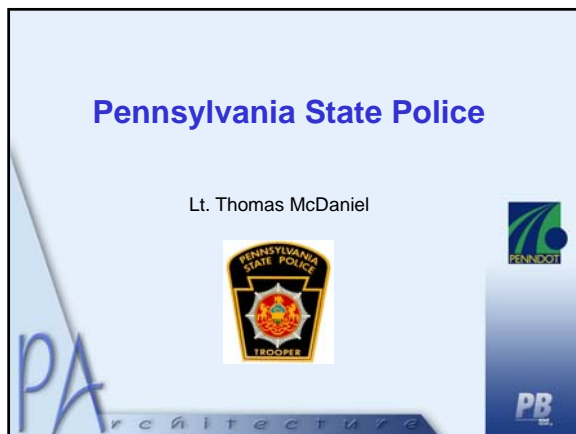
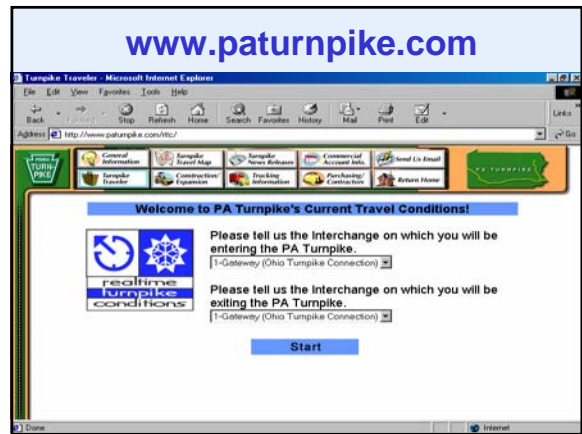
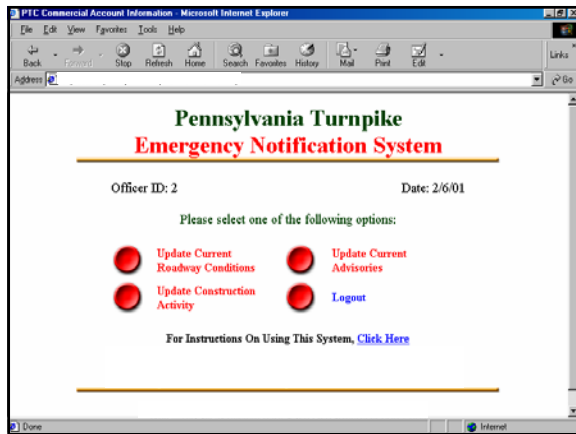
- How do we communicate with Travelers
 - ITS Devices
 - Highway Advisory Radio (HAR)
 - Variable Message Signs (VMS)
 - Closed Circuit TeleVision (CCTV)
 - PTC Web Page – www.paturnpike.com
 - Traffic Reporting Agencies
 - Media Notifications
 - Traffic Advisories





Unique Turnpike



Highway Incident Management

- Detection
- Verification
- Response
- Scene Management & Info to Motorists
- Clearance & Restoration



Detection

- Cell Phones (911)
- ITS Technology
 - Microwave or Loop Detectors
 - CCTV
- Freeway Service Patrols
- "Eyes on the Road"



Verification

- Determine precise location of the incident
- Determine nature of incident
- What resource agencies are needed



Response

- Law Enforcement
- Fire & Rescue
- EMS
- Transportation
- Towing & Recovery



Incident Scene Management

- Safety (responders, public and injured)
- Stabilize the incident scene
- Traffic Control (backlogs & secondary crashes)
- Investigation and evidence preservation
- Clear the lanes of crash debris
- Removal of responders from lanes



Scene Management

- Motorcycle Patrols
- Clear the Lane
- Crash Investigation
- Secondary Crashes
- Unified Command Training (PSP participation & trainers)
- Highway Incident Scene Safety and Traffic Control Training



The Five Functional Sections of the ICS

- Command
- Operations
- Planning
- Logistics
- Finance / Administration



PA

rchitecture

PB

Information to Motorists

- VMS
- District TMC
- Upstream traffic diversion (ahead of the detour point)
- Local media/traffic reporting



PA

rchitecture

PB

Clearance & Restoration

- Clear the lanes of:
 - Crashes
 - Crash debris (T&R, may be done off-peak)
 - Roadway infrastructure damage repair
 - Other hazards (apply non-skid material)
- Restore traffic to normal flow conditions



PA

rchitecture

PB

Pre-planning & Coordination

- Detour routes for major highways
- Special Events (RNC, Cabelas)
- Incident Management meetings
 - Regions, Corridors (I-81, I-95, Capital Beltway)
 - IM Plans (standing)
 - IM Plans for construction projects (US 202, 222)



PA

rchitecture

PB

Validation Outreach

Larry Bankert, PB Farradyne



PA

rchitecture

PB

You are here because...

- **Your knowledge is needed to validate information we have begun to compile**
- Your regional perspectives is valued
- You are involved in operating a piece of the transportation system
- You are involved in planning and programming for regional transportation
- You are involved in setting transportation policy in the region
- You are creating the regional ITS forum for the future






PA

rchitecture

PB

Validating What?

- Southcentral PA Regional ITS Architecture
 - 43 elements
 - 166 interconnects
 - 1,190 information flows
- Interconnects – Who do I connect with or want to connect with in the future?
 - Operations/elements connected to other operations
- Information flows – With the connection, what information do I pass or want to pass?
 - Data and Information passing from one operation/element to another
- Only items that pertain to **you**
 - You are the 'center of the universe'
 - Primarily existing knowledge




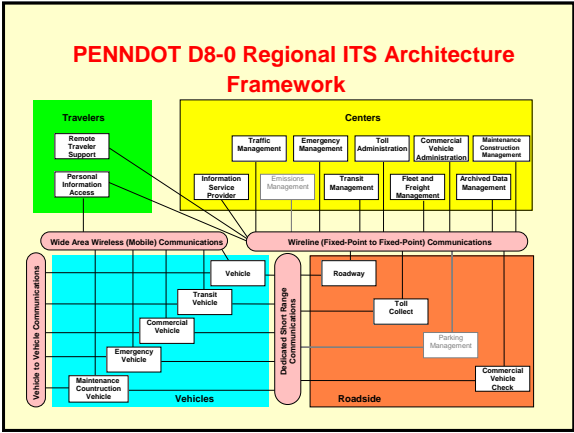
PENNDOT District 8-0 Regional ITS Architecture

July 2004

Stakeholder Validation

Contact Name: Larry Bankert
Agency: PENNDOT D8-0 – Traffic/ITS
Address: _____
Phone: _____
Email: _____

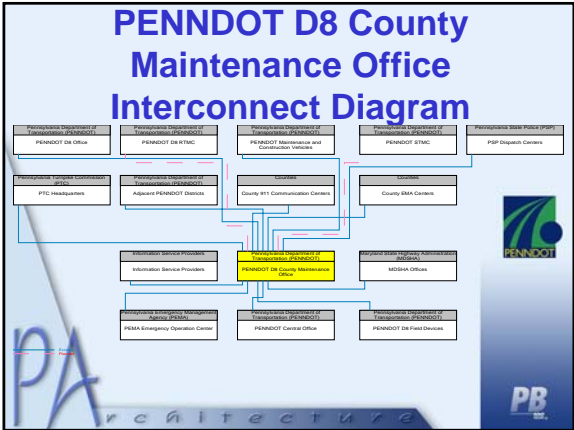
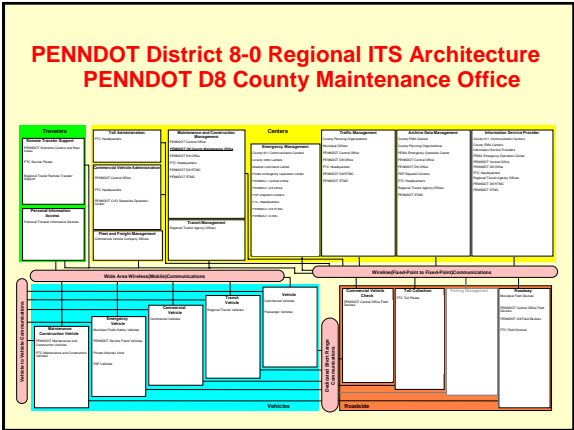
Architecture Elements To Review
 PENNDOT D8-0 TMC
 PENNDOT D8-0 RTMC
 PENNDOT D8-0 Field Devices
 PENNDOT Service Patrol Vehicles

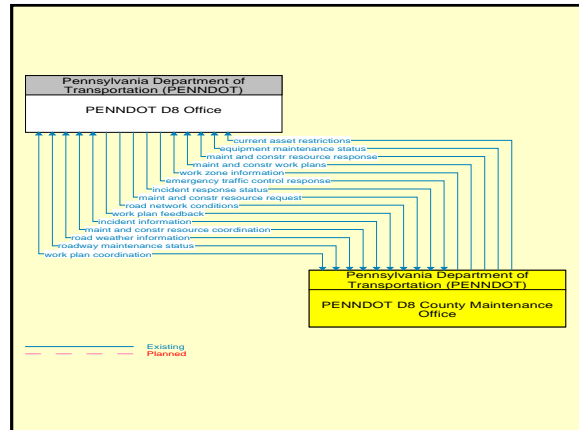
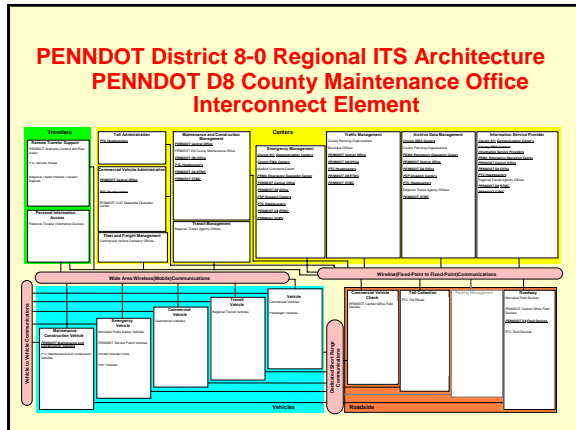





Architecture Element PENNDOT D8 County Maintenance Office

Element Description Pennsylvania Department of Transportation Engineering District 8-0 County Maintenance Offices in all the District 8-0 Counties. Includes personnel and existing/future systems that provide overall coordination and support for construction and routine maintenance on PENNDOT roadways, as well as management of construction and maintenance equipment.

Stakeholder Pennsylvania Department of Transportation (PENNDOT)





Validation Effort

- Two large stakeholder meetings
 - One at the front end of the effort (July 21st)
 - One at the back end of the effort (Oct 27th est.)
- Validation meetings by functional areas
 - Traffic Management
 - Incident and Emergency Management
 - Public Transportation
 - Commercial Vehicle Operations
 - Planning
 - Others/Information Service Providers

Validation Meeting Schedule

- July 28th – Travel & Traffic Mgt I & II
- July 29th – Travel & Traffic Mgt III & PTC
- August 3rd – Incident & Emergency Mgt III
- August 5th – Incident & Emergency Mgt I & II
- August 10th – Public Transportation & CVO
- August 11th – Planning & Others/ISP

Project Moving Forward

- Incorporate validation meeting comments
- Resolve conflicts with the Regional Advisory Panel
- Final Stakeholder meeting (Oct 27th est)
- Final report issued, Fall 2004

Planned Regional Actions

- Input to support Adoption
- Continue to advance ITS element of Regional Long Range Plans
- Organize ITS Task Force under South Central Region umbrella group
- Continue ITS regional dialog beyond this effort
- Develop Regional ITS Implementation Plan

Contacts

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Phone: (717) 783-3981
Email: glrowe@state.pa.us
- **Chip Millard, TCRPC**
Phone: (717) 234-2639
Email: cmillard@tcrpc-pa.org
- **Larry Bankert, PB Farradyne**
Phone: (717) 795-7153
Email: bankert@pbworld.com



Discussion



Appendix G: Validation Meeting Minutes

Date: July 28th, 2004

Location: Perry Room, PennDOT D8-0 Office; Harrisburg, PA

Attendees:

Larry Bankert, PB Farradyne
Devang Patel, PennDOT D8
Greg Penny, PennDOT D8
Jim Smith, PennDOT D8
Jeff Weaver, PennDOT D8
Mike Yuschock, PennDOT D8
Vijay Varadarajan, PB Farradyne

Minutes Prepared By: Vijay Varadarajan, PB Farradyne

A meeting was held on July 28th, 2004 between 10:00 AM and 12:00 PM at the Perry Room, PennDOT District 8-0 Office, Harrisburg, PA. The meeting was conducted to validate the **Traffic and Travel Management (PennDOT D8)** elements of the PennDOT D8 Regional ITS Architecture. The following was the meeting agenda:

- I. Introductions
- II. Background
- III. Validation
 - i. Elements Description
 - ii. Interconnects
 - iii. Information Flows
- IV. Potential Projects
- V. Wrap-up/Next Steps

The validation component of the agenda including the validation of the following elements in the PennDOT D8 Regional ITS Architecture:

- PennDOT D8 RTMC
- PennDOT D8 County Maintenance Offices
- PennDOT D8 Field Devices
- PennDOT D8 County Maintenance and Construction Vehicles

- PennDOT D8 Service Patrol Vehicles
- PennDOT Welcome Centers and Rest Areas

A “package” was developed for each of the above elements in order to portray how an element (i.e., the “subject” element) fits into the regional architecture. The packages were then combined into a MS PowerPoint presentation and reviewed with the stakeholders in attendance. Copies of each element package are attached with these minutes. Specifically, the element packages consisted of:

- PennDOT D8 Regional ITS Architecture Framework – a copy of the National ITS Architecture “Sausage Diagram”.
- Element Cover Sheets – The name, description and stakeholder of the subject element as defined in the DRAFT Regional ITS Architecture.
- “Sausage Diagrams” showing the context of the subject element and the relationship between other elements in the DRAFT Regional ITS Architecture – the subject element was shown alone within the “Sausage Diagram” framework to provide a sense of context as to where that particular element fits within the National ITS Architecture framework. In addition, a second drawing was provided to show the relationship (i.e., interconnects) between the subject element and other elements in the PennDOT D8 Regional ITS Architecture.
- Interconnect Diagram – An Interconnect Diagram showing existing and planned interconnects between the subject element and other elements in the regional architecture were provided.
- Information Flow Diagrams – Existing and planned information flows by direction were shown on drawings for the subject element and each of the elements it interconnects with.
- Appendices – Definitions for the elements and architecture flows were provided.

The following is a list of comments that we’re provided at the meeting. For the elements, comments are organized around additions and deletions by element, as well as general discussion items.

I. Introductions:

Mr. Bankert opened the meeting with an overview of the agenda for the meeting. Then, the meeting participants introduced themselves.

II. Background:

Mr. Bankert presented the project background. He briefly explained the project purpose and the importance of the project to the PennDOT D8 region.

III. Validation:

The following comments were received as part of the validation process:

I PennDOT D8 RTMC

a. **Definition:**

- Includes' in Adam county.
- Replace Statewide ITS Operational Concept by Transportation Management Approach.
- Include design, construction and CRC group in the definition

b. **Interconnects**

- Include the following interconnects
 - Municipal offices and PennDOT D8 field devices
- Delete the following interconnects
 - County 911 communication centers
 - County EMA Centers

c. **Information Flows**

i With PennDOT D8 County Maintenance Offices

1. Additions
 - None
2. Deletions
 - None
3. Changes
 - Maint and constr resource response – planned
 - Incident response status – both ways
 - Road network condition – planned, both ways.
 - Incident Information – not occurring outside working hrs
 - Road Weather Information – planned

- Roadway maintenance status – planned
- Work plan coordination – planned

ii With PTC Offices

1. Additions:
 - None
2. Deletions:
 - Road weather information
3. Changes:
 - Work plan coordination – both ways
 - incident report – planned
 - resource deployment status – planned
 - resource request – planned

iii With PEMA Emergency Operation Center

1. Additions:
 - 911 call incident information
2. Deletions:
 - Road network probe information.
3. Changes:
 - Current asset restrictions – planned
 - Road network conditions – planned
 - Resource request also happens through PennDOT D8 County Maintenance Offices

iv County 911 Communications Centers

- No connection

v County EMA Centers

- No connection

vi With Medical Command Center

1. Additions
 - None
2. Deletions
 - None
3. Changes
 - Incident Information – planned
 - Incident response coordination – planned
 - road network conditions – planned

vii With PSP Dispatch Centers

1. Additions
 - Work plan coordination (planned)
 - Remote surveillance control (future)
2. Deletions
 - Current asset restrictions
3. Changes
 - Current asset restrictions to PSP Dispatch Centers also happens through PennDOT County Maintenance Offices
 - All flows – two ways

viii With Regional Transit Agency Offices

1. Additions
 - Roadway network information flow to Regional Transit Agency Offices
 - Current asset restrictions information flow to Regional Transit Agency Offices

2. Deletions

- None

3. Changes

- All flows – planned
- Bridge closure/lane narrow information are passed on through PennDOT D8 bridge division
- Rail road design information is passed on through PennDOT D9 design division

ix With TRANSCOM Center

1. Additions

- None

2. Deletions

- None

3. Changes

- None

x With Adjacent PennDOT Districts

1. Additions

- Regional coordination

2. Deletions

- None

3. Changes

- None
- Currently D8 coordinates work zone information with PennDOT D5 along I78 and I 81

xi With MDSHA Offices

1. Additions

- None
- 2. Deletions
 - None
- 3. Changes
 - Incident response coordination – planned
 - traffic information coordination – planned
 - Information flows may occur through PennDOT STMC also

xii With PennDOT D8 Field Devices

- 1. Additions
 - None
- 2. Deletions
 - hri status
 - hri control data
 - hri request
- 3. Changes
 - None
 - Field device status is monitored in the queue detection project

xiii With Municipal Field Devices

- 1. Additions
 - None
- 2. Deletions
 - None
- 3. Changes
 - signal control status – planned
 - signal control data - planned

xiv With PennDOT D8 Service Patrol Vehicles

- 1 Additions
 - None
- 2 Deletions
 - None
- 3 Changes
 - None

xv With PennDOT Welcome Centers and Rest Areas

- 1 Additions
 - None
- 2 Deletions
 - None
- 3 Changes
 - Traveler information – planned
 - Traveler request – planned

xvi With PennDOT STMC

- 1 Additions
 - None
- 2 Deletions
 - None
- 3 Changes
 - None

xvii County Planning Organizations

- 1 Additions
 - None

2 Deletions

- None

3 Changes

- Archive coordination – two ways

xvi With Municipal Offices

1 Additions

- Special event information (both ways)

2 Deletions

- None

3 Changes

- All flows - planned

xviii With Regional Media Outlets

1 Additions

- None

2 Deletions

- None

3 Changes

- None

xix With Event Promoters

1 Additions

- None

2 Deletions

- None

3 Changes

- None

xx With Information Service Providers

- 1 Additions
 - None
- 2 Deletions
 - None
- 3 Changes
 - None

xxi With PennDOT Central Office

- 1 Additions
 - None
- 2 Deletions
 - None
- 3 Changes
 - None

II PennDOT D8 County Maintenance Offices

a. **Definition:**

- Include bridge inspection and survey vans in the definition

b. **Interconnects**

- Include the following interconnect

c. **Information Flows**

i With PennDOT D8 RTMC

- Please refer to section III.I.c.i for comments on the information flows for this interconnect

ii With PTC Offices

- 1 Additions

- None
- 2 Deletions
 - Maint and constr resource response
 - Maint and constr resource request
 - 3 Changes
 - None

iii With County 911 Communication Centers

- 1 Additions
 - None
- 2 Deletions
 - None
- 3 Changes
 - None

iv With County EMA Centers

- 1 Additions
 - None
- 2 Deletions
 - None
- 3 Changes
 - None

v With PSP Dispatch Centers

- 1 Additions
 - Road weather information
- 2 Deletions
 - Maint and constr resource response

- Incident response status
 - Maint and constr resource request
- 3 Changes
- None

vi With Adjacent PennDOT Districts

- 1 Additions
- None
- 2 Deletions
- None
- 3 Changes
- None

vii With MDSHA Offices

- 1 Additions
- None
- 2 Deletions
- None
- 3 Changes
- None

viii With PennDOT D8 Field Devices

- 1 Additions
- Field device control
- 2 Deletions
- None
- 3 Changes
- None

ix With Maintenance and Construction Vehicles

- 1 Additions
 - None
- 2 Deletions
 - Maint and Constr vehicle system control
 - Infrastructure conditions data
 - Maint and constr vehicle conditions
 - Maint and constr vehicle operational data
- 3 Changes
 - Maint and constr vehicle location data (planned)

x With STMC

- 1 Additions
 - None
- 2 Deletions
 - None
- 3 Changes
 - None

xi With Information Service Providers

- 1 Additions
 - Road weather information
- 2 Deletions
 - Roadway maintenance status
 - Current asset restriction
- 3 Changes
 - Work zone information (planned)

xii With PennDOT Central Office

- 1 Additions
 - None
- 2 Deletions
 - None
- 3 Changes
 - None

III PennDOT D8 Field Devices

- a. **Definition:**
 - No changes
- b. **Interconnects**
 - Add the following interconnects
 - With PEMA Emergency Operations Center
 - PEMA has the ability to control the VMS
 - Municipal Offices
 - Gettysburg will have the ability to control the VMS
- c. **Information Flows**
 - i **With PennDOT D8 RTMC**
 - Please refer to section III.I.c.xii for comments on the information flows for this interconnect
 - ii **With PennDOT D8 RTMC**
 - Please refer to section III.II.c.viii for comments on the information flows for this interconnect
 - iii **With PennDOT STMC**
 - This interconnect was not commented in this meeting. This interconnect will be commented as part of the PennDOT STMC validation

IV PennDOT D8 Maintenance and Construction Vehicles

a. **Definition:**

- No changes

b. **Interconnects**

- No changes

c. **Information Flows**

i With PennDOT D8 County Maintenance Offices

- Please refer to section III.II.c.ix for comments on the information flows for this interconnect

V PennDOT D8 Service Patrol Vehicles

a. **Definition:**

- No changes

b. **Interconnects**

- Delete the following interconnect
 - PennDOT STMC (all the information flows through PennDOT D8 RTMC)

c. **Information Flows**

i With PennDOT D8 RTMC

- Please refer to section III.I.c.xiv for comments on the information flows for this interconnect

ii With PennDOT D8 STMC

- No interconnection

VI PennDOT Welcome Centers and Rest Areas

a. **Definition:**

- No changes

b. **Interconnects**

- No Changes

c. **Information Flows**

i **With PennDOT D8 RTMC**

- Please refer to section III.I.c.xv for comments on the information flows for this interconnect
- (show all the flows as planned)

General Discussion

1. In general, most of the information flows are occurring as existing are taking place on an ad-hoc basis. There is no formal process in place to formalize the information flow. PennDOT needs to formalize the process. Also, some of the flows are applicable only to the Capital Beltway area. PennDOT vision is to include the information flows for other areas in the District.
2. Consider adding the following elements:
 - i. PennDOT D8 Design Office (include bridge design, bridge inspection crane team)
 1. Include work plan coordination and work plan feedback information with the PennDOT D8 County Maintenance Office.
 2. Include maintenance and construction resource response and coordination (Bridge inspection crane/team) with PennDOT D8 RTMC
 3. Include bridge closure, lane narrow information with Regional Transit Agency Offices
 - ii. PennDOT D8 Construction Office
 1. Include lane closure information flow with PennDOT D8 RTMC (Existing)
 2. Include construction and maintenance work plans information flow with PennDOT D8 RTMC (CRC)
 - iii. PennDOT D8 Incident Command Van
 1. Show information flows same as PennDOT D8 Service Patrol Vehicles
 2. Include video surveillance data information flows

- Show Community Relation Coordination (CRC) as part of PennDOT D8 RTMC
- CRC receives only the long term schedule of the project (starting/ending time). CRC does not receive real time work zone information.
- PSP information comes to CRC
- CRC provides construction plan information to media
- CRC may have a staff the future PennDOT D8 RTMC.
- It is District policy to have the road closures reported to the PennDOT D8 Office.
- Include road weather information with PennDOT D8 Field Devices for PennDOT D8 RTMC.
- PennDOT D8 RTMC does not log incident information in PIERS
- There is an interconnection between PTC Offices and PennDOT County Maintenance Offices.
- PennDOT D8 County Maintenance Office faxes weather related information to PEMA Emergency Operation Center.
- PennDOT D8 RTMC does not perform any activity related to highway railroad information.
- PennDOT D8 RTMC broadcast real time information to Traffax, PSP, Media (through Bob Conrad)
- Regional Media Outlets monitor PSP station frequency.

IV. Potential Projects

- Develop PennDOT D8 RTMC central repository
- Deploy the projects as identified in the ITS Master Plan
- Provide available real-time traffic information in the internet
- Develop a one stop shop contact list for the County Maintenance Offices
- Develop better coordination with other agencies for better information exchange
- Formalize the information flows done on an ad-hoc basis
- Recruit more D8 personnel
- Develop better Work Zone Information Coordination

V. Wrap-Up/Next Steps

Mr. Bankert identified the following as next steps:

- Conduct and complete other validation meetings
- Identify conflicting comments
- Convene a Regional Advisory Panel (RAP) members to resolve the conflicting comments
- Incorporate the comments into draft Strawman Architecture
- Finalize the architecture
- Conduct the second Bookend meeting

Date: July 28th, 2004

Location: PB Farradyne Office, Mechanicsburg, PA

Attendees:

Larry Bankert, PB Farradyne
Robert Conrad, PennDOT
Dan Leonard, PennDOT
Devang Patel, PennDOT
Craig Reed, PennDOT
Glenn Rowe, PennDOT
Dan Smyser, PennDOT
Vijay Varadarajan, PB Farradyne

Minutes Prepared By: Vijay Varadarajan, PB Farradyne

A meeting was held on July 28th, 2004 between 1:00 AM and Noon at the PB Farradyne's office. The meeting was conducted to validate the **Travel and Traffic Management II (Statewide)** elements of the PennDOT D8 Regional ITS Architecture. The following was the meeting agenda:

- I. Introductions
- II. Background
- III. Validation
 - i. Elements Description
 - ii. Interconnects
 - iii. Information Flows
- IV. Potential Projects
- V. Wrap-up/Next Steps

The validation component of the agenda including the validation of the following elements in the PennDOT D8 Regional ITS Architecture:

- PennDOT Central Office
- PennDOT Central Office Field Devices
- PennDOT STMC
- PennDOT D8 RTMC

A "package" was developed for each of the above elements in order to portray how an element (i.e., the "subject" element) fits into the regional architecture. The packages were then combined into a MS PowerPoint presentation and reviewed with the

stakeholders in attendance. Copies of each element package are attached with these minutes. Specifically, the element packages consisted of:

- Element Cover Sheets – The name, description and stakeholder of the subject element as defined in the DRAFT Regional ITS Architecture.
- “Sausage Diagrams” showing the context of the subject element and the relationship between other elements in the DRAFT Regional ITS Architecture – the subject element was shown alone within the “Sausage Diagram” framework to provide a sense of context as to where that particular element fits within the National ITS Architecture framework. In addition, a second drawing was provided to show the relationship (i.e., interconnects) between the subject element and other elements in the PennDOT D8 Regional ITS Architecture.
- Interconnect Diagram – An Interconnect Diagram showing existing and planned interconnects between the subject element and other elements in the regional architecture was provided.
- Information Flow Diagrams – Existing and planned information flows by direction were shown on drawings for the subject element and each of the elements it interconnects with.
- Appendices – Definitions for the elements and architecture flows were provided.

The following is a list of discussed items:

I. Introductions:

Mr. Bankert opened the meeting with an overview of the agenda for the meeting. Then, the meeting participants introduced themselves.

II. Background:

Mr. Bankert presented the project background. He briefly explained the project purpose and the importance of the project to the PennDOT D8 region.

III. Validation:

The following comments were received as part of the validation process:

I. PennDOT Central Office

a. Definition

- Change the element name to PennDOT Central Office Organization
- Change the definition to include the following departments: “Systems located at the PennDOT Central Office Organizations located in Harrisburg. The element consists of those Central Office

Organizations operating transportations systems, including the Bureau of Maintenance and Operations (BOMO), Motor Carrier Division, Bureau of Planning and Research (BPR), Bureau of Highway Safety and Traffic Engineering (BHSTE), Bureau of Licensing, Bureau of Motor Vehicles, Bureau of Freights, rails, Bureau of Information Systems, Communication Office of Information Technology, and Press Office.

b. Interconnects

- Remove the following interconnect:
 - Information Service Providers
- Include the following interconnects
 - Regional Transit Agency Offices (airports, AMTRAK)
 - MDSHA Offices
 - Incidence response coordination
- PSP Dispatch Centers
 - CVO Operations
 - Incident Management
 - Amber Alert

c. Information Flows

i. With PennDOT D8 RTMC

1. Additions

- Current asset restrictions (with PennDOT D8 design department)

2. Deletions

- None

3. Changes

- Most of the information flow happens in Ad-hoc basis. The information flows should be made firm by standardizing the procedures. If possible, show the flows as planned until the flows are standardized

- PennDOT Central Office houses archive data (traffic count, pavement conditions but not incident data)
- PennDOT BOMO owns Maintenance Operations & Resources Information System (MORIS)

ii. With PennDOT D8 County Maintenance Offices

1. Additions

- None

2. Deletions

- Roadway weather information
- Work zone information

3. Changes

- Archive status-one way towards PennDOT Central Office
- Archive status-one way towards PennDOT Central Office

iii. With PTC Offices

1. Additions

- None

2. Deletions

- None

3. Changes

- None

iv. With PEMA Emergency Operations Center

1. Additions

- Request for road network conditions from PEMA

2. Deletions

- Archive status

- Work zone information

3. Changes

- Road network conditions - planned

v. With Commercial Vehicle Company Offices

1. Additions

- None

2. Deletions

- None

3. Changes

- None

vi. With Adjacent PennDOT Districts

1. Additions

- None

2. Deletions

- None

3. Changes

- None

vii. With Central Office Field Devices

1. Additions

- None

2. Deletions

- None

3. Changes

- None

viii. With STMC

1. Additions

- None

2. Deletions

- None

3. Changes

- All flows – both ways

ix. With Personal Traveler Information Devices

1. Additions

- None

2. Deletions

- None

3. Changes

- None
- The information flows are on an ad-hoc basis (done only partially)
- The information flows are non real-time

x. With Regional Media Outlets

1. Additions

- None

2. Deletions

- None

3. Changes

- None

xi. With Information Service Providers

- **No Connection**

II. PennDOT Central Office Field Devices

a. Definition

- No changes

b. Interconnects

- No changes

c. Information Flows

i. With Commercial Vehicles

1. Additions

- None

2. Deletions

- None

3. Changes

- None

ii. With PennDOT STMC

1. Additions

- None

2. Deletions

- None

3. Changes

- None

iii. With PennDOT Central Office

1. Additions

- Road weather information flow (existing). The road weather information data goes directly to the Central Office in addition to the County Maintenance Offices

2. Deletions

- None

3. Changes

- None

III. PennDOT STMC

a. Definition

- Remove bullet no (4). Performing political and public relations is done through PEMA

b. Interconnects

- Remove the following interconnection
 - With PennDOT D8 County Maintenance Offices. All the information should flow through PennDOT D8 RTMC.
 - With County 911 Communication Centers
 - With County EMA Centers
 - With Regional Transit Agency Centers
 - With PennDOT D8 Service Patrol Vehicles
 - With Municipal Public Safety Vehicles

c. Information Flows

i. With PennDOT D8 RTMC

1. Additions

- None

2. Deletions

- None

3. Changes

- All flows – both ways

ii. With PennDOT D8 County Maintenance Offices

- No Connection

iii. With PTC Offices

1. Additions

- None

2. Deletions

- None

3. Changes

- All flows – both ways

iv. With PEMA Emergency Operation Center

1. Additions

- None

2. Deletions

- None

3. Changes

- All flows – both ways

v. With County 911 Communications Center

- No Connection

vi. With County EMA Center

- No Connection

vii. With PSP Dispatch Centers

1. Additions

- None

2. Deletions

- None

3. Changes

- All flows – both ways

viii. With Regional Transit Agency Offices

- No Connection. All the connections are through PennDOT D8 RTMC

ix. With Commercial Vehicle Company Offices

1. Additions

- None

2. Deletions

- None

3. Changes

- All flows – both ways (as applicable)

x. With TRANSCOM Center

1. Additions

- None

2. Deletions

- None

3. Changes

- None

xi. With Adjacent PennDOT Districts

1. Additions

- None

2. Deletions

- None

3. Changes

- The information flows should be same as for PennDOT D8 RTMC

xii. With MDSHA Offices

1. Additions

- Emergency Response Coordination

2. Deletions

- None

3. Changes

- All flows – both ways

xiii. With PennDOT D8 Field Devices

1. Additions

- None

2. Deletions

- All flows relating to HRI

3. Changes

- None

xiv. With PennDOT Central Office Field Devices

1. Additions

- None

2. Deletions

- Accident report

3. Changes

- Show same flows as shown between PennDOT Central Office and PennDOT Central Office Field Devices
- Consider adding the third-party weather systems as a terminator

xv. With PennDOT D8 Service Patrol Vehicles

- No Connection

xvi. With Municipal Public Safety Vehicles

- No Connection

xvii. With County Planning Organizations

1. Additions

- None

2. Deletions

- None

3. Changes

- None

xviii. With Regional Media Outlets

1. Additions

- None

2. Deletions

- None

3. Changes

- None

xix. With Event Promoters

1. Additions

- None

2. Deletions

- None

3. Changes

- None

xx. With Information Service Providers

1. Additions

- None

2. Deletions

- None

3. Changes

- None
- Welcome centers are maintenance by Central Office of Communication
- Rest Areas are maintained by the districts

xxi. With PennDOT Central Office

1. Additions

- None

2. Deletions

- None

3. Changes

- None

IV. PennDOT D8 RTMC

- Since this element was validated as part of Travel and Traffic Management Validation Meeting #1, this element is not formally separately validated

IV. Potential Projects

- Formalize the process and procedures for the ad-hoc information flows
- Develop a central repository for archive data
- Develop a website to disseminate the traveler, work zone related information
- Develop a center-to-center communications plan
- Develop a statewide telecommunication plan
- Develop Statewide GIS based incident detour map
- Develop RTMC and STMC as planned
- Develop 511 traveler information system

V. Wrap-Up/Next Steps

Mr. Bankert identified the following as next steps:

- Conduct and complete other validation meetings
- Identify conflicting comments
- Convene a Regional Advisory Panel (RAP) members to resolve the conflicting comments
- Incorporate the comments into draft Strawman Architecture
- Finalize the architecture
- Conduct the second Bookend meeting

Date: July 29th, 2004

Location: PTC Headquarters, Highspire, PA

Attendees:

Larry Bankert, PB Farradyne
Lou Belmonte, PennDOT D6
Mike Pastore, PennDOT D9
Devang Patel, PennDOT D8
Kevin Snyder, PennDOT D9
John Townsend, PennDOT D5
Vijay Varadarajan, PB Farradyne

Minutes Prepared By: Vijay Varadarajan, PB Farradyne

A meeting was held on July 29th, 2004 between 10:00 AM and Noon at the Pennsylvania Turnpike Commission (PTC) Headquarters. The meeting was conducted to validate the **Travel and Traffic Management (external to PennDOT D8 Region)** elements of the PennDOT D8 Regional ITS Architecture. The following was the meeting agenda:

- I. Introductions
- II. Background
- III. Validation
 - i. Elements Description
 - ii. Interconnects
 - iii. Information Flows
- IV. Potential Projects
- V. Wrap-up/Next Steps

The validation component of the agenda including the validation of the following elements in the PennDOT D8 Regional ITS Architecture:

- Adjacent PennDOT Districts
- MDSHA Offices
- TRANSCOM Center

A “package” was developed for each of the above elements in order to portray how an element (i.e., the “subject” element) fits into the regional architecture. The packages were then combined into a MS PowerPoint presentation and reviewed with the stakeholders in attendance. Copies of each element package are attached with these minutes. Specifically, the element packages consisted of:

- Element Cover Sheets – The name, description and stakeholder of the subject element as defined in the DRAFT Regional ITS Architecture.
- “Sausage Diagrams” showing the context of the subject element and the relationship between other elements in the DRAFT Regional ITS Architecture – the subject element was shown alone within the “Sausage Diagram” framework to provide a sense of context as to where that particular element fits within the National ITS Architecture framework. In addition, a second drawing was provided to show the relationship (i.e., interconnects) between the subject element and other elements in the PennDOT D8 Regional ITS Architecture.
- Interconnect Diagram – An Interconnect Diagram showing existing and planned interconnects between the subject element and other elements in the regional architecture were provided.
- Information Flow Diagrams – Existing and planned information flows by direction were shown on drawings for the subject element and each of the elements it interconnects with.
- Appendices – Definitions for the elements and architecture flows were provided.

The following is a list of comments that we’re provided at the meeting. For the elements, comments are organized around additions and deletions by element, as well as general discussion items.

I. Introductions:

Mr. Bankert opened the meeting with an overview of the agenda for the meeting. Then, the meeting participants introduced themselves.

II. Background:

Mr. Bankert presented the project background. He briefly explained the project purpose and the importance of the project to the PennDOT D8 region.

III. Statewide Transportation Approach:

Mr. Bankert shared the draft version of the Statewide Transportation Approach with the meeting participants. The following are the comments received from the participants:

- Level III STMC should not monitor roadway status
- Level III STMC should not be involved with the special events management
- Level III STMC need not necessarily be operating 24X7
- Level III STMC should function as an information collection and dissemination center in addition to coordination functions

- PennDOT D6-0 TMC should be operating 24X7
- Districts and ADE-Maintenance should be involved in further developing the approach
- Districts should not operate adjacent District's TMC because of the possibilities of lack of local area knowledge
- 24 hours operations is not possible in all the Districts
- In a sense PennDOT D9 TMC operates 24 hrs by sharing control with Blair County 911 Communications Center and County Maintenance Offices
- The name "Statewide Transportation Approach" should be changed (possibly Traveler Information Center or Traveler Resource Center)

IV. Validation:

The following comments were received as part of the validation process:

I. Adjacent PennDOT Districts

a. Definition

- No changes

b. Interconnects

- Consider breaking the Adjacent PennDOT Districts element into two namely, Adjacent PennDOT District TMC and Adjacent PennDOT District County Maintenance Offices.
- Adjacent PennDOT District TMC definition should include the traffic operations of the Adjacent PennDOT Districts. All the interconnects and information flows shown with other elements except PennDOT District 8-0 County Maintenance Offices should be reflected for Adjacent PennDOT District TMC
- Adjacent PennDOT District County Maintenance Offices definition should include the individual counties (in the adjacent Districts) with which PennDOT D8 communicates/will communicate. The existing information flows between Adjacent PennDOT Districts and PennDOT D8 County Maintenance Offices should be reflected in this interconnection between Adjacent PennDOT District County Maintenance Offices and PennDOT D8 County Maintenance Offices

c. Information Flows

i. With PennDOT D8 RTMC

1. Additions

- Include exchange of traffic images – both ways, planned
- Include emergency response coordination – both ways, planned

2. Deletions

- None

3. Changes

- None

ii. PennDOT D8 County Maintenance Offices

1. Additions

- None

2. Deletions

- None

3. Changes

- Transfer the information flows between Adjacent PennDOT Districts and PennDOT D8 County Maintenance Offices to the new interconnect between Adjacent PennDOT District County Maintenance Offices and PennDOT D8 County Maintenance Offices

iii. PTC Offices

1. Additions

- Exchange of traffic images-both ways, planned
- Exchange of plan x information from PTC offices to Adjacent PennDOT Districts
- Exchange of work zone information
- Exchange work zone information

- Ability to control the adjacent traffic signals

2. Deletions

- None

3. Changes

- Change the element name from Adjacent PennDOT Districts to Adjacent PennDOT District TMC
- All the flows are both ways

iv. PennDOT STMC

1. Additions

- Exchange of traffic images-both ways, planned
- Exchange of archived data-both ways, planned
- Emergency response coordination-both ways, planned

2. Deletions

- None

3. Changes

- Change the element name from Adjacent PennDOT Districts to Adjacent PennDOT District TMC
- All the flows are both ways

v. PennDOT Central Office

1. Additions

- Emergency response coordination

2. Deletions

- None

3. Changes

- Changes the element from Adjacent PennDOT Districts to Adjacent PennDOT District TMC

- All the flows are both ways

II. MDSHA Offices

Since there was no representative from the MDSHA Offices, this element was not validated separately.

III. TRANSCOM Center

Since there was no representative from the MDSHA Offices, this element was not validated separately.

IV. Potential Projects

- Develop Central repository (GIS database) for information collection and dissemination
- Develop a Statewide webpage to disseminate the following data to the public
 - Construction/work zone information
 - Weather advisory information
 - Traveler information
- Improve coordination between central office and PennDOT county offices
- Share video with adjacent PennDOT Districts
- Develop Telecommunication link between adjacent districts (telecom master plan)
- Allow for better intermodal connections with freight and rail
- Exploring the possibilities of attaching the ITS devices to the utility poles sharing the Right Of Way
- Develop Statewide ITS Maintenance Plan
- Allocate Operations and Maintenance budget
- Develop a Statewide maintenance contract for all the PennDOT districts
- Develop Statewide business/implementation plan

V. Wrap-Up/Next Steps

Mr. Bankert identified the following as next steps:

- Conduct and complete other validation meetings
- Identify conflicting comments
- Convene a Regional Advisory Panel (RAP) members to resolve the conflicting comments
- Incorporate the comments into draft Strawman Architecture
- Finalize the architecture
- Conduct the second Bookend meeting

Date: July 29th, 2004

Location: PTC Headquarters, Highspire, PA

Attendees:

Larry Bankert, PB Farradyne
Les Ford, PTC-ITS
Lt. Bill Fraley, PSP Troop T
Tim Scanlon, PTC - Engineering
Vijay Varadarajan, PB Farradyne

Minutes Prepared By: Vijay Varadarajan, PB Farradyne

A meeting was held on July 29th, 2004 between 1:30 PM and 3:30 PM at the Pennsylvania Turnpike Commission (PTC) Headquarters. The meeting was conducted to validate the **Pennsylvania Turnpike Commission (PTC)** elements of the PennDOT D8 Regional ITS Architecture. The following was the meeting agenda:

- I. Introductions
- II. Background
- III. Validation
 - i. Elements Description
 - ii. Interconnects
 - iii. Information Flows
- IV. Potential Projects
- V. Wrap-up/Next Steps

The validation component of the agenda including the validation of the following elements in the PennDOT D8 Regional ITS Architecture:

- PTC Offices
- PTC Field Devices
- PTC Service Plazas
- PTC Toll Plazas
- PSP Troop T Dispatch Centers
- PSP Troop T Vehicles
- PTC Maintenance and Construction Vehicles

- Passenger Vehicles

A “package” was developed for each of the above elements in order to portray how an element (i.e., the “subject” element) fits into the regional architecture. The packages were then combined into a MS PowerPoint presentation and reviewed with the stakeholders in attendance. Copies of each element package are attached with these minutes. Specifically, the element packages consisted of:

- Element Cover Sheets – The name, description and stakeholder of the subject element as defined in the DRAFT Regional ITS Architecture.
- “Sausage Diagrams” showing the context of the subject element and the relationship between other elements in the DRAFT Regional ITS Architecture – the subject element was shown alone within the “Sausage Diagram” framework to provide a sense of context as to where that particular element fits within the National ITS Architecture framework. In addition, a second drawing was provided to show the relationship (i.e., interconnects) between the subject element and other elements in the PennDOT D8 Regional ITS Architecture.
- Interconnect Diagram – An Interconnect Diagram showing existing and planned interconnects between the subject element and other elements in the regional architecture was provided.
- Information Flow Diagrams – Existing and planned information flows by direction were shown on drawings for the subject element and each of the elements it interconnects with.
- Appendices – Definitions for the elements and architecture flows were provided.

The following is a list of discussed items:

I. Introductions:

Mr. Bankert opened the meeting with an overview of the agenda for the meeting. Then, the meeting participants introduced themselves.

II. Background:

Mr. Bankert presented the project background. He briefly explained the project purpose and the importance of the project to the PennDOT D8 region.

III. Validation:

The following comments were received as part of the validation process:

I. PTC Offices

a. Definition

- Include customer service center in the definition

b. Interconnects

- No changes

c. Information Flows

- Since PTC Offices element was already validated as part of the Southwest Regional ITS architecture validation process, only major changes from the previous validation meeting were validated. There were no comments on the changed information flows.

II. PTC Field Devices

a. Definition

- No changes

b. Interconnects

- No changes

c. Information Flows

i. With PTC Offices

1. Additions

- Include automated de-icing – both ways, planned
- Include remote monitoring of field devices (bridge stress sensor, in particular)

2. Deletions

- None

3. Changes

- None

III. PTC Service Plazas

a. Definition

- No changes

b. Interconnects

- No changes

c. Information Flows

i. With PTC Offices

1. Additions

- None

2. Deletions

- None

3. Changes

- None

IV. PTC Toll Plazas

a. Definition

- No changes

b. Interconnects

- No changes

c. Information Flows

i. With PTC Offices

1. Additions

- Lane monitor/control

2. Deletions

- None

3. Changes

- None

ii. With Passenger Vehicles

1. Additions

- None

2. Deletions

- None

3. Changes

- None

iii. With Commercial Vehicles

1. Additions

- None

2. Deletions

- Safety Inspection record
- Screening event record

3. Changes

- None

V. PSP Troop T Dispatch Centers

a. Definition

- Change the name to PSP Troop T Highspire
- Change the definition to “Existing PTC TOC dispatch center and Troop T barracks (backup) dispatch PSP units on the Pennsylvania Turnpike. PSP Troop T Highspire represent public safety systems that support incident management, disaster response and evacuation, security monitoring, and other security and public safety-oriented ITS applications for the Pennsylvania Turnpike.”
- PSP Troop T staff in the PTC TOC is just for supervision.

b. Interconnects

- Remove the following Interconnects
 - County 911 Communications Centers
 - County EMA Centers
 - PEMA Emergency Operation Center

- All the above connections are through PTC Offices elements.

c. Information Flows

i. With PTC Offices

1. Additions

- None

2. Deletions

- None

3. Changes

- All flows are existing

ii. With PEMA Emergency Operations Center

- No interconnection. All information flows are through PTC Offices
- Data in the PIERS systems are entered by duty officers

iii. With County 911 Communications Center

- No interconnection. All information flows are through PTC Offices

iv. With County EMA Centers

- No interconnection. All information flows are through PTC Offices

v. With PSP Dispatch Centers

1. Additions

- None

2. Deletions

- None

3. Changes

- PSP Troop T may receive phone calls from other Dispatch Centers

vi. With PSP Troop T Vehicles

1. Additions

- None

2. Deletions

- None

3. Changes

- PSP Troop T Highspire has Mobile Data Terminal (MDT) dispatch capabilities and hence can communicate with field Troop T vehicles directly

VI. PSP Troop T Vehicles

a. Definition

- Change the element name to PSP Troop T Vehicles/Stations
- Change the definition to “All existing/Future systems within Pennsylvania State Police Troop T Vehicles/Stations. In-Vehicle systems include voice communications and Mobile Data Terminals (MDTs) used by the vehicles to communicate and receive dispatch information from PSP and other agency systems.”

b. Interconnects

- Interconnects with PSP Dispatch centers and PTC Offices are existing

c. Information Flows

i. With PTC Offices

1. Additions

- None

2. Deletions

- None

3. Changes

- All flows are existing

ii. With PSP Dispatch Centers

1. Additions

- None

2. Deletions

- None

3. Changes

- All flows are existing
- Radio communications among the PSP troopers exist for incident response coordination in case of major incidents affecting the jurisdictions of PSP Troop T and other PSP Troops
- Currently, PSP Dispatch Centers can not communicate with PSP Troop T Vehicles

iii. With PSP Troop T Dispatch Centers

- For comments, see section III.5.c.vi for PSP Troop T Dispatch Centers

VII. PTC Maintenance and Construction Vehicles

a. Definition

- No changes

b. Interconnects

- No changes

c. Information Flows

i. With PTC Offices

1. Additions

- None

2. Deletions

- Environmental probe data

- Maint and constr dispatch status
- Maint and constr vehicle conditions
- Maint and constr vehicle location data
- Maint and constr vehicle operational data
- Environmental sensors control
- Maint and constr vehicle system control

3. Changes

- None
- Work zone warning status information flow happens through radio but not automatic

VIII. Passenger Vehicles

a. Definition

- No changes

b. Interconnects

- No changes

c. Information Flows

i. With PTC Toll Plazas

1. Additions

- None

2. Deletions

- No changes

3. Changes

- None

VI. Potential Projects

- Install new Dakatron VMS with increased functionalities
- Deploy more ITS field devices for better incident detection and response
- Improve Incident Management program. Notification of incidents further down the incident location for effective traffic diversion

VII. Wrap-Up/Next Steps

Mr. Bankert identified the following as next steps:

- Conduct and complete other validation meetings
- Identify conflicting comments
- Convene a Regional Advisory Panel (RAP) members to resolve the conflicting comments
- Incorporate the comments into draft Strawman Architecture
- Finalize the architecture
- Conduct the second Bookend meeting

Date: August 3rd, 2004

Location: PB Farradyne Office, Mechanicsburg, PA

Attendees:

Allen Baldwin, PTC
Larry Bankert, PB Farradyne
Graham Hess, PennDOT
Sgt. Stephen Kiessling, PSP
Rena Lehe, PennDOT
Glenn Rowe, PennDOT
Sgt. Richard Stegerwalt, PSP
Vijay Varadarajan, PB Farradyne

Minutes Prepared By: Vijay Varadarajan, PB Farradyne

A meeting was held on August 3rd, 2004 between 1:00 AM and Noon at the PB Farradyne's office. The meeting was conducted to validate the Incident and Emergency Management (statewide) elements of the PennDOT D8 Regional ITS Architecture. The following was the meeting agenda:

- I. Introductions
- II. Background
- III. Validation
 - i. Elements Description
 - ii. Interconnects
 - iii. Information Flows
- IV. Potential Projects
- V. Wrap-up/Next Steps

The validation component of the agenda including the validation of the following elements in the PennDOT D8 Regional ITS Architecture:

- PSP Dispatch Centers
- PSP Vehicles
- Incident Response Agency Offices
- PEMA Emergency Operation Center
- MEMA Emergency Operation Center
- High Threat Facilities

- Pennsylvania Office of Homeland Security

A “package” was developed for each of the above elements in order to portray how an element (i.e., the “subject” element) fits into the regional architecture. The packages were then combined into a MS PowerPoint presentation and reviewed with the stakeholders in attendance. Copies of each element package are attached with these minutes. Specifically, the element packages consisted of:

- Element Cover Sheets – The name, description and stakeholder of the subject element as defined in the DRAFT Regional ITS Architecture.
- “Sausage Diagrams” showing the context of the subject element and the relationship between other elements in the DRAFT Regional ITS Architecture – the subject element was shown alone within the “Sausage Diagram” framework to provide a sense of context as to where that particular element fits within the National ITS Architecture framework. In addition, a second drawing was provided to show the relationship (i.e., interconnects) between the subject element and other elements in the PennDOT D8 Regional ITS Architecture.
- Interconnect Diagram – An Interconnect Diagram showing existing and planned interconnects between the subject element and other elements in the regional architecture were provided.
- Information Flow Diagrams – Existing and planned information flows by direction were shown on drawings for the subject element and each of the elements it interconnects with.
- Appendices – Definitions for the elements and architecture flows were provided.

The following is a list of discussed items:

I. Introductions:

Mr. Bankert opened the meeting with an overview of the agenda for the meeting. Then, the meeting participants introduced themselves.

II. Background:

Mr. Bankert presented the project background. He briefly explained the project purpose and the importance of the project to the PennDOT D8 region.

III. Validation:

The following comments were received as part of the validation process:

I. PSP Dispatch Centers

a. Definition

- Consider changing the name to include PSP Headquarters
- Add the functionality of gathering and dissemination information in the definition
- IIMS system is an all inclusive system which performs dispatching and reporting functions

b. Interconnects

- Remove the following interconnects
 - Regional transit agency offices
 - Municipal public safety vehicles
 - Medical command center
 - Regional media outlets
 - Information services providers
- Include the following interconnects
 - PEMA Emergency Management Agencies
 - Adjacent District Police (New element?)
 - Incident response coordination
 - PennDOT Central Office
 - Amber alert
- Private wrecker units – existing interconnect

c. Information Flows

i. With PennDOT D8 RTMC

1. Additions

- None

2. Deletions

- None

3. Changes

- None

ii. With PennDOT County Maintenance Offices

1. Additions

- Road weather information

2. Deletions

- Maintenance and construction resource request and response
- Incident response status

3. Changes

- Include work zone plan coordination between PSP Dispatch Centers and PennDOT D8 Construction elements
- In the future, the work plan coordination may happen through PennDOT RTMC
- In the future, there may be no link between PSP Dispatch Centers and PennDOT D8 County Maintenance Offices

iii. With PTC Offices

- No Connection

iv. With County 911 Communications Centers

1. Additions

- None

2. Deletions

- None

3. Changes

- All flows – both ways
- County 911 Communications Centers when connected directly to CDC, calls are transferred efficiently

v. With County EMA Centers

1. Additions

- Incident information request

2. Deletions

- None

3. Changes

- All flows – both ways
- County 911 Communications Centers when connected directly to CDC, calls are transferred efficiently

vi. With Medical Command Center

- No Connection
- Dispatch of ambulances are through County 911 Communication centers

vii. With Regional Transit Agency Offices

- No Connection
- The information flow may happen through PennDOT D8 RTMC in the future

viii. se Agency Offices

1. Additions

- None

2. Deletions

- None

3. Changes

- All flows – both ways
- PSP Dispatch centers have supervisor guidelines for determining the which agency to call for a particular incident type

ix. With Municipal Public Safety Vehicles

- No Connection

x. With PennDOT STMC

1. Additions

- None

2. Deletions

- None

3. Changes

- None

xi. With PSP Vehicles

1. Additions

- None

2. Deletions

- Suggested route

3. Changes

- None
- IIMS CADS plays a major role in the communication between PSP Vehicles and PSP Dispatch Centers

xii. With Regional Media Outlets

- No Connection
- All the media information are referred back to the stations
- Dispatch Centers performs only the dispatch functions and not administrative functions

xiii. With Event Promoters

1. Additions

- None

2. Deletions

- None

3. Changes

- None
- PSP conducts meetings with event promoters prior to the meeting
- For non-security related events, PSP coordinates with PennDOT for event plans
- For security related events, PSP coordinates directly with event promoters
- In case of events affecting PTC, PTC sets up command post

xiv. With Information Service Providers

- No Connection

xv. With Private Wrecker Units

1. Additions

- Emergency dispatch request

2. Deletions

- None

3. Changes

- All flows are existing
- In the future, PennDOT wants to directly contact wrecker units based on the verification of incidents through roadway cameras
- PTC provides radio to wrecker units
- PTC call the wrecker units nearest to the incidents

- PTC contracts the wrecker units and has established fee schedule and the services provided by the wrecker units
- PSP has a rotational list of wrecker units which results in delayed incidence response

xvi. With PSP Troop T Dispatch Centers

4. Additions

- Incident information – both ways

5. Deletions

- Archive coordination
- Archive requests
- Archive status
- Emergency response coordination

6. Changes

- None

xvii. With PSP Troop T Vehicles

- No Connection

II. PSP Vehicles

a. Definition

- Include incident commander in the definition

b. Interconnects

- Remove the interconnect with County 911 Communication Centers
- All the flows to County 911 Communication Center occurs through PSP Dispatch Centers
- All communication with PennDOT on the incident site happens face to face
- PSP calls PennDOT incident response personnel over phone

- PennDOT (Central Office) supplies tool boxes for incident command post

c. Information Flows

i. With PSP Dispatch Centers

- Please see Section III.1.C.xii for comments

III. Incident Response Agency Offices

- Since there was no representation for this elements, this element in not formally separately validated

IV. PEMA Emergency Operation Center

- Since there was no representation for this elements, this element in not formally separately validated

V. MEMA Emergency Operation Center

- Since there was no representation for this elements, this element in not formally separately validated

VI. High Threat Facilities

a. Definition

- No Changes

b. Interconnects

- Remove the interconnect with County 911 Communication Centers and County EMA Centers
- All the information flows are through PEMA
- The information flows from high threat facility to Federal Emergency Management Agency (FEMA) to Pennsylvania Emergency Management Agency (PEMA) to County 911 Communications Center
- PEMA monitors and makes notifications in case of major threat to the high threat facilities

c. Information Flows

- All the information flows shown for high threat facilities should be between high threat facilities and PEMA Emergency Operation Center

VII. Pennsylvania Office of Homeland Security

a. Definition

- No changes

b. Interconnects

- No changes

c. Information Flows

- No changes
- The information about this element is not clearly defined yet. This element may exist virtually.

VIII. Potential Projects

- Explore the possibilities of providing radios to wrecker units
- Explore contracting wrecker units services
- Improve interoperable communications system (Nextel, 800 Mhz system)
- Develop code for abandoned vehicles regulations
- Develop extensive evacuation plans for the region
- Deploy more Variable Speed Limit (VSL) signs, Highway Advisory Radio (HAR) and detours signs

IX. Wrap-Up/Next Steps

Mr. Bankert identified the following as next steps:

- Conduct and complete other validation meetings
- Identify conflicting comments
- Convene a Regional Advisory Panel (RAP) members to resolve the conflicting comments
- Incorporate the comments into draft Strawman Architecture
- Finalize the architecture
- Conduct the second Bookend meeting

Date: August 30th, 2004

Location: PB Farradyne Office, Mechanicsburg, PA

Attendees:

Larry Bankert, PB Farradyne
Kent Haberle, Capital Area Transit
Chip Millard, TCRPC/HATS
DeVang Patel, PennDOT D8
Vijay Varadarajan, PB Farradyne

This minute reflects the inputs from Jeff Bray, Capital Area Transit through telephone conversation on August 23rd, 2004.

Minutes Prepared By: Vijay Varadarajan, PB Farradyne

A meeting was held on August 10th, 2004 between 10:00 AM and 12:00 PM at the PB Farradyne, Mechanicsburg, PA office. The meeting was conducted to validate the **Public Transportation** elements of the PennDOT D8 Regional ITS Architecture. The following was the meeting agenda:

- I. Introductions
- II. Background
- III. Validation
 - i. Elements Description
 - ii. Interconnects
 - iii. Information Flows
- IV. Potential Projects
- V. Wrap-up/Next Steps

The validation component of the agenda including the validation of the following elements in the PennDOT D8 Regional ITS Architecture:

- Regional Transit Agency Offices
- Regional Transit Vehicles
- Regional Transit Remote Traveler Support
- Regional Personal Travel Card

A “package” was developed for each of the above elements in order to portray how an element (i.e., the “subject” element) fits into the regional architecture. The packages were then combined into a MS PowerPoint presentation and reviewed with the

stakeholders in attendance. Copies of each element package are attached with these minutes. Specifically, the element packages consisted of:

- Element Cover Sheets – The name, description and stakeholder of the subject element as defined in the DRAFT Regional ITS Architecture.
- “Sausage Diagrams” showing the context of the subject element and the relationship between other elements in the DRAFT Regional ITS Architecture – the subject element was shown alone within the “Sausage Diagram” framework to provide a sense of context as to where that particular element fits within the National ITS Architecture framework. In addition, a second drawing was provided to show the relationship (i.e., interconnects) between the subject element and other elements in the PennDOT D8 Regional ITS Architecture.
- Interconnect Diagram – An Interconnect Diagram showing existing and planned interconnects between the subject element and other elements in the regional architecture was provided.
- Information Flow Diagrams – Existing and planned information flows by direction were shown on drawings for the subject element and each of the elements it interconnects with.
- Appendices – Definitions for the elements and architecture flows were provided.

The following is a list of comments that we’re provided at the meeting. For the elements, comments are organized around additions and deletions by element, as well as general discussion items.

i. Introductions:

Mr. Bankert opened the meeting with an overview of the agenda for the meeting. Then, the meeting participants introduced themselves.

ii. Background:

Mr. Bankert presented the project background. He briefly explained the project purpose and the importance of the project to the PennDOT D8 region.

iii. Validation:

The following comments were received as part of the validation process:

I. Regional Transit Agency Offices

a. Definition

- No changes

b. Interconnects

I Additions

- a. Information Service Providers
- b. Transit vehicle delays relating to weather conditions

II Deletions

- a. PSP Dispatch Centers
- b. PennDOT STMC

c. Information Flows

i. With PennDOT D8 RTMC

1. Additions

- Road network probe information (planned)

2. Deletions

- Transit emergency data
- Transit emergency Coordination data
- Transit incident information
- Transit information request

3. Changes

- Incident information – both ways
- Greg Penny, PennDOT D8 occasionally contacts transit agencies
- The connection is very informal and is on an ad-hoc basis
- Transit agencies need to coordinate with PennDOT and County planning organizations for funding substantiation

ii. PEMA Emergency Operation Center

1. Additions

- None

2. Deletions

- None

3. Changes

- All information (except transit emergency coordination data) - planned
- Transit agencies would like to conduct drill for training personnel and people in case of events on major threat facilities
- PEMA coordinates transit operations in case of emergencies

iii. County 911 Communication Centers

1. Additions

- None

2. Deletions

- None

3. Changes

- None
- Transit agencies call 911 communication centers during emergencies and incidents
- Transit agencies report robbery and other similar situations in and near by transit vehicles
- Sometimes, City of Harrisburg faxes planned road closure information to Capital Area Transit agency

iv. Count EMA Centers

1. Additions

- None

2. Deletions

- None

3. Changes

- All flows - existing

v. PSP Dispatch Centers

- No Connection

vi. Regional Transit Vehicles

1. Additions

- None

2. Deletions

- None

3. Changes

- None
- Most of the buses will have GPS/AVL capability in the future
- Buses will have cameras in the future for security and incidence information collection purposes. The images will not be available real-time but the images can be downloaded
- Buses may be used as vehicle probes in the future
- Ridership and revenue information can be received from General Farebox Information (GFI)
- Buses will have capabilities for location announcement
- Buses' location can transmitted to the dispatch center (planned)

vii. PennDOT STMC

- No Connection

viii. County Planning Organizations

1. Additions

- None

2. Deletions

- None

3. Changes

- All the information flows are planned
- For easy analysis purposes, the ridership data and revenue data may be transferred electronically to the County Planning Organization
- In the future, bus stops may be geocoded
- County planning organization is not interested in real-time information

ix. Personal Traveler Information Devices

1. Additions

- Transit information user request
- Trip plan (future)

2. Deletions

- None

3. Changes

- Broadcast information – existing
- Traveler information - existing
- Currently, static schedules are available through website. Planning an interactive schedule through webpage in the future.
- Transit agencies would like to encourage ride matching program

x. Regional Media Outlet

1. Additions

- None

2. Deletions

- None

3. Changes

- None
- The connection is informal and is on an ad-hoc basis

xi. Event Promoters

1. Additions

- None

2. Deletions

- None

3. Changes

- None
- Transit agencies provide shuttle routes to event attractors and event generators
- Transit agencies don't adjust schedules during events due to logistics issues

xii. Regional Transit Remote Traveler Support

1. Additions

- Secured area surveillance data
- Secured area monitoring support

2. Deletions

- Broadcast information
- Transit traveler information
- Traveler information
- Transit information user request
- Traveler request

3. Changes

- None
- Currently, there are no real time camera images in the transit dispatch centers
- Transit agencies have cameras in the buses

II. Regional Transit Vehicles

a. Definition

- No changes

b. Interconnects

- No changes

c. Information Flows

i. With Regional Transit Agency Offices

Please see section III.I.C.Vi for changes to the information on this interconnect

ii. With Regional Personal Traveler Card

1. Additions

- None

2. Deletions

- None

3. Changes

- None
- In the future regional transit agencies would like to deploy Electronic Payment Systems (EPS)
- Currently, the transit agencies have pay box system

III. Regional Transit Remote Traveler Support

a. Definition

- No changes

b. Interconnects

- No changes

c. Information Flows

- With Regional Transit Agency Offices

Please see section III.I.C.xii for changes to the information on this interconnect

IV. Regional Personal Traveler Card

a. Definition

- No changes

b. Interconnects

- No changes

c. Information Flows

i. With Regional Transit Agency Offices

Please see section III.I.C.ii for changes to the information, if any, on this interconnect

V. Potential Projects

- Electronic Fare Card: A single fare card for paying different modes of transportation (Corridor One program may include the single fare card deployment)
- Automatic Vehicle Location (AVL) System: Deploy AVL system in the buses
- Interactive Schedule Website: Develop an interactive real-time website to provide customized schedule to the passengers. Interoperability with other Agencies: Improve inter-agency coordination
- Emergency Preparedness: Develop a contact list for various agencies involved with emergency response and also conduct emergency response drills

- Transit Security Funding: Coordinate with PennDOT and County planning Organizations for securing transit security funding
- Provide 'physical' links to other regional agencies and with other modes of transportation
- Coordinate all the transit efforts with ' Corridor One' project
- Capital Beltway Task Force: Include Jeff Bray, CAT in the capital Beltway Task Force

VI. Wrap-Up/Next Steps

Mr. Bankert identified the following as next steps:

- Conduct and complete other validation meetings
- Identify conflicting comments
- Convene a Regional Advisory Panel (RAP) members to resolve the conflicting comments
- Incorporate the comments into draft Strawman Architecture
- Finalize the architecture
- Conduct the second Bookend meeting

Date: August 30th, 2004

Location: PB Farradyne Office, Mechanicsburg, PA

Attendees:

Larry Bankert, PB Farradyne
Ed Botchie, Cressler Trucking
Chip Millard, TCRPC/HATS
Don Siekerman, PMTA
Craig Talbott, MMTA
Vijay Varadarajan, PB Farradyne

Minutes Prepared By: Vijay Varadarajan, PB Farradyne

A meeting was held on August 10th, 2004 between 1:30 PM and 3:00 PM at the PB Farradyne, Mechanicsburg, PA office. The meeting was conducted to validate the **Commercial Vehicle Operations** elements of the PennDOT D8 Regional ITS Architecture. The following was the meeting agenda:

- I. Introductions
- II. Background
- III. Validation
 - i. Elements Description
 - ii. Interconnects
 - iii. Information Flows
- IV. Potential Projects
- V. Wrap-up/Next Steps

The validation component of the agenda including the validation of the following elements in the PennDOT D8 Regional ITS Architecture:

- Commercial Vehicle Company Offices
- Commercial Vehicles

A “package” was developed for each of the above elements in order to portray how an element (i.e., the “subject” element) fits into the regional architecture. The packages were then combined into a MS PowerPoint presentation and reviewed with the stakeholders in attendance. Copies of each element package are attached with these minutes. Specifically, the element packages consisted of:

- Element Cover Sheets – The name, description and stakeholder of the subject element as defined in the DRAFT Regional ITS Architecture.

- “Sausage Diagrams” showing the context of the subject element and the relationship between other elements in the DRAFT Regional ITS Architecture – the subject element was shown alone within the “Sausage Diagram” framework to provide a sense of context as to where that particular element fits within the National ITS Architecture framework. In addition, a second drawing was provided to show the relationship (i.e., interconnects) between the subject element and other elements in the PennDOT D8 Regional ITS Architecture.
- Interconnect Diagram – An Interconnect Diagram showing existing and planned interconnects between the subject element and other elements in the regional architecture was provided.
- Information Flow Diagrams – Existing and planned information flows by direction were shown on drawings for the subject element and each of the elements it interconnects with.
- Appendices – Definitions for the elements and architecture flows were provided.

The following is a list of comments that we’re provided at the meeting. For the elements, comments are organized around additions and deletions by element, as well as general discussion items.

I. Introductions:

Mr. Bankert opened the meeting with an overview of the agenda for the meeting. Then, the meeting participants introduced themselves.

II. Background:

Mr. Bankert presented the project background. He briefly explained the project purpose and the importance of the project to the PennDOT D8 region.

III. Validation:

The following comments were received as part of the validation process:

I. Information Service Providers

a. Definition

- Expand the definition to include PEMA, PMTA

b. Interconnects

- None

c. Information Flows

ii. With PTC Offices

1. Additions

- None

2. Deletions

- None

3. Changes

- None
- Heavy vehicles' permit are processed electronically
- Hazmat tracking is expensive
- Most of the large trucking agencies track the movement of the vehicles with GPS units. However, not many trucking agencies are large enough to invest in GPS
- PMTA operates 8 hrs/day – five days a week

iii. PEMA Emergency Operation Center

1. Additions

- Emergency Information to PMTA

2. Deletions

- None

3. Changes

- None
- Commercial vehicle company offices fills out survey regarding hazmat information
- Information through PIERS is slow. Usually commercial vehicle agencies get information from other sources first

iv. Commercial Vehicles

1. Additions

- None

2. Deletions

- None

3. Changes

- All the information are exchanged through QualComm GPS/satellite system
- Routing, directions and loading information are exchanged between the commercial vehicles and commercial vehicle company offices

v. PennDOT STMC

1. Additions

- None

2. Deletions

- None

3. Changes

- None

vi. PennDOT Central Office

1. Additions

- None

2. Deletions

- None

3. Changes

- None

II. Commercial Vehicles

a. Definition

- No changes

b. Interconnects

- No changes

c. Information Flows

i. With Commercial Vehicle Company Offices

Please see section III.C.iii for changes to the information, if any, on this interconnect

ii. PTC Toll Plazas

1. Additions

- None

2. Deletions

- None

3. Changes

- None

iii. PennDOT Central Office Field Devices

1. Additions

- None

2. Deletions

- None

3. Changes

- None

III. Potential Projects

- Improve the operational efficiency of Commercial Vehicles Operations in the following areas:
 - Size restrictions
 - Real-time traffic
 - Emergency and weather related information

- Deploy system similar to Maryland CHART system
- Improve the reliability of Roadway Weather Information System (RWIS) information
- Deploy more Highway Advisory Radio (HAR) with increased coverage area
- Decrease the extensive paperwork necessary for routing approval via PennDOT
- Develop a single website portal for all the commercial vehicle information
 - Live feed camera images
 - Alerts for incident information on a particular truck route
 - Register trips and customize incident and weather related information based on truck routes
- Develop a single transponder technology for collecting toll which can be used across the states

IV. Wrap-Up/Next Steps

Mr. Bankert identified the following as next steps:

- Conduct and complete other validation meetings
- Identify conflicting comments
- Convene a Regional Advisory Panel (RAP) members to resolve the conflicting comments
- Incorporate the comments into draft Strawman Architecture
- Finalize the architecture
- Conduct the second Bookend meeting

Date: August 30th, 2004

Location: PB Farradyne Office, Mechanicsburg, PA

Attendees:

Larry Bankert, PB Farradyne

Chip Millard, TCRPC/HATS

Lee Seitz, Farm Show

Tim Shellenberger, Hershey Entertainment and Resorts

Vijay Varadarajan, PB Farradyne

This minute reflects the inputs from Allison Morris, Media Networks, Information Service Providers

Minutes Prepared By: Vijay Varadarajan, PB Farradyne

A meeting was held on August 11th, 2004 between 1:30 PM and 3:30 PM at the PB Farradyne, Mechanicsburg, PA office. The meeting was conducted to validate the **ISP/Others** elements of the PennDOT D8 Regional ITS Architecture. The following was the meeting agenda:

- I. Introductions
- II. Background
- III. Validation
 - i. Elements Description
 - ii. Interconnects
 - iii. Information Flows
- IV. Potential Projects
- V. Wrap-up/Next Steps

The validation component of the agenda including the validation of the following elements in the PennDOT D8 Regional ITS Architecture:

- Information Service Providers
- Regional Media Outlets
- Personal Traveler Information Devices
- Event Promoters

A “package” was developed for each of the above elements in order to portray how an element (i.e., the “subject” element) fits into the regional architecture. The packages were then combined into a MS PowerPoint presentation and reviewed with the

stakeholders in attendance. Copies of each element package are attached with these minutes. Specifically, the element packages consisted of:

- Element Cover Sheets – The name, description and stakeholder of the subject element as defined in the DRAFT Regional ITS Architecture.
- “Sausage Diagrams” showing the context of the subject element and the relationship between other elements in the DRAFT Regional ITS Architecture – the subject element was shown alone within the “Sausage Diagram” framework to provide a sense of context as to where that particular element fits within the National ITS Architecture framework. In addition, a second drawing was provided to show the relationship (i.e., interconnects) between the subject element and other elements in the PennDOT D8 Regional ITS Architecture.
- Interconnect Diagram – An Interconnect Diagram showing existing and planned interconnects between the subject element and other elements in the regional architecture was provided.
- Information Flow Diagrams – Existing and planned information flows by direction were shown on drawings for the subject element and each of the elements it interconnects with.
- Appendices – Definitions for the elements and architecture flows were provided.

The following is a list of comments that we’re provided at the meeting. For the elements, comments are organized around additions and deletions by element, as well as general discussion items.

I. Introductions:

Mr. Bankert opened the meeting with an overview of the agenda for the meeting. Then, the meeting participants introduced themselves.

II. Background:

Mr. Bankert presented the project background. He briefly explained the project purpose and the importance of the project to the PennDOT D8 region.

III. Validation:

The following comments were received as part of the validation process:

I. Information Service Providers

a. Definition

- No changes

b. Interconnects

- No changes

c. Information Flows

i. With PennDOT D8 RTMC

1. Additions

- None

2. Deletions

- Emergency traffic control coordination

3. Changes

- None
- ISP would like to know more detailed information about the incident including the closed highways, estimated duration of the close time, nature of the incident (what is involved), and suggested alternative routes.

ii. PennDOT D8 County Maintenance Offices

1. Additions

- Include request for the roadway maintenance status, work zone information, and maint and constr work plans from ISP (the flows do not exist)
- Include road weather information

2. Deletions

- Current asset restriction

3. Changes

- ISP would like to receive planned road closure information

iii. PTC Offices

1. Additions

- None

2. Deletions

- None

3. Changes

- None
- ISP receives the information through PTC website and through PTC's Emergency Notification System (ENS)

iv. PEMA Emergency Operation Center

1. Additions

- Incident information flow from PEMA to ISP (done)

2. Deletions

- None

3. Changes

- None
- ISP information exchange is on an ad-hoc basis
- ISP receives the information through PEMA's press releases
- Currently, ISP does not have access to PEMA's PIERS system

v. County 911 Communication Centers

1. Additions

- None

2. Deletions

- None

3. Changes

- None
- Currently, ISP calls 911 Communication centers for receiving the incident information. ISP would like to receive fax on a regular basis as the incident occurs

- ISP also likes the web based incident information system in Lancaster County. Since the web based system is updated and accurate, ISP does not call Lancaster County. ISP would like other counties to have a similar web based incident information system

vi. County EMA Centers

1. Additions

- None

2. Deletions

- None

3. Changes

- None

vii. PSP Dispatch Centers

1. Additions

- None

2. Deletions

- None

3. Changes

- None
- Currently ISP listens to PSP's radio channel. Sometimes ISP calls PSP to ensure that they are not missing any incidents.
- ISP would like to receive suggested route alternatives

viii. TRANSCOM

1. Additions

- None

2. Deletions

- None

3. Changes

- None
- Currently, they don't have any connections with TRANSCOM, but they would like to have connections in the future.

ix. PennDOT STMC

1. Additions

- None

2. Deletions

- Emergency traffic control response

3. Changes

- None

x. Personal Traveler Information Devices

1. Additions

- None

2. Deletions

- None

3. Changes

- None
- Currently, ISP updates the E-Tax system and SmartRoute systems with the available incident and traffic information
- ISPs information are available to the Metro Networks associates which include regional media outlet

xi. Regional Media Outlets

1. Additions

- External reports – both ways

2. Deletions

- None

3. Changes

- None
- ISP updates the media information automatically into the E-tax and Smart Route systems

xii. Event Promoters

1. Additions

- None

2. Deletions

- None

3. Changes

- None
- Receive traffic pattern changes information through event promoters' press releases and sometimes through phone calls

xiii. PennDOT Central Office

1. Additions

- None

2. Deletions

- None

3. Changes

- Incident information - existing

II. Regional Media Outlets

Since there was no representative from the Regional Media Outlets, this element was not validated separately. However, all the elements that are associated with the Regional Media Outlets are validated through other validation meetings.

III. Personal Traveler information Devices

Since there was no specific representation group for the Personal Traveler Information Devices, this element was not validated separately. However, all the elements that are associated with the Regional Media Outlets are validated through other validation meetings.

IV. Event Promoters

a. Definition

- Consider changing the element name to Attractions and Event Promoters
- Include traffic management functions for event promoters

b. Interconnects

- Include the following interconnects
 - I** PennDOT D8 Field Devices
 - Farm show has ability to control PennDOT D8 VMS devices (include roadway information system data)
 - Hershey park has portable VMS devices and sometimes rent more devices during events
 - III** Municipal Public Safety Vehicles
 - Hershey Park has good relationship with Derry township police. Hershey park officials review traffic plans, support traffic coordination, involves with the operation of the traffic signal systems and provides assistance (with EMS) in case of an incident (include traffic control coordination flow – both ways)
 - IV** PEMA Emergency Operations Center
 - Receiving PEIRS report (planned)
 - V** Other Incident Responsible Agencies
 - VI** County Planning Organizations

- Planning coordination
- Parking information
- Major improvement projects
- Traffic impact studies

c. Information Flows

i. With PennDOT D8 RTMC

1. Additions

- Lane Closure Coordination (Planned)
- Video Information (Planned)
- Traffic Signal Coordination (from RTMC)
- Incident information
- Maintenance and construction work plan information

2. Deletions

- **None**

3. Changes

- None
- Event promoters would like to receive maintenance and construction information during construction
- Event promoters would like to have the ability to control VMS signs
- Farm Show Complex has ability to control VMS devices
- Event promoters would like to coordinate traffic impact study efforts with County Planning Organizations
- Event promoters would like to share traffic and incident information with other interested agencies
- Event promoters would like to have real-time traffic information during events

- Event promoters would like to have alternate routes for event destination displayed in the VMS
- Event promoters stressed the impact of event generators on the general economic development

ii. With PTC Offices

1. Additions

- None

2. Deletions

- None

3. Changes

- None
- Event promoters would like to have more PTC toll booths open during events to reduce traffic congestion

iii. With PSP Dispatch Centers

1. Additions

- Traffic and incident information (planned from PSP)

2. Deletions

- None

3. Changes

- None
- Event promoters would like to have better coordination

iv. With Regional Transit Agency Offices

1. Additions

- Traffic information

2. Deletions

- None

3. Changes

- None
- Event promoters contract shuttle services for transit
- Event promoters has vehicles counts data for 12 years

v. With PennDOT STMC

1. Additions

- None

2. Deletions

- None

3. Changes

- None

vi. With Municipal Offices

1. Additions

- Traffic signal timing coordination

2. Deletions

- None

3. Changes

- None
- Event promoters would like to have better coordinated traffic signal timing during events

vii. With Information Service providers

1. Additions

- None

2. Deletions

- None

3. Changes

- Change the flows to planned

V. Potential Projects

- Improve information sharing with municipalities and adjacent municipalities
- Better coordination of traffic signal timing during events. Establish events' traffic signal plans. The traffic signal coordination may extend to adjacent municipalities
- Improve information sharing with PTC
- Increase the number of PTC toll booths during events
- Improve coordination with PennDOT to receive real-time or close to real-time information
- Share video/camera image with PennDOT D8
- Provide ability to control traffic signal systems during events
- Event generators have lot of historic traffic data for planning purposes and are willing to share with other planning agencies
- Consider the effect of event generators during NEPA process
- Evaluate post event traffic conditions

VI. Wrap-Up/Next Steps

Mr. Bankert identified the following as next steps:

- Conduct and complete other validation meetings
- Identify conflicting comments
- Convene a Regional Advisory Panel (RAP) members to resolve the conflicting comments
- Incorporate the comments into draft Strawman Architecture
- Finalize the architecture
- Conduct the second Bookend meeting

Date: August 24th, 2004

Location: PB Farradyne Office, Mechanicsburg, PA

Attendees:

Eric Bachman, Lancaster County EMA
Larry Bankert, PB Farradyne
Charlie Beard, PA Towing Agency
Robert Conrad, PennDOT D8
Don Eshleman, Franklin County 911
Rick Harrison, Lancaster County 911
Paul Johnson, PA Towing Agency
Terry Johnson, PA Towing Agency
Bob Krol, PA State Police
Edward P. Nolter, EHSF RCTTF
Vijay Varadarajan, PB Farradyne
Theodore Wise, Cumberland County 911

Minutes Prepared By: Vijay Varadarajan, PB Farradyne

A meeting was held on August 24th, 2004 between 10:00 AM and Noon at the PB Farradyne, Mechanicsburg office. The meeting was conducted to validate the **Incident and Emergency Management (regional)** elements of the PennDOT D8 Regional ITS Architecture. The following was the meeting agenda:

- I. Introductions
- II. Background
- III. Validation
 - i. Elements Description
 - ii. Interconnects
 - iii. Information Flows
- IV. Potential Projects
- V. Wrap-up/Next Steps

The validation component of the agenda including the validation of the following elements in the PennDOT D8 Regional ITS Architecture:

- Count 911 Communication Centers
- County EMA Communication Centers
- Medical Command Center
- Incident Response Agency Offices

- Municipal Public Safety Vehicles
- Private Wrecker Units

A “package” was developed for each of the above elements in order to portray how an element (i.e., the “subject” element) fits into the regional architecture. The packages were then combined into a MS PowerPoint presentation and reviewed with the stakeholders in attendance. Copies of each element package are attached with these minutes. Specifically, the element packages consisted of:

- Element Cover Sheets – The name, description and stakeholder of the subject element as defined in the DRAFT Regional ITS Architecture.
- “Sausage Diagrams” showing the context of the subject element and the relationship between other elements in the DRAFT Regional ITS Architecture – the subject element was shown alone within the “Sausage Diagram” framework to provide a sense of context as to where that particular element fits within the National ITS Architecture framework. In addition, a second drawing was provided to show the relationship (i.e., interconnects) between the subject element and other elements in the PennDOT D8 Regional ITS Architecture.
- Interconnect Diagram – An Interconnect Diagram showing existing and planned interconnects between the subject element and other elements in the regional architecture were provided.
- Information Flow Diagrams – Existing and planned information flows by direction were shown on drawings for the subject element and each of the elements it interconnects with.
- Appendices – Definitions for the elements and architecture flows were provided.

The following is a list of comments that we’re provided at the meeting. For the elements, comments are organized around additions and deletions by element, as well as general discussion items.

I. Introductions:

Mr. Bankert opened the meeting with an overview of the agenda for the meeting. Then, the meeting participants introduced themselves.

II. Background:

Mr. Bankert presented the project background. He briefly explained the project purpose and the importance of the project to the PennDOT D8 region.

III. Validation:

The following comments were received as part of the validation process:

I. County 911 Communication Centers

a. Definition

- No changes

b. Interconnects

- Remove the following connections:
 - VII** MDSHA Offices (all the connections are through PEMA)
 - VIII** PSP Vehicles (all the connections are through PSP CDC)
 - IX** PSP Troop T Dispatch Centers

c. Information Flows

i. With PennDOT D8 RTMC

1. Additions

- Emergency evacuation route coordination (planned 2)

2. Deletions

- Resource request (occurs through County Maintenance Offices)

3. Changes

- None
- The information flows between these two elements occur mostly in the Capital Beltway area.
- 911 communications center communicates among themselves through 800 MHz system
- County 911 Communication Centers would like to establish an emergency talk group channel under 800 MHz system with PennDOT (need)

ii. PennDOT D8 County Maintenance Offices

1. Additions

- None.

2. Deletions

- None

3. Changes

- None
- County 911 Communications Center calls County maintenance office foreman/shed for maintenance resource coordination

iii. PTC Offices

1. Additions

- None

2. Deletions

- None

3. Changes

- None
- PTC dispatches all the resources to the incident location except the emergency medical dispatches
- In case of 911 call for events within Turnpike, 911 communication center transfers the call to the PTC Offices
- County 911 communication centers will be responsible for providing medical support at the incident site

iv. PEMA Emergency Operation Center

1. Additions

- Emergency response coordination

2. Deletions

- None

3. Changes

- None

- Consider changing the name to PEMA Statewide Emergency Operation Center
- The PEMA SEOC should be utilized more often for incidence and emergency coordination

v. County EMA Centers

1. Additions

- None

2. Deletions

- None

3. Changes

- None
- In some cases, the County EMA Centers act as County 911 Communication Center during the day time

vi. PSP Dispatch Centers

1. Additions

- None

2. Deletions

- None

3. Changes

- None
- Any 911 calls from the incident location covered by PSP

vii. Regional Transit Agency Offices

1. Additions

- None

2. Deletions

- Transit information request
- Transit request confirmation

3. Changes

- None
- The information flows are on an infrequent basis

viii. TRANSCOM Center

1. Additions

- None

2. Deletions

- None

3. Changes

- None

ix. Incident Response Agency Offices

1. Additions

- None

2. Deletions

- None

3. Changes

- None
- County 911 Centers notify incident response agency whenever the agencies' resources are necessary

x. MDSHA Offices

- No Connection

xi. Municipal Public Safety vehicles

1. Additions

- None

2. Deletions

- None

3. Changes

- None
- The connection exists but all the connections are through the public safety offices. For e.g., the County 911 centers will contact fire department for the dispatch of the fire vehicles. The fire department in turn dispatches vehicles

xii. PennDOT STMC

- No connection

xiii. PSP Vehicles

- No connection

xiv. Regional Media Outlets

1. Additions

- None

2. Deletions

- External Reports

3. Changes

- None

xv. Information Service Providers

1. Additions

- None

2. Deletions

- None

3. Changes

- None

xvi. Private Wrecker Units

4. Additions

- Incident information (planned)

5. Deletions

- Incident command information
- Suggested route
- Incident command request
- Incident status

6. Changes

- None
- The location of the private wreckers units are not tracked
- Private wrecker units would like to know more about the incident before dispatching appropriate vehicles
- Vehicles identification codes are available and the dispatch agencies can use the codes for the dispatch of the proper resources

xvii. High Threat Facilities

1. Additions

- None

2. Deletions

- None

3. Changes

- None

xviii. PSP Troop T Dispatch Centers

- No Connection

II. County EMA Centers

a. Definition

- No changes

b. Interconnects

- Same changes as identified for County 911 Communications Centers

c. Information Flows

- Same flows as County 911 Communications Centers
- County EMA Centers are activated during major events and they coordinate with 911 communications centers to respond to events
- County EMA Centers act on a township level whereas County 911 Communications centers act on an incident level

III. Medical Command Center

- Delete this element and include the information flows of this element with Municipal Public Safety elements
- Include the definition of this element in the Municipal Public Safety elements

IV. Incident Response Agency Offices

Since there were no members representing this element, this element was not validated as part of this meeting.

V. Municipal Public Safety Vehicles

a. Definition

- Change the element name to Municipal/Regional Public Safety Offices
- Include Medical Command Center in the definition
- Include local personnel, resources, helicopter resources and bomb squads

b. Interconnects

- Delete the following interconnects

- PSP Dispatch Centers
- PennDOT STMC

c. Information Flows

i. County 911 Communication Centers

1. Additions

- None

2. Deletions

- None

3. Changes

- None

ii. County EMA Centers

1. Additions

- None

2. Deletions

- None

3. Changes

- None

iii. PSP Dispatch Centers

- No interconnection

iv. PennDOT STMC

- No interconnection

VI. Private Wrecker Units

a. Definition

- No changes

b. Interconnects

- Connections with PTC Offices and PSP Dispatch Centers are existing
- Include the following interconnects
 - PennDOT D8 RTMC
 - Municipal Public Safety Office

c. Information Flows

i. PTC Offices

1. Additions

- None

2. Deletions

- Incident command request
- Incident command information

3. Changes

- None

ii. County 911 communication centers

1. Additions

- None

2. Deletions

- Incident command request
- Suggested route
- Incident command information

3. Changes

- None

iii. PSP Dispatch Centers

1. Additions

- Request for emergency dispatch (from PSP Dispatch Centers)

2. Deletions

- None

3. Changes

- None

VII. Potential Projects

- Establish emergency talk group channel under 800 MHZ system with PennDOT
- Develop emergency response evacuation plan coordination (for smooth flow of traffic from the incident location to the designated evacuation place)
- Conduct more hazard mitigation studies
- In some counties (York especially), provide exact location address for wreckers
- Coordinate wreckers with more incident information for better response
- Provide some communication medium for all wreckers (Nextel)
- Operate PennDOT RTMC 24X7
- Provide a one-stop shop for all the information necessary for incident response agencies
- Develop more comprehensive evacuate plans
- Involve PennDOT in the counter terrorism task force
- Evaluate the possibilities of collocation of D8 RTMC with transit agency/County 911 communication center/PEMA SEOC

VIII. Wrap-Up/Next Steps

Mr. Bankert identified the following as next steps:

- Conduct and complete other validation meetings
- Identify conflicting comments
- Convene a Regional Advisory Panel (RAP) members to resolve the conflicting comments

- Incorporate the comments into draft Strawman Architecture
- Finalize the architecture
- Conduct the second Bookend meeting

Appendix H: Bookend II Meeting Minutes

Date: Monday, November 15, 2004
Meeting of: PennDOT South Central Region – Second Meeting
Location: Holiday Inn -- Harrisburg, PA

Presentation

- Glenn Rowe from PennDOT welcomed everyone to the meeting. Since the group was smaller in number, Glenn Rowe asked each person attending to introduce themselves and say which agency they are from. Glenn explained that this meeting is the final regional stakeholder meeting of the ITS Architecture effort. The first regional meeting was held in July 2004, and it was followed by a series of smaller working meetings in July and August 2004. Material from the first regional meeting is available upon request or via the web at www.paits.org. Glenn also added that he was encouraged to see stakeholders such as Hershey Park and Gettysburg Park participate in this effort because they are event generators. The purpose of the meeting includes concluding the ITS Architecture effort, meeting the federal mandate for architecture conformity, discussing next steps, and discussing continuing regional operations dialogue. Glenn stressed that the ITS Architecture is a living document. Glenn quickly listed the agenda for the meeting. First, Larry Bankert from PB would give an overview of the ITS Architecture. Then, Noah Goodall, also from PB, would describe the website and how users would access information and provide input for updating the architecture. Next, Dennis Lebo from PennDOT would talk about next steps. Chip Millard, from TCRPC, would be explaining the role of the regional planning bodies. Glenn mentioned that Chip is spearheading the effort for the planning commissions in that region. Mike Pack from PennDOT would facilitate discussion at the end.
- Larry Bankert from PB began his section on ITS Architecture by showing an outline of some of the questions that he would be answering during his part of the presentation. The first slide lists reasons why there is a need for South Central PA Regional ITS Architecture. Larry explained that a regional ITS Architecture would provide structure for ITS planning and deployment. In addition, it establishes an institutional mechanism that promotes development and deployment of ITS. Interoperability is promoted and efficient investment is encouraged. Furthermore, the federal mandate which states “Regional architecture must be completed in partnership with the state and regional planning partners, including regional stakeholders by April 8, 2005 for use of Federal funds for ITS,” must be satisfied. The mandate for conformity is reflected in this statement “The Intelligent Transportation System Architecture and Standards final rule issues by the Federal Highway Administration (FHWA), USDOT, Section: 940.5 (and 49 CFR Part 613 and 621) has been met for this region in Pennsylvania. This means that federal rules from FTA and FHWA have been met. The federal funds can continue to be used for ITS projects in the

South Central Region because the regional has been successful. Then, Larry explained what the process was for creating the ITS Architecture. He presented a map of the nine PennDOT regions. This closely resembles the regions drawn out for the ITS Architecture. A map of PennDOT District 8 was shown. This regions consists of the following counties: Perry, Dauphin, Lebanon, Lancaster, York, Cumberland, Adams, and Franklin. The process for developing the regional ITS Architecture involved District champions who are Glenn Rowe and Chip Millard, regional advisory panels, a “strawman” architecture, validation meetings, regional meetings, and the finalization of the ITS Architecture. This finalization will take place later this month. Currently, this region has an ITS architecture that can support regional stakeholder planning for ITS projects and funding, regional and statewide planning processes, and regional and statewide ITS project development and design. Additionally, it can support ITS integration, interoperability of ITS systems, architecture updates. Finally it provides a forum for regional agencies to collaborate on ITS capital, operations, and maintenance.

- Larry continued by summarizing each of the chapters in the South Central PA Regional ITS Architecture Document. The first chapter introduces the architecture development process and gives instructions on how to use the document. This chapter states that the architecture will be maintained by PennDOT Central Office and Regional Stakeholder Participation. Recurring and long-term effort will require familiarity with national ITS architecture and knowledge of turbo architecture software tool. The architecture will be updated every 4 years, and the regional can look at revisions and put it into the TIP process, and the planning for the update should begin one year prior to the update. The first update is scheduled for Fall 2008. Elements that will be maintained include the following: a description of the region, stakeholders, ITS architecture elements, system inventory, needs and services, interconnect diagrams, architecture flows, and applicable ITS standards. The mode by which the ITS Architecture will be maintained is via the website. In moving forward and institutionalizing ITS, the regional stakeholders and PennDOT Central Office ITS Partnership will work together. They will work to get transportation technology issues in front of decision makers, incorporate ITS in long range plans, modify TIP project selection criteria to more fairly evaluate technology and ITS, give regular updates to elected officials, and set up regional ITS/Operations Coordination Committees. Furthermore, educational training courses are provided to introduce practitioners to systems engineering, ITS procurement, and managing traffic incidents for roadway emergencies. A helpful website is www.nhi.fhwa.dot.gov. Educational scanning tours may also be provided county commissioners, executive boards, managers, operations staff, and public safety officials.
- Chapter 2 of the ITS Architecture document summarizes the scope and magnitudes of the architecture. Stakeholders are defined and projects are listed in this chapter. Chapter 3 is titled “Regional Systems, Inventory, Needs and Services”. This contains the “building blocks” of the architecture, and defines the elements, systems inventory and links elements, stakeholders and

project, needs and services that establish architecture flows among elements. Chapter 4 contains a graphical display of the architectures, which includes the regional interconnect diagrams, and the architecture flows. Larry showed an example of an interconnect diagram and architecture flows in the following slide. Furthermore, ITS Standards are industry consensus standards. This defines how system components operate within a consistent framework. Interoperability is promoted, and participating standards development organizations include AASHTO, ANSI, ASTM, IEEE, ITE, NEMA, and SAE.

- Noah Goodall proceeded to give a demonstration of how the website would be used to update the ITS Architecture. The website will become the historical library and also provide forms for filling out new information on stakeholder and project updates. From the website, users can select the region from which they belong. This page provides a list of counties and a description of the region. Noah provided a sample scenario to show the stakeholder how the process works. The scenario shows that the Red Rose Transit Authority is planning to deploy an automatic vehicle location (AVL) system on its buses. There is a list of stakeholder on the website for each region to show who may be interested in the architecture. In this sample scenario, the user would click on “Regional Transit Agencies” listed under Stakeholders. The user may further specify that it is a Regional Transit Agency Office and view the interconnect diagrams. There are solid lines for communication that currently exists between offices, and dotted lines represent planned activities. Users may also go back to the main page and look at architecture flow definitions. Finally the user may go the “Architecture Update Form” and fill in the project contact information. This is a repository of all projects that are in the area pertaining to ITS Architecture.
- Dennis Lebo from the PennDOT Central Office, Center for Program Development and Management talk about next steps. He began by showing a picture of the state and the outlines of Pennsylvania’s Transportation Planning Organizations. Then, he shows the pyramid that places ITS Architecture in the context of planning. It is between vision and long range plans / transportation improvement program. For regional next steps, each MPO and RPO in the region will formally adopt this. The region will prioritize projects documented in the architecture, and incorporate this into regional long range plans and the transportation improvement program. For PennDOT, the next step is a new statewide plan called the Statewide Mobility Plan. The focus is on mobility. One of the components of the SMP is the Transportation System Operations Plan (TSOP). Prioritized statewide PennDOT projects are focused in incident management, telecommunications, ITS and operations. There will be a draft of the TSOP by May 2005. A regional outreach on this plan is proposed in order to show what the priorities are statewide.
- Chip Millard from the Tri-County Regional Planning Commission continued by talking about the Role of the Regional Planning Bodies. To move forward, the region must adopt the ITS architecture and incorporate it into their long range plan. The region needs to support the ITS/Operations project in the TIP and the PennDOT statewide TSOP. The region should continue, and the RAP should

evolve to address ITS/operations at the regional level. There is a meeting scheduled for January 19th to identify goals and objectives of a regional technical body that would be an evolution of the RAP. This regional technical body could educate/train stakeholders, continue to engage non-MPO stakeholders and seek input, and identify and prioritize potential future ITS projects.

- Mike Pack facilitated the discussion after the power point presentation. He emphasized the themes that the ITS Architecture document is a living document, and it need everyone's support in the region. While some of the stakeholders had gone to a scanning trip to Texas earlier, Mike also mentioned that there is a good TMC in their state at King of Prussia. He encouraged the stakeholders to contact them if they are interested in visiting the facility.
- Barry Hoffman began the discussion that the MPOs are generally supportive of this plan. The sales pitch to those who are not as familiar with ITS should be that ITS reduces fatalities and congestion. Then, Barry asked whether or not the website is secure. Mike Harris from PB said that the website is not secure and is currently posted through PB Farradyne. As a follow up question, Barry asked if there is intent to update projects. Mike Harris answered that the intent is to update the ITS Architecture.
- Glenn Rowe said that as they add projects, PennDOT will be able to use all the forms on the website to update the architecture. Jessie Yung from FHWA said that there needs to be some way to demonstrate that the project is part of the ITS Architecture. The agencies entering these projects into ITS Architecture need to know what currently exists and what needs to be added in order to conform to the ITS Architecture.
- Louis Cortelazzi from the PA Turnpike wanted to know what the logistics will be for updating the ITS Architecture. Dennis Lebo said that in 2008, PennDOT will need to decide what needs to be done, and how they want it done. E-mails will be sent to all the stakeholders when updates are made.
- Finally, Mike Pack concluded by saying that as more regional ITS Architectures are finalized, the dialogues will be expanded. The task force headed by the MPO was a success and technical buy-in was needed the by the MPO leadership.

List of Attendees

Last Name	First Name	Agency	Email	Phone
Anastasiadis	Manny	ITS/Traffic Operations Manager PennDOT District 6-0	eanastasia@state.pa.us	
Botchie	Ed	Major Trucking Agencies	ed.botchie@cresslertrucking.com	(717) 532-6315
Cortelazzi	Lou	Pennsylvania Turnpike Commission (PTC)	lcortela@paturnpike.com	
Crider	Lt. Jacob M.	PSP Troop H	jacrider@state.pa.us	
Eshleman	Don	Franklin County EMA	deshleman@co.franklin.pa.us	(717) 264-2813
Fraleley	Lt. William R.	PSP Troop T HQ Highspire Dispatch	wfraley@state.pa.us	
Gillespie	Michael	PennDOT District 8-0 Design	mgillespie@state.pa.us	
Herron	Mike	Federal Highway Administration (FHWA)	mike.herron@fhwa.dot.gov	
Hoffman	Barry	PennDOT - District 8-0 Engineer		
Hopkins	Jeff	Pennsylvania State Police		

Last Name	First Name	Agency	Email	Phone
Joy	Jeff	York County		
Koser	Steve	PennDOT Central Office	skoser@state.pa.us	(717) 705-0143
Lebo	Dennis	PennDOT Central Office	dlebo@state.pa.us	(717) 787-5246
McGee	Dennis. M.	Federal Motor Carrier Safety Administration	dennis.mcgee@fmcsa.dot.gov	
McNary	Bob	Lebanon Valley Economic Development Corporation	bmcnary@lvedc.org	
Millard	Carl "Chip"	Tri-County Regional Planning Commission	cmillard@tcrpc-pa.org	(717) 234-2639
Oyer	Eric	Borough of Chambersburg	eoyer@chbgboro.com	
Pack	Mike	PennDOT Central Office	mpack@state.pa.us	(717) 783-4579
Patel	Devang D.	PennDOT D8-0 (Traffic/ITS)	depatel@state.pa.us	(717) 783-3949
Pratt	Marc	Gettysburg National Military Park	Marc_Pratt@nps.gov	
Rigney	John	PSP Troop J		

Last Name	First Name	Agency	Email	Phone
Rowe	Glenn	PennDOT D8-0 (Traffic/ITS)	glrowe@state.pa.us	(717) 783-3981
Royer	David		royerd@co.lancaster.pa.us	
Schmoyer	Richard H.	Historic Gettysburg/Adams County Planning Commission	rschmoyer@acc.pa.net	
Shellenberger	Tim	Hershey Entertainment and Resorts Company (HERCO)	tshellen@hersheypa.com	(717) 534-3369
Smoker	Matt	Federal Highway Administration (FHWA)		
Steigerwalt	Richard	PSP Troop T		
Stevens	Spencer	Federal Highway Administration (FHWA)		
Straka	Christopher	Lebanon Valley Chamber of Commerce	cstraka@lvchamber.org	
Tarquino	Phil	Franklin County Planning Commission	ptarquino@co.franklin.pa.us	
Taylor	Jay	PEMA / Operations	jaytaylor@state.pa.us	
Townsend	John	PennDOT District 5-0	jotownsend@state.pa.us	

Last Name	First Name	Agency	Email	Phone
Welt	Mike			
Wolfe	George	Lower Paxton Township	gwolfe@lowerpaxton-pa.gov	
Yung	Jessie	Federal Highway Administration (FHWA)	Jessie.yung@fhwa.dot.gov	

Pennsylvania ITS Architecture - Update and Moving Forward

South Central Region

Second Regional Meeting
November 15, 2004



Welcome

Glenn Rowe, PennDOT



Meeting Series

- This is the final regional stakeholder meeting of the ITS Architecture effort
 - First Regional stakeholder meeting was held in July 2004
 - Followed by a series of smaller working meetings in July and August 2004
- Material from the first regional meeting is available upon request or via the web at: www.paits.org



Meeting Purpose

- Conclude the ITS Architecture effort
- Meet the Federal Mandate for Architecture Conformity
- Discuss Next Steps
- Discuss continuing regional operations dialog



Agenda

- **Larry Bankert**, PB – ITS Architecture
 - Web Site – **Noah Goodall**, PB
- **Dennis Lebo**, PennDOT – Next Steps
- **Chip Millard**, TCRPC – Role of the Regional Planning Bodies
- **Mike Pack**, PennDOT – Discussion Facilitator



ITS Architecture

Larry Bankert, PB



ITS Architecture

- Why prepare a South Central PA Regional ITS Architecture?
- How did we create the ITS Architecture?
- What is in the ITS Architecture Document?
- How do I as a Stakeholder use the ITS Architecture?
- How will the ITS Architecture be updated?



ITS Architecture

- Why prepare a South Central PA Regional ITS Architecture?
- How did we create the ITS Architecture?
- What is in the ITS Architecture Document?
- How do I as a Stakeholder use the ITS Architecture?
- How will the ITS Architecture be updated?



Why a Regional ITS Architecture

- Provides Structure for ITS Planning and Deployment
- Establishes an Institutional Mechanism That Promotes Development and Deployment of ITS
- Promotes Interoperability
- Encourages Efficient Investment
- Satisfies the Federal Mandate



The Federal Mandate

Regional ITS Architectures must be completed in partnership with the State and regional planning partners, including regional stakeholders by April 8, 2005 for use of Federal funds for ITS



Mandate Conformity

Conformity Statement

The Intelligent Transportation System Architecture and Standards final rule issued by the Federal Highway Administration (FHWA), USDOT, Section: 940.5 (and 49 CFR Part 613 and 621) has been met for this region in Pennsylvania.



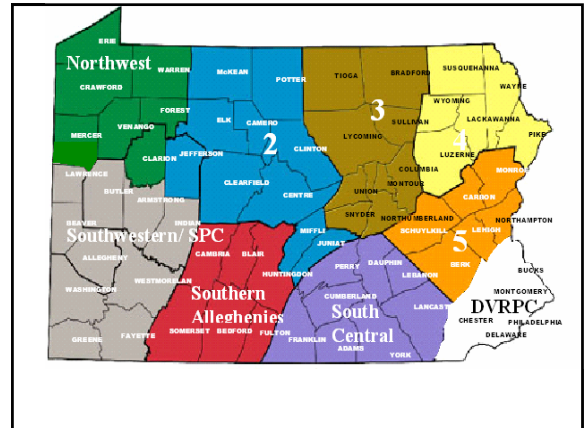
Meaning

- Federal rules from FTA and FHWA have been met
- Federal funds can continue to be used for ITS projects in this region
- The region has been successful

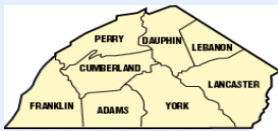


ITS Architecture

- Why prepare a South Central PA Regional ITS Architecture?
- How did we create the ITS Architecture?
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- How will ITS Architecture be updated?



The South Central PA Region (PennDOT District 8)



The Process

- Champions
- Regional Advisory Panels
- "Strawman"
- Validation
- Regional Meetings
- Finalize



We now have:

- A conforming regional ITS Architecture that can support:
 - Regional stakeholder planning for ITS projects and funding
 - Regional and Statewide planning processes
 - Regional and Statewide ITS project development and design
 - ITS integration
 - Interoperability of ITS systems
 - Architecture updates as necessary
 - A forum for regional agencies to collaborate on ITS capital, operations and maintenance



ITS Architecture

- Why prepare a South Central PA Regional ITS Architecture?
- How did we create the ITS Architecture?
- What is in the ITS Architecture Document?
- How do I as a Stakeholder use the ITS Architecture?
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The South Central PA Regional ITS Architecture Document

Chapter 1. Introduction

Chapter 2. Architecture Scope

Chapter 3. Regional Systems Inventory, Needs, and Services

Chapter 4. Regional ITS Architecture References



www.paits.org



The South Central PA Regional ITS Architecture Document

Appendix A: Acronyms

Appendix B: ITS Definitions

Appendix C: Subsystems and Terminator Definitions

Appendix D: Architecture Flow Definitions

Appendix E: Operations Coverage

Appendix F: Bookend Meeting Minutes

Appendix G: Validation Meeting Minutes



Chapter 1. Introduction

- Architecture Development Process
- Using the document
- Utility of the Architecture
- Maintenance of the Architecture
- Moving Forward/Institutionalizing ITS



Utility of the Architecture

- The South Central Regional ITS Architecture:
 - Provides Structure for ITS Planning and Deployment
 - Establishes an Institutional Mechanism That Promotes Development and Deployment of ITS
 - Promotes Interoperability
 - Encourages Efficient Investment
 - Satisfies the Federal Mandate



Maintenance of the Architecture

- Who Will Maintain the Architecture
 - PennDOT Central Office
 - Regional Stakeholder Participation
- Recurring and Long-Term Effort Requiring
 - Familiarity with National ITS Architecture
 - Knowledge of Turbo Architecture Software Tool



Maintenance of the Architecture

- When Will the Architecture be Updated?
 - Every 4 Years
 - Planning for Update to Commence 12-months Prior to Update
 - First Update: Approximately Fall 2008



Maintenance of the Architecture

- What Will be Maintained?
 - Description of the Region
 - Stakeholders
 - Elements
 - System Inventory
 - Needs and Services
 - Interconnect Diagrams
 - Architecture Flows
 - Applicable ITS Standards
- How Will be Maintained?
 - Website



Moving Forward/ Institutionalizing ITS

- Regional Stakeholders and PennDOT Central Office ITS Partnership – Working Together
 - Get Transportation Technology Issues in Front of Decision Makers
 - ITS in Long Range Plans
 - Modify TIP Project Selection Criteria to More Fairly Evaluate Technology and ITS
 - Regular Updates to Elected Officials
 - Regional ITS / Operations Coordination Committees



Moving Forward/ Institutionalizing ITS

- Educational Training Courses (e.g., National Highway Institute Training Courses)
 - Introduction to Systems Engineering
 - ITS Procurement
 - Managing Traffic Incidents for Roadway Emergencies
 - Others
- www.nhi.fhwa.dot.gov



Moving Forward/ Institutionalizing ITS

- Educational Scanning Tours
 - County Commissioners
 - Executive Boards
 - Managers
 - Operations Staff
 - Public Safety Officials
 - Others



Chapter 2. Architecture Scope

- Summarizes the Scope and Magnitude of the Architecture
- Defines Stakeholders
- Lists Projects



Chapter 3. Regional Systems Inventory, Needs, and Services

- Contains the “Building Blocks” of the Architecture
 - Defines Elements
 - Defines Systems Inventory and Links Elements, Stakeholder and Projects
 - Defines Needs and Services that Establish Architecture Flows Among Elements

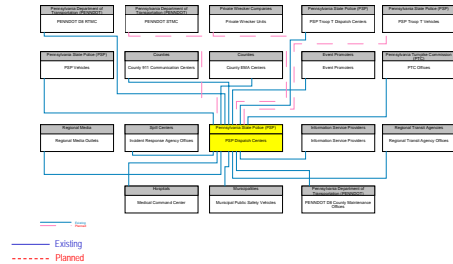


Chapter 4. Regional ITS Architecture

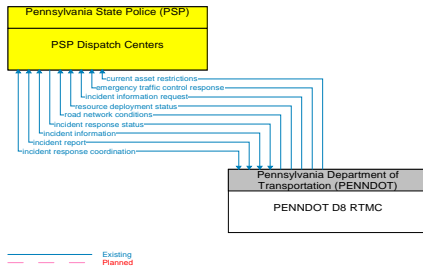
- Graphical Display of the Architecture
- Regional Interconnect Matrix
- Interconnect Diagrams
- Architecture Flows
- ITS Standards



Interconnect Diagram



Architecture Flows



ITS Standards

- ITS Standards
 - Industry Consensus Standards
 - Define How System Components Operate within a Consistent Framework
 - Promote Interoperability
 - Participating Standards Development Organizations Include AASHTO, ANSI, ASTM, IEEE, ITE, NEMA, SAE
- 50-60 Standards for the South Central Pennsylvania Regional ITS Architecture

ITS Architecture

- Why prepare a South Central PA Regional ITS Architecture?
- How did we create the ITS Architecture?
- What is in the ITS Architecture Document?
- How do I as a Stakeholder use the ITS Architecture?
- How will the ITS Architecture be updated?

ITS Architecture

Noah Goodall, PB

How to Use the Architecture

- Web based
- Easy to use
- Web site will become the historical library
- Form for new information
 - Stakeholder updates
 - Project updates



PA Regional ITS Architectures | SC | Home - Microsoft Internet Explorer

Address: http://www.pats.org/sc/

South Central Regional ITS Architecture

Home Using the Architecture Definitions and Acronyms Architecture Update Form

Regional Description

This Region, in the south central part of the state, is comprised of 8 counties:

- Adams
- Cumberland
- Dauphin
- Franklin
- Lancaster
- Lebanon
- Perry
- York

The capital of Pennsylvania, Harrisburg, is located in this Region. As the Capital Region, District 8 contains the headquarters

Sample Scenario

Scenario: Red Rose Transit Authority is planning to deploy an automatic vehicle location (AVL) system on its buses



How to Use the Architecture Website

- Using the Architecture
 - Sample Scenario
 - Identifying Who May be Interested
 - Understand the Information Flows
 - Identify the ITS Standards
 - Update the Architecture Website
 - ITS Architecture Document



PA Regional ITS Architectures | SC | Home - Microsoft Internet Explorer

Address: http://www.pats.org/sc/

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PA Regional ITS Architectures | SC | Stakeholders - Microsoft Internet Explorer

Address: http://www.pats.org/sc/stake

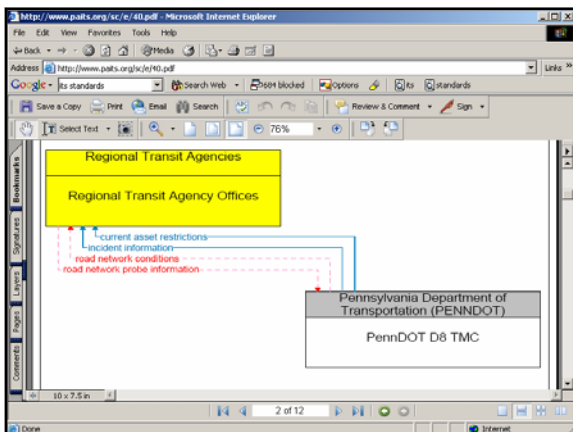
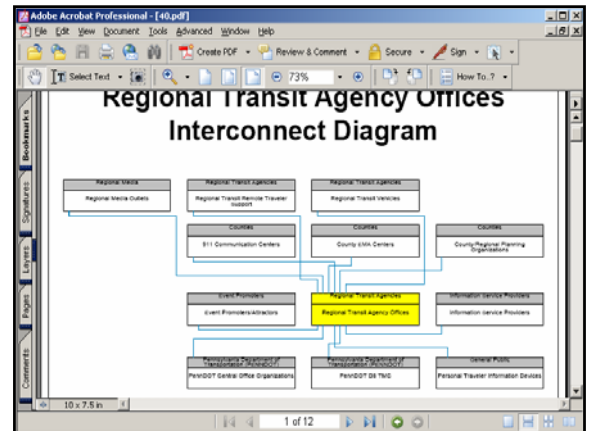
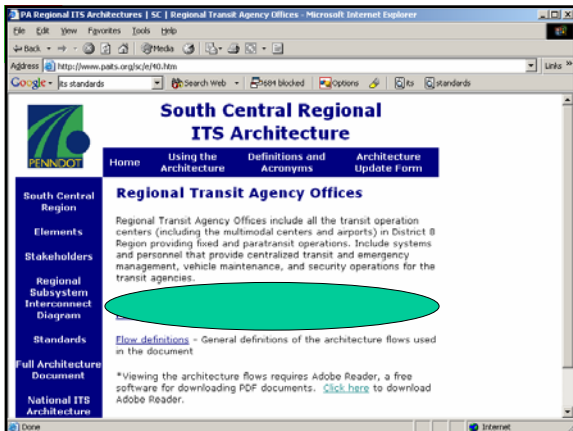
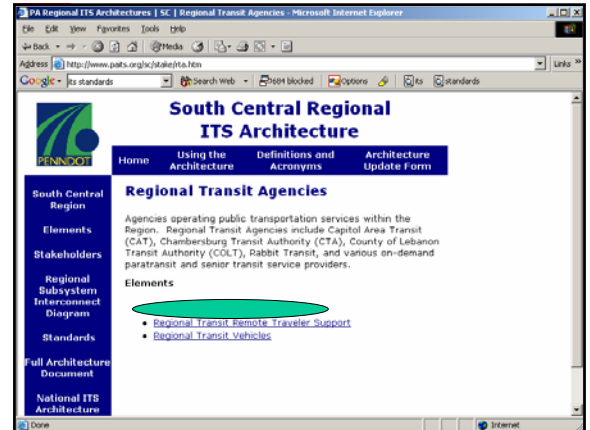
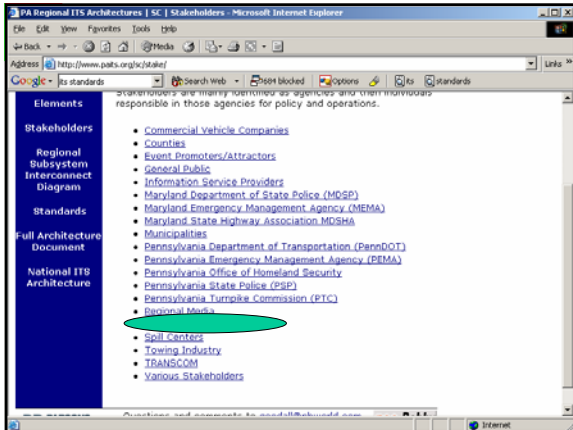
South Central Regional ITS Architecture

Home Using the Architecture Definitions and Acronyms Architecture Update Form

Stakeholders



Stakeholders are mainly identified as agencies and then individuals responsible in those agencies for policy and operations.

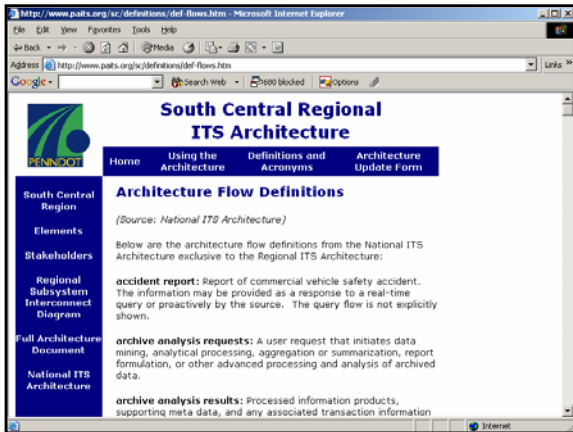
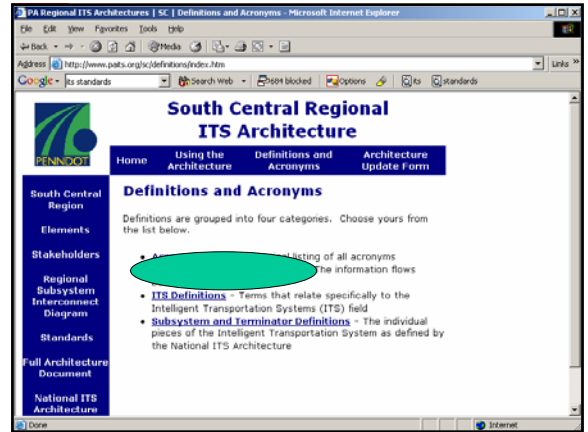
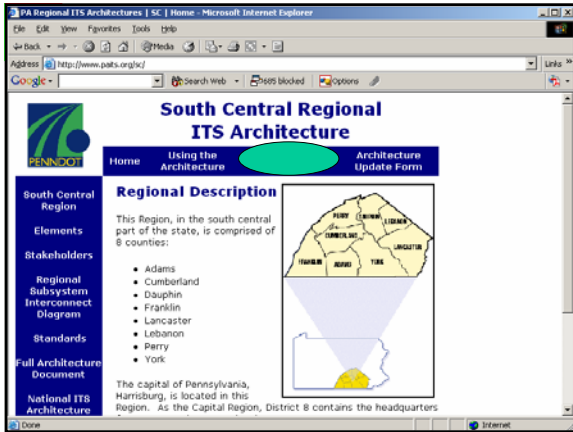
- Commercial Vehicle Companies
- Counties
- Event Promoters/Attractors
- General Public
- Information Service Providers
- Maryland Department of State Police (MDSP)
- Maryland Emergency Management Agency (MEMA)
- Maryland State Highway Association (MSHA)
- Municipalities
- Pennsylvania Department of Transportation (PennDOT)
- Pennsylvania Emergency Management Agency (PEMA)
- Pennsylvania Office of Homeland Security
- Pennsylvania State Police (PSP)



How to Use the Architecture Website

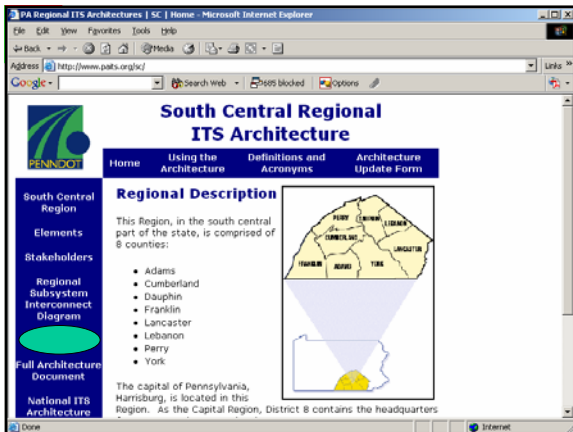
- Using the Architecture
 - **Sample Scenario**
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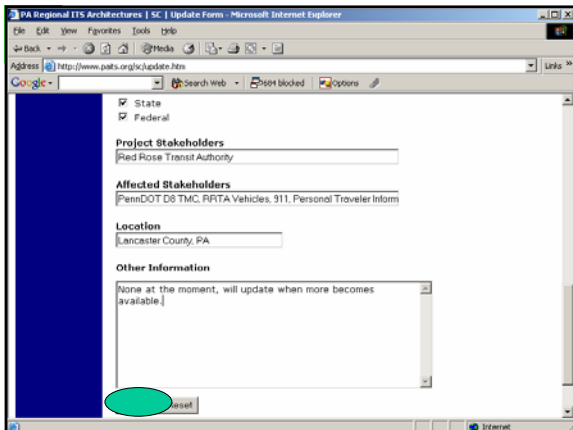
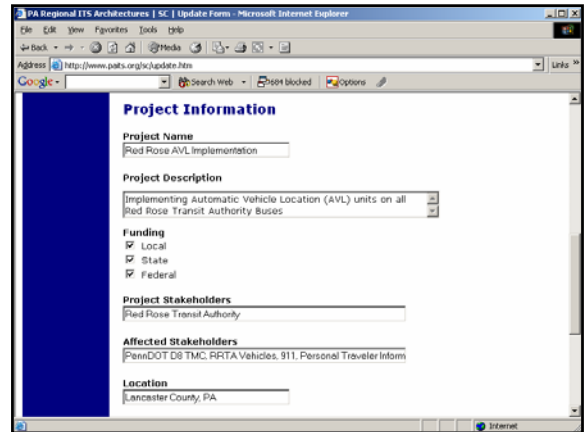
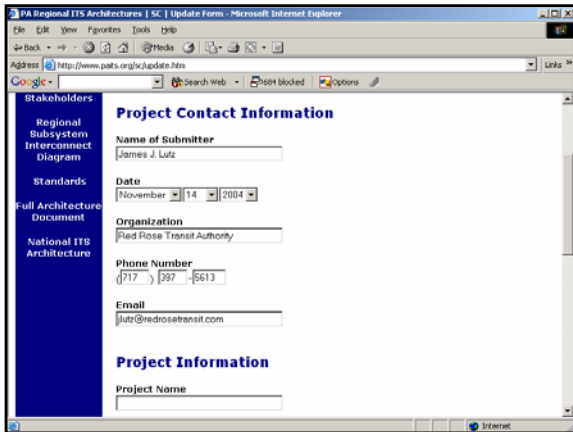
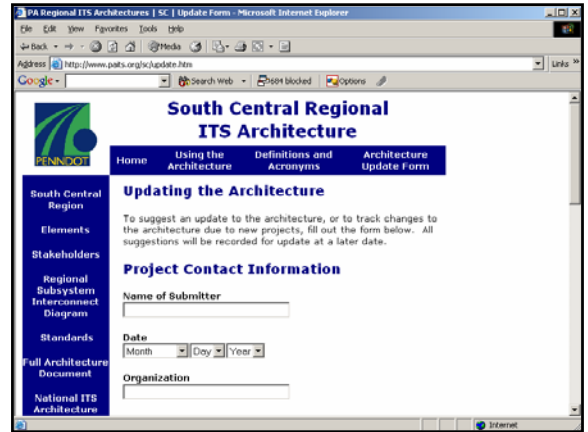
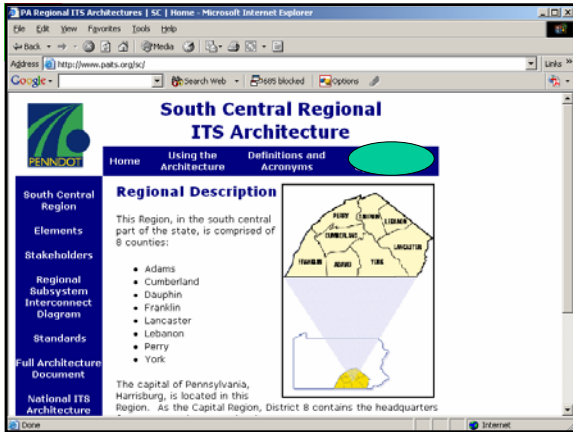
How to Use the Architecture Website

- Using the Architecture
 - Sample Scenario
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How to Use the Architecture Website

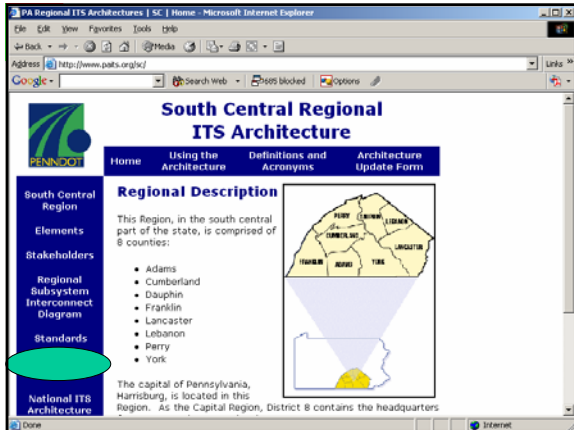
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 - Update the Architecture Website**
 - ITS Architecture Document



How to Use the Architecture Website

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 - Sample Scenario
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 - Understand the Information Flows
 - Identify the ITS Standards
 - Update the Architecture Website
 - **ITS Architecture Document**


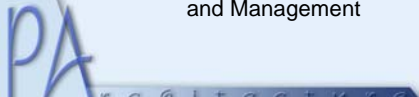

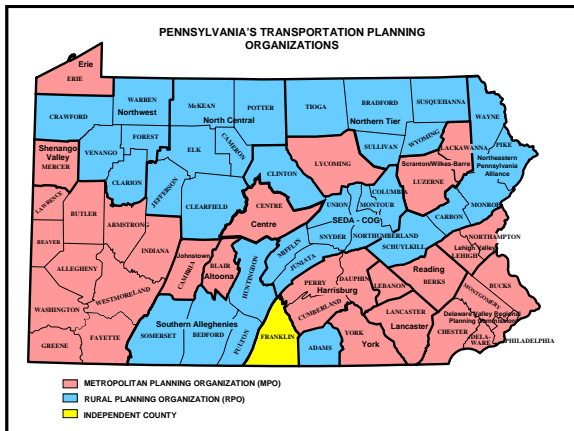






Moving Forward – Next Steps

Dennis Lebo

PennDOT Central Office
Center for Program Development
and Management

Regional Next Steps


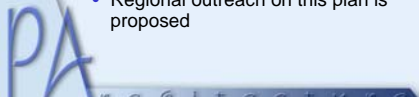

- Adopt Architectures at Each MPO/RPO
- Regionally prioritize projects documented in Architecture
- Incorporate into regional long range plans
- Incorporate into regional transportation improvement programs (TIP)





PennDOT Next Steps

- Statewide Mobility Plan (SMP)
 - One of these components of the SMP is the Transportation Systems Operations Plan (TSOP)
 - Prioritized statewide PennDOT projects focused in:
 - Incident Management
 - Telecommunications
 - ITS and Operations
 - Draft TSOP by May 2005
 - Regional outreach on this plan is proposed

Role of the Regional Planning Bodies

Chip Millard

Tri-County Regional Planning Commission (TCRPC)



To move forward ...

- Region must adopt the ITS Architecture
- Incorporate ITS Architecture into long-range plan
- Support ITS/Operations projects in TIP
- Support the PennDOT statewide TSOP as needed
- Continue/evolve the RAP to address ITS/operations at regional level



Next steps ...

- MPO's/RPO's adopt the Regional ITS Architecture
- RAP has agreed to continue regional ITS/Operations dialogue
- Meeting scheduled for January 19th
 - You are invited
 - Identify goals and objectives of a regional technical body



Next steps ...

- Regional Technical Body could:
 - Educate/train stakeholders
 - Continue to engage non-MPO stakeholders and seek input
 - Identify and prioritize potential future ITS projects



Discussion

Facilitated by:

Mike Pack, PennDOT

