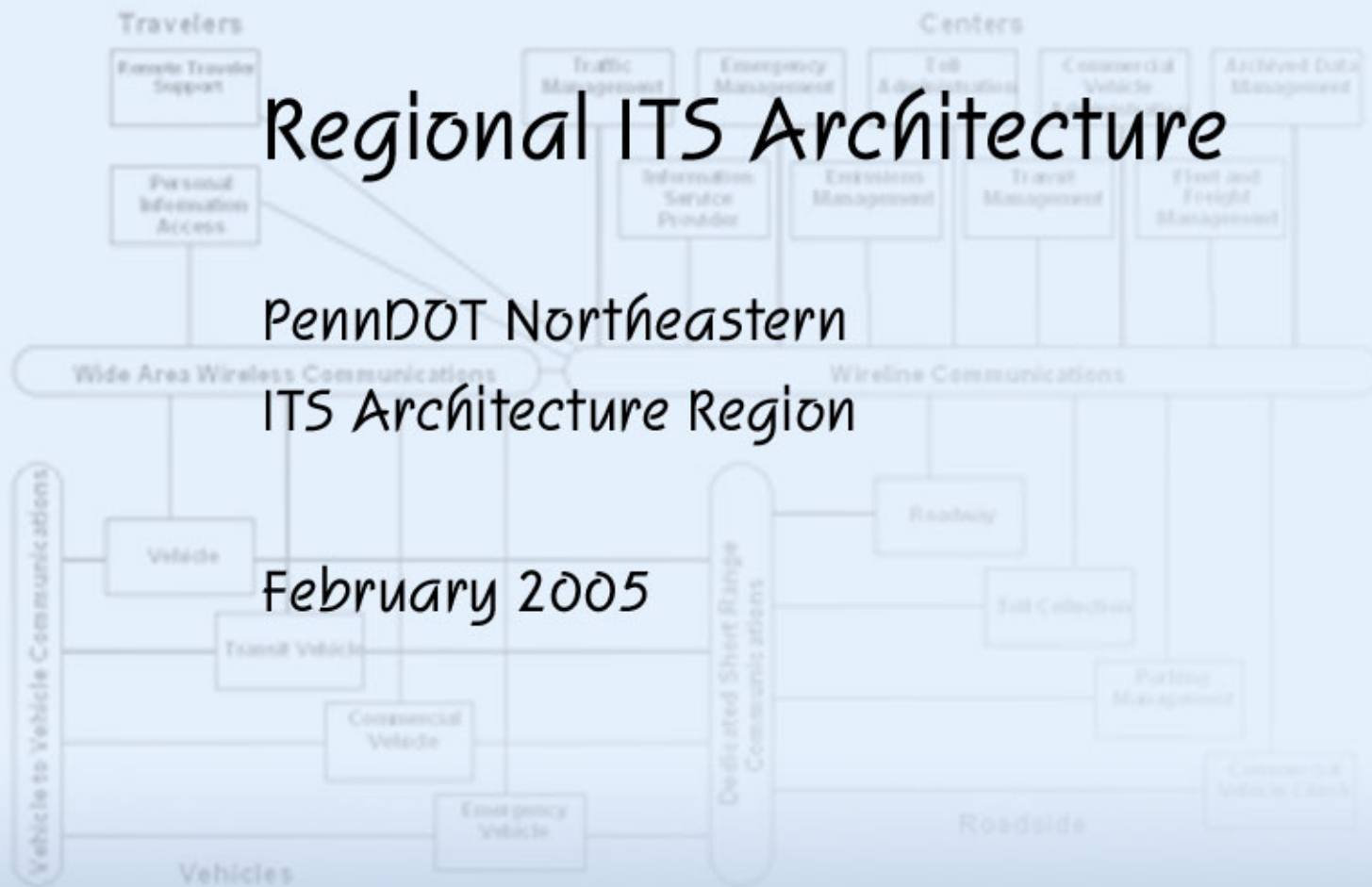


Regional ITS Architecture

PennDOT Northeastern
ITS Architecture Region

February 2005



PA

r e g i o n a l i t s a r c h i t e c t u r e



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**Lackawanna-Luzerne Transportation Study –
Metropolitan Planning Organization**

Adopted by the Coordinating Committee on February 22, 2005

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Organization**

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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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Regional Champion

The Regional Champion 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 Champion for this Region was:

Keith Williams – PennDOT District 4-0

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.

Alan Baranski – Northeastern Pennsylvania Alliance (NEPA)

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Parsons Brinckerhoff

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

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Conformity Statement

The Northeastern 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 Northeastern 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 Northeastern Region, which is comprised of six counties in the northeastern part of the state. The Northeastern Region encompasses PennDOT Engineering District 4-0. The document is the result of intensive data-gathering, research, and planning activities conducted between March 2003 and February 2005. The current version of the ITS Architecture was generated in February 2005.

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

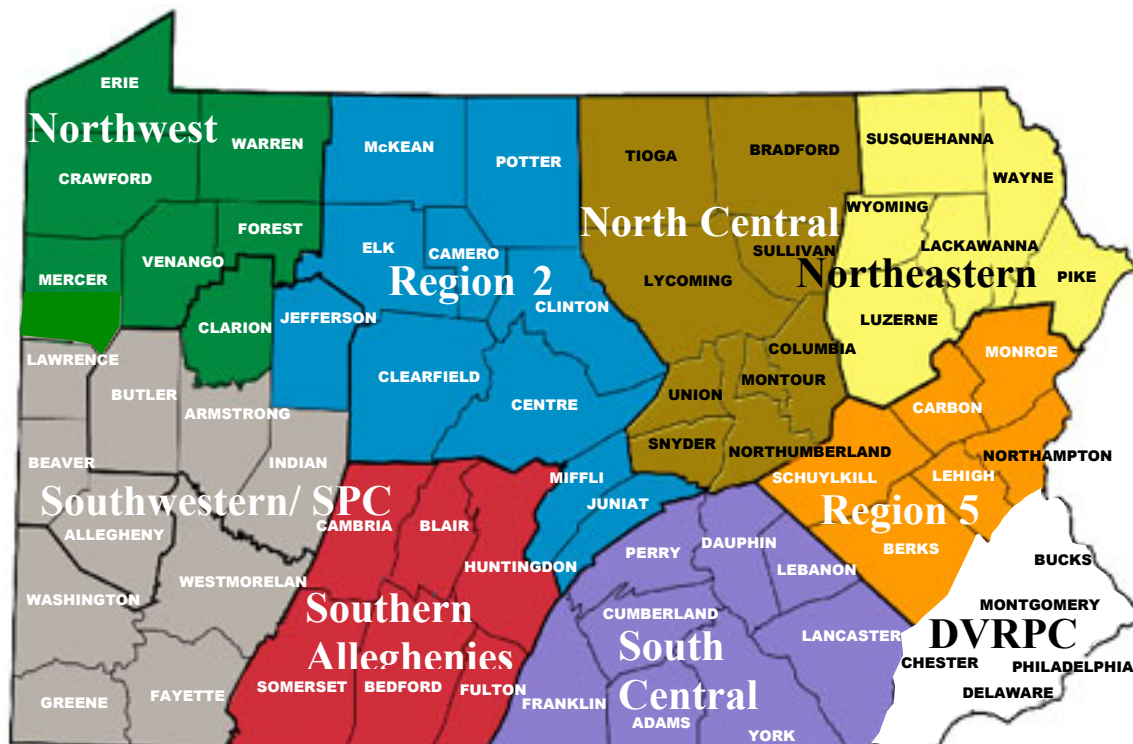


Figure 1-1: PennDOT ITS Architecture Regions

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:

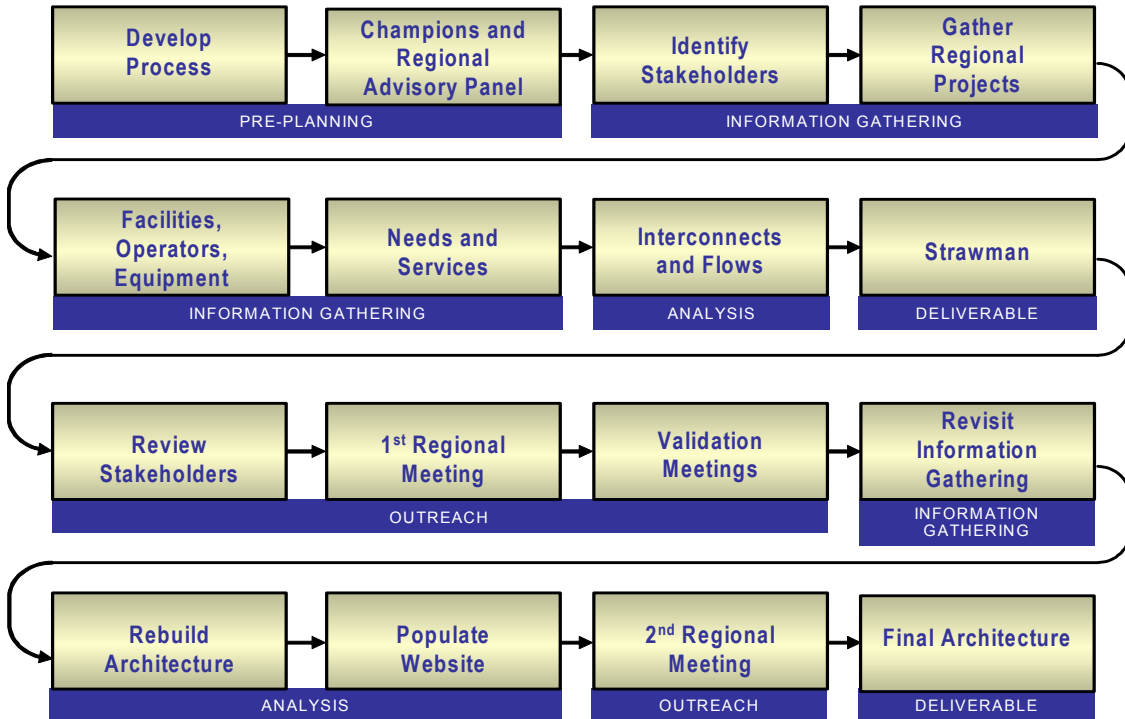


Figure 1-2: Pennsylvania ITS Architecture Process Schematic

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 Northeastern 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 Northeastern 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 Northeastern Regional Architecture, go to:

www.paits.org/ne

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

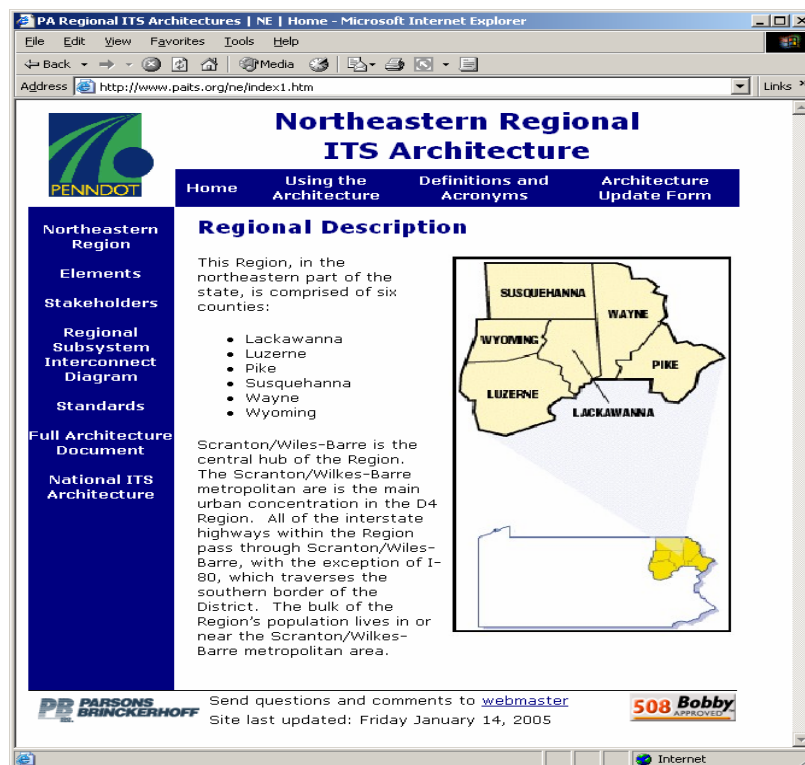


Figure 1-3: Pennsylvania ITS Architecture Web Site

From the Northeastern Regional ITS Architecture Homepage (www.paits.org/ne), 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 Northeastern 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 Northeastern ITS Architecture user can access applicable ITS standards by:

1. Viewing the information flow diagrams in the Northeastern 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 Northeastern 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 Northeastern 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 Northeastern 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 Northeastern Regional ITS Architecture Homepage (www.paits.org/ne) 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/ne/update.htm>.

Northeastern 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 Northeastern 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.

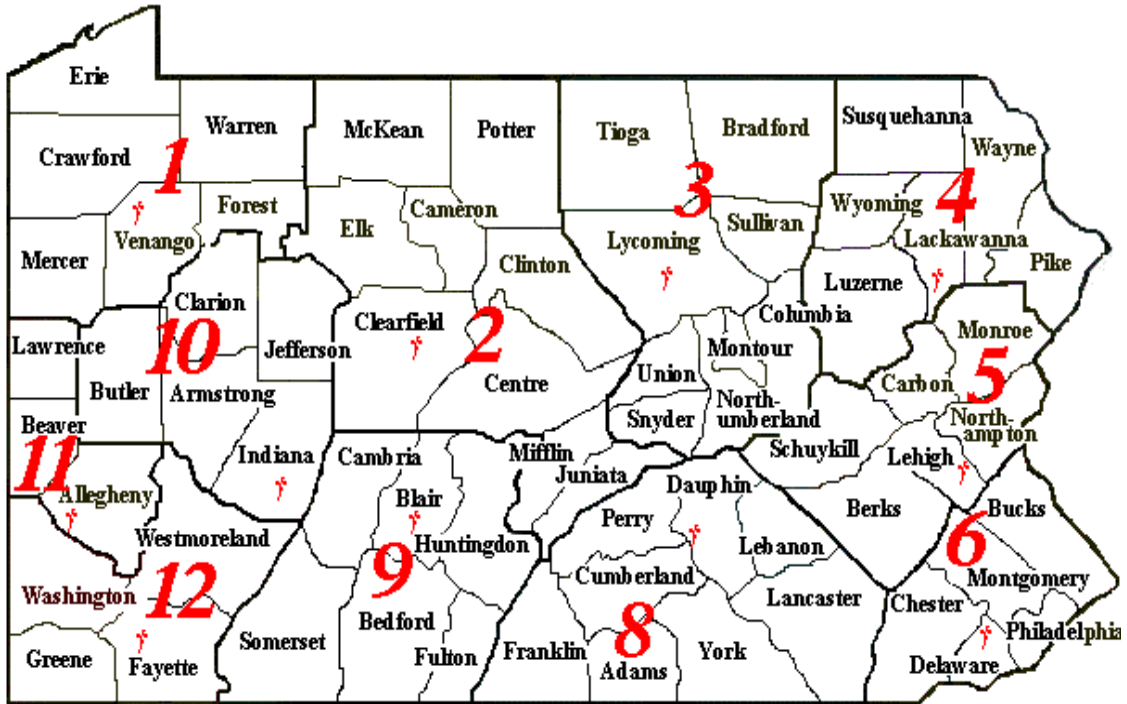


Figure 1-4: PennDOT District Map

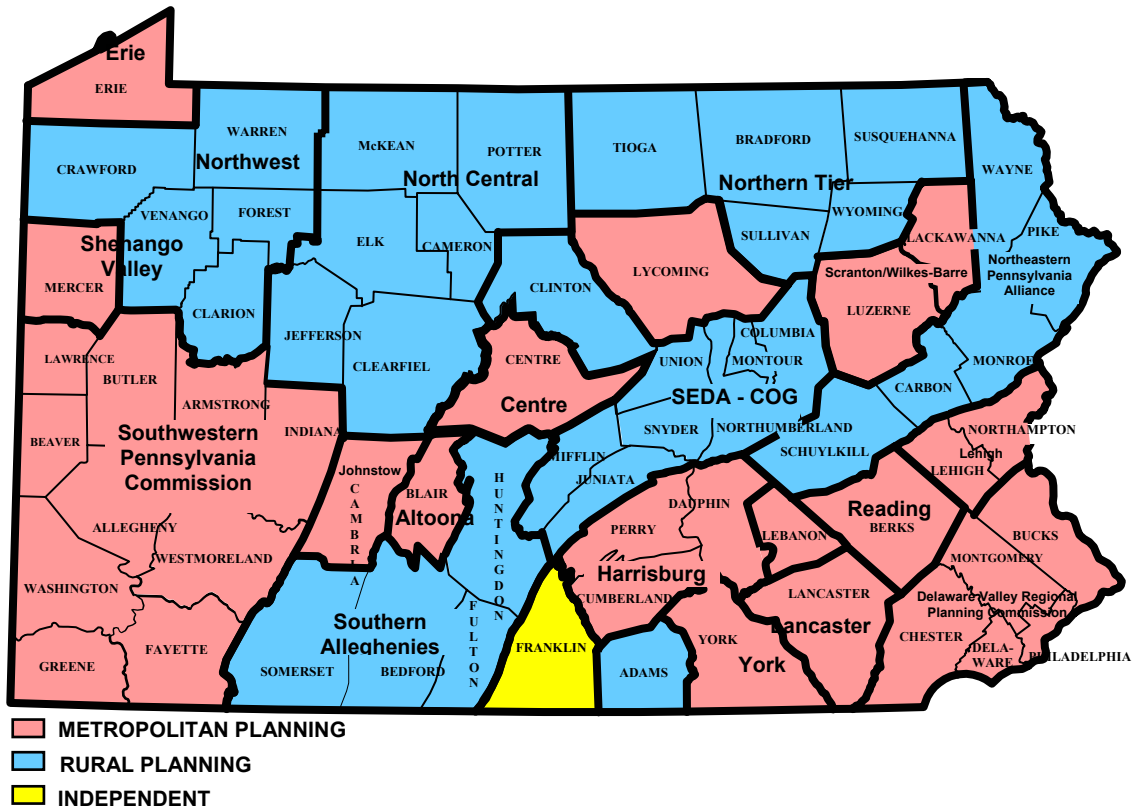


Figure 1-5: Pennsylvania MPO/RPO Map

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 Northeastern 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 Northeastern 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 Northeastern 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 Northeastern 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?

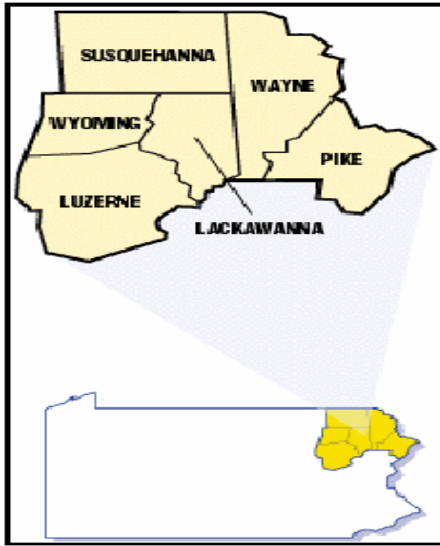
Checklist Table #4

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 northeastern part of the state, is comprised of six counties: Lackawanna, Luzerne, Pike, Susquehanna, Wayne, and Wyoming. The Northeastern Region encompasses PennDOT Engineering District 4-0. The Region is depicted in Figure 2-1.

Scranton/Wilkes-Barre is the central hub of the Region. The Scranton/Wilkes-Barre metropolitan area is the main urban concentration in the D4 Region. All of the interstate highways within the Region pass through Scranton/Wilkes-Barre, with the exception of I-80, which traverses the southern border of the District. The bulk of the Region's population lives in or near the Scranton/Wilkes-Barre metropolitan area.

Figure 2-1: Northeastern ITS Architecture Region

(Source: PennDOT District 4-0 Web site)

Table 2-1 reveals that nearly seven hundred thousand people — or approximately six percent of statewide residents of the Commonwealth of Pennsylvania — live in the Northeastern ITS Architecture Region. Over three-quarters of the Region's population resides in Lackawanna (Scranton) and Luzerne (Wilkes-Barre), with the remainder scattered among the other four counties of the Region.

Table 2-1: Northeastern ITS Architecture Region Population by County

County	% Population
Lackawanna	31%
Luzerne	46%
Pike	7%
Susquehanna	6%
Wayne	7%
Wyoming	4%
Total Population in the Region	696,887

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

Table 2-2 compares specific population traits in the Northeastern Region to those across Pennsylvania and the U.S. generally. For instance, the Region is decidedly more homogeneous than either the statewide or national populations — only 3.4 percent of the Northeastern residents are classified as minorities. Similarly, the Region’s population skews older than the state or national averages — the median age of D4 residents is 40, as compared to 38 years statewide and 35 years nationally. Also, mean family size is smaller, and per capita income is lower, in D4 than across Pennsylvania or the U.S.

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

Demographic Factor	Northeastern Region	Pennsylvania	United States
Total Population	696,887	12,281,054	281,421,906
% Minority Population	3.4%	14.6%	24.9%
Median Age (In Years)	40.4	38.0	35.3
Mean Family Size	2.98	3.04	3.14
Per Capita Income	\$18,289	\$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 Northeastern workers drive to work alone, just a bit higher than the state and national “drive-alone” rates. Twelve percent of workers in the Region carpool to work, which is comparable to the statewide average. Approximately one percent of workers use public transportation; considerably less than state and national transit usage trends. The average one-way commute time for Northeastern ITS Architecture Region workers is 23 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 Northeastern ITS Architecture Region, Pennsylvania, and the United States

Commuting Pattern	Northeastern Region	Pennsylvania	United States
Total Workers 16 & Over	306,060	5,556,311	128,279,228
% Commuters Driving Alone	80.9%	76.5%	75.7%
% Commuters Carpooling	11.6%	10.4%	12.2%
% Commuters Using Public Transportation	1.0%	5.2%	4.7%
Mean Travel Time to Work (Minutes)	23.2	25.2	25.5

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

As shown in Table 2-4, the Northeastern Region encompasses a substantial network of roadways. As reported in PennDOT's *2002 Highway Statistics*, the Region contains 8,851 linear miles of roadway, signifying 7.3 percent of the Commonwealth's total linear mileage. This includes 3,625 linear miles of roadway maintained by PennDOT, with the remaining road miles maintained by the PTC, municipalities, etc.

Table 2-4: Northeastern ITS Architecture Region Linear Miles

County	PennDOT Linear Miles	Total Linear Miles
Lackawanna	557.6	1,520.2
Luzerne	852.4	2,641.1
Pike	327.5	624.7
Susquehanna	802.3	1,876.7
Wayne	718.7	1,429.0
Wyoming	366.3	759.0
Regional Total	3,624.8	8,850.7
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 18.0 million miles. The DVMT on PennDOT roadways was approximately 14.9 million miles.

Table 2-5: Northeastern Daily Vehicle Miles of Travel

County	PennDOT DVMT	Total DVMT
Lackawanna	4,321,723	5,155,987
Luzerne	6,191,158	7,790,193
Pike	1,313,696	1,627,712
Susquehanna	1,417,883	1,582,265
Wayne	1,020,543	1,157,497
Wyoming	668,599	751,862
Regional Total	14,933,602	18,065,516
Statewide	217,331,036	287,203,348

The Northeastern ITS Architecture Region contains a range of important highway corridors. The most significant corridors are depicted in Figure 2-6.

Table 2-6: Significant Highway Corridors

Interstates	United States (U.S.) Routes	Pennsylvania (PA) Routes
Interstate 80 (I-80)	US Route 6 (US-6)	PA Route 29 (PA-29)
Interstate 81 (I-81)	US Route 11 (US-11)	PA Route 309 (PA-309)
Interstate 84 (I-84)	US Route 209 (US-209)	Scranton Expressway
Interstate 380 (I-380)		
Interstate 476* (I-476)		

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

- Canadian Pacific Railroad Taylor Intermodal Yard,
- Proctor & Gamble paper products facility in Tunkhannock,
- The Scranton/Wilkes-Barre International Airport (AVP), and
- Pittston Area Foreign Trade Zone.

Several major road systems in the Region connect the nation's Midwest to New York State and New England and, therefore, support high-volume commercial vehicle traffic. In particular, a large number of trucks travel through the Scranton/Wilkes-Barre metropolitan area as they transfer from I-81 to I-84.

The Northeastern Region contains tourist attractions and travel destinations, including:

- Endless Mountains ski areas,
- Pocono Mountains ski areas,
- Delaware Water Gap National Recreation Area,
- Scranton/Wilkes-Barre are attractions, and
- PennDOT Welcome Centers.

The Region also contains one nuclear generating unit — Pennsylvania Power & Light's Susquehanna Nuclear Power Plant located near Berwick.

The Region is also home to multiple transit providers, including:

- County of Lackawanna Transit System (COLTS),
- Luzerne County Transportation Authority (LCTA),
- Hazelton Public Transit (HPT), and
- Several other 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.

Adjacent State Emergency Management Agencies: Statewide police/public safety agencies in New York and New Jersey, the states that border the District 4-0 Region. These agencies are responsible for coordination activities related to major incidents and events that cross state borders and have impacts within the Region.

Adjacent State Public Safety Agencies: Statewide emergency management agencies in New York and New Jersey, the states that border the District 4-0 Region. These agencies are responsible for coordination activities related to major emergencies and disasters that cross state borders and have impacts within the Region.

Adjacent State Transportation Agencies: Agencies responsible for operating, maintaining, and managing major transportation facilities adjacent to the District 4-0 Region in New York and New Jersey, the states that border the Region. Agencies include the New York State DOT (both centrally and within Region 9), the New York State Thruway Authority, and the New Jersey DOT (both centrally and within the North Region).

Attractions and Event Promoters: Locations, venues, facilities, and businesses within the Region that attract major trip-making, thereby creating impacts on the

transportation system. This element includes concert venues, (Montage Mountain, County Fairgrounds), sports facilities (Wachovia Arena, Lackawanna County Stadium, Pocono Raceway), tourism sites (ski/recreation sites, Delaware Water Gap, Steamtown USA), and other major 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: Lackawanna, Luzerne, Pike, Susquehanna, Wayne, and Wyoming county government operations are included within the Region. Departments typically having an impact on the transportation system include incident and emergency management agencies such as county police, fire, EMS, 911, and EMA's, as well as County planning departments.



Delaware River Joint Toll Bridge

Commission (DRJTBC): The Delaware River Joint Toll Bridge Commission (DRJTBC) is an independent agency responsible for operating, maintaining, and managing a total of twenty bridges crossing the Delaware River between Pennsylvania

and New Jersey, two of which connect to the Region (Milford-Montague Toll Bridge and Delaware Water Gap Toll Bridge). More information about the DRJTBC is available on their website (<http://www.drjtbc.org>).

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: Public agencies and private companies that provide information to media outlets and the general public on the status of the transportation system, including delays, incidents, and facility closures.

Local School Districts: Municipal and regional entities that operate schools within the Region. In addition, school districts are responsible for providing students with transportation to and from school on a daily basis.

Municipalities: Municipal governments located within the Region, whose responsibilities include traffic signal operations, traffic management, and emergency response (fire/police/EMS). Major municipalities within the Region include Scranton, Wilkes-Barre, and Hazleton, along with a large number of boroughs and townships, which vary in nature from urban to suburban to rural. Staffing and hours of service vary widely, from cities with a large staff that operate 24 hours per day, 7 days per week to

townships with only a handful of paid staff that are only open 2-3 days per week during regular business hours.

National Park Service: US federal agency (part of the Department of the Interior) that owns and operates a variety of recreational and historical sites within the Region. In particular, the Delaware Water Gap National Recreation Area is significant NPS unit within the Region, which manages roadways and provides police services.



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.paturndpike.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 Railroads: Railroads provide for the bulk movement of goods within and to/from the Region (no passenger rail service currently exists within District 4-0, although a study is ongoing for NJ Transit commuter rail service to Hoboken, NJ). Railroads operating within the Region include Norfolk Southern, Canadian Pacific, local short lines, and county/regional railroad authorities.

Regional Transit Agencies: Public agencies and private companies operating public transportation services within the Region, including Luzerne County Transportation Authority (LCTA), County of Lackawanna Transit System (COLTS), Hazleton Public Transit (HPT), and Endless Mountains Transportation Authority (EMTA), as well as private companies such as Martz Lines and Greyhound.

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 the incident cleanup and the 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.

Weather Information Providers: Public agencies and private companies that provide weather forecast information to transportation agencies, emergency response agencies, media outlets, and the general public. Includes the National Weather Service/NOAA, Accuweather, The Weather Channel, and others.

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/ Program	Status	Project/Program Description
Adjacent State Transportation Agencies	NYSDOT Incident Coordination Center	Existing	Statewide traffic management center for New York State.
Adjacent State Transportation Agencies	New York State DOT Region 9 TMC	Planned 1	Regional traffic management center for the Region 9 area.

Stakeholder	Project/ Program	Status	Project/Program Description
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 Emergency/911 Centers	Existing	911 Centers provide dispatching for all local and county emergency vehicles.
Counties	County Emergency Management Agencies (EMA's)	Existing	County EMA's respond and coordinate with others during emergencies within each county.
Counties	Enhanced 911	Existing	Enhanced 911 currently deployed in certain counties, and will be deployed in additional counties in the future.
Counties	Computer-Aided Dispatching (CAD) (Lackawanna County)	Existing	All county Fire, EMS, and Police agencies dispatched via CAD.
Counties	ALS Vehicle Automatic Vehicle Location (AVL) (Lackawanna County)	Existing	AVL devices deployed on all Advanced Life Support (ALS) EMS vehicles in the county.
Counties	Information Service Provider Connection	Planned 1	Develop direct connection between ISPs and County 911 Communication Centers

Stakeholder	Project/ Program	Status	Project/Program Description
Counties	Emergency Communications	Planned 2	Improve communications links between County 911 Centers and County Emergency Management Agencies.
Counties	Public Transit Emergency Management	Planned 2	Improve communications between transit agencies and County 911 Communication Centers, for emergency management.
Delaware River Joint Toll Bridge Commission (DRJTBC)	DRJTBC E-Z Pass Electronic Toll Collection	Existing	E-Z Pass deployed on DRJTBC bridges, including those in the District 4-0 Region.
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	In-Vehicle Technology	Existing	Existing in-vehicle ITS systems, such as navigation systems, adaptive cruise control, and OnStar.
Information Service Providers	General Media Traveler Information	Existing	Regional traffic information clearinghouse that provides traffic information and data to regional media outlets.
Local School Districts	Traffic Management Coordination	Planned 2	Improved traffic management coordination for school transportation.
Local School Districts	Vehicle Communications	Planned 1	Install two-way radio systems to allow school buses to communicate with school district offices.

Stakeholder	Project/ Program	Status	Project/Program Description
Local School Districts	School Bus AVL	Planned 2	Install Automatic Vehicle Location systems on school buses.
Municipalities	Advanced Traffic Signal Control (Borough Ashley)	Planned 1	Signal coordination project.
Municipalities	Advanced Traffic Signal Control (Borough of Forty-Fort)	Existing	Signal coordination project.
Municipalities	Advanced Traffic Signal Control (City of Hazleton)	Planned 1	Signal coordination project.
Municipalities	Advanced Traffic Signal Control (Borough of Kingston)	Existing	Signal coordination project.
Municipalities	Advanced Traffic Signal Control (City of Pittston)	Planned 1	Signal coordination project.
Municipalities	Advanced Traffic Signal Control (Borough of Plymouth)	Planned 1	Signal coordination project.
Municipalities	Advanced Traffic Signal Control (City of Scranton)	Existing	Centralized traffic signal system with 5 separate closed loop systems.
Municipalities	Traffic Signal Data Collection (City of Scranton)	Planned 1	30 signals to be equipped with loop detectors and 20 signals to be equipped with video detectors.
Municipalities	Advanced Traffic Signal Control (City of Wilkes-Barre)	Existing	Signal coordination project.
Municipalities	Roadway Information to Transit	Planned 2	Improve communication of information about roadway conditions (congestion, construction detours) to public transit agencies.

Stakeholder	Project/ Program	Status	Project/Program Description
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.
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.

Stakeholder	Project/ Program	Status	Project/Program Description
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.
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.

Stakeholder	Project/ Program	Status	Project/Program Description
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 4-0)	Portable Dynamic Message Signs (DMS)	Existing	42 DMS units are currently deployed and 4 additional units are in the process of being deployed, to provide information to travelers regarding roadway and travel conditions. Portable units are generally solar-powered and can be moved around between sites; many sites have been prepared with roadside concrete pads to more easily accommodate placement of units.
PennDOT (District 4-0)	Permanent/Overhead Dynamic Message Signs (DMS)	Existing	4 permanent/overhead DMS units provide information to travelers on roadway and travel conditions. Overhead units are permanently installed at key locations and are directly connected to the power grid. 3 additional permanent/overhead DMS units are under construction.
PennDOT (District 4-0)	I-81 ITS Improvements (NTRPDC TIP Project #57724)	Existing	\$390,000 programmed for installation of one additional permanent/overhead DMS unit on I-81 near the New York State line.
PennDOT (District 4-0)	I-84 ITS Improvements (NEPA TIP Project #57723)	Existing	\$375,000 programmed for installation of one additional permanent/overhead DMS unit on I-84 near the New York State line.
PennDOT (District 4-0)	Luzerne ITS I-81 and I-84 (LLTS TIP Project #57722)	Existing	\$245,000 programmed hardware power and communications to 5 DMS sites.

Stakeholder	Project/ Program	Status	Project/Program Description
PennDOT (District 4-0)	ITS Tracking Database	Existing	Microsoft Access database used to track use of ITS devices (for example, messages placed on DMS units) and maintenance of ITS devices.
PennDOT (District 4-0)	Closed Circuit Television (CCTV)	Existing	CCTV cameras provide surveillance of roadway operations, as well as verification of messages posted on DMS units. 1 camera uses microwave communications and 2 cameras use ISDN communications.
PennDOT (District 4-0)	Highway Advisory Radio (HAR)	Existing	Nine HAR broadcasting stations provide travelers (through their radios) with information about roadway and weather conditions, as well as construction and special events. These are accompanied by nine HAR advisory beacons that provide travelers with warning to tune to the HAR frequency because a message has been posted.
PennDOT (District 4-0)	Roadway Weather Information Stations (RWIS)	Existing	7 RWIS sites gather information about weather that is relevant to highway safety, such as snow or freezing rain.
PennDOT (District 4-0)	I-81 1/10 Mile Markers	Existing	Installed along 50 miles of I-81, tenth of a mile markers clearly mark every tenth of a mile location with static signage. Used to more accurately locate incidents and provide motorists with more accurate roadway condition information.
PennDOT (District 4-0)	Pre-Assigned Detour Routes	Existing	Pre-determined and statically signed detour routes that can be used in the event of a major incident along or closure of an Interstate highway. Information about which detour routes to follow can be disseminated using DMS, HAR, and other ITS systems.

Stakeholder	Project/ Program	Status	Project/Program Description
PennDOT (District 4-0)	Email Distribution Lists	Existing	D4 Community Relations Coordinator (CRC) has email distribution lists to which members of the media, local residents, and others can subscribe, to receive information about roadway conditions, detours, special events, and other conditions that affect travel within the D4 Region. Subscribers can specify the routes and/or geographic area in which they are interested.
PennDOT (District 4-0)	Pennsylvania Welcome Centers	Existing	Two Pennsylvania Welcome Centers are located within the district, and provide motorists with travel, tourism, and roadway information.
PennDOT (District 4-0)	Luzerne County AFLADS	Existing	Automated Fixed Location Anti-/De-Icing System (AFLADS) installed on Sans Souci Bridge (SR2002) in Luzerne County.
PennDOT (District 4-0)	NEPARoads.com Web Site	Existing	Portal for access to D4 web site, which includes traffic updates, weather conditions, and travel advisories. Also includes the ability to sign up for customized email updates.
PennDOT (District 4-0)	Zero-Velocity Salt Spreaders	Existing	More than 50 snowplows are equipped with zero-velocity salt spreaders to provide more effective and more efficient deicing.
PennDOT (District 4-0)	PennDOT Advanced Traffic Management System Software	Planned 1	As part of the implementation of the Traffic Operations Center (CTTC project), D4 will deploy the ATMS control and integration software that is currently being used by D11, modified and updated as necessary to meet D4's needs.

Stakeholder	Project/ Program	Status	Project/Program Description
PennDOT (District 4-0)	D4 Traffic Management Center	Planned 1	Project being implemented by Carbondale Technology Transfer Center (CTTC) using federal FY99 and FY01 funding earmarks. Project has been refined and focused on the development of a regional Traffic Operations Center for District 4-0, to be located inside the District HQ in Dunmore. In addition to the construction of a new facility, the existing central systems will be made user-friendlier and more robust, and greater provision will be made for connections to neighboring districts and states.
PennDOT (District 4-0)	Hazard Advisory Radio (LLTS TIP Project #57695)	Planned 1	\$605,000 programmed for thirteen additional HAR beacons to be installed along I-81.
PennDOT (District 4-0)	SR-29 Improvement Project	Planned 1	3 permanent/overhead DMS units recommended for installation on SR-29 in Tunkhannock area.
PennDOT (District 4-0)	Resource Deployment Coordination	Planned 2	Improve resource deployment coordination between PennDOT, PSP, and PTC.
PennDOT (District 4-0)	Surveillance Coordination	Planned 2	Coordinate roadway surveillance between roadway management agencies during detours, to monitor secondary congestion and incidents.
PennDOT (District 4-0)	Incident Response/Management Priority Schemes	Planned 2	Define and refine thresholds for incident response and management for various types of incidents, particularly within the urbanized areas.
PennDOT (District 4-0)	Improved Information Coordination	Planned 2	Develop general methodology and standards for communication between stakeholders.
PennDOT (District 4-0)	Municipal Signal Control	Planned 2	Implement systems to allow PennDOT to take over control of municipal traffic signal systems to implement detour routes.

Stakeholder	Project/ Program	Status	Project/Program Description
PennDOT (District 4-0)	Additional Roadway Surveillance	Planned 2	Install additional roadway flow sensors and CCTV cameras.
PennDOT (District 4-0)	Public Transit Information Exchange	Planned 2	Better connect Regional Transit Agency Offices and the D4 TMC, to exchange information about roadway conditions.
PennDOT (District 4-0)	On-Vehicle Cameras	Planned 2	Install traffic monitoring cameras on PennDOT maintenance vehicles.
PennDOT (District 4-0)	Information Clearinghouse	Planned 2	Create central clearinghouse for regional traveler information.
PennDOT (District 4-0)	Online Event Notification	Planned 1	Provide online form to report upcoming events that will affect traffic.
PennDOT (District 4-0)	NPS Coordination	Planned 2	Improved coordination of information between PennDOT D4 TMC and the National Park Service (Delaware Water Gap NRA).
PennDOT (District 5-0)	I-81 Motorist Call Boxes (PennDOT District 5-0)	Existing	38 call boxes located between MP 140 and MP 158 provide motorists with a means to contact emergency service providers. District 5-0 maintains call boxes because most are located in D5-0. Pennsylvania State Police (PSP) provides monitoring and response.
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.

Stakeholder	Project/ Program	Status	Project/Program Description
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.
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.

Stakeholder	Project/ Program	Status	Project/Program Description
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 State Police (PSP)	Local Emergency Communications	Planned 2	Better connect PSP with local emergency dispatch and emergency responders, including reconnecting agencies that lose direct contact with PSP due to transition to 800 MHz radio system.
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.
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.

Stakeholder	Project/ Program	Status	Project/Program Description
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.
Railroads	HRI Control Information	Planned 2	Better dissemination of information about who controls Highway-Rail Intersections.
Regional Transit Agencies	COLTS Radio Communication System	Existing	Radios are used for voice communication between transit vehicles and the dispatch center.
Regional Transit Agencies	COLTS Automatic Vehicle Location (AVL)	Existing	AVL technology provides real-time location of transit vehicles, for dispatching and customer information functions. AVAIL Technologies AVL system deployed on all COLTS buses. System also includes mobile data terminals and vehicle component monitoring.
Regional Transit Agencies	COLTS Automated Stop Annunciation	Existing	Provides travelers with automated voice and text announcement of upcoming bus stops.
Regional Transit Agencies	Scranton Intermodal Transit Center	Planned 2	Central location to be served by all COLTS buses. Will provide travelers with real-time information about bus arrival times. Similar systems may be deployed at other major traffic generators in the COLTS service area (i.e. major malls).

Stakeholder	Project/ Program	Status	Project/Program Description
Regional Transit Agencies	HPT Radio Communication System	Existing	Radios are used for voice communication between transit vehicles and base stations located at HPT and at the contractors' dispatch centers.
Regional Transit Agencies	HPT Stop Annunciation	Existing	Provides travelers with voice and text announcement of upcoming bus stops. Drivers manually trigger messages.
Regional Transit Agencies	HPT Automated Stop Annunciation	Planned 1	Provides travelers with automated voice and text announcement of upcoming bus stops.
Regional Transit Agencies	LCTA Radio Communication System	Existing	Radios are used for voice communication between transit vehicles and the dispatch center.
Regional Transit Agencies	LCTA Automated Stop Annunciation	Existing	Provides travelers with automated voice and text announcement of upcoming bus stops.
Regional Transit Agencies	LCTA Automatic Vehicle Location (AVL)	Planned 1	Provides real-time location of transit vehicles, for dispatching and customer information functions.
Regional Transit Agencies	Transit Panic Buttons	Planned 1	Install panic buttons on buses to provide notification in case of an emergency.
Regional Transit Agencies	Full AVL Deployment	Planned 1	Outfit all transit vehicles within the Region with Automatic Vehicle Location systems.
Regional Transit Agencies	Online Traveler Information	Planned 2	Make real-time traveler information available through agency web sites.
Various Stakeholders	800 MHz Statewide Communication System	Existing	This project involves the deployment of a statewide 800 MHz wireless communication system for state agencies.

Stakeholder	Project/ Program	Status	Project/Program Description
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: The PennDOT Engineering Districts located adjacent to District 4-0, along with the County Maintenance Offices located in those districts. District 3-0 is located to the west of District 4-0 and District 5-0 is located south of District 4-0. These adjacent districts coordinate with PennDOT on a variety of operations and management issues, and will share responsibilities under the proposed statewide operations framework. This element includes a variety of systems to operate each District's transportation facilities, such as existing/planned surveillance, communications, and system management tools.

Adjacent State Emergency Management Offices: Emergency management agency offices/operations centers located in New York and New Jersey, the states adjacent to District 4-0. This element provides coordination with respect to emergencies and disasters that have impacts within the District. Includes a variety of systems to monitor emergencies and coordinate emergency management, including existing/planned wireline and wireless communications technologies, mobile incident

response vehicles, and systems/procedures to coordinate with other stakeholder agencies.

Adjacent State Public Safety Offices: Police/public safety offices/operations centers located in New York and New Jersey, the states adjacent to District 4-0. This element provides coordination with respect to incidents and other public safety activities that have an impact within the District. Includes a variety of systems to monitor and coordinate these incidents, including existing/planned wireline and wireless communications technologies, mobile incident response vehicles, and systems/procedures to coordinate with other stakeholder agencies.

Adjacent State Transportation Offices: Offices and Transportation Management Centers operated by transportation agencies in New York and New Jersey, the states adjacent to District 4-0. Facilities included in this element include the NYSDOT Incident Coordination Center, the NYSDOT Region 9 TMC (currently planned), and TMC's that are to be operated by the New York State Thruway Authority and the New Jersey DOT. This element provides general coordination regarding adjacent state incidents and traffic conditions that will impact the District 4-0 Region. Includes a variety of systems to operate each jurisdiction's transportation facilities, including existing/planned surveillance, communications, and system management tools.

Attractions and Event Promoters: Regional attractions and event locations that generate large traffic events that have a significant impact on the local and regional transportation system. Systems in this element include parking management, control of traffic signals on adjacent arterials, communication with local and regional public safety/emergency management agencies, and connections to nearby DMS installations.

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: County and/or regional agencies responsible for planning for both the long-range future of the transportation system and the short-range programming of funds for upcoming projects. Includes existing/future systems for data management and data archiving, regional planning and programming, and coordination of Geographic Information Systems.

Delaware Water Gap National Recreation Area: Unit of the National Park Service located on the eastern border of District 4-0. In addition to tourism and recreation functions, the Delaware Water Gap NRA also manages roadways within the park and provides police protection through NPS Protection Rangers.



DRJTBC Offices: Regional toll bridge agency, with operations and management systems located at their headquarters in Morrisville, PA. DRJTBC Headquarters serve as a central point for traffic management, emergency/incident management, interagency coordination, and toll system management.

DRJTBC Toll Plazas: Existing DRJTBC-operated systems/equipment located at bridge tolling plazas. Toll plazas have electronic toll capabilities using the E-Z Pass system to automatically read in-vehicle tags and collect the appropriate toll. Toll plazas also act as the administrative/management location for each crossing facility.

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.

Local School District Offices: Local and regional entities responsible for providing pupil transportation. Existing/future systems include radio communications, vehicle management, route optimization, contract management, and vehicle tracking.

Local School District Transit Vehicles: Vehicles operated by public agencies and private contractors to provide pupil transportation within the Region. Depending on the location, vehicles may be equipped with radio communications and/or vehicle tracking systems.

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

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.

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.



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 D4 County Maintenance Offices: Pennsylvania Department of Transportation District 4-0 County Maintenance Offices located in each of the six counties within the Region. 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.

PennDOT D4 Field Devices: Pennsylvania Department of Transportation Engineering District 4-0-operated field devices. Includes existing/future DMS, HAR, CCTV, and AFLADS equipment, as well as low-technology solutions such as predetermined detour routes and 1/10 mile markers.

PennDOT D4 Maintenance and Construction Vehicles: Pennsylvania Department of Transportation Engineering District 4-0-operated maintenance vehicles. Includes field personnel and existing/future in-vehicle systems for routine construction and maintenance vehicles. Note that while the element includes the word “construction” for consistency with the National ITS Architecture, all of PennDOT’s vehicle are considered maintenance vehicles, with major construction performed by private contractors.

PennDOT D4 Service Patrol Vehicles: Planned future vehicles operated by PennDOT or private contractors that will patrol major roadways within the Region and provide traveler assistance and support, as well as assisting in emergency response. This element includes the physical vehicles and personnel, communications and monitoring systems, and traveler information connections.

PennDOT D4 TMC: Physical location and operational systems at the Pennsylvania Department of Transportation Engineering District 4-0 Headquarters in Dunmore, PA. As of 2005, this element consists of a cubicle that houses all of the existing ITS operations and monitoring systems, as well as terminals from a private weather service and from the I-95 IEN. In the future, the TMC will be upgraded to a dedicated facility with specialized HVAC, power, and communications, providing an upgraded operation and monitoring location. This will also include implementation of a system integration platform and other systems improvements in communications, monitoring, and data archiving/data management, and enhanced hours of operation. This upgraded TMC is expected to operate as a Regional Transportation Management Center (RTMC), as classified within the latest PennDOT Statewide ITS Operational Concept, which may include extended hours of operation.

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 Welcome Centers and Rest Areas: The Northeastern Region has two Welcome Centers, near the Pennsylvania border, that provide travelers with information. The Northeastern 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.



Railroad Offices: Centralized and local operations and management location for railroads operating within the Region. Some offices are located inside the Region, whereas others are remote and located elsewhere. Includes systems deployed for railroad operations and management within the Region, such as grade-crossing warning devices, wayside and in-cab signal systems, yard/terminal facilities, and maintenance facilities.



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 Transit Agency Offices: Offices/dispatching centers operated by public and private transportation agencies/companies within the Region to manage fixed-route transit and paratransit operations. Includes systems and personnel that provide centralized transit and emergency tracking, dispatching, and management.

Regional Transit Vehicles: Vehicles and in-vehicle systems operated by public and private transit providers in the Region. Includes drivers and in-vehicle systems that provide existing/future driver-to-dispatch communications, automated stop announcements, transit signal priority, AVL, and safety/security surveillance, as well as 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 4-0 Office is a member agency of TRANSCOM.

Weather Information Providers: Systems operated by private companies and public agencies that collect, analyze, and disseminate information on current and future weather conditions. Existing/future systems include surveillance devices (e.g., satellites, weather stations, and Doppler radar), central database and analysis tools, and public and private information distribution networks.

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	Project
911 Communication Centers	Counties	Provides call-taking for emergencies and dispatching of all county and local emergency vehicles- In Lackawanna County, 911 Center uses Computer-Aided Dispatching, and Advanced Life Support EMS vehicles are equipped with AVL- Enhanced 911 is currently deployed in certain counties, and will be deployed in additional counties in the future	Existing	<ul style="list-style-type: none"> • County/Emergency 911 Communication Centers • Computer-Aided Dispatching (CAD) • ALS Vehicle Automatic Vehicle Location (AVL) • Enhanced 911
Adjacent PennDOT District and County Offices	Pennsylvania Department of Transportation (PennDOT)	Provides general coordination with PennDOT District 4-0 Offices	Existing	
Adjacent State Emergency Management Agency Offices	Adjacent State Emergency Management Agencies	Provides general coordination with PennDOT District 4-0 Offices	Existing	
Adjacent State Public Safety Offices	Adjacent State Public Safety Agencies	Provides general coordination with PennDOT District 4-0 Offices	Existing	

Element	Stakeholder	Functionality	Status	Project
Adjacent State Transportation Offices	Adjacent State Transportation Agencies	Provides overall statewide coordination of NYSDOT resources, response and system status during major incidents and emergencies	Existing	<ul style="list-style-type: none"> • NYSDOT Incident Coordination Center • NYSDOT Region 9 TMC
		Provides traffic management for the Region 9/ Binghamton area	Planned 2	
		Provides general coordination with PennDOT District 4-0 Offices	Existing	
Attractions and Event Promoters	Attraction and Event Promoters	Attracts significant traffic to the area to visit cultural, recreational, and entertainment destinations	Existing	
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 schedules based on the vehicle miles traveled determined using vehicle tracking	Existing	
		Provides appropriate transportation and emergency agencies with hazmat and emergency information	Existing	

Element	Stakeholder	Functionality	Status	Project
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	
		Offers the capability 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 to and coordination of emergencies	Existing	<ul style="list-style-type: none"> County Emergency Management Agencies (EMA's)
County/Regional Planning Organizations	County/Regional Planning Organizations	Coordinates county and regional planning activities in accordance with state and federal requirements	Existing	
Delaware Water Gap National Recreational Area	National Park Service	Provides roadway management and public safety services; also serves as a significant tourist destination at the eastern edge of District 4-0	Existing	
DRJTBC Offices	Delaware River Joint Toll Bridge	Provides general coordination with District 4-0	Existing	<ul style="list-style-type: none"> DRJTBC E-Z Pass

Element	Stakeholder	Functionality	Status	Project
	Commission (DRJTBC)	Operates toll plazas (includes E-Z Pass)	Existing	Electronic Toll Collection
DRJTBC Toll Plazas	Delaware River Joint Toll Bridge Commission (DRJTBC)	Provides capability to automatically identify vehicle type using tag readers and collect tolls	Existing	<ul style="list-style-type: none"> DRJTBC E-Z Pass Electronic Toll Collection
High Threat Facilities	Various Stakeholders	Major facilities that require special security and/or emergency response coordination	Existing	
		Reports high-threat facility information to 911 Communications 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	Provides information to radio and TV stations about current traffic conditions, detour routes, and other traffic data	Existing	<ul style="list-style-type: none"> General Media Traveler Information
Local School District Offices	Local School Districts	Provides transportation for students to and from school	Existing	
Local School District Transit Vehicles	Local School Districts	Provides pupil transportation through a mix of public and private contractor vehicles	Existing	

Element	Stakeholder	Functionality	Status	Project
Municipal Field Devices	Municipalities	Controls municipally-owned traffic signal systems	Existing	<ul style="list-style-type: none"> • Municipal Traffic Signal Control
		Provides centralized traffic control at local intersections; also performs remote data-collection functions	Existing	<ul style="list-style-type: none"> • Advanced Traffic Signal Control (Forty-Fort) • Advanced Traffic Signal Control (Kingston) • Advanced Traffic Signal Control (Scranton) • Advanced Traffic Signal Control (Wilkes-Barre)
			Planned 1	<ul style="list-style-type: none"> • Advanced Traffic Signal Control (Ashley) • Advanced Traffic Signal Control (Hazleton) • Advanced Traffic Signal Control (Pittston), Traffic Signal Data Collection (Scranton)
Municipal Traffic Management Offices	Municipalities	Controls municipality-owned traffic signals system and performs other roadway management	Existing	

Element	Stakeholder	Functionality	Status	Project
Municipal/Regional Public Safety Offices	Municipalities	Manages municipal public safety services (fire and police response)	Existing	
Municipal/Regional Public Safety Vehicles	Municipalities	Provides local fire and police response	Existing	
Passenger Vehicles	General Public	Provides the capability for vehicle operators to pay a toll without stopping	Existing	<ul style="list-style-type: none"> • DRJTBC E-Z Pass Electronic Toll Collection • 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	

Element	Stakeholder	Functionality	Status	Project
		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	
		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	

Element	Stakeholder	Functionality	Status	Project
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 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
		The PennDOT Central Office Press Office communicates traffic-related information to Regional Media Outlets	Existing	
		PennDOT (Motor Carrier Division) maintains commercial vehicle registrations	Existing	
		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	

Element	Stakeholder	Functionality	Status	Project
		PennDOT Motor Carrier Division provides appropriate credentials to motor carriers and collects necessary registration and title fees	Existing	(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
		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	
		RWIS monitors roadway weather conditions and transfers information to PennDOT BOMO	Existing	
		Receives environmental conditions information from various weather sources to aid in scheduling routine maintenance activities	Existing	
PennDOT D4 County Maintenance	Pennsylvania Department of Transportation	PSP contacts the D4 County Maintenance Office which, in turn, contacts the D4 Office/TMC when there is an incident	Existing	

Element	Stakeholder	Functionality	Status	Project
Offices	(PennDOT)	PSP contacts the County Maintenance Office for sand trucks, vehicle removals, etc.	Existing	
		PSP contacts the County Maintenance Office for sand trucks, vehicle removals, etc.	Existing	
		D4 County Maintenance Offices must fill out incident information forms (manually) and send them to the PennDOT Central Office (BHSTE) using email and fax	Existing	
		Receives real-time RWIS data from RWIS stations	Existing	
PennDOT D4 Field Devices	Pennsylvania Department of Transportation (PennDOT)	46 portable and 9 permanent/overhead DMS units provide travelers with text information about roadway system conditions	Existing	<ul style="list-style-type: none"> • Portable Dynamic Message Signs (DMS) • Permanent/Overhead Dynamic Message Signs (DMS) • I-81 ITS Improvements (NTRPDC TIP Project #57724) • I-84 ITS Improvements (NEPA TIP Project #57723), • Highway Advisory Radio
		9 existing broadcasting stations and 22 existing beacons provide travelers with verbal information about roadway system conditions	Existing	
		One-tenth mile markers are used to obtain and disseminate accurate information about the locations of incidents, detours, and lane restrictions	Existing	

Element	Stakeholder	Functionality	Status	Project
		Permanently installed, color-coded detour signs are used to direct motorists to follow detours around specific sections of the Interstate due to major incidents or highway closures	Existing	(HAR) <ul style="list-style-type: none"> Hazard Advisory Radio (LLTS TIP Project #57695) I-81 1/10 Mile Markers Pre-Assigned Detour Routes Luzerne ITS I-81 and I-84 (LLTS TIP Project #57722) Closed Circuit Television (CCTV) Luzerne County AFLADS SR-29 Improvement Project I-81 Motorist Call Boxes
		D4 is installing hardwired power and communications to 5 DMS units	Existing	
		3 cameras monitor roadway conditions using video images	Existing	
		Automatically treats bridge surface with anti-icing fluids when freezing/icing conditions are detected	Existing	
		Installation of 3 additional permanent/overhead DMS units	Planned 1	
		38 cellular call boxes located along I-81 allow motorists to report incidents or other emergency conditions to the Pennsylvania State Police	Existing	
PennDOT D4 Maintenance and Construction Vehicles	Pennsylvania Department of Transportation (PennDOT)	Provides on-board systems that support effective winter operations, as well as general maintenance of the regional roadway system	Existing	<ul style="list-style-type: none"> Zero-Velocity Salt Spreaders

Element	Stakeholder	Functionality	Status	Project
PennDOT Service Patrol Vehicles	Pennsylvania Department of Transportation (PennDOT)	Provides motorists with direct assistance in the event of stalls, breakdowns, and other incidents. Circulates along area roadways looking for incidents	Planned 2	
PennDOT D4 TMC	Pennsylvania Department of Transportation (PennDOT)	Provides centralized control and monitoring of ITS devices	Existing	<ul style="list-style-type: none"> • Portable Dynamic Message Signs (DMS) • Permanent/Overhead Dynamic Message Signs (DMS) • I-81 ITS Improvements (NTRPDC TIP Project #57724) • I-84 ITS Improvements (NEPA TIP Project #57723) • Highway Advisory Radio (HAR) • Hazard Advisory Radio (LLTS TIP Project #57695) • I-81 1/10 Mile Markers • Pre-Assigned Detour Routes • Luzerne ITS I-81 and I-84
		Provides travelers with text information about roadway system conditions	Existing	
		Provides travelers with verbal information about roadway system conditions	Existing	
		One-tenth mile markers are used to obtain and disseminate accurate information about the location of incidents, detours, and lane restrictions	Existing	
		Permanently installed, color-coded detour signs are used to direct motorists to follow detours around specific sections of the Interstate due to major incidents or highway closures	Existing	
		D4 is installing hardwired power and communications to 5 DMS units	Existing	

Element	Stakeholder	Functionality	Status	Project
		Monitors roadway conditions using video images	Existing	(LLTS TIP Project #57722) <ul style="list-style-type: none"> • Closed Circuit Television (CCTV) • Email Distribution Lists • Roadway Weather Information Stations (RWIS) • Luzerne County AFLADS • D4 Traffic Management Center • PennDOT Advanced Traffic Management System Software • SR-29 Improvement Project
		Information about roadway conditions and incidents is distributed to the general public via email	Existing	
		7 RWIS sites gather information about weather conditions along the roadway	Existing	
		Carbondale Technology Transfer Center will design and construct a new facility that will integrate all of the existing and future ITS devices and control equipment	Planned 1	
		The RTMC will include deployment of the Lockheed Martin ATMS software to provided integrated control, as well as data archiving	Planned 1	
		Installation of 3 additional permanent/overhead DMS units	Planned 1	
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
		May support ATIS systems	Planned 2	

Element	Stakeholder	Functionality	Status	Project
		May coordinate statewide operations (among districts and other states) and other state agencies (PSP, PTC, PEMA)	Planned 2	Hotline for Interstate Highways <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
		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	
		May act as central data repository	Planned 2	
		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	

Element	Stakeholder	Functionality	Status	Project
		May be responsible for conducting weight enforcement activities	Planned 2	<ul style="list-style-type: none"> • Video Sharing • Web site Portal for Assisting Commercial Vehicle Operators • Statewide Telecommunication
PennDOT Welcome Centers and Rest Areas	Pennsylvania Department of Transportation	Provides traveler information and other services at official PennDOT Welcome Centers and roadside rest areas	Existing	<ul style="list-style-type: none"> • PennDOT Welcome Centers
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	
Personal Traveler Information Devices	General Public	Provides the capability to access traffic information from personal devices, including pagers, cell phones, computers, PDA, etc.	Existing	<ul style="list-style-type: none"> • In-Vehicle Technology • Additional Personal Information Services
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
		Plans to receive CCTV images from PTC. PTC intends to share CCTV images with PennDOT, PEMA, and other incident management agencies	Planned 1	

Element	Stakeholder	Functionality	Status	Project
		Receives work zone coverage plans and requests for troopers to cover work zones from PennDOT District Offices	Existing	Center <ul style="list-style-type: none"> 800 MHz Statewide Communication System AMBER Alert Coordination
		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	
		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

Element	Stakeholder	Functionality	Status	Project
		Acts as first-responder at an incident site	Existing	Dispatch Centers <ul style="list-style-type: none"> Incident Information Management System (IIMS) Pennsylvania State Police Consolidated Dispatch Center 800 MHz Statewide Communication System AMBER Alert Coordination
		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 Communication System Emergency Vehicle Traffic Signal Preemption Mobile Data Terminals (MDT's)
		Responds to incidents on the Pennsylvania Turnpike	Existing	
PSP Vehicles	Pennsylvania State Police (PSP)	Coordinates with PSP CDC in case of incident	Existing	<ul style="list-style-type: none"> 800 MHz Statewide Communication System Emergency Vehicle Traffic
		Coordinates with PTC in case of an incident	Existing	

Element	Stakeholder	Functionality	Status	Project
		County/Municipal 911 Centers are contacted by field command to dispatch specialty services and vehicles, such as wreckers and hazmat teams. Specialty services and vehicles are also contacted directly by the field command	Existing	<ul style="list-style-type: none"> Signal Preemption Mobile Data Terminals (MDT's)
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	
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
		Coordinates traffic and emergency operations with agencies throughout the state	Existing	

Element	Stakeholder	Functionality	Status	Project
		Provides support for special event traffic management	Planned 1	Center (TOC) <ul style="list-style-type: none"> PTC E-Z Pass Toll Collection System
		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	
		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	

Element	Stakeholder	Functionality	Status	Project
		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	
		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	

Element	Stakeholder	Functionality	Status	Project
		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	
		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	

Element	Stakeholder	Functionality	Status	Project
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
		Serves as electronic screening and safety inspection stations for the Pennsylvania Turnpike	Planned 2	
Railroad Offices	Regional Railroads	Provides goods movement within the Region. Movement of railroad vehicles is supervised from centralized control centers, located both within and outside the District	Existing	<ul style="list-style-type: none"> Norfolk Southern Canadian Pacific Regional Rail Authorities
Regional Media Outlets	Regional Media	Information about roadway conditions and incidents is distributed to the public via general media outlets (radio and TV)	Existing	<ul style="list-style-type: none"> General Media Traveler Information

Element	Stakeholder	Functionality	Status	Project
Regional Transit Agency Offices	Regional Transit Agencies	Provides communications between transit vehicles and the dispatch centers	Existing	<ul style="list-style-type: none"> • COLTS Radio Communication System • LCTA Radio Communication System • HPT Radio Communication System • COLTS Automatic Vehicle Location (AVL) • LCTA Automatic Vehicle Location (AVL) • Scranton Intermodal Transit Center • Lackawanna Cutoff Rail Restoration
		Through Automatic Vehicle Location (AVL), provides real-time tracking of bus locations and schedule adherence	Existing	
		Provides transit passengers with real-time information about bus arrivals and transit system status	Planned 2	
		Rail service restoration between Hoboken, NJ and Scranton, PA	Planned 2	

Element	Stakeholder	Functionality	Status	Project
Regional Transit Vehicles	Regional Transit Agencies	Provides communications between transit vehicles and dispatch centers/base stations, and provides customer service information to passengers	Existing	<ul style="list-style-type: none"> COLTS Radio Communication System COLTS Automatic Vehicle Location (AVL) COLTS Automated Stop Annunciation LCTA Radio Communication System LCTA Automated Stop Annunciation HPT Radio Communication System
			Planned 1	<ul style="list-style-type: none"> HPT Stop Annunciation LCTA Automatic Vehicle Location (AVL) HPT Automated Stop Annunciation
Towing Industry Responders	Towing Companies	Helps with cleanup at accident sites	Existing	
		Contacted by the PSP and 911 Centers	Existing	

Element	Stakeholder	Functionality	Status	Project
TRANSCOM Center	TRANSCOM	Provides construction coordination, incident management, and technology development in the New York metropolitan area	Existing	<ul style="list-style-type: none"> Regional Transportation Management
Weather Information Providers	Agencies and companies providing weather reports	Provides transportation agencies, emergency response agencies, and the general public with forecasts and other weather data	Existing	

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 response information/coordination	Existing	County EMA Centers, DRJTBC Offices, Incident Response Agency Offices, Municipal Public Safety Offices, PEMA Emergency Operation Center, PennDOT D4 County Maintenance Offices, PSP Offices, PTC Offices, Railroad Offices, Regional Transit Agency Offices, PennDOT D4 TMC,
		Planned 2	Information Service Providers, Local School District Offices
	High threat/emergency information	Existing	High Threat Facilities
	Road closure information	Existing	PTC Offices, PennDOT D4 TMC
	Roadway information	Existing	PTC Offices, PennDOT D4 TMC
	Emergency vehicle dispatch information/coordination	Existing	Municipal/Regional Public Safety Vehicles, Towing Industry Providers
	Special event information	Existing	Attractions and Event Promoters
	Media information	Planned 2	Regional Media Outlets

Element	Need (operation/data inputs from others)	Status	Origin Element
	Weather information	Planned 2	Weather Information Providers
Adjacent PennDOT District and County Offices	Maintenance and construction coordination	Existing	PennDOT D4 County Maintenance Offices, PennDOT D4 TMC
	Weather information	Existing	PennDOT D4 County Maintenance Offices, PennDOT D4 TMC
	Work zone coordination	Existing	PennDOT D4 County Maintenance Offices, PennDOT D4 TMC
	Incident response information/coordination	Existing	PennDOT D4 TMC
	Traffic information	Existing	PennDOT D4 TMC
	Traffic control coordination	Planned 2	PennDOT D4 TMC
Adjacent State Emergency Management Offices	Statewide incident/emergency coordination	Existing	PEMA Emergency Operation Center
Adjacent State Public Safety Offices	Incident response information/coordination	Existing	PSP Offices
	High-threat/emergency information	Existing	PSP Offices
Adjacent State Transportation	Incident response information/coordination	Existing	PennDOT D4 TMC

Element	Need (operation/data inputs from others)	Status	Origin Element	
Offices		Planned 2	PennDOT STMC	
	Maintenance and construction coordination	Existing	PennDOT D4 County Maintenance Offices	
		Planned 2	PennDOT STMC	
	Work zone coordination	Existing	PennDOT D4 County Maintenance Offices	
		Planned 2	PennDOT STMC	
	Traffic information	Existing	PennDOT D4 TMC	
		Planned 2	PennDOT STMC	
	Road weather information	Existing	PennDOT D4 TMC	
	Attractions and Event Promoters	Special event information	Existing	PennDOT D4 TMC, PSP Offices, PTC Offices

Element	Need (operation/data inputs from others)	Status	Origin Element
		Planned 2	911 Communication Centers, County EMA Centers, Information Service Providers, Municipal Traffic Management Offices, Municipal/Regional Public Safety Offices, Regional Transit Agency Offices
Commercial Vehicle Company Offices	Detour route and traffic information	Existing	PTC Offices
	Relaying information from emergency operations to trucking companies	Existing	PTC Offices, PennDOT D5 TMC, PSP Offices
	On-board safety information	Planned 1	Commercial Vehicle Vehicles
	Trip log and identification information	Planned 1	Commercial Vehicle Vehicles
	Safety inspection/screening records	Existing	PennDOT Central Office Field Devices
Commercial Vehicles	Fleet coordination	Planned 1	Commercial Vehicle Company Offices
County EMA Centers	Incident response information/coordination	Existing	911 Communication Centers, DRJTBC Offices, Incident Response Agency Offices, Municipal Public Safety Offices, PEMA Emergency Operation Center, PennDOT D4 County Maintenance Offices, PSP Offices, PTC Offices, Railroad Offices, Regional Transit Agency Offices, PennDOT D4 TMC,

Element	Need (operation/data inputs from others)	Status	Origin Element
		Planned 2	Information Service Providers, Local School District Offices
	High-threat/emergency information	Existing	High Threat Facilities
	Road closure information	Existing	PTC Offices, PennDOT D4 TMC
	Roadway information	Existing	PTC Offices, PennDOT D4 TMC
	Emergency vehicle dispatch information/coordination	Existing	Municipal/Regional Public Safety Vehicles, Towing Industry Providers
	Special event information	Existing	Attractions and Event Promoters
	Media information	Planned 2	Regional Media Outlets
	Weather information	Planned 2	Weather Information Providers
County/Regional Planning Organizations	Archived data	Existing	County EMA Centers, DRJTBC Offices, Regional Transit Agency Offices, Municipal Traffic Management Offices, PennDOT Central Office Organizations, PennDOT D4 TMC, PTC Offices
		Planned 2	PennDOT STMC

Element	Need (operation/data inputs from others)	Status	Origin Element
Delaware Water GAP National Recreation Area	Traffic conditions	Planned 2	PennDOT D4 TMC
	Maintenance and construction information	Planned 2	PennDOT D4 TMC
DRJTBC Offices	Incident response information/coordination	Existing	911 Communication Centers, County EMA Centers, Information Service Providers, PennDOT D4 TMC
	Traffic information	Existing	Information Service Providers, PennDOT D4 TMC
	Tolling information	Existing	DRJTBC Toll Plazas
	Media information	Existing	Regional Media Outlets
	Weather information	Existing	Weather Information Providers
	Traffic control coordination	Planned 2	PennDOT D4 TMC
DRJTBC Toll Plazas	Toll tag data	Existing	Passenger Vehicles
	Tolling information	Existing	DRJTBC Offices
High-Threat Facilities	N/A	N/A	N/A

Element	Need (operation/data inputs from others)	Status	Origin Element
Incident Response Agency Offices	Incident response information/coordination	Existing	911 Communication Centers, County EMA Centers, PEMA Emergency Operation Center, PTC Offices
Information Service Providers	Traffic conditions	Existing	DRJTBC Offices, PTC Offices
		Planned 2	Municipal Traffic Management Offices, PennDOT D4 TMC
	Incident information	Existing	DRJTBC Offices, PTC Offices, PSP Offices
		Planned 2	911 Communication Centers, County EMA Centers, Municipal Traffic Management Offices, PennDOT D4 TMC, Regional Transit Agency Offices
	Special event information	Existing	Attractions and Event Promoters
	Weather information	Planned 2	Weather Information Providers
Local School District Offices	Traffic conditions	Existing	Municipal Traffic Management Offices, PennDOT D4 TMC
	Maintenance and construction information	Planned 2	PennDOT D4 County Maintenance Offices

Element	Need (operation/data inputs from others)	Status	Origin Element
	Road weather information	Planned 2	PennDOT D4 County Maintenance Offices
	AVL data	Planned 1	Local School District Transit Vehicles
Local School District Transit Vehicles	N/A	N/A	N/A
Municipal Field Devices	Request for signal priority	Planned 2	Regional Transit Vehicles
	Signal control	Existing	Municipal Traffic Management Offices
		Planned 2	PennDOT D4 TMC
Municipal Traffic Management Offices	Incident response information/coordination	Existing	PennDOT D4 County Maintenance Offices, PTC Offices
		Planned 2	County EMA Centers, Information Service Providers, PennDOT D4 TMC, Regional Transit Agency Offices
	Traffic information	Existing	PennDOT D4 TMC, PTC Offices
	Road closures	Existing	PennDOT D4 County Maintenance Offices, PTC Offices

Element	Need (operation/data inputs from others)	Status	Origin Element
	Archived data	Existing	County/Regional Planning Organizations
	Weather information	Planned 2	Weather Information Providers
	Media information	Planned 2	Regional Media Outlets
	Special event information	Planned 2	Attractions and Event Promoters
Municipal/Regional Public Safety Offices	Incident response information/coordination	Existing	911 Communication Centers, Municipal/Regional Public Safety Vehicles, PSP Offices
	AVL data	Existing	Municipal/Regional Public Safety Vehicles
	Special event information	Planned 2	Attractions and Event Promoters
Municipal/Regional Public Safety Vehicles	Dispatch Information	Existing	911 Communication Centers, Municipal/Regional Public Safety Offices
Passenger Vehicles	Request for electronic payment	Existing	DRJTBC Toll Plazas, PTC Toll Plazas

Element	Need (operation/data inputs from others)	Status	Origin Element
PEMA Emergency Operation Center	Incident/emergency information and response coordination	Existing	911 Communication Centers, County EMA Centers, PennDOT Central Office Organizations, PennDOT STMC , Pennsylvania Office of Homeland Security
	Traffic conditions	Existing	PTC Offices
		Planned 2	PennDOT STMC
	Traffic control coordination	Planned 2	PTC Offices
	Hazmat information	Existing	Commercial Vehicle Company Offices
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 D4 TMC, PTC Offices
		Planned 2	PennDOT STMC
	Incident/emergency response coordination and information	Existing	PEMA Emergency Operation Center, PennDOT D4 TMC, PSP Offices, PTC Offices
		Planned 2	PennDOT STMC
	Work plan coordination	Existing	PennDOT D4 TMC

Element	Need (operation/data inputs from others)	Status	Origin Element
		Planned 2	PennDOT STMC
	Maintenance and construction coordination	Existing	PennDOT D4 TMC
	Traffic information and roadway conditions	Existing	PennDOT D4 TMC
		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

Element	Need (operation/data inputs from others)	Status	Origin Element
	RWIS information (BOMO)	Existing	PennDOT Central Office Field Devices
		Planned 2	PennDOT STMC
PennDOT D4 County Maintenance Offices	Incident/emergency information and response coordination	Existing	911 Communication Centers, Adjacent PennDOT District and County Offices, County EMA Centers, Municipal Traffic Management Offices, PennDOT D4 TMC
	Maintenance and construction information	Existing	Adjacent PennDOT District and County Offices, Adjacent State Transportation Offices, PTC Offices, Regional Transit Agency Offices, PennDOT D4 Maintenance and Construction Vehicles
		Planned 2	Local School District Offices
	Traffic conditions	Existing	PennDOT D4 TMC
	Work zone information	Existing	Adjacent PennDOT District and County Offices, Adjacent State Transportation Offices, PennDOT D4 TMC , PSP Offices, PTC Offices

Element	Need (operation/data inputs from others)	Status	Origin Element
	Work plan coordination	Existing	Adjacent PennDOT District and County Offices, Adjacent State Transportation Offices, PennDOT D4 TMC, PTC Offices
	Weather information	Existing	Adjacent PennDOT District and County Offices, PennDOT D4 TMC, PSP Offices
		Planned 2	Local School District Offices, Weather Information Providers
	Road closures	Existing	Adjacent PennDOT District and County Offices, PennDOT D4 TMC , PSP Offices
	RWIS data	Existing	PennDOT Central Office Field Devices
	Field device status	Existing	PennDOT D4 Field Devices
PennDOT D4 Field Devices	Field device control	Existing	PennDOT D4 County Maintenance Offices, PennDOT D4 TMC
PennDOT D4 Maintenance and Construction Vehicles	Maintenance and construction dispatch information	Existing	PennDOT D4 County Maintenance Offices

Element	Need (operation/data inputs from others)	Status	Origin Element
PennDOT D4 Service Patrol Vehicles	Emergency dispatch request	Existing	PennDOT D4 TMC
PennDOT D4 TMC	Incident/emergency information and response coordination	Existing	911 Communication Centers, Adjacent PennDOT District and County Offices, Adjacent State Transportation Offices, County EMA Centers, DRJTBC Offices, Municipal Traffic Management Offices, PennDOT Central Office Organizations, PennDOT D4 County Maintenance Offices, PSP Offices, PTC Offices, Regional Transit Agency Offices
		Planned 2	Information Service Providers, PennDOT STMC
	Road weather information	Existing	Adjacent State Transportation Offices, PennDOT Central Office Organizations, PennDOT D4 County Maintenance Offices, PTC Offices
		Planned 2	PennDOT STMC

Element	Need (operation/data inputs from others)	Status	Origin Element
	Traffic information/conditions	Existing	911 Communication Centers, Adjacent PennDOT District and County Offices, Adjacent State Transportation Offices, County EMA Centers, Local School Districts, Municipal Traffic Management Offices, PennDOT Central Office Organizations, PennDOT D4 County Maintenance Offices, PSP Offices, PTC Offices
		Planned 2	DRJTBC Offices, Information Service Providers, PennDOT STMC
	Work plan coordination	Existing	Adjacent PennDOT District and County Offices, PennDOT Central Office Organizations, PennDOT D4 County Maintenance Offices, PTC Offices
		Planned 2	PennDOT STMC
	Work zone coordination	Existing	Adjacent PennDOT District and County Offices, Adjacent State Transportation Offices, PennDOT Central Office Organizations, PennDOT D4 County Maintenance Offices,
		Planned 2	PennDOT STMC

Element	Need (operation/data inputs from others)	Status	Origin Element
	Resource request	Existing	911 Communication Centers, County EMA Centers, PennDOT D4 County Maintenance Offices, PSP Offices, PTC Offices
		Planned 2	PennDOT STMC
	Traffic control coordination	Planned 2	Adjacent PennDOT District and County Offices, Municipal Traffic Management Offices
		Planned 2	DRJTBC Offices, PennDOT STMC
	Archived data	Existing	PennDOT Central Office Organizations, County/Regional Planning Organizations
		Planned 2	PennDOT STMC
	Special event information	Existing	Attractions and Event Promoters
	Maintenance and construction coordination	Existing	PennDOT Central Office Organizations, PennDOT D4 County Maintenance Offices
		Planned 2	PennDOT STMC

Element	Need (operation/data inputs from others)	Status	Origin Element
	Field device control and information	Existing	PennDOT D4 Field Devices
	Media information	Existing	Regional Media Outlets
	Weather information	Existing	Weather Information Providers
PennDOT STMC	Incident/emergency information and coordination	Planned 2	PEMA Emergency Operation Center, PennDOT Central Office Organizations, PennDOT D4 TMC, PSP Offices, PTC Offices
	Traffic control coordination	Planned 2	PennDOT D4 TMC
	Traffic conditions and information	Planned 2	PEMA Emergency Operation Center, PennDOT Central Office Organizations, PennDOT D4 TMC
	Archived data	Planned 2	PennDOT Central Office Organizations, PennDOT D4 TMC
	Weather information	Planned 2	PennDOT Central Office Organizations PennDOT D4 TMC, PennDOT Central Office Field Devices
	Work zone information	Planned 2	PennDOT D4 TMC
	Special event information	Planned 2	Event Promoters
	Maintenance and Construction information including snow removal	Planned 2	PennDOT Central Office Organizations

Element	Need (operation/data inputs from others)	Status	Origin Element
	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	Planned 2	PennDOT D4 TMC
Pennsylvania Office of Homeland Security	High Threat Facility Incident Information	Existing	PEMA Emergency Operation Center
Personal Traveler Information Devices	Traveler information	Existing	PTC Offices
		Planned 2	Regional Transit Agency Offices, Information Service Providers
	Emergency notification	Existing	PennDOT Central Office Organizations
PSP Offices	Incident and emergency information and coordination	Existing	911 Communication Centers, County EMA Centers,, Municipal Public Safety Offices, PennDOT Central Office Organizations, PennDOT D4 TMC, 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

Element	Need (operation/data inputs from others)	Status	Origin Element
	Maintenance and Construction information	Existing	PennDOT D4 County Maintenance Offices
		Planned 2	PennDOT STMC
	Traffic conditions	Existing	PennDOT D4 TMC
		Planned 2	PennDOT STMC
	Weather information	Existing	PennDOT D4 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
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

Element	Need (operation/data inputs from others)	Status	Origin Element
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 D4 TMC, PSP Offices, 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 D4 County Maintenance Offices
	Traffic control coordination (control of DMS along the Turnpike)	Planned 2	PEMA Emergency Operation Center, PennDOT D4 TMC, PennDOT STMC
	Traffic information and conditions	Existing	PennDOT D4 TMC, PTC Field Devices, PSP Troop T Highspire
		Planned 2	PennDOT STMC
	Weather conditions	Existing	PennDOT Central Office Organizations, PSP Troop T Highspire
	Work zone and plan information	Existing	PennDOT D4 County Maintenance Offices, PennDOT D4 TMC
		Planned 2	PennDOT STMC
CVO violation information (overweight vehicles)	Existing	PTC Field Devices	

Element	Need (operation/data inputs from others)	Status	Origin Element
	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
Railroad Offices	Incident/emergency information and response coordination	Existing	911 Communication Centers, County EMA Centers
Regional Media Outlets	Traffic and roadway conditions	Existing	PennDOT D4 TMC, PennDOT Central Office Organizations,
		Planned 2	Municipal Traffic Management Offices, PennDOT STMC
	Incident and emergency information	Existing	DRJTBC Offices, PennDOT D4 TMC, PennDOT D4 County Maintenance Offices, PennDOT Central Office Organizations, PSP Offices
		Planned 2	911 Communication Centers, Count EMA Centers, Regional Transit Agency Offices, PennDOT STMC

Element	Need (operation/data inputs from others)	Status	Origin Element
	Traveler information	Existing	Information Service Providers, PennDOT Central Office Organizations
		Planned 2	PennDOT STMC
	Maintenance and construction information	Existing	PennDOT D4 County Maintenance Offices, PennDOT Central Office Organizations, PennDOT D4 TMC
		Planned 2	PennDOT STMC
Regional Transit Agency Offices	Incident and emergency response coordination	Existing	911 Communication Centers, County EMA Centers, PennDOT D4 TMC
	Transit archive information	Existing	County/Regional Planning Organizations
	Passenger count, automated driver logs, and fare payment information from vehicles	Planned 2	Regional Transit Vehicles
	Vehicle diagnostics and maintenance information	Planned 1	Regional Transit Vehicles
	Fare payment information	Planned 2	Regional Transit Vehicles
	Vehicle location data	Planned 1	Regional Transit Vehicles
	Parking coordination information	Planned 2	Park-n-Ride Facilities
	Road and weather information	Planned 2	PennDOT D11 RTMC
	Maintenance and construction information	Planned 2	PennDOT D4 Maintenance and Construction Offices
	Weather information	Planned 2	Weather Information Providers
Regional Transit Vehicles	Driver dispatch and management information	Existing	Regional Transit Agency Offices

Element	Need (operation/data inputs from others)	Status	Origin Element
Towing Industry Responders	Dispatch information	Existing	911 Communication Centers, PSP Offices, PTC Offices
TRANSCOM Center	Information coordination	Existing	PEMA Emergency Operation Center, PennDOT Central Office Organizations, PennDOT D4 TMC, PTC Offices
		Planned 2	PennDOT STMC
Weather Information Providers	Weather information	Existing	PennDOT D4 TMC, PTC Offices
		Planned 2	DRJTBC Offices, Municipal Traffic Management Offices, PennDOT D4 County Maintenance Offices

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 response information/coordination	Existing	County EMA Centers, DRJTBC Offices, High Threat Facilities, Incident Response Agency Offices, Municipal/Regional Public Safety Offices, PEMA Emergency Operation Center, PennDOT D4 County Maintenance Offices, PennDOT D4 TMC, PSP Offices, PTC Offices, Railroad Offices, Regional Transit Agency Offices
		Planned 2	Information Service Providers
	Emergency dispatch	Existing	Municipal/Regional Public Safety Vehicles
	Special event information	Planned 2	Attractions and Event Promoters, Towing Industry Responders
Adjacent PennDOT District and County Offices	Incident response information/coordination	Existing	PennDOT D4 TMC
	Traffic information	Existing	PennDOT D4 TMC
	Maintenance and construction coordination	Existing	PennDOT D4 County Maintenance Offices, PennDOT D4 TMC
	Road weather information	Existing	PennDOT D4 County Maintenance Offices, PennDOT D4 TMC
	Work Plan information	Existing	PennDOT D4 County Maintenance Offices, PennDOT D4 TMC
	Work zone information	Existing	PennDOT D4 County Maintenance Offices, PennDOT D4 TMC

Element	Service (operation/data outputs to others)	Status	Destination Element
	Traffic control coordination	Existing	PennDOT D4 TMC
Adjacent State Emergency Management Offices	Incident response information/coordination	Existing	PEMA Emergency Operation Center
Adjacent State Public Safety Offices	Incident response information/coordination	Existing	PSP Offices
Adjacent State Transportation Offices	Incident response information/coordination	Existing	PennDOT D4 TMC
		Planned 2	PennDOT STMC
	Maintenance and construction coordination	Existing	PennDOT D4 County Maintenance Offices
		Planned 2	PennDOT STMC
	Traffic information	Existing	PennDOT D4 TMC
		Planned 2	PennDOT STMC
	Work zone information	Existing	PennDOT D4 County Maintenance Offices, PennDOT D4 TMC
		Planned 2	PennDOT STMC
	Work plan information	Existing	PennDOT D4 County Maintenance Offices
	Road weather information	Existing	PennDOT D4 TMC
Attractions and Event Promoters	Special event information	Existing	PennDOT D4 TMC, PTC Offices, PSP Offices

Element	Service (operation/data outputs to others)	Status	Destination Element
		Planned 2	911 Communication Centers, County EMA Centers, Regional Transit Agency Offices, Municipal Traffic Management Offices, Municipal/Regional Public Safety Offices, Information Service Providers
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
	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

Element	Service (operation/data outputs to others)	Status	Destination Element
County EMA Centers	Incident response information/coordination	Existing	911 Communication Centers, DRJTBC Offices, High Threat Facilities, Incident Response Agency Offices, Municipal/Regional Public Safety Offices, PEMA Emergency Operation Center, PennDOT D4 County Maintenance Offices, PennDOT D4 TMC, PSP Offices, PTC Offices, Railroad Offices, Regional Transit Agency Offices
		Planned 2	Information Service Providers
	Emergency dispatch	Existing	Municipal/Regional Public Safety Vehicles
	Special event information	Planned 2	Attractions and Event Promoters, Towing Industry Responders
County/Regional Planning Organizations	Planning data	Existing	DRJTBC Offices, PennDOT Central Office Organizations, PTC Offices, County EMA Centers, Regional Transit Agency Offices
		Planned 2	PennDOT STMC
Delaware Water GAP National Recreation Area	Maintenance and construction information	Planned 2	PennDOT D4 TMC
	Traffic conditions	Planned 2	PennDOT D4 TMC
DRJTBC Offices	Incident response information/coordination	Existing	911 Communication Centers, County EMA Centers, Information Service Providers, PennDOT D4 TMC

Element	Service (operation/data outputs to others)	Status	Destination Element
	Traffic conditions	Existing	Information Service Providers, Regional Media Outlets
		Planned 2	PennDOT D4 TMC
	Traffic information coordination	Planned 2	PennDOT D4 TMC
	Traffic control	Planned 2	PennDOT D4 TMC
	Archived data	Existing	County/Regional Planning Organizations
	Tolling information	Existing	DRJTBC Toll Plazas
	Road weather information	Planned 2	Weather Information Providers
DRJTBC Toll Plazas	Electronic toll information	Existing	Commercial Vehicles, Passenger Vehicles, DRJTBC 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 response information/coordination	Existing	DRJTBC Offices, PSP Offices, PTC Offices
		Planned 2	911 Communication Centers, County EMA Centers
	Traffic conditions	Existing	DRJTBC Offices, PTC Offices
	Traveler information	Existing	Regional Media Outlets

Element	Service (operation/data outputs to others)	Status	Destination Element
		Planned 2	Personal Traveler Information Devices
Local School District Offices	Transit incident information/coordination	Planned 2	911 Communication Centers
Local School District Transit Vehicles	AVL data	Planned 2	Local School Districts
Municipal Field Devices	N/A	N/A	N/A
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 D4 TMC, Municipal Traffic Management Offices
	Incident information	Existing	PTC 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

Element	Service (operation/data outputs to others)	Status	Destination Element
Municipal/Regional Public Safety Vehicles	Emergency dispatch coordination	Existing	Municipal/Regional Public Safety Offices
	Incident command coordination	Existing	Municipal/Regional Public Safety Offices
Passenger Vehicles	Electronic toll tag readers	Existing	DRJTBC Toll Plazas, PTC Toll Plazas
PEMA Emergency Operation Center	Incident response coordination	Existing	911 Communication Centers, Adjacent State Emergency Operation Centers County EMA Centers, Incident Response Agency Offices, 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
PennDOT Central Office Field Devices	RWIS information	Existing	PennDOT Central Office Organizations, PennDOT D4 County Maintenance Offices

Element	Service (operation/data outputs to others)	Status	Destination Element
		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 D4 TMC
		Planned 2	PennDOT STMC
	Incident and emergency information and coordination (BHSTE)	Existing	PEMA Emergency Operation Center, PennDOT D4 TMC, PSP Offices
		Planned 2	PennDOT STMC
	Traffic information and conditions (BHSTE)	Existing	PennDOT D4 TMC
		Planned 2	PennDOT STMC
	Work zone information (BOMO)	Existing	PennDOT D4 TMC
		Planned 2	PennDOT STMC
	Maintenance and construction coordination	Existing	PennDOT D4 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

Element	Service (operation/data outputs to others)	Status	Destination Element
PennDOT D4 County Maintenance Offices	Maintenance and construction information	Existing	Adjacent PennDOT District and County Offices, Adjacent State Transportation Offices, Local School Districts, PennDOT D4 TMC, Municipal Traffic Management Offices, PTC Offices, Regional Media Outlets
		Planned 2	Regional Transit Agency Offices
	Work plan coordination	Existing	Adjacent PennDOT District and County Offices, Adjacent State Transportation Offices, PennDOT D4 TMC, PTC Offices
	Incident response information/coordination	Existing	911 Communication Centers, County EMA Centers, Municipal Traffic Management Offices, PennDOT D4 TMC, PSP Offices
	Road closures	Existing	Adjacent PennDOT District and County Offices, Municipal Traffic Management Offices, PennDOT D4 TMC, PSP Offices
	Work zone information	Existing	Adjacent PennDOT District and County Offices, Adjacent State Transportation Offices, PennDOT D4 TMC, PSP Offices
	Maintenance and construction vehicle dispatch	Existing	PennDOT D4 Maintenance and Construction Vehicles
	Field device control	Existing	PennDOT D4 Field Devices

Element	Service (operation/data outputs to others)	Status	Destination Element
PennDOT D4 Field Devices	Field device status	Existing	PennDOT D4 County Maintenance Offices, PennDOT D4 TMC
PennDOT D4 Maintenance and Construction Vehicles	Maintenance and construction information	Existing	PennDOT D4 County Maintenance Offices
	Work zone information	Existing	PennDOT D4 County Maintenance Offices
PennDOT D4 Service Patrol Vehicles	N/A	N/A	N/A
PennDOT D4 TMC	Incident response information/coordination	Existing	911 Communication Centers, Adjacent PennDOT District and County Offices, Adjacent State Transportation Offices, County EMA Centers, DRJTBC Offices, Municipal Traffic Management Offices, PennDOT Central Office Organizations, PennDOT D4 County Maintenance Offices, PSP Offices, PTC Offices, Regional Transit Agency Offices, Regional Media Outlets
		Planned 2	Information Service Providers, PennDOT STMC

Element	Service (operation/data outputs to others)	Status	Destination Element
	Road network conditions	Existing	911 Communication Centers, Adjacent PennDOT District and County Offices, County EMA Centers, Delaware Water Gap National Recreation Area, Local School Districts, Municipal Traffic Management Offices, PennDOT Central Office Organizations, PennDOT D4 County Maintenance Offices, PSP Offices, PTC Offices, Regional Media Outlets
		Planned 2	DRJTBC Offices, Information Service Providers, PennDOT STMC
	Work zone information	Existing	Adjacent PennDOT District and County Offices, Adjacent State Transportation Offices, PennDOT Central Office Organizations, PennDOT D4 County Maintenance Offices
		Planned 2	PennDOT STMC
	Work plan coordination	Existing	Adjacent PennDOT District and County Offices, Delaware Water Gap National Recreation Area, PennDOT Central Office Organizations, PennDOT D4 County Maintenance Offices, PTC Offices
		Planned 2	PennDOT STMC

Element	Service (operation/data outputs to others)	Status	Destination Element
	Maintenance and construction resource coordination	Existing	Adjacent PennDOT District and County Offices, PennDOT Central Office Organizations, PennDOT D4 County Maintenance Offices
		Planned 2	PennDOT STMC
	Road weather information	Existing	Adjacent PennDOT District and County Offices, PennDOT Central Office Organizations, PennDOT D4 County Maintenance Offices
		Planned 2	PennDOT STMC
	Traffic information coordination	Existing	Adjacent PennDOT District and County Offices, Adjacent State Transportation Offices, Municipal Traffic Management Offices, PennDOT Central Office Organizations, PTC Offices, TRANSCOM Center, Regional Media Outlets
		Planned 2	DRJTBC Offices, PennDOT STMC
	Field device control	Existing	PennDOT D4 Field Devices
	Traveler information	Planned 2	PennDOT Welcome Centers and Rest Areas
Emergency vehicle dispatch	Planned 2	PennDOT D4 Service Patrol Vehicles	
Traffic control coordination	Planned 2	Adjacent PennDOT District and County Offices, Municipal Traffic Management Offices, PennDOT STMC	

Element	Service (operation/data outputs to others)	Status	Destination Element
	Traffic signal control	Planned 2	DRJTBC Offices, Municipal Field Devices, PennDOT STMC
PennDOT STMC	Incident and emergency information and coordination	Planned 2	Adjacent State Transportation Offices, PEMA Emergency Operation Center, PennDOT Central Office Organizations, PennDOT D4 TMC, PSP Offices, PTC Offices
	Request for archived data	Planned 2	Adjacent State Transportation Offices, PennDOT Central Office Organizations, PennDOT D4 TMC
	Traffic information, restrictions, and conditions	Planned 2	Adjacent State Transportation Offices, PennDOT Central Office Organizations, PennDOT D4 TMC, PTC Offices
	Work zone information	Planned 2	Adjacent State Transportation Offices, PennDOT Central Office Organizations, PennDOT D4 TMC, PTC Offices
	Maintenance and construction coordination	Planned 2	Adjacent State Transportation Offices, PennDOT Central Office Organizations, PennDOT D4 TMC, PTC Offices
	Commercial vehicle enforcement information	Planned 2	PennDOT Central Office Organizations, Commercial Vehicle Company Offices

Element	Service (operation/data outputs to others)	Status	Destination Element
	Road weather information	Planned 2	PennDOT Central Office Organizations, PennDOT D4 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
Pennsylvania Office of Homeland Security	Threat information coordination	Existing	PEMA Emergency Operation Center
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, Adjacent State Transportation Offices, County EMA Centers, Municipal Public Safety Offices, PennDOT Central Office Organizations, PennDOT D4 County Maintenance Offices, PennDOT D4 TMC, 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 D4 County Maintenance Offices

Element	Service (operation/data outputs to others)	Status	Destination Element
	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
	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

Element	Service (operation/data outputs to others)	Status	Destination Element
PTC Offices	Incident and emergency information and coordination	Existing	911 Communication Centers, County EMA Centers, PEMA Emergency Operation Center, PennDOT Central Office Organizations, PennDOT D4 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 D4 County Maintenance Offices
	Traffic control coordination (control of DMS along the Turnpike)	Planned 2	PEMA Emergency Operation Center, PennDOT D4 TMC, PennDOT STMC
	Traffic information and conditions	Existing	PennDOT D4 TMC, PTC Field Devices, PSP Troop T Highspire
		Planned 2	PennDOT STMC
	Weather conditions	Existing	PennDOT Central Office Organizations, PSP Troop T Highspire
	Work zone and plan information	Existing	PennDOT D4 County Maintenance Offices, PennDOT D4 TMC
		Planned 2	PennDOT STMC
	CVO violation information (overweight vehicles)	Existing	PTC Field Devices
	CCTV images	Existing	PTC Field Devices

Element	Service (operation/data outputs to others)	Status	Destination Element
	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
Railroad Offices	Incident information	Existing	911 Communication Centers, County EMA Centers
Regional Media Outlets	N/A	N/A	N/A
Regional Transit Agency Offices	Incident information/coordination	Planned 2	911 Communication Centers, County EMA Centers, Information Service Providers, PennDOT D4 TMC, Regional Media Outlets
	Transit vehicle coordination	Existing	Regional Transit Vehicles
	Transit archived data	Existing	County/Regional Planning Organizations, PennDOT Central Office Organizations

Element	Service (operation/data outputs to others)	Status	Destination Element
	Traveler information	Planned 2	Personal Traveler Information Devices, Information Service Providers
Regional Transit Vehicles	AVL data	Existing	Regional Transit Agency Offices
	Fare and payment data	Existing	Regional Transit Agency Offices
	Schedule information	Existing	Regional Transit Agency Offices
	Passenger counts	Existing	Regional Transit Agency Offices
	Traffic signal priority	Planned 2	Municipal Field Devices
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
Weather Information Providers	Weather information	Existing	DRJTBC Offices, PEMA Emergency Operation Center, PennDOT Central Office Organizations, PennDOT D4 TMC, PennDOT D4 County Maintenance Offices, PSP Offices, PTC Offices

Element	Service (operation/data outputs to others)	Status	Destination Element
		Planned 2	911 Communication Centers, County EMA Centers, Information Service Providers, Municipal Traffic Management Offices, Regional Transit Agency Offices

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 June 28, 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 August 25, 2004, a Stakeholders Bookend Meeting convened in Mayfield 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 September and October 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 January 18, 2005 in Mayfield, 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 F.

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.

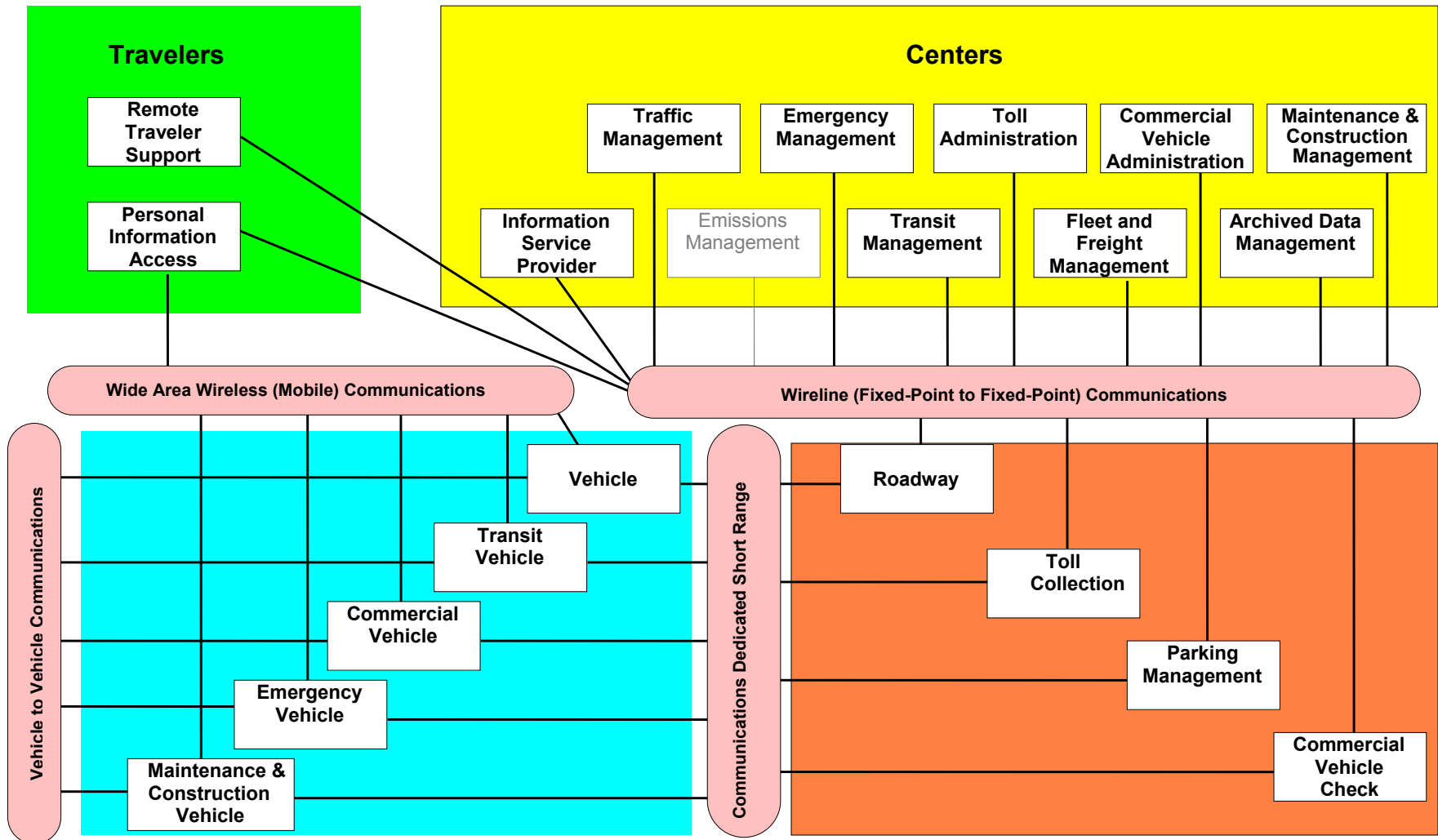


Figure 4-1: Subsystem Interconnect Diagram

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.

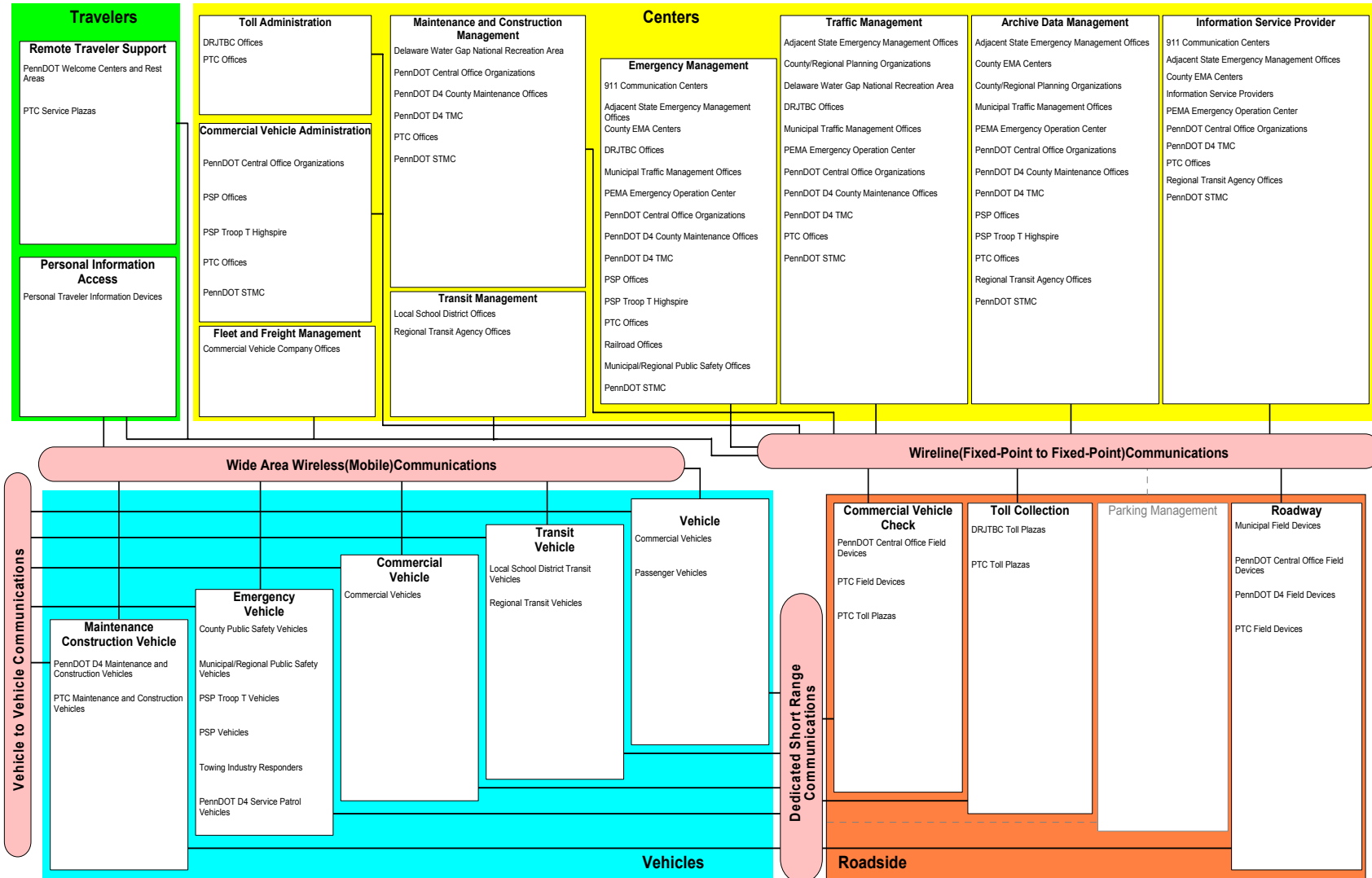


Figure 4-2: Regional Subsystem Interconnect Diagram showing Elements

Table 4-1: Regional Subsystems/Terminators

Element	Subsystem/Terminator mapped to:
911 Communication Centers	Archived Data Management Emergency Management Information Service Provider
Adjacent PennDOT District and County Offices	Emergency Management Information Service Provider Maintenance and Construction Management Traffic Management
Adjacent State Emergency Management Offices	Emergency Management
Adjacent State Transportation 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
Delaware Water Gap National Recreation Area	Event Promoter Maintenance and Construction Management Traffic Management
DRJTBC Offices	Emergency Management Traffic Management Toll Administration
DRJTBC Toll Plazas	Toll Collection
High Threat Facilities	Emergency Management
Incident Response Agency Offices	Emergency management
Information Service Providers	Information Service Provider

Element	Subsystem/Terminator mapped to:
Local School District Offices	Transit Management
Local School District Transit Vehicles	Transit Vehicle
Municipal Field Devices	Roadway
Municipal Traffic Management Offices	Archived Data Management Emergency management Traffic Management
Municipal/Regional Public Safety Offices	Emergency management
Municipal/Regional Public Safety Vehicles	Emergency Vehicle
Passenger Vehicles	Vehicle
PEMA Emergency Operation Center	Archived Data Management 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 D4 County Maintenance Offices	Archived Data Management Emergency Management Maintenance and Construction Management Traffic Management
PennDOT D4 Field Devices	Roadway
PennDOT D4 Maintenance and Construction Vehicles	Maintenance and Construction Vehicle
PennDOT D4 Service Patrol Vehicles	Emergency Vehicle
PennDOT D4 TMC	Archived Data Management Emergency Management Information Service Provider Maintenance and Construction Management Traffic Management

Element	Subsystem/Terminator mapped to:
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
PSP Offices	Archived Data Management Commercial Vehicle Administration Emergency Management
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
Railroad Offices	Emergency Management Rail Operations

Element	Subsystem/Terminator mapped to:
Regional Media Outlets	Media
Regional Transit Agency Offices	Archived Data Management Information Service Provider Transit Management
Regional Transit Vehicles	Transit Vehicle
Towing Industry Responders	Emergency Vehicle
TRANSCOM Center	Information Service Provider
Weather Information Providers	Weather Information Providers

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	Adjacent State Emergency Management Offices	Adjacent State Public Safety Offices	Adjacent State Transportation Offices	Attractions and Event Promoters	Commercial Vehicle Company Offices	Commercial Vehicles	County EMA Centers	County/Regional Planning Organizations	Delaware Water Gap National Recreation Area	DRJTBC Offices	DRJTBC Toll Plazas	High Threat Facilities	Incident Response Agency Offices	Information Service Providers	Local School District Offices	Local School District Transit Vehicles	Municipal Field Devices	Municipal Traffic Management Offices	Municipal/Regional Public Safety Offices	Municipal/Regional Public Safety Vehicles	Passenger Vehicles	PEMA Emergency Operation Center	PennDOT Central Office Field Devices	PennDOT Central Office Organizations	PennDOT D4 County Maintenance Offices	PennDOT D4 Field Devices	PennDOT D4 Maintenance and Construction Vehicles	PennDOT D4 Service Patrol Vehicles	PennDOT D4 TMC	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	Railroad Offices	Regional Media Outlets	Regional Transit Agency Offices	Regional Transit Vehicles	Towing Industry Responders	TRANSCOM Center	Weather Information Providers		
911 Communication Centers					X			X				X		X	X	X					X	X		X		X									X								X	X	X		X		X				
Adjacent PennDOT District and County Offices																									X																												
Adjacent State Emergency Management Offices																								X																													
Adjacent State Public Safety Offices																																				X																	
Adjacent State Transportation Offices																										X				X	X																						
Attractions and Event Promoters	X							X								X				X	X														X											X							
Commercial Vehicle Company Offices							X																X	X																													
Commercial Vehicles							X																	X																													
County EMA Centers	X				X				X	X	X	X		X	X				X				X		X										X										X	X	X				X		

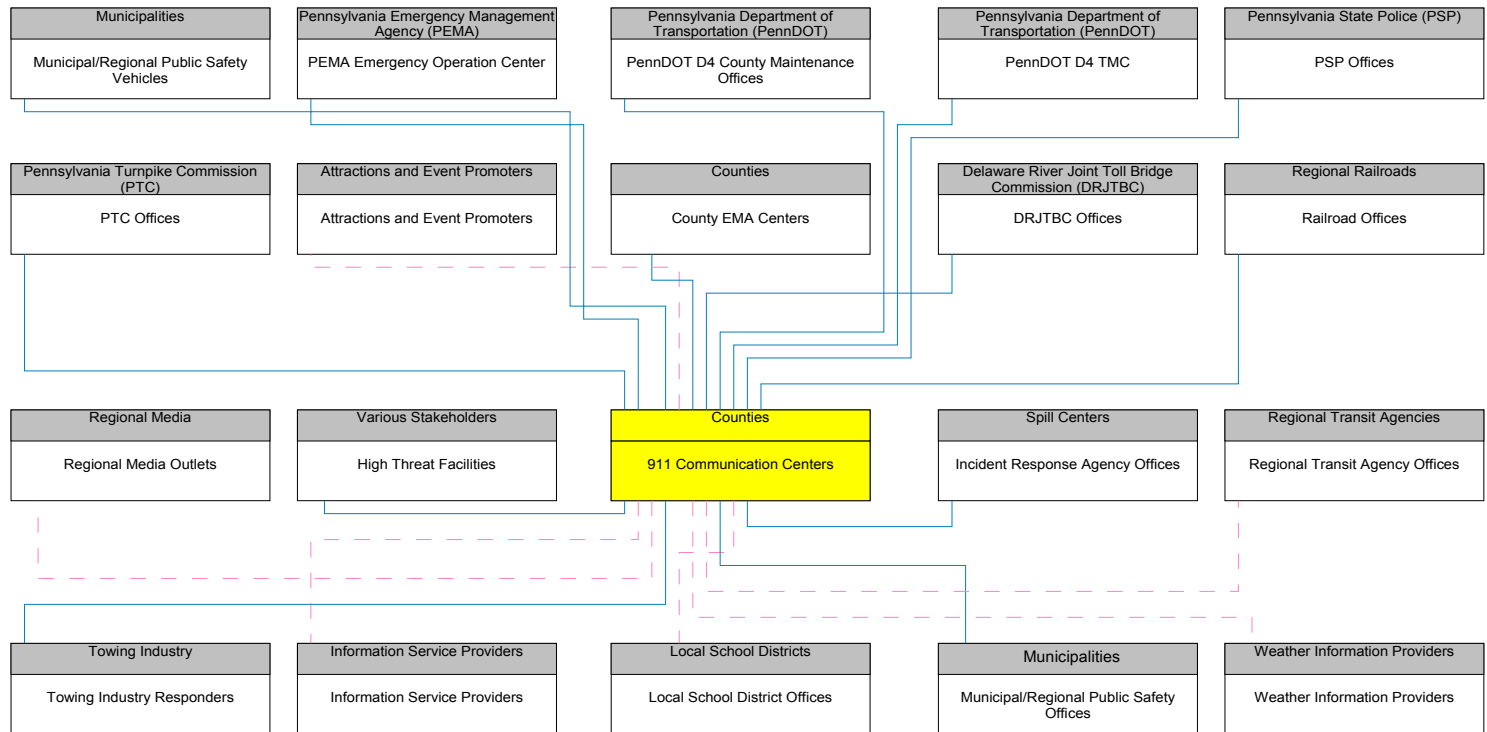
4.4 ITS Architecture

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.

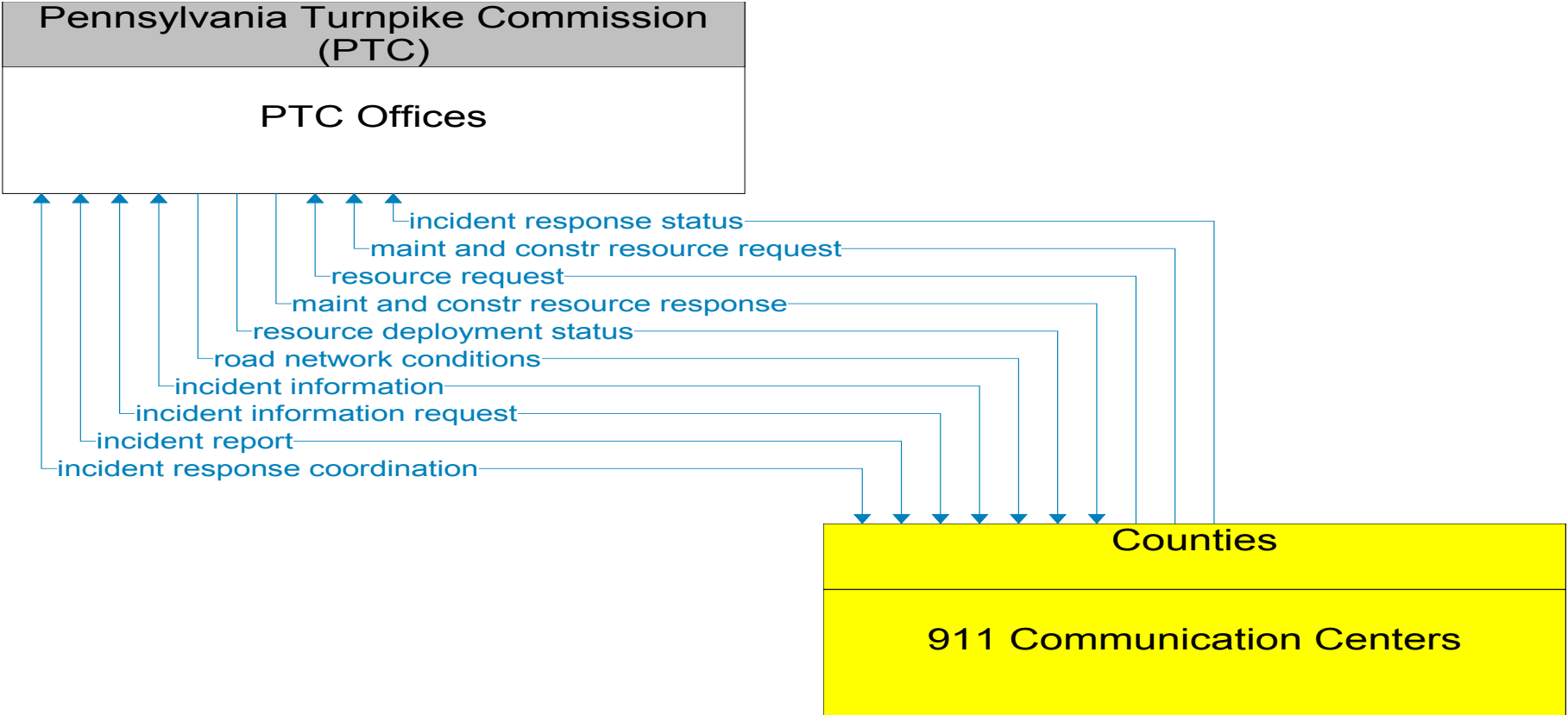
911 Communication Centers



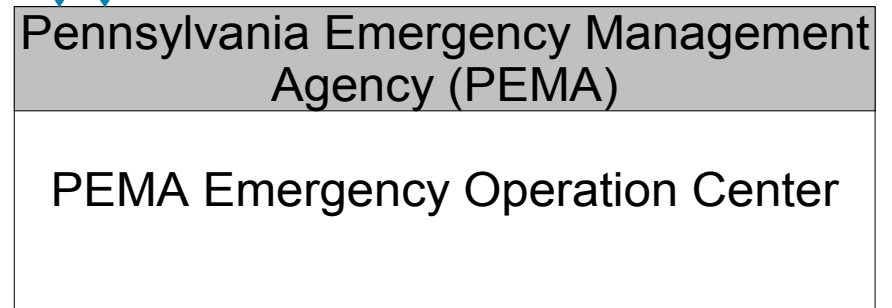
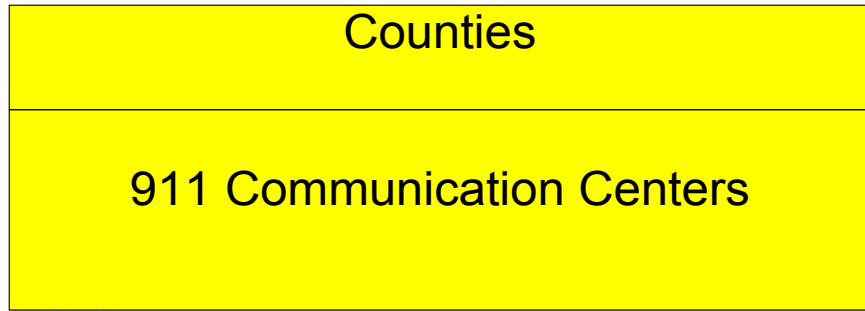
911 Communication Centers Interconnect Diagram

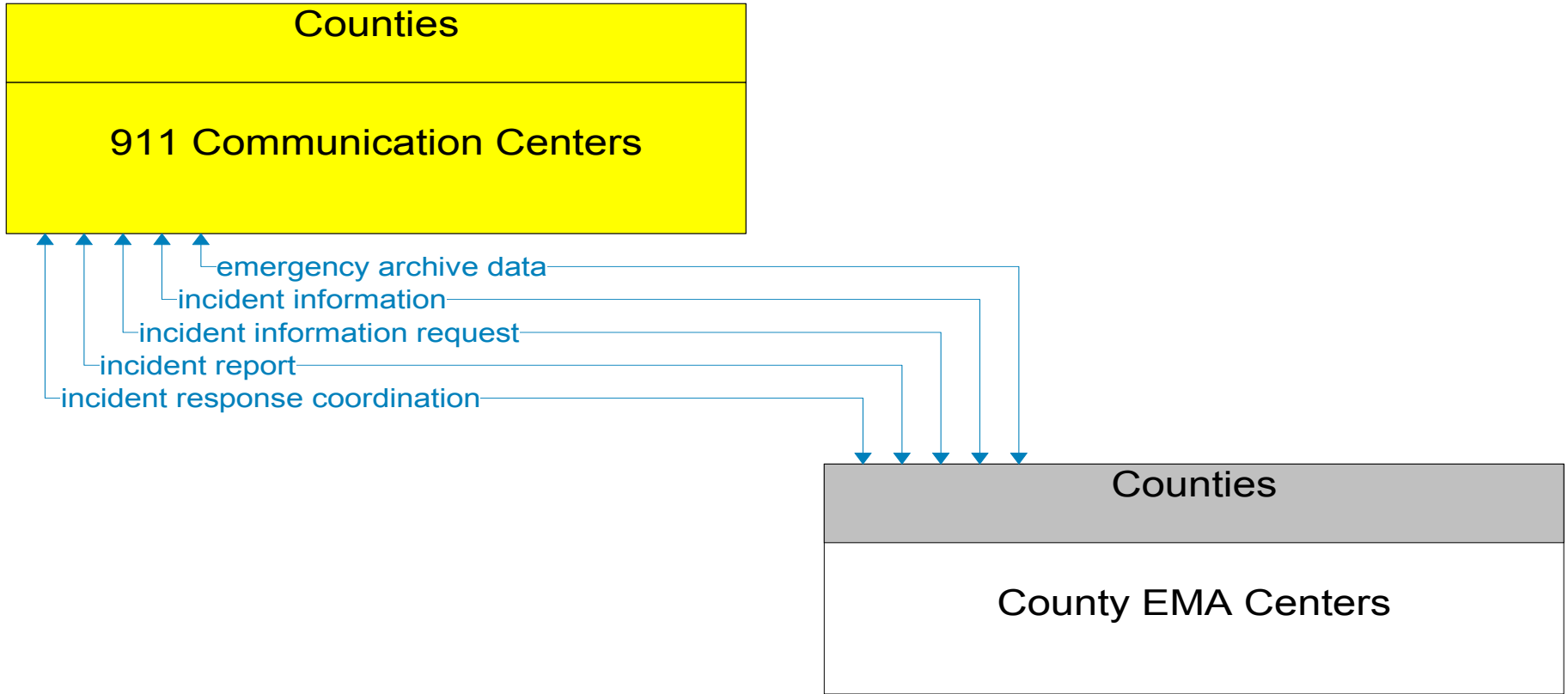


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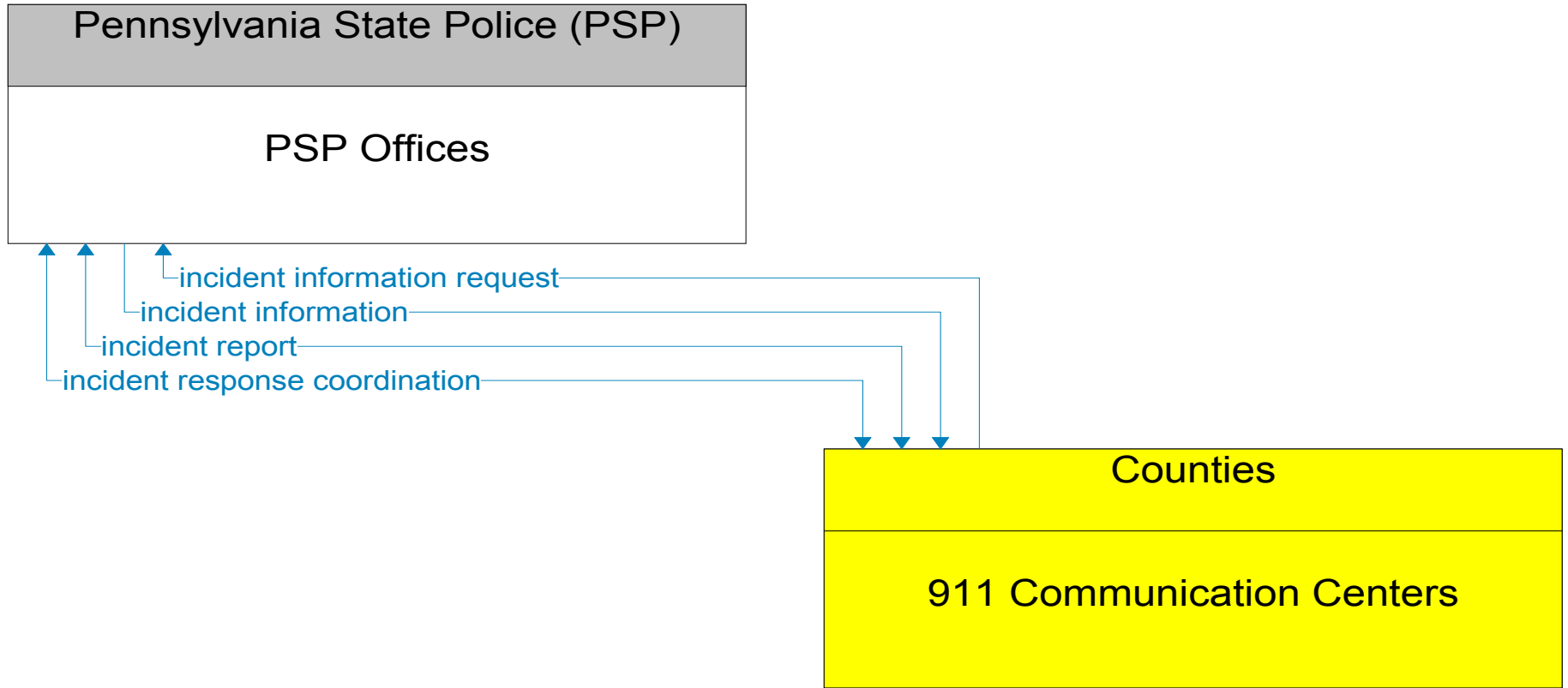


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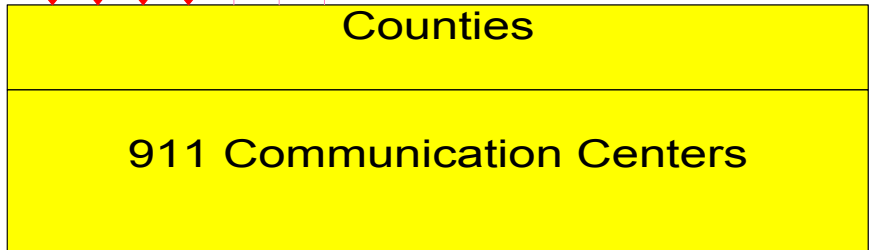
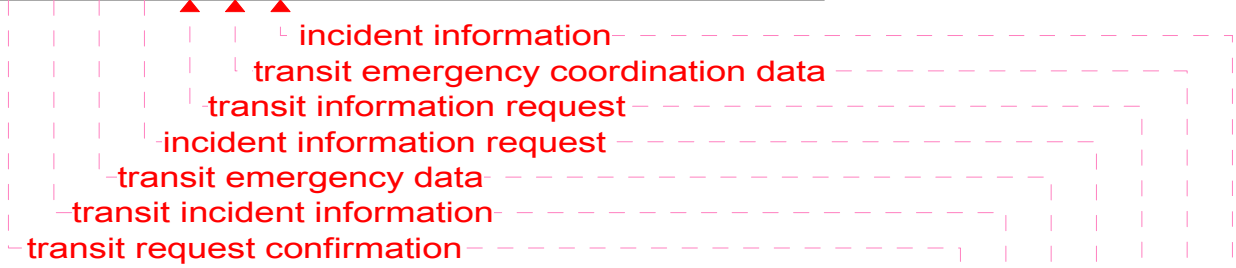
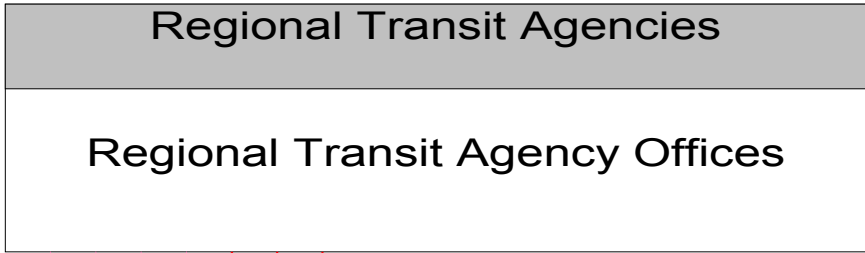




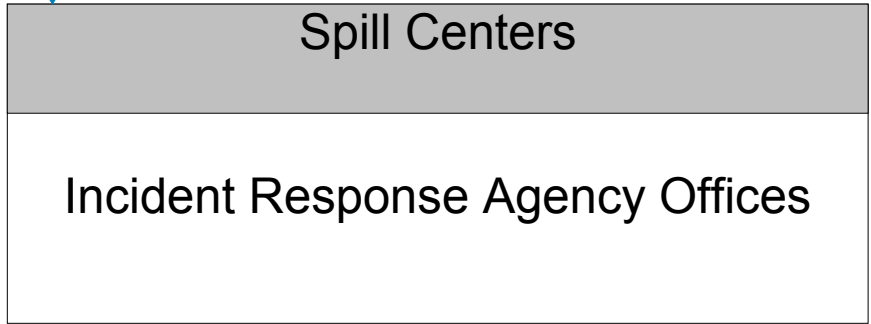
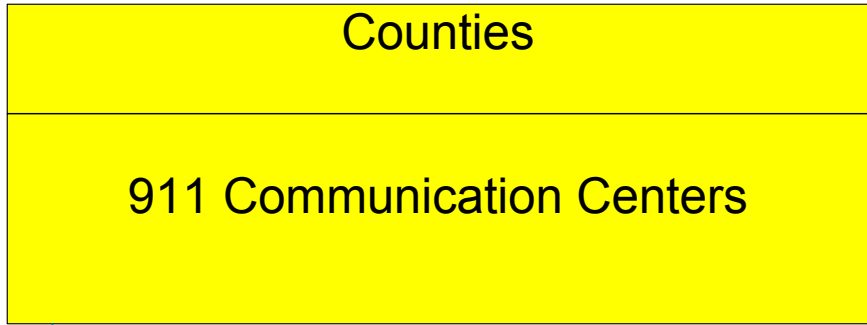
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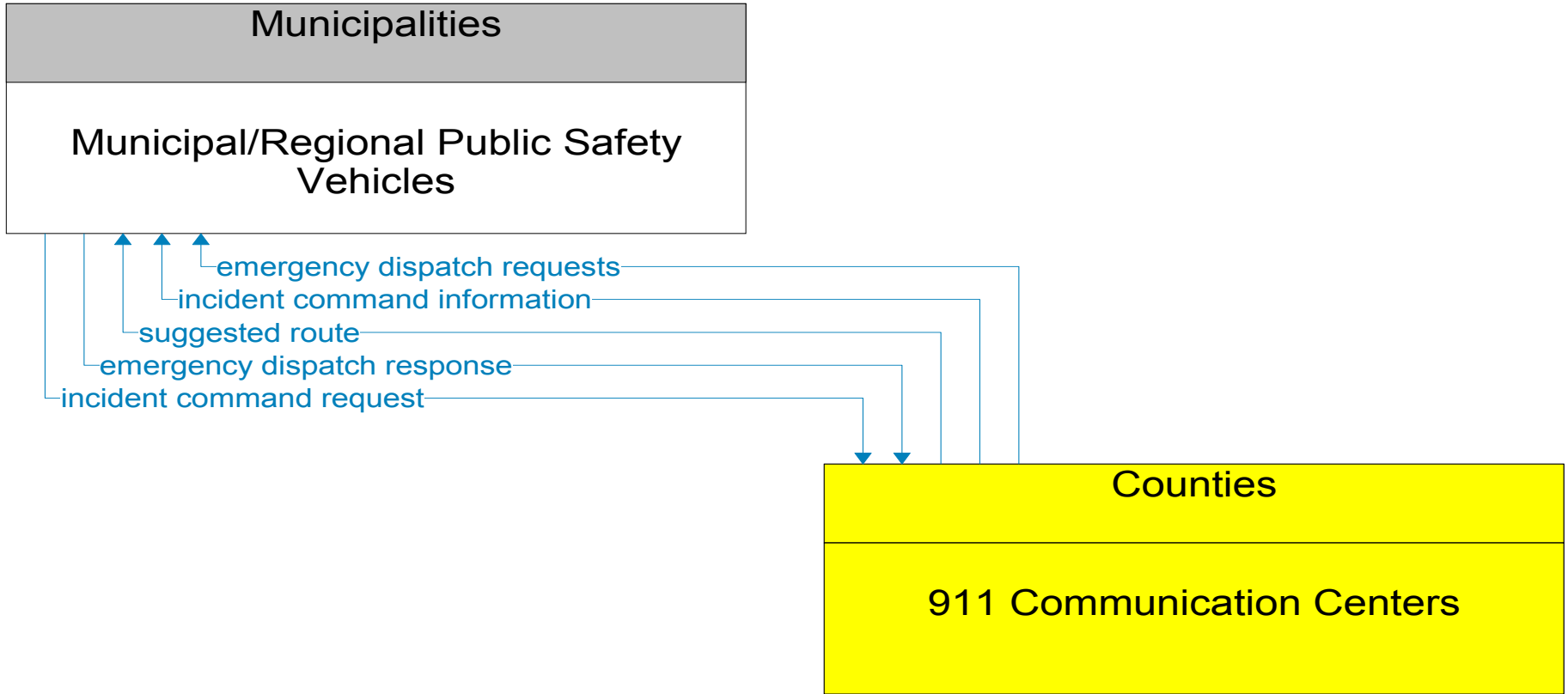
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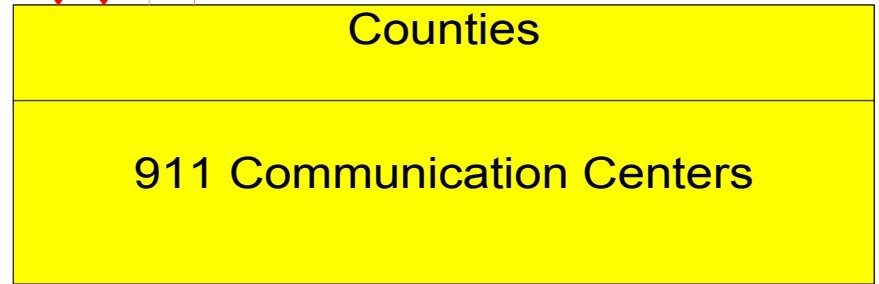
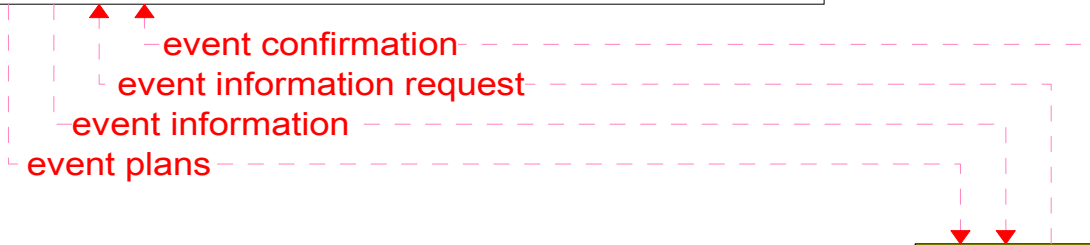
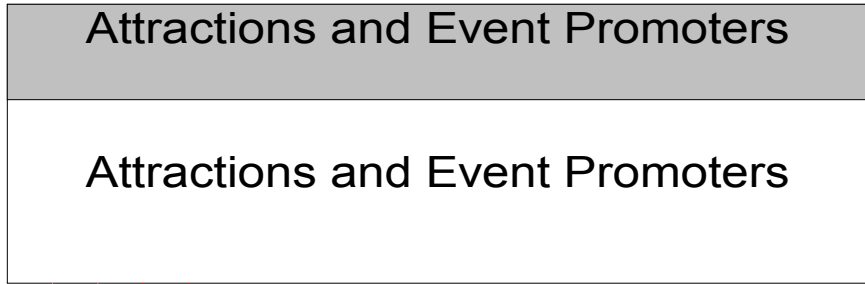
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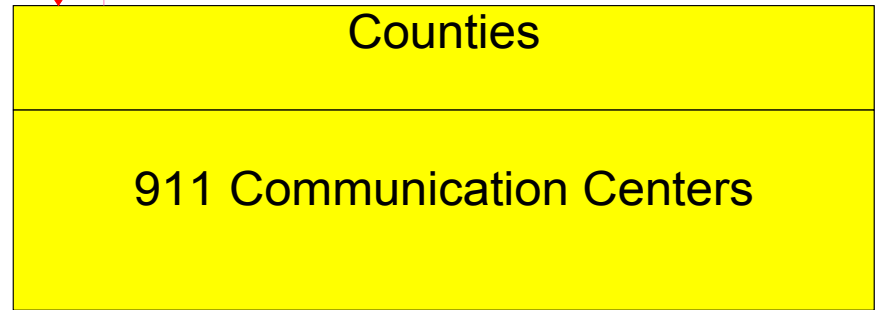
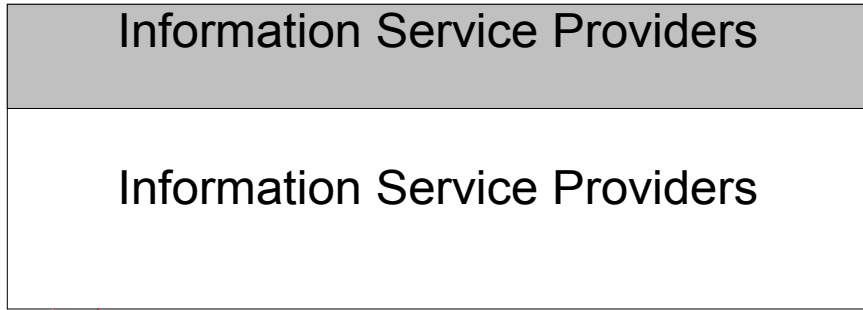


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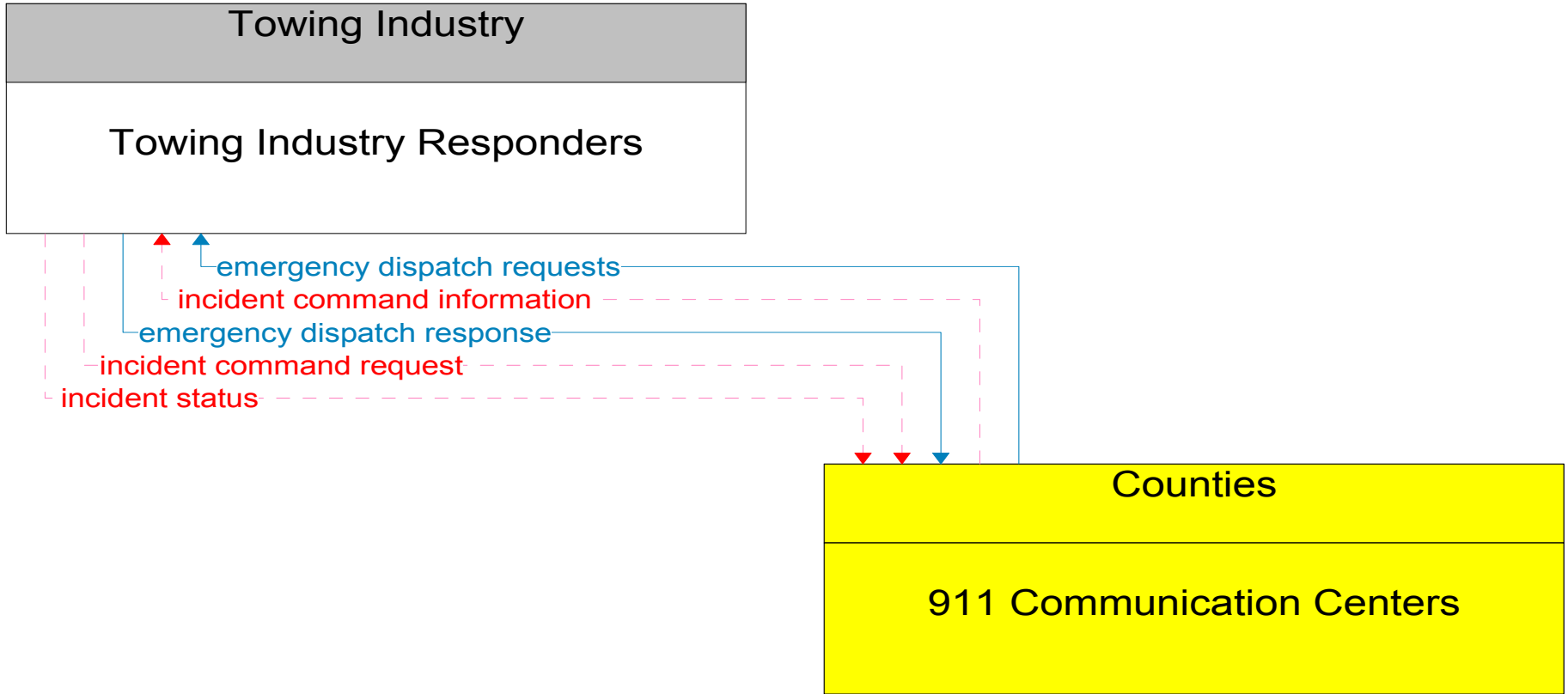


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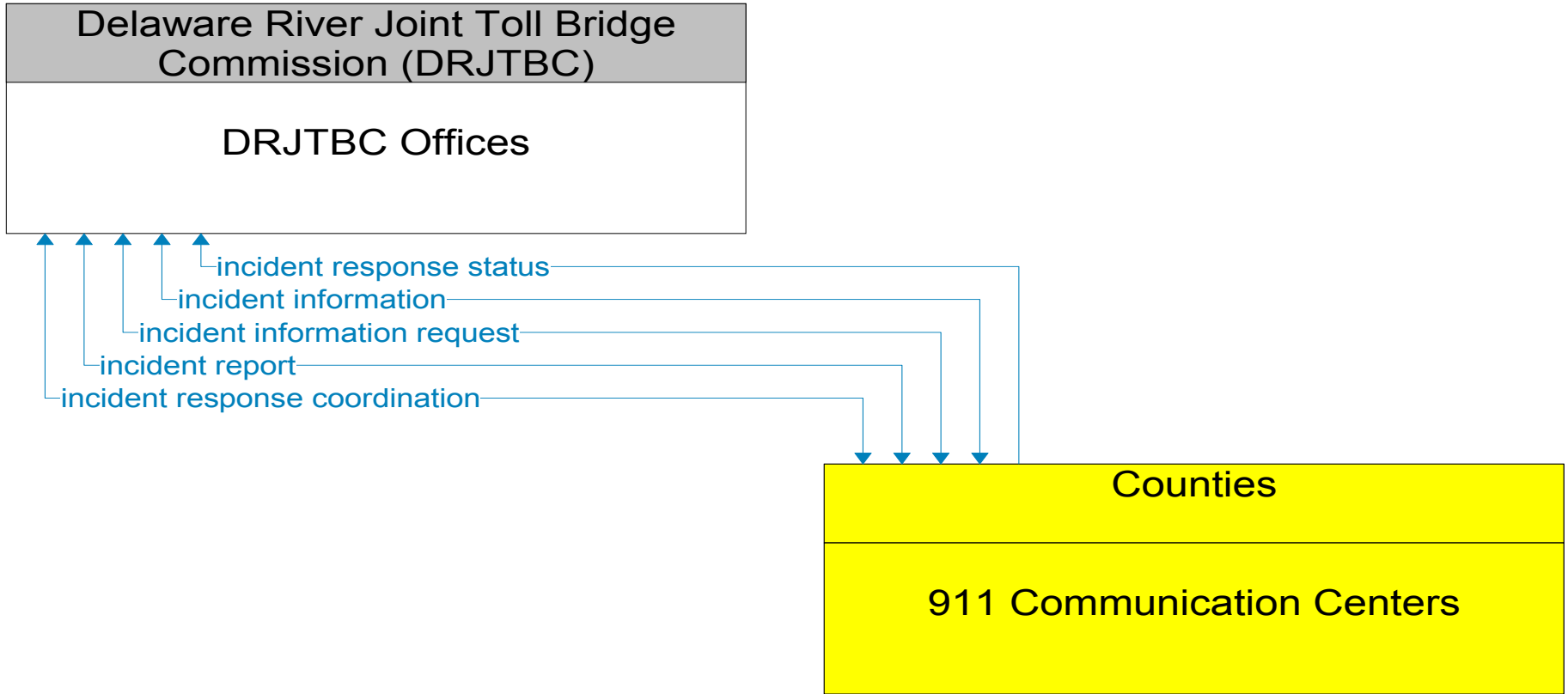
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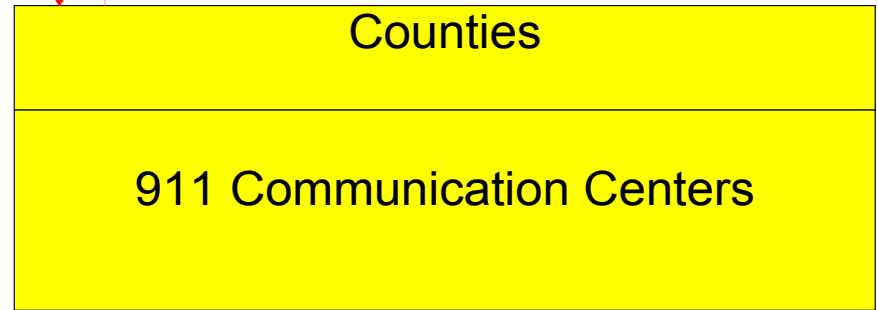
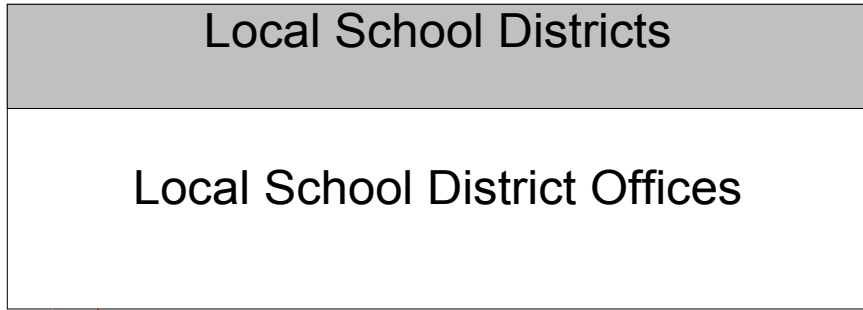


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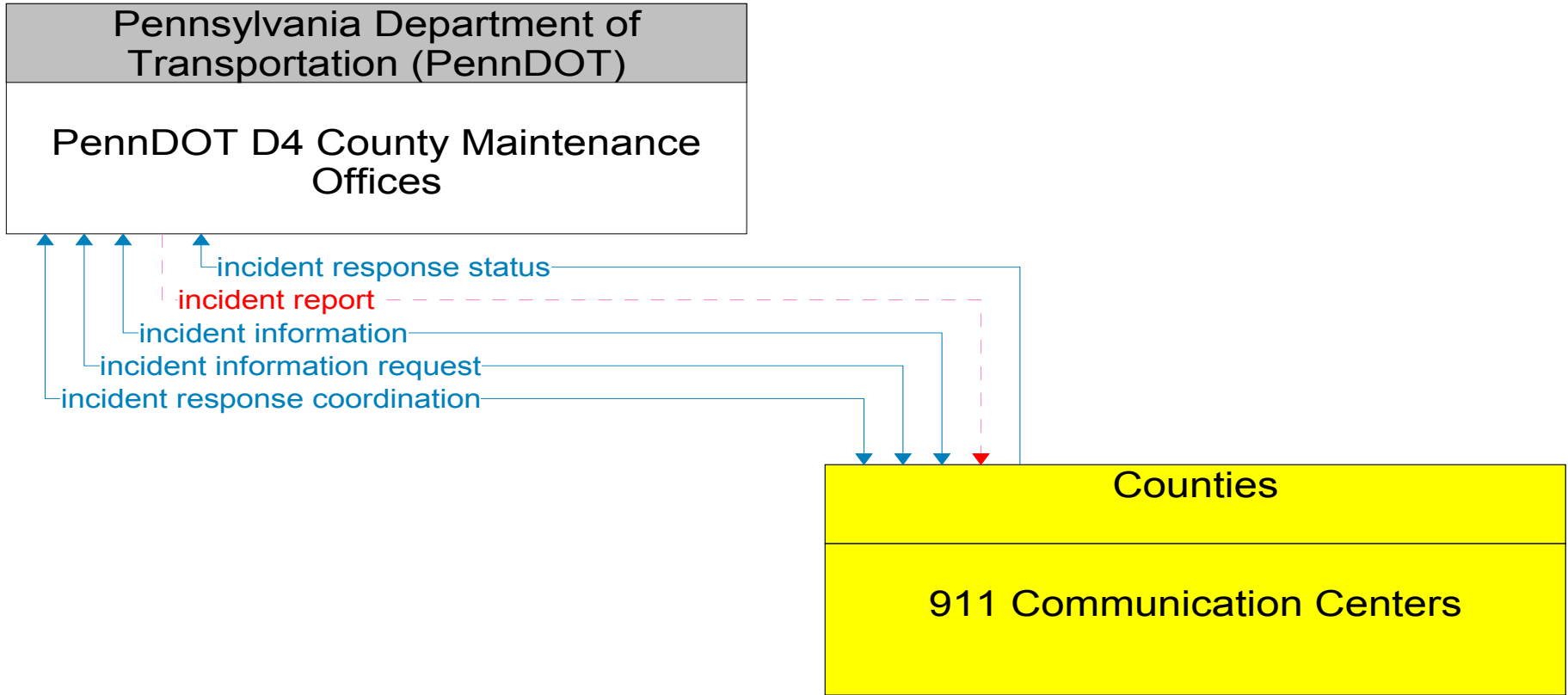
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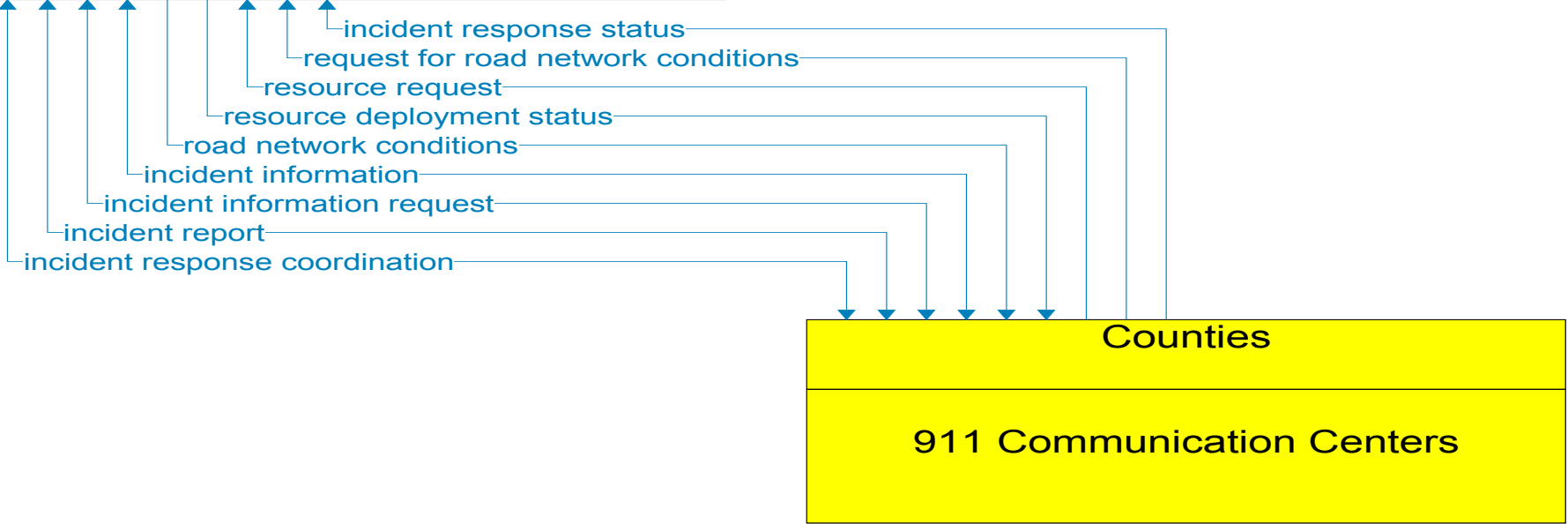
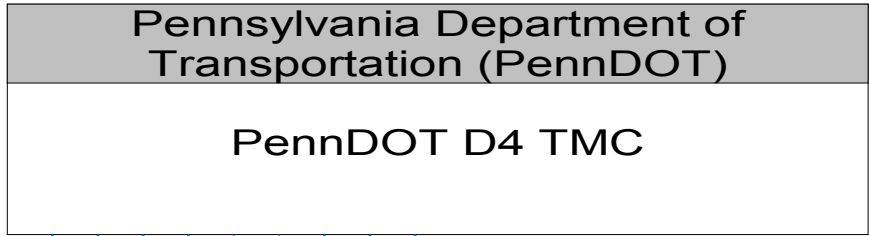


transit information request
transit incident information

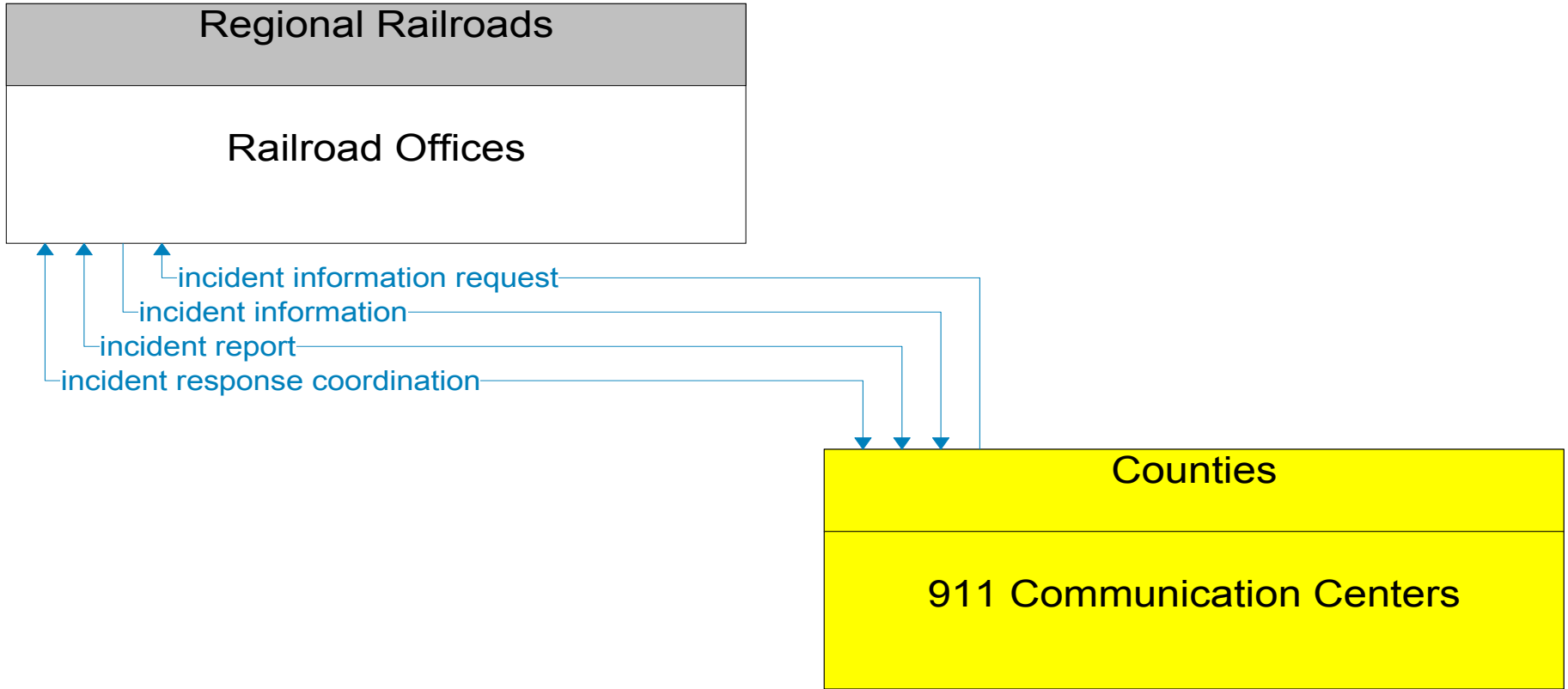
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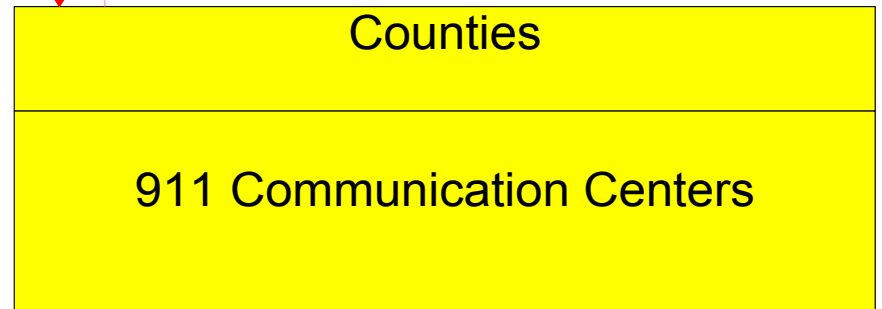
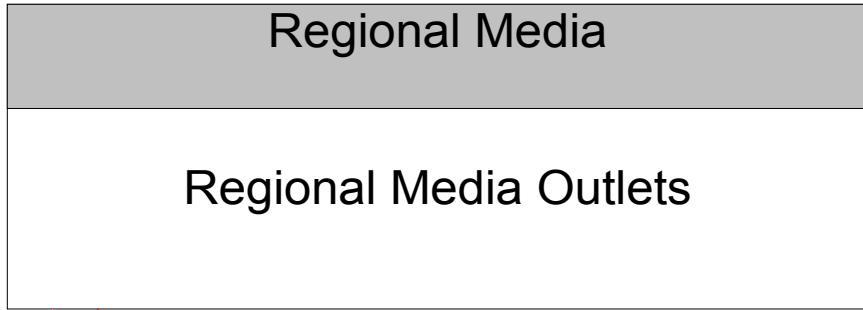
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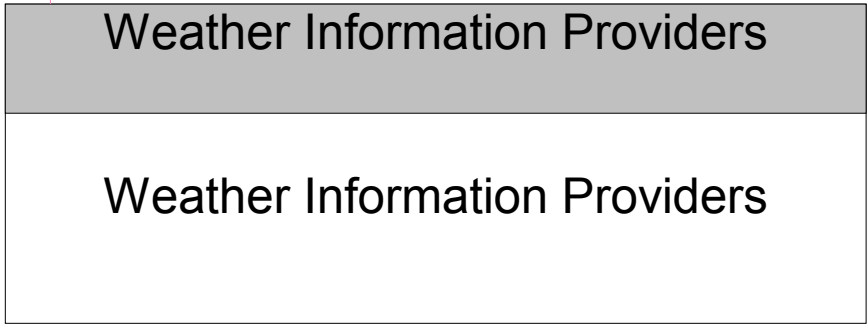
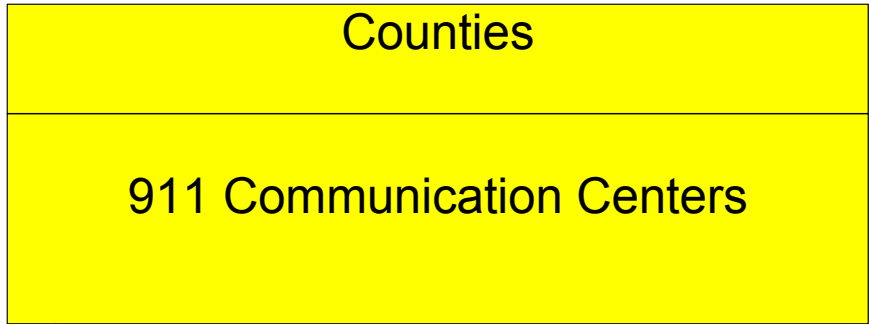
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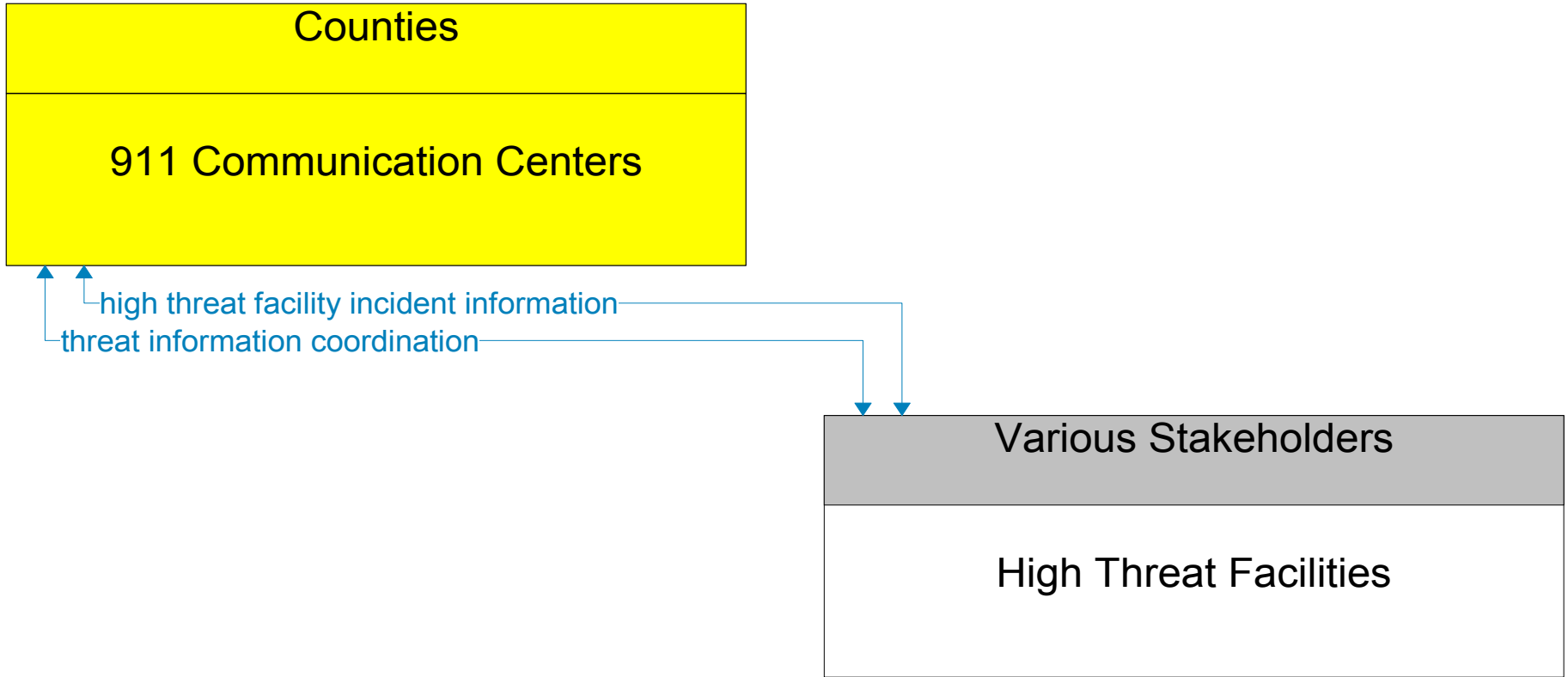
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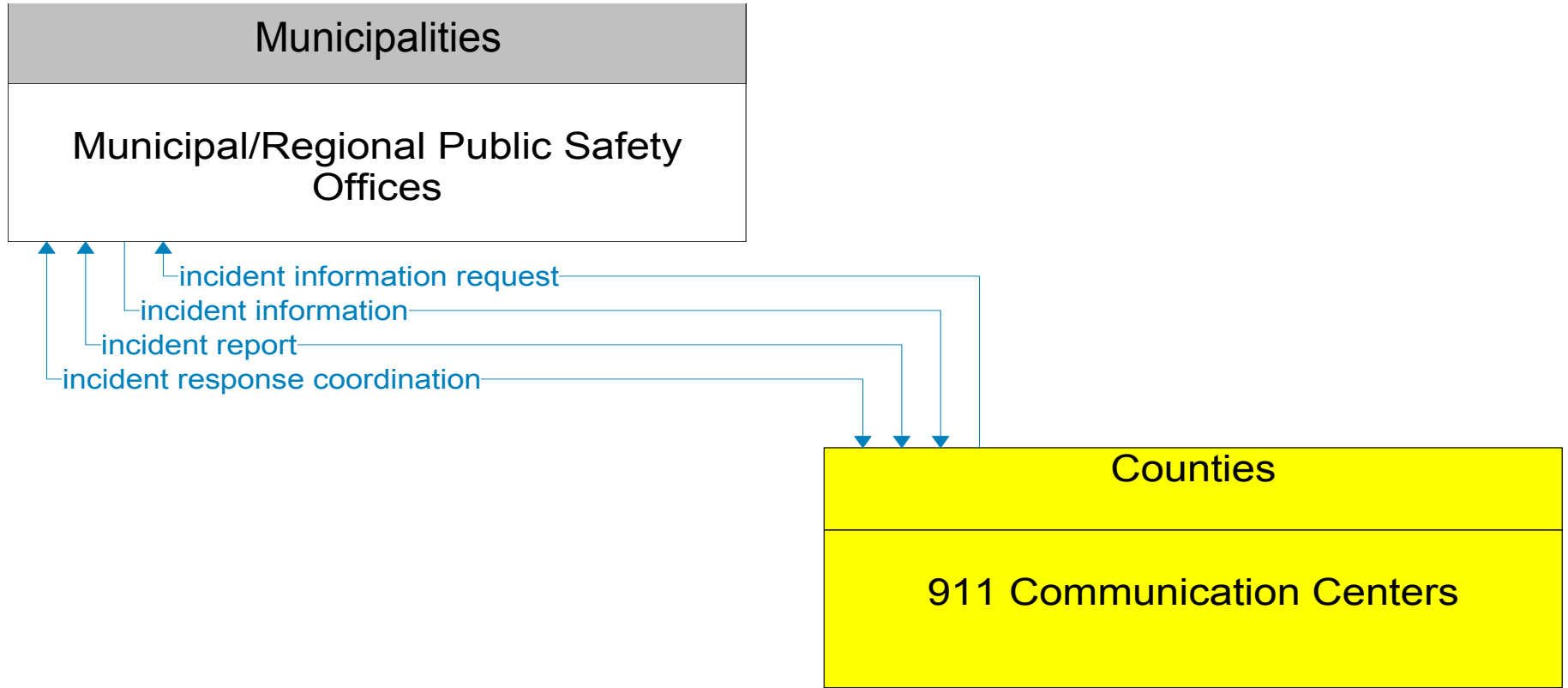
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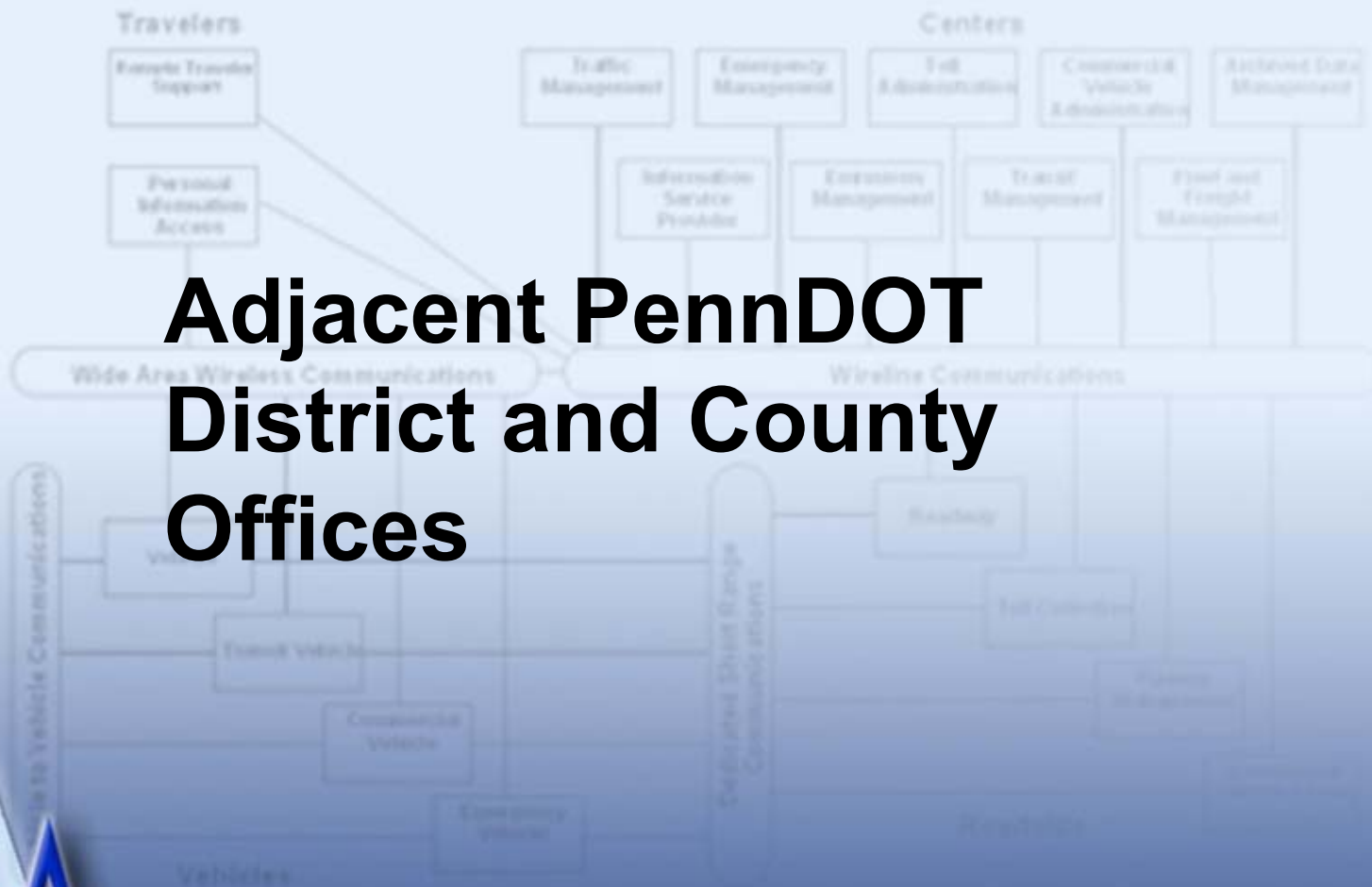


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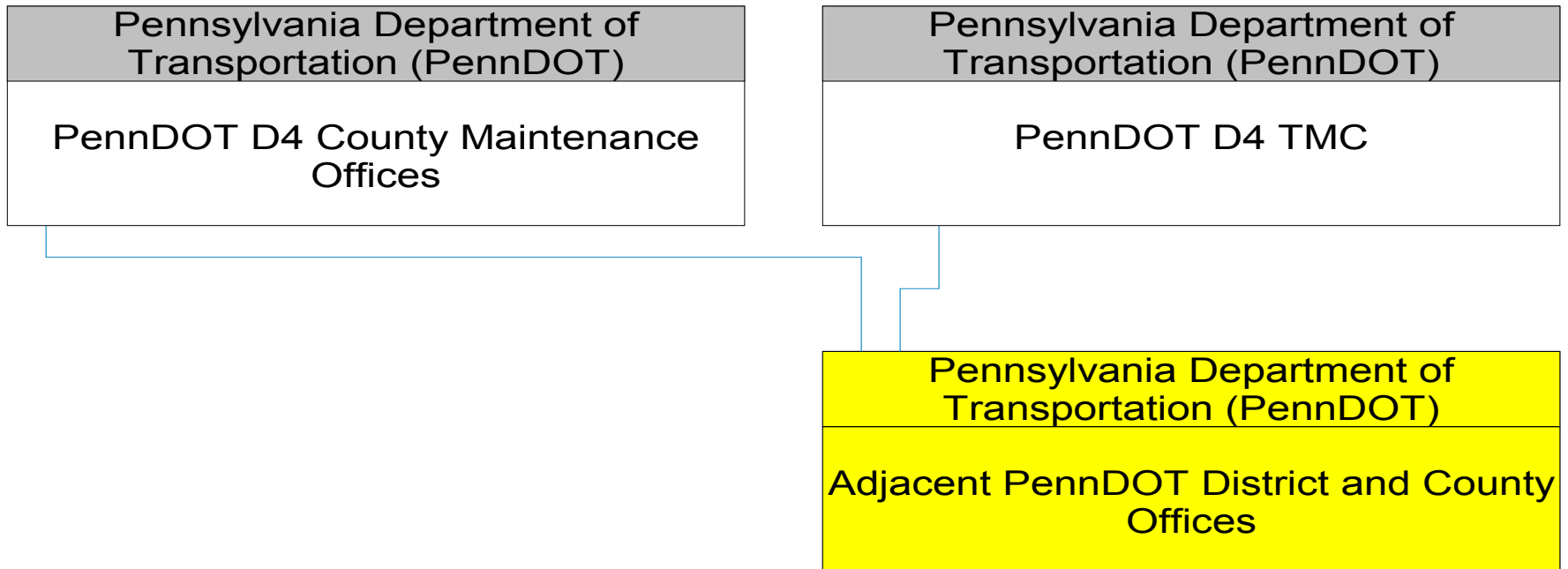


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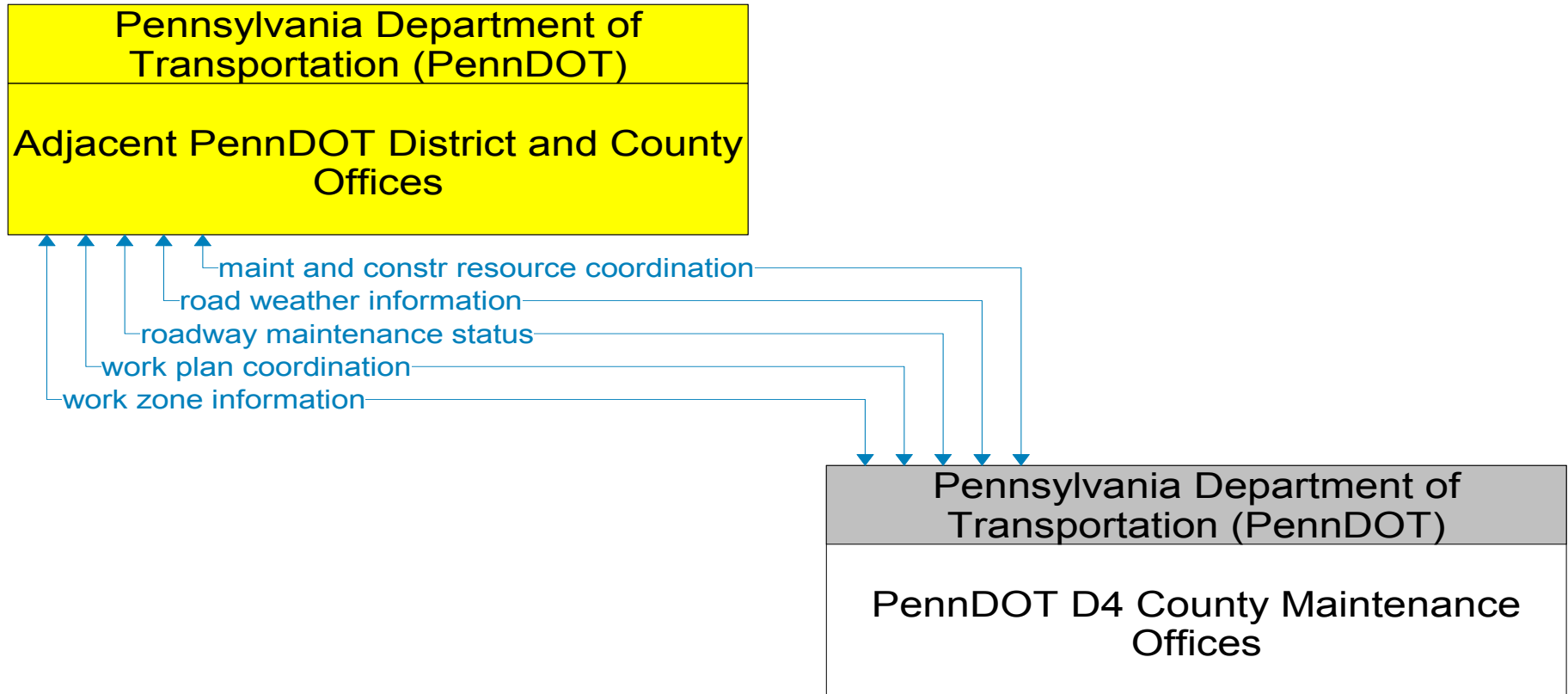
Adjacent PennDOT District and County Offices



Adjacent PennDOT District and County Offices Interconnect Diagram

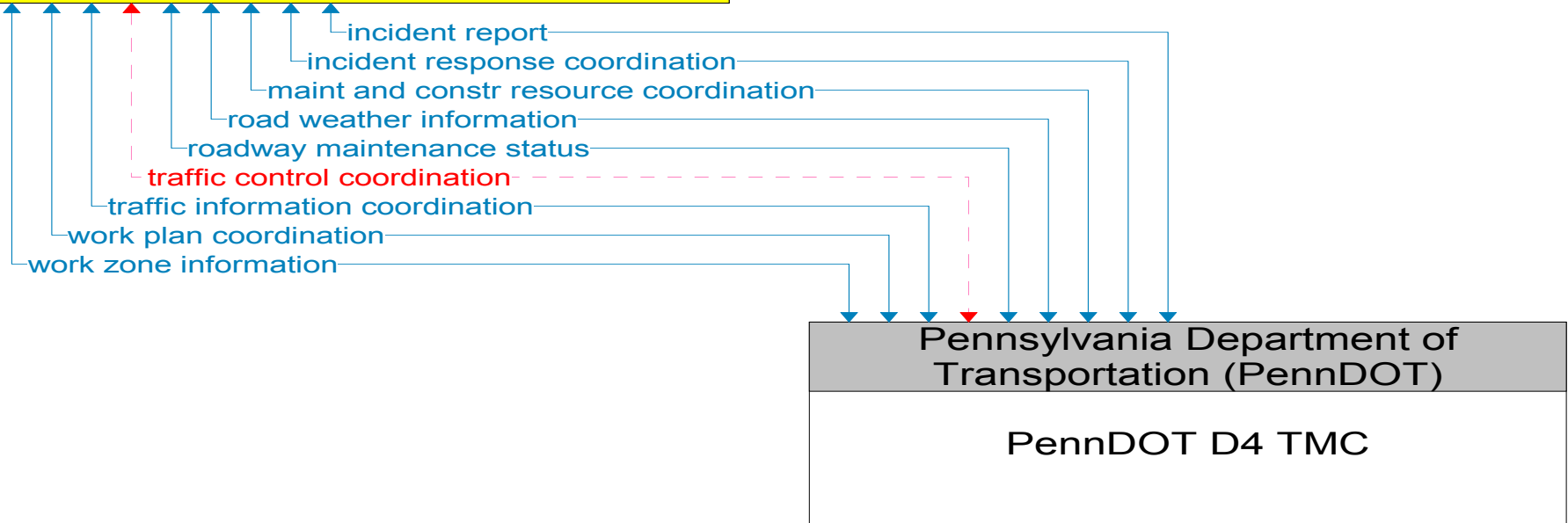


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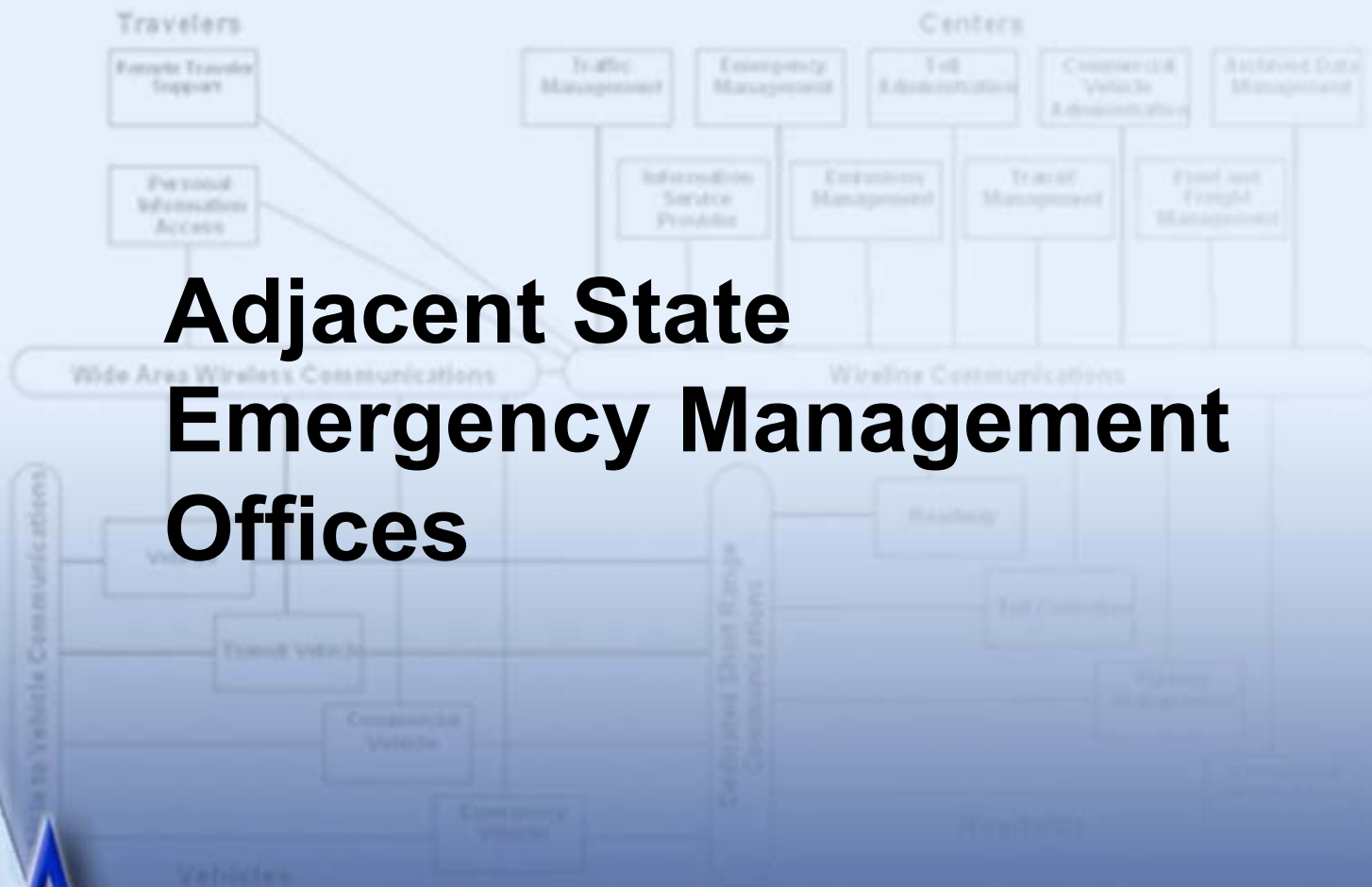
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Pennsylvania Department of Transportation (PennDOT)
Adjacent PennDOT District and County Offices

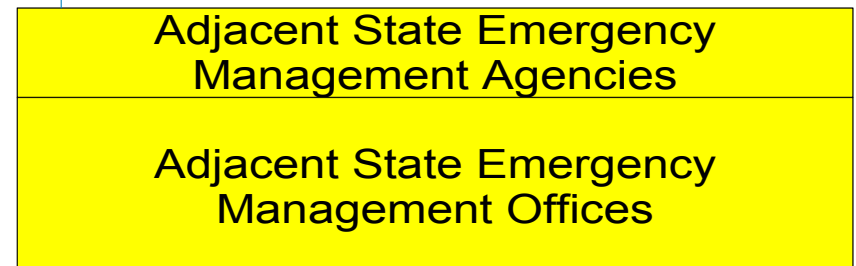
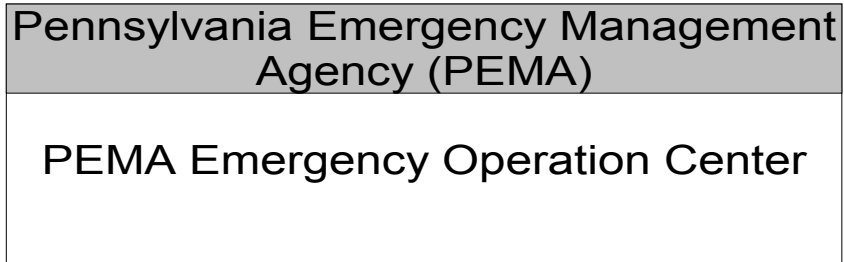


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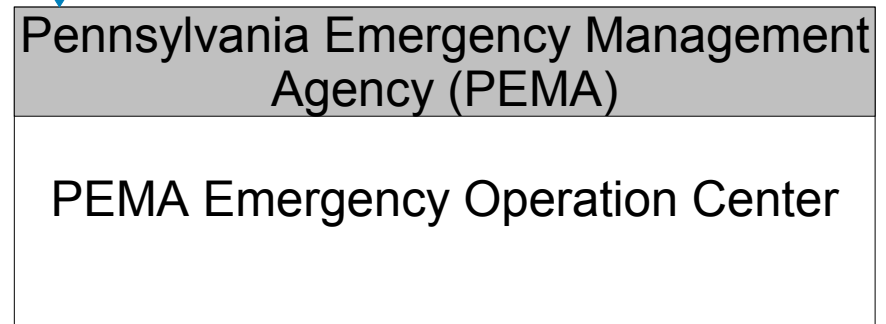
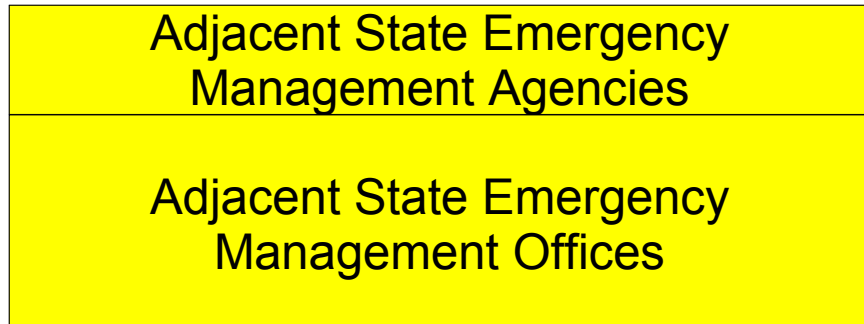
Adjacent State Emergency Management Offices



Adjacent State Emergency Management Offices Interconnect Diagram

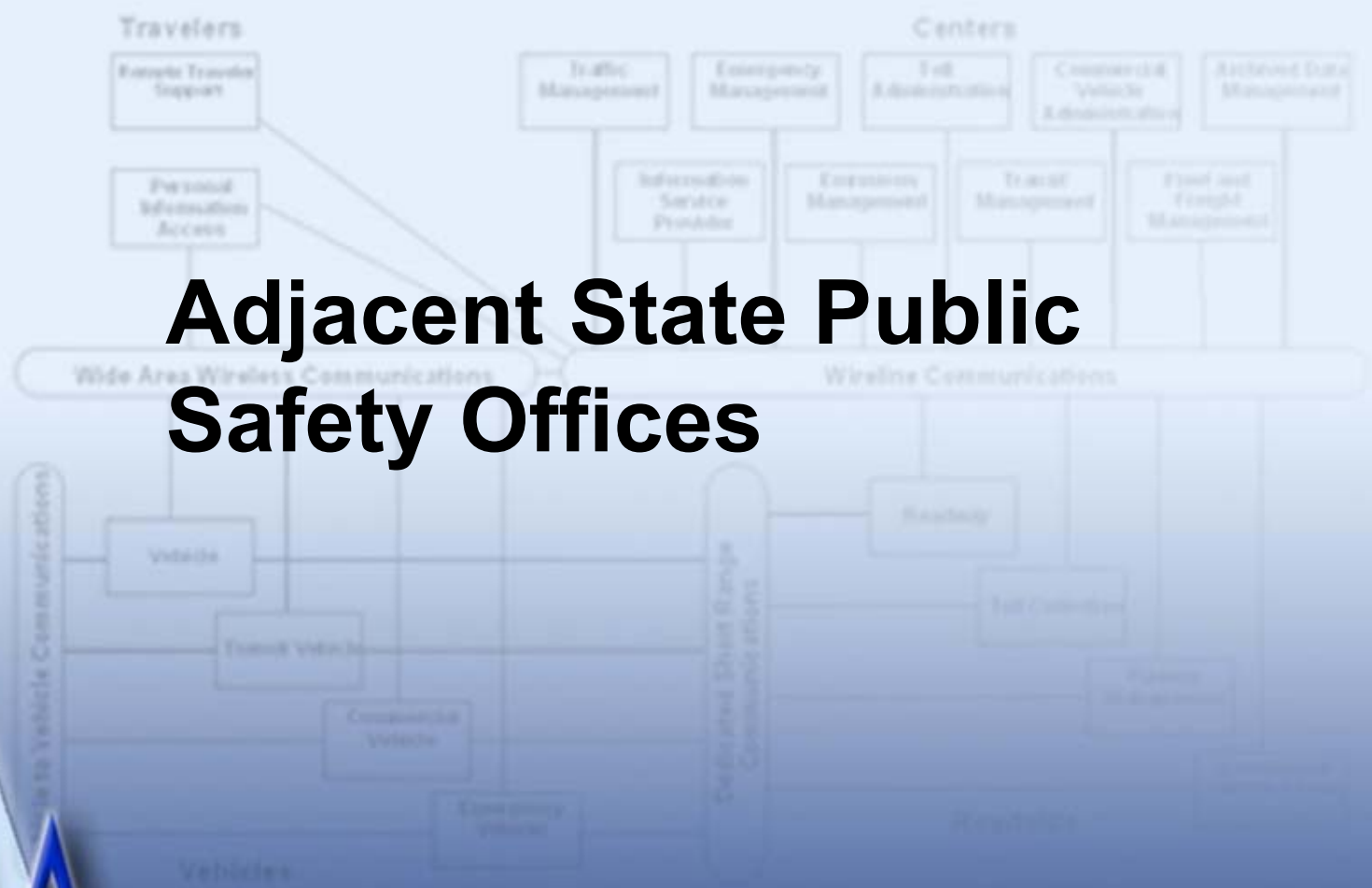


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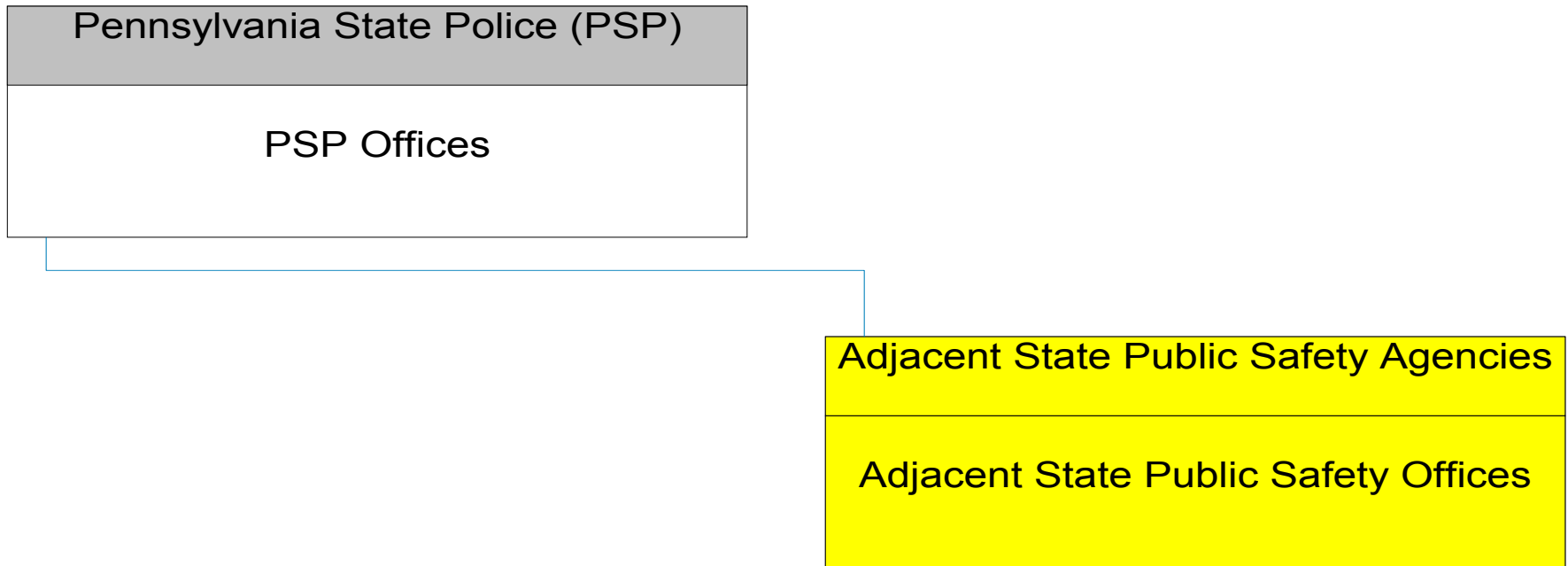


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Adjacent State Public Safety Offices



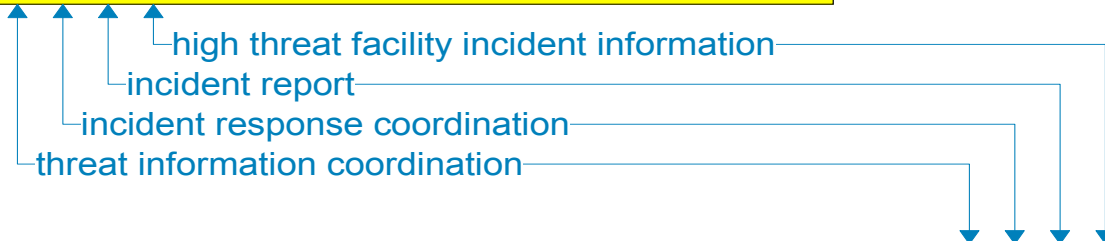
Adjacent State Public Safety Offices Interconnect Diagram



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Adjacent State Public Safety Agencies

Adjacent State Public Safety Offices

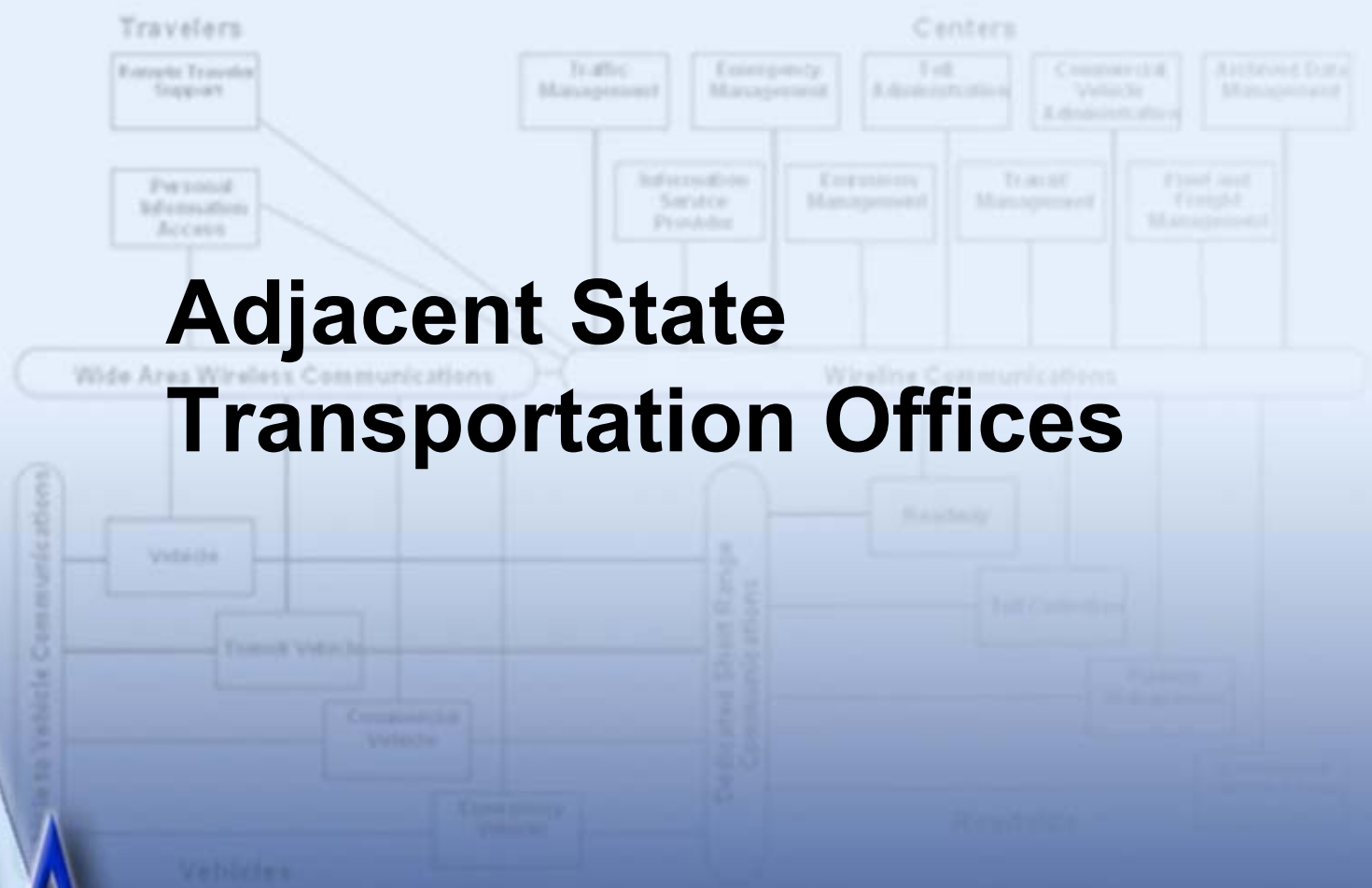


Pennsylvania State Police (PSP)

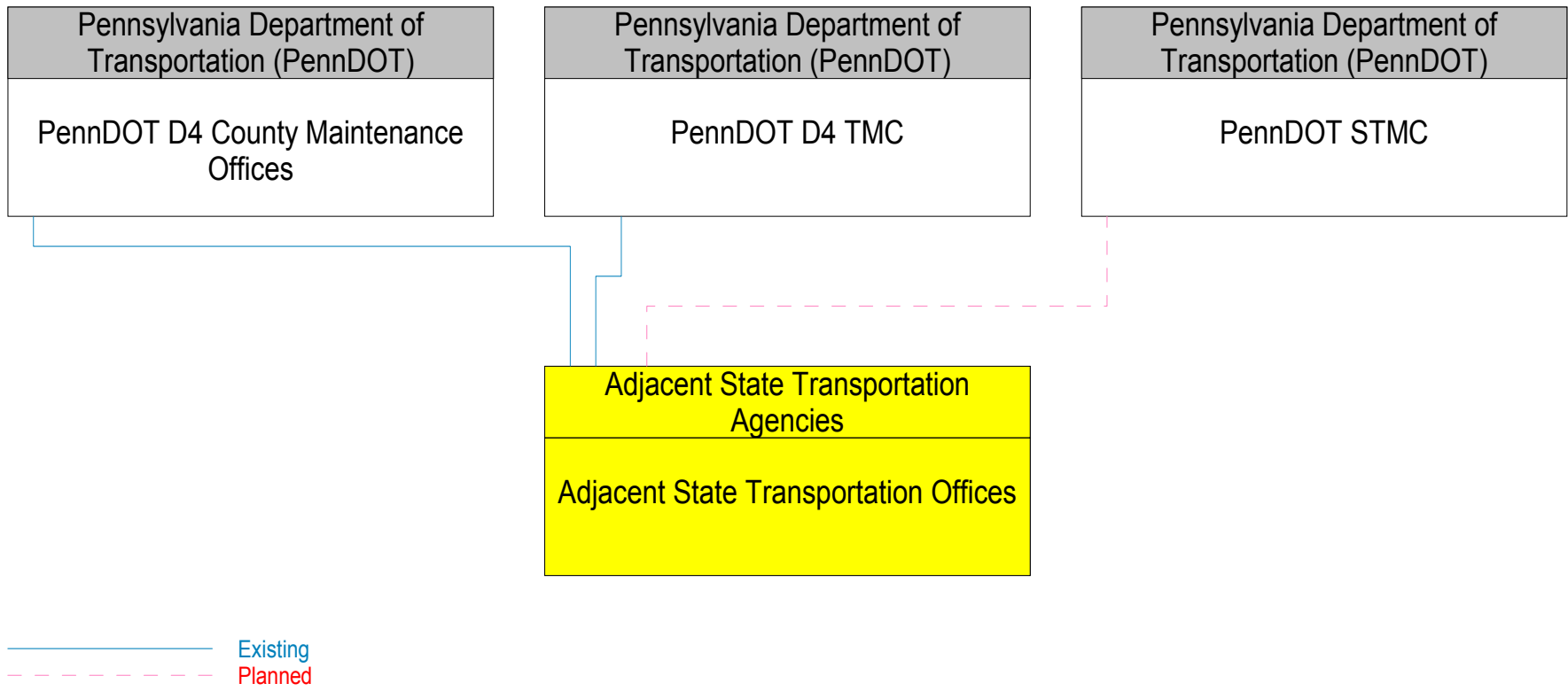
PSP Offices

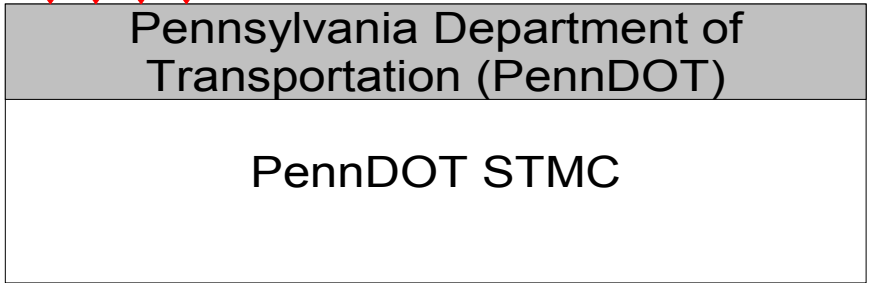
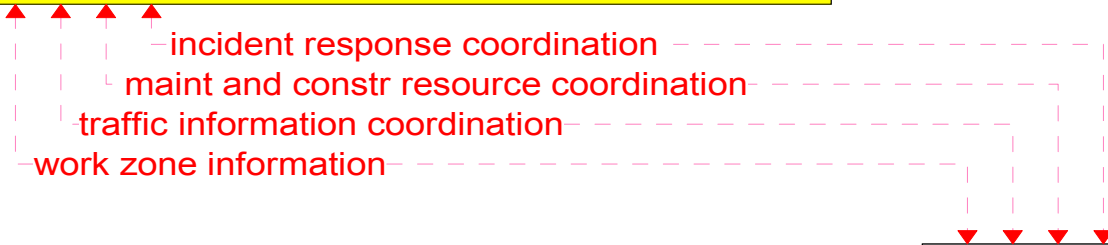
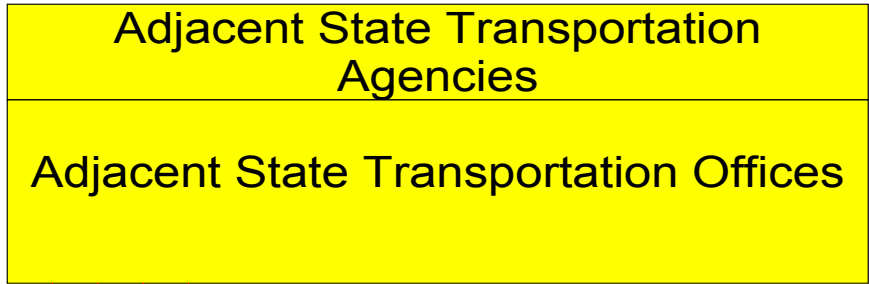
Existing
Planned

Adjacent State Transportation Offices

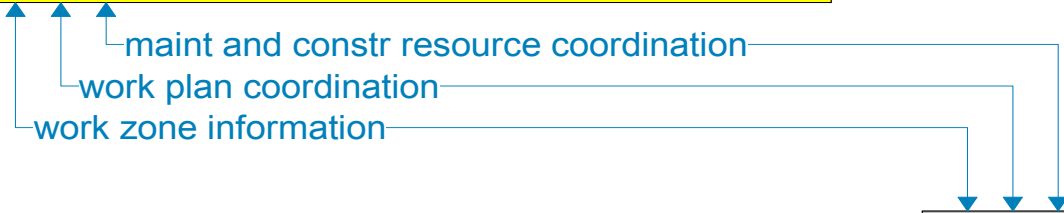
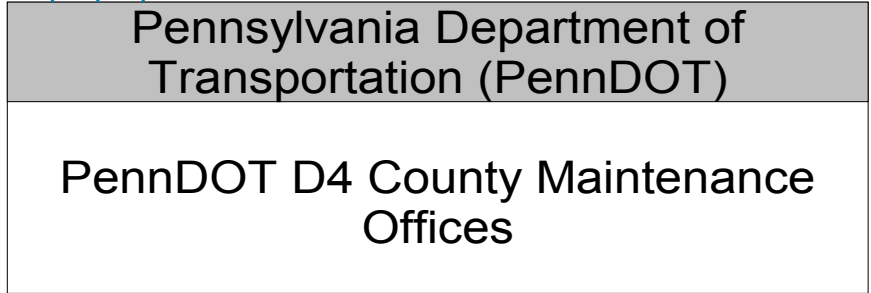
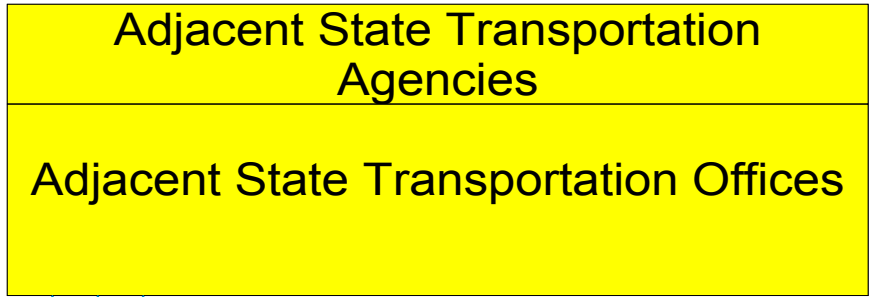


Adjacent State Transportation Offices Interconnect Diagram

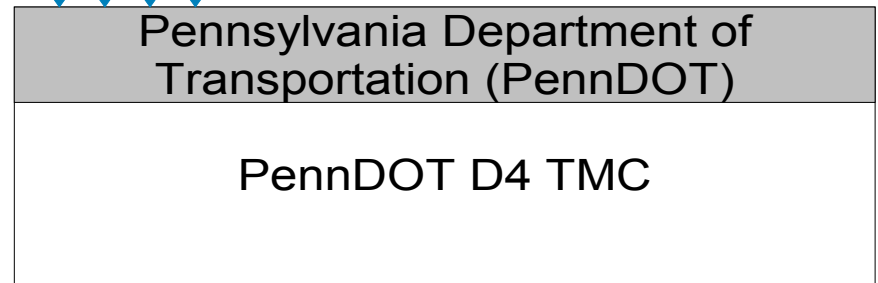
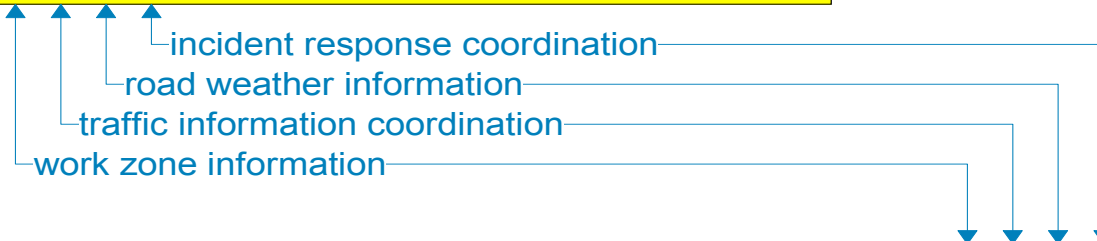
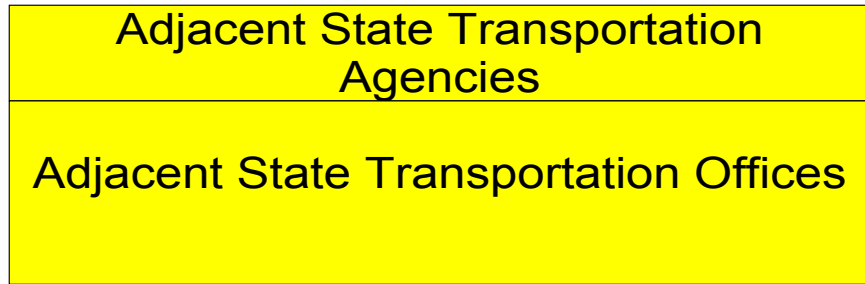




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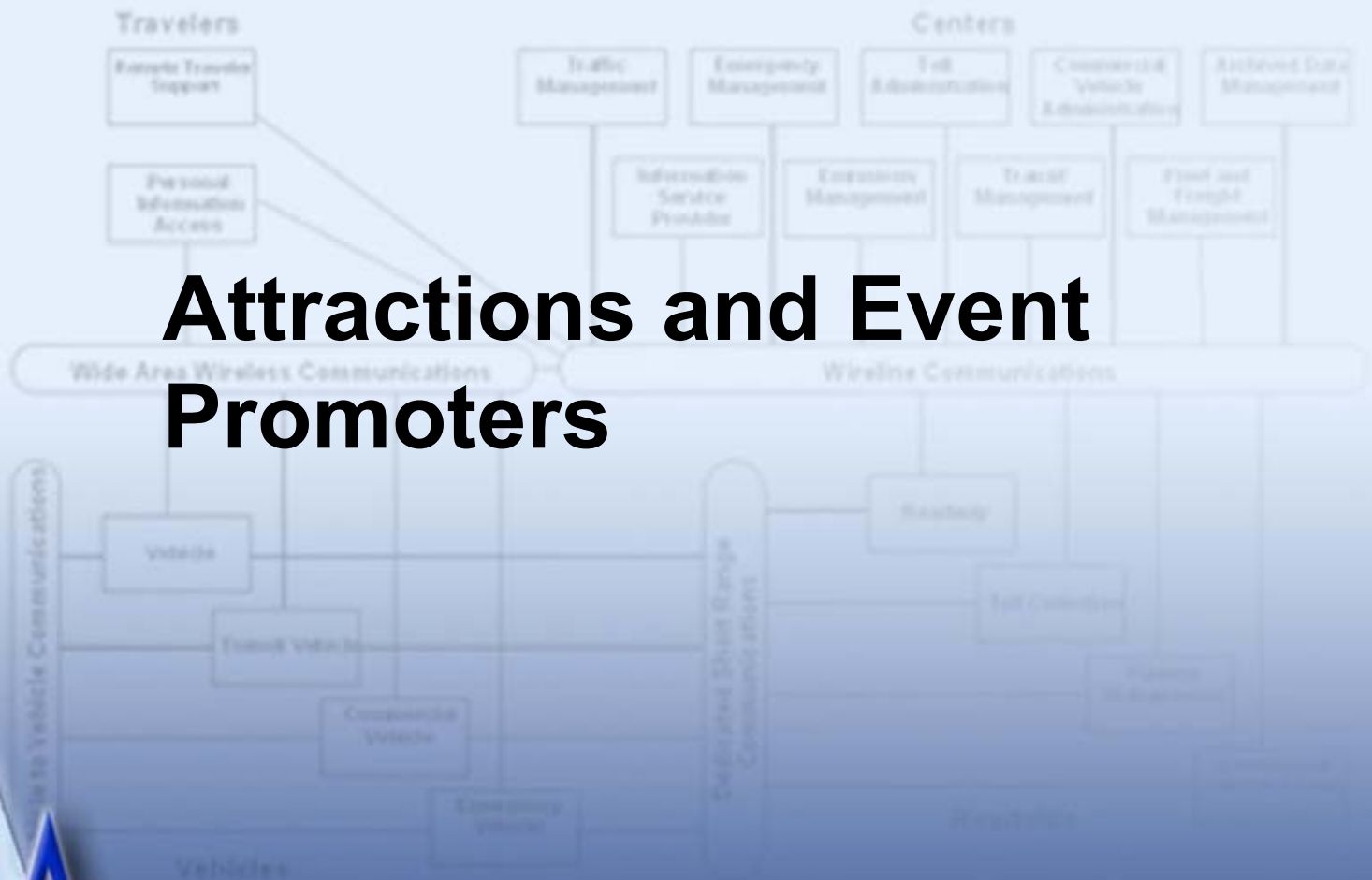


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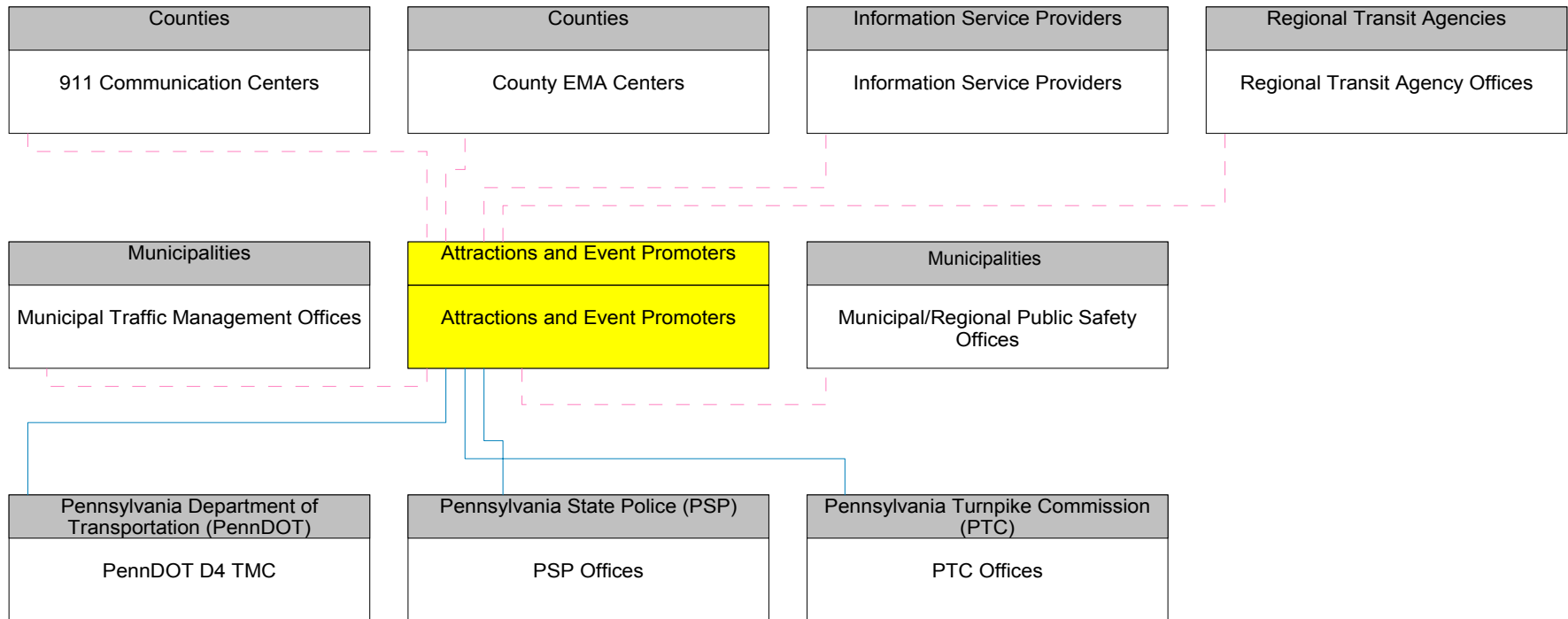
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Attractions and Event Promoters

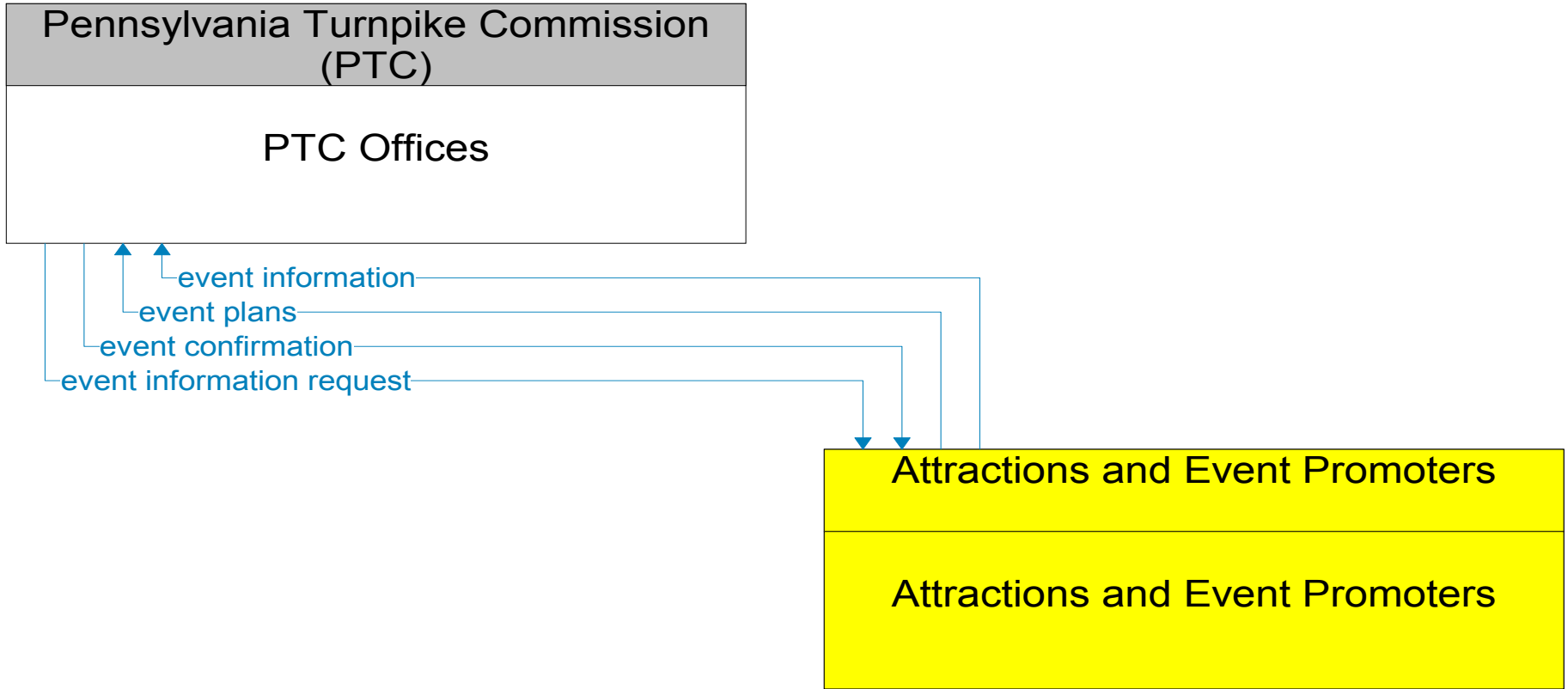


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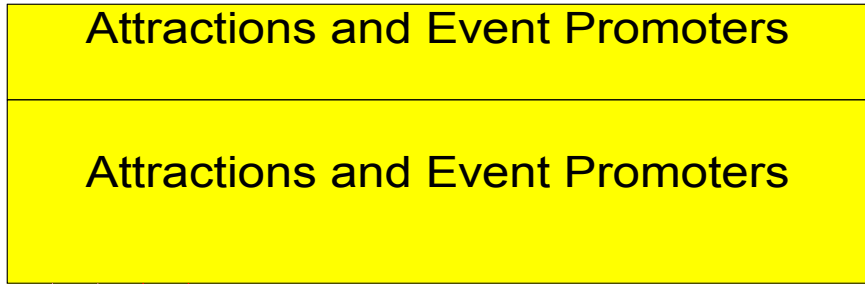
Attractions and Event Promoters Interconnect Diagram

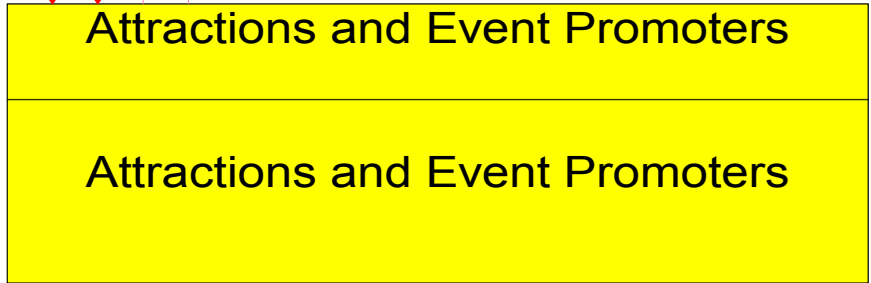
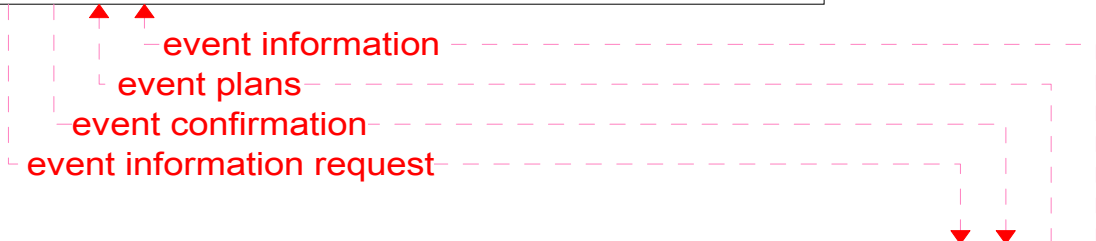
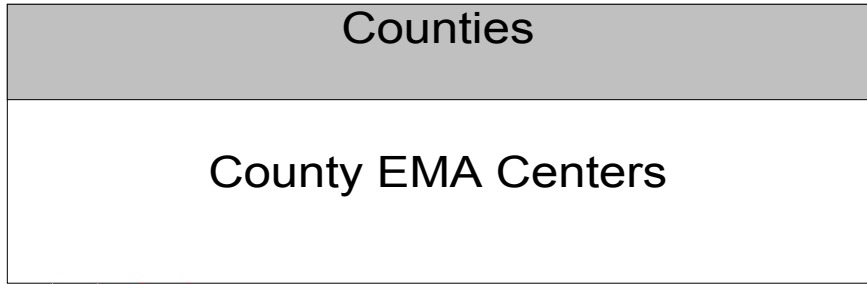


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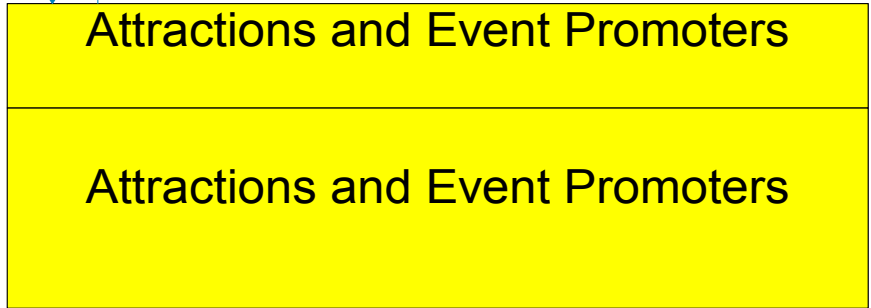
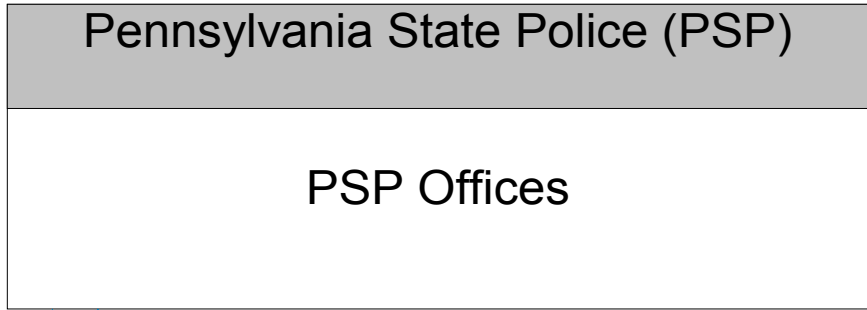


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Existing
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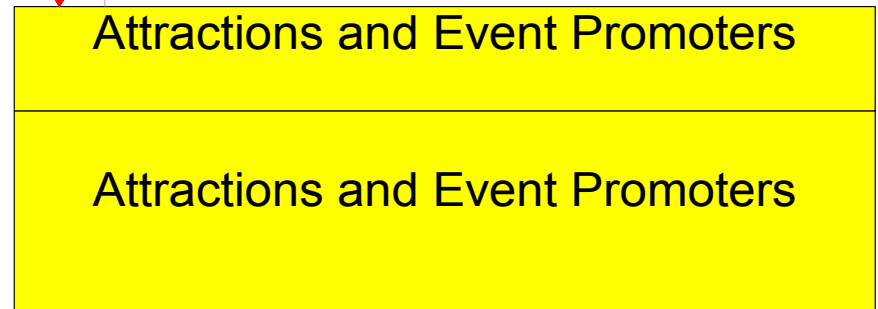
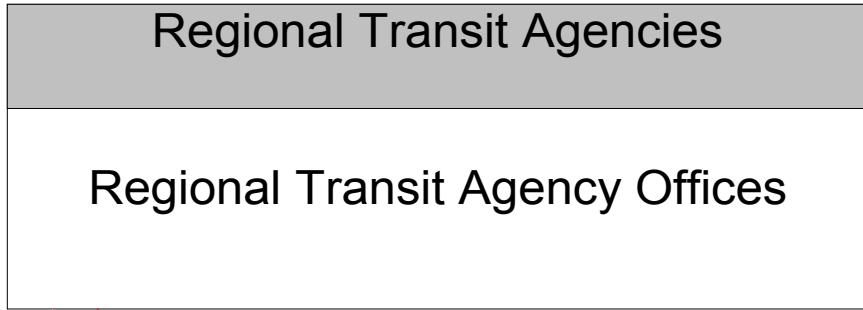


event plans

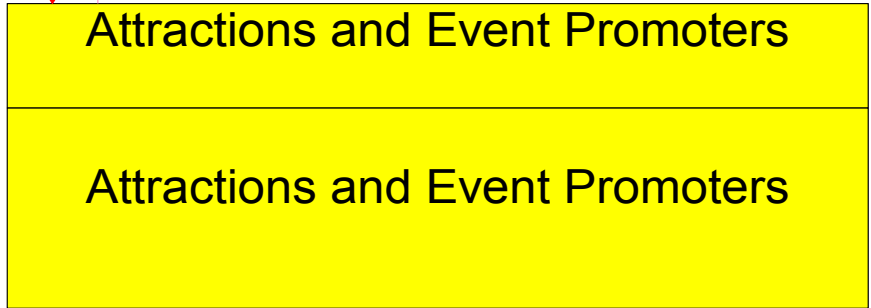
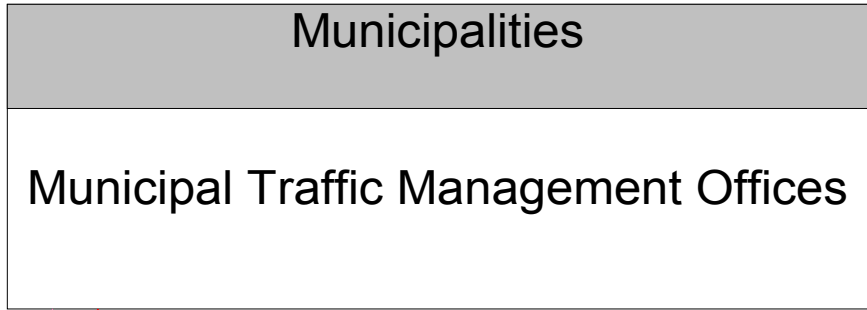
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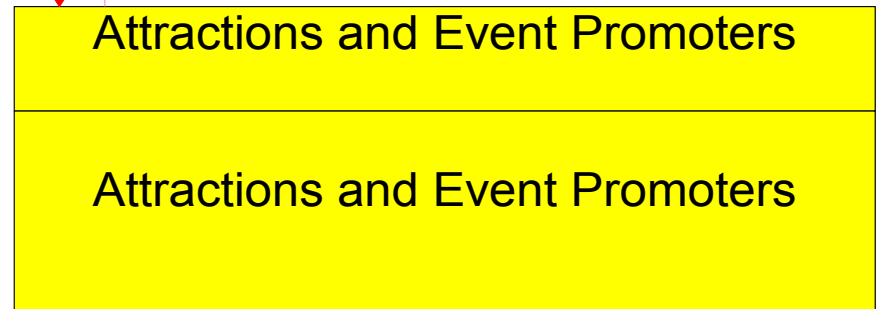
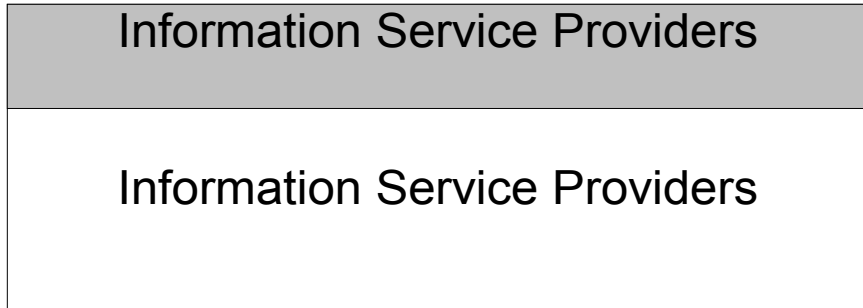
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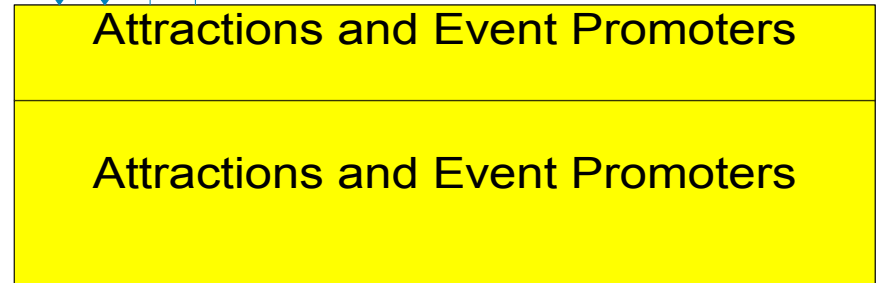
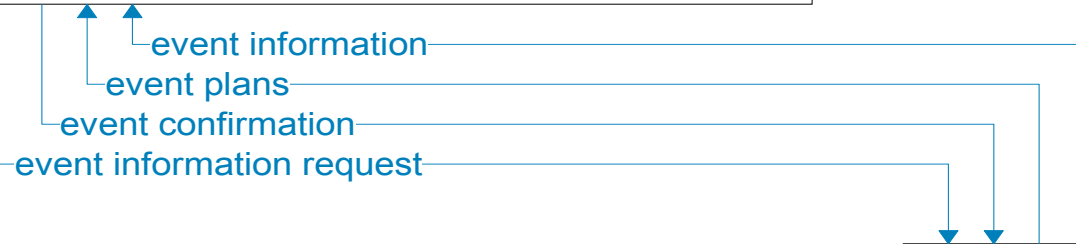
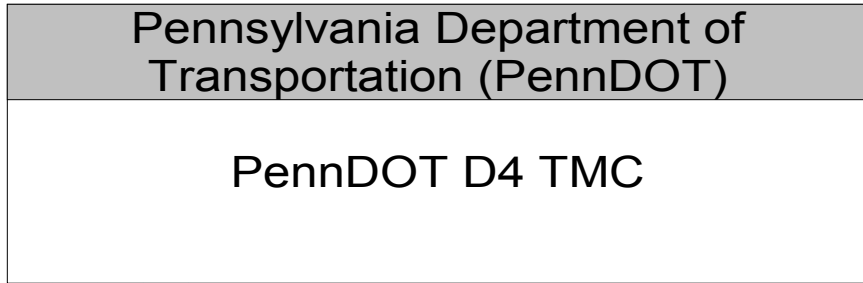
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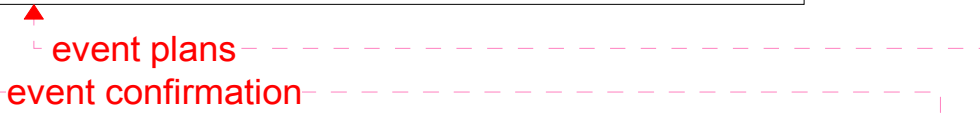
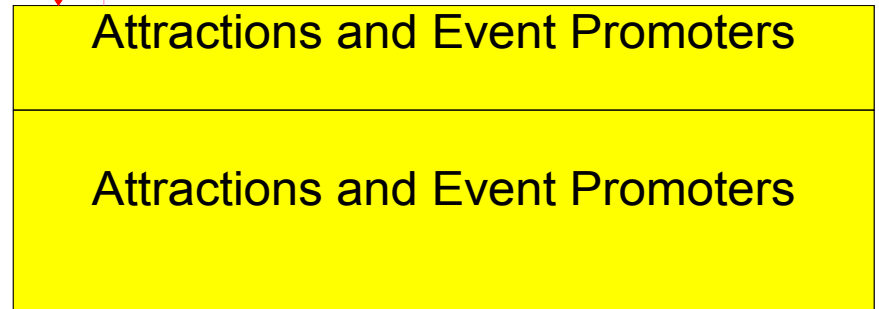
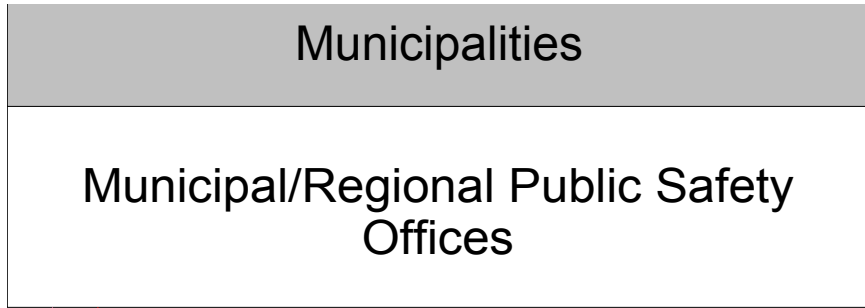


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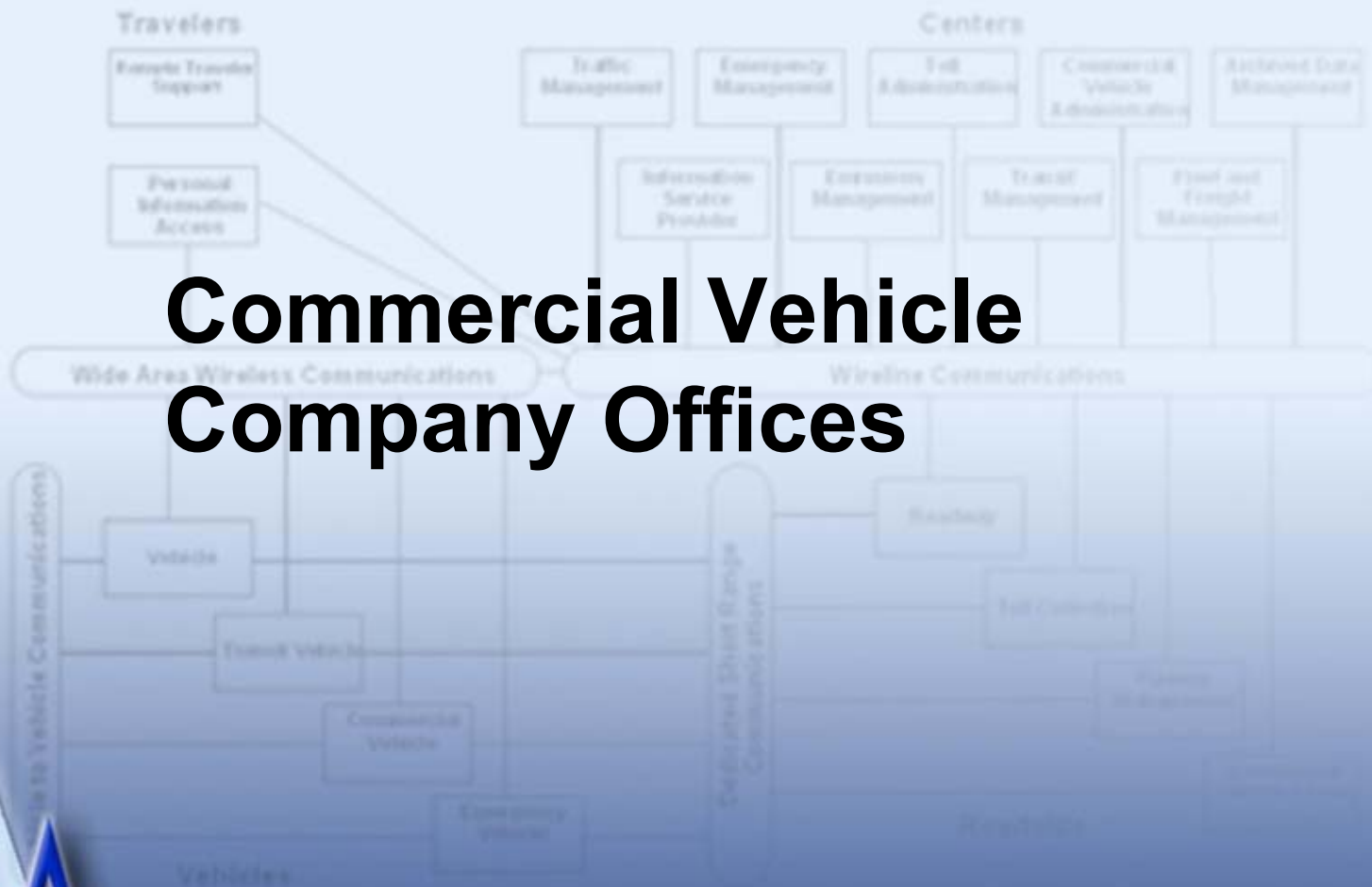
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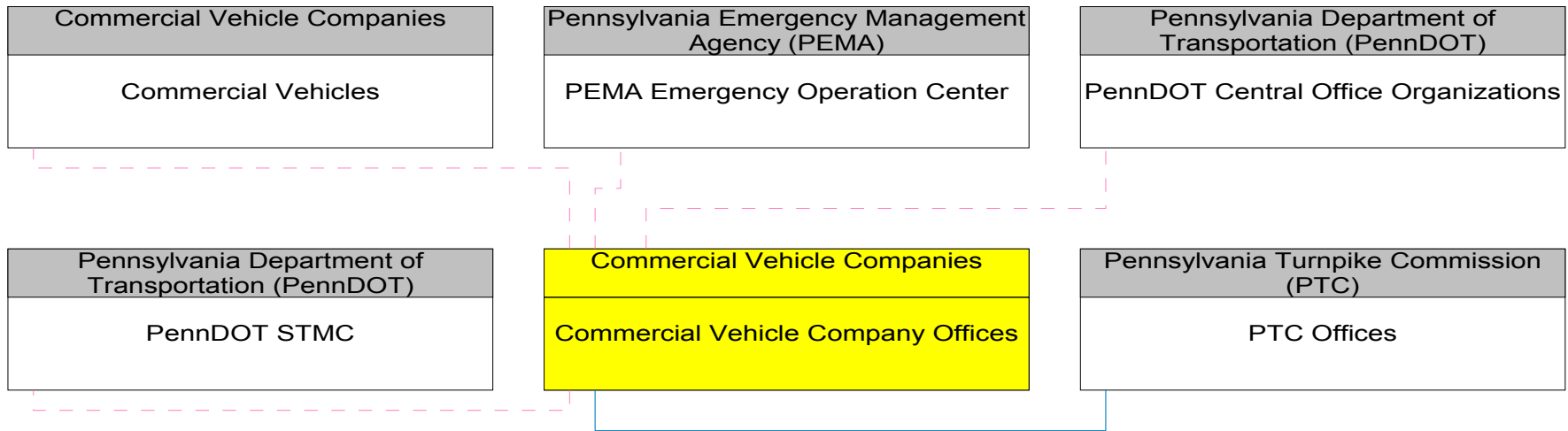


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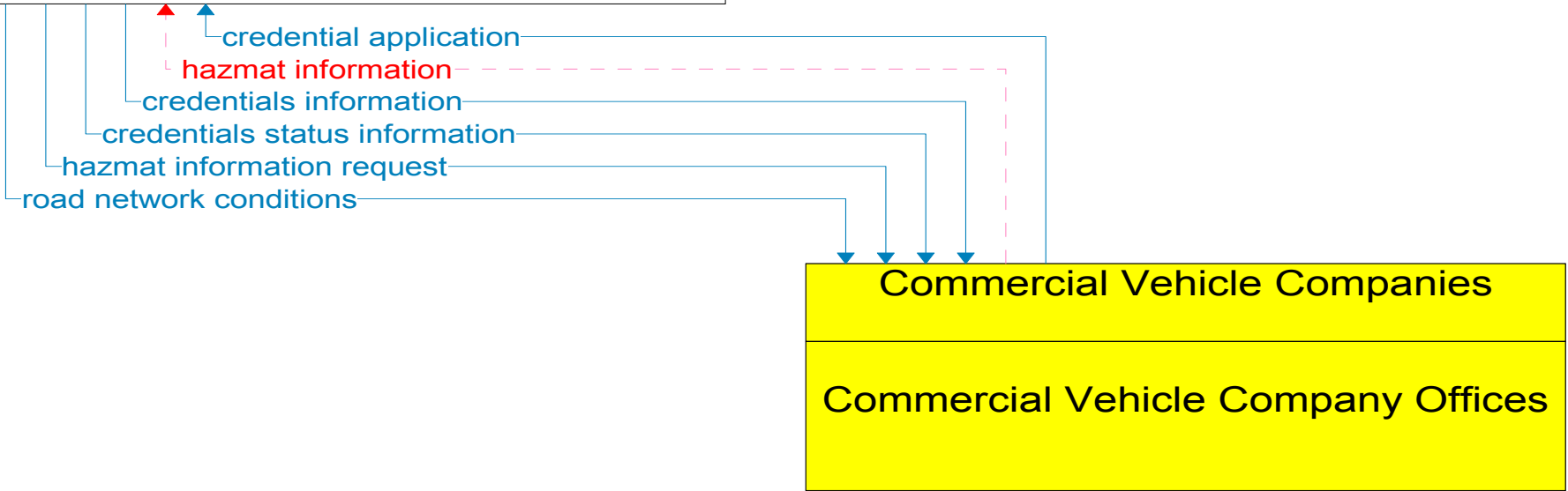
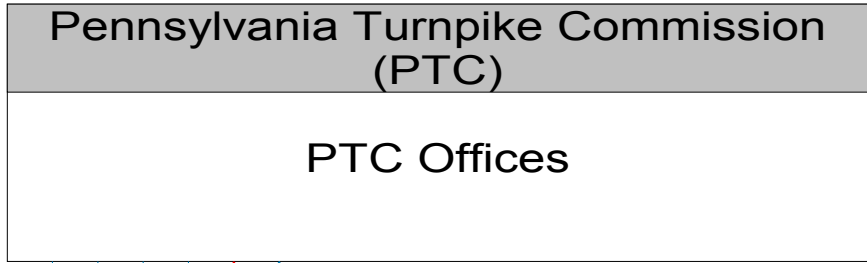
Commercial Vehicle Company Offices



Commercial Vehicle Company Offices Interconnect Diagram



Existing
Planned



Existing
Planned

Pennsylvania Emergency Management Agency (PEMA)

PEMA Emergency Operation Center

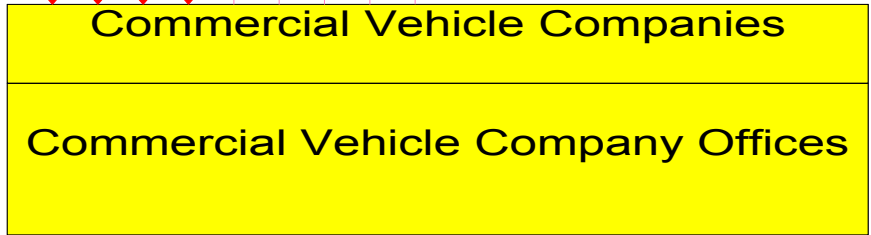
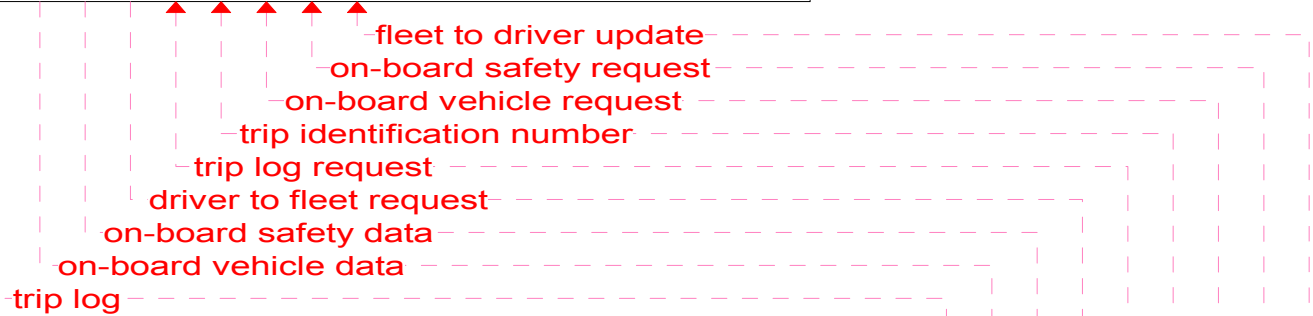
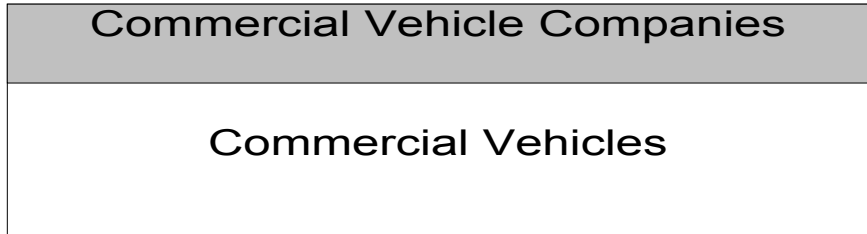


hazmat information

Commercial Vehicle Companies

Commercial Vehicle Company Offices

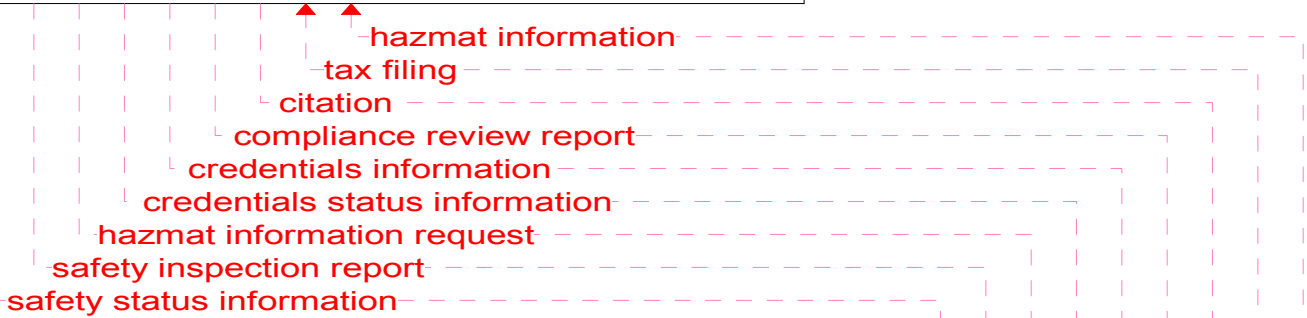
Existing
Planned



———— 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

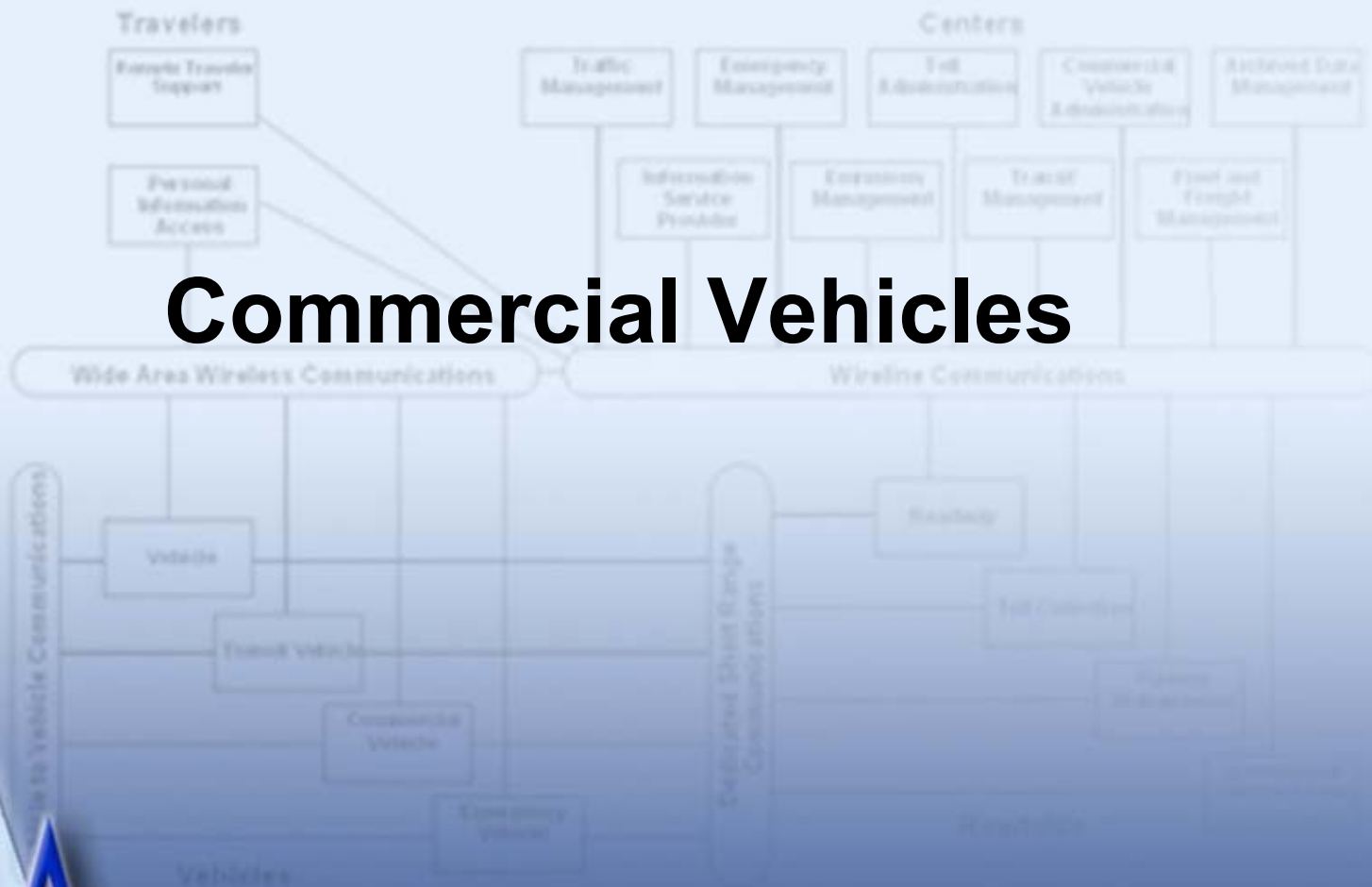


Commercial Vehicle Companies

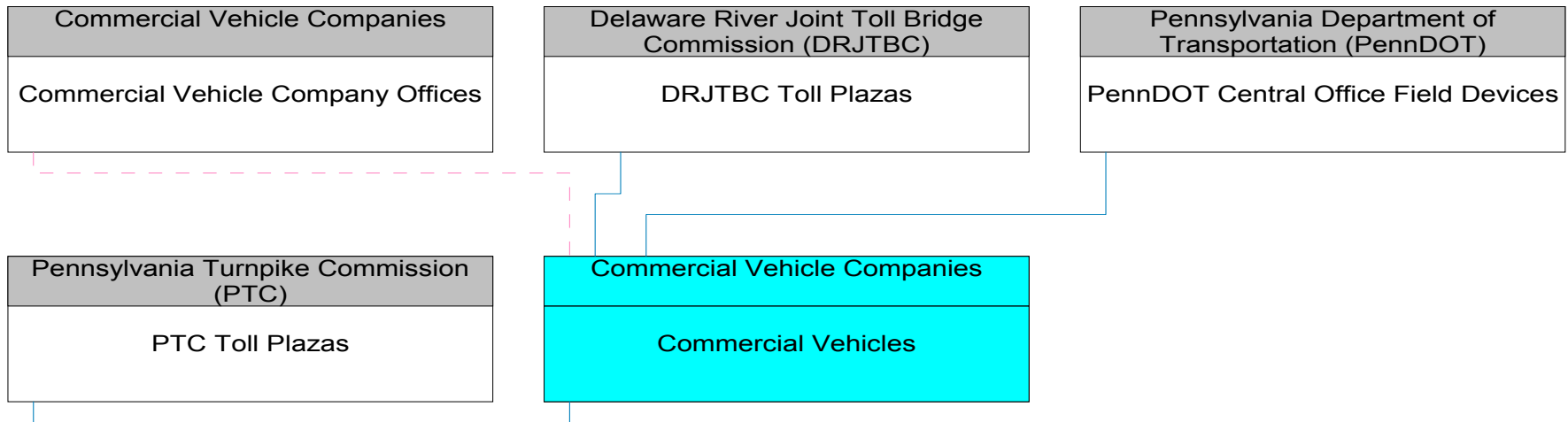
Commercial Vehicle Company Offices

Existing
Planned

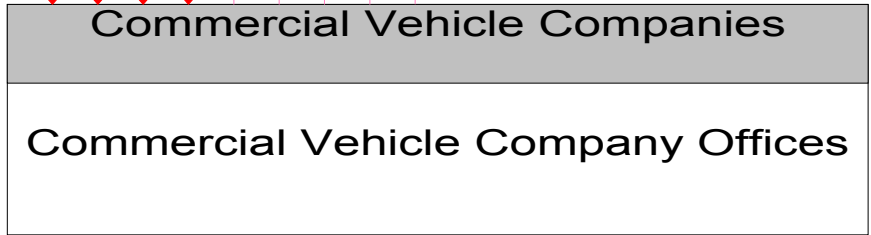
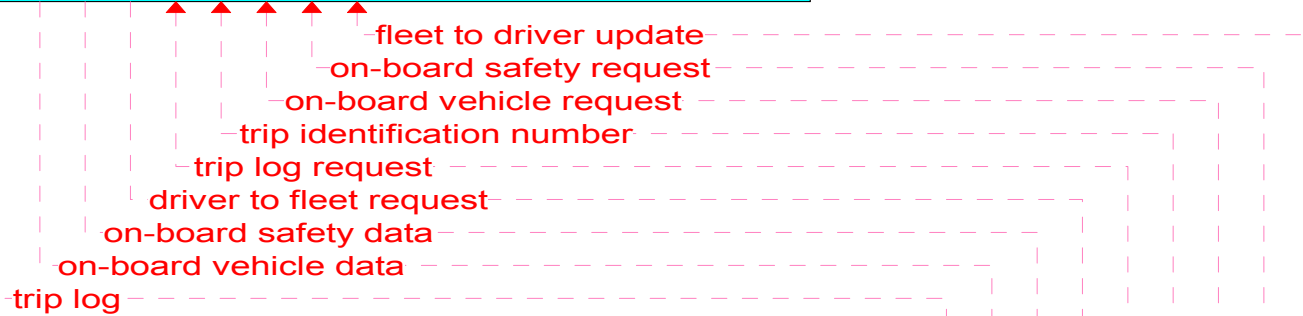
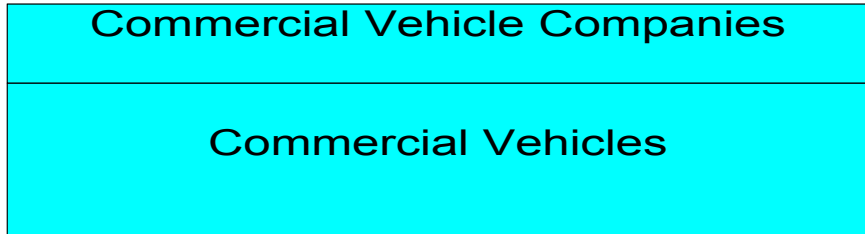
Commercial Vehicles



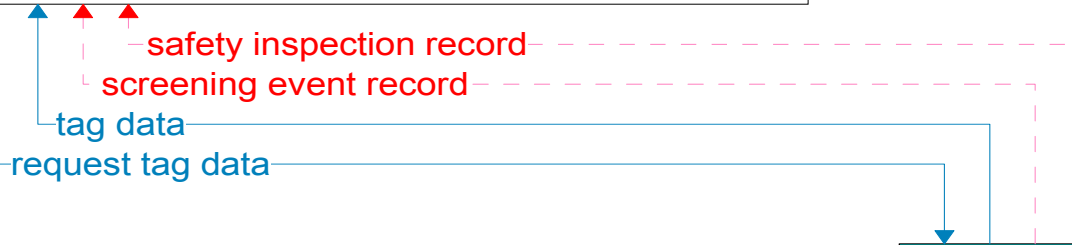
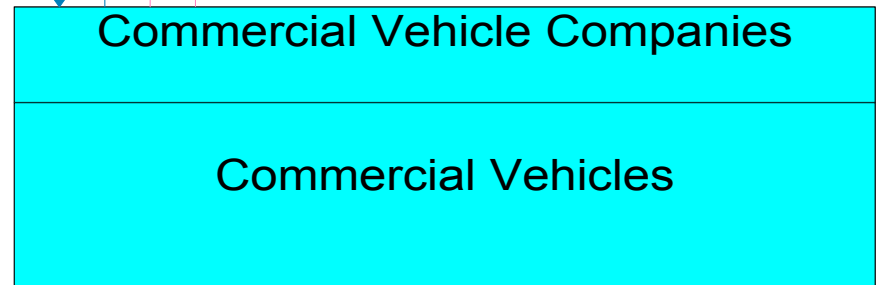
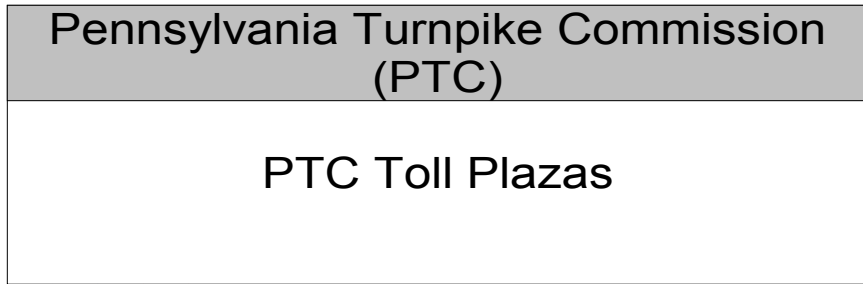
Commercial Vehicles Interconnect Diagram



— Existing
- - - Planned



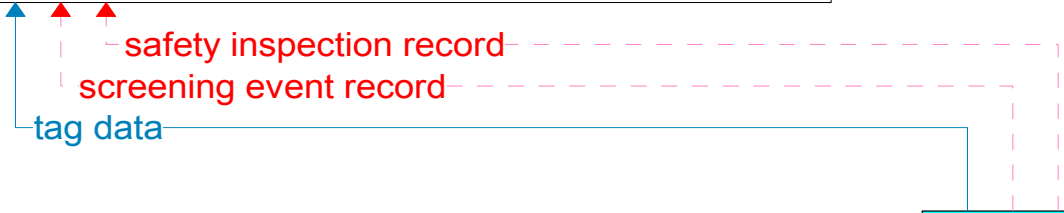
Existing
Planned



Existing
Planned

Pennsylvania Department of
Transportation (PennDOT)

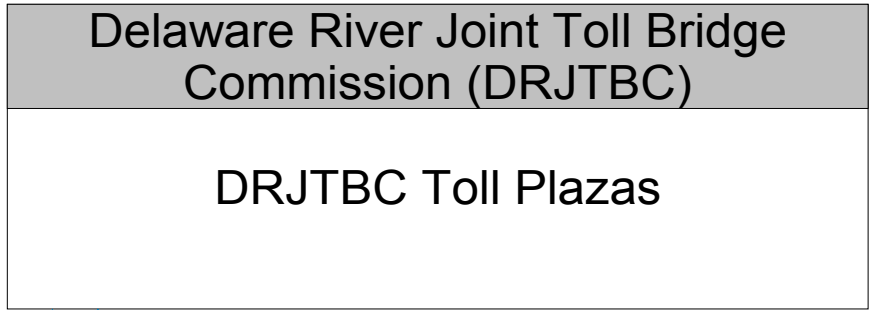
PennDOT Central Office Field Devices



Commercial Vehicle Companies

Commercial Vehicles

———— Existing
- - - - - Planned

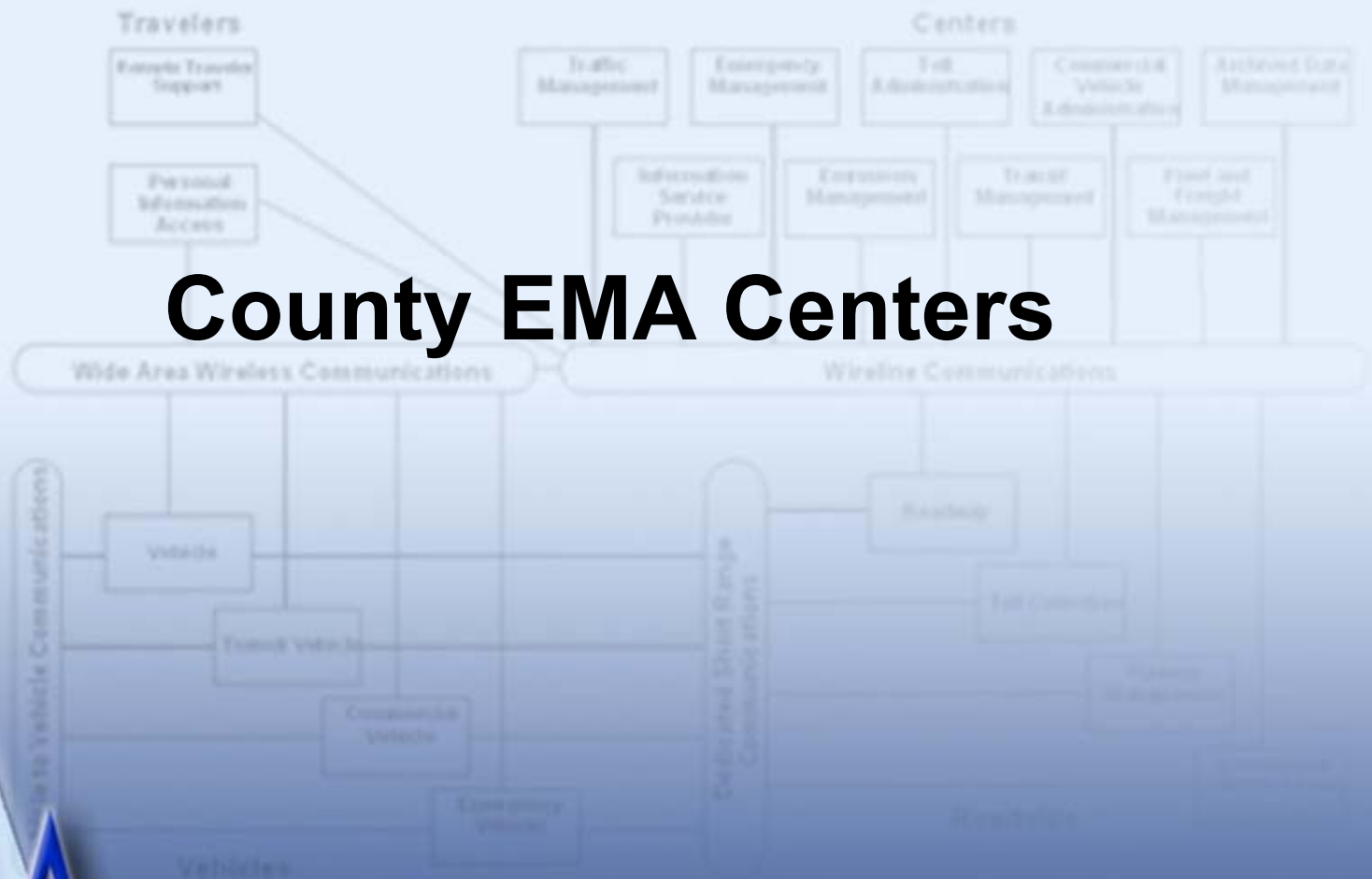


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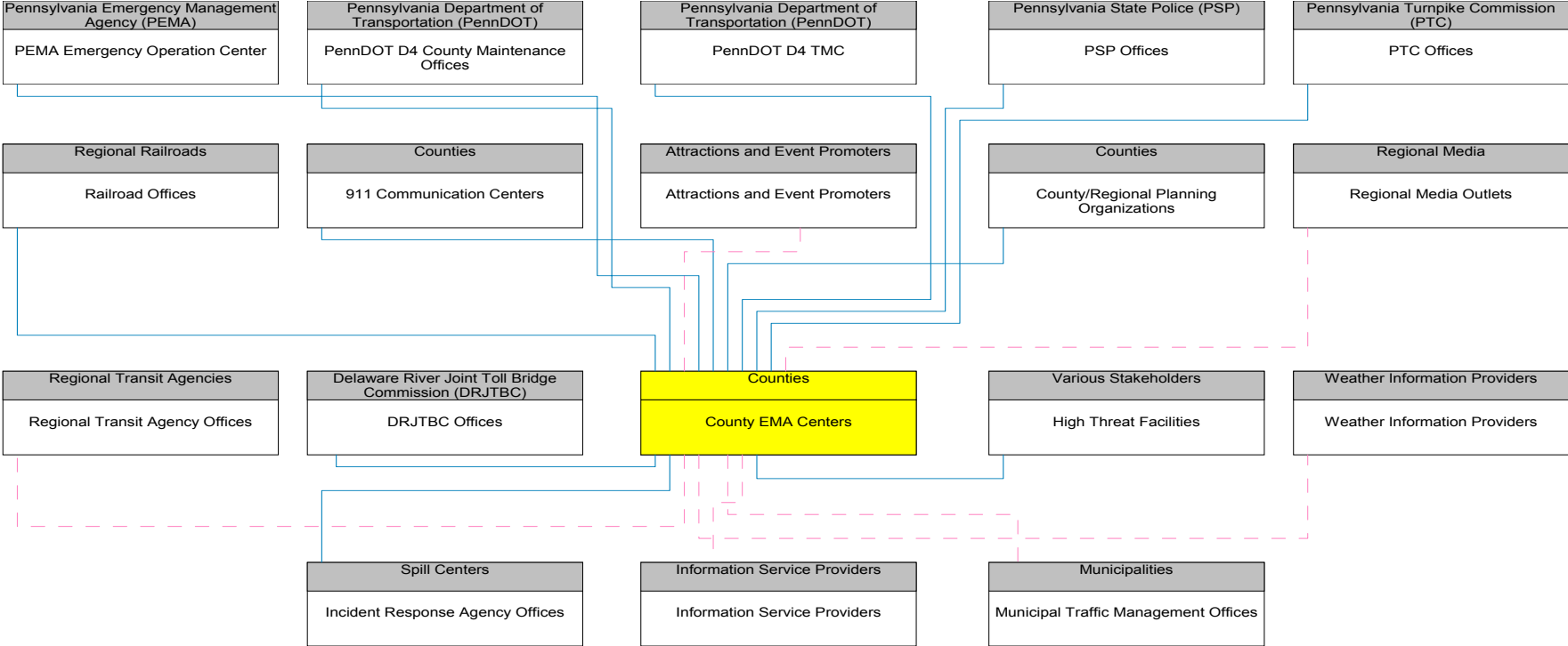
request tag data

Existing
Planned

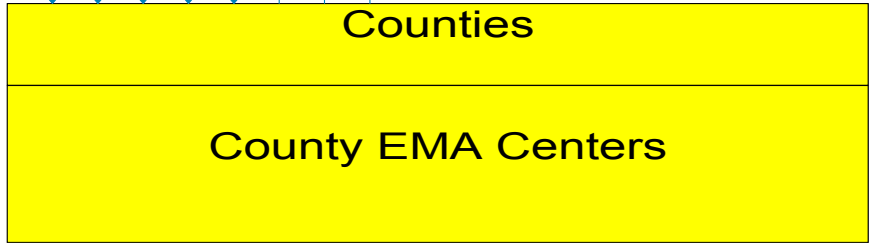
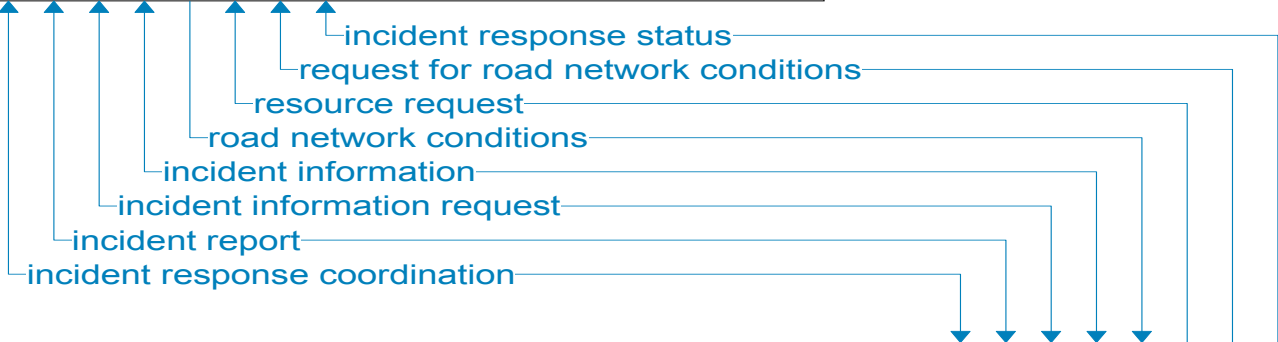
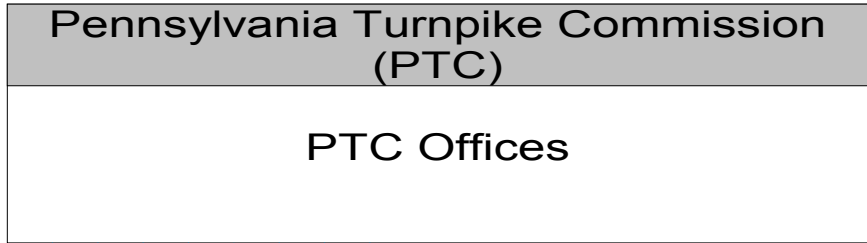
County EMA Centers



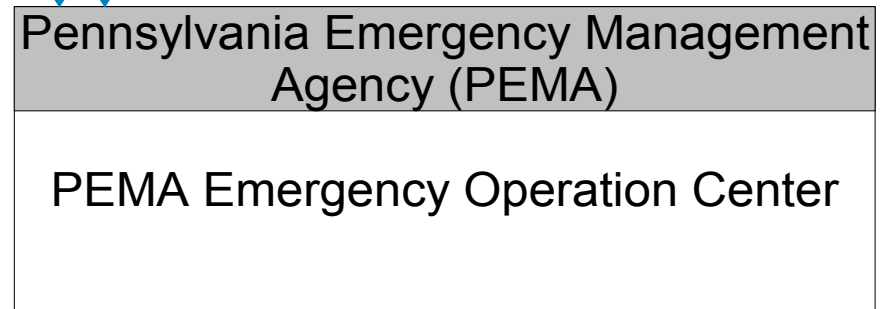
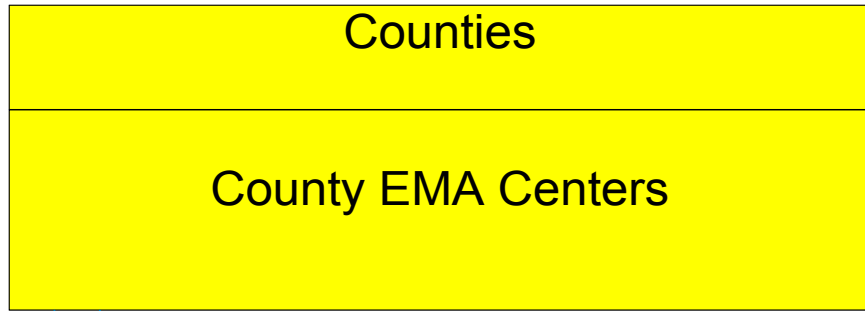
County EMA Centers Interconnect Diagram

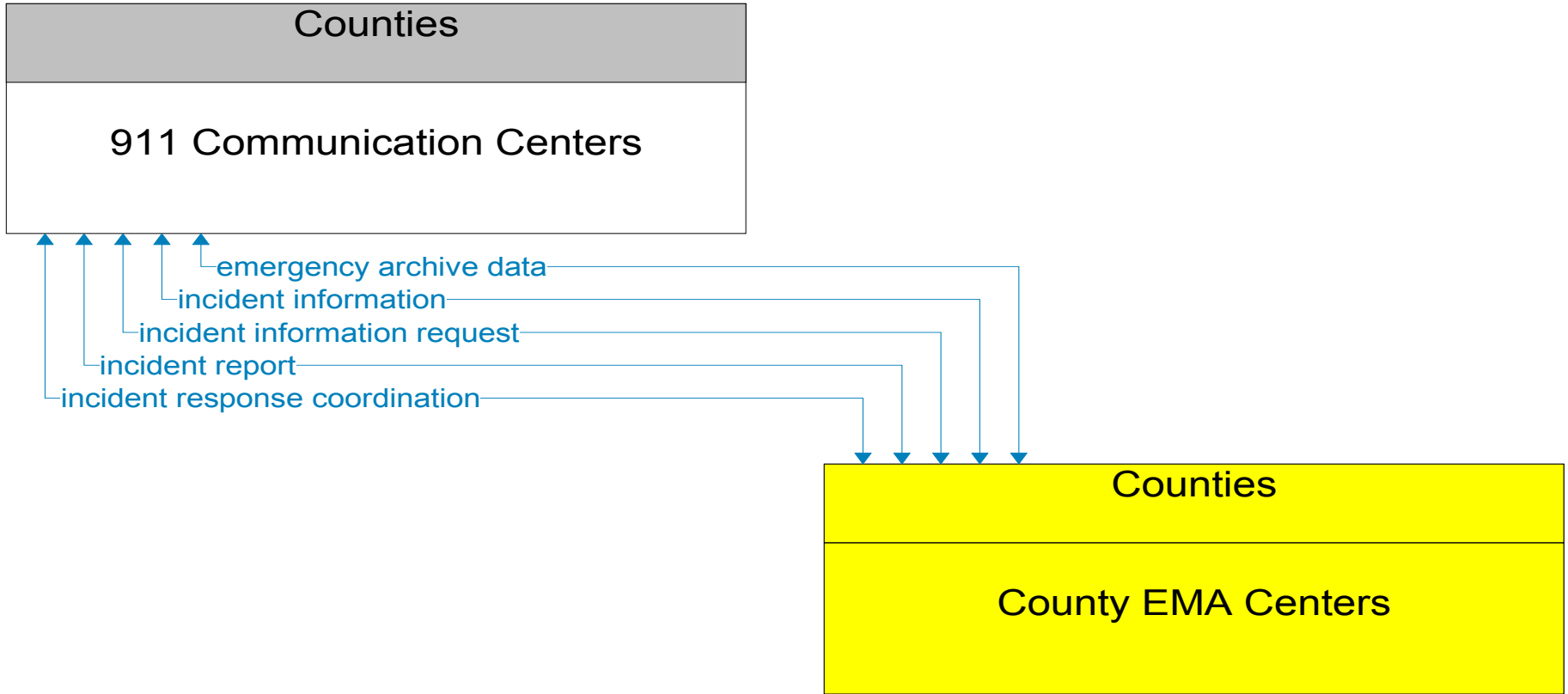


— Existing
- - - Planned

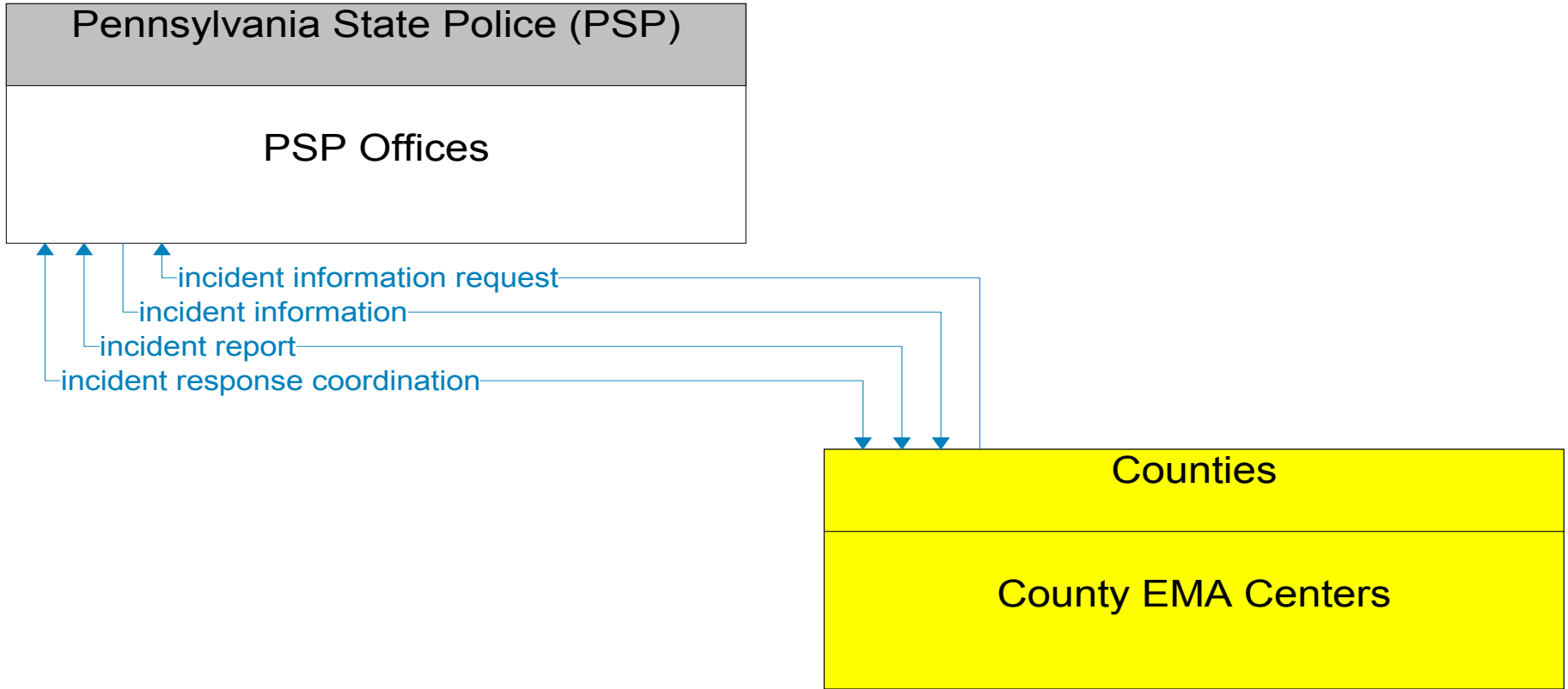


Existing
Planned

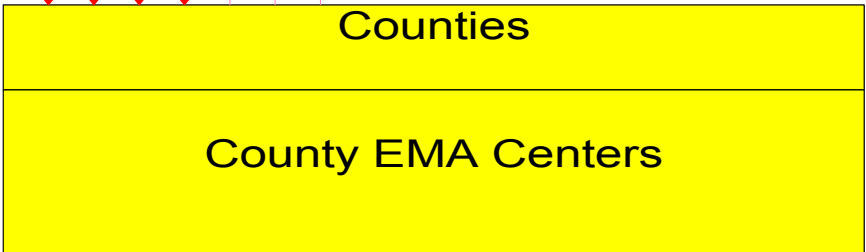
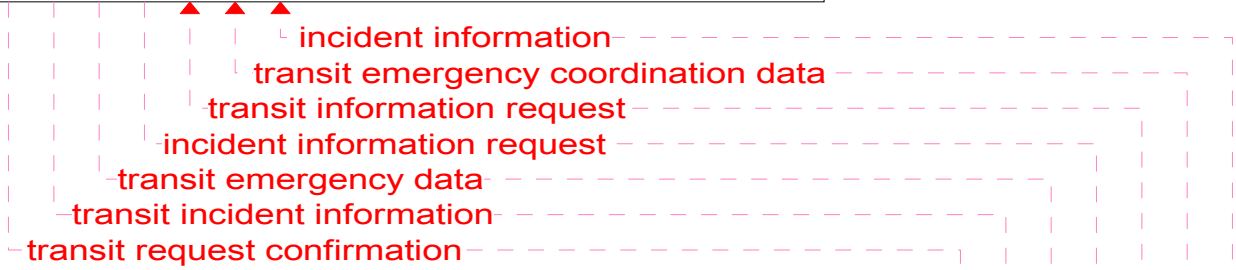
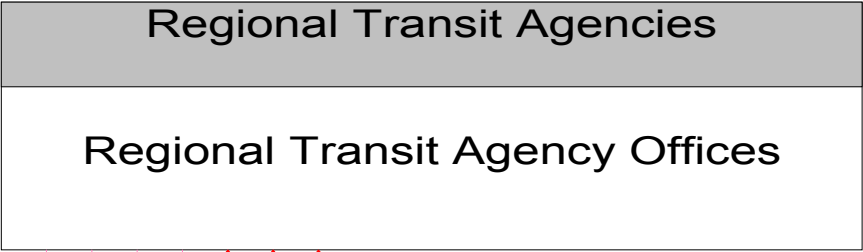




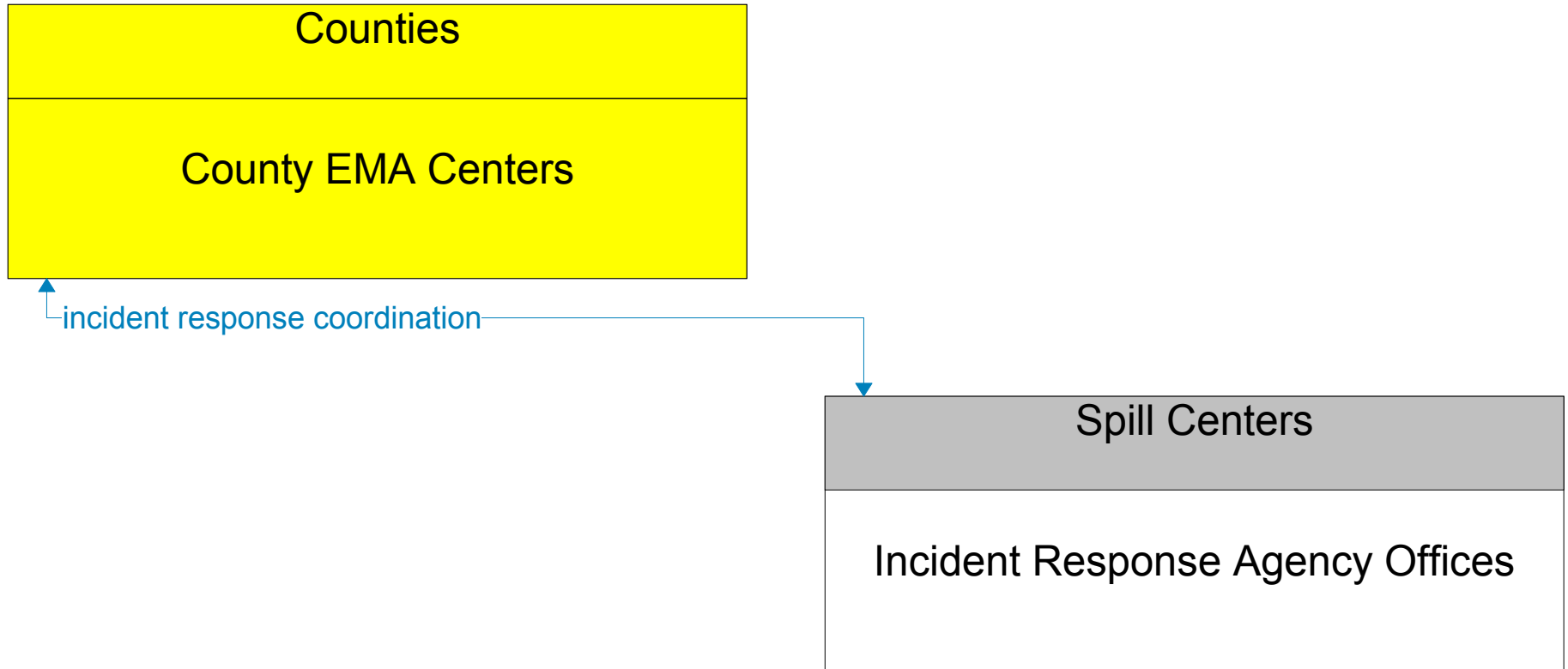
———— Existing
- - - - - Planned



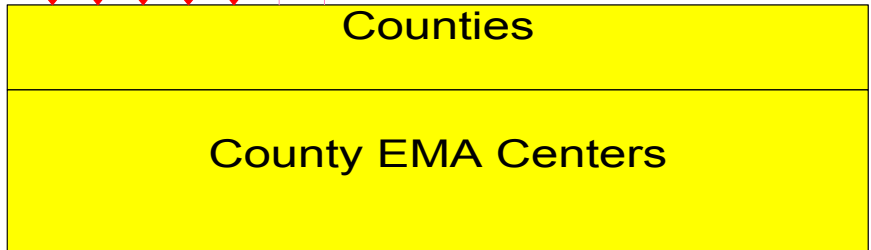
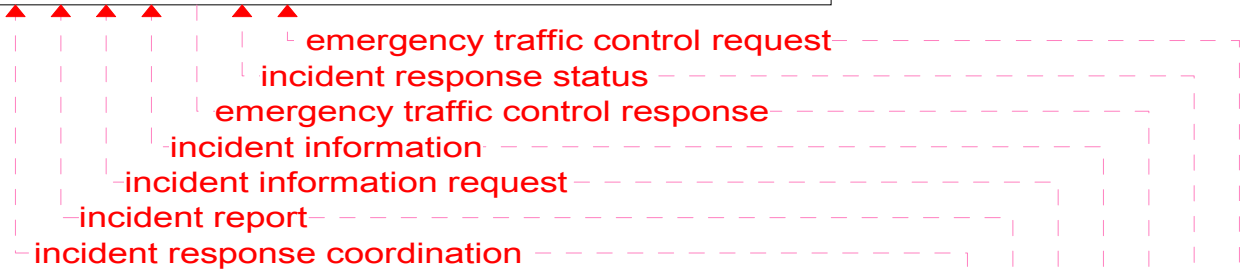
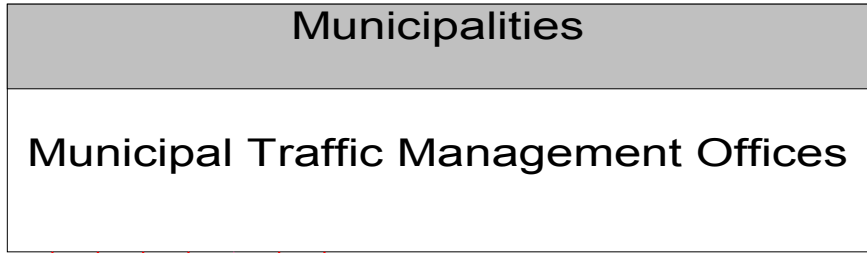
———— Existing
- - - - - Planned



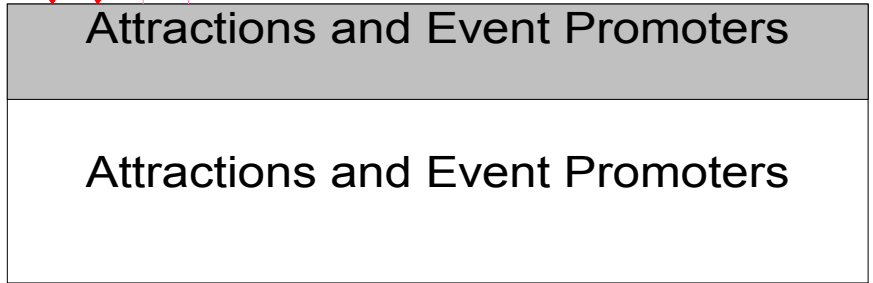
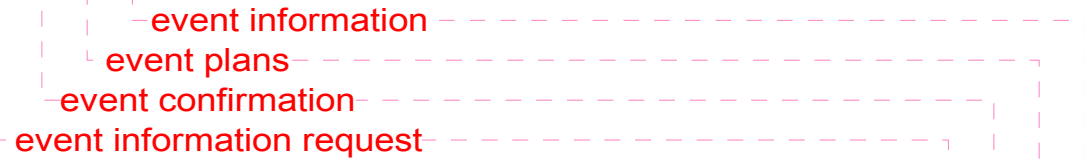
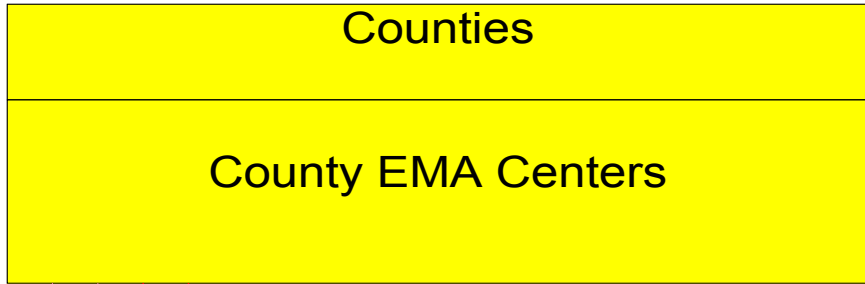
Existing
Planned

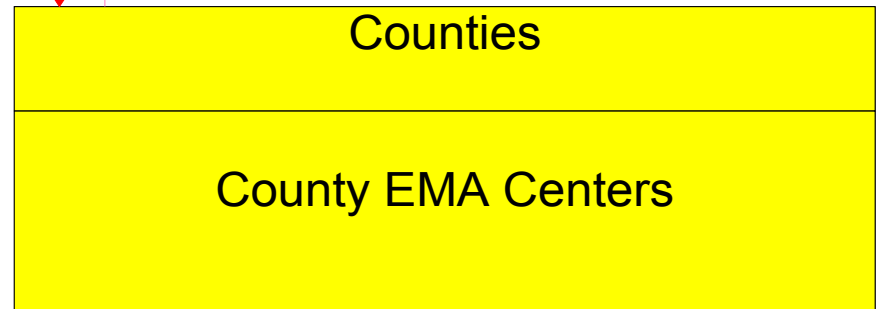
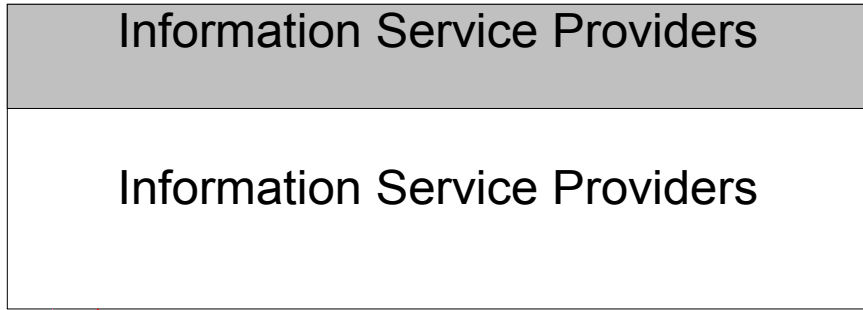


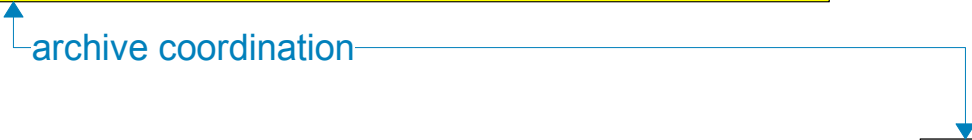
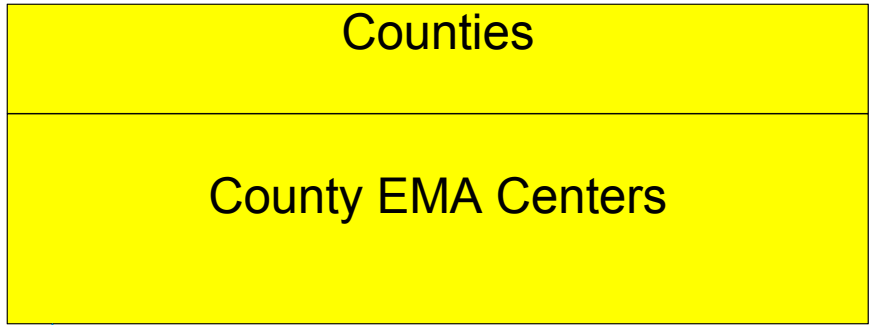
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- - - - - Planned



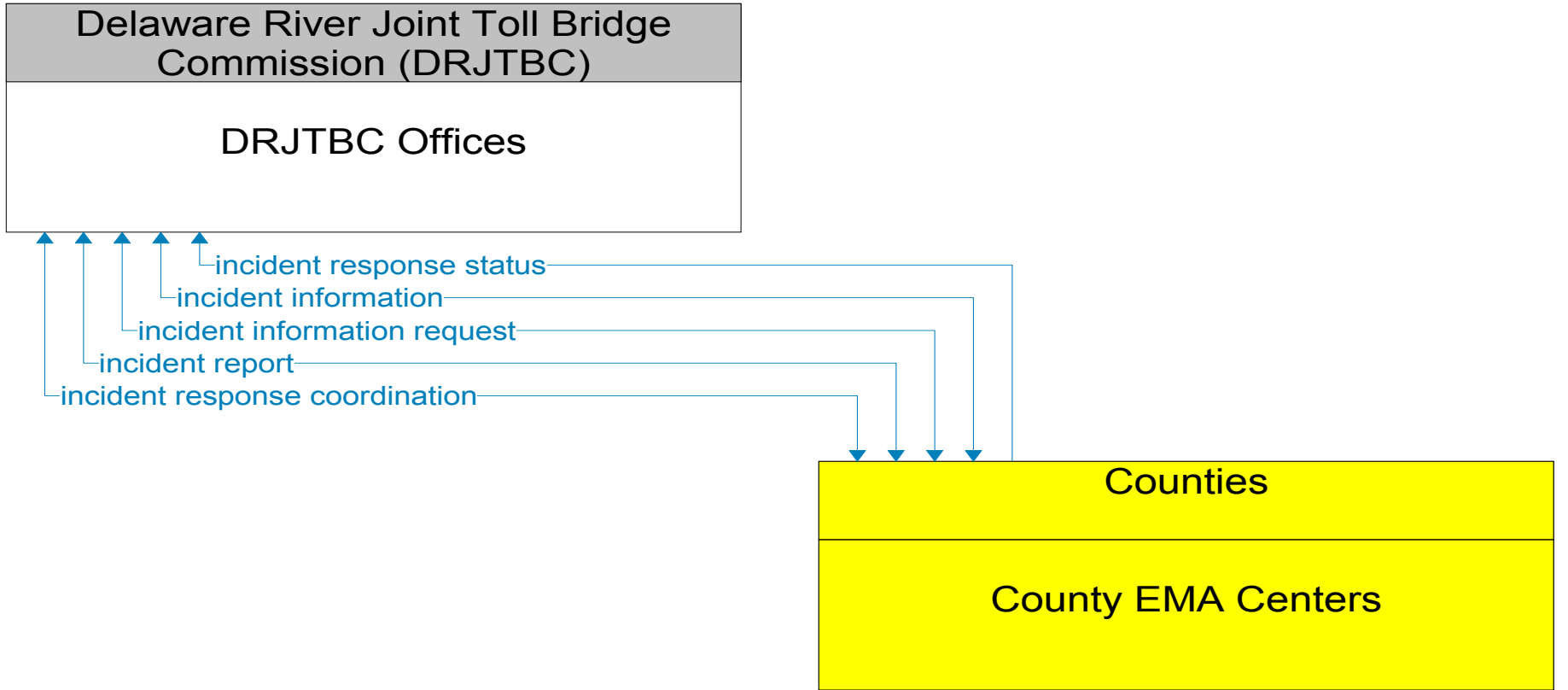
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Planned

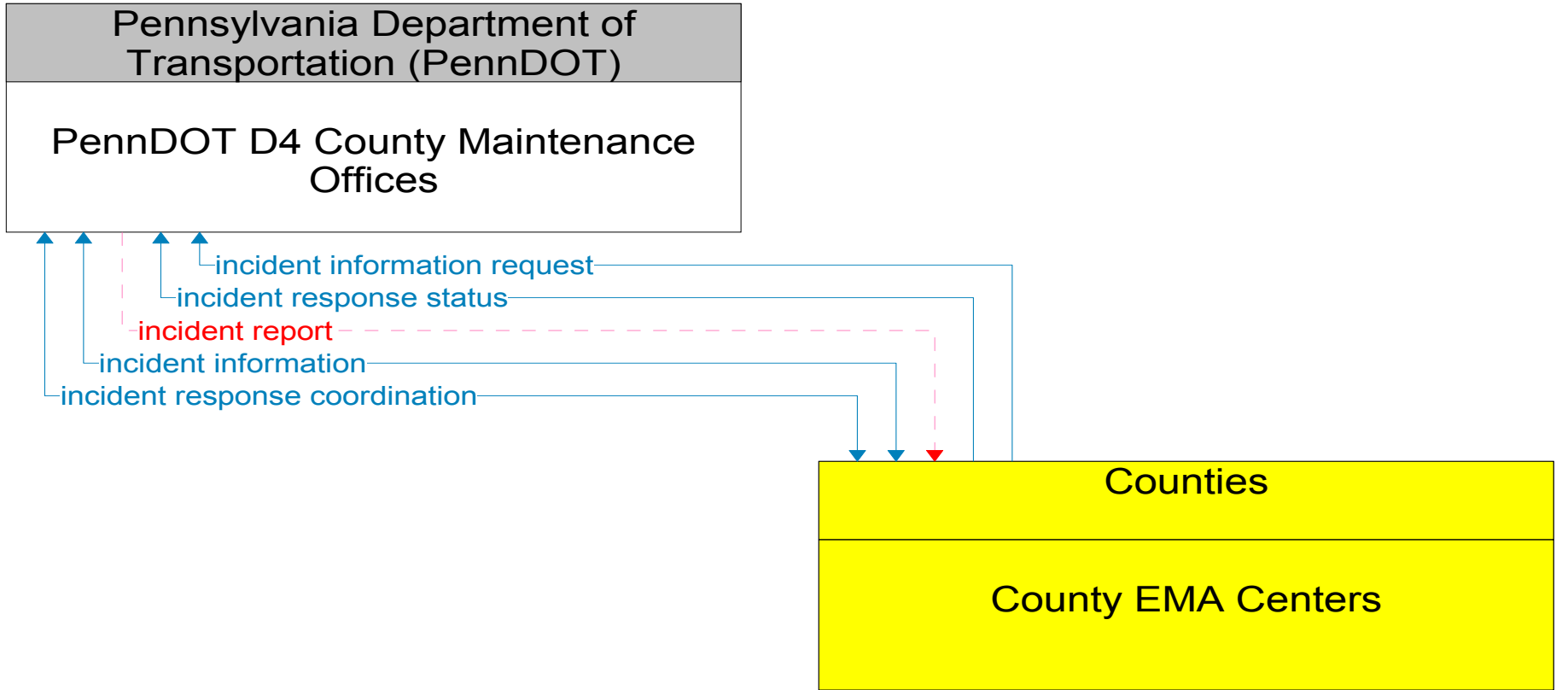




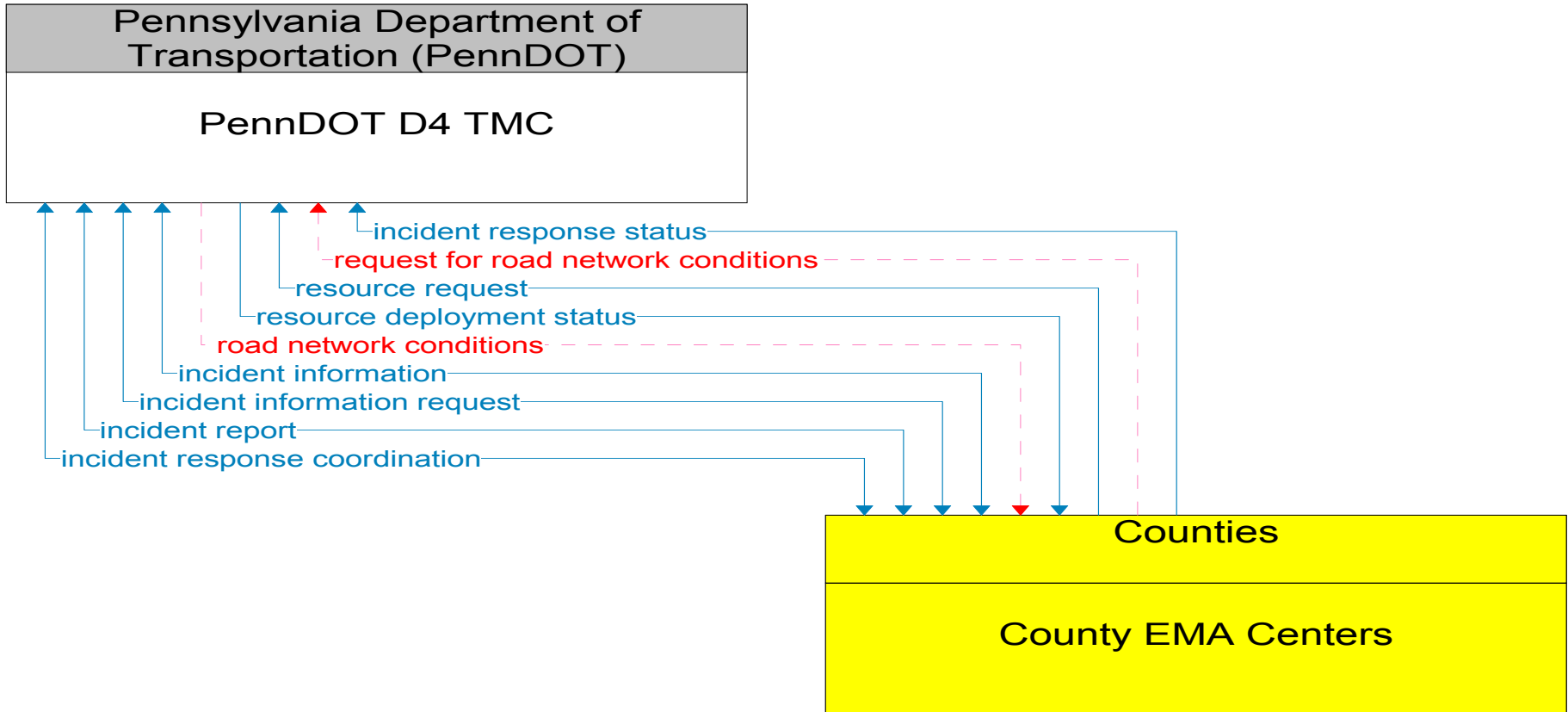


———— Existing
- - - - - Planned

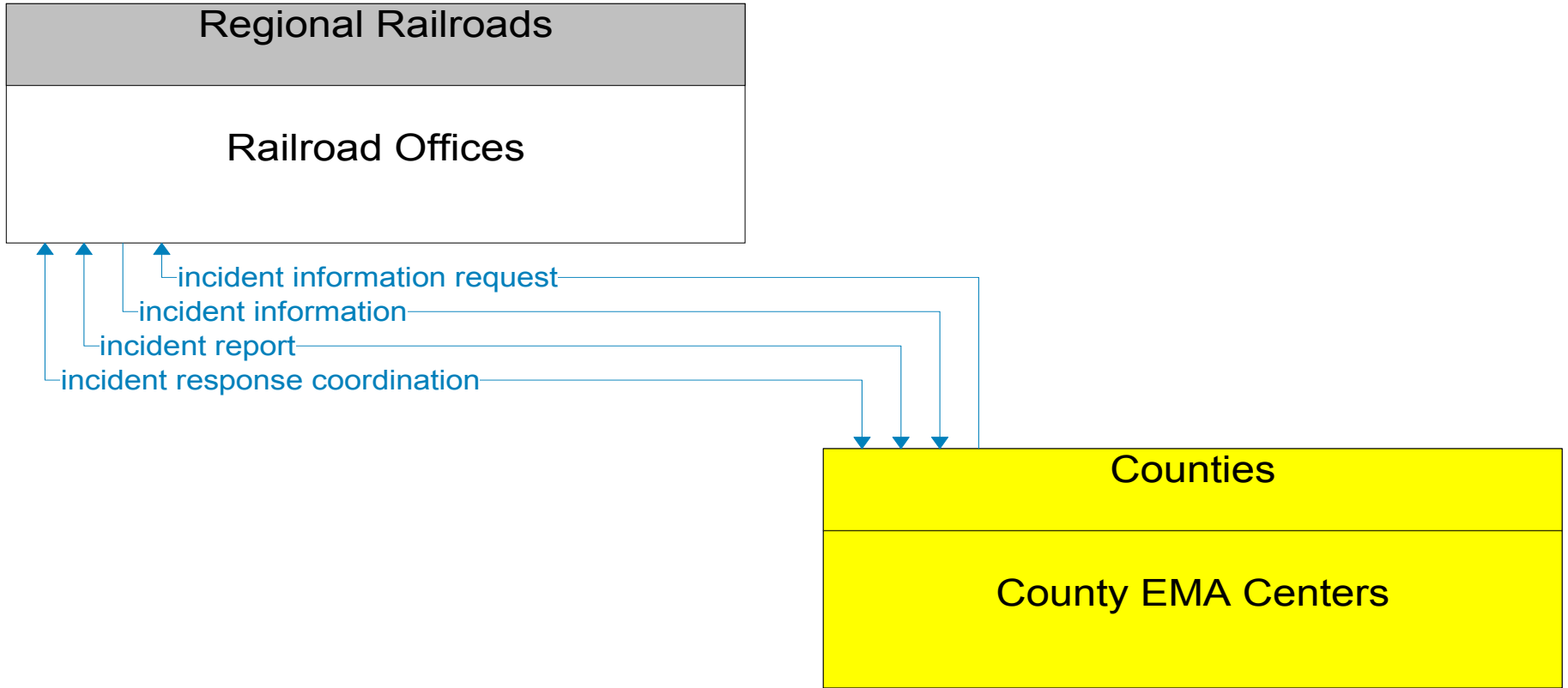




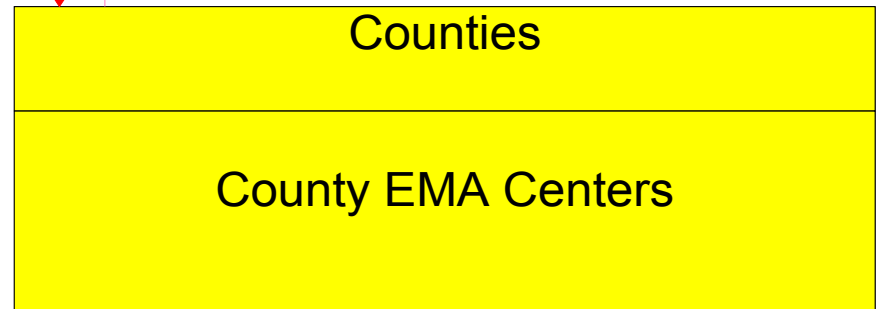
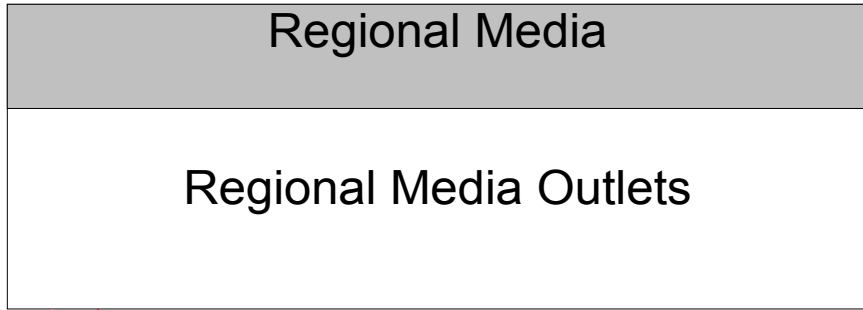
———— Existing
- - - - - Planned



———— Existing
- - - - - Planned

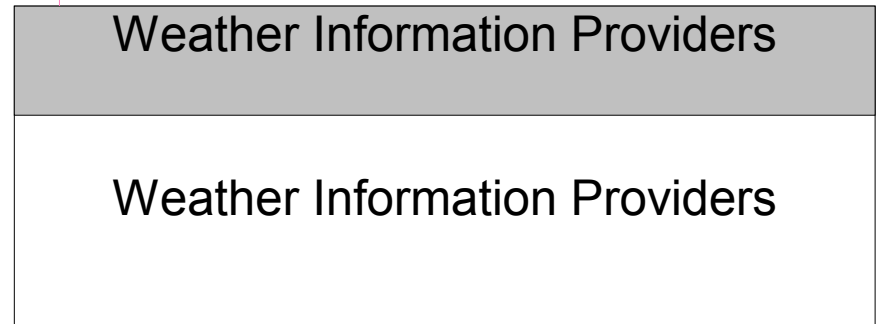
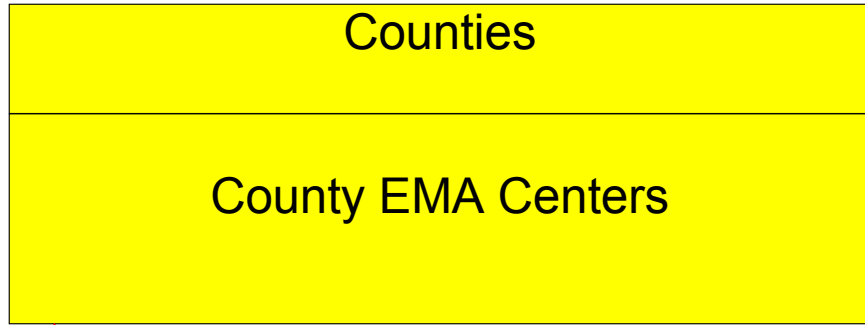


———— Existing
----- Planned

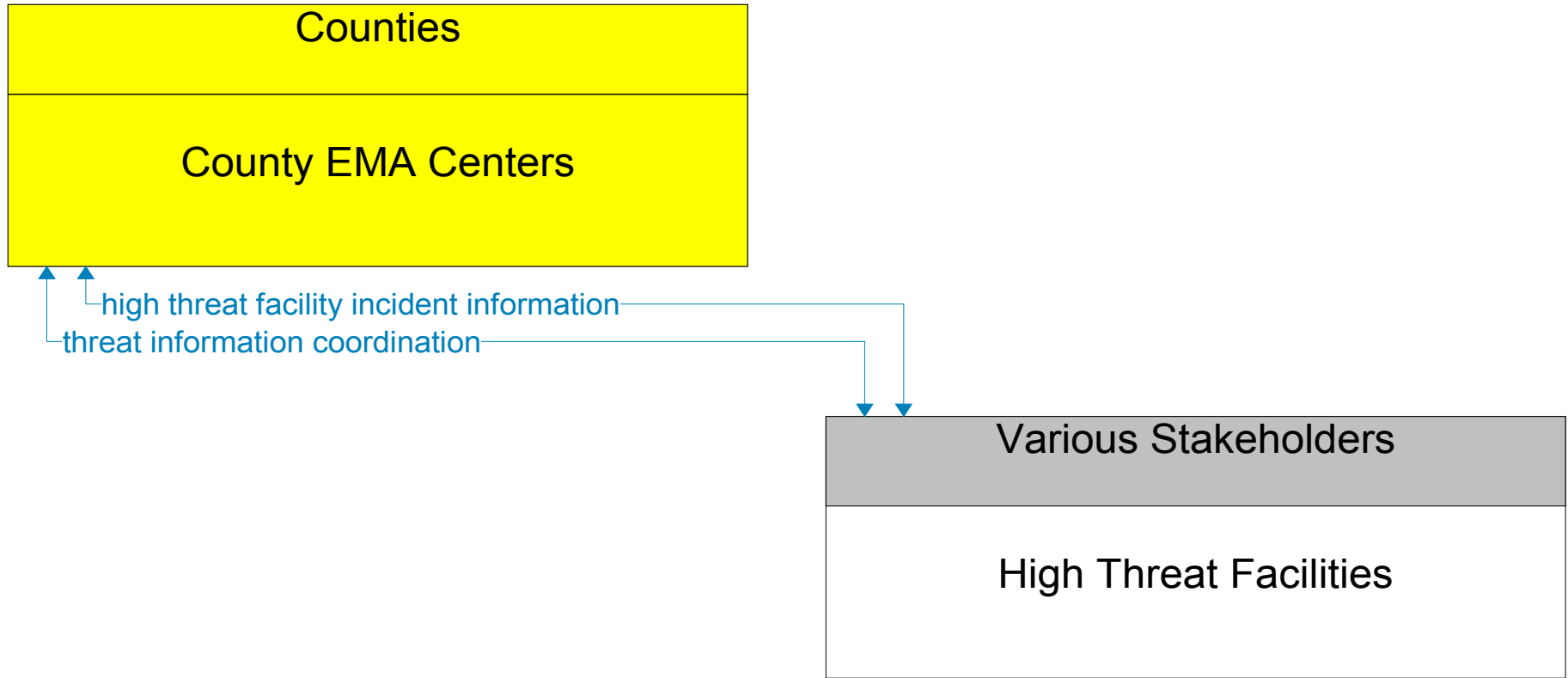


Existing
Planned

A legend showing a solid blue line next to the word "Existing" and a dashed red line next to the word "Planned".



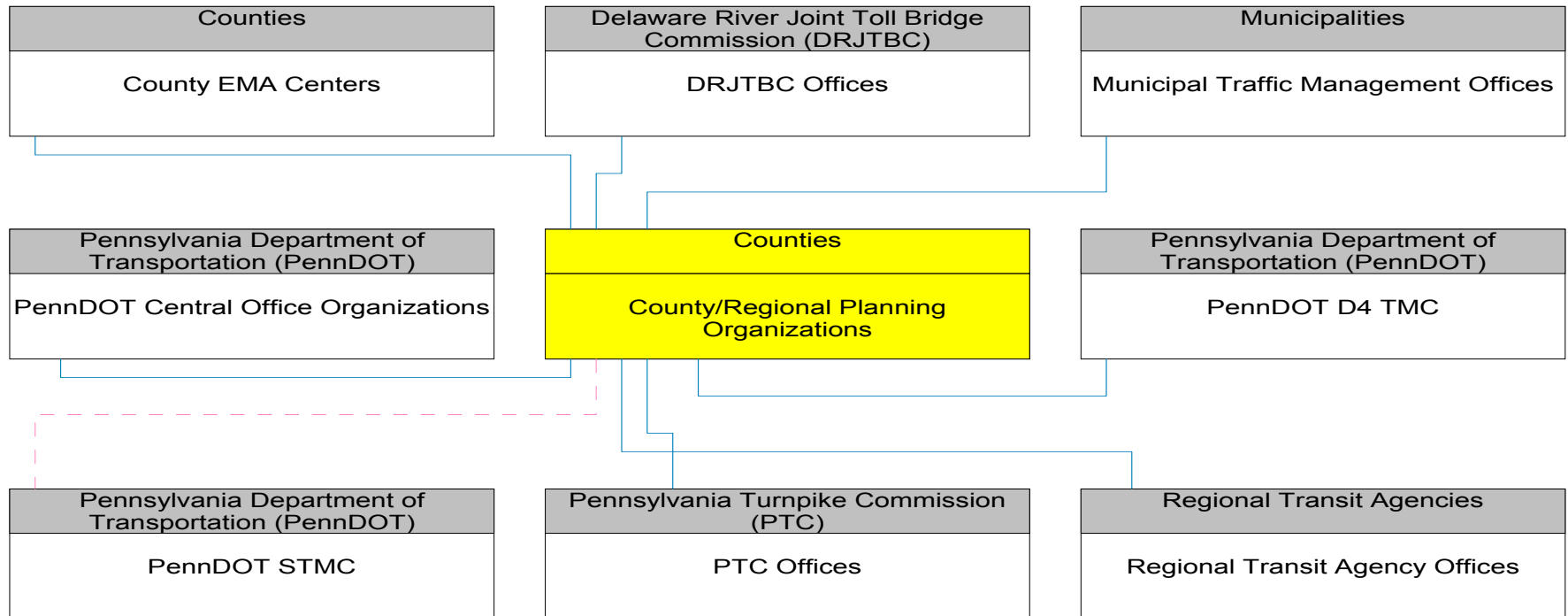
———— Existing
- - - - - Planned



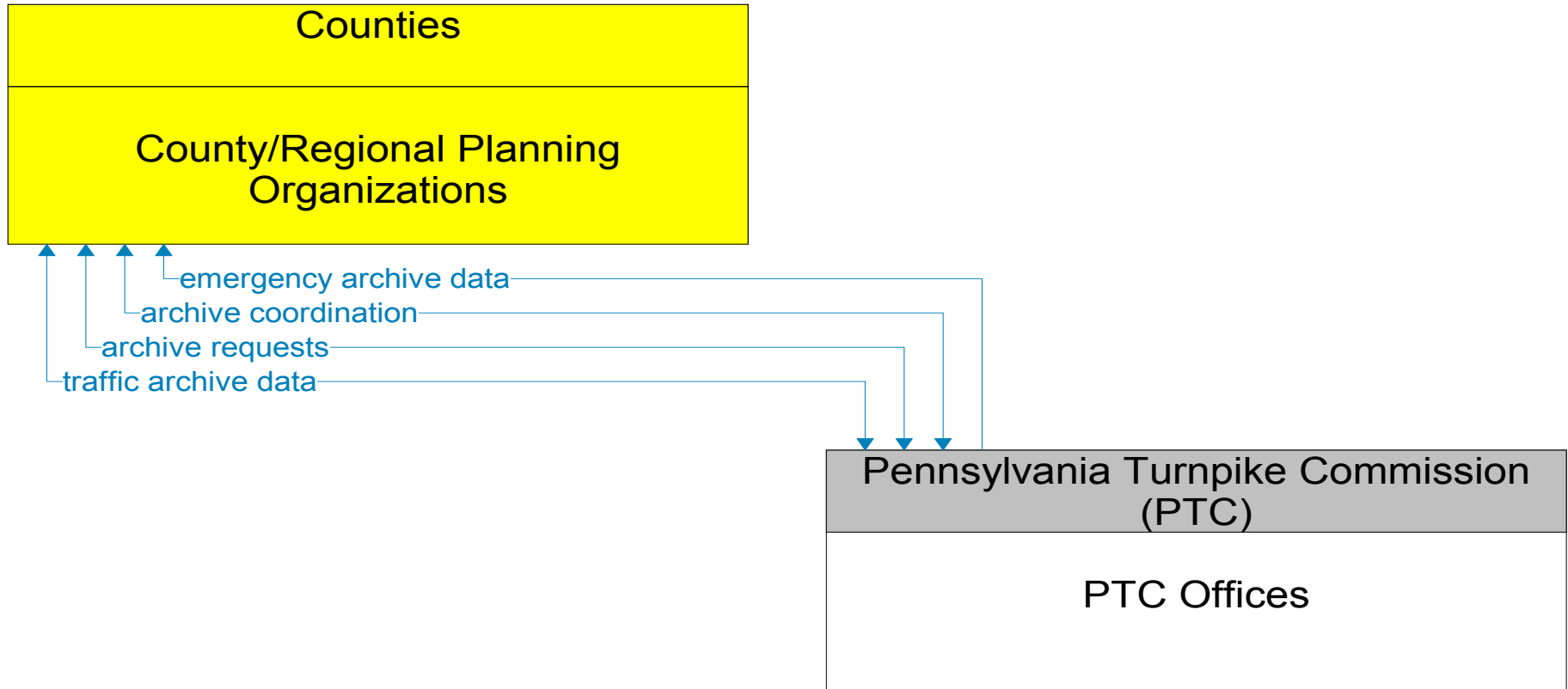
County/Regional Planning Organizations



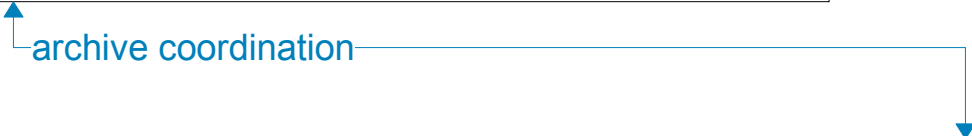
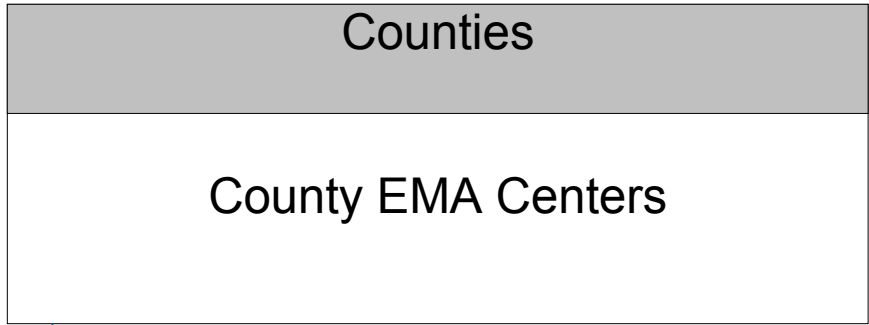
County/Regional Planning Organizations Interconnect Diagram



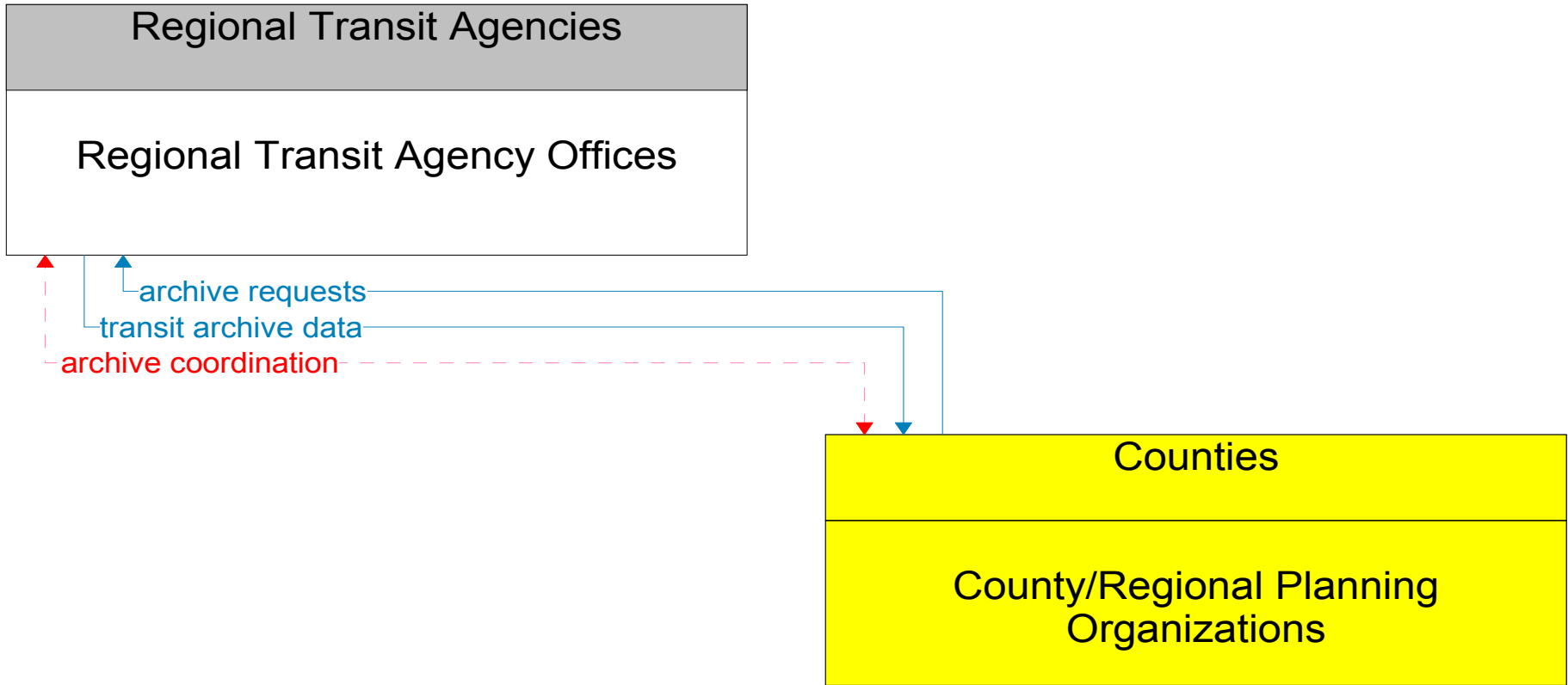
— Existing
 - - - Planned



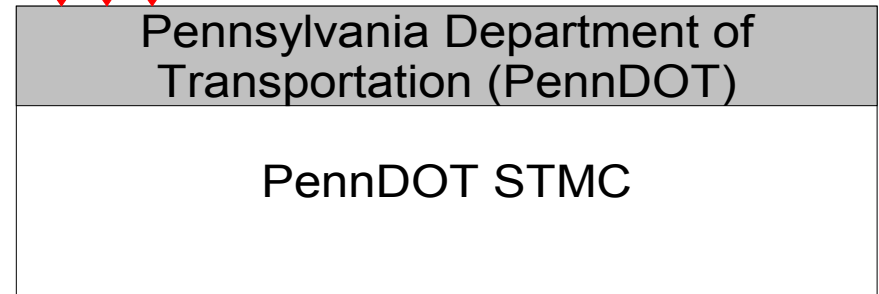
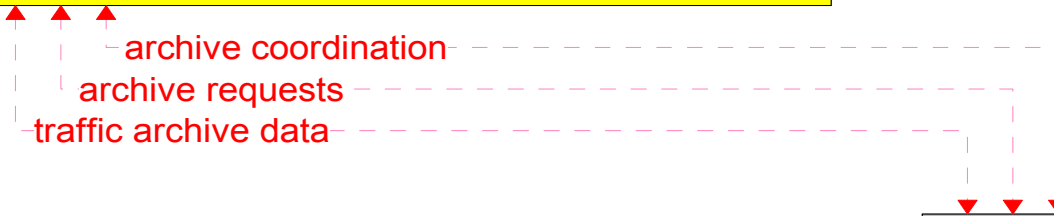
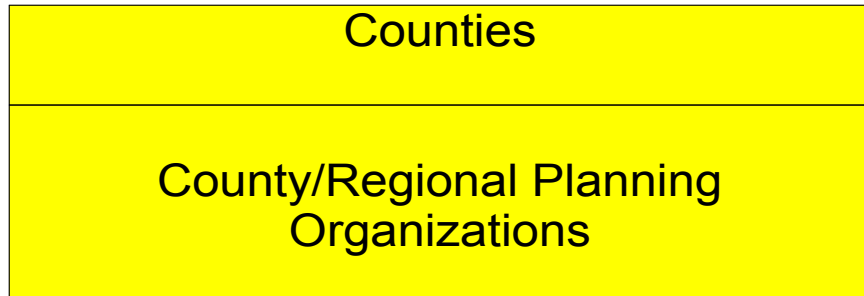
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----- Planned



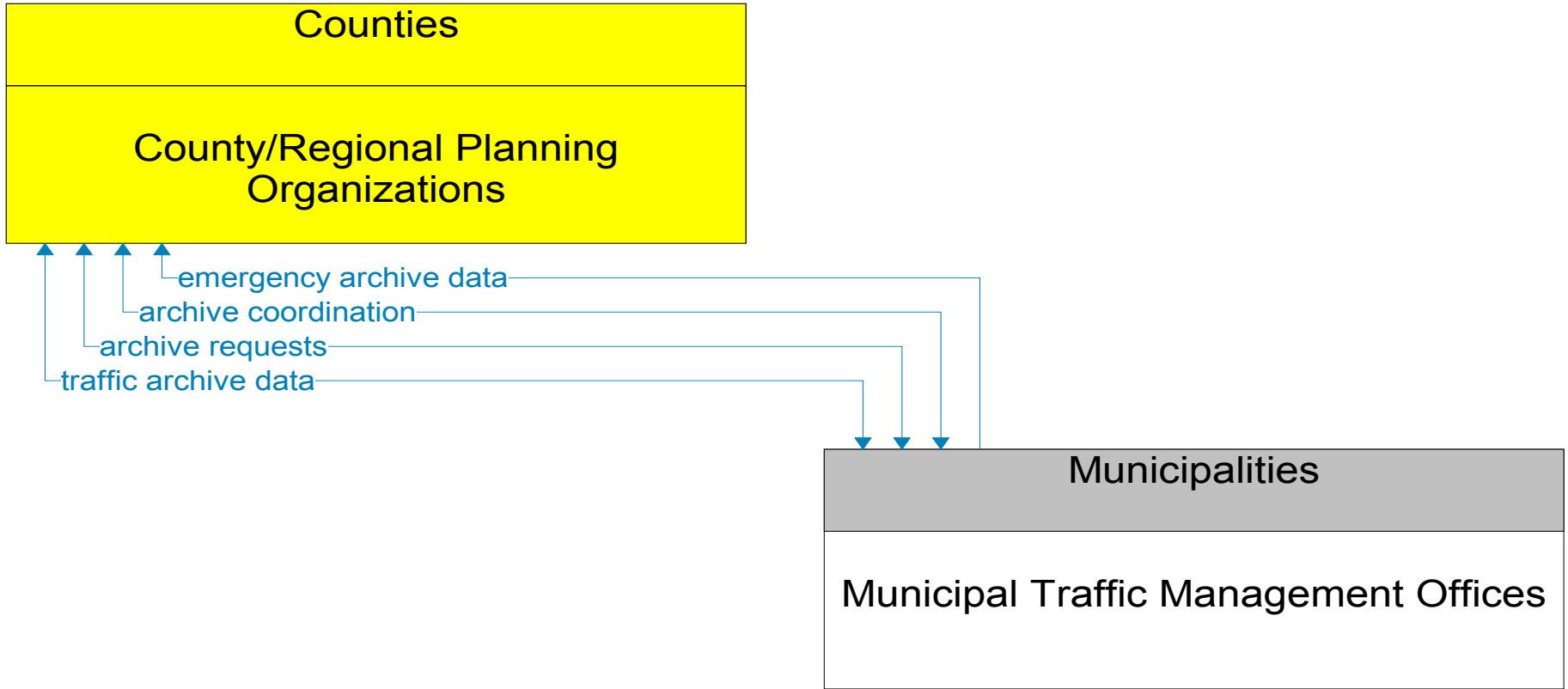
———— Existing
- - - - - Planned



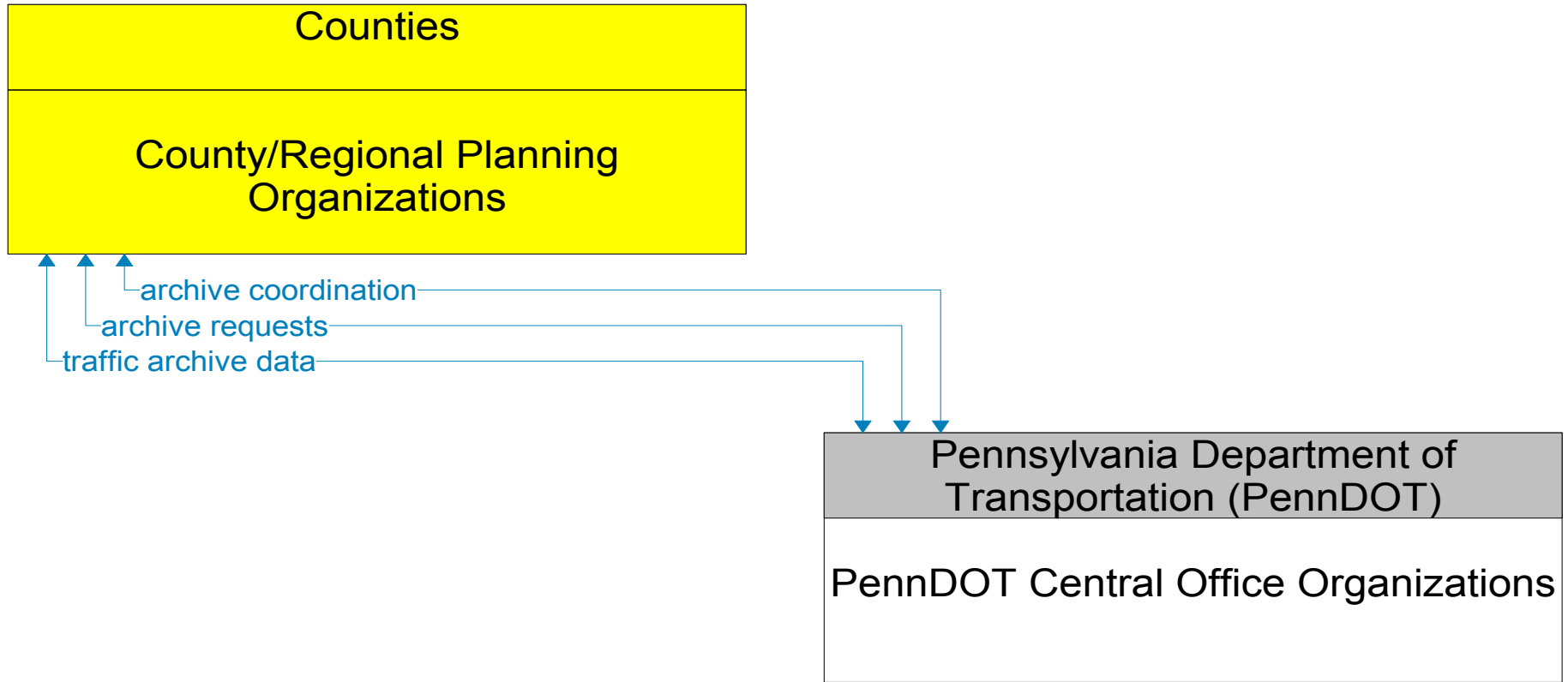
———— Existing
- - - - - Planned



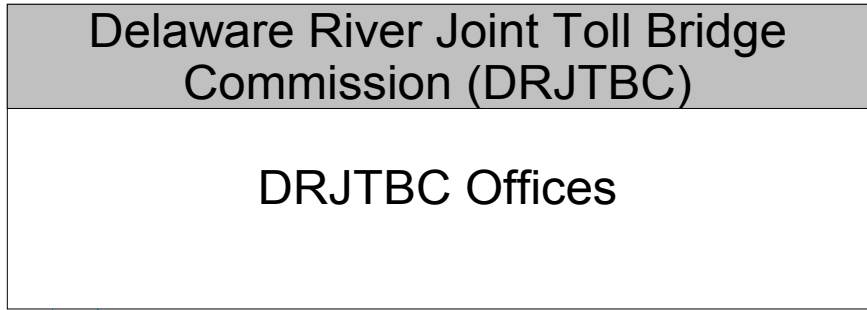
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- - - - - Planned



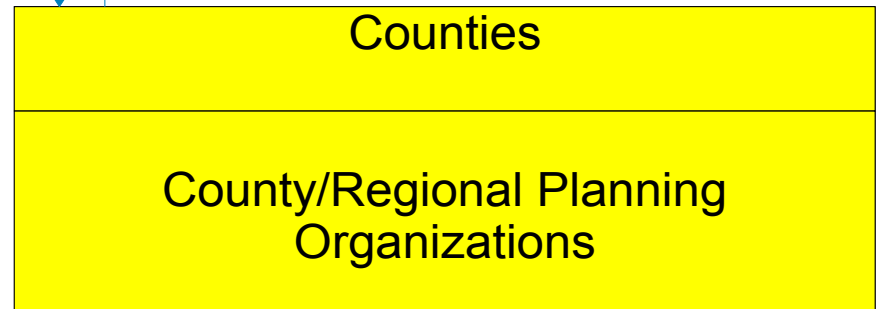
———— Existing
- - - - - Planned



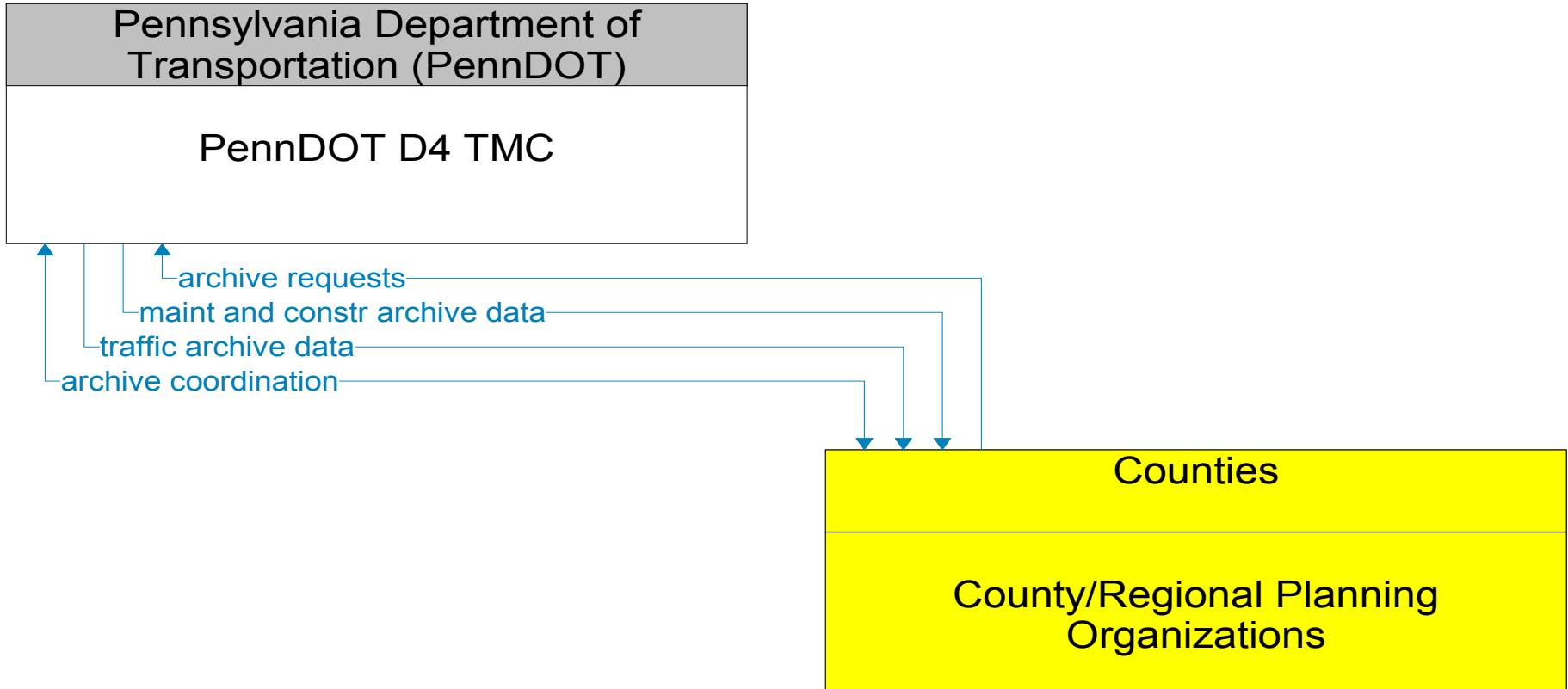
———— Existing
----- Planned



archive requests
traffic archive data



———— Existing
----- Planned



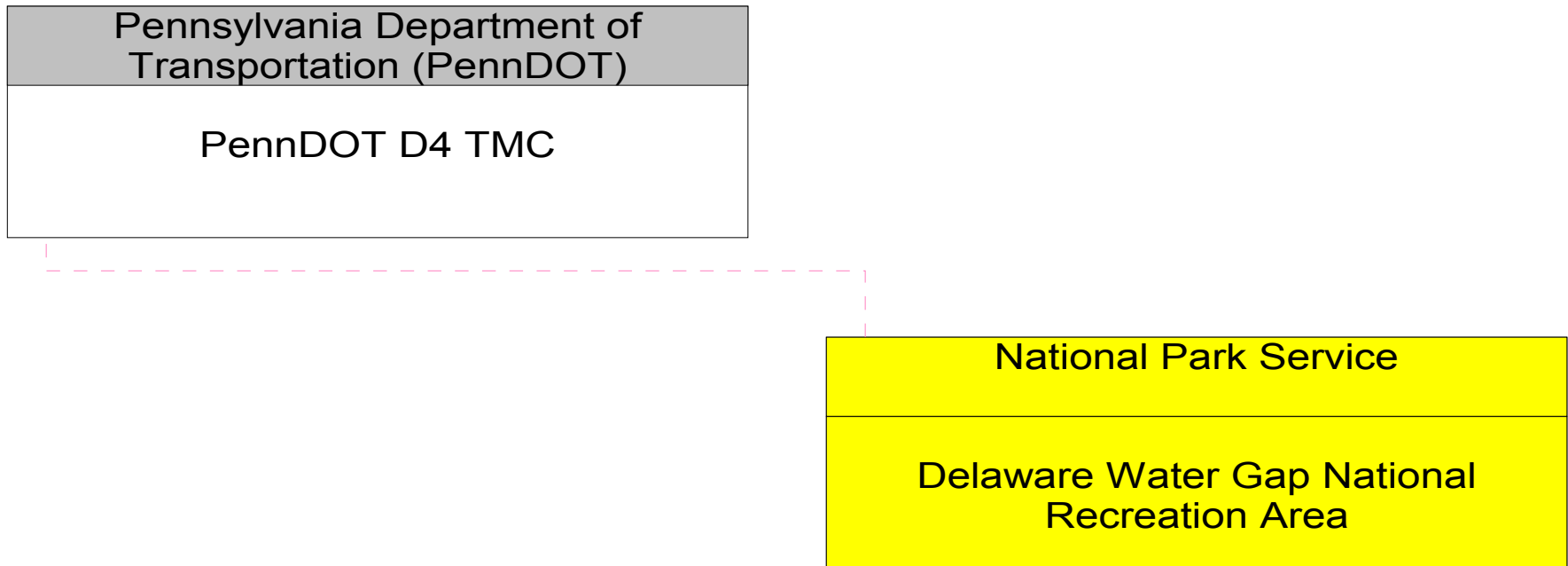
———— Existing
----- Planned

Delaware Water Gap National Recreation Area

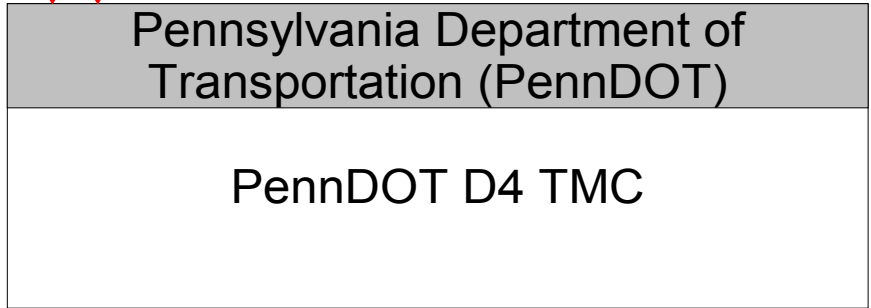
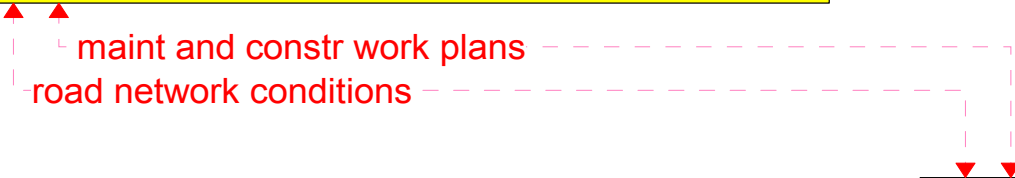
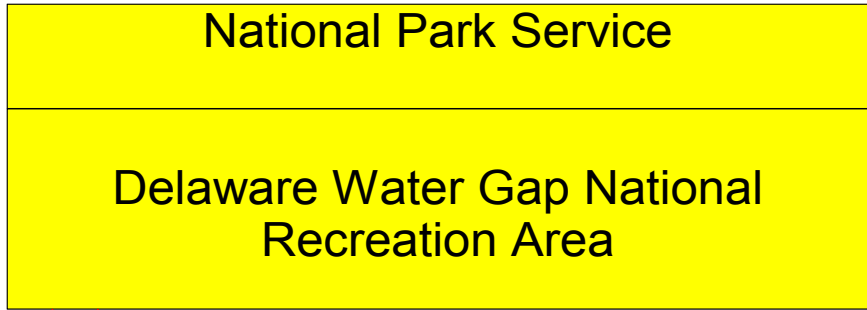


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Delaware Water Gap National Recreation Area Interconnect Diagram

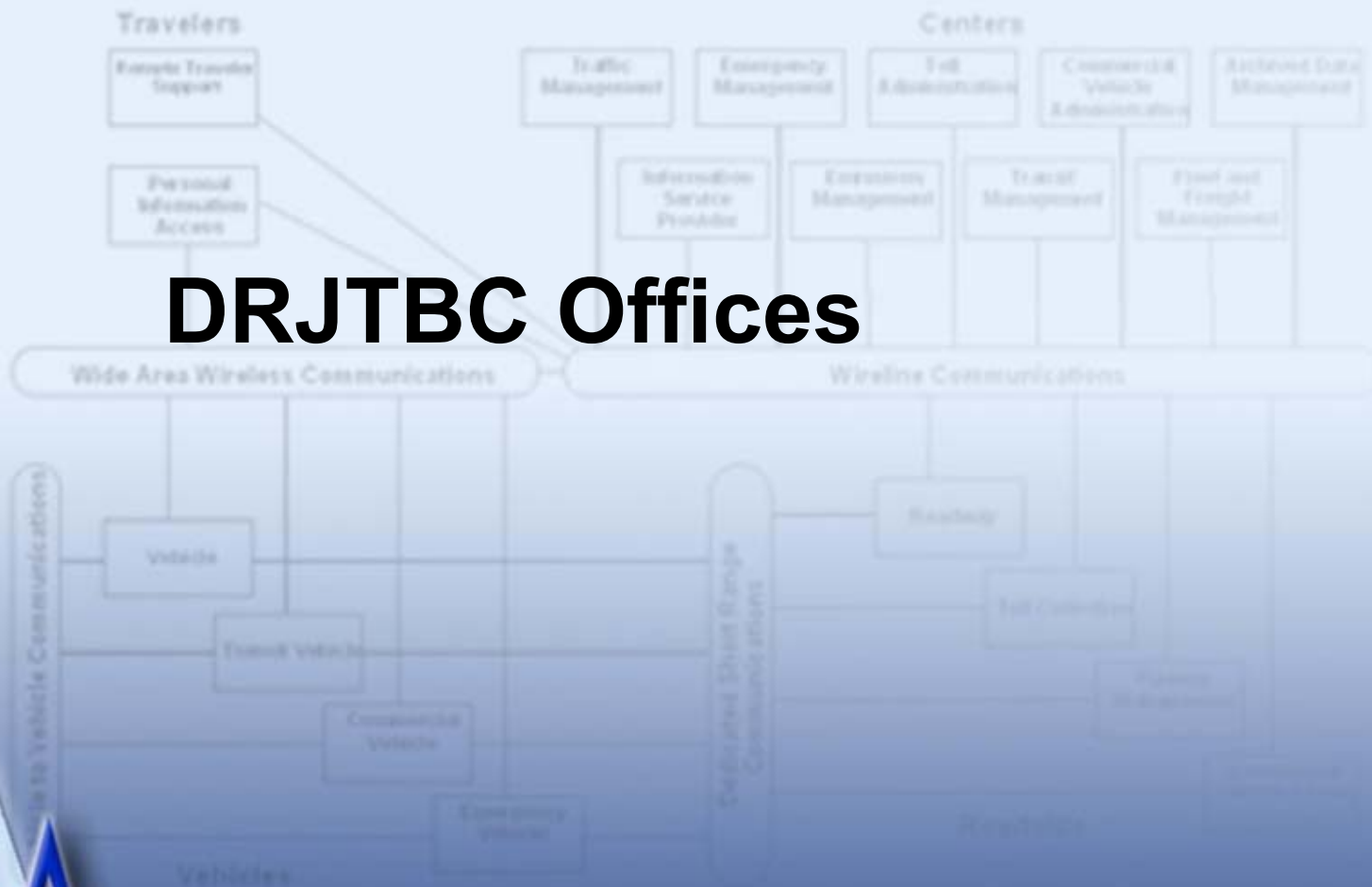


———— Existing
- - - - - Planned

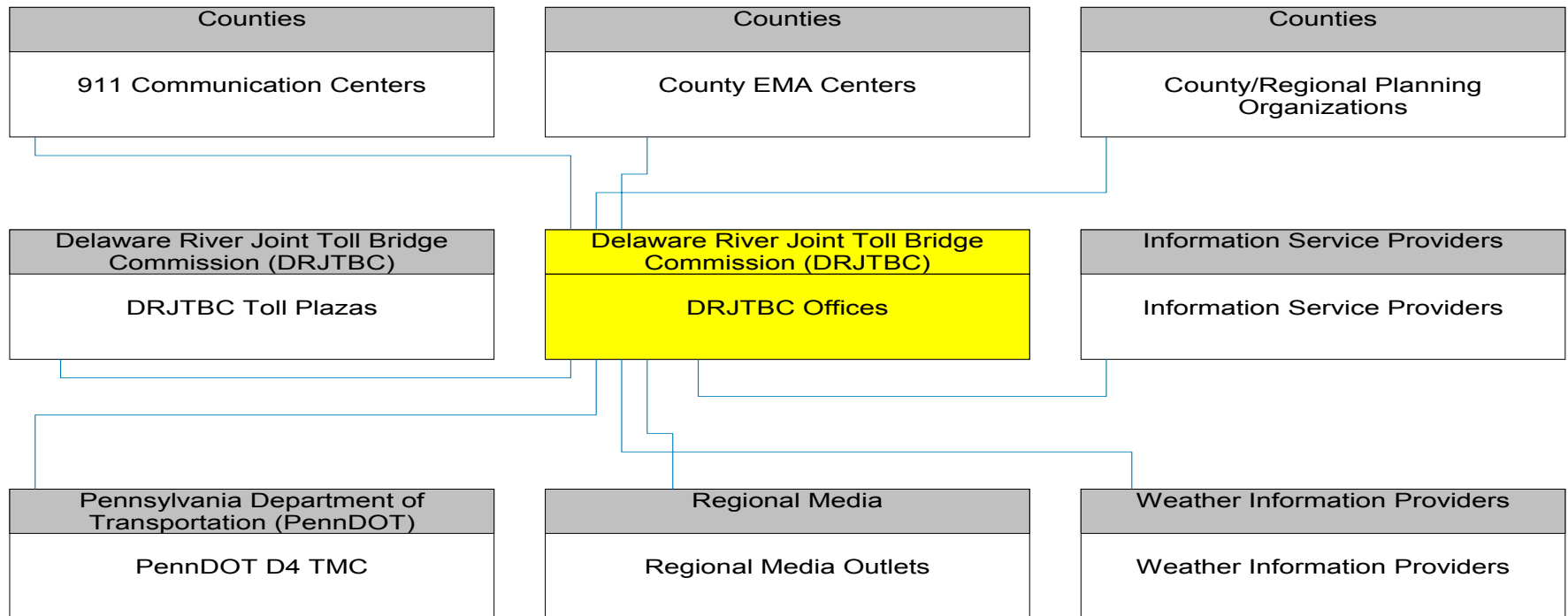


———— Existing
- - - - - Planned

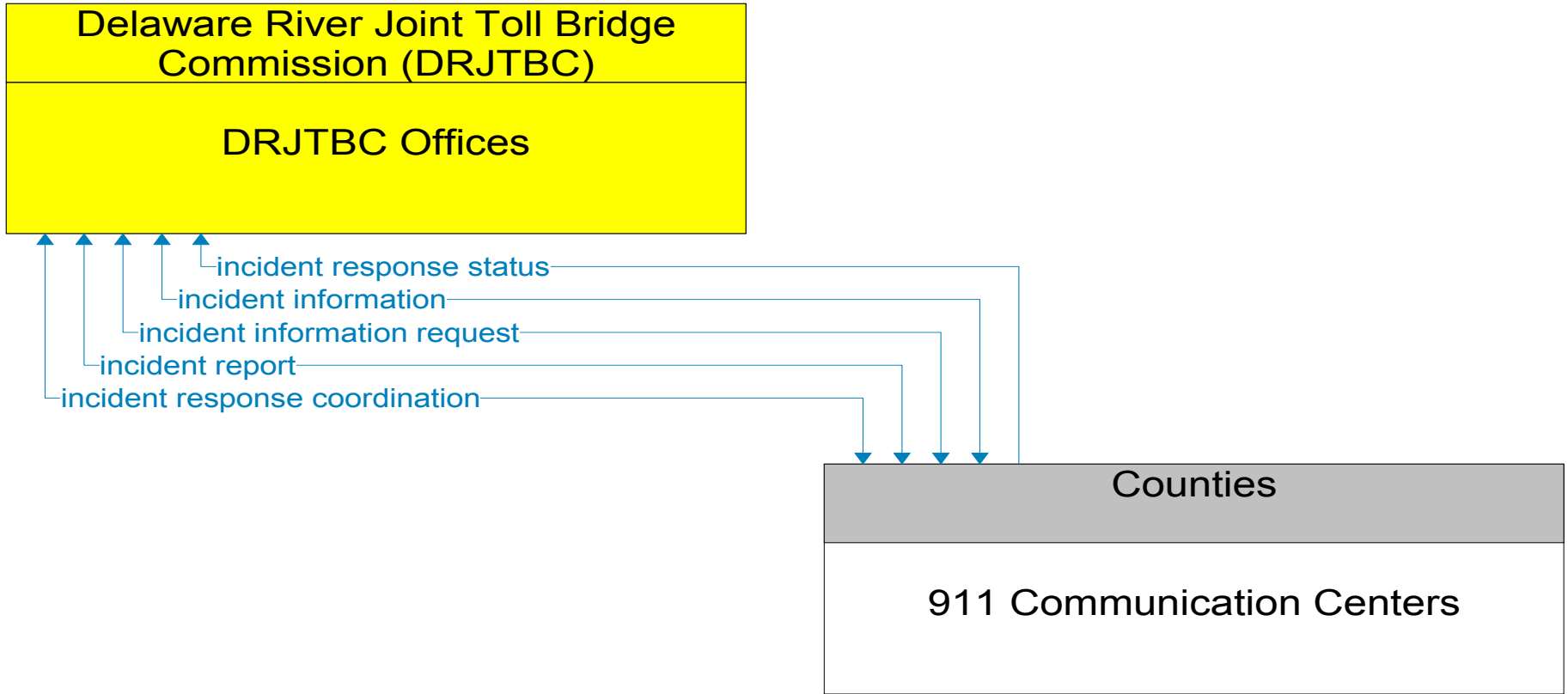
DRJTBC Offices



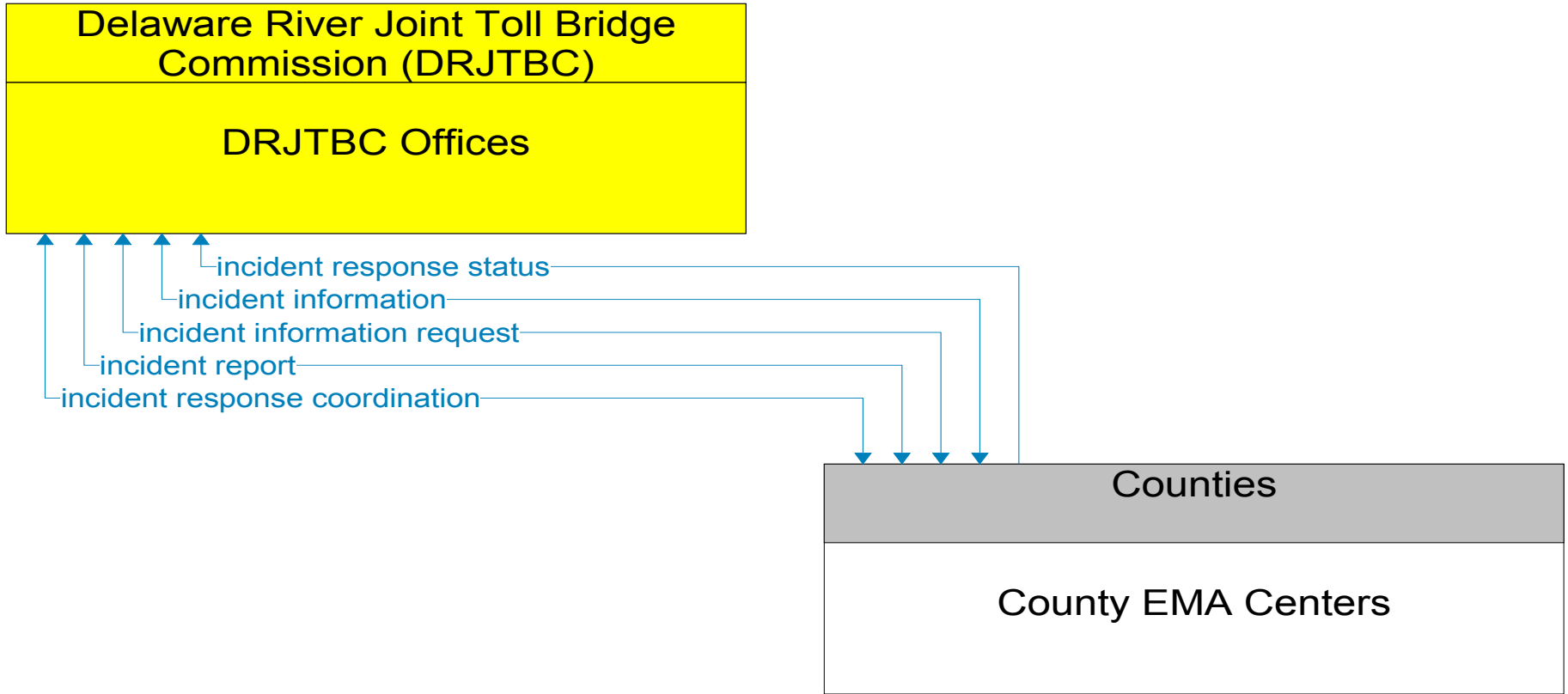
DRJTBC Offices Interconnect Diagram



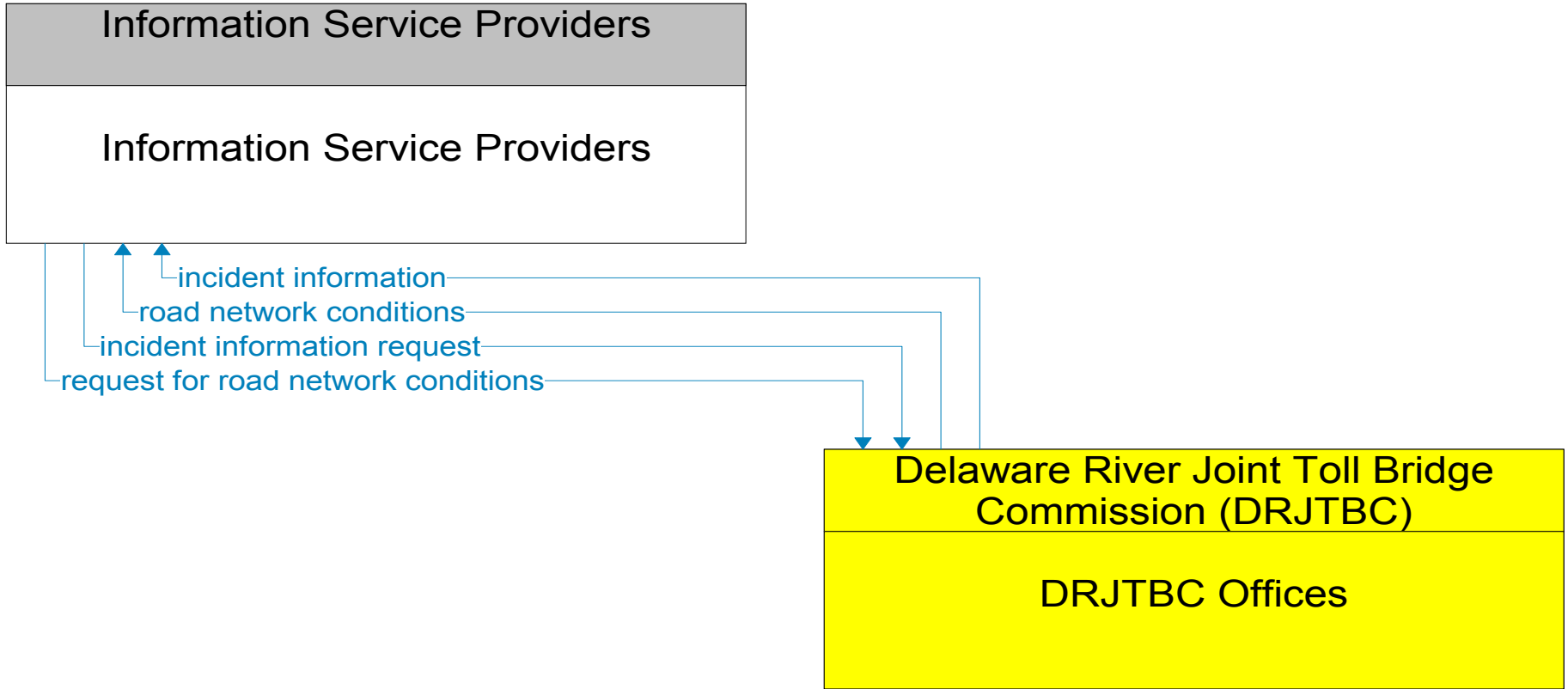
————— Existing
- - - - - Planned



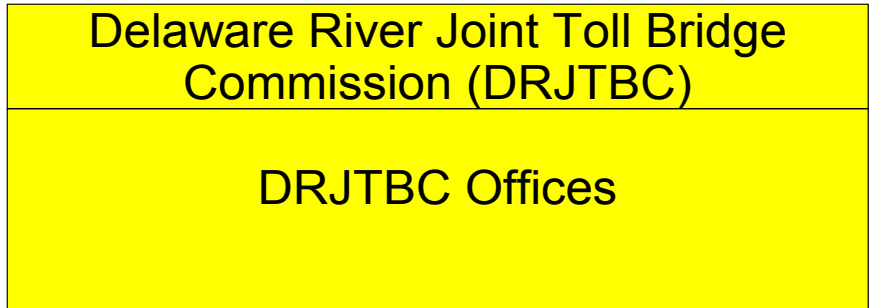
———— Existing
- - - - - Planned



———— Existing
- - - - - Planned



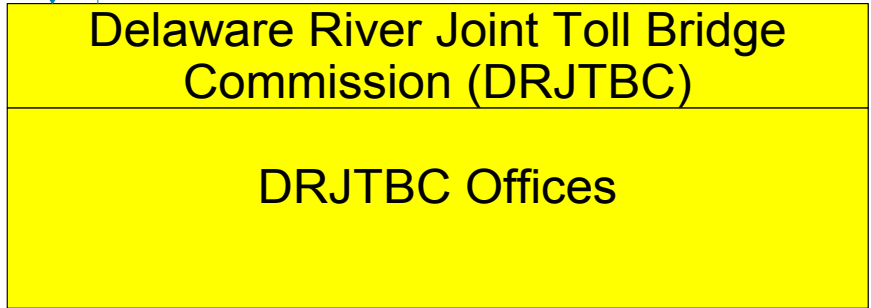
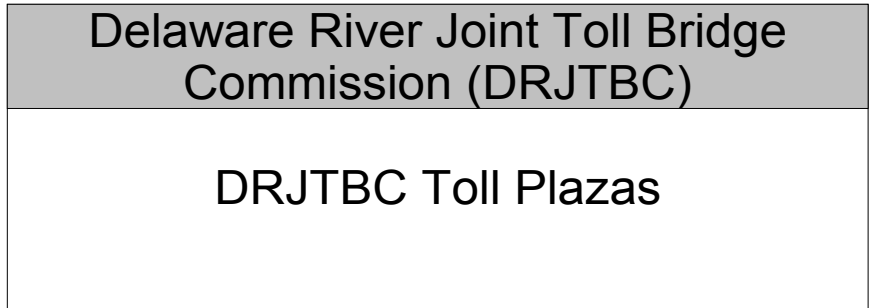
———— Existing
----- Planned



archive requests
traffic archive data

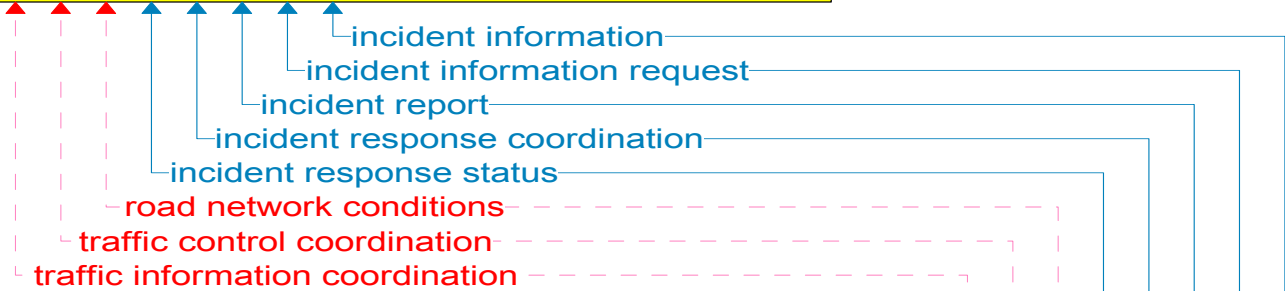
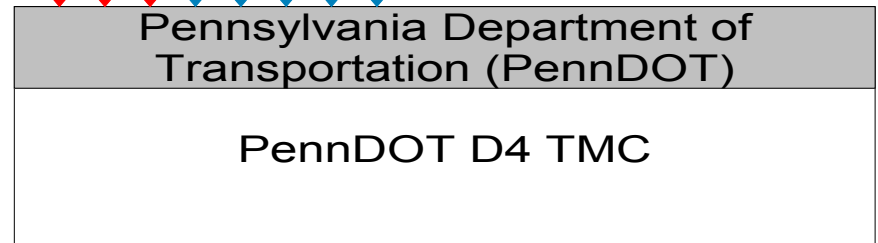
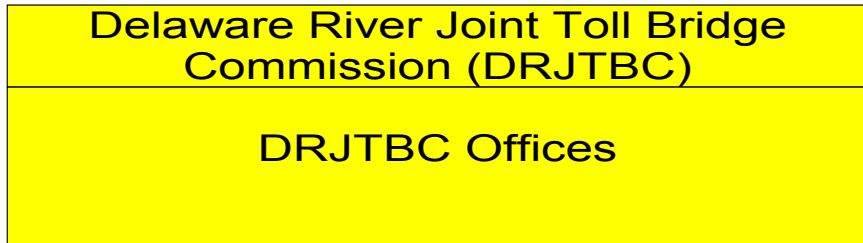


———— Existing
- - - - - Planned

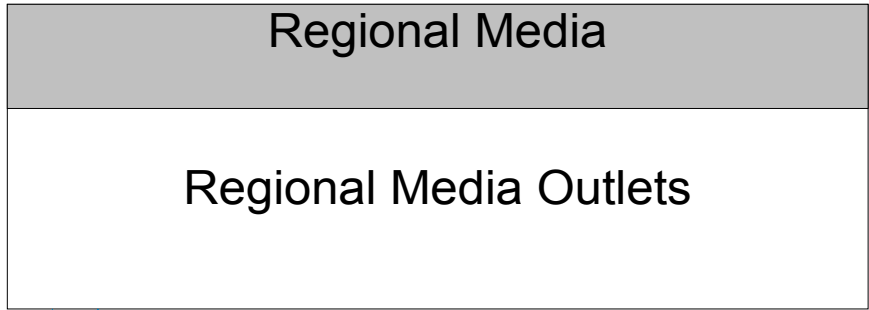


toll instructions
toll transactions

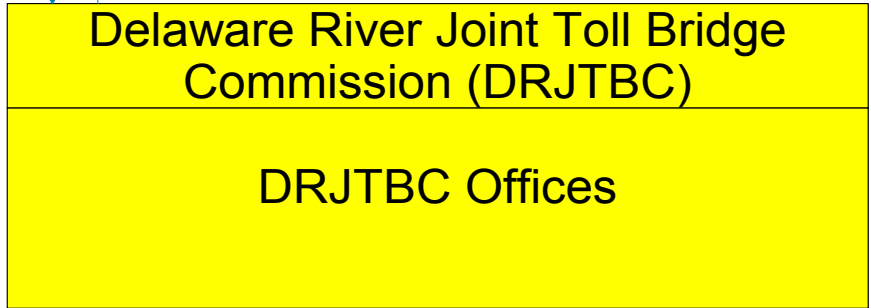
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----- Planned



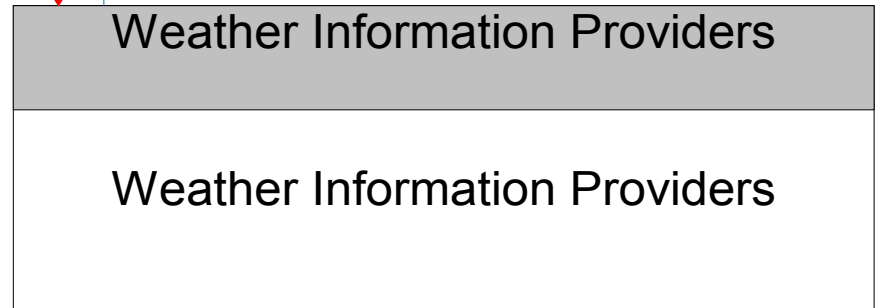
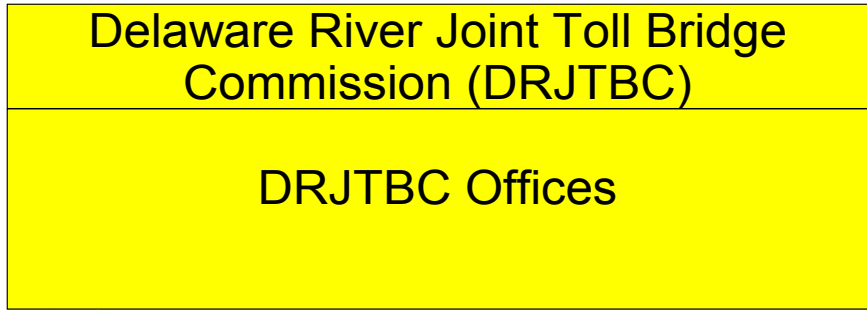
Existing
Planned



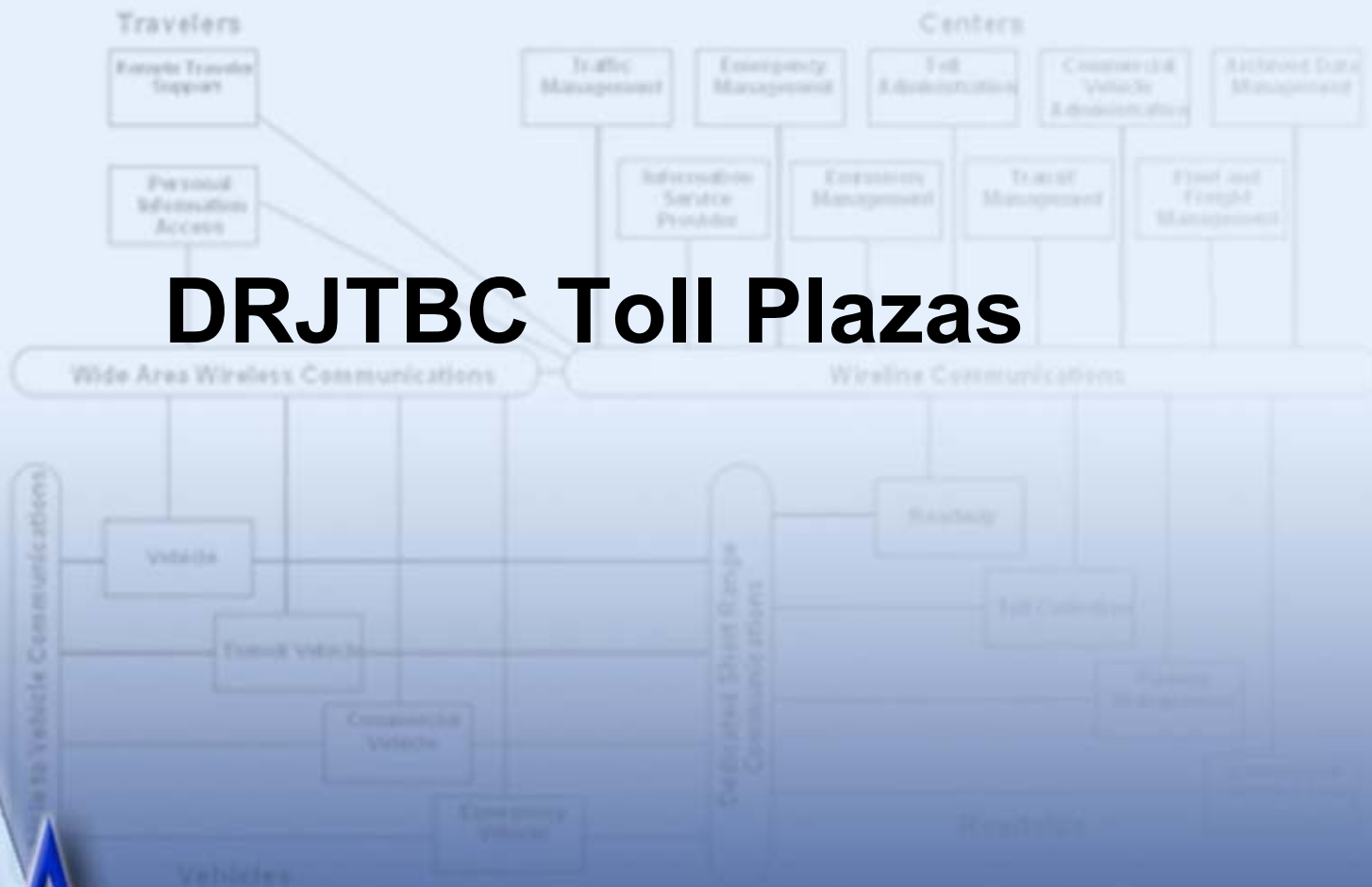
incident information for media
media information request



Existing
Planned

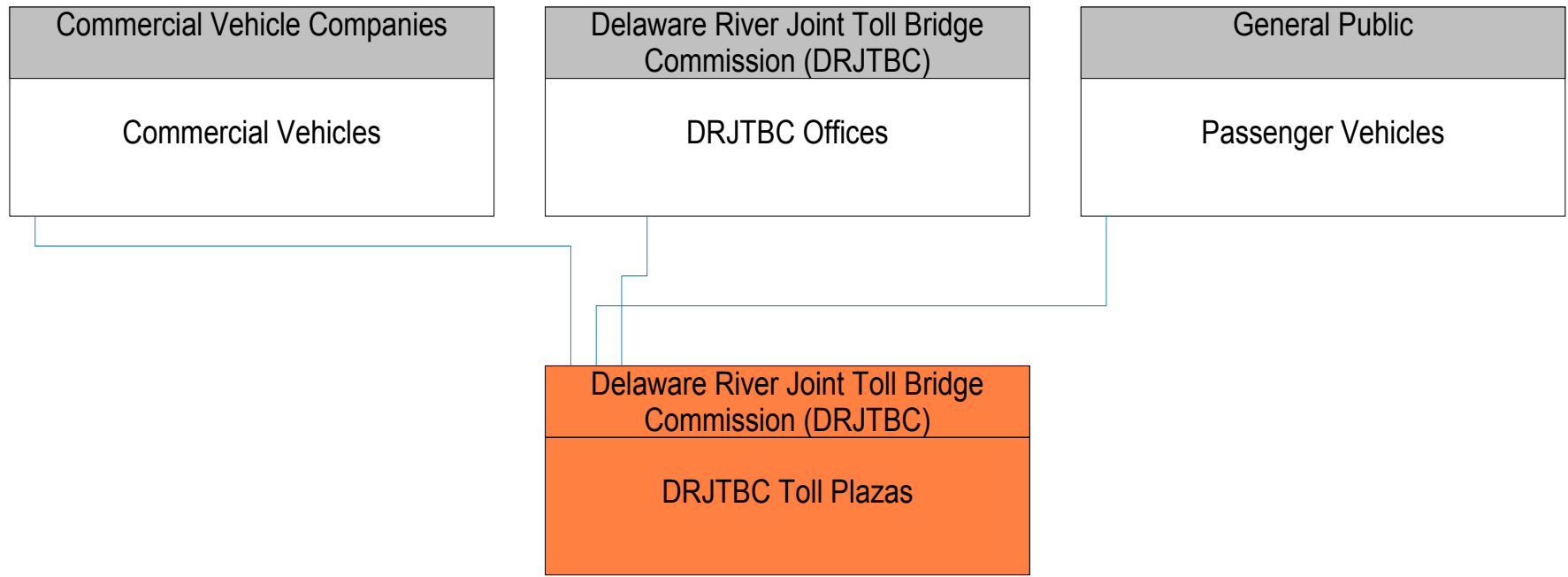


DRJTBC Toll Plazas

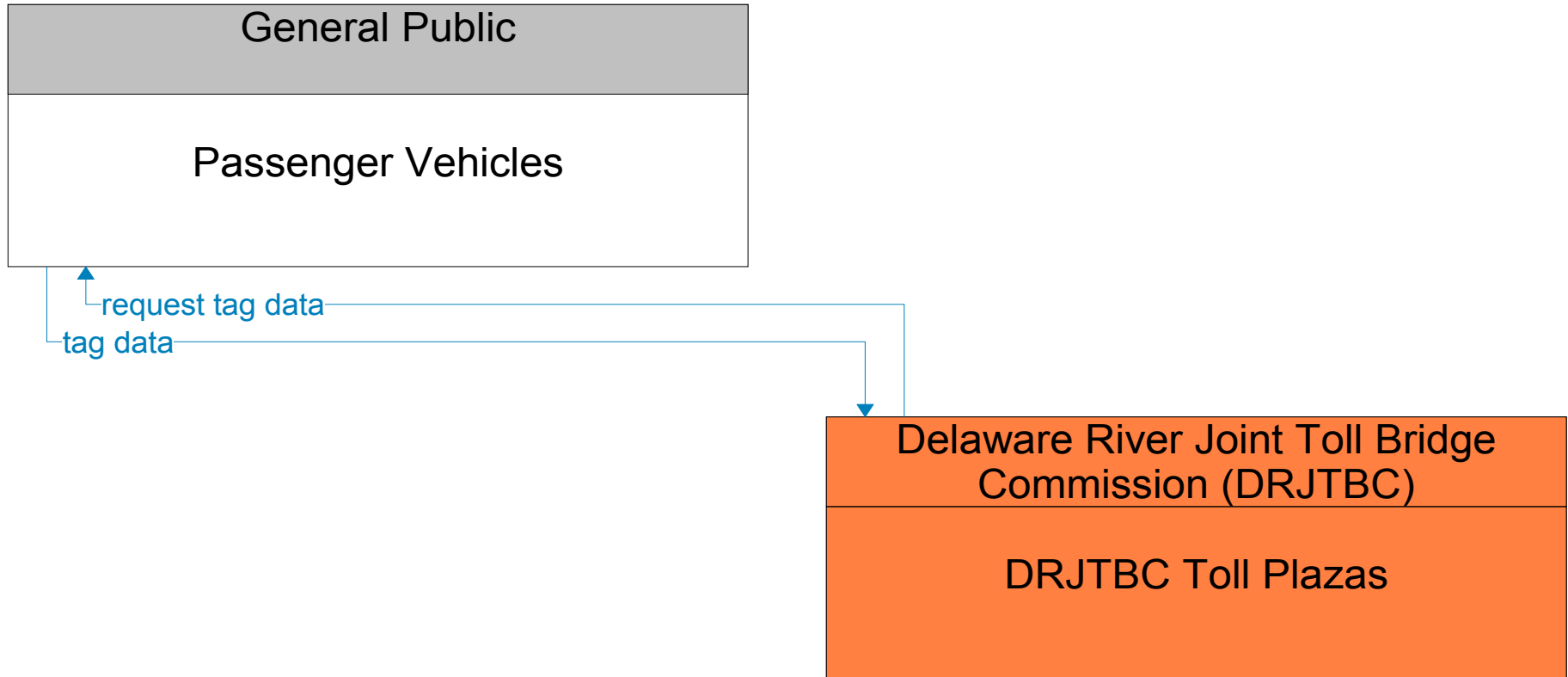


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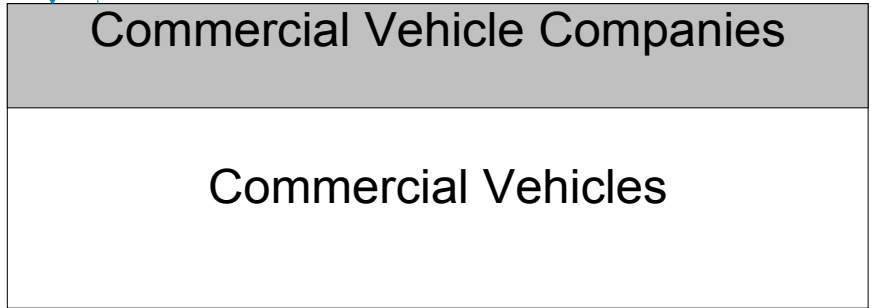
DRJTBC Toll Plazas Interconnect Diagram

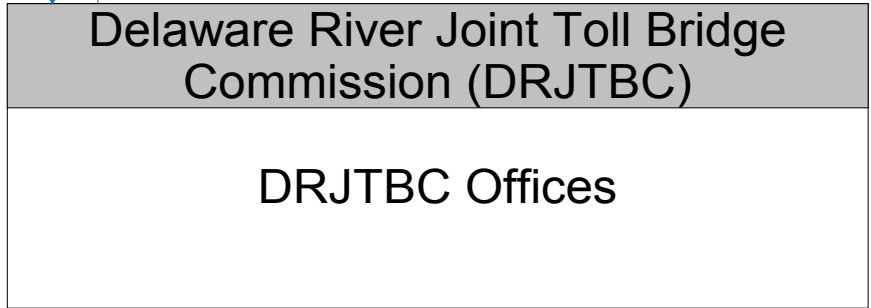


———— Existing
- - - - - Planned



———— Existing
----- Planned





toll instructions
toll transactions

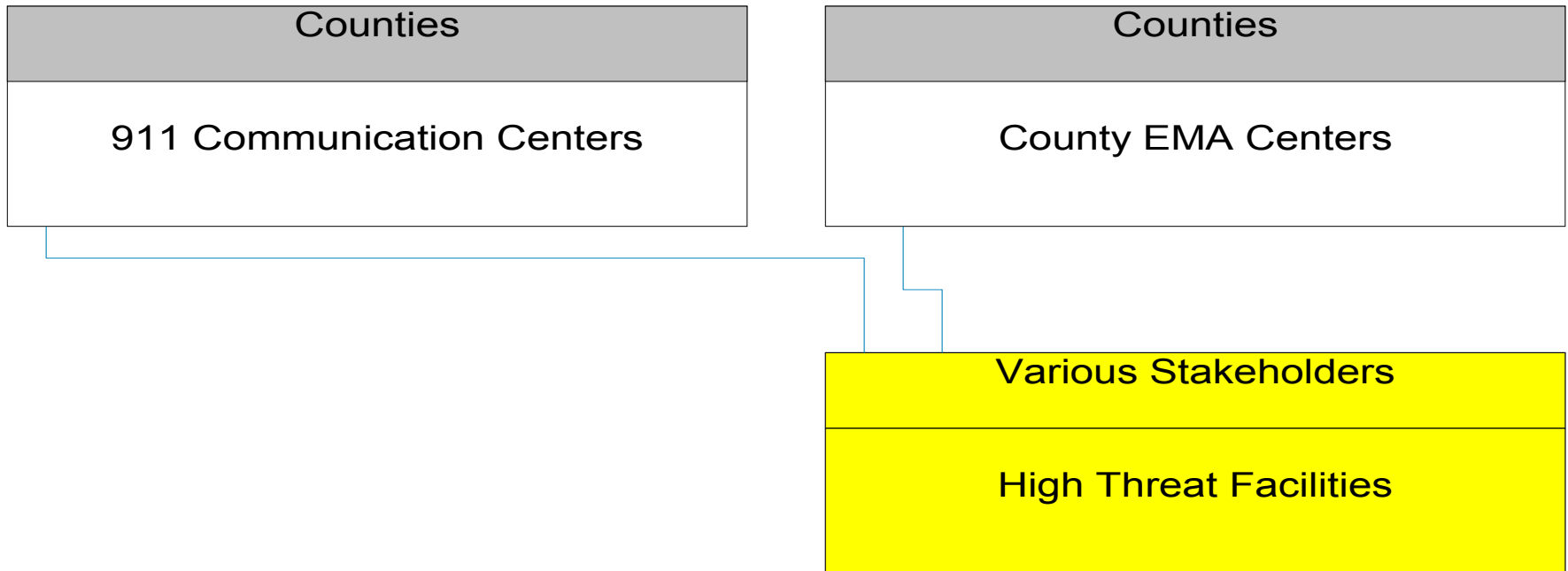
———— Existing
----- Planned



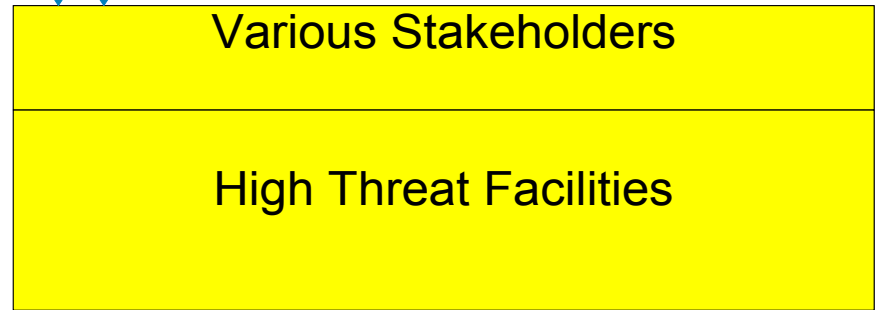
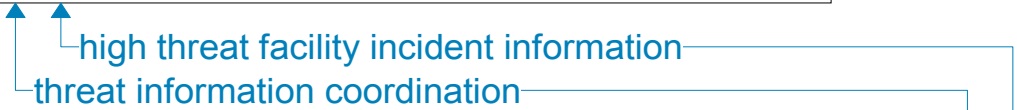
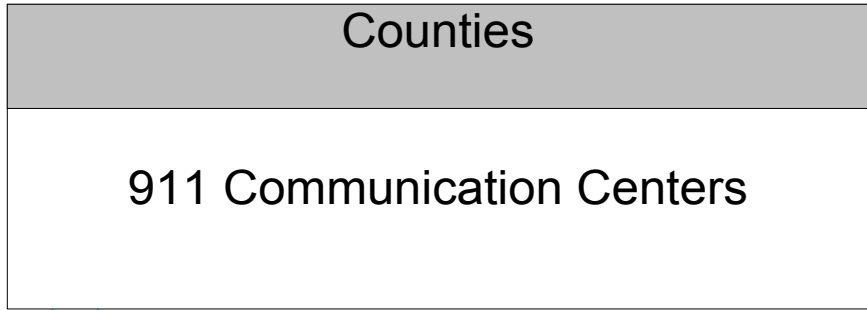
High Threat Facilities

PA

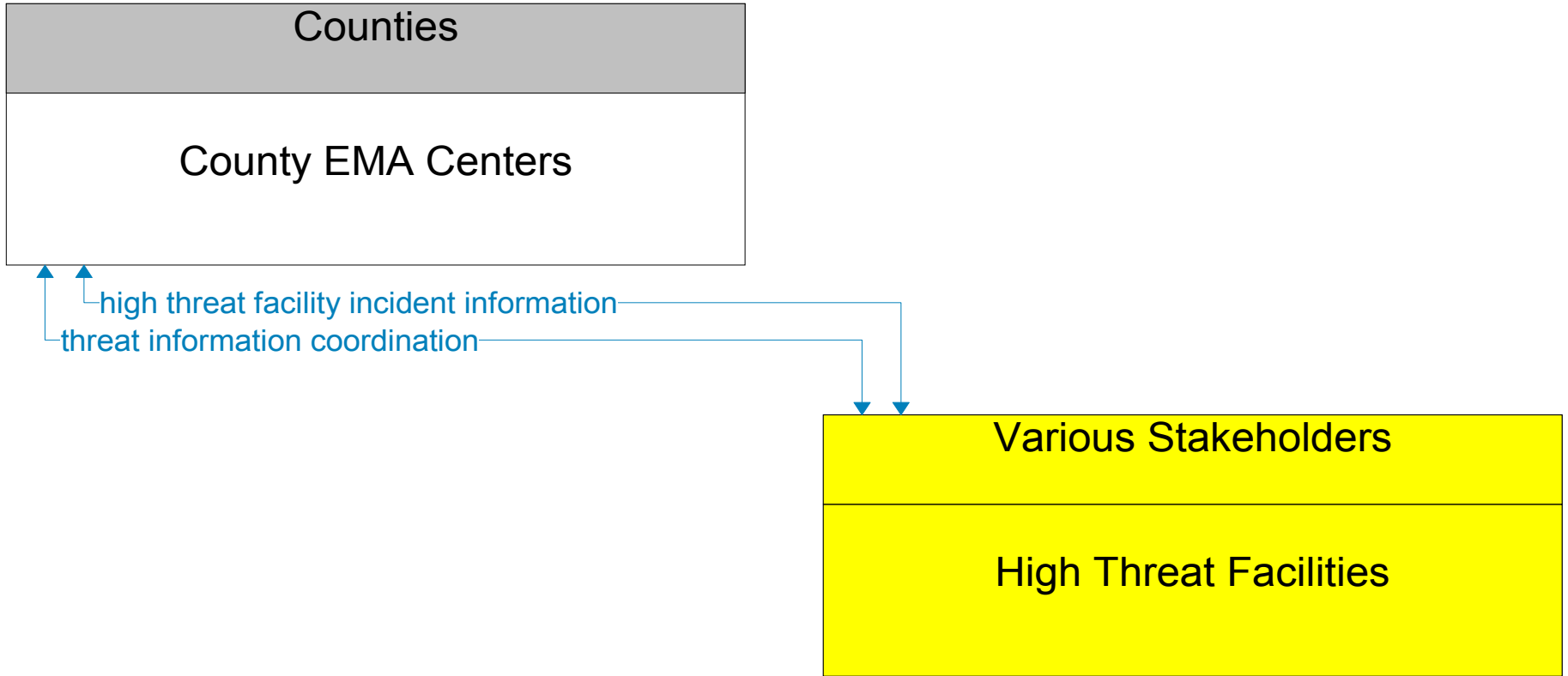
High Threat Facilities Interconnect Diagram



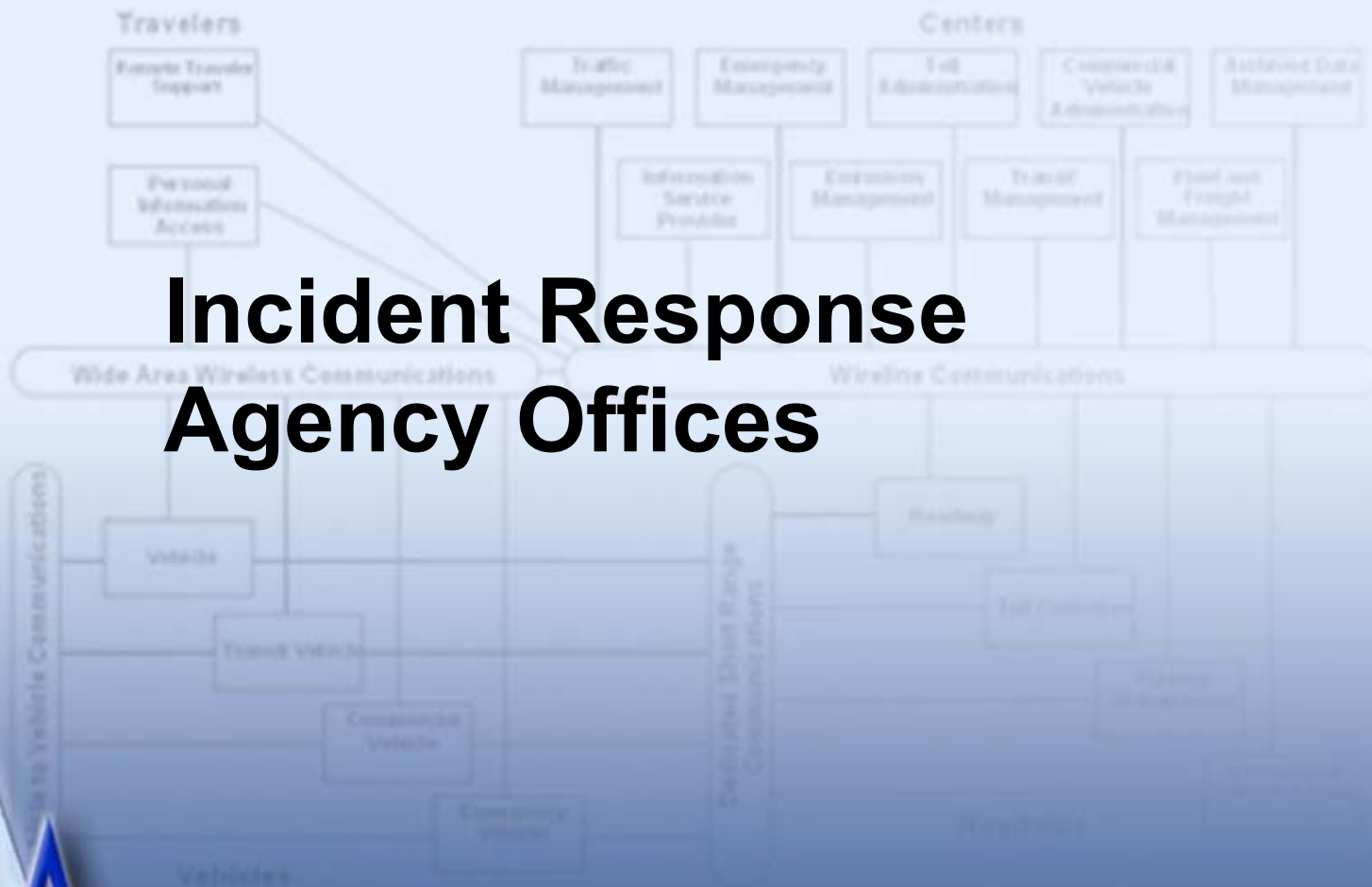
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- - - - - Planned



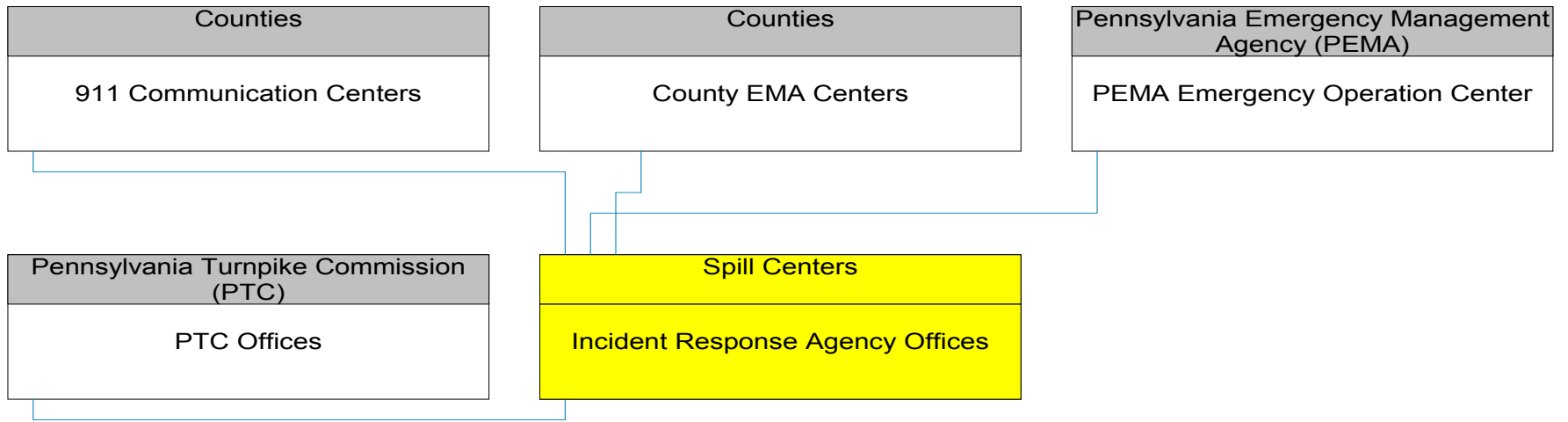
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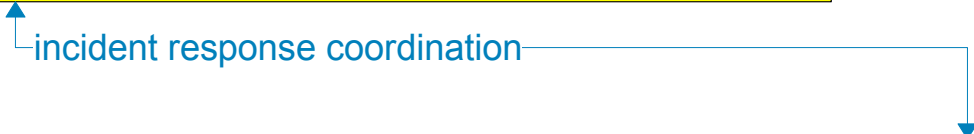
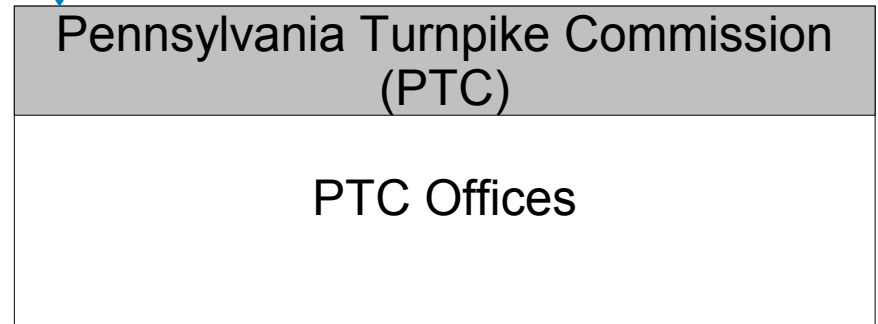
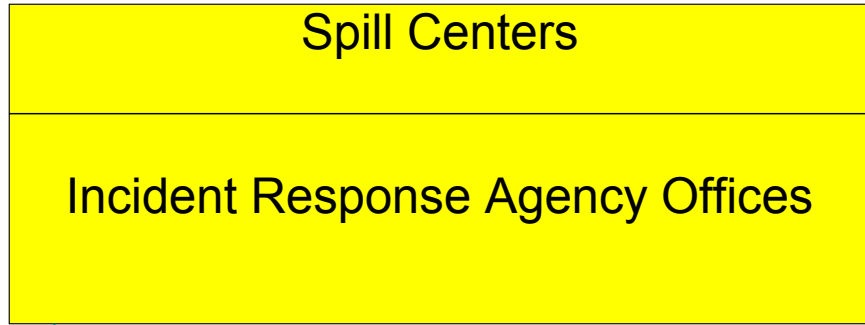
Incident Response Agency Offices



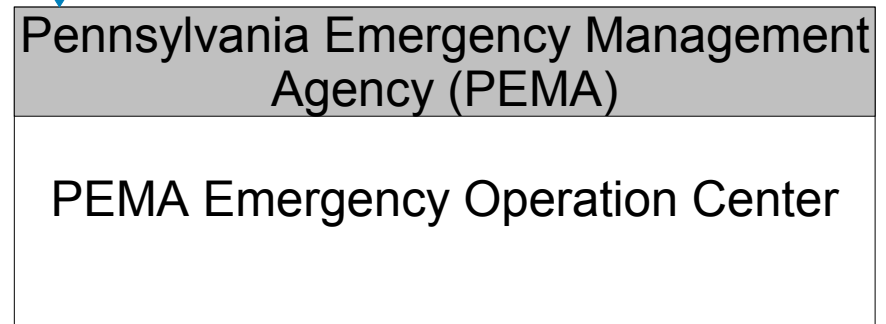
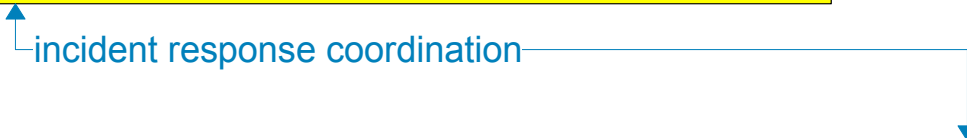
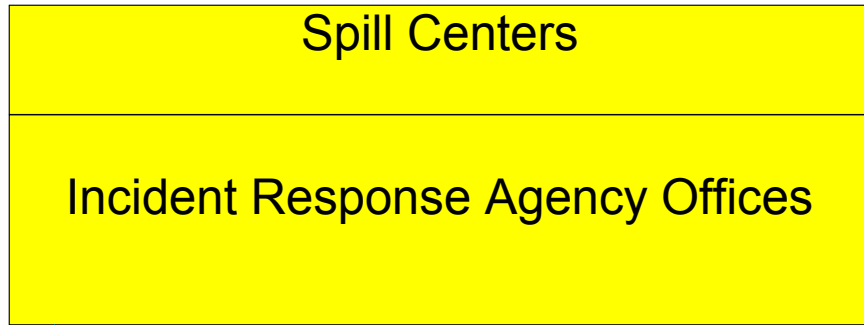
Incident Response Agency Offices Interconnect Diagram

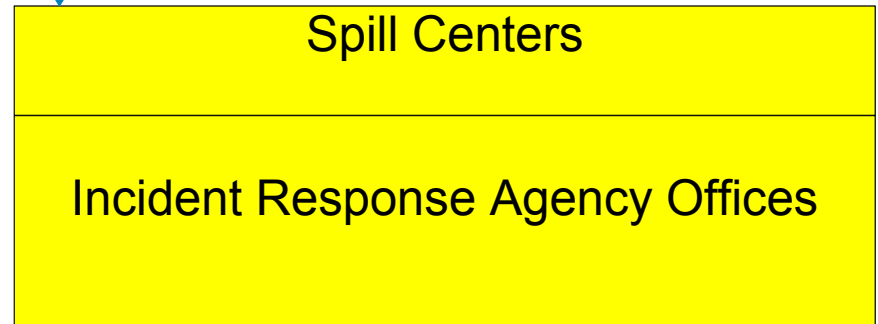
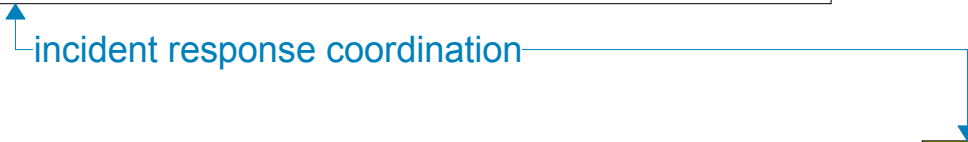
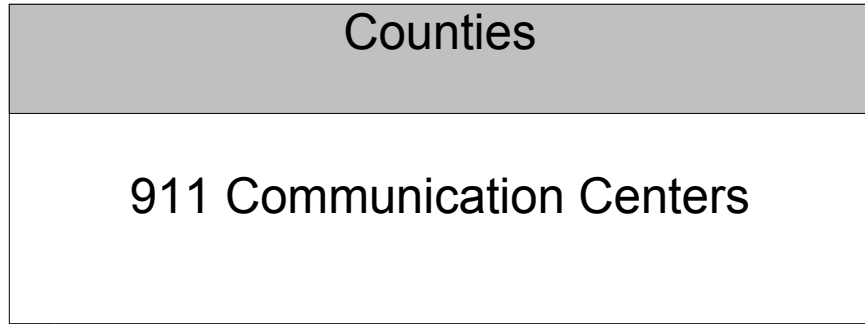


— Existing
- - - Planned

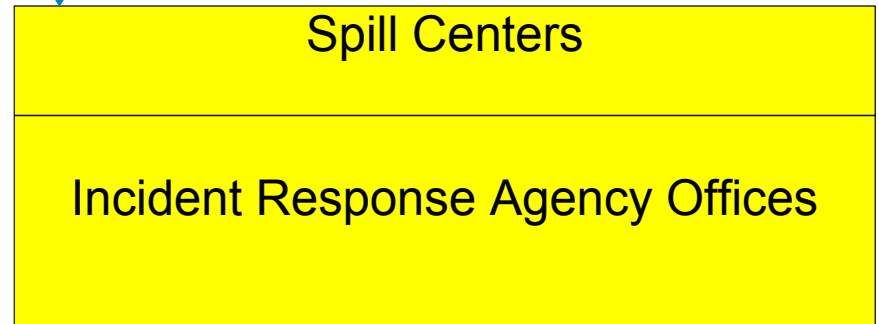
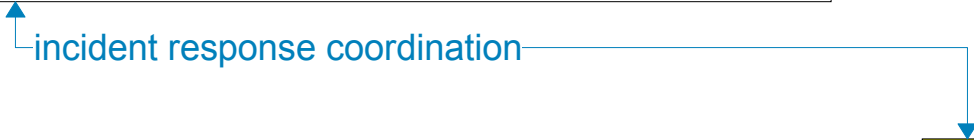
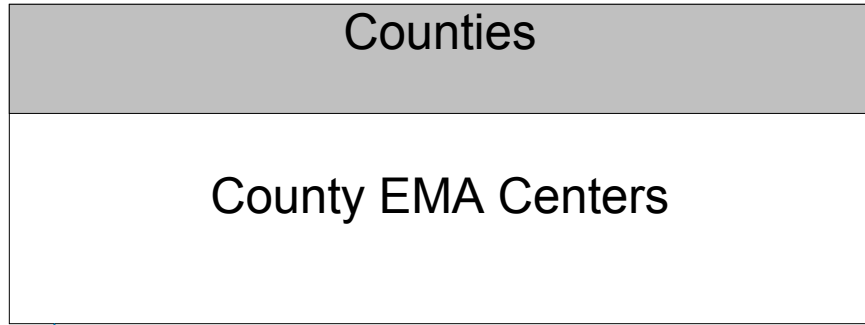


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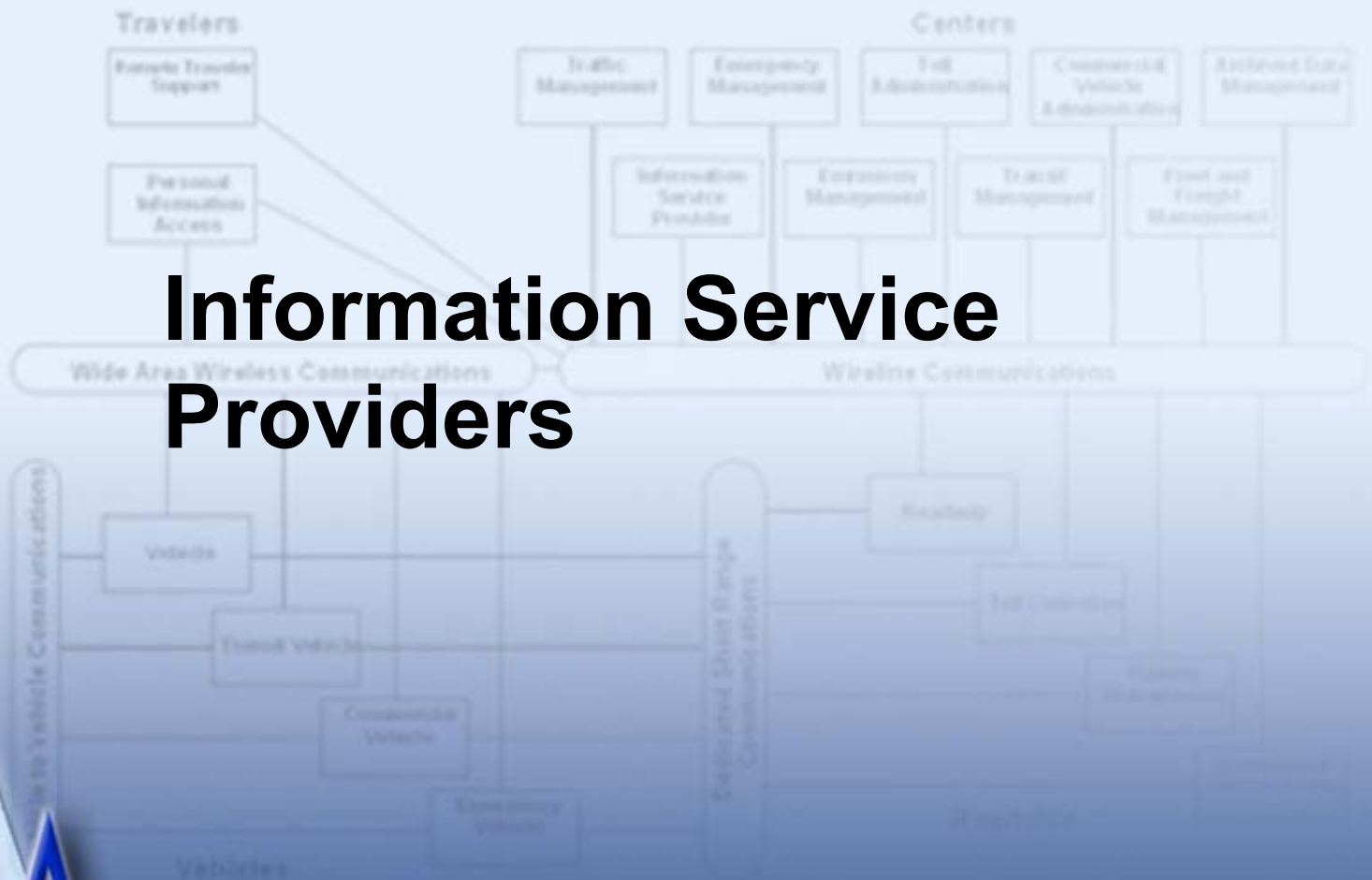


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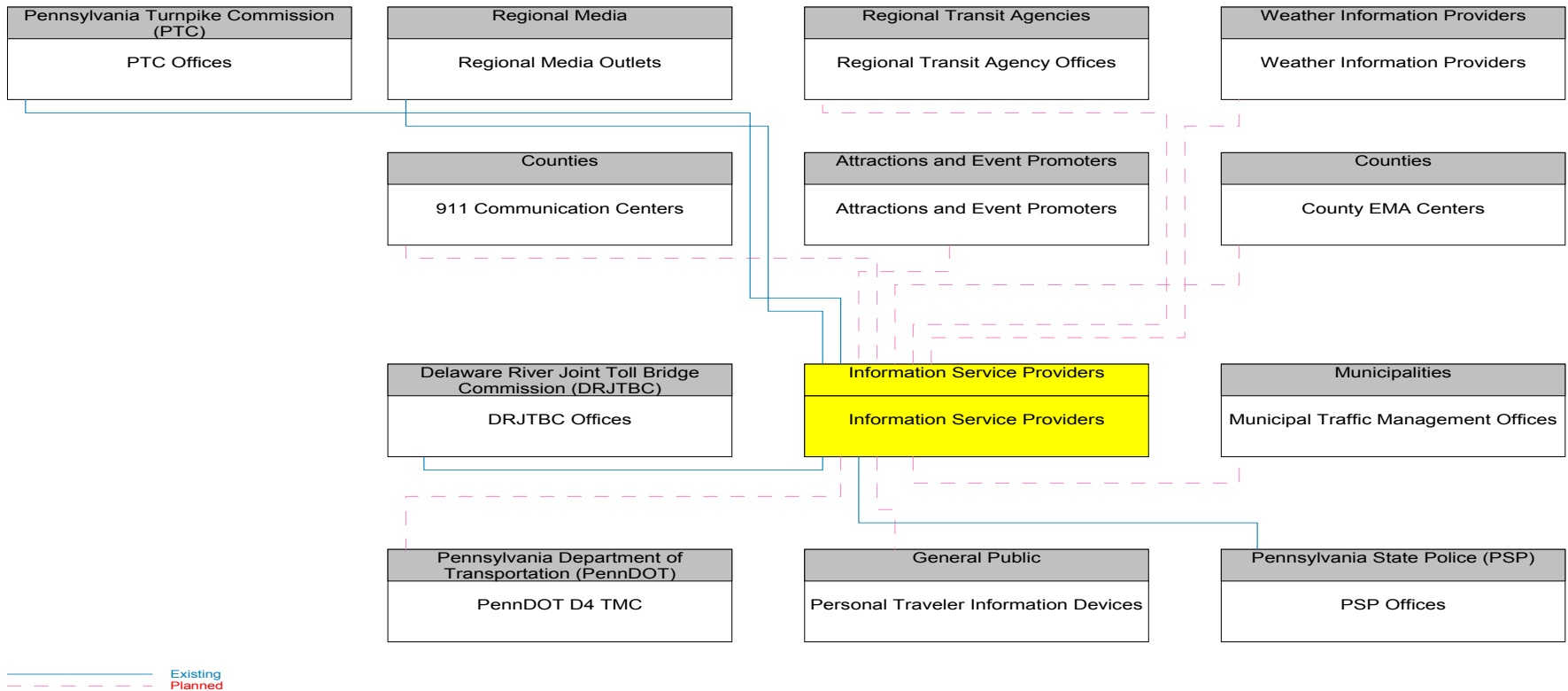
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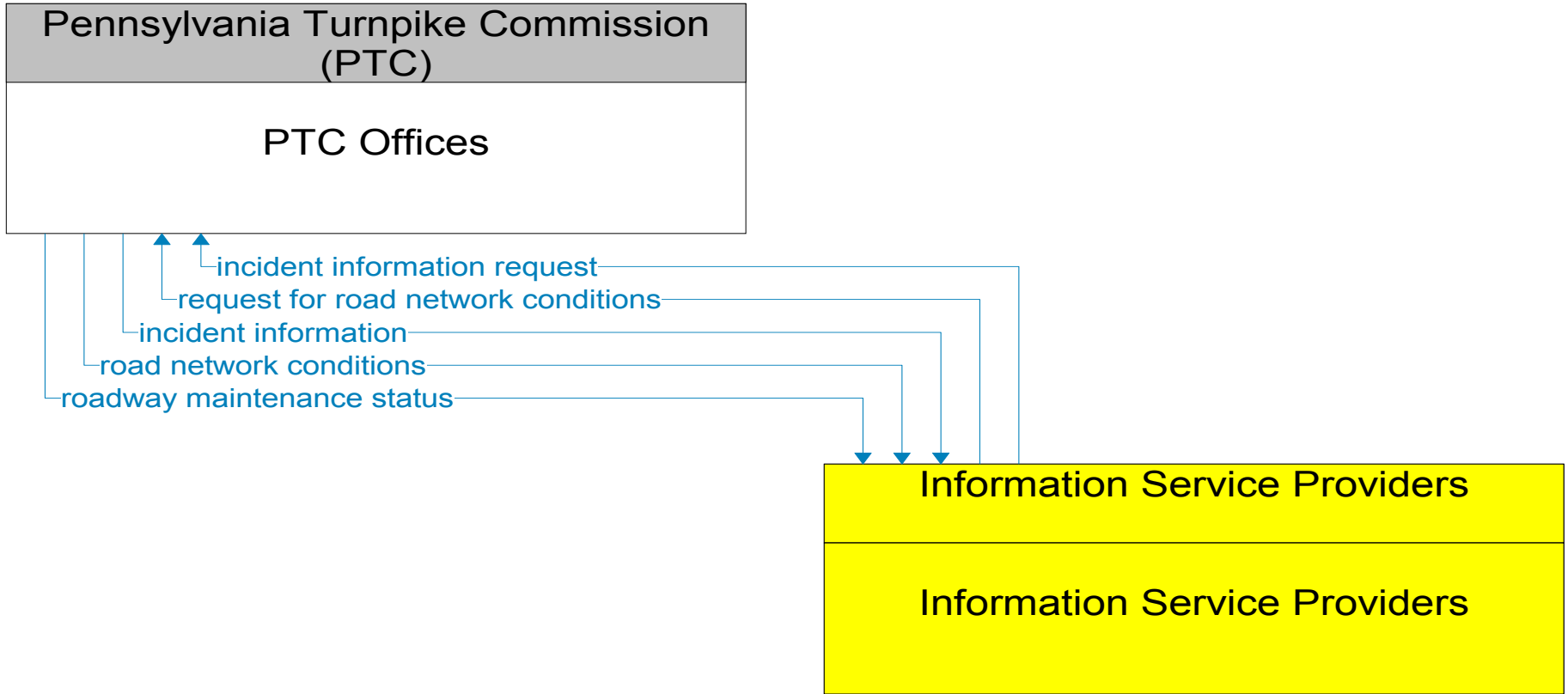
Information Service Providers



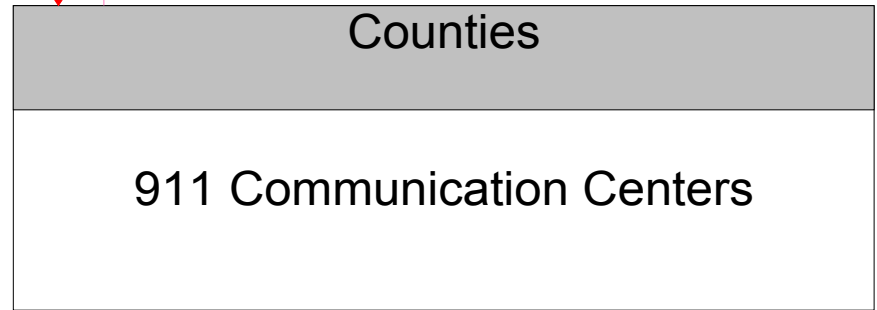
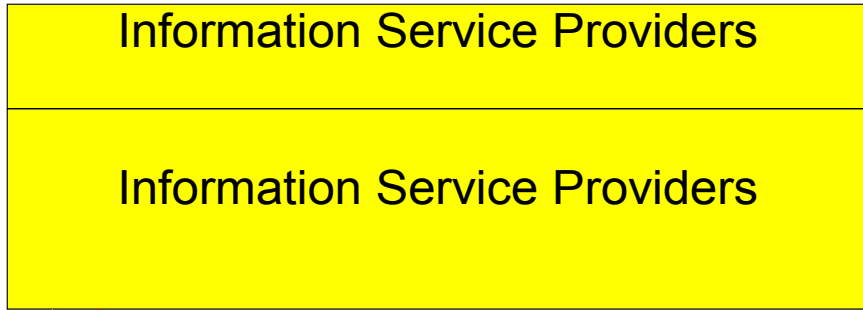
PA

Information Service Providers Interconnect Diagram

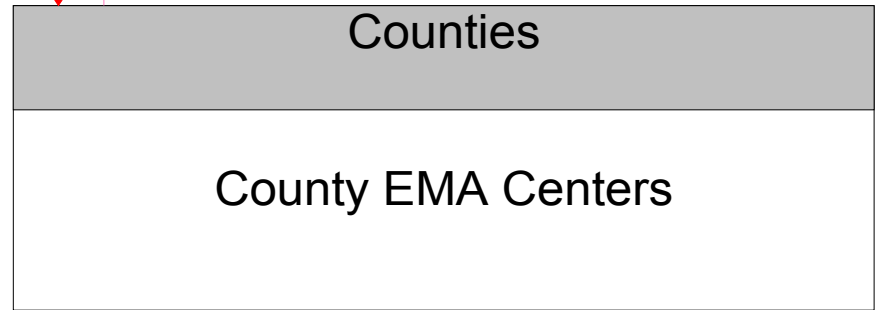
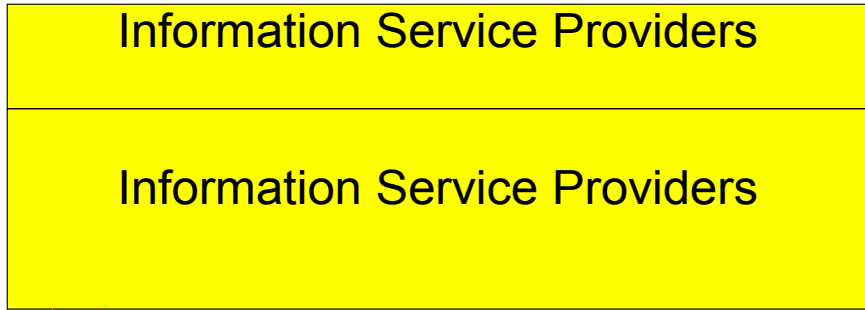




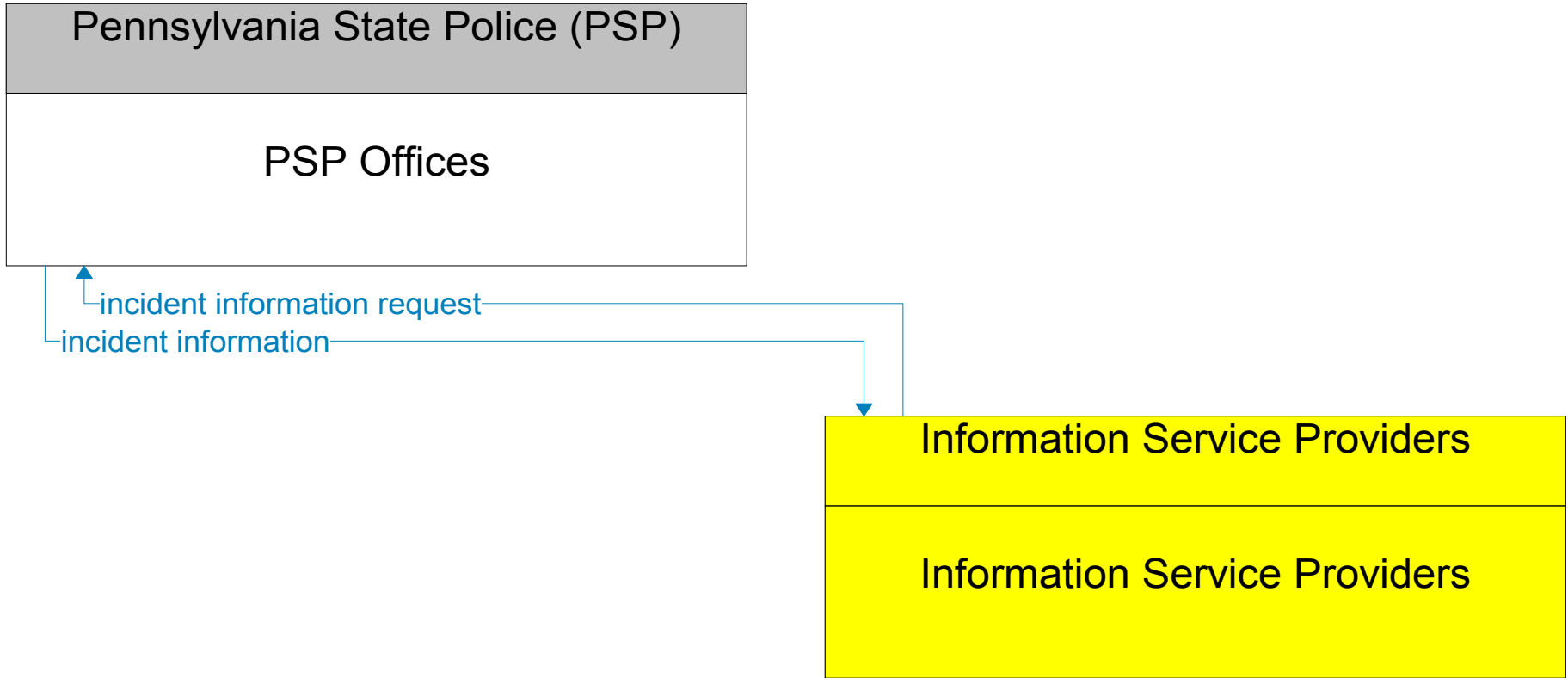
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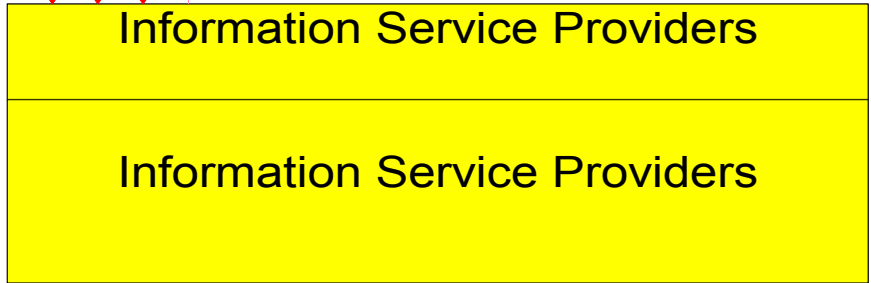
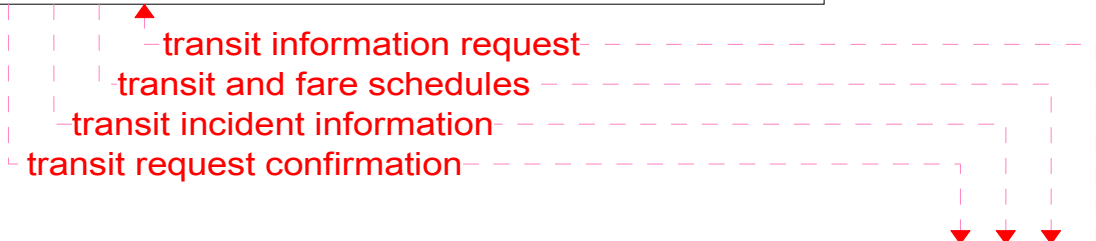
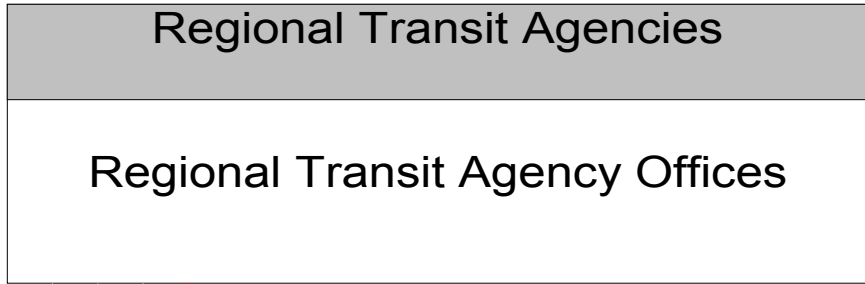
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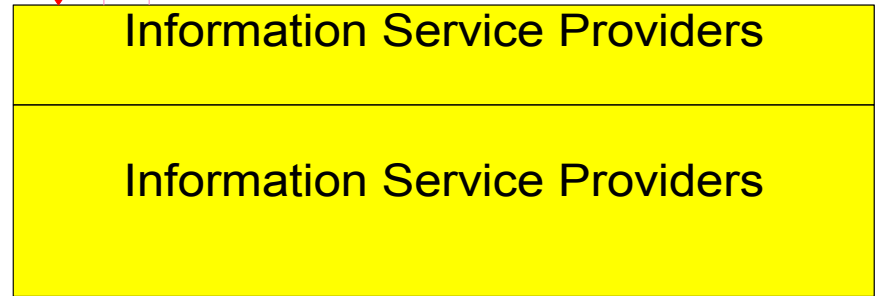
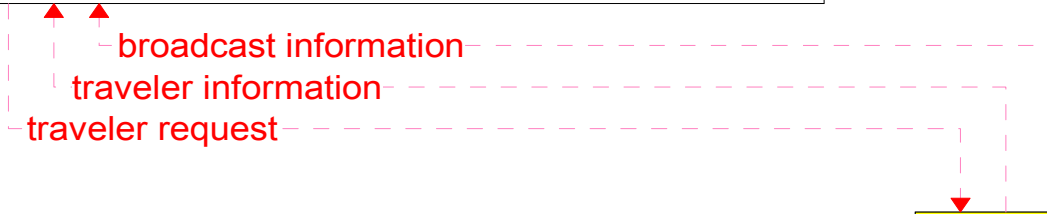
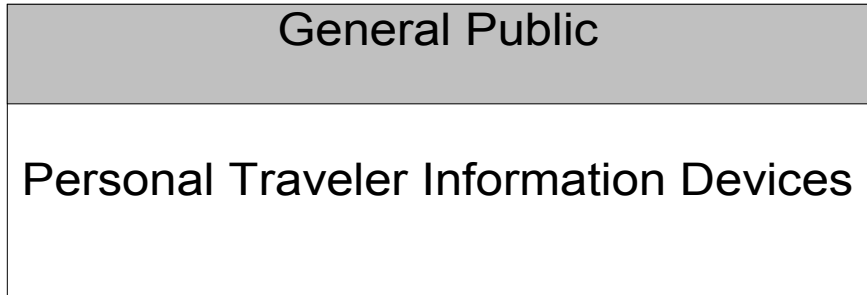
Existing
Planned



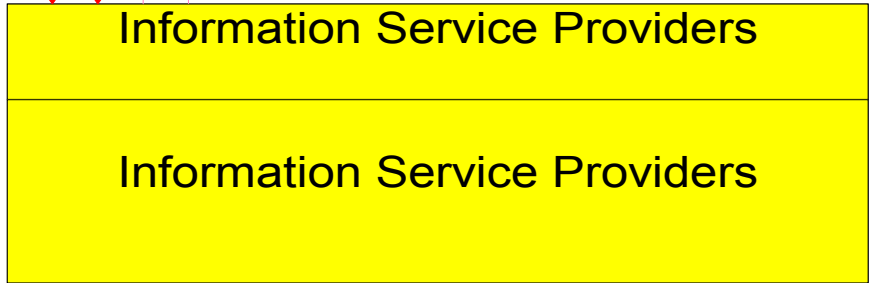
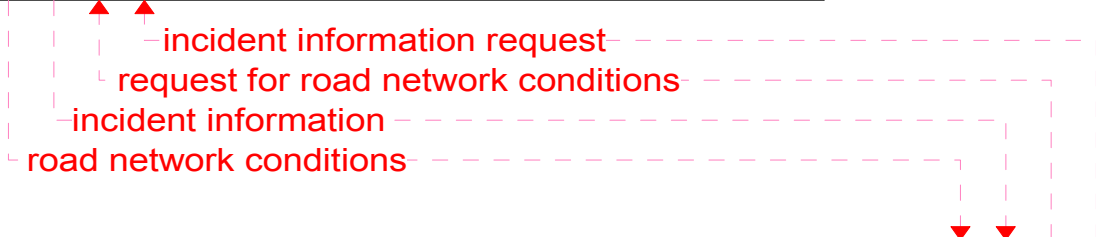
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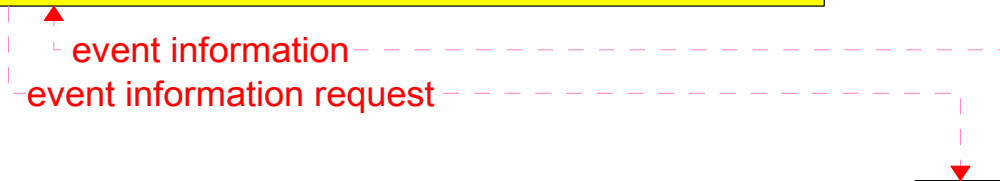
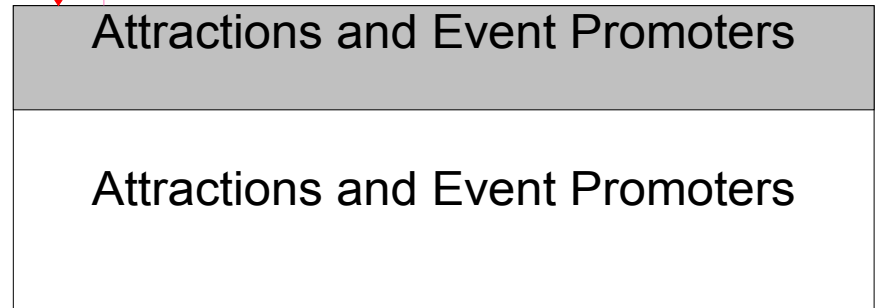
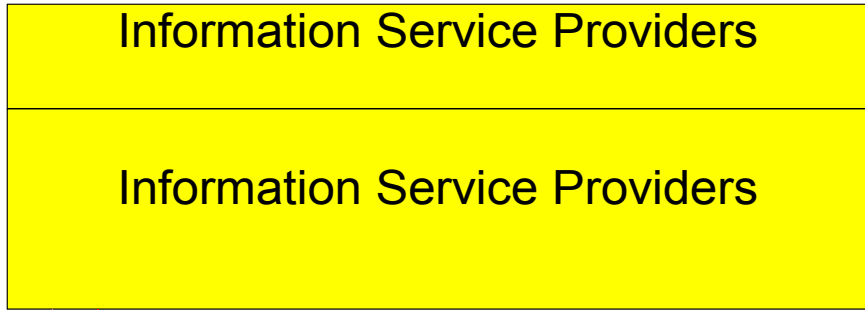
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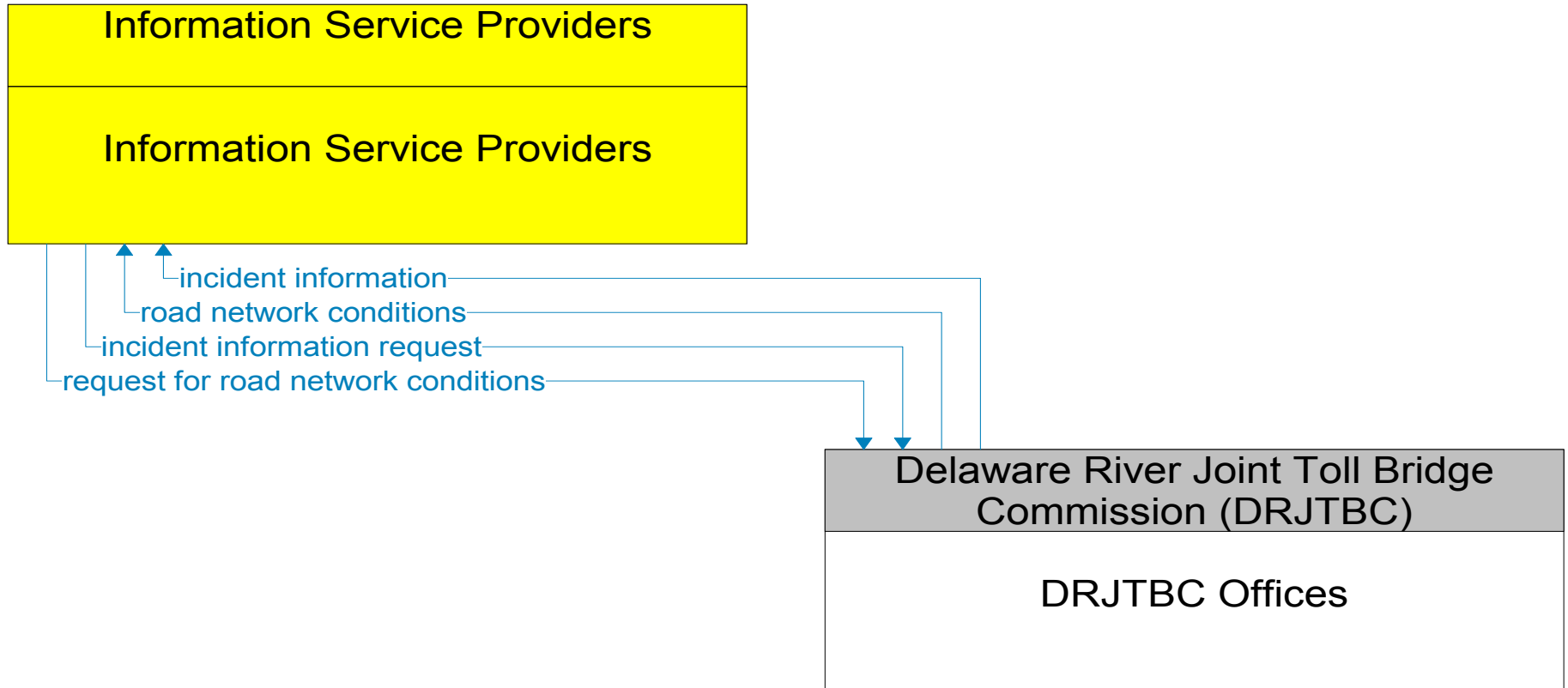
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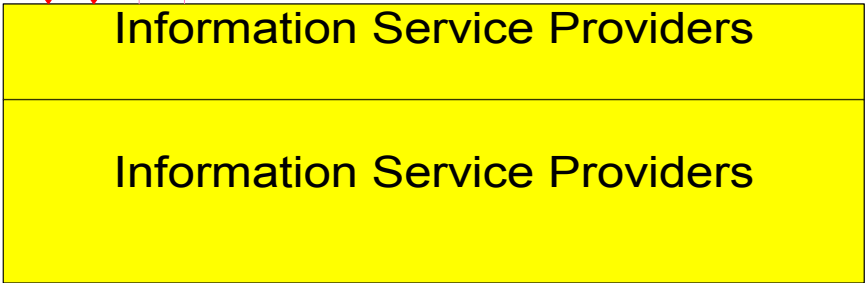
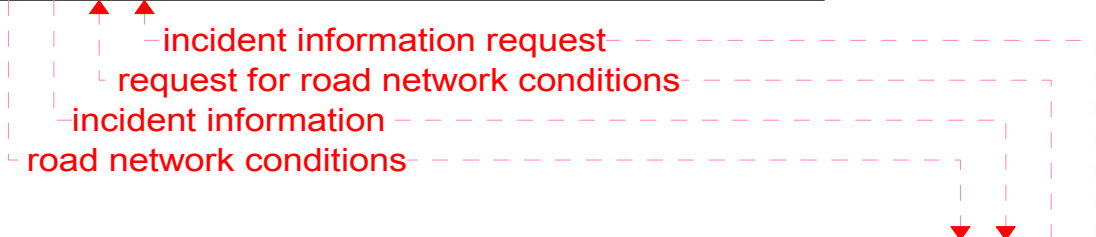
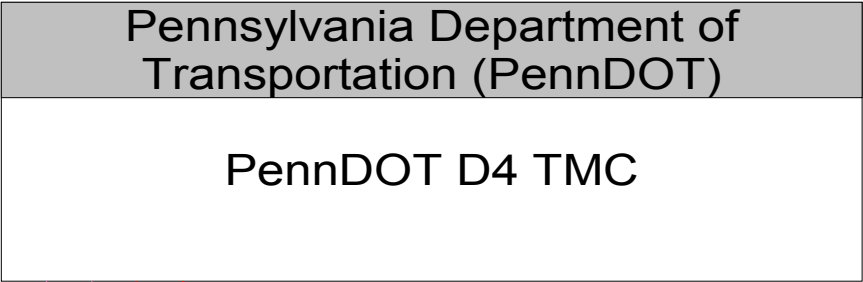
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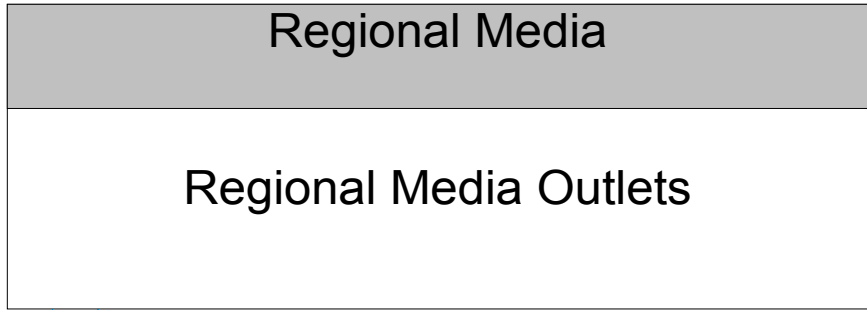
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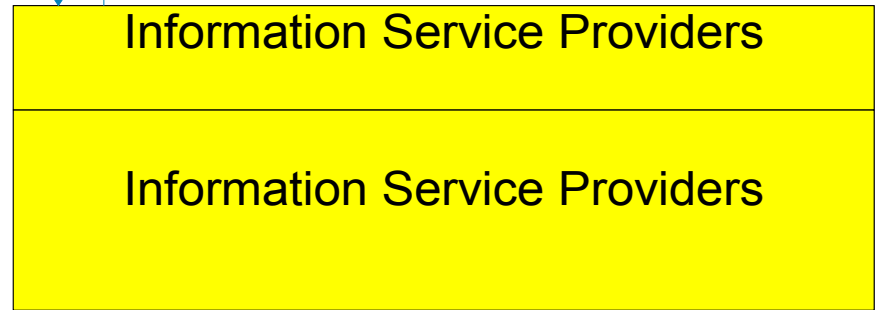
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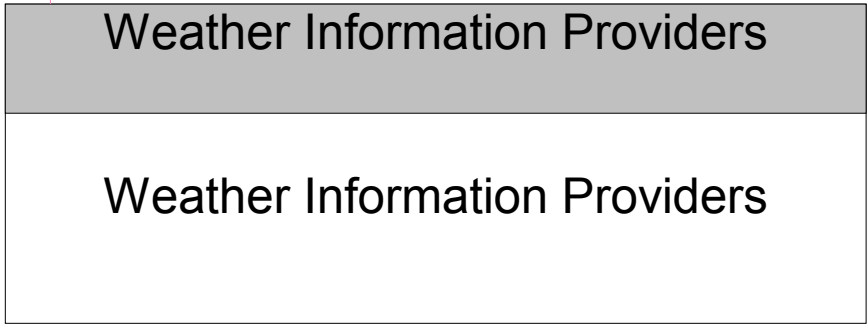
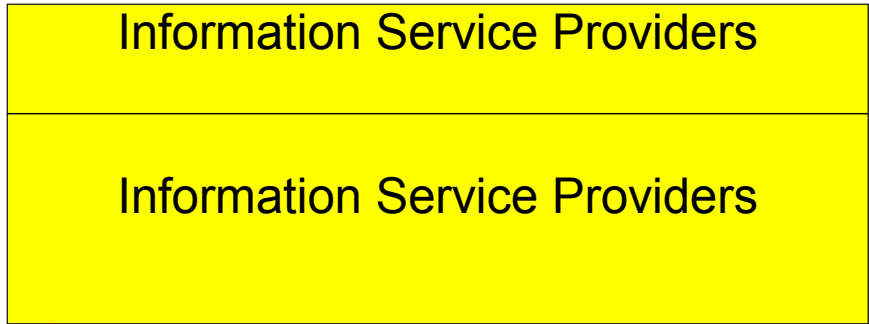
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- - - - - Planned



traveler information for media
media information request

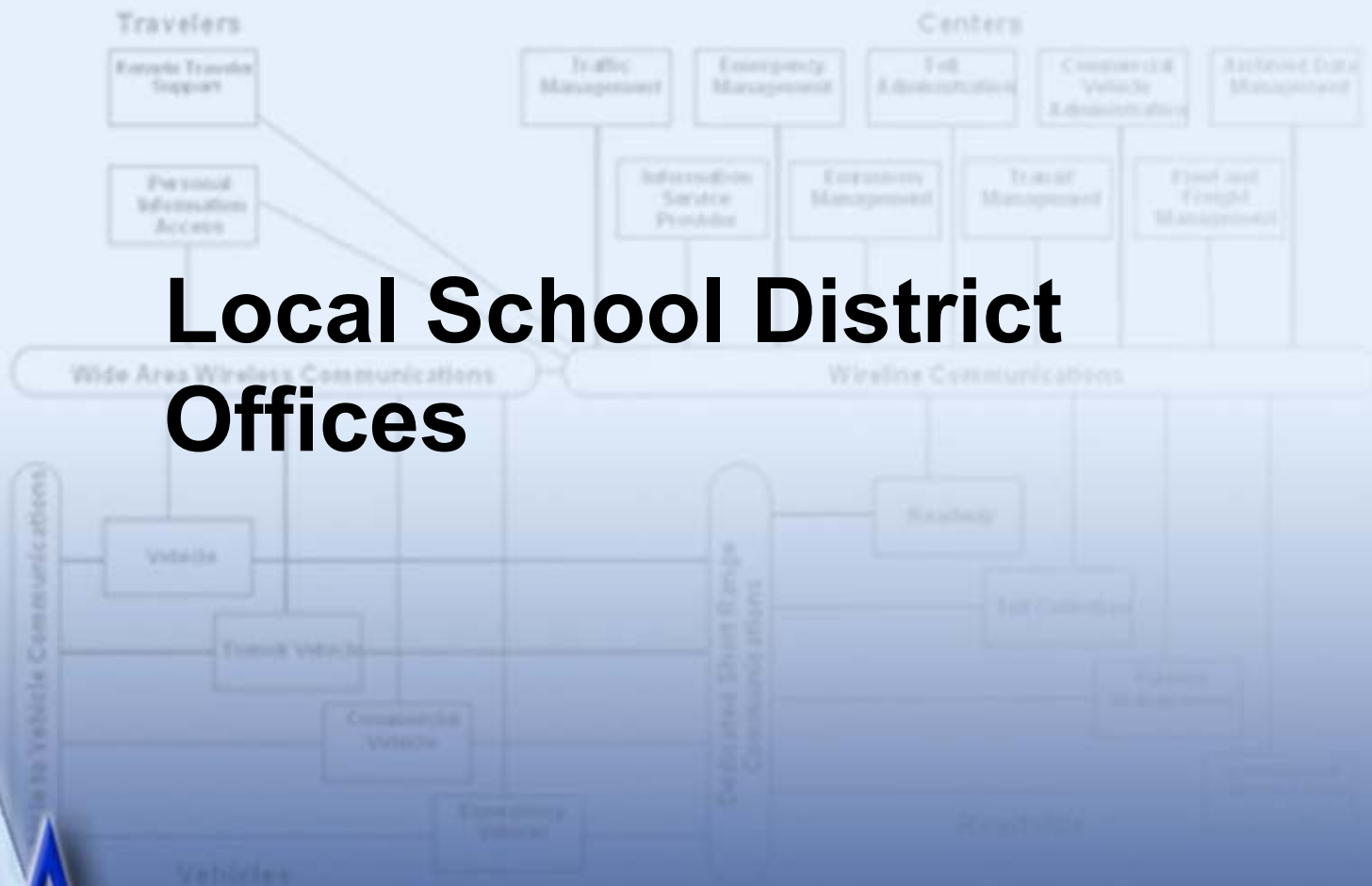


Existing
Planned

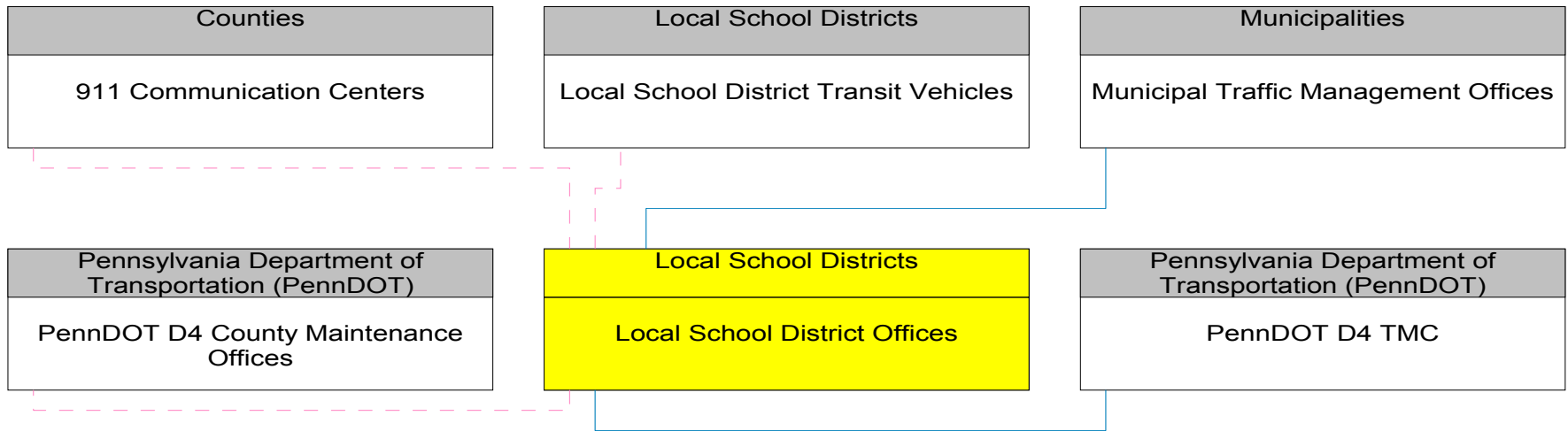


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- - - - - Planned

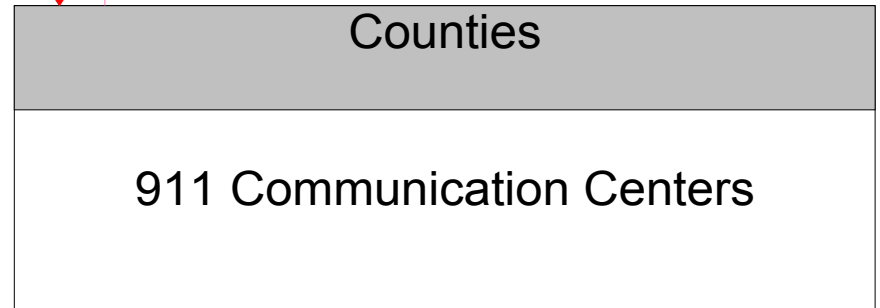
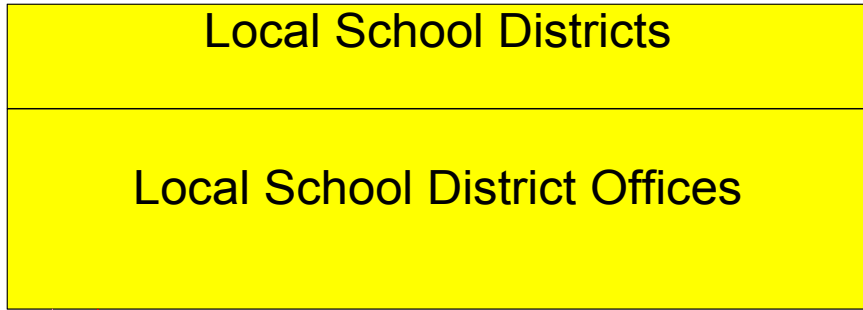
Local School District Offices



Local School District Offices Interconnect Diagram



———— Existing
- - - - - Planned

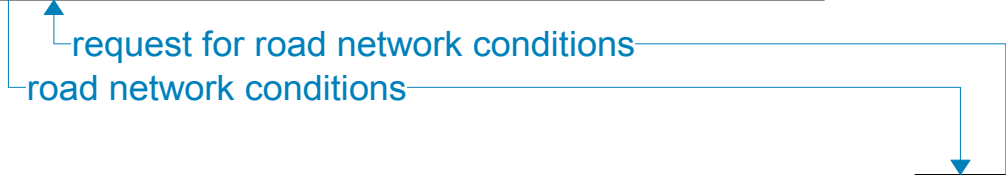
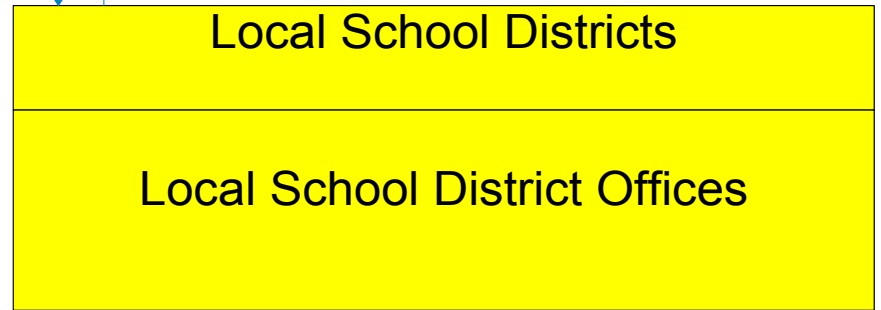
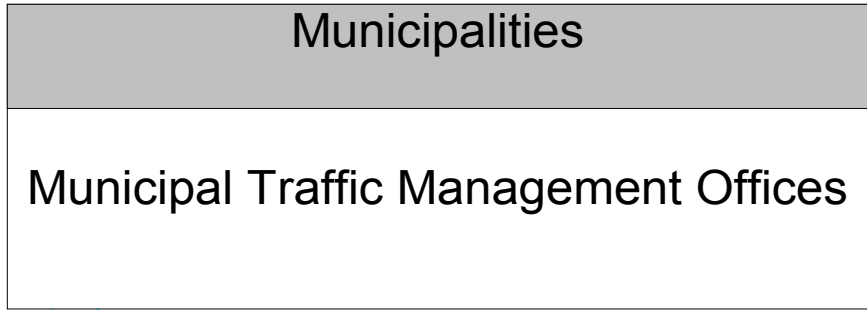


transit information request

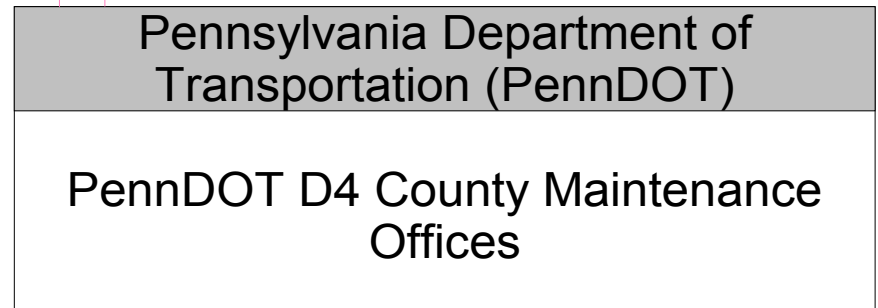
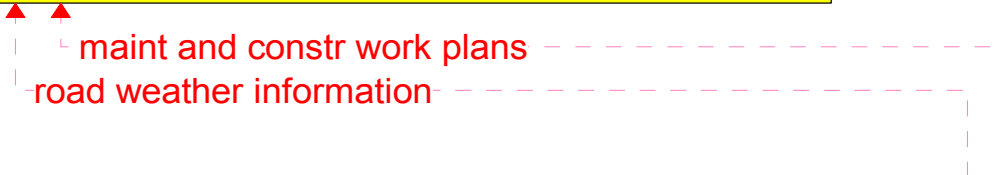
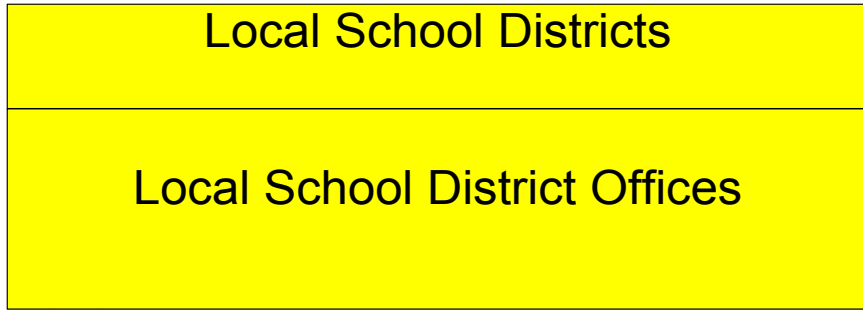
transit incident information

Existing

Planned

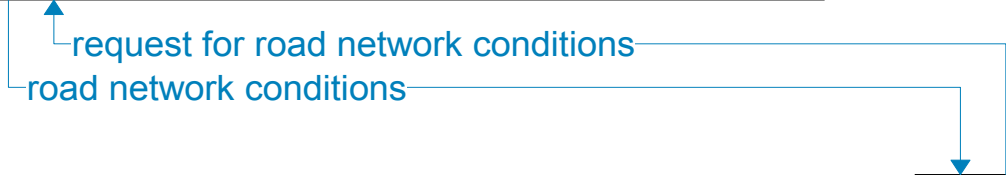
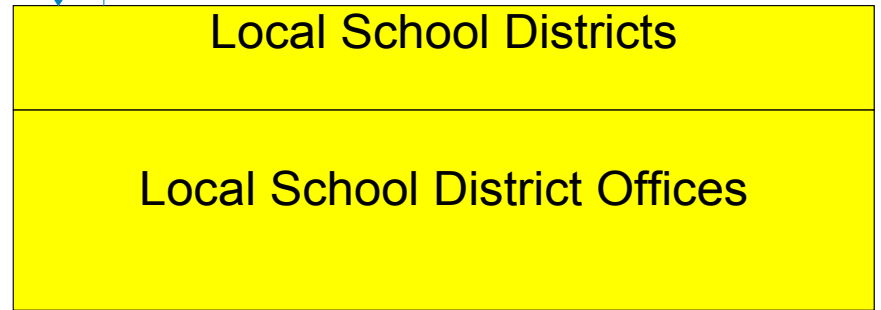
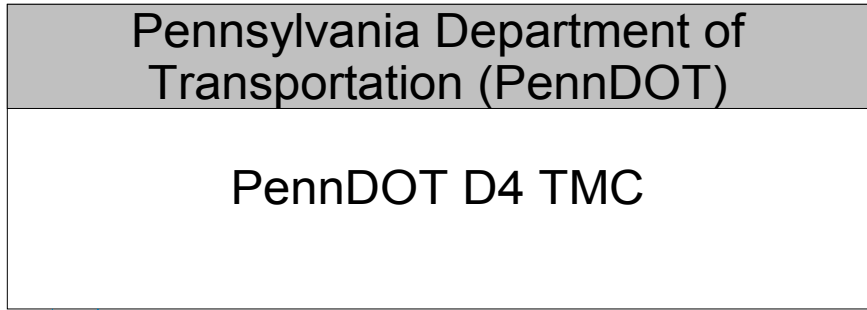


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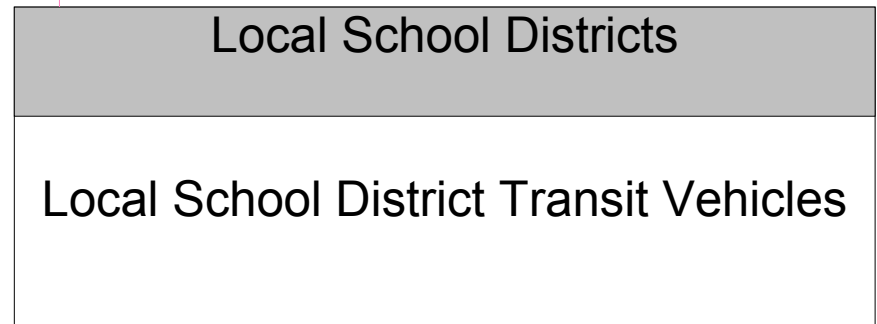
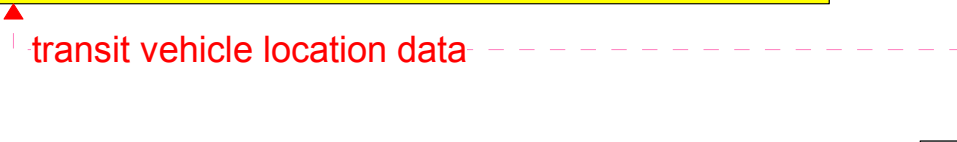
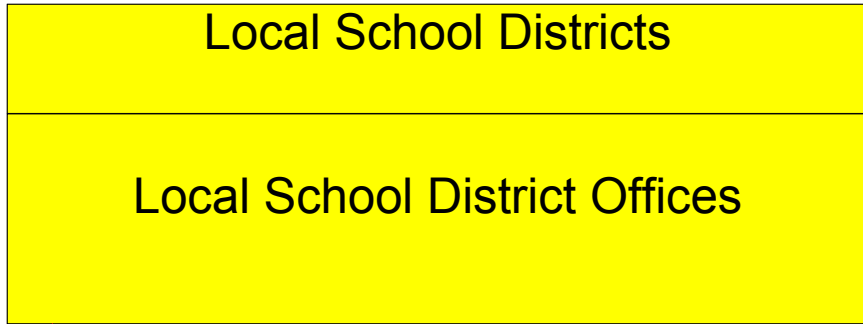


———— Existing

- - - - - Planned

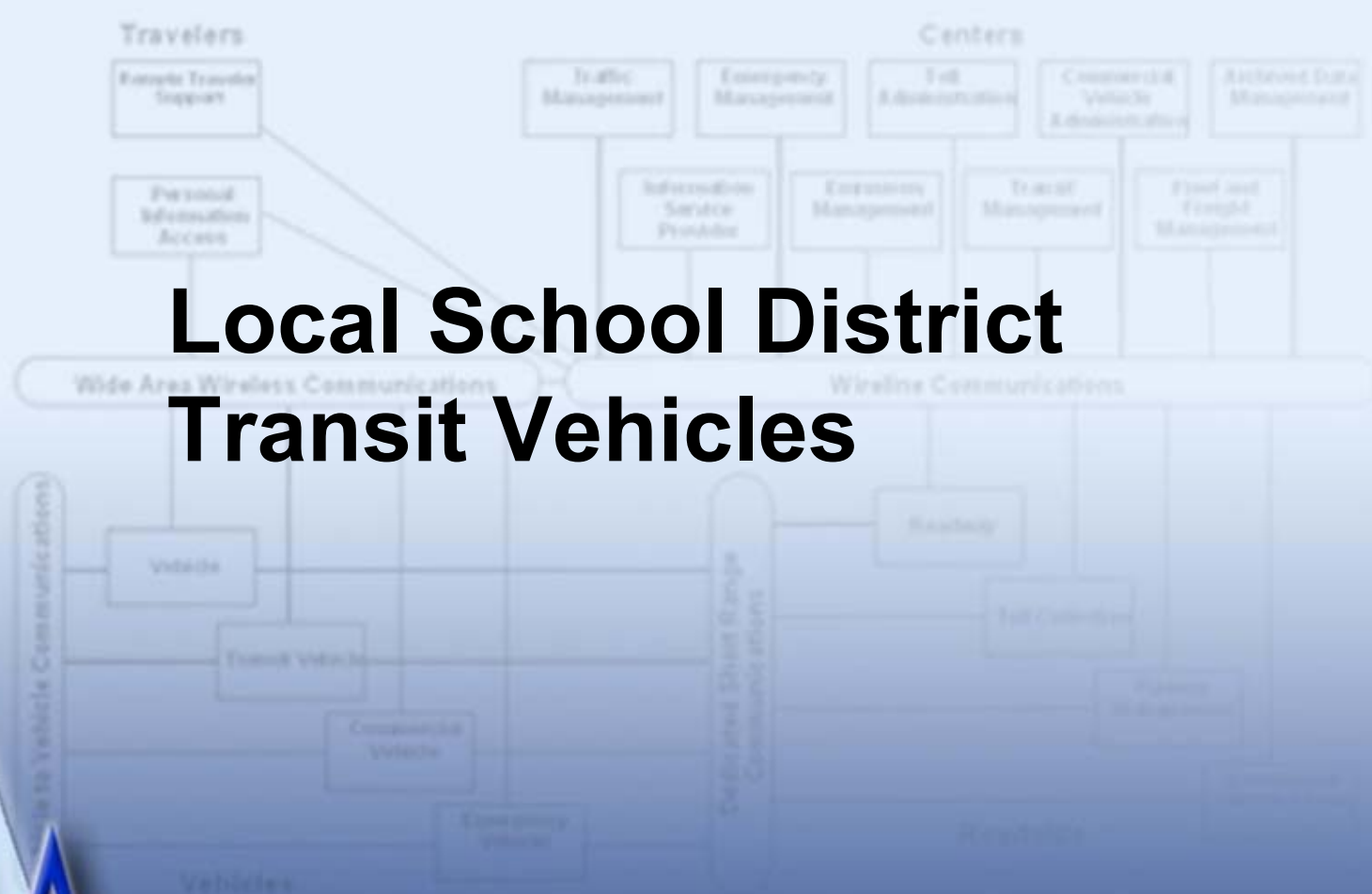


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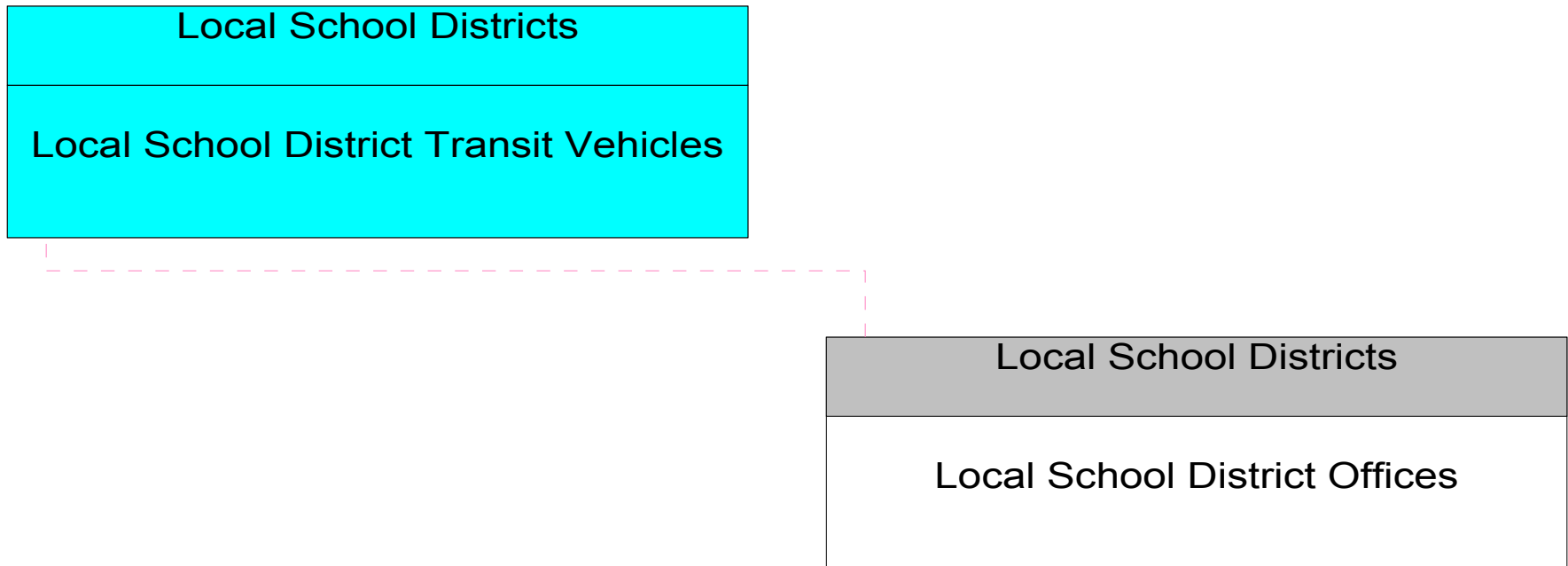


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- - - - - Planned

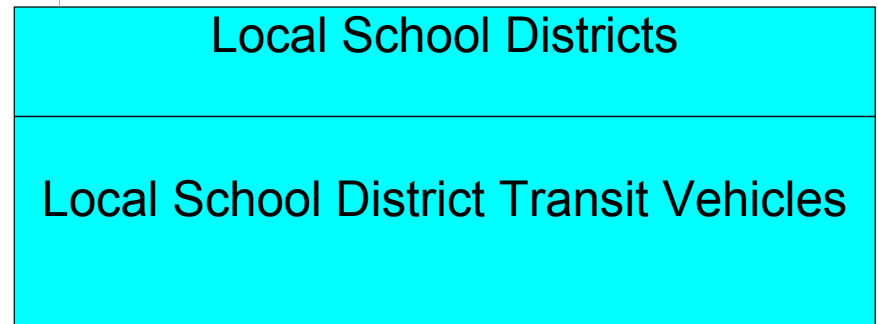
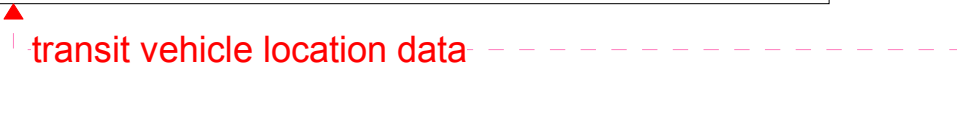
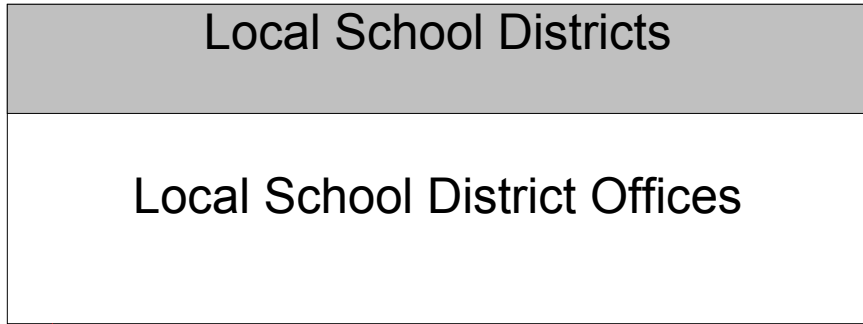
Local School District Transit Vehicles



Local School District Transit Vehicles Interconnect Diagram

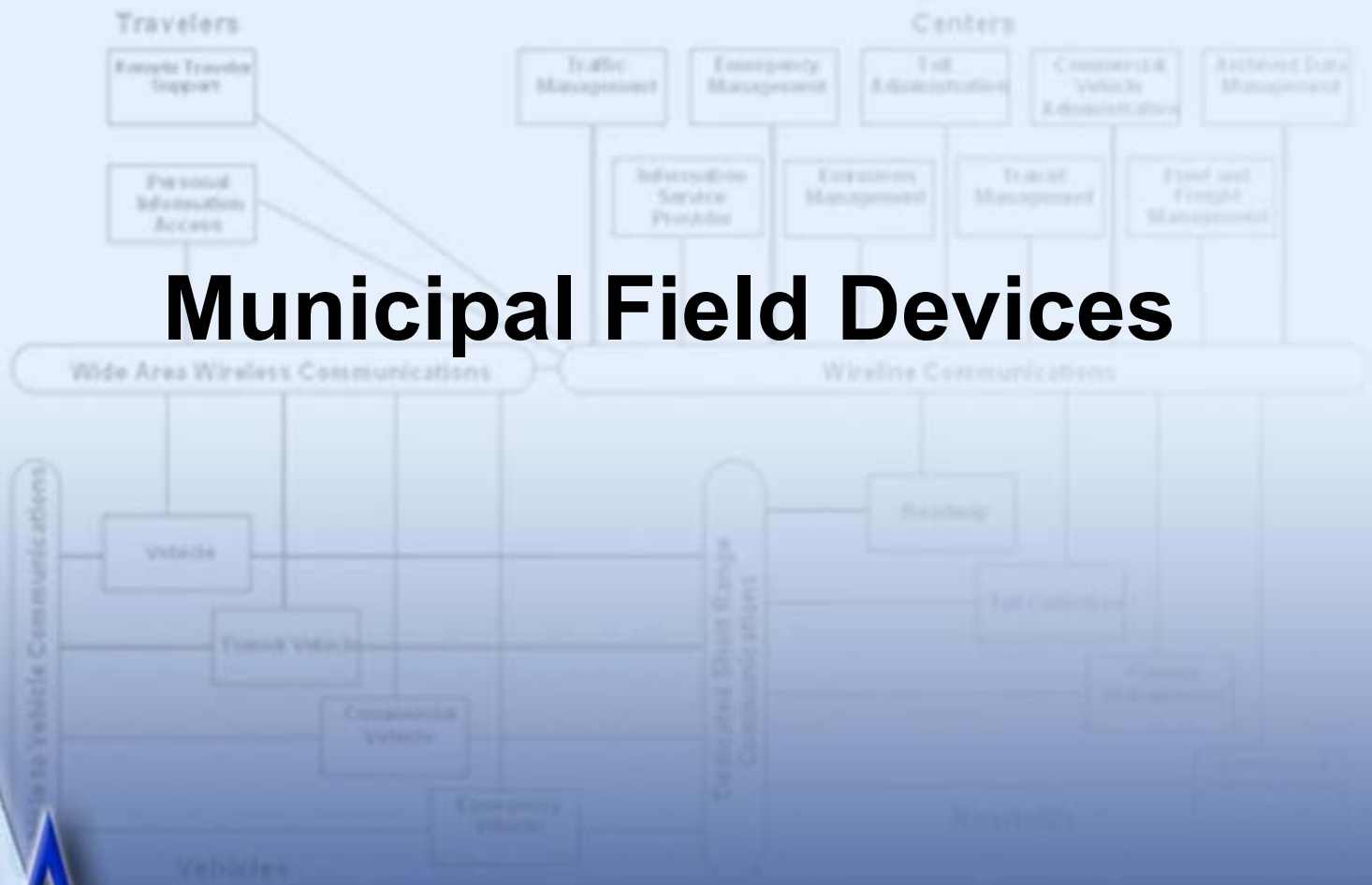


———— Existing
- - - - - Planned

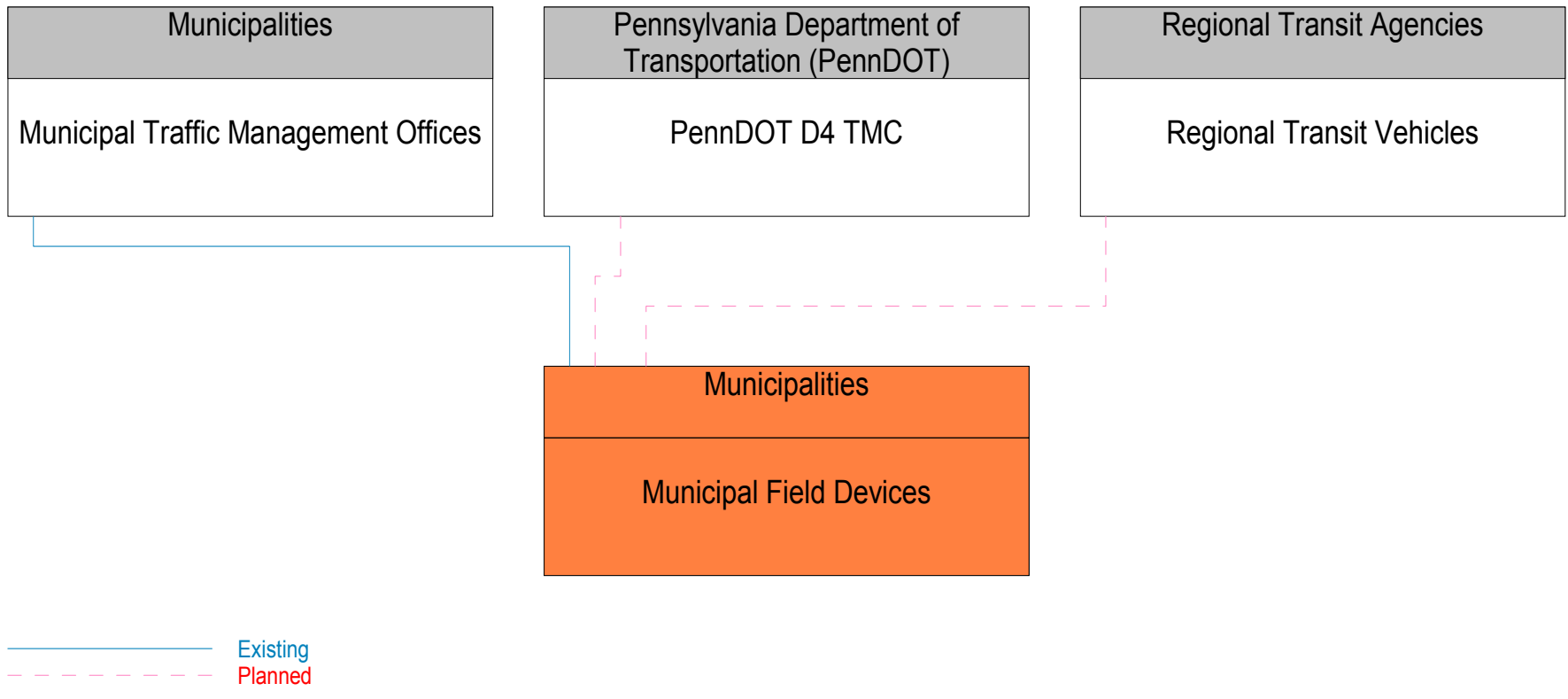


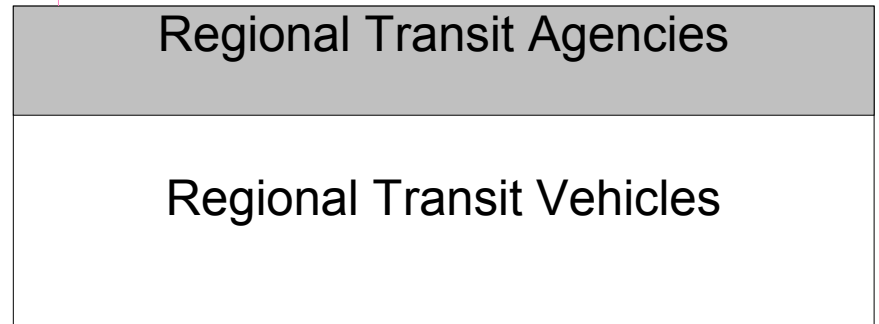
———— Existing
- - - - - Planned

Municipal Field Devices

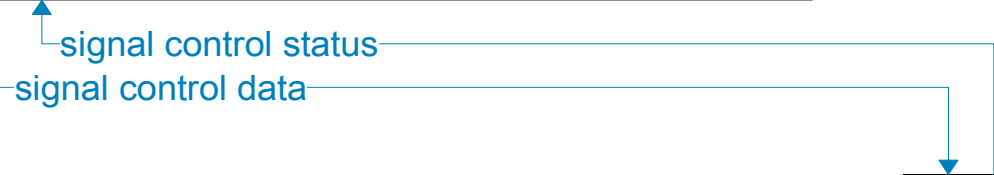
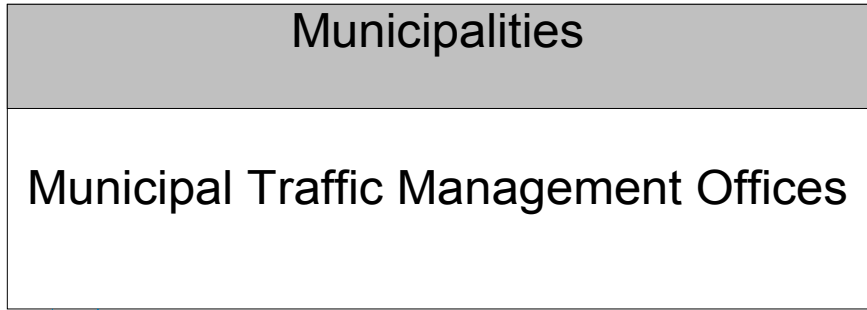


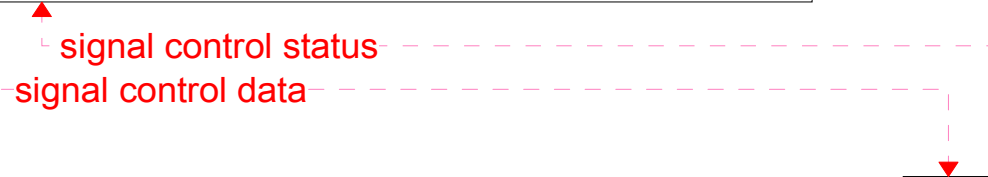
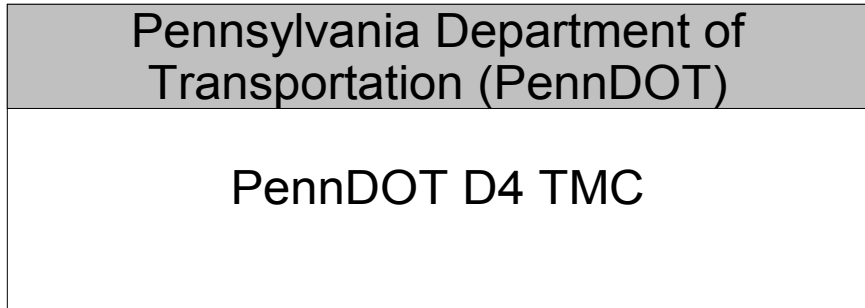
Municipal Field Devices Interconnect Diagram





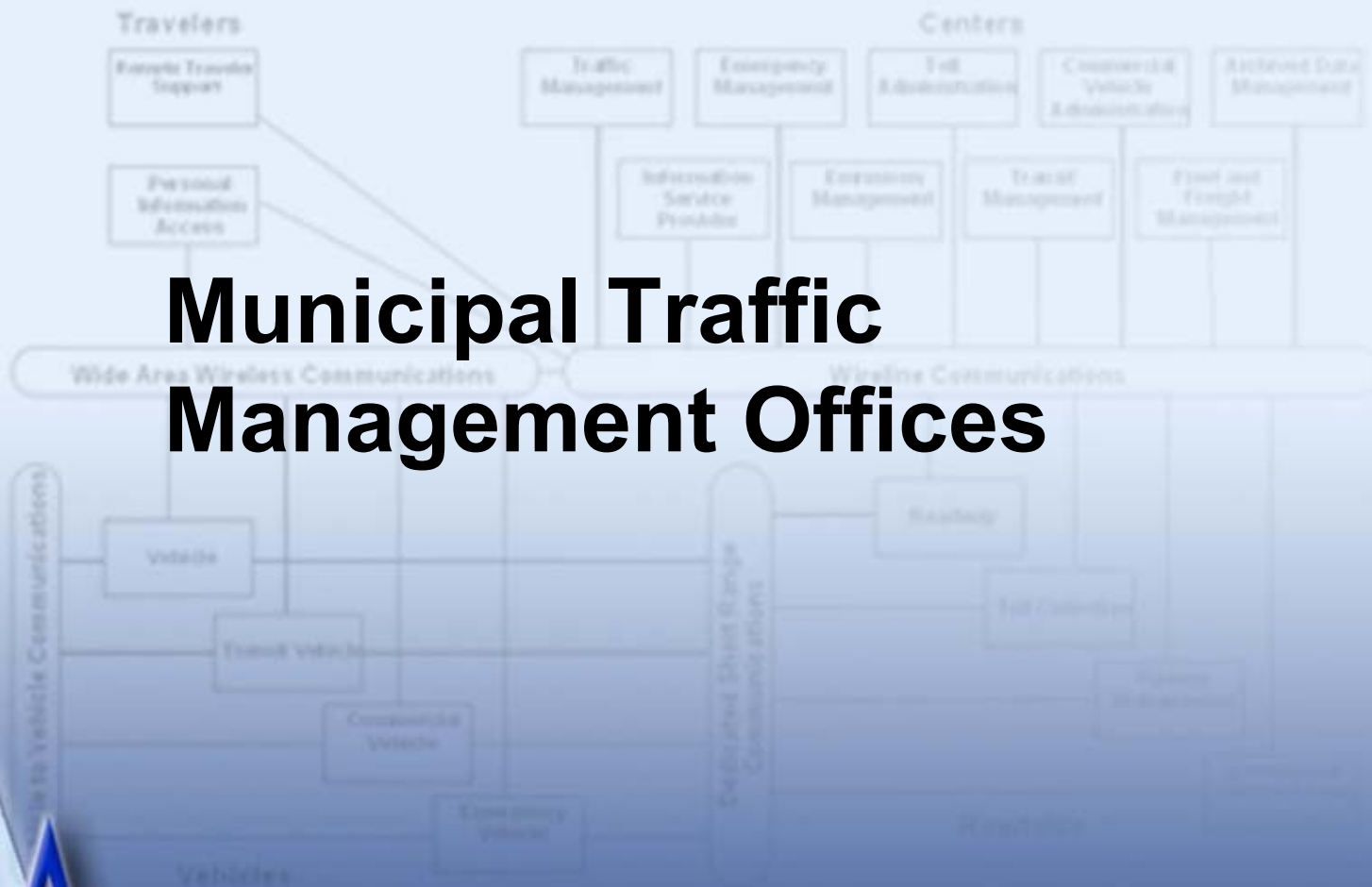
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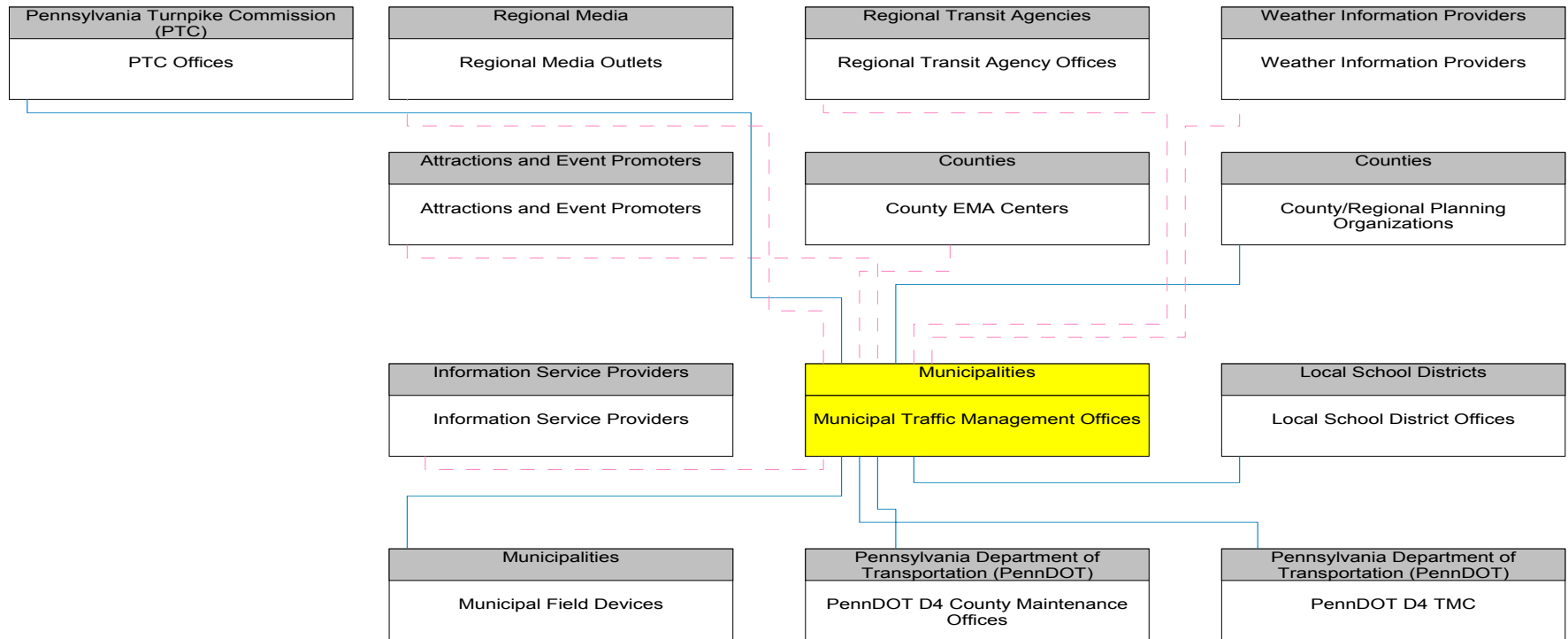


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- - - - - Planned

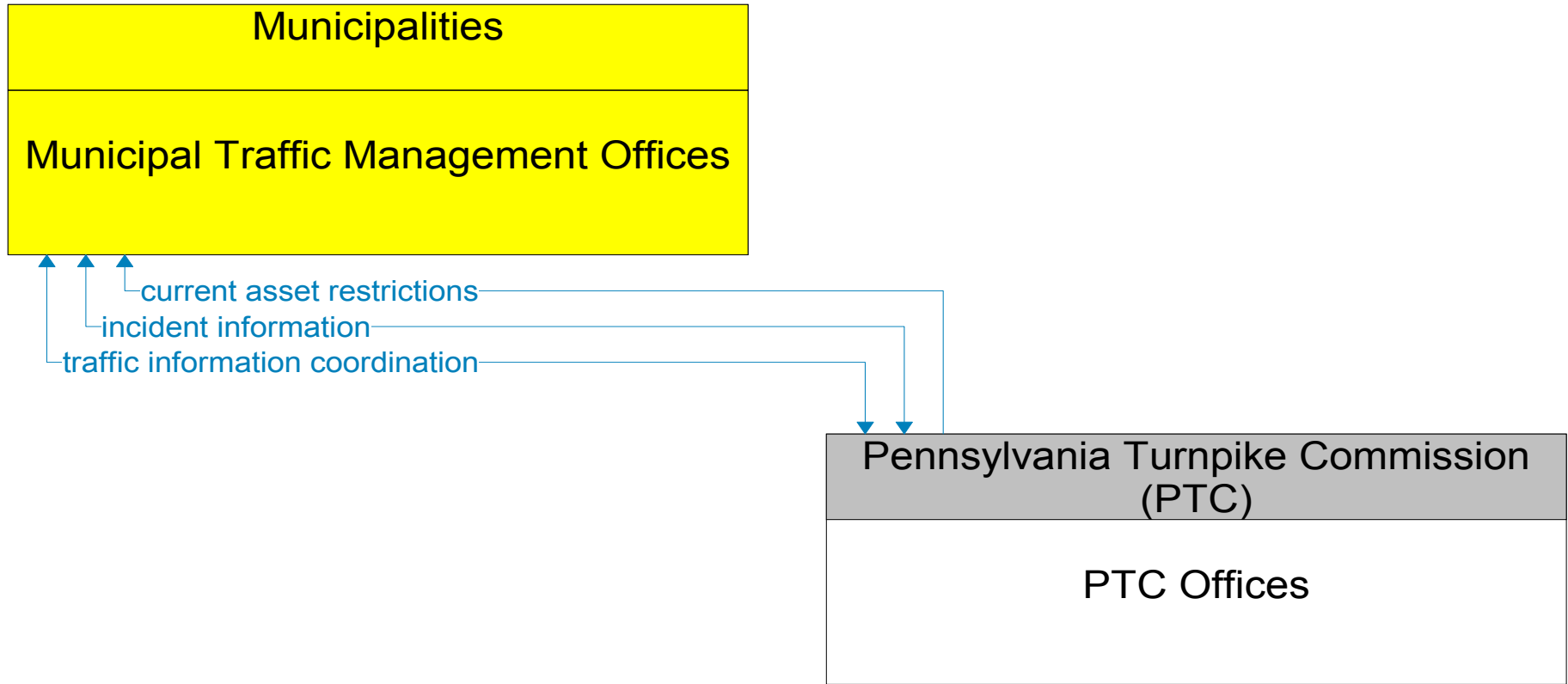
Municipal Traffic Management Offices



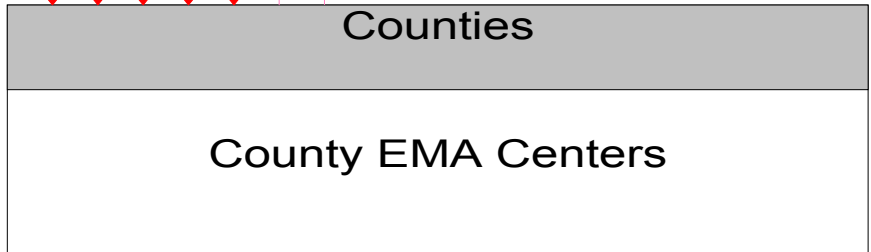
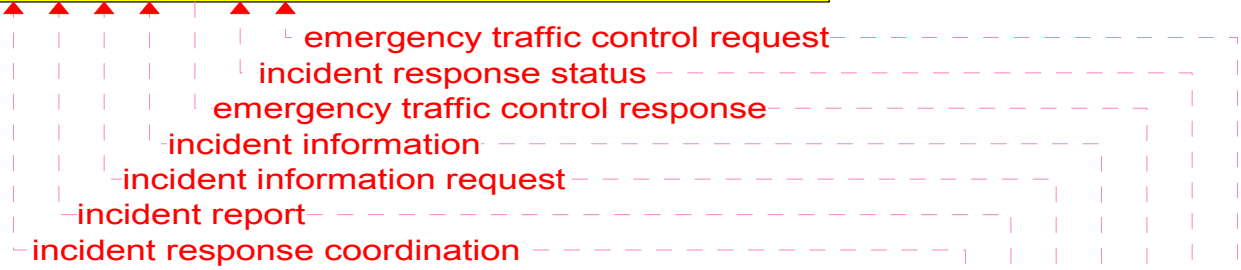
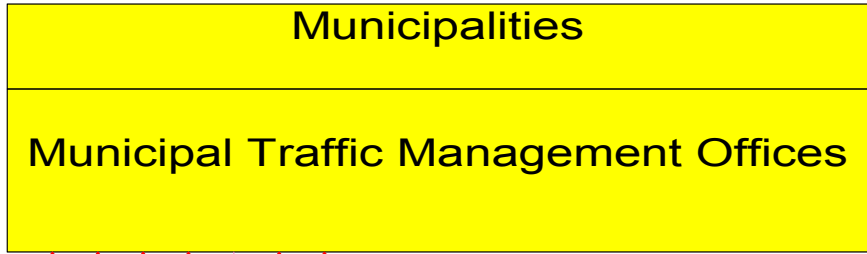
Municipal Traffic Management Offices Interconnect Diagram



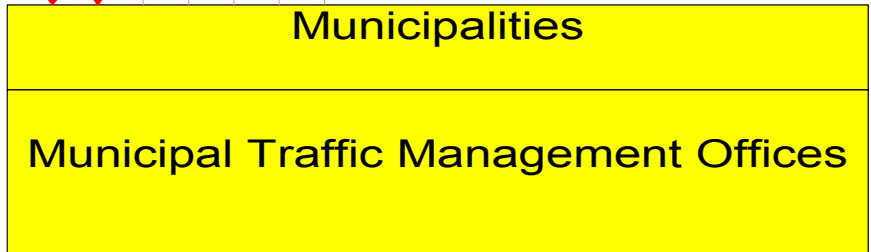
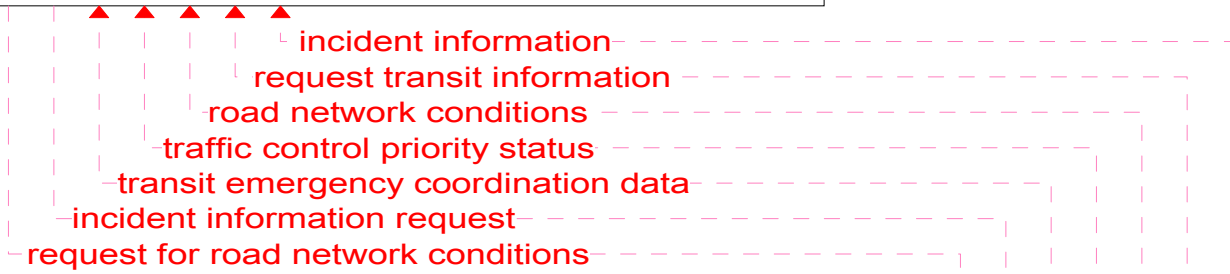
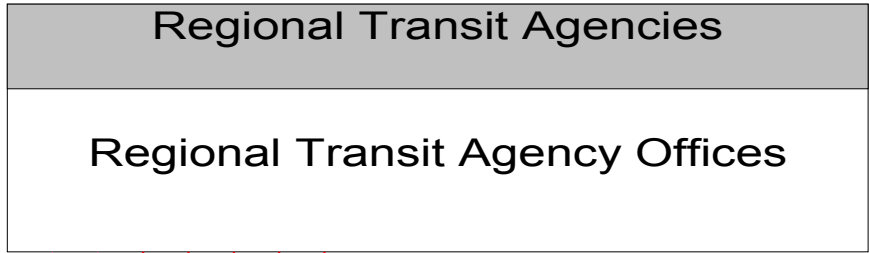
Existing
Planned



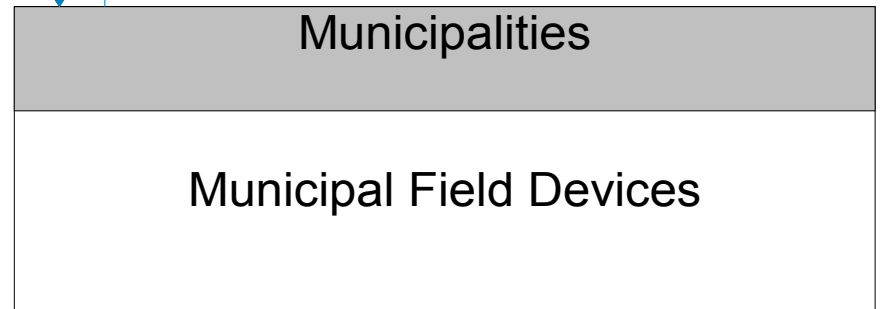
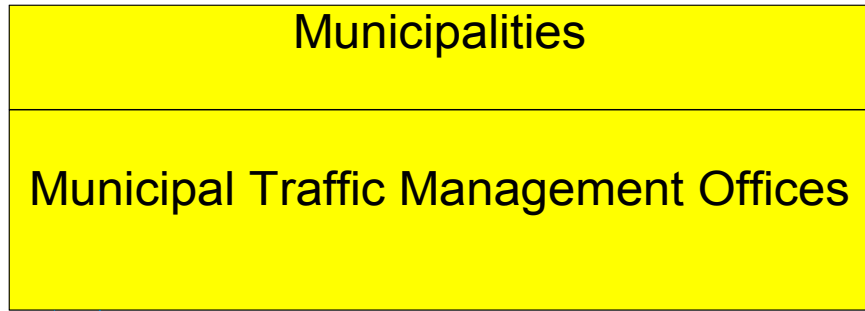
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----- Planned

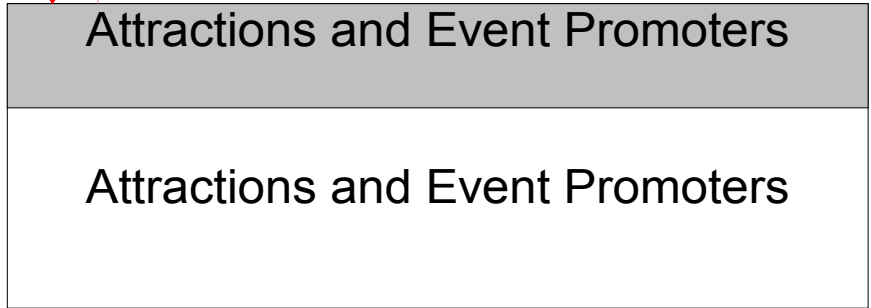
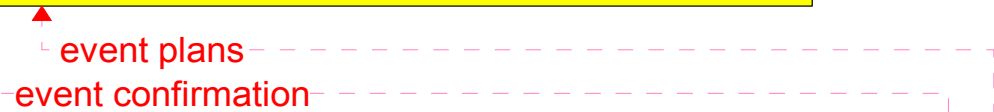
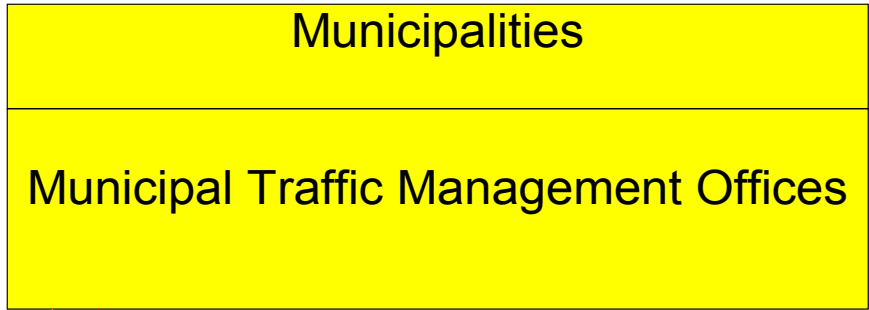


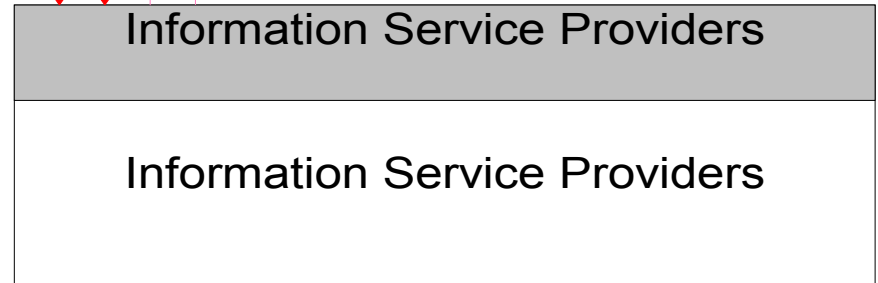
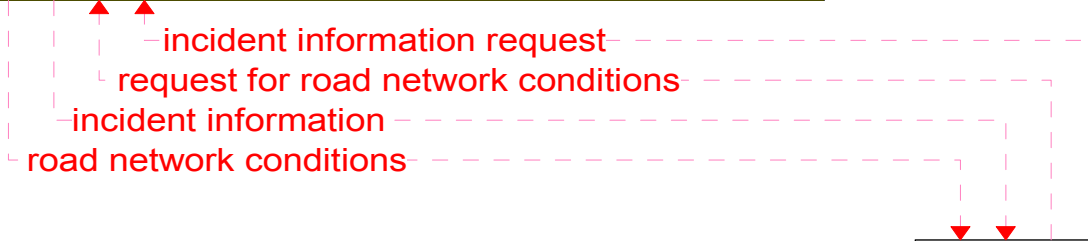
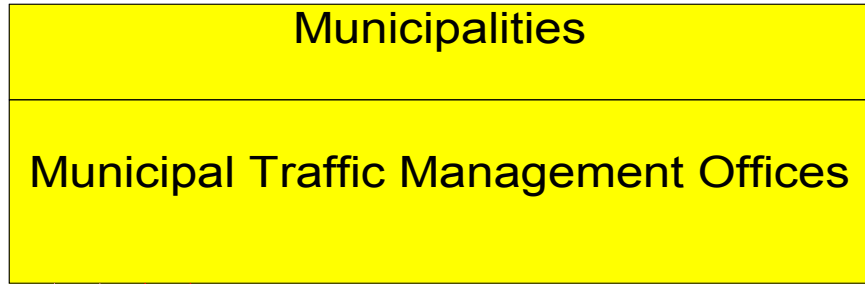
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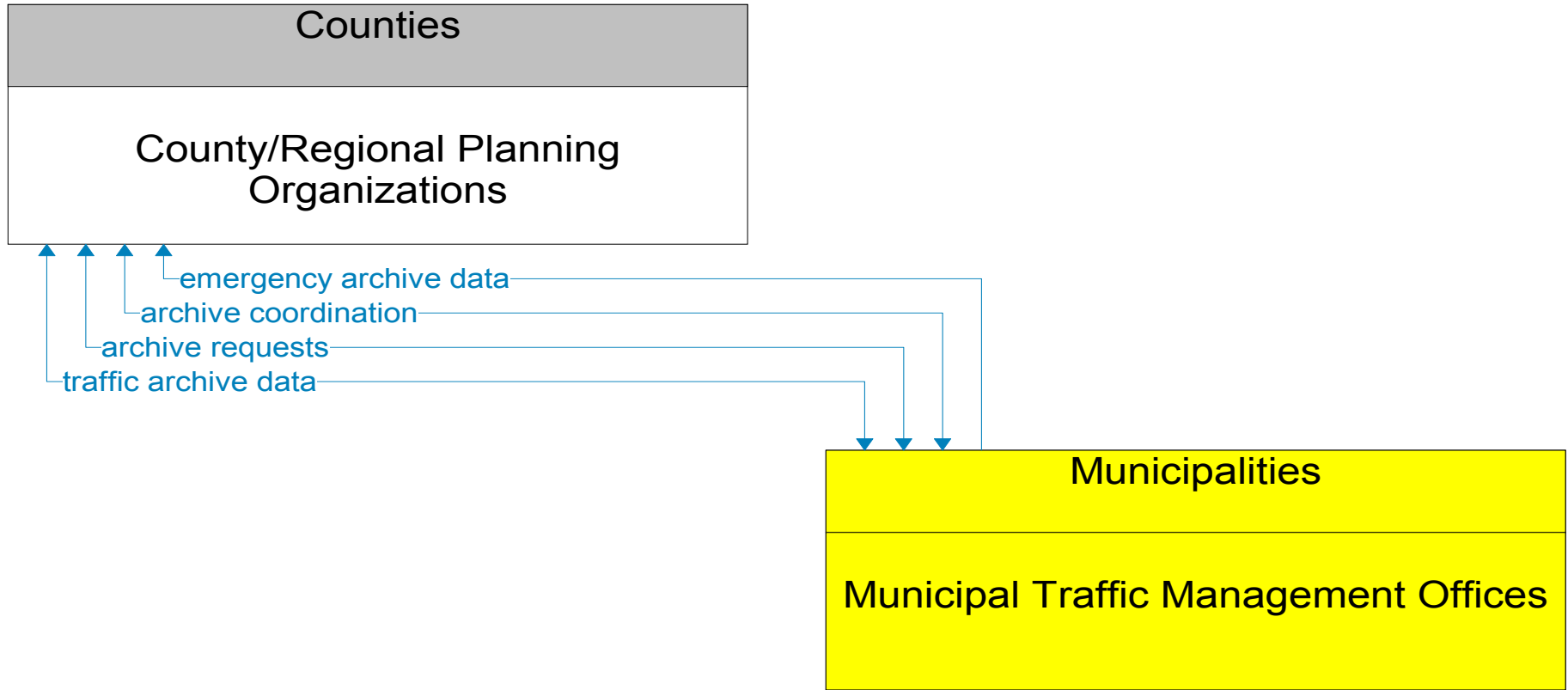
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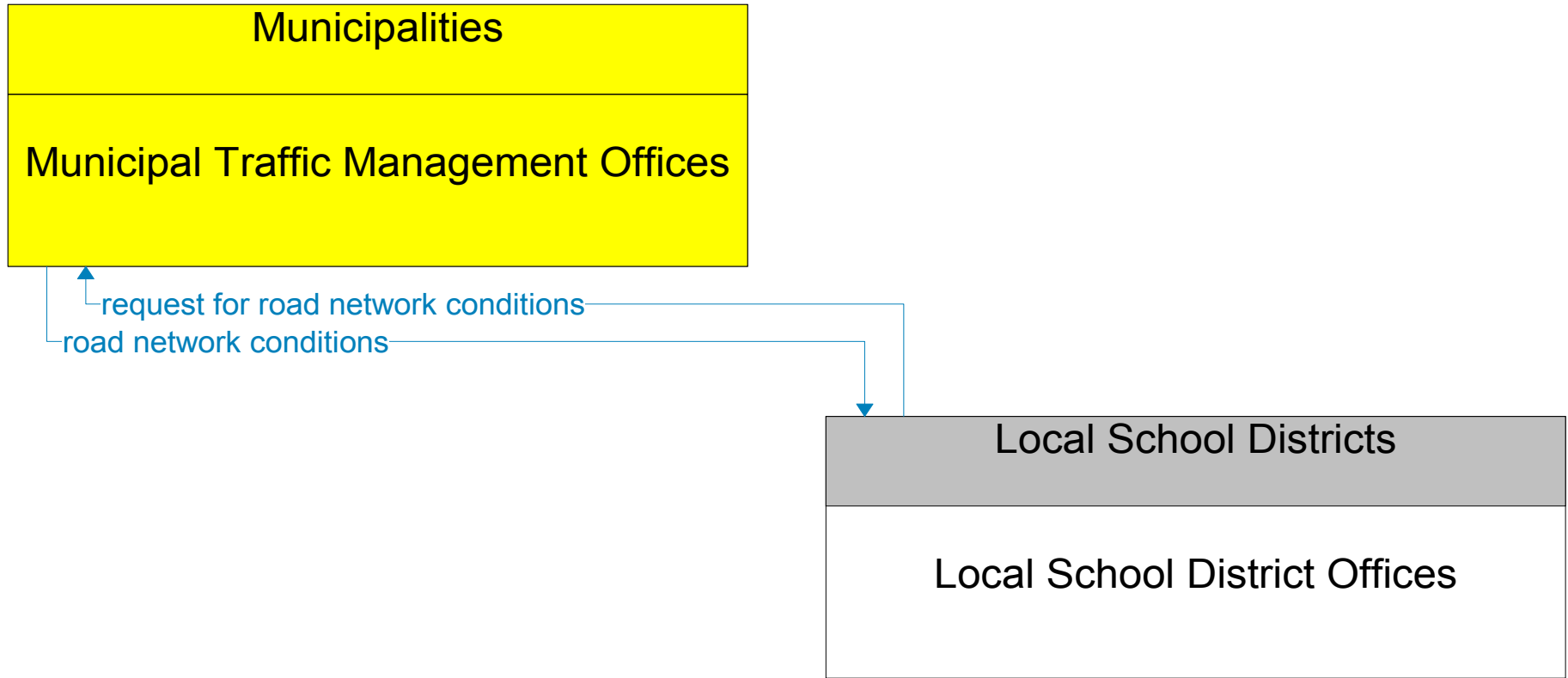




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Planned

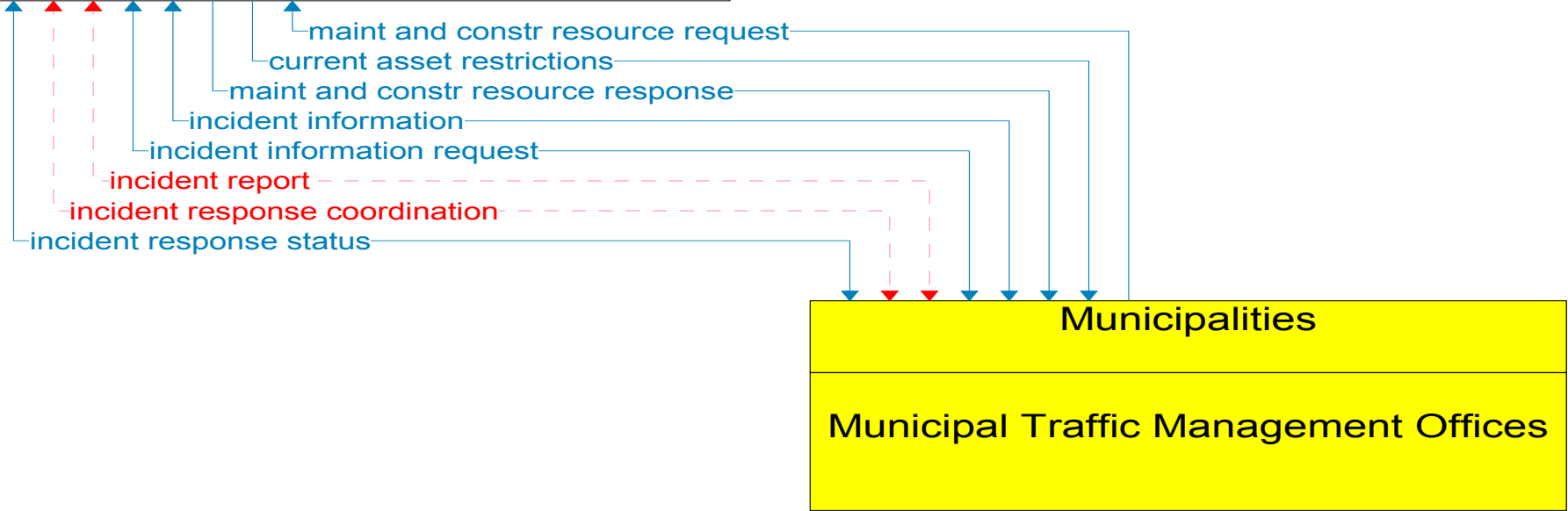


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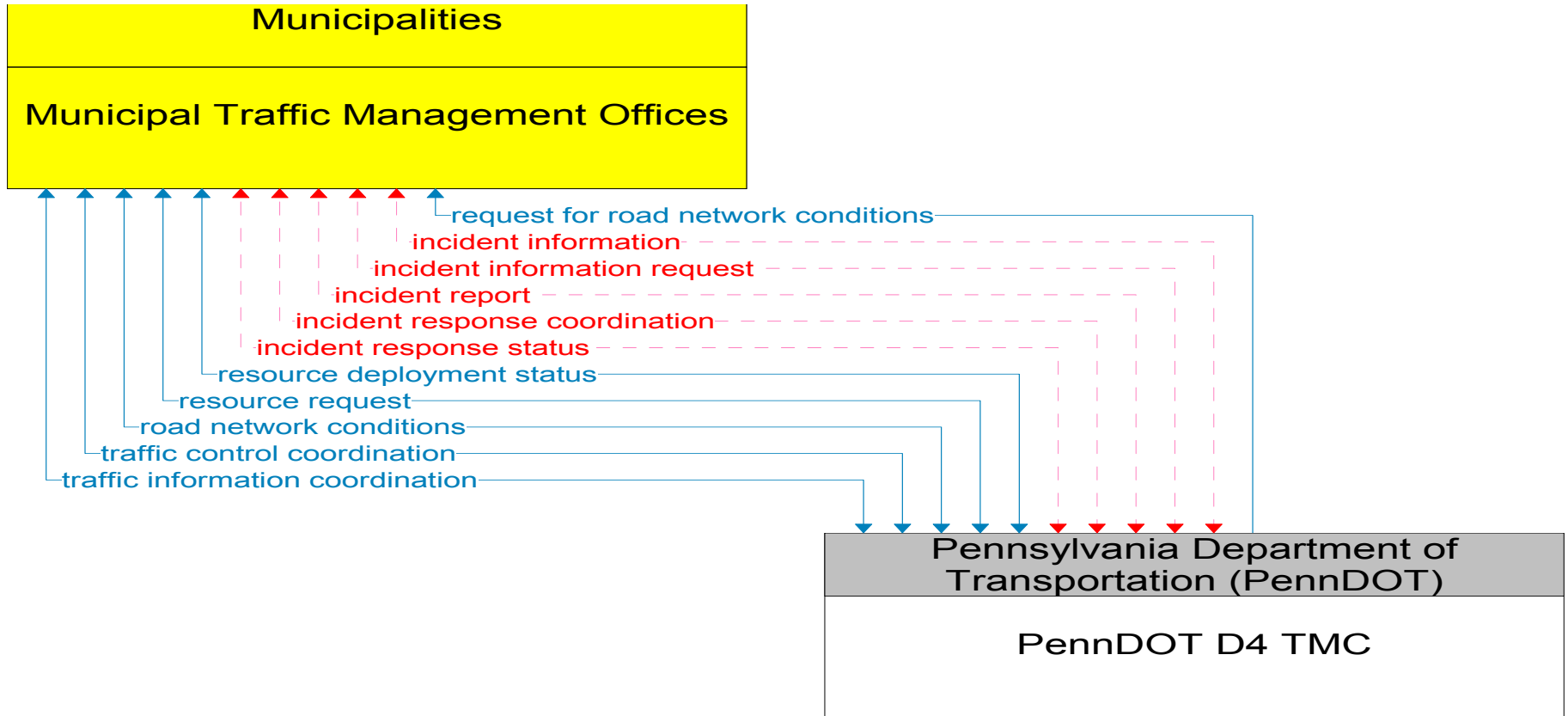


Pennsylvania Department of
Transportation (PennDOT)

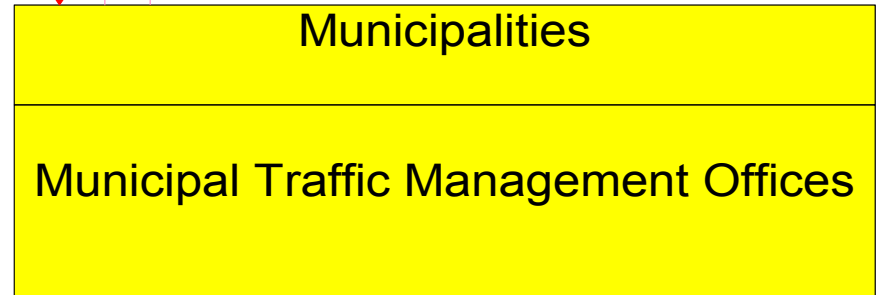
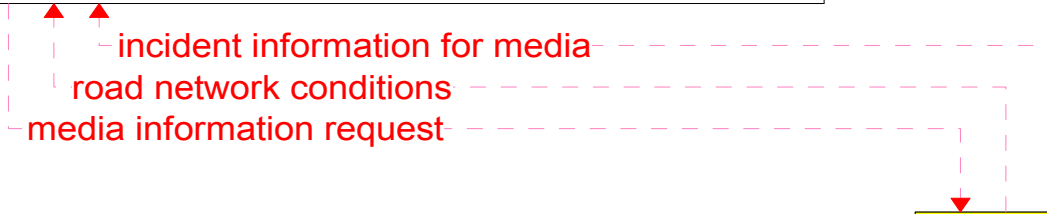
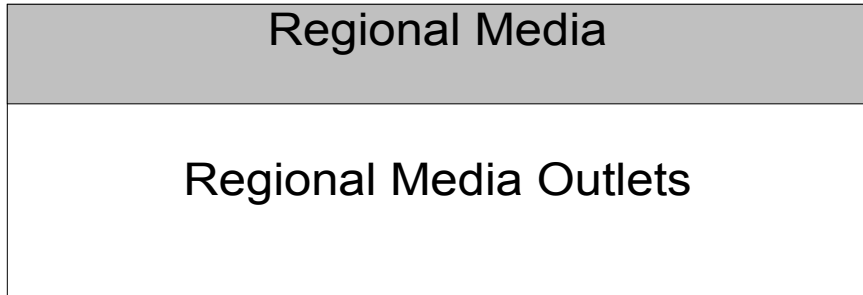
PennDOT D4 County Maintenance
Offices



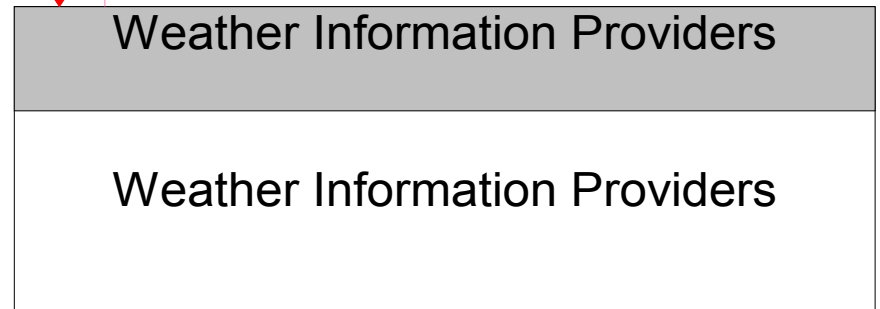
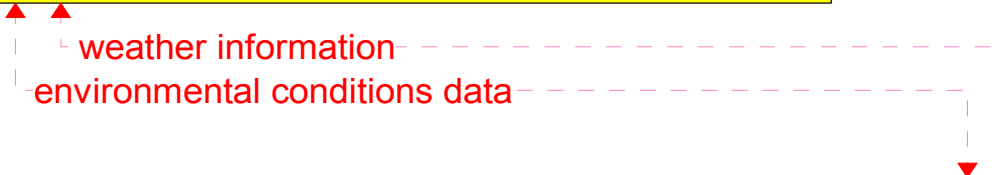
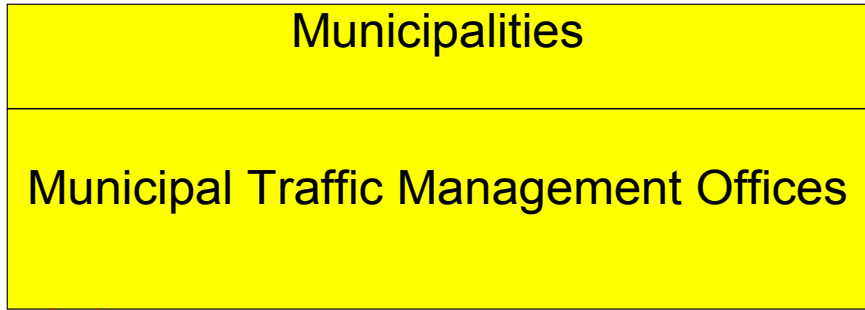
Existing
Planned



Existing
Planned



Existing
Planned

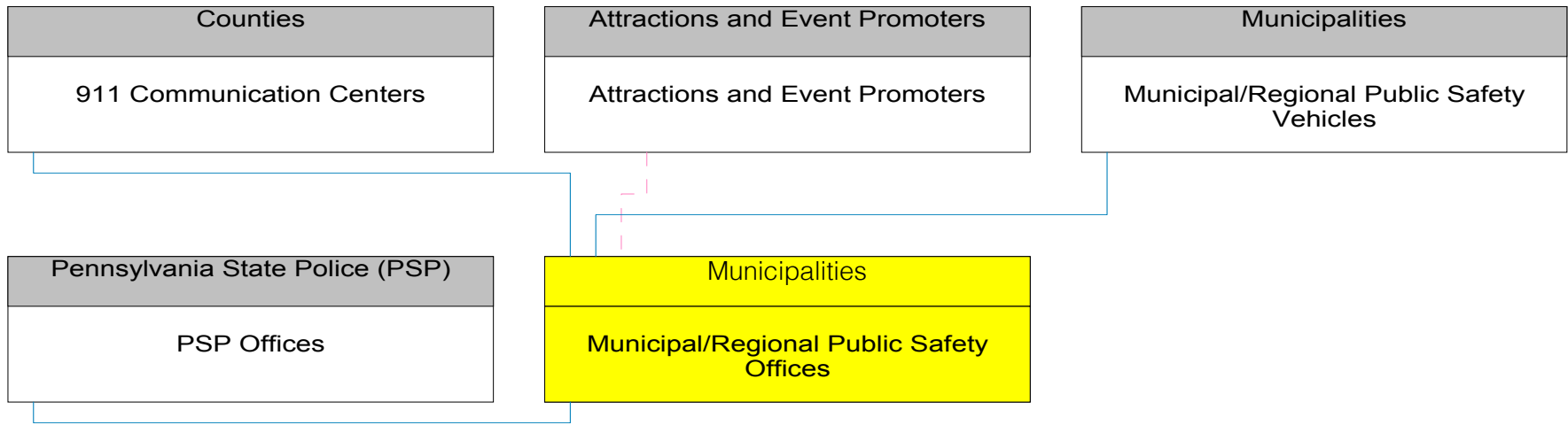


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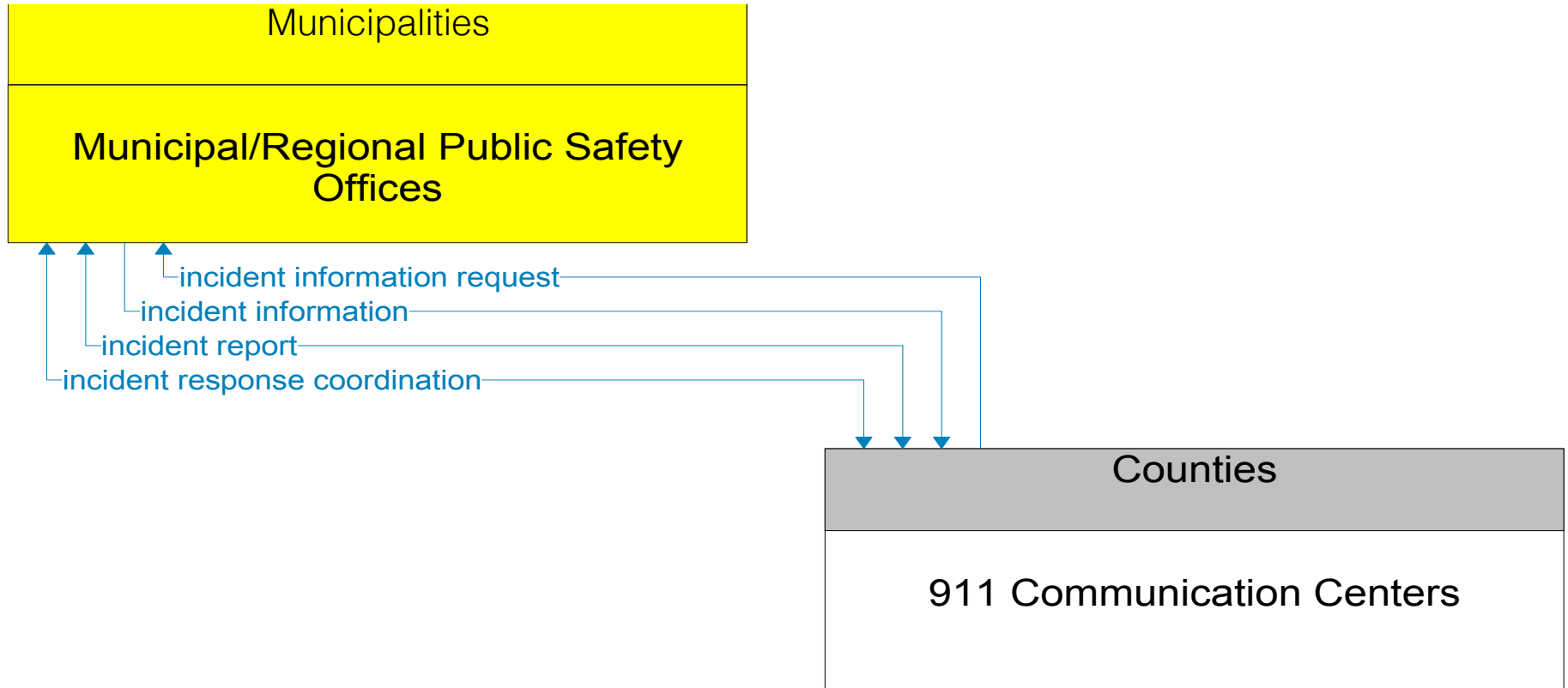
Municipal/Regional Public Safety Offices

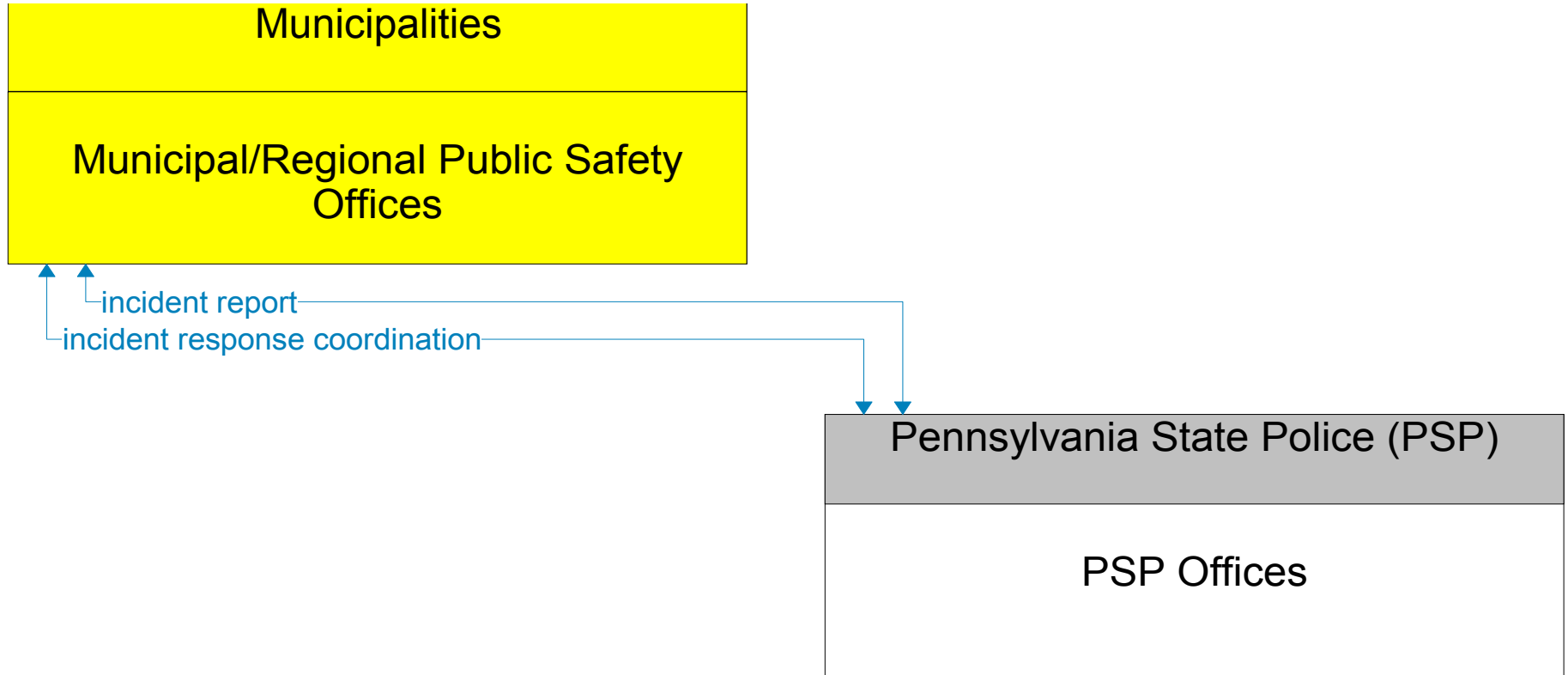


Municipal/Regional Public Safety Offices Interconnect Diagram

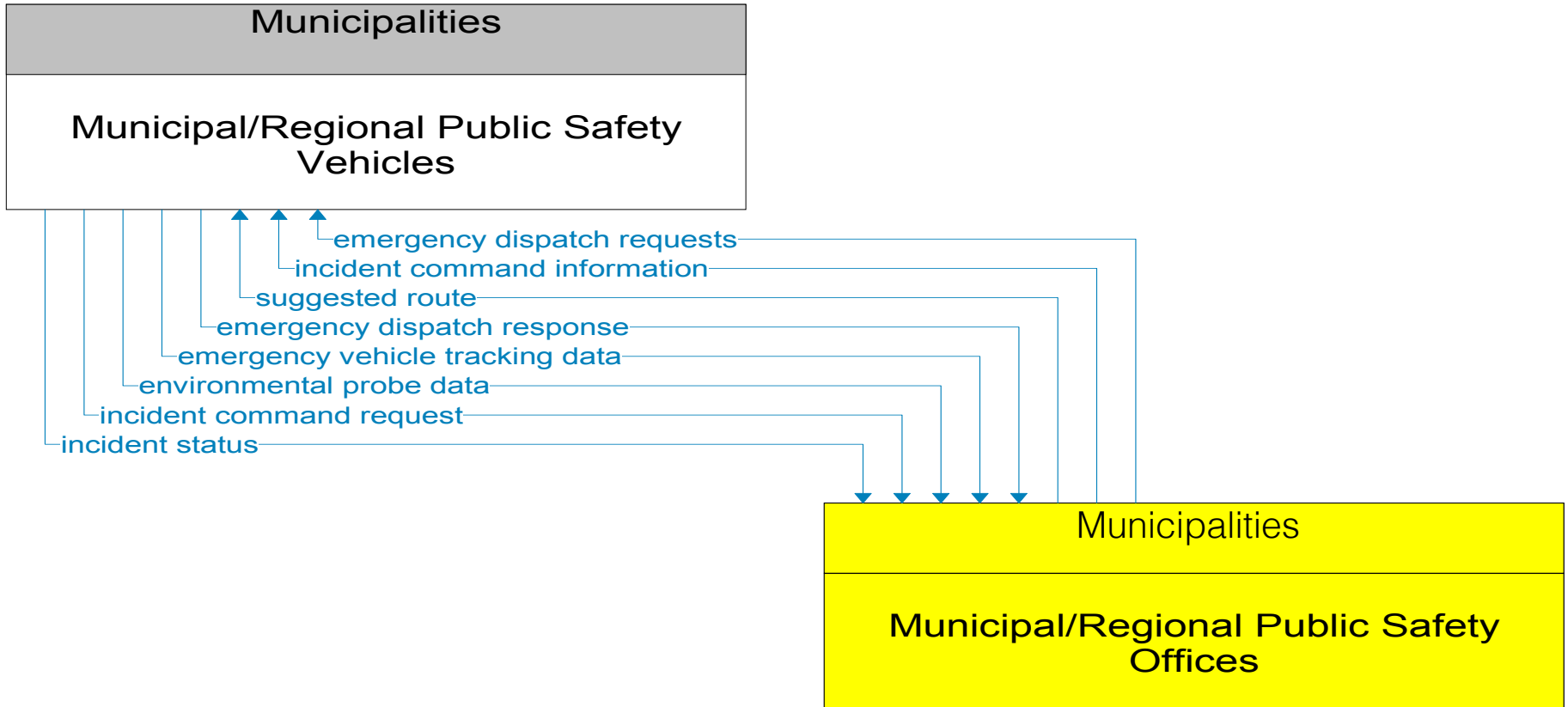


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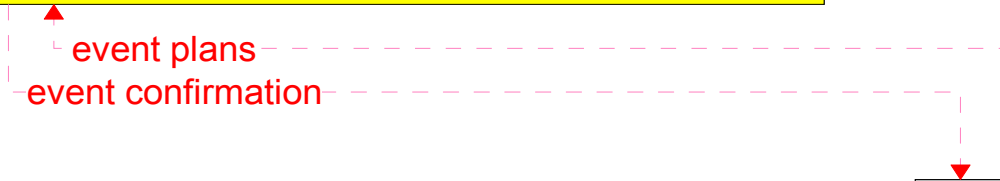
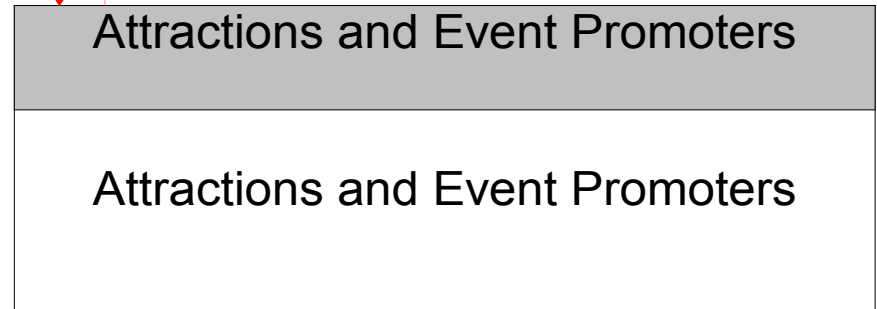




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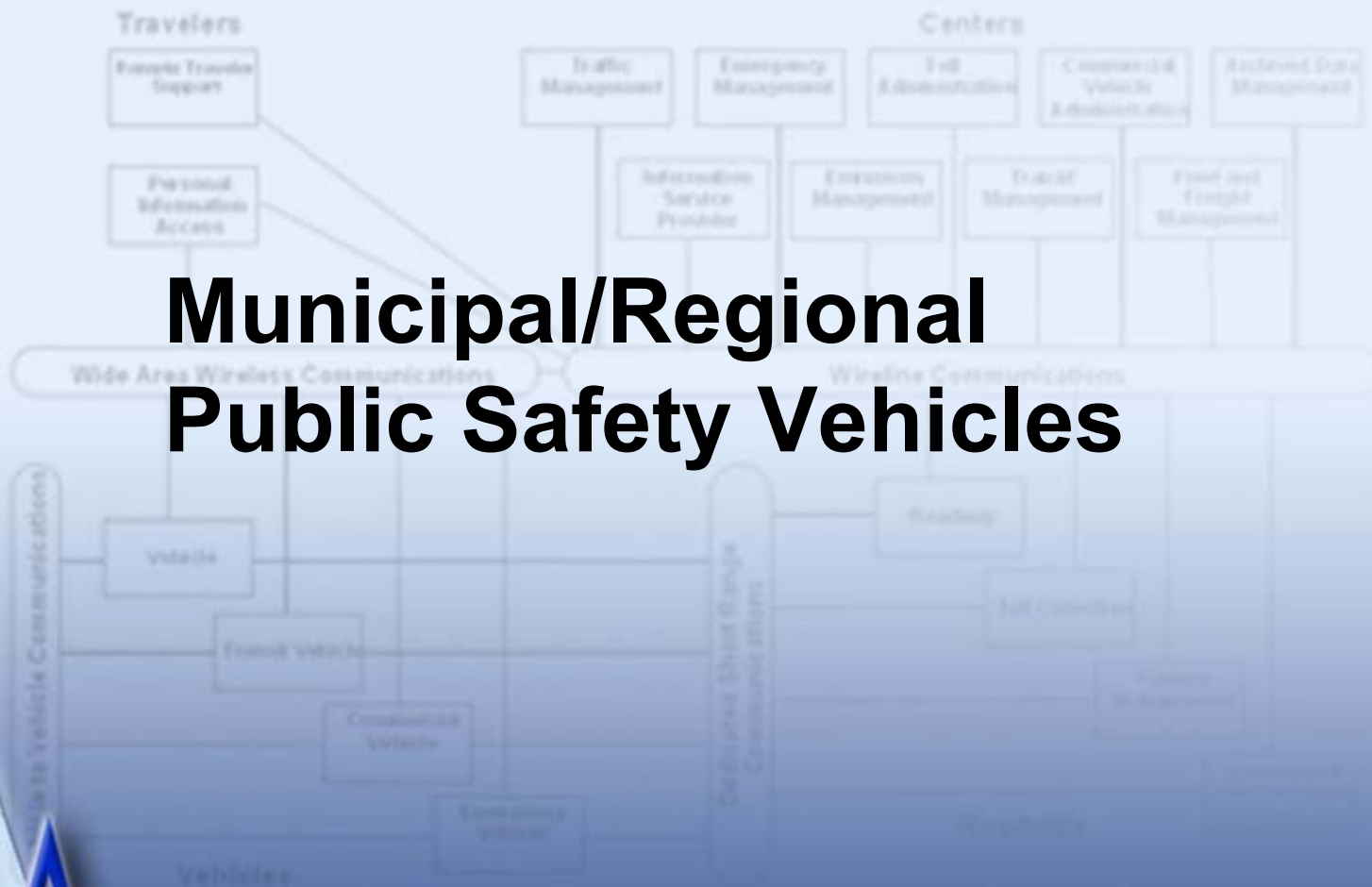


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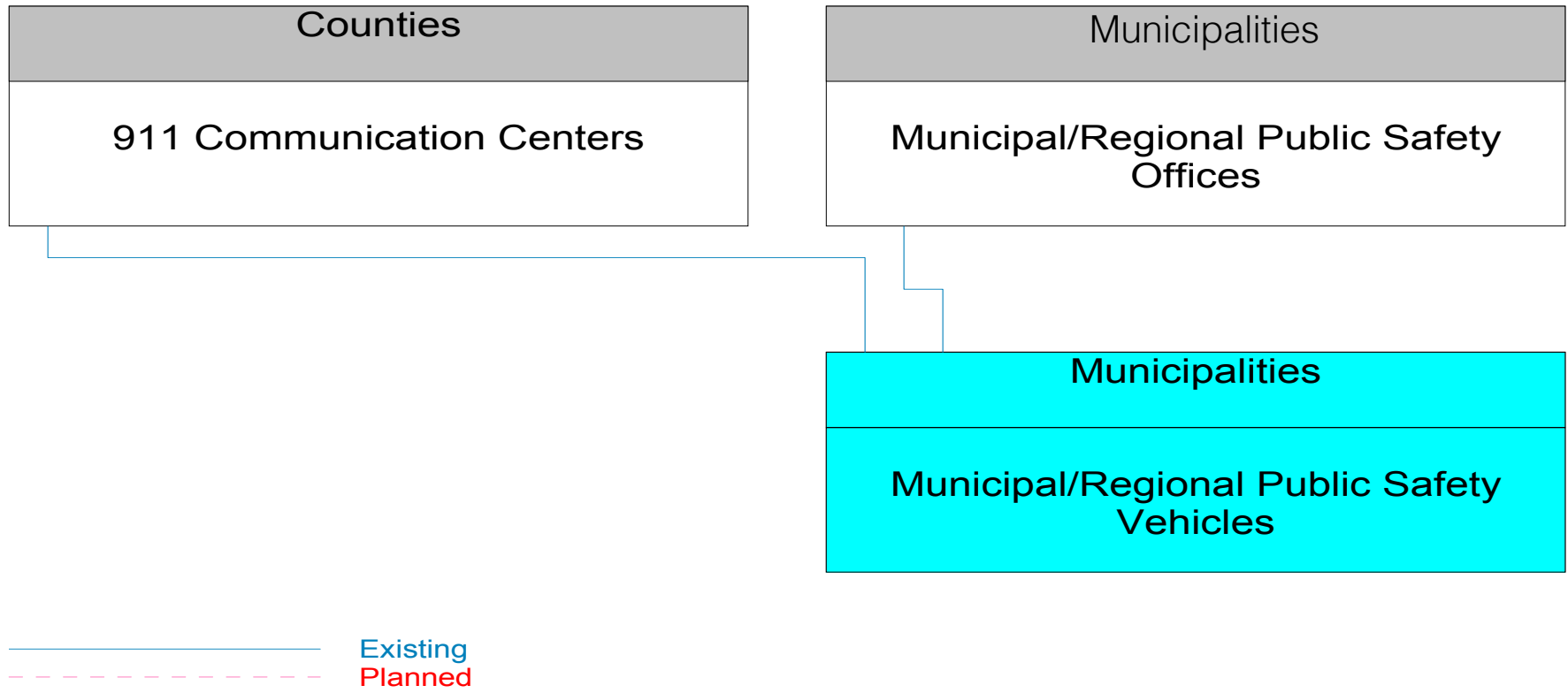


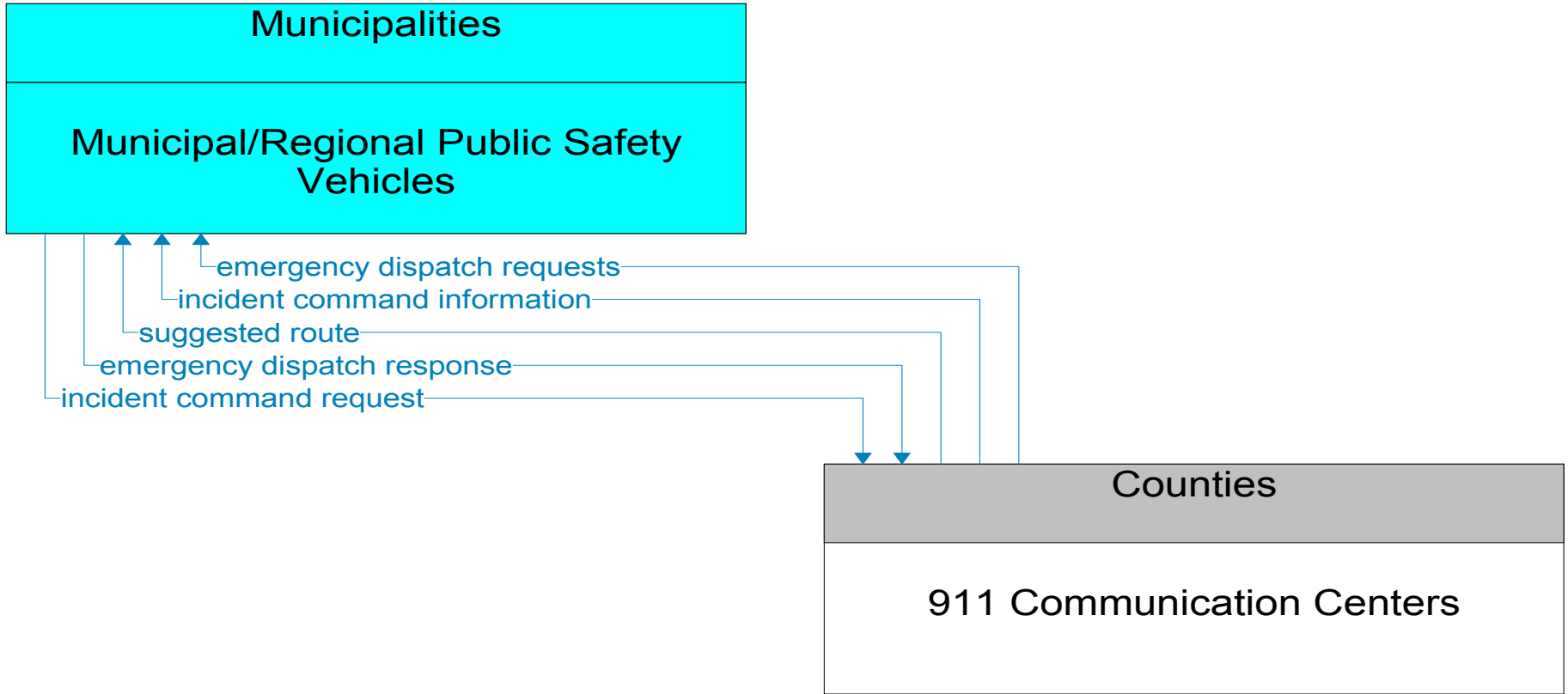
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- - - - - Planned

Municipal/Regional Public Safety Vehicles

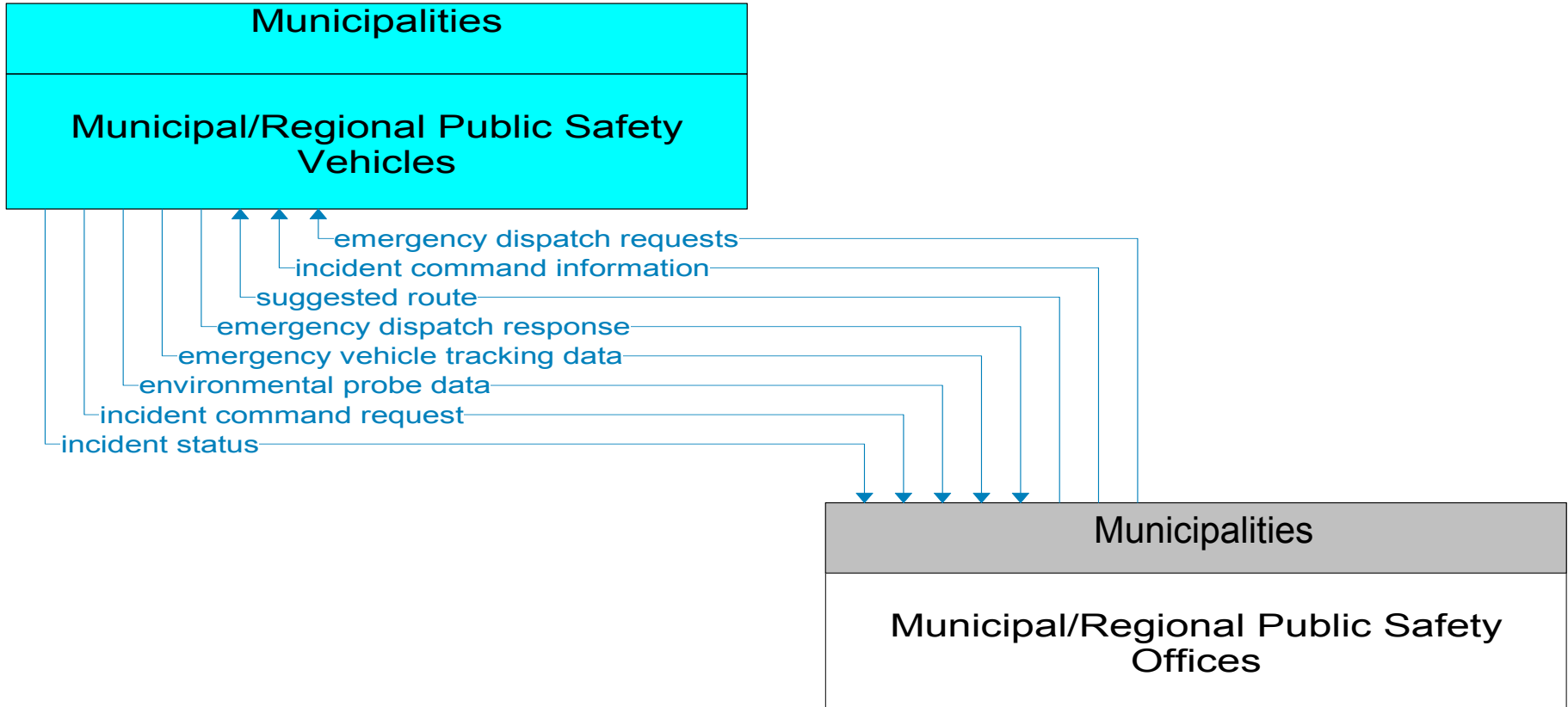


Municipal/Regional Public Safety Vehicles Interconnect Diagram



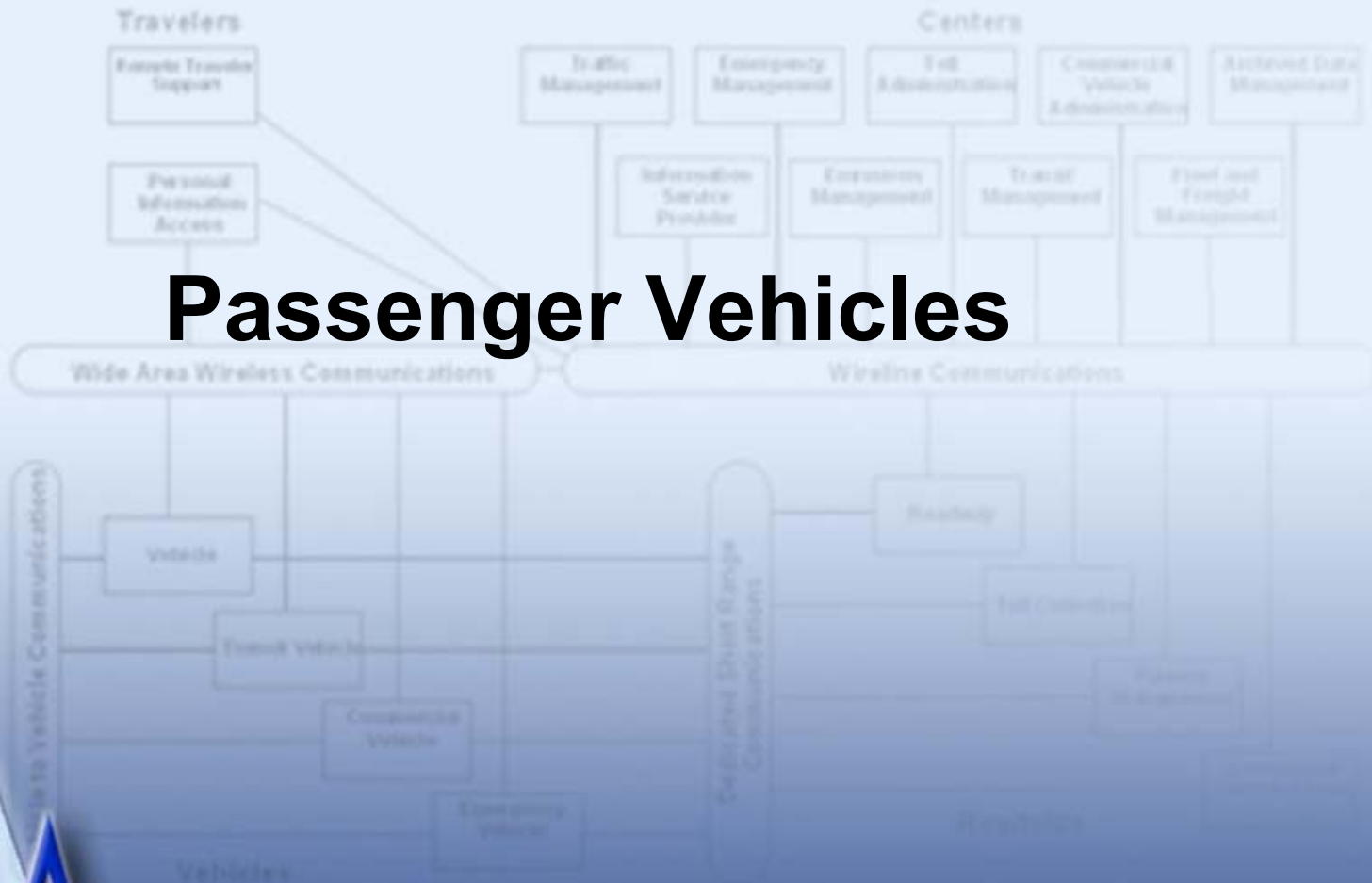


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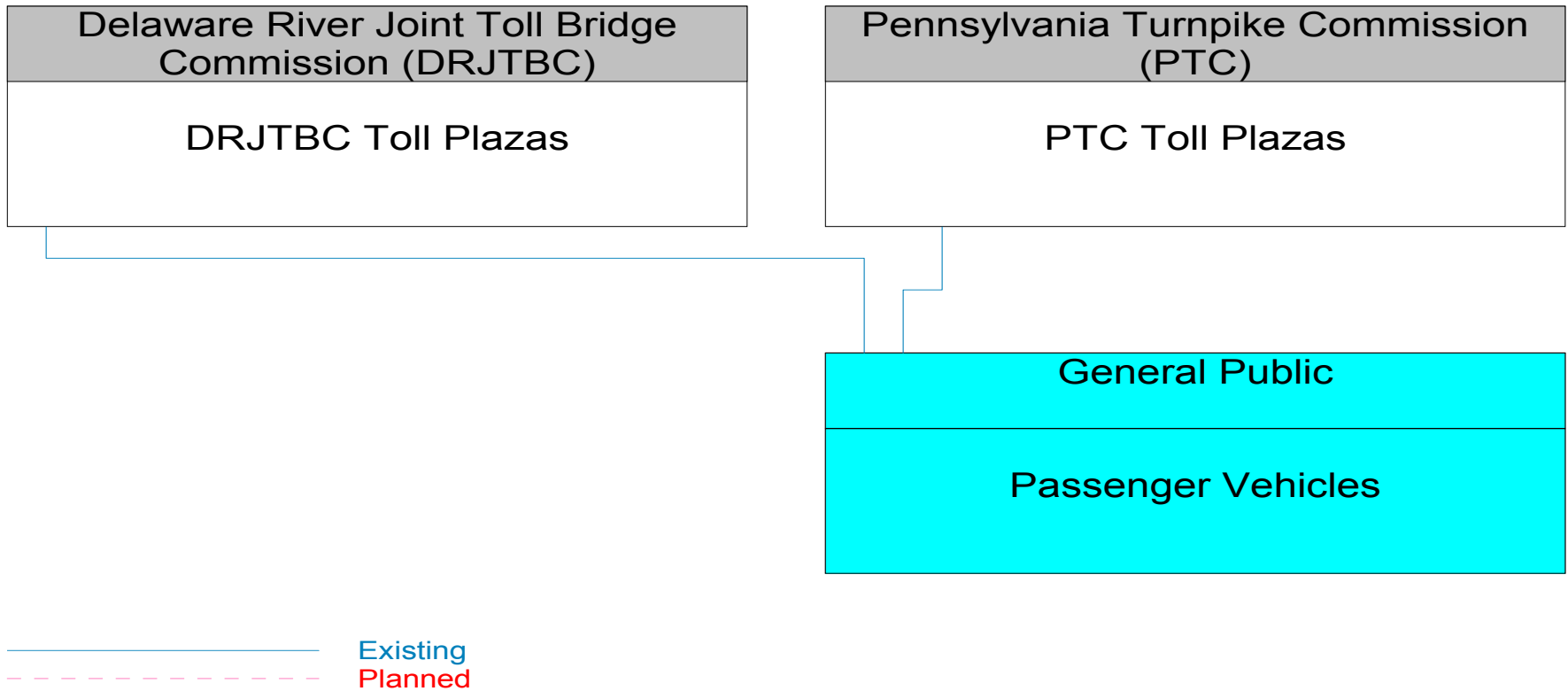
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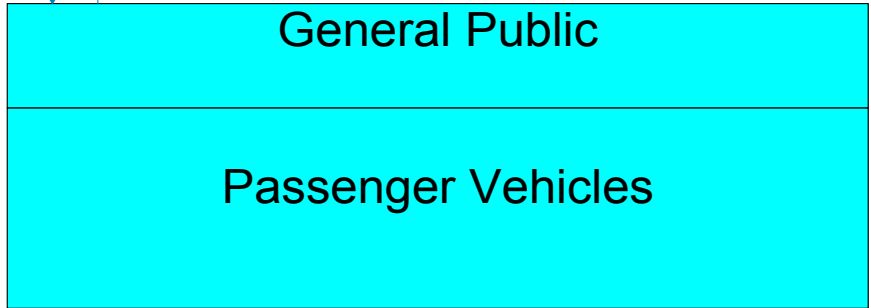
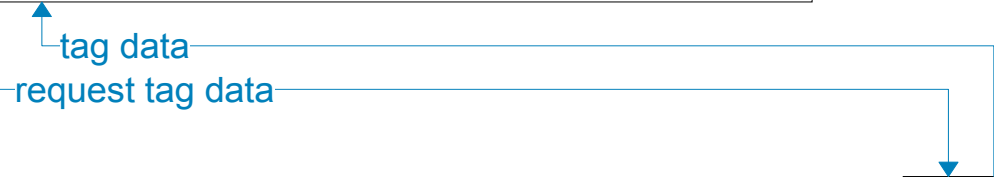
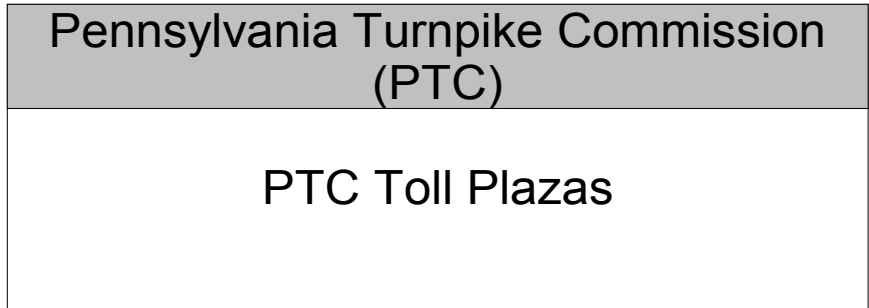
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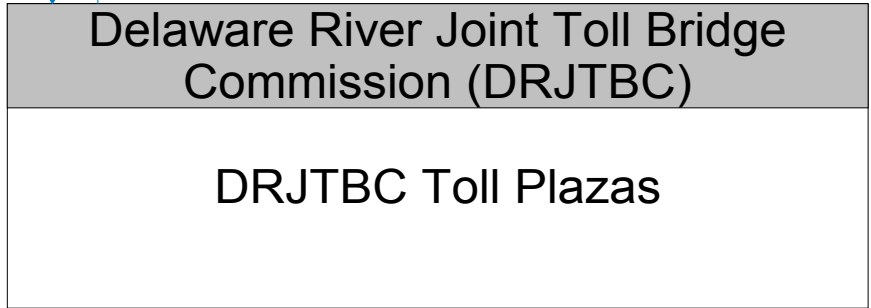
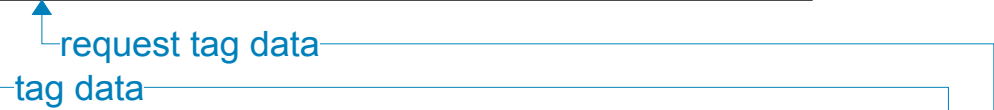
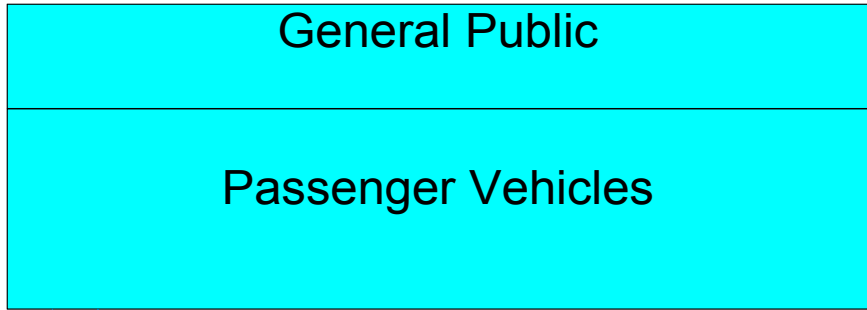
PA

Passenger Vehicles Interconnect Diagram

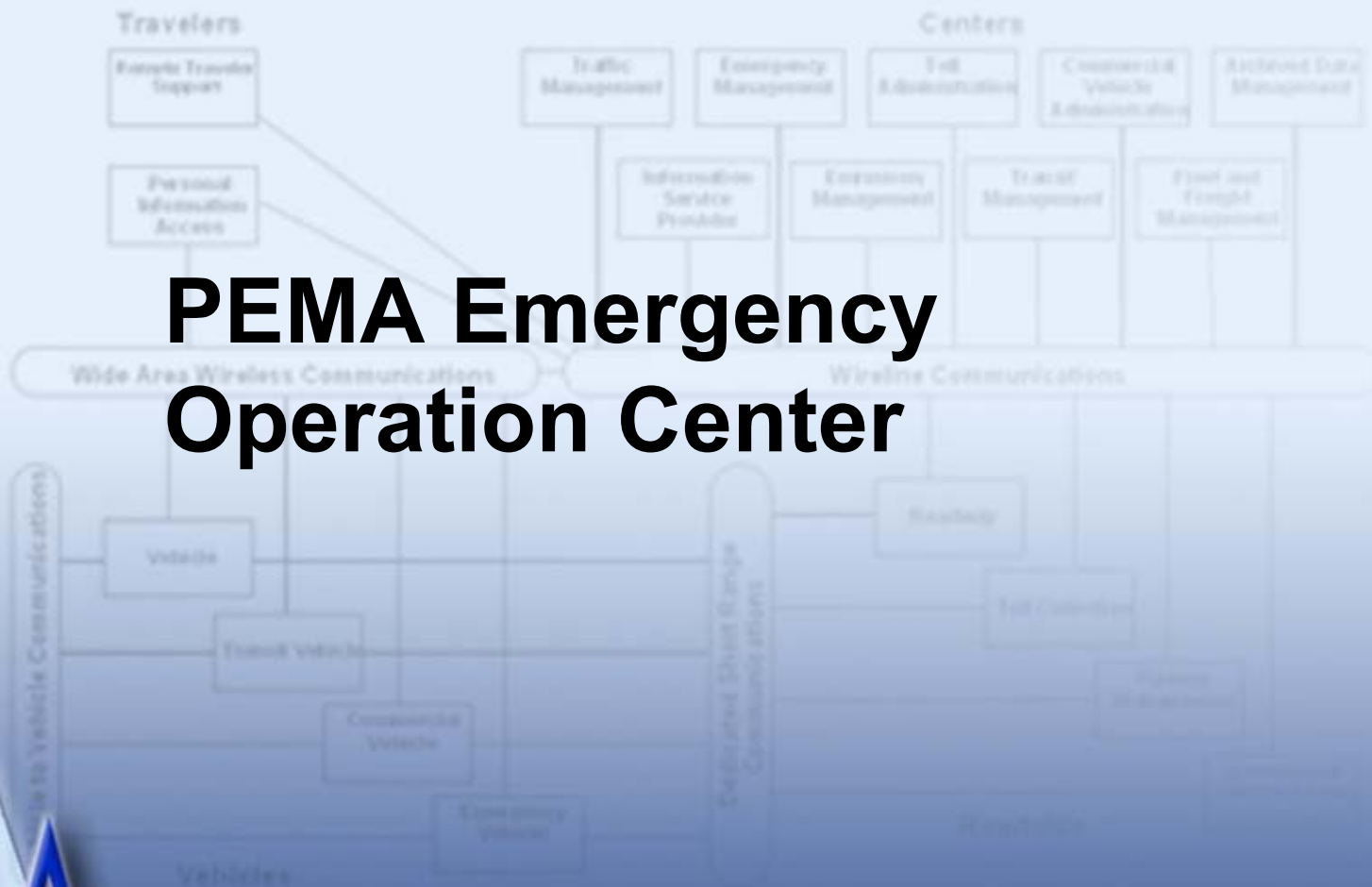




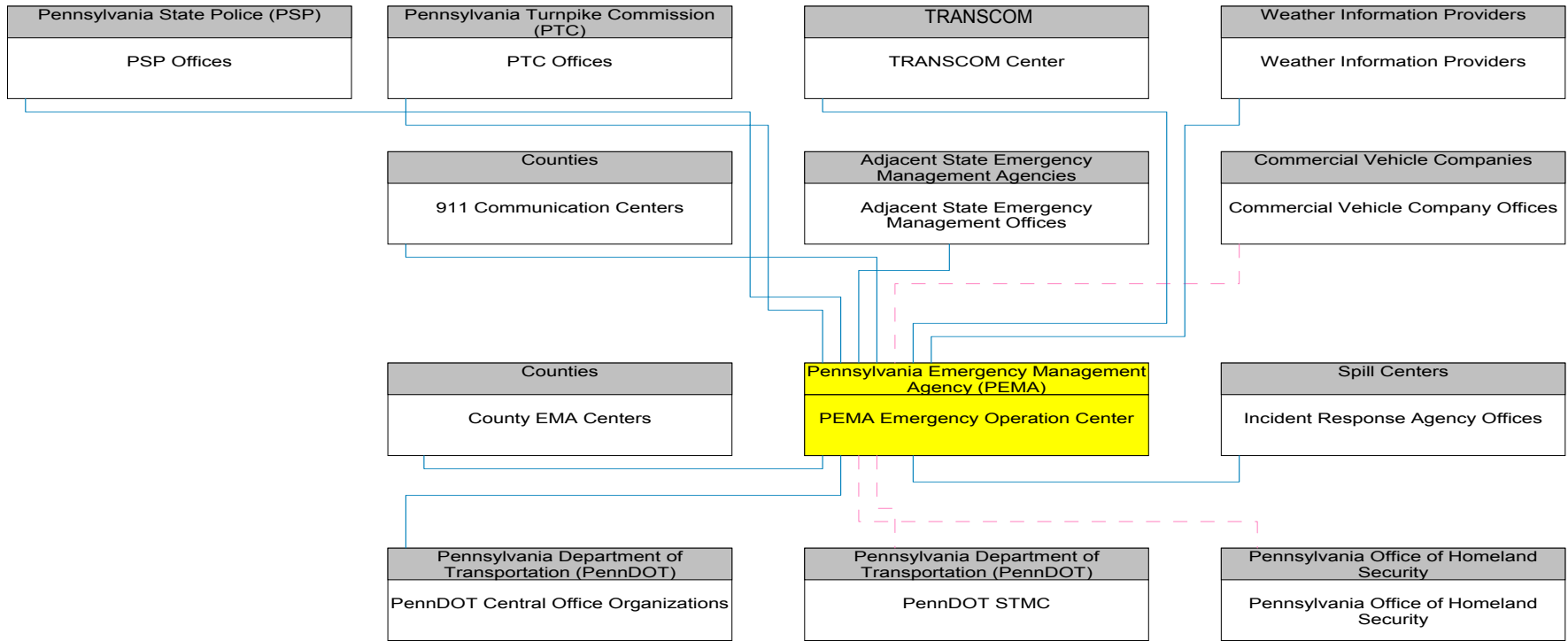
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- - - Planned



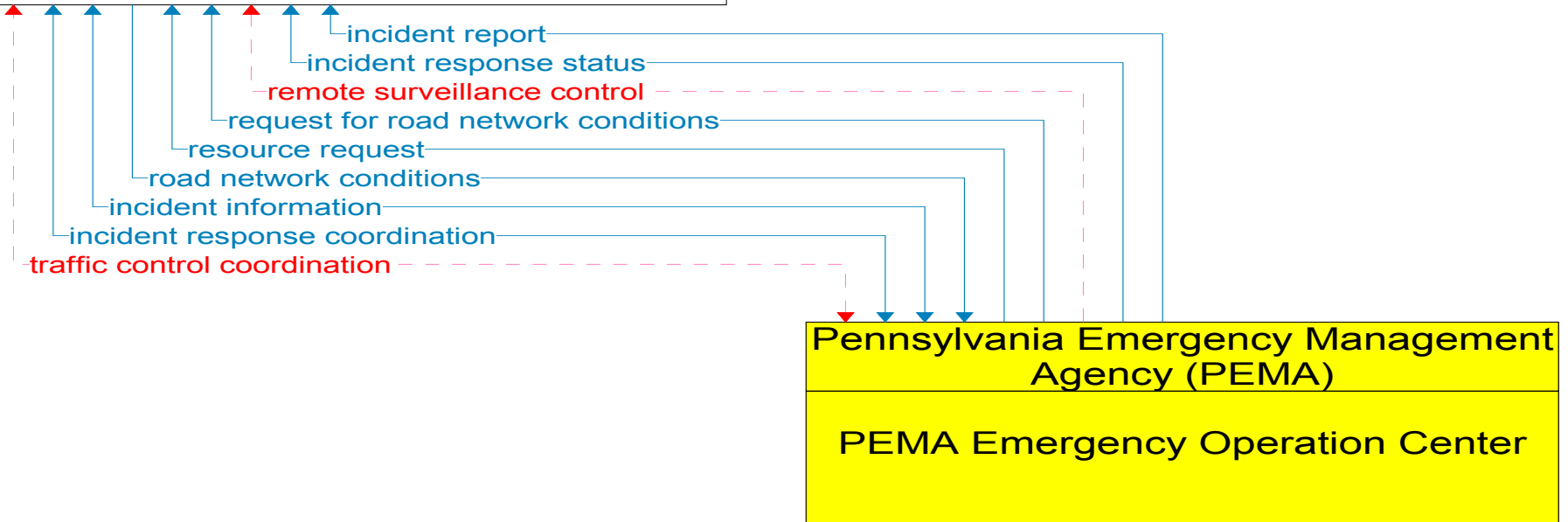
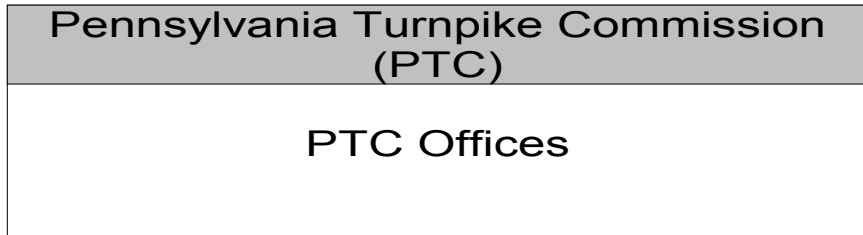
PEMA Emergency Operation Center



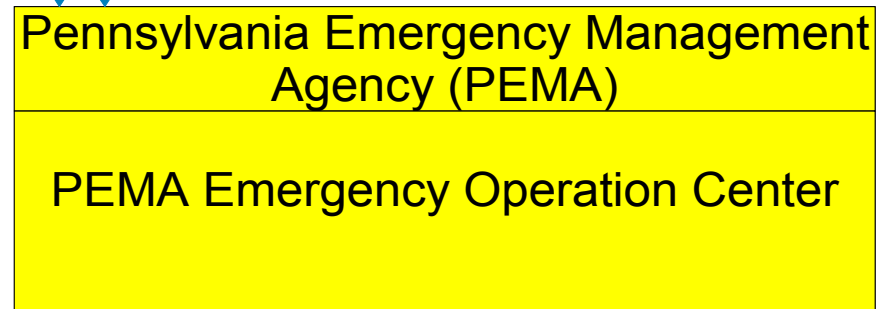
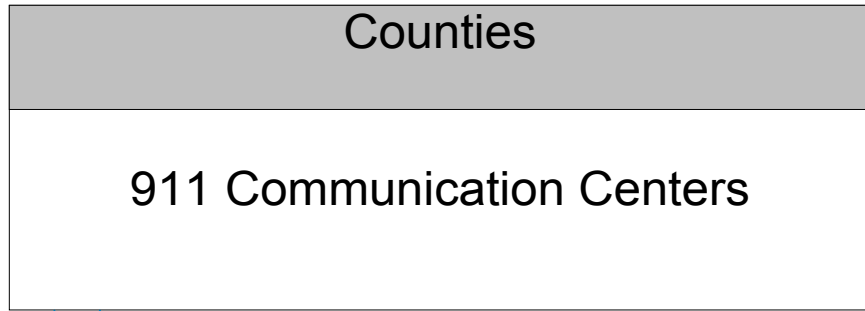
PEMA Emergency Operation Center Interconnect Diagram



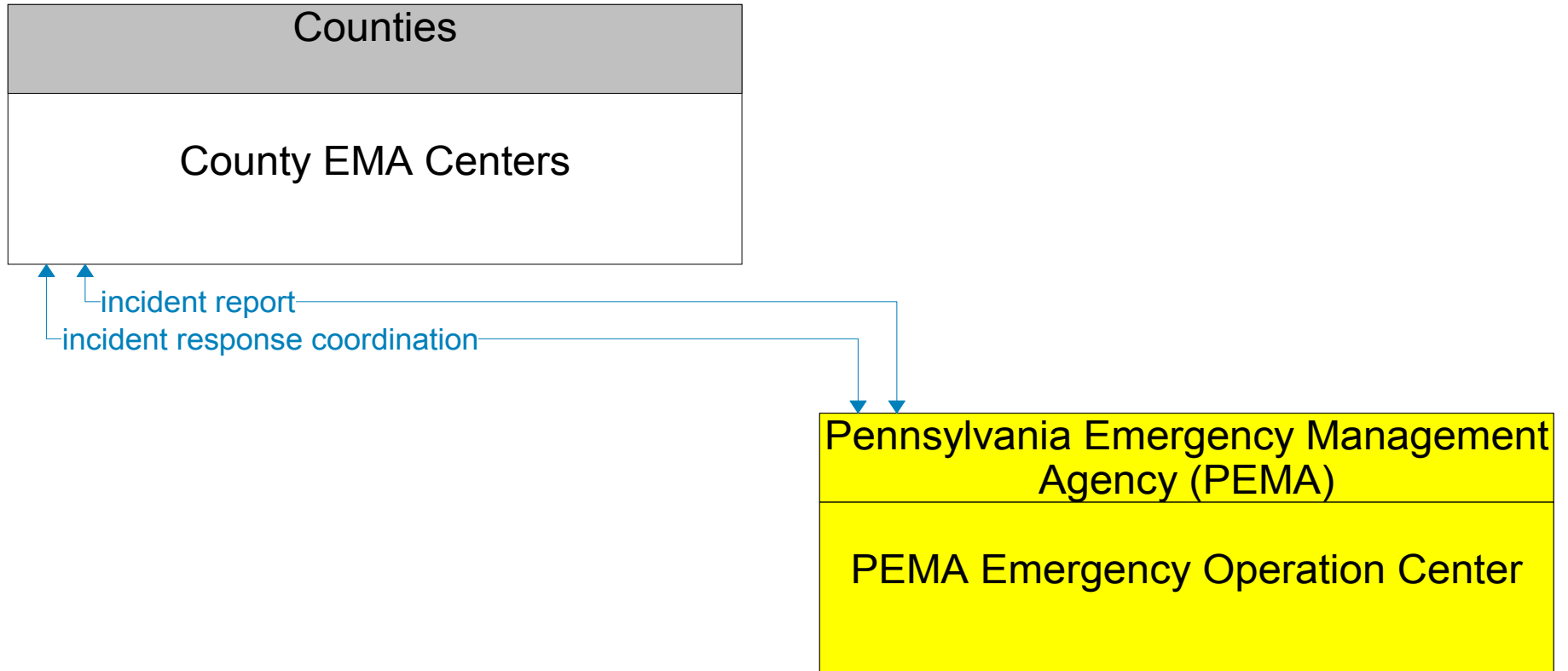
— Existing
- - - Planned



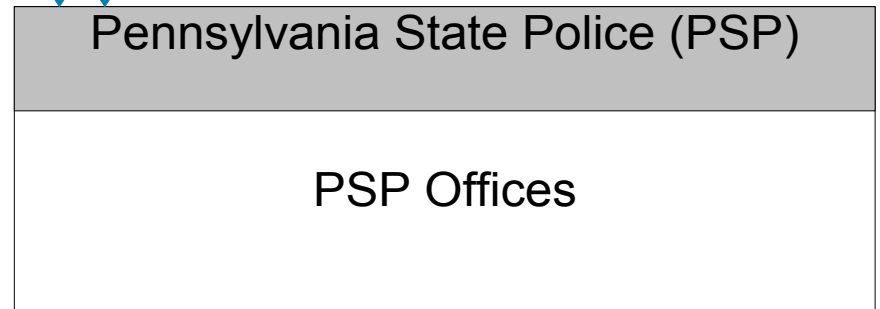
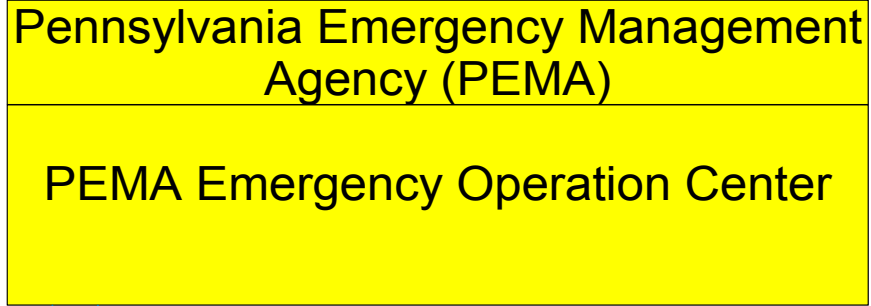
Existing
Planned



— Existing
- - - Planned



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———— Existing
----- Planned

Pennsylvania Emergency Management Agency (PEMA)

PEMA Emergency Operation Center

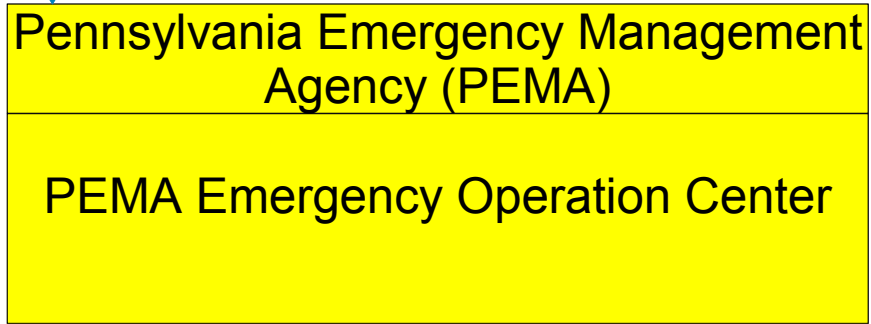
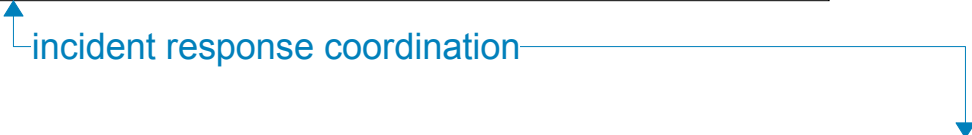
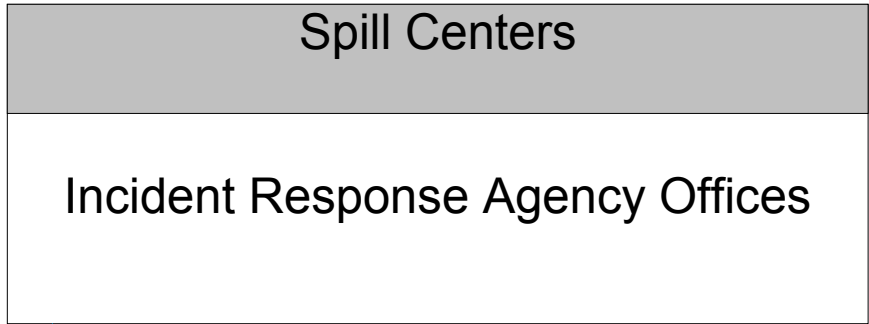


hazmat information

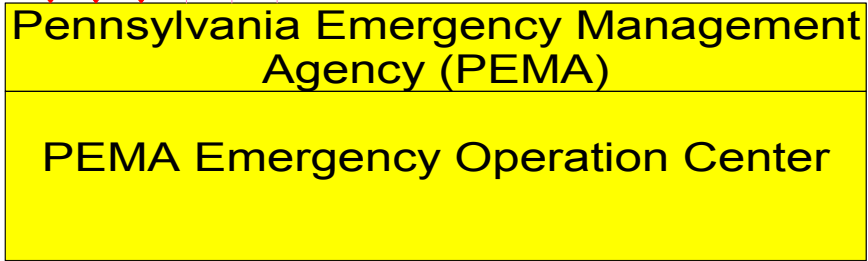
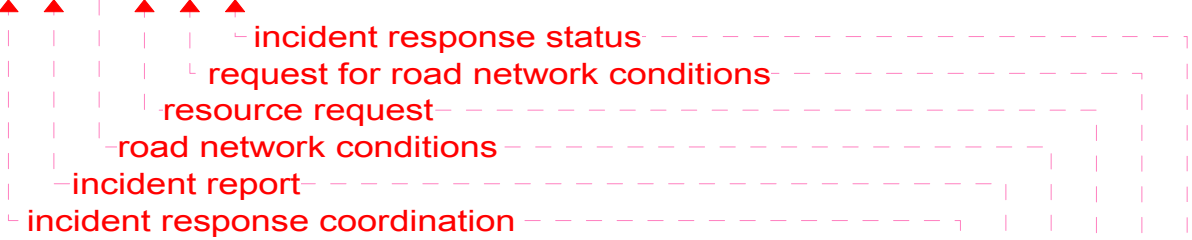
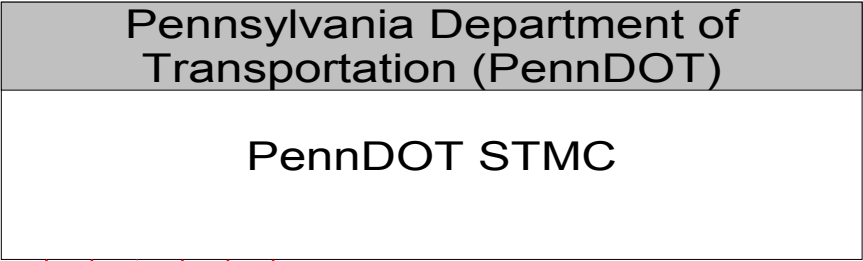
Commercial Vehicle Companies

Commercial Vehicle Company Offices

Existing
Planned



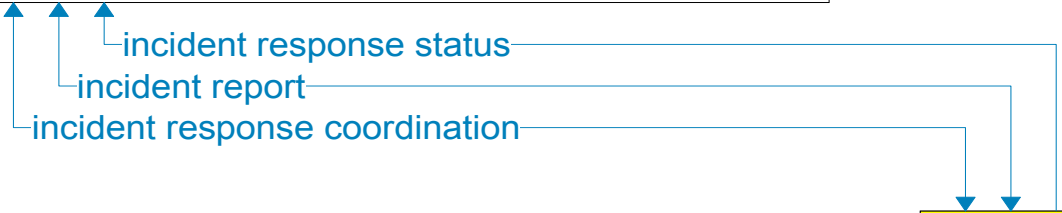
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———— Existing
- - - - - Planned

Pennsylvania Department of
Transportation (PennDOT)

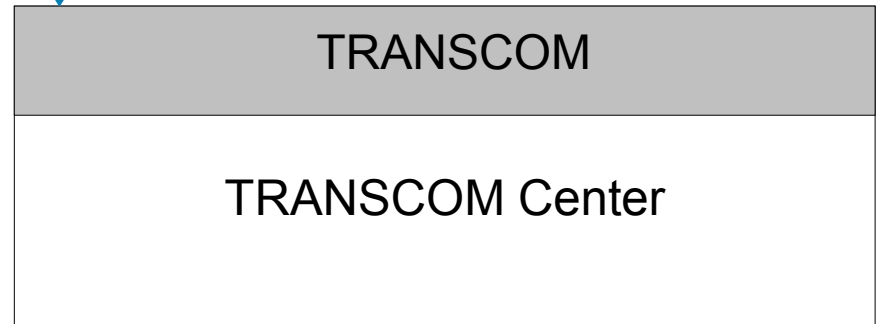
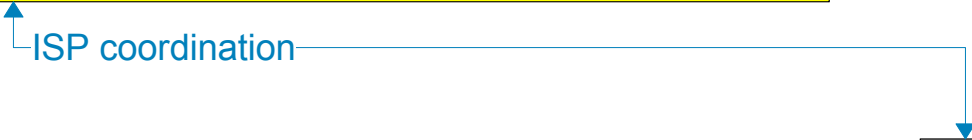
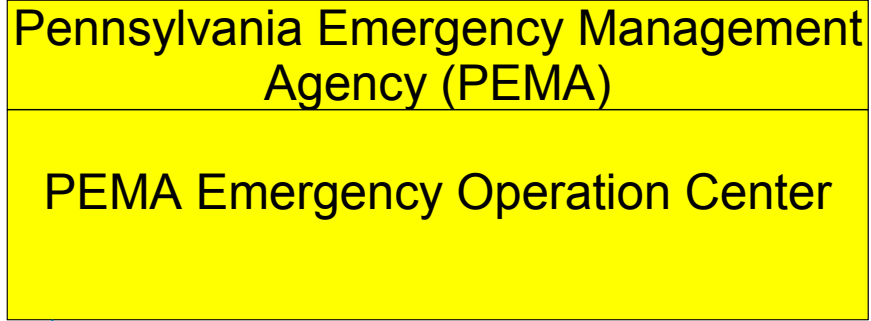
PennDOT Central Office Organizations



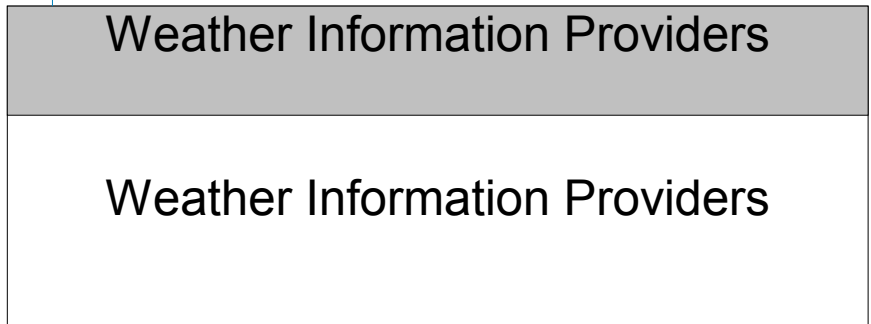
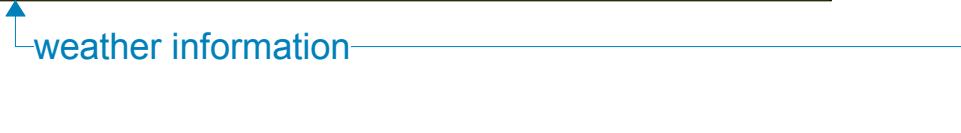
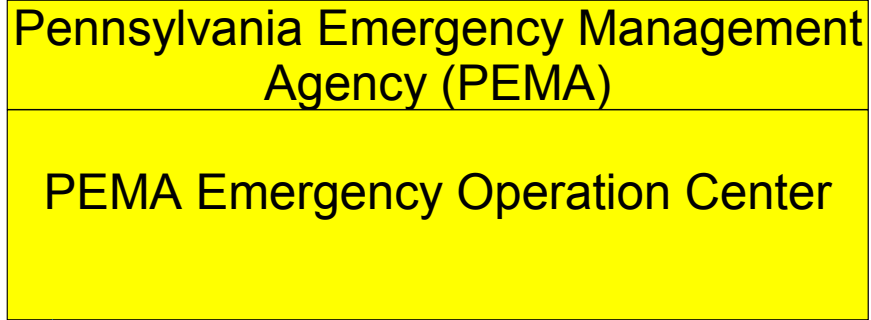
Pennsylvania Emergency Management
Agency (PEMA)

PEMA Emergency Operation Center

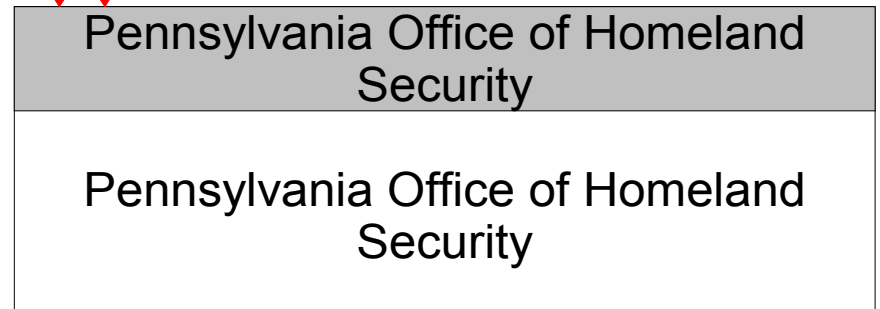
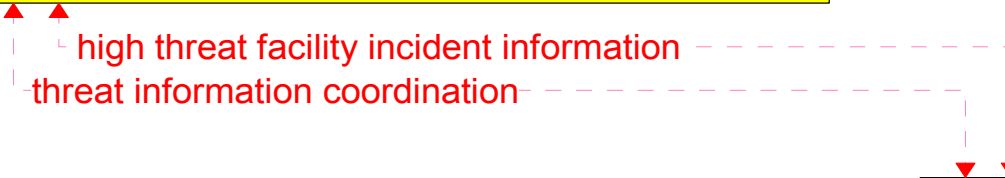
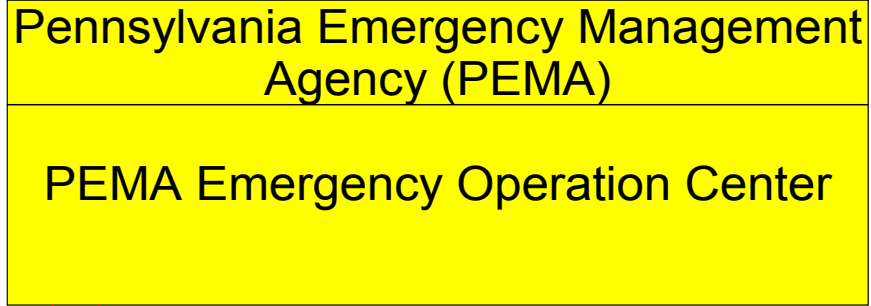
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- - - - - Planned



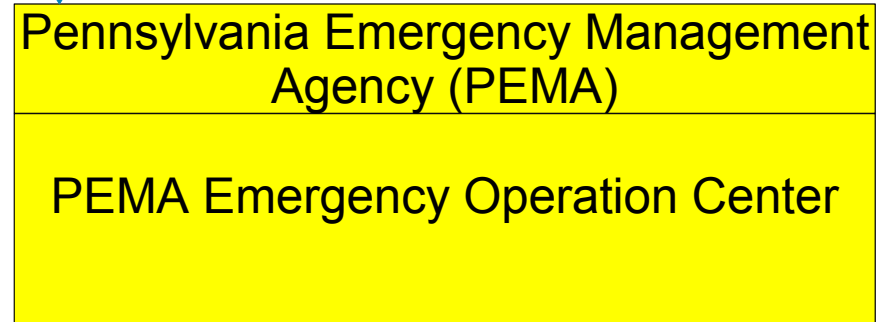
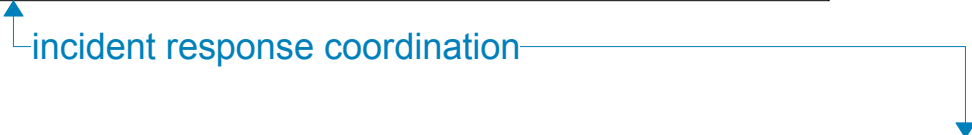
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- - - - - Planned



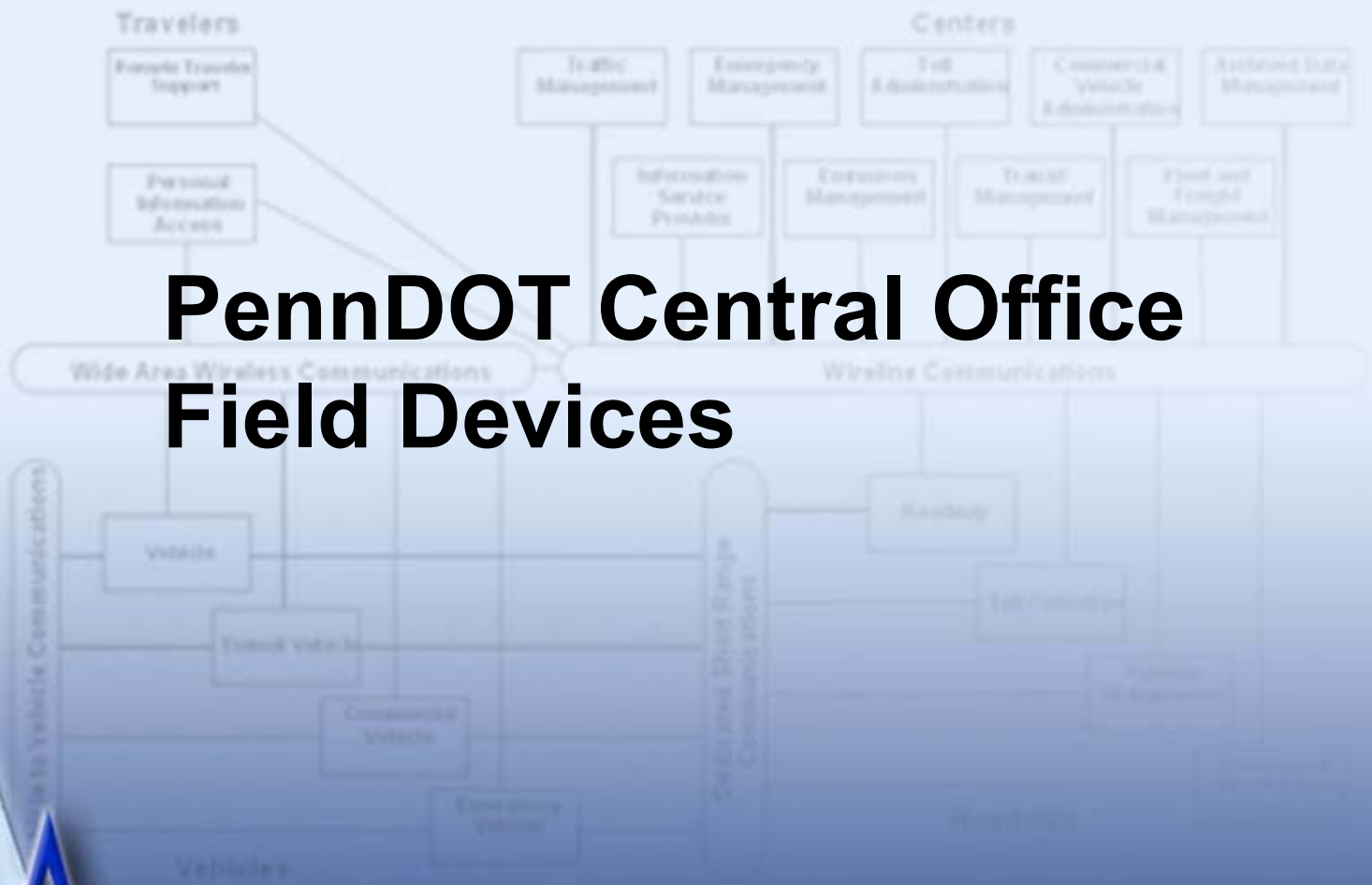
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- - - - - Planned



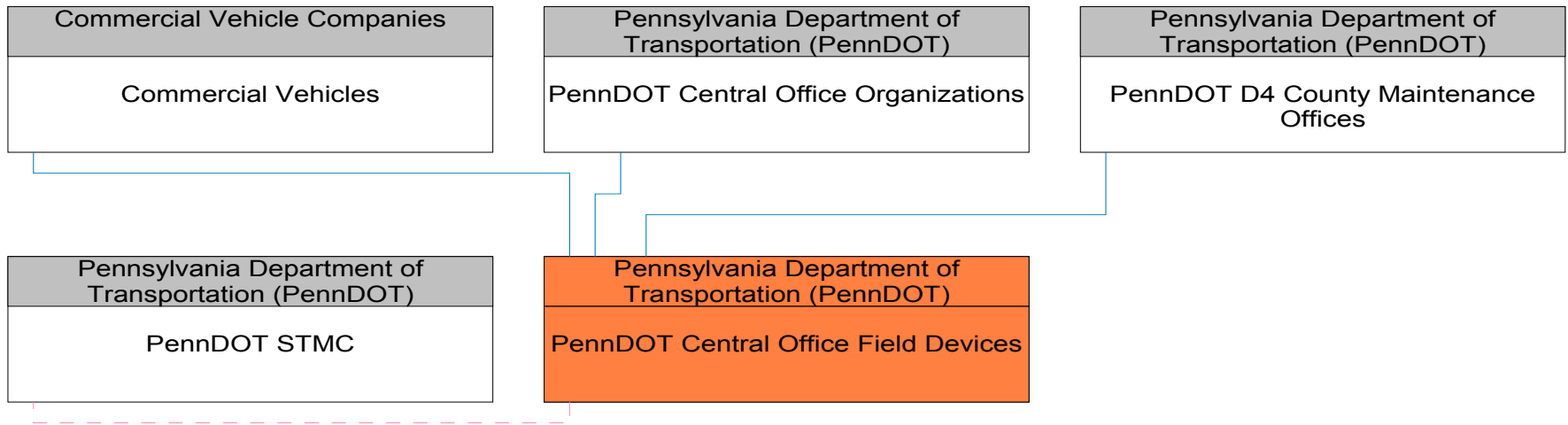
———— Existing
- - - - - Planned



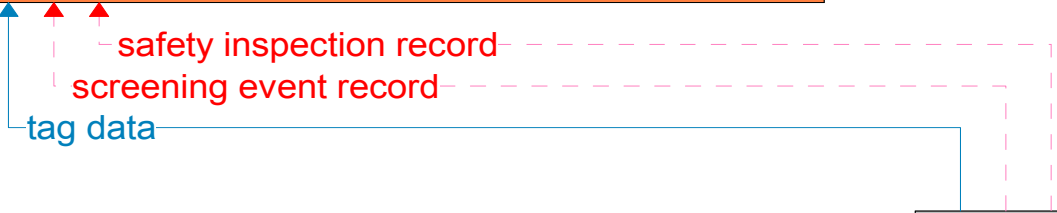
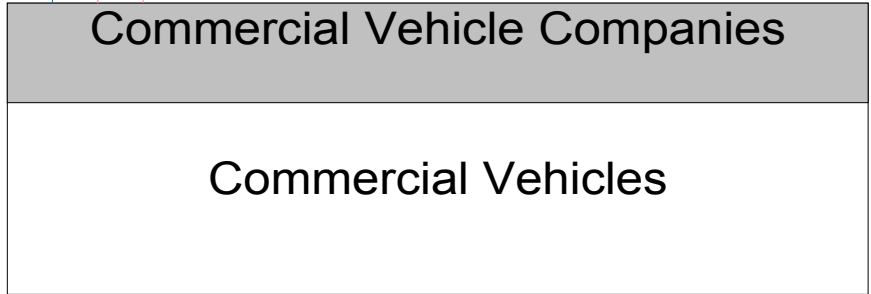
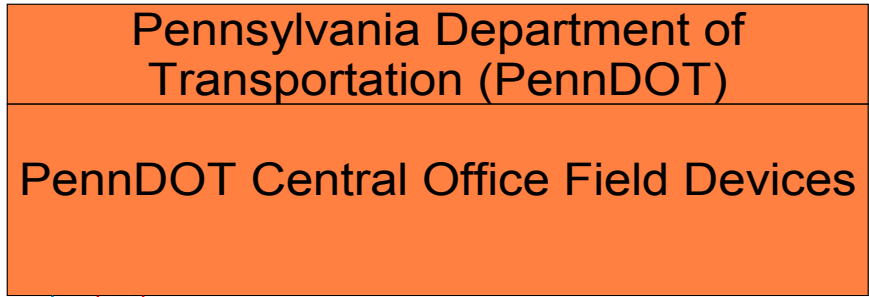
PennDOT Central Office Field Devices



PennDOT Central Office Field Devices Interconnect Diagram



— 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 -

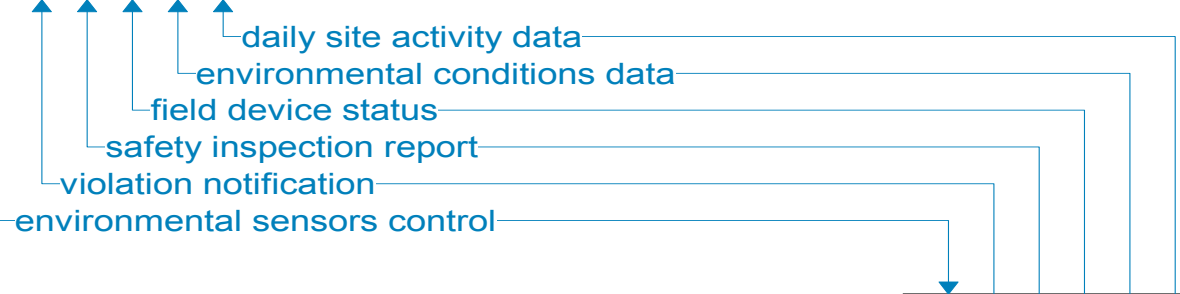
Pennsylvania Department of
Transportation (PennDOT)

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

Pennsylvania Department of
Transportation (PennDOT)

PennDOT D4 County Maintenance
Offices

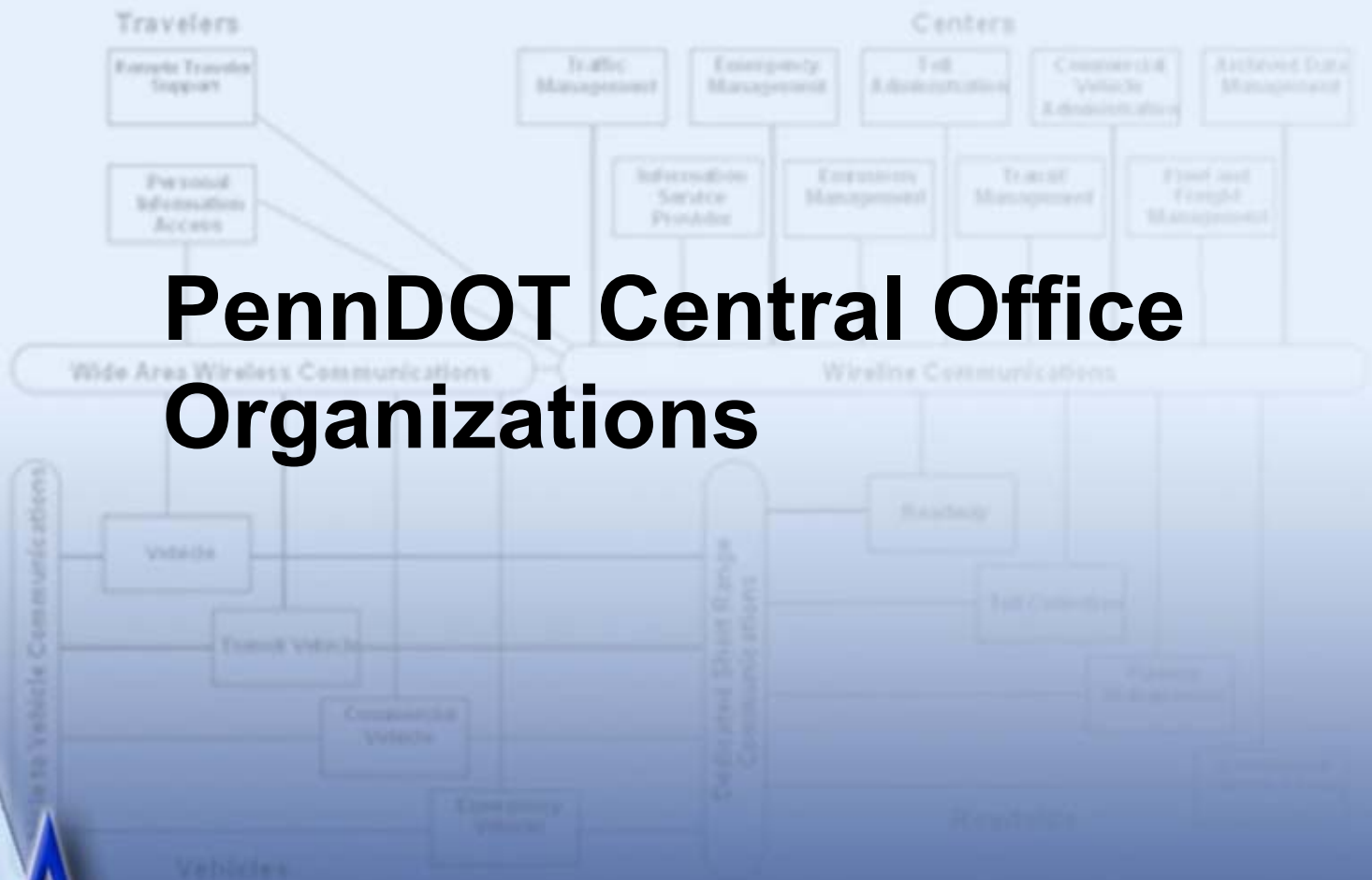


Pennsylvania Department of
Transportation (PennDOT)

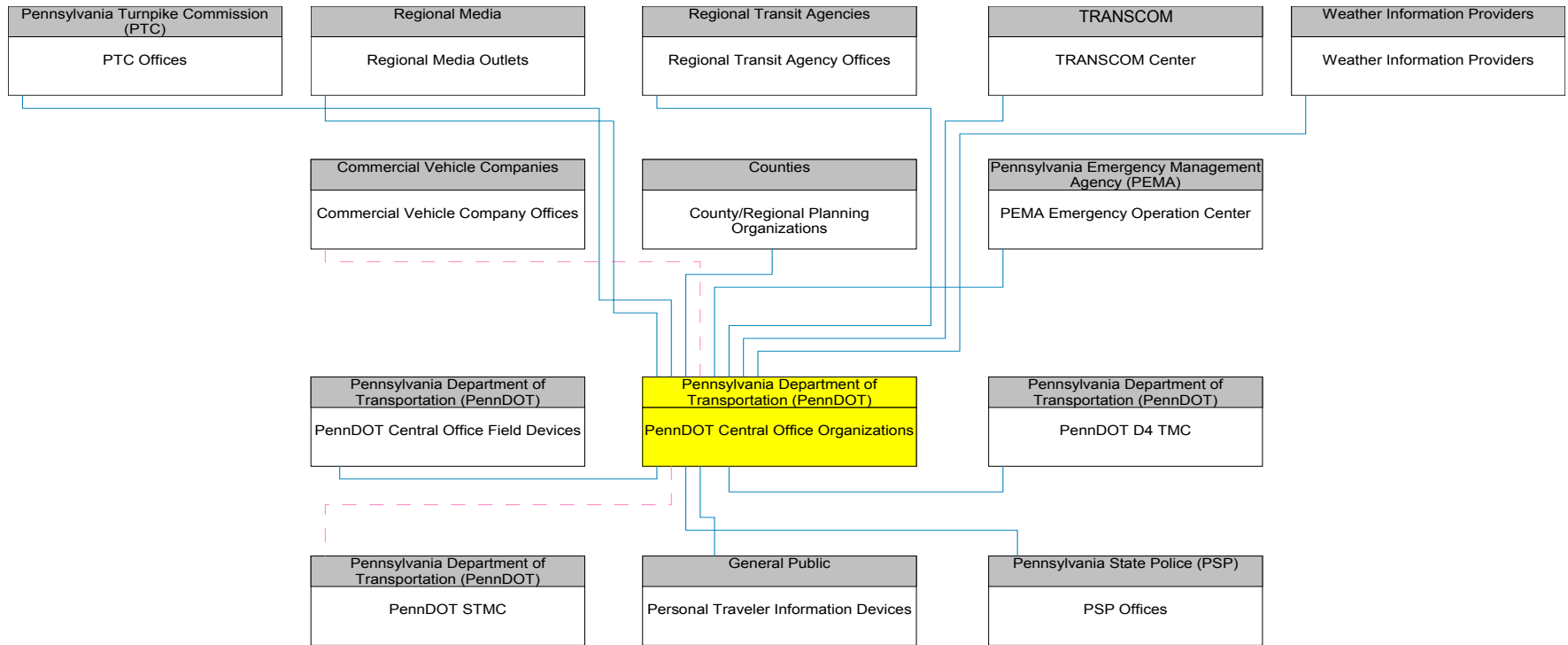
PennDOT Central Office Field Devices

———— Existing
- - - - - Planned

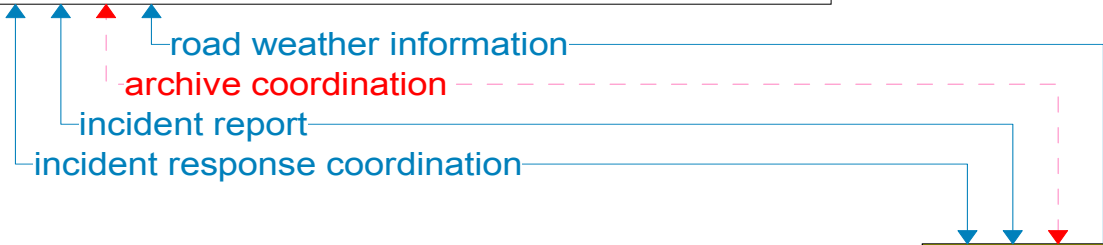
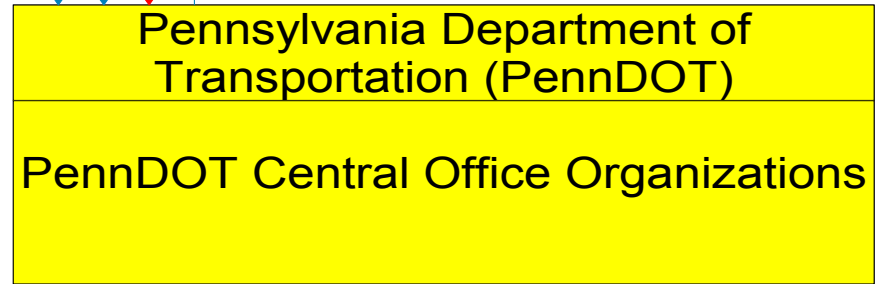
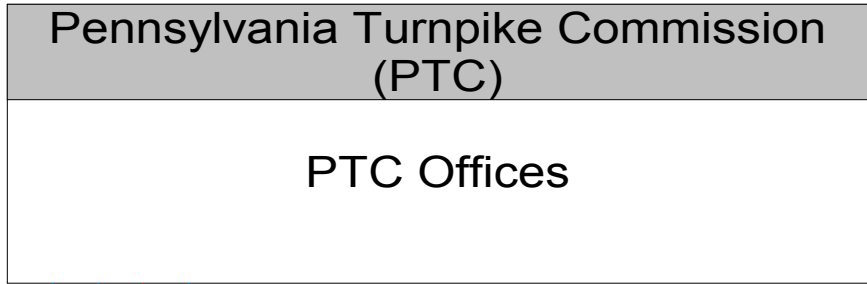
PennDOT Central Office Organizations



PennDOT Central Office Organizations Interconnect Diagram



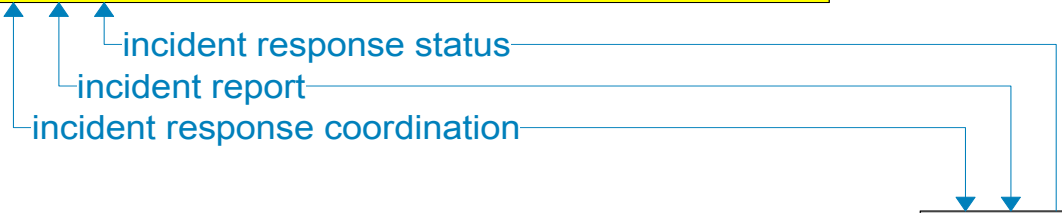
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- - - Planned



Existing
Planned

Pennsylvania Department of
Transportation (PennDOT)

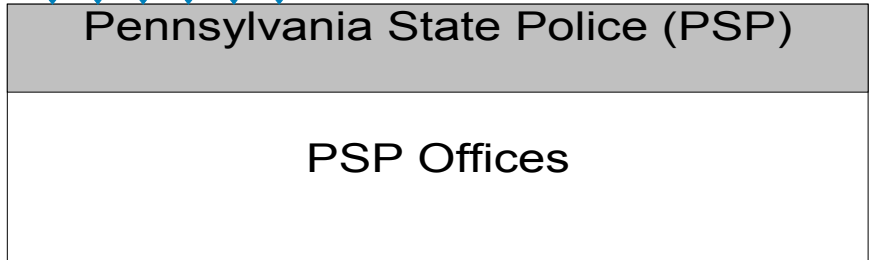
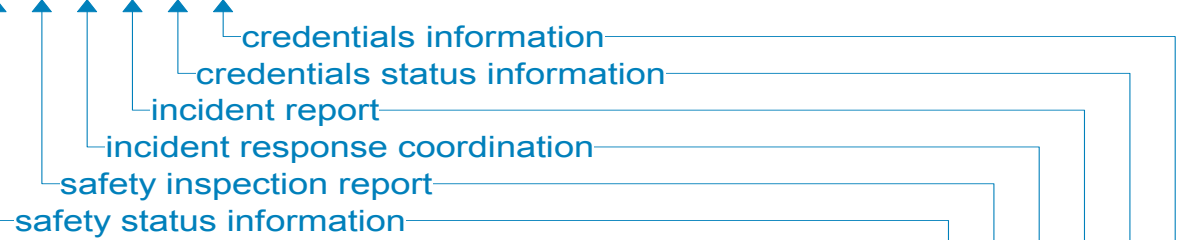
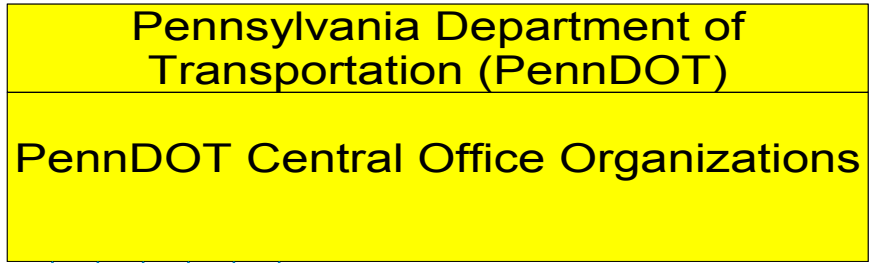
PennDOT Central Office Organizations

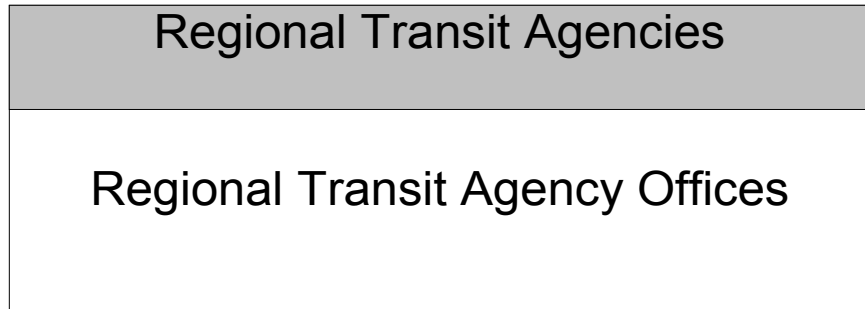


Pennsylvania Emergency Management
Agency (PEMA)

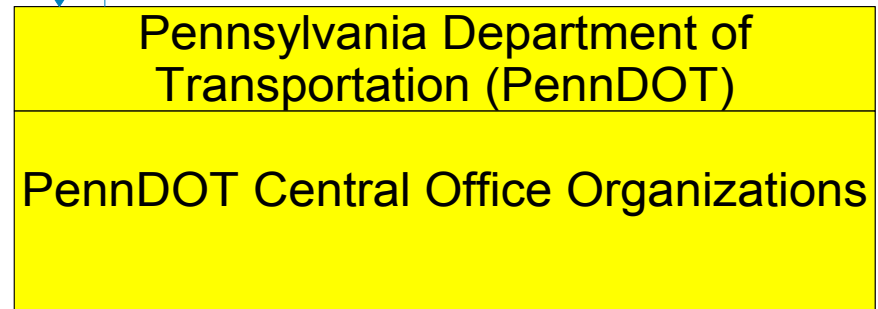
PEMA Emergency Operation Center

———— Existing
- - - - - Planned

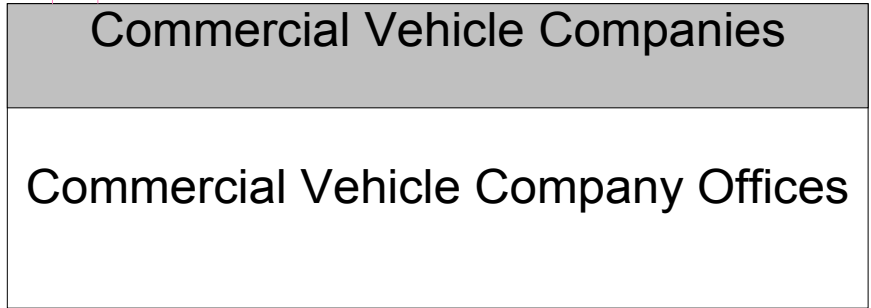
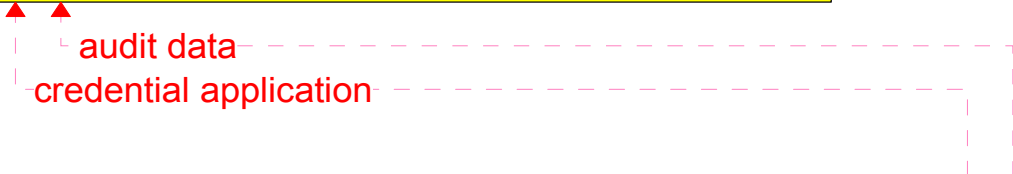
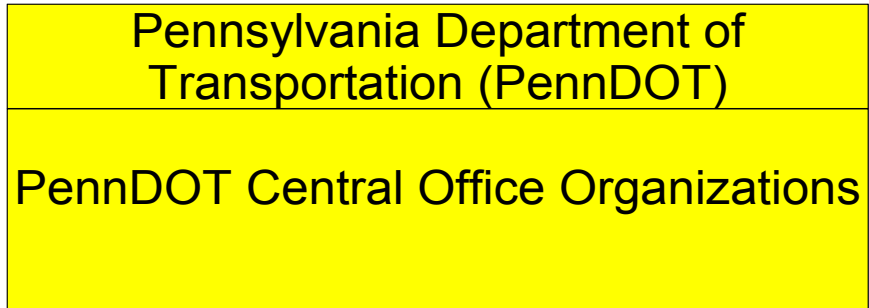




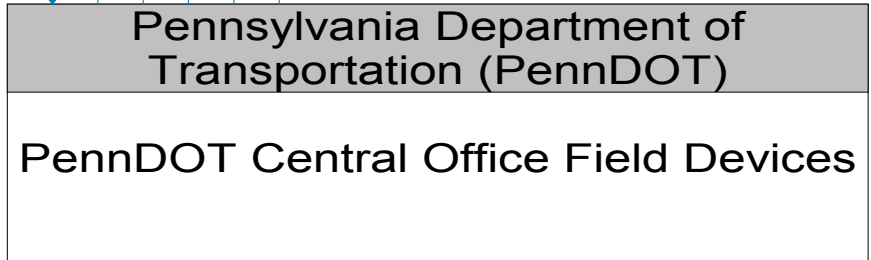
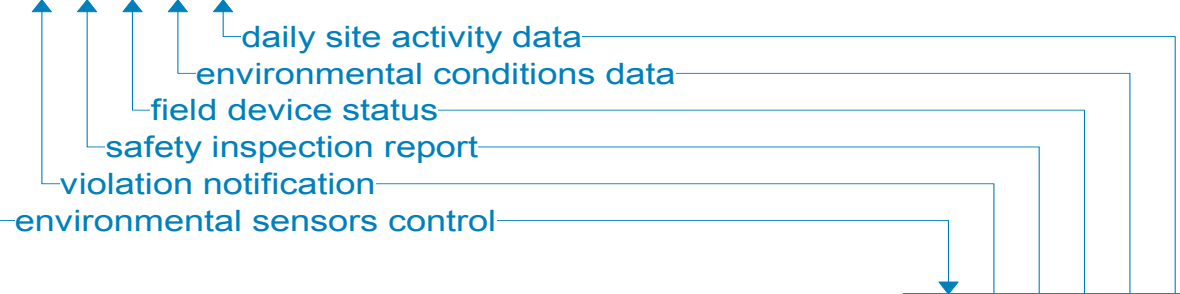
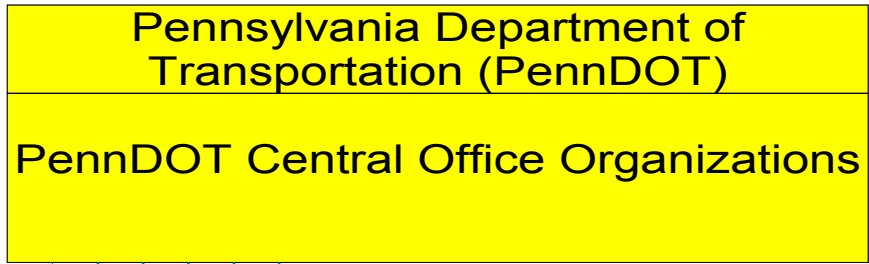
archive requests
transit archive data



———— Existing
----- Planned

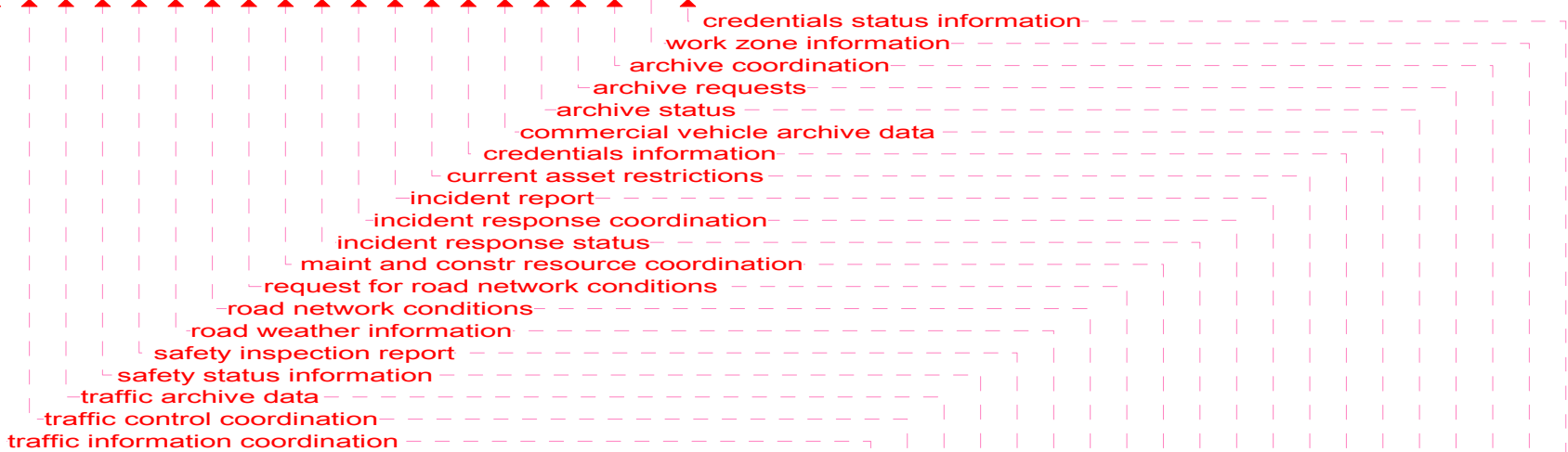


———— Existing
- - - - - Planned



**Pennsylvania Department of Transportation
(PennDOT)**

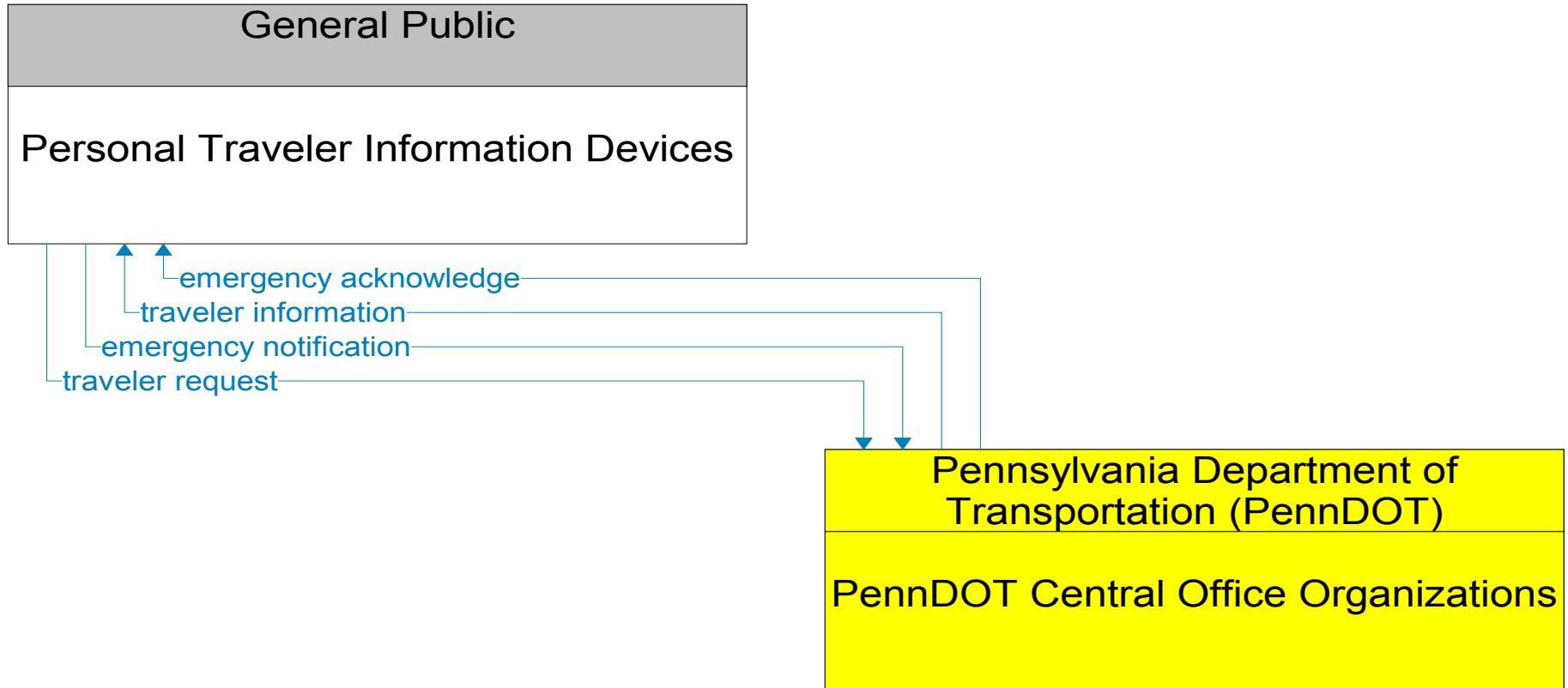
PennDOT STMC



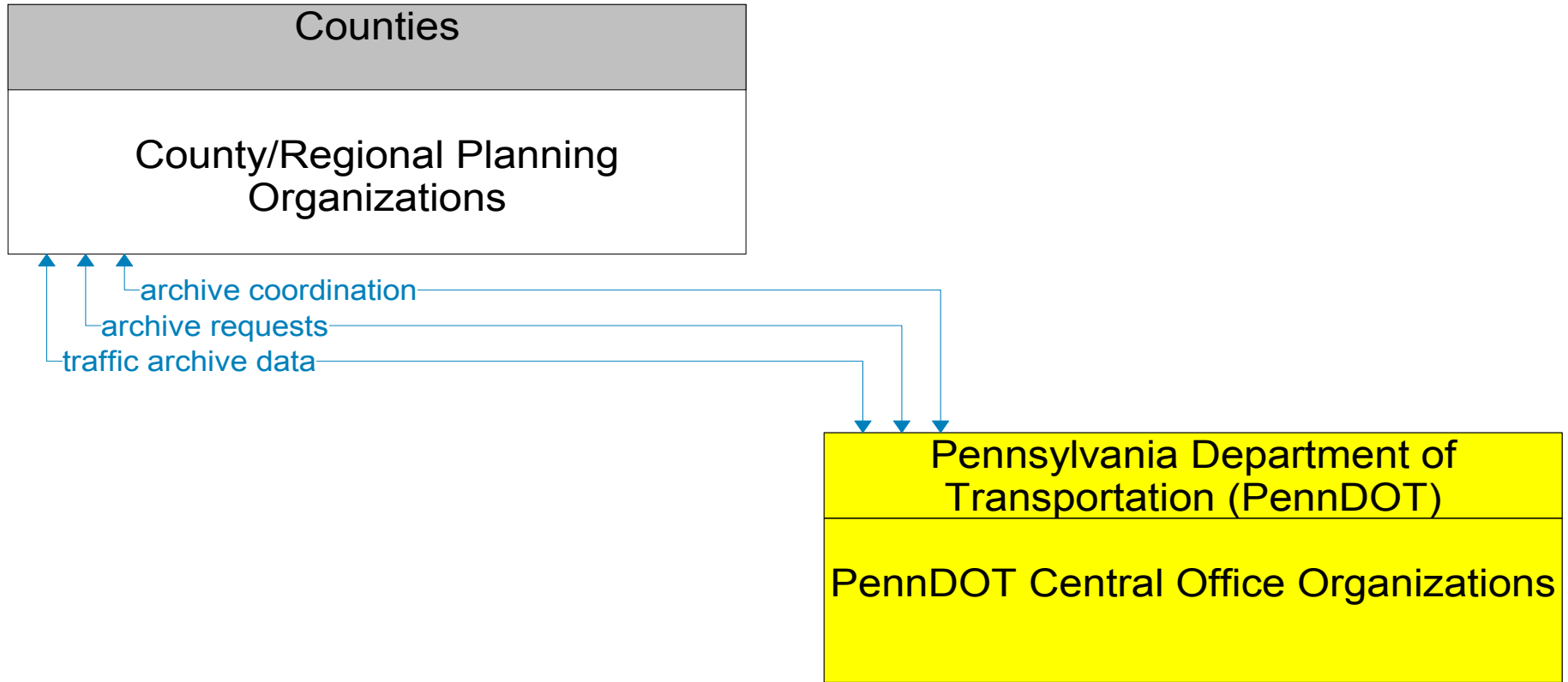
**Pennsylvania Department of Transportation
(PennDOT)**

PennDOT Central Office Organizations

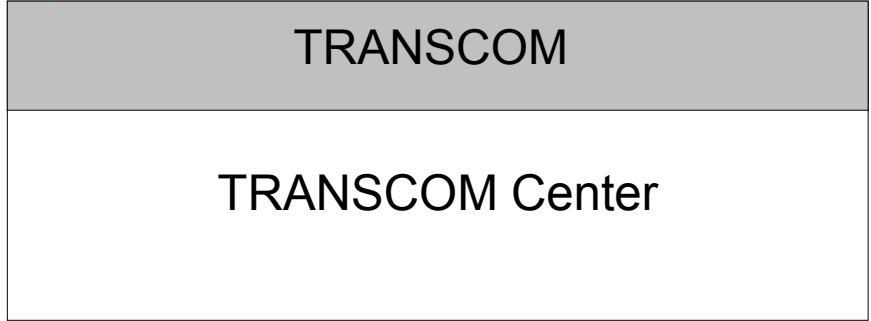
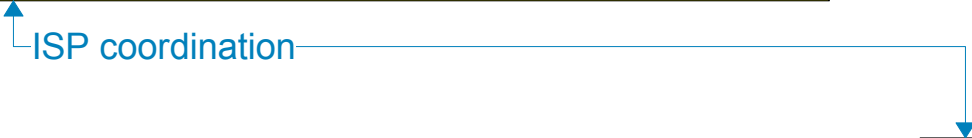
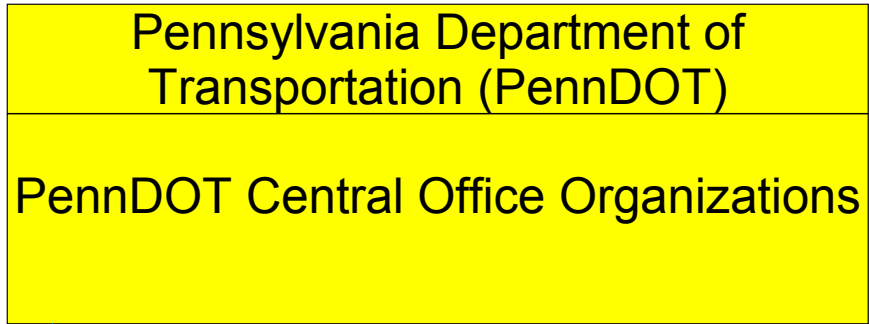
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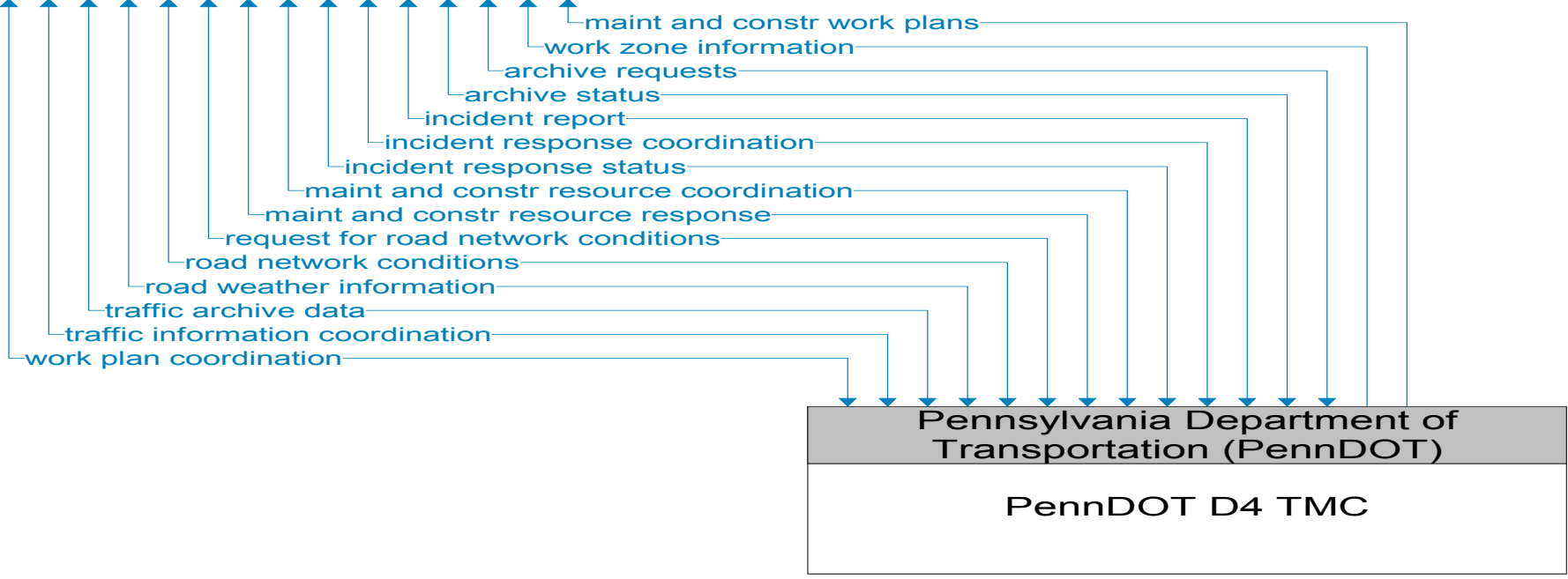


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- - - - - Planned

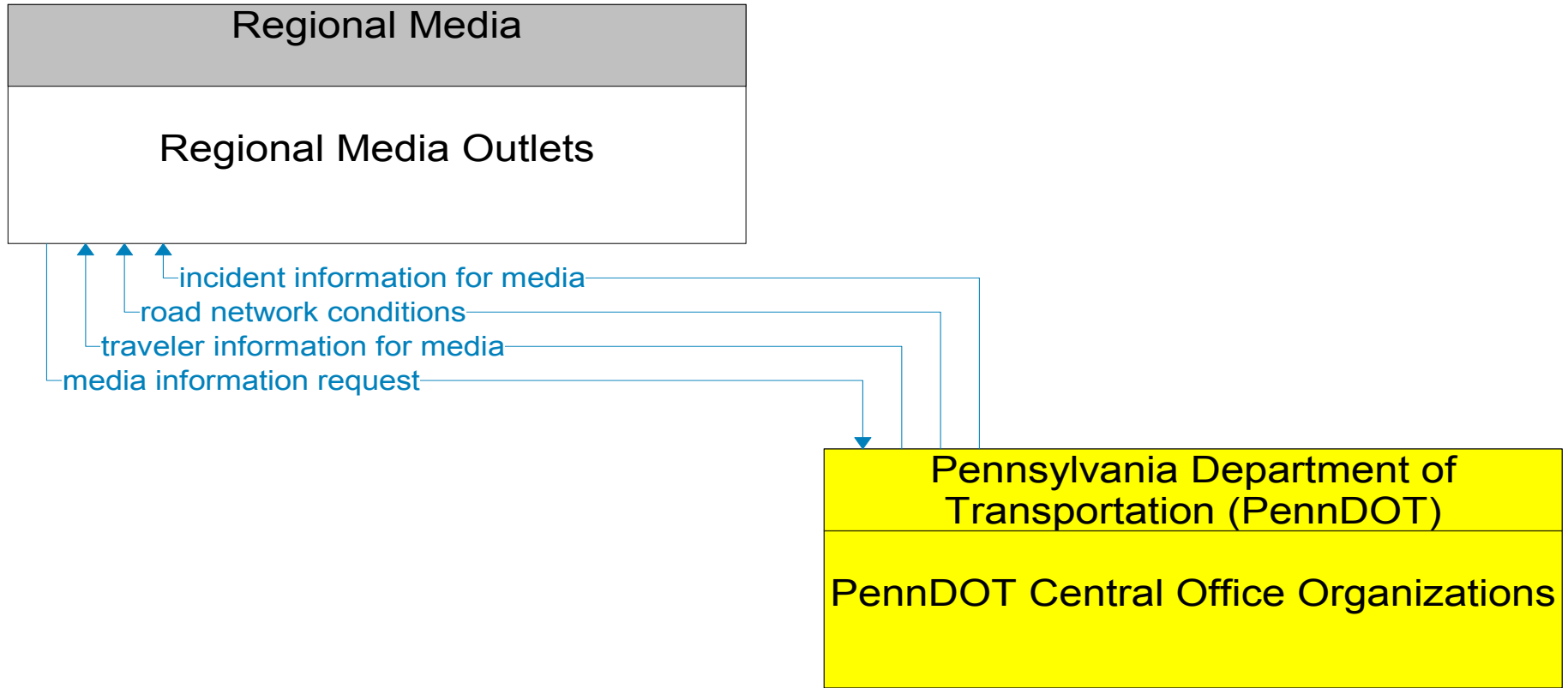


Pennsylvania Department of Transportation (PennDOT)

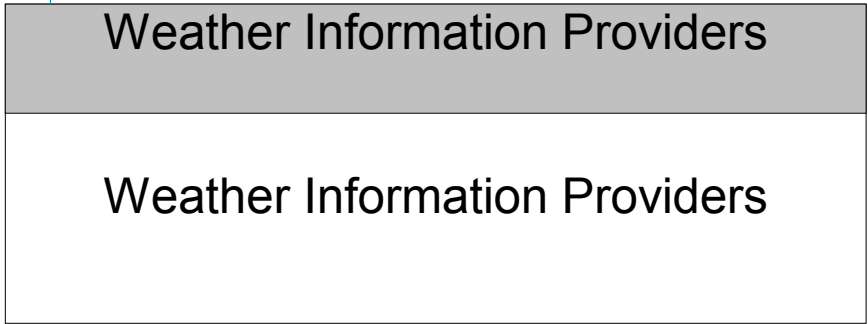
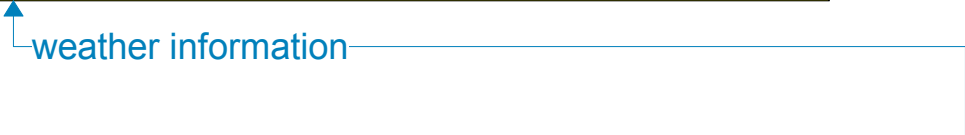
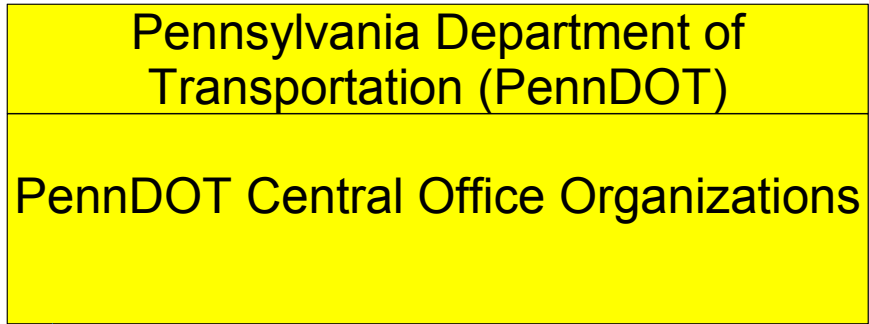
PennDOT Central Office Organizations



———— Existing
- - - - - Planned

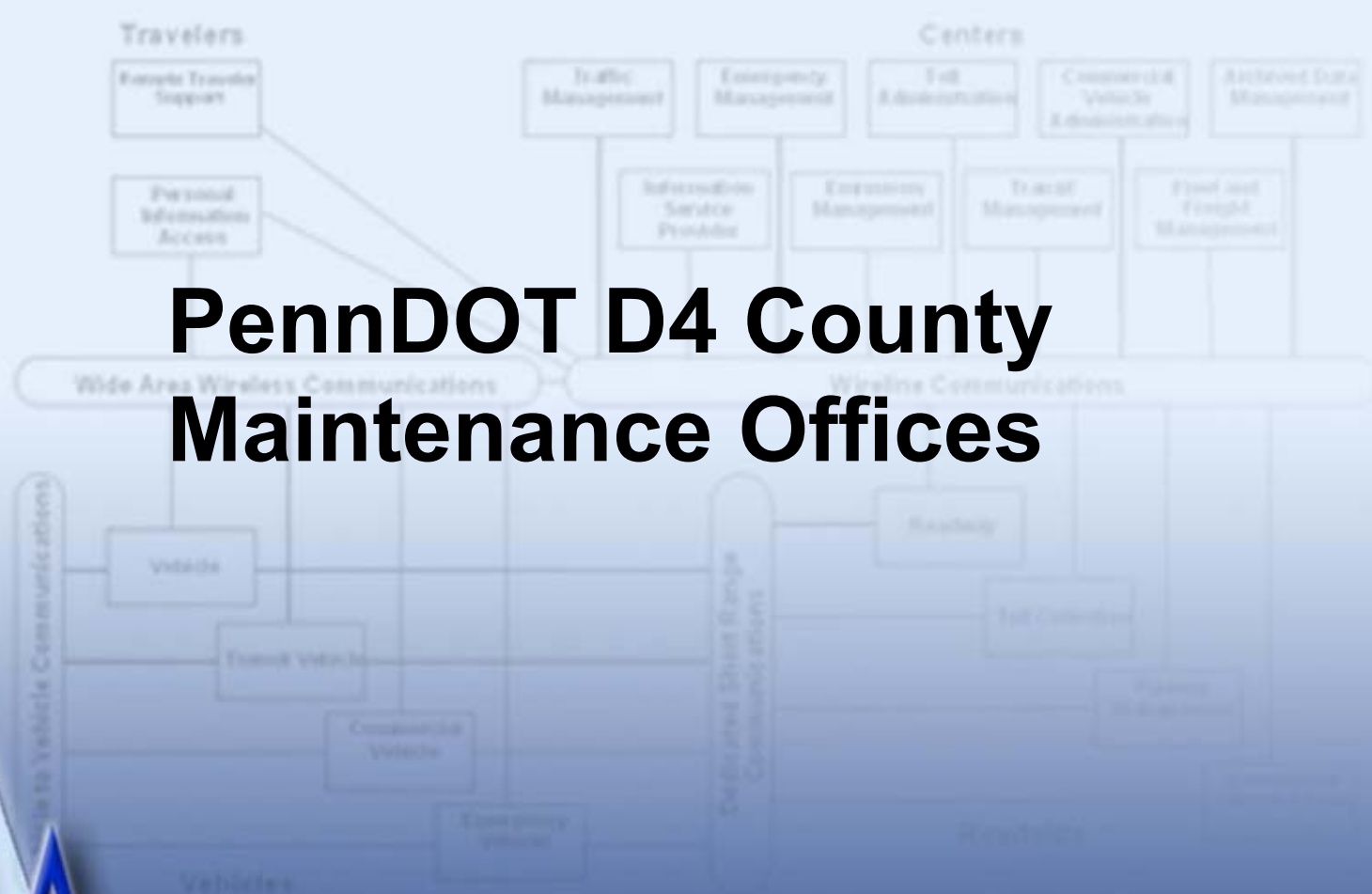


———— Existing
- - - - - Planned

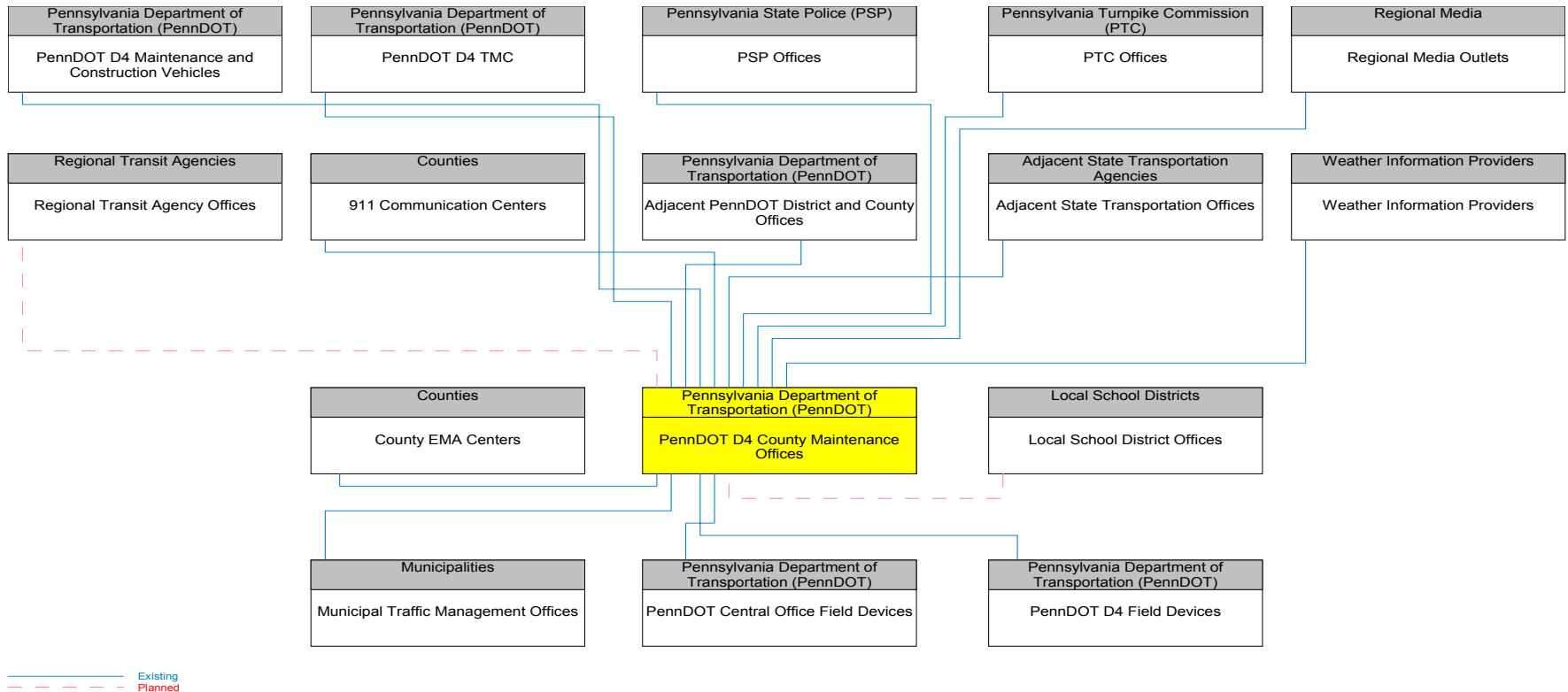


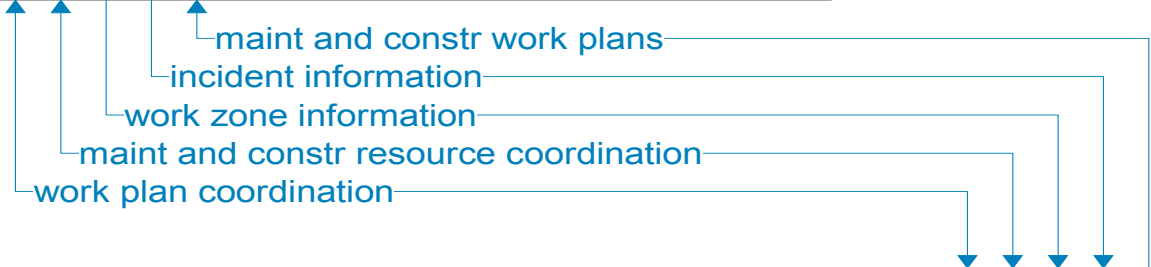
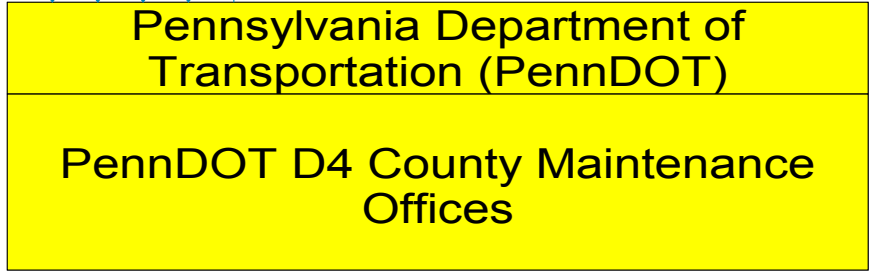
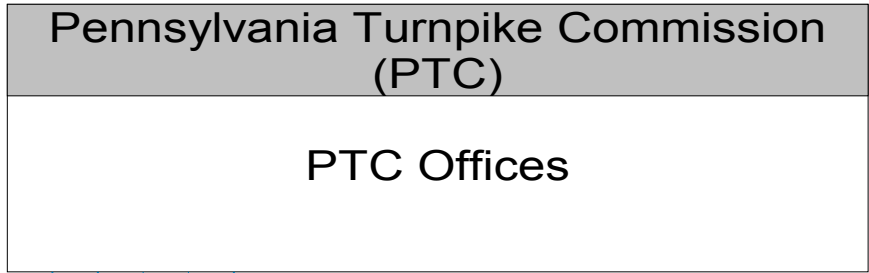
———— Existing
- - - - - Planned

PennDOT D4 County Maintenance Offices

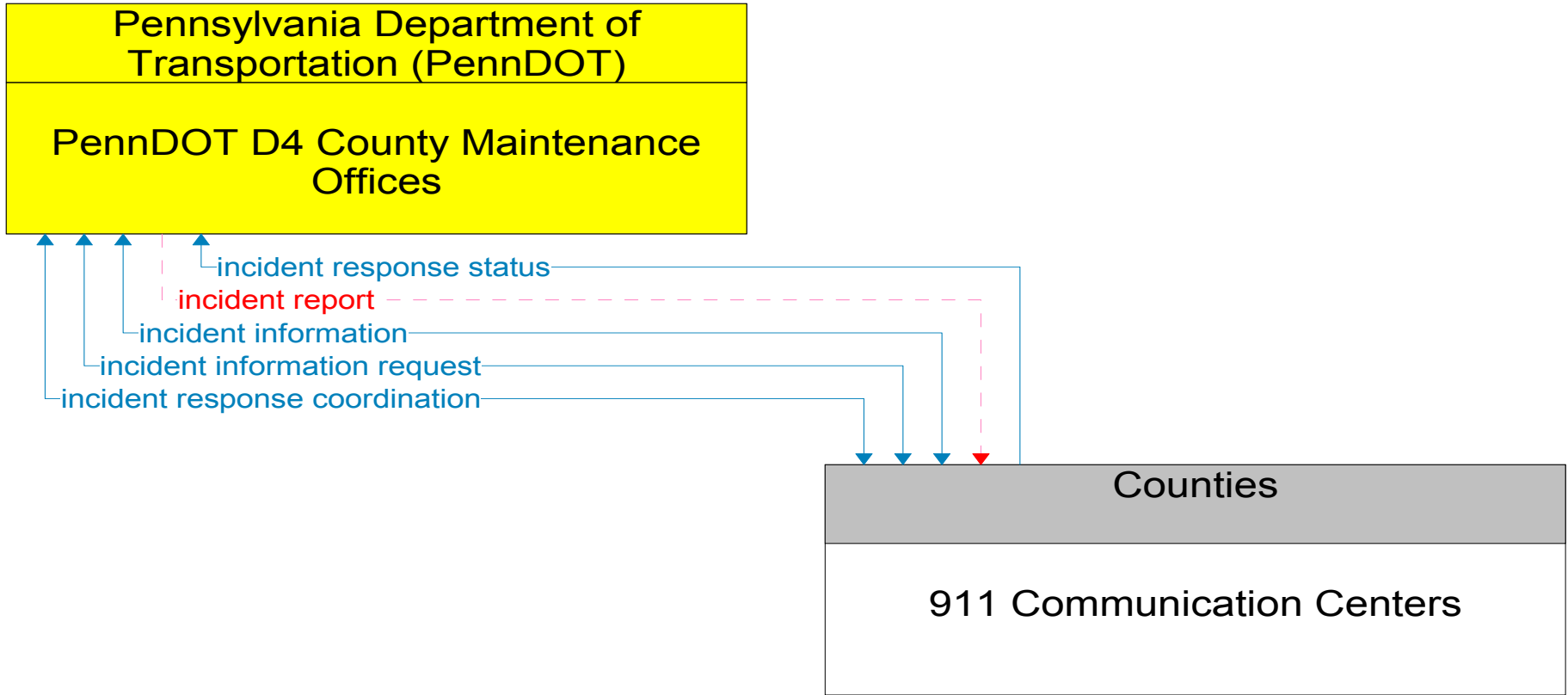


PennDOT D4 County Maintenance Offices Interconnect Diagram

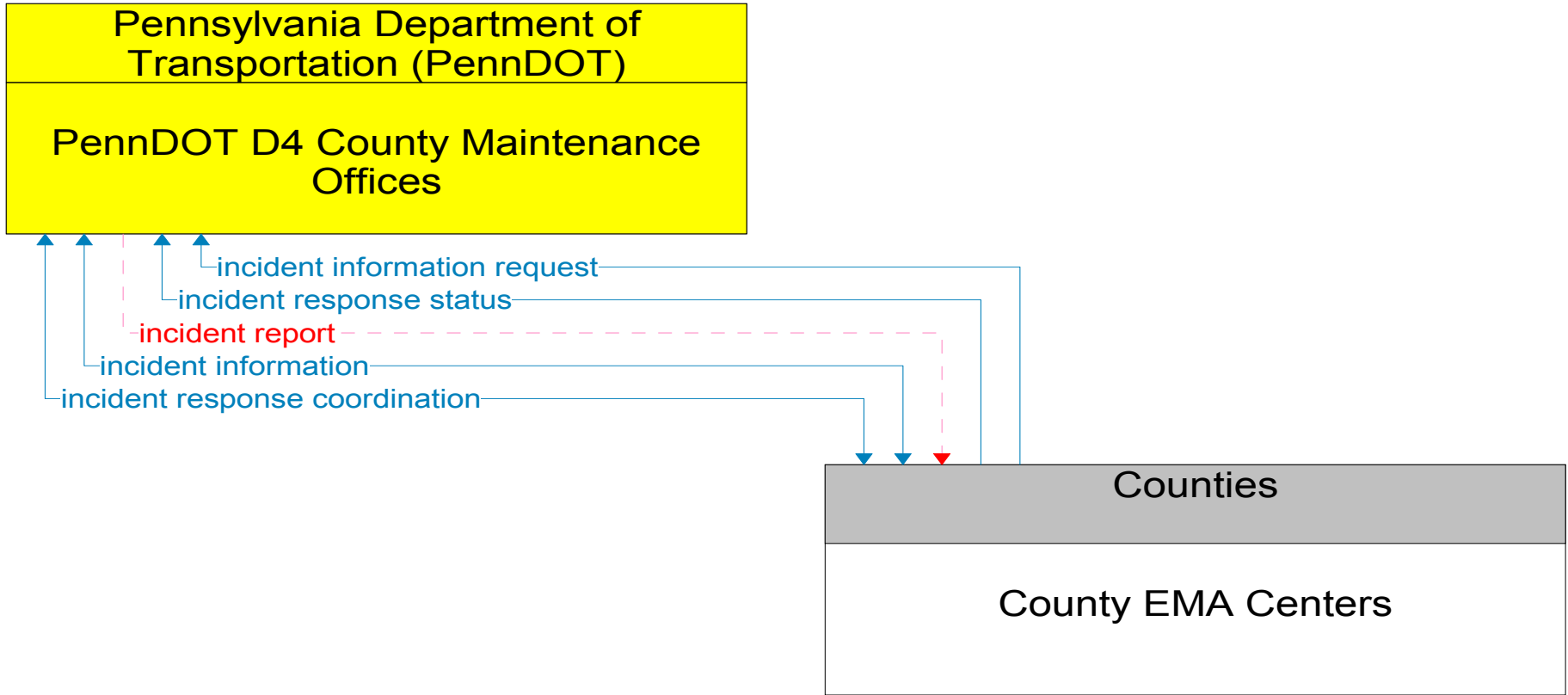




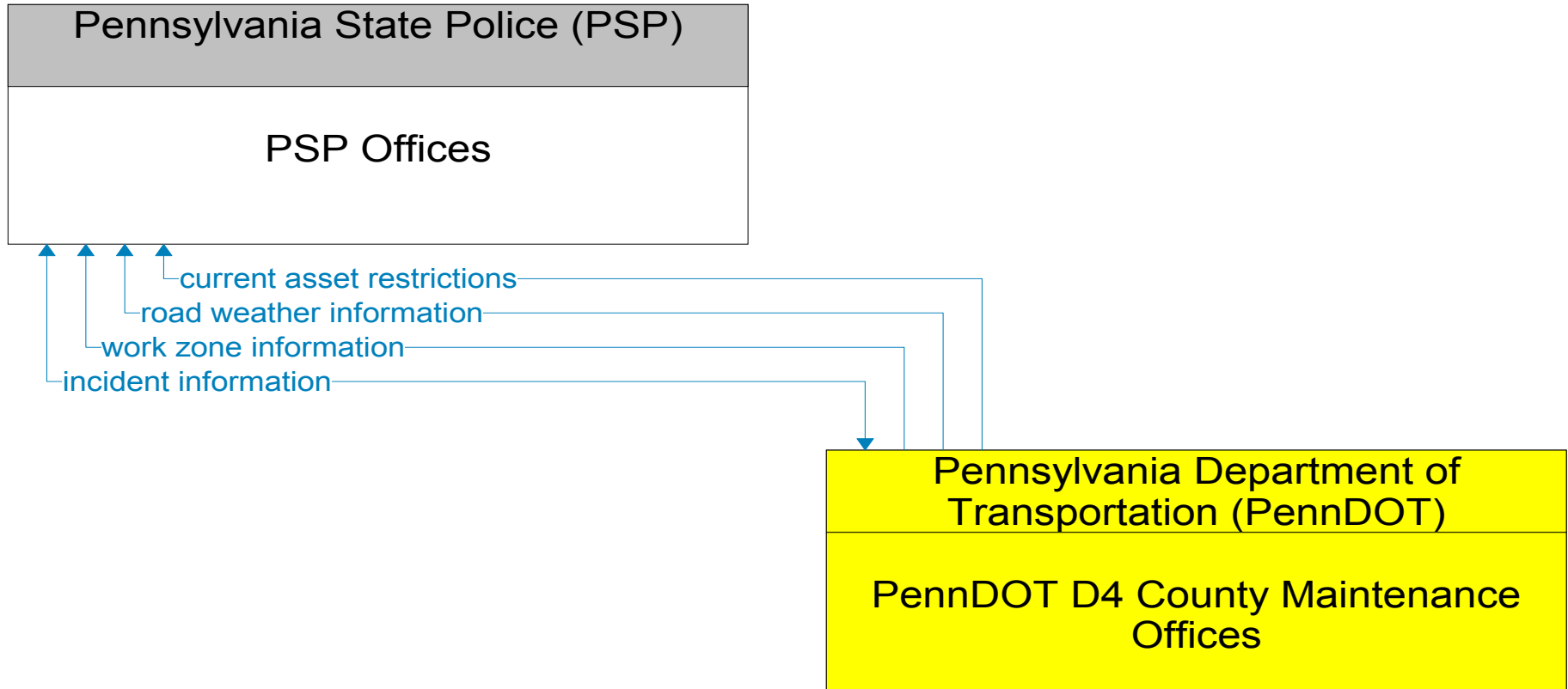
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- - - - - Planned



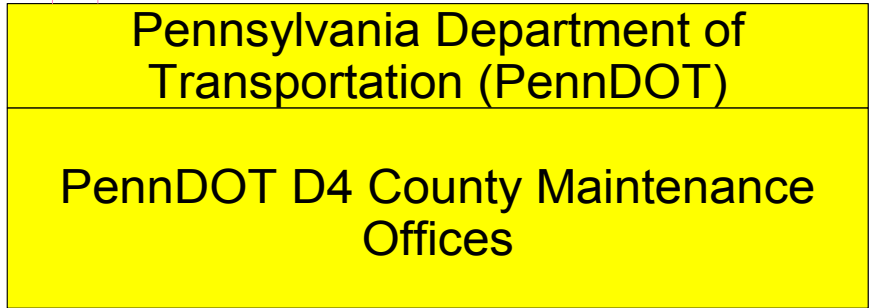
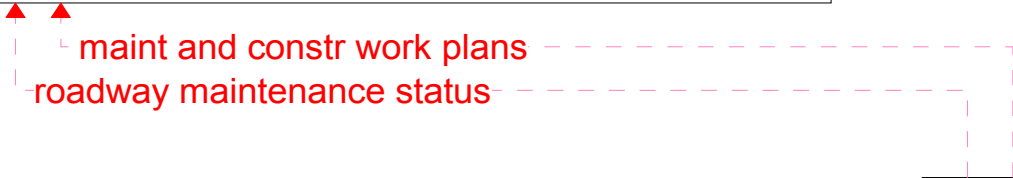
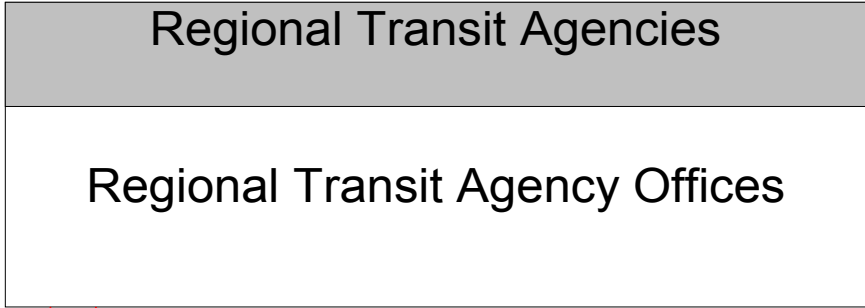
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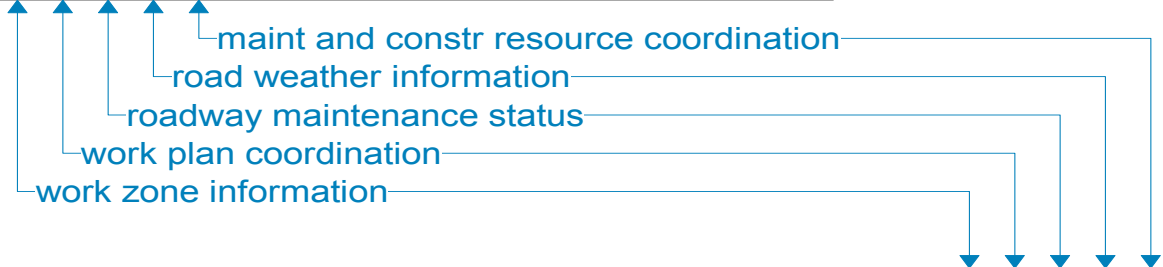


———— Existing

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Pennsylvania Department of
Transportation (PennDOT)

Adjacent PennDOT District and County
Offices



Pennsylvania Department of
Transportation (PennDOT)

PennDOT D4 County Maintenance
Offices

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- - - - - Planned

Pennsylvania Department of
Transportation (PennDOT)

PennDOT D4 County Maintenance
Offices

environmental conditions data

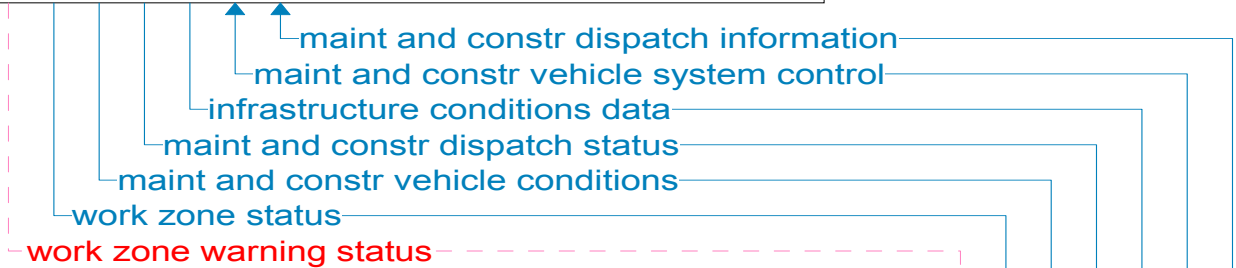
Pennsylvania Department of
Transportation (PennDOT)

PennDOT Central Office Field Devices

Existing
Planned

Pennsylvania Department of
Transportation (PennDOT)

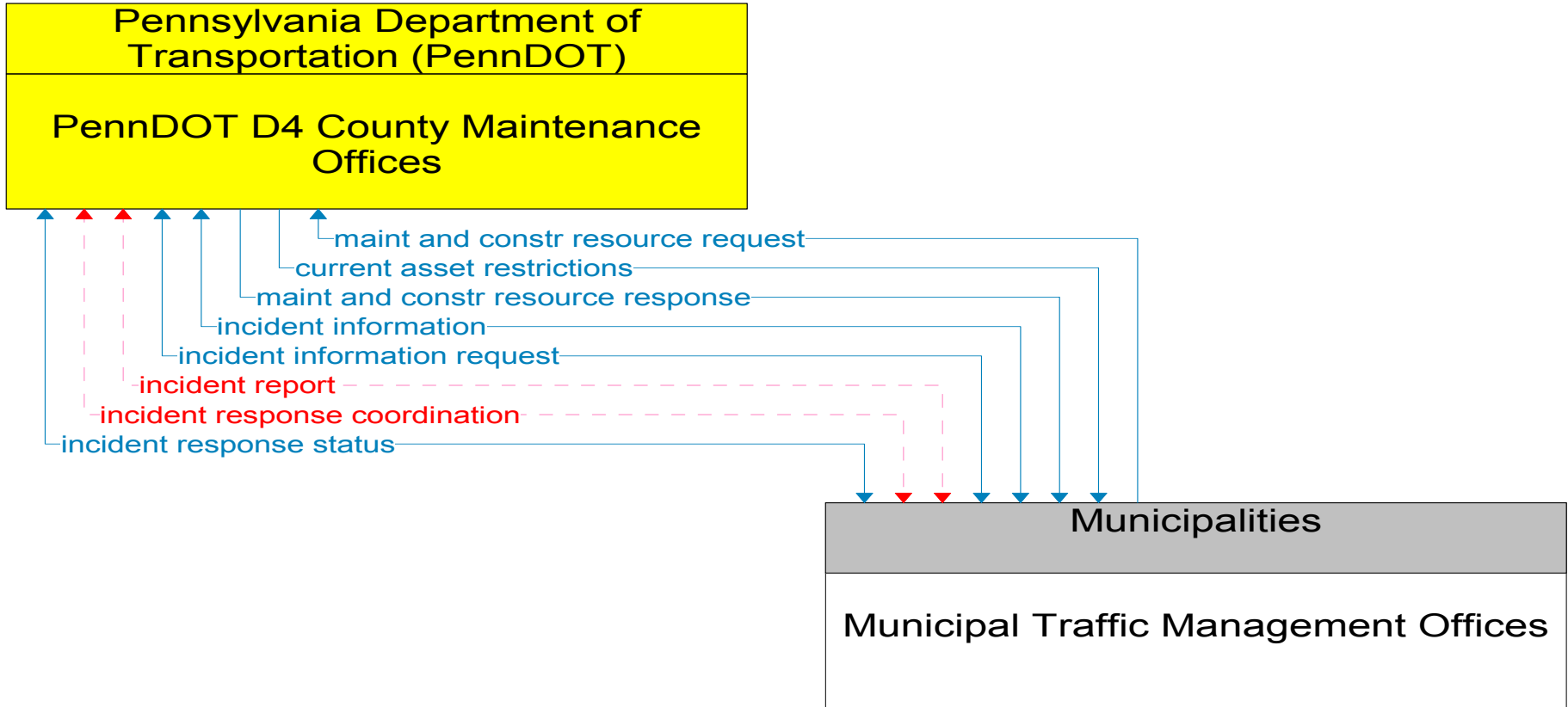
PennDOT D4 Maintenance and
Construction Vehicles



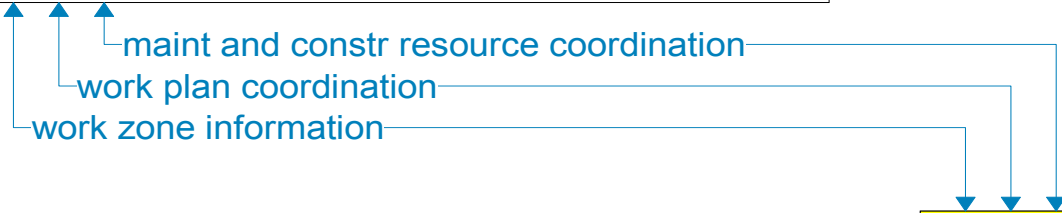
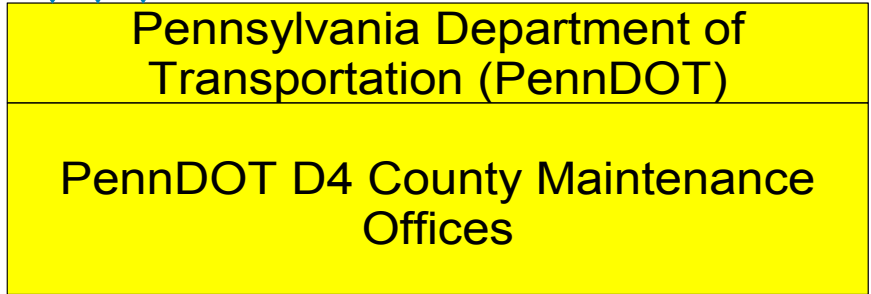
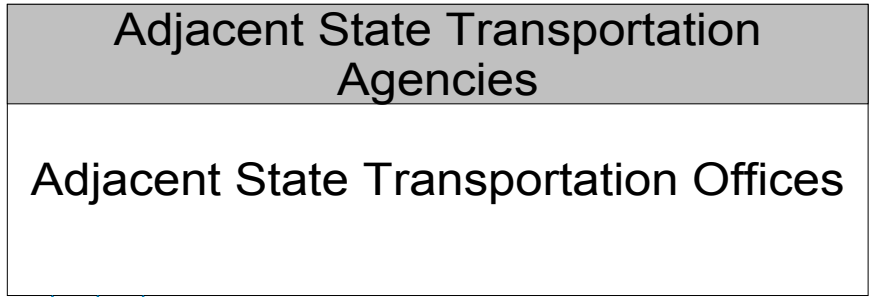
Pennsylvania Department of
Transportation (PennDOT)

PennDOT D4 County Maintenance
Offices

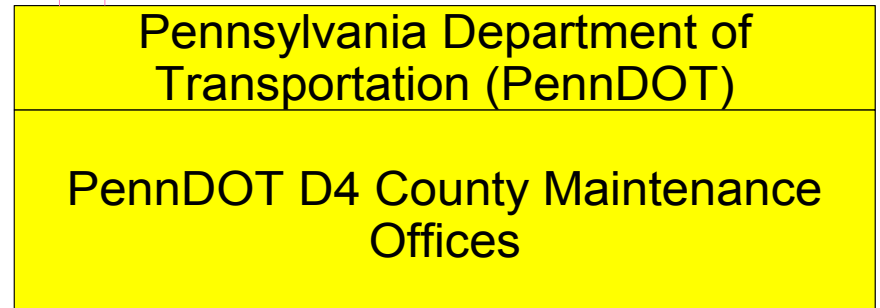
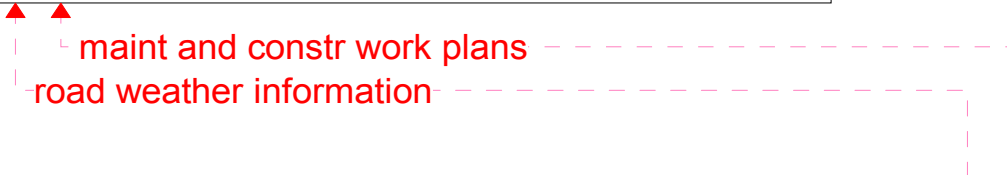
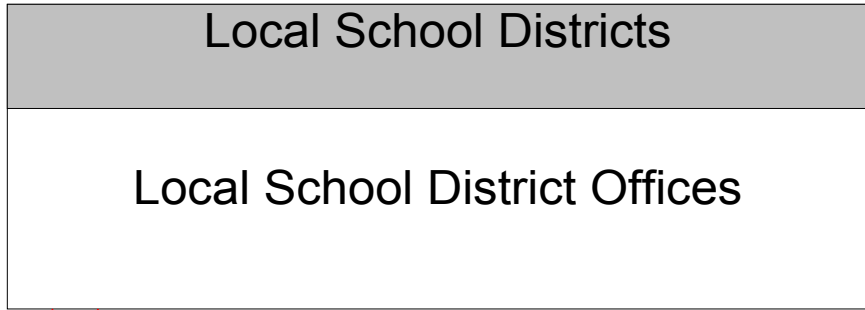
Existing
Planned



———— Existing
- - - - - Planned

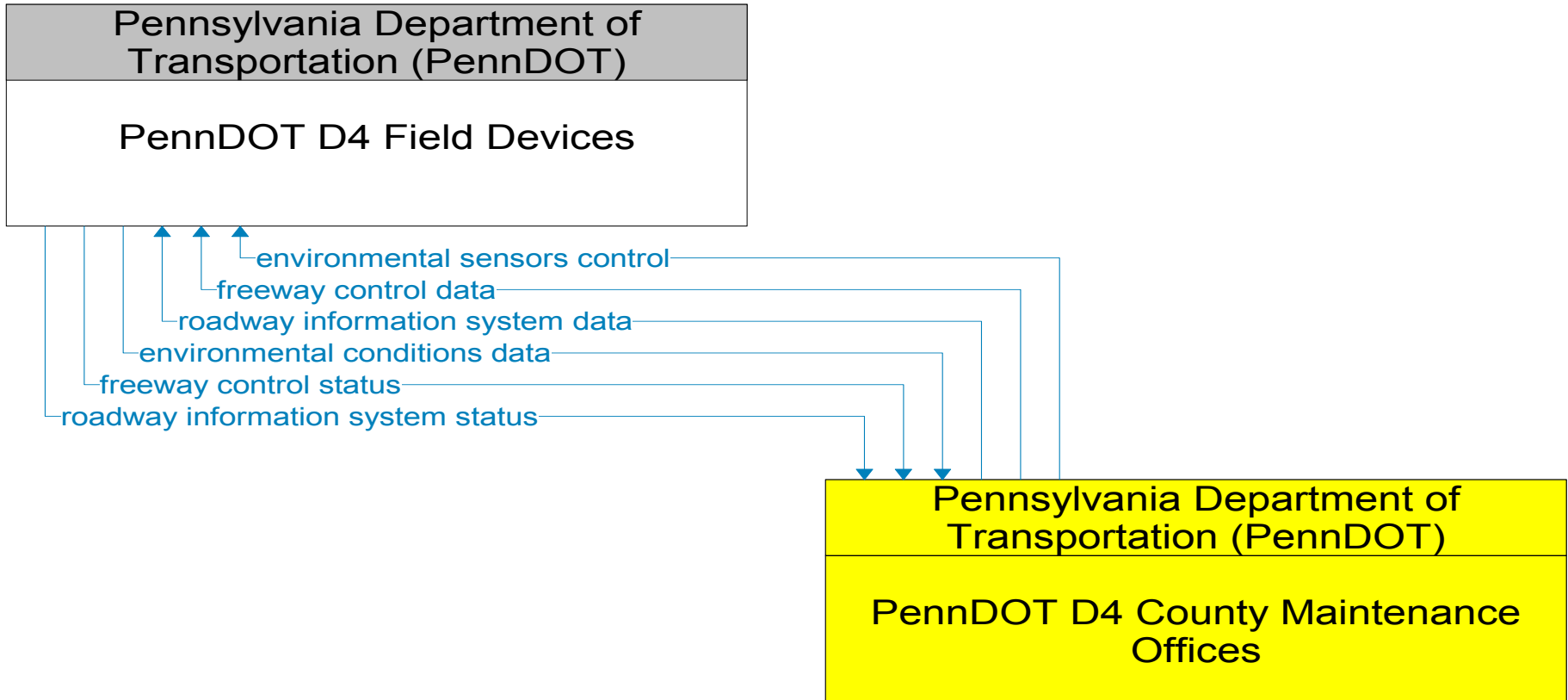


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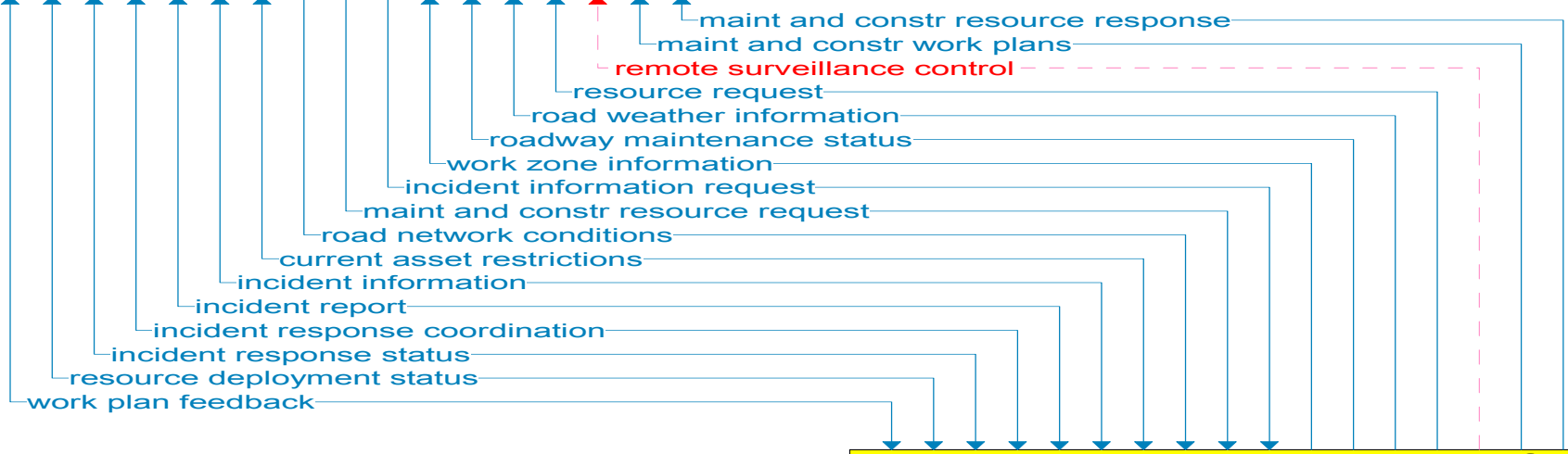
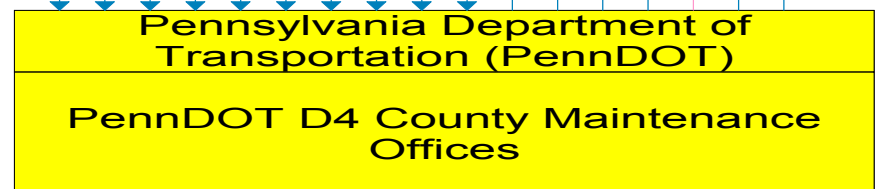
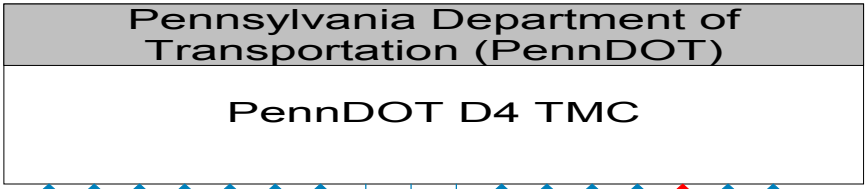


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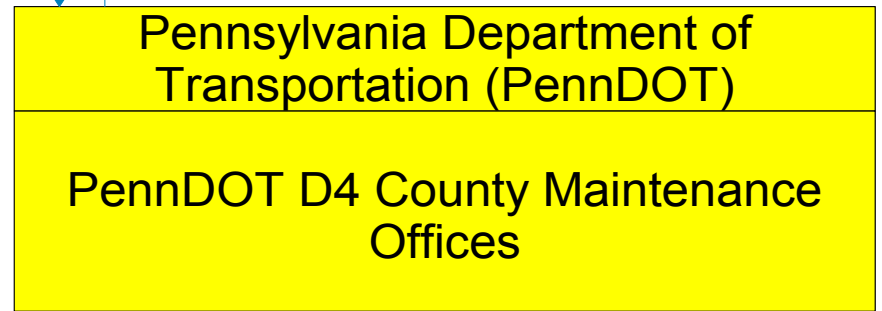
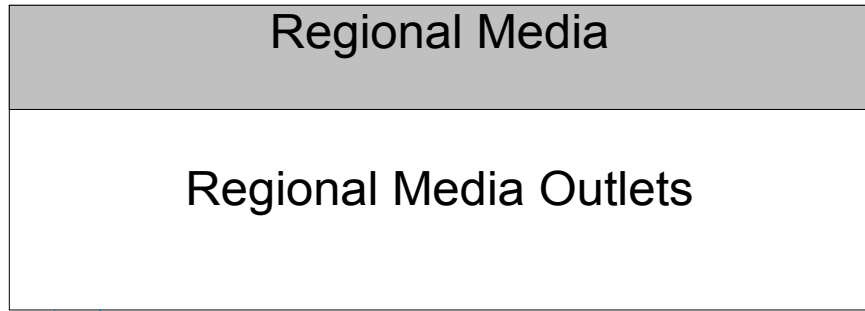
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- - - - - Planned



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- - - - - Planned

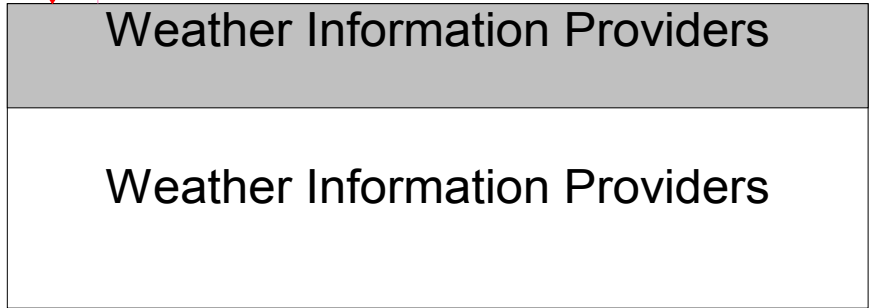
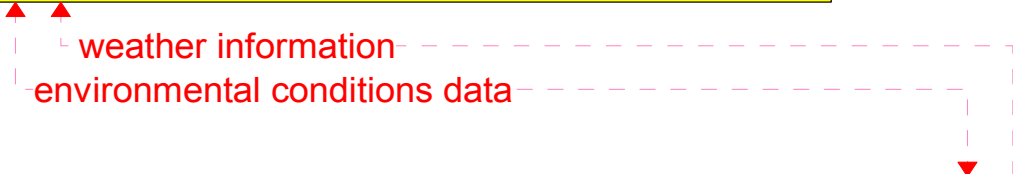
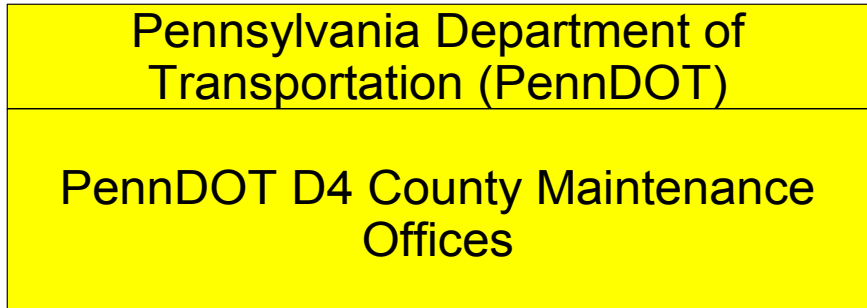


incident information for media

media information request

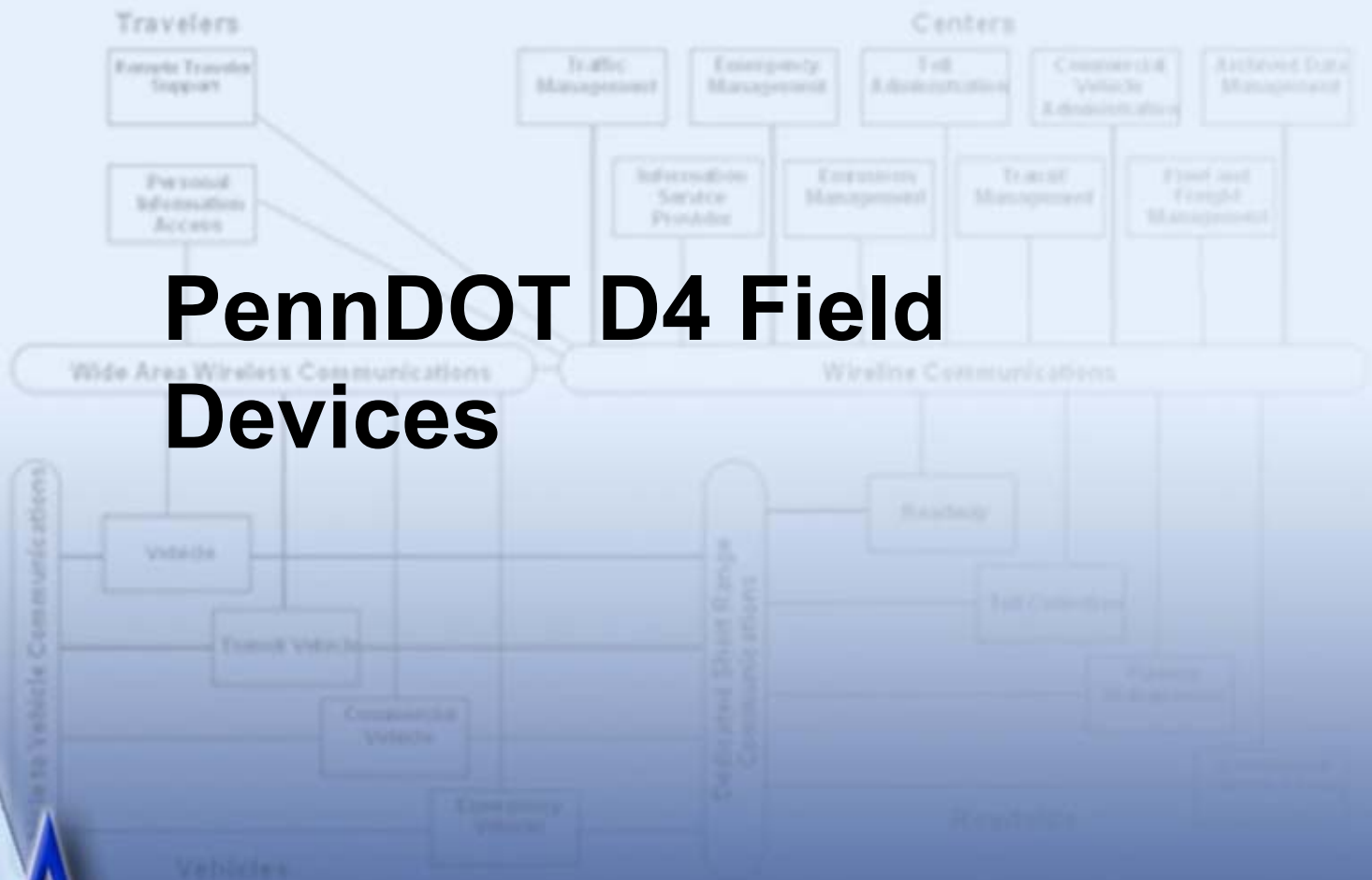
Existing

Planned

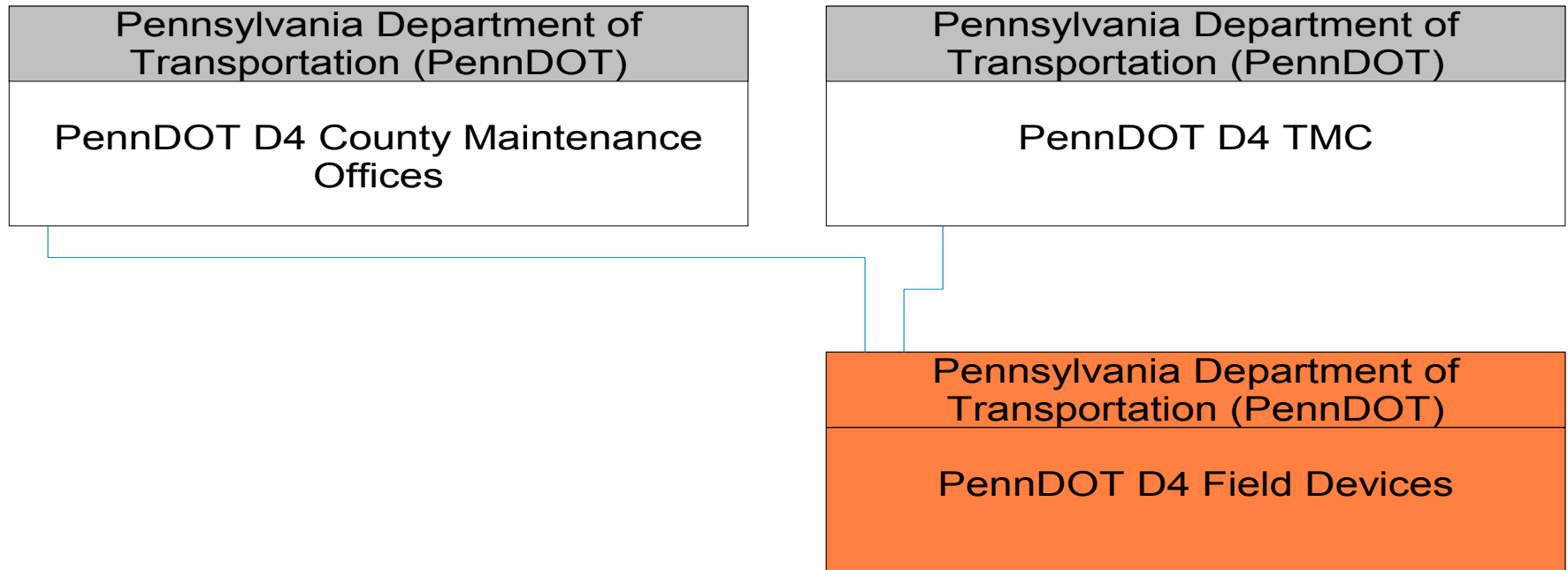


———— Existing
- - - - - Planned

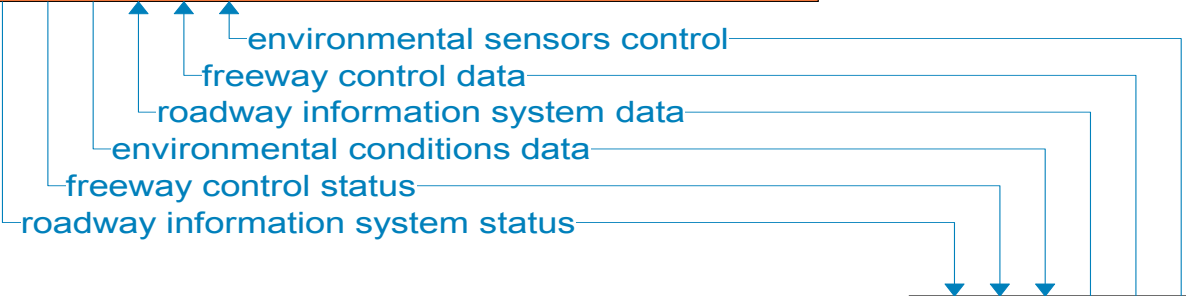
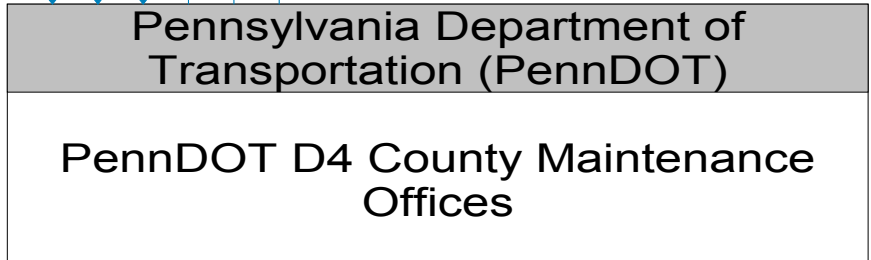
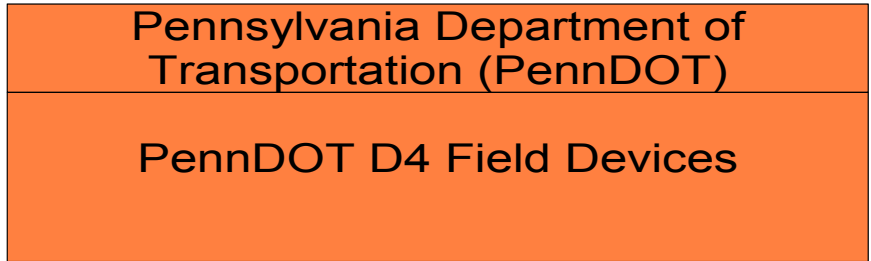
PennDOT D4 Field Devices



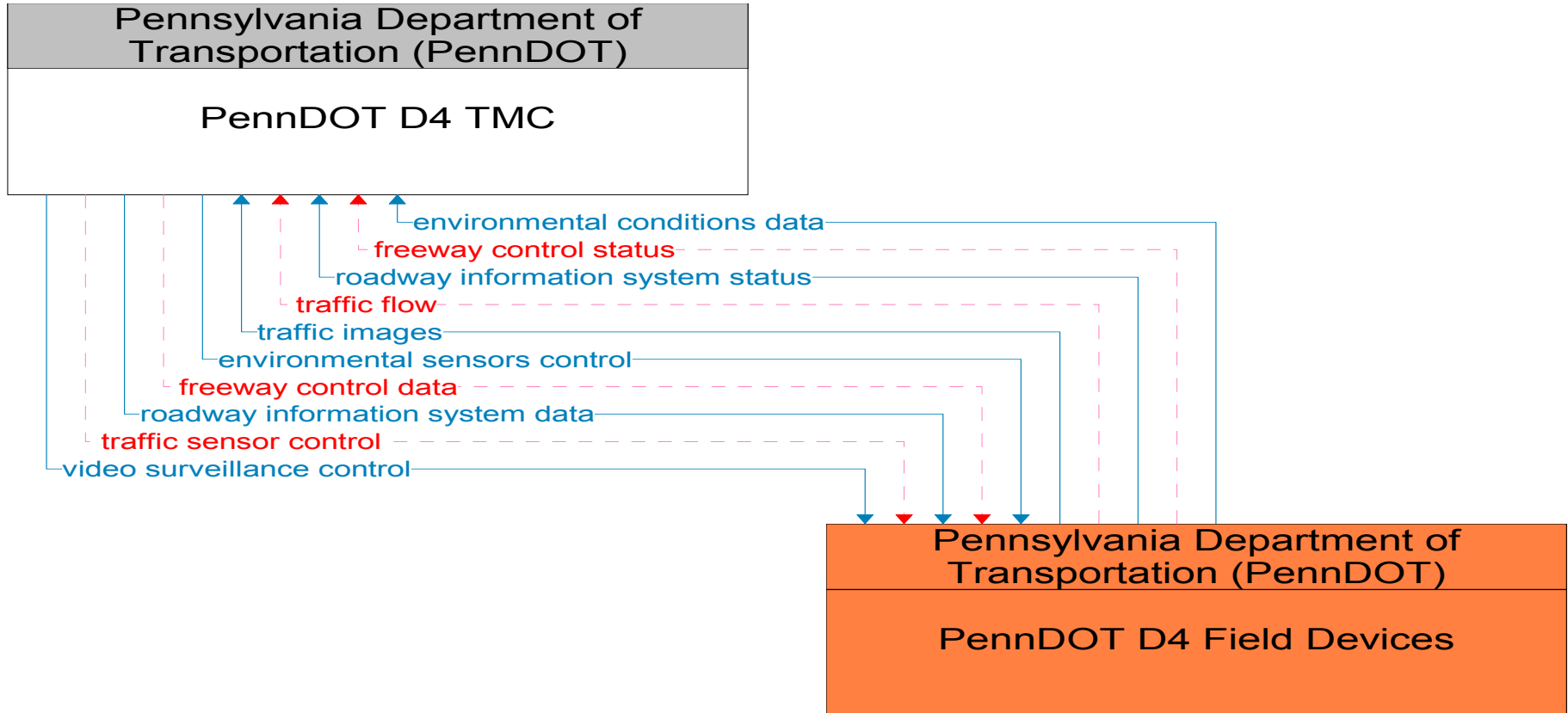
PennDOT D4 Field Devices Interconnect Diagram



———— Existing
----- Planned

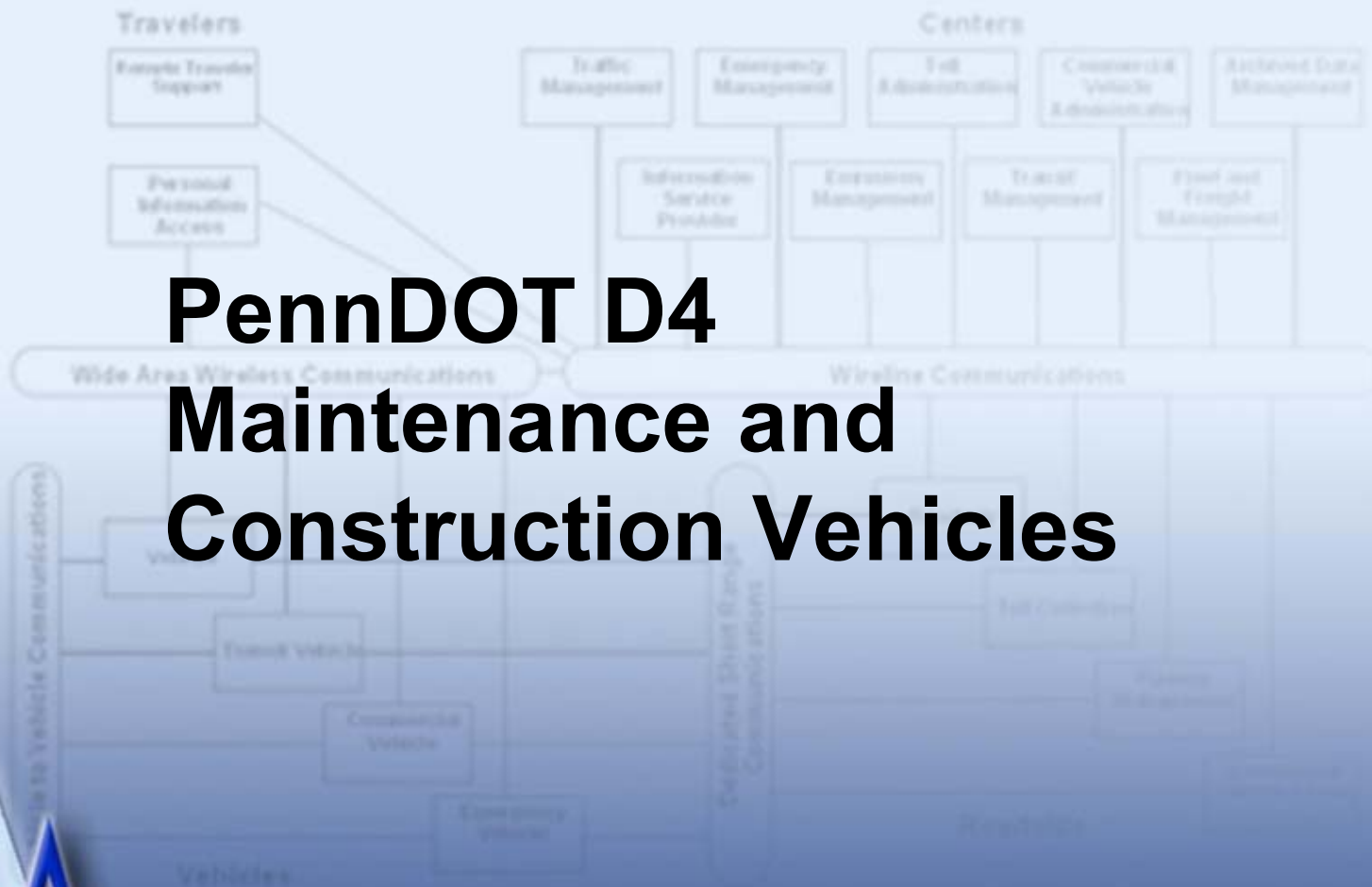


Existing
Planned

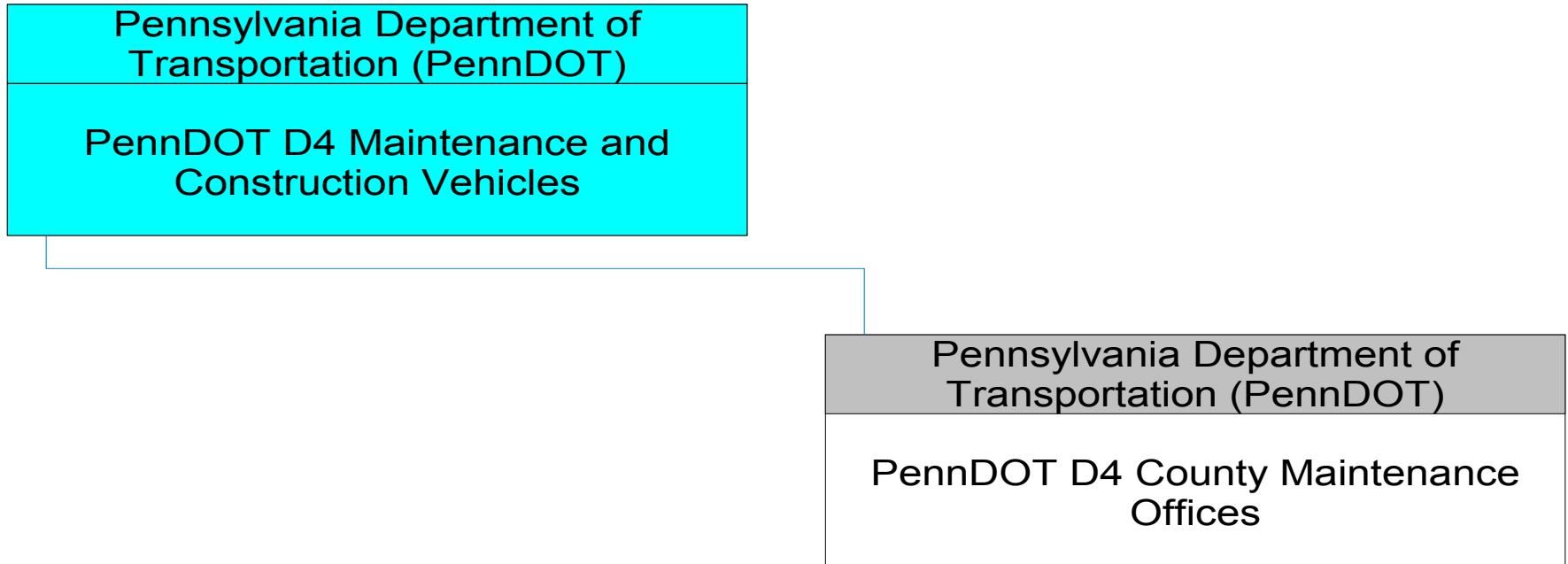


———— Existing
- - - - - Planned

PennDOT D4 Maintenance and Construction Vehicles



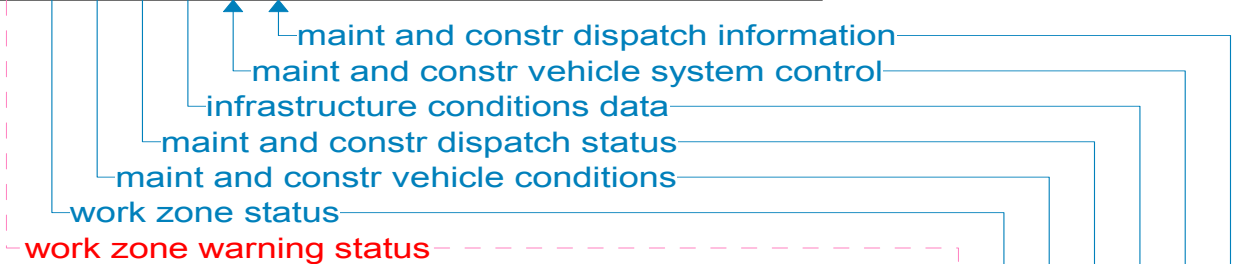
PennDOT D4 Maintenance and Construction Vehicles Interconnect Diagram



———— Existing
----- Planned

Pennsylvania Department of
Transportation (PennDOT)

PennDOT D4 Maintenance and
Construction Vehicles

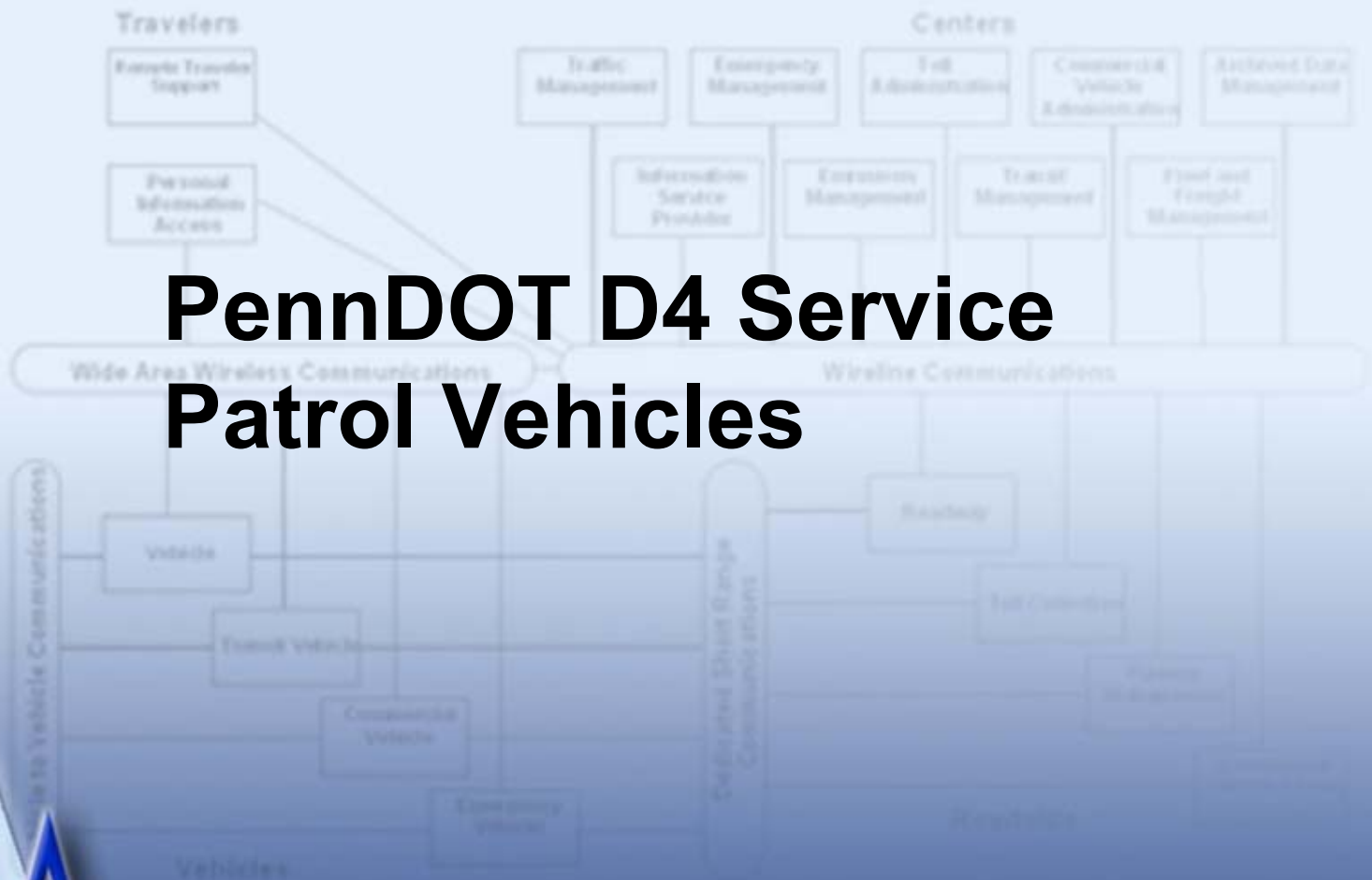


Pennsylvania Department of
Transportation (PennDOT)

PennDOT D4 County Maintenance
Offices

Existing
Planned

PennDOT D4 Service Patrol Vehicles

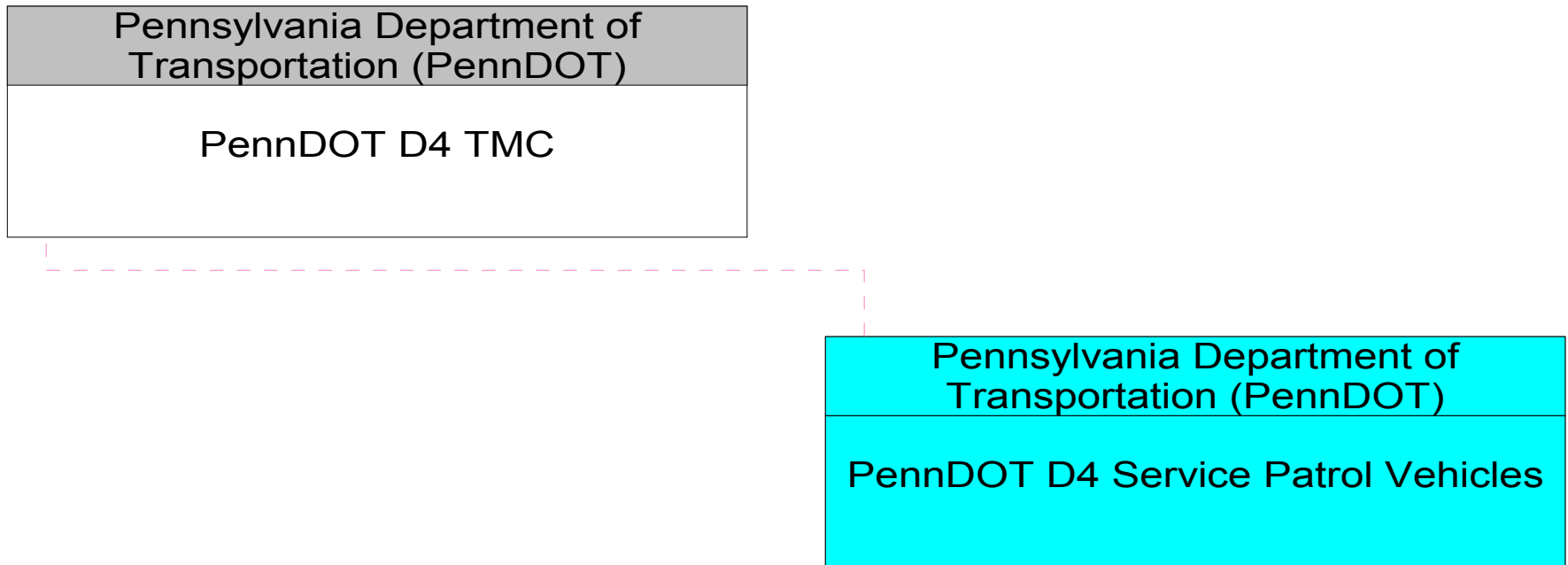


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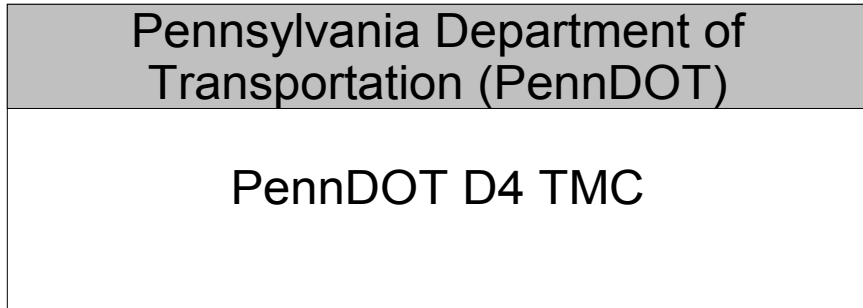
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architecture

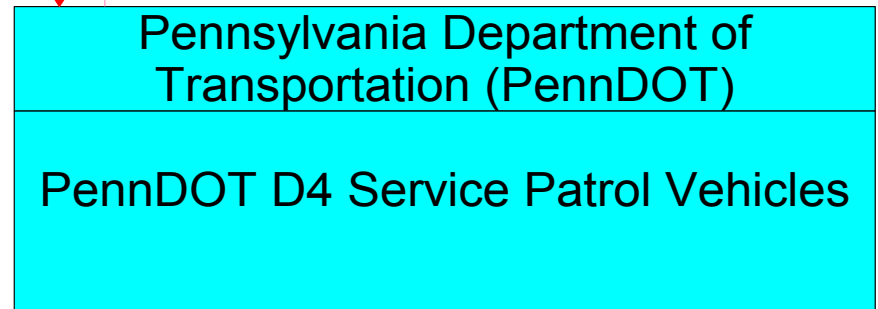
PennDOT D4 Service Patrol Vehicles Interconnect Diagram



———— Existing
- - - - - Planned

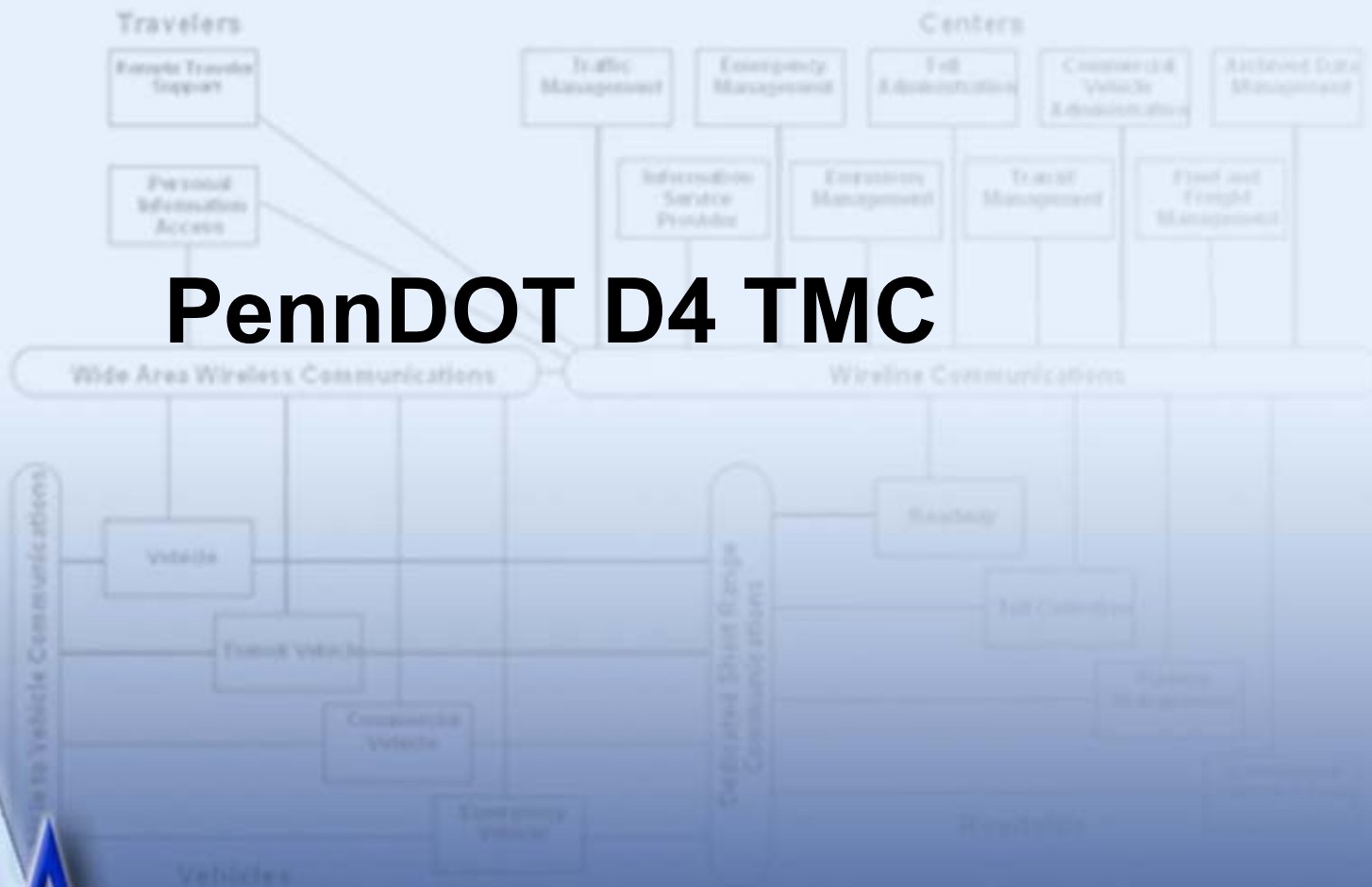


emergency dispatch response
emergency dispatch requests

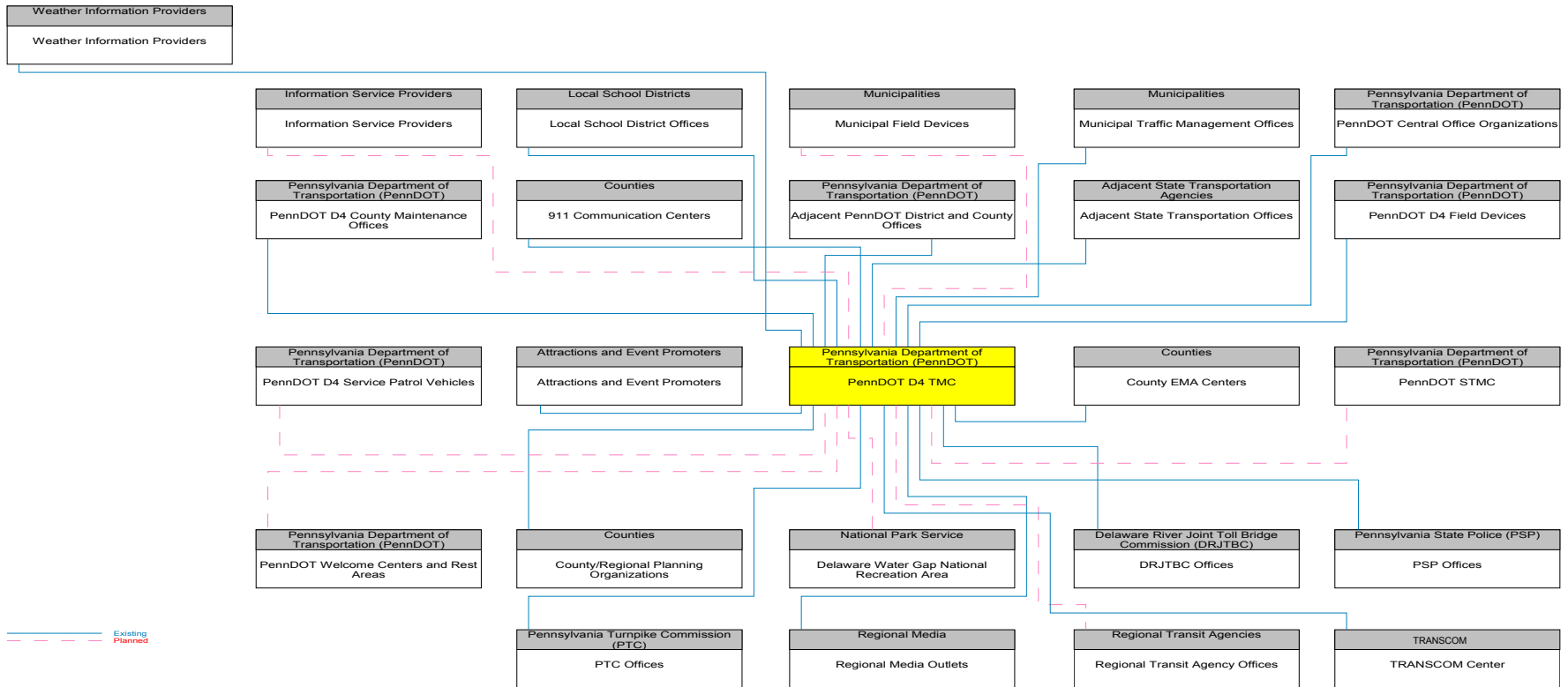


Existing
Planned

PennDOT D4 TMC

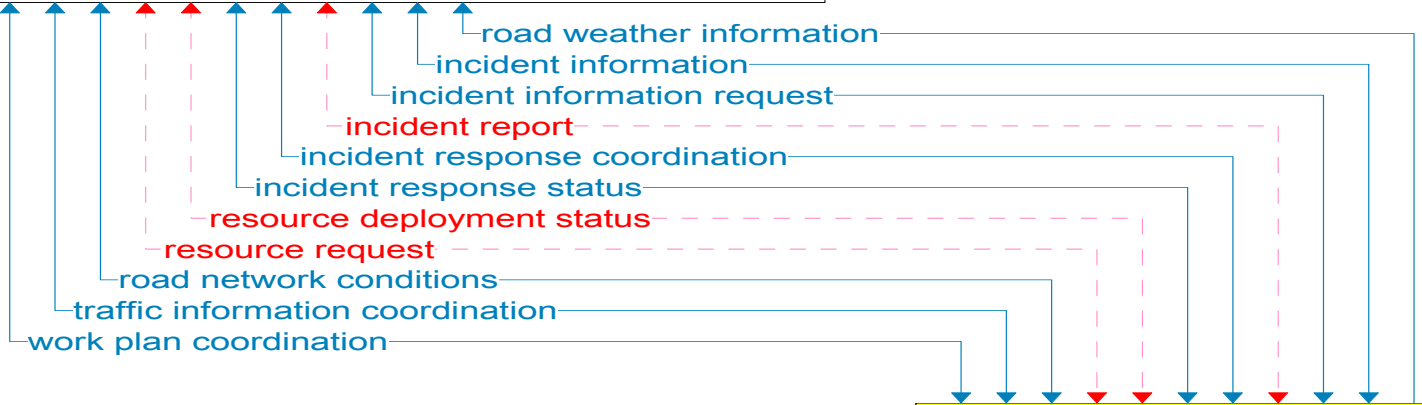


PennDOT D4 TMC Interconnect Diagram

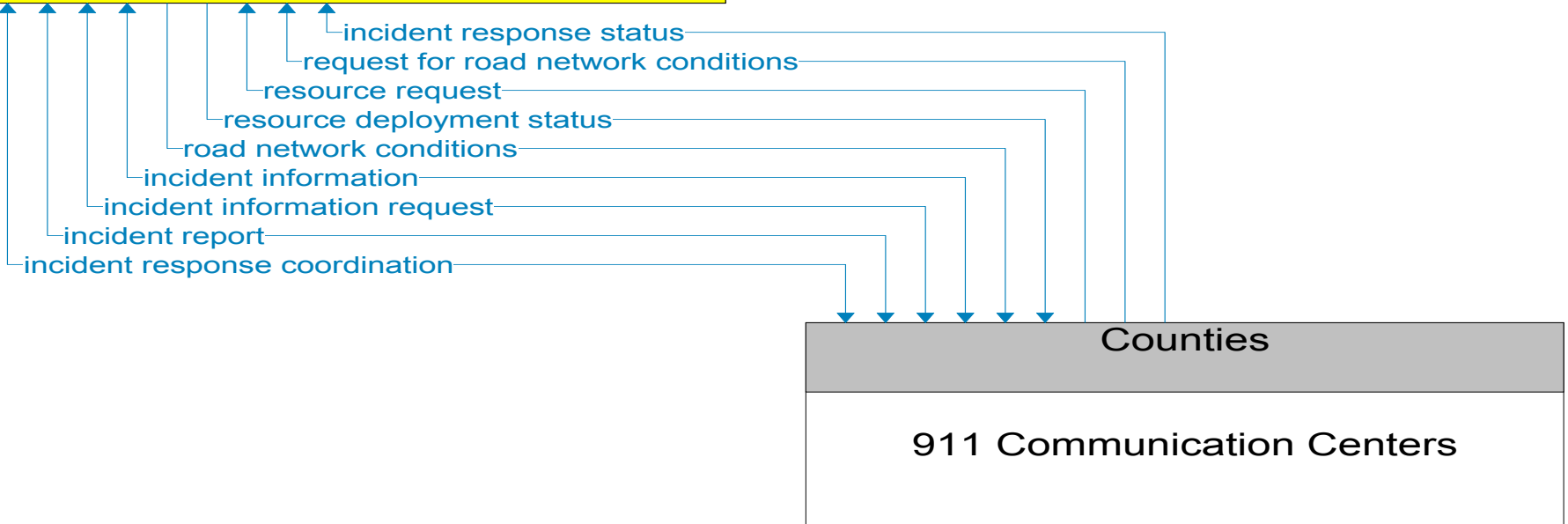
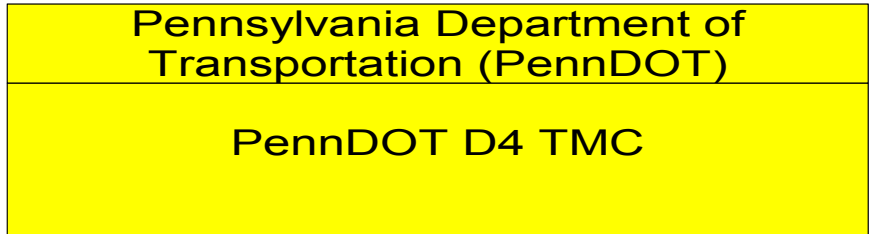


Pennsylvania Turnpike Commission (PTC)
PTC Offices

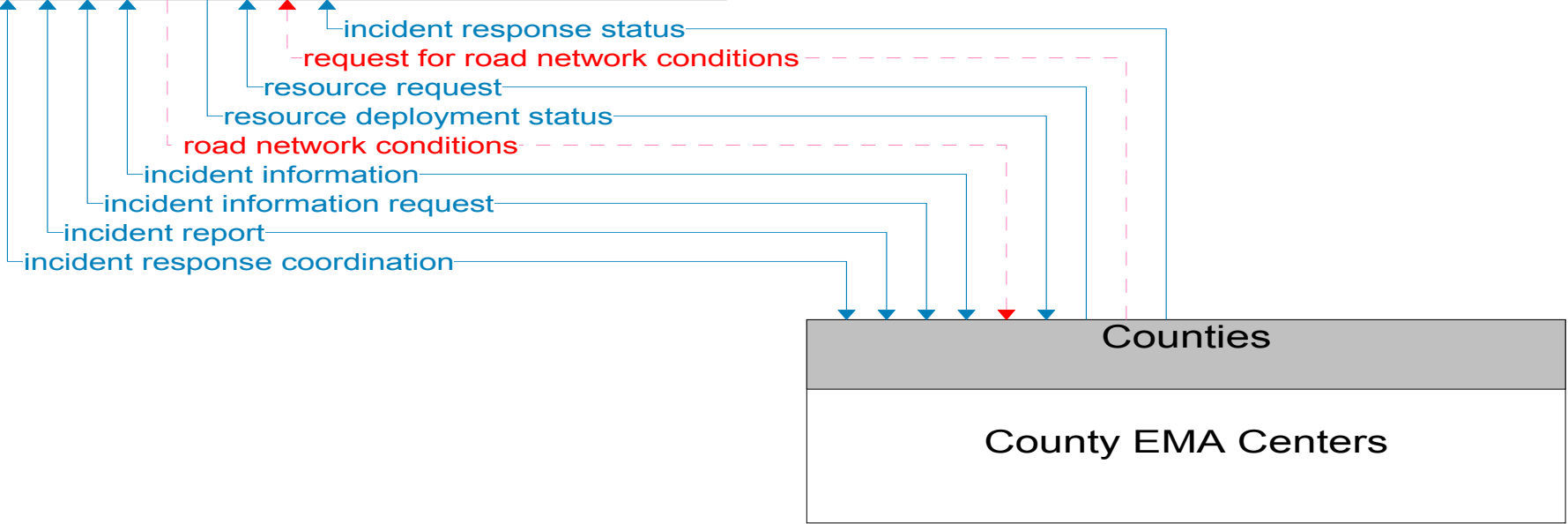
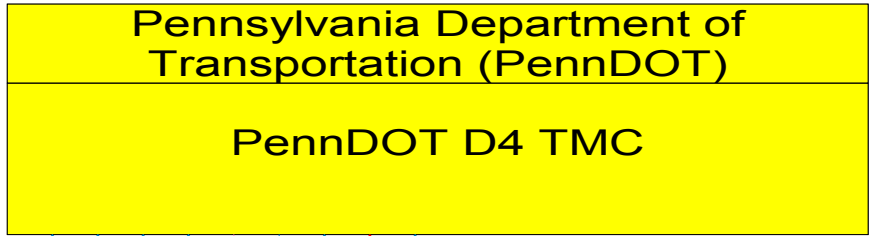
Pennsylvania Department of Transportation (PennDOT)
PennDOT D4 TMC



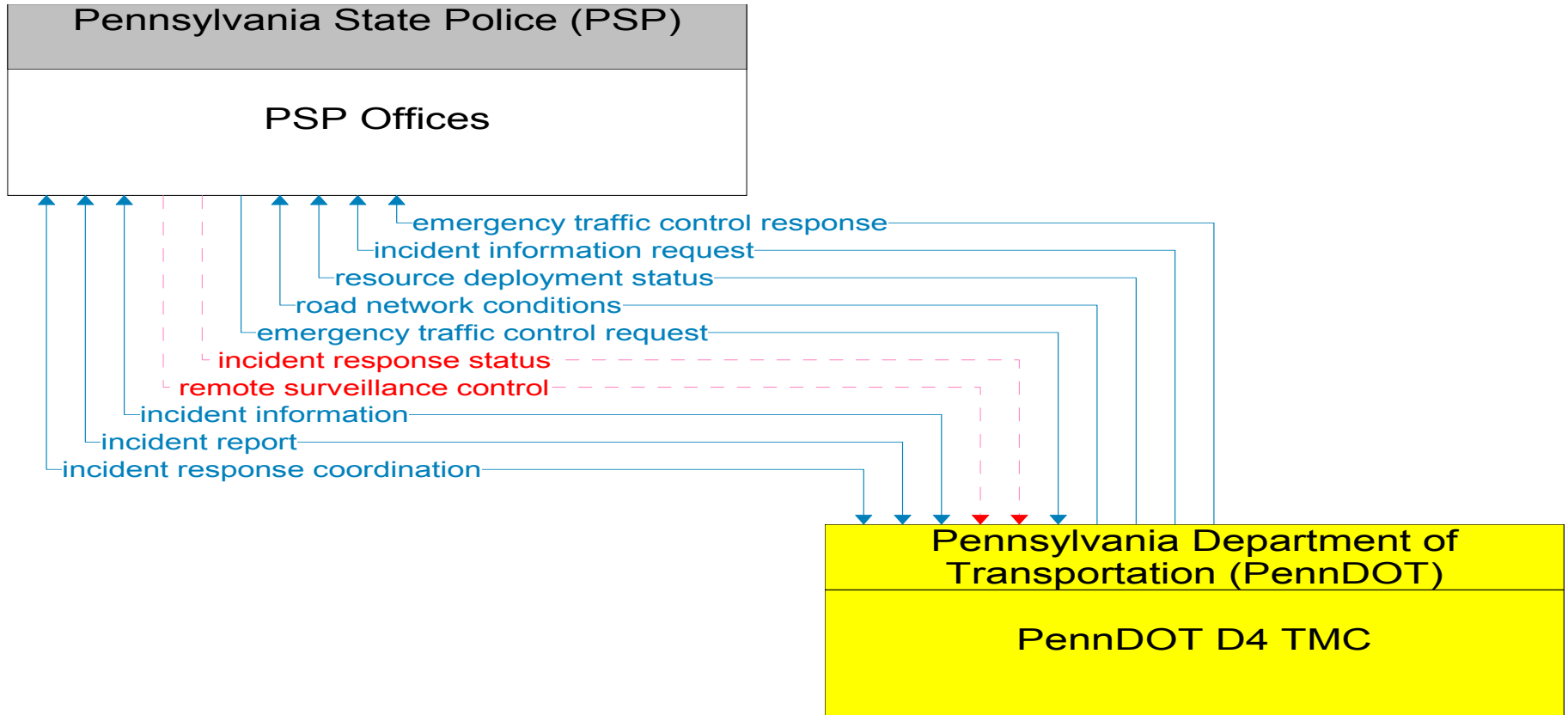
———— Existing
- - - - - Planned

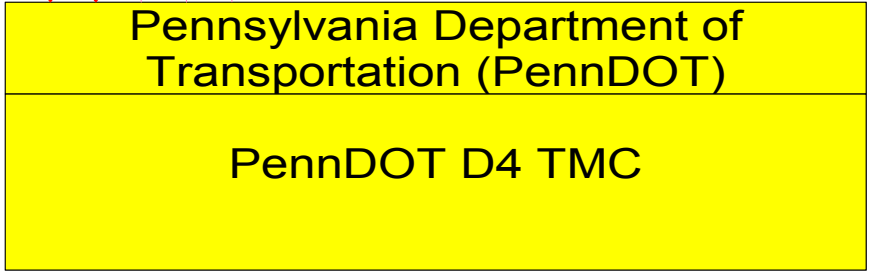
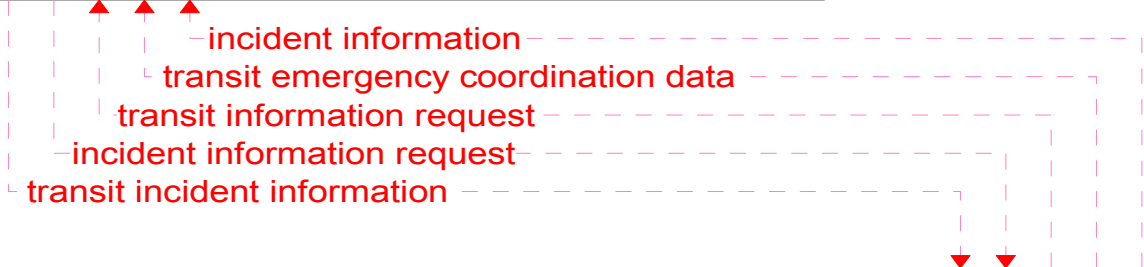
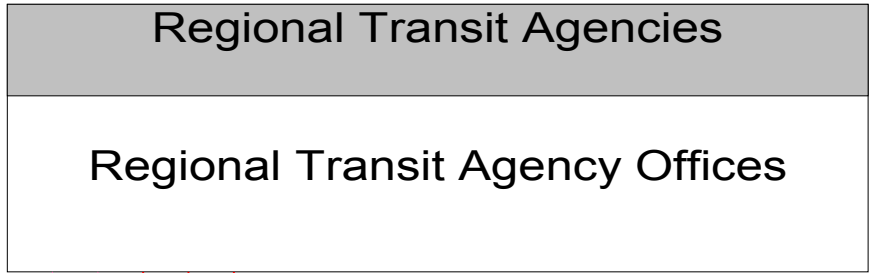


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Planned



Existing
Planned

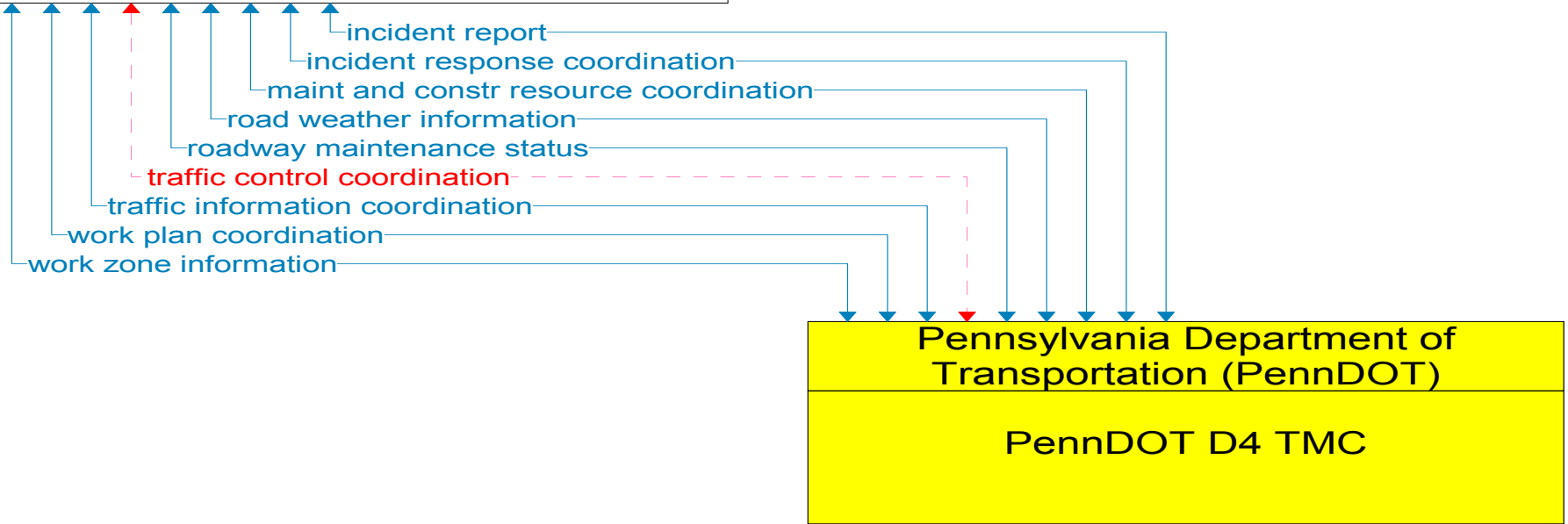




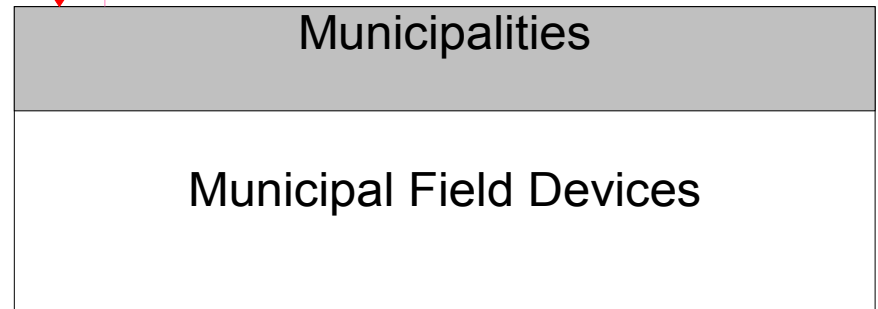
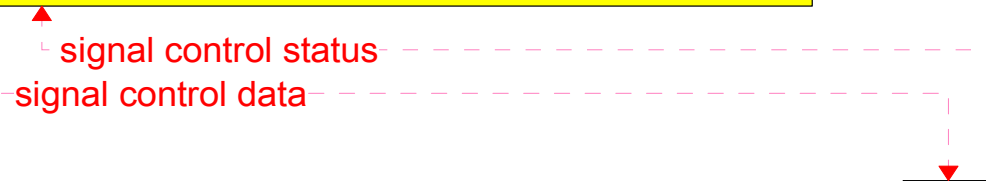
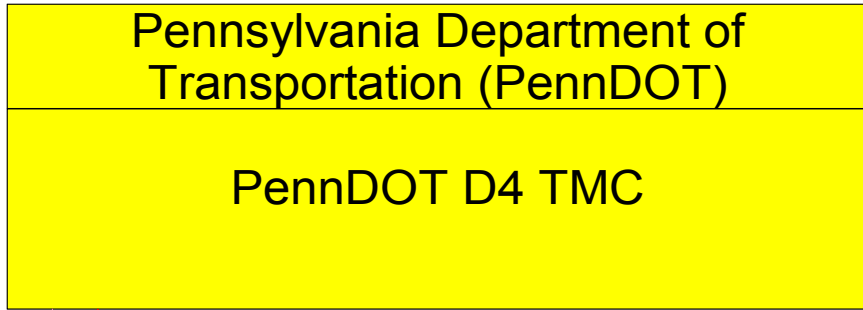
Existing
Planned

Pennsylvania Department of
Transportation (PennDOT)

Adjacent PennDOT District and County
Offices



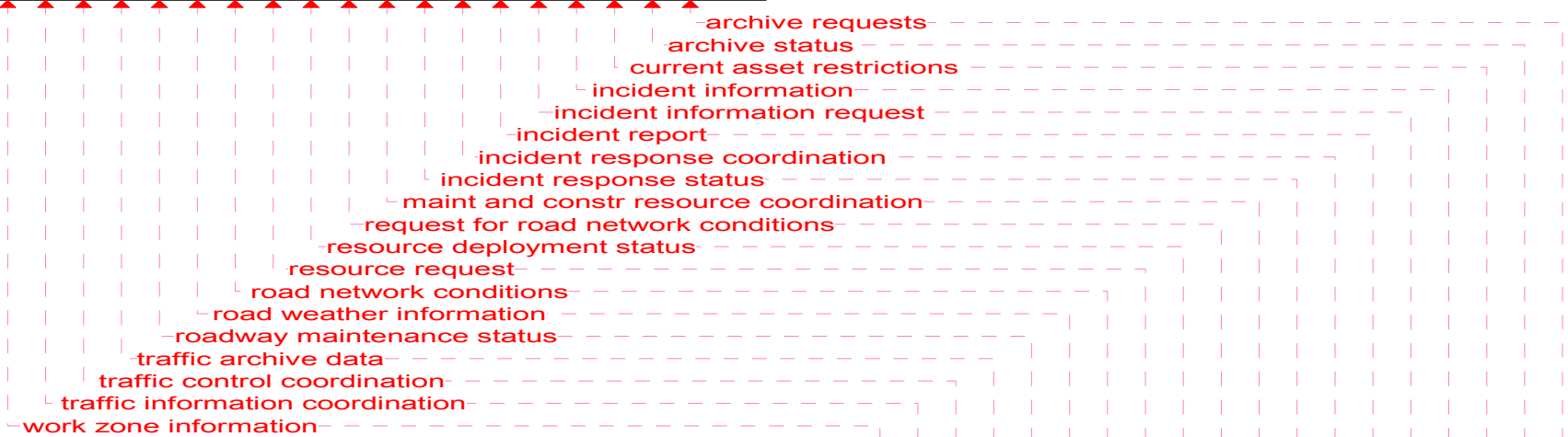
Existing
Planned



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- - - - - Planned

**Pennsylvania Department of Transportation
(PennDOT)**

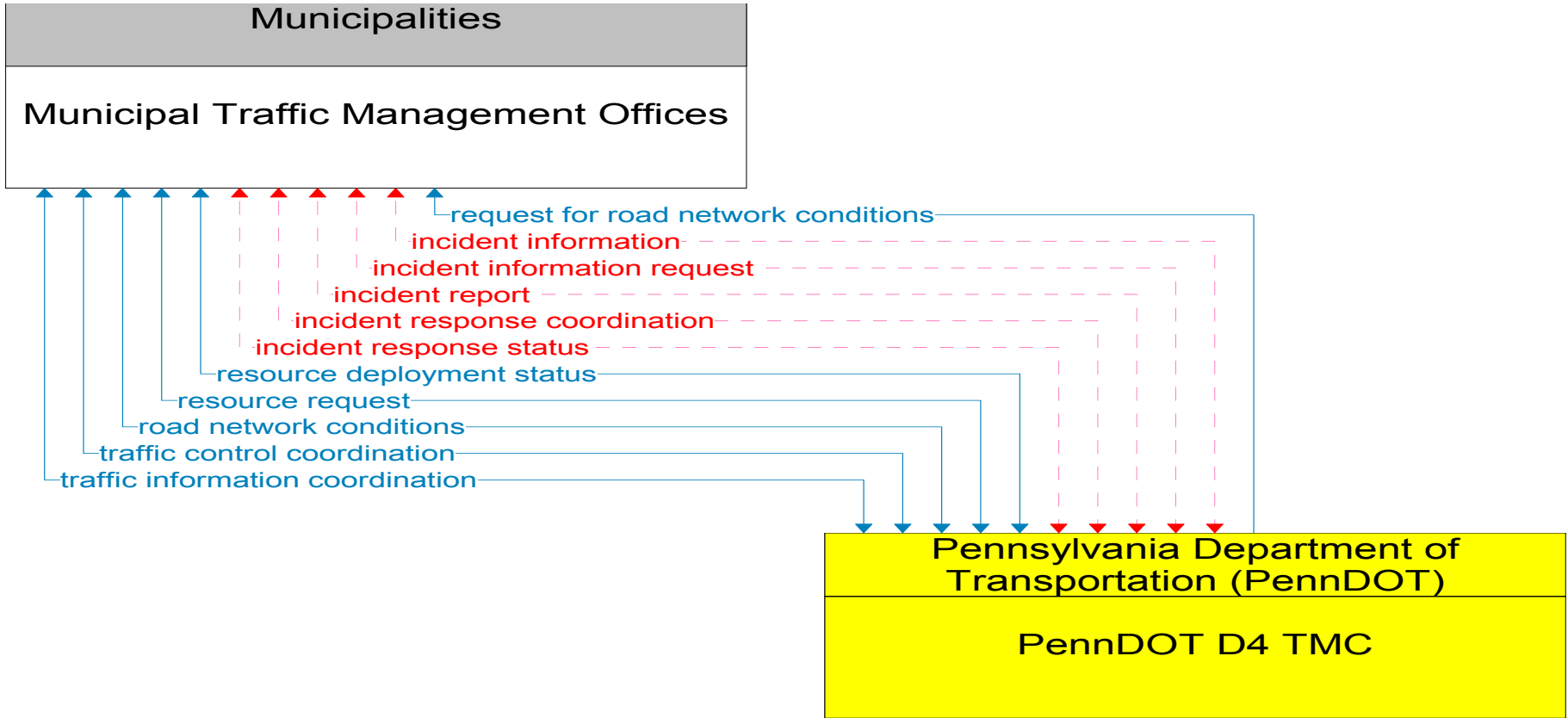
PennDOT D4 TMC

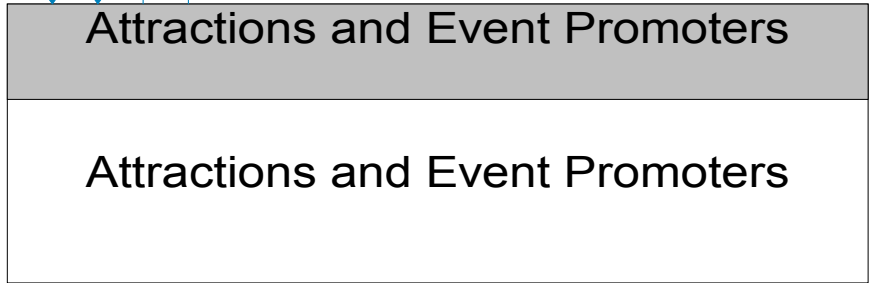
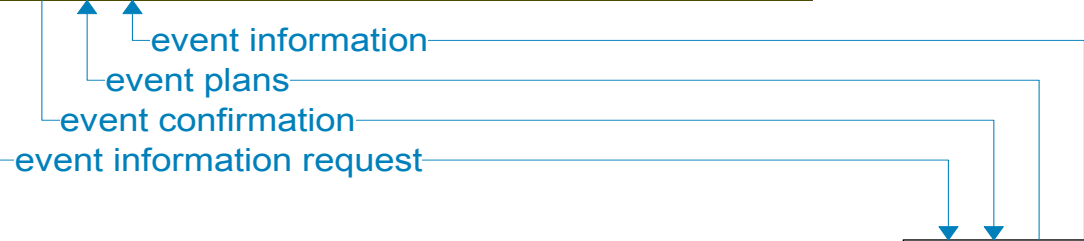
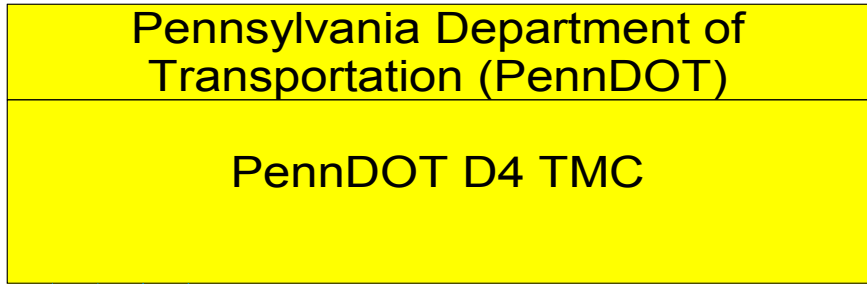


**Pennsylvania Department of Transportation
(PennDOT)**

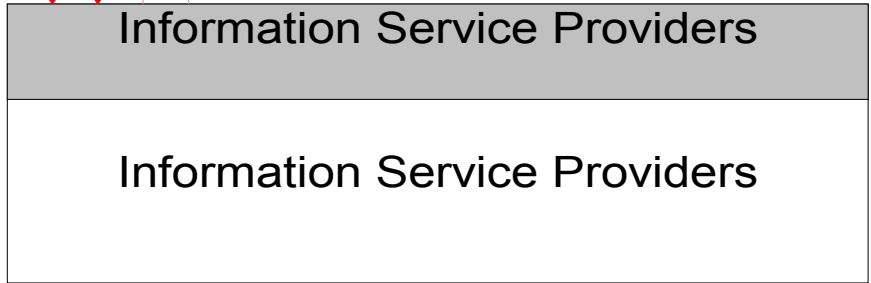
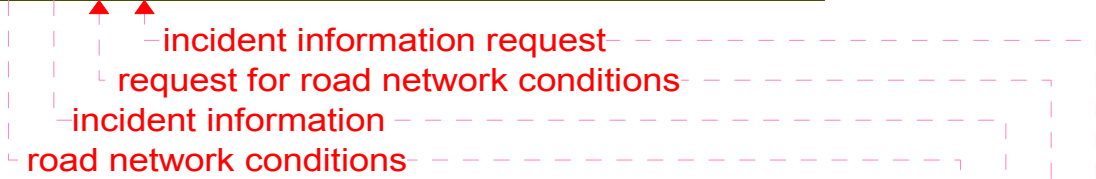
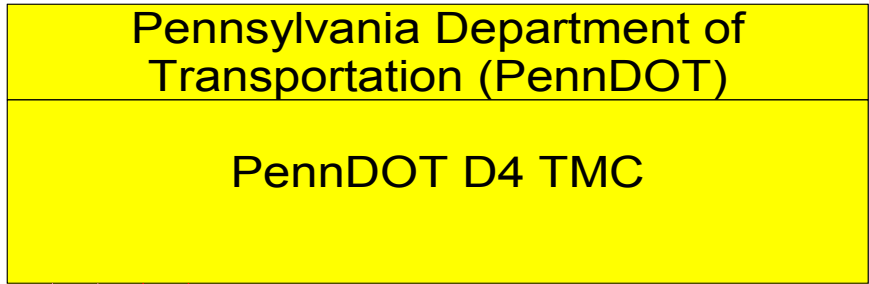
PennDOT STMC

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- - - - - Planned



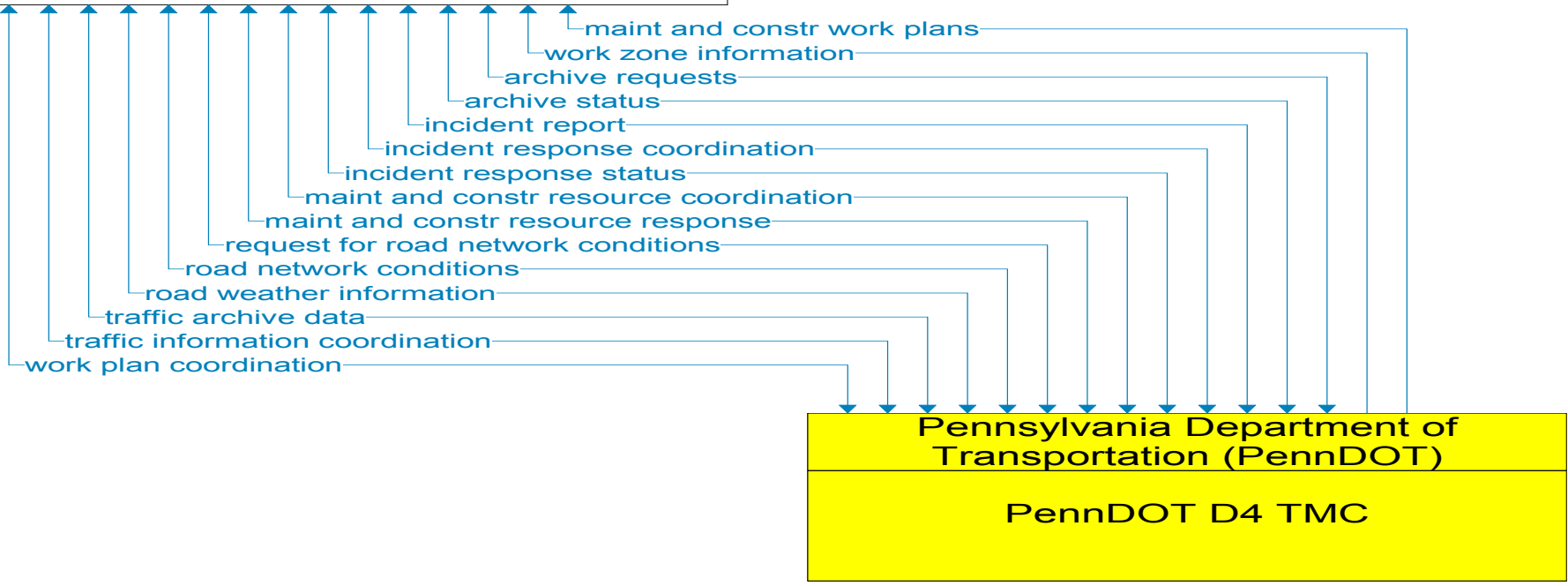


Existing
Planned

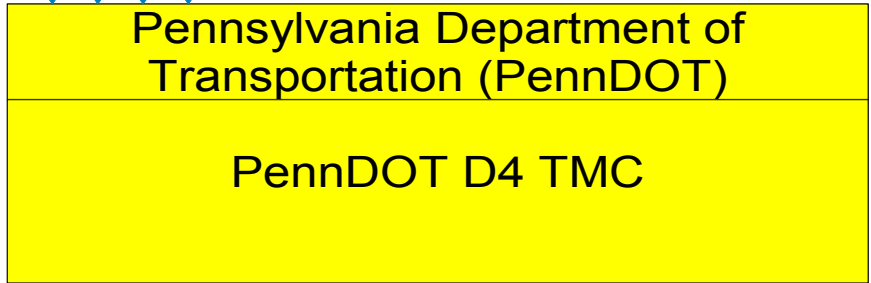
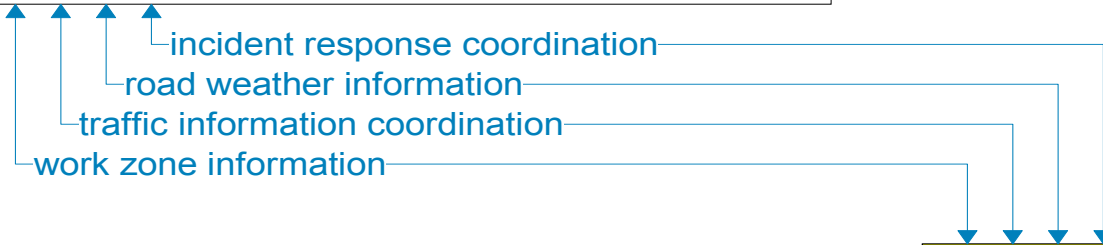
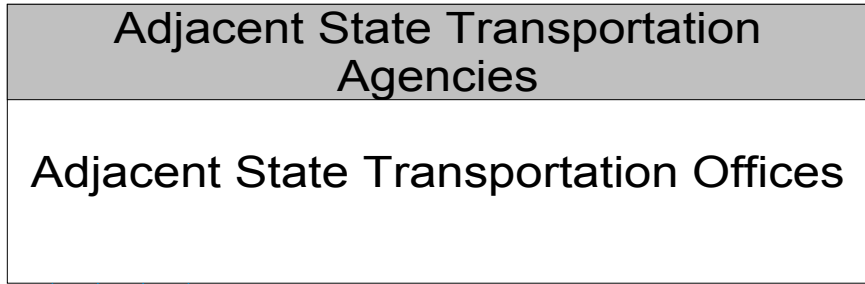


Pennsylvania Department of Transportation (PennDOT)

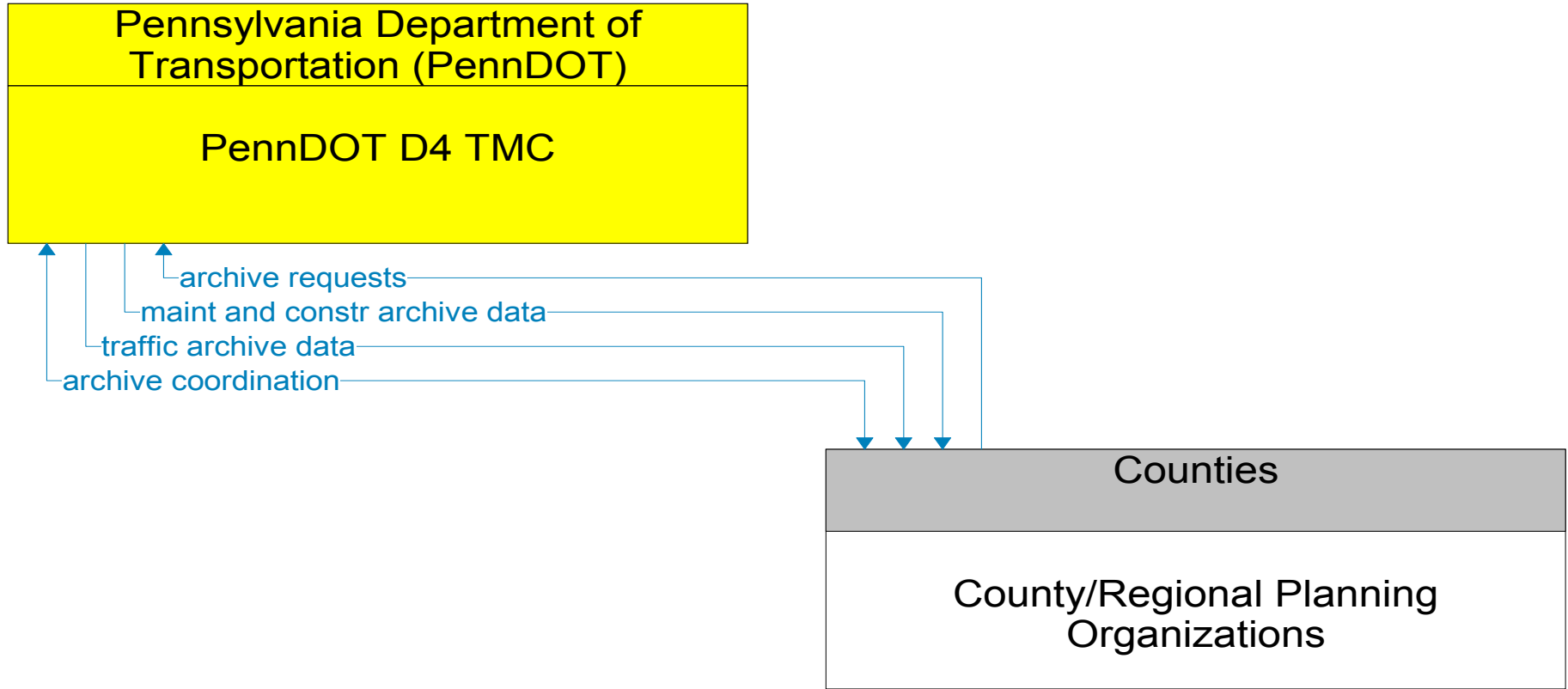
PennDOT Central Office Organizations



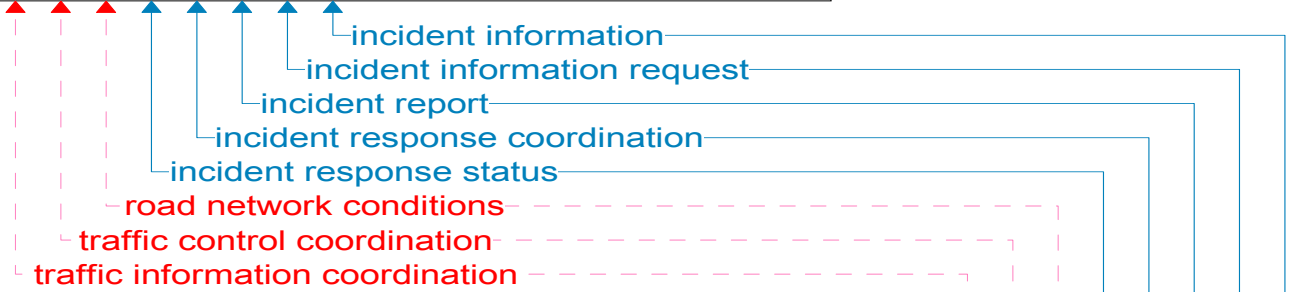
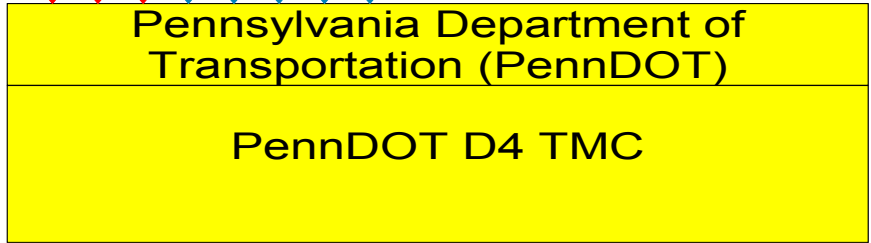
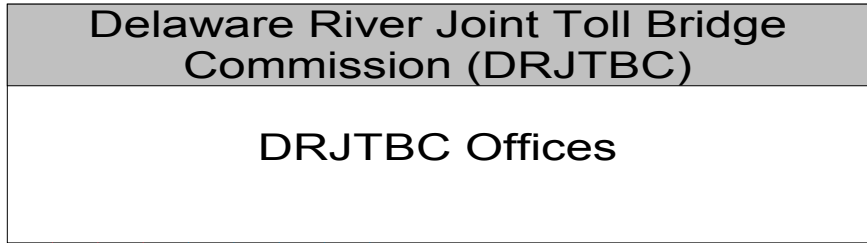
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- - - - - Planned



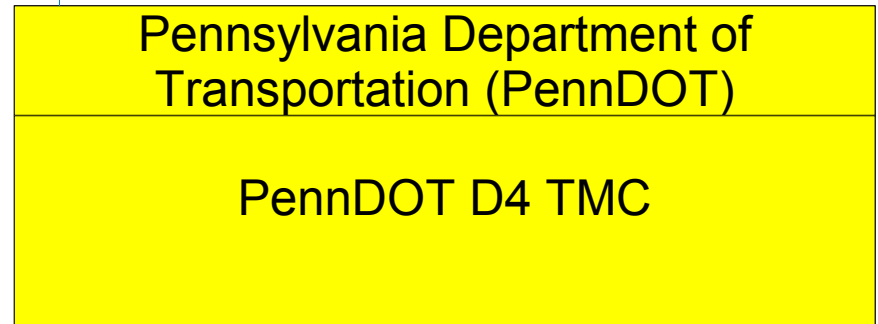
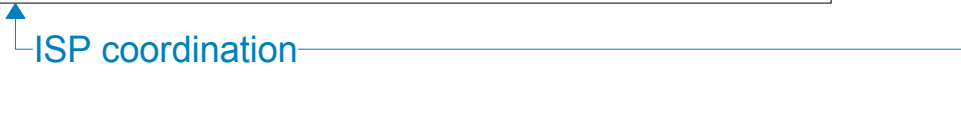
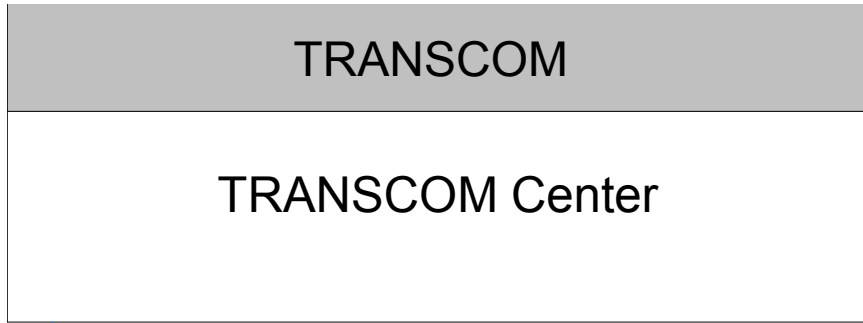
Existing
Planned

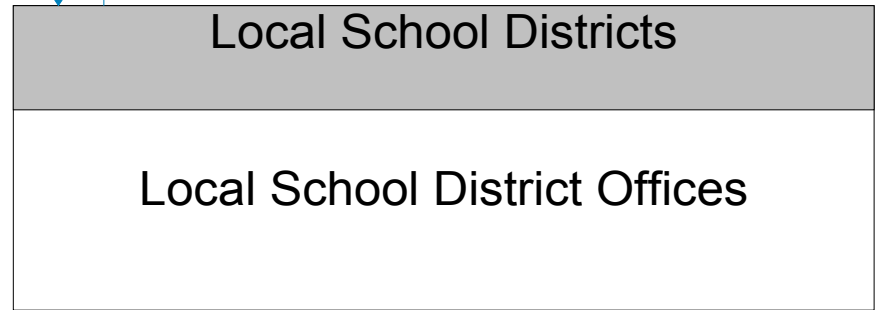
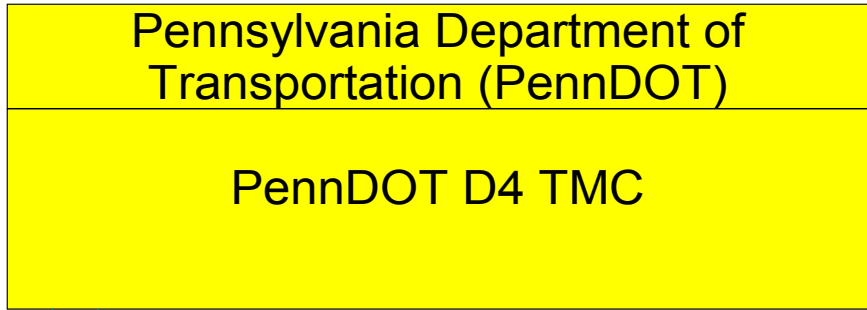


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- - - - - Planned

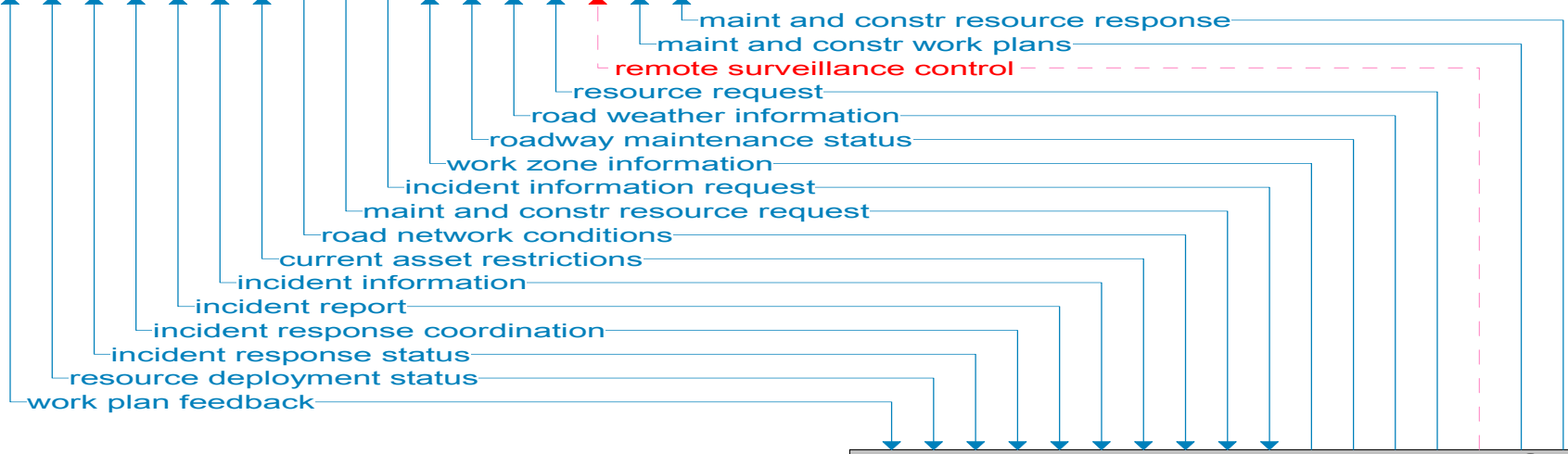
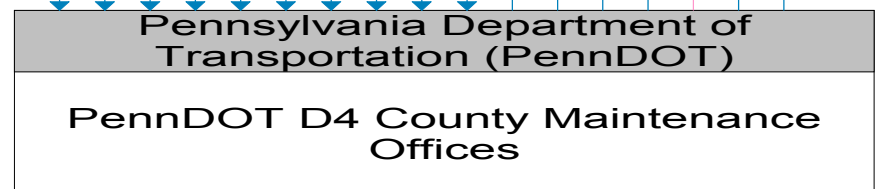
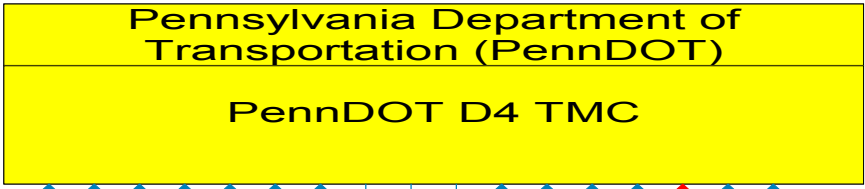


Existing
Planned

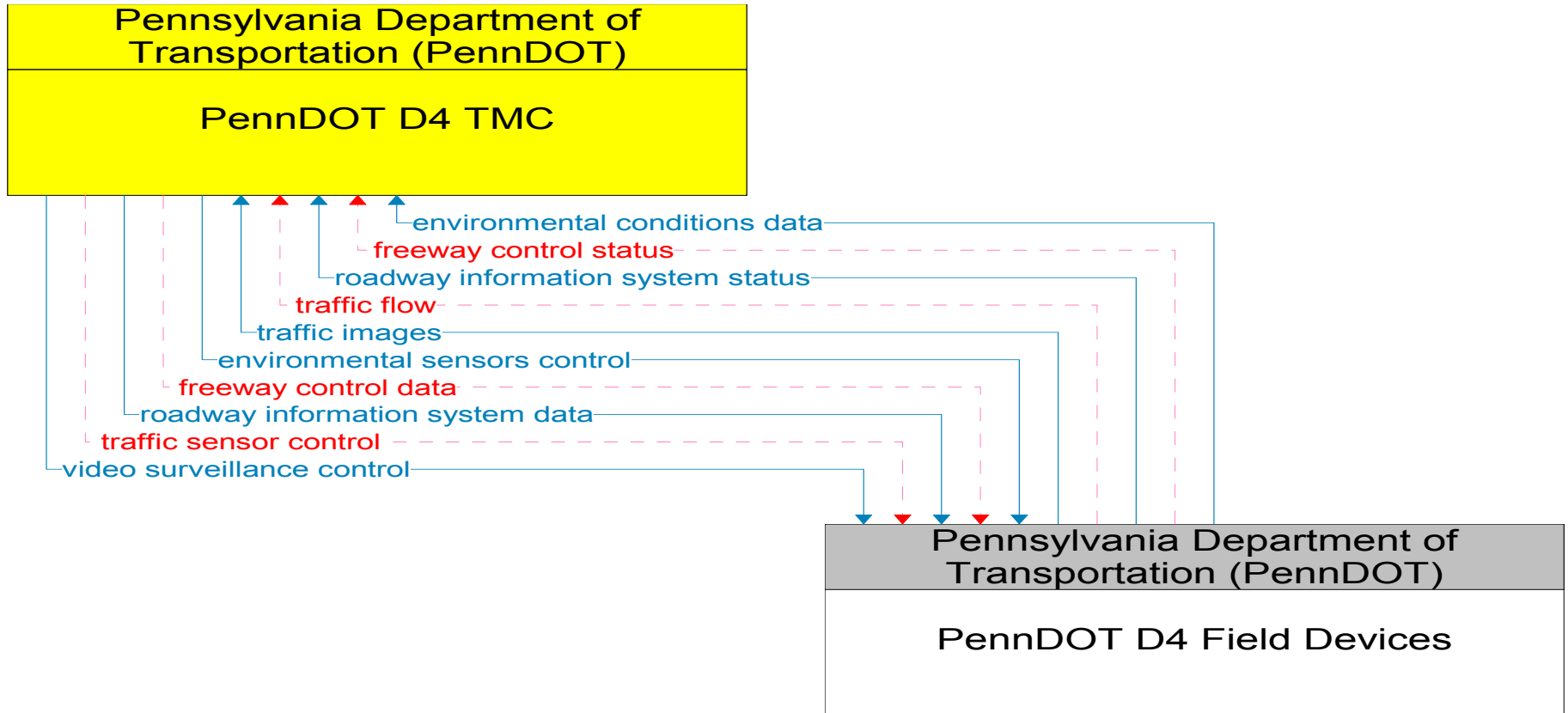




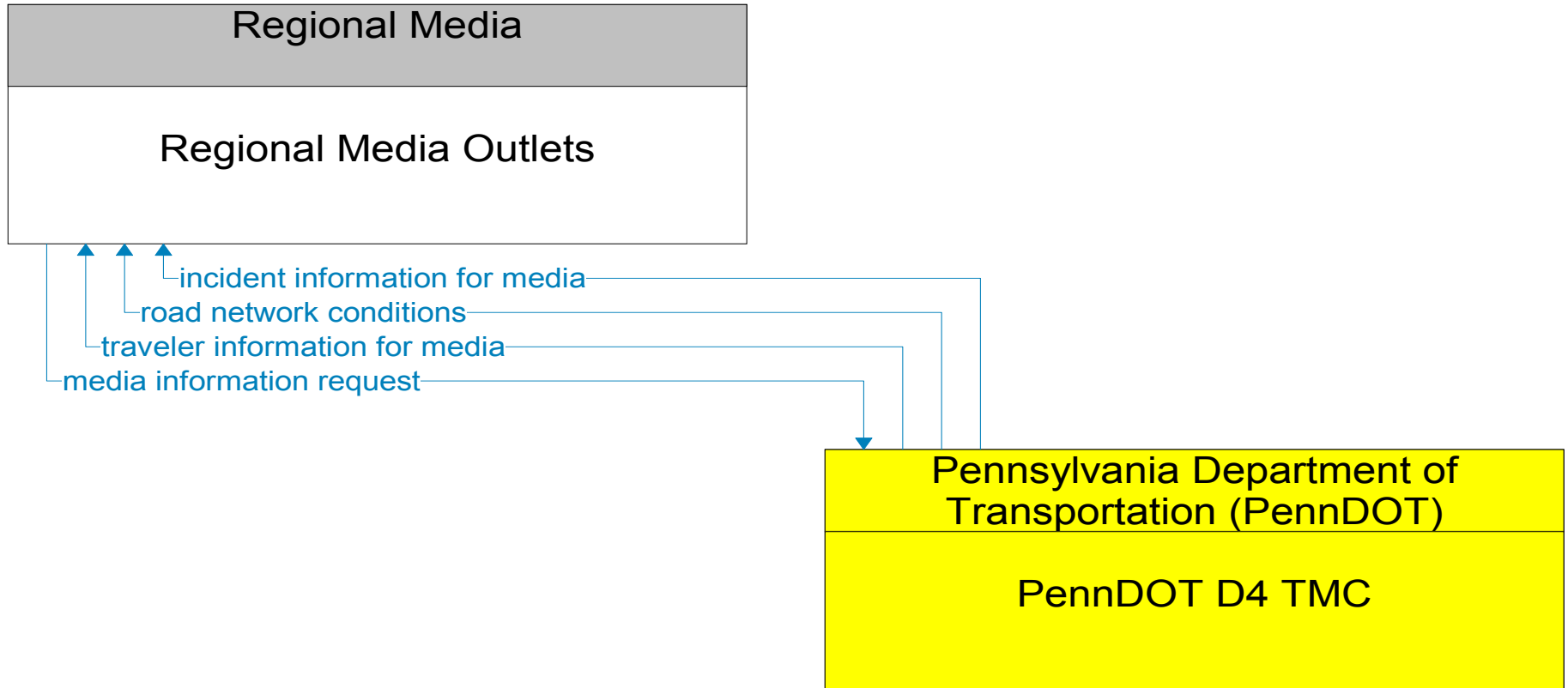
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- - - - - Planned



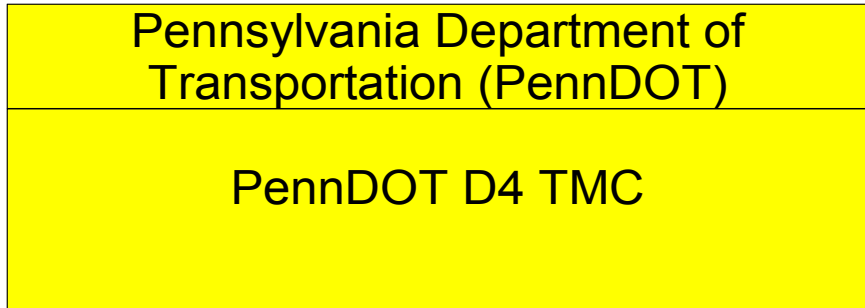
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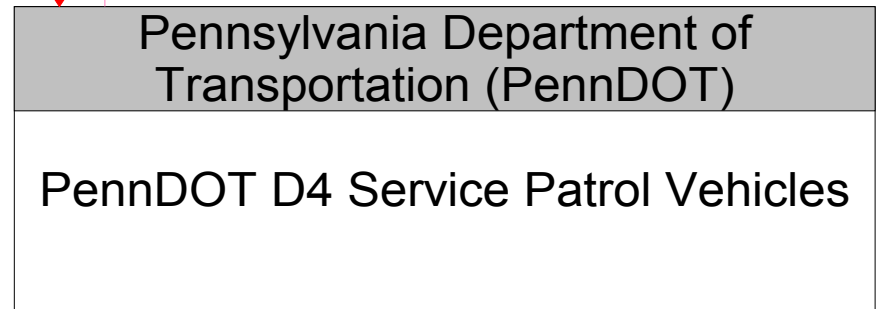
———— Existing
- - - - - Planned



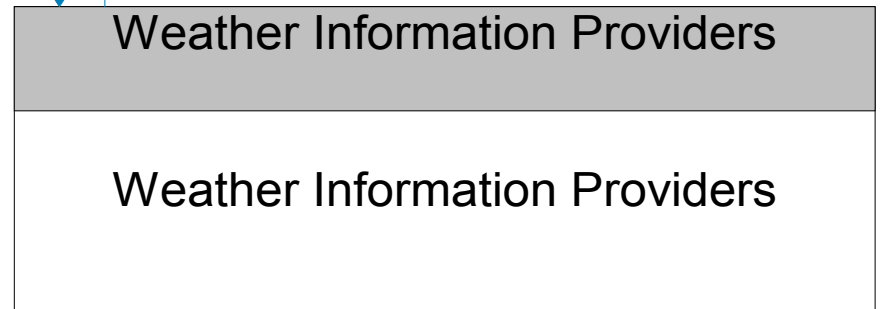
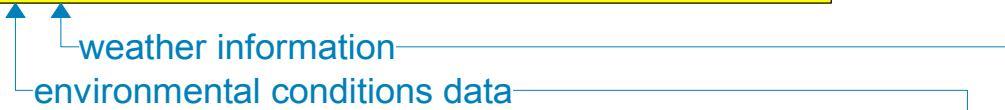
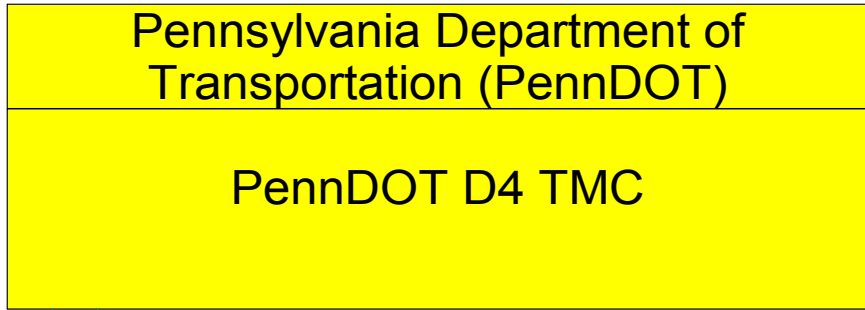
———— Existing
----- Planned



emergency dispatch response
emergency dispatch requests



———— Existing
- - - - - Planned



Pennsylvania Department of
Transportation (PennDOT)

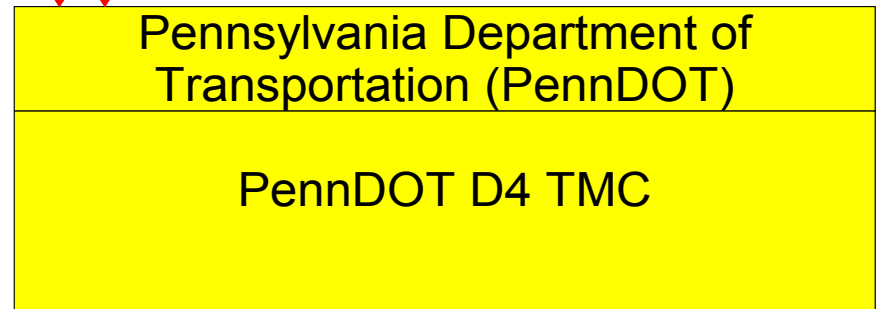
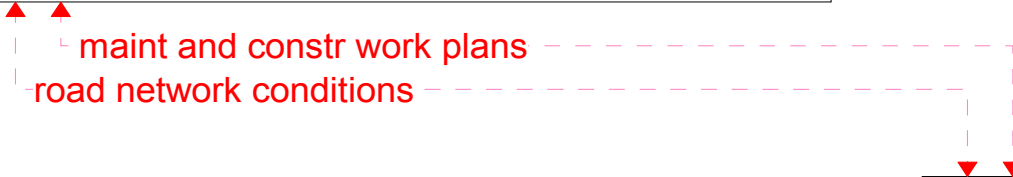
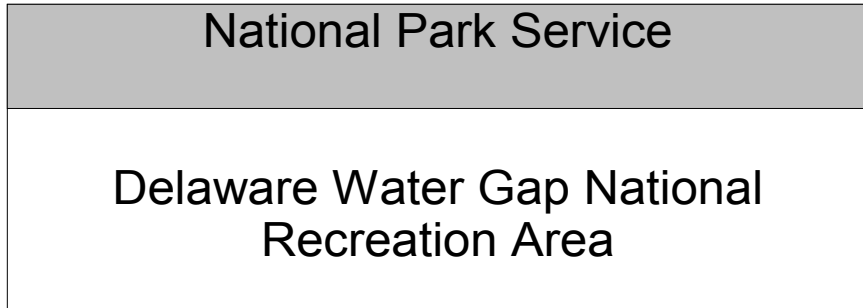
PennDOT Welcome Centers and Rest
Areas

traveler information
traveler request

Pennsylvania Department of
Transportation (PennDOT)

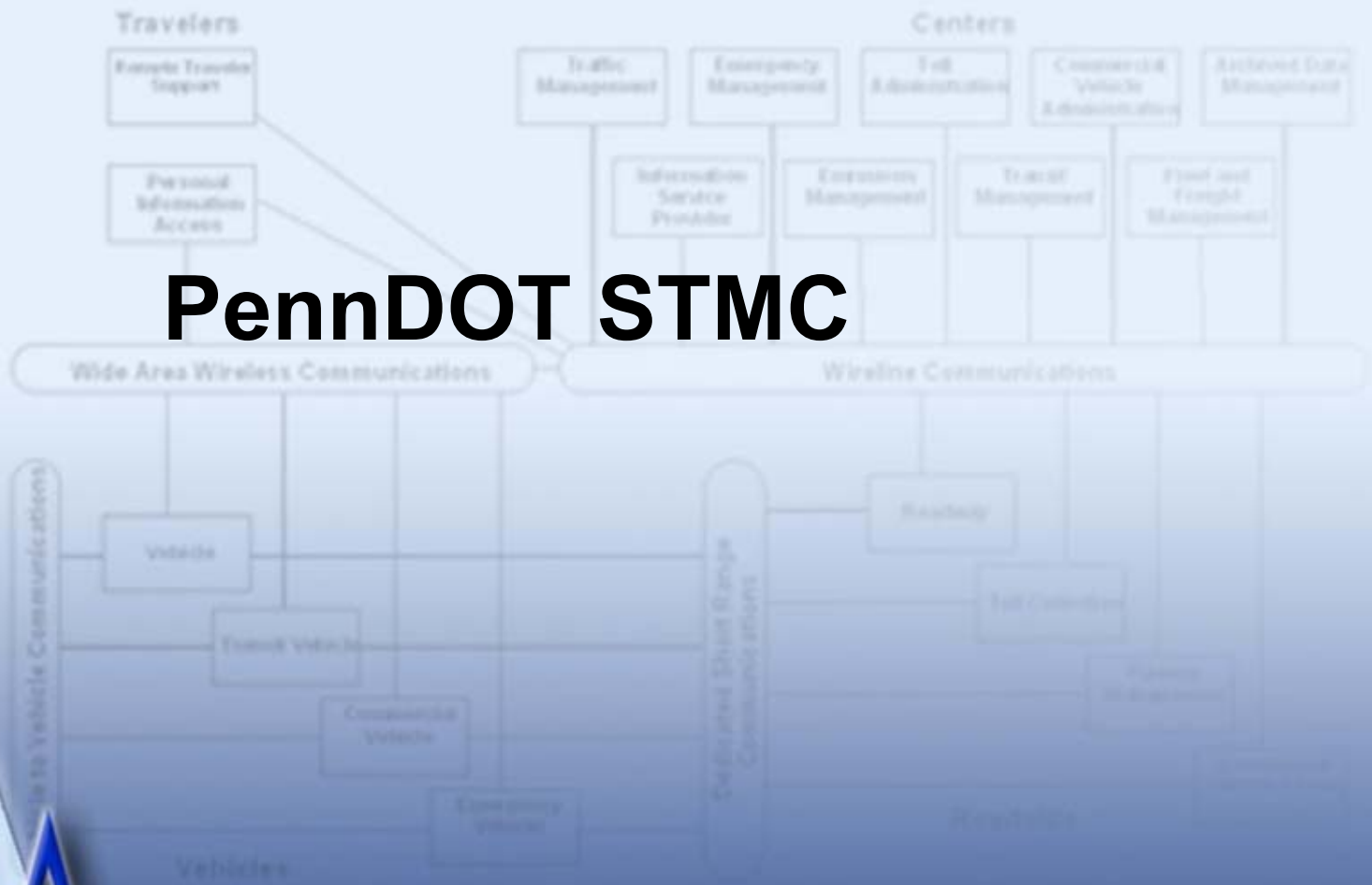
PennDOT D4 TMC

Existing
Planned



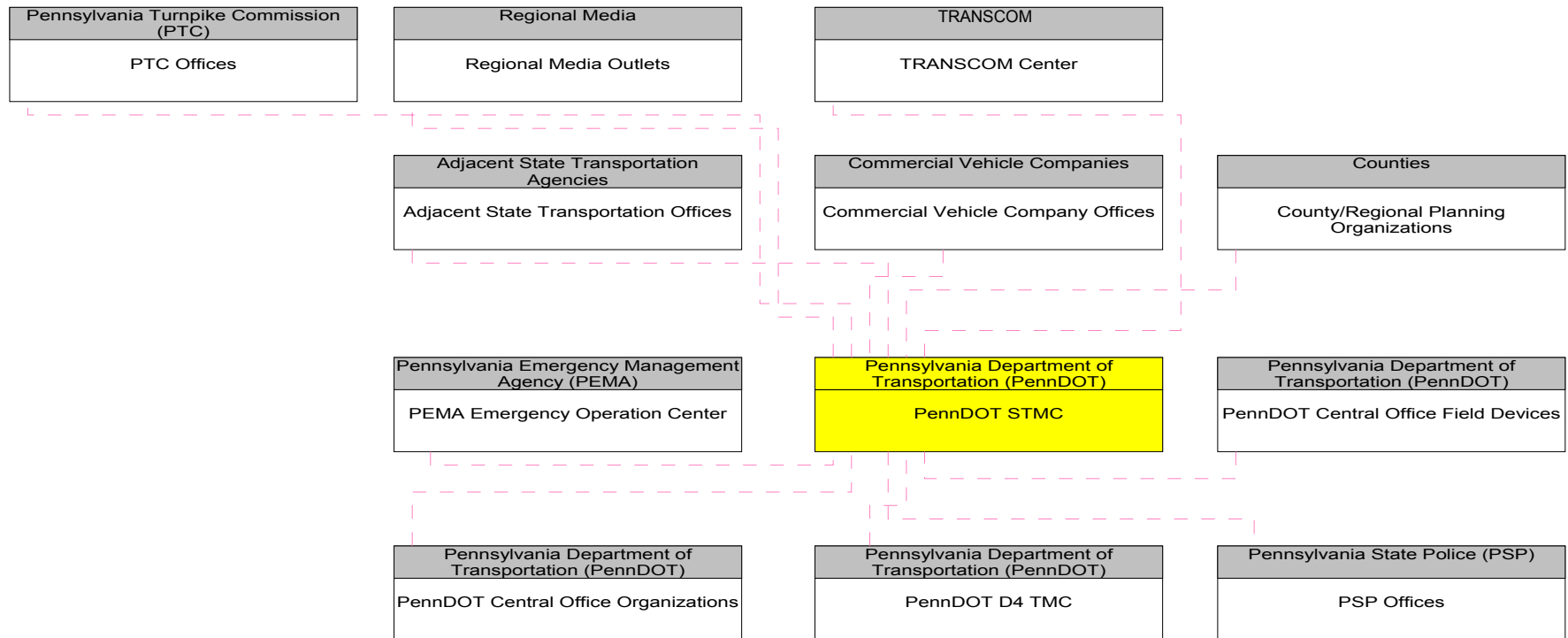
———— Existing
- - - - - Planned

PennDOT STMC

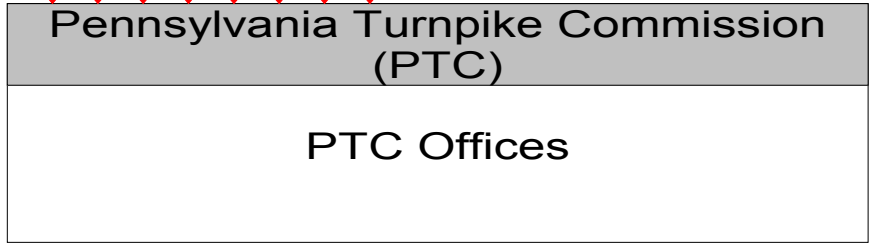
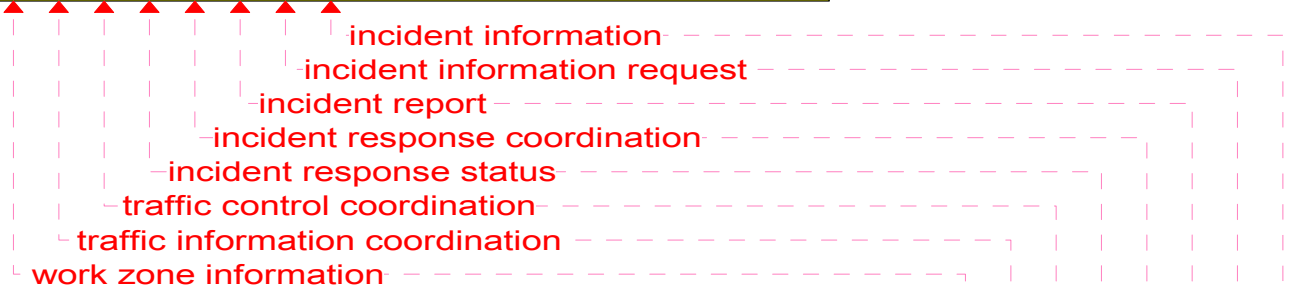
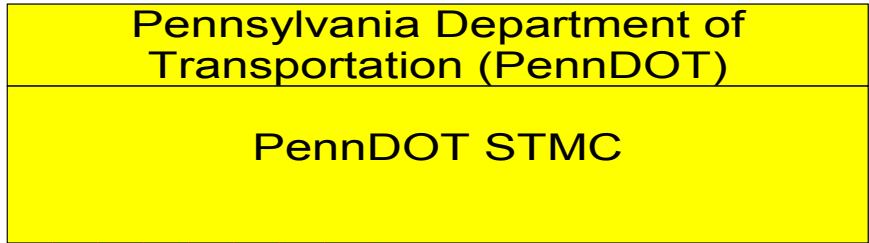


PA

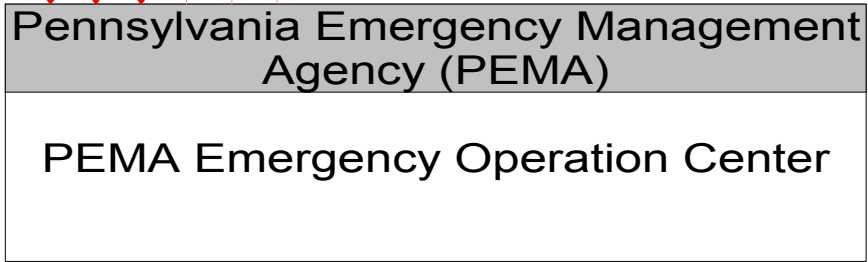
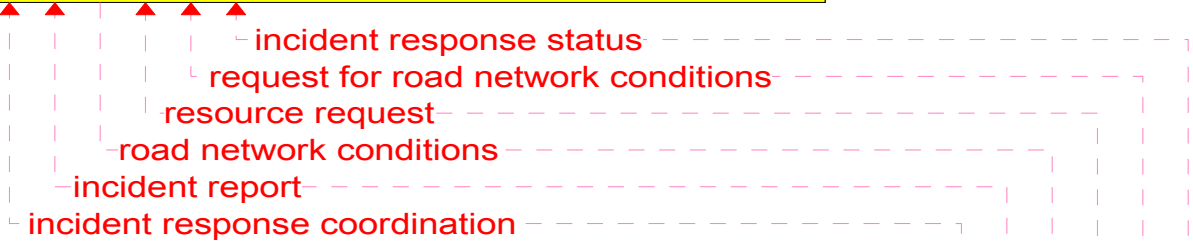
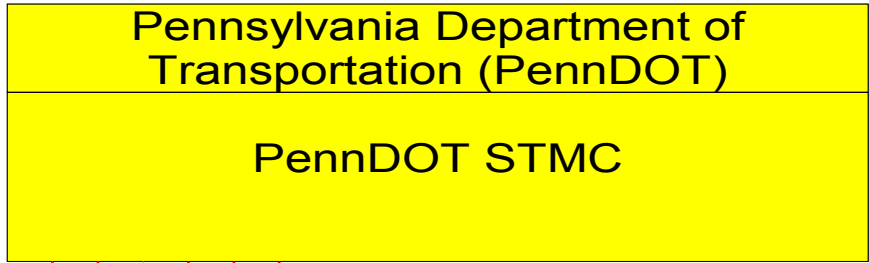
PennDOT STMC Interconnect Diagram



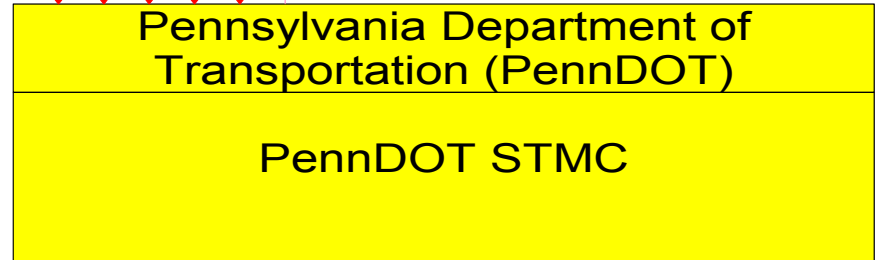
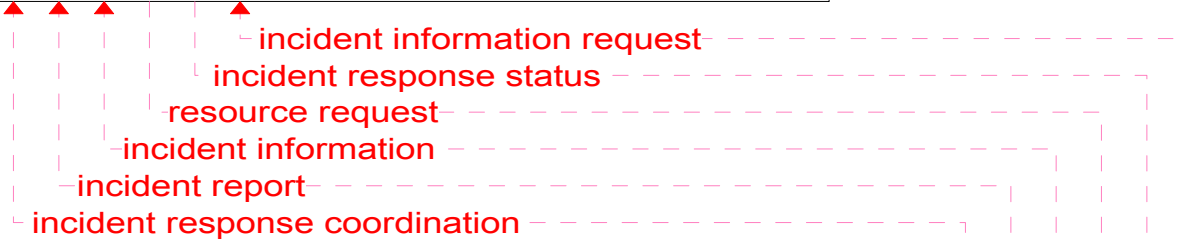
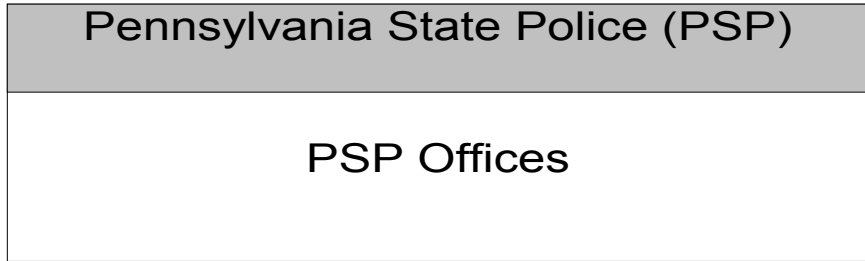
— Existing
- - - Planned



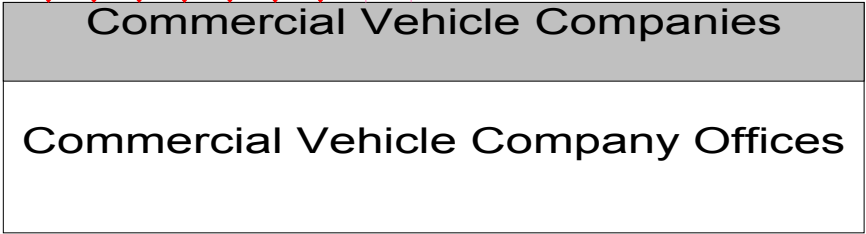
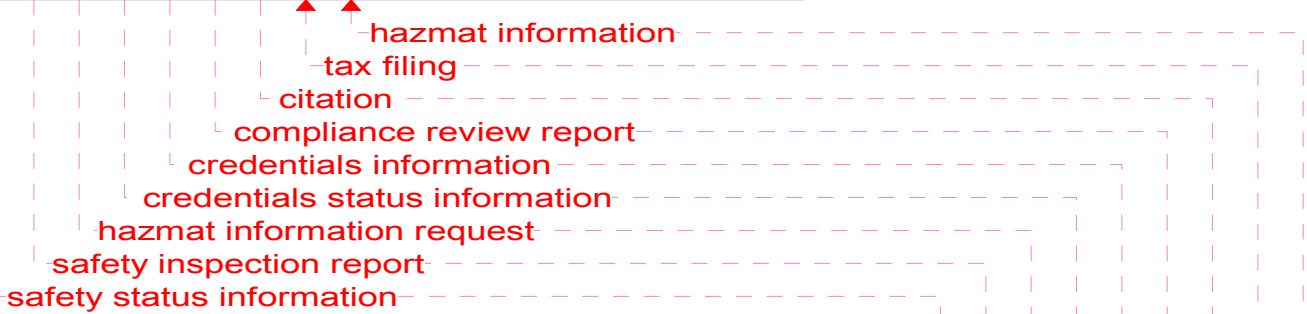
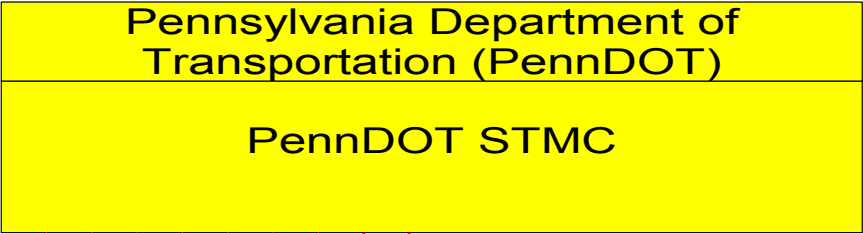
———— Existing
- - - - - Planned



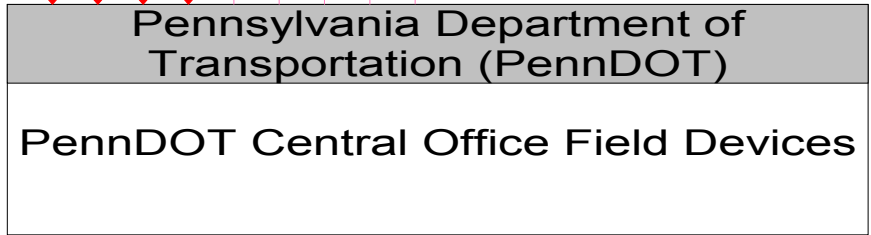
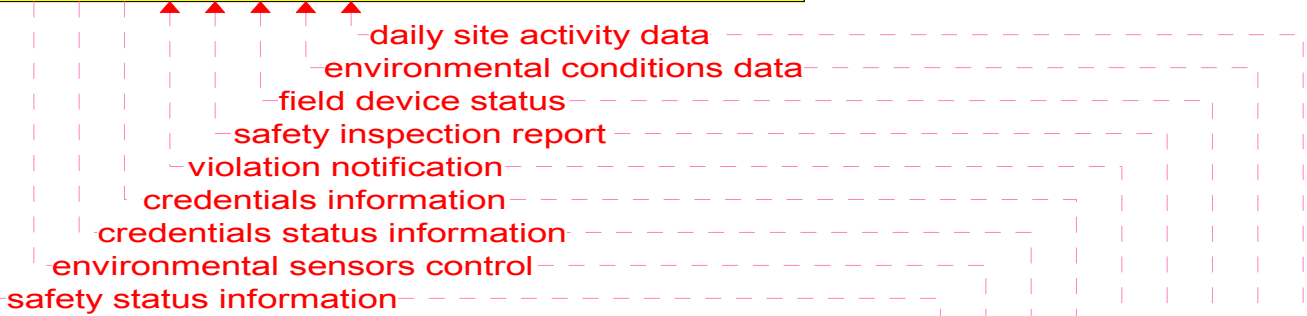
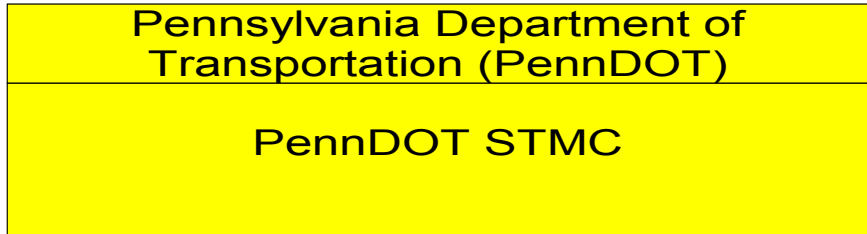
———— Existing
- - - - - Planned



Existing
Planned



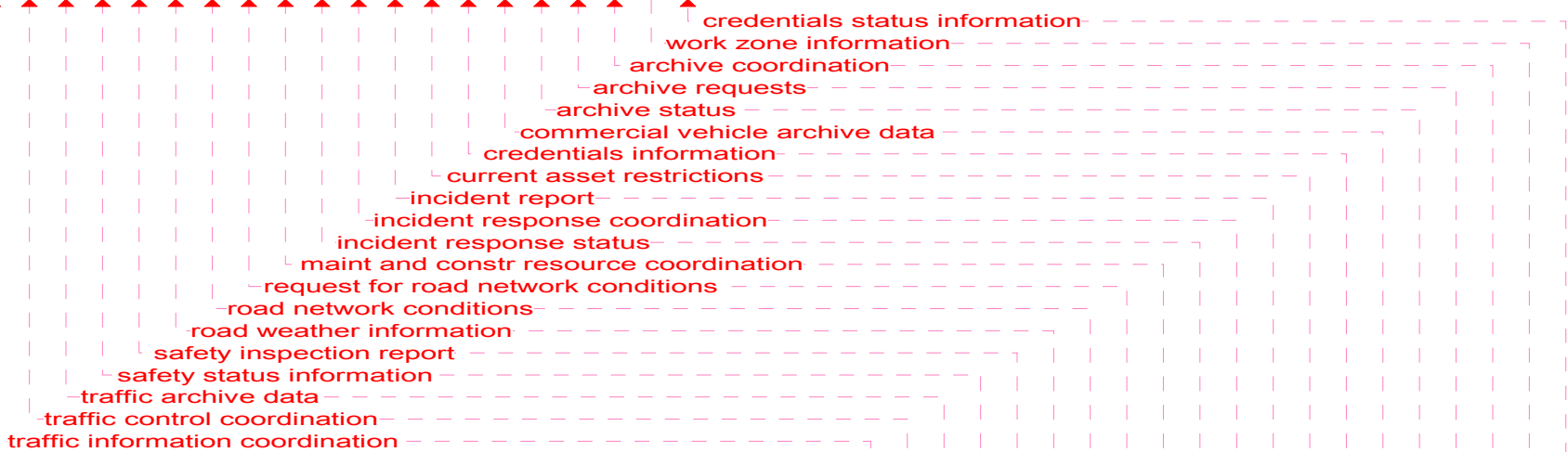
Existing
Planned



———— Existing
- - - - - Planned

**Pennsylvania Department of Transportation
(PennDOT)**

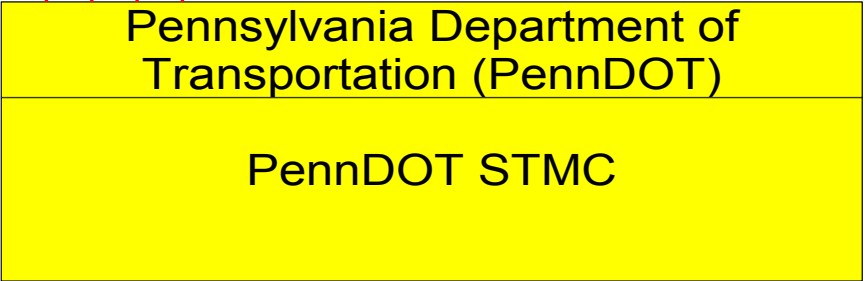
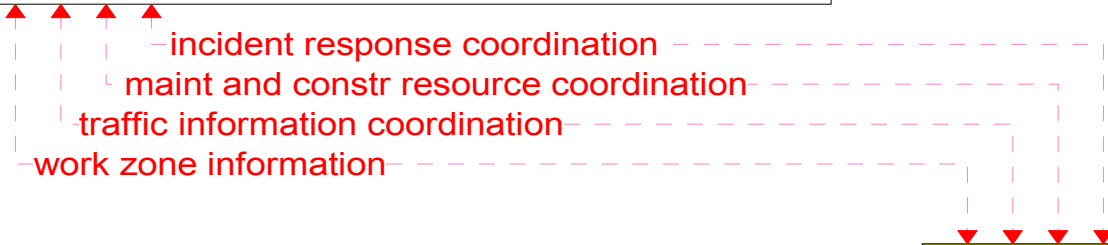
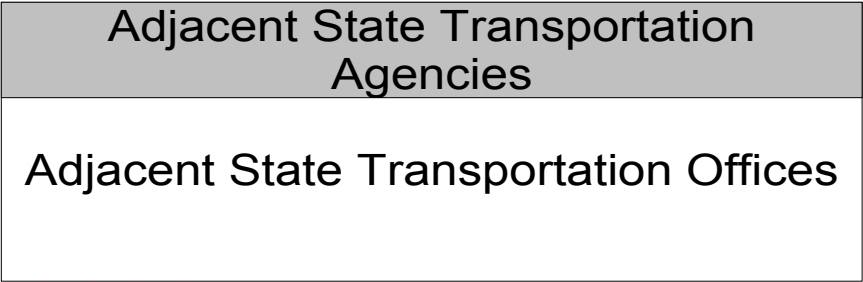
PennDOT STMC



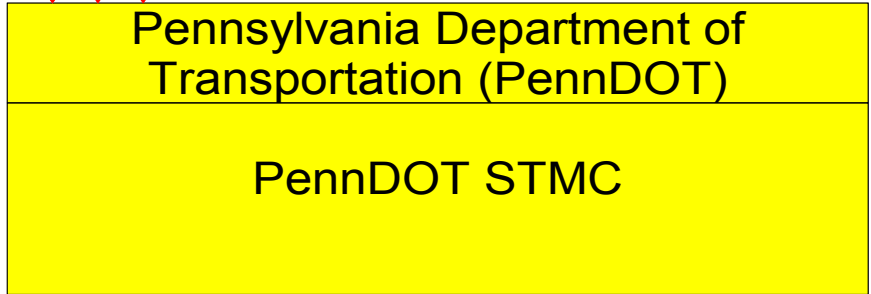
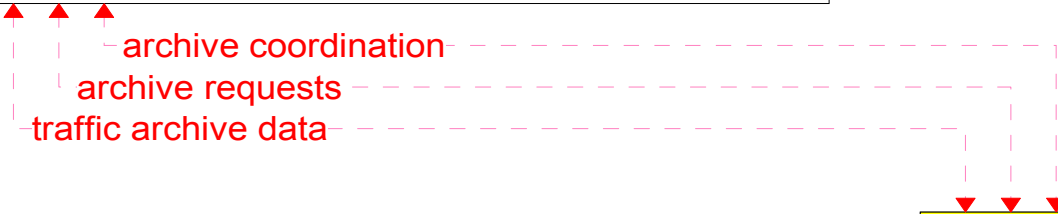
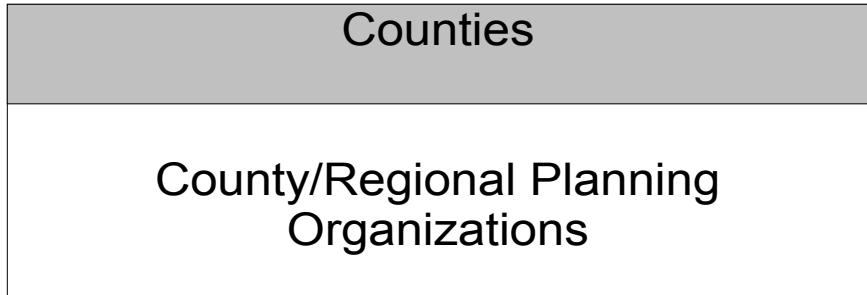
**Pennsylvania Department of Transportation
(PennDOT)**

PennDOT Central Office Organizations

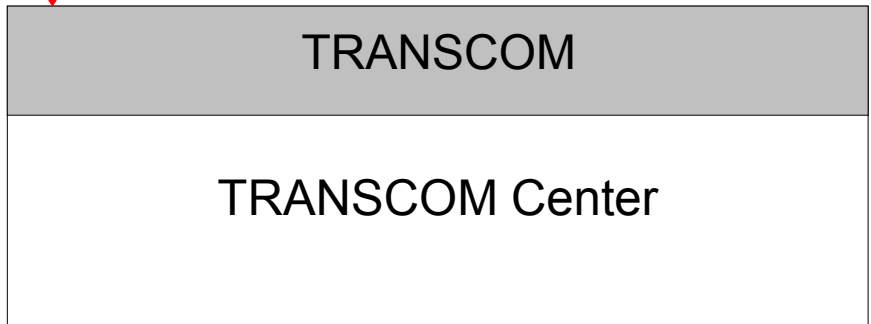
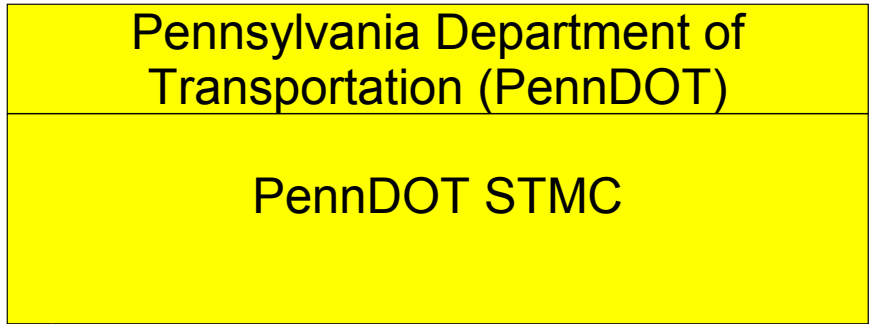
———— Existing
- - - - - Planned



———— Existing
----- Planned

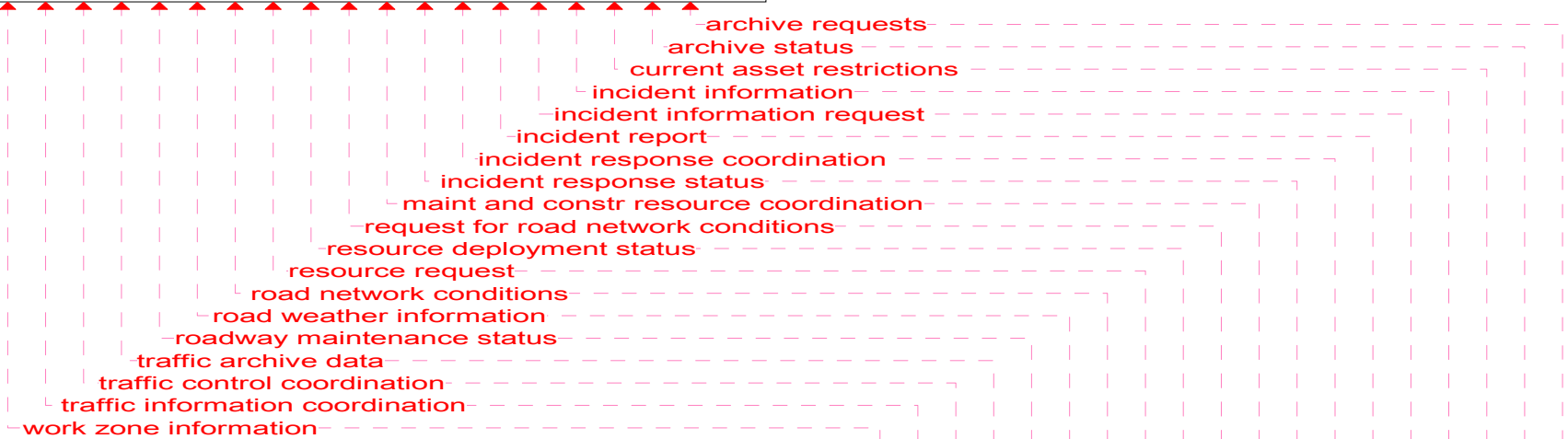


Existing
Planned



Pennsylvania Department of Transportation
(PennDOT)

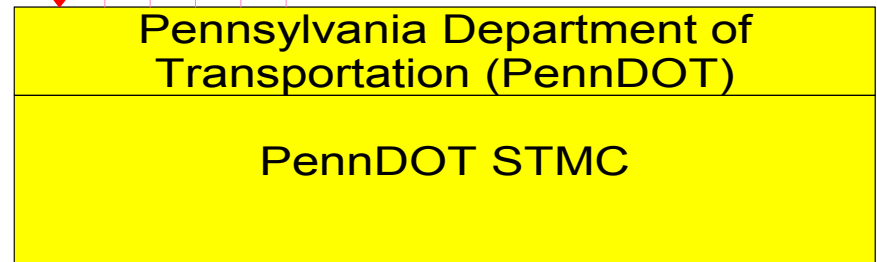
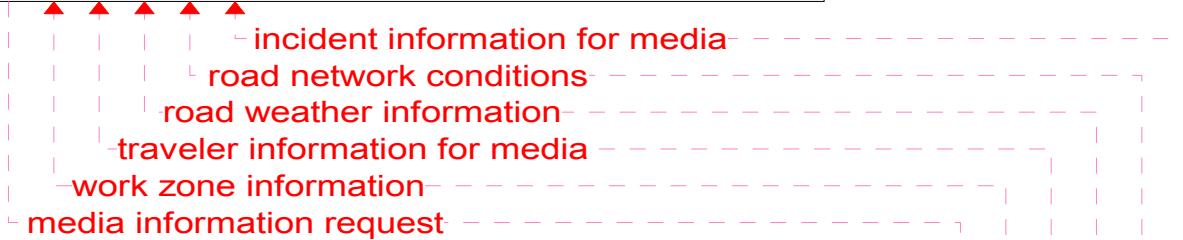
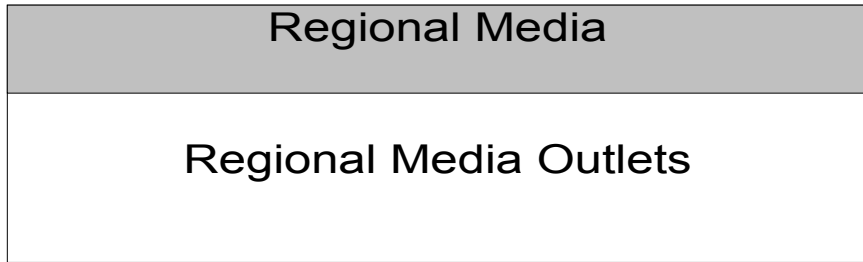
PennDOT D4 TMC



Pennsylvania Department of Transportation
(PennDOT)

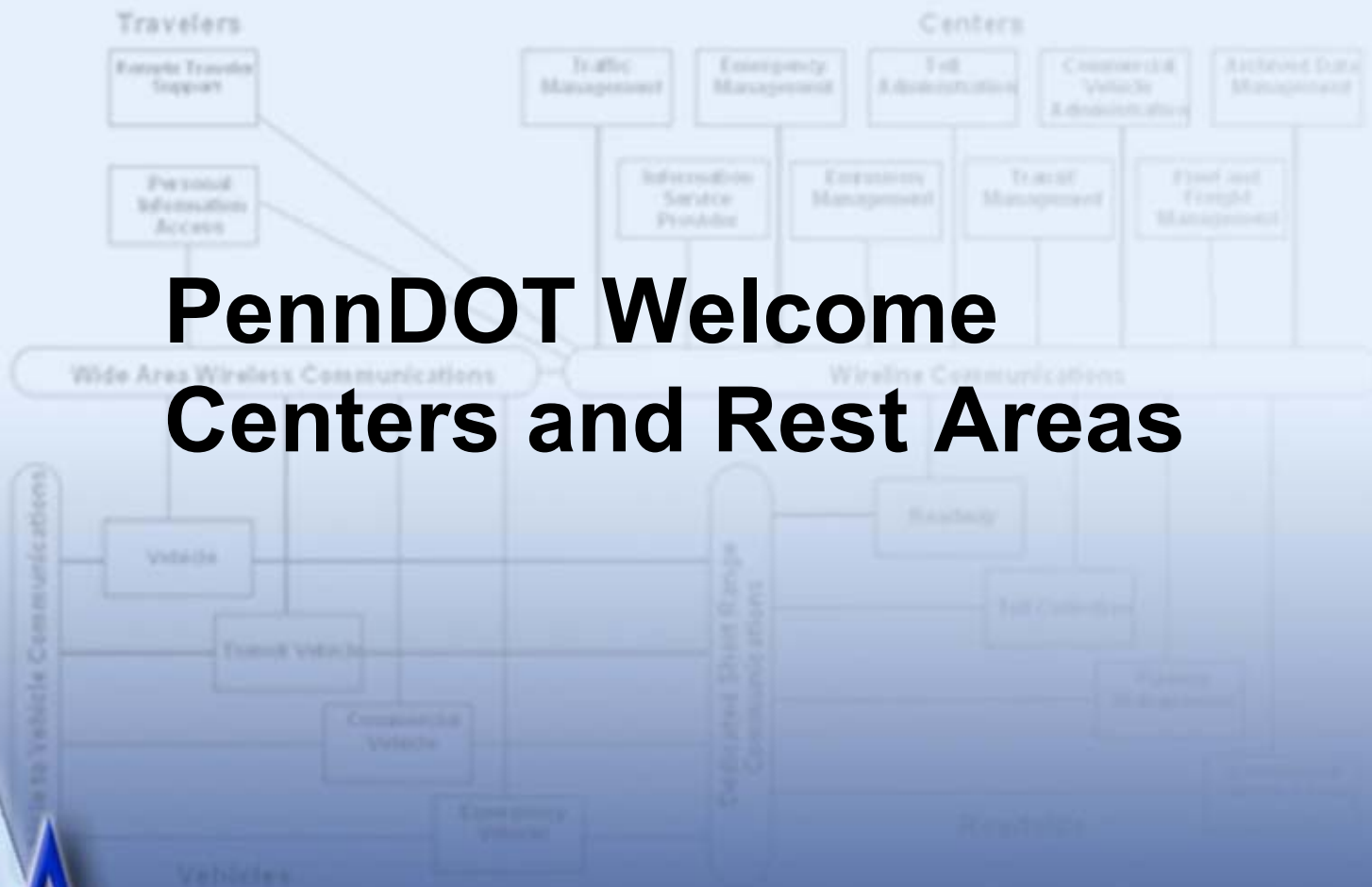
PennDOT STMC

Existing
Planned



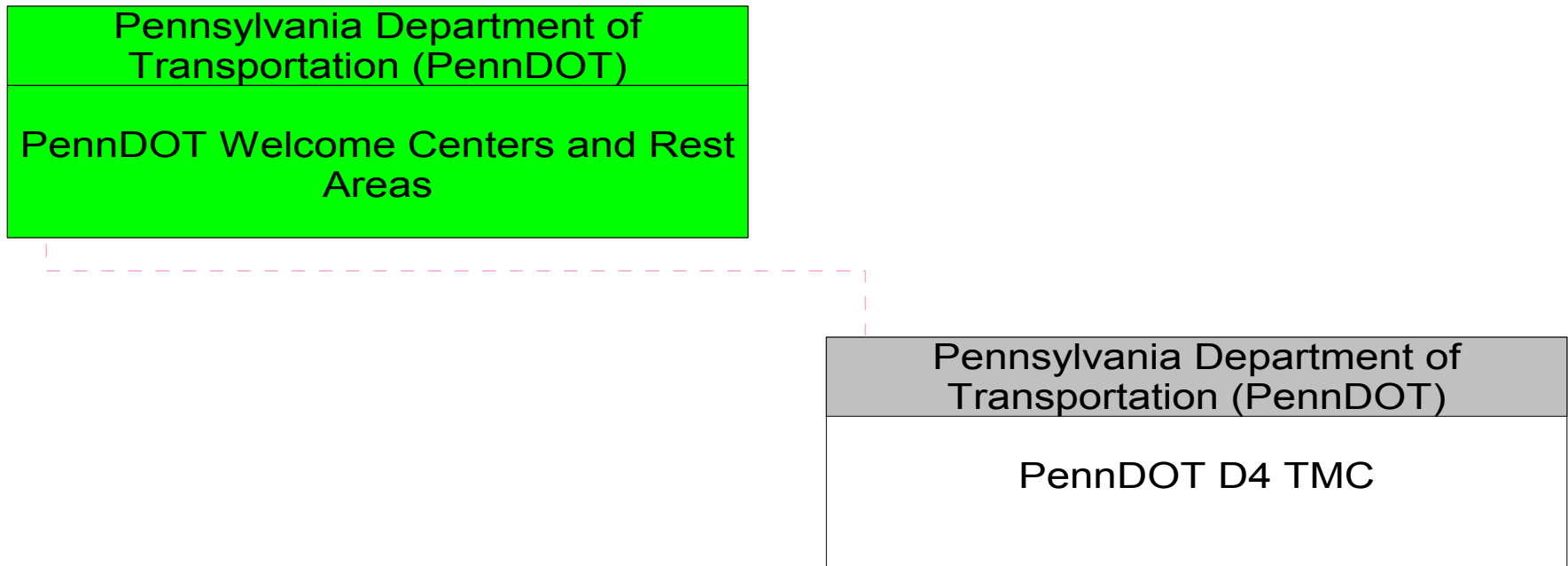
———— Existing
- - - - - Planned

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)

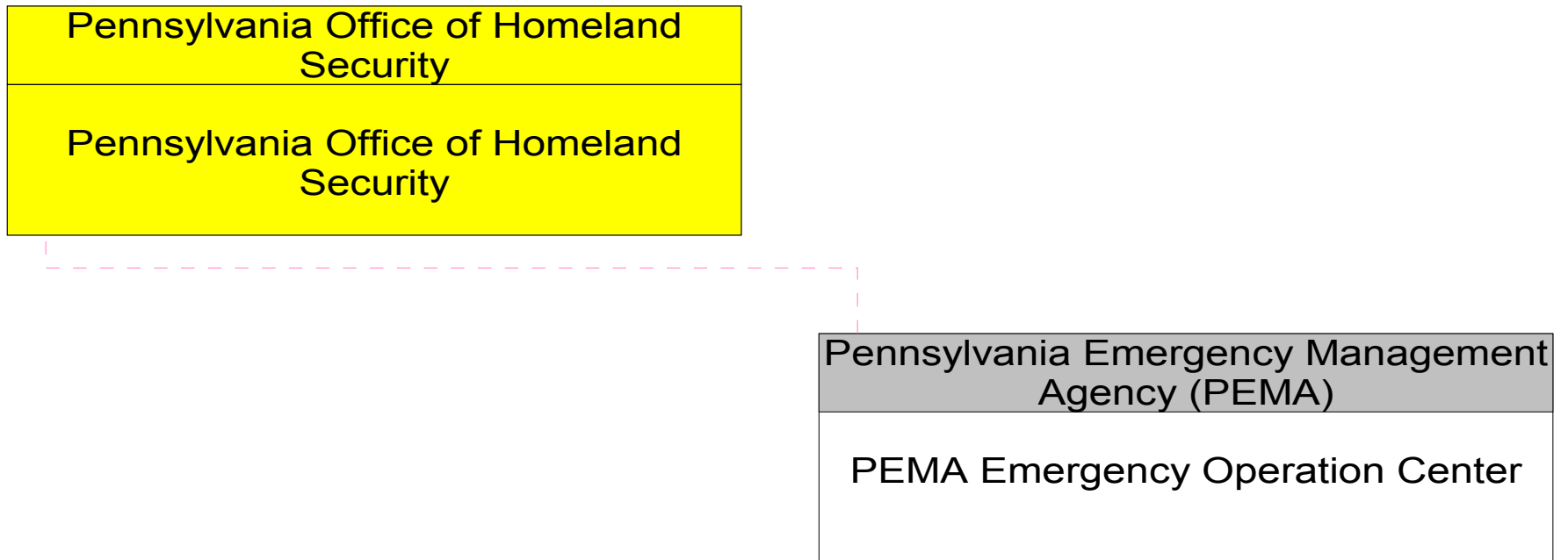
PennDOT D4 TMC

Existing
Planned

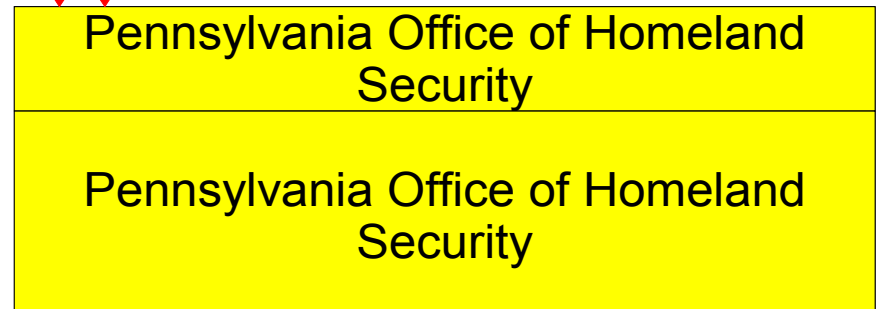
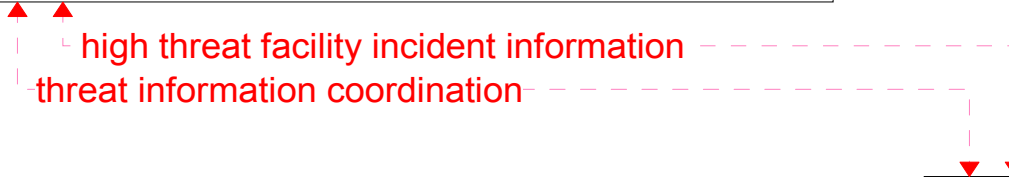
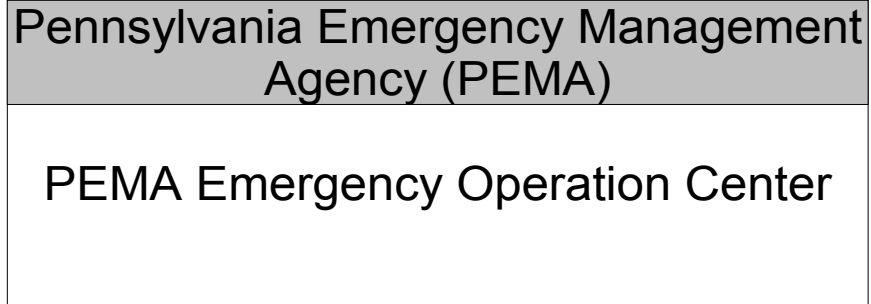
Pennsylvania Office of Homeland Security



Pennsylvania Office of Homeland Security Interconnect Diagram

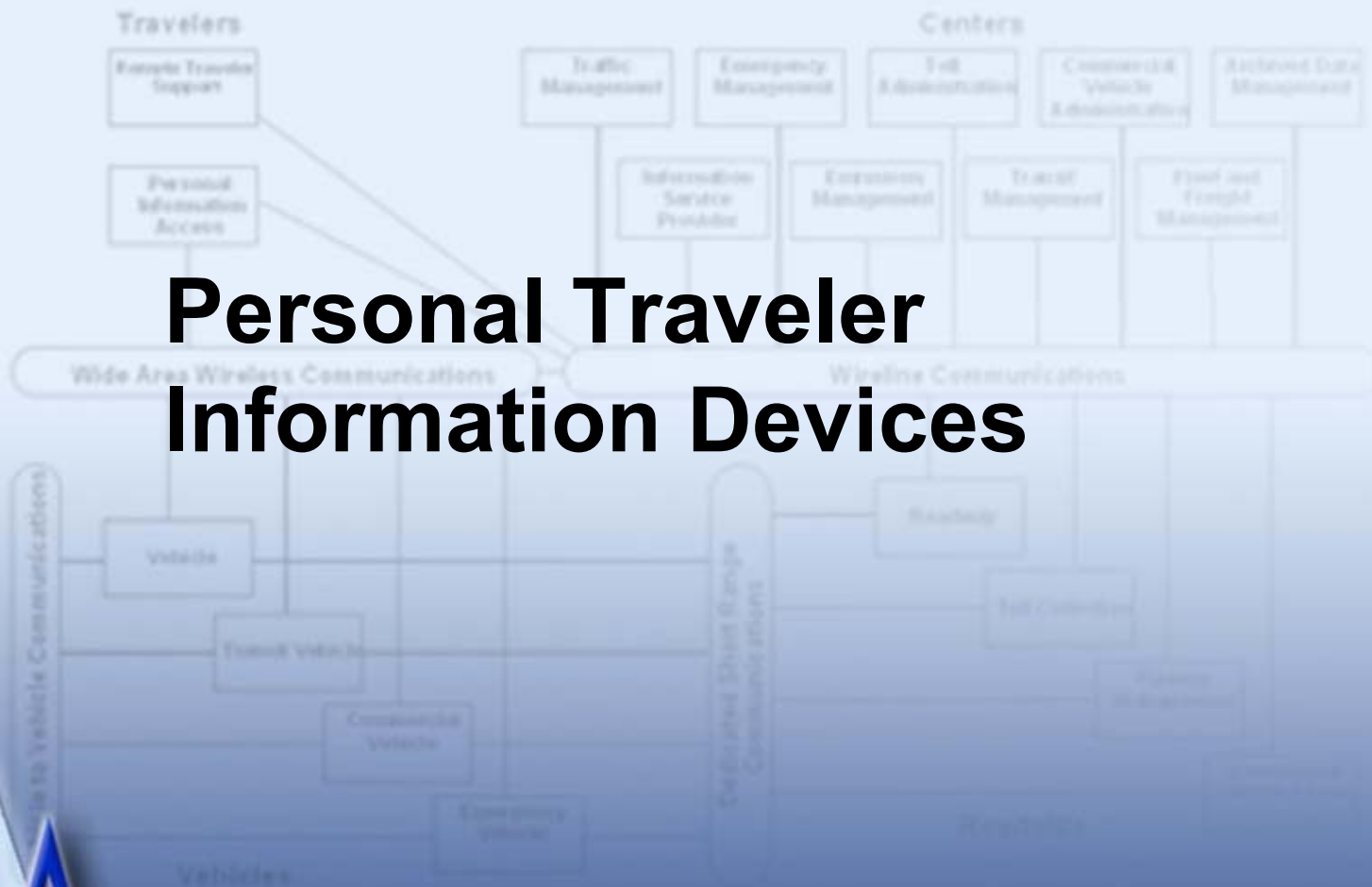


Existing
Planned



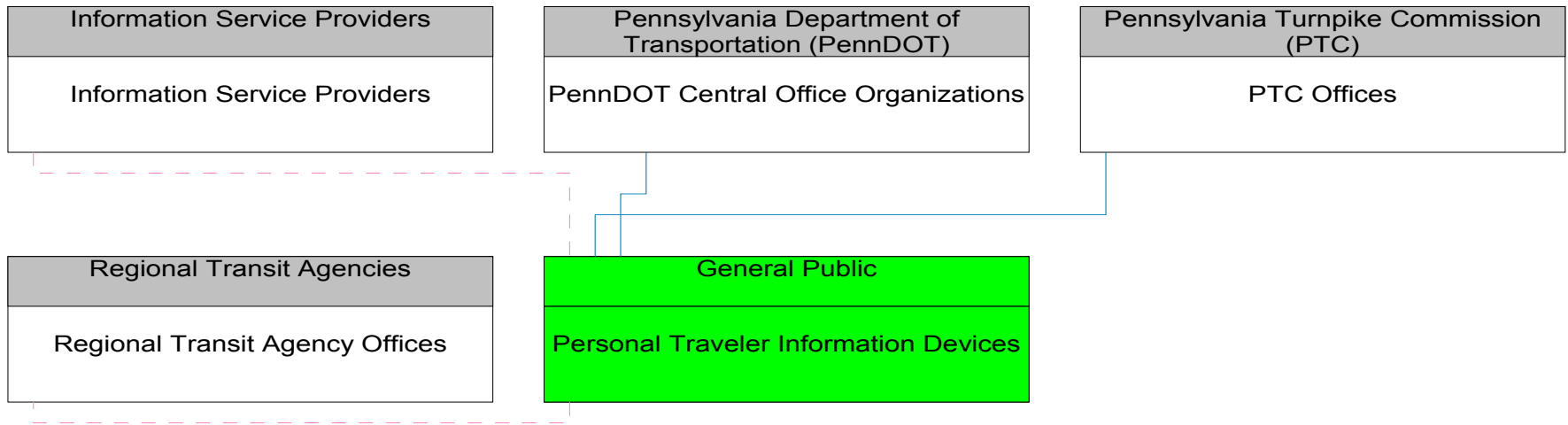
———— Existing
- - - - - Planned

Personal Traveler Information Devices

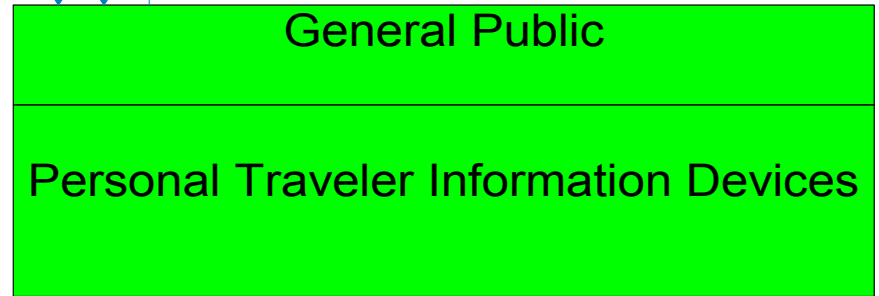
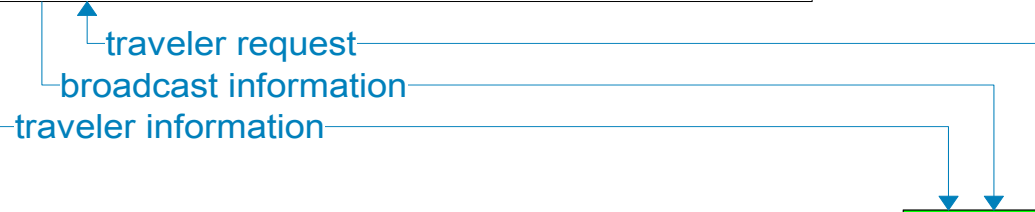
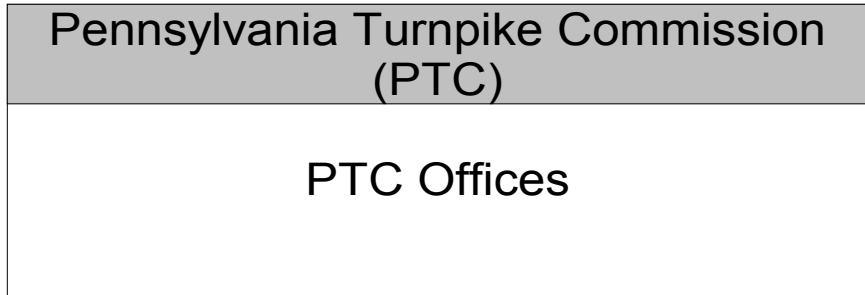


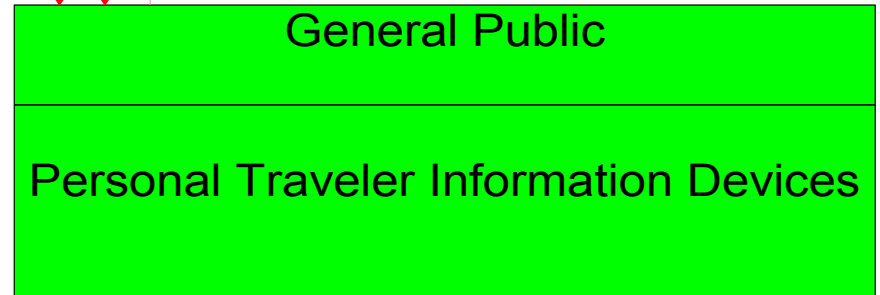
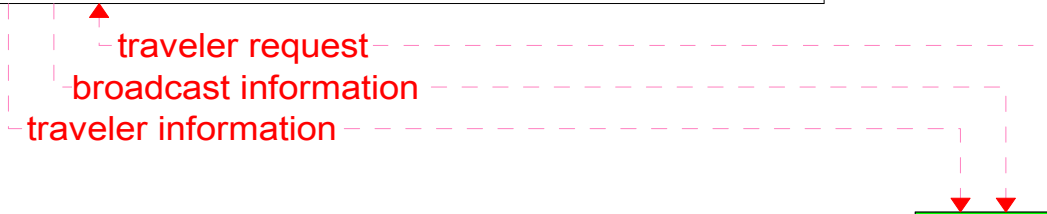
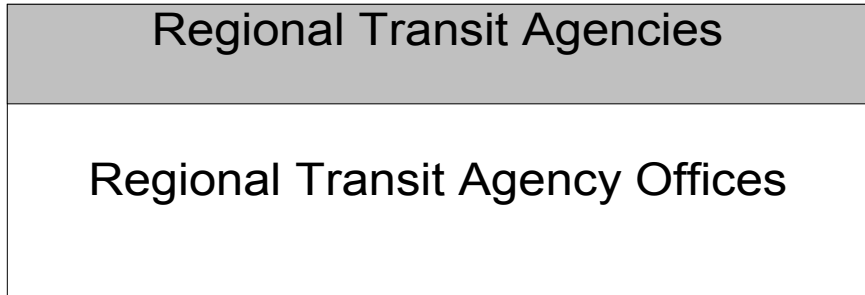
PA

Personal Traveler Information Devices Interconnect Diagram



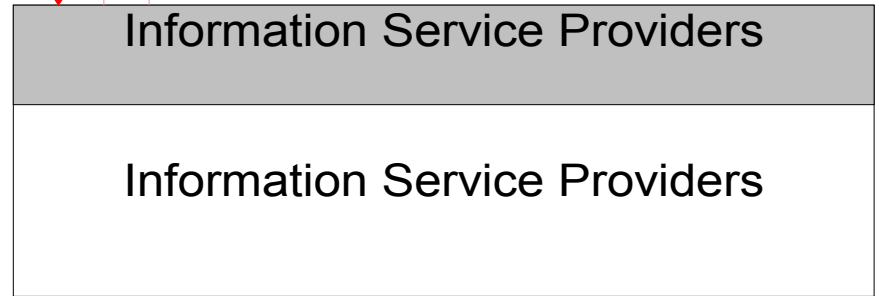
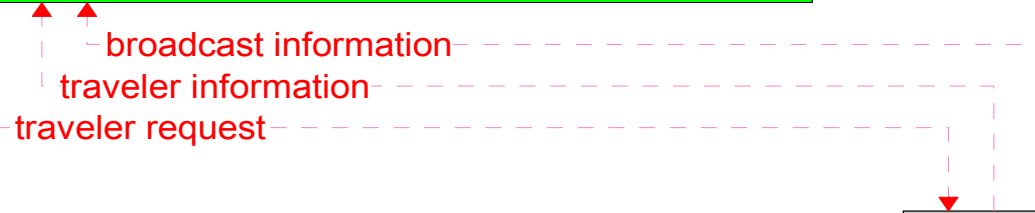
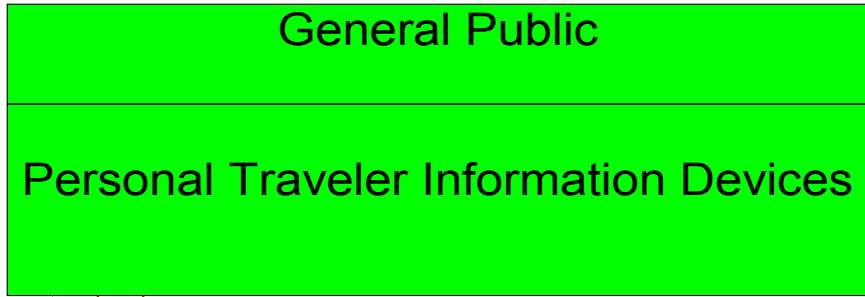
— Existing
- - - Planned



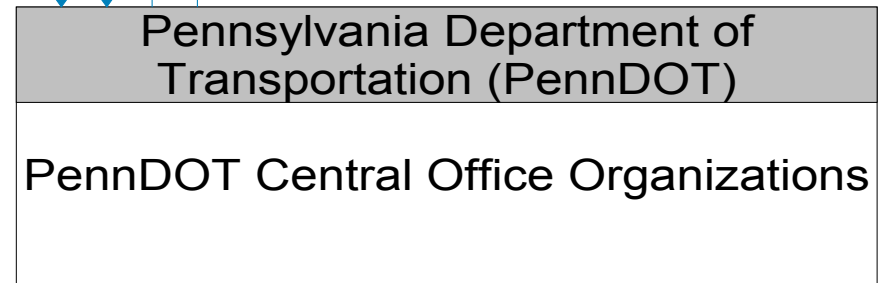
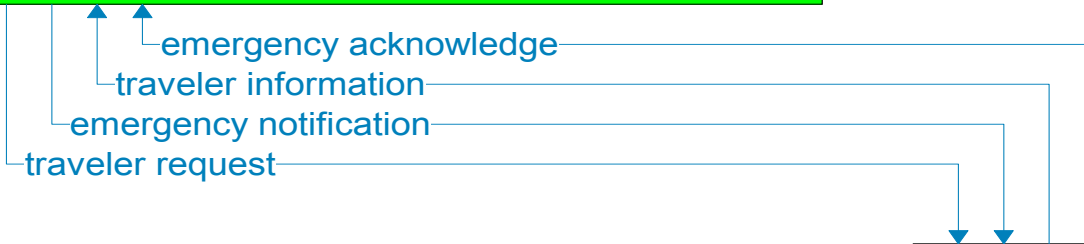
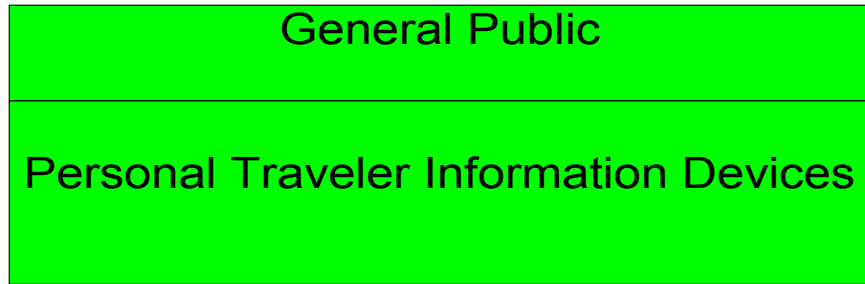


Existing

Planned

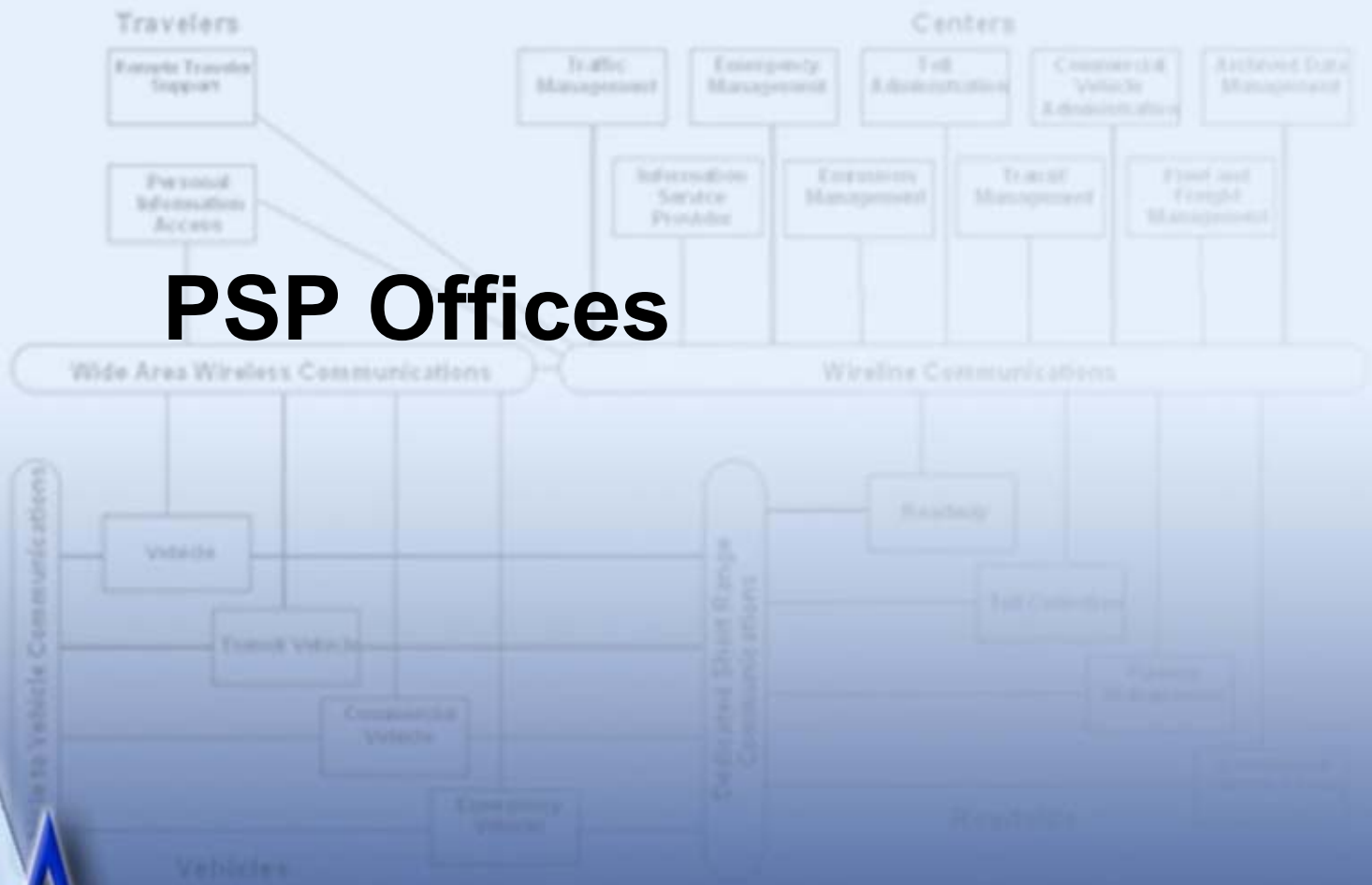


———— Existing
- - - - - Planned



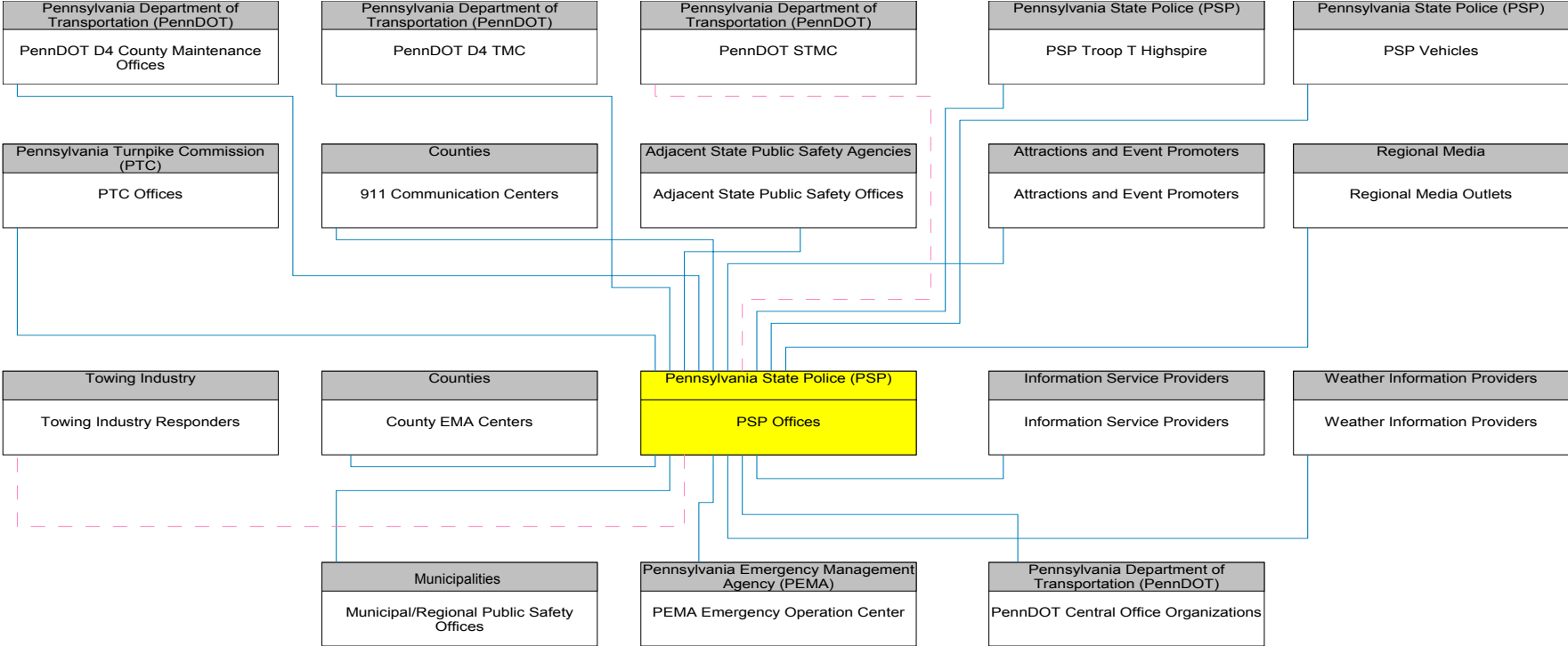
———— Existing
----- Planned

PSP Offices

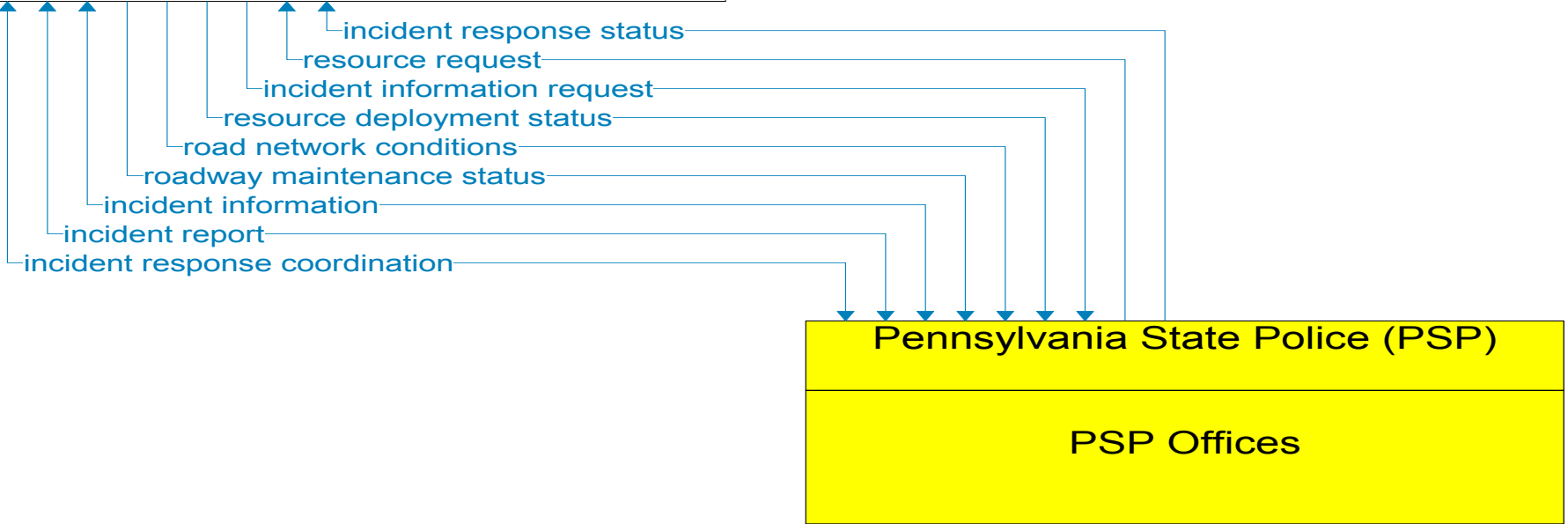
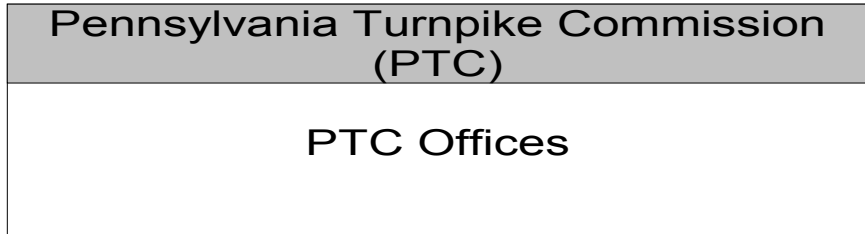


PA

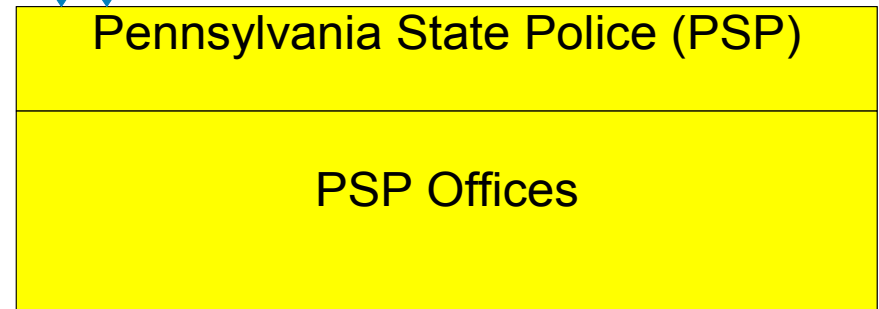
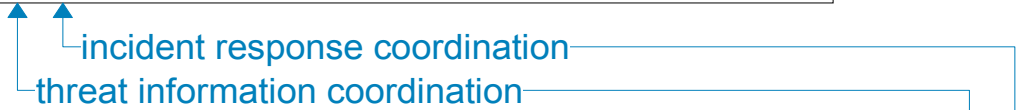
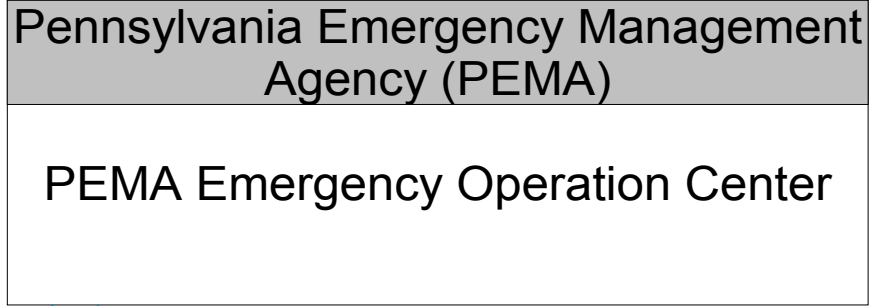
PSP Offices Interconnect Diagram



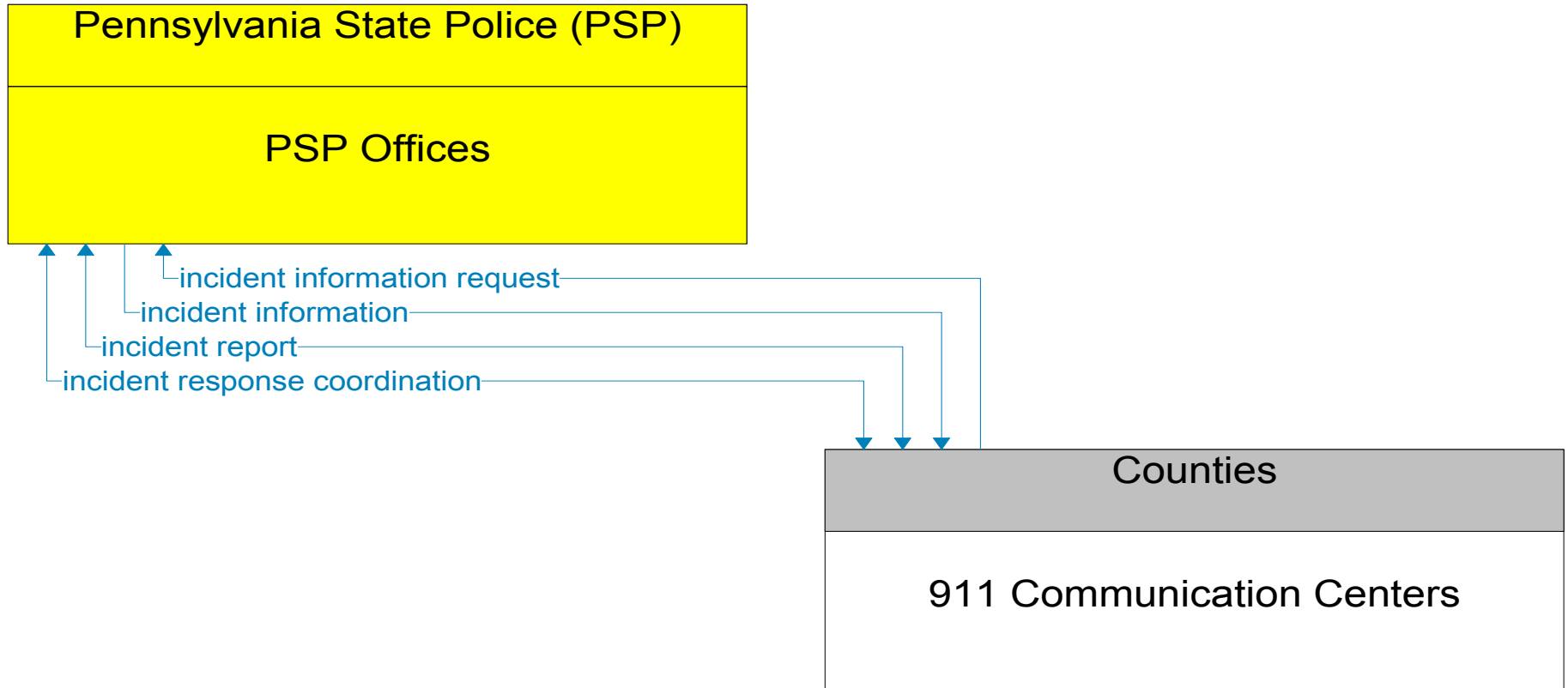
— Existing
- - - Planned



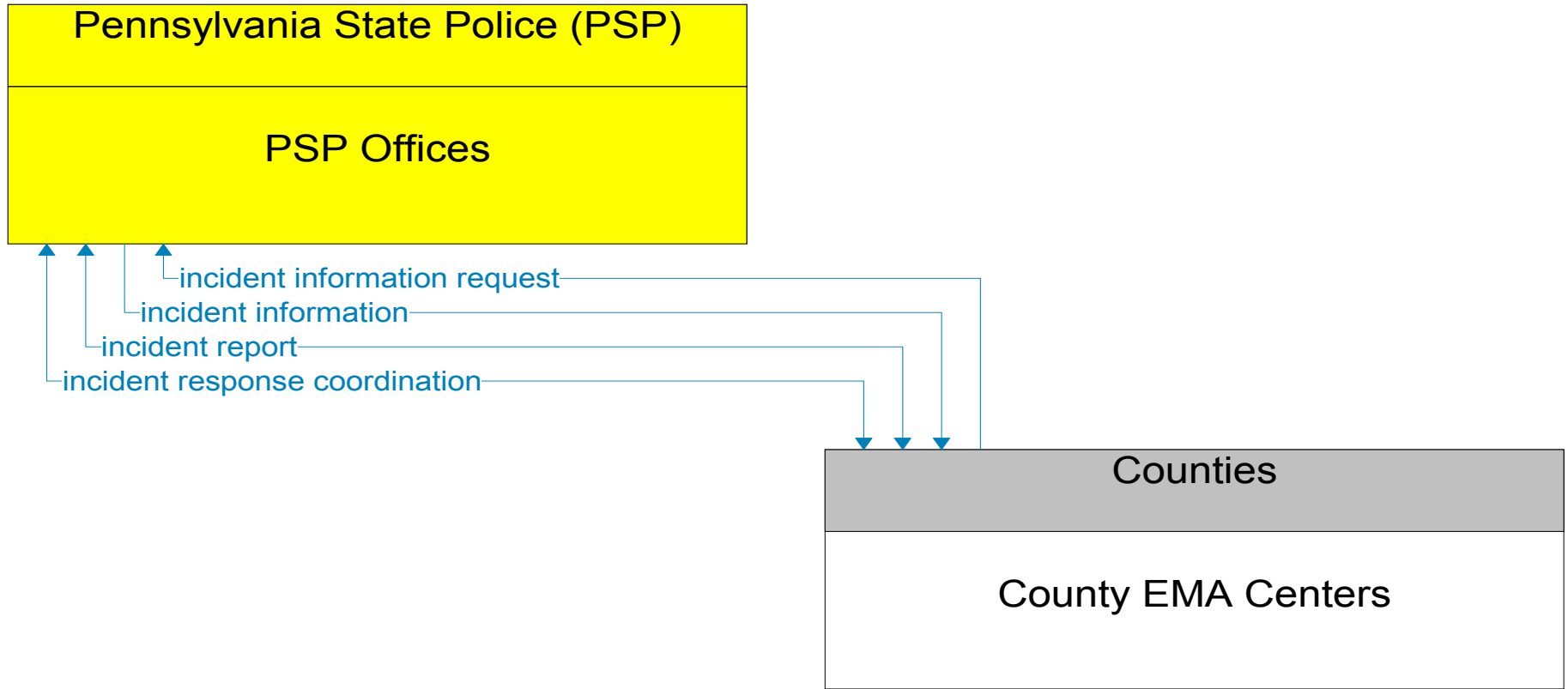
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- - - - - Planned



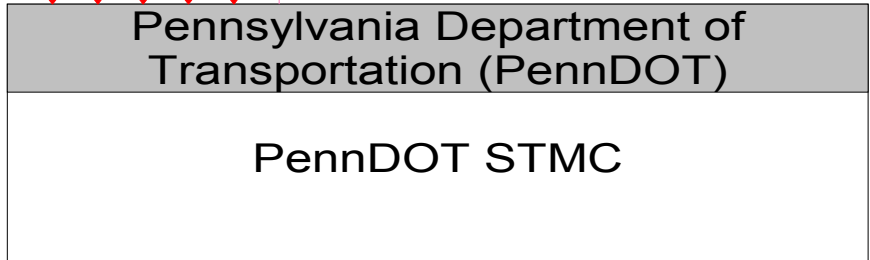
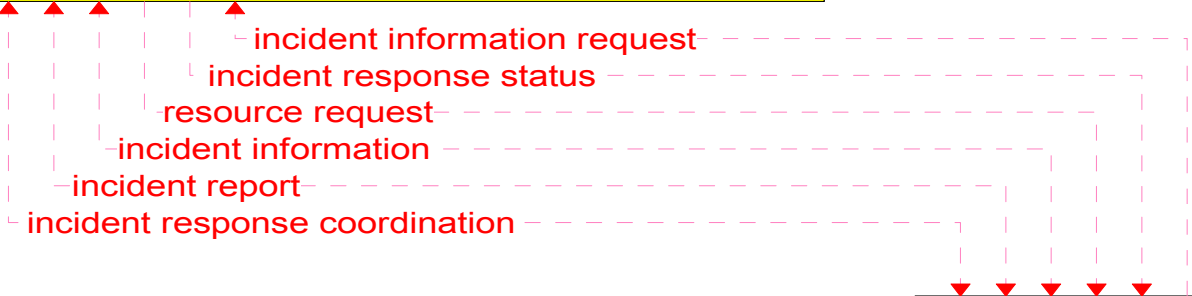
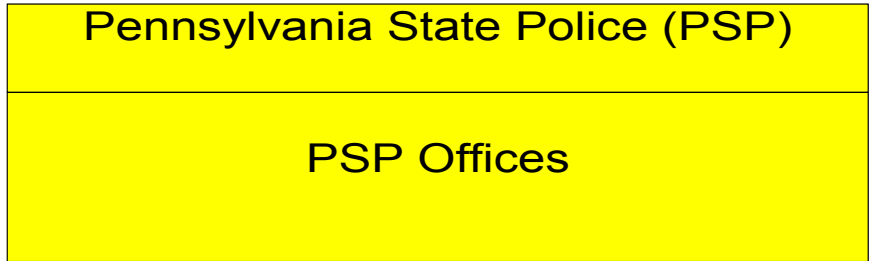
— Existing
- - - Planned



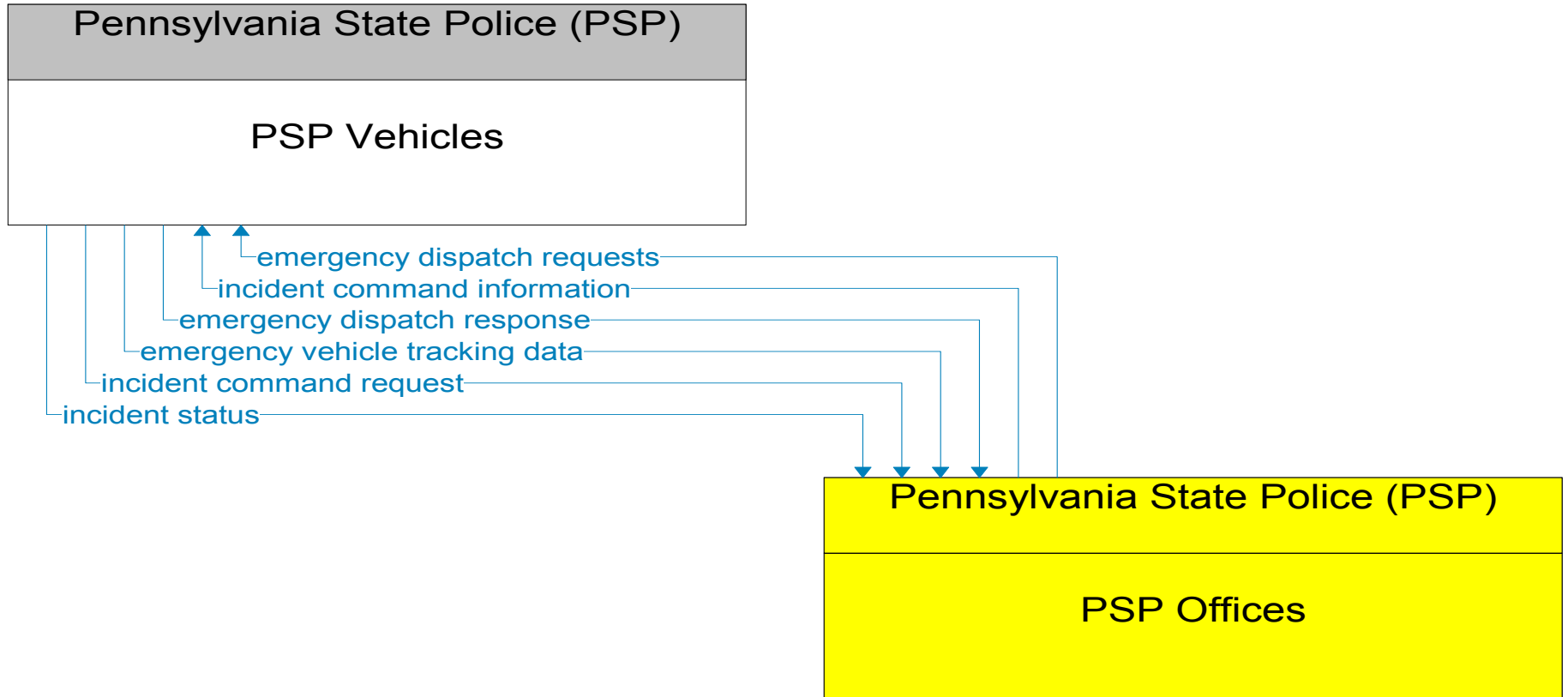
———— Existing
- - - - - Planned



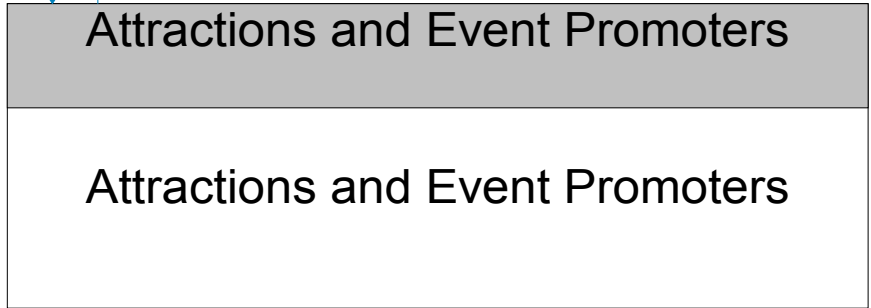
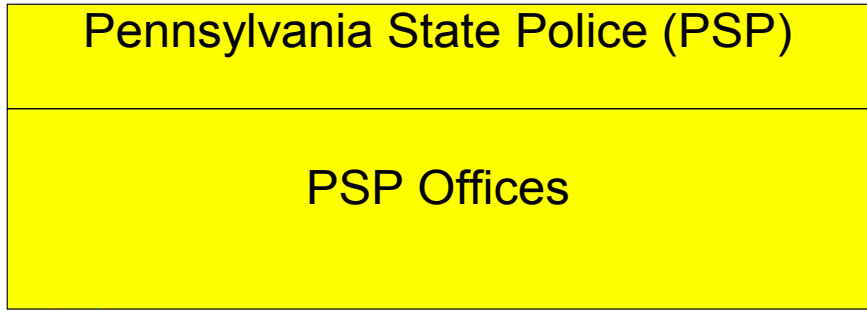
———— Existing
- - - - - Planned



———— Existing
- - - - - Planned



———— Existing
- - - - - Planned

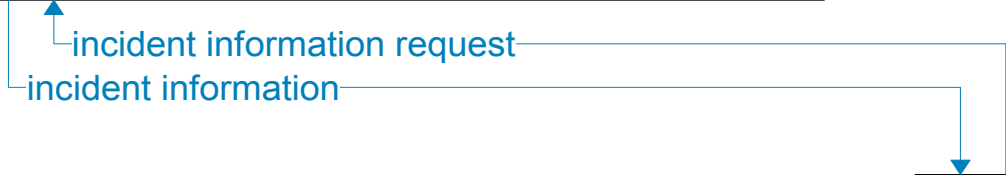
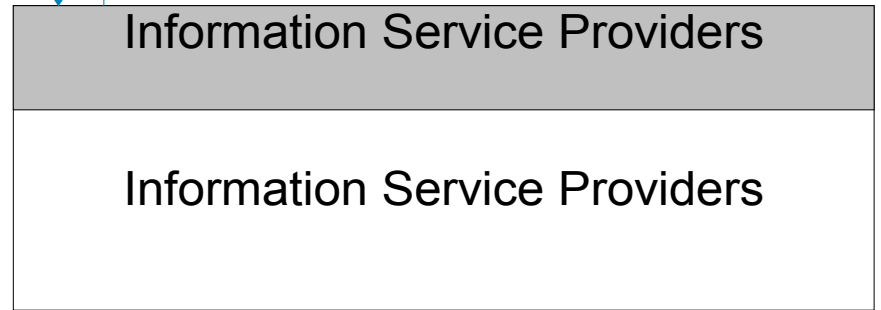
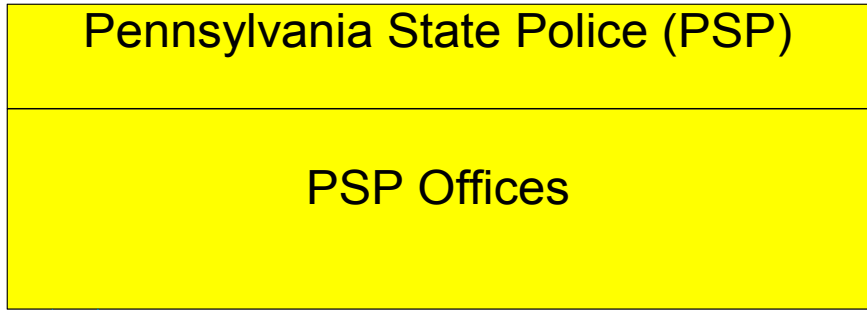


event plans

event confirmation

Existing

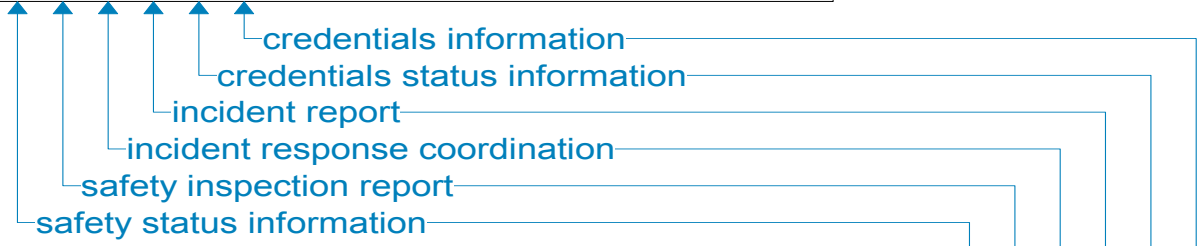
Planned



———— Existing
----- Planned

Pennsylvania Department of
Transportation (PennDOT)

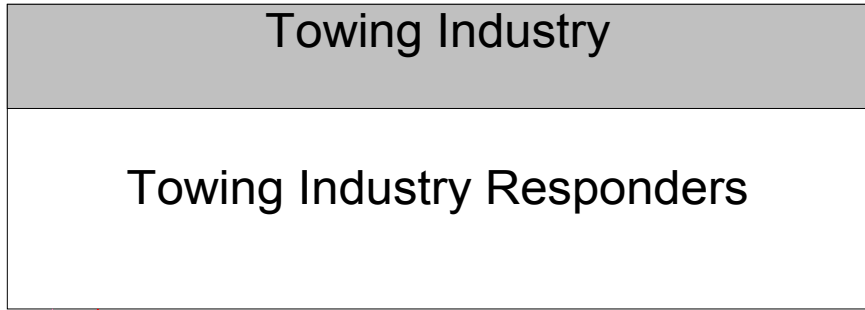
PennDOT Central Office Organizations



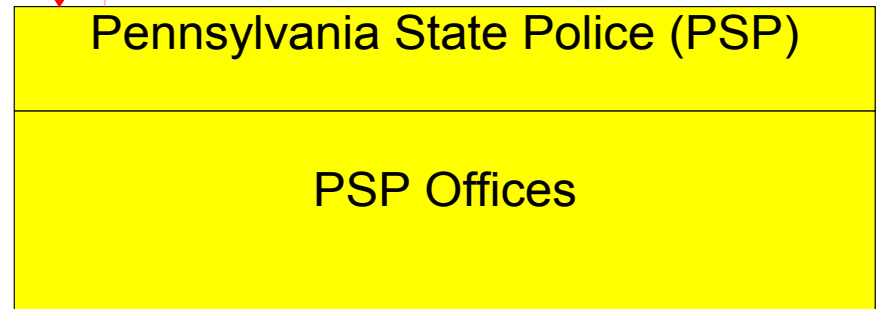
Pennsylvania State Police (PSP)

PSP Offices

Existing
Planned



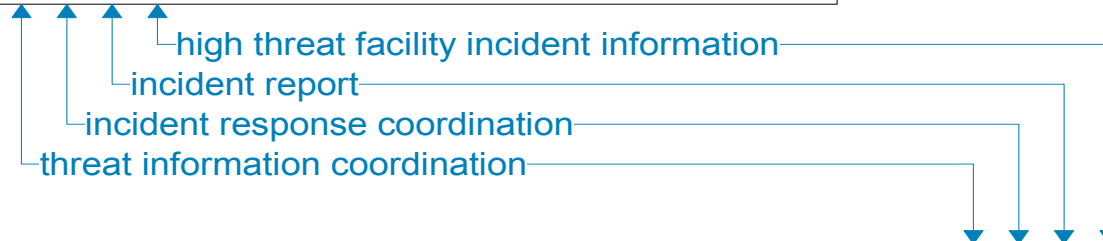
emergency dispatch requests
emergency dispatch response



Existing
Planned

Adjacent State Public Safety Agencies

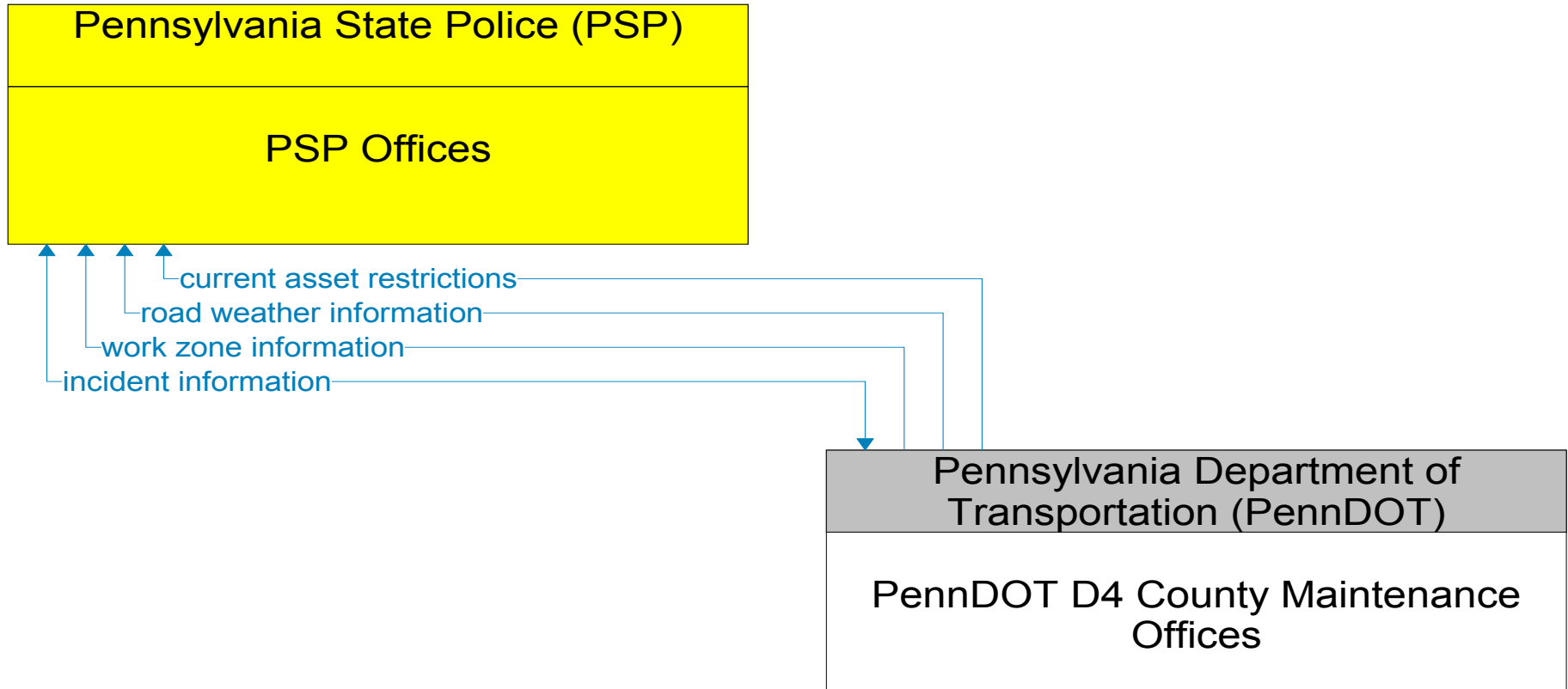
Adjacent State Public Safety Offices

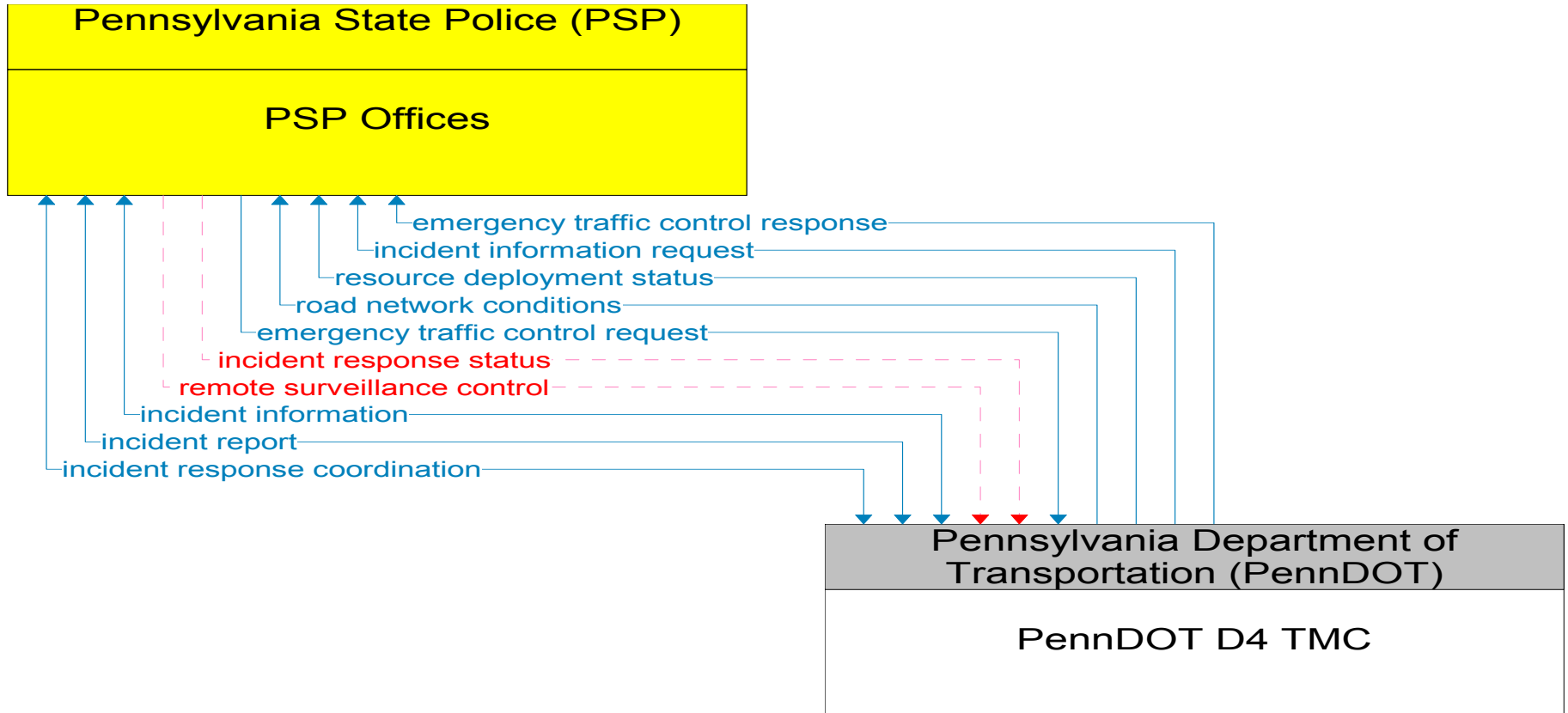


Pennsylvania State Police (PSP)

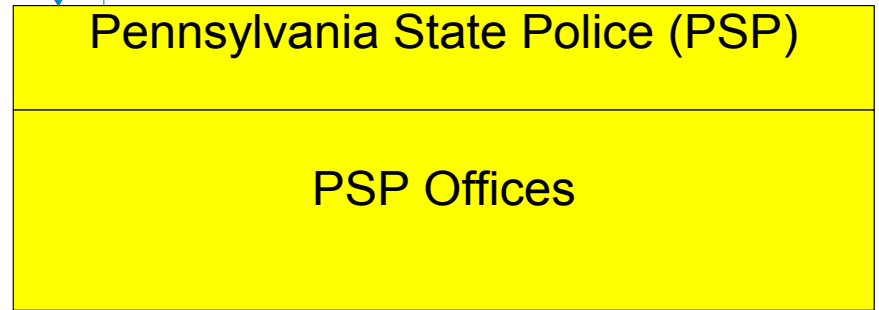
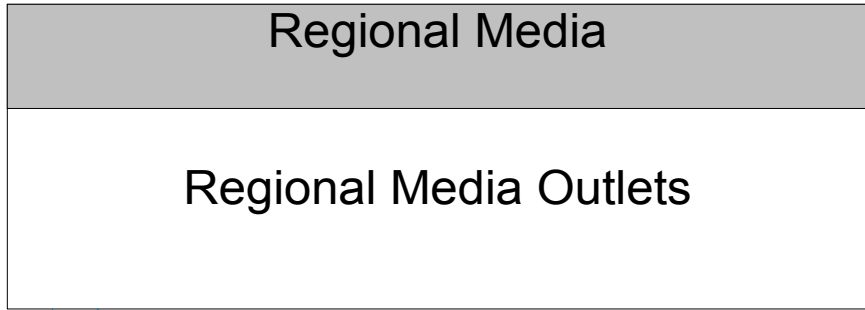
PSP Offices

Existing
Planned



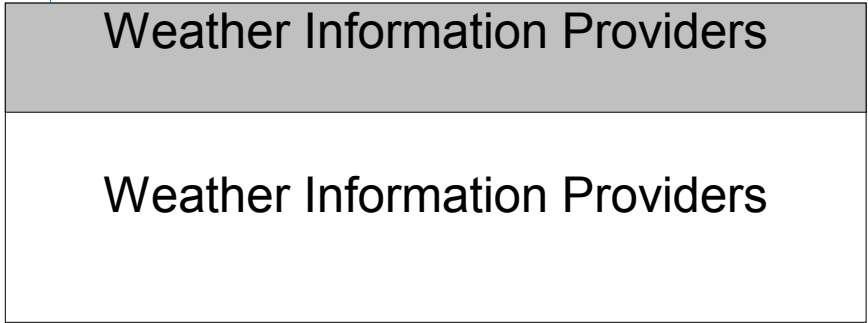
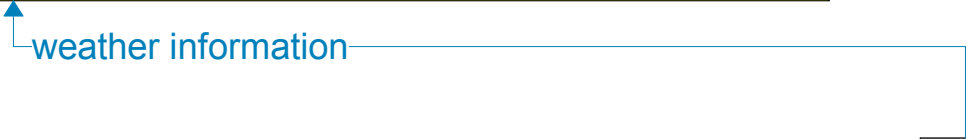
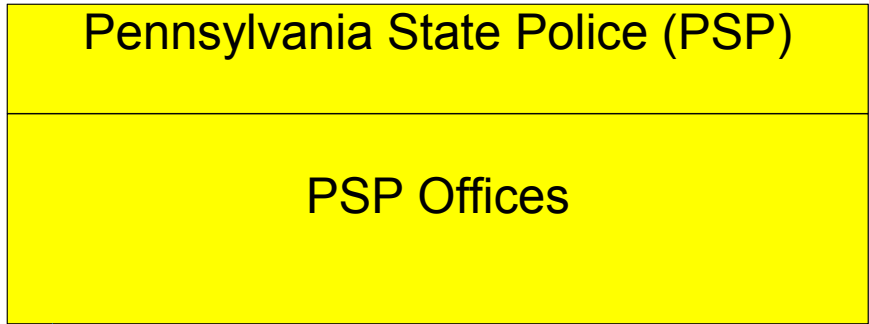


———— Existing
----- Planned

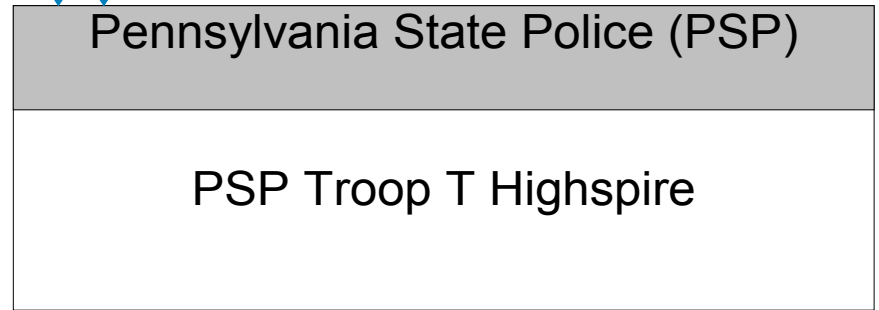
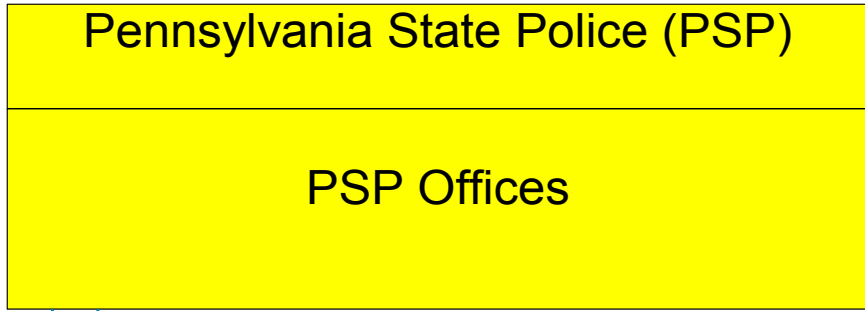


incident information for media
media information request

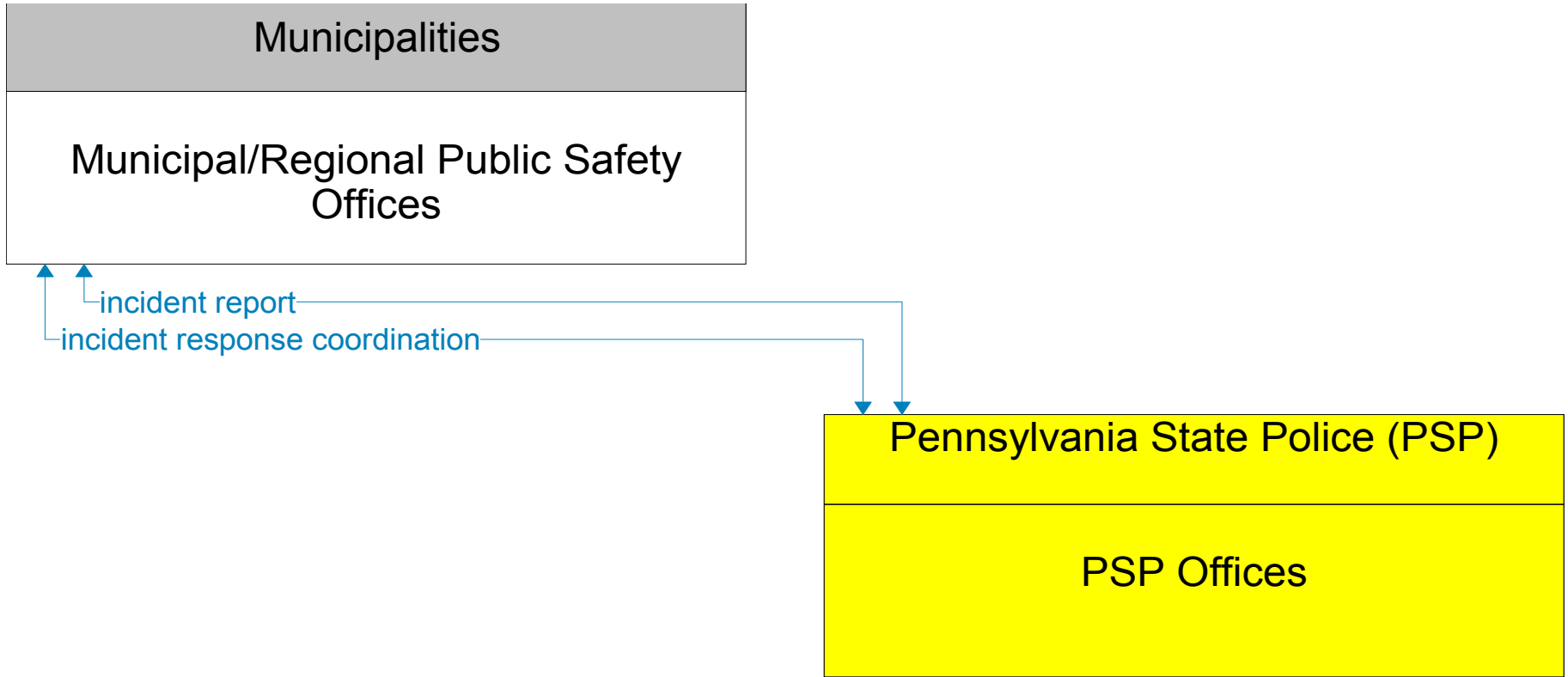
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Planned



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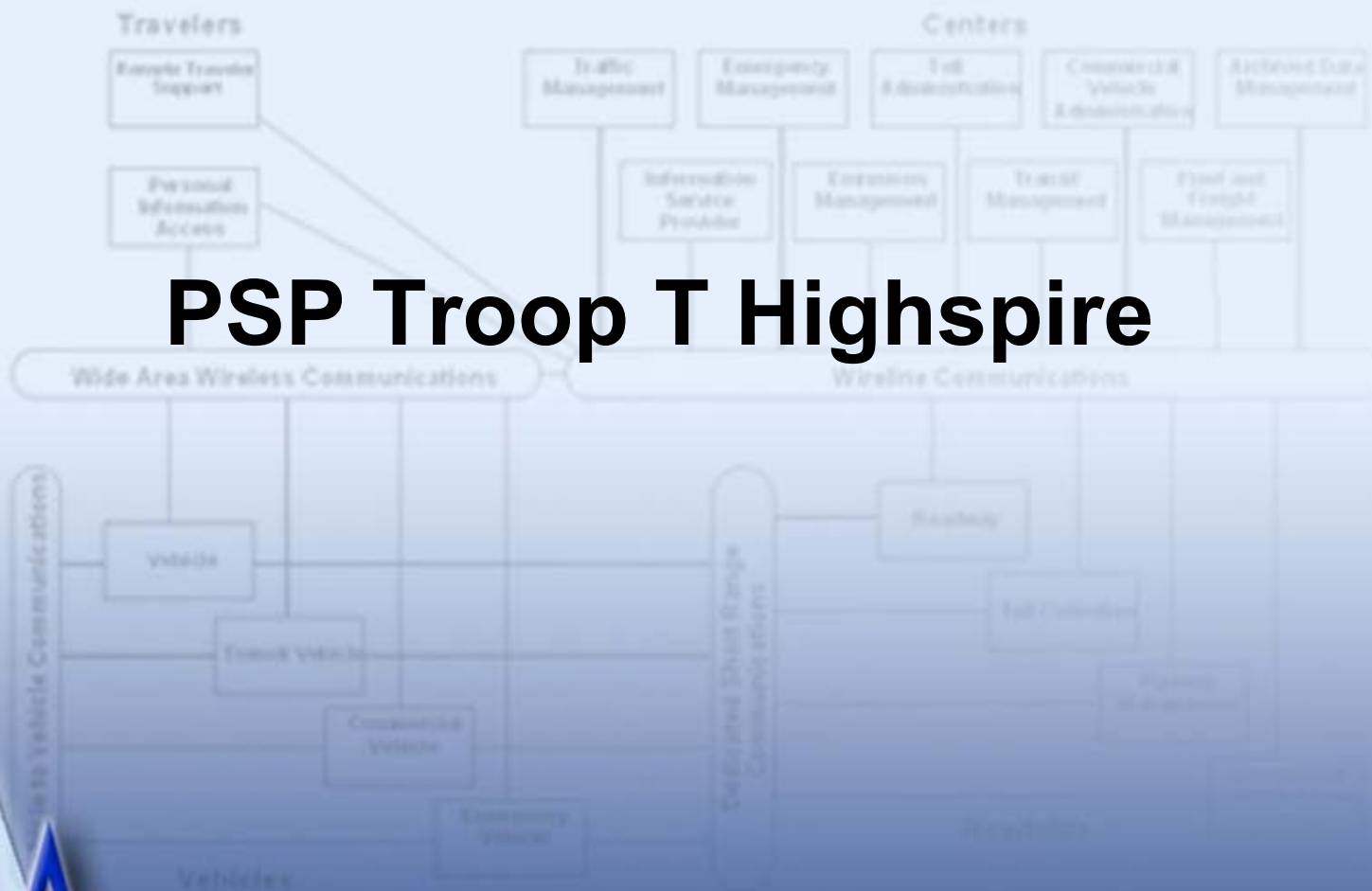


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———— Existing
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PSP Troop T Highspire

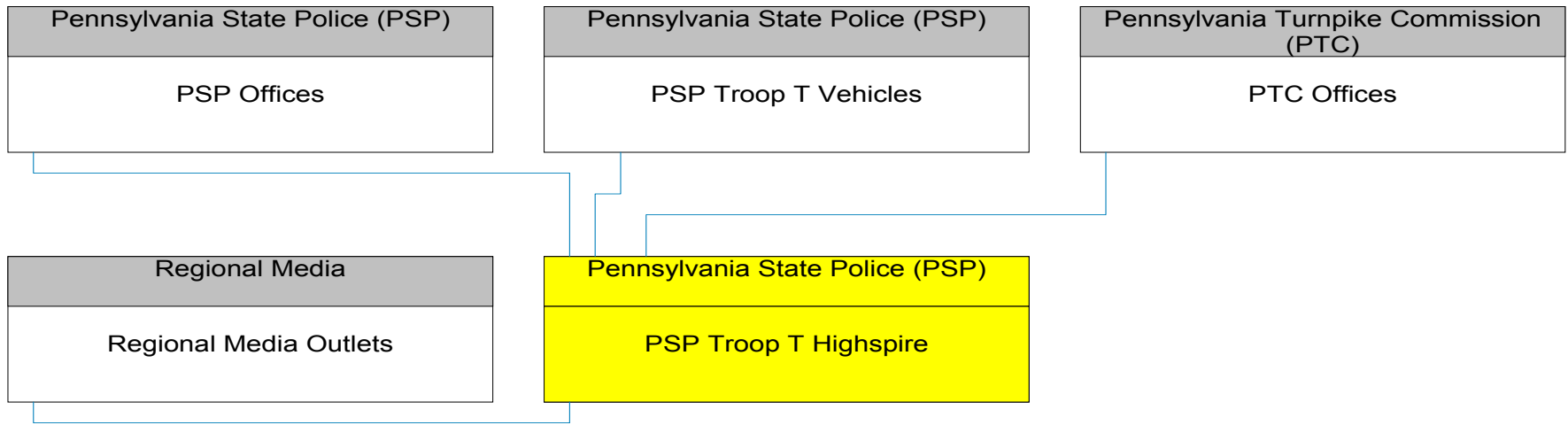


PA

450

architecture

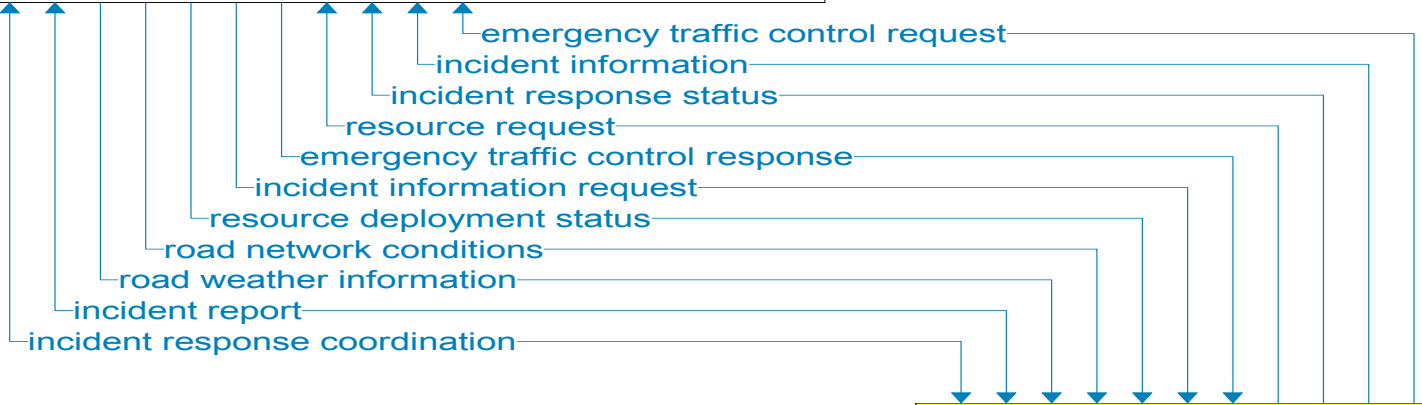
PSP Troop T Highspire Interconnect Diagram

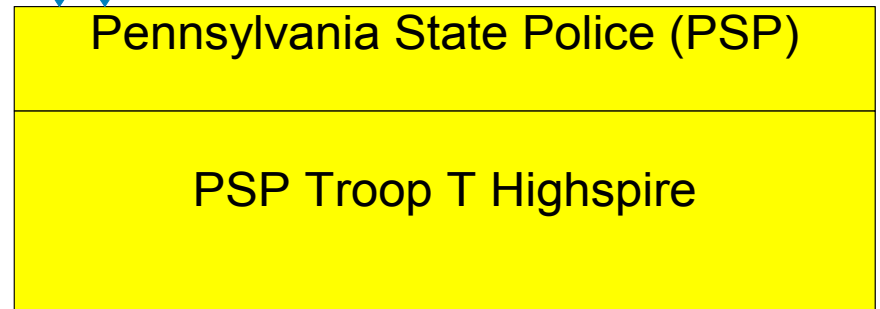
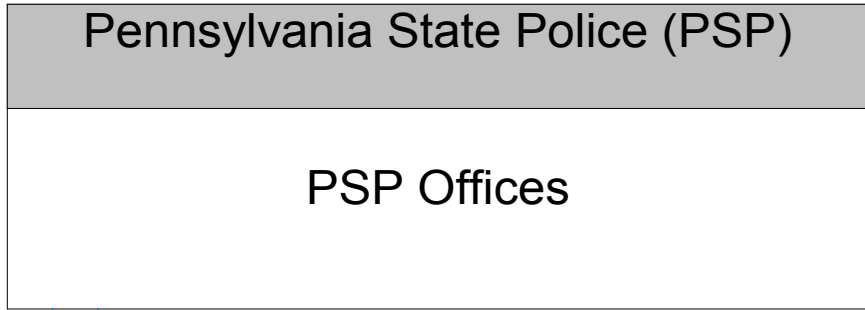


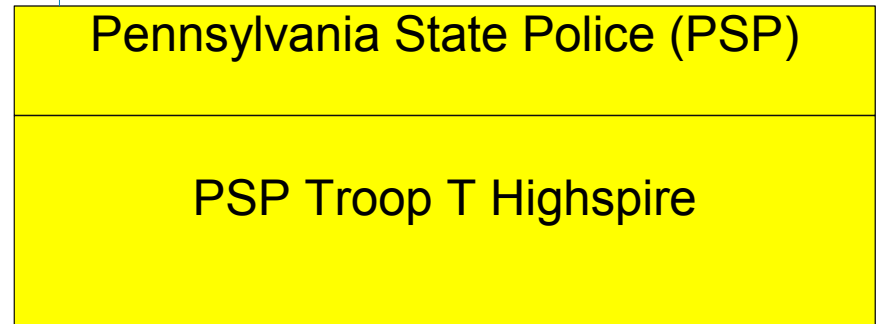
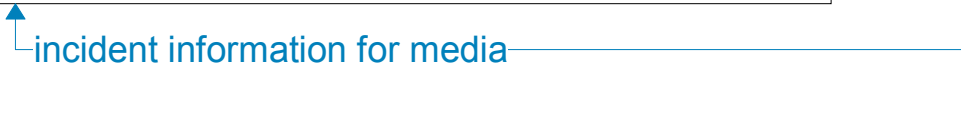
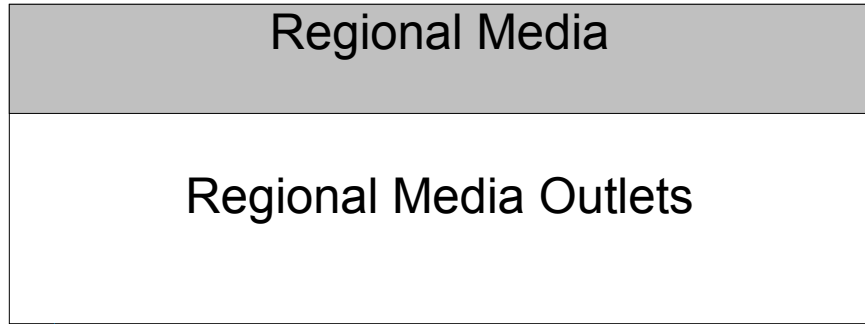
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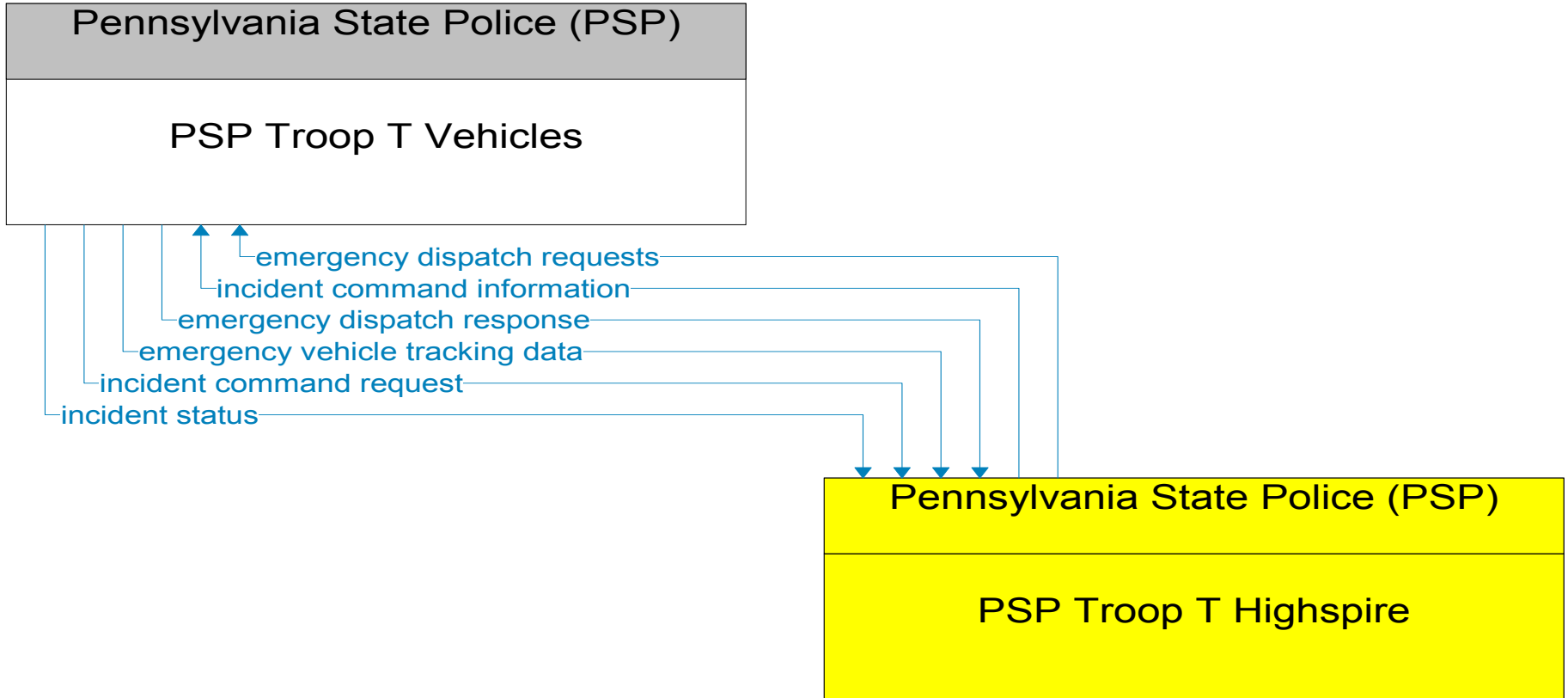
Pennsylvania Turnpike Commission (PTC)
PTC Offices

Pennsylvania State Police (PSP)
PSP Troop T Highspire



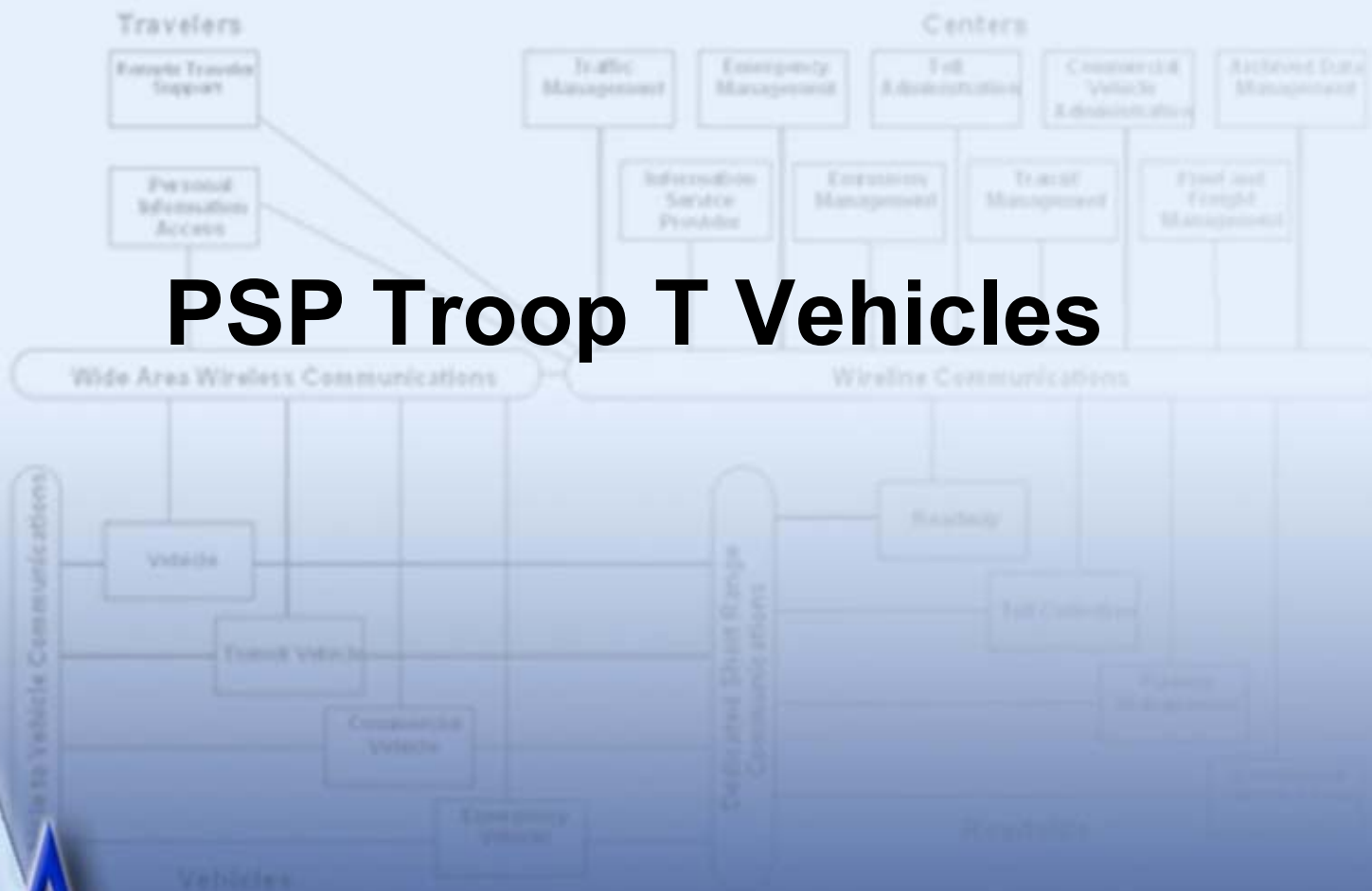






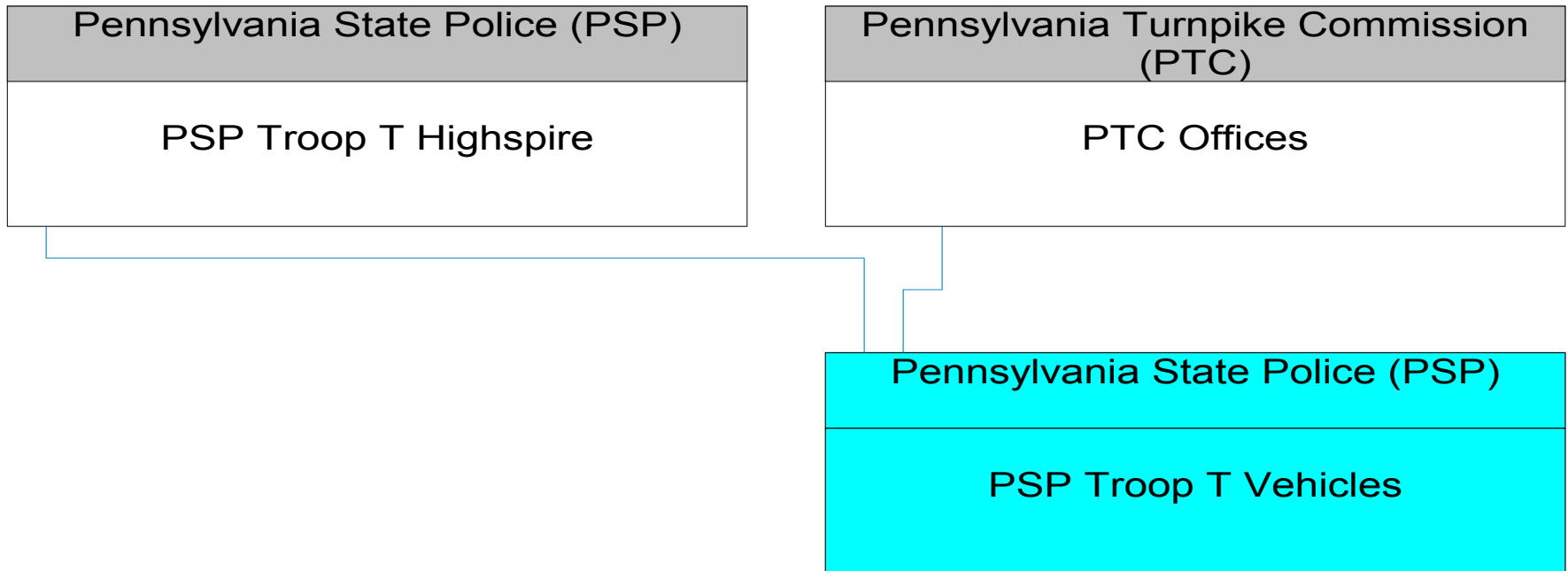
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PSP Troop T Vehicles

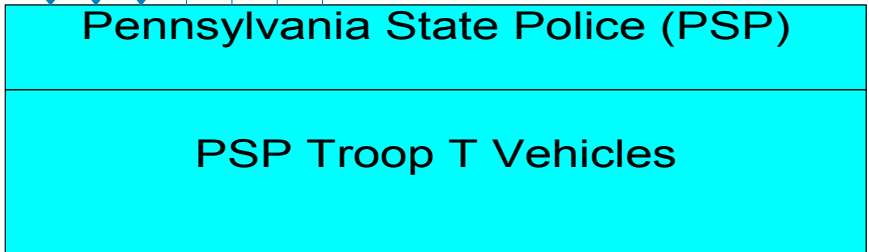
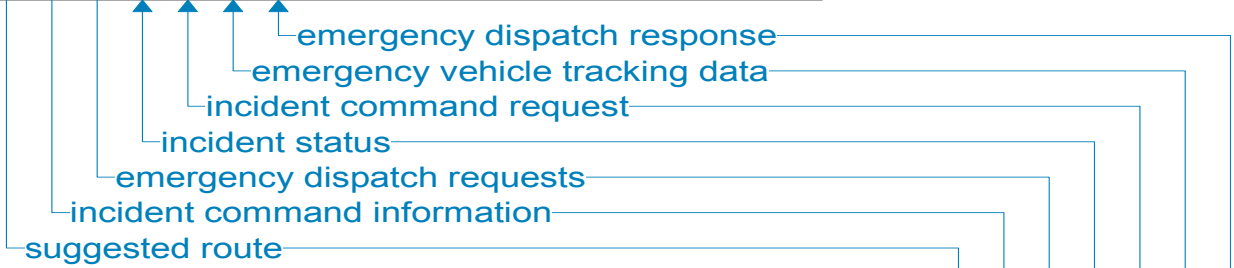
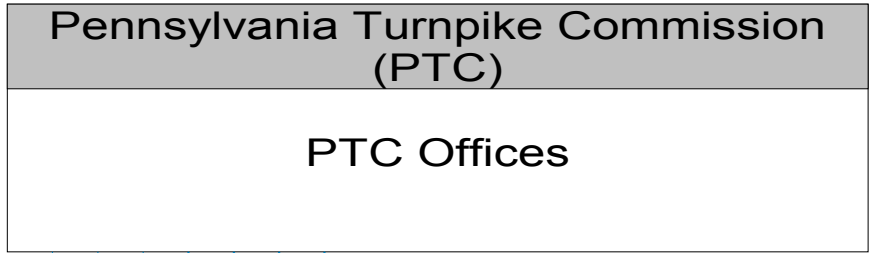


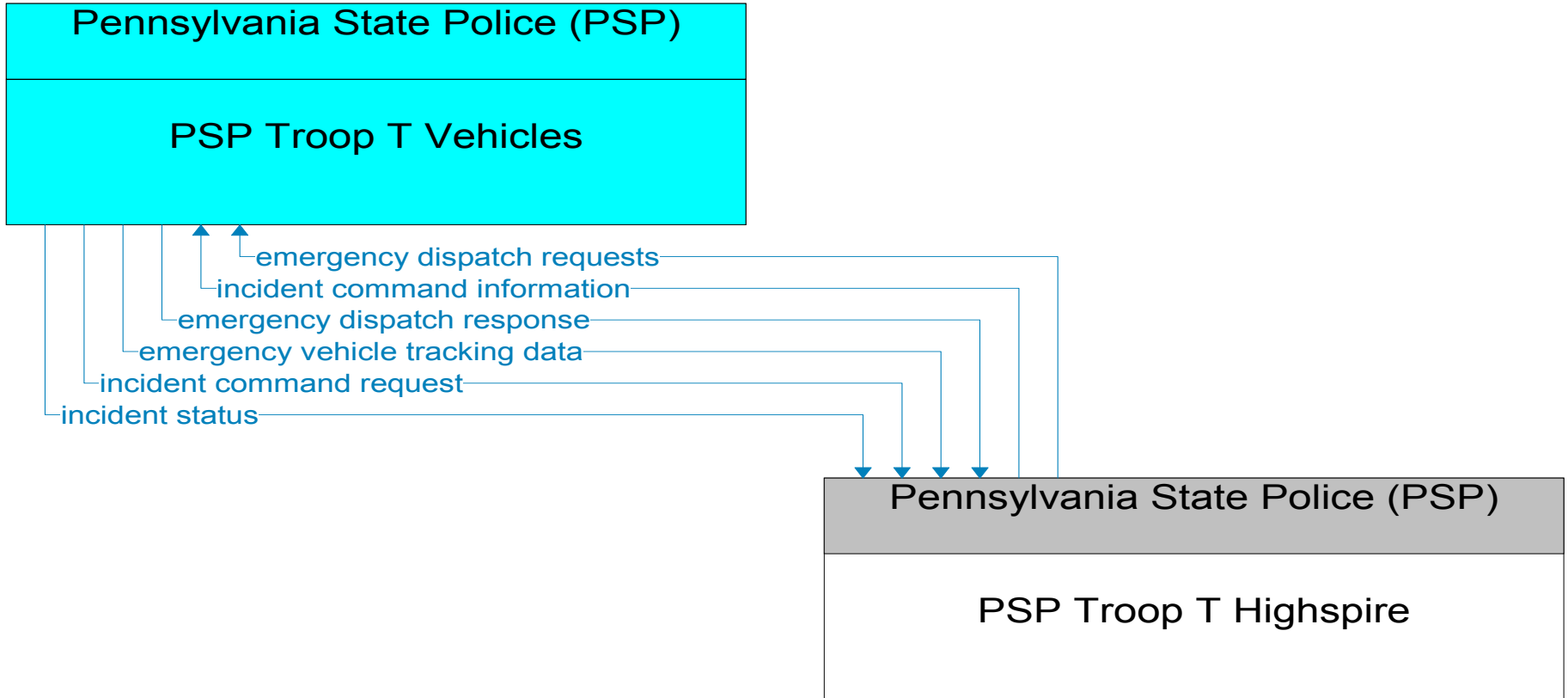
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PSP Troop T Vehicles Interconnect Diagram

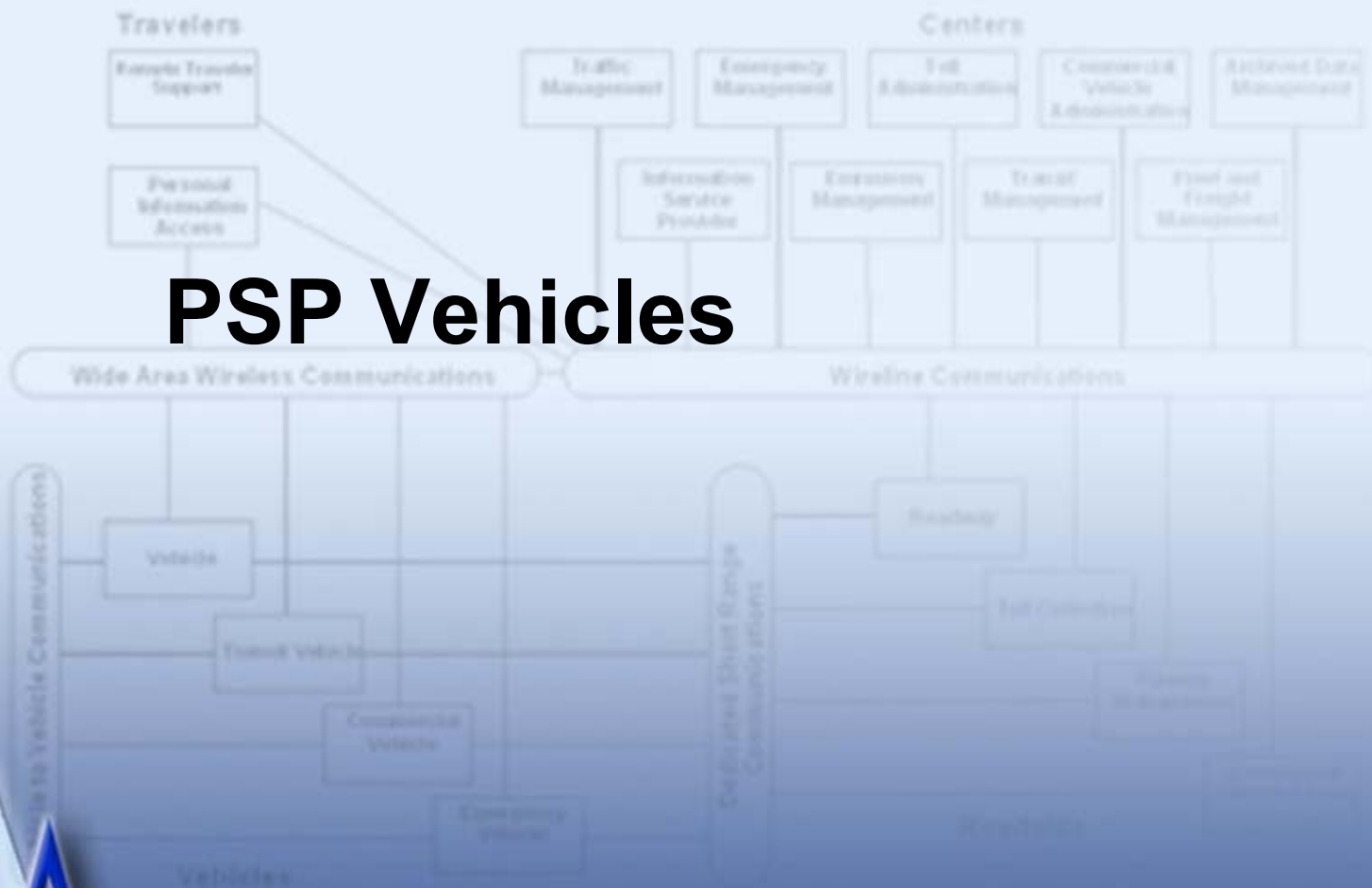


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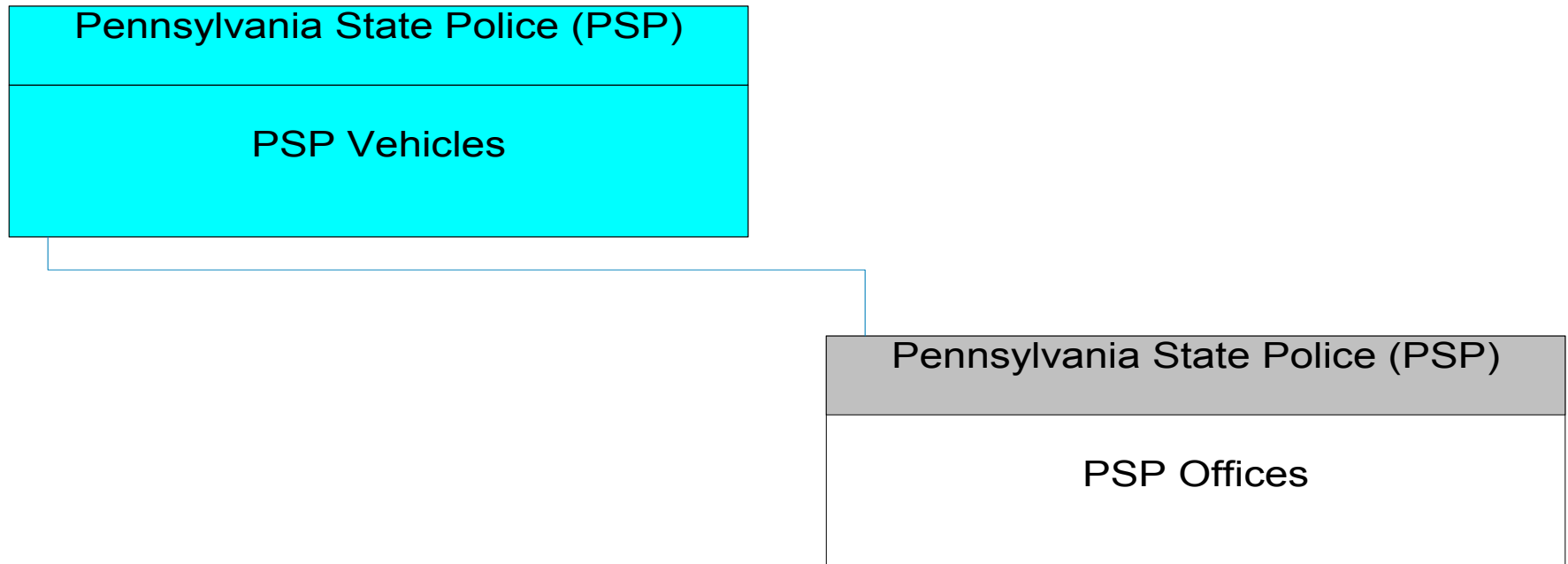


PSP Vehicles

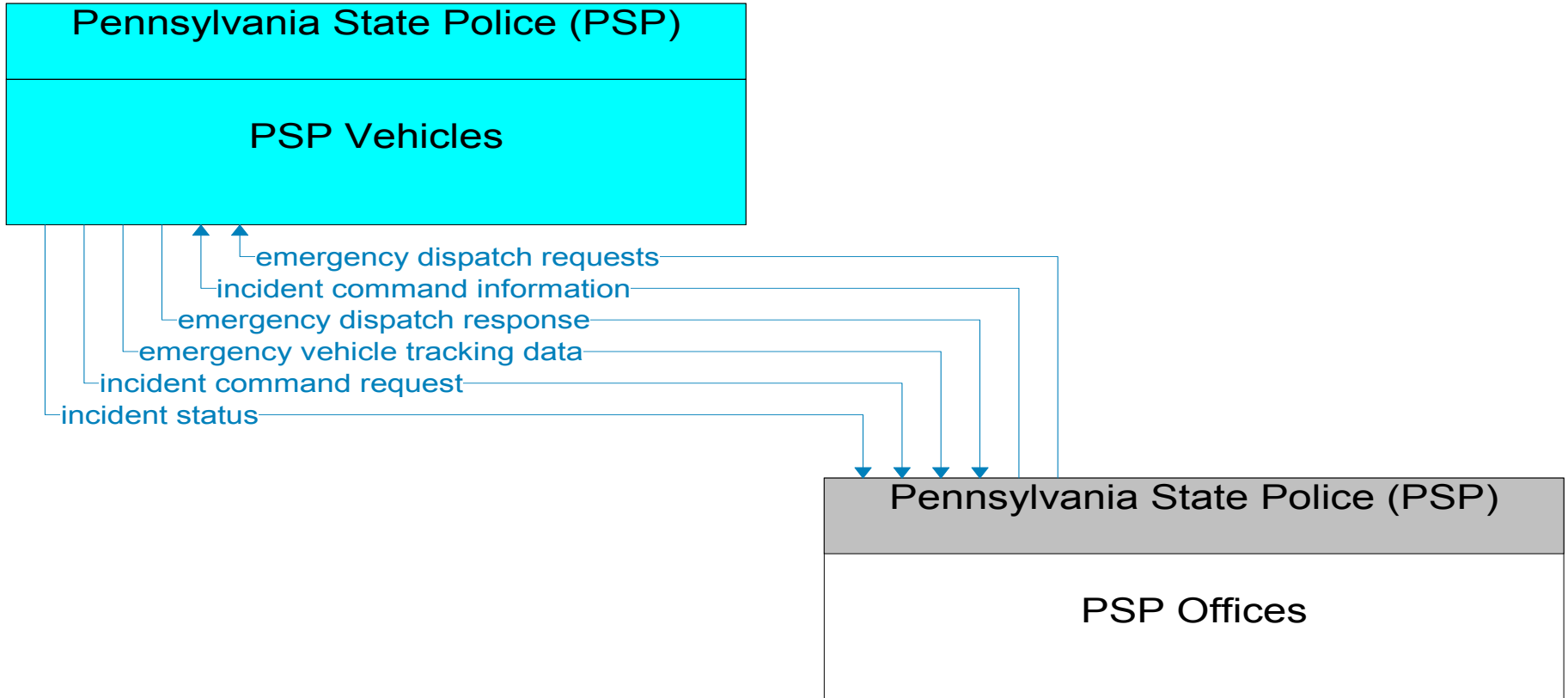


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PSP Vehicles Interconnect Diagram

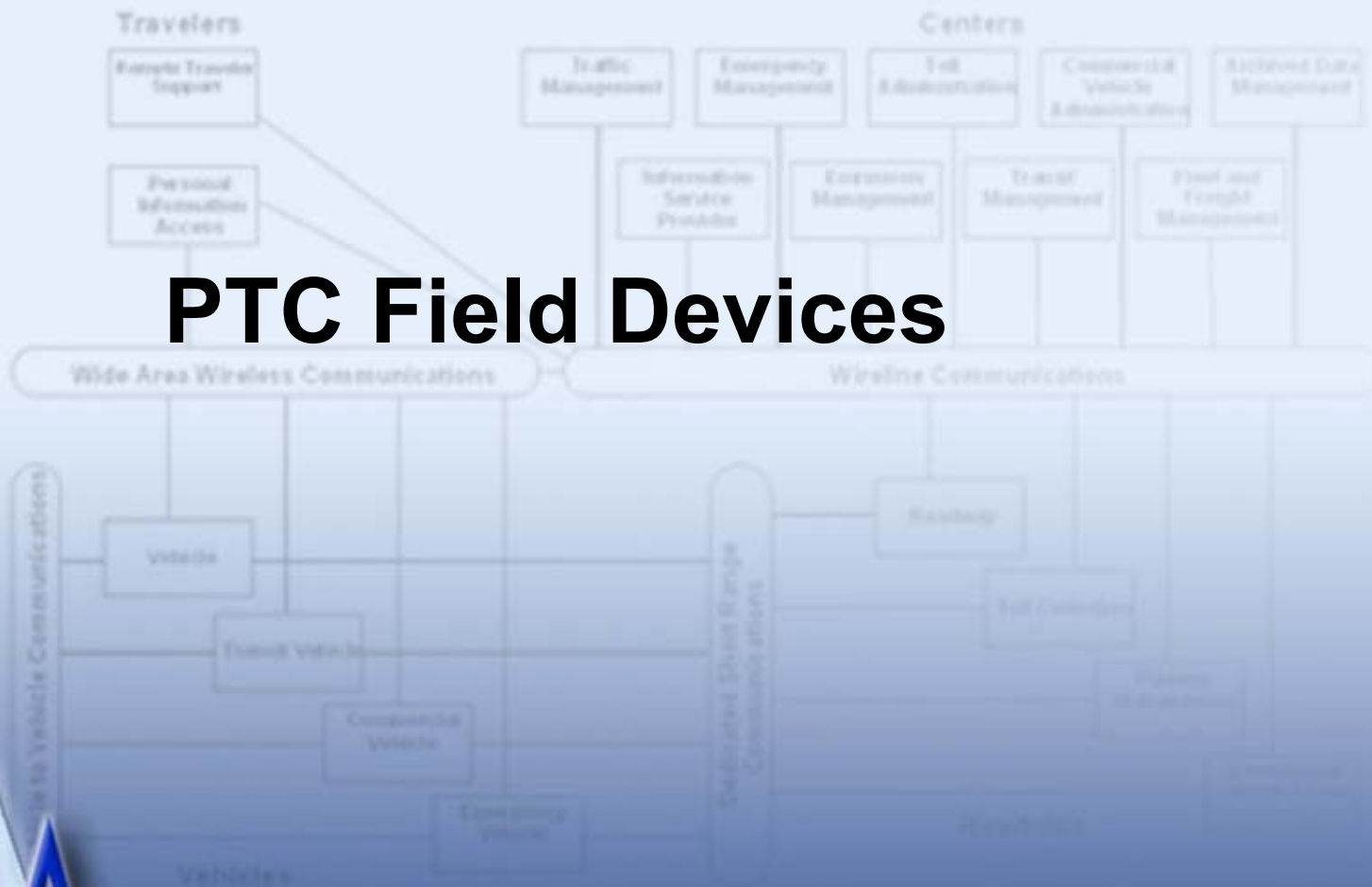


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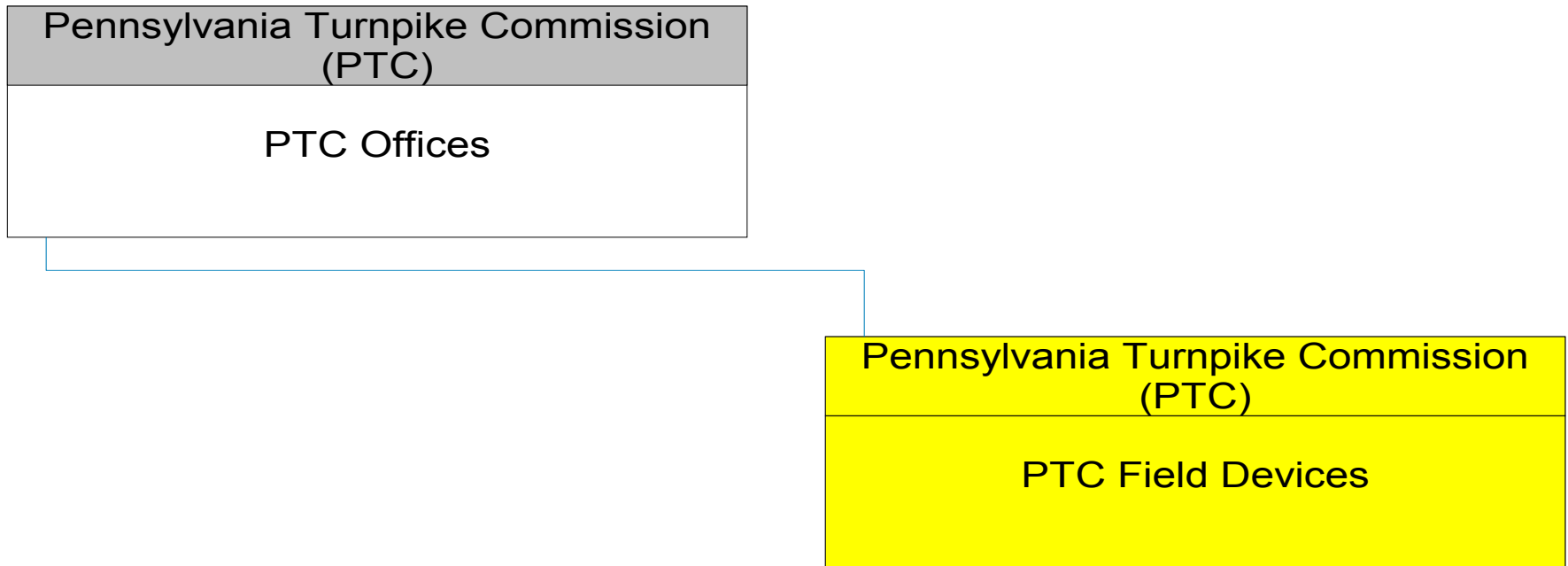


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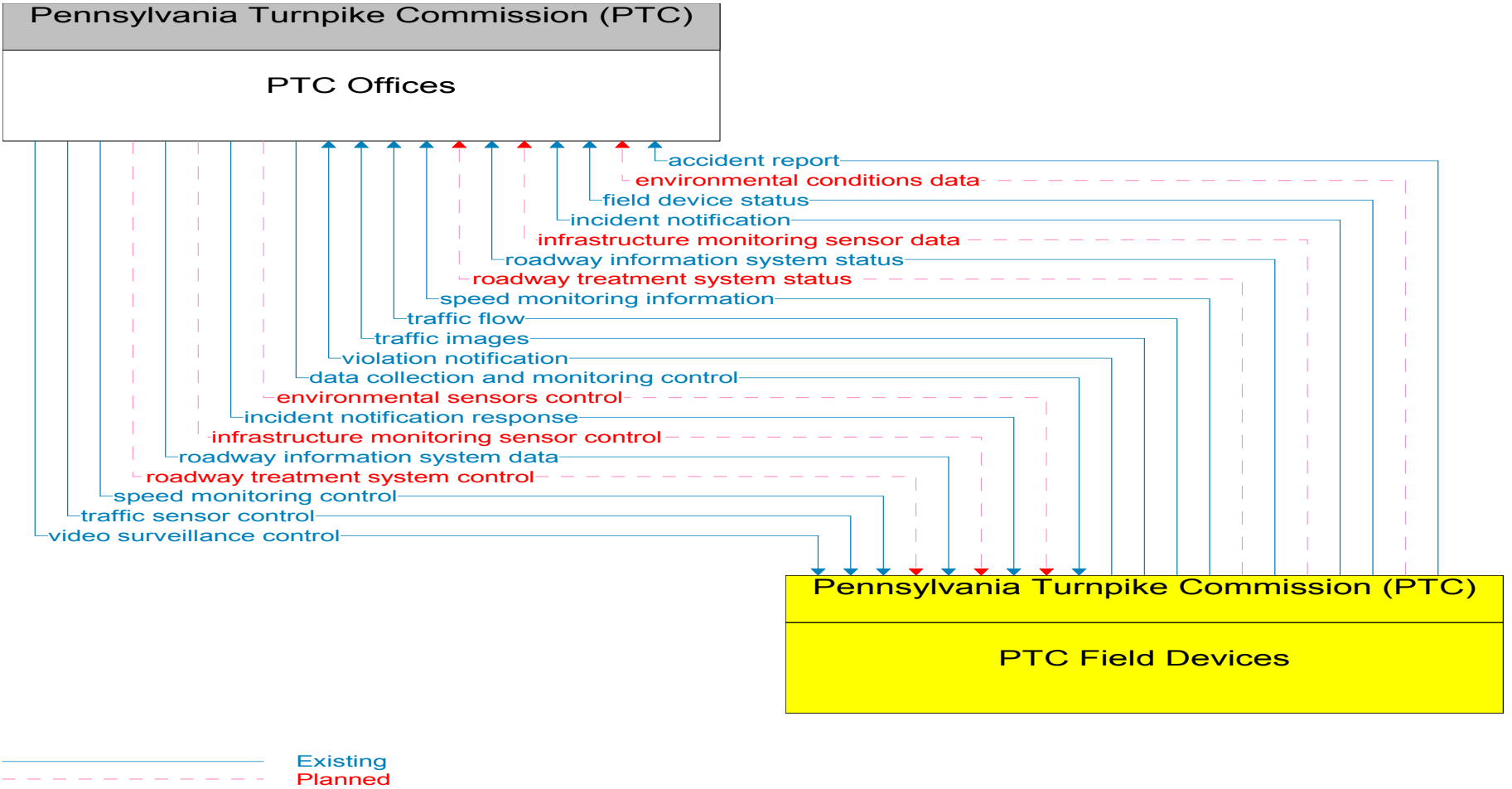
PTC Field Devices



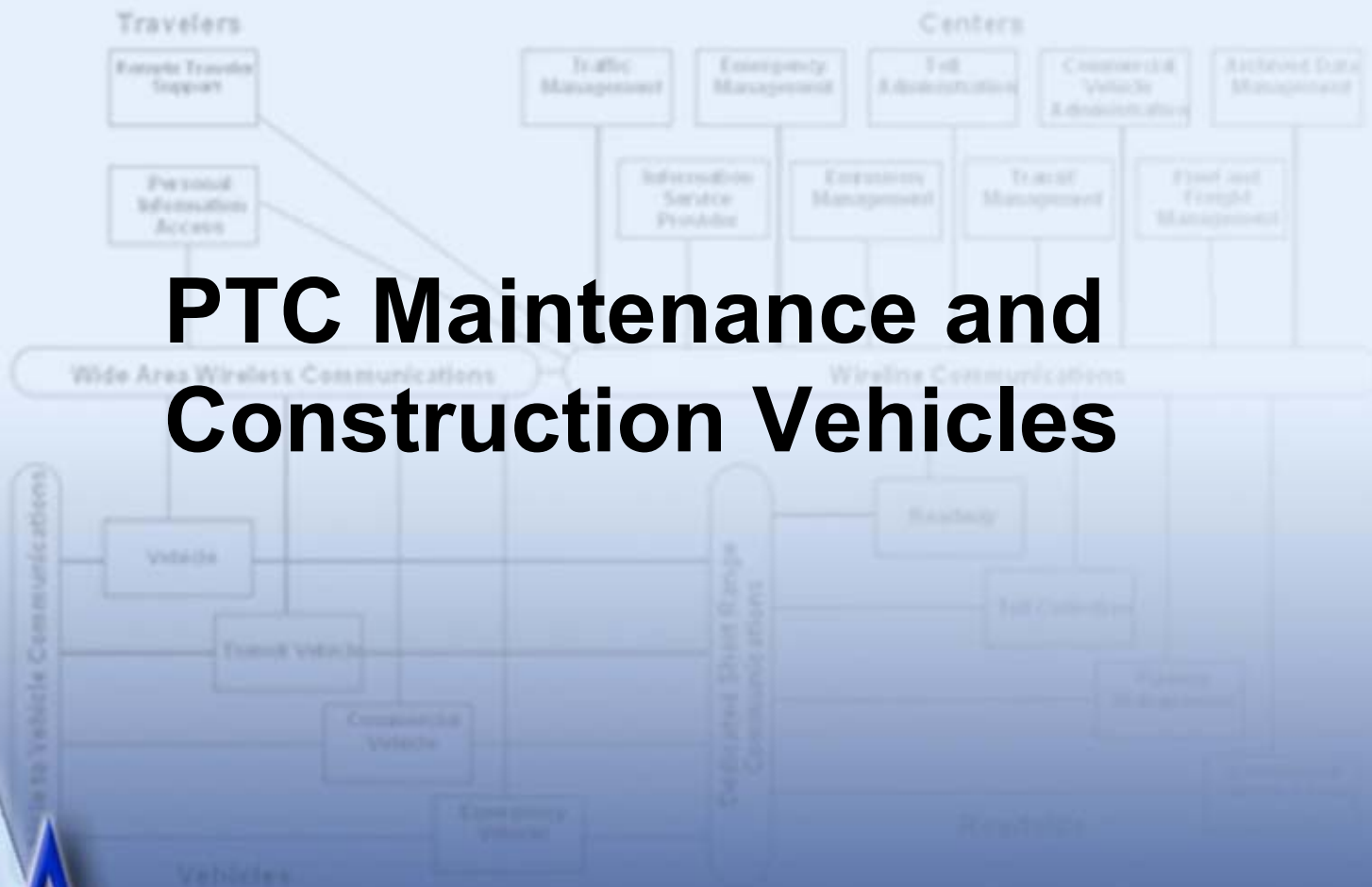
PTC Field Devices Interconnect Diagram



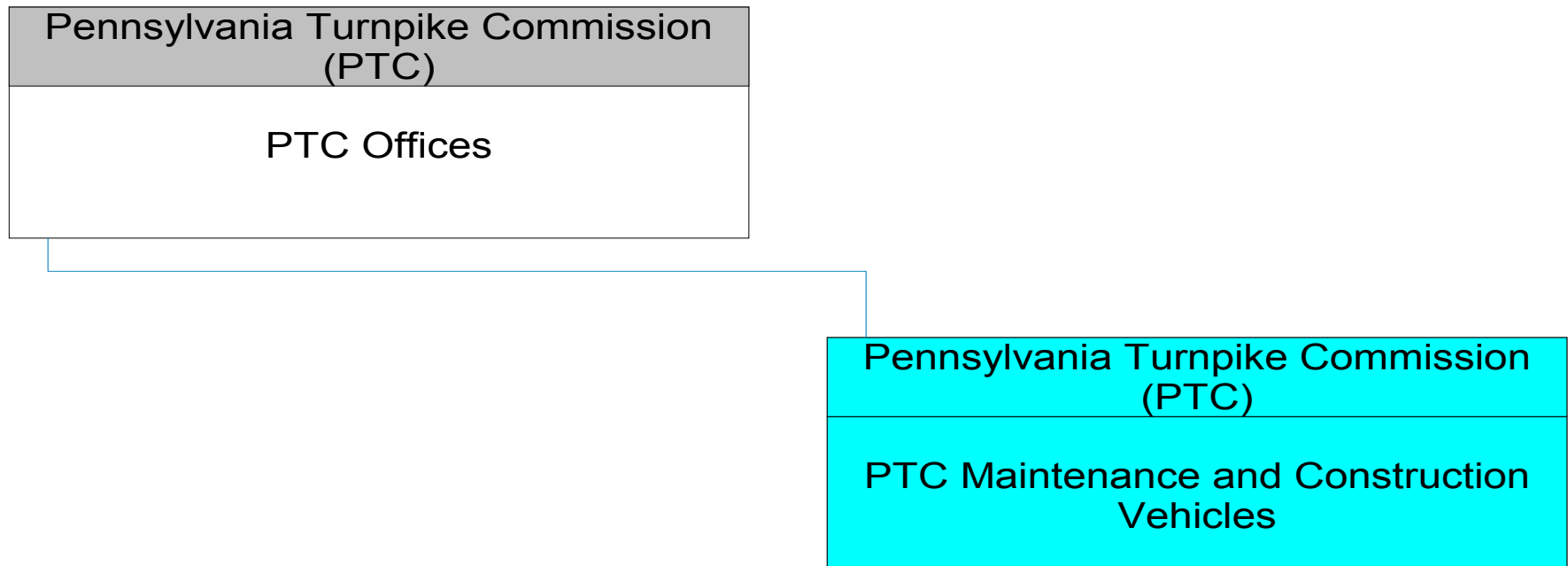
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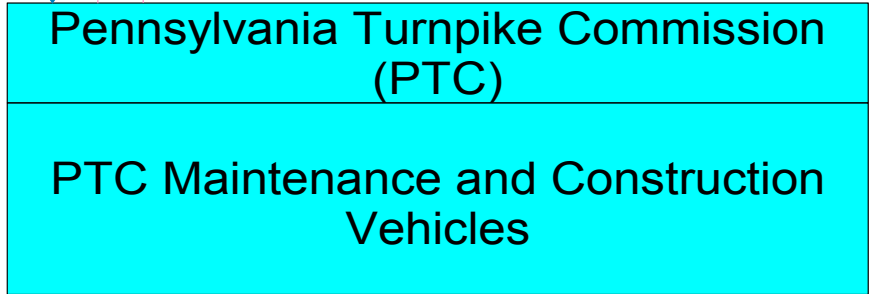
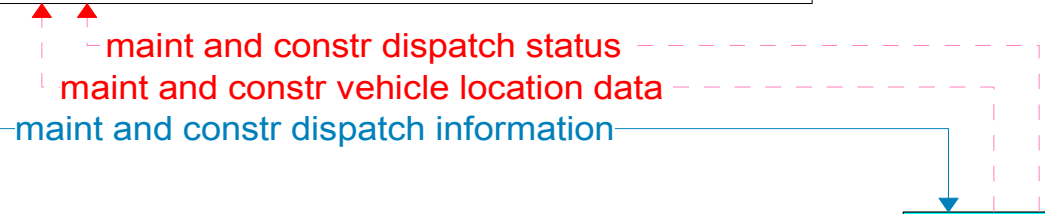
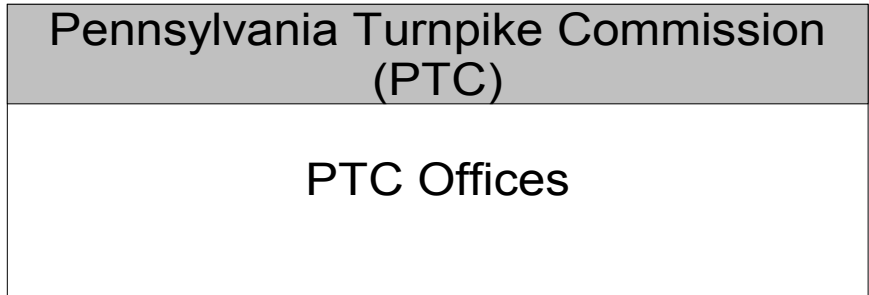
PTC Maintenance and Construction Vehicles



PTC Maintenance and Construction Vehicles Interconnect Diagram

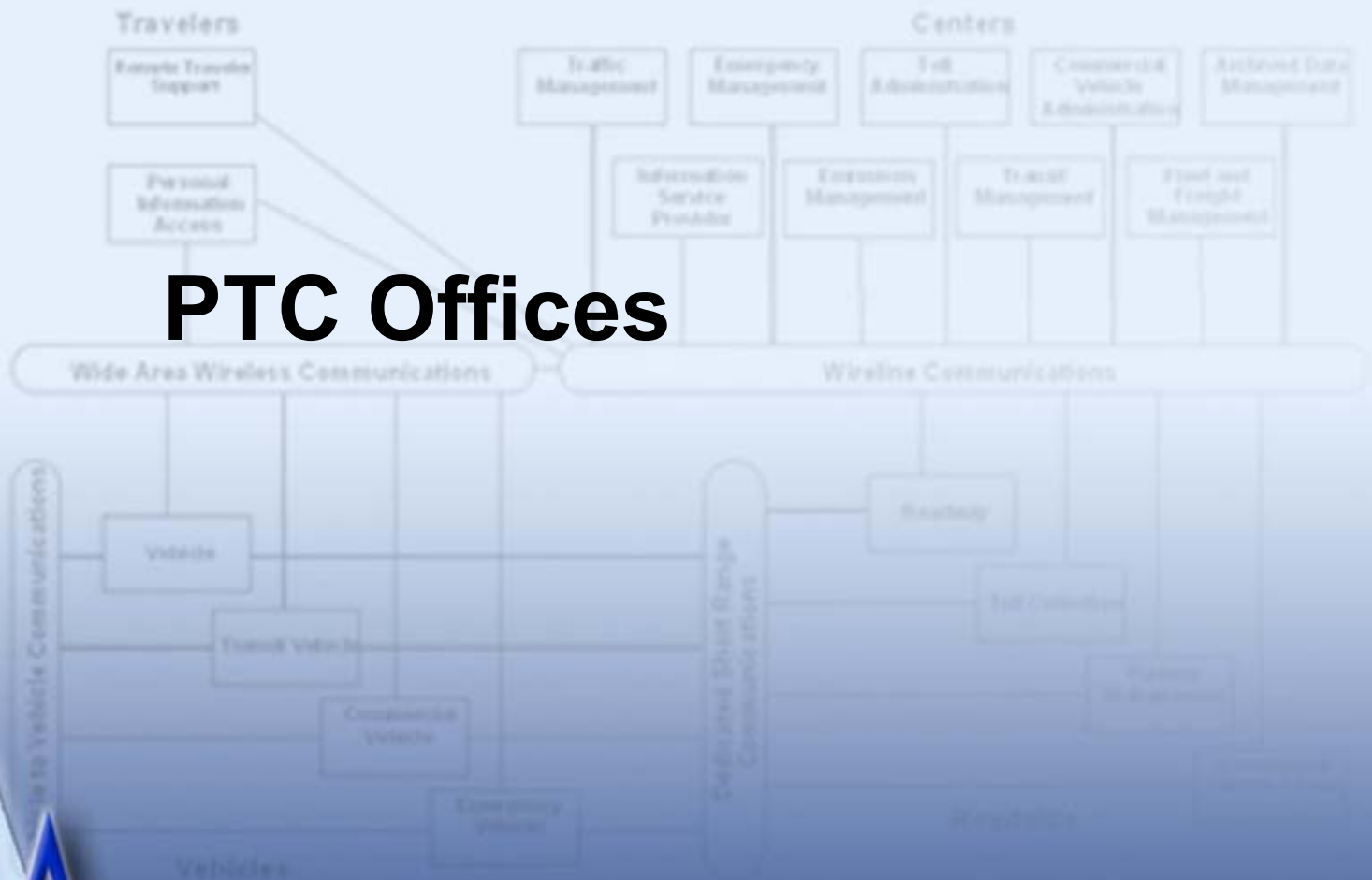


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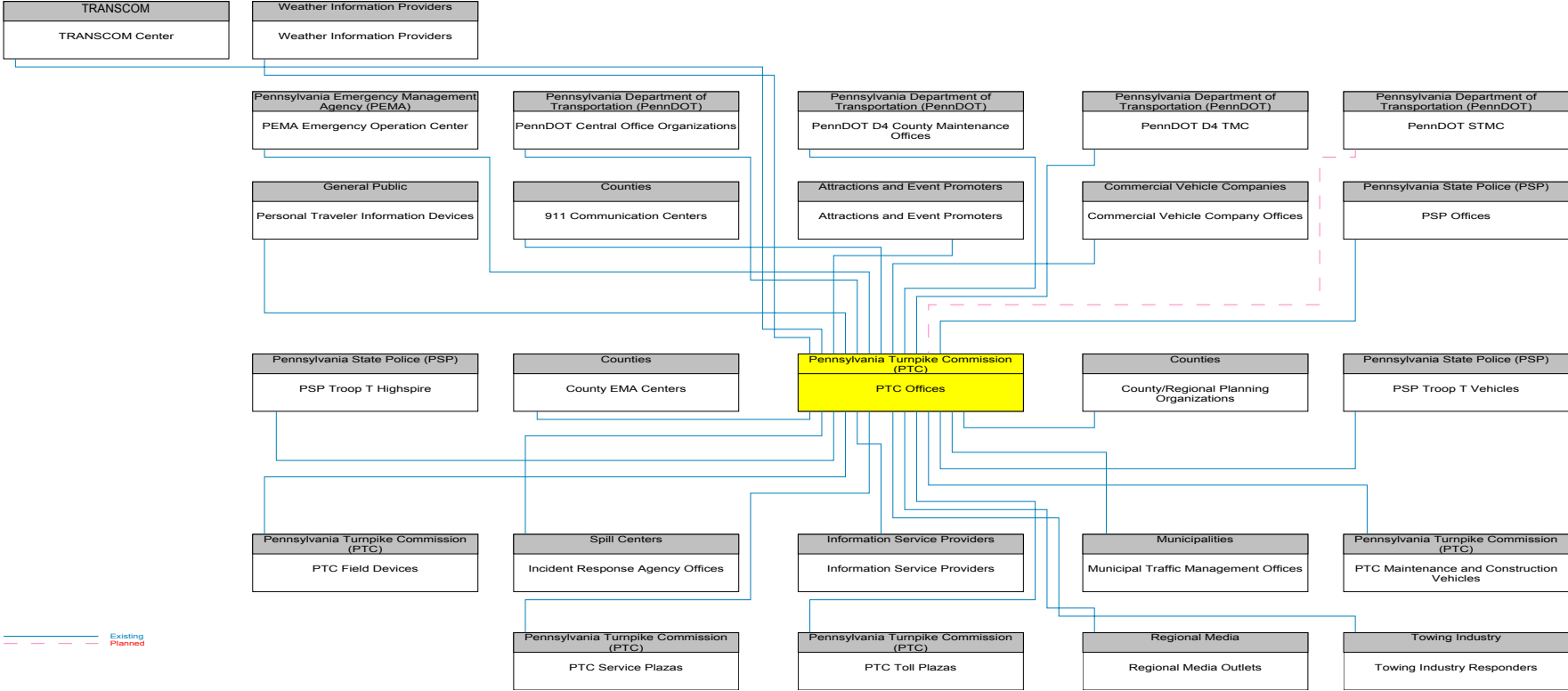
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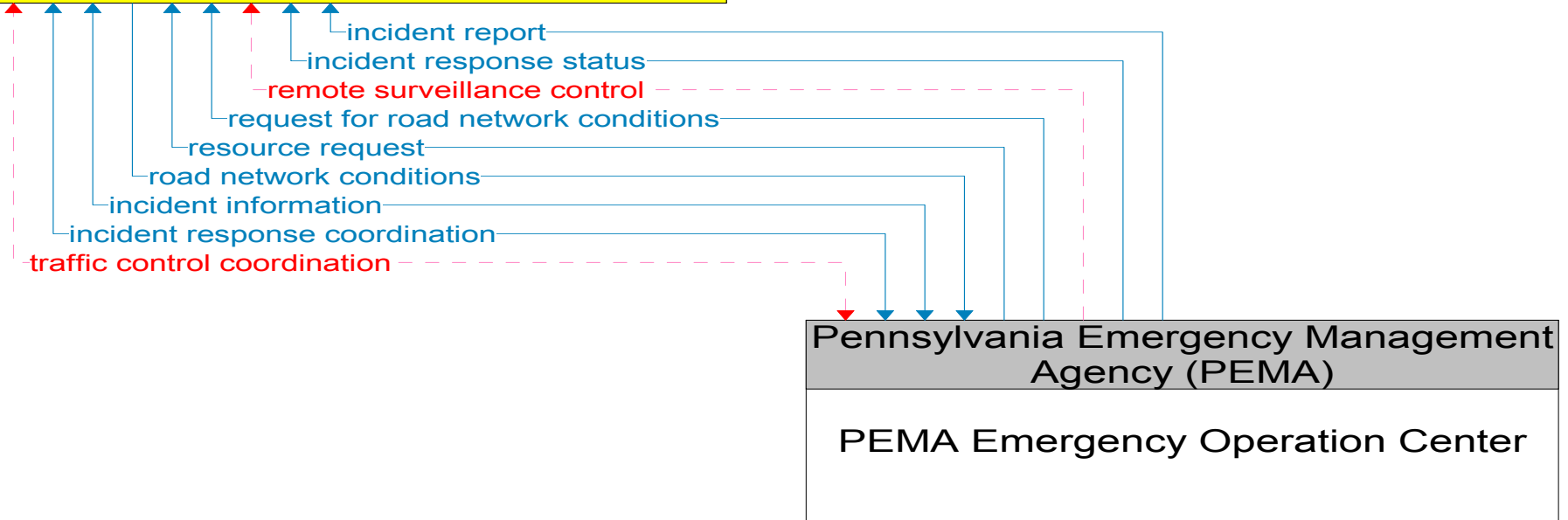
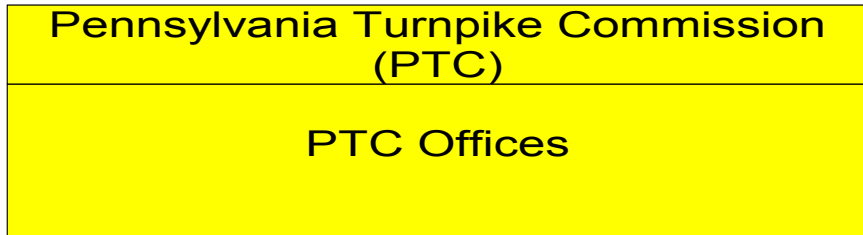
PTC Offices



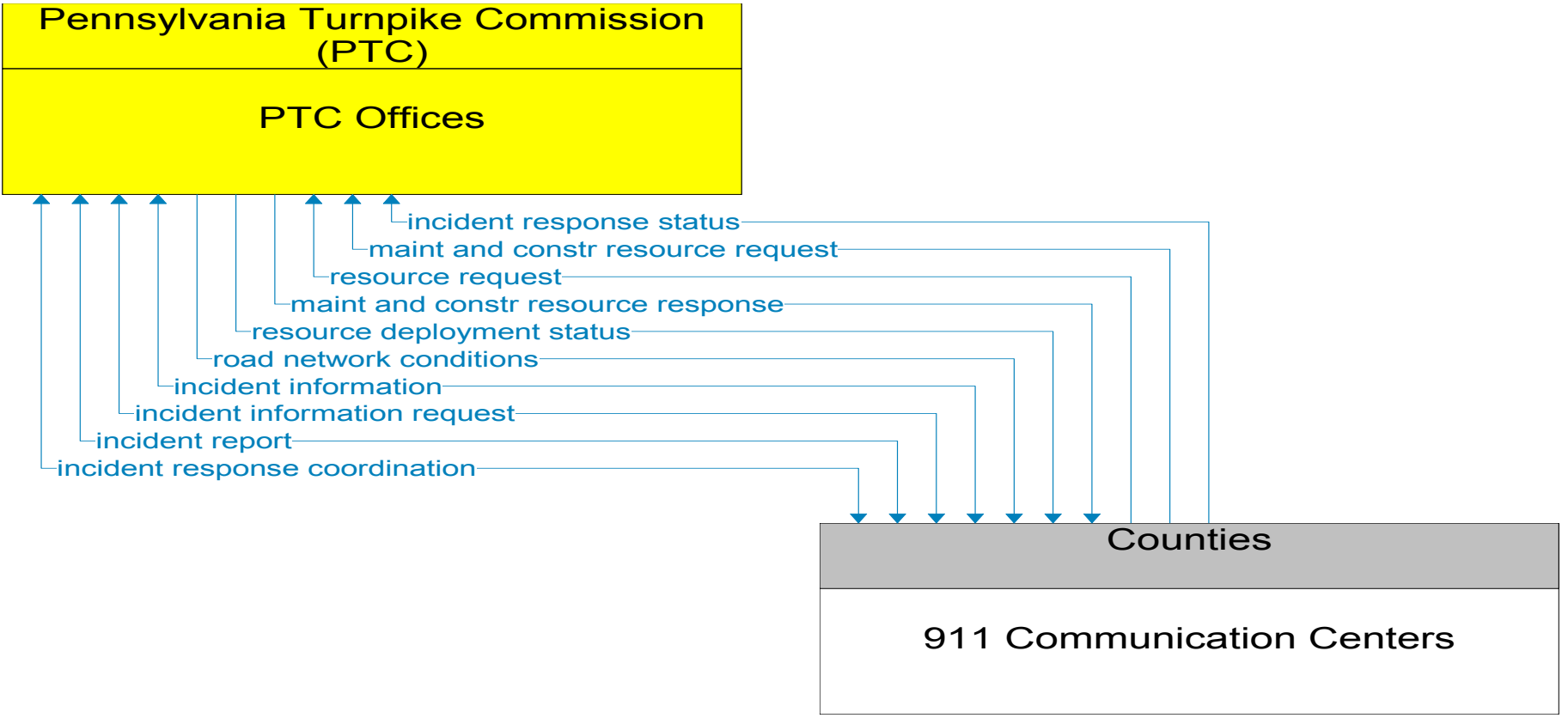
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PTC Offices Interconnect Diagram

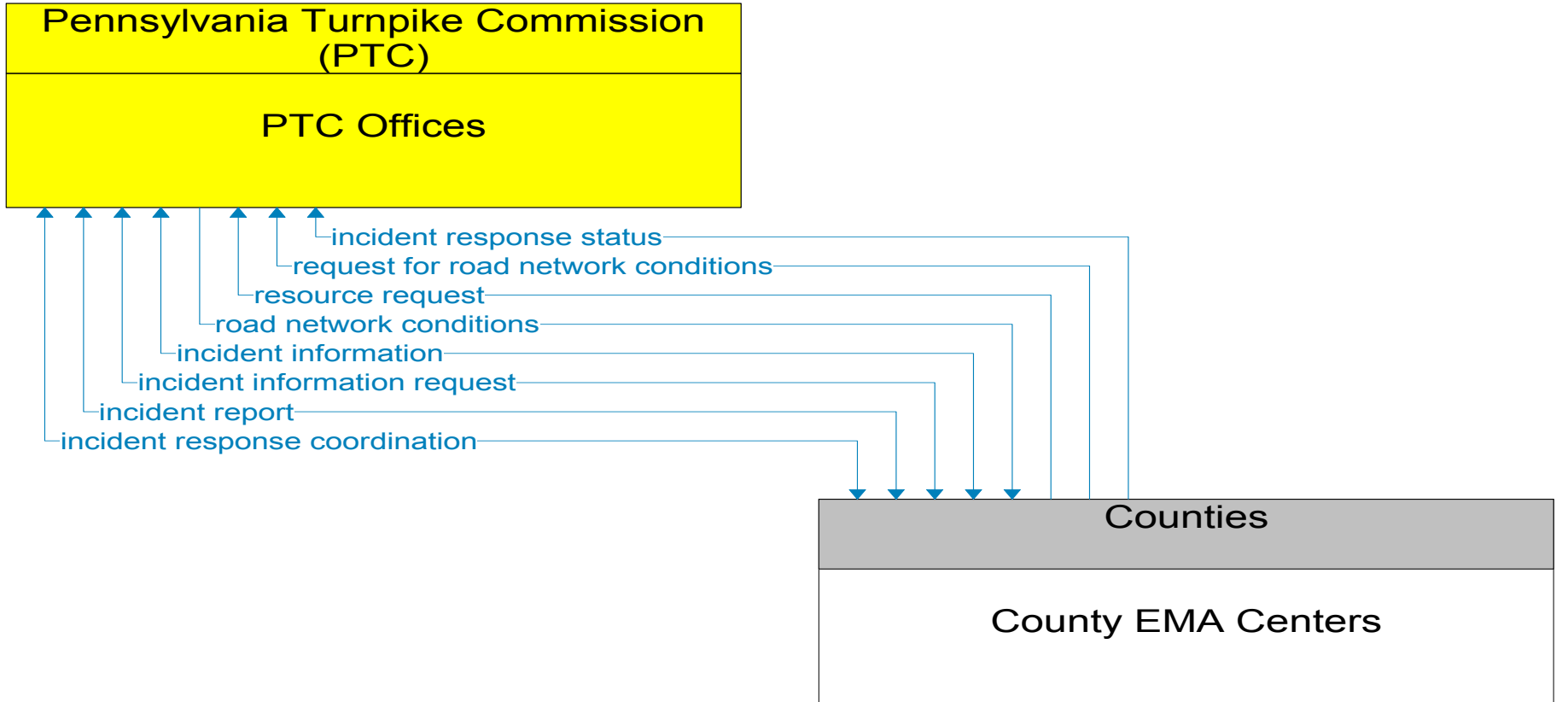




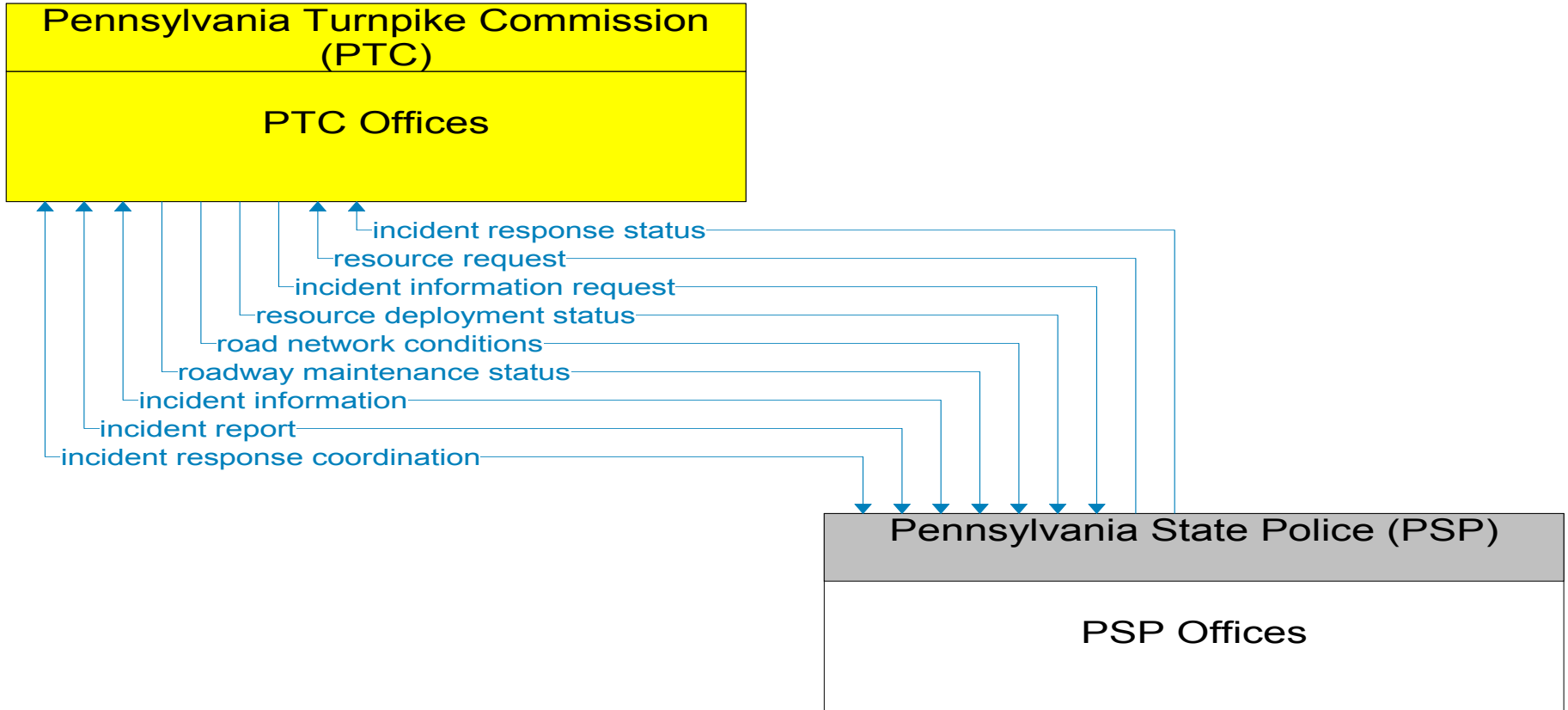
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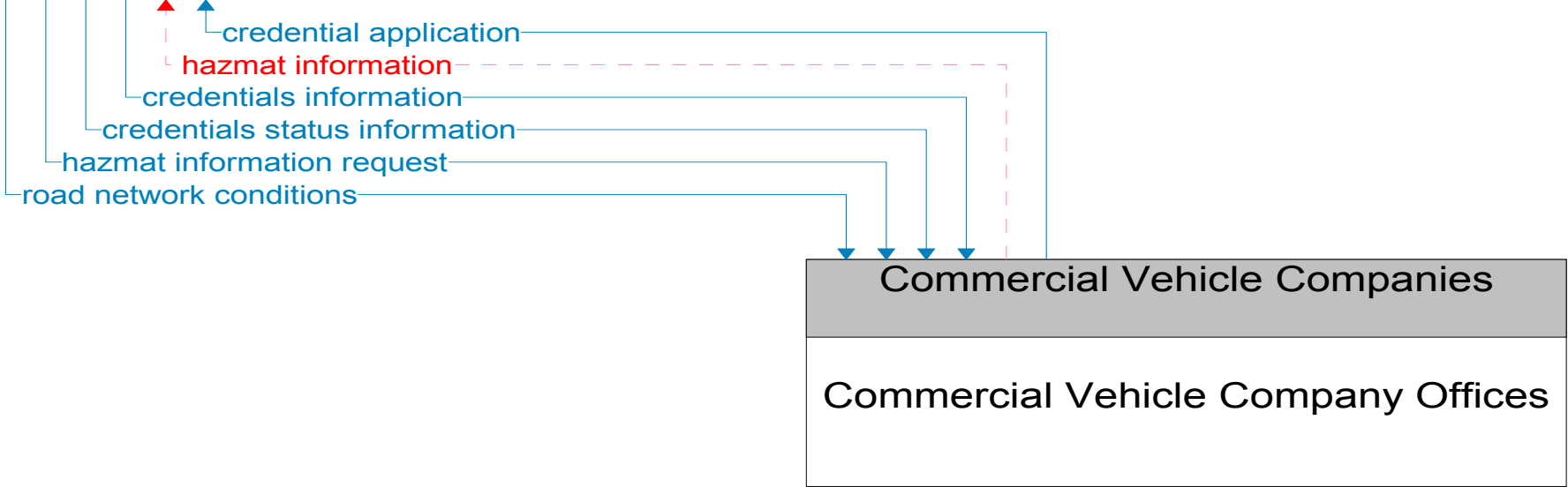
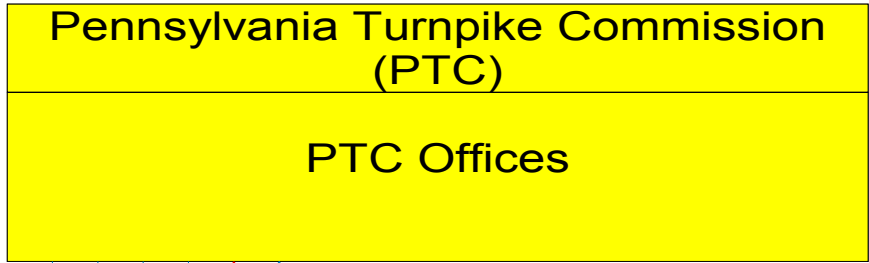
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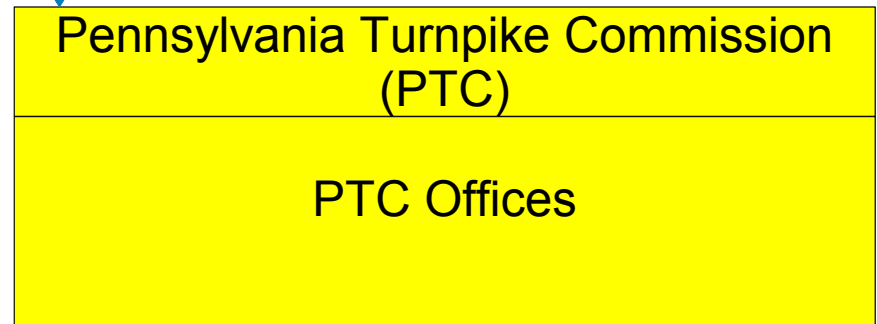
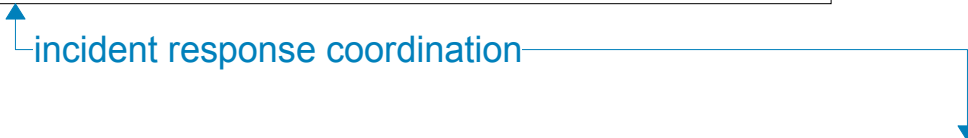
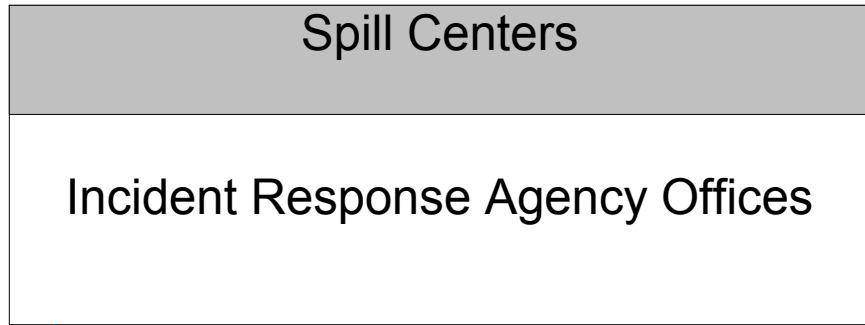
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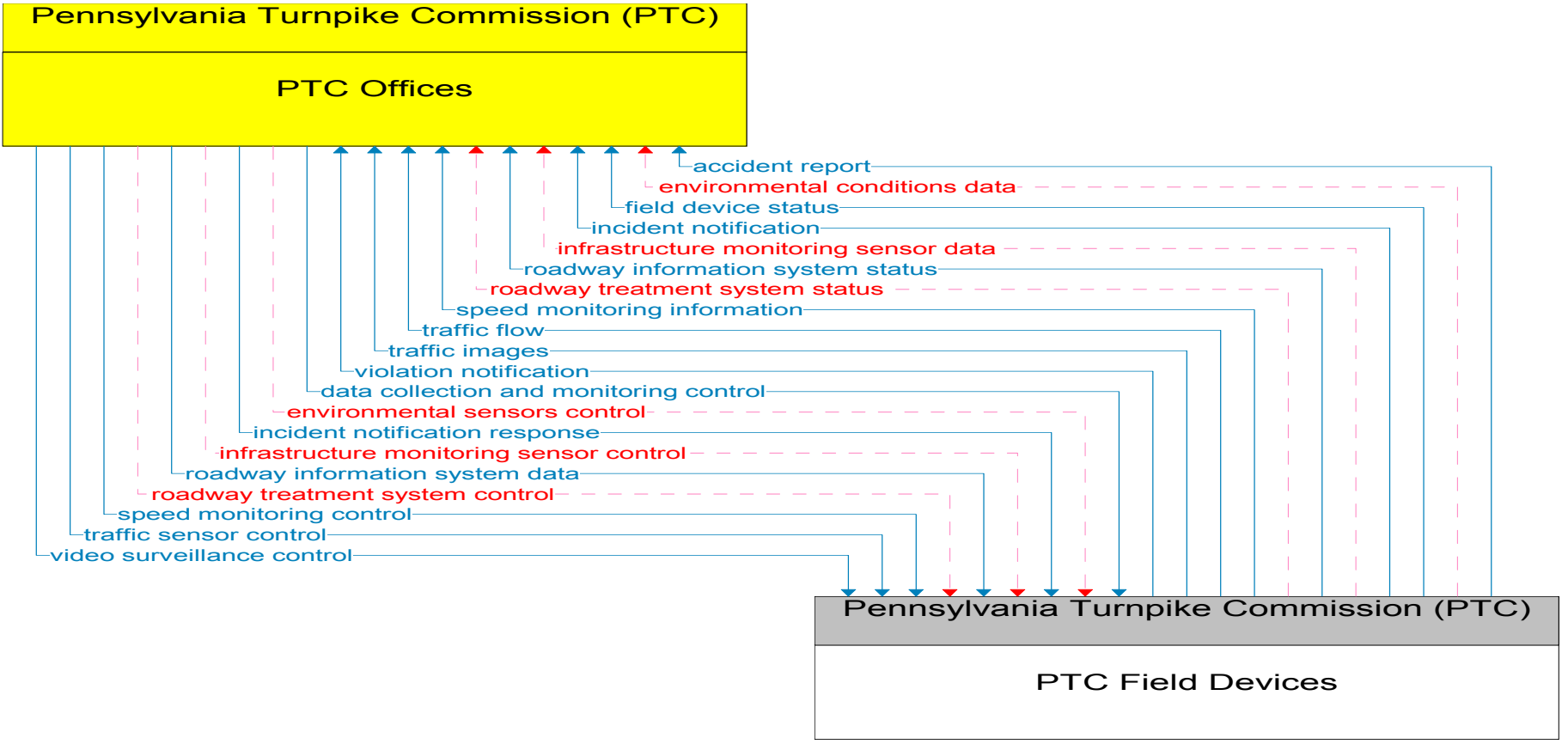


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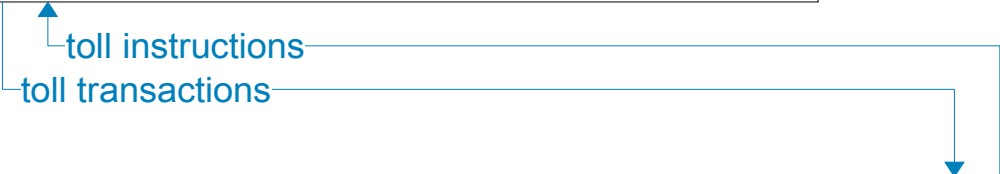
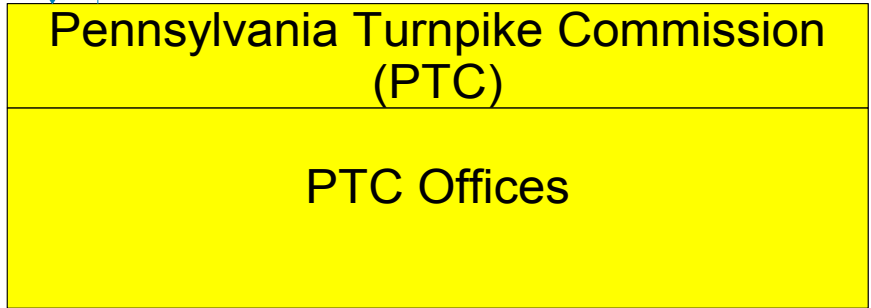
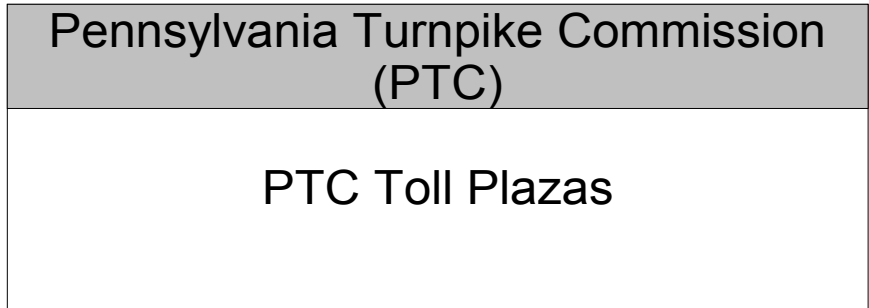


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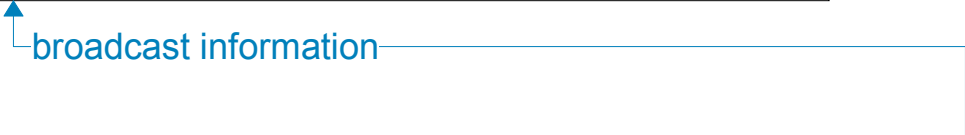
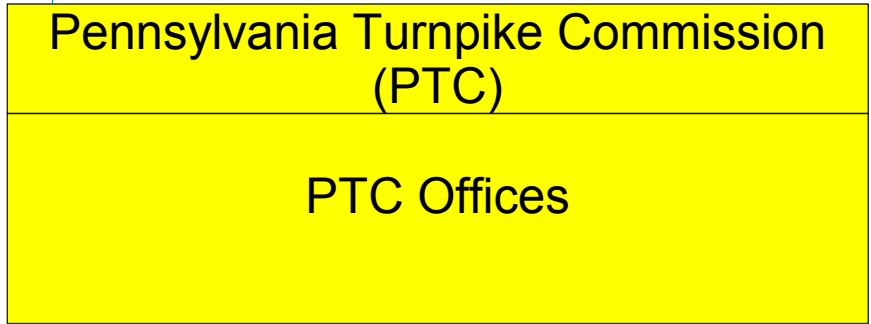
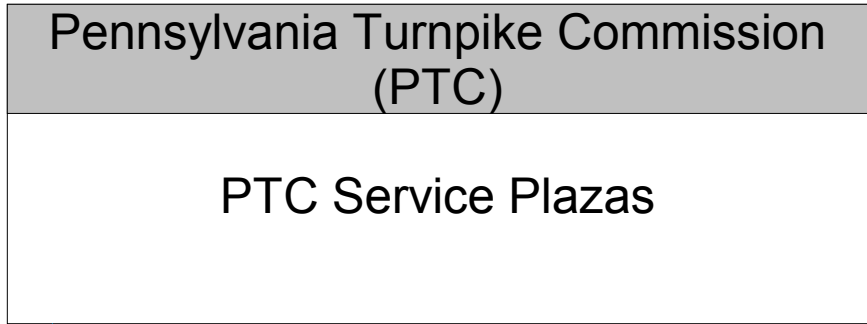




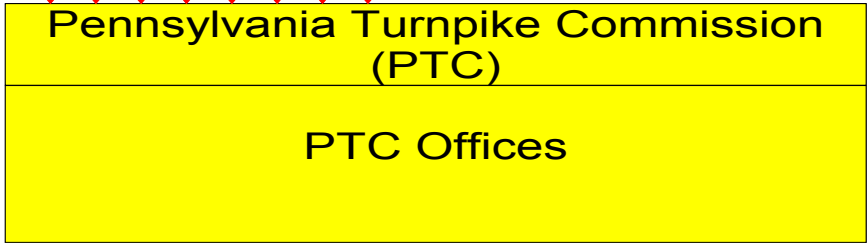
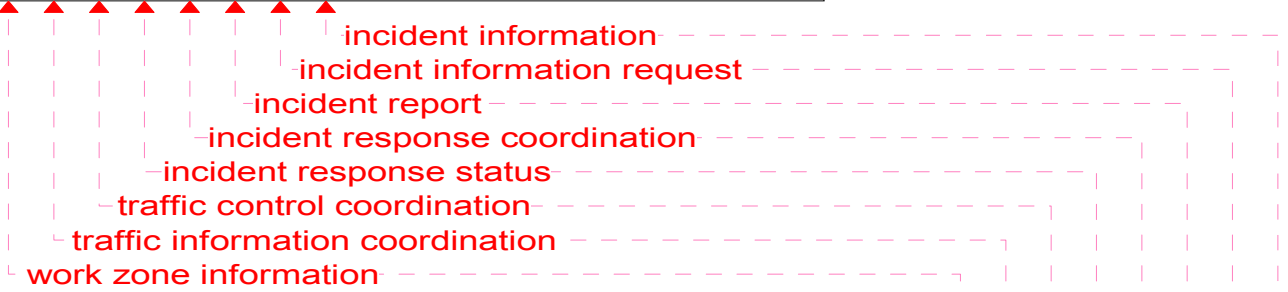
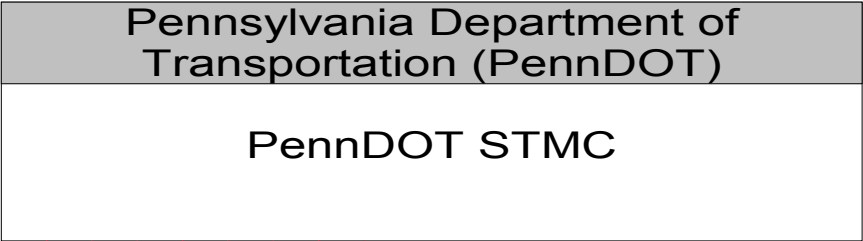
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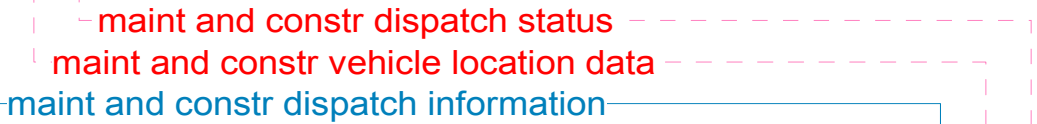
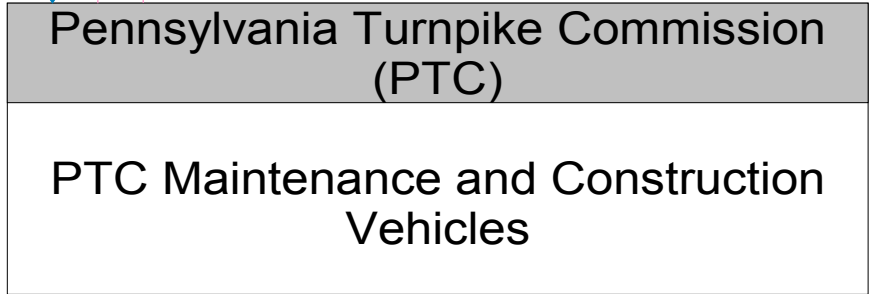
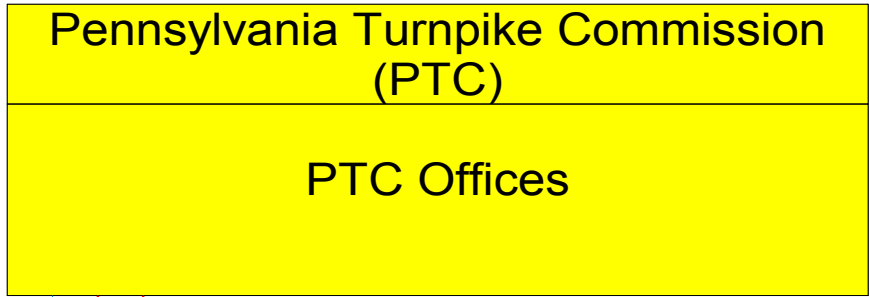
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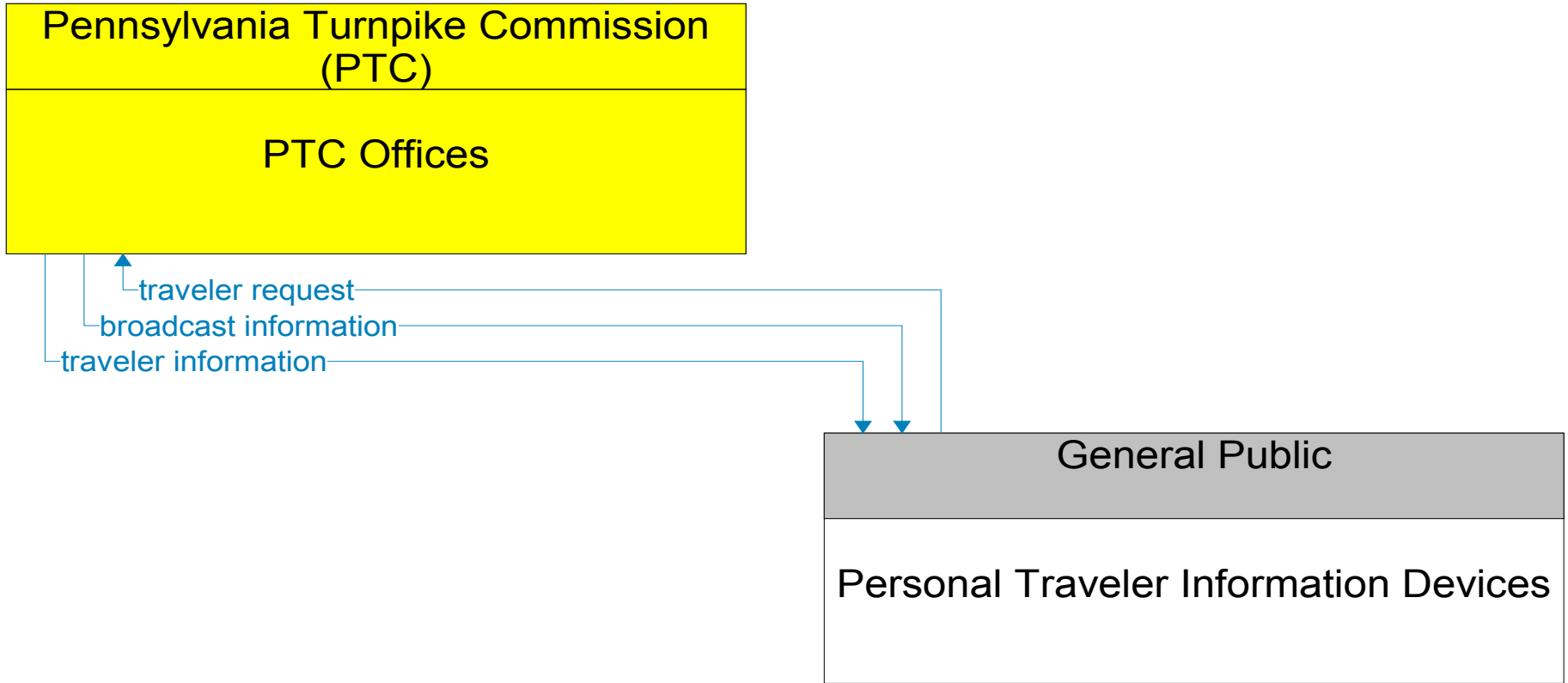
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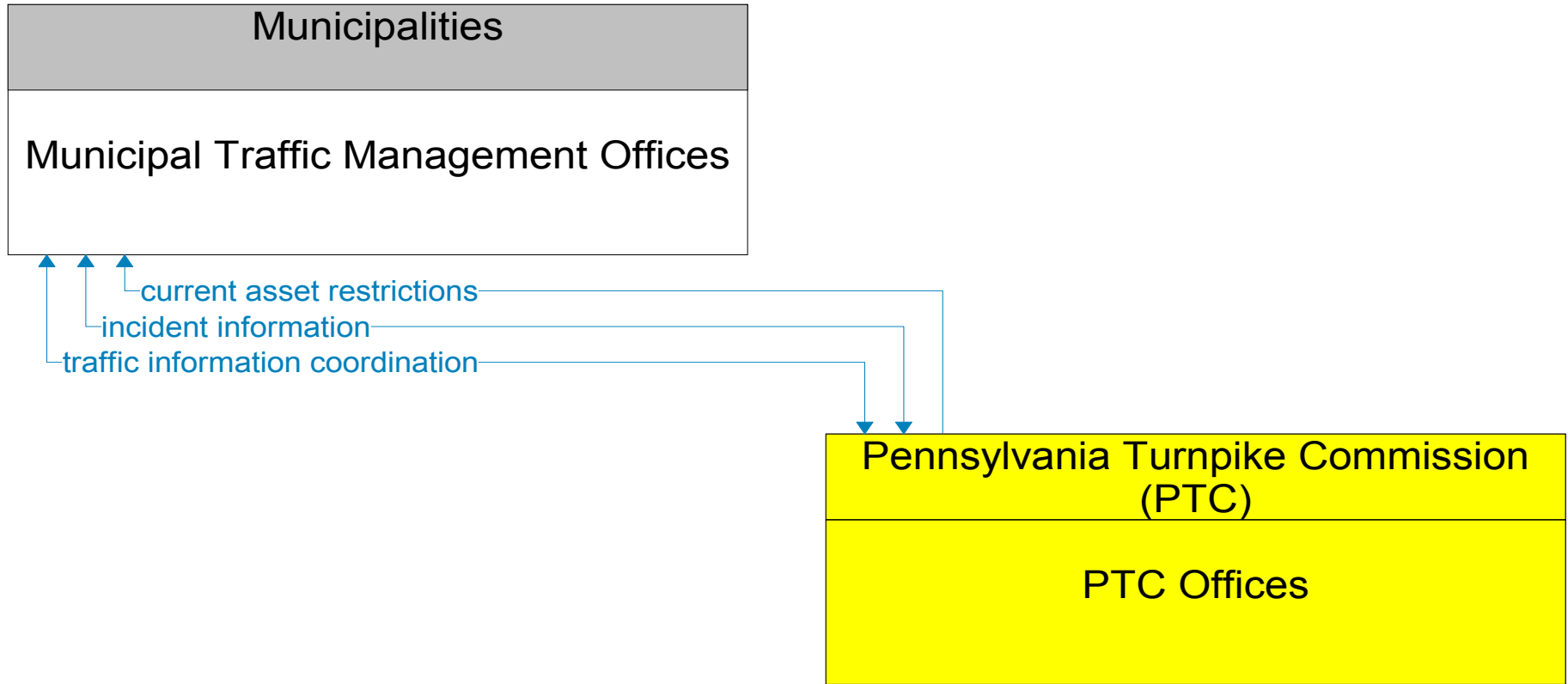
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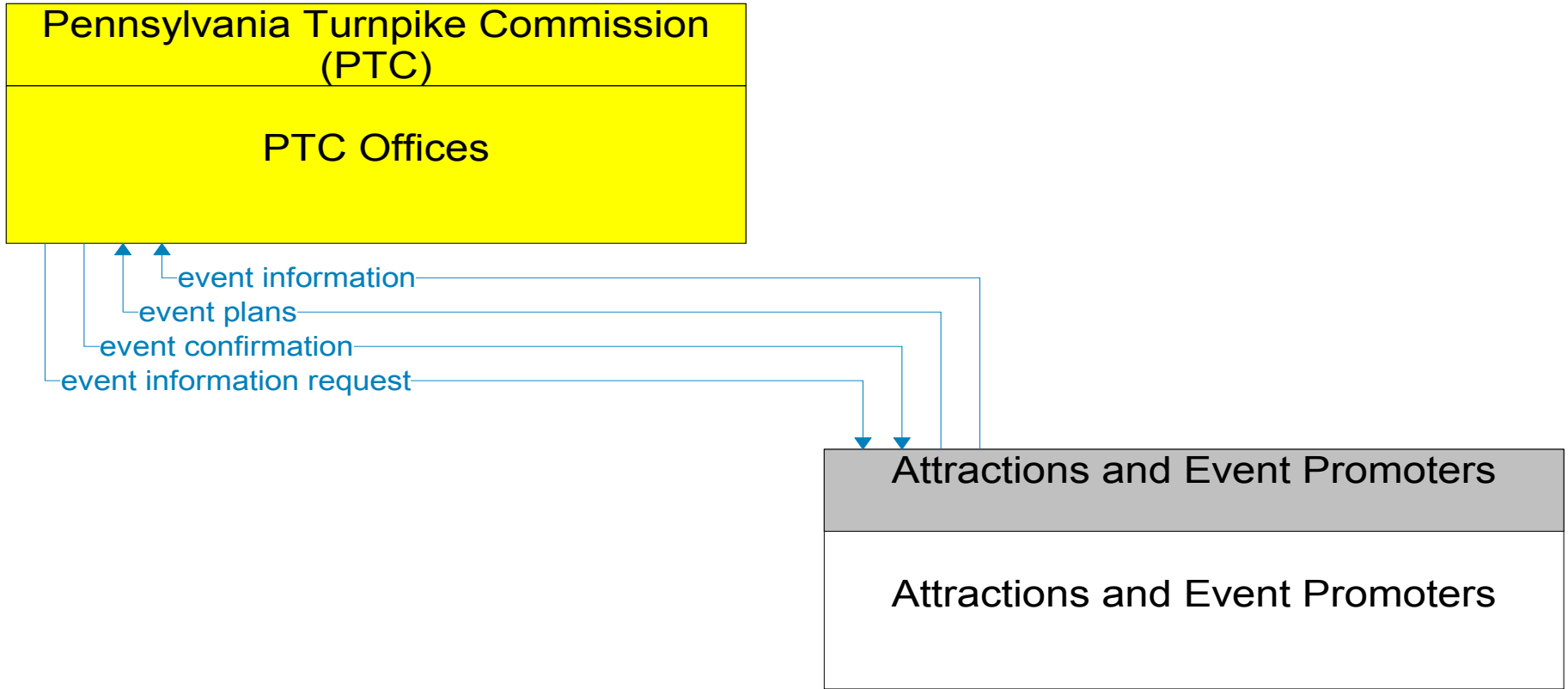
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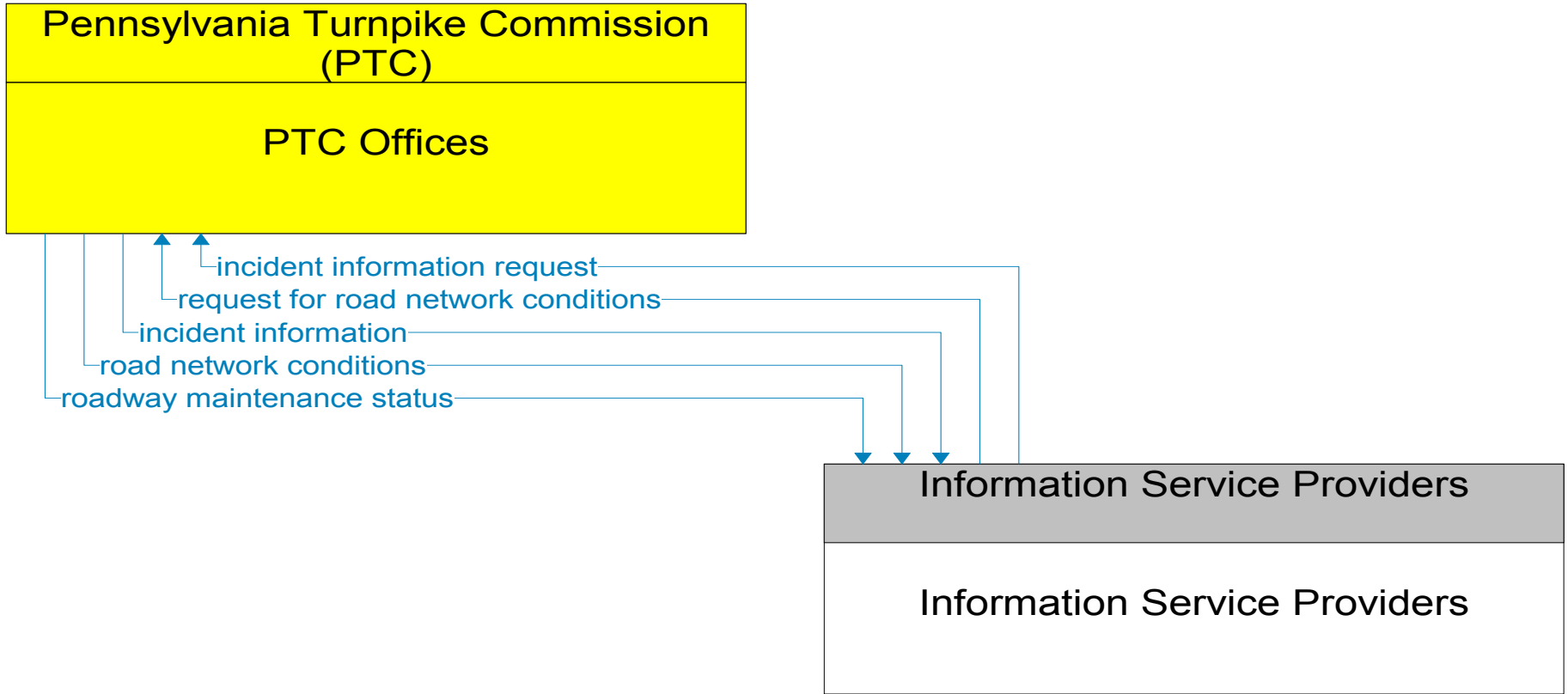
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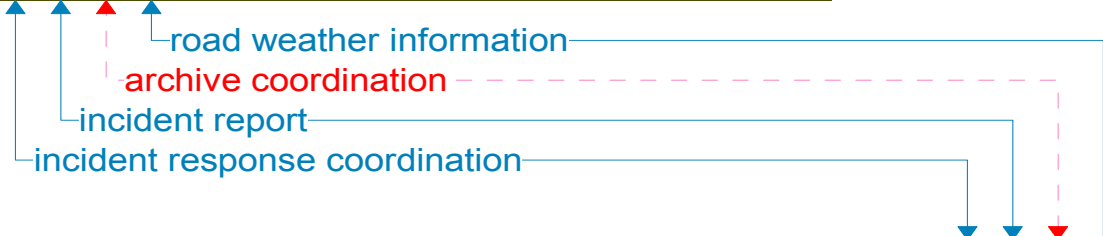
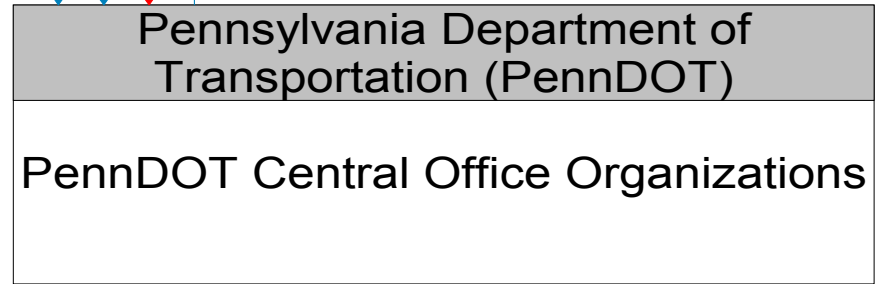
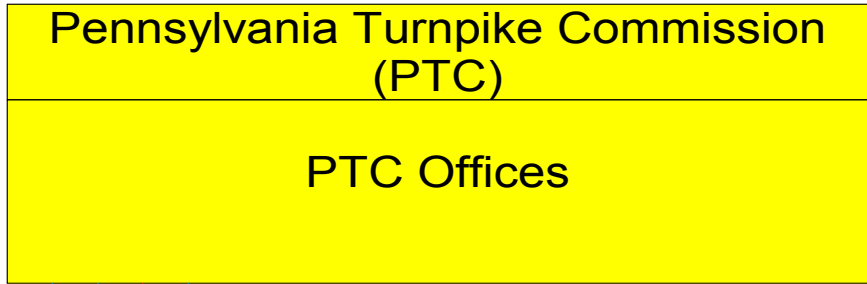
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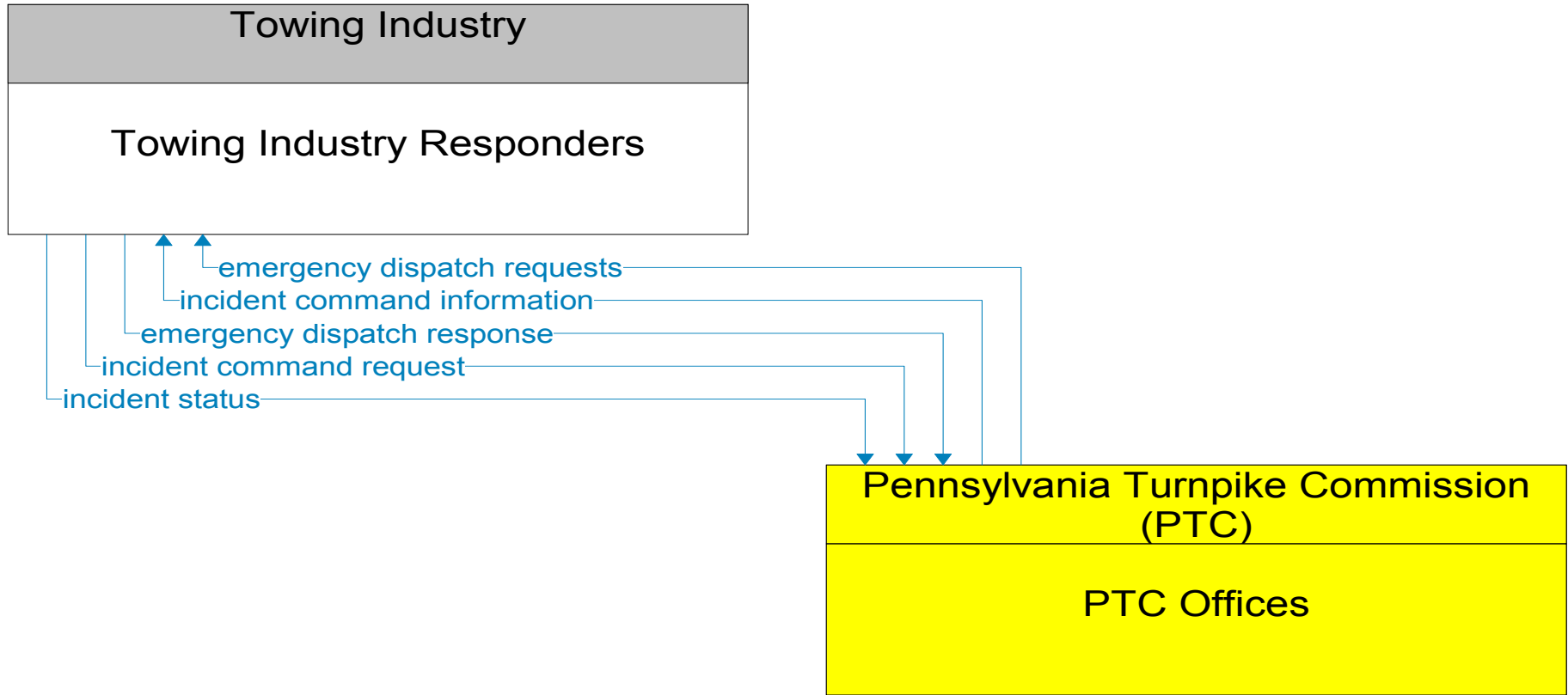
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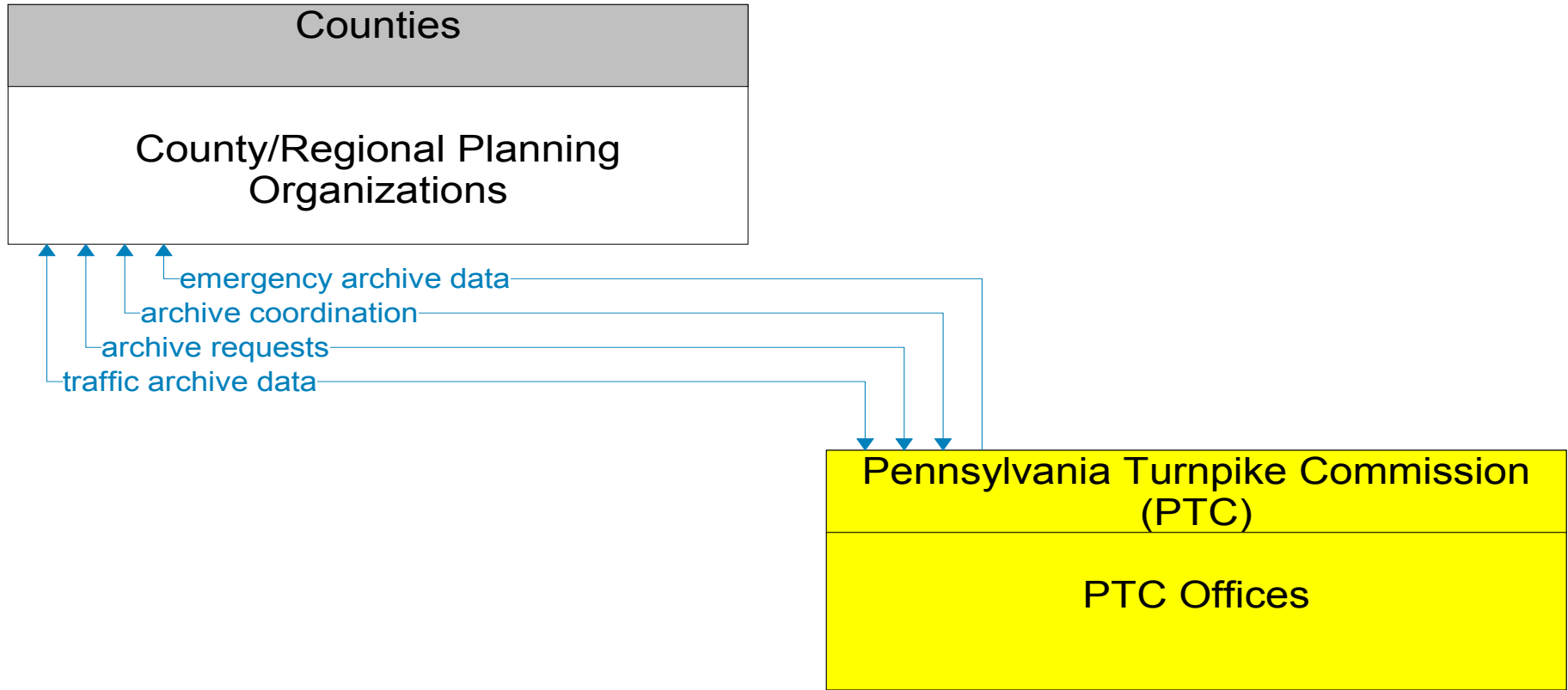
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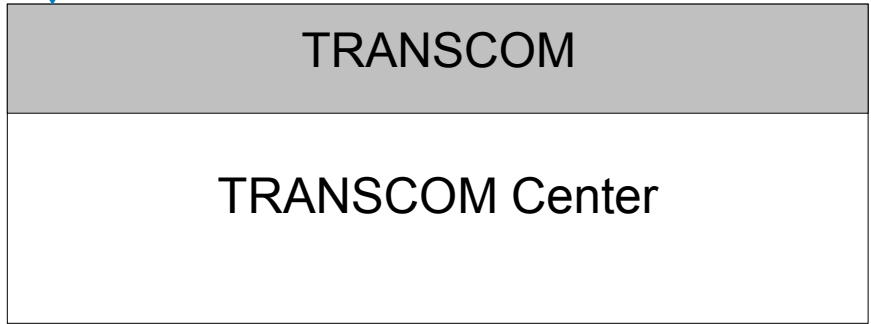
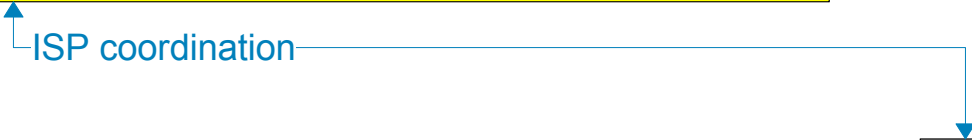
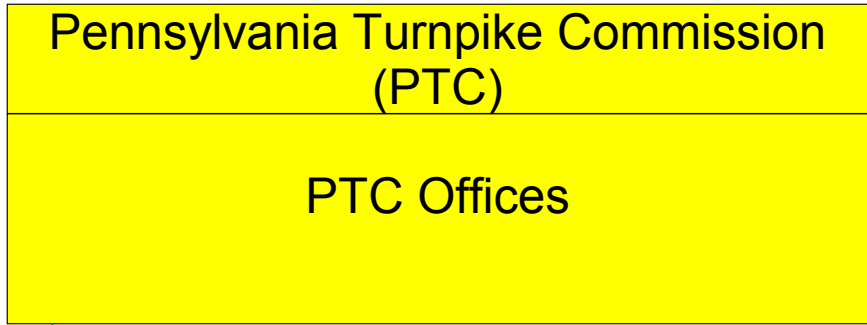
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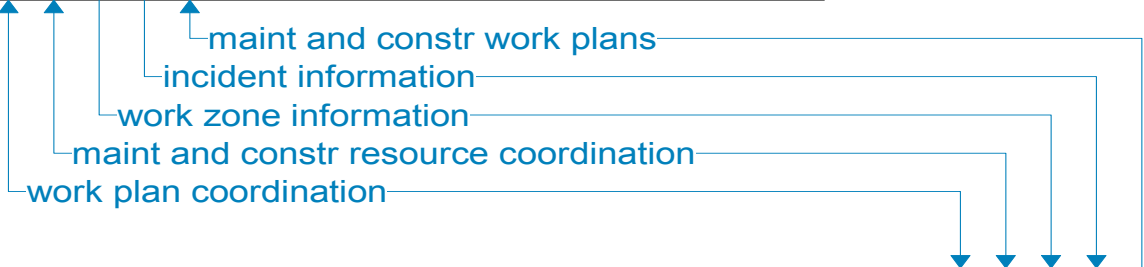
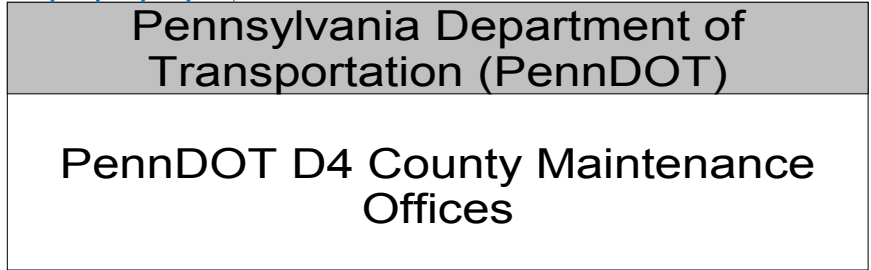
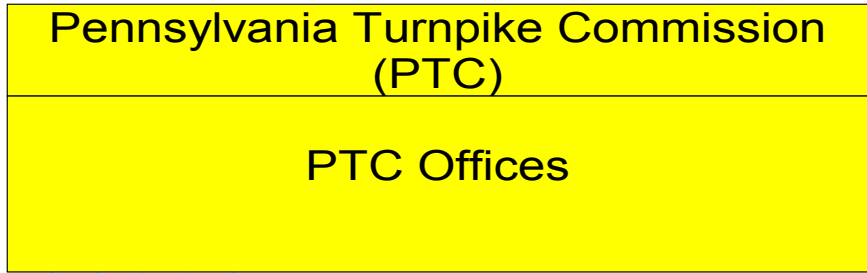
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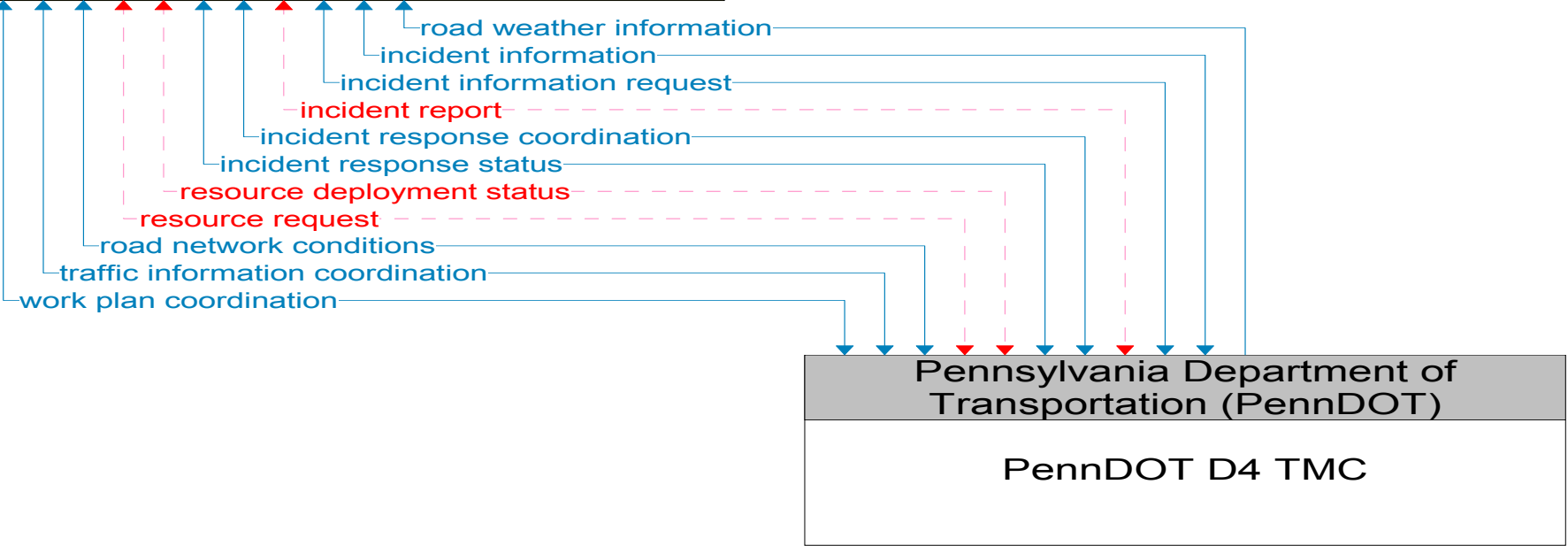
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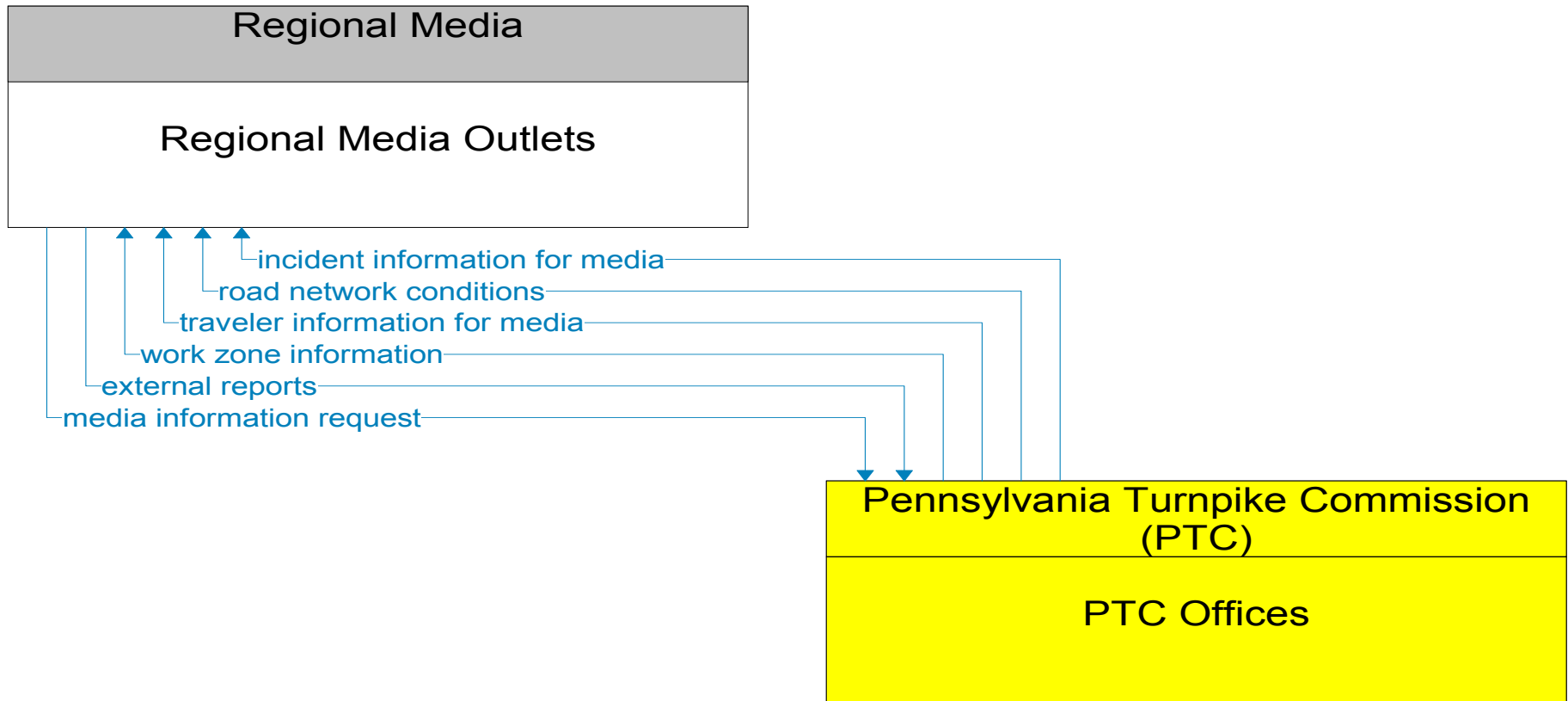
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**Pennsylvania Turnpike Commission
(PTC)**

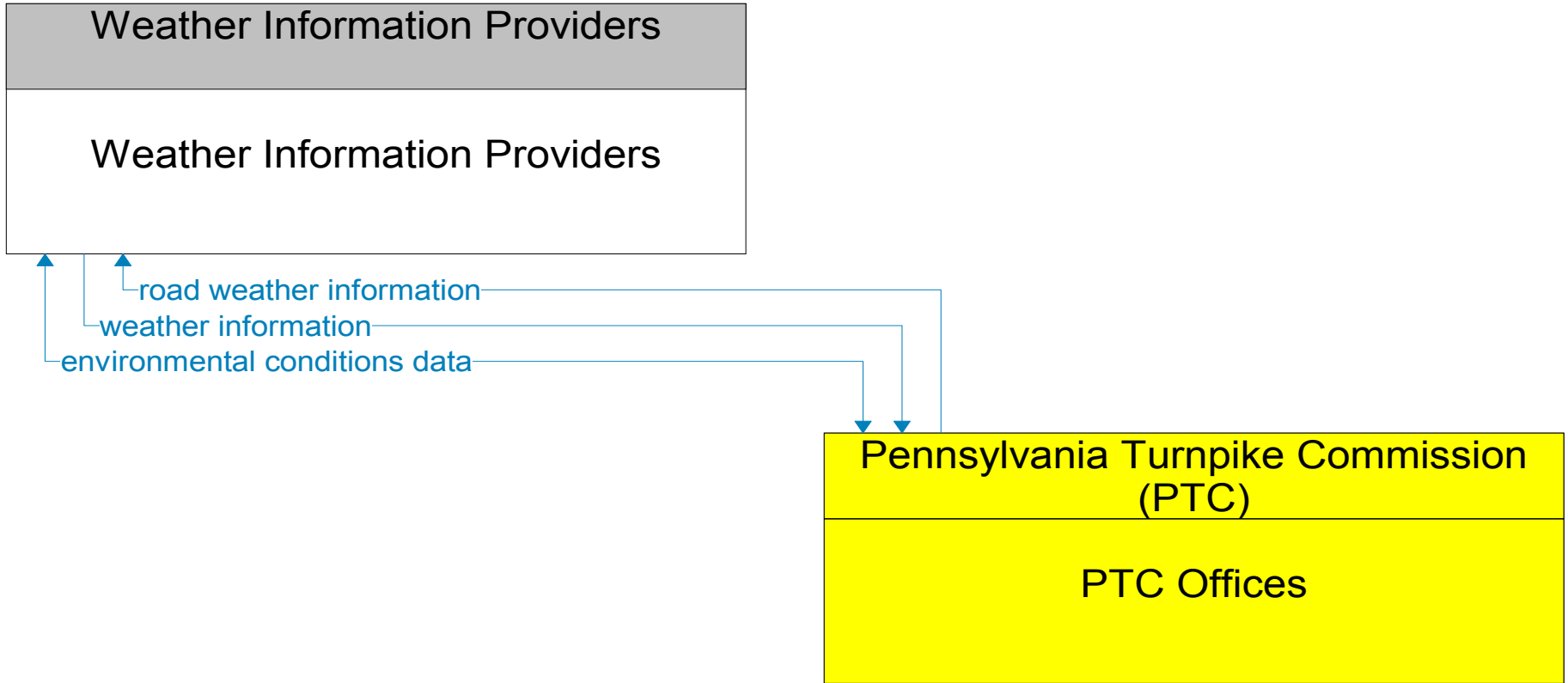
PTC Offices



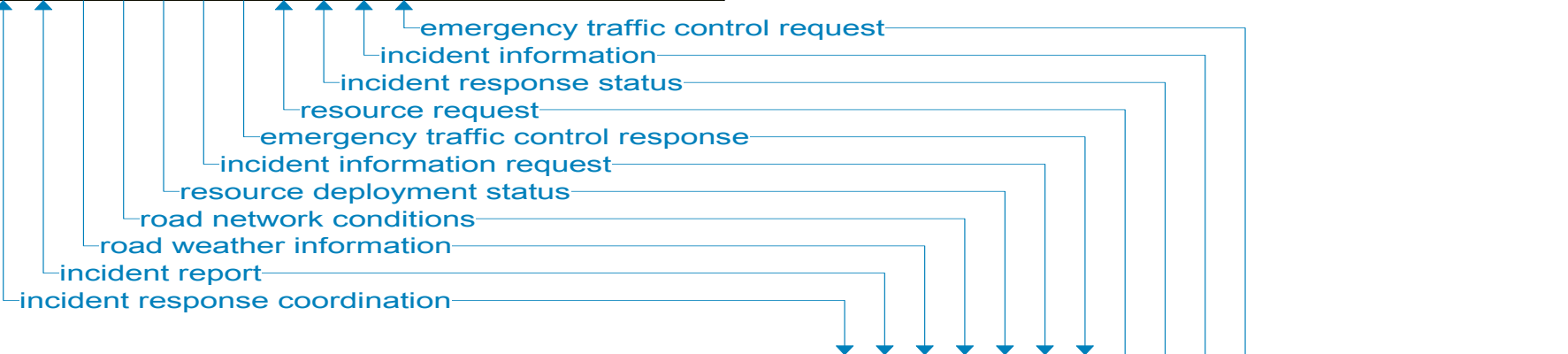
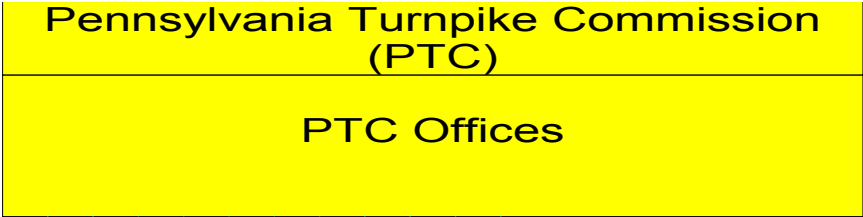
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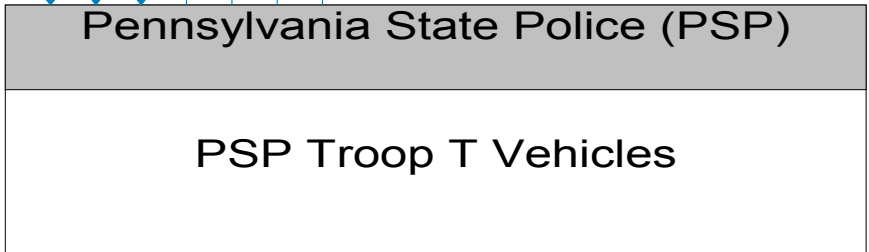
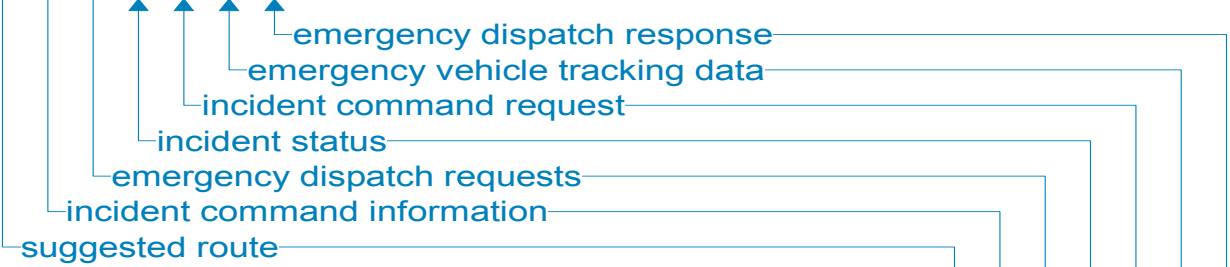
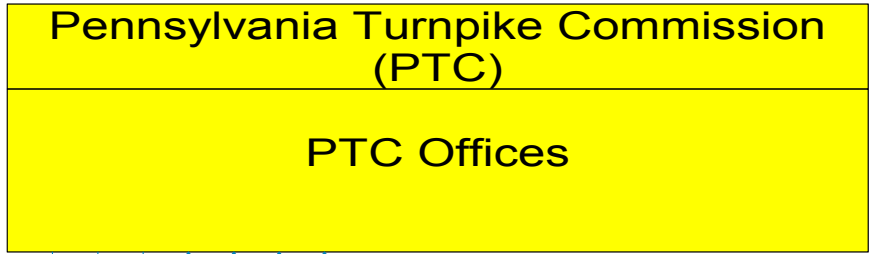


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- - - - - Planned

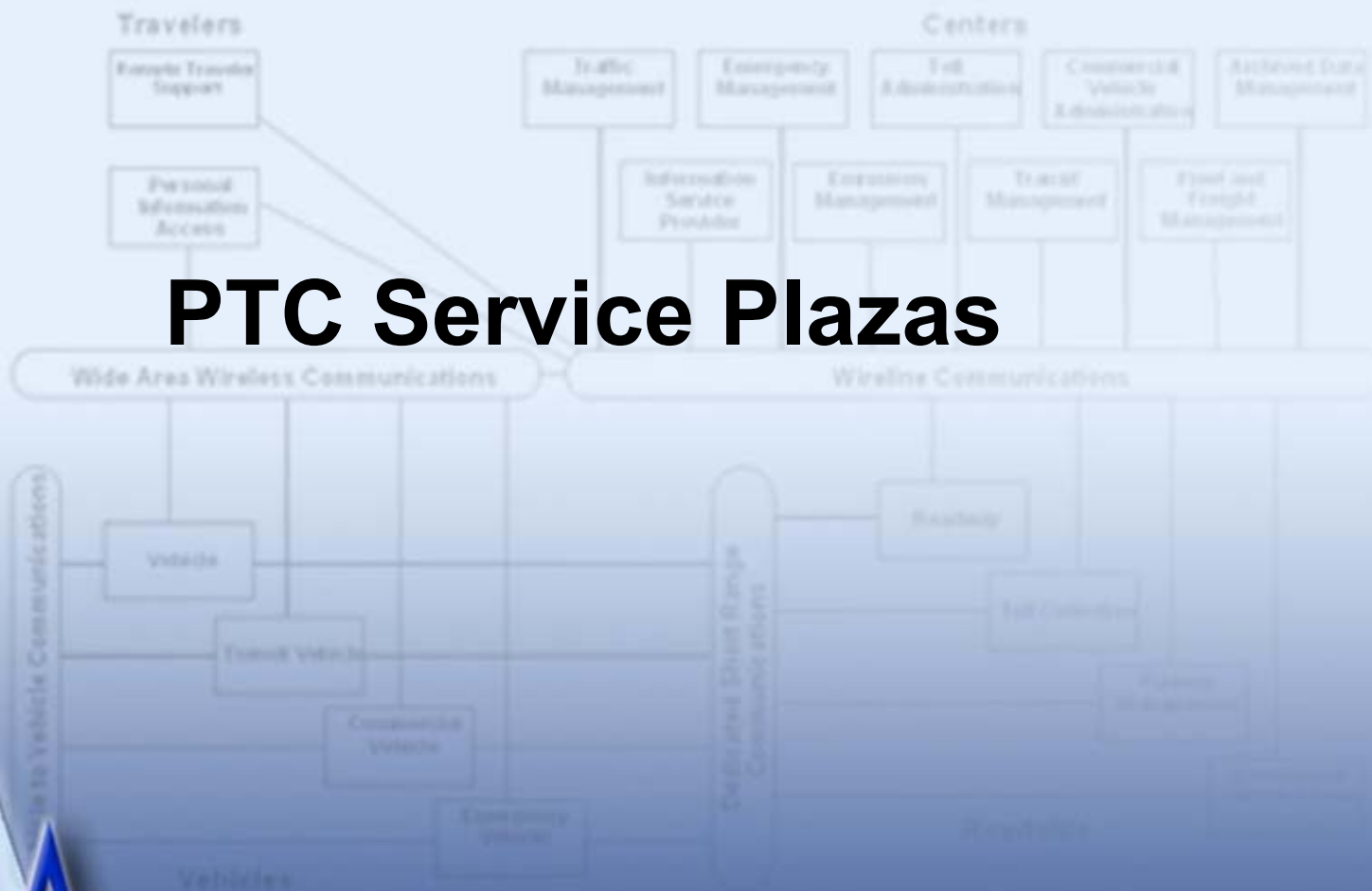


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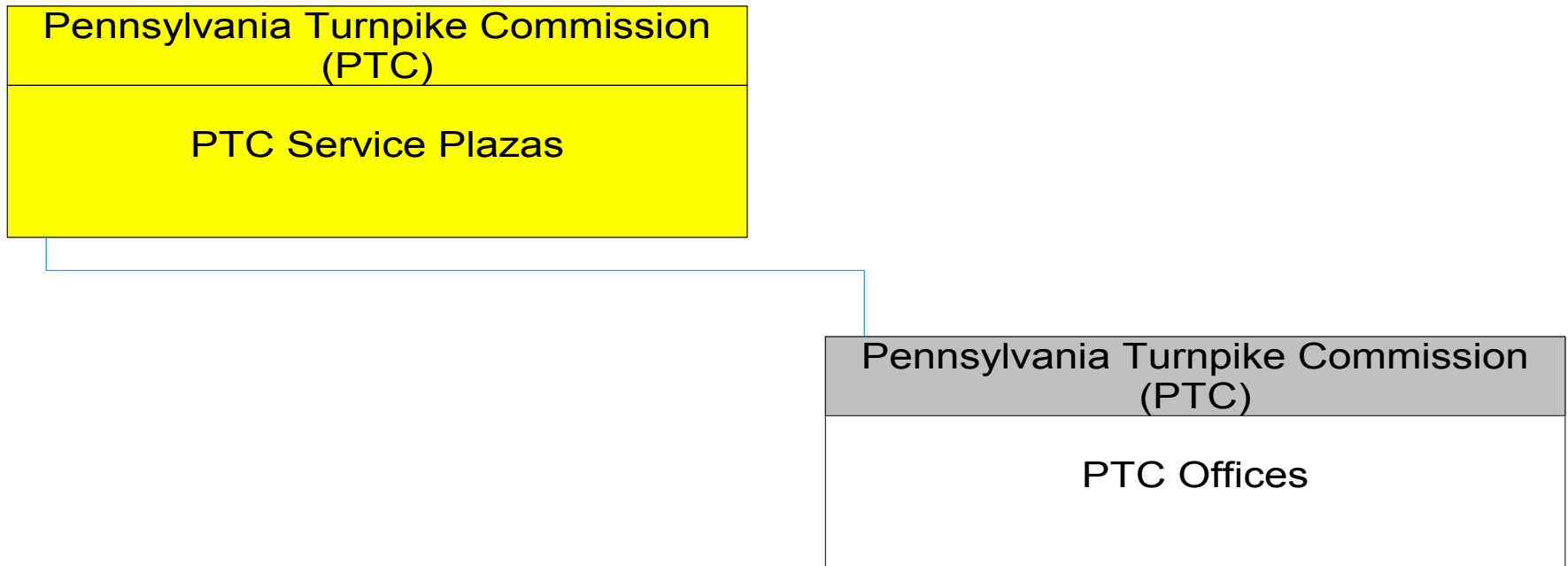


PTC Service Plazas

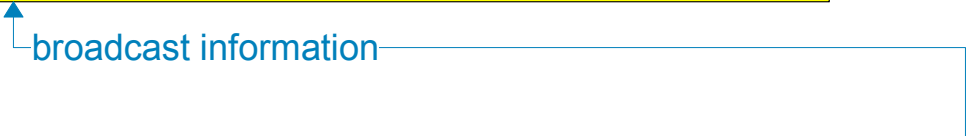
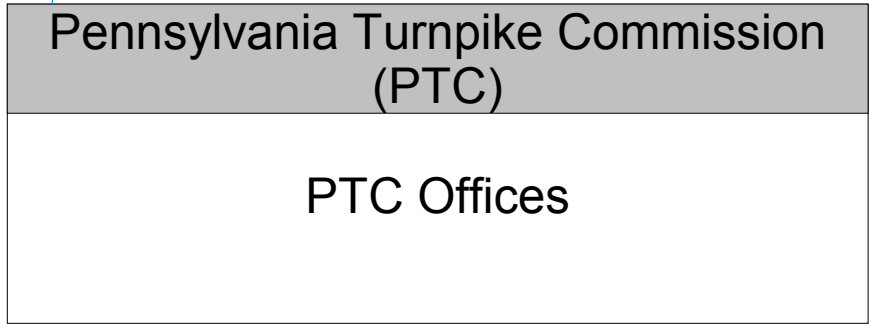
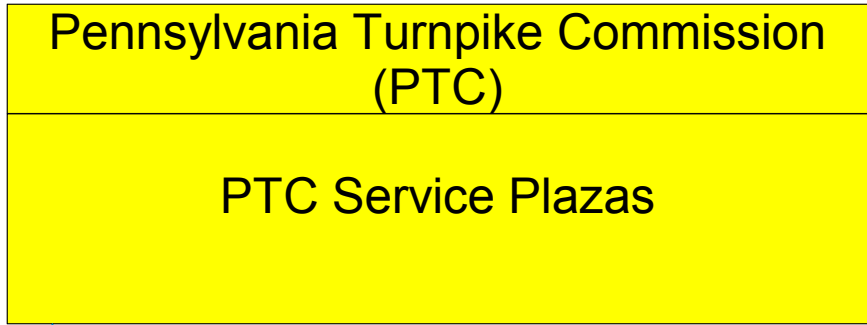


PA

PTC Service Plazas Interconnect Diagram

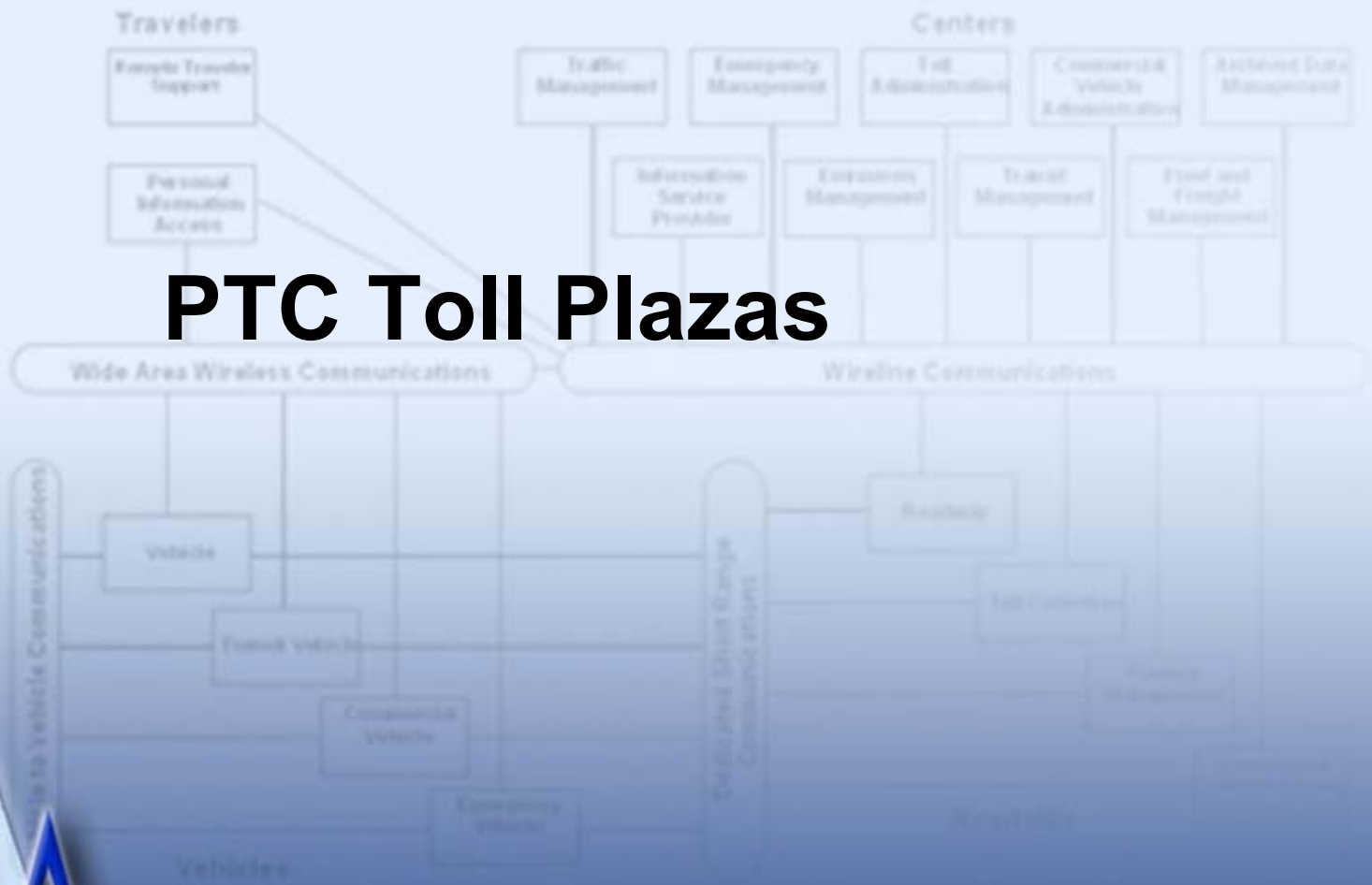


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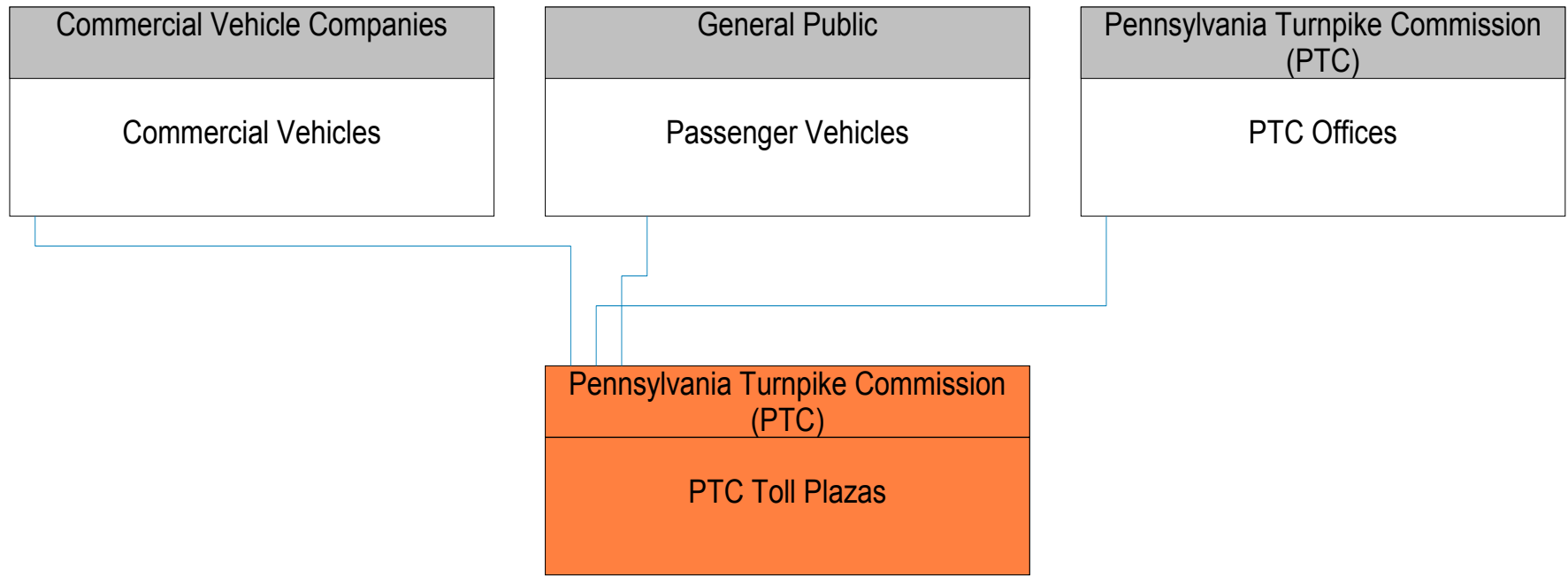


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- - - - - Planned

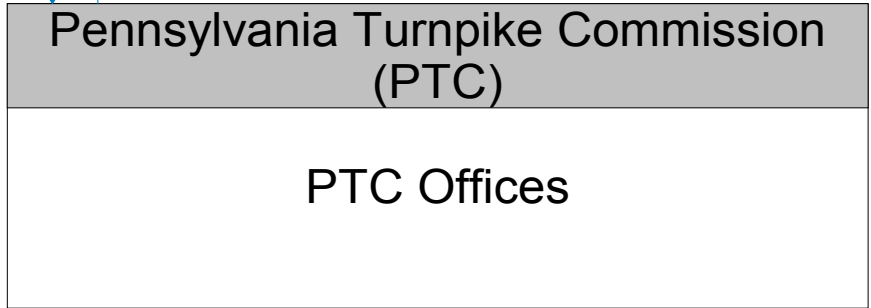
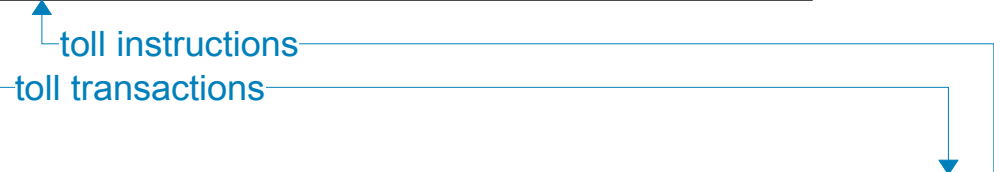
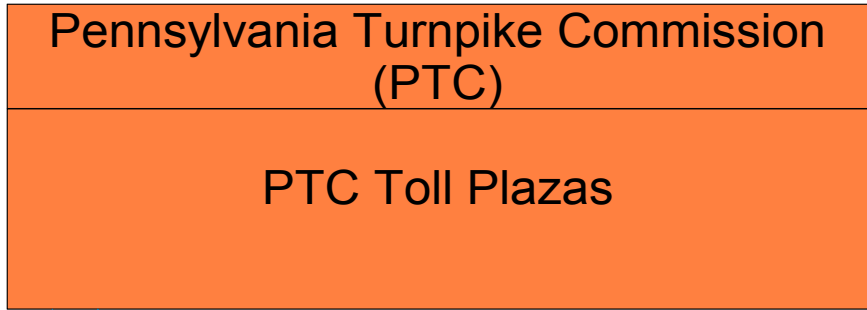
PTC Toll Plazas

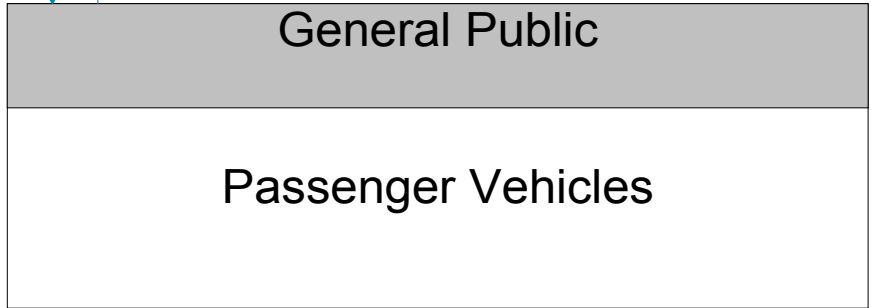
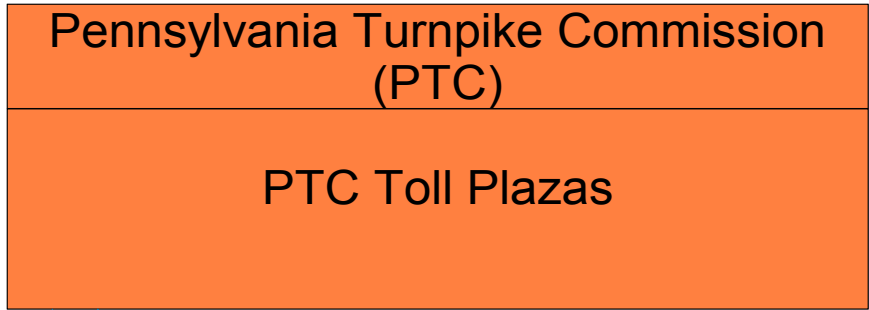


PTC Toll Plazas Interconnect Diagram



— Existing
- - - Planned

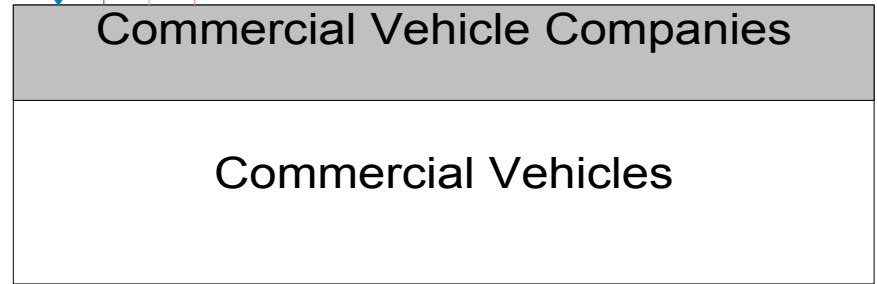
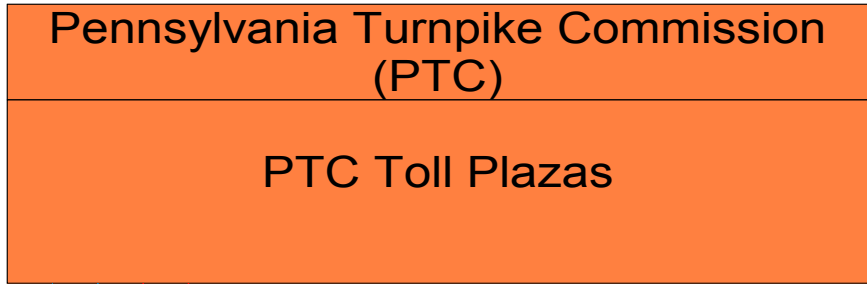




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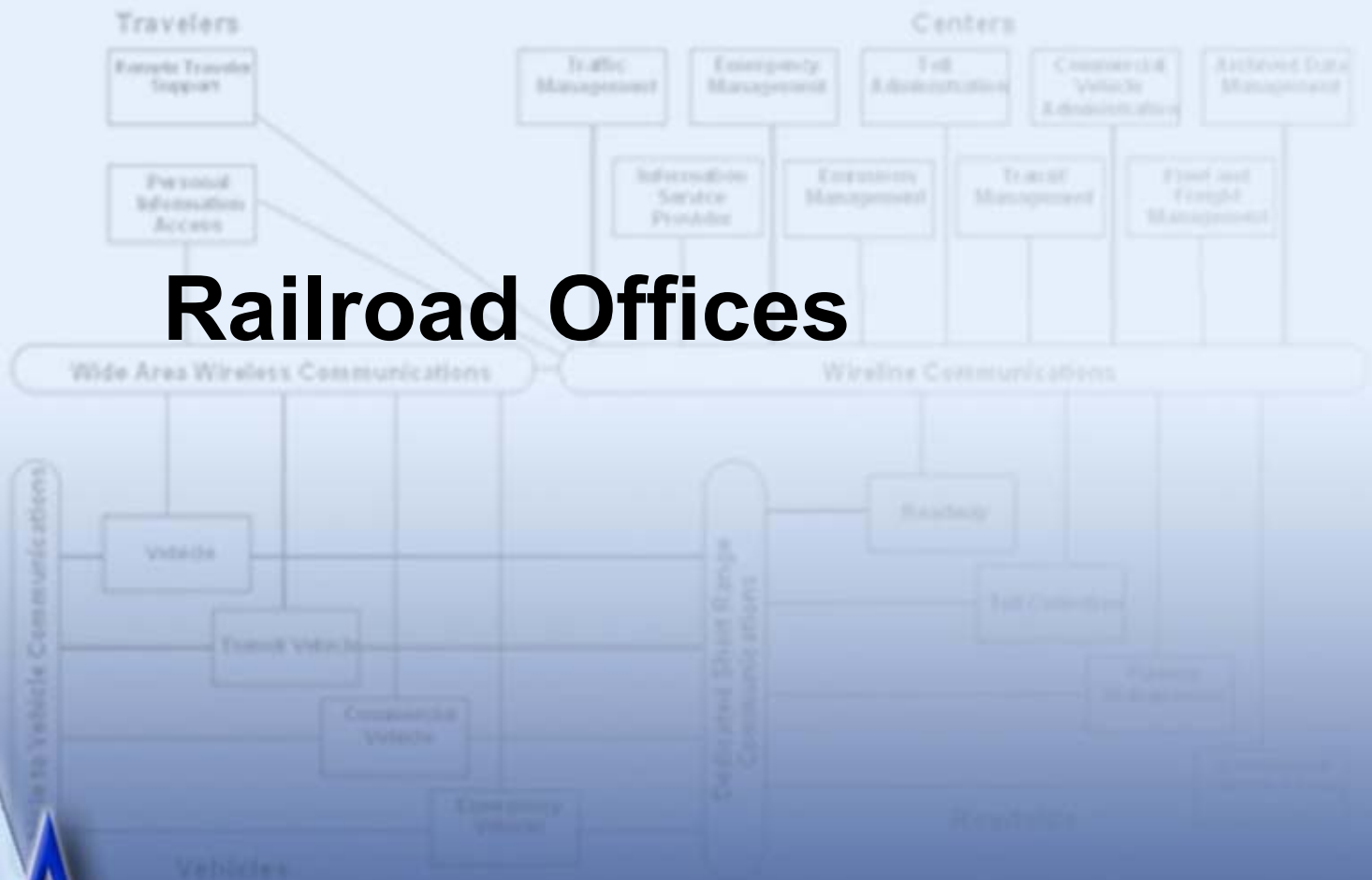
request tag data

Existing
Planned



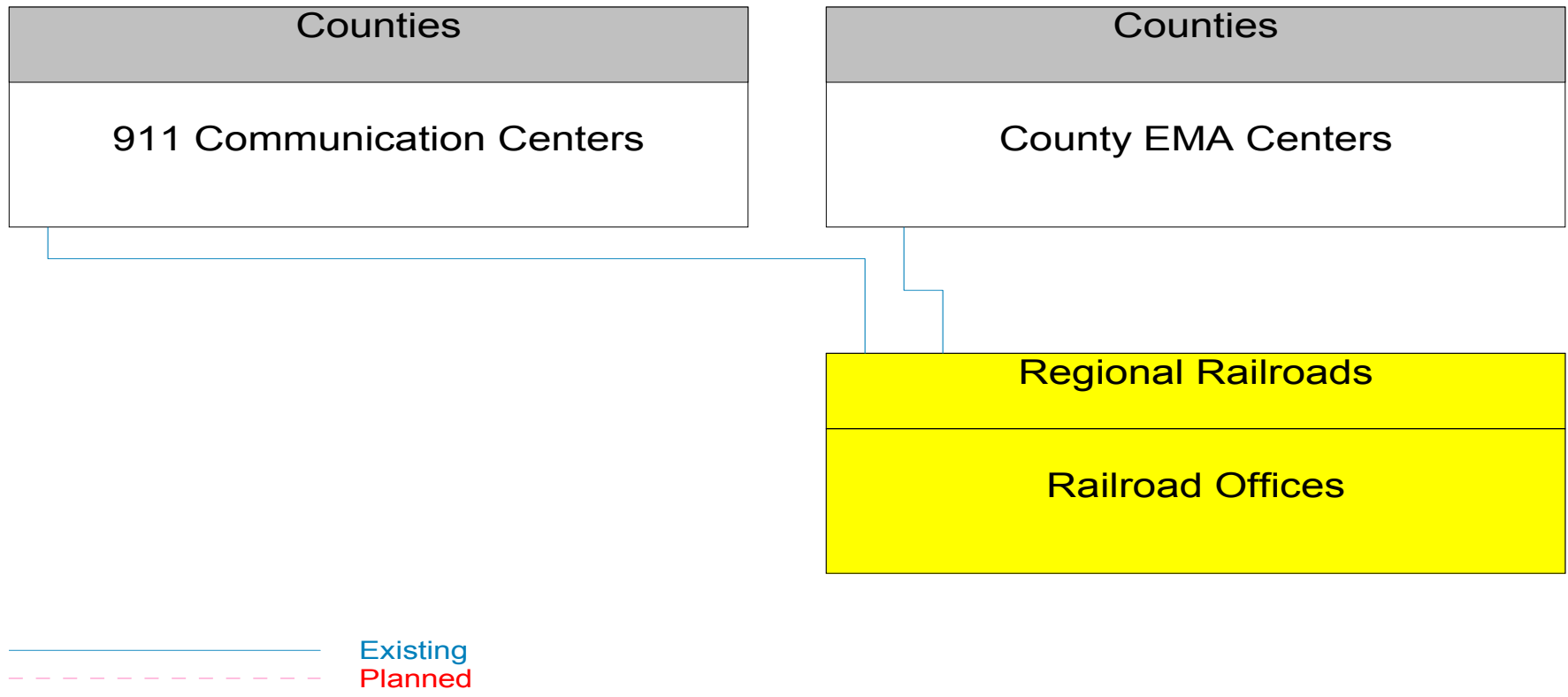
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Planned

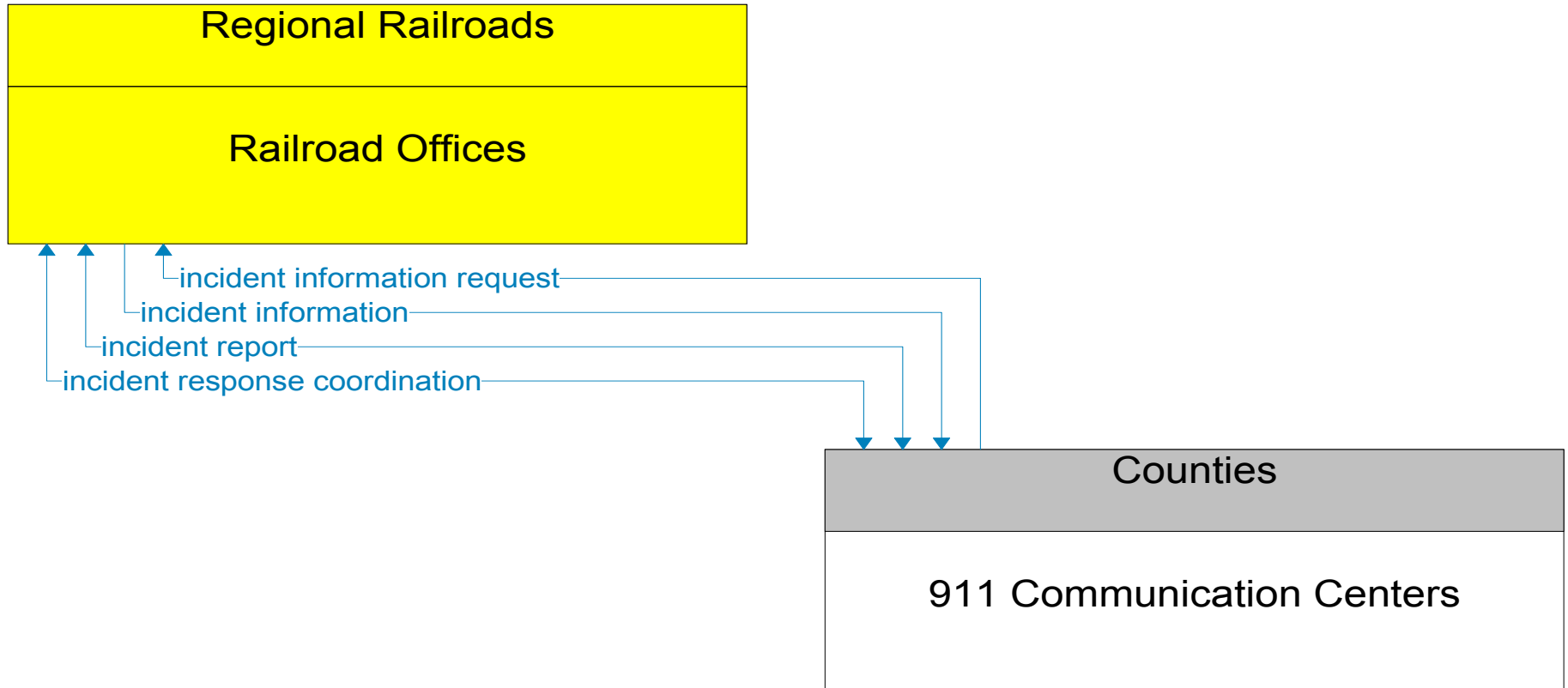
Railroad Offices



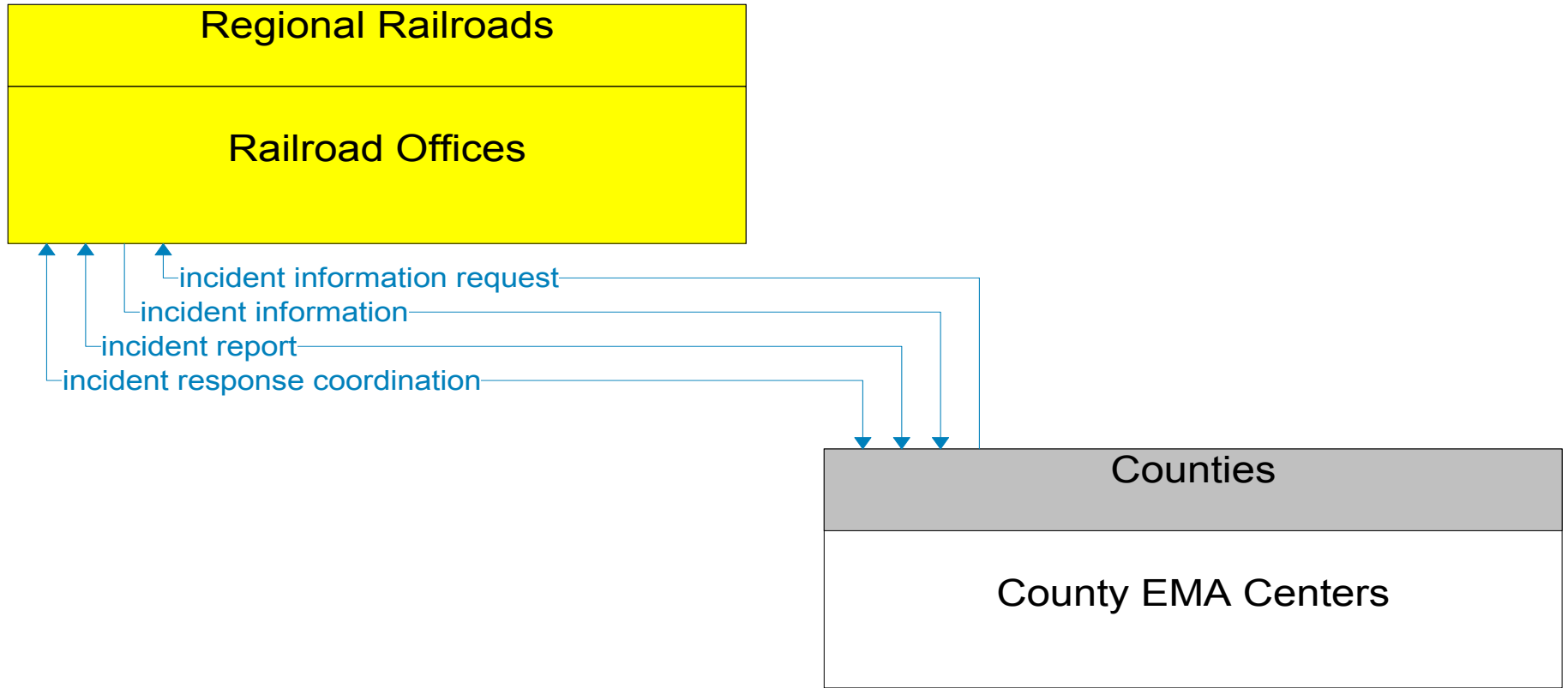
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Railroad Offices Interconnect Diagram





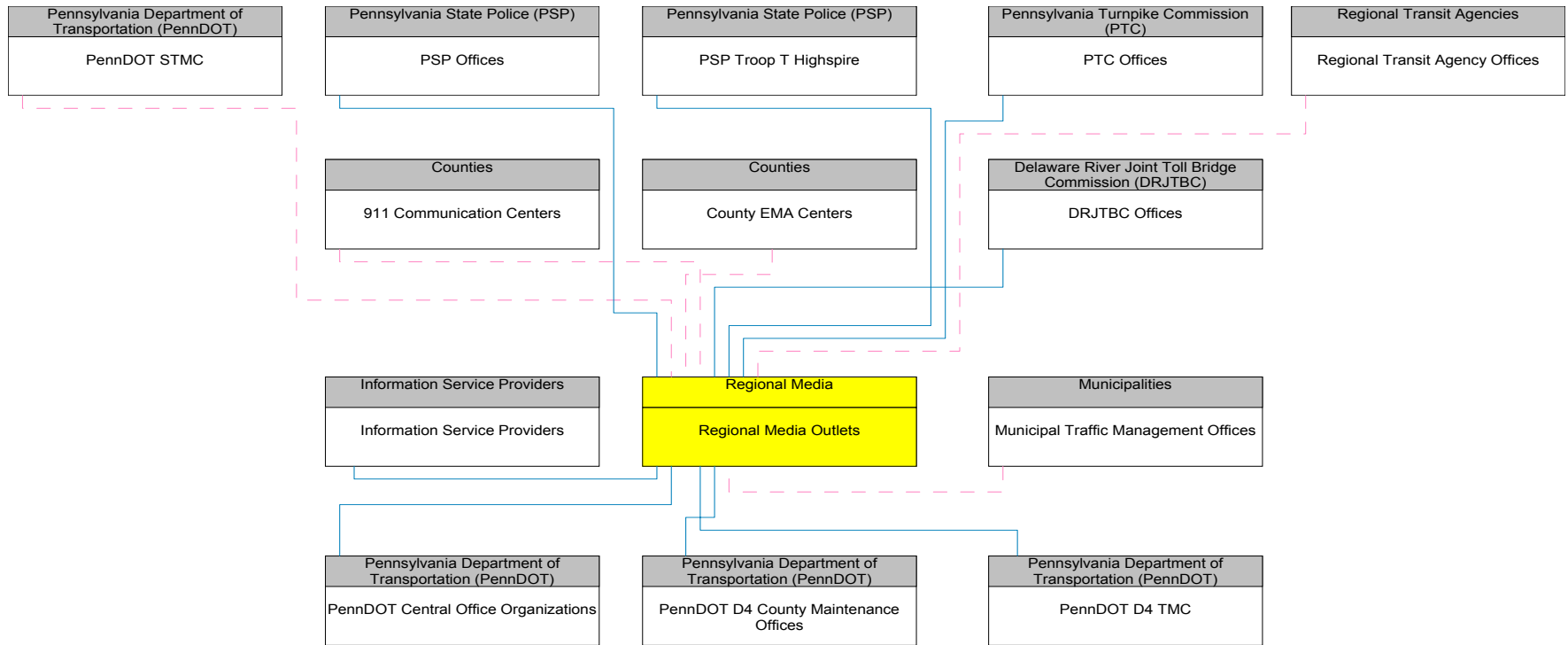
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- - - - - Planned

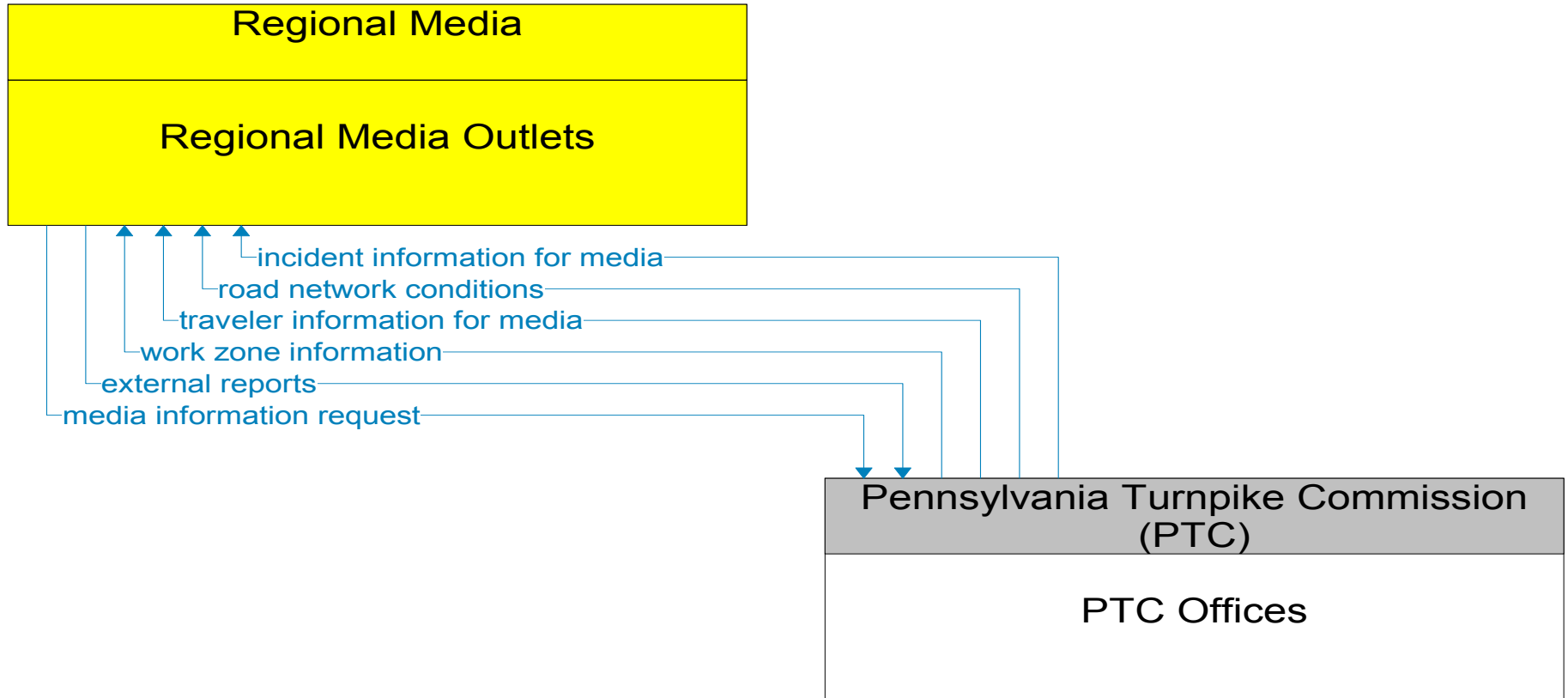


Regional Media Outlets

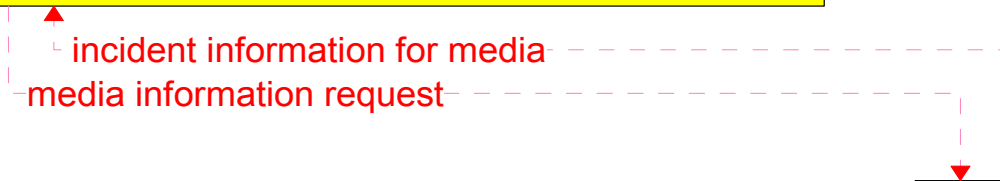


Regional Media Outlets Interconnect Diagram

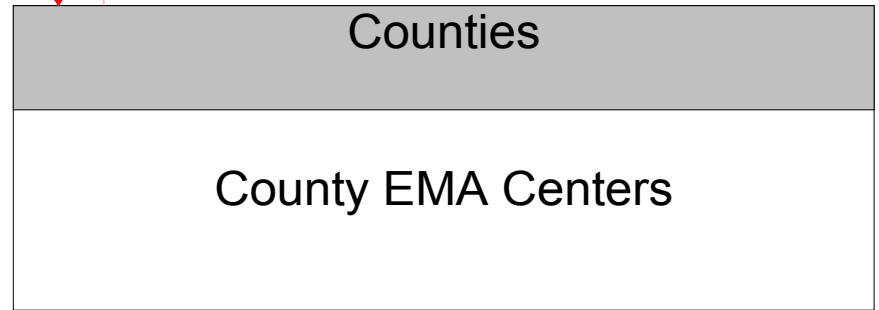
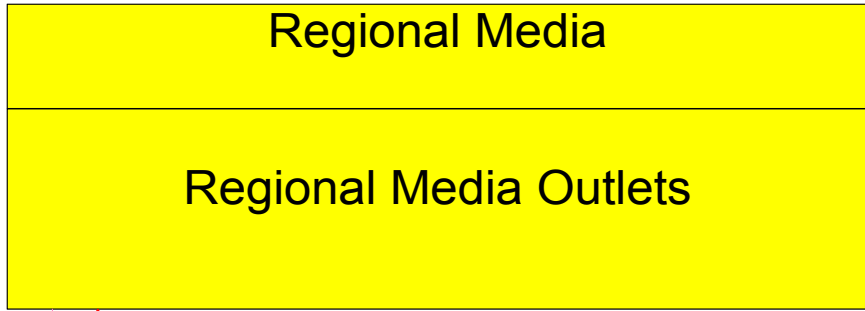




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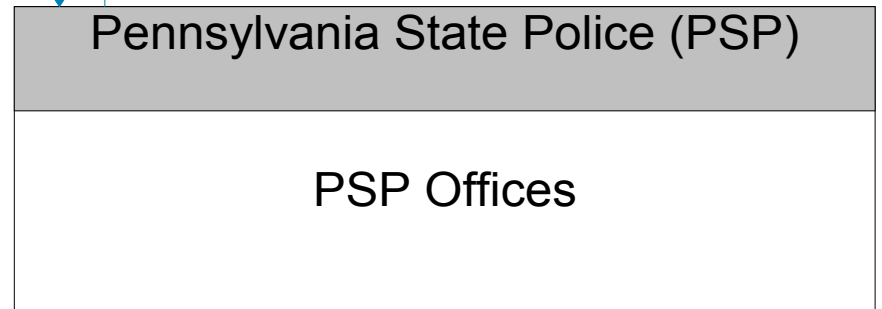


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Existing

Planned

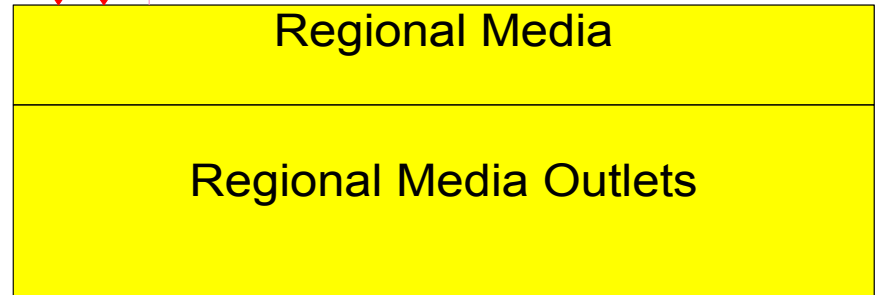
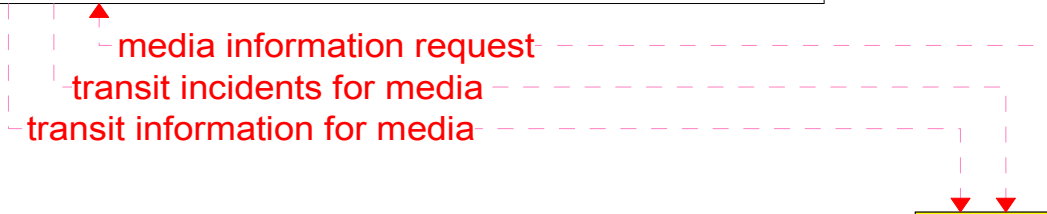
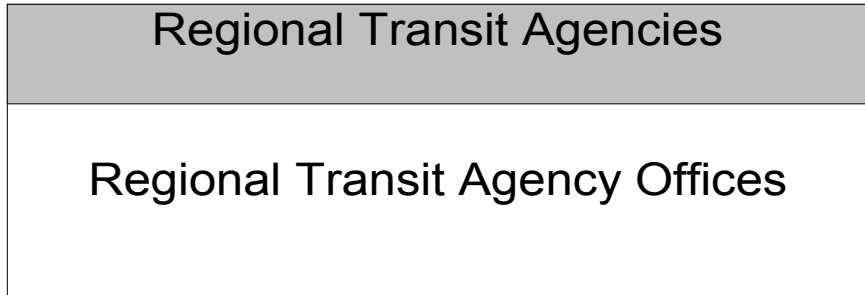


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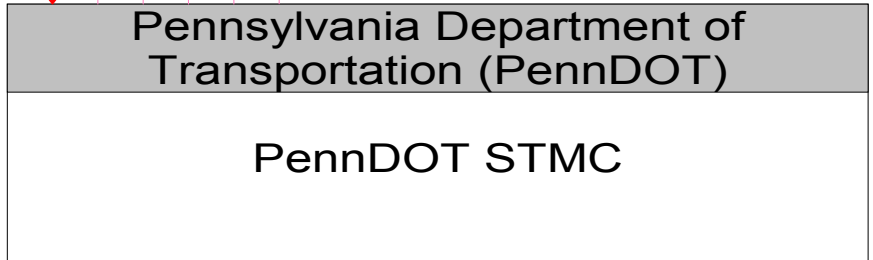
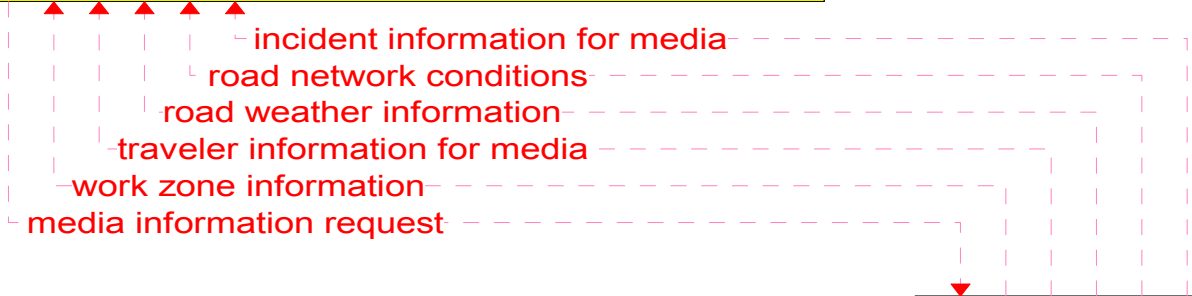
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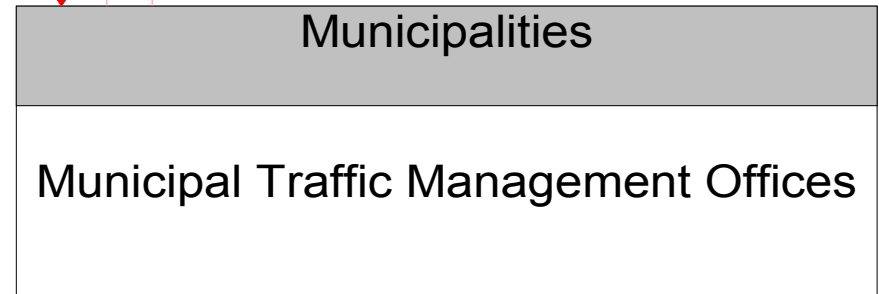
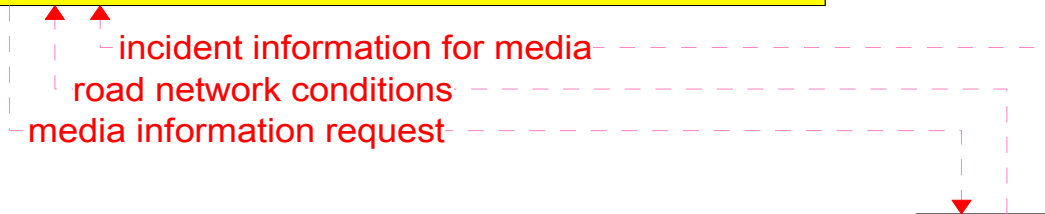
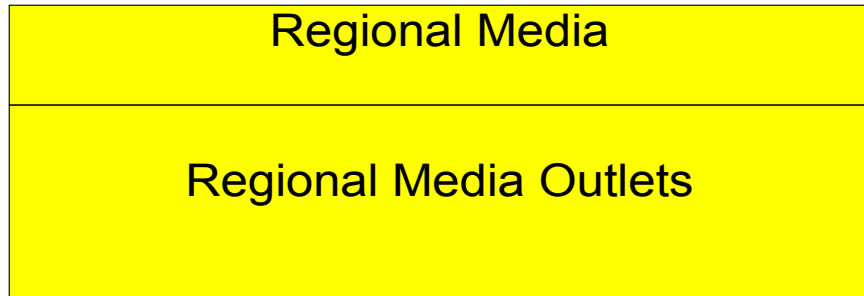
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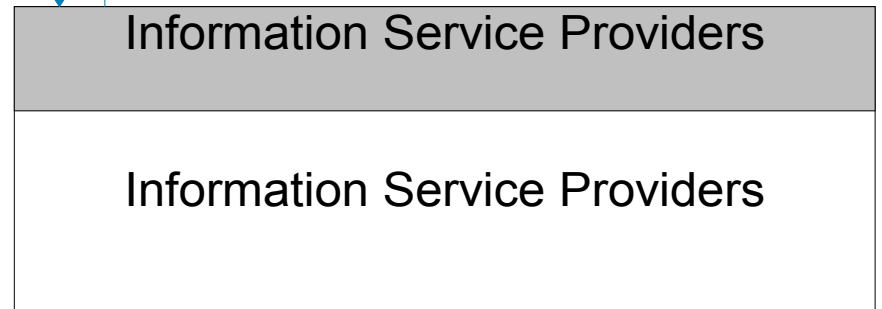
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Planned



———— Existing
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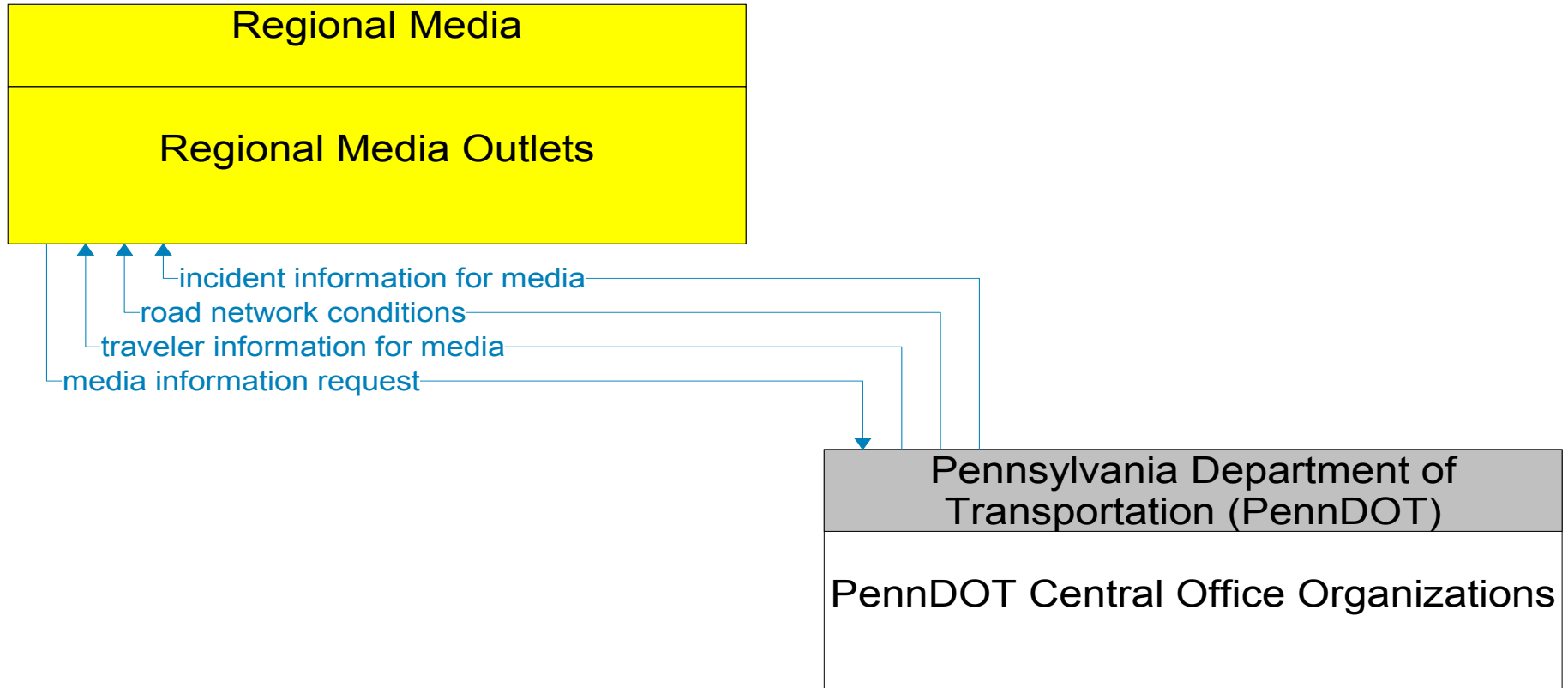


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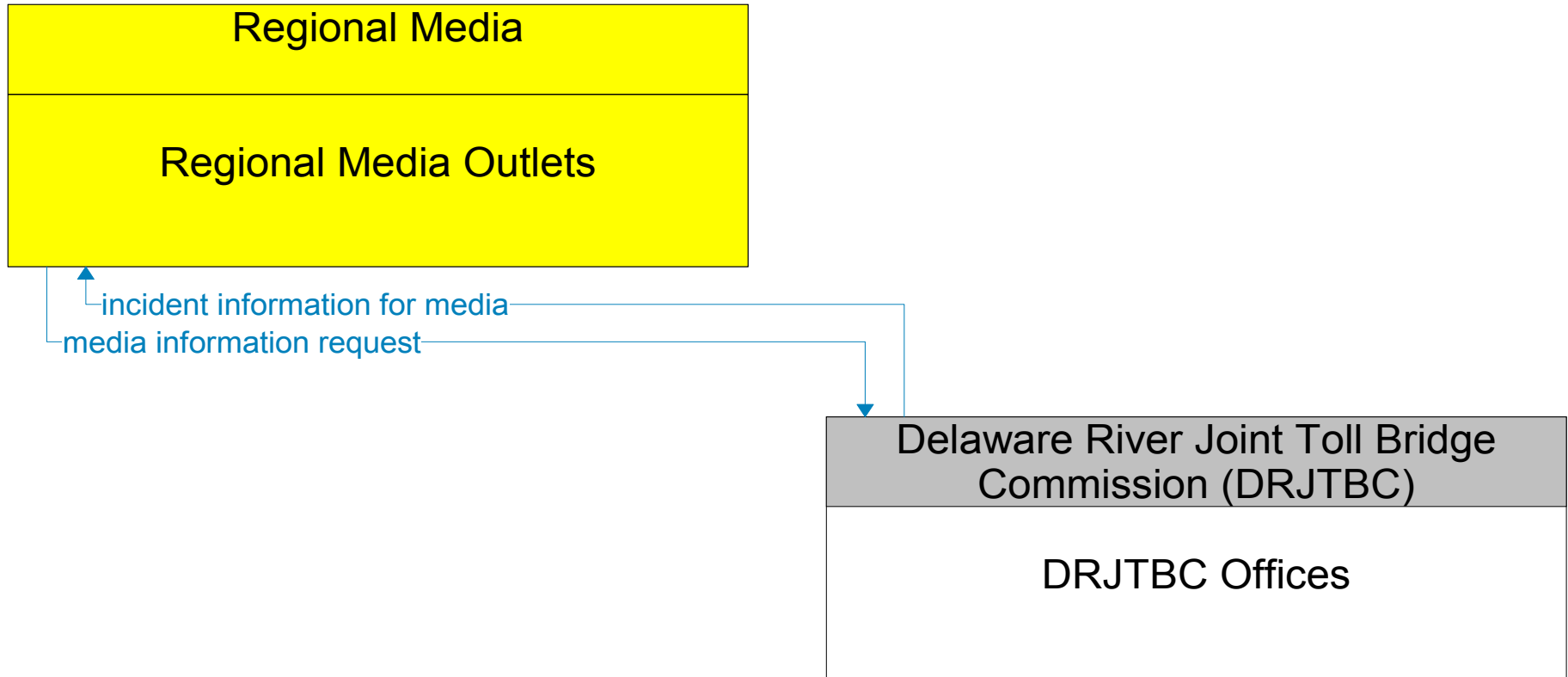


traveler information for media
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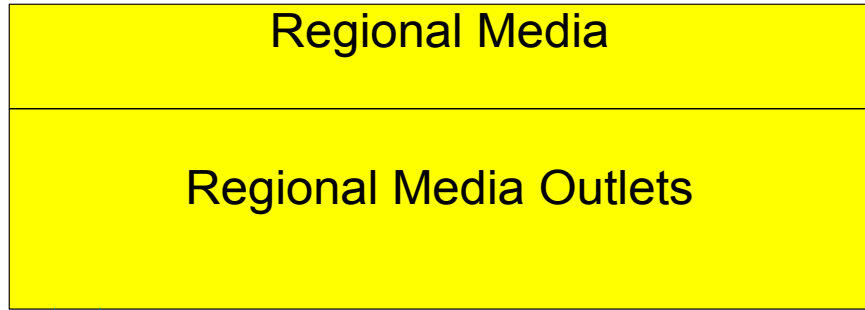
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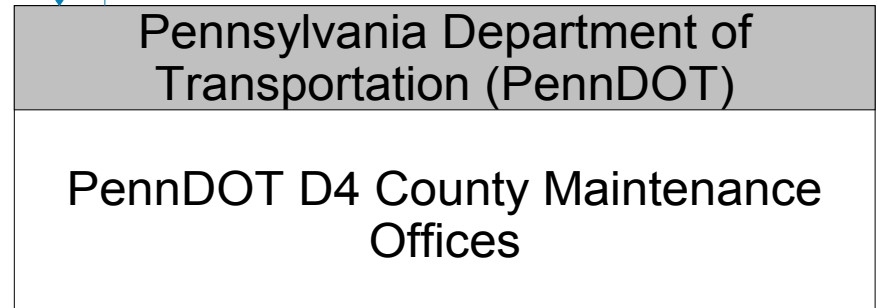
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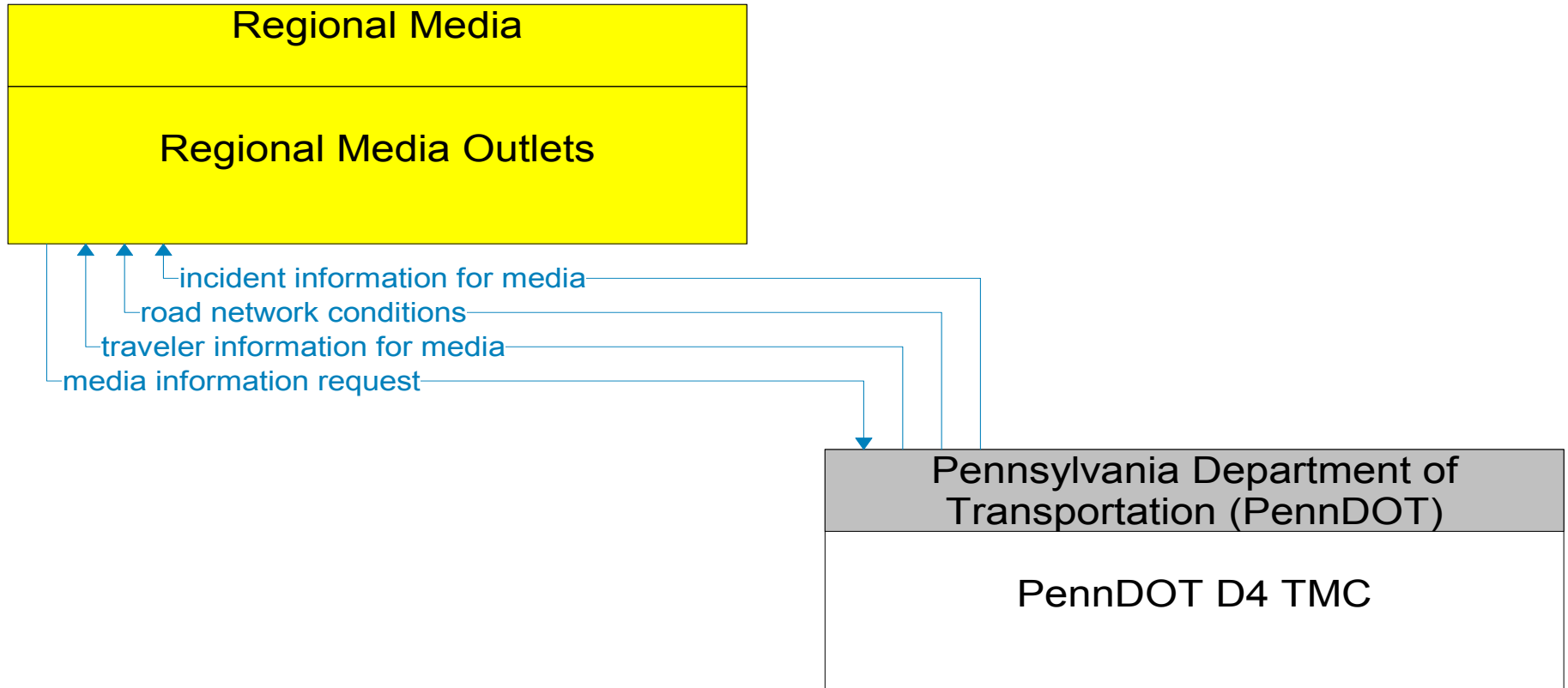
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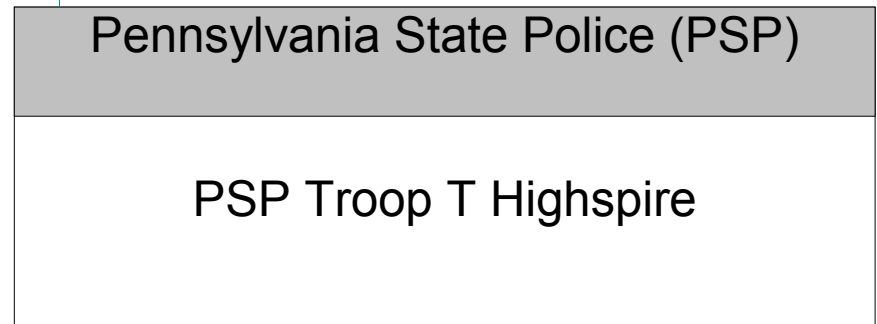
incident information for media
media information request



Existing
Planned



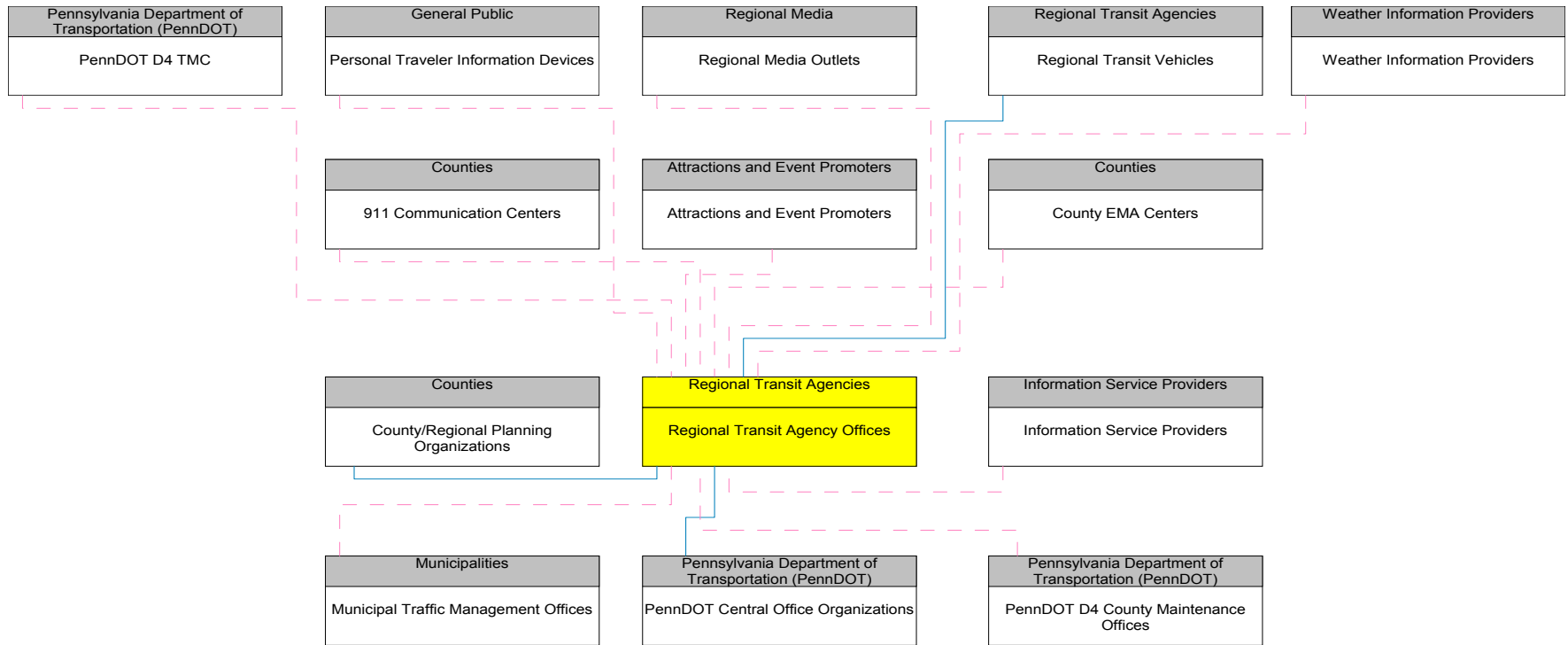
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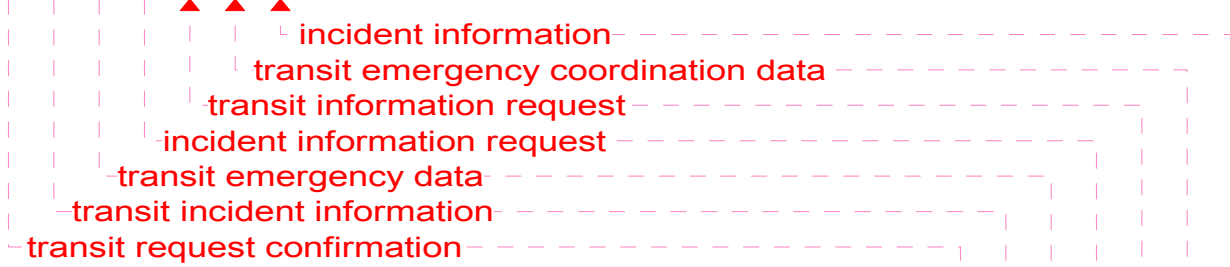
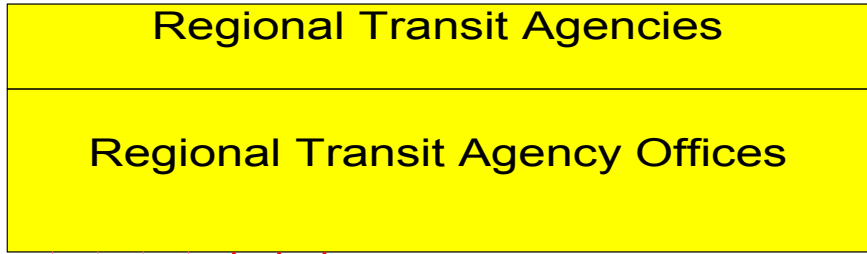
Regional Transit Agency Offices



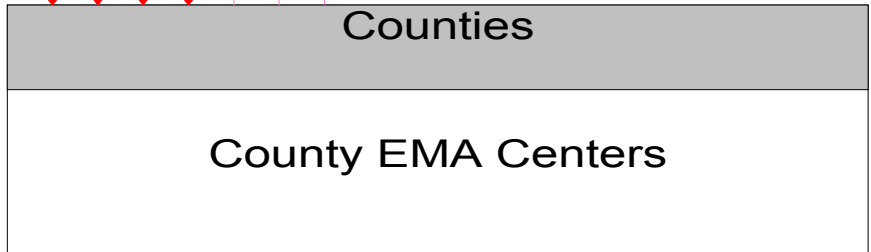
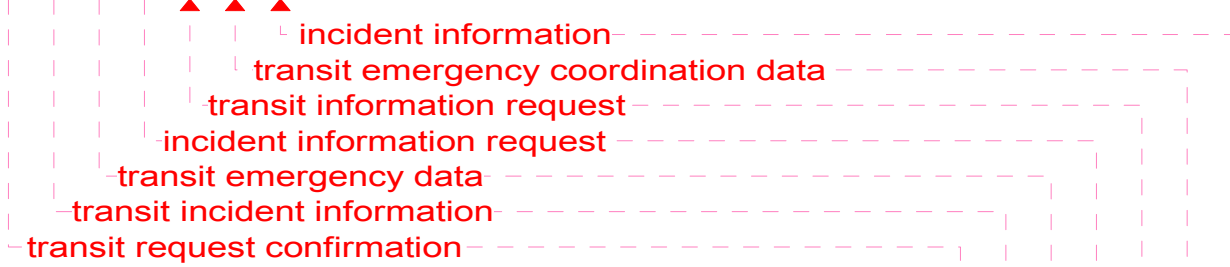
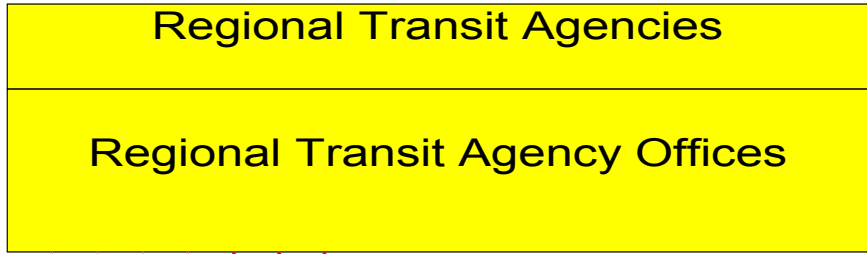
Regional Transit Agency Offices Interconnect Diagram



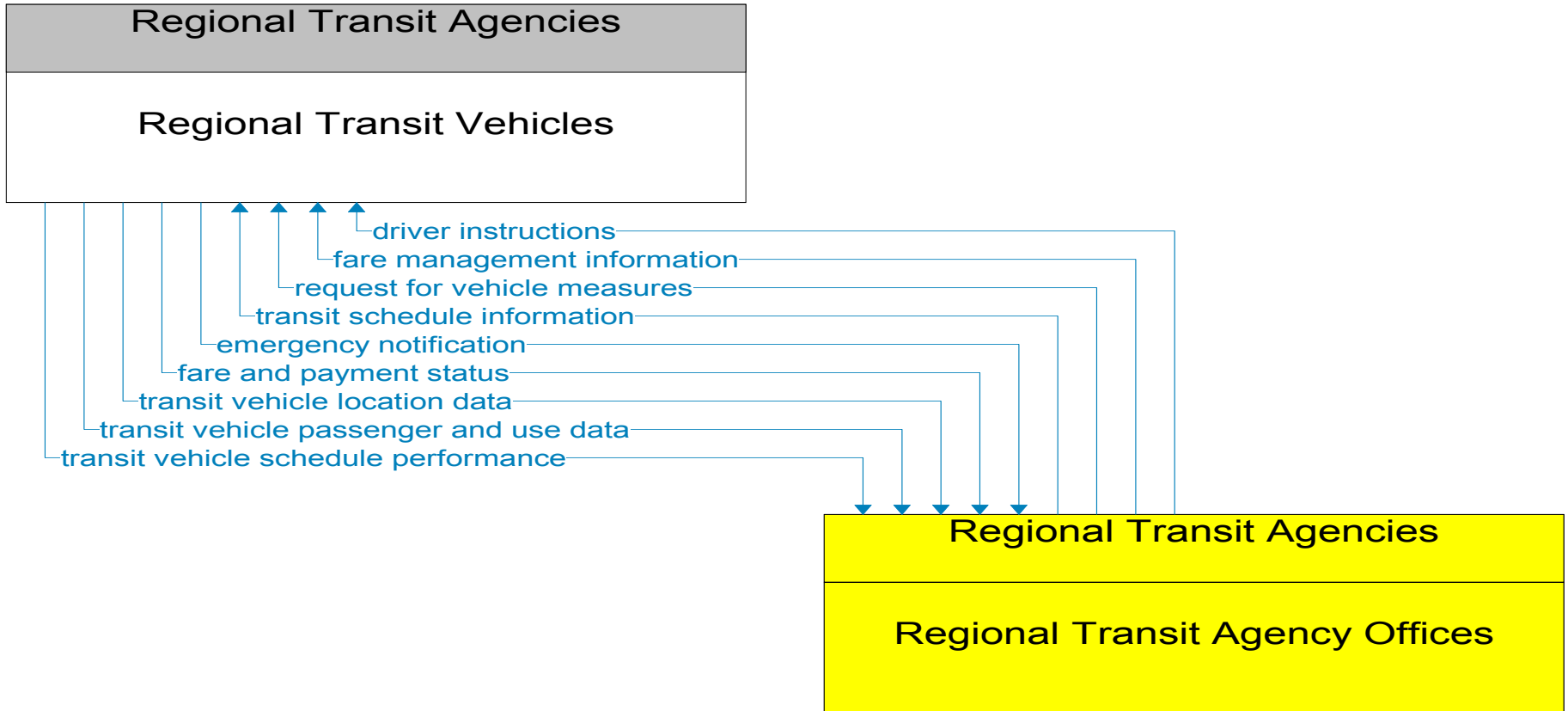
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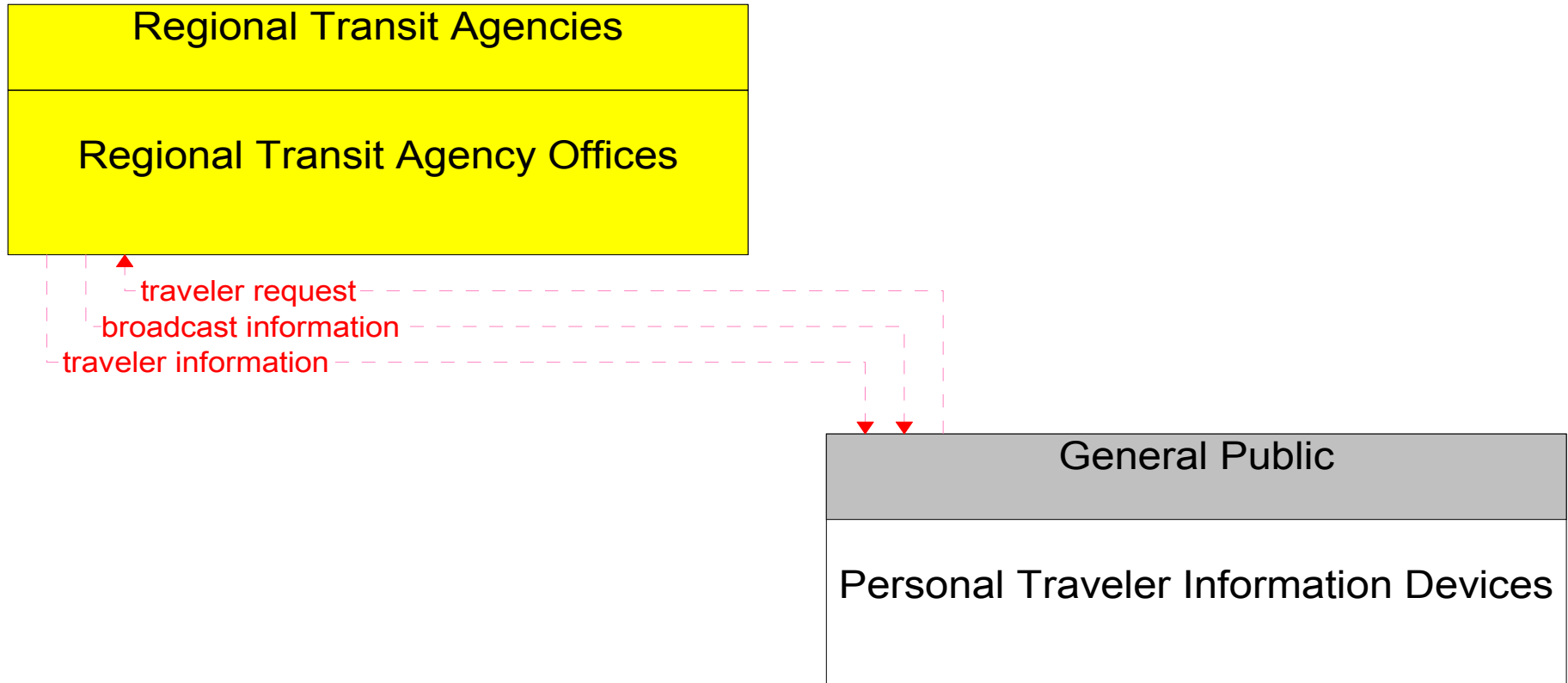
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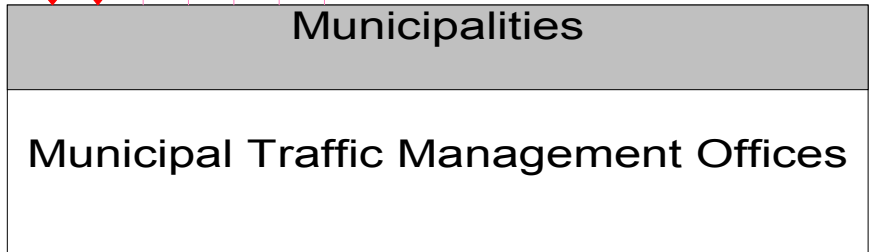
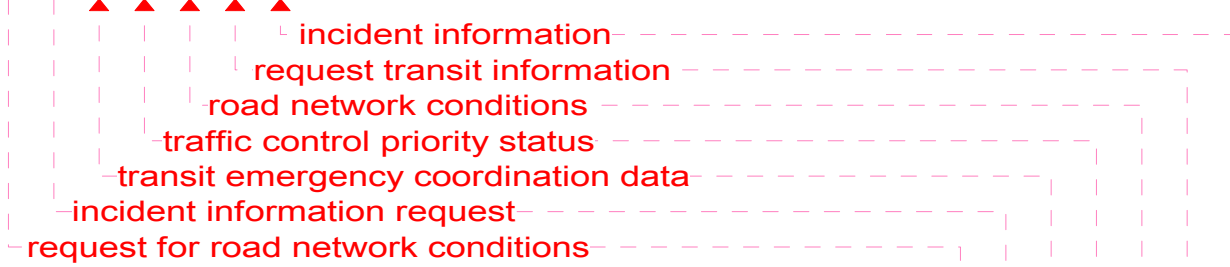
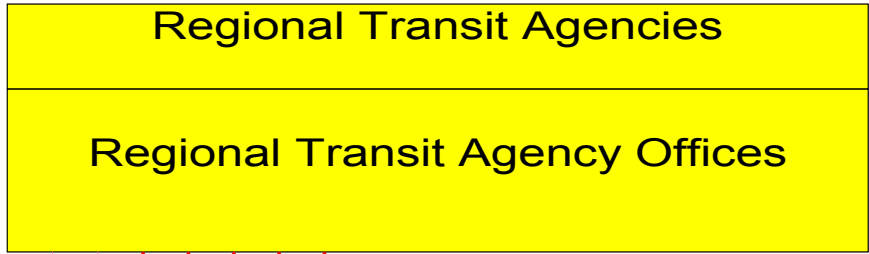
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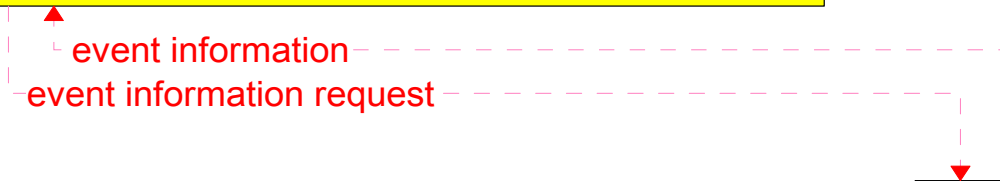
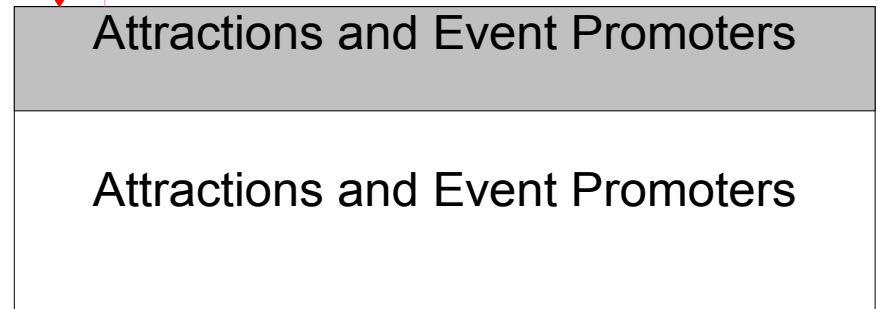
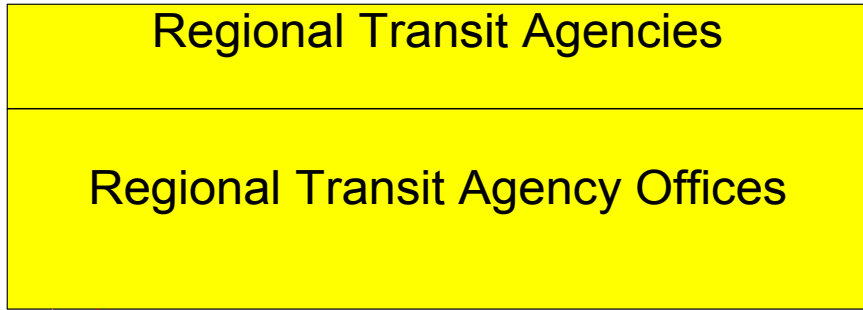
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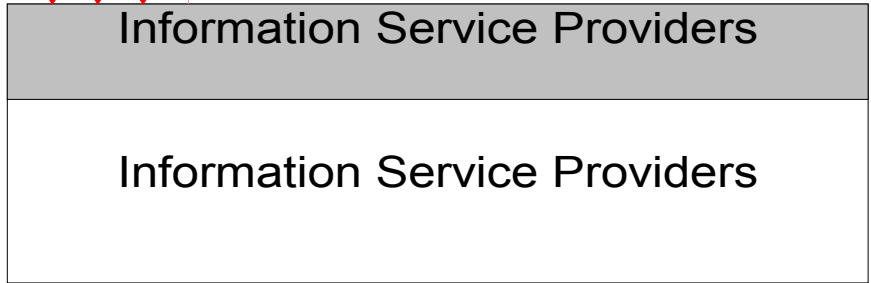
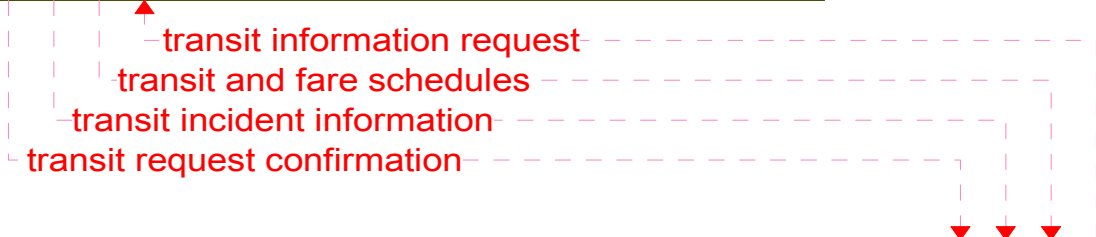
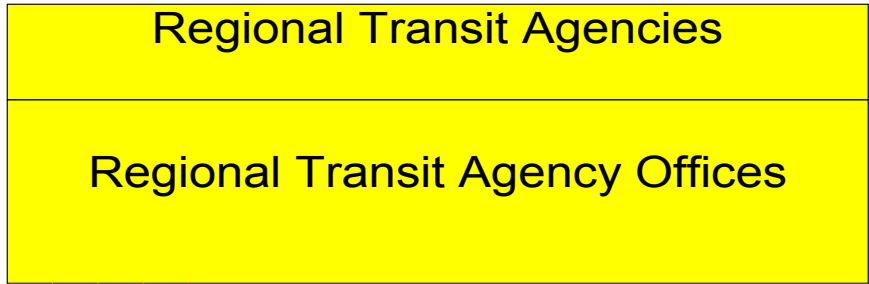
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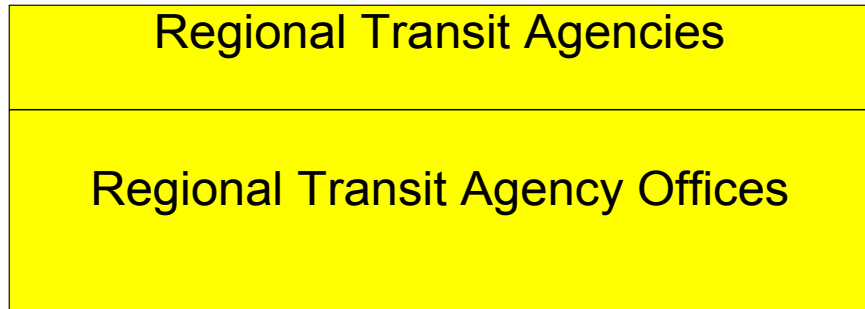
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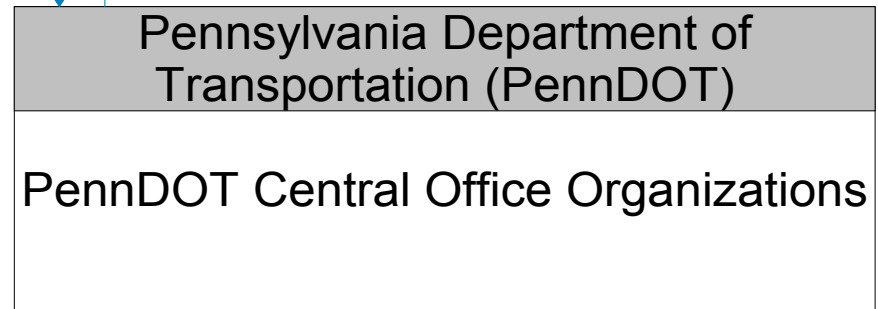
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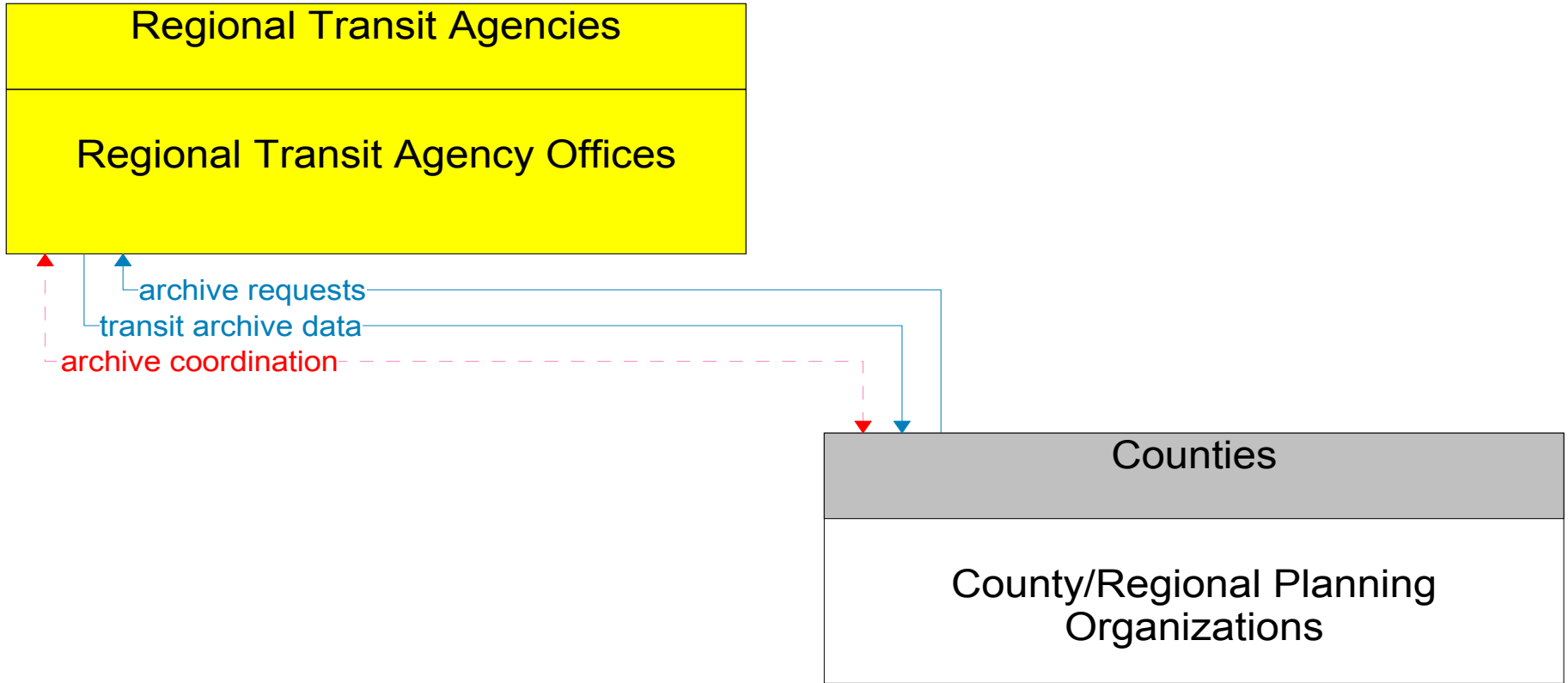
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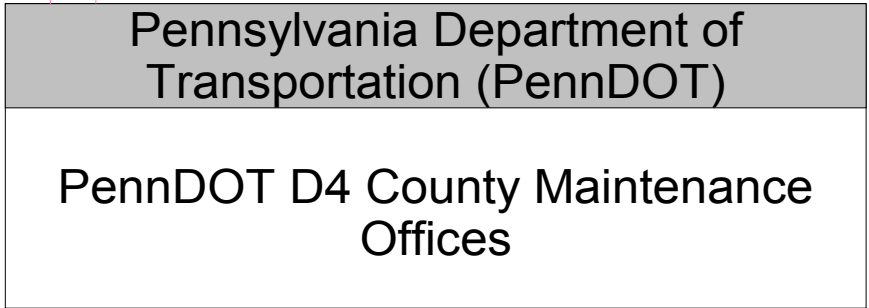
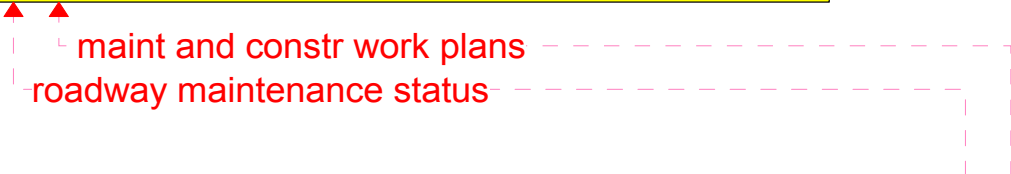
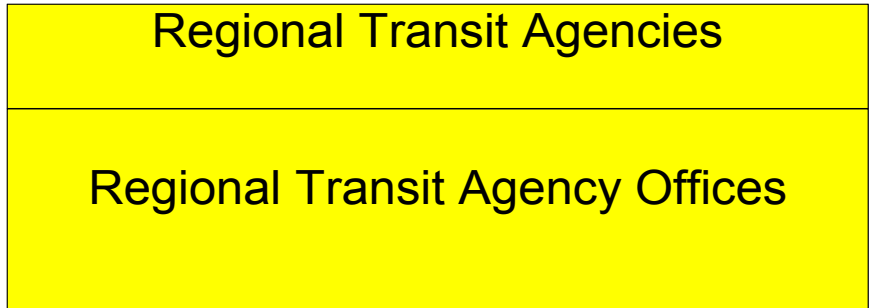
archive requests
transit archive data



Existing
Planned

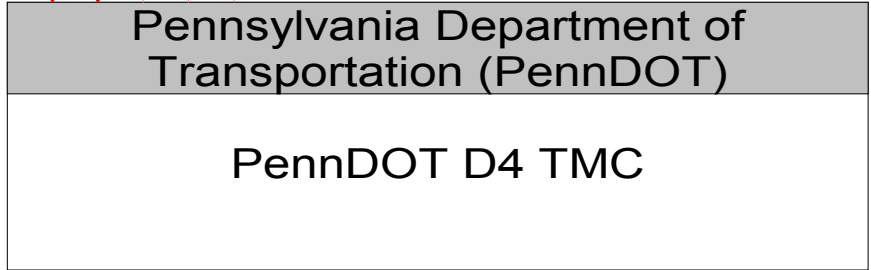
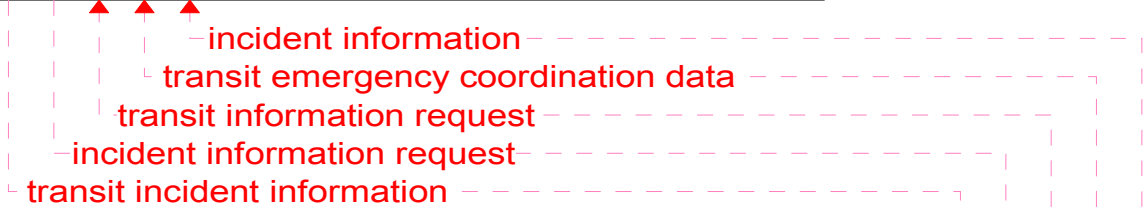
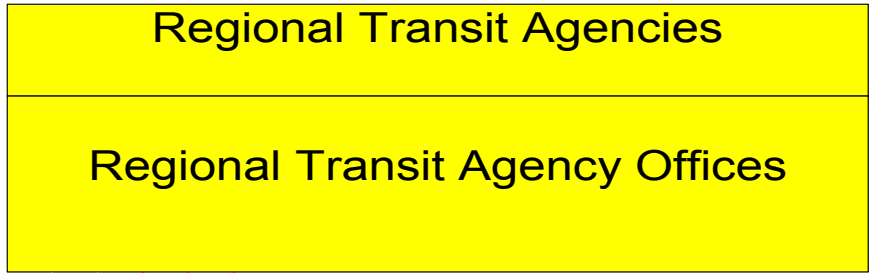


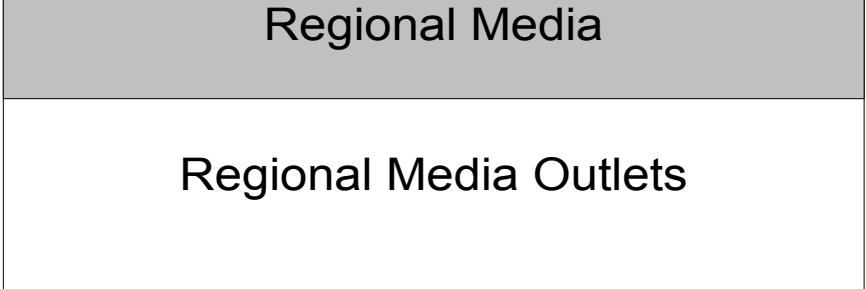
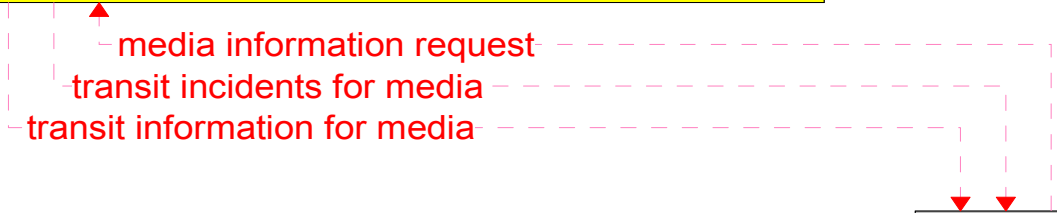
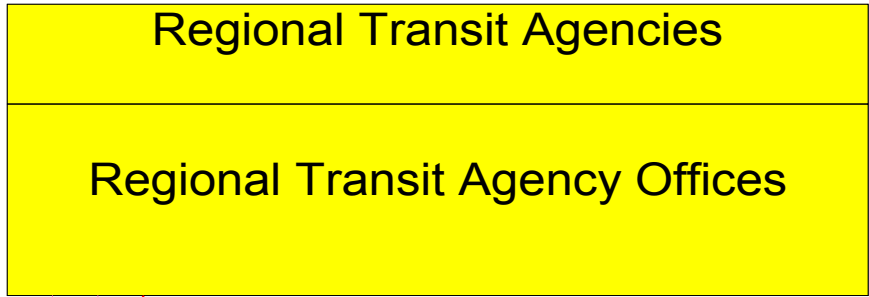
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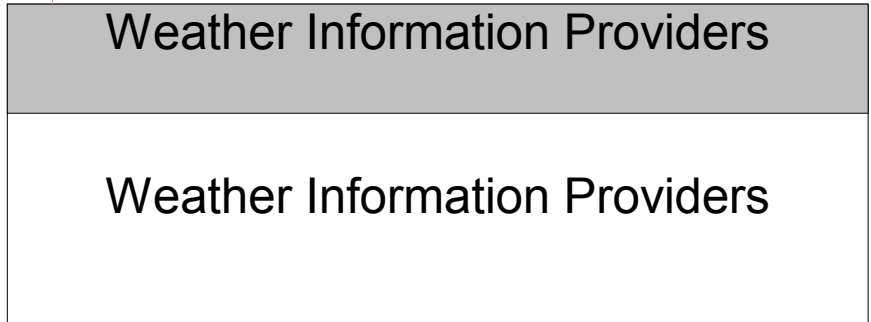
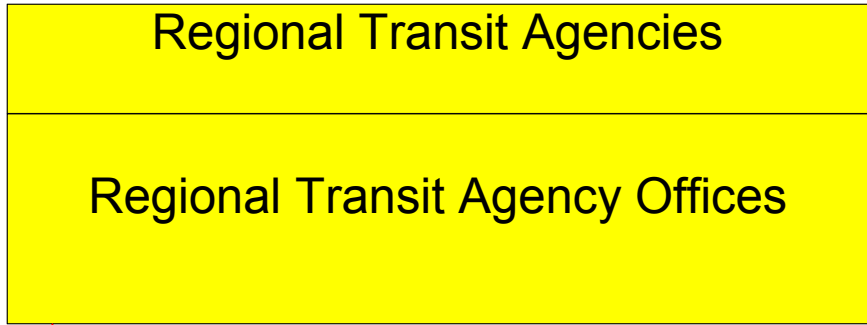
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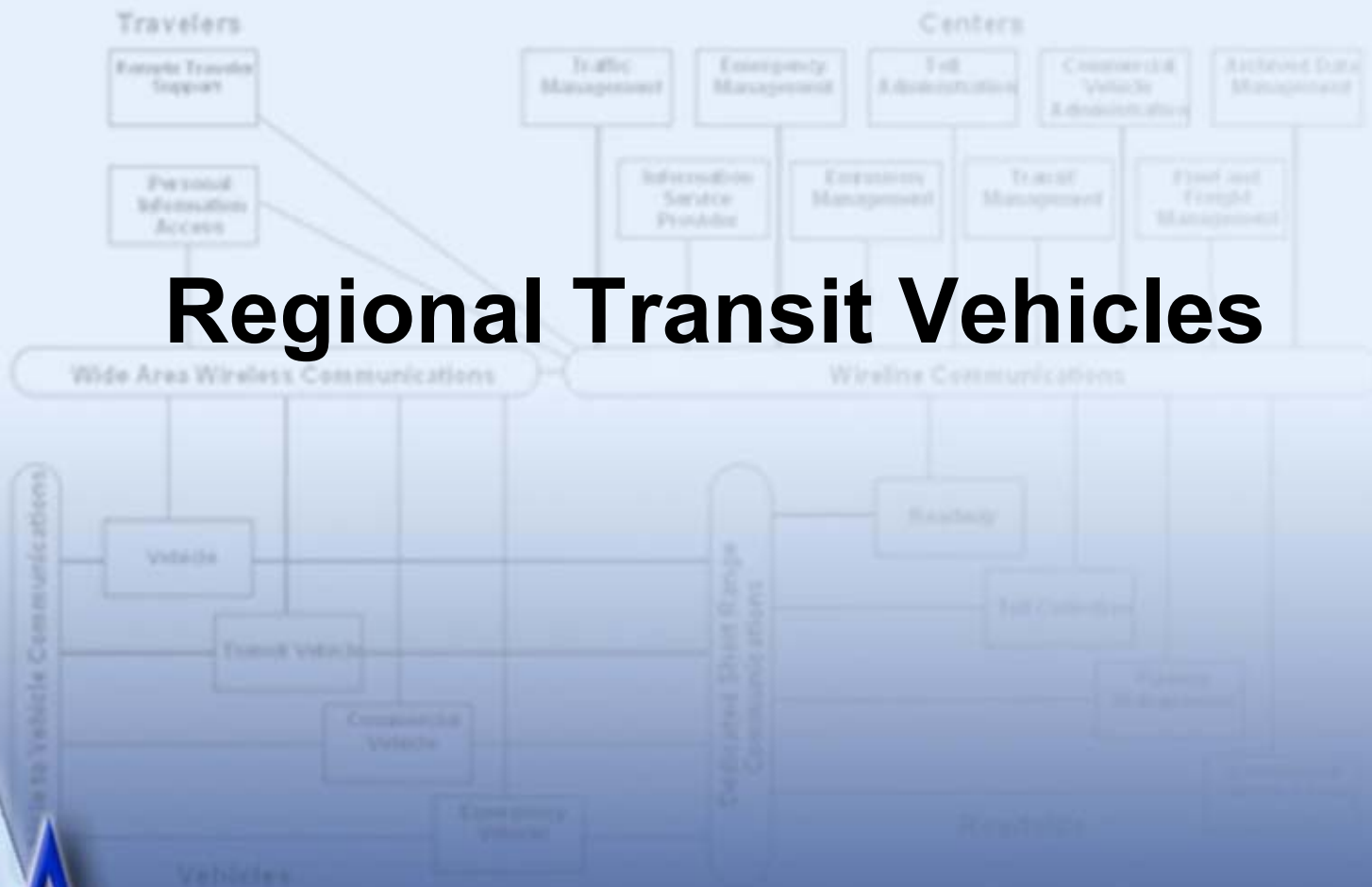


Existing
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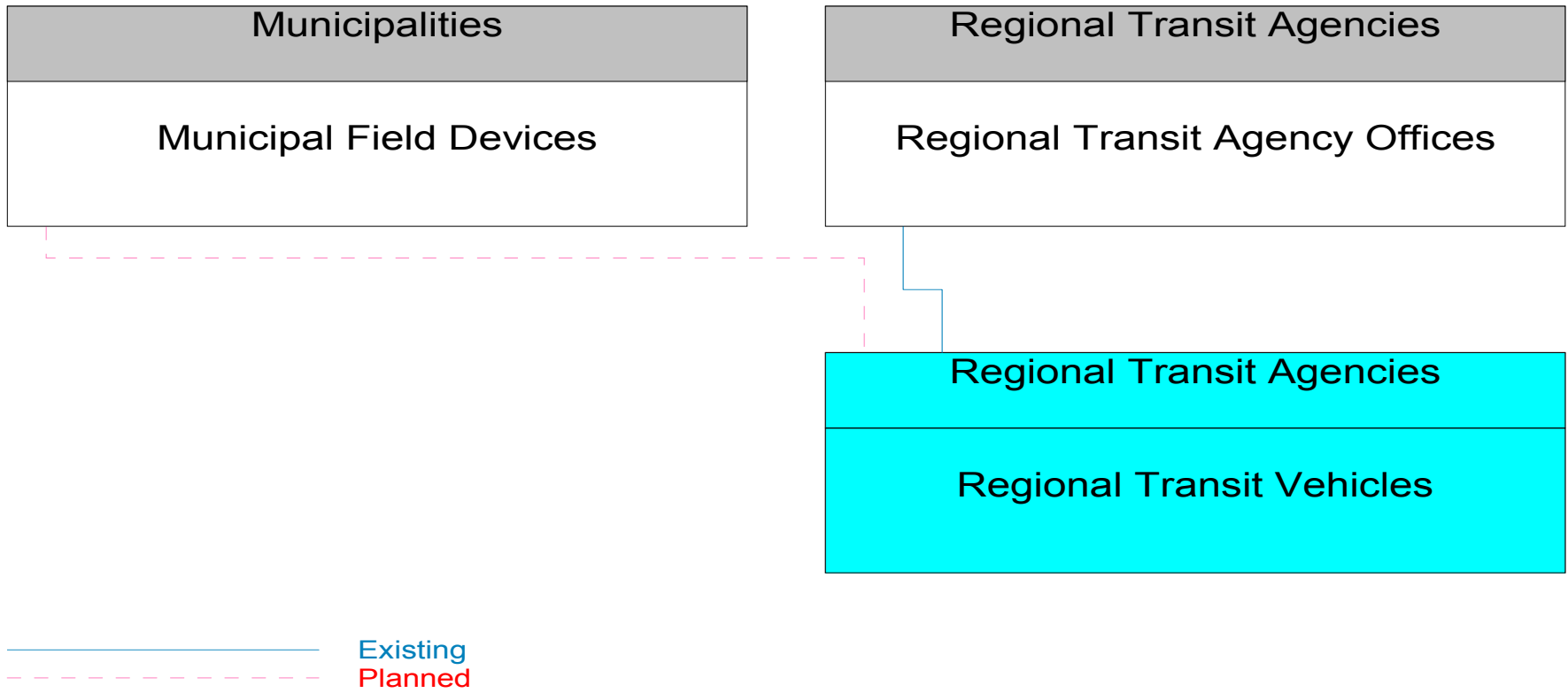


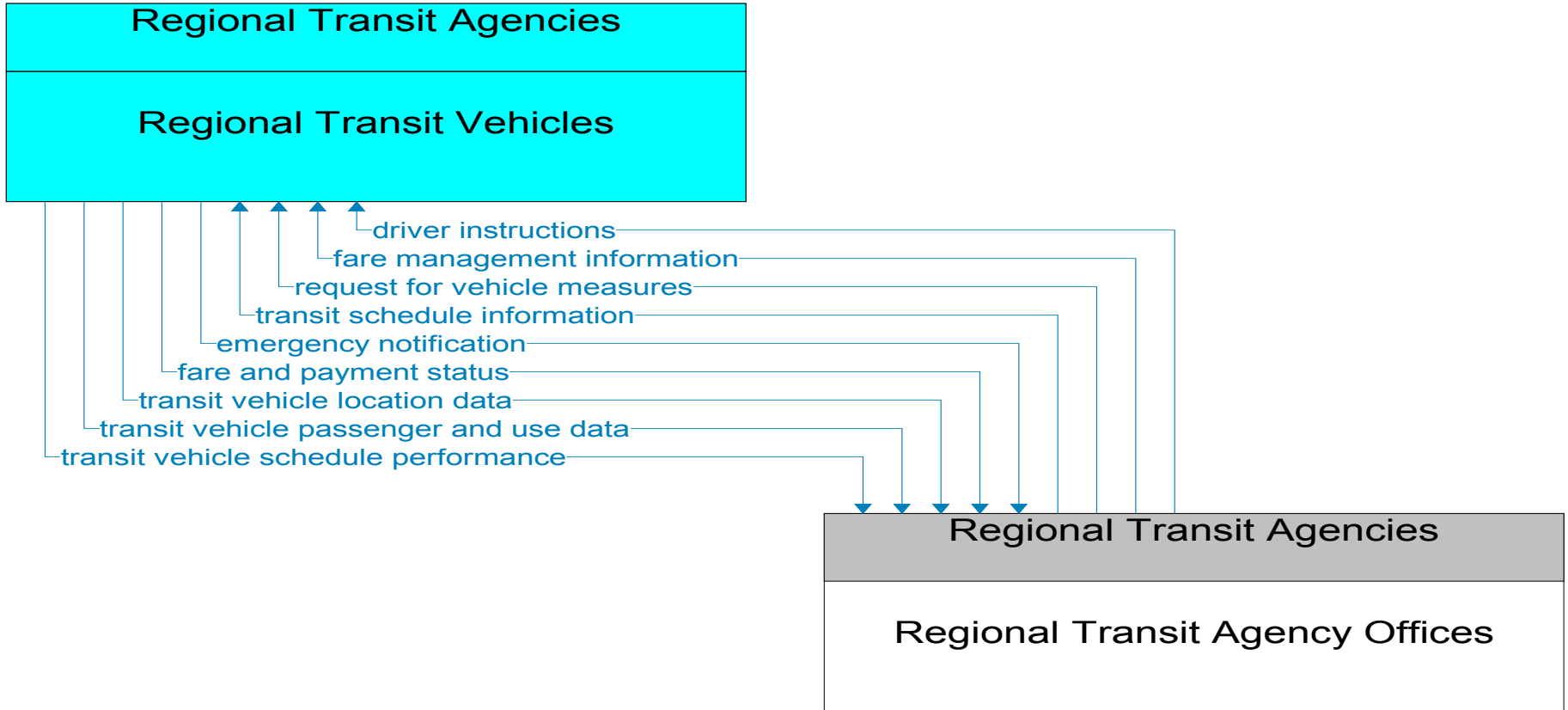
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Regional Transit Vehicles

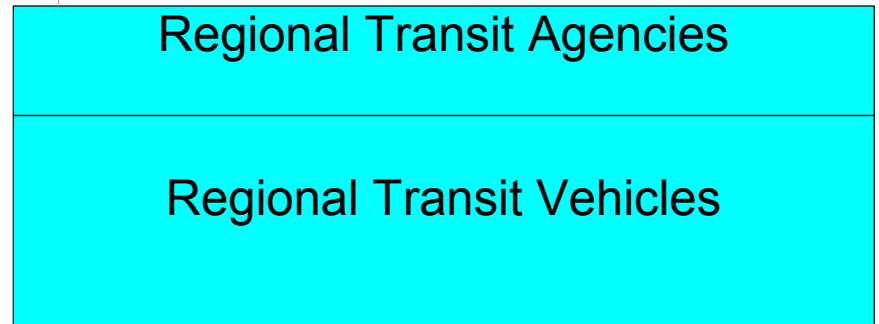
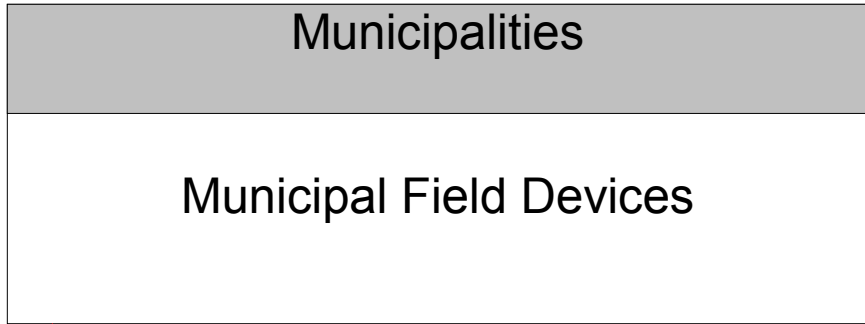


Regional Transit Vehicles Interconnect Diagram



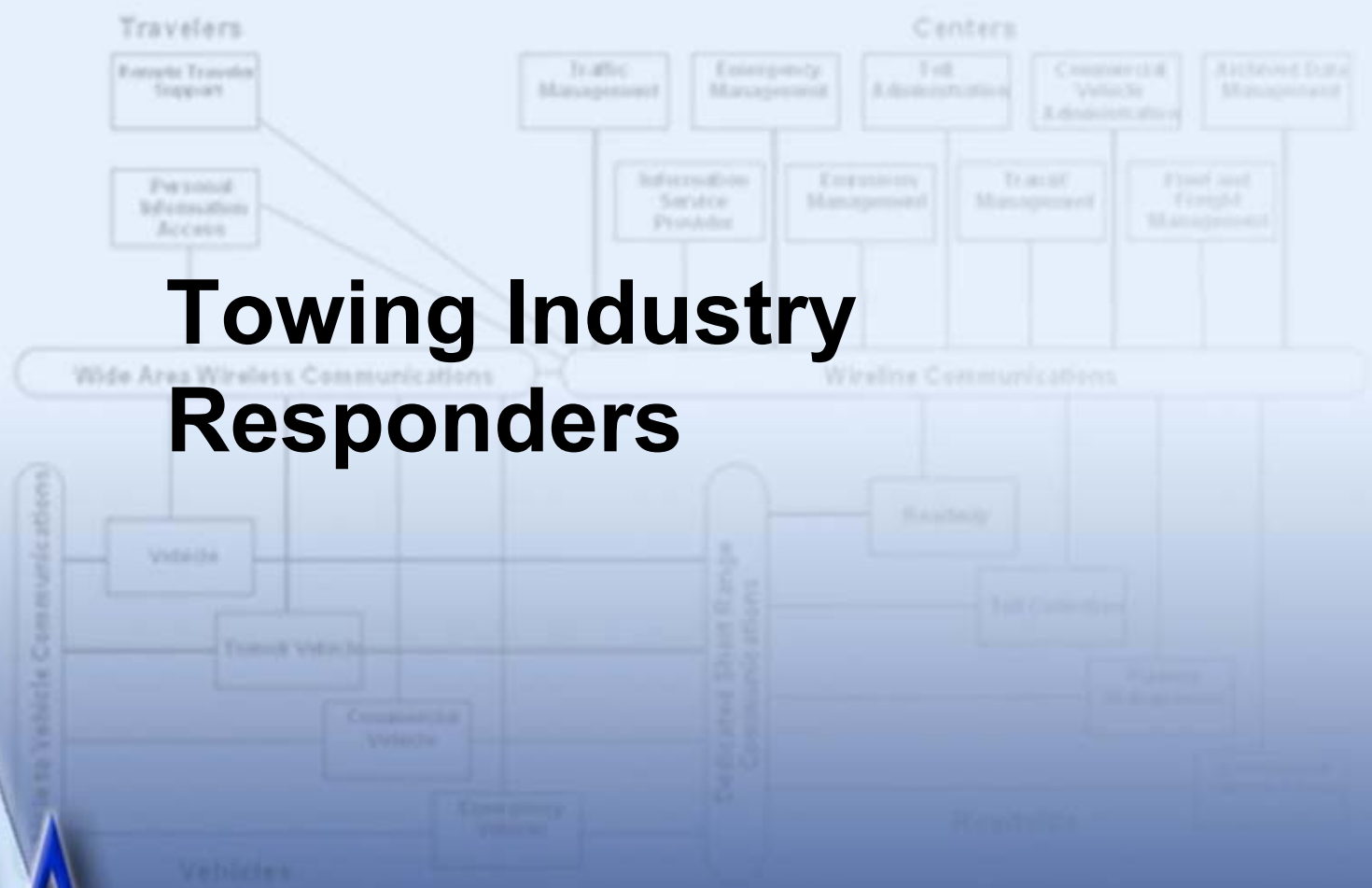


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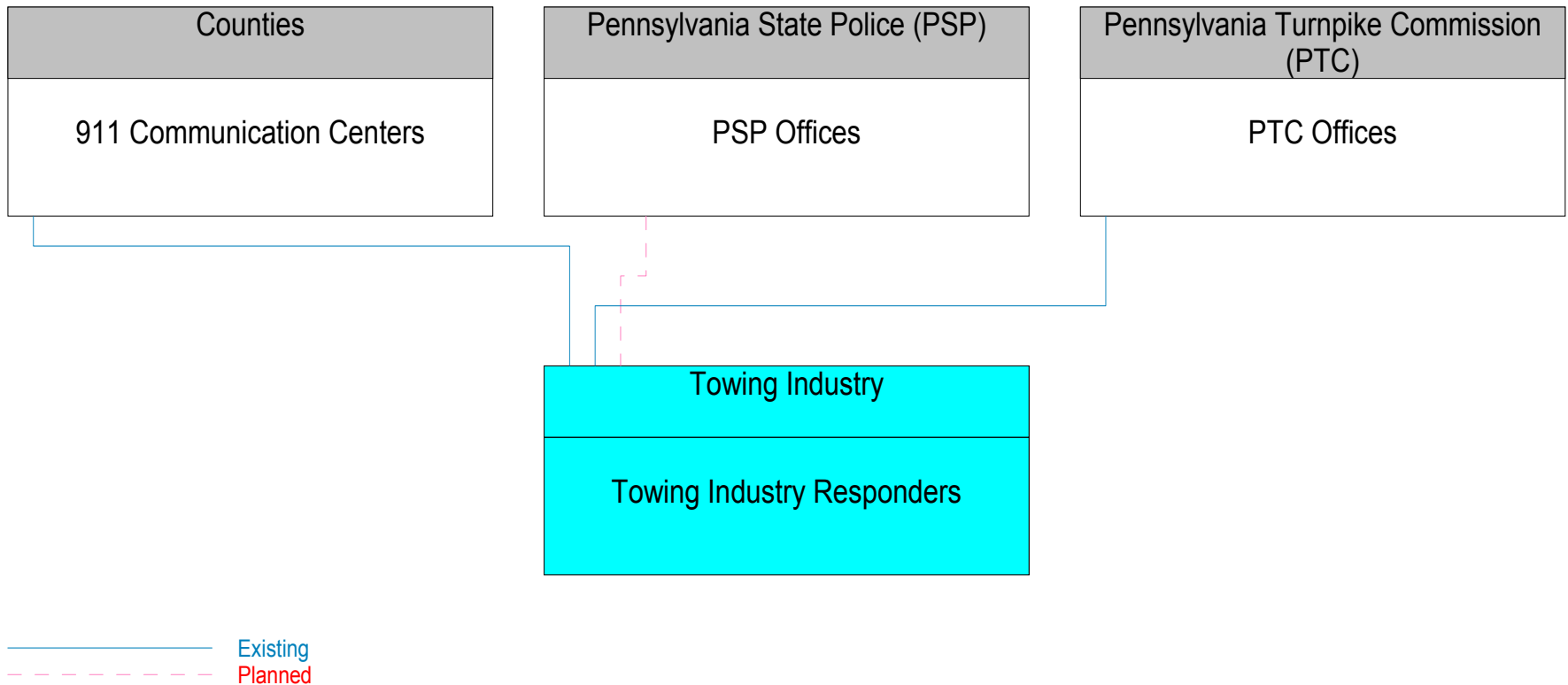
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- - - - - Planned

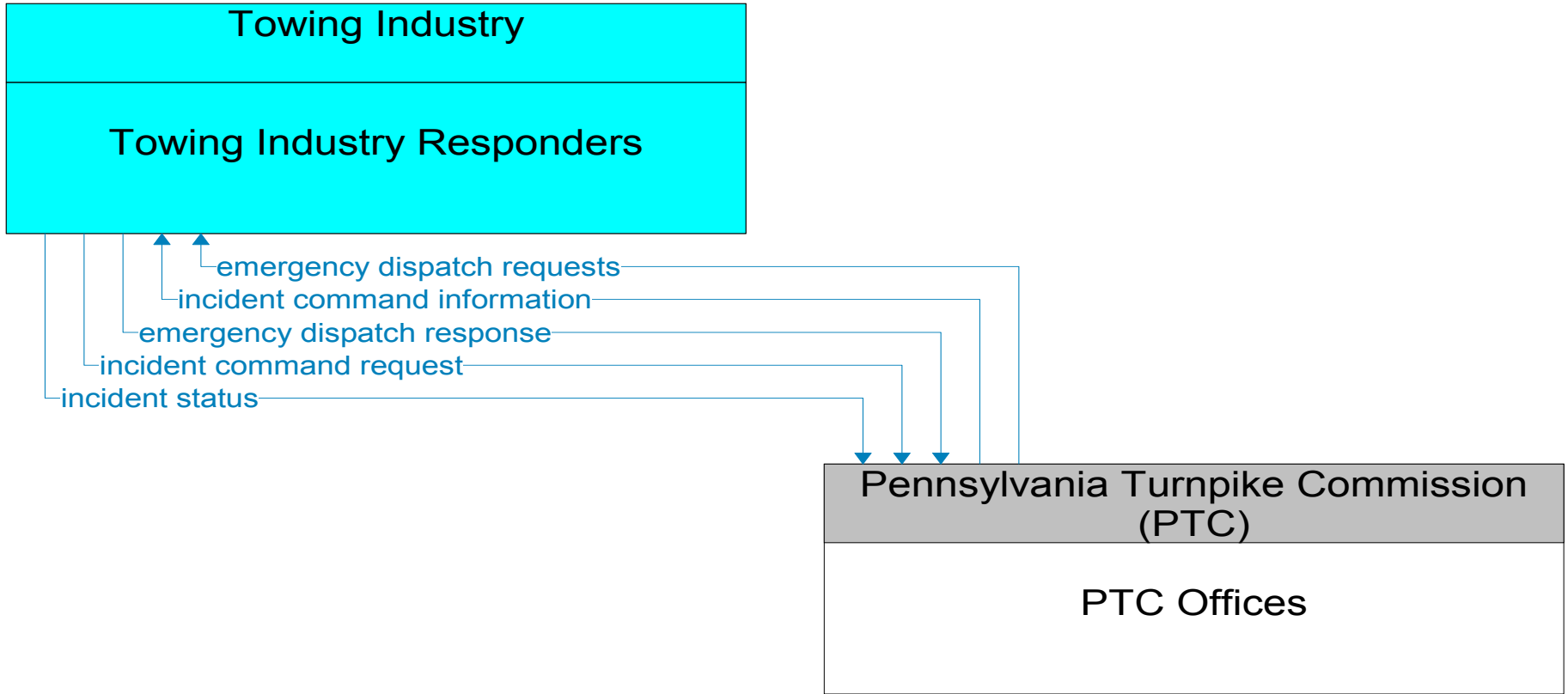
Towing Industry Responders



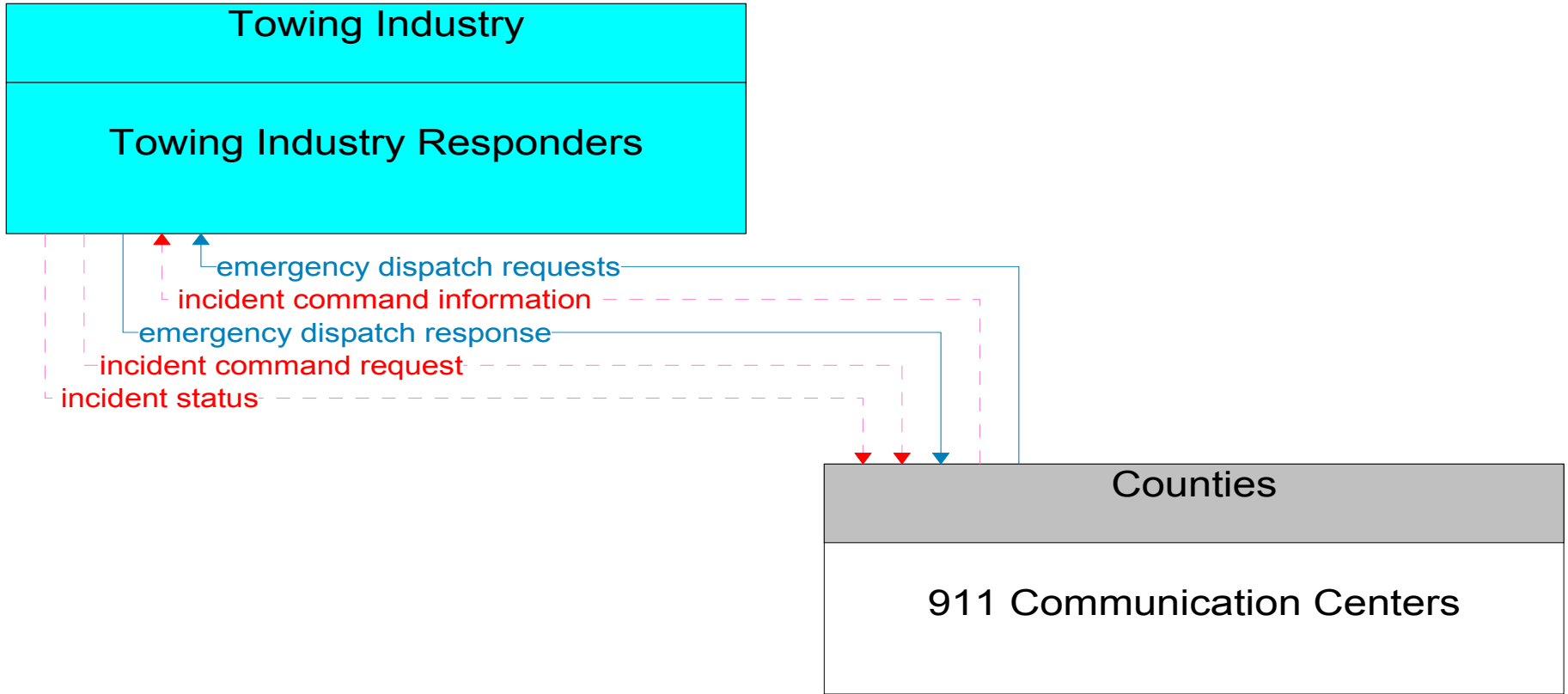
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Towing Industry Responders Interconnect Diagram

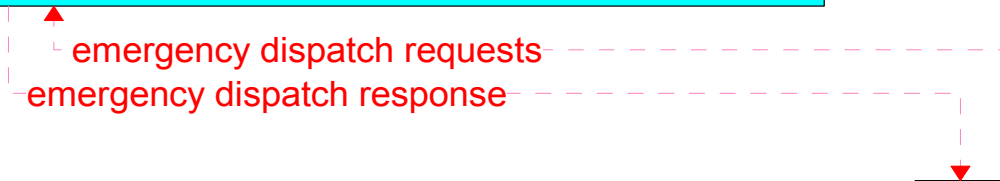
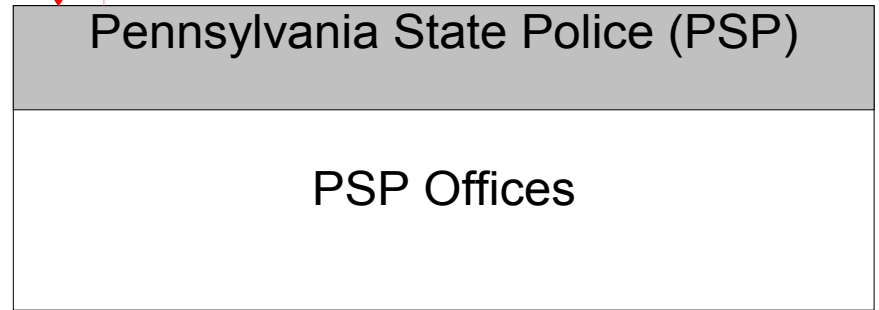
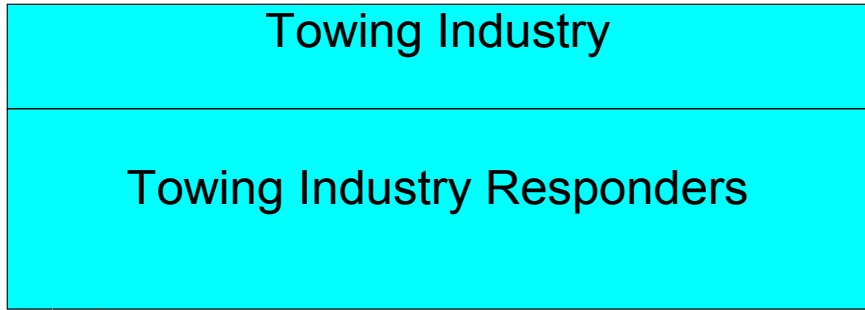




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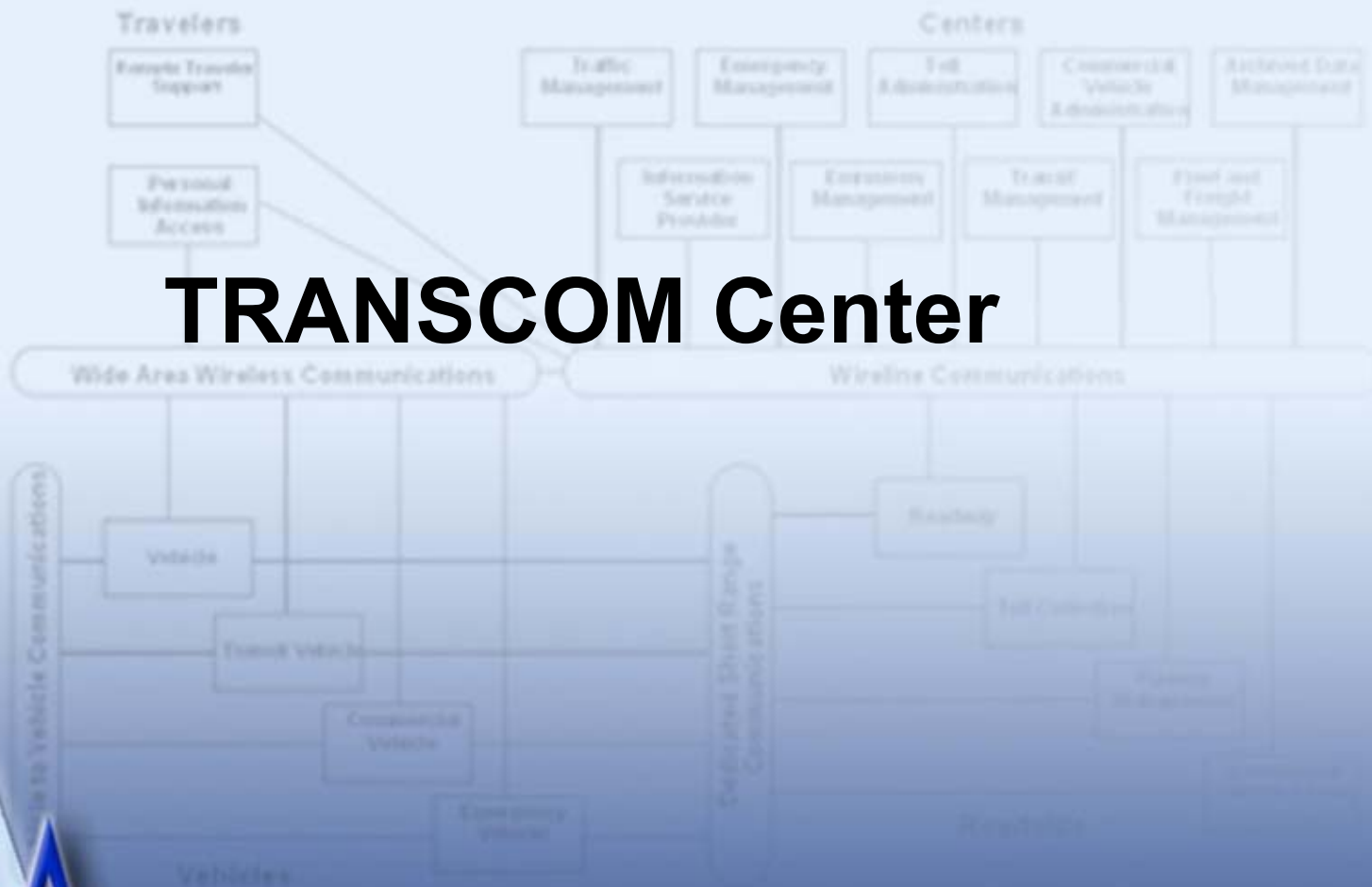


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- - - - - Planned



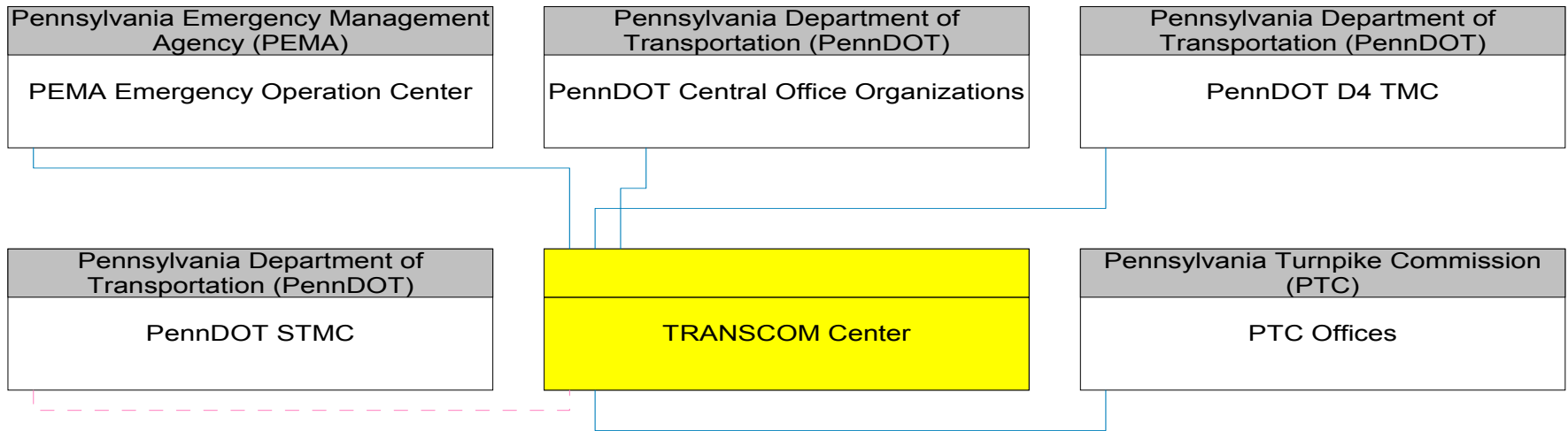
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- - - - - Planned

TRANSCOM Center

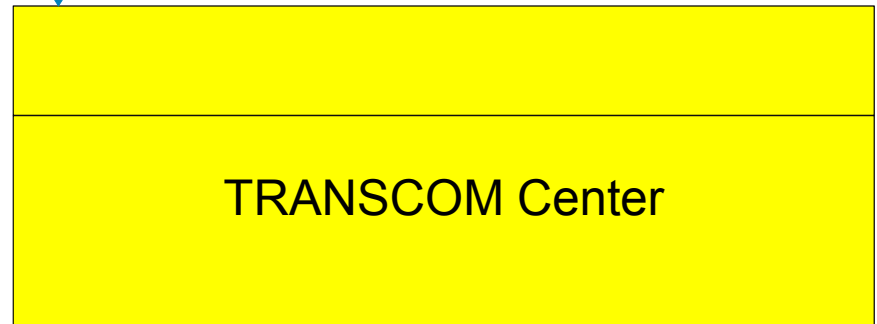
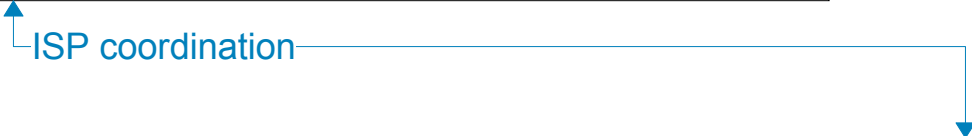
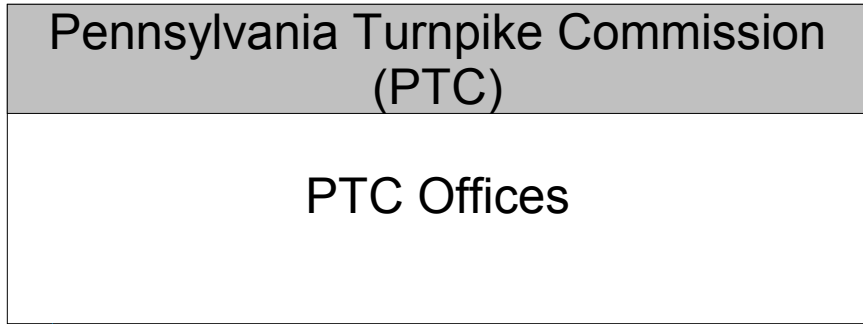


PA

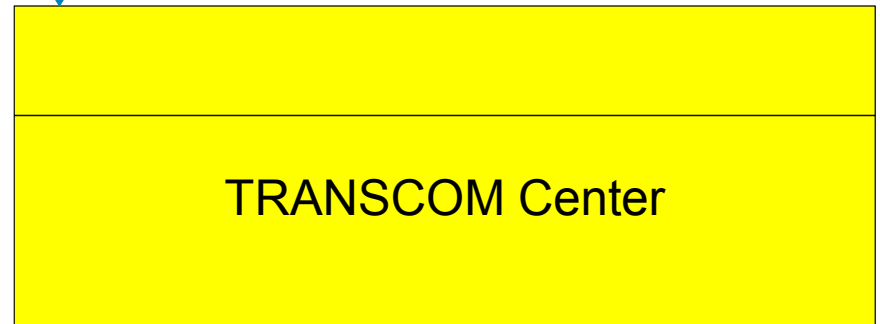
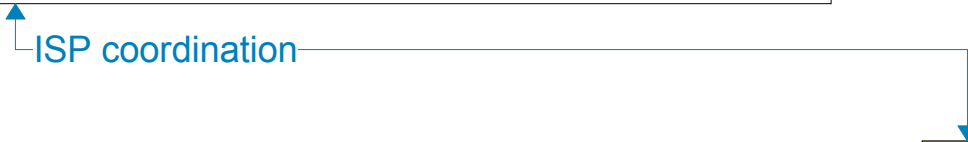
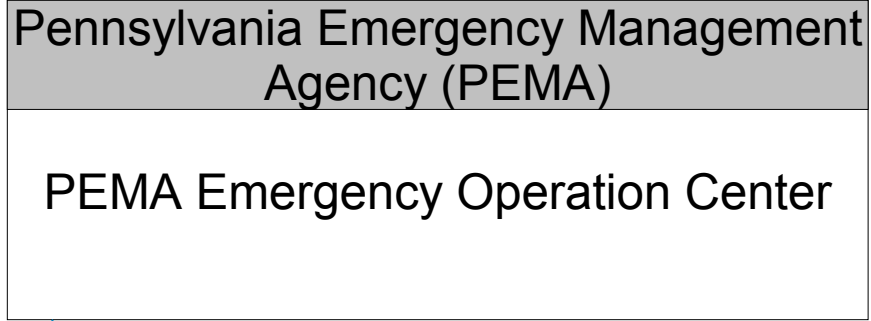
TRANSCOM Center Interconnect Diagram



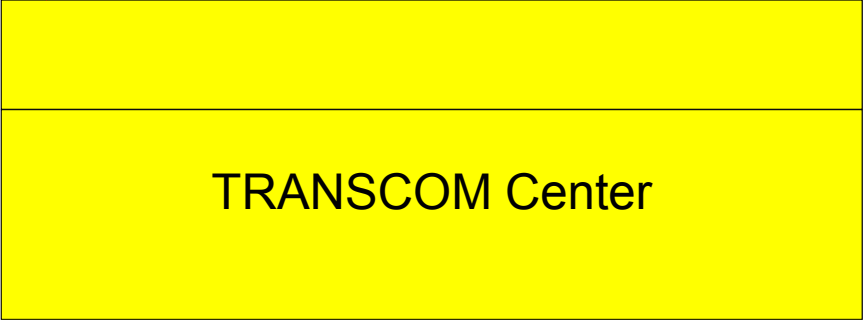
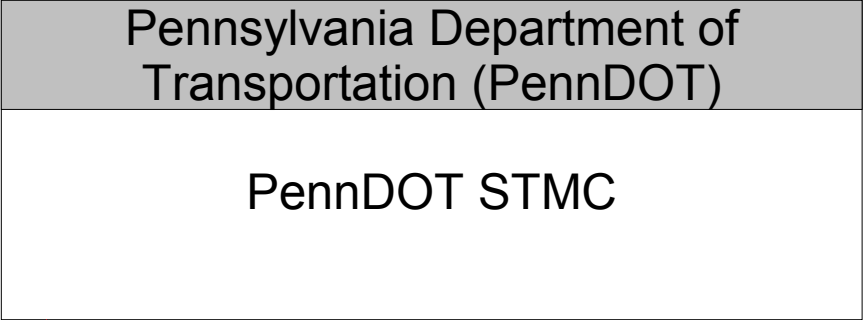
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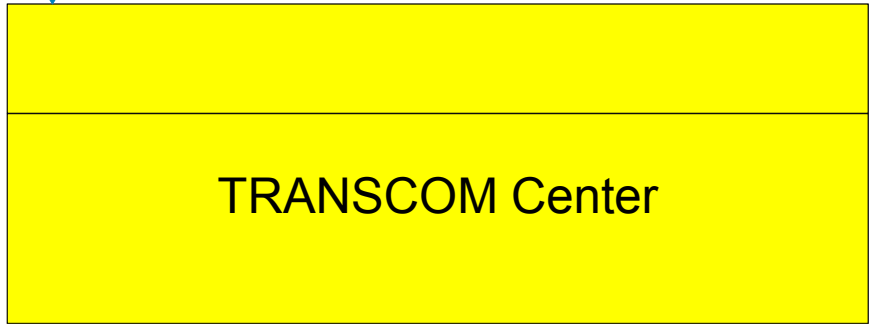
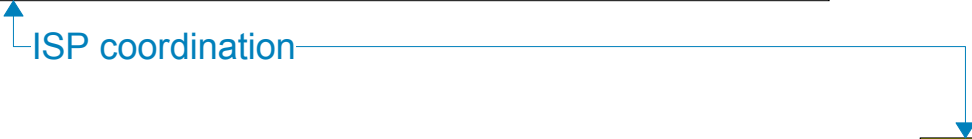
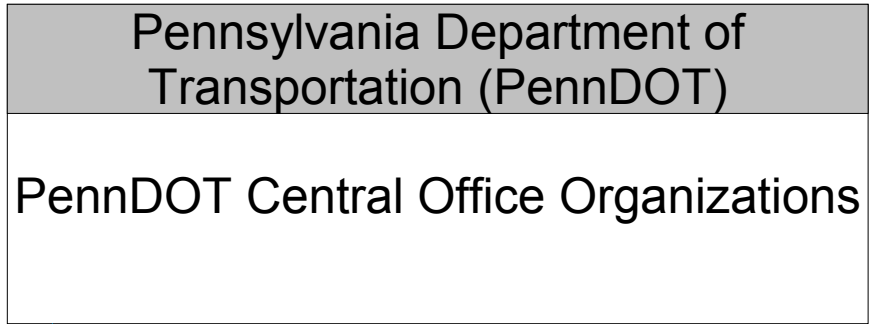


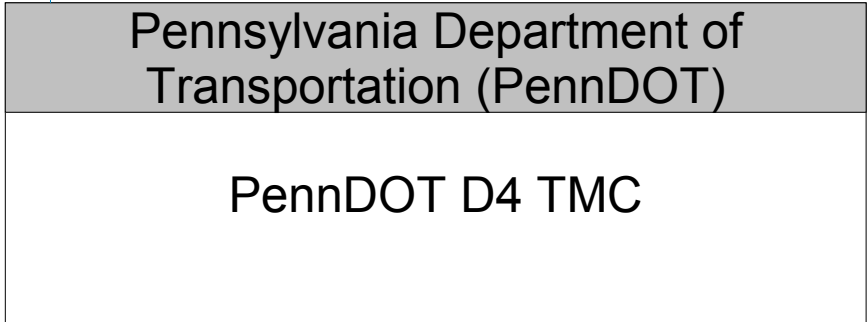
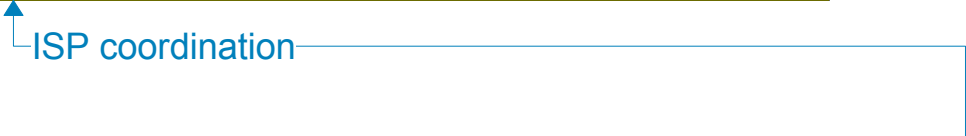
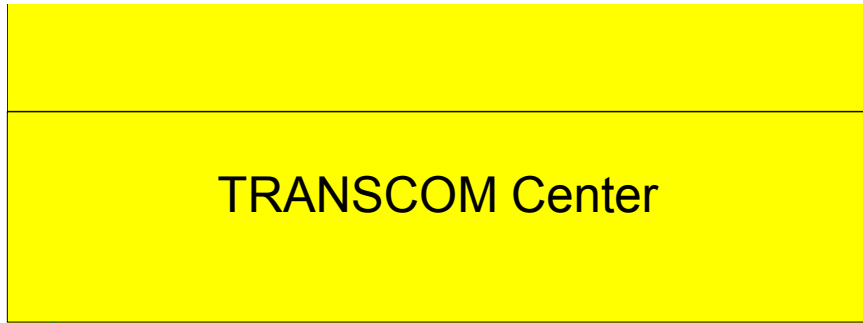
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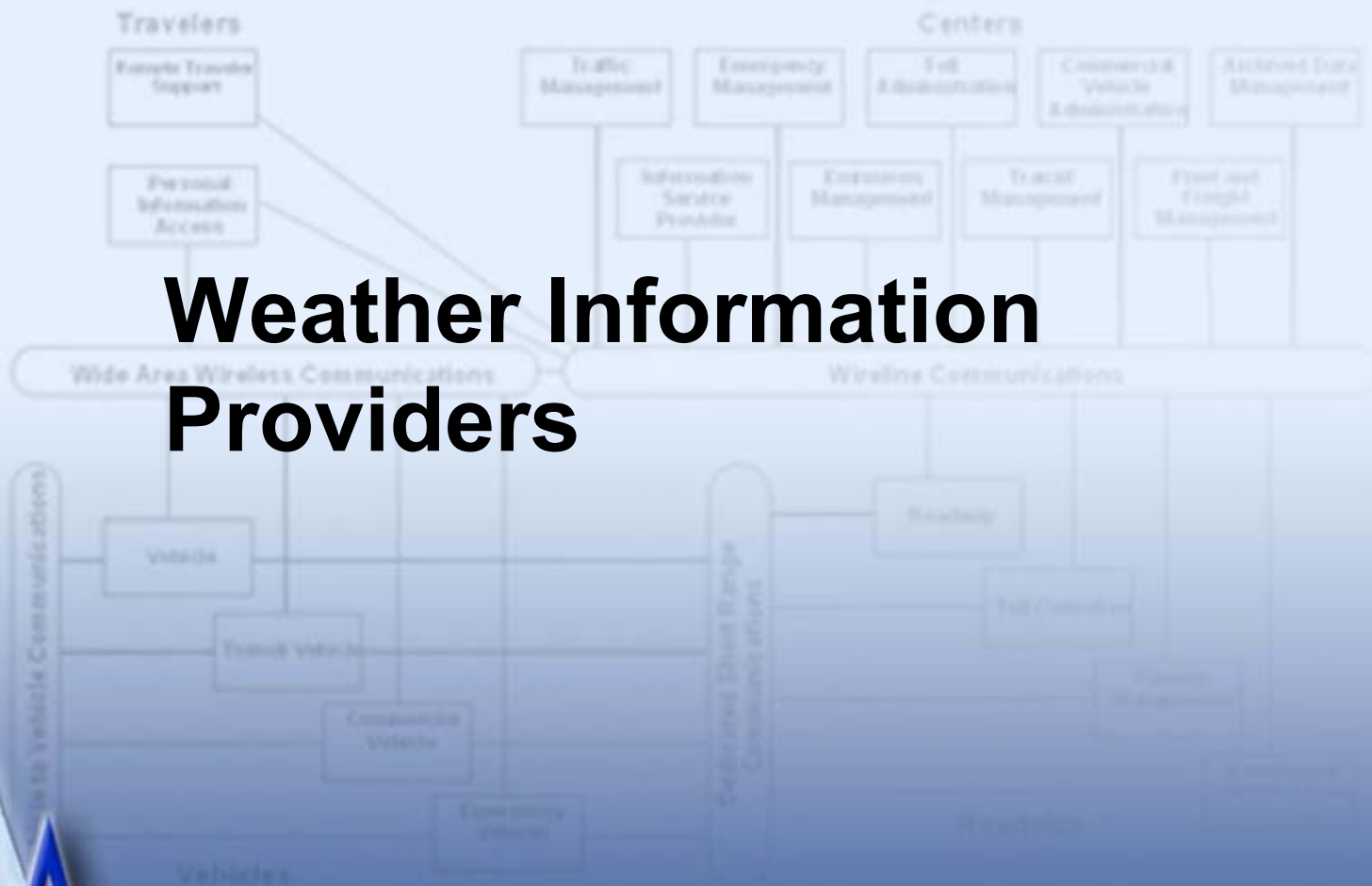
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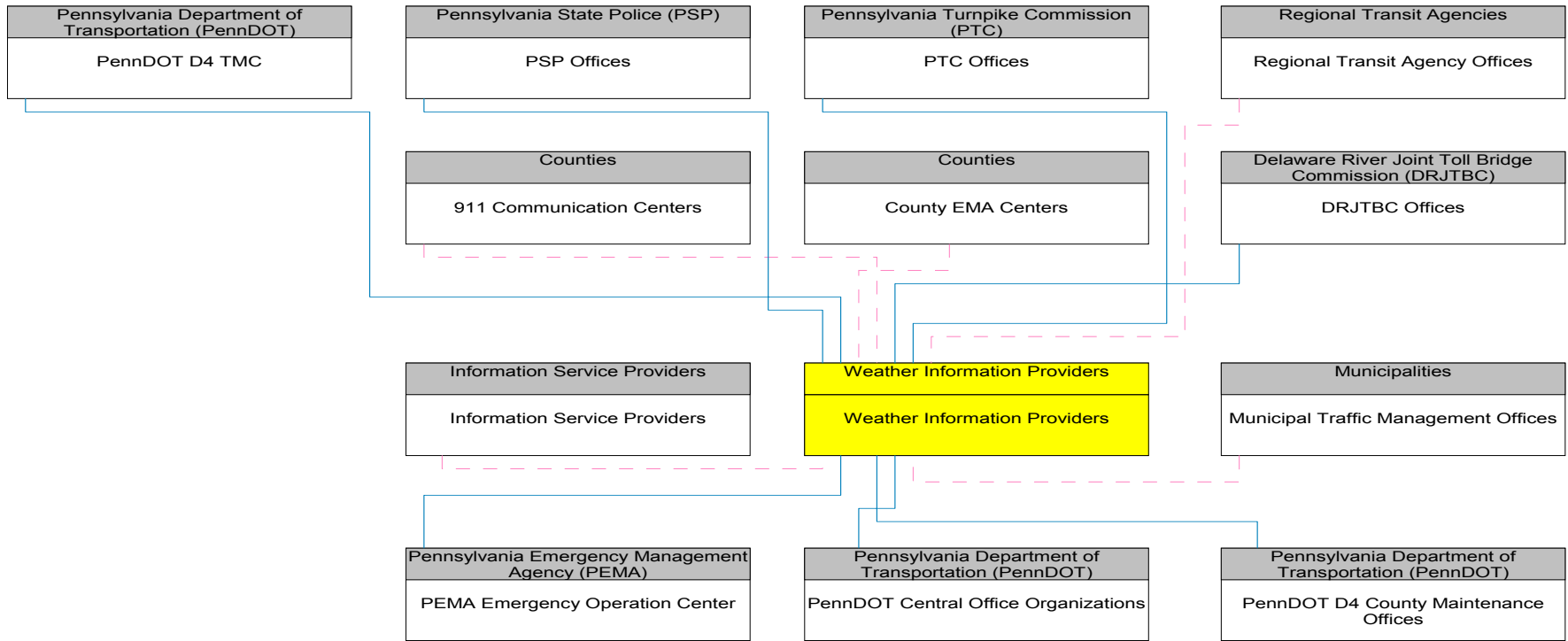


Weather Information Providers

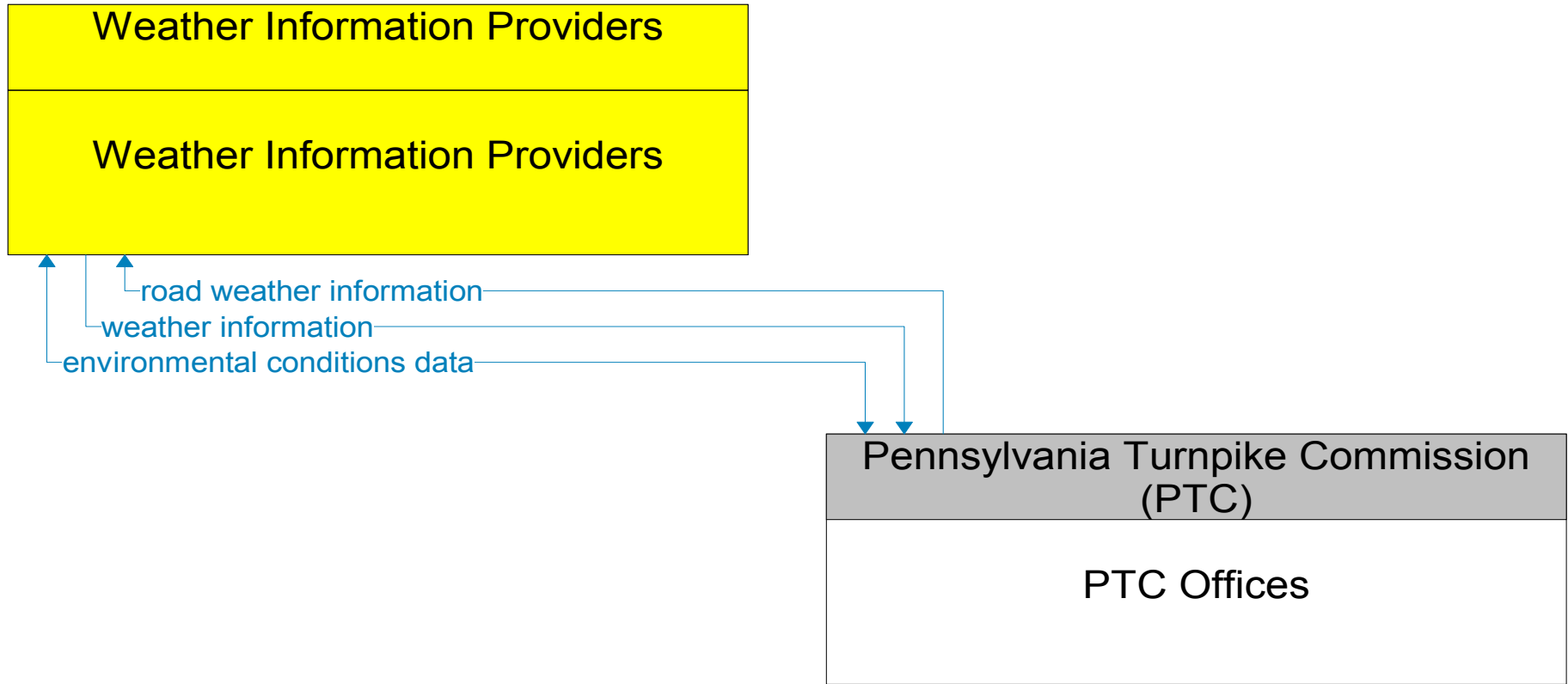


PA

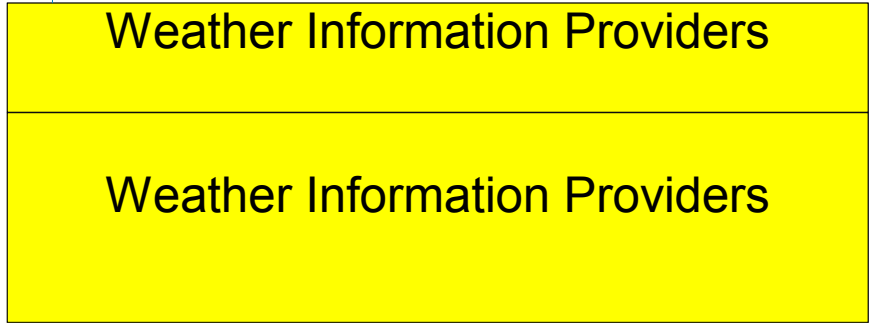
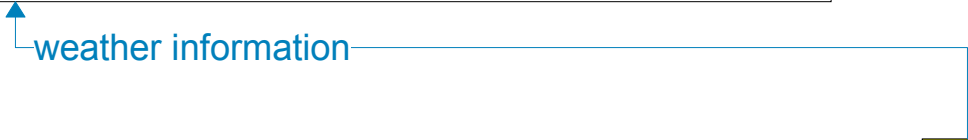
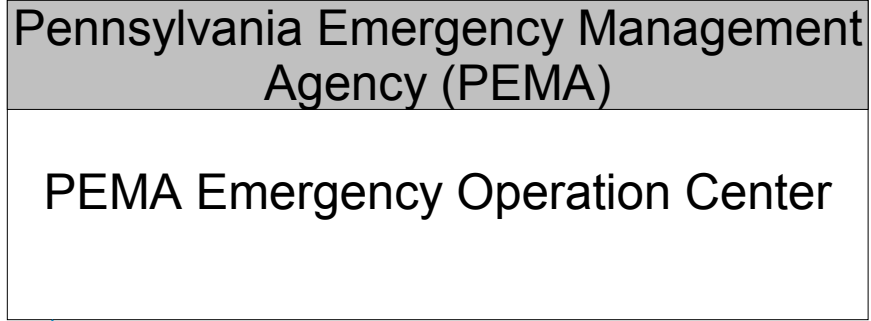
Weather Information Providers Interconnect Diagram



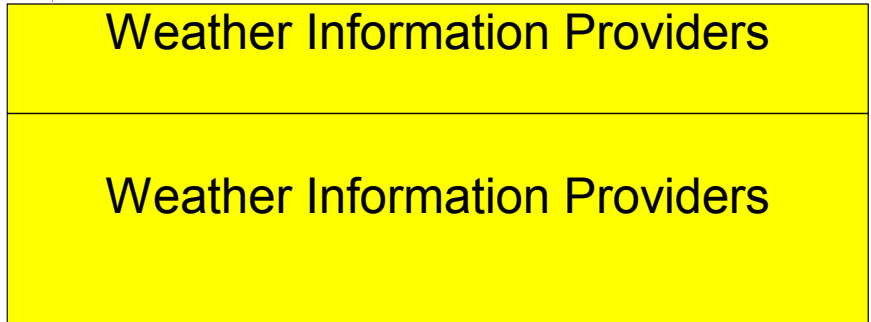
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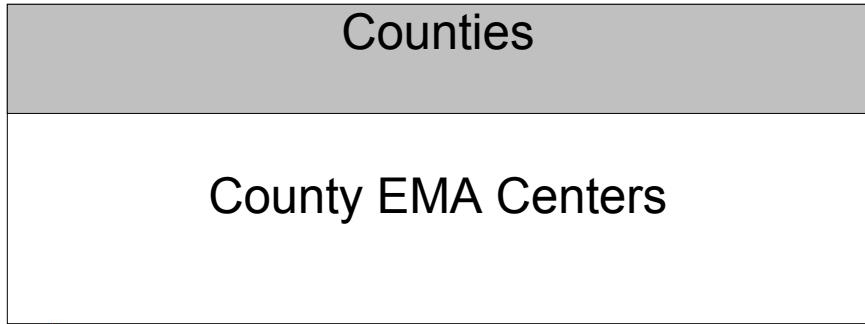
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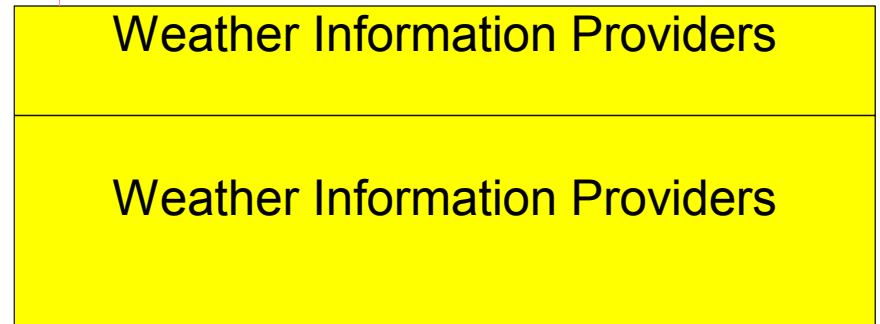
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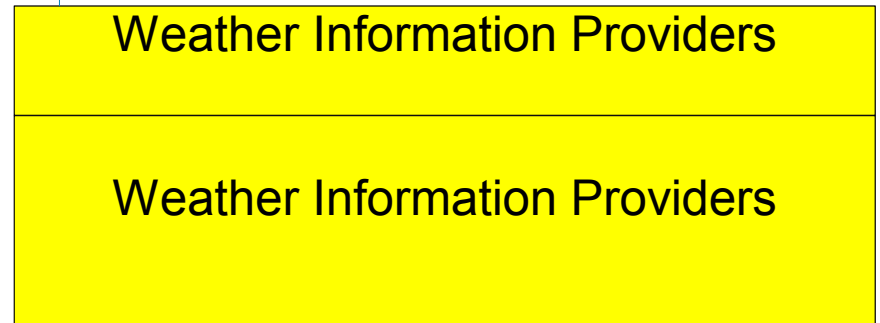
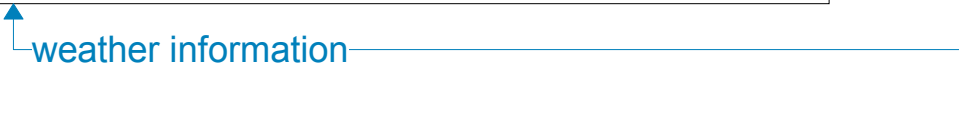
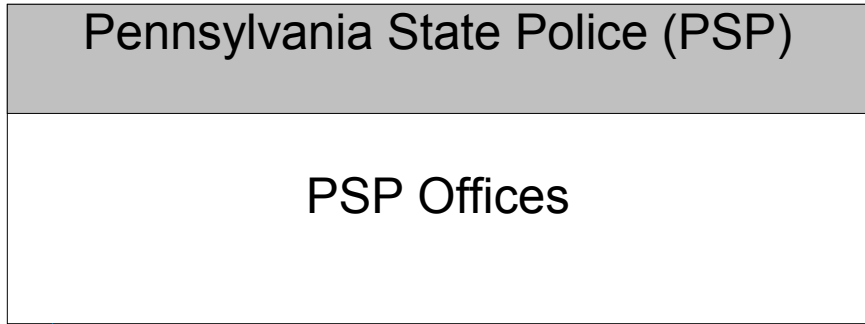
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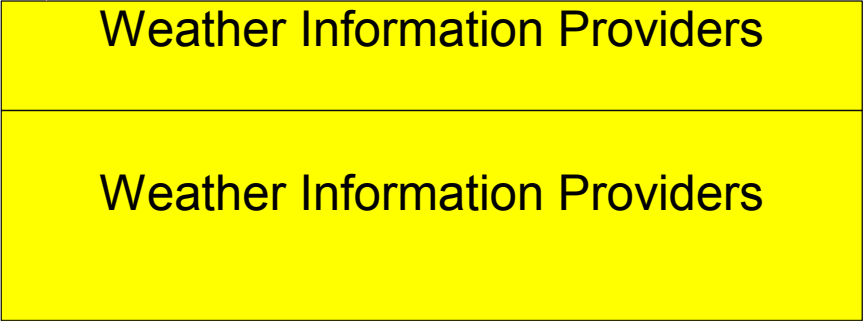
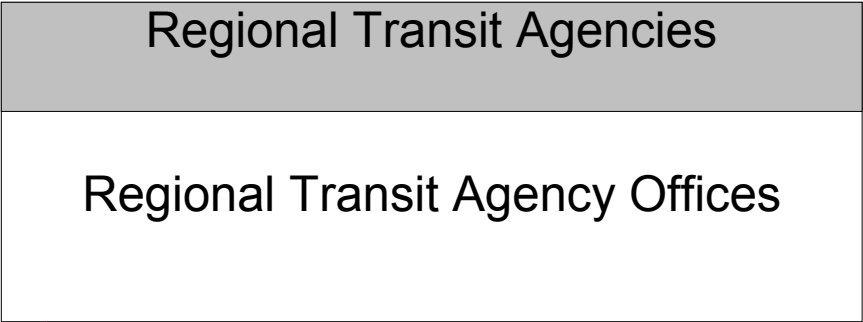
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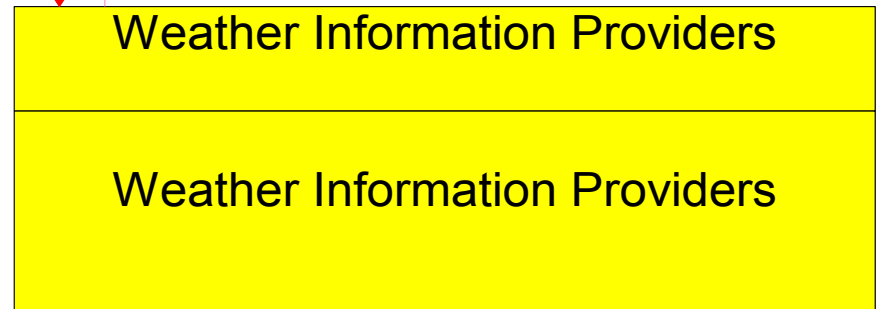
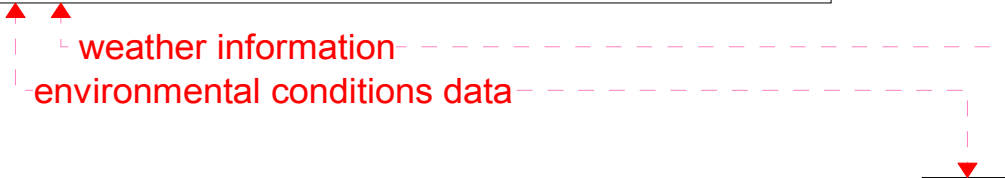
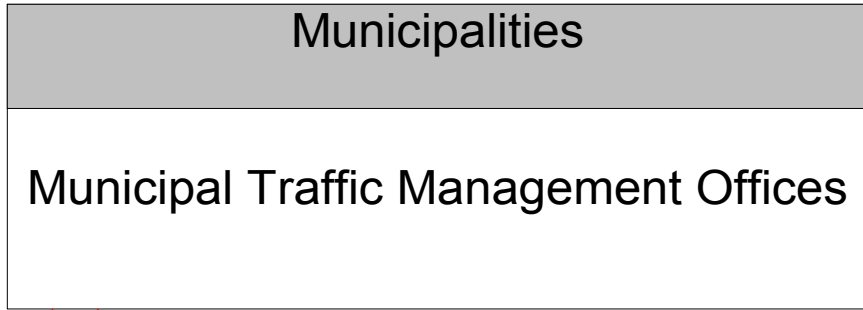
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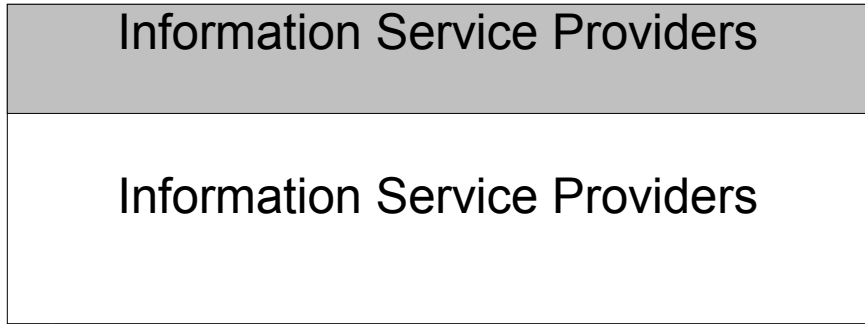
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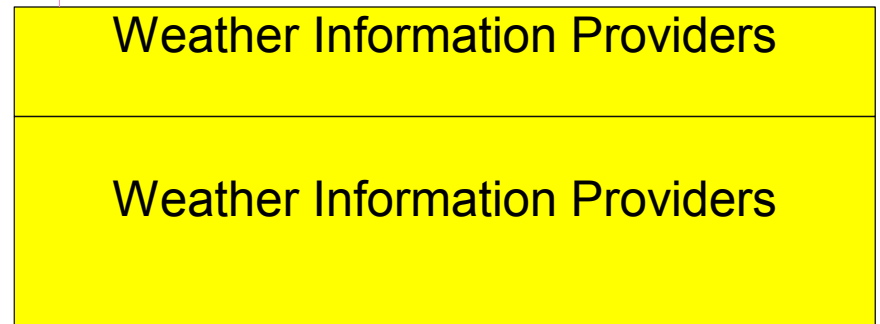
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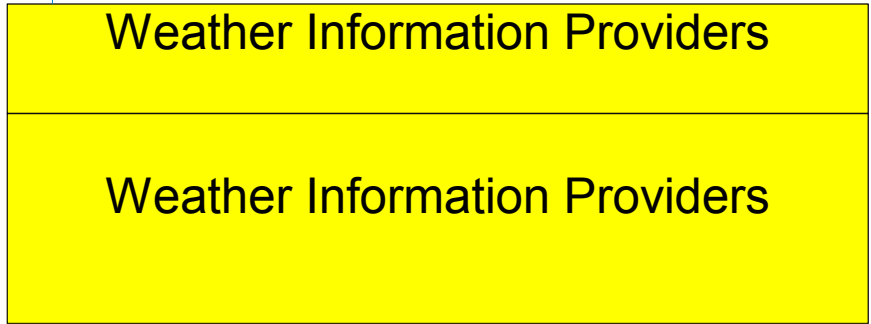
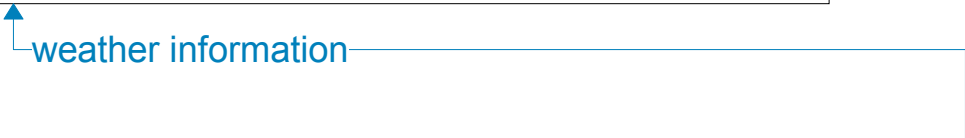
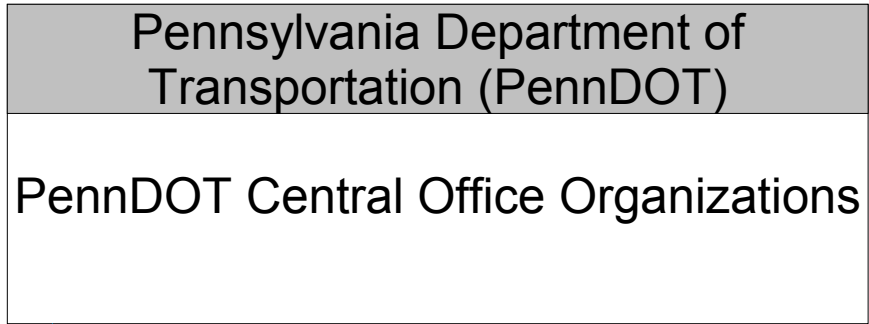
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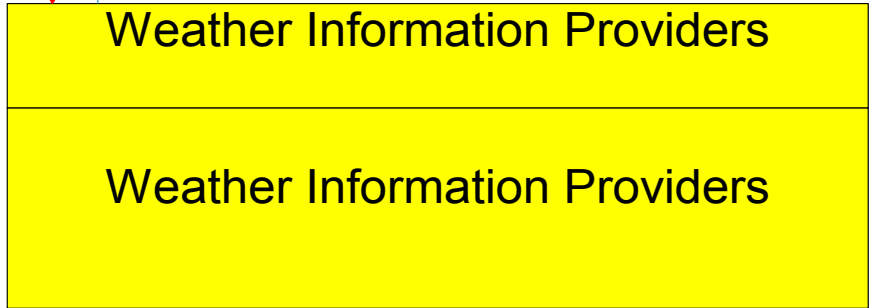
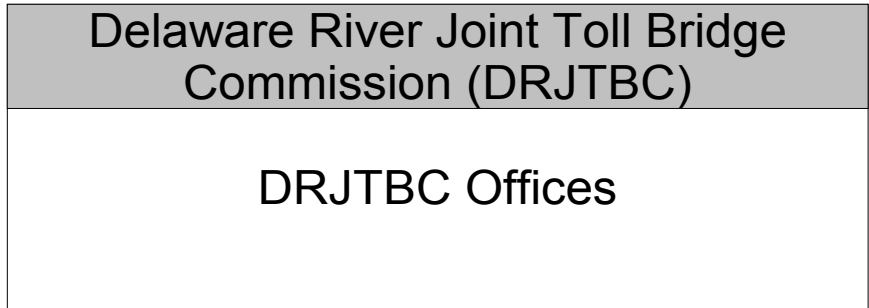
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Pennsylvania Department of
Transportation (PennDOT)

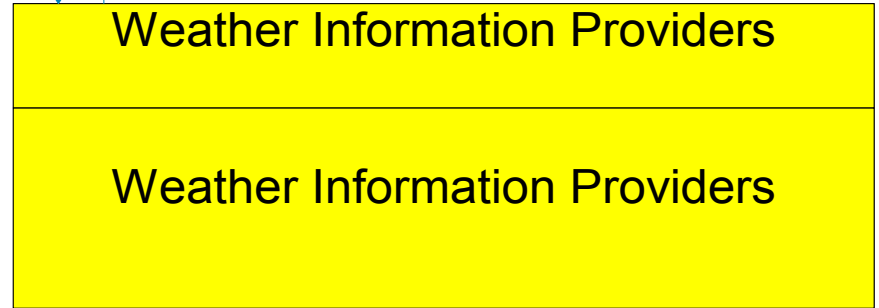
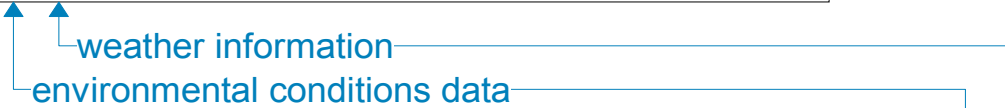
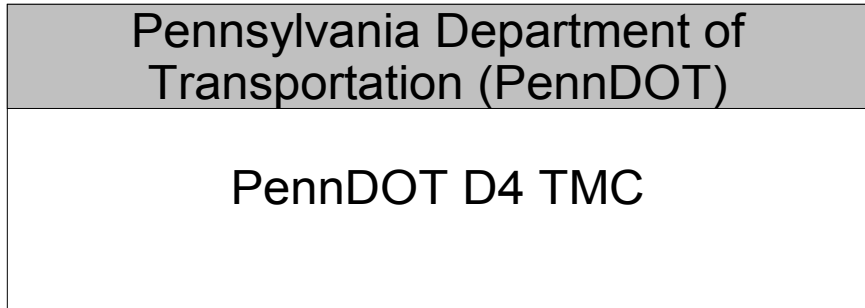
PennDOT D4 County Maintenance
Offices

weather information
environmental conditions data

Weather Information Providers

Weather Information Providers

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Planned



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- *DVRPC Regional ITS Architecture – Version 1.0.* Delaware Valley Regional Planning Commission. Philadelphia, PA. March 2001.
- *National ITS Architecture – Version 4.0.* <http://itsarch.iteris.com/itsarch> Last viewed, April 2004.
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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
CCTV	Closed Circuit Television
CDC	Consolidated Dispatch Centers
COLTS	County of Lackawanna Transit System
CDL	Commercial Drivers License
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
DRJTB	Delaware River Joint Toll Bridge Commission
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
HOV	High Occupancy Vehicle

HPT	Hazelton Public Transit
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
LCTA	Luzerne County Transportation Authority
MCSAP	Motor Carrier Safety Assistance Program
MOE	Measures of Effectiveness
MOU	Memorandum of Understanding
m.p.	Milepost
MPO	Metropolitan Planning Organization
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 the electronic clearance

Commercial Vehicle: 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. In addition, the subsystem will automatically collect and record mileage, fuel usage, and border

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 most timely 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 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, ridematching 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.

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.

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 in 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.

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.

Weather Service: This terminator provides weather, hydrologic, and climate information and warnings of hazardous weather including thunderstorms, flooding, hurricanes, tornadoes, winter weather, tsunamis, and climate events. It provides atmospheric weather observations and forecasts that are collected and derived by the National Weather Service, private sector providers, and various research organizations. The interface provides formatted weather data products suitable for on-line processing and integration with other ITS data products as well as Doppler radar images, satellite images, severe storm warnings, and other products that are formatted for presentation to various ITS users.

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.

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 conditions data: Current condition of pavement, bridges, culverts, signs, and other roadway infrastructure as measured by on-board sensors or read from infrastructure-based sensors. The data may include raw data or images (e.g., photo logs) that indicate the current 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.

local signal preemption request: Direct control signal or message to a signalized intersection that results in preemption of the current control plan and grants right-of-way to the requesting vehicle.

local signal priority request: Request from a vehicle to a signalized intersection for priority at that intersection.

maint and constr archive data: Information describing road construction and maintenance activities identifying the type of activity, the work performed, and work zone information including work zone configuration and safety (e.g., a record of intrusions and vehicle speeds) information.

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, decision support information, etc.

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 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.

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 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 for vehicle measures: Request for vehicle performance and maintenance data collected by onboard sensors.

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

request transit information: Request for transit service information and current transit status.

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

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). This flow can provide message content and delivery attributes.

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).

roadway treatment system status: Current operational status of automated roadway treatment devices (e.g., anti-icing systems).

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.

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.

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 control priority status: Status of signal priority request functions at the roadside (e.g. enabled or disabled).

traffic flow: Raw and/or processed traffic detector data which allows derivation of traffic flow variables (e.g., speed, volume, and density measures) and associated information (e.g., congestion, potential incidents).

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.

traffic sensor control: Information used to configure and control traffic sensor systems.

transit and fare schedules: Specific transit and fare schedule information including schedule adherence.

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 request confirmation: Confirmation of a request for transit information or service.

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 archive data: Data associated with traveler information services including service requests, facility usage, rideshare, routing, and traveler payment transaction data. Content may include a catalog of available information, the actual information to be archived.

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.

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 (e. g., overweight on specific axle by xxx pounds or which brake was out of adjustment).

weather information: Accumulated forecasted and current weather data (e.g., temperature, pressure, wind speed, wind direction, humidity, precipitation, visibility, light conditions, etc.).

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, 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 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 Corridor	Primary Operations	Secondary Operations
Lackawanna	I-81	PennDOT District 4-0	
	I-84	PennDOT District 4-0	
	I-380	PennDOT District 4-0	
	I-476	Pennsylvania Turnpike Commission	
	US-6	PennDOT District 4-0	
	US-6B	PennDOT District 4-0	
	US-11	PennDOT District 4-0	
Luzerne	I-80	PennDOT District 4-0	
	I-81	PennDOT District 4-0	
	I-476	Pennsylvania Turnpike Commission	
	US-11	PennDOT District 4-0	
	PA-29	PennDOT District 4-0	
	PA-309	PennDOT District 4-0	
Pike	I-84	PennDOT District 4-0	
	US-6	PennDOT District 4-0	
	US-209 (south of US-206)	National Park Service	PennDOT District 4-0
	US-209 (north of US-206)	PennDOT District 4-0	
Susquehanna	I-81	PennDOT District 4-0	

County	Highway Corridor	Primary Operations	Secondary Operations
	US-11	PennDOT District 4-0	
	PA-29	PennDOT District 4-0	
Wayne	I-84	PennDOT District 4-0	
	I-380	PennDOT District 4-0	
	US-6	PennDOT District 4-0	
Wyoming	US-6	PennDOT District 4-0	
	US-11	PennDOT District 4-0	
	PA-29	PennDOT District 4-0	
	PA-309	PennDOT District 4-0	

Appendix F: Bookend I Meeting I Minutes

Date: Wednesday, August 25, 2004
Meeting of: PennDOT D 4-0 Stakeholders' Meeting
Location: Lackawanna Valley Heritage Center – Mayfield, PA

Presentation

- Welcome and introductory remarks were provided by Steve Shimko, District 4-0 Executive. He then discussed some information on the projects goals and existing conditions. Michael Harris of PB Farradyne then went over the background of the project. He stated that ITS is a tool that can help to improve safety, mobility and help to manage capacity. Of the various types of ITS listed on slide 11, he highlighted that the 511 Traveler Information line has been approved by the Federal Communications Commission. Some examples of the types of ITS listed on slide 12 are the broadcast of road icing information and the potential implementation of a single travel fare smart card at the state, regional or even national level.
- Slide 13 features an introduction ITS architecture. Mr. Harris stressed that any deployments of ITS will not be made in isolation and that this effort is seeking to hear a voice from as many stakeholders as possible. Slide 14 features the Planning of ITS moving from the vision to the Transportation Improvement Plan, while slide 15 describes the deployment timeline of ITS. In slide 19, the State and MPO's are described as being responsible for ensuring that the mandate's conditions are met, and Mr. Harris added that the State Police and the Turnpike Authority would also play a role. He stressed that this plan would be a living document that will need to have a 3-5 year update schedule in order to keep up with changing conditions, needs and technologies. Slides 20 and 21 describe some of the benefits of the ITS planning effort. Not only will it implement a process for planning ITS integration, but it will also institutionalize the architecture. And in order to do the best with scarce resources, the program allows integration options to be considered before investments are made.
- Next, Craig Reed on the PennDOT Central Office discussed the statewide vision and tried to put interoperability and ITS into context. While the industry focus had been on road building during the 50's and 60's, people started to think about maintenance in the 70's and 80's. One of the reasons ITS has become a focus is that the money does not exist to continue to build roads and maintaining the system has become more and more difficult. One of the goals of this effort is to maximize the investment in the system and to keep it functioning safely and efficiently in order to maintain a high quality of life. There were 1618 highway deaths in the commonwealth during 2002. And while that number dropped to 1577 in 2003, additional work must be completed to make the system safer and more reliable.

- Slide 25 lists several congestion solutions and Mr. Reed added that we must evaluate additional tools and techniques that will make the highway network operate most effectively in order to maximize our investment. We must also consider how much to spend in order to build, maintain and operate these new technologies. In order to achieve the full potential of ITS, it must be implemented across the commonwealth, but with special attention paid to the particular needs of each region. A minimum level of integration and standards must exist to ensure interoperability. The main requirement will be to manage the mobility of the interstate highway system as they are the trunk of the transportation tree. Another important need is to provide the best possible information to emergency management agencies in the timeliest manner possible.
- At this point, Dennis Lebo of the PennDOT Central Office Center for Program Development and Management took the podium to discuss statewide planning. Slide 32 mentions that this planning effort provides an opportunity to establish a basis for sound investments, which is important given scarce and constrained financial resources. ITS will not only allow us to better manage the transportation system, but also to change how we manage and maintain the highway network. Slide 37 introduces the Regional Architecture Boundaries. These are different from the PennDOT regions or the MPO's, as the existing boundaries did not fit the needs and implementation requirements of ITS. For instance, the Philadelphia and southwest Pennsylvania area already have an ITS plan. This planning effort will reconcile that existing plan with the new statewide vision. The expected results of this planning effort are displayed on slide 39, and Mr. Lebo added that we will also know the what and the who of information flows. He closed his portion of the presentation stressing that we must continue this dialog as the system is implemented and refined.
- Next, Keith Williams of PennDOT District 4-0 discussed current and future ITS operations in the region. Some of the goals for ITS in the region include incident management, providing road condition information to motorists, various work zone activities, maintenance, litter control, emergency bridge deck repair, winter operations, safety (buckle-up and DUI), Amber alert and homeland security activities. The District 4-0 focus is currently on interstates 80, 81, 380 and 84 along with Routes 6, 20 and 309. Slide 44 displays examples of some ITS hardware (clockwise from upper left); portable Variable Message Sign in transit, stationary portable VMS, fixed-overhead VMS, RWIS weather station, CCTV tower, traffic operations center and finally a weather advisory board.
- In the late 90's, the goal was to manage congestion on the interstates. This role has expanded to monitor and communicate with traffic entering the region. Slide 45 lists several related studies, including a recent FHWA grant to the Carbondale Technology Transfer Center to upgrade the existing software and design a new integrated transportation management center. Slide 47 states that there are currently 3 portable DMS's in the region. This number has recently increased to 5. Slide 50 describes the Roadway Weather Information System, and Mr. Williams added that this system will be available on the web. The AFLADS system featured on slide 51 senses when a road is icing over and then

automatically applies a deicing solution. The current District 4-0 Traffic Management Center photo on slide 52 may be expanded as the ITS architecture develops and will perhaps be manned by a 24/7 staff and will require a larger room and setup. There exists a need to integrate and make it easier for the operator to share and distribute alerts and to share information across the state.

- In closing, Mr. Williams stressed that we must evaluate those technologies that are most widely used as compared to those that are most effective. In the near future, the main focus for construction and incident information will be on I-81. But, questions still remain on how ITS can best upgrade internal, local, signalized corridors. Additionally, efforts must be made to communicate with State Police and coordinate responses and the distribution of information. On September 11th, 2001, variable messages signs displayed information about the I-95 corridor as far west as I-81.
- Tom Lawson of Borton-Lawson took the podium next to discuss regional planning issues. He stressed a need for ITS planning to occur in an MPO setting and described how some have advanced the state of the practice by providing traffic camera images on the web. There is a need for ITS because there is a lack of available funds to expand the system along with existing NIMBY opposition and environmental concerns. Because detours cause major local EMA costs, it is imperative that localities have plans in place that will complement the ITS network. ITS will allow for drivers to be notified of incidents and directed to alternative routes as much as 30 miles up-stream. With District 4-0 located within 1.5 to 2 hours of New York City, traffic will continue to radiate out from that metropolitan area. More and more people will choose to live in the region and commute into the New York Metro area. And with many warehousing operations moving to the region, additional trucks will add to safety and maintenance concerns.
- Specific roadway improvements in District 4-0 include the widening of I-81 from Clark's Summit to Nanticoke. The State House and Senate have been asked to consider additional funding for the corridor. This heavily traveled through-route is currently operating at level of service E/F. No interchanges in the Scranton / Wilkes-Barre area currently meet standards. The majority of those interchanges were built to handle 1960's traffic. How do we manage this system with major safety issues while not adversely impacting economic development? And with traffic continuing to increase, capacity improvements will only be incremental or short term solutions to improve safety.
- Next, Lt. Thomas McDaniel of the Pennsylvania State Police spoke to the audience about Incident Management and ITS. He offered that the majority of incident calls that they receive come from cell phones, that they typically receive up to 50 calls within 5 minutes of an event and that roadside call boxes have been underutilized. Freeway patrol service provides non-trooper gasoline and other aid services and help to keep the system running by providing support and helping to clear queue incidents. ITS is being used to help share

information within MPO's and even to upstream locations outside of the region depending on the severity of the incident.

- Joel Ticatch of PB Farradyne closed the presentations with a discussion of the ITS Strawman Architecture. The concept of a Regional Transportation Management Center was introduced and the need to define proper connections and task flow was stressed. He directed people to visit www.paits.org if they had further questions about the project and encouraged everyone to comment and participate in future meetings.

Questions and Answers

A gentleman from the audience asked if there would be any additional opportunities for stakeholders to be included.

- Keith Williams of PennDOT District 4-0 directed any interested persons to contact Joe Barr or Joel Ticatch about further meetings.

A gentleman from Binghamton shared that their ITS architecture was complete and was curious about what sorts of coordination should be sought and asked how the PADOT team saw potential collaboration.

- Keith Williams admitted that there is a need to establish better relationships along I-81 similar to how the I-95 coalition functions. He suggested that the two organizations share notes on linkages across state lines and that he encouraged the gentleman to help form a partnership.

Someone suggested that they did not see a direct tie in with PEMA.

- Keith Williams described the process where by PEMA would be notified of a hazardous material incident, or road closures. Contact with PEMA would primarily go through a PennDOT lead contact person. Information also flows the other way from a statewide alert such as September 11th or and Amber Alert. Craig Reed, also of PennDOT added that PEMA does incident recording through a network at county 911 call centers. One goal of the ITS project is to expand the PEIRS software to standardize reporting across the state.

John Sninsky asked how District 5-0 fit into the planning equation.

- Keith Williams stated that there is a provision to share information across PennDOT districts and that agreements would be in place to transfer incident management across district offices. Joel Ticatch added that District 5-0 is also undertaking the same architecture planning efforts.

Steve Pitoniak asked if there was an effort to integrate digital road data across districts.

- Craig Reed answered that the Office of Information Technology was working to develop a common statewide road layer and that local agencies would be responsible to keep the data up to date.

Tom Dubas asked if it would be possible to view closed circuit TV feeds in Lackawanna County.

- Craig Reed said that whoever needs and should have access would be able to view the feeds. Discussions still need to take place regarding the development of privacy agreements. Keith Williams added that planning is underway to provide limited web-based access statewide. Mike Harris said that this was the type of question they were hoping to hear and hoping to find out who needs access to the data.

Sandra Schultz asked how far the state is from providing consumer access to the CCTV feeds on the web or even to a traffic channel.

- Keith Williams said that it would be nice to go one step further and provide in-car information. Craig Reed said that even the most robust operations in the district are not even provided 24/7 at this point and that it has not been decided how best to provide 511 service. Mike Harris added that this planning process is looking at how to increase data collection and that at some point in the future it will be disseminated through various means such as the basic existing AM alert services. Joel Ticatch said that the goal of ITS is to make the system safe and more efficient through the evolving wise use and dissemination of information.

A gentleman from the audience asked about evacuation planning.

- Keith Williams said that cross-district and cross-border information sharing will help to manage large evacuation events and inform the traveling public.

List of Attendees

Last Name	First Name	Agency	Email	Phone
Baranski	Alan	Northeastern Pennsylvania Alliance	baranski@nepa-alliance.org	(570) 655-5581
Bauman	Kurt	Northeastern Pennsylvania Alliance	kbauman@nepa-alliance.org	(570) 655-5581
Bishop	Marie	PennDOT engineer	mabishop@state.pa.us	
Brostoski	John	Pennsylvania State Police	jbrostoski@state.pa.us	(570) 963-4304
Browne	Paul	Carbondale Technology Transfer Center	pauFl@cttc.org	(570) 282-1255
Cacciamani	Paul	Synergist Technology Group	pcacciamani@synergist-tech.com	(570) 383-5375
Cera	Michael	Alfred Benesch & Company	mcera@benesch.com	(570) 622-4055
Chesnick	Patricia	Forest City Regional School District	pchesnick@forestcityschool.org	(570) 785-2400
Coleman	Bill	Lackawanna County Economic Development	bcoleman@lackawannacountyra.org	(570) 963-6451
Cook	Denise	Delaware Water Gap National Recreational Area	denise_cook@nps.gov	(570) 296-6952
DeSanto	Frank	Luzerne/Wyoming Counties Transportation Department	frank.desanto@luzernecounty.org	(570) 288-8420

Last Name	First Name	Agency	Email	Phone
Douglass	Bill	Upper Delaware Council		
Dubas	Thomas	Lackawanna County Department of Emergency Services	dubast@lackawannacounty.org	(570) 963-6700
Flanagan	Robert	Northeast Pennsylvania Emergency Response Group	flanaganr@lackawannacounty.org	(570) 961-5511
Forney	Dave	Upper Delaware Water Gap		
Gayle	Steve	Binghamton MPO	sgayle@co.broome.ny.us	(607) 778-2443
Gunuskey	Glen	Wayne County Emergency Management Agency	ema@co.wayne.pa.us	(570) 253-5970
Hagen	Kip	Steamtown National Historic Site	kip_hagen@nps.gov	(570) 340-5200
Kempter	Kurt	County of Lackawanna Transit System	kkempter1@compuserve.com	(570) 346-2061
Klenk	Cindy	Carbondale Chamber of Commerce	cklenk@carbondale-pa-coc.com	(570) 282-1690
Lamereaux	David	PA Dept		
Lawson	Thomas	Borton-Lawson Engineering Inc.	tlawson@borton-lawson.com	(570) 821-1999
Lebo	Dennis	PennDOT Central Office	dlebo@state.pa.us	(717) 787-5246

Last Name	First Name	Agency	Email	Phone
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McDaniel	Tom	Pennsylvania State Police	tmcdaniel@stateopc.us	(717) 783-5521
Moyer	Dana	Schuylkill Transportation System	dlmoyer@redcogrp.com	(570) 429-2701
Mrozinski	Mike	Pike County Community Planning and Human Development	mmrozinski@pikepa.org	(570) 296-3437
Parker	George	City of Scranton	gwparkerpe@msn.com	(570) 348-4180
Parsell	Ted	Pike County Road Task Force	dtbos@ptd.net	(570) 828-2347
Patton	Ted	Frank Martz Coach Co	tpatton@martzgroup.com	(570) 821-3818
Pfiiffenberger	Karl	Greater Scranton Chamber of Commerce	kpfeiffn@scrantonchamber.com	
Pitoniak	Steve	Lackawanna County Regional Planning Commission	pitoniaks@lackawannacounty.org	(570) 963-6826
Reed	Craig	PennDOT Central Office	rcreed@state.pa.us	(717) 787-7350
Sager	Roger	Delaware River Joint Toll Bridge Commission	rpsager@drjtbc.com	(215) 295-5061
Schultz	Sandra	Upper Delaware Council		

Last Name	First Name	Agency	Email	Phone
Seaman	Bill	Office of NYSDOT--Region 9		
Shimko	Steve		sshimko@state.pa.us	(570) 963-4010
Smith	Dave	Synergist Technology Group, Inc.	dsmith@synergist-tech.com	(570) 341-5305
Snee	Nancy	Luzerne County Planning Commission	nancy.snee@luzernecounty.org	(570) 825-1560
Sninsky	John	Schuylkill Transportation System	jsninsky@redcogrp.com	(570) 429-2805
White	William	Lakeland School District	wwhite@lakeland.sd.org	(570) 254-9485
Williams	Keith	PennDOT Engineering District 4-0	keiwilliam@state.pa.us	(570) 496-6161
Wufus	Alan	Hazleton Public Works	alanw@hazletoncity.org	(570) 459-4918
Yung	Jessie	Federal Highway Administration	jessie.yung@fhwa.dot.gov	(717) 221-4422

Pennsylvania Intelligent Transportation Systems (ITS) Architecture

Northeast Region
Stakeholders' Meeting
August 25, 2004



Welcome

Steve Shimko
District 4-0 Executive
Pennsylvania Department of Transportation



Agenda

- Welcome – Steve Shimko, PennDOT District 4-0
- Background – Michael Harris, PB Farradyne
- Statewide Vision - Craig Reed, PennDOT
Statewide Planning - Dennis Lebo, PennDOT
Regional Operations – Keith Williams, PennDOT
District 4-0
- Regional Planning – Thomas Lawson, Borton-Lawson
- Enforcement Approach - Lt. Thomas McDaniel, Pennsylvania State Police
- ITS Architecture – Joel Ticatch, PB Farradyne
- Questions and Answers



Welcome

- PennDOT
- PSP
- Transit
- Counties
- Cities
- Townships
- Emergency Management Agencies
- Planning Offices
- Partnership Organizations
- Enforcement Community
- Media
- Tourism and Event Destinations
- Economic Development Agencies
- School Districts
- Policy



Northeastern Pennsylvania Regional Description

- PennDOT District 4-0 Region
 - 6 County Region; 1 MPO, 2 RPOs
 - Borders New Jersey and New York
 - Regional Long-Range Transportation Plans
 - ITS referenced in Long-Range Plans
 - ITS Architecture required to meet Federal Mandate enabling Region to use Federal Funds for ITS
 - ITS line items/investments in regional Transportation Improvement Programs
 - Regions and State responsible for preparing ITS Architectures



Northeastern Pennsylvania Transportation Challenges

- Develop, maintain, and manage an adequate, safe, accessible, and environmentally-sound intermodal transportation network that provides for the efficient movement of people and goods across the Region
- Identify and respond, safely and efficiently, to roadway emergencies and incidents
- Accommodate increased roadway congestion, even when resources for system expansion are limited
- Furnish road and traffic conditions data, transit data, travel advisories, routing information, etc. to travelers and commuters



We need your help because...

- **Your knowledge is required to validate critical baseline information**
- Your insights and perspectives on regional conditions and activities are needed
- Some of you operate a piece of the transportation system
- Some of you are involved in planning and programming for regional transportation
- Some of you help set transportation policy in the Region
- **All of you have a stake in transportation conditions and performance in the Region**



What we need from you...

- Attend meetings on this effort
- Validate the work presented to you
- Champion ITS
- Outreach to other stakeholders and organizations about ITS
- Continue the ITS regional dialogue 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

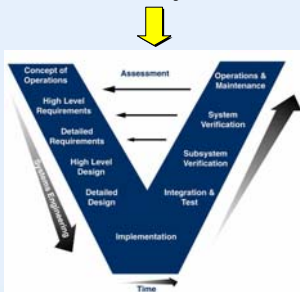


Projects



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 on 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

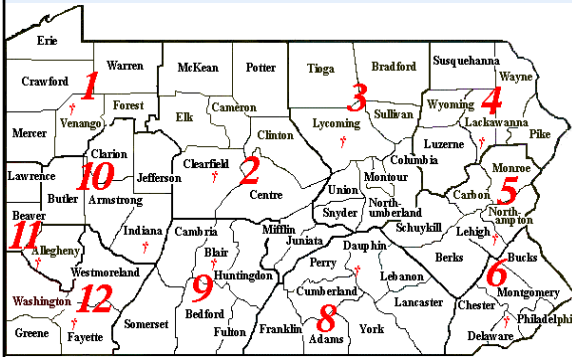


Regional Tool

- 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



PennDOT District Map



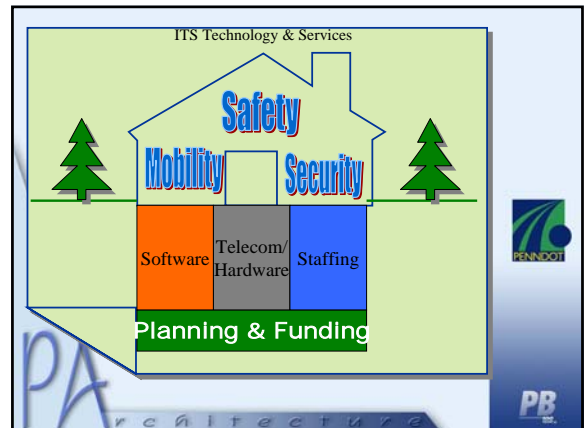
Statewide Vision

- Transportation Management Centers in each Region
- Incident Management and Reporting Software
- Incident Management Program for All Interstate Highways
- ITS Data Integration and Information Sharing
 - Voice
 - Data
 - Video
- PA Mobility (Congestion Management) Strategy
 - 24 X 7 Operations



Statewide Vision

- Transportation Operations
 - Safety
 - Security
 - Mobility
 - Economic Vitality
 - Quality of Life
- ITS
 - Tools, Techniques, & Technology



Statewide Planning

Dennis Lebo

PennDOT Central Office
Center for Program Development
and Management

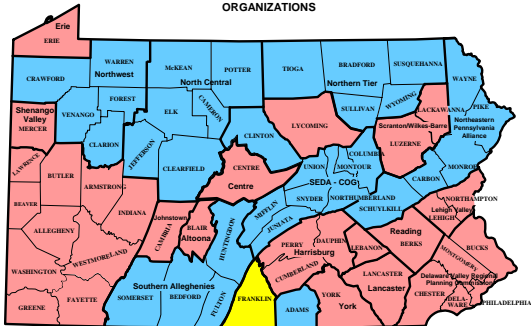


Statewide Planning Opportunity

- 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



PENNSYLVANIA'S TRANSPORTATION PLANNING ORGANIZATIONS



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

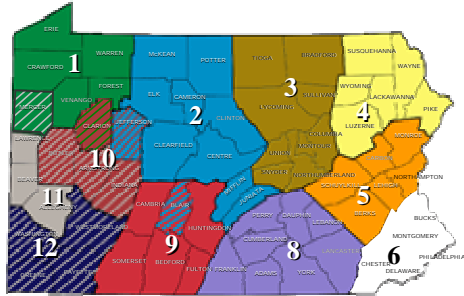


Project Organization

- Guided by a Statewide Working Group
- Each Region is led by a Regional Advisory Panel (RAP)
- 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
- Provides 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
- 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 Operations

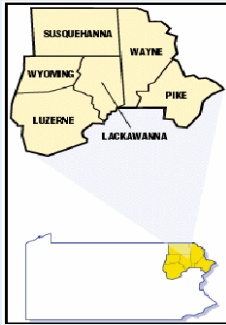
Keith Williams, PennDOT D4-0



PENNDOT District 4-0 ITS Operations



District 4 Region

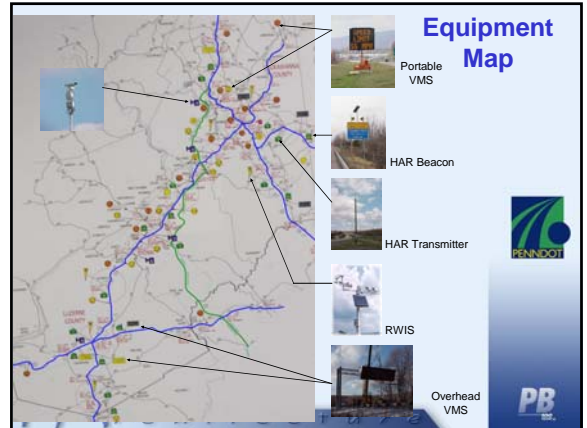


Intelligent Transportation Systems (ITS)



Related Studies

- Scranton/Wilkes-Barre Early Deployment Study
 - Defined initial set of potential ITS investments
- Carbondale Technology Transfer Center (CTTC)
 - System integration and design of a new integrated Transportation Management Center



Equipment Map

Portable & Permanent VMS

(Variable Message Signs)



Currently there are 3 movable VMS units which can be programmed remotely, via cell phone, by the ITS operator when placed in the field by county personnel.



There are 45 movable VMS units permanently mounted along the District's Interstate and traffic route system.



Currently 4 overhead VMS units are operational with 5 under construction.

HAR

(Highway Advisory Radio)



BEACON
(330AM, 1610AM, and 1640AM)

The District currently has 9 radio transmitters and 9 advisory beacons.

PENNDOT currently has a contract to install 13 additional beacons for a total of 22 beacons.



TRANSMITTER
(3-Mile Radius Minimum)



Cameras

There are 3 camera installations within District 4-0. They are located at the interchange of I-81, I-84, and the Casey Highway (US 6); I-81 Exit 182 (Davis St./Montage Mountain Rd.); and I-81 Exit 168 (Wilkes-Barre/Highland Park Blvd).



RWIS

(Roadway Weather Information System)

There are 8 RWIS located within District 4-0. There is one additional RWIS under contract, for a total of 9.



AFLADS

(Automatic Fixed Location Anti-/De-Icing System)

One bridge in Luzerne County is equipped with an automated de-icing system.



PennDOT District 4-0 Traffic Management Center



PennDOT District 4-0 Traffic Management Center

- Carbondale Technology Transfer Center (CTTC) project to upgrade to new dedicated facility
- Integration of hardware and software under single workstation
- Improved equipment and mechanicals (electrical/HVAC)

Upgradeable/expandable



Other ITS Activities

- Improved incident/emergency management and coordination using ITS
- Advanced traffic signal systems (municipalities) – PennDOT permits and installs
- Connection to I-95 Information Exchange Network
- Electronic information dissemination (e-mail and web-based)
- Pre-Assigned Detour Routes
- 1/10 Mile Markers



Regional Planning

Tom Lawson
Borton-Lawson
Co-Chairman – Focus 81



MPO / RPO Involvement



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

- Mandate to receive Federal funds for ITS projects in future
- Cannot build our way out of congestion
- Funding limitations
- NIMBY
- No longer just an urban problem
- Public expects more for less



MPO / RPO Involvement

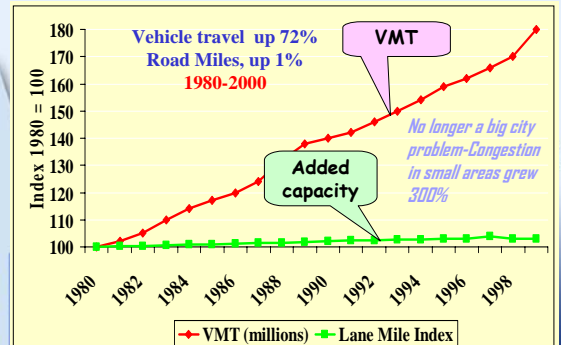


Need for ITS Planning at regional (MPO/RPO) level:

- 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 systems)
 - Plan for economic development
 - Improved signing



This is why....



CONGESTION AHEAD

No Kidding!
So what am I
supposed to
do now!



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
 - Truckers
 - AAA
 - Transit
 - Major municipalities
 - Emergency management providers (including law enforcement)
 - Major event generators



MPO / RPO Involvement

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

- Region is a transportation hub
 - Major Interstates I-81, 80, 380, 84
 - Well-connected to East Coast cities, Midwest, South, and eastern Canada
 - Significant truck (warehousing) and rail operations in the region



MPO / RPO Involvement

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

- Much interaction between markets within Region (Wilkes-Barre, Hazleton, Scranton, Poconos)
- Portions of urbanized areas for an MPO area "spill over" into jurisdictions of an RPO area (example – Wilkes-Barre/Scranton commute through rural counties to Northern New Jersey/New York City)



MPO / RPO Involvement

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

- Region has significant tourist attractors
 - Pocono's Arena
 - Steamtown
 - Pocono Raceway
 - Lackawanna County Stadium
 - 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 (Focus 81, Safe 80)
- Create an ITS Task Force to work on technical and operational issues
- Find a home for the ITS Task Force housed under a regional for planning and programming group
- Regional ITS Implementation Plan



Current Strategic Initiatives

FOCUS 81 COMMITTEE

Scranton/Wilkes-Barre
I-81 Corridor Expansion
Initiative



I-81 Corridor Expansion

- This Corridor of I-81 is a link of Strategic Significance for:
 - Northeastern U.S. Megalopolis
 - Mid-Atlantic and Southern States
- Conduit for International Trade between the U.S. and Canada & North-South alternate to I-95
- Corridor Includes Major Interchanges with other regional highways:
 - Interstates 380 and 476
 - Extensions to Interstates 80 and 84 & Route 6



I-81 Corridor Expansion

- **Current Level of Service – E to F**
- **Future Level of Service Analysis**
 - By 2010, many sections will be unacceptable over 13 hours per day
- **Anticipated Future Vehicle Volume**
 - By 2010 - 86,000 vehicles per day
 - By 2023 - 104,000 vehicles per day
 - By 2033 - 119,000 vehicles per day
- **PENNDOT has Identified the Corridor as:**
 - High-crash area
 - High-congestion area
 - Warning and safety signage installed



I-81 Corridor Expansion

- **Economic Impact of Expanded Corridor**
 - Labor and Capital more Efficient
 - Increase Business Expansion
 - Increase New Investment
 - Increase Job Creation
- **Corridor is Essential for sustaining:**
 - Regional Interstate Commerce
 - Population Movements
 - Overall Regional Economic Vitality
- **Transportation Infrastructure**
 - Primary footings for Economic Development
 - Current and Growing need for Vehicle Capacity
 - Crucial to Economic Development Initiatives



I-81 Corridor Expansion

- **Estimated Cost:**
 - \$ 1 billion
- **Estimated Time for Project Completion:**
 - Ten (10) to Fifteen (15) years



I-81 Corridor Expansion

- **Short-Range/Mid-Range Goals:**
 - Accident Reduction
 - Congestion Alleviation
 - Enhanced Safety
 - Positive Impact on Employment & Earnings Growth
- **Long-Range Goals:**
 - Widen Corridor from four (4) to six (6) lanes
 - Provide input regarding design and scope of work for I-81 corridor expansion



Pennsylvania State Police

Lt. Thomas McDaniel



Incident Management & ITS



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



Information to Motorists

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



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



Pre-Planning & Coordination

- Detour routes for major highways
- Special Events
- Incident Management meetings
 - Regions and Corridors
 - IM Plans
 - IM Plans for construction projects



Validation Outreach

Joel Ticatch, PB Farradyne



ITS Strawman Architecture Process

1. Prepare Work Plan
2. Appoint Regional Advisory Panel and ITS Regional Champion to Oversee Process
3. Inventory Systems and Gather Information on Existing and Planned ITS Activities
4. Generate ITS Strawman Architecture
5. **Validate ITS Architecture**
6. Finalize ITS Architecture



Characteristics of the ITS Architecture

- Identifies the ITS projects and activities across the Region
- Inventories the ITS systems – both existing and planned – associated with those projects
- Describes the inter-relationships among the Region's ITS systems:
 - Which systems are linked?
 - What types of information pass over these links?
 - In which direction(s) does the information flow?



Characteristics of the Strawman Document

- The *Strawman* is a draft document
- The *Strawman* is a temporary – ephemeral – document to be refined and eventually replaced by a more permanent document
- The *Strawman* is designed to be “knocked down,” reconstituted, and reconfigured
- The *Strawman* gives stakeholders a common baseline to react to



We Need Your Help Because...

- **Your knowledge is required to validate the contents of the Strawman Architecture**
- Your insights and perspectives on regional conditions and activities are needed
- Some of you operate a piece of the transportation system
- Some of you are involved in planning and programming for regional transportation
- Some of you help set transportation policy in the Region
- **All of you have a stake in transportation conditions and performance in the Region**



Regional Validation Sessions

- Large-Group Stakeholder Meetings (2)
 - August 2004 & January 2005
- Small-Group Validation Meetings (6)
 - September & October 2004



Validation Meeting Schedule

- *Traffic Management–PennDOT* September 23, 9:00AM
- *Traffic Management–All* September 23, 1:00PM

- *Emergency/Incident Management* October 5, 9:00AM
- *Transit Management* October 5, 1:00PM

- *Traveler Information/Tourism* October 6, 9:00AM
- *Transportation Planning* October 6, 1:00PM



Validation Meeting Activities

- Review pertinent ITS Architecture diagrams
- Help identify and clarify:
 - *Interconnections*: Who do you connect with, or want to connect with in the future?
 - *Information flows*: What information do you pass over the connection, or want to pass in the future?
 - *Directional flow*: In what direction(s) does the information flow – now and in the future?
- Brainstorm about potential ITS projects for the Region

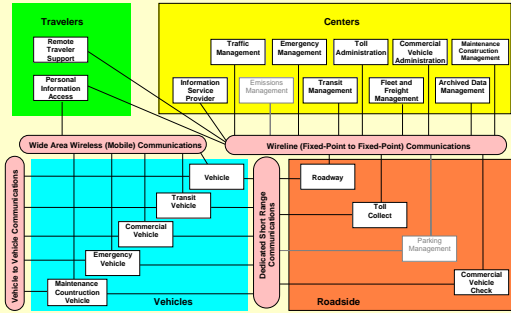


Sample Diagrams

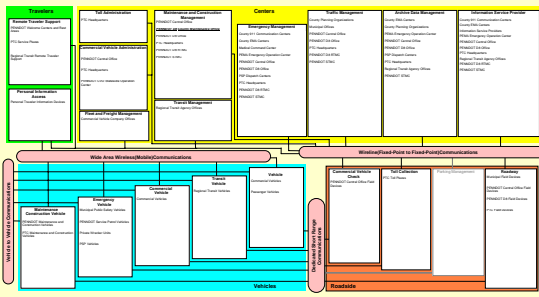
County 911 Communication Centers



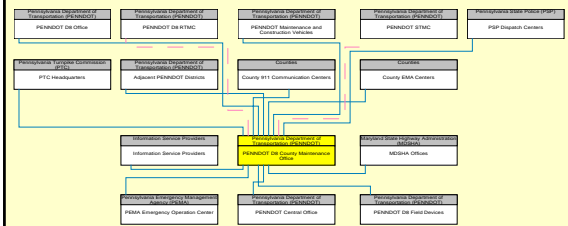
PENNDOT D4-0 Regional ITS Architecture Framework



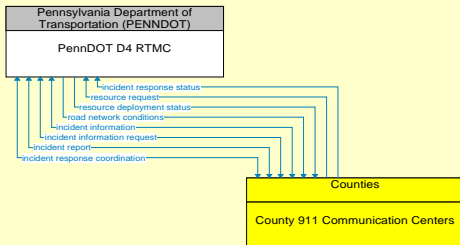
PENNDOT District 4-0 Regional ITS Architecture County 911 Communication Centers



County 911 Communication Centers Interconnect Diagram



County 911 Centers/PennDOT D4 RTMC Information Flow Diagram



Next Steps

- Determine the Validation Meetings you will attend
- RSVP for the Validation Meetings
- Bring today's packet to the Validation Meetings
- Attend the Validation Meetings on September 23, October 5, or October 6



Moving Forward

- Consolidate Validation Meeting inputs and comments
- Reconcile conflicts with the Regional Advisory Panel
- Finalize ITS Architecture
- Convene 2nd Stakeholder Session (January 2005 tentative)



Planned Regional Actions

- Utilize ITS concepts and projects in Regional Long-Range Plans
- Continue the ITS regional dialogue
- Institutionalize ITS
- Develop an ITS Implementation Plan for the Region



Contacts

- **Keith Williams, PENNDOT D4-0**
Phone: 570-496-6161
Email: keiwilliam@state.pa.us
- **Joel Ticatch, PB Farradyne**
Phone: 703-742-5973
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Discussion



Appendix G: Validation Meeting Minutes

Date: September 23, 2004

Location: Lackawanna Heritage Valley Center, Mayfield, PA

Attendees: Marie Bishop, PennDOT District 4-0
Jeff Fuhr, PennDOT District 4-0
Kim Holcomb, East Stroudsburg School District
Michael Pack, PennDOT Central Office
Ted Patton, Martz Line
Joel Ticatch, Parsons Brinckerhoff
Joseph Barr, Parsons Brinckerhoff

Prepared By: Joseph Barr, Parsons Brinckerhoff

A meeting was held on September 23, 2004 from 9:00am to 11:30am at the Lackawanna Heritage Valley Center, to validate the following elements of the District 4-0 Regional ITS Architecture:

- Adjacent PennDOT Districts
- PennDOT Maintenance and Construction Vehicles
- PennDOT County Maintenance Offices
- PennDOT D4 Field Devices
- PennDOT D4 RTMC
- PennDOT Service Patrol Vehicles

For each of the elements, a validation package was developed showing the interconnect diagram and the information flow diagrams associated with that element. The packages for each of the elements were then combined into a single PowerPoint presentation, which was reviewed with the stakeholders in attendance (stakeholders had previously received copies of the packet at the first large stakeholder “bookend” meeting). A copy of the entire validation package for this meeting is attached to these minutes as an appendix.

The meeting began with a welcome by J. Ticatch, along with a review of the process to date and the steps that have been taken to get to this point. He also provided an overview of the purpose and format of the meeting, and distributed additional handouts to aid stakeholders in the validation process. He also requested that stakeholders provide input regarding potential future ITS projects in the region, without worrying about issues such as funding or detailed feasibility.

The following is a list of comments that we're provided at the meeting. General comments are noted first, followed by the specific change, additions, and deletions that were suggested for each element.

General Comments

- A question was asked and answered regarding the difference between the "incident report" flow and the "incident information" flow. As part of the response, J. Ticatch used the flow definitions within the Regional ITS Architecture document to define the difference.
- A stakeholder mentioned that the Pennsylvania Turnpike Commission has pre-assigned detour route in place (Plan X detours), and asked that this be reflected in the architecture.
- A question was asked about the status of the Pennsylvania State Police Consolidated Dispatch Centers, and whether the Architecture should show an existing flow to a planned element. J. Ticatch responded that the PSP Dispatch Centers element includes both the existing dispatch system and the future CDC system. It was decided that this should be clarified in the definition of the element.
- A similar question was raised about the PennDOT RTMC, which is a future element that has existing flows. Based on this comment, it was decided that the name of the element should be changed to PennDOT TMC, and the definition clarified to indicate that this represents both the current office and the future RTMC when it is built.
- J. Fuhr asked about information flows between the various County Maintenance Offices, which are represented as a single element. Based on this comment and subsequent discussion, it was decided that the definition of this element should be modified to indicate that there is ongoing communication between the different county offices.
- The definition of Regional Transit Agency Offices and Regional Transit Agency Vehicles needs to be modified to include private carriers that provide scheduled transportation services (i.e. Martz Lines).

PennDOT D4 County Maintenance Offices

Changes

1. All flows to/from PTC Offices – *Planned*
2. Incident Report to/from 911 Communication Centers – *Planned and One Way (To 911 Communication Centers)*
3. Incident Information Request from 911 Communication Centers – *Two Way*

4. Incident Response Status flow 911 Communication Centers – *Two Way*
5. Incident Report to/from County EMA Centers – *Planned and One Way (To County EMA Centers)*
6. Incident Information Request from County EMA Centers – *Two Way*
7. Incident Response Status from County EMA Centers – *Two Way*

Additions

None

Deletions

None

PennDOT D4 RTMC

Changes

1. Remote Surveillance Control from PTC Office – *Planned and Two Way*
2. Maintenance and Construction Work Plans from PTC Office – *Two Way*
3. Incident Information Request from PTC Office – *Two Way*
4. Incident Information from PTC Office – *Two Way*
5. Resource Request to PSP Dispatch Centers – *Two Way*
6. Remote Surveillance Control from PSP Dispatch Centers – *Planned and Two Way*
7. Resource Deployment Status to PSP Dispatch Centers – *Two Way*
8. For interconnect to/from Adjacent PennDOT Districts, flows should exactly match those flows to/from PTC Offices.
9. For all flows to/from Event Promoters – *Existing*
10. Work Plan Feedback to PennDOT D4 County Maintenance Offices - *Two Way*
11. Resource Deployment Status to PennDOT D4 County Maintenance Offices - *Two Way*
12. Maintenance and Construction Resource Request to PennDOT D4 County Maintenance Offices - *Planned*

13. Remote Surveillance Control from PennDOT D4 County Maintenance Offices - *Planned*
14. Maintenance and Construction Resource Response from PennDOT D4 County Maintenance Offices - *Planned*

Additions

1. Signal Control Status from Municipal Field Devices – *Planned*
2. Resource Request to/from Municipal Offices – *Existing and Two Way*
3. Resource Deployment Status to/from Municipal Office – *Existing and Two Way*

Deletions

None

PennDOT D4 Field Devices

Changes

1. Freeway Control Status to PennDOT D4 RTMC – *Planned*
2. Traffic Flow to PennDOT D4 RTMC - *Planned*
3. Freeway Control Data from PennDOT D4 RTMC – *Planned*
4. Traffic Sensor Control from PennDOT D4 RTMC - *Planned*

Additions

1. Environmental Conditions Data to PennDOT D4 County Maintenance Offices – *Existing*
2. Freeway Control Status to PennDOT D4 County Maintenance Offices - *Existing*
3. Roadway Information System Status to PennDOT D4 County Maintenance Offices - *Existing*
4. Environmental Sensors Control from PennDOT D4 County Maintenance Offices - *Existing*
5. Freeway Control Data to PennDOT D4 County Maintenance Offices - *Existing*
6. Roadway Information System Data to PennDOT D4 County Maintenance Offices – *Existing*

Deletions

None

PennDOT Maintenance and Construction Vehicles

Changes

1. Change name of element to “PennDOT Maintenance Vehicles”

Additions

None

Deletions

None

PennDOT Service Patrol Vehicles

Changes

None

Additions

1. Emergency Dispatch Requests from PennDOT D4 RTMC – *Planned*
2. Emergency Dispatch Response to PennDOT D4 RTMC - *Planned*

Deletions

1. Emergency Dispatch Request from PennDOT D4 County Maintenance Office

Adjacent PennDOT Districts

Changes

None

Additions

None

Deletions

1. Delete interconnect/all information flows to DRJTBC Headquarters
2. Delete interconnect/all information flows to Incident Response Agency Offices
3. Delete interconnect/all information flows to PennDOT Central Office Organizations

4. Delete interconnect/all information flows to PennDOT STMC

Potential Projects

- Resource deployment coordination between PTC, PSP, and PennDOT.
- Surveillance coordination between agencies in the case of detours (to identify resulting congestion and secondary accidents).
- High priority incident response for public transit (panic buttons on buses).
- Emergency response for incident on private bus carriers; this is currently being tested by the PennDOT Bureau of Public Transportation in cooperation with Martz Lines and others.
- Definition and refinement of incident prioritization and response schemes for different types of events (different thresholds for response).
- Develop general approach/methodology for communicating information between stakeholders.
- Allow PennDOT to directly control certain municipal traffic signals during incidents and emergencies.
- Deploy roadway flow sensors on highways, as well as additional CCTV cameras.

Date: September 23, 2004

Location: Lackawanna Heritage Valley Center, Mayfield, PA

Attendees: Kurt Kempter, County of Lackawanna Transit System
Tony Koloras, County of Lackawanna Transit System
Mike Pack, PennDOT Central Office
Steve Pitoniak, Lackawanna County Regional Planning Commission
Tony Signorelli, New York State DOT (Broome County)
Nancy Snee, Luzerne County Planning Commission
David Smith, Synergist Technology Group
Joseph Barr, Parsons Brinckerhoff

Prepared By: Joseph Barr, Parsons Brinckerhoff

A meeting was held on September 23, 2004 from 1:00pm to 3:00pm at the Lackawanna Heritage Valley Center, to validate the following elements of the District 4-0 Regional ITS Architecture:

- Adjacent PennDOT Districts
- Municipal Field Devices
- Municipal Offices
- Municipal Field Devices
- Adjacent State TMC's
- DRJTBC Headquarters
- DRJTBC Toll Plazas
- I-95 Information Exchange Network

For each of the elements, a validation package was developed showing the interconnect diagram and the information flow diagrams associated with that element. The packages for each of the elements were then combined into a single PowerPoint presentation, which was reviewed with the stakeholders in attendance (stakeholders had previously received copies of the packet at the first large stakeholder "bookend" meeting). A copy of the entire validation package for this meeting is attached to these minutes as an appendix.

The meeting began with a welcome by J. Ticatch, along with a review of the process to date and the steps that have been taken to get to this point. He also provided an overview of the purpose and format of the meeting, and distributed additional handouts to aid stakeholders in the validation process. He also requested that stakeholders

provide input regarding potential future ITS projects in the region, without worrying about issues such as funding or detailed feasibility.

The following is a list of comments that we're provided at the meeting. General comments are noted first, followed by the specific change, additions, and deletions that were suggested for each element.

General Comments

- A number of attendees noted that this is a timely meeting, in light of the recent flooding events.
- The representatives from COLTS noted that fixed route buses were used to evacuate flooded areas.
- There should be a link between Municipal Offices and School Districts, related to roadway condition information.
- There should be a planned link between Transit Agency Offices and Municipal Field Devices, for traffic signal preemption.
- There should be a link between Transit Agency Offices and Regional Media Outlets
- There is a need to enhance the contact between adjacent states and the PennDOT District 4-0 RTMC.
- There is no need to connect other district entities (such as County Maintenance Offices) to Adjacent PennDOT Districts.
- The group noted that Lackawanna County alone has over 40 municipalities, which each operate at varying levels of staffing (and even hours of service).

Municipal Offices

Changes

1. All flows to/from County EMA Centers – *Planned*
2. Traffic Control Priority Status to Regional Transit Agency Offices – *Planned*
3. All flows to/from Information Service Providers - *Planned*

Additions

1. Incident Information from Regional Transit Agency Offices – *Existing*
2. Incident Information Request to Regional Transit Agency Offices – *Existing*

3. Road Network Conditions to Local School District Offices – *Existing*

Deletions

1. Request For Road Network Conditions from Regional Transit Agency Offices

Municipal Field Devices

Changes

1. Local Signal Preemption Request from County Public Safety Vehicles - *Existing*

Additions

1. Local Signal Preemption Request from Regional Transit Agency Vehicles - *Planned*

Deletions

None

DRJTBC Headquarters

Changes

1. Traffic Control Coordination to PennDOT D4 RTMC – *Planned*
2. Media Information Request from Regional Media Outlets – *Existing*
3. Weather Information from Weather Information Providers – *Existing*

Additions

None

Deletions

1. All flows to/from Adjacent PennDOT Districts
2. All flows to/from Adjacent State Public Safety/Emergency Management Offices
3. All flows to/from Adjacent State TMC's
4. All flows to/from I-95 Information Exchange Network
5. All flows to/from Incident Response Agency Offices

DRJTBC Toll Plazas

Changes

None

Additions

None

Deletions

None

I-95 Information Exchange Network

Changes

None

Additions

None

Deletions

1. All flows to/from DRJTBC Headquarters

Adjacent State TMC's

Changes

None

Additions

1. Resource Request to/from PennDOT D4 RTMC - *Existing*
2. Resource Deployment Status to/from PennDOT D4 RTMC – *Existing*
3. Work Zone Information to/from PennDOT D4 RTMC – *Existing*
4. Road Network Conditions to/from PennDOT D4 RTMC – *Existing*
5. Weather Information to/from PennDOT D4 RTMC – *Existing*

Deletions

1. All flows to/from DRJTBC Headquarters
2. All flows to/from Incident Response Agency Offices
3. All flows to/from PennDOT STMC

Adjacent PennDOT Districts

Changes

None

Additions

None

Deletions

1. All flows to/from Incident Response Agency Offices
2. All flows to/from PennDOT STMC
3. All flows to/from PennDOT Central Office Organizations
4. All flows to/from DRJTBC Headquarters

Delaware Water Gap National Recreation Area (NEW ELEMENT)

Changes

None

Additions

1. Road Network Conditions to/from PennDOT D4 TMC – *Planned*
2. Maintenance and Construction Work Plans to/from PennDOT D4 TMC – *Planned*

Deletions

None

Potential Projects

- Traffic signal priority system for transit vehicles (currently in the engineering stage).
- Region 9 (NYSDOT) TMC – currently under design.
- Better signal coordination when detour routes are put into place.
- Incident management/incident response plans for the urbanized area of the Region.

- Traffic management coordination for school transportation (and its impact on the rest of the transportation system).

Date: October 5, 2004

Location: Lackawanna Heritage Valley Center, Mayfield, PA

Attendees: Marie Bishop, PennDOT District 4-0
John Brostoski, Pennsylvania State Police
Paul Cacucaman, Carbondale Technology Transfer Center
Thomas Dubas, Lackawanna County Department of Emergency Services
Jeff Fuhr, PennDOT District 4-0
Kim Holcomb, East Stroudsburg School District
David Lamereaux, Pennsylvania Department of Environmental Protection
John Lewis, Lackawanna County 911 Center
Michael Meeker, Delaware River Joint Toll Bridge Commission
Steve Pitoniak, Lackawanna County Regional Planning Commission
Ted Patton, Martz Line
David Smith, Synergist Technology Group
Jock Sharp, Carbondale Technology Transfer Center
Joel Ticatch, Parsons Brinckerhoff
Joseph Barr, Parsons Brinckerhoff

Prepared By: Joseph Barr, Parsons Brinckerhoff

A meeting was held on October 5, 2004 from 9:00am to 11:30am at the Lackawanna Heritage Valley Center, to validate the following elements of the District 4-0 Regional ITS Architecture:

- 911 Communication Centers
- Adjacent State Public Safety/Emergency Management Centers
- County EMA Centers
- County Public Safety Vehicles
- Municipal Public Safety Vehicles
- Private Wrecker Units
- PSP Dispatch Centers
- PSP Vehicles

For each of the elements, a validation package was developed showing the interconnect diagram and the information flow diagrams associated with that element. The packages for each of the elements were then combined into a single PowerPoint presentation, which was reviewed with the stakeholders in attendance (stakeholders had previously received copies of the packet at the first large stakeholder “bookend”

meeting). A copy of the entire validation package for this meeting is attached to these minutes as an appendix.

The meeting began with a welcome by J. Ticatch, along with a review of the process to date and the steps that have been taken to get to this point. He also provided an overview of the purpose and format of the meeting, and distributed additional handouts to aid stakeholders in the validation process. He also requested that stakeholders provide input regarding potential future ITS projects in the region, without worrying about issues such as funding or detailed feasibility.

The following is a list of comments that we're provided at the meeting. General comments are noted first, followed by the specific change, additions, and deletions that were suggested for each element.

General Comments

- Representatives from Lackawanna County indicated that the EMA Centers in that county link directly to the hospitals in the county. They were not sure whether this type of link exists in other counties in the Region. They also noted that the EMA Center and 911 Center are very tightly integrated
- There was a discussion about incident reporting and how this takes places, which is reflected in the suggested changes to the architecture diagrams.
- For public transit agency vehicles and public transit agency offices, the architecture needs to include private transit operators. This will be handled through the name and definition of the element.
- There was a discussion about the best way to connect PSP to local emergency responders.
- The link between PSP Dispatch Centers and Private Wrecker Units should be changed to Existing.
- There is a connection between PSP and the New Jersey State Police because they both patrol the DRJTBC facilities.
- For the County Public Safety Vehicles element, the definition needs to be modified to reflect the use of private EMS vehicles.
- For the 911 Communication Centers, need to add a "suggested route guidance" linkage to the vehicles that they are dispatching.
- There is potentially an upcoming issue with the implementation of 800MHz radios for state use, since there are local agencies that can currently talk via the existing radios, who won't be upgraded to the new system, so that communications link may be lost.

- The role of the Office of Homeland Security needs to be clarified, as that agency's role becomes clearer.
- The Adjacent State Public Safety centers need to connect to the County 911 Centers and County EMA Centers.

911 Communication Centers

Changes

1. Incident Information Request to/from County EMA Centers – *Existing*
2. All Flows to/from Event Promoters – *Planned*
3. All Flows to/from Information Service Providers - *Planned*

Additions

1. Suggest Route to Municipal Public Safety Vehicles - *Existing*
2. Emergency Vehicle Tracking Data from Municipal Public Safety Vehicles – *Existing*
3. Incident Command Request from Municipal Public Safety Vehicles – *Existing*
4. Incident Status from Municipal Public Safety Vehicles – *Existing*
5. Accident Report from Municipal Public Safety Vehicles – *Existing*
6. Maintenance and Construction Dispatch Information to Municipal Public Safety Vehicles – *Existing*
7. Maintenance and Construction Dispatch Status from Municipal Public Safety Vehicles – *Existing*
8. Maintenance and Construction Resource Coordination to/from Municipal Public Safety Vehicles – *Existing*
9. Maintenance and Construction Resource Request to Municipal Public Safety Vehicles – *Existing*
10. Maintenance and Construction Resource Response from Municipal Public Safety Vehicles – *Existing*
11. Incident Report from PSP Troop T Highspire – *Two Way*
12. Incident Response Coordination from PSP Troop T Highspire – *Two Way*

Deletions

1. Incident Command Request from Private Wrecker Units
2. Incident Status from Private Wrecker Units

Adjacent State Public Safety/Emergency Management

Changes

None

Additions

1. Incident Report to/from County EMA Centers – *Existing*
2. Incident Response Coordination to/from County EMA Centers – *Existing*
3. Incident Report to/from 911 Communication Centers – *Existing*
4. Incident Response Coordination to/from 911 Communication Centers - *Existing*

Deletions

1. All Flows to/from DRJTBC Headquarters
2. All Flows to/from Incident Response Agency Offices

County EMA Centers

Changes

1. All Flows to/from Event Promoters - *Planned*

Additions

1. Add new Element named “Regional Hospitals”
2. Incident Information to Regional Hospitals – *Existing*
3. Incident Information Request from Regional Hospitals - *Existing*

Deletions

None

County Public Safety Vehicles

Changes

None

Additions

1. Suggested Route from 911 Communication Centers – *Existing*

Deletions

None

Municipal Public Safety Vehicles

Changes

None

Additions

1. Incident Command Status to 911 Communication Centers – *Existing*
2. Incident Command Request to 911 Communication Centers – *Existing*
3. Emergency Vehicle Tracking Data to 911 Communication Centers – *Existing*
4. Suggested Route from 911 Communication Centers – *Existing*
5. Incident Command Information from 911 Communication Centers – *Existing*

Deletions

None

Private Wrecker Units

Changes

1. All flows from PTC Offices – *Existing*
2. All flows to/from PSP Dispatch Centers - *Existing*

Additions

None

Deletions

1. Incident Command Request to 911 Communication Centers
2. Incident Status to 911 Communication Centers

PSP Dispatch Centers

Changes

1. All flows to/from Private Wrecker Units - *Existing*

Additions

1. Emergency Dispatch Request to/from Municipal Offices – *Existing*
2. Emergency Dispatch Response to/from Municipal Offices – *Existing*
3. Resource Request to/from Municipal Offices – *Existing*
4. Resource Deployment Status to/from Municipal Offices – *Existing*
5. Incident Response Coordination to/from Municipal Public Safety Vehicles – *Existing*
6. Incident Command Request to/from Municipal Public Safety Vehicles – *Existing*
7. Incident Command Information to/from Municipal Public Safety Vehicles - *Existing*

Deletions

None

PSP Vehicles

Changes

None

Additions

1. Add same flows to 911 Communication Centers as currently exist to PSP Dispatch Centers - *Existing*

Deletions

None

Private EMS Vehicles (NEW ELEMENT)

Changes

None

Additions

1. Incident Command Status to 911 Communication Centers – *Existing*

2. Incident Command Request to 911 Communication Centers – *Existing*
3. Emergency Vehicle Tracking Data to 911 Communication Centers – *Existing*
4. Suggested Route from 911 Communication Centers – *Existing*
5. Incident Command Information from 911 Communication Centers – *Existing*
6. Emergency Dispatch Requests from 911 Communication Centers – *Existing*
7. Incident Command Information to/from 911 Communication Centers – *Existing*
8. Emergency Dispatch Response to 911 Communication Centers – *Existing*

Deletions

None

Regional Hospitals (NEW ELEMENT)

Changes

None

Additions

1. Incident Information from County EMA Centers – *Existing*
2. Incident Information Request to County EMA Centers – *Existing*

Deletions

None

Potential Projects

- Improvements in communication between emergency management and emergency communications agencies.
- A project is currently underway to develop a communications link between ISPs and 911 Communication Centers
- Better distribution of information about who controls each highway-rail intersection.
- Project to better connect PSP to the local emergency dispatch.
- Reconnect the local and state public safety agencies that lose communication as a result of the transition to the new 800MHz radio system.

- Create link between private bus carriers, PSP, and 911 Communication Centers, for notification from panic buttons located on buses (test currently underway).

Date: October 5, 2004

Location: Lackawanna Heritage Valley Center, Mayfield, PA

Attendees: Marie Bishop, PennDOT District 4-0
Jim Burke, County of Lackawanna Transit System
Mike Cera, Alfred Benesch & Company
Jeff Fuhr, PennDOT District 4-0
Kurt Kempter, County of Lackawanna Transit System
William White, Lakeland School District
Joel Ticatch, Parsons Brinckerhoff
Joseph Barr, Parsons Brinckerhoff

Prepared By: Joseph Barr, Parsons Brinckerhoff

A meeting was held on October 5, 2004 from 1:00pm to 3:00pm at the Lackawanna Heritage Valley Center, to validate the following elements of the District 4-0 Regional ITS Architecture:

- Local School District Office
- Railroad Offices
- Regional Transit Agency Offices
- Regional Transit Vehicles

For each of the elements, a validation package was developed showing the interconnect diagram and the information flow diagrams associated with that element. The packages for each of the elements were then combined into a single PowerPoint presentation, which was reviewed with the stakeholders in attendance (stakeholders had previously received copies of the packet at the first large stakeholder “bookend” meeting). A copy of the entire validation package for this meeting is attached to these minutes as an appendix.

The meeting began with a welcome by J. Ticatch, along with a review of the process to date and the steps that have been taken to get to this point. He also provided an overview of the purpose and format of the meeting, and distributed additional handouts to aid stakeholders in the validation process. He also requested that stakeholders provide input regarding potential future ITS projects in the region, without worrying about issues such as funding or detailed feasibility.

The following is a list of comments that we’re provided at the meeting. General comments are noted first, followed by the specific change, additions, and deletions that were suggested for each element.

General Comments

- The relationship between transit agencies and 911 communication centers is generally informal; this relationship needs to be made more formal in the future.
- Relationship between municipalities and transit agencies is also informal and basic.
- Need to add a connection between the Regional Transit Agency Offices and the PennDOT District 4-0 County Maintenance Offices.
- Need to show planned connection between Regional Transit Agency Offices and ISPs.
- For school district transportation, the transportation coordinators check roads individually to see if school needs to be delayed/cancelled.
- The PennDOT representatives noted that they include language in the Maintenance and Protection of Traffic documents for contractors that require that they notify school districts about construction activities.
- Currently, there is very little communication between the school district dispatch and the school buses; many do not have radios installed.
- The COLTS representatives noted that there are ongoing discussions about integrating COLTS into the Lackawanna County Paratransit System, which could benefit more from AVL.

Local School District Offices

Changes

1. All flows to/from PennDOT D4 RTMC - *Existing*

Additions

1. Add new element named "School Transportation Vehicles"
2. Transit Vehicle Location Data from School Transportation Vehicles - *Planned*
3. Roadway Maintenance Status to/from PennDOT D4 County Maintenance Offices – *Planned*
4. Road Weather Information to/from PennDOT D4 County Maintenance Offices – *Planned*
5. Transit Incident Information to 911 Communication Centers – *Planned*
6. Incident Information from 911 Communication Centers – *Planned*
7. Incident Information Request to/from 911 Communication Centers – *Planned*

8. Transit Incident Information to Municipal Offices – *Planned*
9. Incident Information from Municipal Offices – *Planned*
10. Incident Information Request to/from Municipal Offices - *Planned*

Deletions

None

Railroad Offices

Changes

None

Additions

None

Deletions

None

Regional Transit Agency Offices

Changes

1. All flows to/from 911 Communication Centers – *Planned*
2. Incident Information from 911 Communication Centers – *Two Way*
3. All flows to/from County EMA Centers – *Planned*
4. All flows to/from Personal Traveler Information Devices – *Planned*
5. All flows to/from Municipal Offices – *Planned*
6. All flows to/from Information Service Providers – *Planned*
7. All flows to/from PennDOT D4 RTMC (except Incident Information) - *Planned*

Additions

1. Maintenance and Construction Work Plans from PennDOT County Maintenance Offices – *Planned*
2. Roadway Maintenance Status from PennDOT County Maintenance Offices – *Planned*

3. Road Network Conditions from Municipal Offices – *Planned*
4. Road Network Conditions Request to Municipal Offices – *Planned*
5. Maintenance and Construction Work Plans from Municipal Offices – *Planned*

Deletions

None

Regional Transit Vehicles

Changes

None

Additions

None

Deletions

None

Potential Projects

- Better coordination between transit agencies and 911 centers for incident management.
- Real time transit information will be available at the Downtown Scranton Intermodal Transit Center when it is built.
- Real time transit information available online.
- Better communication between transit agencies and municipalities about roadway conditions and disruptions.
- Improved communication between the PennDOT District 4-0 RTMC and Regional Transit Agency Offices
- Monitoring cameras on PennDOT trucks.
- Better communication between PennDOT, municipalities, and local school districts.
- Voice communication between school buses and school district offices.
- AVL for school buses.

Date: October 6, 2004

Location: Lackawanna Heritage Valley Center, Mayfield, PA

Attendees: Marie Bishop, PennDOT District 4-0
Denise Cook Bauer, National Park Service
Joel Ticatch, Parsons Brinckerhoff
Joseph Barr, Parsons Brinckerhoff

Prepared By: Joseph Barr, Parsons Brinckerhoff

A meeting was held on October 6, 2004 from 9:00am to 11:00am at the Lackawanna Heritage Valley Center, to validate the following elements of the District 4-0 Regional ITS Architecture:

- Event Promoters
- Information Service Providers
- Personal Traveler Information Devices
- Regional Media Outlets
- Weather Information Providers

For each of the elements, a validation package was developed showing the interconnect diagram and the information flow diagrams associated with that element. The packages for each of the elements were then combined into a single PowerPoint presentation, which was reviewed with the stakeholders in attendance (stakeholders had previously received copies of the packet at the first large stakeholder “bookend” meeting). A copy of the entire validation package for this meeting is attached to these minutes as an appendix.

The meeting began with a welcome by J. Ticatch, along with a review of the process to date and the steps that have been taken to get to this point. He also provided an overview of the purpose and format of the meeting, and distributed additional handouts to aid stakeholders in the validation process. He also requested that stakeholders provide input regarding potential future ITS projects in the region, without worrying about issues such as funding or detailed feasibility.

The following is a list of comments that we’re provided at the meeting. General comments are noted first, followed by the specific change, additions, and deletions that were suggested for each element.

General Comments

- The Dingman's Ferry Bridge is growing in important as a Delaware River Crossing, as traffic has grown and congestion has increased on other crossings.
- Because they manage portions of PA 209, the National Park Service needs to also be considered as road management agency within the Region.
- The Mount Laurel Performing Arts Center, which is another tourist attraction, is located in close proximity to the Delaware Water Gap National Recreation Area. This attraction can create traffic events within the park.
- There was a suggestion of connecting the Information Service Providers directly to the RWIS units, rather than having them go through the web site (or other means).
- Most of the contact between NPS and roadway maintenance agencies is with municipalities, not PennDOT. For the architecture, planned (and some existing) connections are needed between NPS and PennDOT.
- The call boxes located along I-81 have been removed due to lack of use and maintenance problems, so any reference to these should be removed from the architecture.

Event Promoters

Changes

1. All flows to/from PTC Offices – *Planned*
2. All flows to/from 911 Communication Centers – *Planned*
3. All flows to/from County EMA Centers – *Planned*
4. All flows to/from Municipal Offices – *Planned*
5. All flows to/from Information Service Providers – *Planned*
6. All flows to/from PennDOT D4 County Maintenance Offices – *Planned*

Additions

None

Deletions

None

Information Service Providers

Changes

1. All flows to/from PTC Offices – *Planned*
2. All flows to/from 911 Communication Centers – *Planned*
3. All flows to/from County EMA Centers – *Planned*
4. All flows to/from Regional Transit Agency Offices – *Planned*
5. All flows to/from Incident Response Agency Offices – *Planned*
6. All flows to/from Personal Traveler Information Devices – *Planned*
7. All flows to/from Municipal Offices – *Planned*
8. All flows to/from Event Promoters – *Planned*
9. All flows to/from PennDOT D4 RTMC – *Planned*
10. All flows to/from Weather Information Providers – *Planned*

Additions

1. Weather Information from PennDOT Central Office Field Devices - *Existing*

Deletions

None

Personal Traveler Information Devices

Changes

1. All flows to/from PTC Offices – *Planned*
2. All flows to/from Regional Transit Agency Offices – *Planned*
3. All flows to/from Information Service Providers – *Planned*
4. All flows to/from PennDOT Central Office Organizations – *Planned*

Additions

None

Deletions

None

Regional Media Outlets

Changes

1. All flows to/from PTC Offices – *Planned*
2. All flows to/from 911 Communication Centers – *Planned*
3. All flows to/from County EMA Centers – *Planned*
4. All flows to/from Regional Transit Agency Offices – *Planned*
5. All flows to/from Incident Response Agency Offices – *Planned*
6. All flows to/from Municipal Offices – *Planned*

Additions

None

Deletions

None

Weather Information Providers

Changes

1. All flows to/from 911 Communication Centers – *Planned*
2. All flows to/from County EMA Centers – *Planned*
3. All flows to/from Regional Transit Agency Offices – *Planned*
4. All flows to/from Municipal Offices – *Planned*
5. All flows to/from Information Service Providers – *Planned*
6. All flows to/from PennDOT D4 County Maintenance Offices – *Planned*
7. Environmental Conditions Data to/from PennDOT D4 RTMC – *Planned*

Additions

None

Deletions

1. Archive Requests from PTC Offices

2. Archive Status from PTC Offices
3. Road Weather Information from PTC Offices
4. Environmental Conditions Data to PTC Offices

Potential Projects

- Creation of a central clearinghouse/database/repository for traffic and traveler information that can be accessed by ISPs, media outlets, and others.
- Automating the process of reporting events to PennDOT (i.e. web form as opposed to paper form).
- Better coordination between the NPS and PennDOT on roadway work.

Date: October 6, 2004

Location: Lackawanna Heritage Valley Center, Mayfield, PA

Attendees: Brian Baker, Northern Tier Regional Planning and Development Commission
Marie Bishop, PennDOT District 4-0
Paul Browne, Carbondale Technology Transfer Center
Steve Pitoniak, Lackawanna County Regional Planning Commission
Joel Ticatch, Parsons Brinckerhoff
Joseph Barr, Parsons Brinckerhoff

Prepared By: Joseph Barr, Parsons Brinckerhoff

A meeting was held on October 6, 2004 from 1:00pm to 3:00pm at the Lackawanna Heritage Valley Center, to validate the following elements of the District 4-0 Regional ITS Architecture:

- County Planning Organization Offices

For each of the elements, a validation package was developed showing the interconnect diagram and the information flow diagrams associated with that element. The packages for each of the elements were then combined into a single PowerPoint presentation, which was reviewed with the stakeholders in attendance (stakeholders had previously received copies of the packet at the first large stakeholder “bookend” meeting). A copy of the entire validation package for this meeting is attached to these minutes as an appendix.

The meeting began with a welcome by J. Ticatch, along with a review of the process to date and the steps that have been taken to get to this point. He also provided an overview of the purpose and format of the meeting, and distributed additional handouts to aid stakeholders in the validation process. He also requested that stakeholders provide input regarding potential future ITS projects in the region, without worrying about issues such as funding or detailed feasibility.

The following is a list of comments that we’re provided at the meeting. General comments are noted first, followed by the specific change, additions, and deletions that were suggested for each element.

General Comments

- Change the name of the element from “County Planning Organizations Offices” to “Planning Organization Offices.”
- Flows currently take place between planning agencies and PennDOT, but they are with the planning and programming or municipal liaison offices, not to

TMC/RTMC. Element description should be modified to indicate that the TMC element includes a variety of functions.

The meeting also included a discussion of the institutional issues involved in maintaining the Regional ITS Architecture and moving forward with ITS implementation, particularly given that the Region is divided among three different Planning Partners.

- S. Pitoniak and B. Baker noted that “bleeds” of the urbanized areas into rural counties has already created a need for Memorandums of Understanding between MPO’s and RPO’s, to deal with planning for these areas.
- There is already precedent for creating agreements between Planning Partners to facilitate planning and project development, so that would be the logical way to create an official structure for maintaining the ITS Architecture after this initial development process is complete.
- The Planning Partner representatives also discussed what type of action should be taken by MPO’s and RPO’s in response to the architecture (i.e. should they officially adopt the architecture at a board meeting). Also need to consider how to disseminate the architecture beyond the RAP, so that other planning and project development groups are aware that it is available.

County Planning Organization Offices

Changes

1. Change name of element to “Planning Organization Offices”
2. Archive Coordination to Regional Transit Agency Offices – *Existing*
3. Archive Requests to Municipal Offices – *Reverse Flow*
4. Archive Status to Municipal Offices – *Reverse Flow*
5. Emergency Archive Data from Municipal Offices – *Reverse Flow*
6. Traffic Archive Data from Municipal Offices – *Reverse Flow*
7. Traffic Archive Data from PennDOT Central Office Organizations – *Two Way*
8. Traveler Archive Data from PennDOT D4 RTMC – *Two Way*

Additions

1. Traffic Archive Data to/from County EMA Centers – *Existing and Two Way*
2. Maintenance and Construction Archive Data to/from PennDOT D4 RTMC – *Existing and Two Way*

Deletions

None

Potential Projects

No specific suggestions for projects were received during this session.

Appendix H: Bookend II Meeting Minutes

Date: Tuesday, January 18, 2005

Meeting of: PennDOT Northeastern Region – Second Regional Meeting

Location: Scranton, PA

Presentation

- Keith Williams, PennDOT District 4-0, welcomed everyone to the meeting. Mr. Williams explained that this meeting is the final regional stakeholder meeting of the ITS Architecture effort. The first regional meeting was held in August 2004; it was followed by a series of smaller working meetings in September and October 2004. Material from the first regional meeting is available upon request, or via the web at www.paits.org. Mr. Williams added the purposes 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 stressing that the ITS Architecture is a living document. He reviewed the agenda for the meeting including, Joel Ticatch from PB would give an overview of the ITS Architecture; Noah Goodall, also from PB, would describe the website and how users would access information and provide input for updating the architecture; Dennis Lebo from PennDOT would talk about next steps; Mr. Pitoniak LCRPC, would then explain the role of the planning region; and Mr. Williams would facilitate discussion at the end in place of Mike Pack.
- Joel Ticatch, 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 listed the needs for a Northeastern PA Regional ITS Architecture. Mr. Ticatch explained that a regional ITS Architecture would provide structure for ITS planning and deployment. Additionally, the architecture establishes an institutional mechanism that promotes development and deployment of ITS and 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 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”. This means that federal rules from FTA and FHWA have been met and federal funds can continue to be used for ITS projects in the Northeastern Region because the regional ITS Architecture has been successfully completed. Mr. Ticatch then explained the process for creating the ITS Architecture starting with the Regional boundaries through presenting a map with nine PennDOT regions and identifying the boundaries of the Northeastern Region. The process for developing the regional ITS Architecture involved the

following steps: identifying District champions; formulating a regional advisory panel (RAP); developing a “strawman” architecture based on RAP inputs; validating the “strawman” architecture through validation meetings; and finalization of the ITS Architecture based on validation meeting inputs. The ITS Architecture will be finalized 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, and architecture updates. Finally it can provide a forum for regional agencies to collaborate on ITS capital, operations, and maintenance.

- Mr. Ticatch highlighted the chapters in the Northeastern PA Regional ITS Architecture Document noting the newest sections – Using the Architecture Document; ITS Standards; Utility of the Architecture; Maintenance of the Architecture; and Moving Forward – Institutionalizing ITS. 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. 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 ITS Architecture will be maintained through the website. To move forward and institutionalize 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 may be provided to introduce practitioners to systems engineering, ITS procurement, and managing traffic incidents for roadway emergencies. A helpful website for the training is www.nhi.fhwa.dot.gov. Educational scanning tours may also be provided to county commissioners, executive boards, managers, operations staff, and public safety officials.
- Chapter 2 of the ITS Architecture document summarizes the scope and magnitude of the architecture. Stakeholders and projects are identified in this chapter. Chapter 3 titled “Regional Systems, Inventory, Needs and Services” 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. Mr. Arch explained the ITS architecture using an example of an interconnect diagram and architecture

flows in the following slide. Furthermore, ITS Standards are industry consensus standards that define the operations of the system components within a consistent framework. Interoperability is promoted, and participating standards development organizations include AASHTO, ANSI, ASTM, IEEE, ITE, NEMA, and SAE.

- Noah Goodall of PB provided a demonstration for using the website to update the ITS Architecture. The website will become the historical library and also will provide forms for filling out new information on stakeholder and project updates. Noah used a sample scenario to demonstrate the use of the website through a deployment project to explain how the Architecture website can be used to identify the stakeholders who might be interested in the project, identify the information flows among the interested stakeholders, and identify the ITS standards applicable to the information flows. He also explained the process of updating the architecture website using the “Architecture Update Form”.
- Mr. Ticatch continued his presentation to help the participants understand where the effort goes from this point, how best to get ITS in front of decision-makers, integrated into TIP’s and STIP’s, and compete for funding.
- Dennis Lebo from the PennDOT Central Office, Center for Program Development and Management talked about next steps. He began with a picture identifying the various planning bodies within Pennsylvania. Then, he explained the role of ITS Architecture in the context of planning. For regional next steps, he suggested that each MPO/RPO in the region needs to formally adopt the ITS Architecture. The region needs to prioritize projects documented in the architecture, and incorporate projects into regional long range plans and the transportation improvement program. For PennDOT, the next step is to develop a Statewide Mobility Plan (SMP). The SMP will focus mainly on mobility. Developing a Transportation System Operations Plan (TSOP) is one of the components of the SMP. Prioritized statewide PennDOT projects are focused in incident management, telecommunications, ITS and operations. The draft of the TSOP may be available as early as May 2005. A regional outreach on this plan is proposed to identify the statewide priorities.
- Steve Pitoniak, Lackawanna County Regional Planning Commission, continued the discussion 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 the RAP meetings and evolve to address ITS/operations at the regional level; a RAP meeting was scheduled immediately following the morning session. The MPO’s/RPO’s must also adopt the Regional ITS Architecture and then a Regional ITS Committee will be established with representatives from the Region’s MPO’s and RPO’s, PennDOT District 4-0, and other stakeholders. Mr. Pitoniak also noted the importance of continuing dialogue regarding ITS and Operations. Upon adoption of the Regional Architecture, a regional meeting will soon be scheduled.

- Joel Ticatch, facilitated the open discussion thanking the participants for helping the team to successfully complete the Regional ITS Architecture as well as congratulating them on their important accomplishment. Mr. Ticatch emphasized the themes that the ITS Architecture document is a living document, and it needs everyone's support in the region. One participant noted the importance of each participant acting as liaison to their respective agencies and peers as well as continuing the dialogues started through this effort. Lastly, the RAP meeting scheduled to immediately follow the morning session was announced. Meeting adjourned.

List of Attendees




Last Name	First Name	Agency	Email	Phone
Baker	Brian	Northern Tier Regional Planning and Development Commission		
Bauman	Kurt	Northeastern Pennsylvania Alliance (NEPA)	kbauman@nepa-alliance.org	(570) 655-5581
Biery	Rick	Northern Tier Regional Planning and Development Commission	biery@northerntier.org	(570) 265-9103
Bishop	Marie	PennDOT Engineer	mabishop@state.pa.us	
Brotoski	Sgt.	Pennsylvania State Police (PSP)	jbrotoski@state.pa.us	(570) 963-4304
Browne	Paul	Carbondale Technology Transfer Center	pauFl@cttc.org	(570) 282-1255
Cacciamani	Paul	Synergist Technology Group	pcacciamani@synergist-tech.com	(570) 383-5375
Flanagan	Robert	Northeast Pennsylvania Emergency Response Group	flanaganr@lackawannacounty.org	(570) 961-5511
Graber	Karen	Endless Mountains Transportation Authority	karen@emtatransit.com	(570) 265-4057
Henry	Al	National Park Service		

Last Name	First Name	Agency	Email	Phone
Kempter	Kurt	County of Lackawanna Transit System	kkempter1@compuserve.com	(570) 346-2061
Lamereaux	David	Pennsylvania Department of Transportation (PennDOT)		
Lebo	Dennis	PennDOT Central Office		
Lewis	John	Lackawanna County Emergency Services		
Litvin	Elwood	PennDOT Susquehanna County	elitvin@state.pa.us	(570) 278-1171
McGowan	Leo	Carbondale Technology Transfer Center		
Moyer	Dana	Schuylkill Transportation System	dlmoyer@redcogrp.com	(570) 429-2701
Mrozinski	Mike	Pike County Community Planning and Human Development	mmrozinski@pikepa.org	(570) 296-3437
Pitoniak	Steve	Lackawanna County Regional Planning Commission	pitoniaks@lackawannacounty.org	(570) 963-6826
Snee	Nancy	Luzerne County Planning Commission	nancy.snee@luzernecounty.org	(570) 825-1560
Sninsky	John	Schuylkill Transportation System	jsninsky@redcogrp.com	(570) 429-2805

Last Name	First Name	Agency	Email	Phone
Weilage	Paul	Wyoming County Office of Community Planning	paul.weilage@wycopa.com	(570) 996-2268
Williams	David	Pennsylvania Emergency Management Agency (PEMA)		
Williams	Keith	PennDOT Engineering District 4-0	keiwilliam@state.pa.us	(570) 496-6161
Wufus	Alan	Hazleton Public Works	alanw@hazletoncity.org	(570) 459-4918
Yurko	Stephen	Carbondale Technology Transfer Center		

Pennsylvania ITS Architecture: Update and Next Steps

Northeastern Region
Second Stakeholders' Meeting
January 18, 2005



Welcome

Keith Williams
PennDOT District 4-0






Welcome

- PennDOT
- PSP
- Transit
- Counties
- Cities
- Townships
- Emergency Management Agencies
- Planning Offices
- Partnership Organizations
- Enforcement Community
- Media
- Tourism and Event Destinations
- Economic Development Agencies
- School Districts
- Policymakers




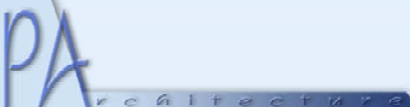

Meeting Series

- This is the final regional stakeholder meeting of the ITS Architecture effort
 - The first Regional Stakeholders' Meeting convened in August 2004
 - A series of smaller, working-group Validation Meetings were conducted in September and October 2004
- Presentation materials from the first Regional Meeting is available on the web at: <http://www.paits.org/>




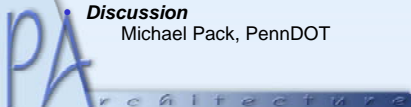

Meeting Purpose

- Conclude the ITS Architecture effort
- Satisfy the Federal mandate for Architecture Conformity
- Identify next steps
- Discuss ongoing regional ITS planning and operations






Topics

- **Welcome**
Keith Williams, PennDOT District 4-0
- **ITS Architecture Overview**
Joel Ticatch, PB
- **ITS Architecture Web Site**
Noah Goodall, PB
- **Next Steps**
Dennis Lebo, PennDOT
- **Role of the Regional Planning Bodies**
Steve Pitoniak, LCRPC
- **Discussion**
Michael Pack, PennDOT



ITS Architecture Overview

Joel Ticatch
Parsons Brinckerhoff

Mandate Conformity

Conformity Statement

The Northeastern Region of the Commonwealth of Pennsylvania is in compliance with the requirements of the "Intelligent Transportation System Architecture and Standards" final rule, as promulgated by the U.S. Department of Transportation.

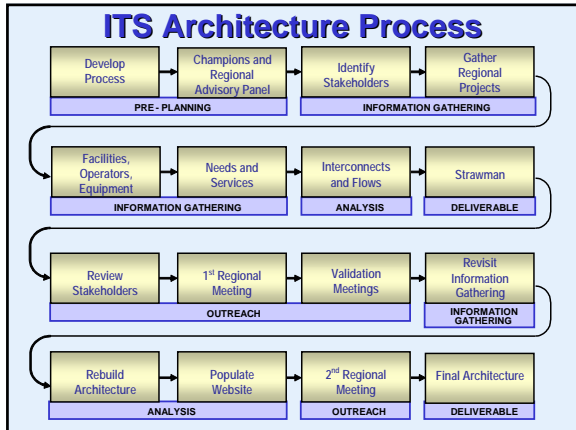
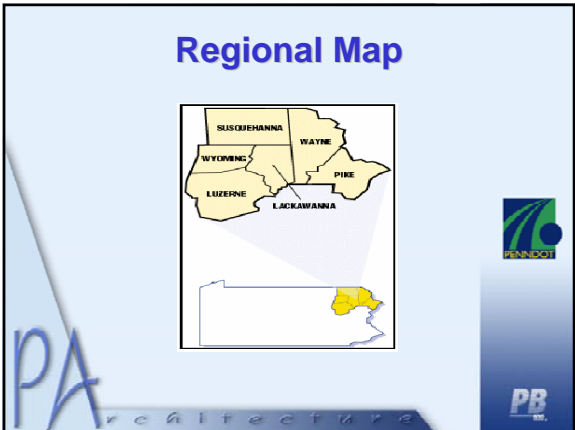
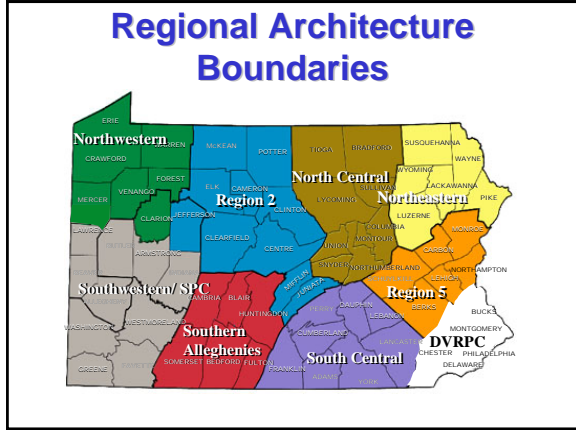




Significance of Meeting the Conformity Requirements

- FHWA's Federal rule (23 CFR 940.5) and FTA's policy objectives have been addressed
- Federal funds can continue to be used for ITS projects in this Region
- ITS projects in the Region will be capable of adhering to the Regional Architecture
- The Region has succeeded in its ITS Architecture endeavors



Final Architecture Document

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3.405. Testability</	

ITS Architecture Maintenance

What will be maintained?

- Description of the Region
- Stakeholders
- Elements
- Systems Inventory
- Needs and Services
- Interconnect Diagrams
- Architecture Flows
- Applicable ITS Standards



Mainstreaming ITS

Strategies for Regional Stakeholders:

- Expose decision-makers to transportation technology issues
- Include ITS projects and concepts in long-range plans
- Modify TIP project selection criteria to better evaluate technology and ITS
- Routinely update elected officials on ITS activities
- Create regional committees and task forces for coordinating ITS/operations



Mainstreaming ITS

Offer Pertinent Regional Training Courses:

- Introduction to Systems Engineering
- Managing Traffic Incidents for Roadway Emergencies
- ITS Procurement
- Others

➤ National Highway Institute

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



Mainstreaming ITS

Educational Scanning Tours:

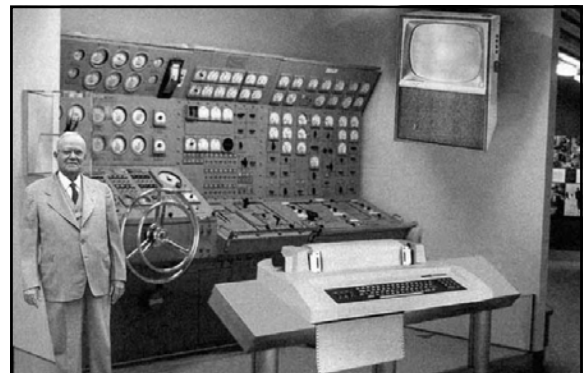
- County Commissioners
- Executive Boards
- Managers
- Operations Staff
- Public Safety Officials
- Others



Mainstreaming ITS

Try Out New Strategies:



- Think creatively "outside the box"
- Bring new approaches to transportation planning
- Utilize technology and operational enhancements, when appropriate
- Search out new ways to optimize roadway capacity
- Look for and implement rapid-term solutions
- Resolve to inform and better serve your customers
- Dare to imagine the possibilities!



Scientists from the RAND Corporation have created this model to illustrate how a "home computer" could look like in the year 2000. However, the needed technology will not be economically feasible for the average home. Also, the scientists readily admit that the computer will require not yet invented technology to actually work, but 30 years from now scientific progress is expected to solve these problems. With teletype interface and the Fortran language, the computer will be easy to use.

ITS Architecture Web Site



Noah Goodall
Parsons Brinckerhoff

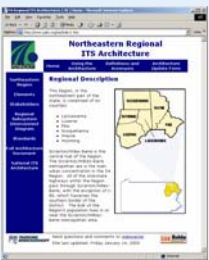


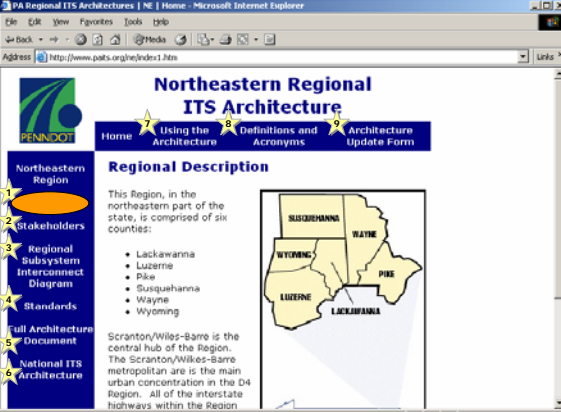
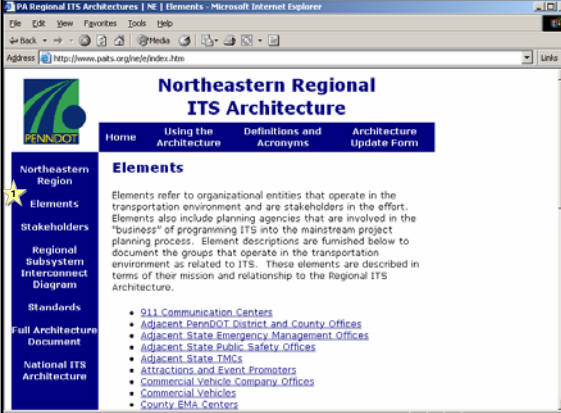
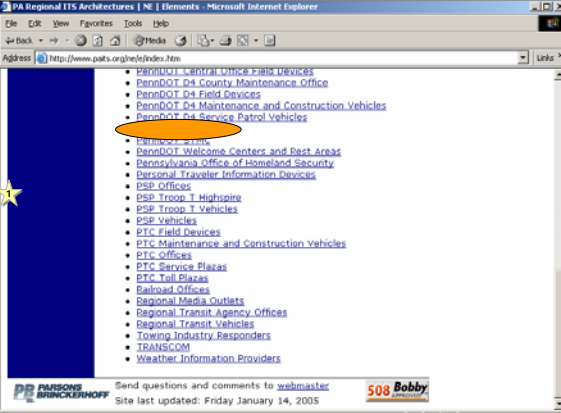
How to Use the Architecture

- Web-based option
- Easy-to-use
- Will serve as the historical library
- Submittal form for new information
 - Stakeholder updates
 - Project updates

<http://www.paits.org/>

PA ITS Architecture Web Site Example Slides...

Northeastern Regional ITS Architecture

Home Using the Architecture Definitions and Acronyms Architecture Update Form

Northeastern Region

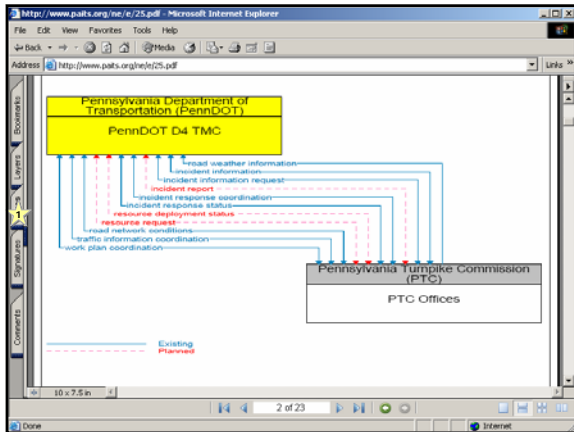
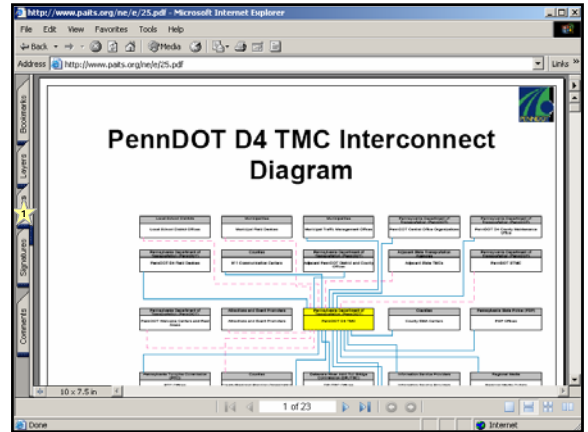
PennDOT D4 TMC

Pennsylvania Department of Transportation Engineering District 4 existing Traffic Management Center responsible for Lackawanna, Luzerne, Pike, Susquehanna, Wayne, and Wyoming 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 4. The District 4 TMC may act as a Regional Transportation Management Center (RTMC) in the future.

Full Architecture Document

Flow definitions - General definitions of the architecture flows used in the document.

*Viewing the architecture flows requires Adobe Reader, a free software for downloading PDF documents. [Click here](#) to download Adobe Reader.



Northeastern Regional ITS Architecture

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Stakeholders

Stakeholders are mainly identified as agencies and then individuals responsible in those agencies for policy and operations.

- Adjacent State Emergency Management Agencies
- Adjacent State Public Safety Agencies
- Adjacent State Transportation Agencies
- Attractions and Event Promoters
- Commercial Vehicle Companies
- Counties
- Delaware River Joint Toll Bridge Commission (DRJTBC)
- General Public
- High Threat Facilities
- Information Service Providers
- Local School Districts
- Municipalities
- Pennsylvania Emergency Management Agency (PEMA)
- Pennsylvania Office of Homeland Security
- Pennsylvania State Police (PSP)

Northeastern Regional ITS Architecture

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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 Central Office consists of several divisions including the Bureau of Maintenance and Operations (BOMO), Bureau of Planning and Research (BPR), Bureau of Highway Safety and Traffic Engineering (BHSTE), and the Motor Carrier Division. PennDOT Central Office oversees statewide operations and is responsible for coordination of transportation services between the 11 Districts.

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

Standards

PennDOT Central Office consists of several divisions including the Bureau of Maintenance and Operations (BOMO), Bureau of Planning and Research (BPR), Bureau of Highway Safety and Traffic Engineering (BHSTE), and the Motor Carrier Division. PennDOT Central Office oversees statewide operations and is responsible for coordination of transportation services between the 11 Districts.

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

Elements

- Adjacent PennDOT Districts
- PennDOT Central Office
- PennDOT Central Office Field Devices
- PennDOT D4 County Maintenance Office
- PennDOT D4 Field Devices
- PennDOT D4 Maintenance and Construction Vehicles
- PennDOT D4 Patrol Vehicles
- PennDOT Welcome Centers
- PennDOT Welcome Centers and Rest Areas

Northeastern Regional ITS Architecture

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Northeastern Region

PennDOT D4 TMC

Standards

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Regional Subsystem Interconnect Diagram

Standards

Northeastern Regional ITS Architecture

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Traffic Management

Standards

Northeastern Regional ITS Architecture

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Subsystem Interconnect Diagram

Standards

Northeastern Regional ITS Architecture

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PennDOT D4 TMC

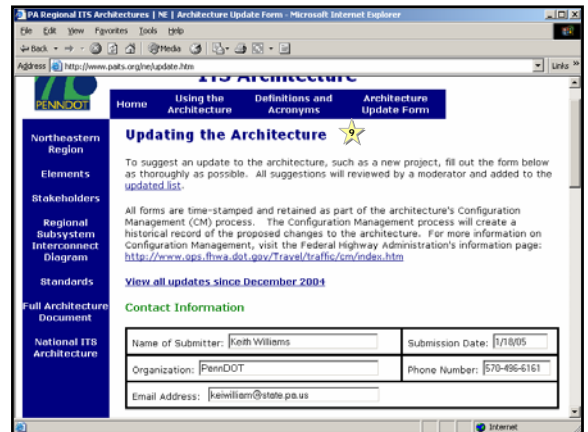
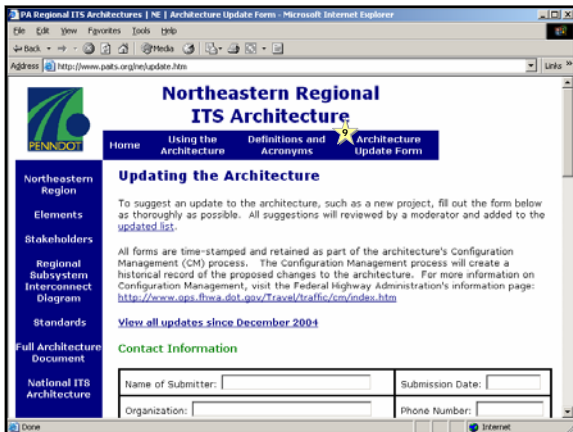
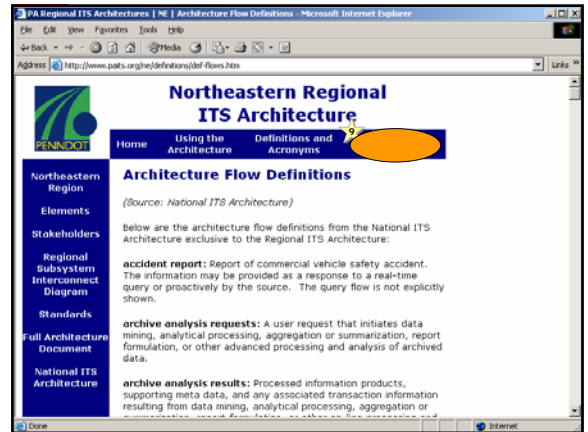
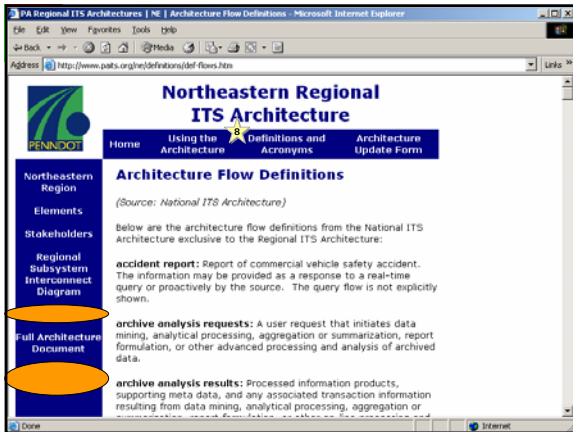
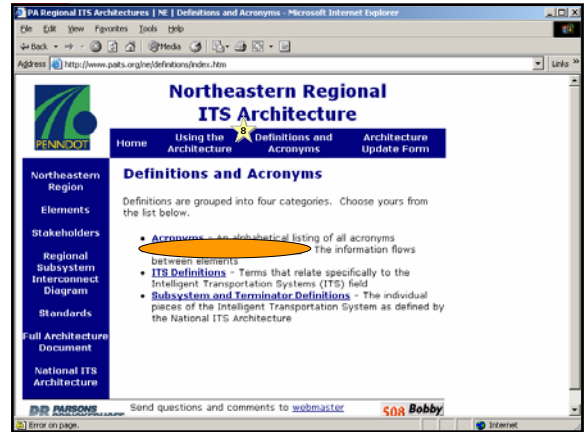
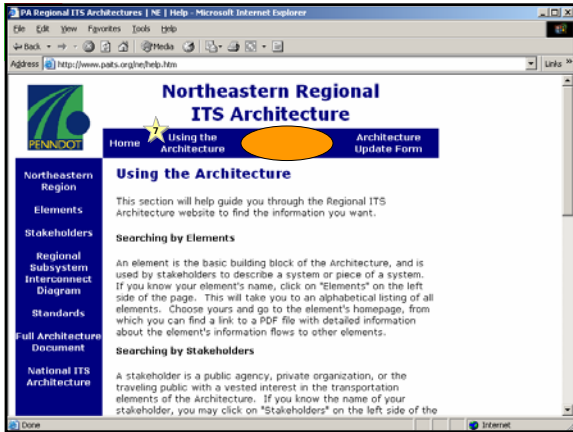
Standards

Northeastern Regional ITS Architecture

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Full Architecture Document

Standards



PA Regional ITS Architectures | NE | Architecture Update Form - Microsoft Internet Explorer

Address: http://www.paits.org/updates.htm

New ITS Project

Project Name: Project Stakeholder:

Stakeholders Involved:

Funding: Local Funding State Funding Federal Funding

Details:

Location: Deployment Date:

Project Description:

[New Stakeholder](#)

PA Regional ITS Architectures | NE | Architecture Update Form - Microsoft Internet Explorer

Address: http://www.paits.org/updates.htm

New Stakeholder

Stakeholder Name:

Status: Existing Planned

Stakeholder Description:

New Element

Element Name: Stakeholder:

Status: Existing Planned

Element Description:

[Other Changes](#)

PA Regional ITS Architectures | NE | Architecture Update Form - Microsoft Internet Explorer

Address: http://www.paits.org/updates.htm

New Element

Element Name: Stakeholder:

Status: Existing Planned

Element Description:

Other Changes

Other Changes:

Send questions and comments to [webmaster](mailto:webmaster@paits.org).
Site last updated: Friday January 14, 2005

508 Bobby

PA Regional ITS Architectures | NE | Current Update List - Microsoft Internet Explorer

Address: http://www.paits.org/updates.htm

Northeastern Regional ITS Architecture

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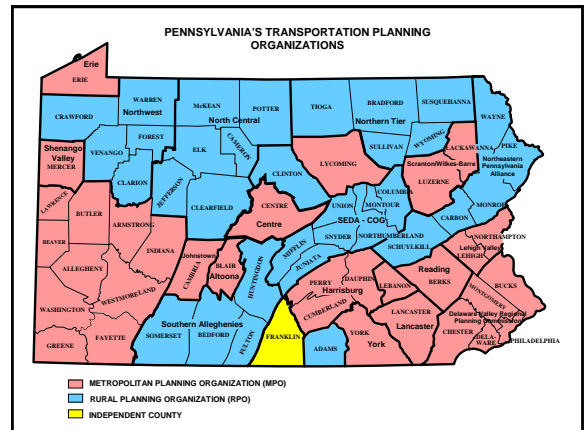
Current Architecture Update List

The following list includes all of the suggested updates to the architecture to date since November 2004.

Regional Subsystem Interconnect Diagram	Contact Information
Standards	Date Submitted: January 10, 2005
Full Architecture Document	Submitter: Keith Williams
National ITS Architecture	Organization: PennDOT
	Email: kewilliam@state.pa.us
	New ITS Project
	Project Name: Hazard Advisory Radio (LLT) TIP Project #S7695
	Project Stakeholder: PennDOT
	Stakeholders: Intrastate PennDOT General Public Commercial Vehicles



Moving Forward – Next Steps

Dennis Lebo
PennDOT Center for Program Development and Management

Business Context

PA
rc architecture



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)



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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



PA
rc architecture



Regional Planning and Operations Dialogue

Steve Pitoniak
Lackawanna County Regional
Planning Commission

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Regional ITS Planning Overview

- Adopt the Regional ITS Architecture (LLTS, NEPA, NTRPDC)
- Incorporate the ITS Architecture into the Region's long-range plans
- Support ITS/Operations projects in the TIP
- Mainstream ITS elements into other transportation projects
- Continue regional and statewide dialogues to address ITS, operations, and mobility at the regional level



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rc architecture



Next Steps

- MPO's/RPO's adopt the Regional ITS Architecture
- Establish a Regional ITS Committee with representation from the Region's MPO's and RPO's, PennDOT District 4-0, and other stakeholders
- Continue the regional ITS/Operations dialogue—meet routinely
- Regional Meeting—To be scheduled after adoption of the Regional Architecture

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rc architecture



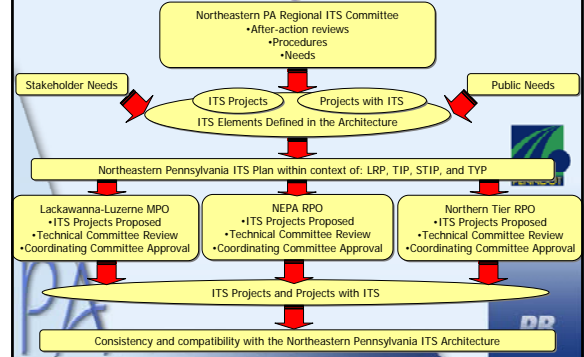
Regional ITS Committee

Regional meetings are expected to focus on:

- **Planning:**
 - Identify current and future ITS/operations needs
 - Identify and prioritize potential ITS projects
 - Examine funding (options and availability)
- **Operations:**
 - After-action reviews
 - Review of standards and procedures
 - Discuss current and future ITS/operations needs



Northeastern Pennsylvania ITS Planning Framework



Regional Challenges/Opportunities

- Ensure that the appropriate stakeholders are involved in ITS program decision-making and oversight
- Coordinate among the Region's three distinct MPO's/RPO's
- Define an ITS vision and regional ITS strategies
- Prioritize projects
- Mediate competition and funding among projects
- Ensure that funding is in place for important systems and integration projects
- Communicate to stakeholders and the public that improved operations are necessary to optimize safety and economic vitality



Discussion

Michael Pack
PennDOT Bureau of Highway Safety
and Traffic Engineering, ITS Division

