
California ITS Architecture and System Plan

Appendix B7: Interfaces

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For:



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1. INTERFACES

1.1 Introduction/Methodology

One of the key aspects of the California Statewide ITS Architecture is the definition of interfaces and information flows that define the interconnections between ITS systems to support the desired operational concepts and services established in earlier tasks. This task creates this detailed view of system interconnections. These interconnections are described in diagram, table, and database formats.

Figure 1 shows the methodology used to create these interfaces and information flows. Outputs of the following tasks served as inputs to creation of the interfaces:

- Task 2: Inventory;
- Task 5: Services;
- Task 6: Operational Concept; and
- Task 7: Functional Requirements.

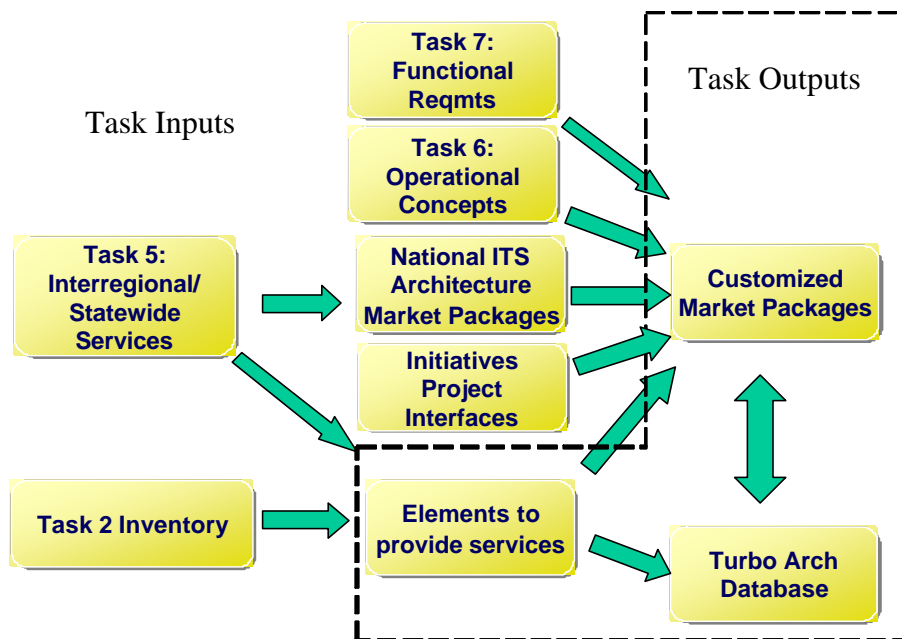



Figure 1 – Interfaces Methodology

The previous tasks, along with information from past efforts serve as the inputs to this task. The services selected for the Statewide ITS Architecture as well as the detailed inventory of systems created in Task 2 were used to create a set of elements that define the beginning and end points of the interconnections. (Note: the term “element” is the name used by the Stakeholders to describe an ITS system or piece of an ITS system.) In order to express the interconnections and interfaces between these elements, a set of customized market packages were created. Market packages are defined in the National ITS Architecture as the entities and interfaces/information flows needed to provide an ITS service. Version 5.0 of the National ITS Architecture defines 85 market

packages that cover all aspects of ITS. The customization of these market packages for the California Statewide ITS Architecture involves identifying which entities and interfaces apply and expressing the diagrams in terms of the elements of the architecture.

Once all the services are expressed in customized market packages the elements and interconnections/information flows are entered into a Turbo Architecture database. This serves as the database repository for the architecture from which a variety of reports, tables and a hyperlinked website may be developed.

Extensive information supporting this report is available on the project website located at: <http://www.kimley-horn.com/caarchitecture>. At places in the report where this additional

information is referenced there will be an  icon in the margin.

1.2 Elements to Provide Services

As described in the methodology section above, a set of elements were created to serve as the basis for defining the interfaces. These elements cover statewide, county, and municipal systems. Some of the elements correspond to specific ITS systems (e.g. Caltrans District 7 Transportation Management Center). Some elements are generic in nature, representing in the single element a variety of actual systems. An example of this generic element is County Public Safety Dispatch, which represents the county level public safety dispatch (e.g. county sheriffs) in each of the 55 counties in the state. While most of the elements represent systems within the state, there are a few, such as the ODOT Medford TOC, which represent systems in adjoining states. These out of state systems are included to define the existing or planned interfaces that cross state boundaries.

The architecture has a total of 135 elements (117 existing, 18 planned), which are listed in detail in **Appendix 1**. Each element is described by a name, the associated stakeholder, a description, and a general status (e.g. existing or planned).

1.3 Top Level Regional System Interconnect Diagram

A system interconnect diagram, or sausage diagram, shows the systems and primary types of interconnections in the region. The National ITS Architecture interconnect diagram has been customized for California based on the information gathered from the stakeholders. **Figure 2** summarizes the existing and planned ITS elements for the state in the context of a physical interconnect. Elements (and their primary associated National ITS Architecture entity) are called out in the boxes surrounding the main interconnect diagram. In the center of the figure the rectangles represent the subsystems of the National ITS Architecture. The California Statewide ITS Architecture has elements that map to 20 of the 22 subsystems of the National ITS Architecture. In addition, the statewide ITS architecture has elements that map to 13 terminators, or system boundary connections, of the National ITS Architecture. These terminators are shown on the right side of the diagram and include entities such as Intermodal Port Facility Systems (which maps to Intermodal Freight Depot).

The diagram also identifies the three basic types of communications used to interconnect the elements of the architecture. These communications types are defined as:

- **Fixed-Point to Fixed-Point Communications:** A communications link serving stationary sources. It may be implemented using a variety of public or private communications networks that may physically include wireless (e.g., microwave) as well as wireline infrastructure. Both dedicated and shared communications resources may be used.

- **Wide Area Wireless Communications:** A communications link that provides communications via a wireless device between a user and an infrastructure-based system. Both broadcast (one-way) and interactive (two-way) communications services are grouped into wide-area wireless communications. These links support a range of services including real-time traveler information and various forms of fleet communications.
- **Dedicated Short Range Communications:** A wireless communications channel used for close-proximity communications between vehicles and the immediate infrastructure. It supports location-specific communications for ITS capabilities such as toll collection, transit vehicle management, driver information, and automated commercial vehicle operations.



| LEGEND | |
|--------|--|
| | No Regional Architecture Elements Map To National ITS Architecture |
| | Regional Architecture Elements Map To National ITS Architecture |

| Remote Traveler Support Subsystem | |
|---|--|
| Bay Area Transit Stations and Stops | |
| Central California Transit System Stations and Transfer Points | |
| *CVO ATIS Truckstop Kiosks | |
| LAMTA Transit Station Equipment | |
| Northern California Transit System Stations and Transfer Points | |
| Southern California Transit System Station and Transfer Points | |
| Personal Information Access Subsystem | |
| User Personal Computing Devices | |

| Vehicle Subsystem | |
|---------------------------------|--|
| In Vehicle Electronic Toll Tags | |
| In Vehicle Equipment | |

| Transit Vehicle Subsystem | |
|--------------------------------------|--|
| Bay Area Transit Vehicles | |
| Central California Transit Vehicles | |
| LAMTA Vehicles | |
| Northern California Transit Vehicles | |
| Southern California Transit Vehicles | |

| Commercial Vehicle Subsystem | |
|------------------------------|--|
| Commercial Vehicles | |

| Emergency Vehicle Subsystem | |
|-----------------------------|--|
| CA DMV Enforcement Vehicles | |

| Maintenance and Construction Vehicle Subsystem | |
|--|--|
| Caltrans Maintenance Vehicles | |

| Archived Data Management Subsystem | |
|---|--|
| California HPMS | |
| California Transit Data Archive | |
| Caltrans District Pavement Management Sys | |
| Caltrans HQ Traffic Operations Databases | |
| Caltrans Performance Monitoring Sys (PeMS) | |
| Caltrans Statewide Pavement Mgmt System | |
| *Regional Transportation Mgmt Info Sys (RTMIS) | |
| Statewide Integrated Reporting System (SWITRS) | |
| Traffic Accident and Surveillance Analysis System (TASAS) | |

| Information Service Provider Subsystem | |
|---|--|
| California Highway Information Network (CHIN) | |
| California Highway Information Web Page | |
| Caltrans District Web pages | |
| Central California 511 Systems | |
| *Multi-Agency CVO Web-site | |
| *Northern California 511 Systems | |
| Northern California Traveler Information Sys | |
| Private Application Service Providers | |
| Private ISPs | |
| Regional Traveler Information Systems | |
| Southern California Traveler Information Sys | |
| TravInfo | |

| Emergency Management Subsystem | |
|--|--|
| BCBP Offices | |
| California Office of Emergency Services Operations Centers | |
| CHP Dispatch Centers | |
| Correctional Facility Operations | |
| County and Local Emergency Operation Centers | |
| County Public Safety Dispatch Centers | |
| Municipal Public Safety Dispatch | |
| Operation Respond | |
| Other CHP Dispatch Centers | |
| Other County Emergency Operation Centers | |
| Other County Public Safety Dispatch Centers | |
| Special Police Force Dispatch | |
| Telematics Service Provider | |

| Maintenance and Construction Management Subsystem | |
|---|--|
| Caltrans District Maintenance Dispatch | |
| Caltrans HO Construction Program | |
| County Maintenance Dispatch | |
| Municipal Maintenance Dispatch | |
| Other Caltrans District Maintenance | |
| Other States Maintenance Dispatch Centers | |

| Commercial Vehicle Administration | |
|---|--|
| *CA CVIEW | |
| Commercial Drivers License Information System (CDLIS) | |
| Credentials One Stop Shopping | |
| *CVO OS/OW Permitting Processing System | |
| Excise Summary Terminal Activity Reporting System (EXSTARS) | |
| Hazmat Permitting System | |
| IFTA Clearinghouse | |
| IRP Clearinghouse | |
| MCMS | |
| Other States Credentials Admin and Safety Systems | |
| Safestat Database | |
| Safety and Fitness Electronic Report (SAFER) | |
| Safetynet 2000 | |
| Single State Registration System (SSRS) | |
| *US BCBP Customs Product Manifest System | |

| Fleet and Freight Management | |
|-------------------------------------|--|
| Commercial Vehicle Fleet Management | |
| Operation Respond | |

| Traffic Management Subsystem | |
|--|--|
| Caltrans District 1 Transportation Mgmt Center | |
| Caltrans District 10 Transportation Mgmt Cent | |
| Caltrans District 11 Intermodal Transportation Mgmt Center | |
| Caltrans District 12 Transportation Mgmt Cent | |
| Caltrans District 2 Transportation Mgmt Center | |
| Caltrans District 3 Regional Transportation Mgmt Center | |
| Caltrans District 4 Transportation Mgmt Center | |
| Caltrans District 5 Transportation Mgmt Center | |
| Caltrans District 6 Transportation Mgmt Center | |
| Caltrans District 7 Transportation Mgmt Center | |
| Caltrans District 8 Transportation Mgmt Center | |
| Caltrans District 9 Transportation Mgmt Center | |
| Caltrans Satellite TMCs | |
| Municipal/ County Traffic Operations | |

| Toll Administration Subsystem | |
|---|--|
| Northern California Electronic Toll Systems | |
| Southern California Electronic Toll Systems | |

| Transit Management Subsystem | |
|---|--|
| BART Fleet Management System | |
| Bay Area Transit Administration | |
| Caltrain Operations Center | |
| Central California Transit Systems | |
| Los Angeles County Metro - Bus Operations | |
| Los Angeles County Metro - Rail Dispatch Center | |
| Los Angeles County MTA Administration | |
| Metro link Administration | |
| Metrolink Operations Center | |
| Northern California Transit Systems | |
| Regional Integration of ITS (RIITS) | |
| Regional Transit Information System (RTIS) | |
| San Francisco MUNI Operations | |
| Southern California Transit Systems | |

| Archived Data User Systems | |
|--|--|
| Archive Data User Systems | |
| PeMS Users | |
| Transit Data Users | |
| Asset Management | |
| Caltrans Statewide Pavement Management | |
| Enforcement Agency | |
| CHP Commercial Vehicle Section | |

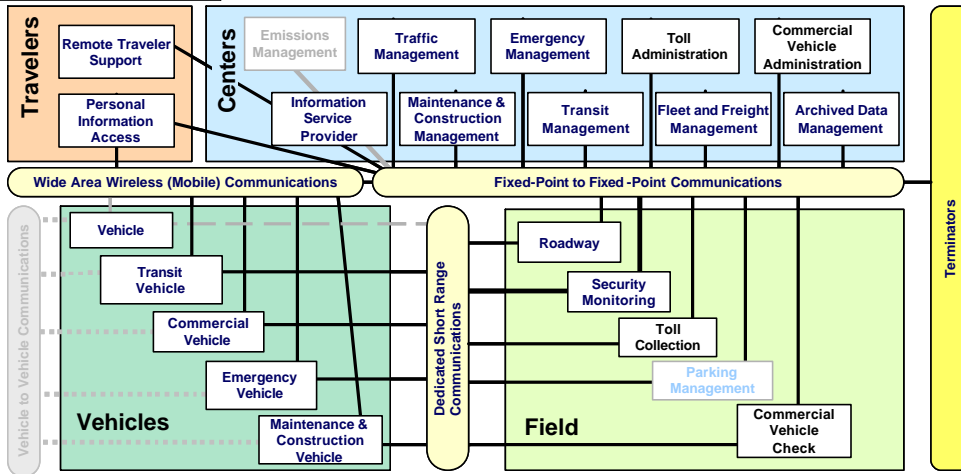
| Freight Equipment | |
|----------------------------------|--|
| Hazmat Freight Containers | |
| Intermodal Freight Depot | |
| Intermodal Port Facility Systems | |

| Maintenance and Construction Administrative Systems | |
|---|--|
| Caltrans Maintenance Administration | |
| Media | |
| Broadcast and Print Media | |

| Multimodal Transp. Service Provider | |
|---|--|
| Amtrak Schedule Operations | |
| Other Traffic Management | |
| Arizona DOT TMCs | |
| *Baja Transportation Management Center | |
| Nevada DOT TMCs | |
| ODOT Medford TOC | |
| Toll Road Transportation Management Centers | |

| Rail Operations | |
|--------------------------------|--|
| Railroad Operations Centers | |
| Traveler Card | |
| *Southern California Fare Card | |
| Translink Smartcard | |

| Weather Service | |
|--|--|
| National Weather Service | |
| Yellow Pages Service Providers | |
| California National Parks and National Forests | |
| State Parks and Recreational Area Information | |



| Commercial Vehicle Check Subsystem | |
|---|--|
| *ASPEN | |
| California Commercial Vehicle Inspection System (CCVIS) | |
| Caltrans Weigh-In-Motion Stations | |
| CHP Weigh-In-Motion/Inspection stations | |
| *Customs Electronic Clearance Systems for International Borders | |
| *CVO Automatic Safety Inspection Devices | |
| CVO PrePass Sites | |
| *US BCBP Electronic Clearance System for International Borders | |

| Roadway Subsystem | |
|--------------------------|--|
| Caltrans Field Equipment | |

| Security Monitoring Subsystem | |
|---|--|
| *Caltrans Security Monitoring Equipment | |

| Toll Collection Subsystem | |
|---|--|
| Northern California Electronic Toll Collection Plazas | |
| Southern California Electronic Toll Collection Plazas | |

California Statewide ITS Architecture "Sausage Diagram"

* Elements are planned, not existing. September 30, 2004

Figure 2 – California System Interconnect Diagram

1.4 Customized Market Packages

The market packages of the National ITS Architecture were customized to reflect the unique systems and connections of the state. Each market package is shown graphically, with the market package name, the entity from the National ITS Architecture and the specific California elements associated with the entity. In addition the market packages show the information flows that move between elements.



Figure 3 is an example of an ATMS market package for Electronic Toll Collection that has been customized for California. Information flows (called “architecture flows” in the National ITS Architecture) between the subsystems indicate what information is being shared. The market packages that were customized for California are shown in on the information website by selecting the “Market Packages by Stakeholder” button. It is important to note that while the market package table on the web page shows all of the market packages from the National ITS Architecture, only those selected for the California are included in the diagrams. The selected market packages on the web page also are highlighted in the web page table with bold print and are indicated as existing or planned.

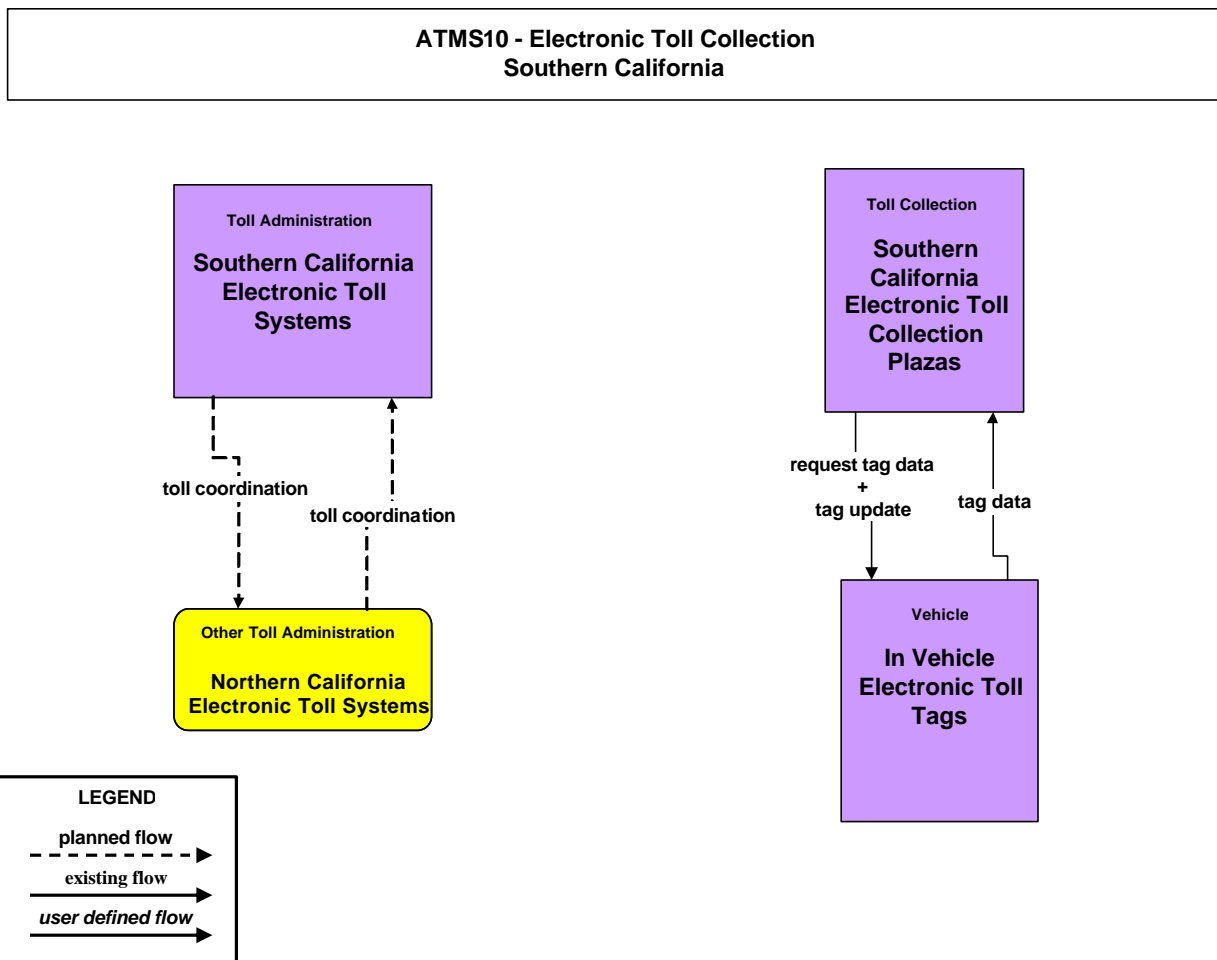


Figure 3 – Example Customized Market Package

1.5 Information Flows

While it is important to identify the various systems and stakeholders as part of the statewide ITS architecture, a primary purpose of the architecture is to identify the *connectivity* between transportation systems in the region. The interconnect diagram shown previously in **Figure 2** showed the high level relationships of the elements in the region. The customized market packages represent services that can be deployed as an integrated capability, and the market package diagrams show the information flows between the subsystems and terminators that are most important to the operation of the market packages. How these systems interface with each other is an integral part of the overall architecture.

There are 134 different elements identified as part of the California Statewide ITS Architecture. Interfaces have been defined for each element in the architecture. For example, the Caltrans District 1 Transportation Management Center has planned interfaces with 21 other elements in the state ranging from field equipment to intermodal port systems. Some of the interfaces are far less complex. For example the planned ASPEN system has interfaces with only three other elements in the architecture.



Elements and their interfaces are accessible via the California Statewide ITS Architecture web page by clicking on the “Interfaces” button. On the web page elements are listed alphabetically in the column on the left, and each entry in the Interfacing Element column on the right is a link to more detailed information about the particular interface.

Information flows between the elements define specific information that is exchanged by the elements. Each information flow has a direction, name, and definition. Most of the information flows match ones from the National ITS Architecture (the mapping of elements to National ITS Architecture entities allowed the developers to match the information flows to the appropriate interfaces.) In some cases new user defined flows have been created for interfaces or connectivities that are not expressed in the National ITS Architecture. These information flows define the interface requirements between the various elements in the regional information.

An example of the information flows between two elements is shown in **Figure 4**. In this interface the flows that go between the Caltrans District 3 Transportation Management Center and the CHP Dispatch Centers are shown.

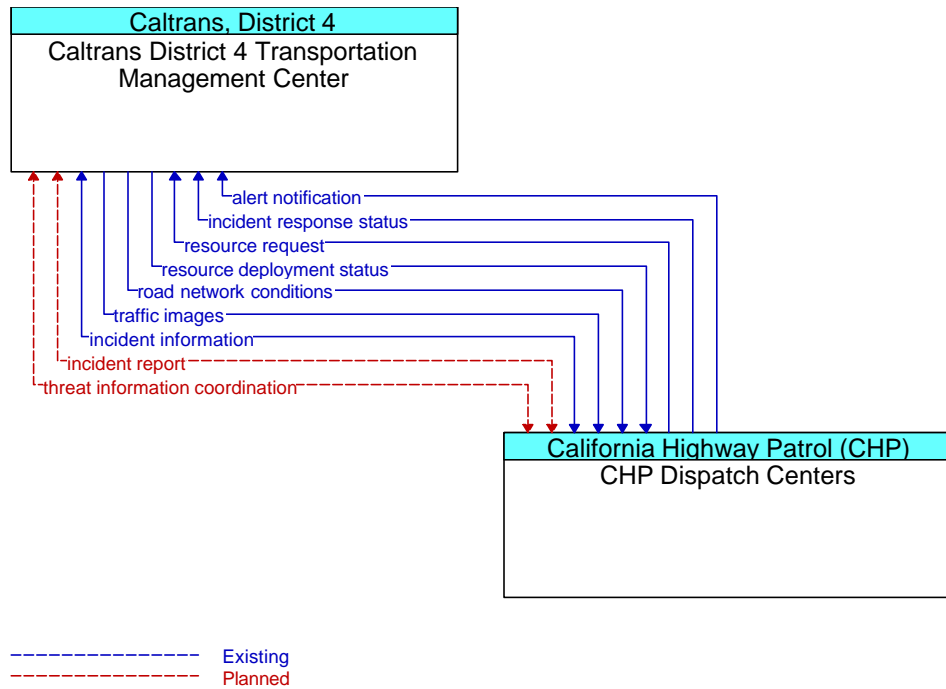


Figure 4 – Interface Example



Each of the individual element interfaces can be accessed on the Statewide ITS Architecture web page by clicking on the “Interfaces” button. Selecting any of the interfacing elements from the column on the right will display an interface diagram and information flows between two specific elements, similar to the diagram shown in **Figure 4**. Each information flow is defined, and any standards associated with that data flow are noted.

APPENDIX 1: ARCHITECTURE ELEMENTS

| Stakeholder Name | Element Name | Element Description | Status |
|-----------------------------------|---|--|----------|
| AMTRAK | Amtrak Schedule Operations | This is the operational entity that provides static and real-time Amtrak schedule information. | Existing |
| Archive Data Users | Archive Data User Systems | Systems that access archive data. | Planned |
| Archive Data Users | PeMS Users | Users of PeMS system outputs. | Existing |
| Archive Data Users | Transit Data Users | Users (and their systems) of transit archive data. | Planned |
| Arizona DOT | Arizona DOT TMCs | Represents Traffic Management Centers operated by State of Arizona. | Existing |
| BART | BART Fleet Management System | Operations and dispatch of BART fleet. | Existing |
| Bay Area Transit Agencies | Bay Area Transit Administration | Administration functions of Bay Area transit agencies. Includes electronic fare reconciliation between agencies. | Existing |
| Bay Area Transit Agencies | Bay Area Transit Stations and Stops | Transit stations and transfer points of Bay Area transit systems. | Existing |
| Bay Area Transit Agencies | Bay Area Transit Vehicles | This element represents the ITS equipment on transit vehicles of Bay Area transit agencies. | Existing |
| BCBP | BCBP Offices | Bureau of Customs and Border Protection Offices. | Existing |
| BCBP | US BCBP Customs Product Manifest System | This element would provide load manifest pre-clearance information to Electronic Screening stations. Information would be requested as needed (real-time) including requests for vehicle, carrier, or driver histories. | Planned |
| BCBP | US BCBP Electronic Clearance System for International Borders | Systems to provide electronic clearance of commercial vehicles at the border with Mexico. | Planned |
| BLM, Fish and Game, Parks and Rec | State Parks and Recreational Area Information | This represents visitor information for the state parks, state recreation areas, and other state level tourist activities. This would include sites managed by Bureau of Land Management, California Parks & Recreation, Department of Fish and Game, Harbor Recreation and Conservation and various State Parks. | Existing |
| California CVO Council | Multi-Agency CVO Web-site | This website is being developed as a means to use the Internet to make useful, up-to-date state CVO documentation, information, and a calendar of events widely available to motor carriers. The benefits of the web-site include: Better informed industry capable of making business decisions and providing information back to state agencies based on accurate, up-to-date information regarding CVO in California. | Planned |
| California DMV | CA DMV Enforcement Vehicles | Represents DMV's enforcement vehicles. | Existing |
| California DMV | Single State Registration System (SSRS) | Commercial vehicle registration system. | Existing |
| California Highway Patrol (CHP) | ASPEN | A laptop based system to conduct roadside safety inspections. | Planned |

| Stakeholder Name | Element Name | Element Description | Status |
|---------------------------------|---|--|----------|
| California Highway Patrol (CHP) | CA CVIEW | Commercial Vehicle Information Exchange Window. Collects snapshots for interstate and intrastate carriers, vehicles, and drivers. Interfaces with SAFER for interstate snapshot exchange. Also distributed snapshots to other states. | Existing |
| California Highway Patrol (CHP) | California Commercial Vehicle Inspection System (CCVIS) | This system allows electronic collection of inspection data while an inspection is being performed. Information is electronically forwarded to a CHP headquarters database and then to SAFETYNET, a federal commercial vehicle information system database. The CHP currently conducts 70 percent of its inspections using CCVIS. The system has improved accuracy, timeliness of reporting, and has significantly reduced data entry time. Future expansions or improvements may include modifications for mobile road enforcement officer use. | Existing |
| California Highway Patrol (CHP) | CHP Commercial Vehicle Section | Section of CHP responsible for commercial vehicle inspection and enforcement. | Existing |
| California Highway Patrol (CHP) | CHP Dispatch Centers | Represents the 22 separate dispatch centers throughout the state that are dispatching CHP vehicles | Existing |
| California Highway Patrol (CHP) | CHP Weigh-In-Motion/ Inspection stations | Weigh-in-Motion stations that are a part of inspection stations. The WIM Bypass System is a high speed weigh in motion technology used in the PrePass operation, which enables registered heavy vehicles to legally bypass open weigh stations after electronic verification of their size, weight, registration, safety inspection and other credentials. These stations reduce delay in the weight enforcement process and increase ability to provide highway truck statistics data. Law enforcement reports the following issues with previous installations: Rough road conditions are reported to affect the accuracy of weights detected by the WIM equipment; the system cannot reliably distinguish between transponder equipped and non-equipped trucks. | Existing |
| California Highway Patrol (CHP) | Credentials One Stop Shopping | Supports a commercial vehicle company interface for credentials. Supports connection between CVIEW and databases including IRP, IFTA, etc. Carriers will be supported by a web-based interface. | Existing |
| California Highway Patrol (CHP) | CVO Automatic Safety Inspection Devices | Rapid inspection via handheld units to download information directly from the vehicle. Technology type unspecified, may include handheld computers, information exchange software, CVISN database, and automated analysis tools. | Planned |

| Stakeholder Name | Element Name | Element Description | Status |
|---------------------------------|--|--|----------|
| California Highway Patrol (CHP) | CVO Pre-Pass Sites | PrePass is a nationwide AVI system that allows participating transponder equipped CVO to bypass designated weigh stations and port-of entry facilities. California has 35 sites in northern, central, and southern parts of the state. Sites are at Antelope (northeast of Sacramento, CA)- I-80, Blythe (near CA/ AZ border)-I-10, Cache Creek (east of Bakersfield, CA) CA-58, Cajon (north of San Bernardino, CA) I-15, Carson (north of Long Beach, CA) I-405, Castaic (north of Santa Clarita, CA) I-5, Chowchilla River (south of Modesto, CA) CA-99, Conejo (west of Thousand Oaks, CA) US101, Cordelia (north of Oakland, CA)-I-80, Cottonwood (south of Redding, CA) I-5, Desert Hills (west of Palm Springs, CA) I-10, Dunsmuir Grade (north of Redding, CA) I-5, Gilroy (south of San Jose, CA)-I-101, Grapevine (south of Bakersfield, CA)-I-5, Livermore (east of Oakland, CA)-I-580, Mission Grade (northeast of Oakland, CA) I-680, Nimitz (east of Oakland, Ca) I-880, Otay Mesa (near US/Mexico border) S-905, Peralta Hwy (east of Anaheim, CA) I-91, Rainbow (south of Temecula, CA) I-15, San Onofre (north of Oceanside, CA) I-5, Santa Nella (east of San Jose, CA) I-5, and Truckee (near CA/NV border) I-80. | Existing |
| California Highway Patrol (CHP) | Hazmat Permitting System | System that provides information on Hazmat permits issued. | Existing |
| California Highway Patrol (CHP) | Other CHP Dispatch Centers | This element is used to create an interface from one CHP dispatch center to another. | Existing |
| California Highway Patrol (CHP) | Statewide Integrated Reporting System (SWITRS) | The Statewide Integrated Reporting System (SWITRS) consists of two components working in conjunction to record and manage accident/crash reporting data. The server component resides on a central database server, which hosts numerous other applications/databases. CHP's Support Services Section (SSS) gathers and processes the data, produces statistical reports, and provides custom statistical reports to public and private sector clients. The client component (data collection) is central to entering and maintaining the accident/crash data. Data collection tools and methods are developed within the framework of the California Vehicle Code (CVC) and the Traffic Collision Report (CHP 555) is the standard reporting tool. In the future, the client component may be a web client that interconnects to the server component via XML and other Internet related protocols and standards. Pertinent data will be exported or queried by other systems such as xCVIEW. | Planned |
| Caltrain | Caltrain Operations Center | Managing of Caltrain system including managing of Automated Passenger Counters (APC) which are integrated with AVL system. | Existing |
| Caltrans | California Transit Data Archive | Represents statewide archive of transit data. | Existing |
| Caltrans | Caltrans District Maintenance Dispatch | Represents maintenance asset dispatch at the district level. | Existing |
| Caltrans | Caltrans District Pavement Management Systems | District based collection of Pavement status information. | Existing |
| Caltrans | Caltrans District Web pages | Represents web pages of each of the Caltrans districts. | Existing |



| Stakeholder Name | Element Name | Element Description | Status |
|------------------|---|---|----------|
| Caltrans | Caltrans Field Equipment | CCTV, sensors, RWIS, signal controllers, etc. | Existing |
| Caltrans | Caltrans Maintenance Administration | Represents the headquarters administrative functions for maintenance operations. | Existing |
| Caltrans | Caltrans Maintenance Vehicles | This element represents the ITS equipment in Caltrans maintenance vehicles. | Existing |
| Caltrans | Caltrans Satellite TMCs | Satellite TMC's that operate in remote or outlying portions of a Caltrans District. | Existing |
| Caltrans | Caltrans Security Monitoring Equipment | Caltrans field equipment used for security monitoring of transportation infrastructure (e.g. CCTV used for security, not for assessment of traffic conditions) | Planned |
| Caltrans | Caltrans Statewide Pavement Management System | Statewide Pavement Management System for Caltrans roadway - currently investigating possibility of an upgrade | Existing |
| Caltrans | Caltrans Weigh-In-Motion Stations | Caltrans has deployed automatic high-speed weigh-in-motion (WIM) stations on mainline highway lanes throughout California. These planning and data collection stations capture vehicle classification and vehicle weight data continuously. They are distinct and separate from facilities at which commercial vehicle enforcement is conducted. The vehicle classification/weigh data is stored in a roadside controller which is periodically (often daily) polled by the Data Center in Sacramento. The Data Center retrieves and analyzes the data for anomalies, which fall outside of expected value boundaries. Fourteen of these planning/data surveillance sites gather data for the Strategic Highway Research Program (SHRP). Each high speed WIM Data Collection Systems includes equipment for collecting, processing, storing and transmitting data to Caltrans, Headquarters, Division of Traffic Operations. The data collected provides info related to counting, classifying and speed monitoring of all vehicles and the weighing of trucks and buses. This system allows for single threshold weighing and operates over a speed range of 0 to 100 mph. | Existing |
| Caltrans | CVO ATIS Truckstop Kiosks | These kiosks represent a general traveler information capability that could be provided at truckstops throughout the state. One specific implementation of this type of system has been proposed in District 8. In this implementation FM subcarrier will be used to disseminate real-time information to commercial vehicles from the District 8 TMC. Kiosks located at four truckstops in the region will provide route and real-time traffic information. Among other interested parties and stakeholders for implementation of this type of system are the I-5 Consortium Cities Joint Powers Authority (Santa Fe Springs, La Mirada, Downey, Buena Park, Commerce, and Norwalk) and the Ports of Los Angeles and Long Beach. | Planned |



| Stakeholder Name | Element Name | Element Description | Status |
|-----------------------|---|---|----------|
| Caltrans | CVO OS/OW Permitting Processing System | This system provides a single entry electronic application for Oversize/Overweight permitting. It provides a single point of information regarding OS/OW regulations and restrictions in the state. Having this type of system will reduce permitting application, processing, and issuance delays for commercial vehicle operators. It will also reduce data collection errors, staff resources required, and cost of permit processing. The existing version of this system is called Caltrans Single-Trip Application and Routing System (STARS). STARS was originally designed for high-volume permit users, but the capability will ultimately be extended to all OS/OW permit applicants. | Planned |
| Caltrans | Excise Summary Terminal Activity Reporting System (ExSTARS) | A fuel tracking system developed with the cooperation of the IRS, DOT, States and Motor Fuel Industry which details the movement of any liquid product into or out of an IRS approved terminal. | Existing |
| Caltrans | Other Caltrans District Maintenance | This element is used to create an interface from one Caltrans District Maintenance to another District Maintenance. | Existing |
| Caltrans | Other Caltrans Field Equipment | Represents DMS, CCTV, signal controllers, field masters, etc. This element used to show interface between field devices. | Existing |
| Caltrans HQ | California Highway Information Network(CHIN) | The California Highway Information Network provides daily adverse travel conditions and work plan information. Information is made available by telephone (1-800-427-ROAD) and Internet (http://www.dot.ca.gov/hq/roadinfo/). | Existing |
| Caltrans HQ | California Highway Information Web Page | This interactive Web-based service (http://www.dot.ca.gov/hq/roadinfo/) provides key road construction, detour and closure information based on user-specified route numbers. | Existing |
| Caltrans HQ | California HPMS | Highway performance monitoring system | Existing |
| Caltrans HQ | Caltrans HQ Construction Program | This element is responsible for implementing the state's highway construction program. It will provide information to local districts about future construction projects as they are introduced. | Existing |
| Caltrans HQ | Caltrans HQ Traffic Operations Databases | Database systems that collect and analyze weight in motion data and other traffic operations data. | Existing |
| Caltrans HQ | Traffic Accident and Surveillance Analysis System(TASAS) | "TASAS is a sophisticated version of an EDP traffic records system. It has an accident data base (AXDB), linked to a highway data base (HDB) which contains description elements of highway segments, intersections and ramps, access control, traffic volumes and other data. TASAS serves the needs of many offices within Caltrans and also provides roadway and/or accident information for other associated State and local agencies. | Existing |
| Caltrans, District 1 | Caltrans District 1 Transportation Management Center | This TMC, called ARTIC (Advanced Rural Technology Integration Center) in the COATS architecture plays a central role in managing and monitoring the transportation system in Del Norte, Humboldt, Mendocino and Lake Counties. It is a Tier 3 Satellite Operation Center connected to the Oakland Regional TMC. | Existing |
| Caltrans, District 10 | Caltrans District 10 Transportation Management Center | Provides traffic management, information dissemination, and incident management for state owned highways in District 10. Located in Stockton. | Existing |

| Stakeholder Name | Element Name | Element Description | Status |
|-----------------------|--|---|----------|
| Caltrans, District 11 | Caltrans District 11 Intermodal Transportation Management Center | Caltrans transportation management center for District 11. Interfaces with San Diego TMC, Ramp Meters, Inductive Loops, CCTV, CMS, HAR. The JTOC is the physical location for this center. | Existing |
| Caltrans, District 12 | Caltrans District 12 Transportation Management Center | The District 12 Transportation Management Center (TMC) provides traffic management and incident management for District 12 freeway and highway systems. Real time information is gathered from many sources such as electronic sensors in the pavement, freeway call boxes, video cameras, 911 calls, officers on patrol, Caltrans highway crews, ramp meter sensors, earthquake monitors, motorist cellular calls, and commercial traffic reporters, which is sent to the TMC 24-hours a day, seven days a week. | Existing |
| Caltrans, District 2 | Caltrans District 2 Transportation Management Center | The Caltrans District 2 TMC, called ARTIC (Advanced Rural Technology Integration Center) in the COATS architecture, coordinates transportation operations for north central California, serving Colusa, Glenn, Lassen, Modoc, Plumas, Shasta, Siskiyou, Tehama, and Trinity Counties. It is a Tier 3 Satellite Operation Center which is connected to the Sacramento TMC. | Existing |
| Caltrans, District 3 | Caltrans District 3 Regional Transportation Management Center | This system will monitor and control the area freeways, including the US Interstates 5 and 80, the US Federal Highway 50, and the California State Highway 99. Monitoring is accomplished by loop sensors and CCTV, and the use of ramp meters and DMS (CMS). Will archive data in the future. This Tier 1 TMC is tied to Tier 2 (Urban) TMCs in Stockton and Fresno and Tier 3 Satellite Operation Centers in Redding and Kingvale | Existing |
| Caltrans, District 4 | Caltrans District 4 Transportation Management Center | Real-time traffic management of Bay Area freeways and bridges. Monitors traffic flow (detectors and video), processes data for incident info, distributes information to motorists (signs and radio), and adjusts ramp meters to balance flow. This Tier 1 TMC is tied to Tier 3 Satellite Operation Centers in Eureka and San Luis Obispo. | Existing |
| Caltrans, District 5 | Caltrans District 5 Transportation Management Center | Caltrans District 5 TMC provides traffic management for the district including managing of field devices and coordination of incident management with CHP and other agencies. | Existing |
| Caltrans, District 6 | Caltrans District 6 Transportation Management Center | Provides traffic management, incident management, and information dissemination for state owned roads in District 6. Located in Fresno | Existing |
| Caltrans, District 7 | Caltrans District 7 Transportation Management Center | Caltrans District 7 TMC is responsible for monitoring and managing real-time traffic conditions for the Los Angeles and Ventura county freeways. Center is located in downtown Los Angeles. | Existing |
| Caltrans, District 8 | Caltrans District 8 Transportation Management Center | Caltrans and CHP jointly operate a TMC located in San Bernardino. There are plans to build a new joint Caltrans/CHP facility in Fontana within the next three to five years, which will operate 24/7 and be designed to operate as an emergency operations center in times of emergency. | Existing |
| Caltrans, District 9 | Caltrans District 9 Transportation Management Center | Provides traffic management and incident management for state highways in district 9. | Existing |

| Stakeholder Name | Element Name | Element Description | Status |
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| Caltrans, Regional, and Local Stakeholders | Central California 511 Systems | Phone based traveler information systems in California accessible through the 3-digit 5-1-1 telephone number assigned to the transportation community by the FCC. The system is being implemented at the regional level as the urban metropolitan areas in California convert their existing traveler information systems or establish enhanced 511 services. MTC is operating 511 in the Bay Area. Los Angeles and greater Southern California, San Diego, and Sacramento are each progressing towards regional implementation. For the rural areas, Caltrans is taking the lead for 511 planning and deployment. | Existing |
| Caltrans, Regional, and Local Stakeholders | Northern California 511 Systems | Represents 511 implementations in Northern California, not including Travinfo, which is described by a separate element. | Planned |
| Central California Transit Agencies | Central California Transit System Stations and Transfer Points | Transit stations and transfer points of Central California transit systems. | Existing |
| Central California Transit Agencies | Central California Transit Systems | Represents the dispatch and administration functions for transit agencies in Central California. | Existing |
| Central California Transit Agencies | Central California Transit Vehicles | Transit vehicles of Central California transit agencies. | Existing |
| Correctional Facilities | Correctional Facility Operations | Operations centers at Federal, state, or local correctional facilities. | Existing |
| County Public Safety Agencies | County Public Safety Dispatch Centers | This includes public safety dispatch and communications centers (police, fire, EMS) that operate at the county level throughout the state. | Existing |
| County Public Safety Agencies | Other County Public Safety Dispatch Centers | This element is used to create an interface between peer county safety dispatch organizations that cross regional boundaries. The element represents public safety dispatch and communications centers (police, fire, EMS) that operate at the county level throughout the state. In addition, this element includes Fire Districts and Coast Guard, This also includes California Fish & Game, National Park Service, U.S. Fish & Wildlife and U.S. Forest Service. | Existing |
| County Public Works | County Maintenance Dispatch | This includes public works or transportation departments for each of the 60 counties in the state. | Existing |
| FMCSA | Commercial Drivers License Information System (CDLIS) | The nationwide driver's license system that the Federal Highway Administration (FHWA) has developed and issued standards for testing and licensing CMV drivers. | Existing |
| FMCSA | MCMIS | MCMIS contains information on the safety fitness of commercial motor carriers and hazardous material shippers subject to the Federal Motor Carrier Safety Regulations and the Hazardous Materials Regulations. This information is available to the general public through the MCMIS Data Dissemination Program. | Existing |
| FMCSA | Safestat Database | SafeStat (short for Motor Carrier Safety Status Measurement System) is an automated, data driven analysis system designed by the Federal Motor Carrier Safety Administration (FMCSA). SafeStat combines current and historical carrier-based safety performance information to measure the relative (peer-to-peer) safety fitness of interstate commercial motor carriers and intrastate commercial motor carriers that transport hazardous materials. | Existing |

| Stakeholder Name | Element Name | Element Description | Status |
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| FMCSA | Safety and Fitness Electronic Report (SAFER) | SAFER provides carrier, vehicle, and driver safety and credential information to fixed and mobile roadside inspection stations. This information will allow the roadside inspector to select vehicles and/or drivers for inspection based on the number of prior carrier inspections, as well as carrier, vehicle, and driver safety and credential historical information. | Existing |
| FMCSA | Safetynet 2000 | Distributing system for managing safety data on both interstate and intrastate motor carriers for federal and state offices to electronically exchange data on interstate carriers with MCMIS (Motor Carrier Management Information System). | Existing |
| IFTA, Inc. | IFTA Clearinghouse | This is a national clearinghouse designed to allocate fuel taxes between multiple states for motor carrier activities across jurisdictional lines, in accordance with the International Fuel Tax Agreement. | Existing |
| IRP, Inc. | IRP Clearinghouse | This is a registration reciprocity agreement among jurisdictions in the United States and Canada which provides for payment of license fees on the basis of fleet miles operated in various jurisdictions | Existing |
| Local Government | County and Local Emergency Operation Centers | Represents emergency operations centers at the county and municipal level. | Existing |
| Local Government | Municipal Maintenance Dispatch | Represents the maintenance dispatch function at the municipal level. | Existing |
| Local Government | Municipal/County Traffic Operations | Represents municipal traffic operations centers and traffic signal systems throughout the state. | Existing |
| Local Government | Other County Emergency Operation Centers | This element is used to create an interface from one county EOC to another county EOC | Existing |
| Local Media | Broadcast and Print Media | Local media that includes traveler information with entertainment, general news and other topical information. In contrast to other traveler information inventory items, this entry represents the analog TV, radio and print media intended for human, rather than system, processing and interpretation. | Existing |
| Los Angeles County Metropolitan Transportation Authority | LAMTA Transit Station Equipment | Represents the equipment (e.g. electronic payment equipment) at LAMTA transit stations. | Existing |
| Los Angeles County Metropolitan Transportation Authority | LAMTA Vehicles | This element represents the LAMTA transit vehicles. | Existing |
| Los Angeles County Metropolitan Transportation Authority | Los Angeles County Metro - Bus Operations | Responsible for radio communications (voice and data) and real-time fleet management for 2400 revenue buses and 75 non-revenue vehicles. | Existing |
| Los Angeles County Metropolitan Transportation Authority | Los Angeles County Metro - Rail Dispatch Center | The dispatch center for the rail operations is located in the City of Compton. Center is manned 24/7 by personnel. Responsible for rail transportation for the county. Majority of trains have SCADA system that allows center to "track" the train. | Existing |
| Los Angeles County Metropolitan Transportation Authority | Los Angeles County MTA Administration | Administration functions of Los Angeles MTA. Includes electronic fare reconciliation between agencies. | Existing |

| Stakeholder Name | Element Name | Element Description | Status |
|--|---|--|----------|
| Metrolink Rail Agency | Metrolink Administration | The administration function, including electronic fare payment reconciliation for Metrolink. | Existing |
| Metrolink Rail Agency | Metrolink Operations Center | Metrolink Operations Center is located in Pomona. Area of responsibility includes Los Angeles to Lancaster/San Bernardino/Riverside/San Diego/Oxnard. Operational responsibilities are to coordinate train movements in a safe and efficient manner. | Existing |
| Metropolitan Transportation Commission (MTC) | Regional Transit Information System (RTIS) | Northern California (Bay Area) system for information sharing and transit coordination between transit systems. | Existing |
| Metropolitan Transportation Commission (MTC) | Translink Smartcard | Contactless smartcard system being used in Bay Area | Existing |
| Metropolitan Transportation Commission (MTC) | TravInfo | TravInfo® is a comprehensive system to gather, organize and disseminate timely information on San Francisco Bay Area traffic and road conditions, public transit routes and schedules, carpooling, highway construction and road closures, van and taxi services for disabled travelers, park-and-ride facilities, and bikeways. | Existing |
| Mexican Transportation Agency | Baja Transportation Management Center | Planned transportation management center in Baja Mexico. | Planned |
| Municipal Public Safety Agencies | Municipal Public Safety Dispatch | This includes public safety dispatch functions (police, fire, EMS) provided at the municipal level throughout the state. Also includes Public Safety Answering Points (PSAPs) at the municipal level. | Existing |
| National Park Service/U.S. Forest Service | California National Parks and National Forests | Visitors information for park access, parking, and trip planning at National Parks and National Forests within the state. | Existing |
| National Weather Service | National Weather Service | Represents the NWS weather information provided to transportation agencies in the state. | Existing |
| Nevada DOT | Nevada DOT TMCs | Traffic Management Centers in Nevada (including one in Reno). | Existing |
| Northern California Toll Agencies | Northern California Electronic Toll Collection Plazas | This element represents the electronic toll collection systems that operate at the toll collection plazas. | Existing |
| Northern California Toll Agencies | Northern California Electronic Toll Systems | This element represents the back end, or administrative systems of Northern California electronic toll systems. | Existing |
| Northern California Transit Agencies | Northern California Transit System Stations and Transfer Points | Transit stations and transfer points of Northern California transit systems. | Existing |
| Northern California Transit Agencies | Northern California Transit Systems | Represents the dispatch function for transit agencies in Northern California other than BART, Caltrain, and SF MUNI, which are called out separately. | Existing |
| Northern California Transit Agencies | Northern California Transit Vehicles | Transit vehicles of Northern California transit systems. | Existing |
| Operation Respond Institute | Operation Respond | electronic link with 911 and participating carriers, provides real-time access emergency response units to hazardous material information | Existing |

| Stakeholder Name | Element Name | Element Description | Status |
|-------------------------------------|---|---|----------|
| Oregon Department of Transportation | ODOT Medford TOC | The ODOT Transportation Operations Center in Medford plays a central role in the COATS architecture. It connects to centers in Bend and Salem and Caltrans centers in Eureka and Redding. | Existing |
| Other States DOTs | Other States Credentials Admin and Safety Systems | Credentials and safety inspection systems in other states. | Existing |
| Other States DOTs | Other States Maintenance Dispatch Centers | Maintenance Dispatch Centers in Oregon, Nevada, or Arizona. | Existing |
| Port Facilities | Intermodal Port Facility Systems | Represents intermodal port facilities and the systems they use to track cargo and manage operations. | Planned |
| Private ASPs | Private Application Service Providers | This element represents those organizations that provide traveler information to end users including telematics service providers such as ATX, OnStar, AAA, and Cross Country, Microsoft (http://autos.msn.com), Tribune Interactive, Cox Interactive, Iteris, TANN, and other traveler information web sites too numerous to list. See also the "Private ISP" element that covers those organizations that collect and distribute traveler information to ASPs. | Existing |
| Private Carriers | Commercial Vehicle Fleet Management | Provide for real-time communication for vehicle locating, dispatching, and tracking to reduce delays from congestion and incidents. Technology type unspecified, may include GPS Tracking, AVL, cellular communications, dispatching software. Stakeholders include individual carriers. | Existing |
| Private Carriers | Commercial Vehicles | Commercial Vehicles operated by private commercial vehicle fleets. | Existing |
| Private Carriers | Hazmat Freight Containers | Represents Hazmat containers that are instrumented for providing a spill notification. | Planned |
| Private ISPs | Private ISPs | This "Information Service Provider" element represents those organizations that collect, process, and supply traffic data and traveler information to Application Service Providers (ASPs) who in turn provide the information to end users. ISPs include Tele Atlas and Westwood One, TANN, and Iteris. As an example of the configuration of these systems, Tele Atlas/Westwood One California operations centers are located in San Francisco, San Jose, Sacramento, Fresno, Los Angeles and San Diego. Each operations center covers a very large region. For example, the Los Angeles and San Diego centers cover all of Southern California. The Sacramento center covers from the Bay Area to Lake Tahoe and as far south as Merced. | Existing |
| Private Rail Operators | Rail Operations Centers | Represents the rail operations centers of freight railroads that operate in the state. | Existing |
| Regional Planning Agencies | Northern California Traveler Information Systems | Traveler information systems (public or private) operating throughout regions of Northern California. | Existing |
| Regional Planning Agencies | Regional Traveler Information Systems | Represents traveler information systems (public or private) that operate within a region. | Existing |
| Regional Planning Agencies | Regional Transportation Management Information System (RTMIS) | This element represents transportation archives at a regional level. | Planned |

| Stakeholder Name | Element Name | Element Description | Status |
|---|--|---|----------|
| Regional Planning Agencies | Southern California Traveler Information Systems | Includes 511 systems and other traveler information systems in the Southern California area. | Existing |
| San Francisco MUNI | San Francisco MUNI Operations | Scheduling/Auto-Dispatch System (an integrated, client-server based scheduling and dispatch system with, among many other features, the ability to perform traffic/ride check data collection); NextBus & Coordinate with BART (Deploys automated arrival info of next train arrival); AVL-GPS; Digital Voice Annunciation System (Allows announcements to be made automatically, without driver intervention). | Existing |
| Southern California Association of Governments (SCAG) | Regional Integration of ITS (RIITS) | Southern California system for information sharing between operators (transit agencies, etc.) and between transportation operators (e.g., transit agencies) and other organizations (e.g., Information Service Providers). Also includes arterial data, Caltrans data, CHP data. Other data sources will be added as they become available. | Existing |
| Southern California Toll System Agencies | Southern California Electronic Toll Collection Plazas | This element represents the electronic toll collection systems that operate at the toll collection plazas. | Existing |
| Southern California Toll System Agencies | Southern California Electronic Toll Systems | This element represents the back end, or administrative systems Southern California electronic toll systems. | Existing |
| Southern California Transit Agencies | Southern California Fare Card | Future electronic fare card used by Southern California transit systems. | Planned |
| Southern California Transit Agencies | Southern California Transit System Station and Transfer Points | Transit stations and transfer points of Southern California transit systems. | Existing |
| Southern California Transit Agencies | Southern California Transit Systems | Represents the dispatch function for transit agencies in Southern California other than LAMTA and Metrolink, which are called out separately. | Existing |
| Southern California Transit Agencies | Southern California Transit Vehicles | Transit vehicles of Southern California transit systems. | Existing |
| Special Police | Special Police Force Dispatch | Police forces other than state, county or municipal. This element includes Fire Districts and Coast Guard, This also includes public safety or enforcement aspects of California Fish & Game, National Park Service, U.S. Fish & Wildlife and U.S. Forest Service. | Existing |
| State Office of Emergency Services | California Office of Emergency Services Operations Centers | The OES Warning Center is staffed 24 hours a day, 365 days a year. From this center, warning controllers speak with county OESs and the National Warning Center in Berryville, Virginia on a daily basis. OES also maintains a 24-hour toll-free toxic release hotline, and relays spill reports to a number of other state and federal response and regulatory agencies, as well as local governments. During emergencies, OES activates the State Operations Center (SOC) in Sacramento and the Regional Emergency Operations Centers (REOCs) in impacted areas to receive and process local requests for assistance. | Existing |



| Stakeholder Name | Element Name | Element Description | Status |
|------------------------------|--|--|----------|
| Telematics Service Providers | Telematics Service Provider | Service centers that provide Mayday and other special concierge services for their clients. These centers will typically not be associated with a single county or district, but will interact with local agencies when their client's have an emergency in the region. Current examples of this system include the service centers operated by OnStar, ATX Technologies, and AAA. | Existing |
| Toll Road Operators | Toll Road Transportation Management Centers | The element represents the traffic operations centers of toll roads throughout the state. | Existing |
| Travelers | In Vehicle Electronic Toll Tags | Represents electronic toll tags used by the general traveling public in their vehicles. | Existing |
| Travelers | In Vehicle Equipment | Represents ITS equipment inside vehicles. | Existing |
| Travelers | User Personal Computing Devices | User Personal Computing Devices refers to equipment an individual owns and can personalize with their choices for information about transportation networks. An Internet-connected PC is an example. | Existing |
| UC Berkeley | Caltrans Performance Monitoring System (PeMS) | The Freeway Performance Measurement System (PeMS) is an Internet-based tool that can be used to monitor conditions on urban freeways. PeMS will allow users to produce congestion monitoring reports using automatically collected data from sensors statewide. | Existing |
| US Customs | Customs Electronic Clearance Systems for International Borders | Systems to provide electronic clearance of commercial vehicles at the border with Mexico. | Planned |