

Standards Requirements Package 4: Inter-Center Data Exchanges for Commercial Vehicle Operations

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1. Introduction to Standards Requirements Documentation

The Standards Requirements Packages are intended to be used in conjunction with the other architecture documents. In particular, the introductory chapters of the Standards Requirements Document provide contextual material and explanations/justifications of some of the methods used to evaluate and rate architecture flows. However, it is recognized that many people may initially only receive a given Standards Requirements Package, without the associated supporting material. To aid these individuals, we offer some generic introductory material to promote understanding of the context and approach used to create a Standards Requirements Package. Ultimately, any standards development organization pursuing an ITS-related standard should ensure that they have access to a complete set of the architecture documents as a reference source.

What's New in this Version?

- This version of the Standards Requirements Package has been updated based on new physical architecture flows and underlying logical data flows recently added to the National ITS Architecture. These new flows provide new material for the standards community to consider.
- This version of the Standards Requirements Package is based on logical data flows whereas previous versions had been based on a separate set of flows called Leveled Data Items. Rather than maintain two sets of information in the architecture, it was felt that these packages could provide the raw material from the logical architecture for the SDOs. If further information is needed to clarify the content or organization of the logical data flows, the architecture team can be contacted for assistance.
- The National ITS Architecture was aligned with the Commercial Vehicle Information Systems and Networks (CVISN) Architecture and the International Border Clearance (IBC) Architecture. The result of this alignment was the renaming, addition and deletion of architecture and data flows, as well as the addition and deletion of terminators. The Commercial Vehicle Operations (CVO) related market packages were updated to reflect these changes. The updates were developed jointly by the National ITS Architecture team, the CVISN team, and the IBC team. These changes are reflected in this SRP.

For this version of the Standards Requirements Packages, some of the changes from Version 3.0 to Version 4.0 of the National ITS Architecture are reflected in the addenda found on the Version 4.0 CD-ROM and website. Addenda were compiled to reflect the smaller changes to affected Standards Requirements Packages that did not necessitate a wholesale rewrite. Addenda have been created for Standards Requirements Packages 1, 2, 3, 5, 6, 7, 9, 10 and 11.

1.1 Standards Requirements Document Executive Summary

The executive summary of the Standards Requirements Document is reproduced here, to provide a sense of the overall goals and content of the document.

The Standards Requirements Document ("SRD") collects information from the other National ITS Architecture program documents and reorganizes it in a manner intended to support the development of critical ITS standards. The key results in the SRD are a reference model for the National ITS Architecture, a rating scheme for evaluating the standardization issues associated with individual data flows that make up the architecture interfaces, and then a set of priority groupings of interfaces into standards requirements "packages". These results and the major conclusions are summarized below.

The introductory section explains the structure of the SRD and its intended usage. The strategy is that the reference model provides the overall context for a standards development organization ("SDO"). A given SDO can pull a particular package of standards requirements out of the document and then use the reference model as a quick reference to the overall architecture. More detailed needs will require going to the original source documents, such as the Logical or Physical Architectures.

The next section provides the rationale for several different ratings schemes applied to the architecture interconnects and flows. These include interoperability requirements, technology maturity assessments, and stakeholder interest. All architecture interconnects were examined with respect to these measures. The stakeholder interest and interoperability requirements in particular were then used as the basis for selecting the standards requirements packages. In general, interfaces associated with mobile systems had both the greatest stakeholder interest and the most stringent interoperability requirements. Following close behind were interfaces associated with Traffic Management and Information Service Provider subsystems.

The Architecture Reference Model is provided next as a high level definition of the components that form the National ITS Architecture. It depicts the interconnectivity of the subsystems and terminators, their definitions, and suitable types of communication strategies. This reference model is an important tool for communicating the full breadth of the architecture at an abstracted level. In the SRD it is intended as a contextual reference, but, as a separate document, the reference model has received international circulation through the International Standards Organization (ISO) as a basis for documenting and comparing ITS architectures.

The "meat" of the SRD is the set of standards requirements packages. Each package is a special grouping of standards requirements and contextual information intended to be used in a nearly standalone fashion by an SDO. Thus, packages have been selected that cover the key ITS priorities, maintain the integrity and vision of the National ITS Architecture, and also are perceived as having an interested stakeholder constituency that will help drive standardization. This is a difficult balancing act, but the following 14 packages were identified as covering the high priority standardization needs for the architecture program:

1. Dedicated Short Range Communications (DSRC, formerly "VRC").
2. Digital Map Data Exchange and Location Referencing Formats.
3. Information Service Provider Wireless Interfaces.
4. Inter-Center Data Exchange for Commercial Vehicle Operations.
5. Personal, Transit, and HAZMAT Maydays.
6. Traffic Management Subsystem to Other Centers (except EMS).
7. Traffic Management Subsystem to Roadside Devices and Emissions Monitoring.
8. Signal Priority for Transit and Emergency Vehicles.
9. Emergency Management Subsystem to Other Centers.
10. Information Service Provider Subsystem to Other Centers (except EMS and TMS).
11. Transit Management Subsystem Interfaces.
12. Highway Rail Intersections (HRI).
13. Archived Data Management Subsystem Interfaces.
14. Maintenance and Construction Management Interfaces

These 14 areas cover much of the National ITS Architecture and represent the distillation of stakeholder interests and architecture interoperability requirements. If standardization can be achieved in the near term for all or most of these packages, then ITS will be a long ways towards achieving the original vision captured in the user service requirements.

1.2 Constructing a Standards Requirements Package

The intent of creating a Standards Requirements Package is to facilitate efforts to standardize some subset of the National ITS Architecture. The “packaging” process involves abstracting and reorganizing information from other documents, primarily the Logical and Physical Architectures.

This Standards Requirements Package has the following main components:

- General introduction to the scope and intent of this package
- Message transaction sets
- Decomposition of the interfaces
- Constraints
- Data Dictionary Entry definitions

The general introduction is self-explanatory, but the other items require some explanation. We will address them one at a time:

Message Transaction Sets: In order to accomplish a given activity, a series of messages usually have to be exchanged between two or more subsystems. These messages, as a group, constitute a message transaction set. The sequencing of the messages is shown via the physical architecture flow, each representing individual messages.

For version 4.0, we will be referencing portions of the revised Theory of Operations which defines the transactions for each Market Package.

Communications Considerations provides a discussion of the basic nature of the communications modalities that are suitable for supporting the interfaces in the particular standards requirements package. This section identifies some high level requirements, but the primary focus is to provide information that is viewed as useful to the initiation of the standardization process.

Decomposition of the Interfaces: This is the hierarchy of items that constitute an interface. It starts with the interface between two subsystems itself, or between a subsystem and a terminator, which is then decomposed into physical architecture flows. Each of the physical architecture flows is then decomposed into a set of Logical Architecture data flows are labeled with the type of communications technology appropriate for that flow. Figure 1 shows as example of an interface decomposition.

Constraints lists the architecture flows and any constraints placed upon them.

Data Dictionary Elements: These definitions are copied from the Logical Architecture Data Dictionary. Each DDE provides a description of the data flow, and a definition of its composite data elements. For a more in depth examination of each data flow and the functions (or PSpecs) that use it, it is necessary to refer to the logical architecture documentation.

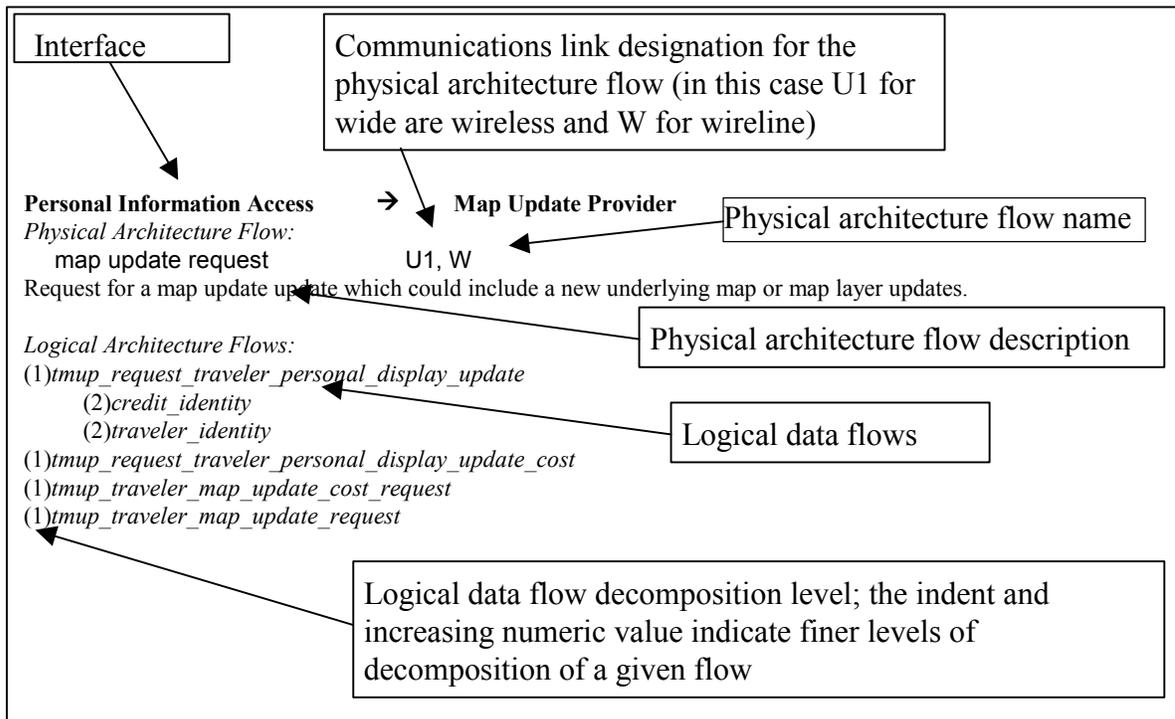


Figure 1. - Example of the Parts of an Interface Decomposition

As a final clarification, it is useful to remind readers of the distinction between the layers in the ISO OSI communications reference model and the layers in the National ITS Architecture. For purposes of analysis and discussion, the National ITS Architecture has been portrayed as having three layers: *the transportation, the communications, and the institutional layer*. The first two are of concern here. The transportation layer contains all the functionality of the National ITS Architecture. As a consequence, any discussion of interfaces, messages, data dictionary entries, etc., is drawn from the information in the transportation layer. The communications layer describes the technology required to support the information exchange needs of the transportation layer. These National ITS Architecture layers can be roughly mapped to the ISO OSI reference model; the transportation layer is typically at or above the application layer and the communications layer is most often concerned with the lowest four layers of the ISO OSI reference model. The interested reader is directed to the Communications Analysis Document for a more substantial explanation of this relationship.

This explanation of the layers is offered here because the terminology can be confusing. Every effort has been made to clarify when the “layered model” is the National ITS Architecture and when it is the OSI reference model. In general, when the term “communications layer” is used in the Standards Requirements Document, it refers to the National ITS Architecture “layer”.

2. Introduction to this Standards Package

This package is primarily concerned with the interfaces that support government-to-government and carrier-to-government interaction for processing commercial vehicle, driver, and cargo information. This is distinct from the wireless vehicle to roadside interface, which is covered in the DSRC standards requirement package. This package deals with the center-to-center data exchange required for electronic forms and data processing.

This package is critical for standardization of the government regulatory interface to the commercial carriers. Achieving accepted nationwide standards could lead to a consistent method for purchasing credentials and providing records. This would, in turn, lead to tremendous reductions in paper work and processing time for vehicles. Based on the size and importance of commercial trucking in the US, any increase in efficiency can yield a tremendous cost-benefit payoff.

Services that require this package include one-stop shopping for credentials, electronic fuel and registration fees filing, and a host of others. Standardization of this package will need to be coordinated with the CVO aspects of the DSRC work, to ensure that both this package and the DSRC standards requirement package in concert provide the entire set of required interactions.

Figure 2 shows the key interfaces described in this standards package.

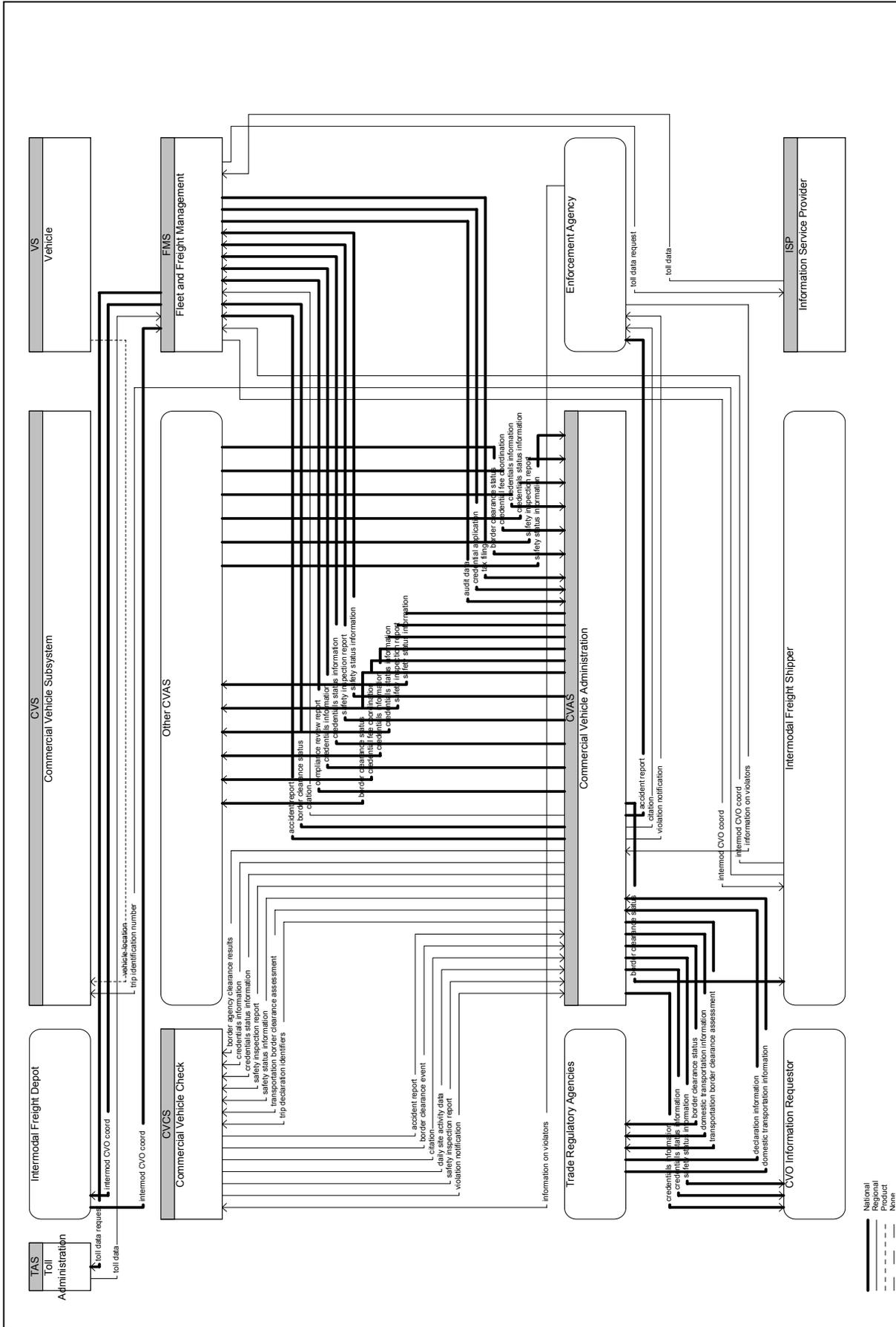


Figure 2 - Interfaces for Inter-Center Data Exchange for Commercial Vehicle Operations

3. Transaction Sets for Inter-Center Data Exchange for Commercial Vehicles

In this section we define the transaction sets needed to accomplish the CVO data exchange between centers. Based on the physical architecture data flows, a message sequence chart format along the lines of those defined under ISO standardization is used for clarity of presentation. The following subsections discuss the interactions between a pair of subsystems or between a subsystem and a terminator.

The transaction set figures used in this chapter identify the messages for inter-center exchange for Commercial Vehicle Operations. Where messages follow each other top to bottom, they represent a transaction sequence or protocol. Where messages are separated by a horizontal dotted line, the messages are distinct, and not related in any other particular sequence. Notes to the right of the messages or in some cases groups of messages amplify on details of the message protocols and sometimes a number in a circle identifies a following numbered section in the text which also describes the particular message or message sequence function. Most of the messages shown are physical architecture flows. Occasionally, in order to better explain the functionality the logical architecture data flows are used. The logical data flows will be printed with underscores between the words to distinguish them from the physical flows.

3.1 Commercial Vehicle Administration and Commercial Vehicle Check Subsystems

The Commercial Vehicle Administration Subsystem (CVAS) 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.

The Commercial Vehicle Check Subsystem (CVCS) 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 manual override by the operator. 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 preclearance program.

The CVAS supports communications with Commercial Vehicle Check Subsystems operating at the roadside to enable credential checking and safety information collection. The CVAS to CVCS is one of the key interfaces of the National Architecture with respect to CVO. Information is exchanged for performing electronic clearance, international border clearance, and safety inspections. The following subsections describe the sequence of flows to provide each of these functions.

3.1.1 Electronic Clearance & International Border Crossing

Both Electronic Clearance and International Border Crossing has three major components- obtaining credentials, distribution information regarding the cleared vehicles information to the roadside facilities and the actual vehicle to roadside data exchanges. Obtaining Credentials is primarily handled through the Fleet and Freight Management Subsystem to CVAS interface and is discussed in that section. The

interface between the CVAS and the CVCS is discussed below. The CVCS to Commercial Vehicle Subsystem (CVS) interface is discussed in Standards Requirements Package 1: Dedicated Short Range Communications. The flows for the CVAS to CVCS interface are shown in Figure 2.

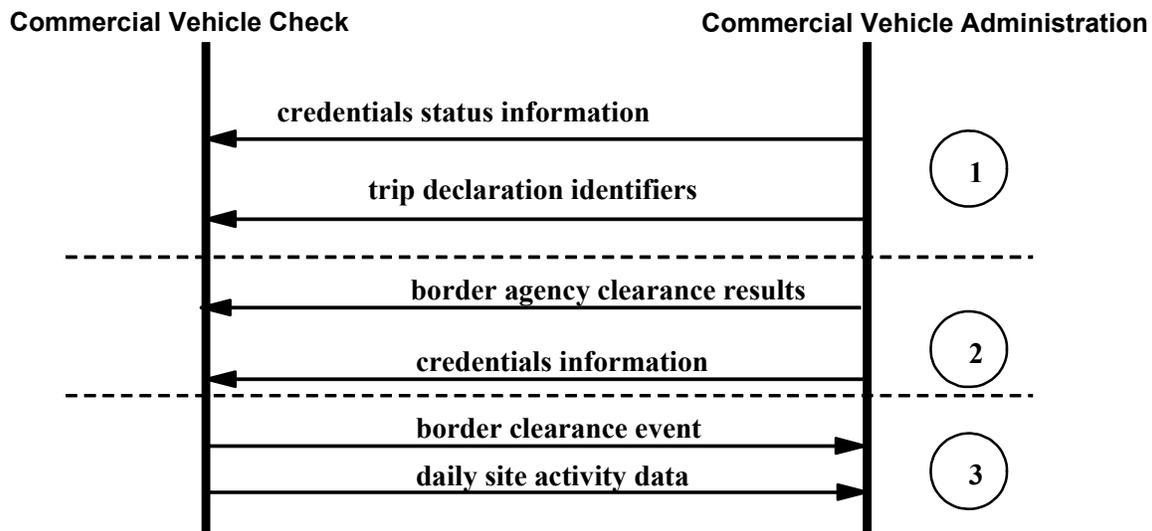


Figure 2 - Electronic Clearance & International Border Clearance Transaction Sets

Periodically (e.g. prior to beginning operations for a shift or day) the Commercial Vehicle Check subsystem (CVCS) on the roadside is sent an update to its local store of credentials for vehicles, carriers and drivers from the Commercial Vehicle Administration subsystem (CVAS) (transaction set 1 in Figure 2). In some deployments, this store may contain only problem (e.g. expired) credentials and out-of-service records, and in other deployments, could be *all* credentials.

In some cases a CVCS will be “mobile,” that is, the location of their operation will change, but during the operation, they will be stationary. A CVCS operating in this way may use wireless WAN communications to exchange messages with their CVAS.

In some cases the CVCS may want to access information about a specific set of credentials in real time. The following steps allow a CVCS to access the full and most recent CVAS stored profile about a particular vehicle, driver or carrier that has been pulled-in. In some deployments where latency of this request-response transaction is sufficiently fast, these steps can be executed prior to making a pass/pull-in determination. For example, some roadside CVCS deployments may use two beacons separated by sufficient space on the roadway so that vehicles passing the first beacon where the tag information is read, will take sufficient time before passing the second beacon where the pass/pull-in message is sent, even at mainline speeds, for all data requests and processing to take place. For example, if the beacons are separated by one-mile, then vehicles traveling at 60-miles per hour will allow one-minute for the data access and pass/pull-in determination processing. Different spacings can be determined to allow for different maximum vehicle speeds and different worst case data access and processing latencies.

1. The CVCS uses the IDs read from the vehicle tag to access the respective Carrier, Vehicle and/or Driver profiles from the CVAS. This can be for electronic clearance or for international border clearance.

2. The requested border agency clearance results and credentials information are sent from the CVAS to the CVCS (credentials information- transaction set 2 in Figure 2). This can be for electronic clearance or for international border clearance.

Also, on a periodic (or as needed) basis, the CVCS will upload the results of its activities to the CVAS. There are two types of updates which can be provided: roadside log update (for clearance event data) and international border crossing data update (for the border crossing case) (transaction set 3 in Figure 2).

3.1.2 Safety Inspection

The following data flows describe the transactions between the CVAS and the CVCS for the transfer of safety inspection information. The data flows are shown in Figure 3.

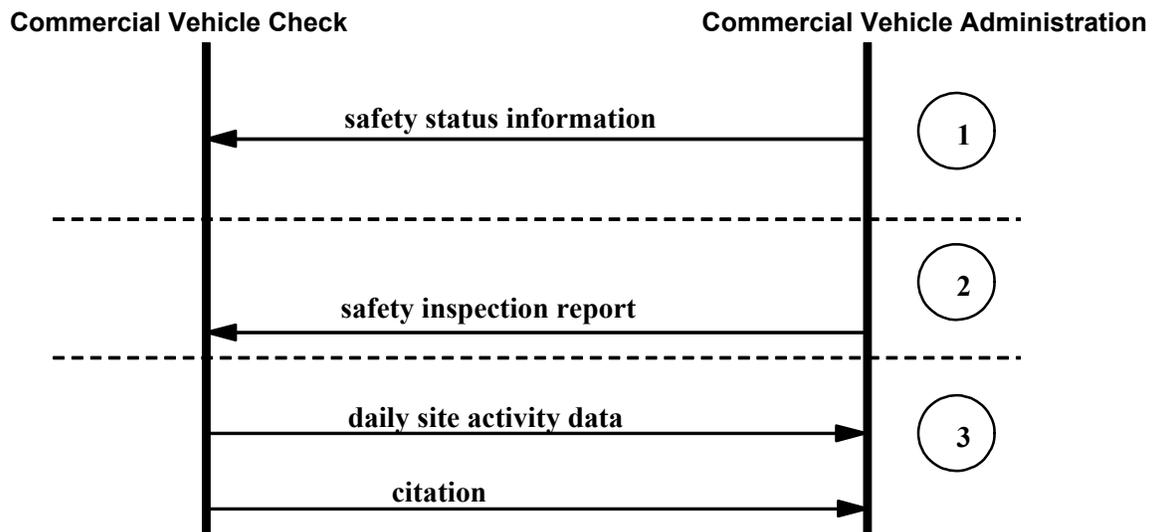


Figure 3 - Safety Inspection Transaction Sets

The CVA subsystem prepares Carrier, Vehicle and Driver Safety Snapshot data and sends this periodically (e.g., each shift or once daily) to the CVC subsystems (part of flow 'safety status information' transaction set 1 in Figure 3). Real-time updates of the CVO database update can also be sent from the CVA subsystem to the CVC subsystem to announce changes such as an out-of-service condition obtained in real time from another CVC subsystem.

The following steps allow a CVC subsystem to access the full and most recent CVA subsystem stored profile about a particular vehicle, driver or carrier that has been pulled-in. In some deployments where latency of this request-response transaction is sufficiently fast, these steps can be executed prior to making a pass/pull-in determination. For example, some roadside CVC deployments may use two beacons separated by sufficient space on the roadway so that vehicles passing the first beacon where the tag information is read, will take sufficient time before passing the second beacon where the pass/pull-in message is sent, even at mainline speeds, for all data requests and processing to take place. For example, if the beacons are separated by one-mile, then vehicles traveling at 60-miles per hour will allow one-minute for the data access and pass/pull-in determination processing. Different spacings can be determined to allow for different maximum vehicle speeds and different worst case data access and processing latencies.

1. After Pull-In, or if using two beacons after having read the Identification Numbers at the first beacon, a request to the CVA subsystem for prior inspection reports or the full data profile of the carrier, vehicle and/or driver can be issued by the CVC subsystem.
2. The CVC subsystem receives all requested prior inspection reports or profiles from the CVA subsystem (the 'safety inspection report' flow, transaction set 2 in Figure 3)

Results of the inspection activity are sent from the CVCS to the CVAS on a periodic basis (as part of 'daily site activity data' flow, transaction set 3 in Figure 3). If the safety assessment involves significant changes from the current snapshot data or Profile data (e.g. a change in out-of-service status) then an operational update can be sent in real time to the CVA subsystem. Otherwise, safety inspection results are periodically (e.g. once per shift or daily) sent from the CVC subsystem to the CVA subsystem. A separate flow is provided for transmittal of citation from the CVCS to the CVAS (transaction set 3 in Figure 3).

3.2 CVAS and CVO Information Requestor

The CVO Information Requestor terminator represents any organization requesting information from the CVO Information Exchange network. An example of this is insurance companies requesting safety information on carriers. The CVAS collects safety information from the CVCS which is processed, stored, and made available to qualified stakeholders. The basic transaction is requested from the CVAS and a response is sent to the CVO Information Requestor as shown in Figure 4 .

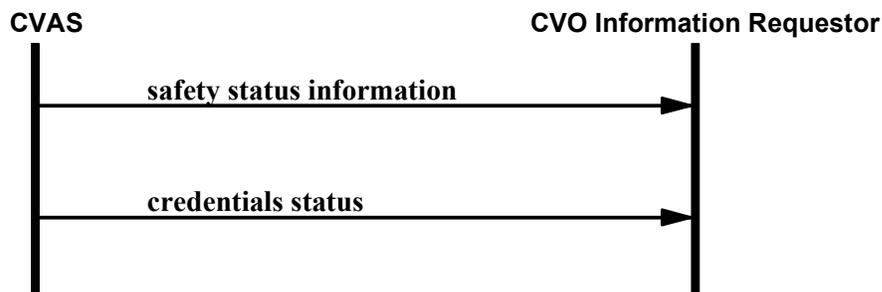


Figure 4 - CVAS to CVO Information Requestor Transaction Set

3.3 CVAS to Enforcement Agency

The architecture supports the possibility of the CVAS sending information to and receiving information from an Enforcement Agency. There are two types of information flow.

The Enforcement Agency supplies the CVAS with the information on the violators (transaction set 1 in Figure 5). In the second transaction set, there are three flows of information regarding violations and citations that have been issued to a driver or vehicle at a roadside station ('violation notification', flow 'citation', and 'accident report', transaction set 2 in Figure 5) from the CVAS to the Enforcement Agency.

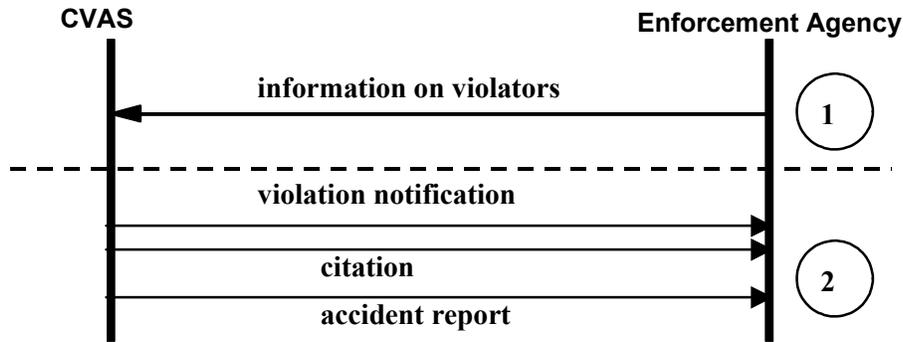


Figure 5 - CVAS to Enforcement Agency Transaction Sets

3.4 CVAS to Fleet and Freight Management Subsystem

The CVAS communicates with the Fleet and Freight Management Subsystems (FMS) associated with the motor carriers to process credentials applications and collect taxes and fees associated with commercial vehicle operations. The CVAS also receives applications for, and issues special Oversize/Overweight and HAZMAT permits in coordination with other cognizant authorities. Figure 6 shows the data flows between the CVAS and the FMS.

The FMS initiates an electronic credentials application. The application is processed by the CVAS and when approved the completed credentials are sent to the FMS (transaction set 1 in Figure 6). An additional function performed by the FMS is to obtain information for its fleet. The CVAS sends information to the FMS which contains the results of CV safety inspections (flow 'safety inspection report', transaction set 2). The CVAS periodically sends a compliance review report regarding their fleet (flow 'compliance review report', transaction set 3). Finally the FMS can send tax or audit data to the CVAS (flow 'tax filing' or 'audit data', transaction set 4).

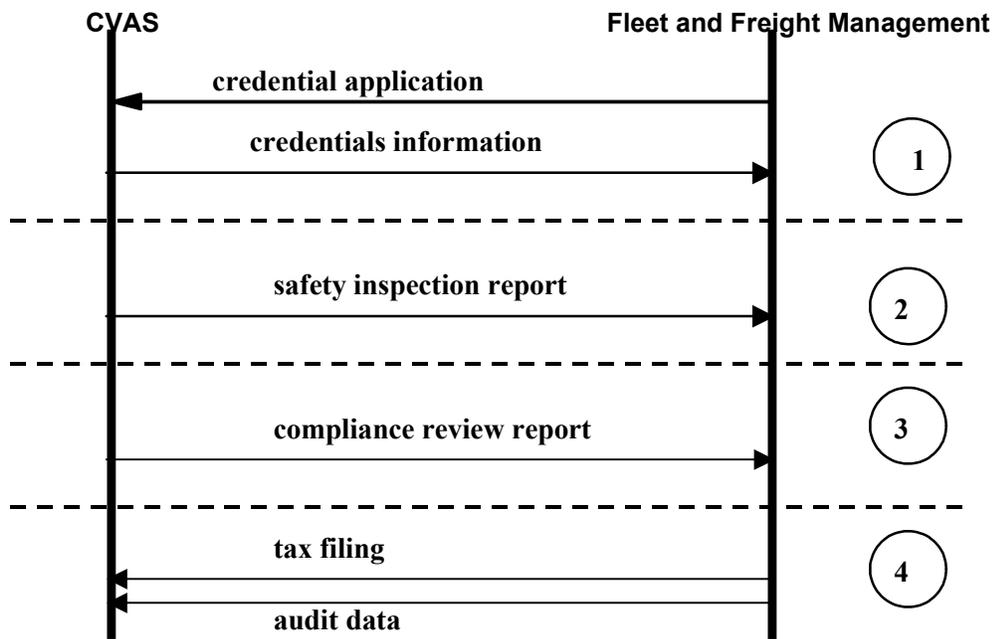


Figure 6 - CVAS to FMS Transaction Sets

3.5 CVAS to Other CVAS

The CVAS coordinates with other CVAS (in other states/regions) to support nationwide access to credentials and safety information for administration and enforcement functions. Two basic functionalities are supported by the architecture. The first is to support an exchange of specific information on a carrier, driver, or vehicle. shows the flows in transaction set 1 as being one direction, but the capability exists for this to occur in either direction. Another more general transaction is CVAS information exchange of general information about taxes, fees, usage, etc. Another set of transactions between CVAS' concern the exchange of information related to border clearances.

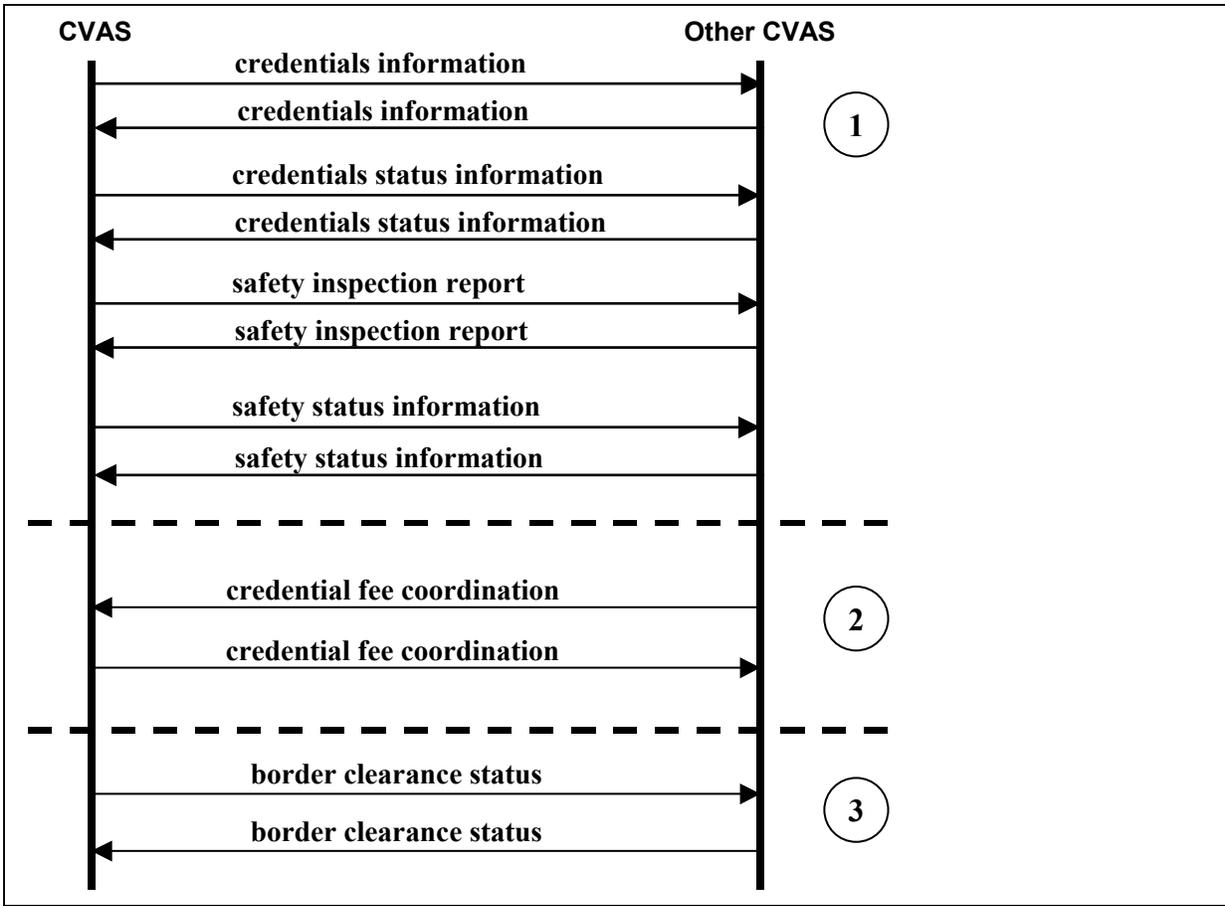


Figure 7 - CVAS to Other CVAS Transaction Sets

3.6 FMS to Intermodal Freight Depot and Shipper

The National Architecture has included an interface from the FMS to Intermodal Freight Depot and to Intermodal Freight Shipper for Intermodal coordination. The functionality of Intermodal freight operations is not included in the 32 user services which the architecture is designed to satisfy, but an architectural "hook" for future inclusion of this functionality into the architecture has been provided.

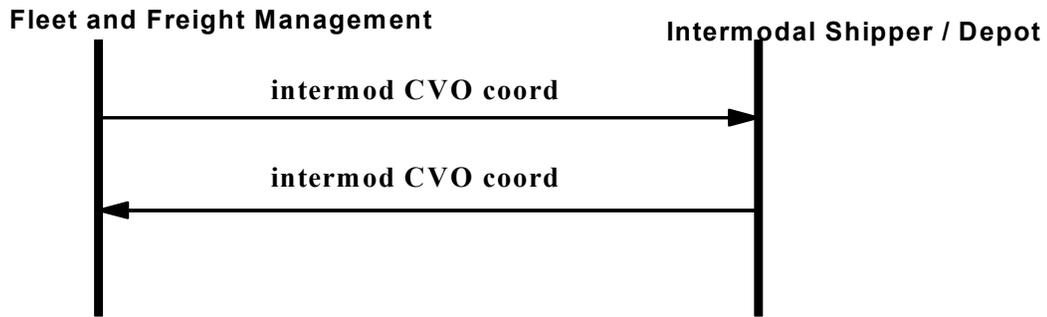


Figure 8 - FMS to Intermodal Freight Depot/Shipper Transaction Set

4. Interface Decomposition

This section shows the interface decomposition for the interfaces covered in this package. The format shows the interface followed by the first physical architecture flow in the interface and its description. Each of the physical architecture flows is then decomposed into its constituent logical data flows, which in turn are decomposed hierarchically into more basic data flows. The data flows are numbered and indented to indicate which are top level flows (1) and which are constituent data flows (numbered 2 and lower). The definitions for all of the logical data flows are given in Section 7. That section contains the data dictionary entries, listed in alphabetical order, for all of the data flows contained in this package.

4.1 Commercial Vehicle Check → Commercial Vehicle Administration

Physical Architecture Flow: **accident report** W

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.

Logical Architecture Flows:

(1) *cvo_accident_data*

Physical Architecture Flow: **border clearance event** W

Reports clearance event data regarding action taken at border, including acceptance or override of system decision, and date/time stamp

Logical Architecture Flows:

- (1) *cvo_border_clearance*
 - (2) *cv_border_record*
 - (3) *cv_border_override*
 - (4) *cv_border_override_code*
 - (5) *cv_operator_override*
 - (4) *cv_credentials_details*
 - (5) *cv_carrier_number*
 - (5) *cv_driver_number*
 - (5) *cv_vehicle_number*
 - (4) *time*
 - (3) *cv_border_pull_in_output*
 - (4) *cv_border_problem*
 - (4) *cv_credentials_details*
 - (5) *cv_carrier_number*
 - (5) *cv_driver_number*
 - (5) *cv_vehicle_number*
 - (4) *time*
 - (3) *list_size*
 - (2) *cv_roadside_facility_identity*
 - (2) *date*

Physical Architecture Flow: **citation** W

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. A citation differs

from a violation because it is adjudicated by the courts. 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.

Logical Architecture Flows:

- (1) *cv_citation_data*

Physical Architecture Flow: daily site activity data

W

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

Logical Architecture Flows:

- (1) *cv_roadside_daily_log*
 - (2) *cv_roadside_facility_identity*
 - (2) *cv_roadside_record*
 - (3) *cv_archived_inspection_data*
 - (4) *cv_credentials_details*
 - (5) *cv_carrier_number*
 - (5) *cv_driver_number*
 - (5) *cv_vehicle_number*
 - (4) *cv_driver_details*
 - (5) *cv_driver_credentials*
 - (5) *cv_driver_license_citations*
 - (4) *cv_inspection_data*
 - (4) *cv_inspector_safety_data_input*
 - (4) *cv_not_pulled_in*
 - (4) *cv_roadside_report*
 - (4) *cv_safety_status_code*
 - (4) *cv_vehicle_details*
 - (5) *cv_credentials*
 - (5) *cv_fuel_purchase_data*
 - (5) *cv_inspection_activities_data*
 - (5) *cv_log_data*
 - (5) *cv_repairs_and_service_records*
 - (5) *cv_safety_systems_diagnostics_results*
 - (5) *cv_vehicle_log*
 - (5) *list_size*
 - (4) *time*
- (3) *cv_archived_safety_data*
 - (4) *cv_credentials_details*
 - (5) *cv_carrier_number*
 - (5) *cv_driver_number*
 - (5) *cv_vehicle_number*
 - (4) *cv_safety_override*
 - (5) *cv_credentials_details*
 - (5) *cv_safety_override_code*
 - (4) *cv_safety_pull_in_output*
 - (5) *cv_credentials_details*
 - (5) *cv_safety_problem*
 - (4) *time*

- (3) *cv_screening_record*
- (4) *cv_credentials_details*
 - (5) *cv_carrier_number*
 - (5) *cv_driver_number*
 - (5) *cv_vehicle_number*
- (4) *cv_screening_override*
 - (5) *cv_credentials_details*
 - (5) *cv_screening_override_code*
- (4) *cv_screening_pull_in_output*
 - (5) *cv_credentials_details*
 - (5) *cv_credentials_problem*
- (4) *time*
- (3) *list_size*
- (2) *date*

Physical Architecture Flow: safety inspection report

W

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.

Logical Architecture Flows:

- (1) *cvo_safety_inspection_data*
 - (2) *cv_archived_inspection_data*
 - (3) *cv_credentials_details*
 - (4) *cv_carrier_number*
 - (4) *cv_driver_number*
 - (4) *cv_vehicle_number*
 - (3) *cv_driver_details*
 - (4) *cv_driver_credentials*
 - (4) *cv_driver_license_citations*
 - (3) *cv_inspection_data*
 - (3) *cv_inspector_safety_data_input*
 - (3) *cv_not_pulled_in*
 - (3) *cv_roadside_report*
 - (3) *cv_safety_status_code*
 - (3) *cv_vehicle_details*
 - (4) *cv_credentials*
 - (4) *cv_fuel_purchase_data*
 - (5) *cv_fuel_purchase_cost*
 - (5) *cv_fuel_purchase_quantity*
 - (4) *cv_inspection_activities_data*
 - (4) *cv_log_data*
 - (5) *cv_driver_number*
 - (5) *cv_log_entry_date*
 - (5) *cv_log_entry_location*
 - (5) *cv_log_entry_mileage*
 - (5) *cv_log_entry_time*
 - (4) *cv_repairs_and_service_records*
 - (4) *cv_safety_systems_diagnostics_results*
 - (4) *cv_vehicle_log*

- (5) *cv_cargo_discharged*
- (5) *cv_cargo_loaded*
- (4) *list_size*
- (3) *time*
- (2) *cv_archived_safety_data*
- (3) *cv_credentials_details*
- (4) *cv_carrier_number*
- (4) *cv_driver_number*
- (4) *cv_vehicle_number*
- (3) *cv_safety_override*
- (4) *cv_credentials_details*
- (5) *cv_carrier_number*
- (5) *cv_driver_number*
- (5) *cv_vehicle_number*
- (4) *cv_safety_override_code*
- (5) *cv_operator_override*
- (3) *cv_safety_pull_in_output*
- (4) *cv_credentials_details*
- (5) *cv_carrier_number*
- (5) *cv_driver_number*
- (5) *cv_vehicle_number*
- (4) *cv_safety_problem*
- (3) *time*

Physical Architecture Flow: violation notification

W

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 and how far out of adjustment it was). A violation differs from a citation because it is not adjudicated by the courts.

Logical Architecture Flows:

- (1) *cvo_violation*

4.2 Enforcement Agency → Commercial Vehicle Administration

Physical Architecture Flow: information on violators

W

Response from law enforcement agency to request for information on violators. May include information about commercial vehicle violations or other kinds of violations associated with the particular entity.

Logical Architecture Flows:

- (1) *fea_cv_enforcement_agency_response*

4.3 Fleet and Freight Management → Commercial Vehicle Administration

Physical Architecture Flow: audit data

W

Information to support a tax audit.

Logical Architecture Flows:

- (1) *cvo_audit_data*

Physical Architecture Flow: credential application

W

Application for commercial vehicle credentials. Authorization for payment is included.

Logical Architecture Flows:

- (1) *cf_enrollment_request*
 - (2) *border_crossing_request*
 - (2) *cv_credentials_details*
 - (3) *cv_carrier_number*
 - (3) *cv_driver_number*
 - (3) *cv_vehicle_number*
 - (2) *cv_route_data*
 - (3) *route_cost*
 - (3) *route_list*
 - (4) *route_segment_number*
 - (3) *route_segment_commercial_details*
 - (4) *route_segment_end_point*
 - (5) *location_identity*
 - (4) *route_segment_estimated_condition*
 - (4) *route_segment_estimated_travel_time*
 - (4) *route_segment_predicted_weather*
 - (4) *route_segment_start_point*
 - (5) *location_identity*
 - (3) *route_start_time*
 - (4) *date*
 - (4) *time*
 - (3) *route_statistics*
 - (2) *cv_route_number*
 - (2) *cv_trip_classification_data*
 - (3) *cv_cargo_class*
 - (3) *cv_vehicle_class*
 - (3) *cv_weight_class*
 - (2) *cv_trip_identity*
 - (2) *route_type*
 - (2) *special_vehicle_application*
 - (3) *hazmat_load_data*
- (1) *cv_enrollment_request*
 - (2) *border_crossing_request*
 - (2) *cv_credentials_details*
 - (3) *cv_carrier_number*
 - (3) *cv_driver_number*
 - (3) *cv_vehicle_number*
 - (2) *cv_route_data*
 - (3) *route_cost*
 - (3) *route_list*

- (4) *route_segment_number*
- (3) *route_segment_commercial_details*
 - (4) *route_segment_end_point*
 - (5) *location_identity*
 - (4) *route_segment_estimated_condition*
 - (4) *route_segment_estimated_travel_time*
 - (4) *route_segment_predicted_weather*
 - (4) *route_segment_start_point*
 - (5) *location_identity*
- (3) *route_start_time*
 - (4) *date*
 - (4) *time*
- (3) *route_statistics*
- (2) *cv_route_number*
- (2) *cv_trip_classification_data*
 - (3) *cv_cargo_class*
 - (3) *cv_vehicle_class*
 - (3) *cv_weight_class*
- (2) *cv_trip_identity*
- (2) *route_type*
- (2) *special_vehicle_application*
 - (3) *hazmat_load_data*

Physical Architecture Flow: tax filing

W

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

Logical Architecture Flows:

- (1) *cf_tax_data*

4.4 Other CVAS → Commercial Vehicle Administration

Physical Architecture Flow: border clearance status

W

Notification regarding the crossing status of commercial freight shipment scheduled to enter the U.S. Includes portions of border agency and transportation agency clearance results, as they become available. Recipients may include trade regulatory agencies that do not receive status information directly from U.S. Customs (e.g., other transportation agencies with trade related responsibilities, such as NHTSA, MARAD, etc.)

Logical Architecture Flows:

- (1) *focvas_border_clearance*

Physical Architecture Flow: credential fee coordination

W

Jurisdiction's rates for various credentials (IRP, IFTA, etc.) that are exchanged between agencies.

Logical Architecture Flows:

- (1) *focvas_data_table*

Physical Architecture Flow: credentials information

W

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.

Logical Architecture Flows:

(1) *focvas_credentials*

Physical Architecture Flow: credentials status information

W

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." The status information may be provided as a response to a real-time query or as a result of a standing request for updated information (subscription). This may also include information about non-U.S. fleets for use by U.S. authorities, and information regarding U.S. fleets made available to Mexican and Canadian authorities. The query flow is not explicitly shown.

Logical Architecture Flows:

(1) *focvas_credentials_status*

Physical Architecture Flow: safety inspection report

W

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.

Logical Architecture Flows:

(1) *focvas_safety_inspection*

Physical Architecture Flow: safety status information

W

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 or as a result of a standing request for updated information (subscription). This may also include information about non-U.S. fleets for use by U.S. authorities, and information regarding U.S. fleets made available to Mexican and Canadian authorities. The query flow is not explicitly shown.

Logical Architecture Flows:

(1) *focvas_safety_status*

4.5 Trade Regulatory Agencies → Commercial Vehicle Administration

Physical Architecture Flow: declaration information

W

Notification containing information regarding pending commercial freight shipment into the U.S.

Logical Architecture Flows:

(1) *fira_declaration_information*

Physical Architecture Flow: domestic transportation information

W

Real-time or near real-time data regarding trade transportation activity. Potentially categorized by shipper classification, carrier, commodity, etc. Intended for use as a transportation decision tool.

Logical Architecture Flows:

- (1) *ftira_domestic_transportation_information*

4.6 Commercial Vehicle Administration → Commercial Vehicle Check

Physical Architecture Flow: border agency clearance results

W

Notification regarding the granting of permission for commercial freight shipment to enter the U.S.

Logical Architecture Flows:

- (1) *cvo_border_agency_clearance_results*
- (2) *cvo_border_results*

Physical Architecture Flow: credentials information

W,U1t

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.

Logical Architecture Flows:

- (1) *cv_credentials_information_response*
- (2) *cv_credentials_details*
- (3) *cv_carrier_number*
- (3) *cv_driver_number*
- (3) *cv_vehicle_number*
- (2) *cv_credentials_status_code*

Physical Architecture Flow: credentials status information

W

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." The status information may be provided as a response to a real-time query or as a result of a standing request for updated information (subscription). This may also include information about non-U.S. fleets for use by U.S. authorities, and information regarding U.S. fleets made available to Mexican and Canadian authorities. The query flow is not explicitly shown.

Logical Architecture Flows:

- (1) *cv_credentials_database_update*
- (2) *cv_credentials_details*
- (3) *cv_carrier_number*
- (3) *cv_driver_number*
- (3) *cv_vehicle_number*
- (2) *cv_credentials_status_code*
- (2) *cv_trip_classification_data*
- (3) *cv_cargo_class*
- (3) *cv_vehicle_class*

- (3) *cv_weight_class*

Physical Architecture Flow: safety inspection report

W,U1t

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.

Logical Architecture Flows:

- (1) *cv_safety_information_response*
 - (2) *cv_credentials_details*
 - (3) *cv_carrier_number*
 - (3) *cv_driver_number*
 - (3) *cv_vehicle_number*
 - (2) *cv_roadside_safety_data*
 - (3) *cv_driver_details*
 - (4) *cv_driver_credentials*
 - (4) *cv_driver_license_citations*
 - (3) *cv_safety_status_code*
 - (3) *cv_vehicle_details*
 - (4) *cv_credentials*
 - (4) *cv_fuel_purchase_data*
 - (5) *cv_fuel_purchase_cost*
 - (5) *cv_fuel_purchase_quantity*
 - (4) *cv_inspection_activities_data*
 - (4) *cv_log_data*
 - (5) *cv_driver_number*
 - (5) *cv_log_entry_date*
 - (5) *cv_log_entry_location*
 - (5) *cv_log_entry_mileage*
 - (5) *cv_log_entry_time*
 - (4) *cv_repairs_and_service_records*
 - (4) *cv_safety_systems_diagnostics_results*
 - (4) *cv_vehicle_log*
 - (5) *cv_cargo_discharged*
 - (5) *cv_cargo_loaded*
 - (4) *list_size*

Physical Architecture Flow: safety status information

W

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 or as a result of a standing request for updated information (subscription). This may also include information about non-U.S. fleets for use by U.S. authorities, and information regarding U.S. fleets made available to Mexican and Canadian authorities. The query flow is not explicitly shown.

Logical Architecture Flows:

- (1) *cv_safety_database_update*
 - (2) *cv_credentials_details*
 - (3) *cv_carrier_number*
 - (3) *cv_driver_number*

- (3) *cv_vehicle_number*
- (2) *cv_roadside_safety_data*
 - (3) *cv_driver_details*
 - (4) *cv_driver_credentials*
 - (4) *cv_driver_license_citations*
 - (3) *cv_safety_status_code*
 - (3) *cv_vehicle_details*
 - (4) *cv_credentials*
 - (4) *cv_fuel_purchase_data*
 - (5) *cv_fuel_purchase_cost*
 - (5) *cv_fuel_purchase_quantity*
 - (4) *cv_inspection_activities_data*
 - (4) *cv_log_data*
 - (5) *cv_driver_number*
 - (5) *cv_log_entry_date*
 - (5) *cv_log_entry_location*
 - (5) *cv_log_entry_mileage*
 - (5) *cv_log_entry_time*
 - (4) *cv_repairs_and_service_records*
 - (4) *cv_safety_systems_diagnostics_results*
 - (4) *cv_vehicle_log*
 - (5) *cv_cargo_discharged*
 - (5) *cv_cargo_loaded*
 - (4) *list_size*

Physical Architecture Flow: transportation border clearance assessment W

Notification regarding the granting of permission for commercial freight shipment to enter the U.S. Includes directions for commercial driver to proceed to nearest vehicle weigh and inspection station for further review if required.

Logical Architecture Flows:

- (1) *cvo_transportation_border_clearance*
- (2) *cvo_transportation_border_results*

Physical Architecture Flow: trip declaration identifiers W

Specific identifiers extracted from notification containing information regarding pending commercial freight shipment into the U.S. includes carrier, vehicle, and driver identification data.

Logical Architecture Flows:

- (1) *cv_border_database_update*
 - (2) *cv_credentials_details*
 - (3) *cv_carrier_number*
 - (3) *cv_driver_number*
 - (3) *cv_vehicle_number*
 - (2) *cv_trip_identity*

4.7 Enforcement Agency → Commercial Vehicle Check

Physical Architecture Flow: information on violators

W

Response from law enforcement agency to request for information on violators. May include information about commercial vehicle violations or other kinds of violations associated with the particular entity.

Logical Architecture Flows:

(1) *fea_violator_information*

4.8 Intermodal Freight Shipper → Commercial Vehicle Subsystem

Physical Architecture Flow: trip identification number

U1t,U2

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

Logical Architecture Flows:

(1) *fifs_trip_identification_number*

4.9 Vehicle → Commercial Vehicle Subsystem

Physical Architecture Flow: vehicle location

V

Location of vehicle and other vehicle characteristics which are exchanged between vehicle subsystems.

Logical Architecture Flows:

(1) *vehicle_location_for_cv*

(2) *location_identity*

4.10 Commercial Vehicle Administration → CVO Information Requestor

Physical Architecture Flow: credentials information

W

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.

Logical Architecture Flows:

(1) *tcvoir_credentials*

Physical Architecture Flow: credentials status information

W

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." The status information may be provided as a response to a real-time query or as a result of a standing request for updated information (subscription). This may also include information about non-U.S. fleets for use by U.S. authorities, and information regarding U.S. fleets made available to Mexican and Canadian authorities. The query flow is not explicitly shown.

Logical Architecture Flows:

(1) *tcvoir_credential_status*

Physical Architecture Flow: safety status information

W

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 or as a result of a standing request for updated information (subscription). This may also include information about non-U.S. fleets for use by U.S. authorities, and information regarding U.S. fleets made available to Mexican and Canadian authorities. The query flow is not explicitly shown.

Logical Architecture Flows:

(1) *tcvoir_safety_status*

4.11 Commercial Vehicle Administration → Enforcement Agency

Physical Architecture Flow: accident report

W

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.

Logical Architecture Flows:

(1) *tea_accident_data*

Physical Architecture Flow: citation

W

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. A citation differs from a violation because it is adjudicated by the courts. 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.

Logical Architecture Flows:

(1) *tea_cv_citation_data*

Physical Architecture Flow: violation notification

W

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 and how far out of adjustment it was). A violation differs from a citation because it is not adjudicated by the courts.

Logical Architecture Flows:

(1) *tea_cv_violation_data*

4.12 Commercial Vehicle Administration → Fleet and Freight Management

Physical Architecture Flow: accident report

W

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.

Logical Architecture Flows:

- (1) *cvo_accident_data_for_fleet*
- (2) *cvo_accident_data*

Physical Architecture Flow: border clearance status

W

Notification regarding the crossing status of commercial freight shipment scheduled to enter the U.S. Includes portions of border agency and transportation agency clearance results, as they become available. Recipients may include trade regulatory agencies that do not receive status information directly from U.S. Customs (e.g., other transportation agencies with trade related responsibilities, such as NHTSA, MARAD, etc.)

Logical Architecture Flows:

- (1) *cvo_border_clearance_for_fleet*
- (2) *cvo_border_clearance_info*
- (3) *cvo_border_clearance*
- (4) *cv_border_record*
- (5) *cv_border_override*
- (5) *cv_border_pull_in_output*
- (5) *list_size*
- (4) *cv_roadside_facility_identity*
- (4) *date*
- (2) *cvo_border_status_from_other_cvas*
- (3) *cvo_border_clearance_info*
- (4) *cvo_border_clearance*
- (5) *cv_border_record*
- (5) *cv_roadside_facility_identity*
- (5) *date*

Physical Architecture Flow: citation

W

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. A citation differs from a violation because it is adjudicated by the courts. 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.

Logical Architecture Flows:

- (1) *cvo_citation*
- (2) *cvo_citation_data*

Physical Architecture Flow: compliance review report

W

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. The query flow is not explicitly shown.

Logical Architecture Flows:

- (1) *cf_roadside_activity_report*
 - (2) *cv_roadside_facility_identity*
 - (2) *cv_roadside_single_activity_data*
 - (3) *cv_roadside_activity_details*
 - (4) *cv_archived_inspection_data*
 - (5) *cv_credentials_details*
 - (5) *cv_driver_details*
 - (5) *cv_inspection_data*
 - (5) *cv_inspector_safety_data_input*
 - (5) *cv_not_pulled_in*
 - (5) *cv_roadside_report*
 - (5) *cv_safety_status_code*
 - (5) *cv_vehicle_details*
 - (5) *time*
 - (4) *cv_archived_safety_data*
 - (5) *cv_credentials_details*
 - (5) *cv_safety_override*
 - (5) *cv_safety_pull_in_output*
 - (5) *time*
 - (4) *cv_border_record*
 - (5) *cv_border_override*
 - (5) *cv_border_pull_in_output*
 - (5) *list_size*
 - (4) *cv_screening_record*
 - (5) *cv_credentials_details*
 - (5) *cv_screening_override*
 - (5) *cv_screening_pull_in_output*
 - (5) *time*
 - (4) *date*
 - (3) *list_size*
 - (2) *list_size*

Physical Architecture Flow: credentials information

W,U1t

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.

Logical Architecture Flows:

- (1) *cf_enrollment_information*
 - (2) *cv_border_enrollments*
 - (2) *cv_route_number*
 - (2) *cv_special_vehicle_enrollments*
 - (2) *cv_taxes_and_duties*
 - (2) *route*
 - (3) *route_cost*
 - (3) *route_list*
 - (4) *route_segment_number*
 - (3) *route_segment*
 - (4) *route_segment_data*
 - (5) *route_segment_description*

- (5) *route_segment_end_point*
- (5) *route_segment_estimated_arrival_time*
- (5) *route_segment_estimated_condition*
- (5) *route_segment_estimated_travel_time*
- (5) *route_segment_predicted_weather*
- (5) *route_segment_report_position_points*
- (5) *route_segment_start_point*
- (4) *route_segment_identity*
 - (5) *location_identity*
 - (5) *route_segment_type*
 - (5) *unit_number*
- (4) *route_segment_mode*
- (3) *route_start_time*
 - (4) *date*
 - (4) *time*
- (3) *route_statistics*
- (2) *route_type*
- (1) *cf_enrollment_payment_confirmation*
 - (2) *cv_account_number*
 - (2) *cv_amount_billed*
 - (2) *cv_route_number*
- (1) *cv_enrollment_information*
 - (2) *cv_border_enrollments*
 - (2) *cv_route_number*
 - (2) *cv_special_vehicle_enrollments*
 - (2) *cv_taxes_and_duties*
 - (2) *route*
 - (3) *route_cost*
 - (3) *route_list*
 - (4) *route_segment_number*
 - (3) *route_segment*
 - (4) *route_segment_data*
 - (5) *route_segment_description*
 - (5) *route_segment_end_point*
 - (5) *route_segment_estimated_arrival_time*
 - (5) *route_segment_estimated_condition*
 - (5) *route_segment_estimated_travel_time*
 - (5) *route_segment_predicted_weather*
 - (5) *route_segment_report_position_points*
 - (5) *route_segment_start_point*
 - (4) *route_segment_identity*
 - (5) *location_identity*
 - (5) *route_segment_type*
 - (5) *unit_number*
 - (4) *route_segment_mode*
 - (3) *route_start_time*
 - (4) *date*
 - (4) *time*
 - (3) *route_statistics*
 - (2) *route_type*

- (1) *cv_enrollment_payment_confirmation*
- (2) *cv_account_number*
- (2) *cv_amount_billed*
- (2) *cv_driver_credit_identity*
- (3) *credit_identity*
- (3) *stored_credit*
- (2) *cv_route_number*

Physical Architecture Flow: credentials status information

W

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." The status information may be provided as a response to a real-time query or as a result of a standing request for updated information (subscription). This may also include information about non-U.S. fleets for use by U.S. authorities, and information regarding U.S. fleets made available to Mexican and Canadian authorities. The query flow is not explicitly shown.

Logical Architecture Flows:

- (1) *cvo_credential_status*

Physical Architecture Flow: safety inspection report

W

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.

Logical Architecture Flows:

- (1) *cf_periodic_activity_report*
- (2) *cv_roadside_facility_identity*
- (2) *cv_roadside_periodic_activity_data*
- (3) *cv_roadside_activity_details*
- (4) *cv_archived_inspection_data*
- (5) *cv_credentials_details*
- (5) *cv_driver_details*
- (5) *cv_inspection_data*
- (5) *cv_inspector_safety_data_input*
- (5) *cv_not_pulled_in*
- (5) *cv_roadside_report*
- (5) *cv_safety_status_code*
- (5) *cv_vehicle_details*
- (5) *time*
- (4) *cv_archived_safety_data*
- (5) *cv_credentials_details*
- (5) *cv_safety_override*
- (5) *cv_safety_pull_in_output*
- (5) *time*
- (4) *cv_border_record*
- (5) *cv_border_override*
- (5) *cv_border_pull_in_output*
- (5) *list_size*
- (4) *cv_screening_record*

- (5) *cv_credentials_details*
- (5) *cv_screening_override*
- (5) *cv_screening_pull_in_output*
- (5) *time*
- (4) *date*
- (3) *list_size*
- (2) *list_size*

Physical Architecture Flow: safety status information

W

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 or as a result of a standing request for updated information (subscription). This may also include information about non-U.S. fleets for use by U.S. authorities, and information regarding U.S. fleets made available to Mexican and Canadian authorities. The query flow is not explicitly shown.

Logical Architecture Flows:

- (1) *cvo_safety_status*

4.13 Information Service Provider → Fleet and Freight Management

Physical Architecture Flow: toll data

W

Current toll schedules for different types of vehicles as well as advanced toll payment information.

Logical Architecture Flows:

- (1) *cvo_advanced_toll_payment_information*
 - (2) *confirmation_flag*
 - (2) *stored_credit*
 - (2) *toll_cost*
 - (2) *traveler_identity*
- (1) *toll_price_for_cvo*
 - (2) *toll_price*
 - (2) *toll_price_application_time*
 - (2) *toll_segments*
 - (3) *list_size*
 - (3) *toll_segment_identity*
 - (4) *unit_number*

4.14 Intermodal Freight Depot → Fleet and Freight Management

Physical Architecture Flow: intermod CVO coord

W

Cargo movement logs, routing information, and cargo ID's.

Logical Architecture Flows:

- (1) *fifd_freight_data*

4.15 Intermodal Freight Shipper → Fleet and Freight Management

Physical Architecture Flow: intermod CVO coord
Cargo movement logs, routing information, and cargo ID's.

W

Logical Architecture Flows:

- (1) *From_Intermodal_Freight_Shipper*
- (2) *fifs_trip_identification_number*

4.16 Toll Administration → Fleet and Freight Management

Physical Architecture Flow: toll data
Current toll schedules for different types of vehicles as well as advanced toll payment information.

W

Logical Architecture Flows:

- (1) *cvo_advanced_toll_confirmation*
 - (2) *confirmation_flag*
 - (2) *stored_credit*
 - (2) *toll_cost*
 - (2) *traveler_identity*
- (1) *cvo_toll_price*
 - (2) *toll_price*
 - (2) *toll_price_application_time*
 - (2) *toll_segments*
 - (3) *list_size*
 - (3) *toll_segment_identity*
 - (4) *unit_number*

4.17 Fleet and Freight Management → Information Service Provider

Physical Architecture Flow: toll data request
Request made to obtain toll schedule information or pay a toll in advance. The request can be a subscription that initiates as-needed information updates as well as a one-time request for information.

W

Logical Architecture Flows:

- (1) *cvo_advanced_payments_request*
 - (2) *credit_identity*
 - (2) *stored_credit*
 - (2) *toll_route_segments*
 - (3) *list_size*
 - (3) *toll_segment_identity*
 - (4) *unit_number*
 - (2) *vehicle_identity*
- (1) *toll_price_for_cvo_request*

4.18 Fleet and Freight Management → Intermodal Freight Depot

Physical Architecture Flow: intermod CVO coord
Cargo movement logs, routing information, and cargo ID's.

W

Logical Architecture Flows:

- (1) *tifd_freight_request*

4.19 Commercial Vehicle Administration → Intermodal Freight Shipper

Physical Architecture Flow: border clearance status

W

Notification regarding the crossing status of commercial freight shipment scheduled to enter the U.S. Includes portions of border agency and transportation agency clearance results, as they become available. Recipients may include trade regulatory agencies that do not receive status information directly from U.S. Customs (e.g., other transportation agencies with trade related responsibilities, such as NHTSA, MARAD, etc.)

Logical Architecture Flows:

- (1) *tifs_border_clearance_status*
 - (2) *cvo_border_clearance_info*
 - (3) *cvo_border_clearance*
 - (4) *cv_border_record*
 - (5) *cv_border_override*
 - (5) *cv_border_pull_in_output*
 - (5) *list_size*
 - (4) *cv_roadside_facility_identity*
 - (4) *date*
- (2) *cvo_border_status_from_other_cvas*
 - (3) *cvo_border_clearance_info*
 - (4) *cvo_border_clearance*
 - (5) *cv_border_record*
 - (5) *cv_roadside_facility_identity*
 - (5) *date*

4.20 Fleet and Freight Management → Intermodal Freight Shipper

Physical Architecture Flow: intermod CVO coord
Cargo movement logs, routing information, and cargo ID's.

W

Logical Architecture Flows:

- (1) *To_Intermodal_Freight_Shipper*
 - (2) *tifs_border_clearance_status*
 - (3) *cvo_border_clearance_info*
 - (4) *cvo_border_clearance*
 - (5) *cv_border_record*
 - (5) *cv_roadside_facility_identity*

- (5) *date*
- (3) *cvo_border_status_from_other_cvas*
- (4) *cvo_border_clearance_info*
- (5) *cvo_border_clearance*

4.21 Commercial Vehicle Administration → Other CVAS

Physical Architecture Flow: border clearance status W

Notification regarding the crossing status of commercial freight shipment scheduled to enter the U.S. Includes portions of border agency and transportation agency clearance results, as they become available. Recipients may include trade regulatory agencies that do not receive status information directly from U.S. Customs (e.g., other transportation agencies with trade related responsibilities, such as NHTSA, MARAD, etc.)

Logical Architecture Flows:

- (1) *tocvas_border_clearance*

Physical Architecture Flow: credential fee coordination W

Jurisdiction's rates for various credentials (IRP, IFTA, etc.) that are exchanged between agencies.

Logical Architecture Flows:

- (1) *tocvas_data_table*

Physical Architecture Flow: credentials information W

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.

Logical Architecture Flows:

- (1) *tocvas_credentials*

Physical Architecture Flow: credentials status information W

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." The status information may be provided as a response to a real-time query or as a result of a standing request for updated information (subscription). This may also include information about non-U.S. fleets for use by U.S. authorities, and information regarding U.S. fleets made available to Mexican and Canadian authorities. The query flow is not explicitly shown.

Logical Architecture Flows:

- (1) *tocvas_credentials_status*

Physical Architecture Flow: safety inspection report W

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.

Logical Architecture Flows:

- (1) *tocvas_safety_inspection*

Physical Architecture Flow: safety status information

W

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 or as a result of a standing request for updated information (subscription). This may also include information about non-U.S. fleets for use by U.S. authorities, and information regarding U.S. fleets made available to Mexican and Canadian authorities. The query flow is not explicitly shown.

Logical Architecture Flows:

- (1) *tocvas_safety_status*

4.22 Fleet and Freight Management → Toll Administration

Physical Architecture Flow: toll data request

W

Request made to obtain toll schedule information or pay a toll in advance. The request can be a subscription that initiates as-needed information updates as well as a one-time request for information.

Logical Architecture Flows:

- (1) *cvo_advanced_toll_request*
 - (2) *credit_identity*
 - (2) *stored_credit*
 - (2) *toll_route_segments*
 - (3) *list_size*
 - (3) *toll_segment_identity*
 - (4) *unit_number*
 - (2) *vehicle_identity*
- (1) *cvo_toll_price_request*

4.23 Commercial Vehicle Administration → Trade Regulatory Agencies

Physical Architecture Flow: border clearance status

W

Notification regarding the crossing status of commercial freight shipment scheduled to enter the U.S. Includes portions of border agency and transportation agency clearance results, as they become available. Recipients may include trade regulatory agencies that do not receive status information directly from U.S. Customs (e.g., other transportation agencies with trade related responsibilities, such as NHTSA, MARAD, etc.)

Logical Architecture Flows:

- (1) *ttra_border_clearance_status*

Physical Architecture Flow: domestic transportation information

W

Real-time or near real-time data regarding trade transportation activity. Potentially categorized by shipper classification, carrier, commodity, etc. Intended for use as a transportation decision tool.

Logical Architecture Flows:

- (1) *ttra_domestic_transportation_information*

Physical Architecture Flow: transportation border clearance assessment W

Notification regarding the granting of permission for commercial freight shipment to enter the U.S. Includes directions for commercial driver to proceed to nearest vehicle weigh and inspection station for further review if required.

Logical Architecture Flows:

- (1) *ttra_transportation_border_clearance*

5. Communications Layer Considerations

This chapter describes relevant requirements on the Communications Layer for the portion of the ITS National Architecture covered by this package. In general the Communications Layer supports the four lower layers of the OSI model (transport, network, data link and physical layer). A complete description of the Communications Layer is contained in the ITS National Architecture Communications Analysis Document.

5.1 Communications Services: Wireline and Wireless

The communication services define the exchange of information between two points and are independent of media and application (i.e., ITS user service). In essence, they are a specified set of user-information transfer capabilities provided by the communication layer to a user in the transportation layer.

Communication services consist of two broad categories, *interactive* and *distribution*. Interactive services allow the user to exchange data with other users or providers in real or near real time, asking for service or information and receiving it in the time it takes to communicate or look up the information. Distribution services allow the user to send the same message to multiple other users.

Interactive services may be either *conversational* or *messaging*. Conversational implies the use of a two-way connection established before information exchange begins and terminated when the exchange is completed. Messaging, on the other hand, works more like electronic mail being exchanged between users. The messages are exchanged without establishing a dedicated path between the two sites. Each message is addressed and placed on the network for transmission, intermixed with messages from other users. The communications community labels this mode of communication a “datagram” service.

Distribution services may be either *broadcast* or *multicast* and may be used over wireline and/or wireless communication links. Broadcast messages are those sent to all users while multicast messages are sent only to a subset of users. Multicast differs from broadcast in its use of a designated address for all users and user groups. Examples of broadcast information might include current weather or road conditions, whereas multicast information might be information sent to all drivers working for a specific company. A changing group membership could be the set of users traveling between two locations or with a certain destination, for which unique information must be transmitted. The services that can be supported using circuit or packet connection mode include voice, video, image and data. (see Appendix A-1 of the communication document for a complete description.)

An additional class of communications services is location services. These fall in two categories: (1) the services that do not use the communication network (i.e., GPS, and stand alone terrestrial systems); (2) location services that use the network for providing the service (e.g., cellular based systems). In the latter case, the location services fall under the interactive services. The service will be rendered by a service provider in response to a request for information or help.

The class of communications service for each Architecture Flow in this standards package is defined in a table in the following section.

5.2 Wireline Communication Elements (w)

The interfaces of this standards package are all wireline interfaces. (There does exist the possibility of wireless communications between the CVCS and the CVAS, although this is not the primary mode of communications). The primary requirements on the wireline communications layers are that open standards be utilized for the communications protocols. The following paragraphs provide a discussion of wireline considerations for ITS.

The wireline links represent wide area network communications elements, which can take a number of forms. Typically it will be a data network of some kind. Physically the network can be fiber, coaxial, twisted pair, or even microwave. It can be an ITS dedicated network, such as a communication system installed by a public agency to pass messages between a CVCS and a CVAS. Alternatively it can be a privately deployed network owned and operated by a communication service provider, where operators of ITS subsystems pay a service fee for connection to and use of the network or lease the lines. More than one network used for ITS may coexist in a region, and these networks will be connected (or internetworked) to support ITS message communication between subsystems that are attached to different networks.

It is expected that the current trend toward ubiquitous internetworking of public and private data networks, as currently embodied by the Internet, will continue. This will enable inter-subsystem messaging across local, regional and national distances. What the Internet is rapidly evolving to (as security and reliability issues of today's Internet are addressed) has been referred to as the National Information Infrastructure (NII).

As commercial data networks are deployed, interconnected, and mature, and the cost of access and use of these private data networks drops, we expect more and more wireline networks for ITS to be supplied from Communication Service Providers (CSPs). The time when the transition from private data networks to commercial data networks becomes practical and economical will vary by region. We expect this transition to be analogous to the transition that was made early in this century from private phone networks to the Public Switched Telephone Network (PSTN). Our expectation is that in the 20-year timeframe most ITS communication will be provided by CSPs.

In the area of center to center communications there are several existing and developing communications standards to choose from. These include ATM, Frame Relay, MAN (IEEE 802.6), and FDDI. At the network layers TCP/IP is a widespread standardized protocol. The key is that by using standard communication protocol suites the regional integration of the wireline data shown above will most readily be accomplished. One of the developing ITS standards for wireline communications is the National Transportation Communications for ITS Protocol (NTCIP). This standard is being developed for the transmission of data and messages between ITS elements.

5.3 Wireless Communication Elements (u1 and u2)

There are no wireless interfaces in this standards requirements package.

6. Constraints

This chapter identifies Physical Architecture intersubsystem message performance requirements below the application layer.

6.1 Assessment Categories

The following categories have been used in rating the constraints that exist on the physical data flows.

1. Performance

a. Emergency Priority (E)

Essentially "real-time" requirements. Emergency data that is time critical must be received by a certain absolute time, or it is useless. For these flows the communication channel may require priority in emergencies. The data channels required must be operational even when there is an emergency which might place other loads on the interface. A private communication channel or frequency may be required to satisfy the requirement.

b. Reliability(R)

This category encompasses both the concepts of reliability and availability. Data must be delivered reliably. Loss can not be tolerated. The communications link must also have high availability. Failure of the communication medium may result in severe accident. This communication channel may require redundant paths or extra attention paid to potential failure modes. For wireline cases, this may indicate alternate phone or other connections are required. For wireless cases (e.g. for AHS applications), special attention will be paid to the transmitters, receivers, and potential interference for these connections.

c. Timing (t)

The timing constraints are critical. If communication does not occur within set limits system failures can occur. Timing for most ITS communication services is based on the response to a request for data. Because of this, common communication media designed to handle voice data will likely support these requirements. The beacon interface has special requirements of identifying the vehicle as well as exchanging information before the vehicle gets out of range. This is more of a problem with vehicles travelling at speed. The architecture constrains such time critical access to data such that the data is available at the beacon site. This obviates the need for explicit specification of other timing information to support data transfer over a short range beacon.

This timing constraint is related to (but not the same as) another attribute often discussed in specifying systems: latency. Latency is used to quantify end-to-end processing and transmission time (round trip delays). Data with a latency requirement must be handled within a certain time interval. This differs from "time criticality" in that it is a relative rather than absolute time requirement (i.e. latency: interface screen must update every 2 seconds; time criticality: route instructions must be received 30 seconds prior to first turning action). Because latency requirements are greatly affected by the implementation of the subsystem elements, it can not be specified directly when discussing only the interface between two subsystems.

2. Data Sensitivity

a. Security (S)

Access to the data must be restricted. Data itself must be secure during transmission. This is typically used for financial information.

b. Privacy (P)

Anonymity of the data source or recipient must be protected. This is typically used for personal information.

6.2 Architecture Flow Constraints

Table 1. - Architecture Flow Constraints

Source	Destination	Architecture flow	Interconnects	Communication Service	Special Constraints
Commercial Vehicle Administration	Enforcement Agency	accident report	W	Messaging data	P
Commercial Vehicle Administration	Enforcement Agency	citation	W	Conversational data, Messaging data	P
Commercial Vehicle Administration	Enforcement Agency	violation notification	W	Messaging data	P
Commercial Vehicle Administration	Fleet and Freight Management	accident report	W	Messaging data	P
Commercial Vehicle Administration	Fleet and Freight Management	citation	W	Conversational data, Messaging data	P
Commercial Vehicle Check	Commercial Vehicle Administration	accident report	W	Messaging data	P
Commercial Vehicle Check	Commercial Vehicle Administration	citation	W	Conversational data, Messaging data	P
Enforcement Agency	Commercial Vehicle Administration	information on violators	W	Messaging data	P
Enforcement Agency	Commercial Vehicle Check	information on violators	W	Messaging data	P
Fleet and Freight Management	Commercial Vehicle Administration	audit data	W	Messaging data	P
Fleet and Freight Management	Commercial Vehicle Administration	tax filing	W	Messaging data	P
Fleet and Freight Management	Information Service Provider	toll data request	W	Messaging data	F
Fleet and Freight Management	Toll Administration	toll data request	W	Messaging data	F
Information Service Provider	Fleet and Freight Management	toll data	W	Messaging data	F

7. Data Dictionary Elements

This section contains the logical architecture data flow definitions for all the CVO related data flows listed in this standards requirements package. The definitions are given in alphabetical order.

border_crossing_request

This request contains necessary enrollment information for commercial vehicle international border crossings. This flow will typically provide information about the carrier or freight forwarder, the vehicle, the driver and the current trip including a cargo declaration.

cf_enrollment_information

This data flow is used within the Manage Commercial Vehicles function and contains the data for enrollment on a particular route produced from data supplied by the commercial fleet manager.

cf_enrollment_payment_confirmation

This data flow is used within the Manage Commercial Vehicles function to confirm that a payment of the taxes and duties for the enrollment of a particular commercial vehicle cargo, weight and type on a particular route from the commercial fleet manager has been accepted.

cf_enrollment_request

This data flow is used within the Manage Commercial Vehicles function and contains the data needed to obtain enrollment information for a particular commercial vehicle cargo, type and weight on a particular route as provided by the commercial fleet manager.

cf_periodic_activity_report

This data flow is used within the Manage Commercial Vehicles function. It consists of the data from the commercial vehicle roadside checkstation facility logs from which a report on activities will be issued. This data flow will have been produced as a result of a request from a commercial vehicle manager for periodic reports.

cf_roadside_activity_report

This data flow is used within the Manage Commercial Vehicles function. It contains data from the commercial vehicle roadside checkstation facility logs from which a report on activities will be issued. This data flow will have been produced as a result of a specific request from a commercial vehicle manager.

cf_tax_data

This data flow is used within the Manage Commercial Vehicles function. It contains tax data and audit filings not related to specific credentials application and is generated as a result of input from the commercial vehicle manager.

confirmation_flag

This data flow is used within various ITS functions to indicate the success or failure of a request or transaction.

cost

This data flow is used by several functions within ITS and contains the cost of a service, such as: the cost of a display map or navigable map database update, or the cost of a transit fare, a paratransit service, a non-motorized transportation service, etc.

credit_identity

This data flow contains the identity number of a credit card which is to be used to secure preclearance from paying dues, taxes, and other commercial vehicles charges, or by a traveler or driver for payment of current or advanced tolls, fares, parking lot charges, or for yellow pages services.

cv_account_number

This data flow is used within the Manage Commercial Vehicle function and contains the account number from which payment is to be made for the taxes and duties required for a commercial vehicle to use a particular route.

cv_amount_billed

This data flow is used within the Manage Commercial Vehicles function to show the amount billed to a particular account for the enrollment of a commercial vehicle cargo, weight and type on a particular route. Set to zero may mean the payment request failed.

cv_archived_inspection_data

This data flow is used within the Manage Commercial Vehicles function and contains archived commercial vehicle inspection data collected at the commercial vehicle roadside checkstation facility.

cv_archived_safety_data

This data flow is used within the Manage Commercial Vehicles function. It contains information that is collected at a roadside checkstation facility as the result of the safety checking of an approaching commercial vehicle. This data is stored in the log of roadside facility data.

cv_border_database_update

This data flow is used within the Manage Commercial Vehicles function. It contains the list of enrolled commercial vehicle credentials maintained by the commercial vehicle administrative processes and is used to periodically update the database at the roadside border crossing facilities served by the function. The databases provide the facilities with an up to date list of which vehicles have been cleared (enrolled) to potentially pass through without stopping.

cv_border_enrollments

This data flow is used within the Manage Commercial Vehicles function. It contains necessary enrollment information for commercial vehicles at roadside facilities that are international border crossings. This flow will typically provide information about the carrier or freight forwarder, the vehicle, the driver and the current trip including a cargo declaration.

cv_border_override

This data flow is used within the Manage Commercial Vehicles function. It contains the decision made by an inspector at a commercial vehicle roadside checkstation facility to override (or not) the automated pass or pull-in decision made by the process responsible for border crossing checking.

cv_border_override_code

This data flow is used within the Manage Commercial Vehicles function. It contains a code which gives the results of the decision made by an inspector at a commercial vehicle roadside checkstation facility to override (or not) the automated pass or pull-in decision made by the process responsible for border crossings checking.

cv_border_problem

This data flow is used within the Manage Commercial Vehicles function to identify the nature of a problem with a commercial vehicle's data at a border crossing. It indicates whether the problem was related to data associated with the vehicle, driver, or cargo.

cv_border_pull_in_output

This data flow is used in the Manage Commercial Vehicles function and contains the output of the result of an analysis of the data from a commercial vehicle that is approaching a roadside checkstation facility, by the process responsible for commercial vehicle border crossing checking. The result is expressed in terms of a pull-in or pass decision for the vehicle.

cv_border_record

This data flow is used within the Manage Commercial Vehicles function. It contains information that is collected at a roadside checkstation facility as the result of the border crossing checks on an approaching commercial vehicle. This data is stored in the log of roadside facility data.

cv_cargo_class

This data flow contains the cargo classification for a particular use of a commercial vehicle route.

cv_cargo_discharged

This data flow contains an identification for cargo that was discharged from a commercial vehicle. The time, date, location, vehicle mileage, etc. when this activity took place are recorded in separate data flows. This data flow consists of an identifier of the cargo, which could include such things as news print, clothing, canned food, dairy products, or furnishings. The activity may in some cases only apply to part of the vehicle's cargo. However for every one of these discharge activities there should be a similar loading activity which is defined in a separate data flow.

cv_cargo_loaded

This data flow contains an identification code for cargo that was loaded onto a commercial vehicle. The time, date, location, vehicle mileage, etc. when this activity took place are recorded in separate data flows. This data flow consists of an identifier which specifies the type of cargo. Examples of the types of cargo could be items such as but not limited to electrical goods, washing machines, freezers, sand, sacks of sand, beef meat (frozen), beef livestock. The activity may in some cases only apply to part of the vehicle's cargo. However for every one of these loading activities there should be a similar discharge activity which is defined in a separate data flow. This data other flow also contains further examples of the codes that can be used.

cv_carrier_number

This data flow contains a character code that is the carrier identification number.

cv_credentials

This data flow is used within the Manage Commercial Vehicles function and contains details about a commercial vehicle, e.g. make, model, type, special features, etc. It is set up at manufacture when the on-board vehicle system is installed and cannot be changed by the driver.

cv_credentials_database_update

This data flow is used within the Manage Commercial Vehicles function. It contains the list of enrolled commercial vehicle credentials maintained by the commercial vehicle administrative processes and is used to periodically update the credentials database at the roadside checkstation facilities served by the function. The databases provide the facilities with an up to date list of which vehicles have been cleared (enrolled) to potentially pass through without stopping.

cv_credentials_details

This data flow is used within the Manage Commercial Vehicles function and contains details about the carrier, driver and vehicle numbers that are used as the key identifiers for commercial vehicles credentials data.

cv_credentials_information_response

This data flow is used within the Manage Commercial Vehicles function and contains the data resulting from a request for some commercial vehicle credentials data to be down loaded to the database maintained by the commercial vehicles roadside checkstation facility.

cv_credentials_problem

This data flow is used within the Manage Commercial Vehicles function to identify the nature of a problem with a commercial vehicle's credentials.

cv_credentials_status_code

This data flow is used within the Manage Commercial Vehicles function and contains the status of an associated set of commercial vehicle credentials. This status may be clear, or set to indicate that there is a problem.

cv_driver_credentials

This data item contains details of the commercial vehicle driver's license.

cv_driver_credit_identity

This data flow is sent from the Provide Electronic Payments Services function to the Manage Commercial Vehicles

function. It contains the credit identity of a commercial vehicle driver or the amount of stored credit obtained from the traveler card / payment instrument terminator.

cv_driver_details

This data flow is used within the Manage Commercial Vehicles function and contains details about a particular commercial vehicle driver. The driver identity is held in an associated data flow.

cv_driver_license_citations

This data items is used within the Manage Commercial Vehicles function and contains details of any citations, etc. recorded against the driver's license.

cv_driver_number

This data flow contains an alphanumeric code that is the commercial vehicle driver identification number.

cv_enrollment_information

This data flow is used within the Manage Commercial Vehicles function and contains the data for enrollment on a particular route produced from data supplied by the commercial vehicle driver.

cv_enrollment_payment_confirmation

This data flow is used within the Manage Commercial Vehicles function to confirm that a payment of the taxes and duties for the enrollment of a particular commercial vehicle cargo, weight and type on a particular route from the commercial vehicle driver has been accepted.

cv_enrollment_request

This data flow is used within the Manage Commercial Vehicles function and contains the data needed to obtain enrollment information for a particular commercial vehicle cargo, type and weight on a particular route as provided by the commercial vehicle driver.

cv_fuel_purchase_cost

This data flow is used within the Manage Commercial Vehicles function. It contains the cost of a quantity of fuel purchased for a commercial vehicle. The quantity of fuel purchased together with the time and date are stored in separate data flows.

cv_fuel_purchase_data

This data flow is used within the Manage Commercial Vehicles function. It contains details of the quantity and cost of fuel purchased for a commercial vehicle. The number of miles recorded by the vehicle, the time and the date are stored in separate data flows.

cv_fuel_purchase_quantity

This data flow contains the quantity of fuel purchased for a commercial vehicle. The cost of this quantity of fuel together with the time and date are stored in separate data flows.

cv_inspection_activities_data

This data flow contains a record of the inspection activities that have been carried out on the commercial vehicle.

cv_inspection_data

This data flow is used within the Manage Commercial Vehicles function and contains the results of a roadside vehicle check which are to be down loaded for storage on-board the vehicle. The data may be eventually retrieved by the driver, the commercial vehicle manager, or at a subsequent roadside inspection.

cv_inspector_safety_data_input

This data flow is used within the Manage Commercial Vehicles function and contains data that is input by an inspector using a hand held terminal. This data will be associated with the roadside inspection of a commercial vehicle and may include extra comments on things not found by the inspection process, or recommendations for remedial action, where problems have been found.

cv_log_data

This data flow is used within the Manage Commercial Vehicles function. It contains identification data for each entry in the vehicle details section of the data archived at a roadside checkstation facility.

cv_log_entry_date

This data flow is used within the Manage Commercial Vehicles function. It contains the date on which an entry was made into the store of vehicle activity.

cv_log_entry_location

This data flow is used within the Manage Commercial Vehicles function. It contains the location of the commercial vehicle when data was loaded into the store of its activities.

cv_log_entry_mileage

This data flow contains the vehicle mileage at which an entry was made into the store of vehicle activity as this is typical of many commercial vehicles.

cv_log_entry_time

This data flow is used within the Manage Commercial Vehicles function. It contains the time at which an entry was made into the store of vehicle activity.

cv_not_pulled_in

This data item contains a flag which if set shows that potentially there will be the need to pull in a commercial vehicle because of a problem.

cv_operator_override

This data flow is used within the Manage Commercial Vehicles function. It contains the roadside facility operator override action.

cv_repairs_and_service_records

This data item contains a record of the repair and service work carried out on a commercial vehicle.

cv_roadside_activity_details

This data flow is used within the Manage Commercial Vehicles function. It contains activity data from the commercial vehicle roadside checkstation facility for a particular carrier, driver and vehicle combination.

cv_roadside_daily_log

This data flow is used within the Manage Commercial Vehicles function. It contains a copy of the daily log of all the activities that have taken place at a commercial vehicle roadside checkstation facility. This data is analyzed to determine problem vehicles, drivers and carriers for future pull-in requests.

cv_roadside_facility_identity

This data item contains the identity of the commercial vehicle roadside checking facility. This data flow enables a unique set of alphanumeric characters to be used while it provides the option of grouping identities by State and/or area(s) within a State.

cv_roadside_periodic_activity_data

This data flow contains activity data from the commercial vehicle roadside checkstation facility for a particular carrier, driver and vehicle combination.

cv_roadside_record

This data flow is used within the Manage Commercial Vehicles function. It contains a copy of the details of the activities that have been logged at a commercial vehicle roadside checkstation facility.

cv_roadside_report

This data flow is used within the Manage Commercial Vehicles function and contains the results data from a commercial vehicle roadside inspection. If set to null there was no data available from which to carry-out the inspection.

cv_roadside_safety_data

This data store is used within the Manage Commercial Vehicles function and contains the data collected from commercial vehicles at a commercial vehicle roadside checking facility.

cv_roadside_single_activity_data

This data flow contains activity data from the commercial vehicle roadside checkstation facility for a particular carrier, driver and vehicle combination. The data flow will be used in the report that is output once at the specific request of a commercial vehicle manager.

cv_route_data

This data flow is sent from the Provide Driver and Traveler Services function to the Manage Commercial Vehicles function. It contains data for routes that have been selected for a commercial vehicle based on the data provided in the request from the Manage Commercial Vehicles function.

cv_route_number

This data flow is used within the Manage Commercial Vehicle function and contains the number of the commercial vehicle route. It is used to associate other items of data such as taxes and duties, route details, classes, etc.

cv_safety_database_update

This data flow is used within the Manage Commercial Vehicles function and contains data to update the data store containing the safety problem list on a periodic basis (i.e. daily).

cv_safety_information_response

This data flow is used within the Manage Commercial Vehicles function and contains the output resulting from a request by the commercial vehicle roadside checkstation inspector for output of some data from the facility safety database. The data to be output will have been specified by the inspector in terms of a carrier, driver and/or vehicle number.

cv_safety_override

This data flow is used within the Manage Commercial Vehicles function. It contains the decision made by an inspector at a commercial vehicle roadside checkstation facility to override (or not) the automated pass or pull-in decision made by the process responsible for safety checking.

cv_safety_override_code

This data flow is used within the Manage Commercial Vehicles function. It contains a code which gives the results of the decision made by an inspector at a commercial vehicle roadside checkstation facility to override (or not) the automated pass or pull-in decision made by the process responsible for safety checking.

cv_safety_problem

This data flow is used within the Manage Commercial Vehicles function and identifies the nature of a problem with the safety of a commercial vehicle, its driver, or the carrier in general.

cv_safety_pull_in_output

This data flow is used in the Manage Commercial Vehicles function and contains the output of the result of an analysis of the data from a commercial vehicle that is approaching a roadside checkstation facility, by the process responsible for commercial vehicle safety checking. The result is expressed in terms of a pull-in or pass decision for the vehicle.

cv_safety_status_code

This data flow is used within the Manage Commercial Vehicles function and contains the status of an associated set of commercial vehicle safety data. This status may be clear, or set to indicate that there is a problem.

cv_safety_systems_diagnostics_results

This data item contains flags set to show the results of diagnostic checks run by a commercial vehicle's on-board safety system. Included in these diagnostics are the safety status of the driver, cargo and vehicle (including brake condition)

cv_screening_override

This data flow is used within the Manage Commercial Vehicles function. It contains the decision made by an inspector at a commercial vehicle roadside checkstation facility to override (or not) the automated pass or pull-in decision made by the process responsible for credentials checking.

cv_screening_override_code

This data flow is used within the Manage Commercial Vehicles function. It contains a code which gives the results of the decision made by an inspector at a commercial vehicle roadside checkstation facility to override (or not) the automated pass or pull-in decision made by the process responsible for credentials checking.

cv_screening_pull_in_output

This data flow is used in the Manage Commercial Vehicles function and contains the output of the result of an analysis of the data from a commercial vehicle that is approaching a roadside checkstation facility, by the process responsible for commercial vehicle credentials checking. The result is expressed in terms of a pull-in or pass decision for the vehicle.

cv_screening_record

This data flow is used within the Manage Commercial Vehicles function. It contains information that is collected at a roadside checkstation facility as the result of the credentials checks on an approaching commercial vehicle. This data is stored in the log of roadside facility data.

cv_special_vehicle_enrollments

This data flow is used within the Manage Commercial Vehicles function. It contains enrollment information for commercial vehicles at roadside facilities. This flow will typically provide information about the carrier or freight forwarder, the vehicle, the driver and the current trip including cargo declaration.

cv_taxes_and_duties

This data flow and contains a list of the taxes and duties required for the use of a particular commercial vehicle route using a particular class of vehicle, cargo and weight.

cv_trip_classification_data

This data flow is used within the Manage Commercial Vehicles function and contains the classification data for which a particular commercial vehicle has been enrolled at commercial vehicle roadside checkstation locations for a particular route.

cv_trip_identity

This data flow contains a trip identity number that is set up by the commercial vehicle manager (or the driver acting in that capacity) for use in checking the commercial vehicle through a border crossing.

cv_vehicle_class

This data flow contains the vehicle classification for a particular use of a commercial vehicle route.

cv_vehicle_details

This data flow is used within the Manage Commercial Vehicles function. It contains details about the activities involving a particular commercial vehicle over a period of time. The vehicle identity for this data is held in an associated data flow.

cv_vehicle_log

This data flow is used within the Manage Commercial Vehicles function. It contains a log of the commercial

vehicle's cargo loading and unloading activities. Data about other activities is stored in separate data flows, as is the date, time, place, driver identity and vehicle mileage when the activity took place.

cv_vehicle_number

This data flow contains an alphanumeric code that is the commercial vehicle identification number.

cv_weight_class

This data flow contains the weight classification for a particular use of a commercial vehicle route.

cvo_accident_data

This data flow is used within the Manage Commercial Vehicles function and contains information about a commercial vehicle accident.

cvo_accident_data_for_fleet

This data flow is used within the Manage Commercial Vehicle function. It contains a report for the fleet manager with information about a commercial vehicle safety accident.

cvo_advanced_payments_request

This data flow is sent from the Manage Commercial Fleet Electronic Credentials function to the Provide Electronic Payment Services to request that a toll be paid for in advance by a commercial vehicle fleet operator.

cvo_advanced_toll_confirmation

This data flow contains data about an advanced toll transaction requested by a commercial vehicle fleet operator.

cvo_advanced_toll_payment_informatio

This data flow is sent from the Provide Electronic Payment Services function to the Manage Commercial Fleet Electronic Credentials function and contains data about an advanced toll transaction requested by a commercial vehicle fleet operator.

cvo_advanced_toll_request

This data flow is sent from the Advanced Toll Payment function to the Manage Commercial Fleet Electronic Credentials function to request that a toll be paid for in advance by a commercial vehicle fleet operator.

cvo_audit_data

This data flow is used within the Manage Commercial Vehicle function. It contains information to support a tax audit.

cvo_border_agency_clearance_results

This data flow is used within the Manage Commercial Vehicle function. It contains notification information regarding the granting of permission for commercial freight shipment to enter the United States.

cvo_border_clearance

This data flow is used within the Manage Commercial Vehicles function. It contains a copy of the daily log of activities that have taken place at a commercial vehicle border crossing facility, including acceptance or override of system decision.

cvo_border_clearance_for_fleet

This data flow is used within the Manage Commercial Vehicle function. It contains information about the status of a commercial freight shipment moving across an international border.

cvo_border_clearance_info

This data flow is used within the Manage Commercial Vehicle function. It contains trip specific data regarding the movement of goods across international borders, including the trip identification number.

cvo_border_results

This data flow is used within the Manage Commercial Vehicle function. It contains information regarding the granting of permission for commercial freight shipments to enter the U.S.

cvo_border_status_from_other_cvas

This data flow is used within the Manage Commercial Vehicle function. It contains status information from a remote commercial vehicle administration function of a commercial freight shipment moving across an international border served by the local function.

cvo_citation

This data flow is used within the Manage Commercial Vehicles function and contains information about a citation received by a commercial vehicle and the references to the statute(s) that was (were) violated.

cvo_citation_data

This data flow is used within the Manage Commercial Vehicles function and contains information about a citation received by a commercial vehicle and references the statute(s) that was (were) violated. A citation has been adjudicated by the courts.

cvo_credential_status

This data flow is used within the Manage Commercial Vehicles function and provides the detailed status for the credentials of a commercial vehicle or commercial vehicle driver, including registration, licensing, insurance, etc...

cvo_safety_inspection_data

This data flow is used within the Manage Commercial Vehicle function. It consists of a report containing results of a commercial vehicle safety inspection.

cvo_safety_status

This data flow is used within the Manage Commercial Vehicles function and provides the detailed status for the safety of a commercial vehicle or carrier, including safety ratings, inspection summaries, etc...

cvo_toll_price

This data flow contains the price for each road segment to which a toll applies for commercial vehicles, with the time and date for when it applies. This data will be used by the Manage Commercial Vehicle Fleet Operations in its efforts to run its operations more efficiently.

cvo_toll_price_request

This data flow contains a request for the current prices being charged for toll segments on the road and highway network being used by the commercial vehicles.

cvo_transportation_border_clearance

This data flow is used within the Manage Commercial Vehicle function. It consists of notifications regarding permissions given for commercial freight shipments to enter the United States. It includes directions for commercial vehicle drivers to proceed to the nearest vehicle weigh and inspection station for further review.

cvo_transportation_border_results

This data flow is used within the Manage Commercial Vehicle function. It contains information regarding the granting of permission for commercial freight shipment to enter the U.S. It may include contents regarding directions for the commercial vehicle driver to proceed to another station for further review.

cvo_violation

This data flow is used within the Manage Commercial Vehicle function. It contains notification information to enforcement agencies about a violation. It describes the statute or regulation that was violated and how it was violated.

date

This data flow is used within many ITS function and contains the calendar date data normally used to indicate

currency or effectivity of other data flows. The codification of the data is YYYYMMDD or equivalent.

fea_cv_enforcement_agency_response

This data flow is sent from the enforcement agency to the Manage Commercial Vehicles function. It contains the response from an enforcement agency to the previous request for data from the commercial vehicle administration facility. The size estimate below is based on a coded response to a standardized query.

fea_violator_information

This data flow is used within the Manage Commercial Vehicles function. It contains information in response to a request from Enforcement Agencies for more information on violators relating to commercial vehicle violations or entity specific violations.

fifd_freight_data

This data flow sent from the Intermodal Freight Depot terminator to the Manage Commercial Vehicles function contains data about the movement of freight by means that may include methods other than commercial vehicles, e.g. heavy rail, air, sea, river, etc.

fifs_trip_identification_number

This data flow is sent from the intermodal freight shipper to the Manage Commercial Vehicle function and it contains the unique trip load number for a specific cross-border shipment from an intermodal freight shipper.

focvas_border_clearance

This data flow is sent from other commercial vehicle administration system to the Manage Commercial Vehicle function. It contains the status of the movement of goods across international borders with corresponding trip identification numbers.

focvas_credentials

This data flow is sent from other commercial vehicle administration system to the Manage Commercial Vehicle function and contains full credentials information.

focvas_credentials_status

This data flow is sent from other commercial vehicle administration system to the Manage Commercial Vehicle function. It contains information regarding the status of credentials information including registration, licensing, check flags, and electronic screening enrollment data.

focvas_data_table

This data flow is sent from the other commercial vehicle administration system to the Manage Commercial Vehicles function and contains data about required taxes and credential fees.

focvas_safety_inspection

This data flow is sent from the other commercial vehicle administration system to the Manage Commercial Vehicle function. It contains a report containing results of commercial vehicle safety inspections.

focvas_safety_status

This data flow is sent from the other commercial vehicle administration system to the Manage Commercial Vehicle function. It contains the status of safety information including safety ratings, inspection summaries, and violation summaries.

From Intermodal Freight Shipper

This data flow is sent from the Intermodal Freight Shipper to the Manage Commercial Vehicles function and contains the trip identification information used to identify a specific cross-border shipment.

fra_declaration_information

This data flow is sent from Trade Regulatory Agencies to the Manage Commercial Vehicles function. It contains information regarding pending commercial freight shipments into the United States.

ftfra_domestic_transportation_informati

This data flow is sent from Trade Regulatory Agencies to the Manage Commercial Vehicles function. It contains real-time information regarding trade transportation activity which may include shipper classification, carrier and commodity.

hazmat_load_data

This data flow contains the manifest data plus the chemical characteristics of a hazmat load being carried by a commercial vehicle. This data is used by the emergency services to plan their responses if the vehicle on which the load is traveling is involved in an incident.

list_size

This data flow is a general parameter used throughout ITS functions to specify the number of data items included in a data flow. For example it can be the number of indicators in a strategy selection message, or the number of data items that have been collected in a particular time period.

location_identity

This data element is used by many of the ITS functions to communicate the location of any transportation feature, entity, or event in an unambiguous and mutually understandable way. The Society of Automotive Engineer's Information Report SAE J2374 describes a suite of alternative location referencing interface profiles for use in Intelligent Transportation Systems. The location referencing interface profiles included in J2374 are in varying states of development and will continue to evolve as ITS user requirements and results of computer and field tests become available. The current set of interface profiles includes:

- Geometry Profile
- Geographic Coordinate Profile
- Grid Profile
- Linear Referencing Profile
- Cross-streets Profile
- Address Profile

The profiles, when incorporated into relevant standards, will provide a common language for the expression of location between the different elements of an integrated transportation system.

route

This data flow is used within the Provide Driver and Traveler Services function and contains details of a route. This will have been produced to fit the origin, destination, preferences and constraints requirements provided by a traveler through the trip request data. The route segment(s) will be in sets, one for a primary route (the nearest fit to the traveler's requirements), plus one or more alternates that may give a better modal split, or improved journey time, etc. There may be one or many route segments depending on the length of the route.

route_cost

This data item is used within the Provide Driver and Traveler Services function and contains the cost of using a particular route. This is made up of some or all of such things as tolls, fares, port charges, plus the cost of commercial vehicle credential filing and tax payments.

route_list

This data flow contains a list of the number of route segments in each route that is being provided to a traveler. The primary route will be that which most closely fits the traveler's requirements, while the others will be alternates that may give such things as improved journey time, shorter distance, lower cost, different modal split, etc.

route_segment

This data flow is used within the Provide Driver and Traveler Services function and forms the basic building block for a route.

route_segment_commercial_details

This data flow is sent from the Provide Driver and Traveler Services function to the Manage Commercial Vehicles

function. It contains data about each of the route segments that have been included in a commercial vehicle route.

route_segment_data

This data flow is used within the Provide Driver and Traveler Services function and contains information about a route segment.

route_segment_description

This data flow is used within the Provide Driver and Traveler Services function and contains a description of the physical details for the entire route segment. This data is used to provide information from which guidance can be produced in a form which is understood by the driver, e.g. lane selection, right/left turns, etc.

route_segment_end_point

This data flow is used within the Provide Driver and Traveler Services function and the Manage Traffic function. It contains the location of the end of a route segment.

route_segment_estimated_arrival_time

This data flow contains the estimated time at which the route segment end point will be reached.

route_segment_estimated_condition

This data flow contains the traffic conditions expected on the route segment at the time at which it will be used.

route_segment_estimated_travel_time

This data flow contains the estimated time it will take a vehicle to travel the route segment taking account of the expected conditions defined in other data.

route_segment_identity

This data flow contains the identity number of a route segment. A link may not be the same physical entity as a surface street or highway link (defined elsewhere), but in some cases they could be the same.

route_segment_mode

This data flow contains the mode that has been selected for use within the route segment. The choice of mode is made as part of the trip planning process using one of those listed in the 'modes' data flow. Only one mode can be used in any single route segment.

route_segment_number

This data flow is used within the Provide Driver and Traveler Services function and contains the number of segments in a route that is being provided in response to a trip request from a traveler.

route_segment_predicted_weather

This data flow contains the weather conditions expected on the road segment at the time at which it will be used.

route_segment_report_position_points

This data flow is used within the Provide Driver and Traveler Services function and contains a list of any points other than those at the route segment start and end where the vehicle's position is to be reported.

route_segment_start_point

This data flow is used within the Provide Driver and Traveler Services function and the Manage Traffic function. It contains the location of the start of a route segment.

route_segment_type

This data flow contains the definition of the type of route segment which will depend on the types of use it will support. The data flow may describe but not be limited to messages such as any type of vehicle, commercial vehicles only, transit vehicles only, commercial and transit vehicles, private cars and vans only, bicycles only, all pedestrians, no vehicles, disabled pedestrians, road route segment, and highway route segment.

route_segment_way_point

This data flow is used within the Provide Driver and Traveler Services function and contains the location of a point part way along a route segment at which a vehicle's position is to be reported.

route_start_time

This data flow is used within the Provide Driver and Traveler Services function. It contains the date and time at which a route will start taken from the time specified in the request for the route.

route_statistics

This data flow is used within the Provide Driver and Traveler Services function and contains the overall predicted statistics associated with a route which may assist the traveler in making a final route selection. The statistics will include such things as itinerary, estimated net travel time, time of arrival, total distance, anticipated delays/congestion, etc.

route_type

This data flow contains an indication of the type of route requested, or that for which data is available. It is stored and may have but not be limited to having a value of no data, dynamic route, or static route.

special_vehicle_application

This data flow contains details about a special vehicle required for securing credentials. This could be a commercial vehicle that is carrying cargo which could be viewed as being liable to cause a potential incident. Loads falling into this category are those containing hazardous (HAZMAT) material, or those which are outsize, e.g. wide, heavy or fragile and hence slow moving.

stored_credit

This data flow contains the value of the credit currently stored by the traveler card / payment instrument.

tcvoir_credential_status

This data is sent from the Manage Commercial Vehicles function to the commercial vehicle operations information requestor. It contains credential information such as registration, licensing, insurance, check flags, and electronic screening enrollment data about a commercial vehicle or carrier.

tcvoir_credentials

This data flow contains consists of full credentials information

tcvoir_safety_status

This data is sent from the Manage Commercial Vehicles function to the commercial vehicle operations information requestor. It contains safety information such as safety ratings, inspection summaries, and violation summaries about a commercial vehicle or carrier.

tea_accident_data

This data flow is sent from the Manage Emergency Services function to the enforcement agency and contains information about a commercial vehicle accident that have been detected by the Manage Commercial Vehicles function. The data in the flow will enable the notified enforcement agency to take the appropriate action regarding the accident.

tea_cv_citation_data

This data flow is sent from the Manage Emergency Services function to the enforcement agency and contains information about violations of commercial vehicle electronic credential and tax filing payment procedures etc. that have been detected by the Manage Commercial Vehicles function. The data in the flow will enable the notified enforcement agency to take the appropriate action against those committing the violation.

tea_cv_violation_data

This data flow is sent from the Manage Emergency Services function to the enforcement agency and contains information about violations of commercial vehicle electronic credential and tax filing payment procedures etc. that

have been detected by the Manage Commercial Vehicles function. The data in the flow will enable the notified enforcement agency to take the appropriate action against those committing the violation.

tifd_freight_request

This data flow is a request for details of the movement of freight by means that may include methods other than commercial vehicles, e.g. heavy rail, air, sea, river, etc.

tifs_border_clearance_status

This data flow is sent to the intermodal freight shipper system from the Manage Commercial Vehicle function. It contains the status of a commercial freight shipment moving across an international border.

time

This data flow is used within many ITS functions. It contains the current time of day and will be associated with other data flows and (possibly) a date.

To_Intermodal_Freight_Shipper

This data flow is sent to the Intermodal Freight Shipper from the Manage Commercial Vehicle function. It contains information regarding the clearance status of a commercial vehicle freight shipment from a roadside checkstation, such as an international border facility.

tocvas_border_clearance

This data flow is sent to other commercial vehicle administration system from the Manage Commercial Vehicle function. It contains information about the status of the movement of goods across international borders with corresponding trip identification numbers.

tocvas_credentials

This data flow is sent to other commercial vehicle administration system from the Manage Commercial Vehicle function and contains full credentials information.

tocvas_credentials_status

This data flow is sent to other commercial vehicle administration system from the Manage Commercial Vehicle function. It contains information regarding the status of credentials information including registration, licensing, check flags, and electronic screening enrollment data.

tocvas_data_table

This data flow is sent to the other commercial vehicle administration system from the Manage Commercial Vehicles function and contains data about required taxes and credential fees.

tocvas_safety_inspection

This data flow is sent to the other commercial vehicle administration system from the Manage Commercial Vehicle function. It contains a report containing results of commercial vehicle safety inspections.

tocvas_safety_status

This data flow is sent to the other commercial vehicle administration system from the Manage Commercial Vehicle function. It contains safety information such as safety ratings, inspection summaries, and violation summaries.

toll_cost

This data flow is used within the Provide Electronic Payment Services function and defines the cost of the toll for a particular vehicle through a toll plaza, thus giving it the ability to use the toll segment governed by the toll plaza.

toll_price

This data flow is used within the Provide Electronic Payment Services function and contains the price for each road segment to which a toll can be applied.

toll_price_application_time

This data flow is used within the Provide Electronic Payment Services function and contains the time at which a toll price applies for a particular toll segment. The time is held as the number of seconds since a fixed reference point, from which the actual time and date can be easily computed.

toll_price_for_cvo

This data flow is sent from the Provide Electronic Payment Services function to the Manage Commercial Vehicles function and contains the price for each road segment to which a toll applies, with the time and date for when it applies.

toll_price_for_cvo_request

This data flow is sent from the Manage Commercial Vehicles function to the Provide Electronic Payment Services function and contains a request for the current prices being charged for toll segments on the road and highway network.

toll_route_segments

This data flow contains the identity of toll segments for which toll payment is being provided or requested. It consists of the following data for a specific route.

toll_segment_identity

This data flow is used within the Provide Electronic Payment Services function and the Provide Driver and Traveler Services function. It contains the identity number of a toll segment, which may not be the same physical entity as a route segment or a link as used by traffic management processes.

toll_segments

This data flow is used within the Provide Electronic Payment Services function and contains the identity of the toll segment for which toll payment is being provided or requested, or for which toll price data is stored.

traveler_identity

This data flow contains the identity of the traveler who is making a request for information or guidance, so that the results of the request can be sent back to the originating traveler. It may be passed to processes in functions outside the Provide Driver and Traveler Services function for the same purpose. The identity can be alphanumeric characters so that (for example) the traveler's family name and initials can be used.

ttra_border_clearance_status

This data flow is sent to the Trade Regulatory Agencies from the Manage Commercial Vehicles function. It contains status information regarding movement of goods across international borders. It includes border agency and transportation agency clearance results.

ttra_domestic_transportation_informati

This data flow is sent to Trade Regulatory Agencies from the Manage Commercial Vehicles function. It contains data regarding trade transportation activity and may include shipper classification, carrier information and commodity.

ttra_transportation_border_clearance

This data flow is sent to the Trade Regulatory Agencies from the Manage Commercial Vehicles function. It contains notification information regarding the granting of permission for a commercial freight shipment to enter the United States.

unit_number

This data flow is used within the Manage Traffic function to provide an identification number of a particular piece of equipment, e.g. intersection signal controller, pedestrian signal controller, dynamic message sign (DMS), ramp meter, parking lot, road/highway link, toll segment, traffic sensor, etc.

vehicle_identity

This data flow contains the identity of a vehicle that may be stored electronically on the vehicle and compared with license data.

vehicle_location_for_cv

This data flow is sent from the Provide Driver and Traveler Services function to the Manage Commercial Vehicles function. It contains the vehicle location data for use in reporting on-board data to the commercial fleet manager, or the driver acting in this role. The data is computed from data input to sensors controlled by the processes that determines vehicle location.