Intelligent Transportation Systems (ITS)

Commercial Vehicle Operations (CVO)

Commercial Vehicle Information Systems and Networks (CVISN) System Design Description

NSTD-09-0238 V4.0

June 2009

This is Version 4 of a Baseline Issue

Internal and external reviews of this document, previously published drafts, and preliminary versions have been completed. All comments received to date have been incorporated or addressed.

Note: This document and other CVISN-related documentation are available for review and downloading by the ITS/CVO community from the Federal Motor Carrier Safety Administration (FMCSA) CVISN site on the World Wide Web. The URL for the CVISN site is: http://www.fmcsa.dot.gov/facts-research/cvisn.

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Change Summary: This document is under configuration management by the CVISN Architecture Configuration Control Board. See the Appendix for information concerning change requests (CRs) applicable to this version of the document.

CVISN System Design Description
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Section 1
Introduction

This CVISN System Design Description document is intended to help a state CVISN project team develop the state's CVISN system design. This guide assumes that you have already read the *Introductory Guide to CVISN* and the *CVISN Operational and Architectural Compatibility Handbook (COACH) Part 1.*

The guide provides additional detail about:

- The relationship between architecture and design (Section 2)
- The generic CVISN design, with the components organized into key stakeholder groups (Section 3)
- How the elements fit together (Section 4)

The document should answer these questions:

- What does a generic state design look like
  - Main elements and interfaces
  - Standard interfaces
  - How it all fits together
- What do the core infrastructure systems do for the states
- Where do states go to find more information

> *Commercial Vehicle Information Systems and Networks (CVISN)* refers to the collection of information systems and communications networks that support commercial vehicle operations (CVO).

What is a State CVISN Top-Level System Design?

A state's CVISN top-level design is the structure of the systems and interfaces within the state and the principles, operational concepts, scenarios, and standards that shape the structure.

The *Introductory Guide to CVISN* gives an overview of Core CVISN requirements, and the *CVISN Operational and Architectural Compatibility Handbook (COACH) Part 1* provides additional details. As specified in COACH Part 1, one requirement for a state to become Core CVISN compatible is:

> "A state CVISN System Design has been established that conforms to the CVISN Architecture and can evolve to include new technology and capabilities."

Section 2 of this document describes the National Intelligent Transportation Systems (ITS) Architecture, of which the CVISN Architecture is a part. A state should start with the CVISN Architecture and tailor it to produce a top-level design.

Another requirement of Core CVISN that is specified in COACH Part 1 is:

> "All the elements of three capability areas (Safety Information Exchange, Credentials Administration, and Electronic Screening) have been implemented using applicable architectural guidelines, operational concepts, and standards."

Section 3 provides additional explanations for some of the high-level operational concepts described in the COACH Part 1. It then describes the design components (information systems and interfaces) for each of the three capability areas.

The top-level design process encompasses setting the scope of the CVISN program in the state, defining top-level requirements, allocating new requirements to new or existing systems, defining interfaces among systems, and describing the physical computers and networks that will support the systems. The top-level design process will result in the definition of:

- User requirements
- System requirements
- Allocation of requirements to major system elements
- High-level interface specification

Completing the COACH Part 1 tables helps the state set the scope of their CVISN program and define top-level requirements. Section 4 of this document shows how to allocate the state requirements from the COACH Part 1 to components of the state system design and how to diagram systems, networks, and interfaces.

Section 2
Architecture and System Design

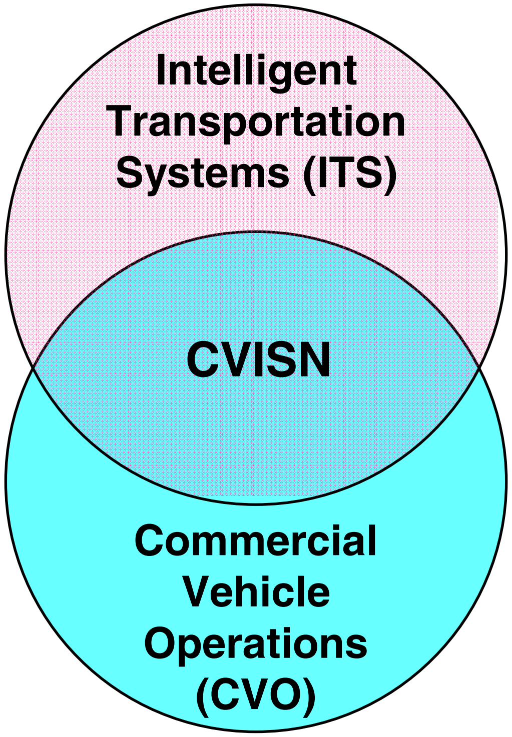
2.1 CVISN in the National Architecture

Architectural Framework:
A Way to Manage Complex Systems

Architecture is a framework that lays out a blueprint for construction.

The National Intelligent Transportation Systems Architecture defines:

- the functions associated with ITS user services,
- the physical entities or subsystems within which such functions reside,
- the data interfaces and information flows between physical subsystems, and
- the communications requirements associated with information flows.


Intelligent Transportation Systems (ITS)
CVISN
Commercial Vehicle Operations (CVO)

The CVISN Architecture is part of the National ITS Architecture

National Intelligent Transportation Systems (ITS) Architecture

The common framework for planning, defining, and integrating intelligent transportation systems supporting interoperability. It is a mature product, adopted by the US Department of Transportation (DOT) Secretary, that defines:

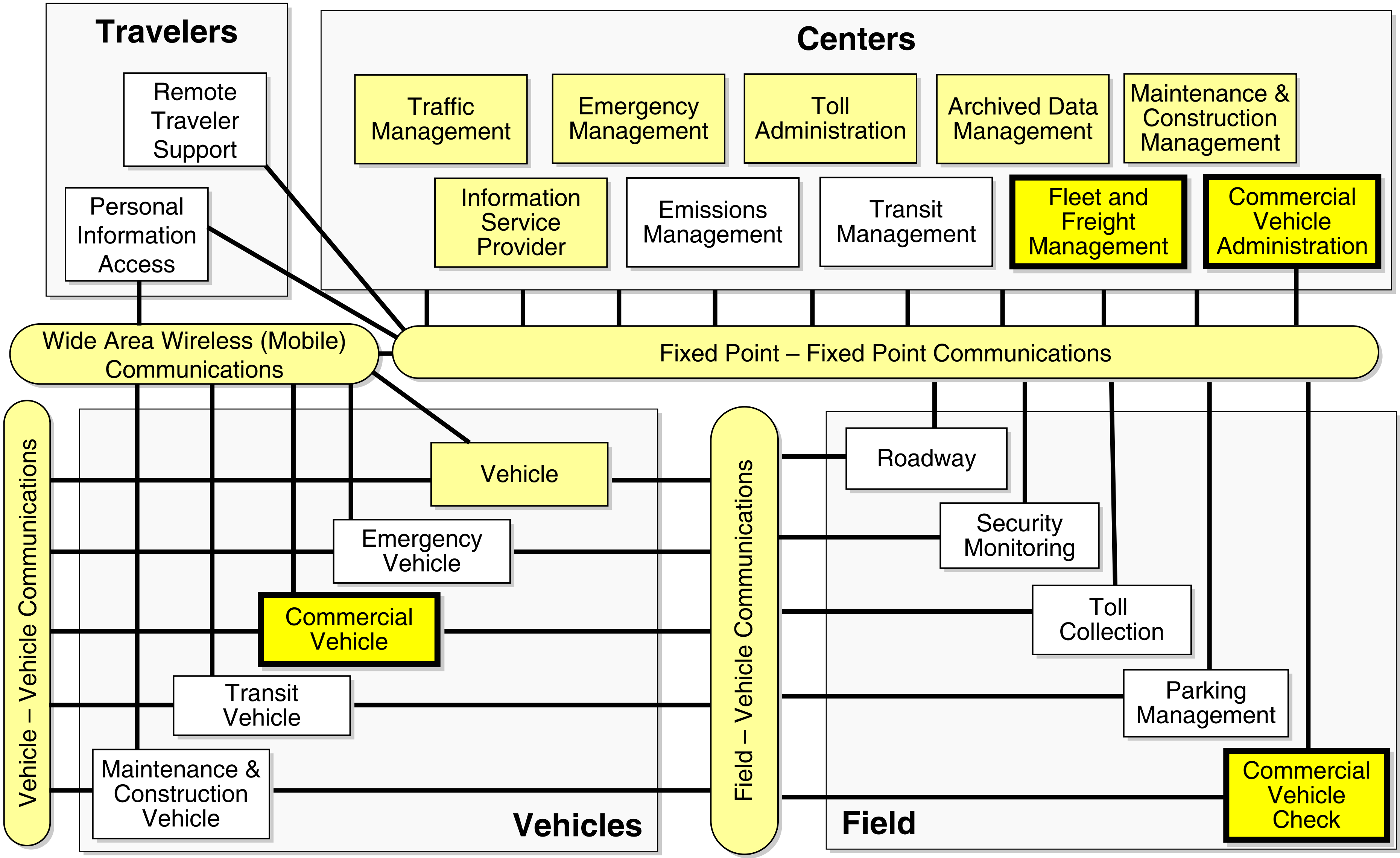
- the functions associated with ITS user services;
- the physical entities or subsystems where these functions reside;
- the data interfaces and information flows between physical subsystems; and
- the communications requirements associated with the information flows.

CVISN Architecture

The CVISN Architecture identifies the general vehicle, general driver, and CVO-unique aspects of the National ITS Architecture.

The Expanded CVISN elements are at the intersection of the National ITS Architecture and Commercial Vehicle Operations. These also include the general driver and vehicle ITS elements that commercial vehicle operators can use. The Core CVISN elements are the subset needed to support Core CVISN functions.

This version of the National ITS Architecture “Subsystems Interconnect Diagram” highlights the CVO subsystems


Travelers
Remote Traveler Support
Personal Information Access
Centers
Traffic Management
Emergency Management
Toll Administration
Archived Data Management
Maintenance & Construction Management
Information Service Provider
Emissions Management
Transit Management
Fleet and Freight Management
Commercial Vehicle Administration
Wide Area Wireless (Mobile) Communications
Fixed Point – Fixed Point Communications
Vehicle – Vehicle Communications
Vehicle
Emergency Vehicle
Commercial Vehicle
Transit Vehicle
Maintenance & Construction Vehicle
Vehicles
Field – Vehicle Communications
Roadway
Security Monitoring
Toll Collection
Parking Management
Commercial Vehicle Check
Field

CVO highlights in National ITS Architecture Subsystems Interconnect Diagram

The ITS subsystems communicate with each other using the communication elements and architecture interconnect channels shown in the ITS Architecture Interconnect Diagram. The subsystems are shown as boxes, the communications channels are shown as lines, and the communication elements are shown as “sausages.” In this version of the drawing, elements unique to Commercial Vehicle Operations are shown with thick borders and those which interface with the CVO-unique elements are shaded.

The subsystems shown as single entities are representative of multiple instances of the specific subsystems. For example, several Commercial Vehicle Administration subsystems in a region, each with its own jurisdiction, may communicate with each other.

The ITS architecture subsystems are grouped by classes where the subsystems may share common communication elements, deployment, and institutional characteristics. The classes of subsystems are Traveler Subsystems, Center Subsystems, Field Subsystems, and Vehicle Subsystems.

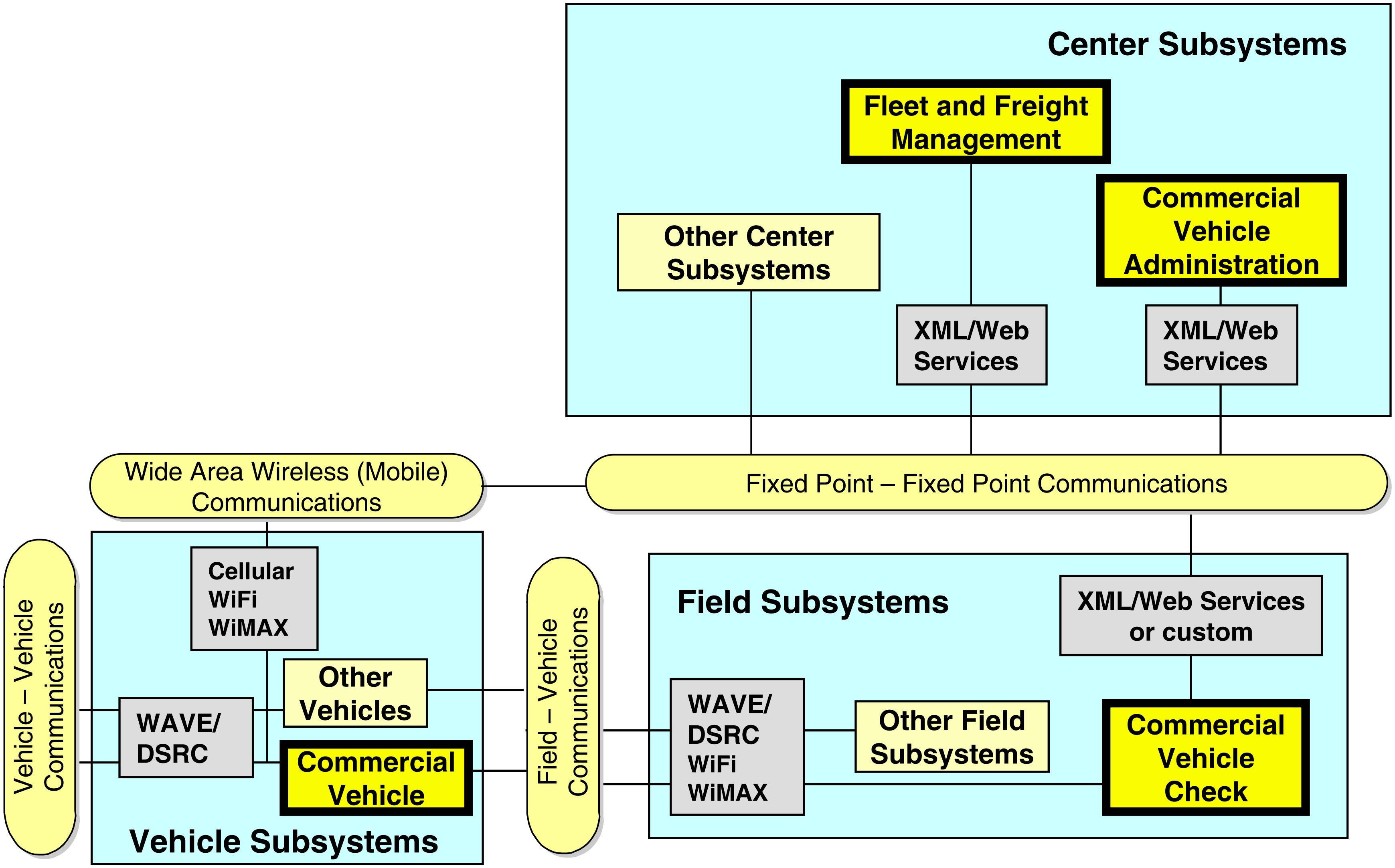
Traveler Subsystems provide the “personal” and portable platform for ITS functions of interest to a traveler for support of multimodal travel. No unique requirements are imposed by CVO on these subsystems.

Center Subsystems are typically located at fixed sites. These subsystems provide management, administration, and support functions for the transportation system. These subsystems communicate with other centers to enable coordination with other agencies, between modes, and across jurisdictions. Center Subsystems provide electronic credentialing services for Commercial Vehicle Operations, support the field in screening and inspecting commercial vehicles, enable safe HazMat (hazardous materials) operations, support freight mobility, and provide services in common with other modes of transportation.

Field Subsystems include some functions that require convenient access to a roadside location for deployment of sensors, signals, programmable signs, or some other interface with travelers, vehicles, or freight. Field subsystems communicate with one or more Center Subsystems. For commercial vehicles, field-vehicle communications via a transponder mounted on the vehicle and a roadside reader will facilitate roadside check and inspection operations.

Vehicle Subsystems are installed in a vehicle. There will be considerable subsystem commonality across the various vehicle types in some areas such as safety, navigation, and Mayday functions. In addition to field-vehicle and vehicle-vehicle communications equipment, some commercial vehicles may be equipped with wireless wide-area network communications to facilitate data communications with Center Subsystems such as Fleet and Freight Management.

2.2 The CVISN Architecture connects subsystems via a combination of interface standards



CVISN interface standards

This figure focuses on the ITS subsystems that support CVO. The subsystems shown with thick borders are unique to CVO. The other boxes contain functions that support CVO as well as other transportation elements. The diagram highlights standardized interface types critical to the CVO portion of ITS: WAVE/DSRC (Wireless Access in Vehicular Environments/Dedicated Short Range Communications), cellular, WiFi (Wireless Fidelity), WiMax (Worldwide Inter-operability for Microwave Access), XML (eXtensible Markup Language), and Web. For information on interface standards, refer to the National ITS Architecture.

WAVE/DSRC will occur via a transponder (tag) on the vehicle that is read from and sometimes written to by a roadside reader. The tag supplies an identifier and may also provide screening data, safety data, and HazMat flags unique to CVO. Standards for DSRC have been developed by the ASTM (American Society for Testing and Materials) and the IEEE (Institute of Electrical and Electronics Engineers). 915 MHz DSRC transponders are used today for CVISN applications. Future 5.9GHz transponders will provide additional capability.

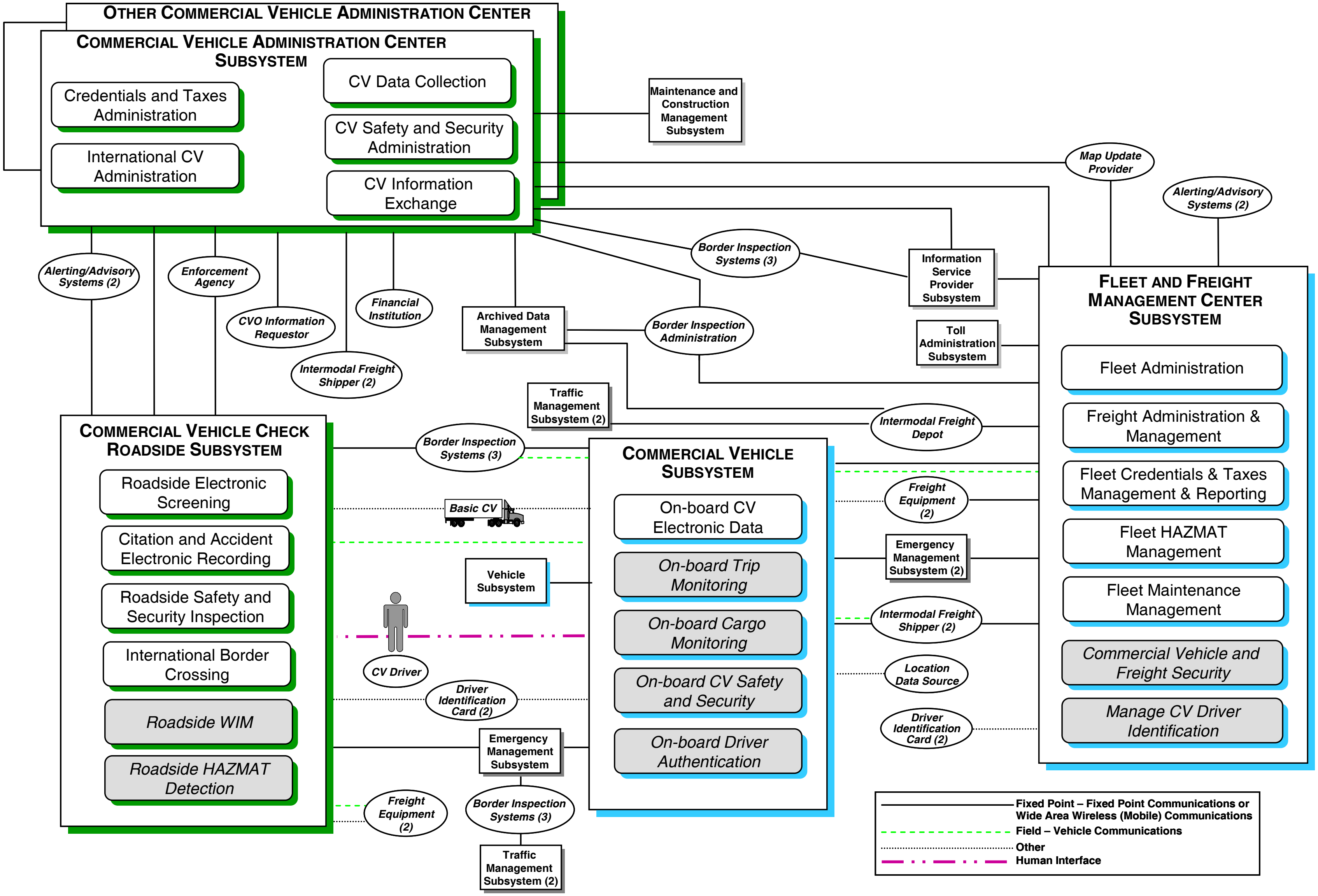
Cellular, WiFi , WiMAX, and wireless mesh networks provide wireless communications between mobile and fixed locations.

XML is a simple, flexible text format derived from SGML (Standard Generalized Markup Language) (ISO 8879). The World Wide Web Consortium (W3C) created, developed, and continues to maintain the XML specification. XML transactions are used for computer-to-computer information exchange (e.g., to fulfill a snapshot subscription) over the Internet using the File Transfer Protocol (FTP).

Web transactions may be used to communicate CVO-related business transactions between information systems and human users. States are implementing World Wide Web-based electronic credentialing. Some CVISN Core Infrastructure systems offer Web browser interfaces to CVO data.

Web services refers to clients and servers that communicate using XML messages that follow the W3C SOAP (Simple Object Access Protocol) standard. Web services support near real-time query and upload capabilities for system-to-system information exchange. WSDL (Web Services Definition Language) is an XML-based language that provides a model for describing Web services and is used in combination with SOAP and XML Schema to provide Web services over the Internet.

CVISN functions are allocated to subsystems and equipment packages of the National ITS Architecture


OTHER COMMERCIAL VEHICLE ADMINISTRATION CENTER
COMMERCIAL VEHICLE ADMINISTRATION CENTER SUBSYSTEM
Credentials and Taxes Administration
International CV Administration
CV Data Collection
CV Safety and Security Administration
CV Information Exchange
Maintenance and Construction Management Subsystem
Map Update Provider
Alerting/Advisory Systems (2)
Border Inspection Systems (3)
Information Service Provider Subsystem
Toll Administration Subsystem
Alerting/Advisory Systems (2)
Enforcement Agency
CVO Information Requestor
Financial Institution
Intermodal Freight Shipper (2)
Archived Data Management Subsystem
Border Inspection Administration
Traffic Management Subsystem (2)
Intermodal Freight Depot
FLEET AND FREIGHT MANAGEMENT CENTER SUBSYSTEM
Fleet Administration
Freight Administration & Management
Fleet Credentials & Taxes Management & Reporting
Fleet HAZMAT Management
Fleet Maintenance Management
Commercial Vehicle and Freight Security
Manage CV Driver Identification
COMMERCIAL VEHICLE CHECK ROADSIDE SUBSYSTEM
Roadside Electronic Screening
Citation and Accident Electronic Recording
Roadside Safety and Security Inspection
International Border Crossing
Roadside WIM
Roadside HAZMAT Detection
Border Inspection Systems (3)
Basic CV
Vehicle Subsystem
CV Driver
Driver Identification Card (2)
Emergency Management Subsystem
Freight Equipment (2)
Border Inspection Systems (3)
Traffic Management Subsystem (2)
COMMERCIAL VEHICLE SUBSYSTEM
On-board CV Electronic Data
On-board Trip Monitoring
On-board Cargo Monitoring
On-board CV Safety and Security
On-board Driver Authentication
Freight Equipment (2)
Emergency Management Subsystem (2)
Intermodal Freight Shipper (2)
Location Data Source
Driver Identification Card (2)
Fixed Point – Fixed Point Communications or Wide Area Wireless (Mobile) Communications
Field – Vehicle Communications
Other
Human Interface

The figure shows how CVISN functions are allocated to subsystems and equipment packages.

All CVO-unique equipment packages from the National ITS Architecture are part of the CVISN architecture. Equipment packages are the building blocks of the physical architecture subsystems. They group similar processes into an “implementable” package. Shaded boxes with italic text represent equipment packages that are not part of Core CVISN.

- The **Commercial Vehicle Administration Center Subsystem** includes these equipment packages:

  Credentials and Taxes Administration, supporting the processing, update, and issuance of CVO credentials; collection, processing, and review of CVO fees and taxes.

  International Commercial Vehicle Administration, supporting administrative functions associated with commercial vehicles crossing international borders.

  Commercial Vehicle Data Collection, supporting CV data archiving.

  Commercial Vehicle Safety and Security Administration, supporting the collection, sharing, and review of CV (Commercial Vehicle) safety data.

  Commercial Vehicle Information Exchange, facilitating the exchange of snapshots and reports containing safety and credentials information for drivers, carriers, and vehicles.

- The **Commercial Vehicle Check Roadside Subsystem**, includes these equipment packages:

  Roadside Electronic Screening, supporting the screening and electronic clearance of vehicles.

  Citation and Accident Electronic Recording, supporting the recording of information related to citations or accidents.

  Roadside Safety and Security Inspection, supporting automated safety inspections.

  International Border Crossing, supporting electronic compliance checks at international borders for CVO.

  Roadside WIM (Weigh-in-Motion), measuring weight at highway speed.

  Roadside HAZMAT Detection, supporting the detection and identification of vehicles carrying HazMat.

- The **Fleet and Freight Management Center Subsystem** includes these equipment packages:

  Fleet Administration, supporting fleet tracking, dispatch, making and distributing route plans.

  Freight Administration and Management, supporting cargo tracking and trading partner interfaces.

  Fleet Credentials and Taxes Management and Reporting, supporting CV credential application, fee payment, and tax filing.

  Fleet HAZMAT Management, managing HazMat shipments and communicating information about the location and handling of HazMat for incident response.

  Fleet Maintenance Management, supporting tracking and monitoring diagnostic data, mileage, inspections, and service records to develop maintenance plans.

  Commercial Vehicle and Freight Security, monitoring for equipment and driver security.

  Manage CV Driver Identification, managing information about the driver and checking for authorized vehicle operation.

- The **Commercial Vehicle Subsystem** includes these equipment packages:

  On-board CV Electronic Data, supporting the communication of IDs and other status and messages from/to the vehicle and driver.

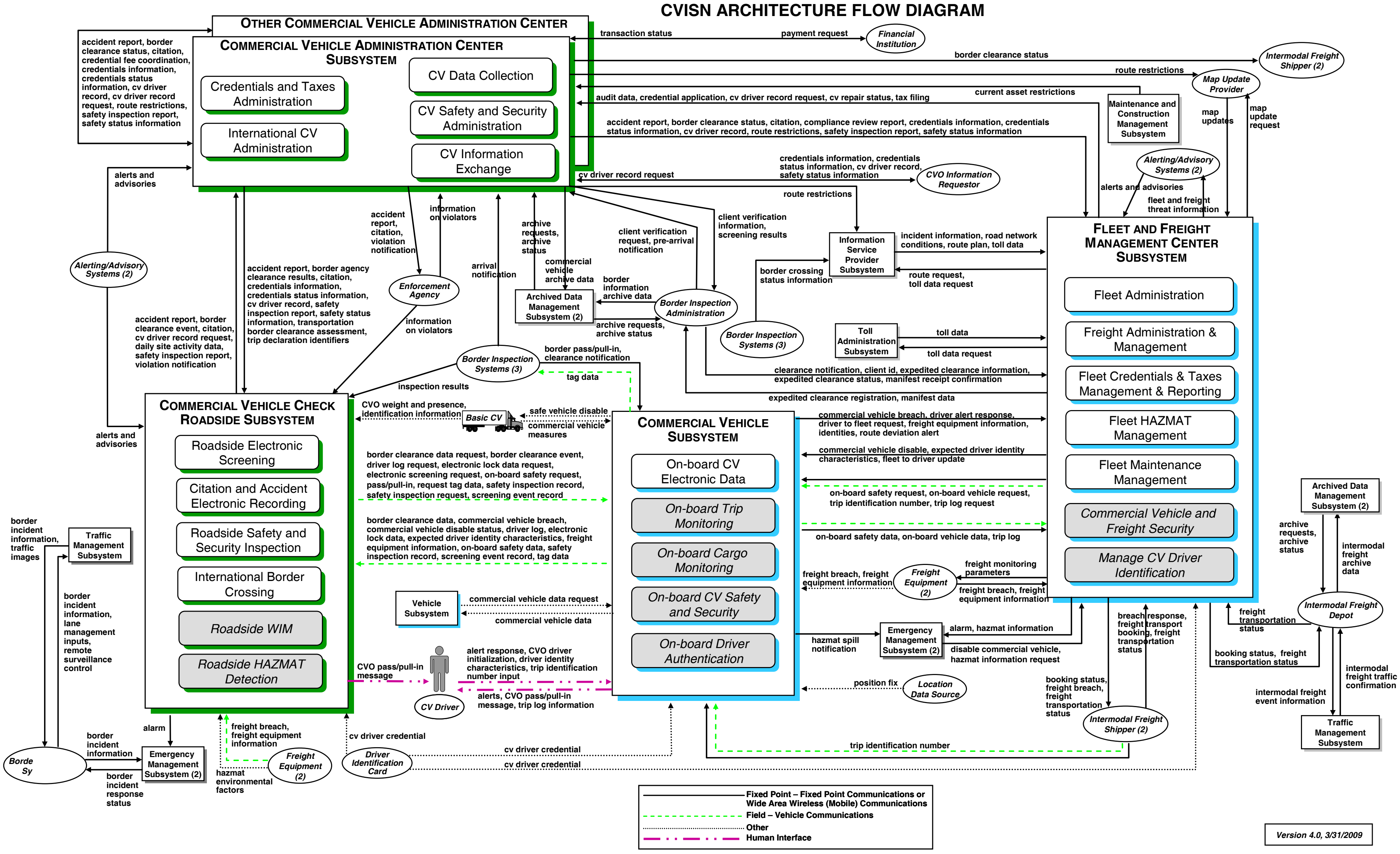
  On-board Trip Monitoring, providing automatic vehicle location, route monitoring, and mileage and fuel reporting.

  On-board Cargo Monitoring, monitoring the location and status of the vehicle and its cargo.

  On-board CV Safety and Security, collecting and sharing vehicle and driver safety and security information.

  On-board Driver Authentication, checking for unexpected changes in driver ID.

CVISN Architecture Flow Diagram



CVISN ARCHITECTURE FLOW DIAGRAM

OTHER COMMERCIAL VEHICLE ADMINISTRATION CENTER

COMMERCIAL VEHICLE ADMINISTRATION CENTER SUBSYSTEM

Credentials and Taxes Administration

International CV Administration

CV Data Collection

CV Safety and Security Administration

CV Information Exchange

accident report, border clearance status, citation, credential fee coordination, credentials information, credentials status information, cv driver record, cv driver record request, route restrictions, safety inspection report, safety status information

alerts and advisories

transaction status

payment request

Financial Institution

border clearance status

Intermodal Freight Shipper (2)

route restrictions

Map Update Provider

current asset restrictions

audit data, credential application, cv driver record request, cv repair status, tax filing

Maintenance and Construction Management Subsystem

map updates

map update request

accident report, border clearance status, citation, compliance review report, credentials information, credentials status information, cv driver record, route restrictions, safety inspection report, safety status information

credentials information, credentials status information, cv driver record, safety status information

cv driver record request

CVO Information Requestor

Alerting/Advisory Systems (2)

alerts and advisories

fleet and freight threat information

route restrictions

client verification information, screening results

client verification request, pre-arrival notification

Information Service Provider Subsystem

incident information, road network conditions, route plan, toll data

route request, toll data request

border crossing status information

FLEET AND FREIGHT MANAGEMENT CENTER SUBSYSTEM

Fleet Administration

Freight Administration & Management

Fleet Credentials & Taxes Management & Reporting

Fleet HAZMAT Management

Fleet Maintenance Management

Commercial Vehicle and Freight Security

Manage CV Driver Identification

Alerting/Advisory Systems (2)

accident report, citation, violation notification

information on violators

archive requests, archive status

commercial vehicle archive data

border information archive data

arrival notification

accident report, border agency clearance results, citation, credentials information, credentials status information, cv driver record, safety inspection report, safety status information, transportation border clearance assessment, trip declaration identifiers

Enforcement Agency

Archived Data Management Subsystem (2)

Border Inspection Administration

archive requests, archive status

Border Inspection Systems (3)

Toll Administration Subsystem

toll data

toll data request

accident report, border clearance event, citation, cv driver record request, daily site activity data, safety inspection report, violation notification

information on violators

Border Inspection Systems (3)

border pass/pull-in, clearance notification

tag data

inspection results

clearance notification, client id, expedited clearance information, expedited clearance status, manifest receipt confirmation

expedited clearance registration, manifest data

alerts and advisories

COMMERCIAL VEHICLE CHECK ROADSIDE SUBSYSTEM

Roadside Electronic Screening

Citation and Accident Electronic Recording

Roadside Safety and Security Inspection

International Border Crossing

Roadside WIM

Roadside HAZMAT Detection

CVO weight and presence, identification information

Basic CV

safe vehicle disable

commercial vehicle measures

COMMERCIAL VEHICLE SUBSYSTEM

On-board CV Electronic Data

On-board Trip Monitoring

On-board Cargo Monitoring

On-board CV Safety and Security

On-board Driver Authentication

commercial vehicle breach, driver alert response, driver to fleet request, freight equipment information, identities, route deviation alert

commercial vehicle disable, expected driver identity characteristics, fleet to driver update

on-board safety request, on-board vehicle request, trip identification number, trip log request

on-board safety data, on-board vehicle data, trip log

border clearance data request, border clearance event, driver log request, electronic lock data request, electronic screening request, on-board safety request, pass/pull-in, request tag data, safety inspection record, safety inspection request, screening event record

border clearance data, commercial vehicle breach, commercial vehicle disable status, driver log, electronic lock data, expected driver identity characteristics, freight equipment information, on-board safety data, safety inspection record, screening event record, tag data

border incident information, traffic images

Traffic Management Subsystem

border incident information, lane management inputs, remote surveillance control

Vehicle Subsystem

commercial vehicle data request

commercial vehicle data

freight breach, freight equipment information

Freight Equipment (2)

freight monitoring parameters

freight breach, freight equipment information

CVO pass/pull-in message

alert response, CVO driver initialization, driver identity characteristics, trip identification number input

alerts, CVO pass/pull-in message, trip log information

CV Driver

hazmat spill notification

Emergency Management Subsystem (2)

alarm, hazmat information

disable commercial vehicle, hazmat information request

position fix

Location Data Source

breach response, freight transport booking, freight transportation status

booking status, freight breach, freight transportation status

Intermodal Freight Shipper (2)

freight transportation status

booking status, freight transportation status

Archived Data Management Subsystem (2)

archive requests, archive status

intermodal freight archive data

Intermodal Freight Depot

intermodal freight event information

intermodal freight traffic confirmation

Traffic Management Subsystem

Borde Sy

border incident information

alarm

Emergency Management Subsystem (2)

border incident response status

freight breach, freight equipment information

Freight Equipment (2)

hazmat environmental factors

cv driver credential

Driver Identification Card

cv driver credential

cv driver credential

trip identification number

Fixed Point – Fixed Point Communications or Wide Area Wireless (Mobile) Communications

Field – Vehicle Communications

Other

Human Interface

Version 4.0, 3/31/2009

CVISN Architecture Flow Diagram

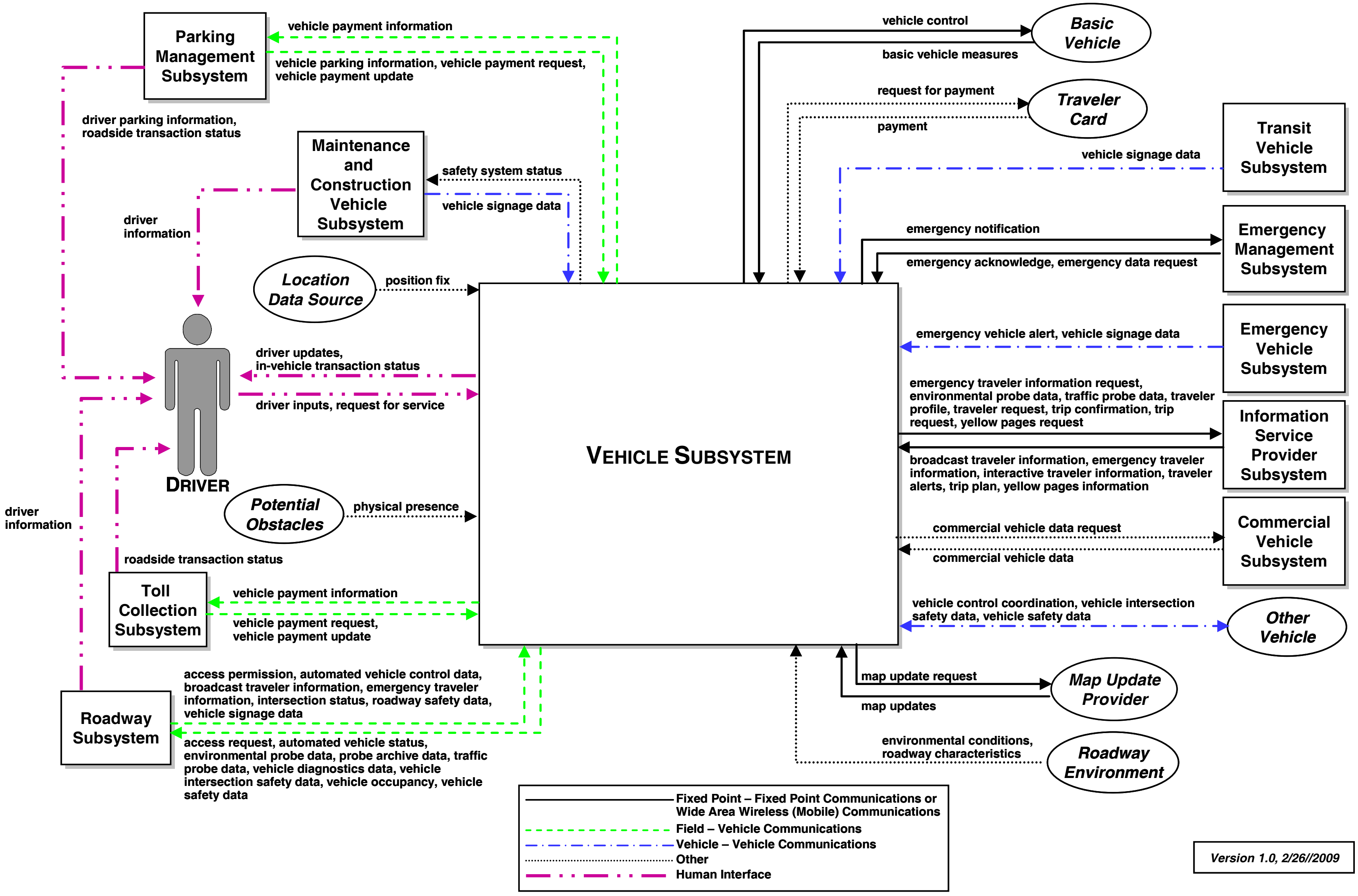
The CVISN Architecture Flow Diagram depicts the CVO data flow among subsystems and between CVO subsystems and external entities. This diagram was used to coordinate with the National Architecture team and to drive CVISN Architecture refinement. The subsystems and equipment packages shown relate to the processes defined in the physical architecture. The flows were used to derive requirements for standardized information exchanges.
The CVISN Architecture baseline (to be published as Version 4) is being aligned with the National ITS Architecture versions 6.0 and 6.1. This diagram reflects the results of that alignment. For details of the previous alignment, see JHU/APL document *CVISN Architecture*, Version 3, and its references.

Credential and Taxes Administration processes are mapped to the Commercial Vehicle Administration Center Subsystem. Roadside operations processes are mapped to the Commercial Vehicle Check Roadside Subsystem. Safety assurance processes are split into 1) the CV Safety and Security Administration and 2) the Roadside Safety and Security Inspection equipment packages. Vehicle operation processes are mapped to the Commercial Vehicle Subsystem. Fleet management processes are mapped to the Fleet and Freight Management Center Subsystem. Archiving data from CV processes is mapped to the Commercial Vehicle Administration Center Subsystem. Other CVO-related ITS functions are depicted through interactions with general ITS subsystems from each of the CVO-unique subsystems.

Conventions used on the figure:
Entities external to the ITS information systems are shown in ovals, e.g., Enforcement Agency. In National Architecture terminology, these are “terminators.” Connections and data exchanges shown on the figures are consistent with and follow the conventions of the National ITS Architecture. Different line types differentiate the means of communication used.

- Fixed point or wireless communications are shown as solid lines.
- Field-vehicle communications used for close proximity communications between a vehicle and the immediate infrastructure along the road are identified using dashed lines.
- Human Interface – shown as a line with a long dash followed by two dots
- Other transactions (National ITS Architecture’s Contact or Proximity Interface, Internal Vehicle Interface, Physical Interface, or Position Location Interface) are shown as dotted lines.
- Vehicle-vehicle communications are shown as a line with a long dash followed by a single dot. (This line type is used on the Vehicle and Driver diagram – see next page.)

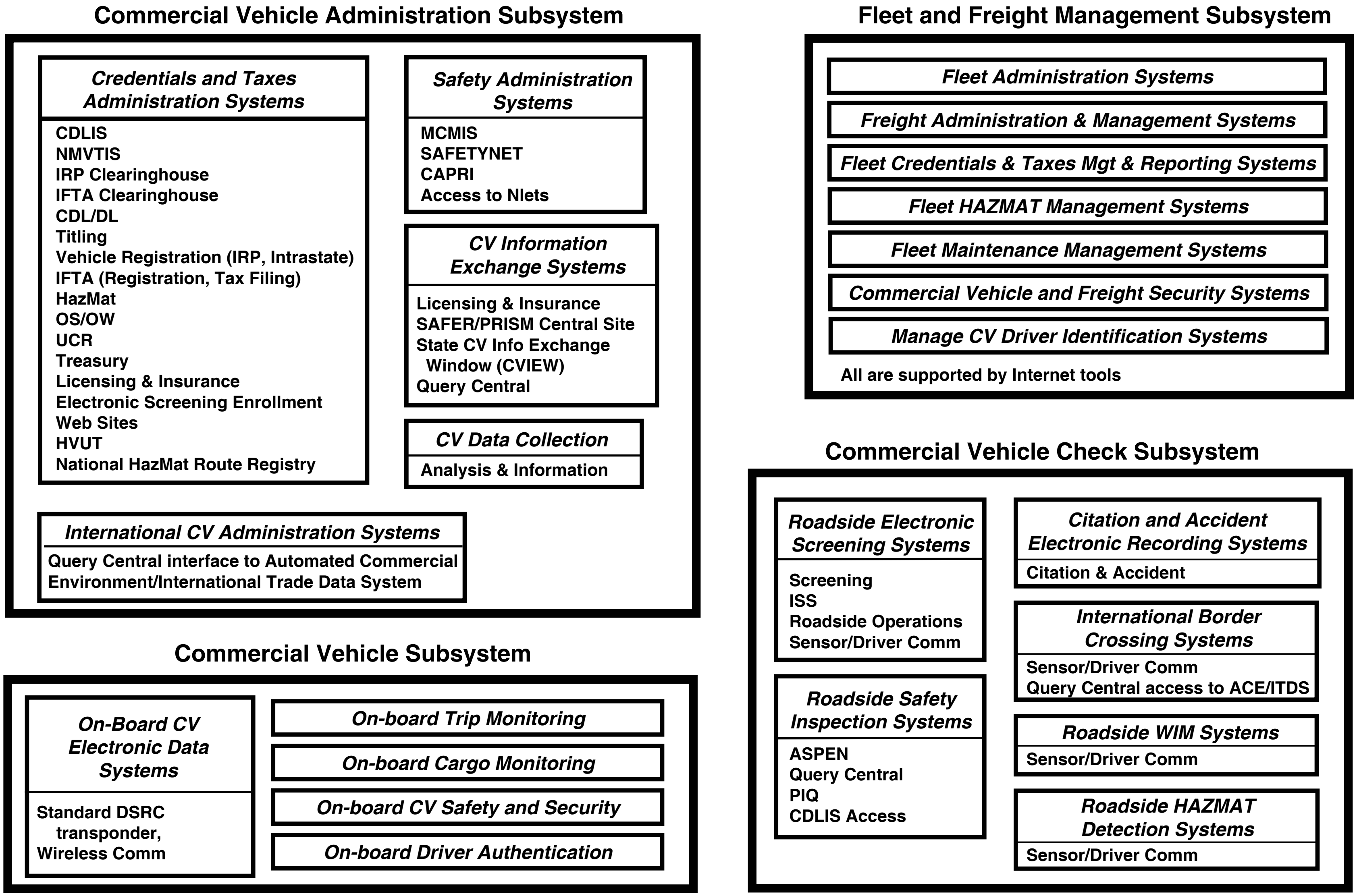
General Driver and Vehicle portions of the National ITS Architecture support Commercial Vehicle Operations as well.


Parking Management Subsystem
vehicle payment information
vehicle parking information, vehicle payment request, vehicle payment update
driver parking information, roadside transaction status
Maintenance and Construction Vehicle Subsystem
safety system status
vehicle signage data
driver information
Location Data Source
position fix
driver updates, in-vehicle transaction status
driver inputs, request for service
DRIVER
Potential Obstacles
physical presence
driver information
roadside transaction status
Toll Collection Subsystem
vehicle payment information
vehicle payment request, vehicle payment update
Roadway Subsystem
access permission, automated vehicle control data, broadcast traveler information, emergency traveler information, intersection status, roadway safety data, vehicle signage data
access request, automated vehicle status, environmental probe data, probe archive data, traffic probe data, vehicle diagnostics data, vehicle intersection safety data, vehicle occupancy, vehicle safety data
VEHICLE SUBSYSTEM
vehicle control
Basic Vehicle
basic vehicle measures
request for payment
Traveler Card
payment
vehicle signage data
Transit Vehicle Subsystem
emergency notification
emergency acknowledge, emergency data request
Emergency Management Subsystem
emergency vehicle alert, vehicle signage data
Emergency Vehicle Subsystem
emergency traveler information request, environmental probe data, traffic probe data, traveler profile, traveler request, trip confirmation, trip request, yellow pages request
broadcast traveler information, emergency traveler information, interactive traveler information, traveler alerts, trip plan, yellow pages information
Information Service Provider Subsystem
commercial vehicle data request
commercial vehicle data
Commercial Vehicle Subsystem
vehicle control coordination, vehicle intersection safety data, vehicle safety data
Other Vehicle
map update request
map updates
Map Update Provider
environmental conditions, roadway characteristics
Roadway Environment
Fixed Point – Fixed Point Communications or Wide Area Wireless (Mobile) Communications
Field – Vehicle Communications
Vehicle – Vehicle Communications
Other
Human Interface
Version 1.0, 2/26//2009

General Driver and Vehicle Diagram

Version 6.0 of the National ITS Architecture included major updates to align with the Vehicle Infrastructure Integration (VII) initiative. [Note that the US DOT's Research and Innovative Technology Administration (RITA) subsequently renamed VII to be IntelliDrive^{SM}.] Commercial vehicle drivers and motor carriers will utilize and benefit from many IntelliDrive^{SM} functions, including, for example, access to traveler information and in-vehicle signing. To reflect that, the CVISN Architecture is being expanded to include general vehicle and driver components of the National ITS Architecture. This diagram and descriptions of the equipment packages and architecture flows will be added to the CVISN Architecture. When states plan their CVISN deployments, they should consider how to take advantage of the general functions and information sharing that are represented on the diagram.

2.3 CVISN System Design
Actual Systems Mapped to Architecture Components



Commercial Vehicle Administration Subsystem

Credentials and Taxes Administration Systems

CDLIS
NMVTIS
IRP Clearinghouse
IFTA Clearinghouse
CDL/DL
Titling
Vehicle Registration (IRP, Intrastate)
IFTA (Registration, Tax Filing)
HazMat
OS/OW
UCR
Treasury
Licensing & Insurance
Electronic Screening Enrollment
Web Sites
HVUT
National HazMat Route Registry

Safety Administration Systems

MCMIS
SAFETYNET
CAPRI
Access to Nlets

CV Information Exchange Systems

Licensing & Insurance
SAFER/PRISM Central Site
State CV Info Exchange
Window (CVIEW)
Query Central

CV Data Collection

Analysis & Information

International CV Administration Systems

Query Central interface to Automated Commercial Environment/International Trade Data System

Commercial Vehicle Subsystem

On-Board CV Electronic Data Systems

Standard DSRC transponder,
Wireless Comm

On-board Trip Monitoring

On-board Cargo Monitoring

On-board CV Safety and Security

On-board Driver Authentication

Fleet and Freight Management Subsystem

Fleet Administration Systems

Freight Administration & Management Systems

Fleet Credentials & Taxes Mgt & Reporting Systems

Fleet HAZMAT Management Systems

Fleet Maintenance Management Systems

Commercial Vehicle and Freight Security Systems

Manage CV Driver Identification Systems

All are supported by Internet tools

Commercial Vehicle Check Subsystem

Roadside Electronic Screening Systems

Screening
ISS
Roadside Operations
Sensor/Driver Comm

Roadside Safety Inspection Systems

ASPEN
Query Central
PIQ
CDLIS Access

Citation and Accident Electronic Recording Systems

Citation & Accident

International Border Crossing Systems

Sensor/Driver Comm
Query Central access to ACE/ITDS

Roadside WIM Systems

Sensor/Driver Comm

Roadside HAZMAT Detection Systems

Sensor/Driver Comm

The CVISN System Design takes the architecture down a level.

The CVISN System Design – Actual Systems Mapped to Architecture Components diagram shows the transition from “architecture” to “top-level system design.” In the architecture drawings, the functional subsystems are shown, but the specific existing or new systems are not. In this top-level system design, legacy systems that handle specific CVO functions are shown. New systems developed since 1995 to support emerging ITS functions are also shown.

On this diagram, the legacy and new systems are shown in the subsystem and equipment package groupings that were used in the National ITS Architecture and CVISN Architecture drawings shown earlier. Some systems support the functions of more than one equipment package; the diagram shows them more than once.

The remainder of this document will provide guidance to the state for developing a state CVISN top-level system design that conforms to the CVISN Architecture and can evolve to include new technology and capabilities.

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Section 3
Top-Level System Design

Topic **Page**

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3.1 General CVISN Concepts and Design Features

This section provides additional explanations for some of the high-level concepts described in the COACH Part 1.

- Standard Identifiers for carriers, vehicles, transponders, drivers, international trips, and shipments
- Snapshots for carrier and vehicle safety and credentials information exchange
- World Wide Web Sites for access to public services and information
- Authoritative Sources for maintaining accurate information
- Open Standards (e.g., DSRC, XML, Web services) for automated information exchange (These were discussed in Section 2.)
- Information Systems, including carrier, core infrastructure, and state systems (These will be described in Sections 3.2-3.5.)

Standard Identifiers

CVISN has tackled the issue of standardizing the identifiers used to exchange information pertaining to the safety history, law enforcement activity, and credentials of a particular CVO entity (i.e., a motor carrier, commercial vehicle, driver, transponder, container). Each of these entities can be identified in a variety of ways using a physical identifier; that is, an identifier that supports an existing manual process. For example, the vehicle physical identifiers include license plate jurisdiction and number, vehicle identification number (VIN), and registration number. If one state chooses to develop a database that is indexed on license plate number while another state's database is based on VIN, it will be difficult for the two states to exchange information about a specific vehicle.

In order to address this problem, it is necessary for the CVO community to adopt a primary identifier for each entity that can act as a common way to "name" each entity about which information is exchanged. This implies that the primary identifier will permit a cross-reference between two databases that are designed around different physical identifiers. This may also require the development of a cross-reference database if one does not already exist. It does not imply that all state databases should be modified to support the primary identifier.

For example, the USDOT Number is the primary identifier for motor carriers.

Companies that operate commercial vehicles transporting passengers or hauling cargo in interstate commerce must be registered with the FMCSA and must have a USDOT Number. Commercial intrastate hazardous materials carriers who haul quantities requiring a safety permit also must register for a USDOT Number. The USDOT Number serves as a unique identifier when collecting and monitoring a company's safety information acquired during audits, compliance reviews, crash investigations, and inspections. In most cases, companies operating exclusively as brokers or non-vehicle-operating shippers or freight forwarders do not need to obtain a USDOT Number.

In about 25 states, all registrants of commercial motor vehicles, even intrastate and non-motor carrier registrants, are required to obtain a USDOT Number as a necessary condition for commercial vehicle registration.

Detailed information on the primary identifiers that CVISN stakeholders should use to facilitate information sharing can be found in Appendix B of the *CVISN Architecture* document.

Snapshots: Principles and Operational Concepts

The CVISN initiative supports the standardization of dataflows to carry summary (snapshot) and detailed (report) safety and credentials information. These dataflows provide a consistent basis for automating CVO information exchanges and processing and for ensuring interoperability among existing and developing CVO information systems.

Snapshots provide a quick picture of the safety performance history and basic credentials information. They convey information about three major entities: carriers, vehicles, and drivers. Only carrier and vehicle snapshots are part of Core CVISN. Some form of “driver snapshots” may be implemented in the future.

Snapshots are used for screening carriers and vehicles at roadside check stations, for safety inspections, for limited credentials checking and insurance applications, and for industry self-checks.

Snapshots are assembled and stored by SAFER (Safety and Fitness Electronic Records) and CVIEW (Commercial Vehicle Information Exchange Window). SAFER manages interstate snapshots while state CVIEWs (or equivalent) manage intrastate and interstate snapshots of interest to the state.

Snapshot information is routinely available for states to retrieve from SAFER; states may retrieve a subset of the information available. Snapshots are also available for near-real-time response to a query.

State information systems are the authoritative sources for safety and credentials data about vehicles that are exchanged in snapshots. MCMIS (Motor Carrier Management Information System) is the primary source of safety data about interstate carriers. State SAFETYNET systems update MCMIS with safety information collected at roadside sites. Since MCMIS is not set up to handle a large volume of requests for specific data, SAFER provides summaries of the data stored in MCMIS to authorized users as part of the carrier snapshots.

Snapshot Data Stored in SAFER/CVIEW

Data Snapshot	Identifier/Census Data	Safety Information	Credential Information

Carrier	Primary Carrier ID;
	Other IDs (e.g., Taxpayer ID, DUNS, IRP account, etc.)
	Names;
	Addresses;
	Type;
	Operations Characterization
		Safety Ratings;
		Accident, Inspection & Violation Summaries;
		Safety Review History;
		Last OOS;
		PRISM Data
			Carrier Registration;
			Fuel Tax Data;
			Insurance Data;
			HazMat Registration;
			Permit Data;
			Electronic Screening Enrollment;
			Carrier Check Flags (e.g., IRP and IFTA Flags)

Vehicle	VIN;
	Vehicle Plate ID;
	Other IDs (e.g., Plate, IRP Account, CVIS Default Carrier, Transponder, Title Number);
	Vehicle Description
		Last Inspection Overview;
		Inspection & Violation Summaries;
		Last OOS;
		CVSA Decal Data;
		PRISM Data
			Apportionment (i.e., Cab Card Data);
			Permit Data;
			Electronic Screening Enrollment;
			Vehicle Check Flags (e.g., Registration Check Flag)

Driver (Future)	Driver Unique ID;
	Home State;
	Names;
	Address;
	DOB, Sex;
	Citizenship
		Last Inspection Overview;
		Accident Summary;
		Inspection & Violation Summaries;
		Last OOS
			Driver Check Flags (e.g., DMV Check Flag)

Driver Snapshots

Various stakeholders need information about drivers. The categories of “driver snapshot” information include: identifiers, driver history, driver license data, inspection data, summary safety data, and access control.

In 2005, the Driver Information Sharing working group made two recommendations about improving access to driver data. No driver snapshot capability has been implemented yet. The *Expanded CVISN Driver Information Sharing Capability Report* described the recommendations in detail. Here is a summary:

Facilitated Centralized Query: In this option, a centralized query service would be provided for all authorized users. Query Central, which provides access to driver license information via CDLIS, is a model. No driver snapshots would actually be stored by the query service. Drivers could control what private entities/ people are able to access their records and could see who had accessed their records. The central query service would interface with all necessary state and federal systems that are authoritative sources for driver snapshot information. The user or system that wants “snapshot” data would retrieve and integrate the data and could store it for later use.

Snapshot Light: Replicate a limited set of driver data in a central snapshot repository. In this option, a centralized information management system (e.g., SAFER) would store or collect limited driver snapshots upon legitimate request. The data would be replicated because SAFER is not the authoritative source for any information. The limited driver snapshot would include the data needed by the roadside for screening [identity information; counts of crashes, inspections, and OOS (out-of-service); safety rating for driver]. Data for which states are the authoritative source would be pushed to the central repository upon change or would be supplied when requested by the repository system. The central repository system would merge data from multiple sources into a limited snapshot. Authorized users could request a full snapshot. The system would request additional information from authoritative sources (primarily state driver licensing agencies and MCMIS) to fulfill the full snapshot request.

FMCSA is revisiting these recommendations as part of the Driver Information Sharing initiative. The Driver Information Resource (DIR) tool is available to authorized users, typically FMCSA staff and MCSAP (Motor Carrier Safety Assistance Program) state enforcement staff. DIR provides screens showing data (crash, driver inspection, and vehicle inspection data stored in MCMIS) related to a particular driver or set of drivers related to a carrier.

State and Core Infrastructure World Wide Web sites provide access to public services and information

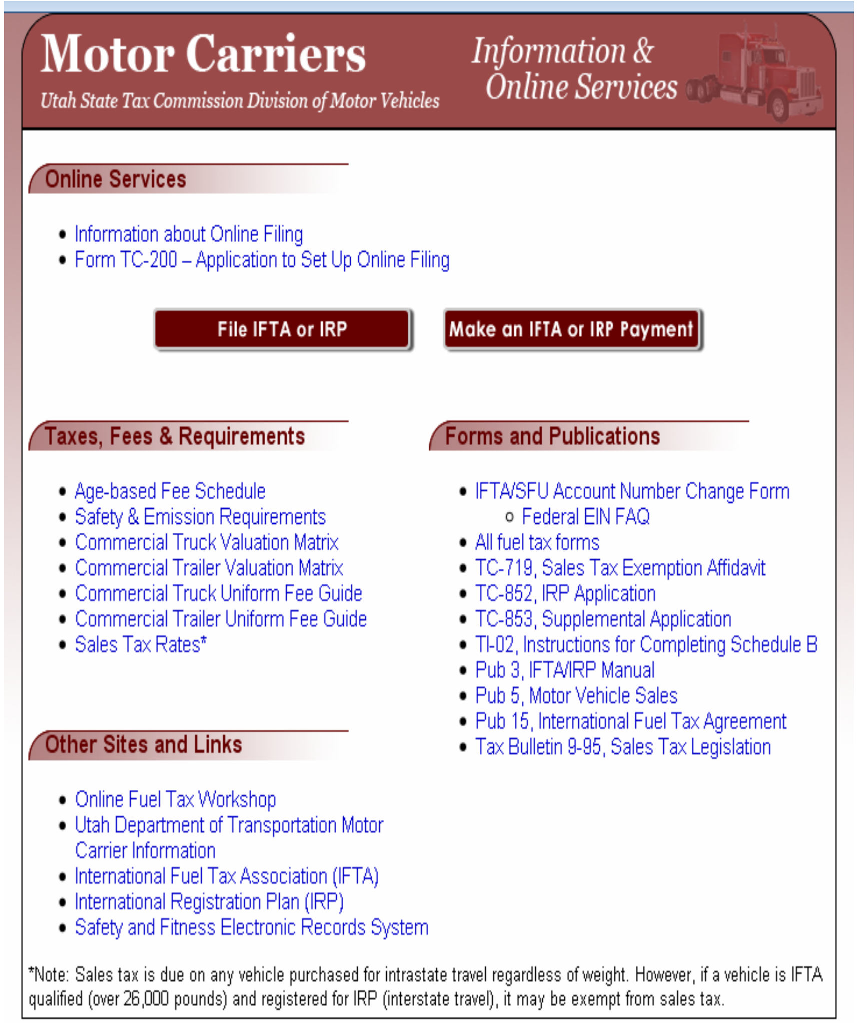
States are implementing Web sites and portals to support electronic credentialing and provide information to motor carriers. Online services offered may include:

- Intrastate vehicle registration
- IRP registration
- IFTA registration and tax filing
- OS/OW permit
- UCR registration

Users obtain authorization from the jurisdiction to access the online applications.

Information exchanged with any address beginning with *https* is encrypted using cryptographic protocols such as Secure Sockets Layer (SSL) or Transport Layer Security (TLS) to provide security and data integrity for communications over TCP/IP (Transmission Control Protocol/Internet Protocol) networks.

Many CVISN Core Infrastructure systems, including FMCSA, IRP, Inc., and IFTA, Inc. systems, offer Web browser interfaces to CVO data, as will be shown later in this section.



Motor Carriers

Utah State Tax Commission Division of Motor Vehicles

Information & Online Services

Online Services

- Information about Online Filing
- Form TC-200 – Application to Set Up Online Filing

File IFTA or IRP

Make an IFTA or IRP Payment

Taxes, Fees & Requirements

- Age-based Fee Schedule
- Safety & Emission Requirements
- Commercial Truck Valuation Matrix
- Commercial Trailer Valuation Matrix
- Commercial Truck Uniform Fee Guide
- Commercial Trailer Uniform Fee Guide
- Sales Tax Rates*

Forms and Publications

- IFTA/SFU Account Number Change Form
  - Federal EIN FAQ
- All fuel tax forms
- TC-719, Sales Tax Exemption Affidavit
- TC-852, IRP Application
- TC-853, Supplemental Application
- TI-02, Instructions for Completing Schedule B
- Pub 3, IFTA/IRP Manual
- Pub 5, Motor Vehicle Sales
- Pub 15, International Fuel Tax Agreement
- Tax Bulletin 9-95, Sales Tax Legislation

Other Sites and Links

- Online Fuel Tax Workshop
- Utah Department of Transportation Motor Carrier Information
- International Fuel Tax Association (IFTA)
- International Registration Plan (IRP)
- Safety and Fitness Electronic Records System

*Note: Sales tax is due on any vehicle purchased for intrastate travel regardless of weight. However, if a vehicle is IFTA qualified (over 26,000 pounds) and registered for IRP (interstate travel), it may be exempt from sales tax.

Authoritative Sources are responsible for maintaining accurate information. Non-authoritative sources provide interim assistance.

Each data element exchanged via CVISN has an authoritative source system. Authoritative sources contribute specific segments of data proactively to snapshots, sometimes via indirect source systems.

Authoritative sources are responsible for sending updates proactively to CVIEW/SAFER. Enforcement relies on timely and accurate information at the roadside.

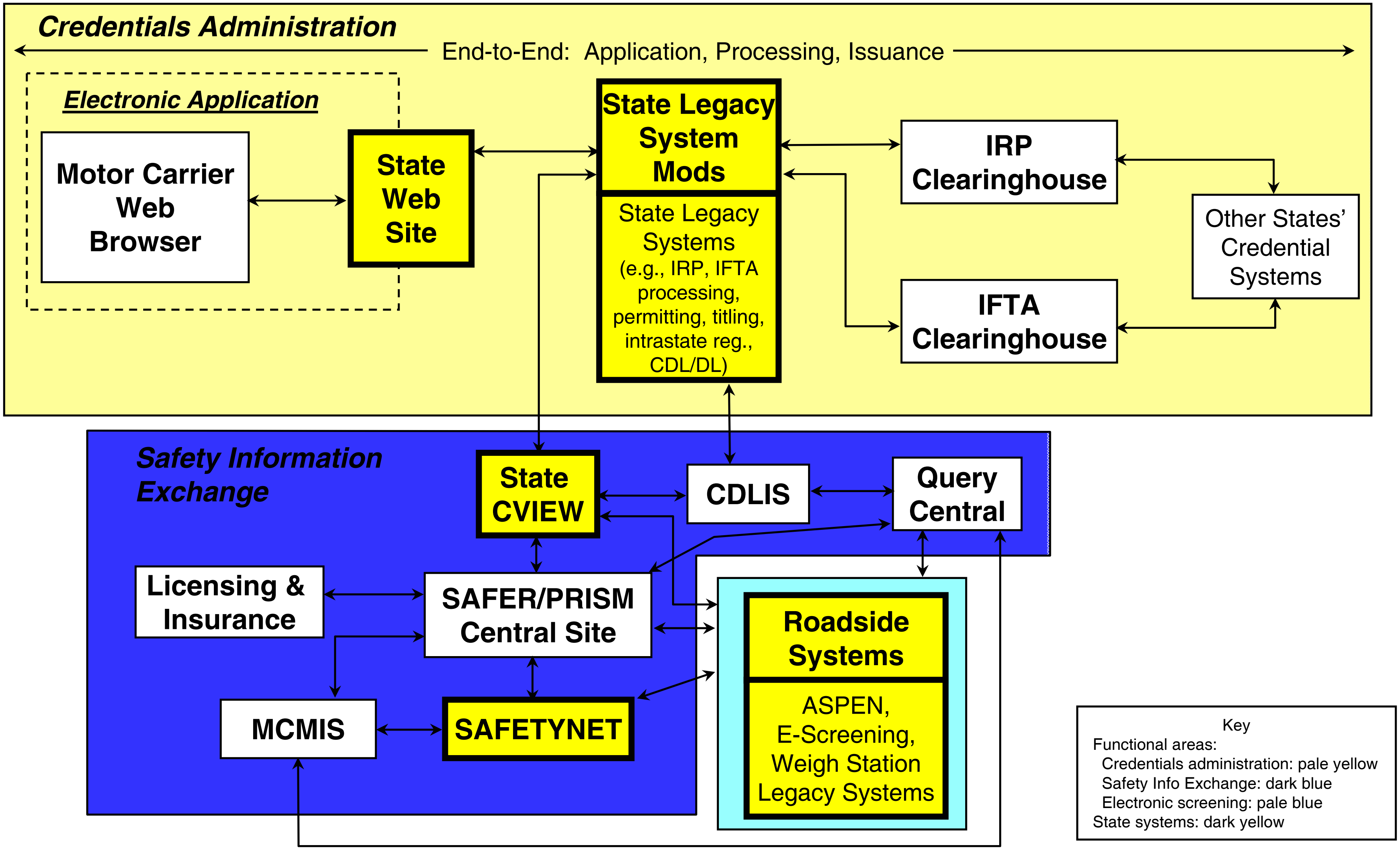
Snapshot users should always check with the authoritative source prior to any enforcement action. SAFER and CVIEW are not authoritative sources for any information. They are systems that provide information from a variety of sources to streamline roadside (and other) operations. Whenever enforcement action is to be taken, users should check with the authoritative source to verify the accuracy of the information on which the action will be based.

Each jurisdiction participating in ITS/CVO information exchange identifies the authoritative source for each data item. Sometimes authoritative systems authorize indirect sources to assist in the information exchange process.

The success of the CVISN program depends on having complete vehicle registration data in SAFER to support roadside screening, whether manual or electronic. Although uploading credential data to SAFER should be each state's urgent priority, FMCSA realizes that some states are not yet at that point in their CVISN deployment. Therefore, FMCSA supports states uploading data for others as an interim solution. In this case, the states that are uploading for others are non-authoritative sources.

In particular, Washington and Kentucky will upload IRP cab card (prorate) data when a carrier in a non-uploading state requests participation in e-screening. Data records will indicate WA or KY as the non-authoritative source of the data. New data elements (sending state, verification source, and verification date) track the exchange if a state is sending vehicles to SAFER on behalf of another state. This interim process will cease after the state's CVIEW has been certified as compliant with current SAFER requirements and the state is successfully uploading its own vehicle registration and prorate data to SAFER.

Completing Core CVISN Deployment: A Simplified View of a State's Top-Level System Design


Credentials Administration
End-to-End: Application, Processing, Issuance
Electronic Application
Motor Carrier Web Browser
State Web Site
State Legacy System Mods
State Legacy Systems (e.g., IRP, IFTA processing, permitting, titling, intrastate reg., CDL/DL)
IRP Clearinghouse
IFTA Clearinghouse
Other States' Credential Systems
Safety Information Exchange
State CVIEW
CDLIS
Query Central
Licensing & Insurance
SAFER/PRISM Central Site
MCMIS
SAFETYNET
Roadside Systems
ASPEN, E-Screening, Weigh Station Legacy Systems

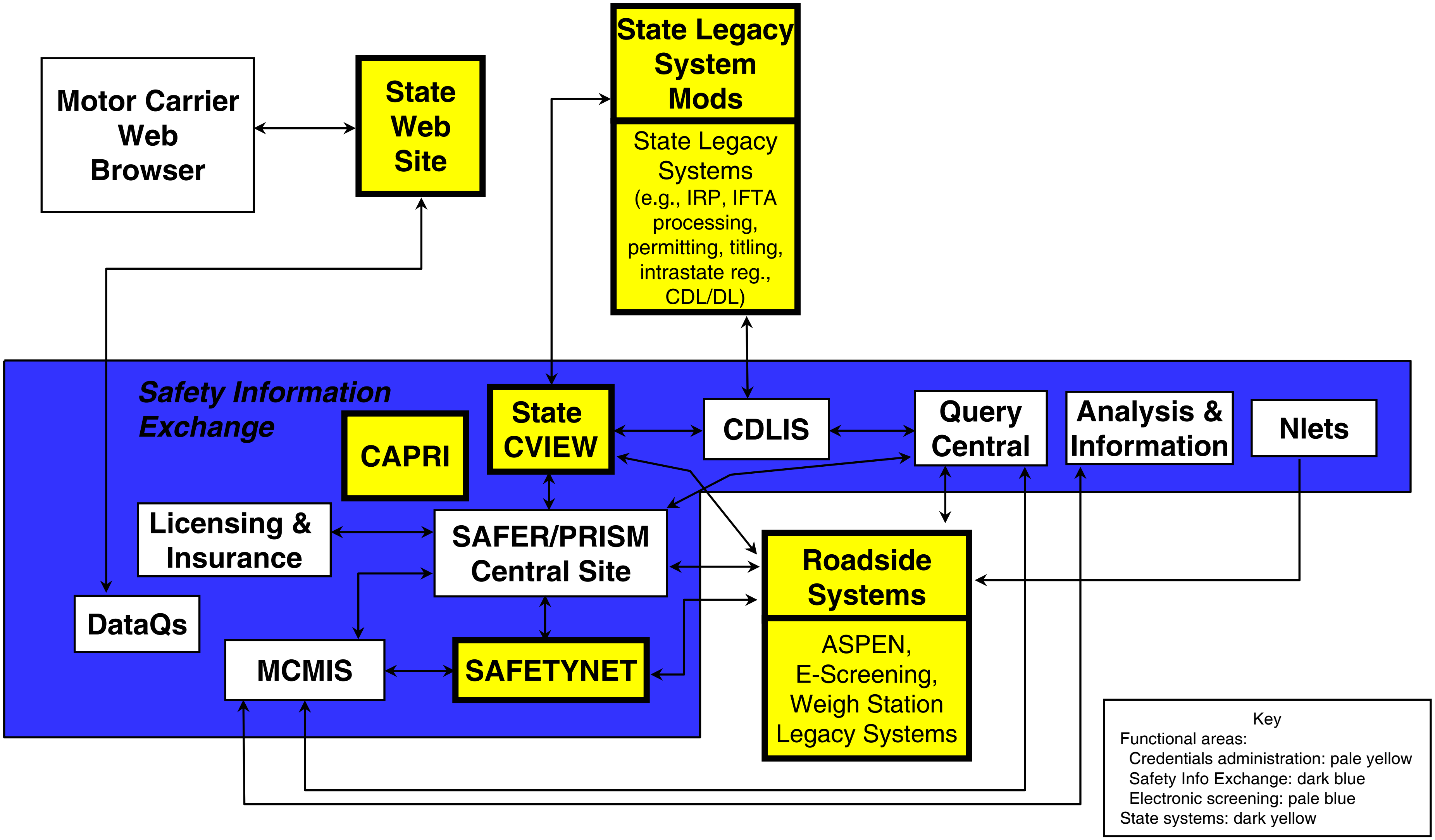
Key
Functional areas:
Credentials administration: pale yellow
Safety Info Exchange: dark blue
Electronic screening: pale blue
State systems: dark yellow

A Simplified View of a State's Top-Level System Design

This simplified view of a state's top-level system design shows high-level boxes that represent major components: safety information exchange, credentials administration, and roadside systems. Typical connections among the systems are shown; these may differ somewhat, depending on choices the state makes.

Section 4 of this document will show how the state develops its state-specific top-level system design. As mentioned earlier, the remainder of this section will describe the functional areas: safety information exchange, credentials administration, and electronic screening. Diagrams in this section will zoom in on the major components to provide more detail on the carrier, core infrastructure, and state systems and their interfaces.

3.2 Safety Information Exchange Concepts and Design


Motor Carrier Web Browser
State Web Site
State Legacy System Mods
State Legacy Systems (e.g., IRP, IFTA processing, permitting, titling, intrastate reg., CDL/DL)
Safety Information Exchange
CAPRI
State CVIEW
CDLIS
Query Central
Analysis & Information
Nlets
Licensing & Insurance
SAFER/PRISM Central Site
Roadside Systems
ASPEN, E-Screening, Weigh Station Legacy Systems
DataQs
MCMIS
SAFETYNET
Key
Functional areas:
Credentials administration: pale yellow
Safety Info Exchange: dark blue
Electronic screening: pale blue
State systems: dark yellow

Safety Information Exchange Design Elements

For safety information exchange, the design elements include state and federal commercial vehicle credential and safety administration-related offices, roadside check stations (fixed and mobile), and information exchange systems.

The primary state administration-related offices include the designated lead MCSAP agency, SAFETYNET, and other enforcement activities. Other state agencies also provide or have an interest in commercial vehicle safety information (e.g., vehicle registration, driver licensing, titling, permitting). These offices exist in each state or region and share information through various CVISN core infrastructure systems.

Roadside check stations include those locations with a permanent structure or mobile facility (including police cruisers) that house elements of the inspection and information systems (e.g., computers and communication systems) and enforcement and safety inspection personnel.

Safety Information Exchange Design Elements

The primary safety-related state information exchange systems and their functions include these back-office systems:

CVIEW (CV Information Exchange Window)
Provides for the electronic exchange of:

- interstate carrier and vehicle safety and credential data between state source systems, users (e.g., at roadside sites), and SAFER; and
- intrastate carrier and vehicle safety and credential data between state source systems and users (e.g., at roadside sites).

Compliance Analysis and Performance Review Information (CAPRI)
Supports compliance reviews and safety audits.

SAFETYNET
Supports entry, access, analysis, and reporting of data from inspections, crashes, compliance reviews, assignments, and complaints.

The following are state roadside systems:

ASPEN (or equivalent)
Records commercial driver/vehicle roadside inspection details. ASPEN-equivalent systems include: Traffic and Criminal Software (TraCS) and Fuel TaCS (Tax Compliance System).

Inspection Selection System (ISS)
Returns the carrier snapshot, which includes critical safety performance indicators to assist in determining whether an inspection is warranted.

Past Inspection Query (PIQ)
Retrieves recent inspection reports.

Citation & Accident
Records citation and accident data.

Safety Information Exchange Design Elements

The CVISN core infrastructure supports the exchange of safety information between states and among other stakeholders. Federal information exchange systems include the following:

Motor Carrier Management Information System (MCMIS)
Captures and stores safety data from field offices through SAFETYNET, CAPRI, and other sources.

Safety and Fitness Electronic Record (SAFER) / Performance and Registration Information Systems Management (PRISM)*
Displays carrier and vehicle information; stores, manages, and shares snapshots; responds to queries.

Licensing & Insurance (L&I)
Enters and displays licensing and insurance information regarding authorized for-hire motor carriers, freight forwarders, and property brokers.

Query Central (QC)
In response to a query, retrieves safety compliance and enforcement data about commercial motor vehicle drivers, vehicles, and carriers from various sources.

DataQs (DQ)
Records and monitors challenges to FMCSA data.

* Commonly referred to as 'SAFER'

Analysis and Information (A&I)
Provides motor carrier safety information including statistical and analytical resources for FMCSA and state enforcement personnel, motor carriers, researchers, insurers, shippers, and the public.

Multi-state information exchange systems and networks that support law enforcement and credentialing activities also support the exchange and use of safety information:

Commercial Vehicle Driver Information System (CDLIS)
Reports and accesses commercial driver identification, commercial driver's license, and driver history information.

Nlets (International Justice and Public Safety Information Sharing Network)
Provides the capability to exchange criminal justice and public safety-related information via a switching network linking local, state, and federal agencies together.

Safety Information Sharing Expanded Design Elements

CVISN stakeholders support a user-friendly interface or **one-stop-shop** for a carrier to access all safety-related data. Authorized users would be able to view consolidated safety information about a carrier. The information would come from a combination of FMCSA sources and state sources. Under FMCSA's Information Technology modernization and business process improvement program (COMPASS – Creating Opportunities, Methods, and Processes to Secure Safety), this will become a reality. After COMPASS has been fully deployed, users will access services via the **FMCSA Portal**. COMPASS is discussed in more detail in Section 3.5.

FMCSA plans to provide **carriers access to driver inspection and crash data** through a third-party system.

FMCSA research indicates that truck and bus drivers with past convictions are statistically more likely to be involved in future crashes. FMCSA requires carriers to check driver history annually and requires drivers to report CDL status changes within 30 days and suspensions within one day. However, employers are not always notified about convictions and are unable to take immediate and appropriate corrective action with drivers. If the driver does not report changes, the lag time before the carrier becomes aware of the change could reach 11 months.

To address this problem, as many as 11 states, usually via third-party providers, have implemented **employer notification service** (ENS) programs. ENS programs allow a carrier to register their drivers with the program. The systems then proactively notify the carrier about the driving records of its drivers, allow the carrier to receive real-time updates of its drivers' CDL status, and streamline a carrier's ability to oversee its drivers.

FMCSA determined that a national system to provide companies access to their drivers' records would be cost-beneficial. They developed a prototype ENS system and conducted an 18-month pilot test in Colorado and Minnesota, completed in June 2008, with positive results. Next steps in the project are to conduct interviews with participating carriers and further assess national benefits based on the pilot.

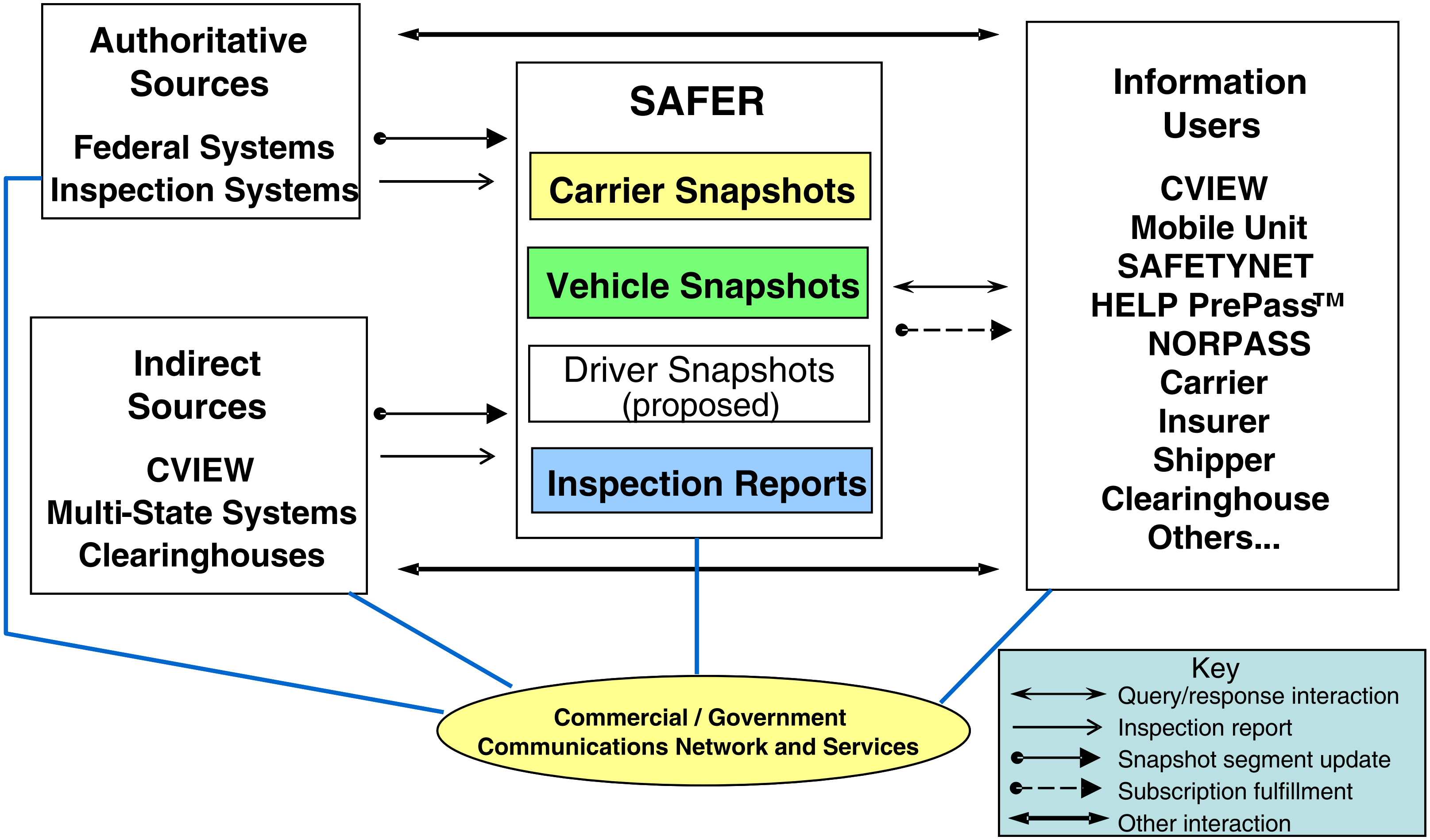
The **Wireless Roadside Inspection** (WRI) research program is exploring how to utilize existing and near-term technologies and systems to wirelessly identify a commercial vehicle, the vehicle's operating carrier, and the vehicle's driver. Additionally, the status of the driver and carrier (e.g., hours of service, operating authority) would be provided for automated assessment.

Safety Data Quality is a stakeholder priority for Expanded CVISN. The CVISN Architecture Configuration Control Board (ACCB), through the efforts of states such as Washington, is working to establish data quality measures (timeliness, accuracy, and integrity) especially for those data elements used in determining ratings or making decisions.

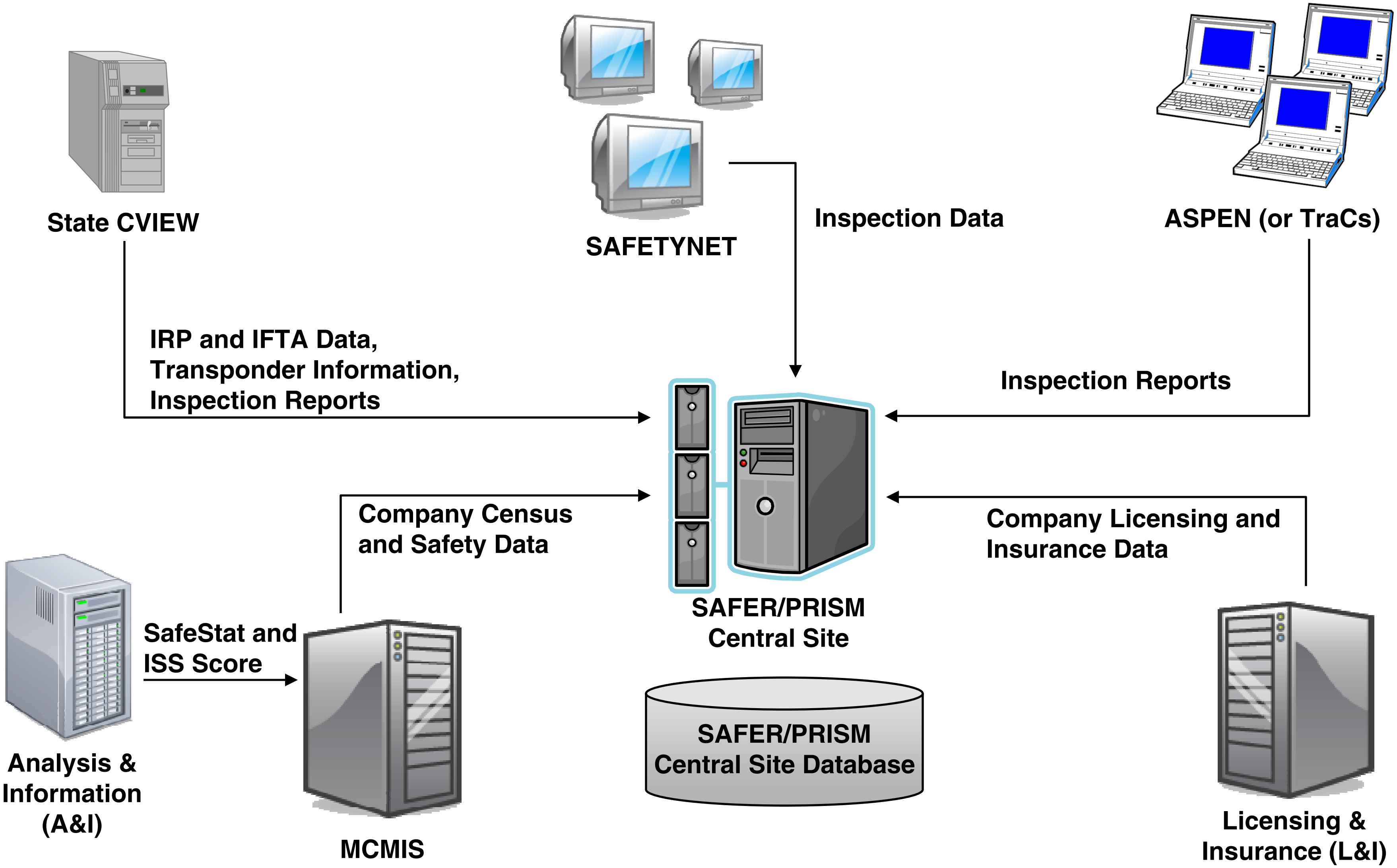
Focus on SAFER and CVIEW

The CVIEW prototype and the SAFER system were developed by FMCSA specifically to support the CVISN effort. The remainder of this section on Safety Information Exchange will provide more detail on SAFER and CVIEW.

SAFER assembles interstate snapshots from authoritative and indirect sources, and responds to queries for snapshots and safety reports. SAFER stores and makes available inspection reports.



Input transactions to the SAFER/PRISM Central Site originate in various source systems.


State CVIEW
SAFETYNET
Inspection Data
ASPEN (or TraCs)
IRP and IFTA Data, Transponder Information, Inspection Reports
Inspection Reports
Company Census and Safety Data
Company Licensing and Insurance Data
SAFER/PRISM Central Site
SafeStat and ISS Score
SAFER/PRISM Central Site Database
Analysis & Information (A&I)
MCMIS
Licensing & Insurance (L&I)

Certified state CVIEW or equivalent systems upload data to SAFER via XML/FTP or Web services.

XML transactions are used for the data exchange for both the FTP and Web services interfaces. For upload to SAFER, the transactions are:

- T0018, Inspection Report Input Transaction
- T0019, IFTA Input Transaction
- T0020, IRP Account Input Transaction
- T0021, IRP Fleet Input Transaction
- T0022, IRP Registration (Cab Card) Input Transaction
- T0024, Vehicle Transponder ID Input Transaction

There are business rules that govern the order in which the IRP transactions may be submitted. These are documented in the *SAFER Interface Control Document (ICD)*.

After a state has implemented a CVIEW, the CVIEW must be certified before it can begin uploading data to SAFER. Certification ensures that communications and data exchange mechanisms between a state CVIEW and the SAFER system hosted at the Volpe National Transportation Systems Center (Volpe) are in compliance with all applicable SAFER interface and security requirements. This ensures the accuracy and quality of the data exchanged, efficient communications, and the prevention of system corruption or performance degradation. Once certified, the state CVIEW is connected to the production version of SAFER.

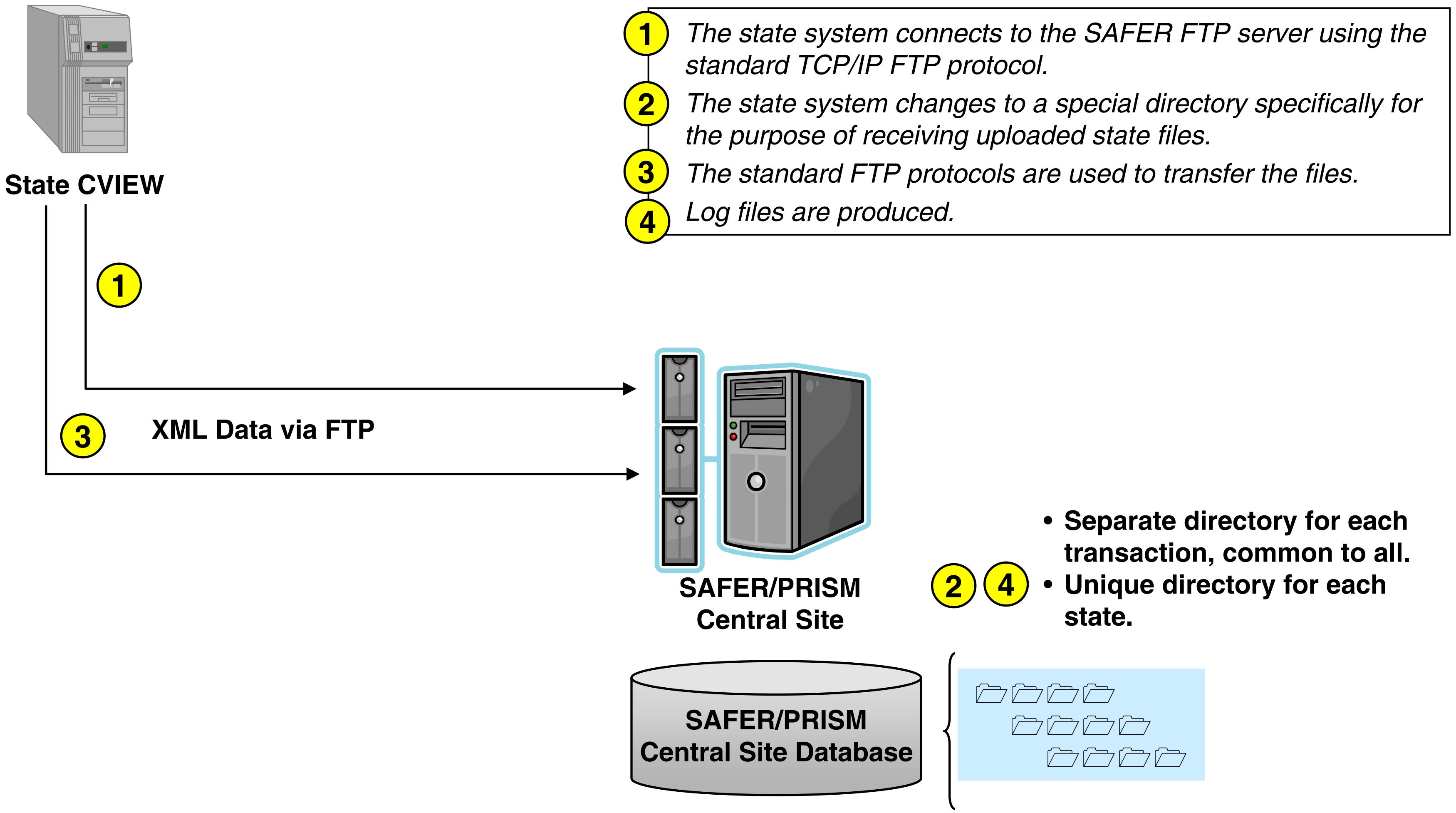
When a state has been certified and is ready to begin uploading data to SAFER, it schedules a time with Volpe to upload all of its IRP and IFTA data. This is called a baseline.

SAFER error codes denote violations of SAFER business rules. A list of the error codes can be found under Frequently Asked Questions on the SAFER Web site.

The re-certification process may be required for existing users when the SAFER-CVIEW interface is changed significantly, such as when business rule changes are made in SAFER.

More information about certification can be found in *Safety and Fitness Electronic Records (SAFER) Interface Certification Procedure (ICP)*.

The SAFER/PRISM Central Site provides an XML/FTP interface to states for uploading safety and credentials information.



1 *The state system connects to the SAFER FTP server using the standard TCP/IP FTP protocol.*

2 *The state system changes to a special directory specifically for the purpose of receiving uploaded state files.*

3 *The standard FTP protocols are used to transfer the files.*

4 *Log files are produced.*

State CVIEW

1

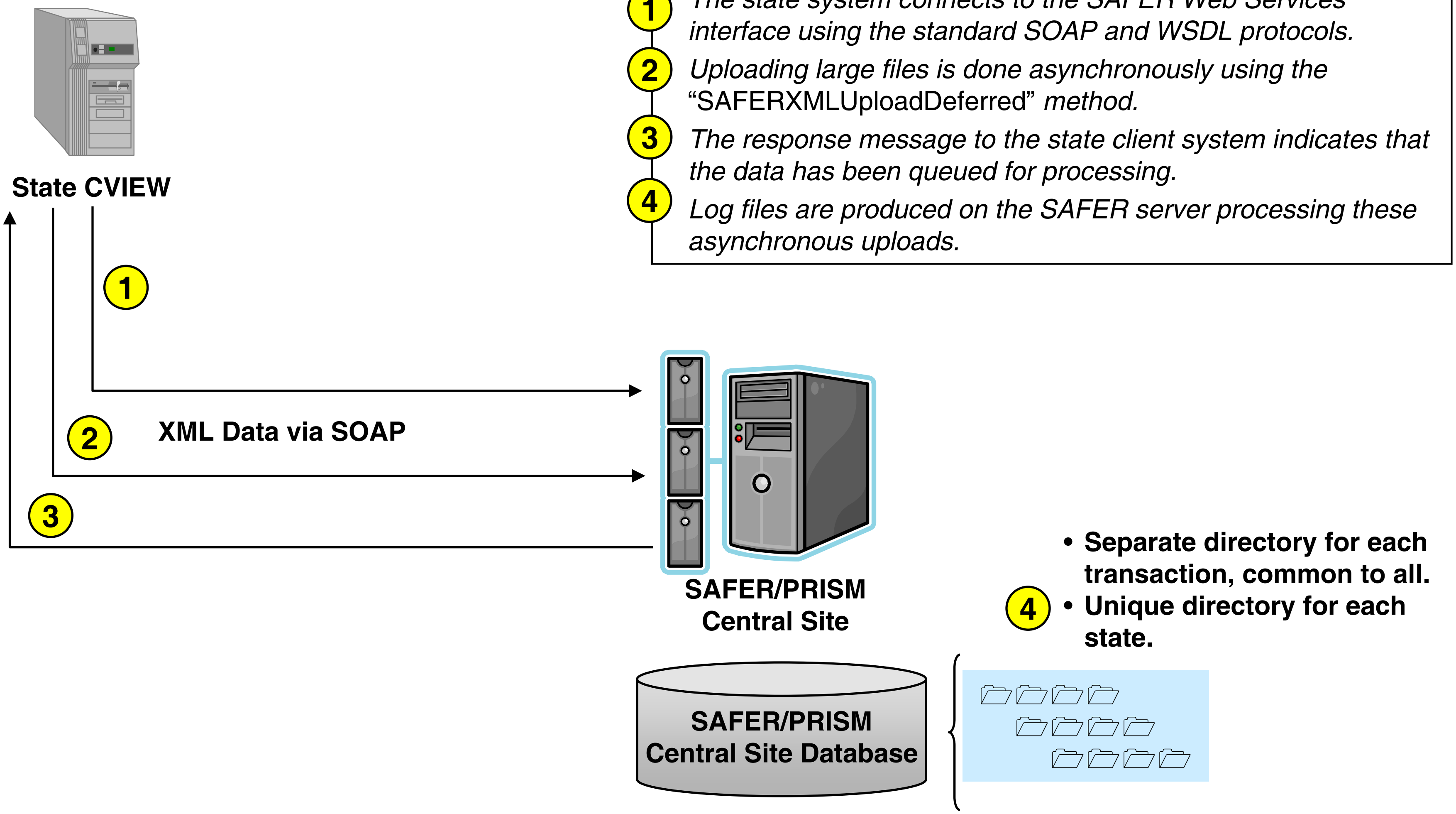
3 **XML Data via FTP**

SAFER/PRISM Central Site

2 4
- **Separate directory for each transaction, common to all.**
- **Unique directory for each state.**

SAFER/PRISM Central Site Database

The SAFER Web Services interface provides near-real-time upload capabilities for state users.



1 *The state system connects to the SAFER Web Services interface using the standard SOAP and WSDL protocols.*

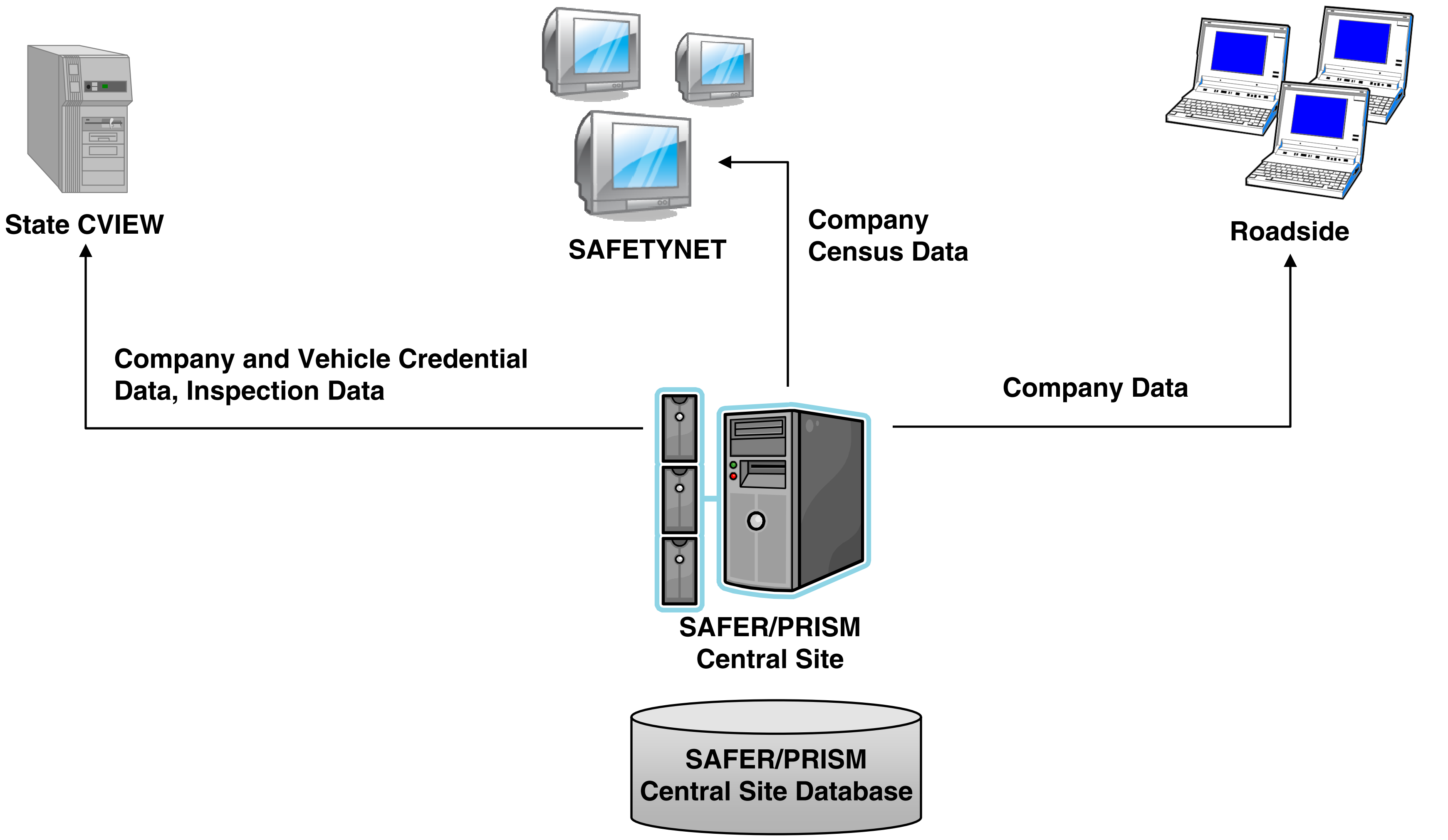
2 *Uploading large files is done asynchronously using the* “SAFERXMLUploadDeferred” *method.*

3 *The response message to the state client system indicates that the data has been queued for processing.*

4 *Log files are produced on the SAFER server processing these asynchronous uploads.*

- **Separate directory for each transaction, common to all.**
- **Unique directory for each state.**

Output transactions from the SAFER/PRISM Central Site are used by various state systems.


State CVIEW
SAFETYNET
Company Census Data
Roadside
Company and Vehicle Credential Data, Inspection Data
Company Data
SAFER/PRISM Central Site
SAFER/PRISM Central Site Database

State CVIEW or equivalent systems download data from SAFER via XML/FTP. Web Services supports data download and queries.

Authorized users can subscribe to receive SAFER data through XML files. The SAFER Web site lists all the SAFER XML transactions that support subscriptions. Using these screens, users can configure the data that they will receive from SAFER.

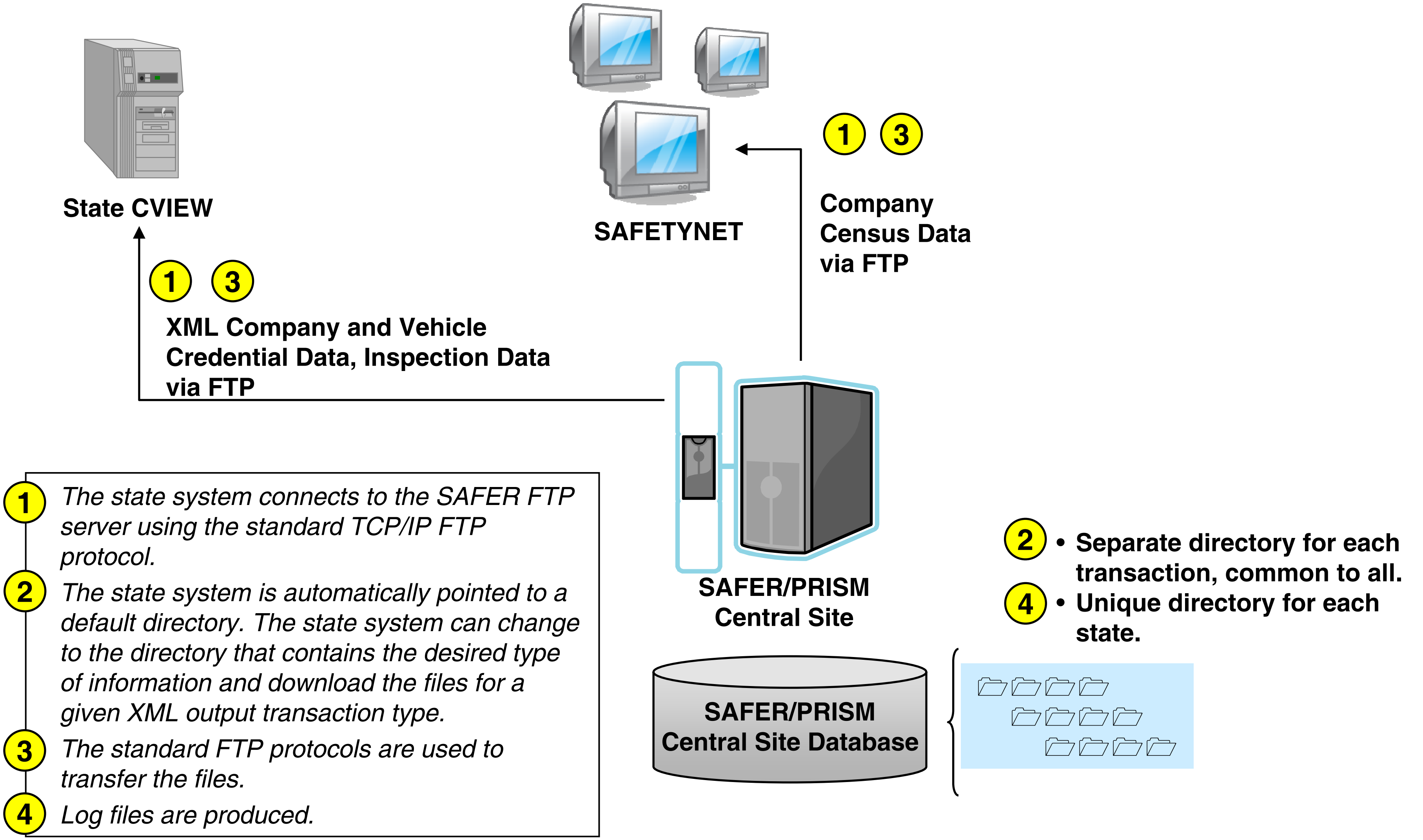
SAFER Web Services output transactions have two modes, update and baseline. If the user specifies a date in the retrieval request, then only records updated in the SAFER data store since the specified date are returned. If no date is specified, then all records satisfying any conditional processing constraints of the particular transaction will be returned. Because of the volume of data, users are encouraged to use the update mode on a regular basis and to baseline only when Volpe advises. Volpe will inform states when another state sends a baseline to SAFER or after a major SAFER upgrade.

The transactions for download from SAFER are:

- T0025, IFTA Output Transaction
- T0026, IRP Account Output Transaction
- T0027, IRP Fleet Output Transaction
- T0028, IRP Registration (Cab Card) Output Transaction
- T0029, Vehicle Transponder ID Output Transaction
- T0030, Vehicle Inspection Summary Output Transaction
- T0031, MCMIS Safety and Census Update Output Transaction
- T0032, Licensing and Insurance Update
- T0041P, PRISM Targeted Vehicle Output Transaction

More details on the XML/FTP and Web Services interfaces are provided in the following figures.

The SAFER/PRISM Central Site provides an XML/FTP interface to states for downloading safety and credentials information.


State CVIEW
SAFETYNET
1 3
Company Census Data via FTP
1 3
XML Company and Vehicle Credential Data, Inspection Data via FTP
SAFER/PRISM Central Site
SAFER/PRISM Central Site Database
2
4

- Separate directory for each transaction, common to all.
- Unique directory for each state.

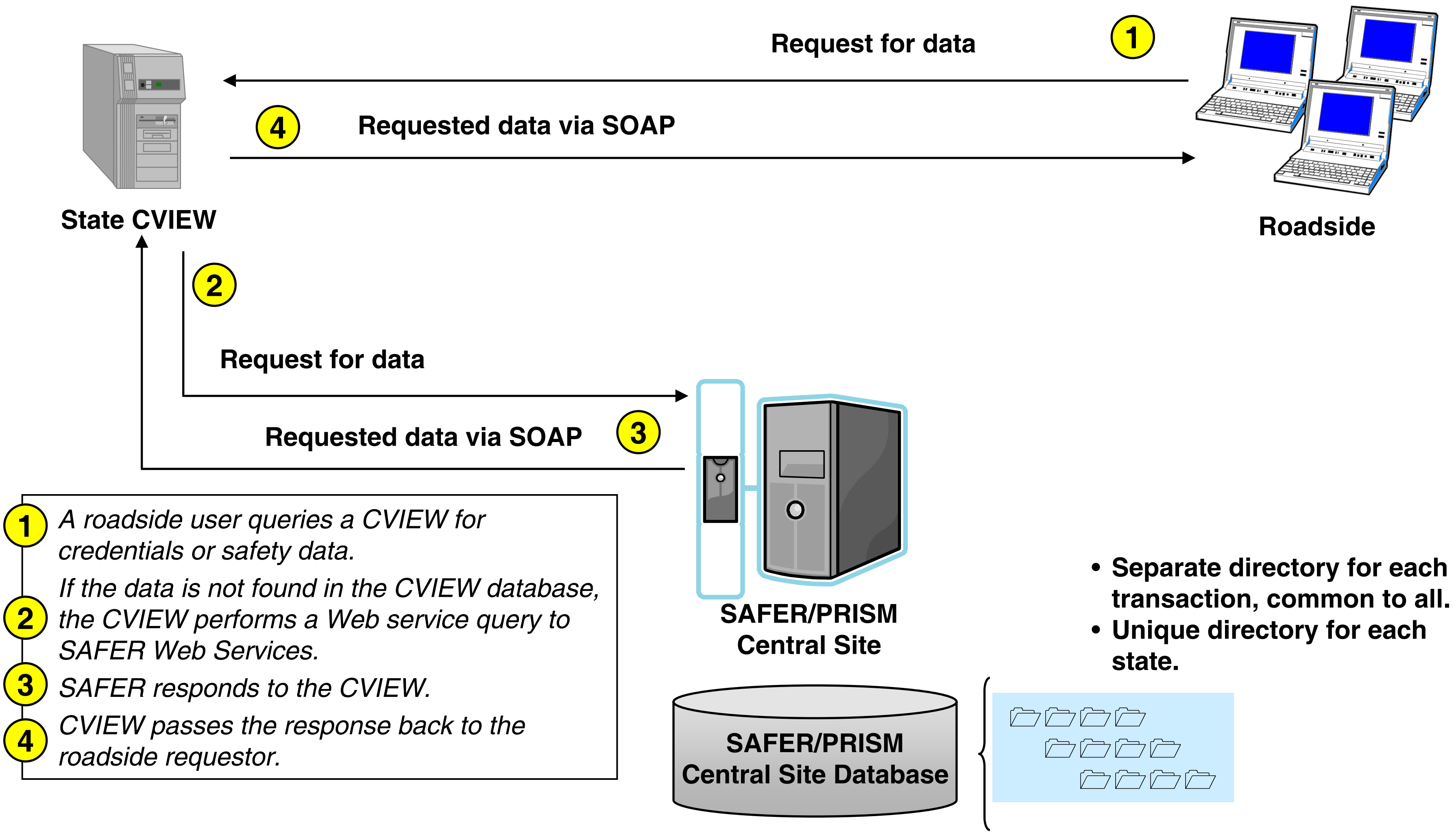
1 *The state system connects to the SAFER FTP server using the standard TCP/IP FTP protocol.*

2 *The state system is automatically pointed to a default directory. The state system can change to the directory that contains the desired type of information and download the files for a given XML output transaction type.*

3 *The standard FTP protocols are used to transfer the files.*

4 *Log files are produced.*

The SAFER Web Services interface provides near-real-time query capabilities. Roadside users are the primary customers.



1 *A roadside user queries a CVIEW for credentials or safety data.*

2 *If the data is not found in the CVIEW database, the CVIEW performs a Web service query to SAFER Web Services.*

3 *SAFER responds to the CVIEW.*

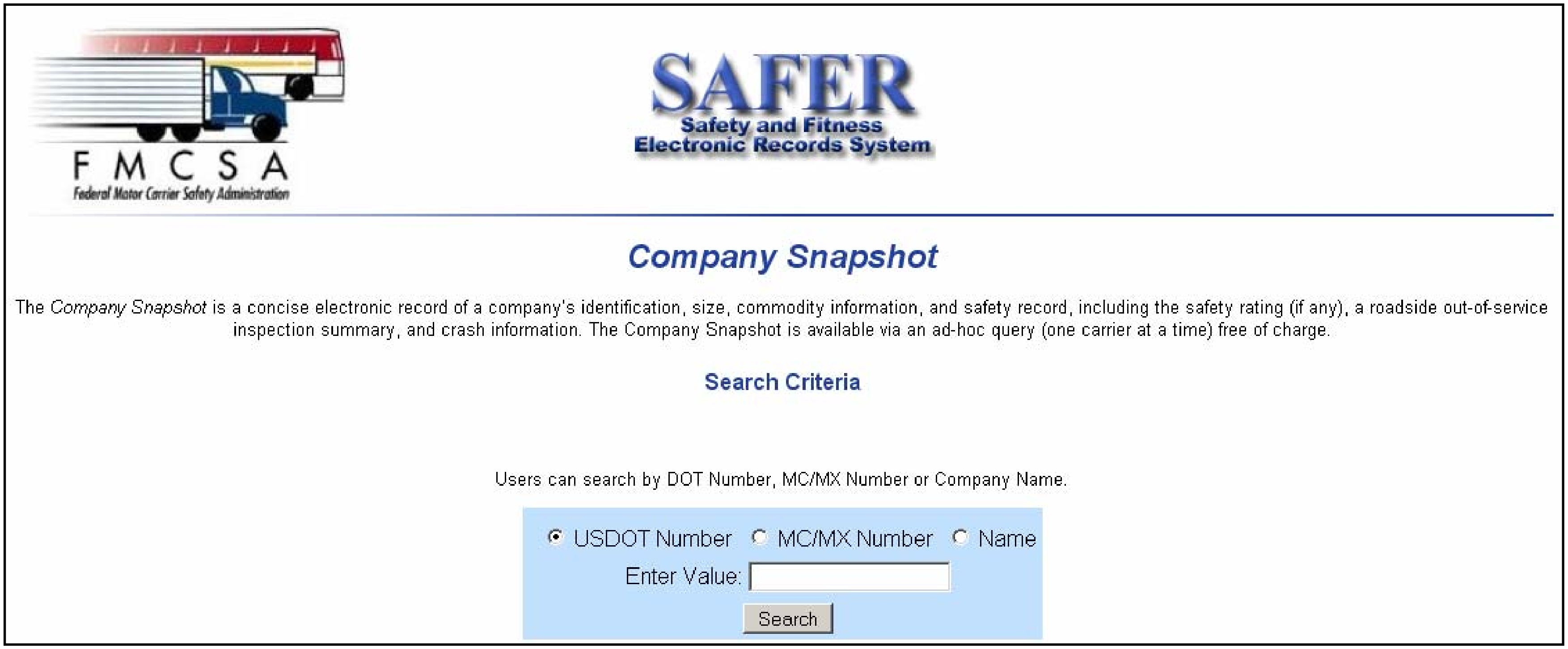
4 *CVIEW passes the response back to the roadside requestor.*

- **Separate directory for each transaction, common to all.**
- **Unique directory for each state.**

SAFER Web site

The FMCSA SAFER System offers company safety data and related services to industry and the public over the Internet. Users can search FMCSA databases, register for a USDOT number, pay fines online, order company safety profiles, challenge FMCSA data using the DataQs system, access the Hazardous Material Route Registry, obtain National Crash and Out of Service rates for HazMat Permit Registration, get printable registration forms and find information about other FMCSA information systems.

The FMCSA SAFER Web site allows anyone to access the *Company Snapshot*, a concise electronic record of a company's identification, size, commodity information, and safety record, including the safety rating (if any), a roadside out-of-service inspection summary, and crash information. Company snapshot data is updated daily, except for inspection and crash counts, which are updated weekly. SAFESTAT scores are updated once per month.


F M C S A
Federal Motor Carrier Safety Administration
SAFER
Safety and Fitness
Electronic Records System

Company Snapshot

The *Company Snapshot* is a concise electronic record of a company's identification, size, commodity information, and safety record, including the safety rating (if any), a roadside out-of-service inspection summary, and crash information. The Company Snapshot is available via an ad-hoc query (one carrier at a time) free of charge.

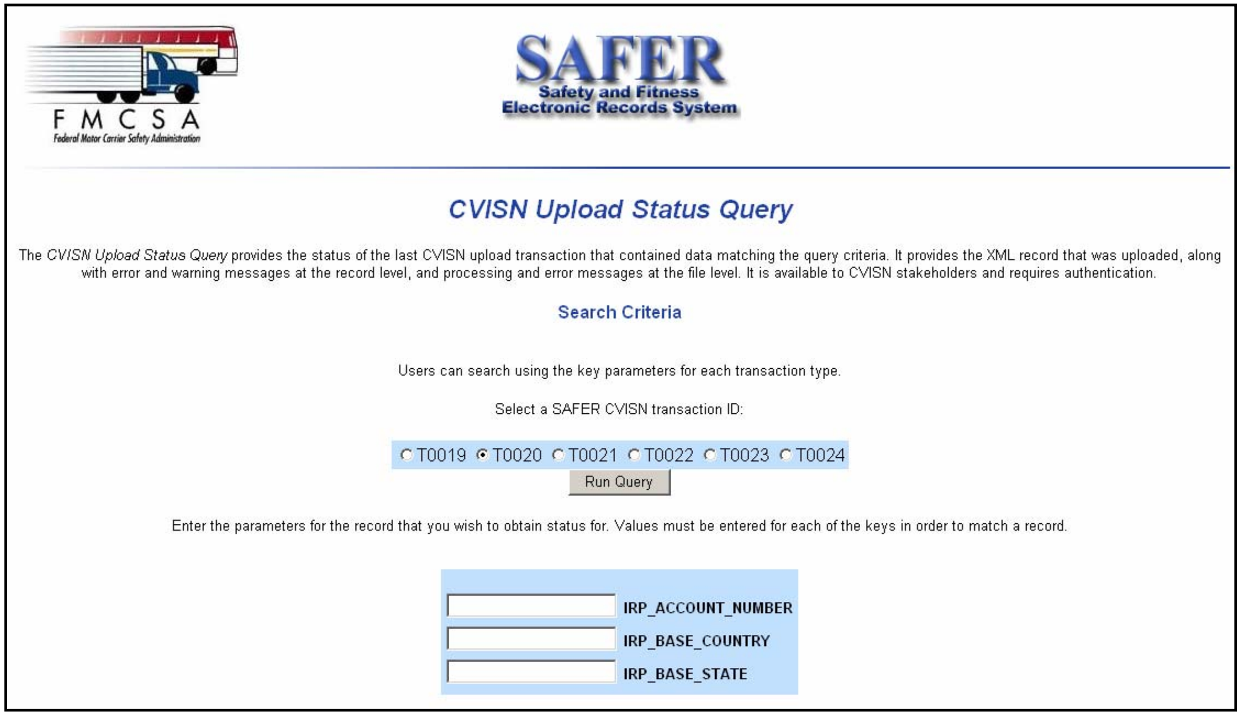
Search Criteria

Users can search by DOT Number, MC/MX Number or Company Name.

SAFER Web site

Web transactions may be used to communicate safety information between information systems and human users. FMCSA offers access to some carrier data and CVISN statistics via the SAFER Web site. This information is available to CVISN stakeholders and requires authentication.

For example, the CVISN Upload Status Query provides the status of the last CVISN upload transaction that contained data matching the query criteria. It provides the XML record that was uploaded, along with error and warning messages at the record level, and processing and error messages at the file level. This is used by states for data quality checking.


F M C S A
Federal Motor Carrier Safety Administration
SAFER
Safety and Fitness
Electronic Records System

CVISN Upload Status Query

The *CVISN Upload Status Query* provides the status of the last CVISN upload transaction that contained data matching the query criteria. It provides the XML record that was uploaded, along with error and warning messages at the record level, and processing and error messages at the file level. It is available to CVISN stakeholders and requires authentication.

Search Criteria

Users can search using the key parameters for each transaction type.

Select a SAFER CVISN transaction ID:

○ T0019 ● T0020 ○ T0021 ○ T0022 ○ T0023 ○ T0024

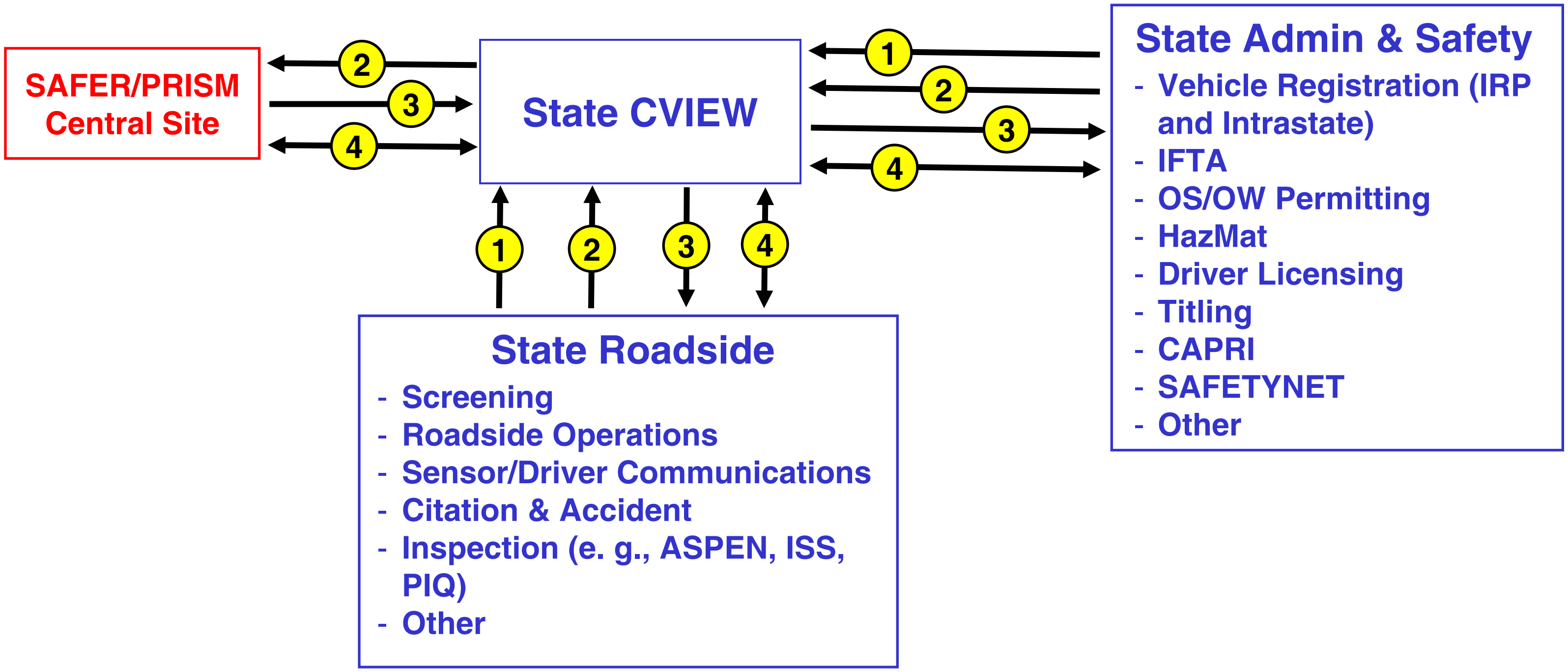
Enter the parameters for the record that you wish to obtain status for. Values must be entered for each of the keys in order to match a record.

IRP_ACCOUNT_NUMBER
IRP_BASE_COUNTRY
IRP_BASE_STATE

The state CVIEW handles the exchange of safety and credentials information within the state and with other jurisdictions via SAFER.

CVIEW

1. Assembles and maintains *intrastate* snapshots. Manages state's copies of interstate snapshots.
2. Provides interstate snapshot segment updates for credentials data to SAFER and is pass-through for CV safety reports.
3. Distributes interstate and intrastate snapshots or reports to roadside sites and other state systems.
4. Responds to queries for snapshots and reports from state data users.



The state CVIEW handles the exchange of safety and credentials information via SAFER.

CVIEW is a state system that collects information from the commercial vehicle (CV) credentialing and tax systems to formulate segments of the interstate carrier, vehicle, and (future) driver snapshots for exchange within the state (e.g., to roadside sites) and with the SAFER system. For CVISN Core Deployment, there is a requirement to implement CVIEW (or a CVIEW equivalent) system for exchange of intrastate and interstate data within the state. The system is owned by, located in, and usually customized by a state. The state can choose to implement a CVIEW or an equivalent system that performs the same functions. Throughout this chapter, the term CVIEW is used to refer to a CVIEW or any equivalent system(s) that a state may deploy.

The minimum set of functions that CVIEW will perform are listed below:

- Provide for the electronic exchange of:
  - interstate carrier and vehicle credential data between state source systems, users, and SAFER
  - intrastate carrier and vehicle safety and credential data between state source systems and users
- Serve as the repository for a state-selected subset of:
  - interstate carrier and vehicle safety and credential data
  - intrastate carrier and vehicle safety and credential data
- Support safety inspection data reporting and retrieval by roadside enforcement personnel
- Provide inter- and intrastate carrier and vehicle safety and credential data to the roadside to support electronic screening and other roadside operations
- Perform electronic data exchange with SAFER using XML standard transactions or Web services
- Allow the general public to access data without the security risk of providing a direct connection to sensitive legacy systems.

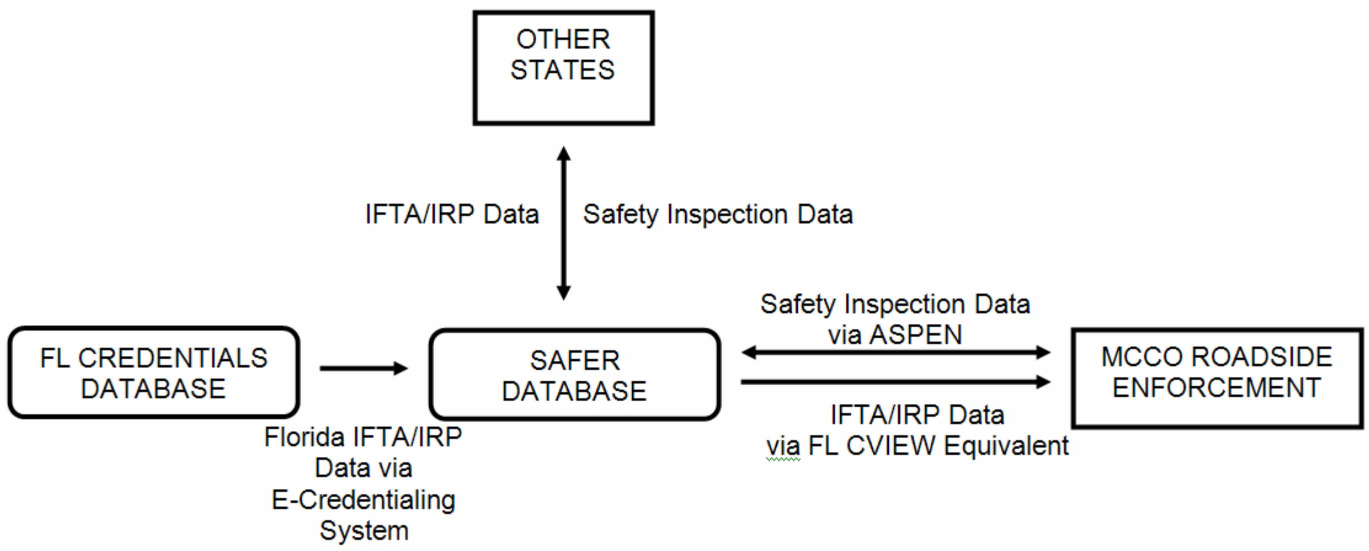
  For states also implementing PRISM, the CVIEW will satisfy PRISM requirements for uploading vehicle registration data to SAFER and for processing specific data elements.

CVIEW Equivalent

Rather than develop a CVIEW system, a state may modify a legacy system to exchange safety and credentials information with SAFER; this system is referred to as a "CVIEW-equivalent." This system may use either the XML/FTP or SAFER Web Services to exchange data with SAFER.

Florida is one state that has chosen the CVIEW-equivalent approach. The figure shows how FL's new e-credentialing system uploads IFTA and IRP credentials data to SAFER. The existing roadside system, in a different agency, has been modified to allow enforcement officers to query SAFER for IFTA and IRP data. Handling of intrastate data functions is not shown.

CVIEW Equivalent Functionality

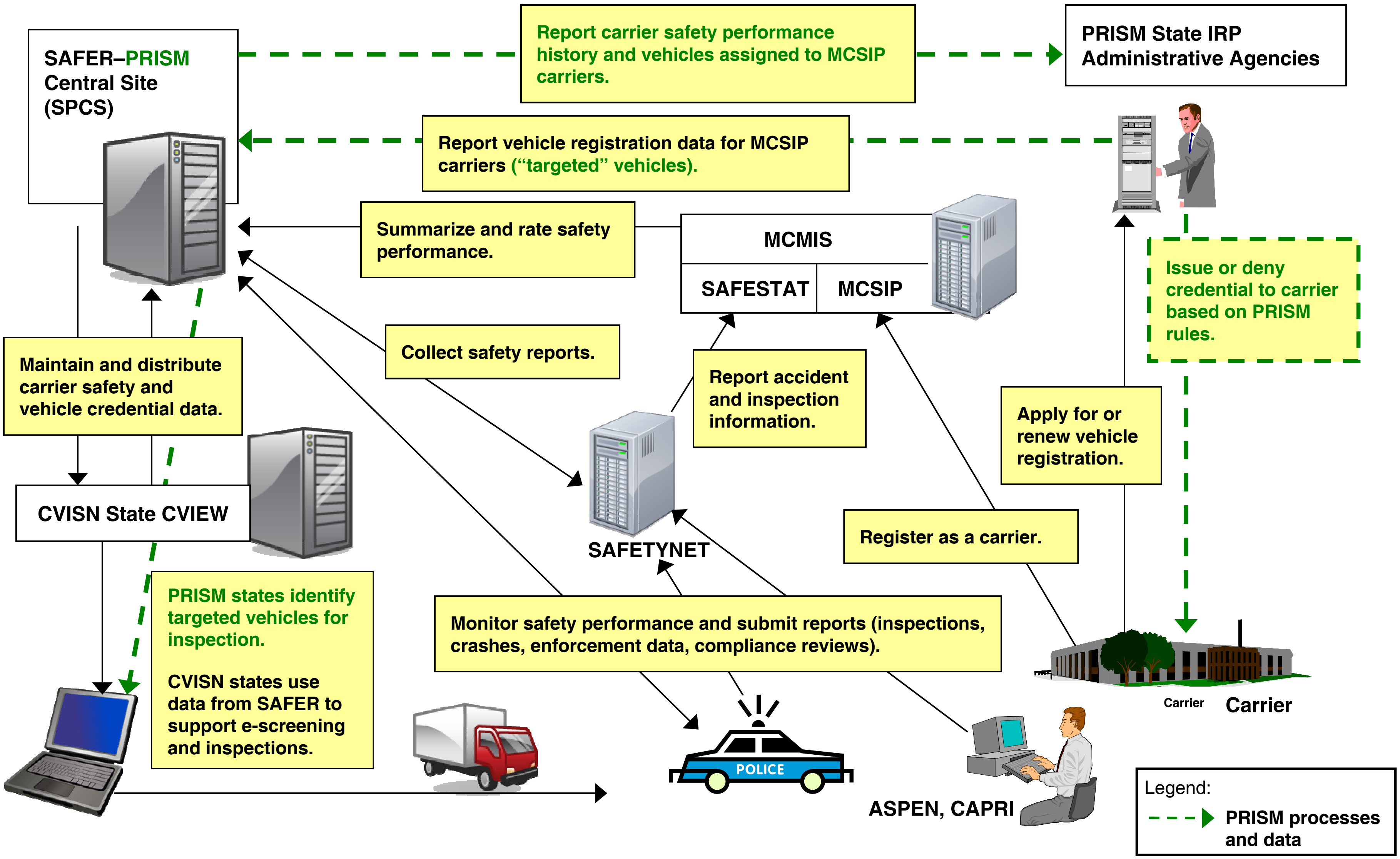

OTHER STATES
IFTA/IRP Data
Safety Inspection Data
FL CREDENTIALS DATABASE
SAFER DATABASE
Florida IFTA/IRP Data via E-Credentialing System
Safety Inspection Data via ASPEN
IFTA/IRP Data via FL CVIEW Equivalent
MCCO ROADSIDE ENFORCEMENT

Other CVIEW Options

A state may also use the functionality of SAFER rather than deploying its own CVIEW; this is known as the “SAFER option.” In this case, the state’s legacy systems (IRP and IFTA) are modified to interface directly with SAFER. To address the CVIEW function of managing intrastate data, SAFER can store intrastate carrier and vehicle data if the USDOT number is used as the primary carrier identifier.

Another option is a regional CVIEW. In this case, one state hosts a CVIEW system and acts as a focal point for the collection of credential information for a number of participating states (which do not have to be geographical neighbors). Subscribing states feed credential data directly into the regional CVIEW. The collected data is designed to meet the roadside screening needs for the region as well as for the providing state. This information will then be uploaded to SAFER for use by states outside the region. Whenever the regional CVIEW is updated (either from the state systems or from SAFER), the updates will be replicated to the databases of the subscribing states in the region.

CVISN Architecture and PRISM



SAFER–PRISM Central Site (SPCS)

Report carrier safety performance history and vehicles assigned to MCSIP carriers.

PRISM State IRP Administrative Agencies

Report vehicle registration data for MCSIP carriers ("targeted" vehicles).

Summarize and rate safety performance.

MCMIS

SAFESTAT

MCSIP

Issue or deny credential to carrier based on PRISM rules.

Maintain and distribute carrier safety and vehicle credential data.

Collect safety reports.

Report accident and inspection information.

Apply for or renew vehicle registration.

CVISN State CVIEW

SAFETYNET

Register as a carrier.

PRISM states identify targeted vehicles for inspection.

CVISN states use data from SAFER to support e-screening and inspections.

Monitor safety performance and submit reports (inspections, crashes, enforcement data, compliance reviews).

Carrier

ASPEN, CAPRI

Legend:
- - -▶ PRISM processes and data

CVISN Architecture and PRISM

The PRISM Program and CVISN are closely related programs managed by FMCSA that share the SAFER/PRISM Central Site as their common data repository. Although both programs seek to improve motor carrier safety through information exchange, they have distinct objectives.

PRISM and CVISN have similar, but not identical, requirements for the exchange of interstate registration credential data with the states and different business rules for updating and processing that data.

The Motor Carrier Safety Improvement Process (MCSIP) is the means by which carrier safety is systematically tracked and improved. MCSIP is a data-driven process that uses current safety event information such as crashes, inspections, driver violations, compliance review data, and other data to assess and monitor motor carrier safety performance. PRISM is concerned with enforcement and catching the MCSIP carriers who are attempting to commit fraud by re-registering with a new DOT number instead of actually improving their safety records. These are sometimes called “chameleon carriers.” Thus, the registration data required for PRISM includes the USDOT number for the carrier responsible for safety, which is an optional field for CVISN states.

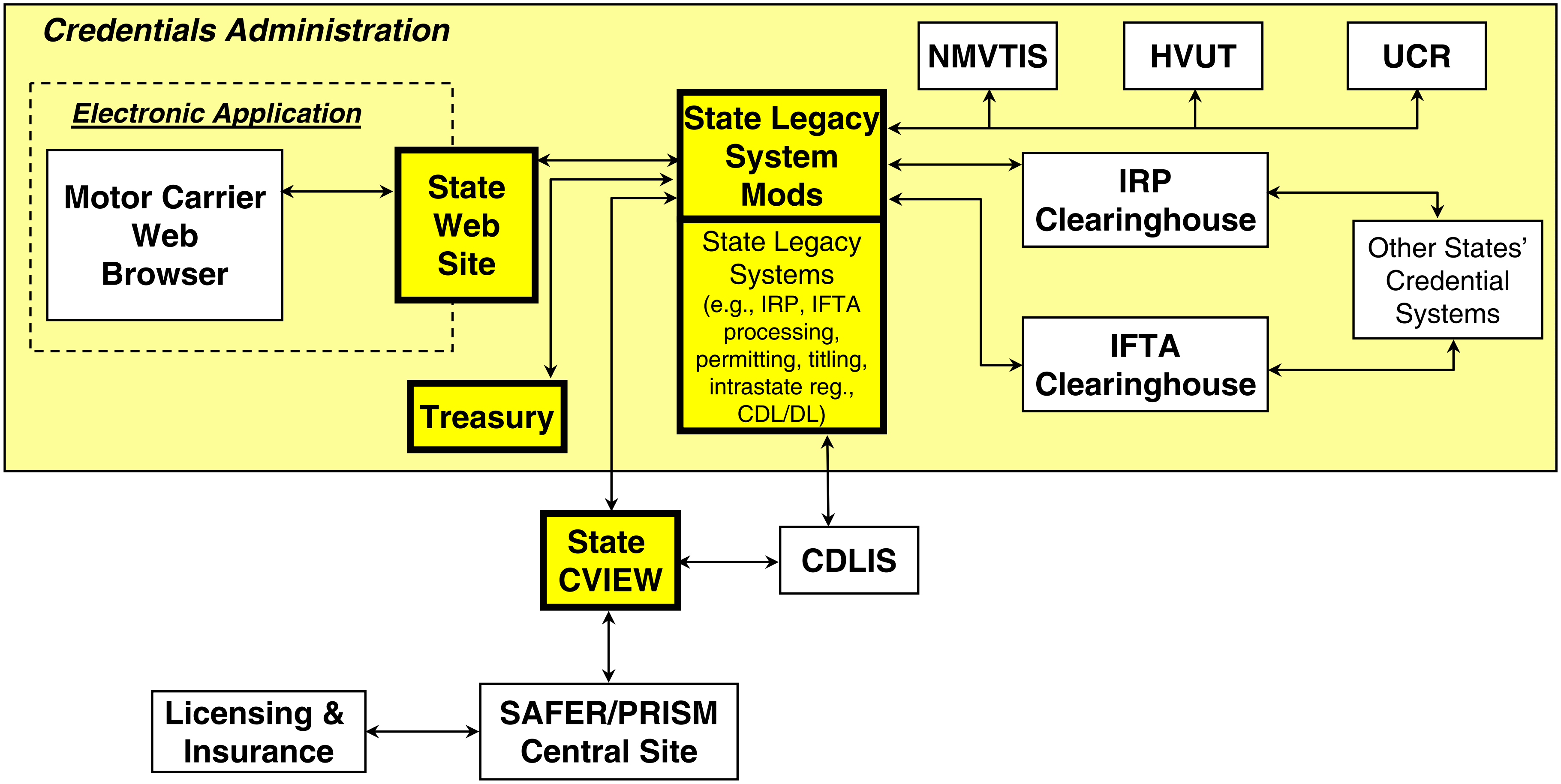
CVISN uses credential and safety data to make e-screening decisions at the roadside and to support inspections. The credential data includes jurisdictions and registered weight information from the IRP cab card, which is not required by PRISM.

The CVISN Architecture supports participation by a state in both programs. PRISM implementation alone does not satisfy CVISN requirements for exchange of credentials data. CVISN implementation can support PRISM requirements if deployed correctly.

A state participating in both programs must use the CVISN XML transactions for uploading IRP registration data to SAFER and must maintain the “IRP status” field. There are several options for downloading registration data; the most straightforward is to use XML transactions because there is a transaction that isolates the targeted vehicle data.

More information is available in *CVISN/PRISM Combined Implementation: Guidance for States.*

3.3 Credentials Administration Concepts and Design


Credentials Administration
Electronic Application
Motor Carrier Web Browser
State Web Site
Treasury
State Legacy System Mods
State Legacy Systems (e.g., IRP, IFTA processing, permitting, titling, intrastate reg., CDL/DL)
NMVTIS
HVUT
UCR
IRP Clearinghouse
IFTA Clearinghouse
Other States' Credential Systems
State CVIEW
CDLIS
SAFER/PRISM Central Site
Licensing & Insurance

Key
Functional areas:
Credentials administration: pale yellow
Safety Info Exchange: dark blue
Electronic screening: pale blue
State systems: dark yellow

Credentials Administration Design Elements

The design elements involved with credentials administration include the state's Web site, the carrier's Web browser, the communications system(s) that facilitates the exchange of information between the carriers and the state, state legacy systems associated with individual credentials, and the IRP and IFTA clearinghouses in the CVISN Core Infrastructure. Some states also use vendors' products/services for credentialing. The state CVIEW and SAFER support the exchange of credentials-related information via snapshots.

This design allows carriers, owners, and drivers to apply for, pay for, and receive credentials electronically. It also supports states/regions in the administration of credentials, collecting and distributing funds, and in storing and distributing credentials-related data. The design also establishes standard mechanisms (the snapshots) for states to provide credentials information to enforcement officials and other authorized stakeholders.

Many elements exchange credentials-related information using Web standards. Some elements exchange information with each other through XML transactions. The system elements are virtually linked through government and commercial network services. Proprietary or sensitive information is protected from inadvertent disclosure through network "firewalls," business practices, and procedures.

A **credential** is defined to be the authority granted by the issuing jurisdiction. Today, most credentials are issued in paper form, with supporting records on file in the issuing jurisdiction's system. An **electronic credential** is an electronic record of the credential.

The authoritative source for an electronic credential is the issuing agency. The holder of the credential may be issued an electronic copy that represents the same authority as today's paper copy.

To support the IRP and IFTA base state arrangements, states must collect fees from operators, apportion the fees collected to other states according to pre-determined criteria, and transfer funds to those states accordingly. To facilitate that process, the design shown here involves the **IRP** and **IFTA Clearinghouses** to support those financial reconciliation activities. This design centralizes the financial reconciliation required by the base state agreements. The clearinghouses could also be used to facilitate other kinds of information exchange. For instance, the clearinghouses could support audits and provide a consolidated reporting database.

To conform with the CVISN Architecture, participants implement person-to-computer (Web) interfaces for public-private interactions. XML transactions could be used, but no nationwide stakeholder group has developed XML guidance for CVO credentials.

Credentials Administration Design Elements

Carriers use these systems for electronic credentialing.

Internet Tools
Provide a Web browser for credentialing and tax activities. Provide the capability to monitor trips, shipments, driver and vehicle performance, and other information.

Other Carrier Systems
Provide for routing, location, safety and security monitoring, HazMat information sharing, border crossing support.

These state systems support credentials administration.

State Web sites
Support electronic credentialing, often implemented as a portal for registration and permitting.

International Fuel Tax Agreement (IFTA)
Allows carriers to register for fuel tax credentials and process fuel tax returns. The IFTA, Inc., Web site provides public access to non-confidential tax information.

International Registration Plan (IRP)
Registers commercial vehicles for payment of interstate vehicle license fees on the basis of fleet miles operated in various jurisdictions.

Intrastate registration
Registers commercial vehicles that normally operate within the state.

OS/OW Permitting
Issues oversize/overweight permits.

Titling
Titles new and used vehicles.

Commercial Driver's License/ Driver's License (CDL/DL)
Maintains CDL records and issues licenses and renewals.

Treasury
Processes electronic payments.

Hazardous Materials (HazMat)
Issues HazMat permits.

Credentials Administration Design Elements

The CVISN core infrastructure supports the exchange of credentials information between states and among other stakeholders. Multi-state systems include:

Commercial Vehicle Driver Information System (CDLIS)
Reports and accesses commercial driver identification, commercial driver's license, and driver history information.

International Registration Plan (IRP) Clearinghouse
Administers IRP base state agreement; enables IRP jurisdictions to electronically exchange motor carrier and fee information.

International Fuel Tax Agreement (IFTA) Clearinghouse
Administers IFTA base state agreement; allocates fuel taxes among jurisdictions.

National Motor Vehicle Titling Information System (NMVTIS)
Verifies the information on the paper title with the electronic data from the state that issued the title.

Unified Carrier Registration (UCR)
Administers the registration of interstate motor carriers, private motor carriers transporting property, leasing companies, brokers, and freight forwarders under the Unified Carrier Registration Act of 2005.

Federal information systems that support credentials administration include the following:

Internal Revenue Service (IRS) Heavy Vehicle Use Tax (HVUT)
Supports e-filing for carriers and payment verification for states.

Expanded CVISN

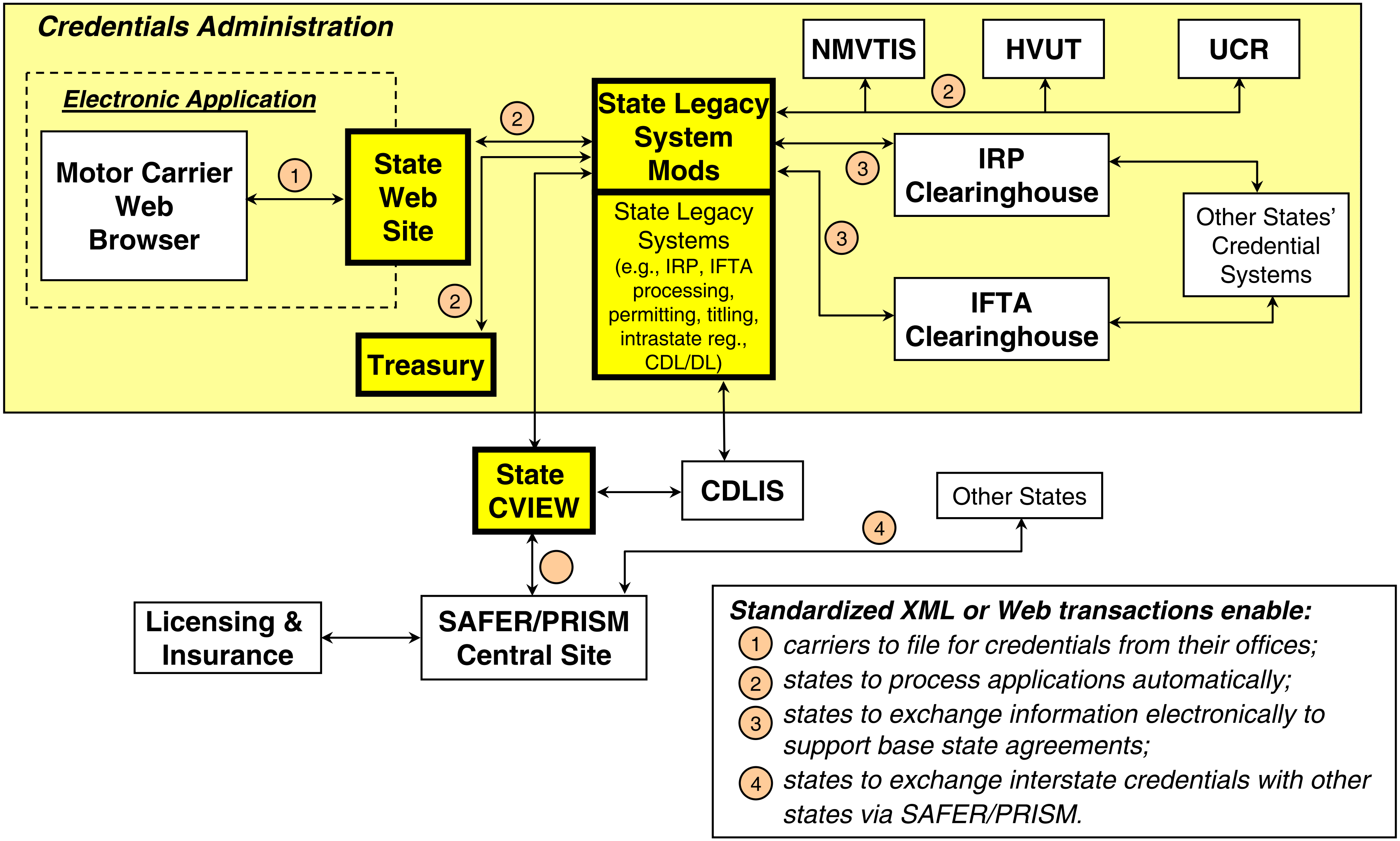
Credentials Administration Expanded Design Elements

Although IRP and IFTA e-credentialing are requirements of Core CVISN, electronic support for permitting has been an interest of both industry and state personnel. Oversize and overweight loads are special case shipments that exceed the operational parameters defined by the state. The correct routing of these shipments makes sure that mobility, safety, and security concerns are addressed. A number of states are actively involved in projects involving **OS/OW electronic permitting** and **route planning**, and some are incorporating bridge analysis into their OS/OW systems.

A **Web portal** or **one-stop shop** can provide a way for a state to give a consistent look and feel across multiple applications for back-office users, enforcement, and motor carriers. A state may provide an electronic one-stop shop through which motor carriers can access the state’s IRP, IFTA, and OS/OW permitting systems. Such a portal may provide single sign-on access to all users, which allows a user to log in to the portal using a username and password and then be directed to specific credentialing applications without having to log in again.

States are interested in on-line access to **HVUT** payment status. A team is working with the IRS to define the requirements and approach for providing on-line access from state commercial vehicle registration offices to HVUT payment status. CVISN stakeholders think it would be most efficient for the states to build upon the SAFER model and retrieve HVUT payment status via SAFER snapshots or a query to SAFER. The HVUT team has worked with the IRS to define the approach to implement e-filing for carriers and electronic access to tax status for state vehicle registration agencies. Carriers can now file Form 2290 electronically. In the future, state vehicle registration agencies should be able to get Form 2290 status for a specific carrier or VIN.

Credentials Administration: Automation and the Internet enable carriers to obtain credentials more quickly and states to process applications more efficiently. Clearinghouses support IRP and IFTA.

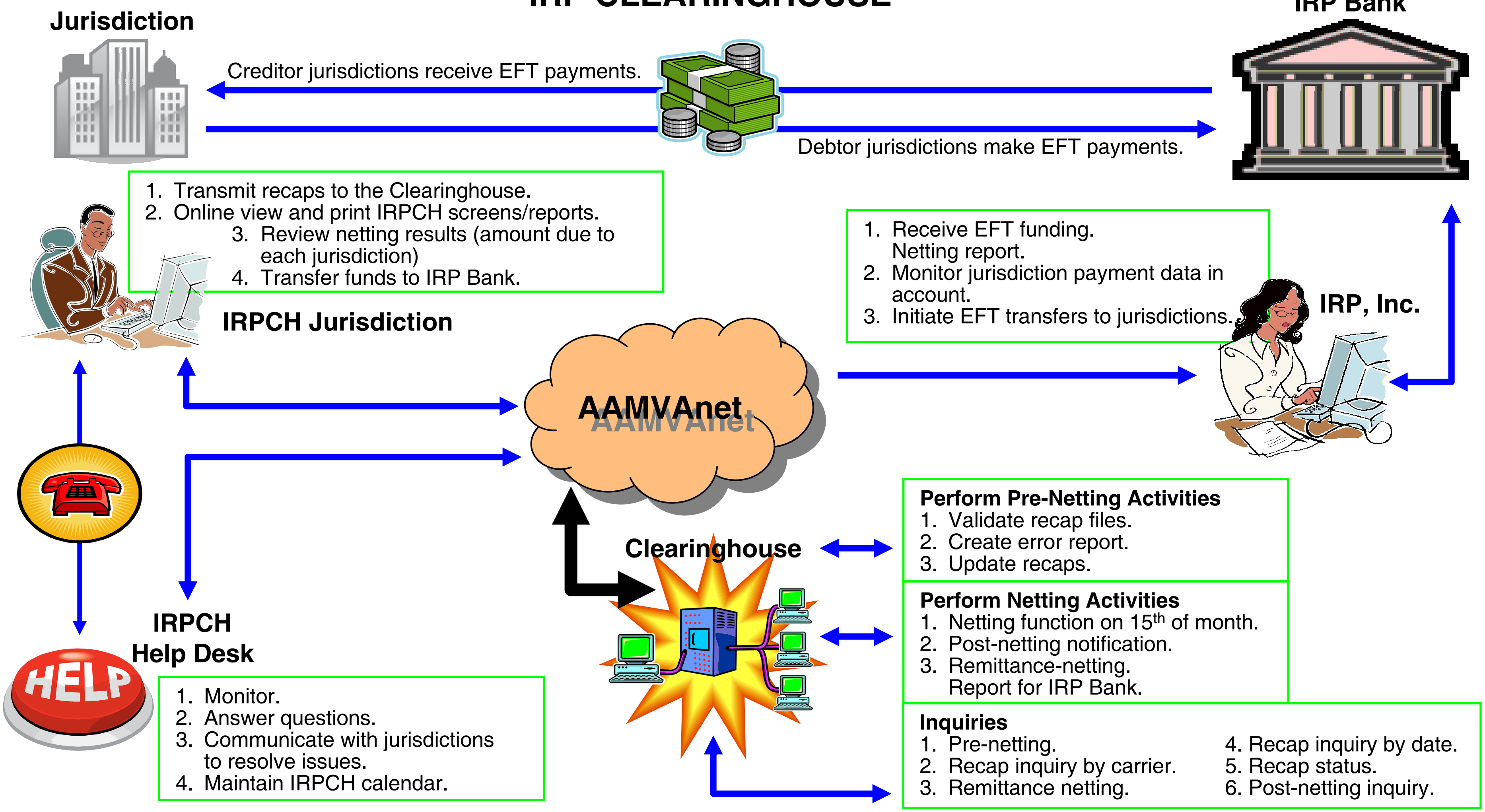


Standardized XML or Web transactions enable:

1. *carriers to file for credentials from their offices;*
2. *states to process applications automatically;*
3. *states to exchange information electronically to support base state agreements;*
4. *states to exchange interstate credentials with other states via SAFER/PRISM.*

The IRP Clearinghouse processes information received electronically from states to compute fees due/owed each jurisdiction and facilitates periodic funds transfers.

IRP CLEARINGHOUSE



Jurisdiction

Creditor jurisdictions receive EFT payments.

Debtor jurisdictions make EFT payments.

IRP Bank

1. Transmit recaps to the Clearinghouse.
2. Online view and print IRPCH screens/reports.
3. Review netting results (amount due to each jurisdiction)
4. Transfer funds to IRP Bank.

IRPCH Jurisdiction

1. Receive EFT funding. Netting report.
2. Monitor jurisdiction payment data in account.
3. Initiate EFT transfers to jurisdictions.

IRP, Inc.

AAMVAnet

Clearinghouse

Perform Pre-Netting Activities

1. Validate recap files.
2. Create error report.
3. Update recaps.

Perform Netting Activities

1. Netting function on 15th of month.
2. Post-netting notification.
3. Remittance-netting. Report for IRP Bank.

IRPCH Help Desk

1. Monitor.
2. Answer questions.
3. Communicate with jurisdictions to resolve issues.
4. Maintain IRPCH calendar.

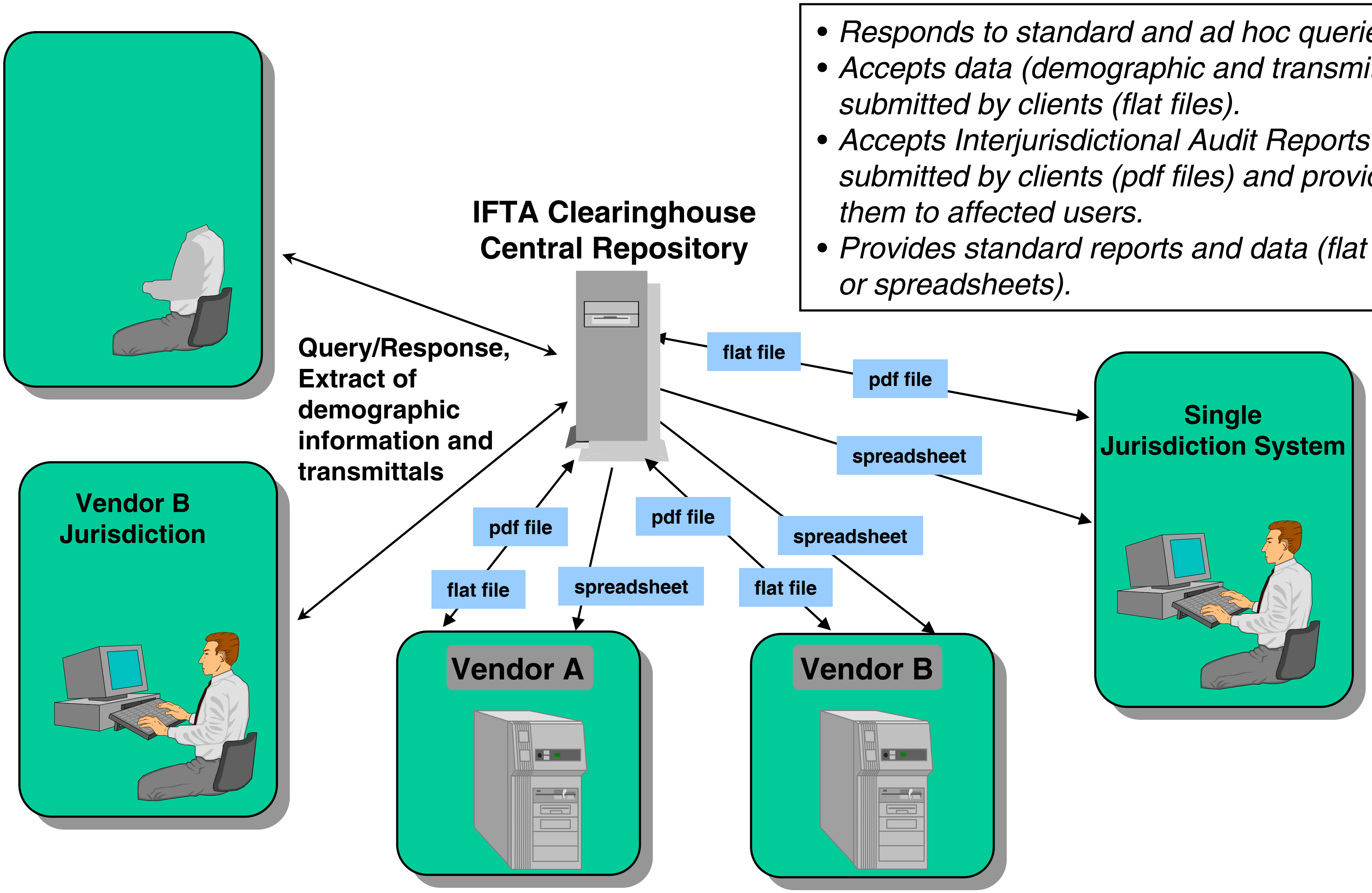
Inquiries

1. Pre-netting.
2. Recap inquiry by carrier.
3. Remittance netting.
4. Recap inquiry by date.
5. Recap status.
6. Post-netting inquiry.

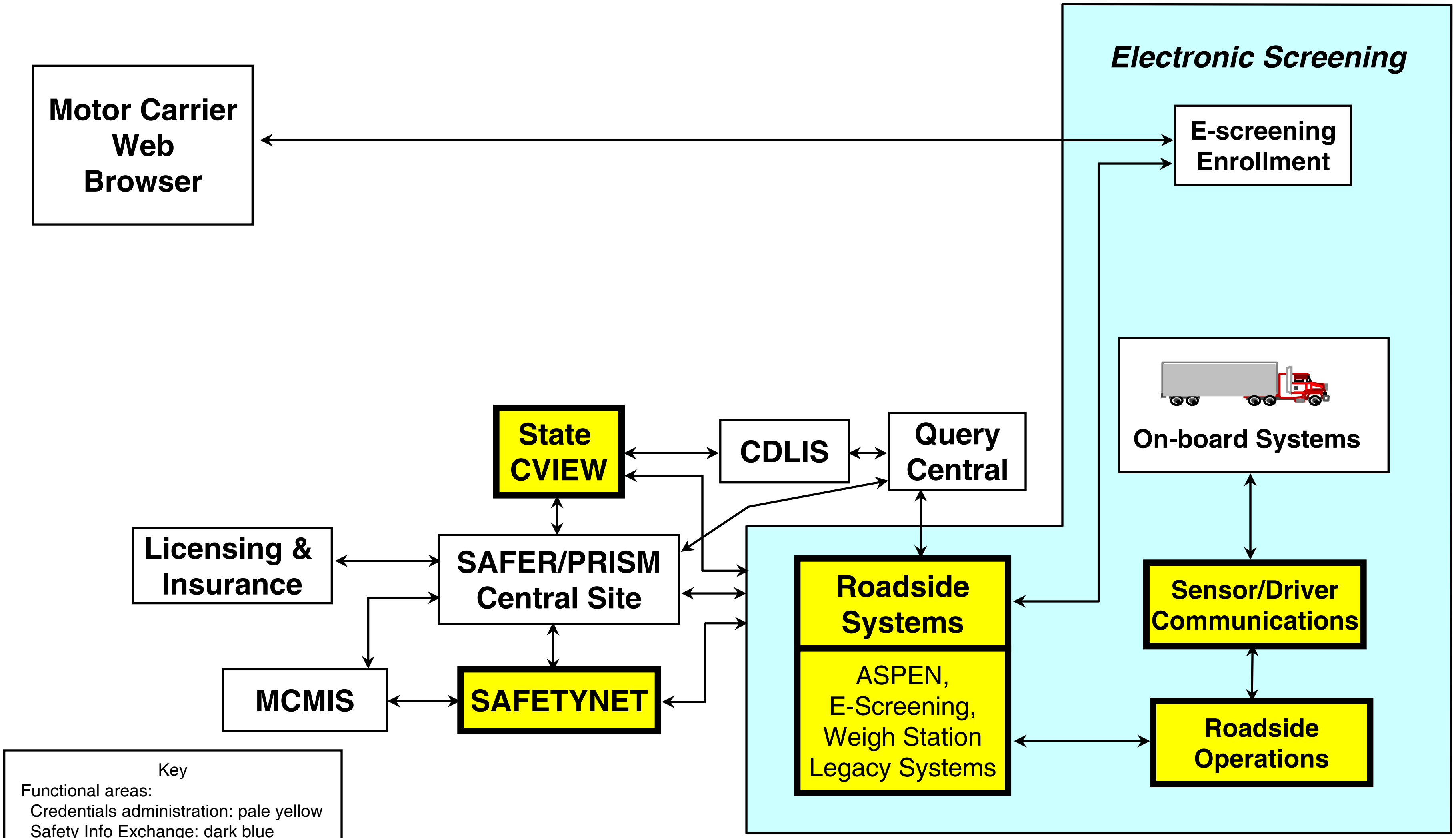
Based on information provided by IRP, Inc., IRP Clearinghouse Web Site Project Jurisdiction System Specifications, Release 1.0, updated 2005

The IFTA Clearinghouse Central Repository provides access to confidential tax information for IFTA, Inc., clients.

- *Responds to standard and ad hoc queries.*
- *Accepts data (demographic and transmittal) submitted by clients (flat files).*
- *Accepts Interjurisdictional Audit Reports submitted by clients (pdf files) and provides them to affected users.*
- *Provides standard reports and data (flat files or spreadsheets).*



3.4 Electronic Screening Concepts and Design



Key
Functional areas:
- Credentials administration: pale yellow
- Safety Info Exchange: dark blue
- Electronic screening: pale blue

State systems: dark yellow

Electronic Screening Design Elements

For electronic screening, the major design elements include vehicles, manned fixed or mobile roadside check stations, state and core infrastructure information systems, and systems on board the vehicle.

Some vehicles are equipped with electronic tags (transponders) that support DSRC and are integrated with an in-cab display (visual and audio) used for driver notification. Vehicles with transponders typically interface with screening equipment at mainline speed, and drivers are notified of bypass status via the in-cab device.

Fixed commercial vehicle roadside check stations are manned locations with a permanent structure that can house elements of the information system (e.g., computers and communication systems). The stations are equipped with DSRC systems for interfacing with tagged vehicles. License plate readers (LPRs) may be used to identify untagged vehicles. Fixed sites are usually equipped with some weighing device, such as a WIM device or a static scale, and a variable message sign (VMS). A more sophisticated configuration includes a screening WIM device integrated with an automated vehicle classification (AVC) system to perform weight, size, and length checks, and a static scale to measure weight more precisely when the vehicle is stopped.

If the WIM device and AVC system are located in the roadway on the mainline, then "screening" (making pass/pull-in decisions) can be performed at mainline speed. Manned fixed sites are likely to be co-located with a safety inspection facility.

Mobile enforcement units can be equipped with various combinations of DSRC, automatic vehicle identification (AVI), AVC, and WIM systems. They are typically positioned in areas where violations are known or suspected to occur. These units are equipped with tag readers that allow them to interface with vehicle transponders. Mobile computers look up credential and safety records and support the screening process.

Systems On Board the Commercial Vehicle provide communications, identification, information collection and sharing, safety and security monitoring, and alerts.

Electronic Screening Design Elements

State systems that support electronic screening include:

Roadside Operations
Processes snapshots and controls site traffic. Roadside operations systems include these interfaces:

- Interface to CVIEW for snapshot data
- Interface to electronic screening (sends criteria, gets screening results, gets sensor data, sends snapshot summaries)
- Interfaces to report activities from other roadside systems to infrastructure, and vice versa
- Supports legacy operator interfaces such as CDLIS, and Nlets

These systems allow operators to set/view screening criteria, and they display sensor data, snapshot data, and vehicle position data to the operator (e.g., mainline, ramp, scale lane, inspection area).

Screening System
Makes pass/pull-in decision for each CV approaching the site. Screening systems sort vehicles on the mainline or ramp using sensor data, snapshot data, availability of inspector, and operator configuration selections. They notify the driver of screening results and control screening messages and signal lights.

Sensor/Driver Communications
Processes vehicle measures and communicates with driver.

Public/private core infrastructure systems support:

E-Screening Enrollment
Collects and evaluates requests from carriers to participate in electronic screening. As implemented, the e-screening programs may not be interoperable; different business models apply. The carrier may or may not own the transponder and be allowed to use it in all e-screening programs. S/he may be responsible for a monthly service charge. Eligibility for participation may depend on a good safety rating. From a state perspective, screening criteria may be determined individually by that jurisdiction and may vary nationally, or the criteria may be determined by a state/motor carrier board and be uniform nationally. E-screening enrollment information may or may not be shared with other jurisdictions. Two goals of CVISN are that e-screening programs are interoperable and that enrollment data are shared among all jurisdictions.

Expanded CVISN

Electronic Screening
Expanded Design Elements

A **virtual weigh station** is an equipment suite on the roadside that collects commercial vehicle weight, size, and other data. It may capture information to facilitate e-screening for targeted enforcement; it may be fixed or mobile, permanent or temporary.

Virtual weigh stations are established for a variety of purposes depending on the priorities and needs of each jurisdiction. Typical purposes include safety enforcement, data collection, security (e.g., homeland security, theft deterrence), size and weight enforcement, targeted enforcement activities, and spreading the enforcement net. These sites are not staffed and may use a variety of sensor components to collect data.

A virtual weigh station may use a camera to capture images of passing vehicles; the images may then be transmitted to a fixed site where enforcement personnel can read the USDOT number, enter the number into the roadside system, and instantaneously check the motor carrier's registration, tax status, and safety record.

The **Wireless Roadside Inspection** (WRI) research program is exploring how to utilize existing and near-term technologies and systems to wirelessly identify a commercial vehicle, the vehicle’s operating carrier, and the vehicle’s driver. Additionally, the status of the driver and carrier (e.g., hours of service, operating authority) would be provided. The information could be used in e-screening algorithms.

Expanded CVISN

Electronic Screening
Roadside Identification

Because transponders have not been universally adopted, alternate forms of **carrier and vehicle identification** are being utilized or proposed. Two of the methods in use that do not involve transmission of data from the vehicle are license plate readers and USDOT number readers.

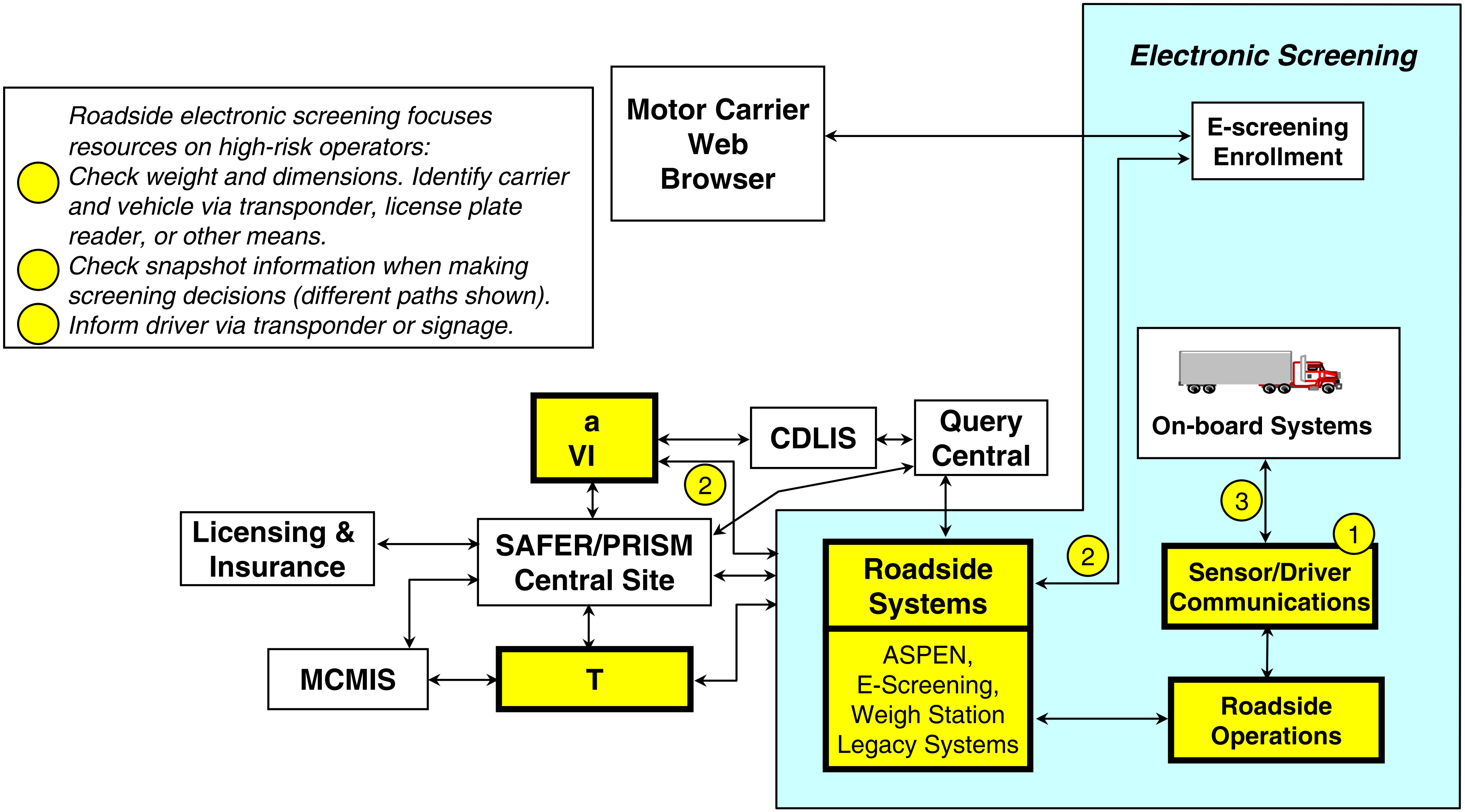
A license plate reader uses cameras and optical character recognition (OCR) software. As a motor vehicle passes through the system, the front of the vehicle is photographed, possibly by multiple cameras. Each image is searched by software to locate the plate and produce a homed-in image of just the plate. The plate image is analyzed by the OCR software to identify the plate number.

A typical USDOT number reader also incorporates cameras and image processing software. As a motor vehicle passes through the system, the camera captures a series of images of the truck. Software examines each image, starting with the first, until it finds the characters “DOT” in an image. The numeric string following the characters “DOT” is interpreted as the DOT number. Once the DOT number is found, the system stops processing images for that truck. For vehicles with DOT numbers that are “properly” displayed (i.e., undamaged, with proper font, size, contrast), the success rate is good.

However, OCR methods are hampered by the inherent difficulty in trying to read identifiers that were not designed to be read electronically.

The CVISN Roadside ad hoc team continues to discuss concepts for universal automated identification using electronic devices.

E-Screening uses real-time measurements and the safety and credentials information in snapshots to make the screening decision.



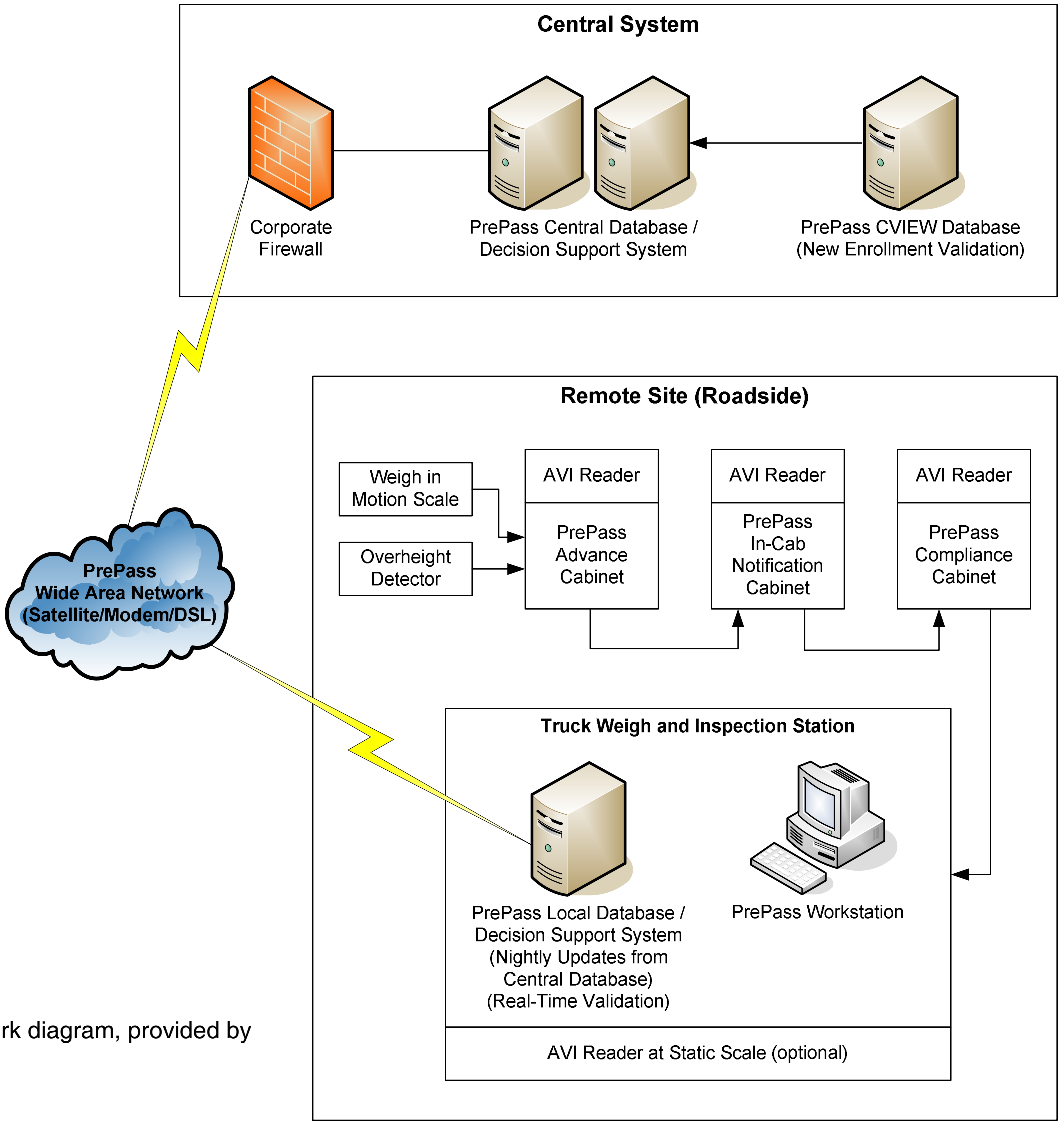
Roadside electronic screening focuses resources on high-risk operators:

● *Check weight and dimensions. Identify carrier and vehicle via transponder, license plate reader, or other means.*

● *Check snapshot information when making screening decisions (different paths shown).*

● *Inform driver via transponder or signage.*

E-Screening Programs
PrePass


Central System
Corporate Firewall
PrePass Central Database / Decision Support System
PrePass CVIEW Database (New Enrollment Validation)
PrePass Wide Area Network (Satellite/Modem/DSL)
Remote Site (Roadside)
Weigh in Motion Scale
Overheight Detector
AVI Reader
PrePass Advance Cabinet
AVI Reader
PrePass In-Cab Notification Cabinet
AVI Reader
PrePass Compliance Cabinet
Truck Weigh and Inspection Station
PrePass Local Database / Decision Support System (Nightly Updates from Central Database) (Real-Time Validation)
PrePass Workstation
AVI Reader at Static Scale (optional)

Typical PrePass state network diagram, provided by Maryland

E-Screening Programs
PrePass

PrePass is an AVI system that enables participating transponder-equipped commercial vehicles to be pre-screened throughout the nation at designated weigh stations, port-of-entry facilities, and agricultural interdiction facilities. Cleared vehicles are then able to “bypass” the facility while traveling at highway speed, eliminating the need to stop.

Vehicles participating in the PrePass program are pre-certified. Customers’ safety records and credentials are routinely verified with state and federal agencies to ensure adherence to the safety and bypass criteria established by PrePass and member states.

Not all motor carriers are eligible to participate in the PrePass program. Only carriers with a history of safe operations are eligible to take advantage of the many benefits PrePass has to offer. To reward customers with a history of safe operations and help states focus enforcement efforts on carriers likely to need enforcement, PrePass has worked with member states to develop bypass eligibility criteria that are used to determine bypass frequencies and random pull-in rates for PrePass-equipped vehicles.

For carriers that do business in multiple states, safety eligibility is based on a proprietary formula developed by PrePass called the PrePass Safety Algorithm 2 (PSA2).

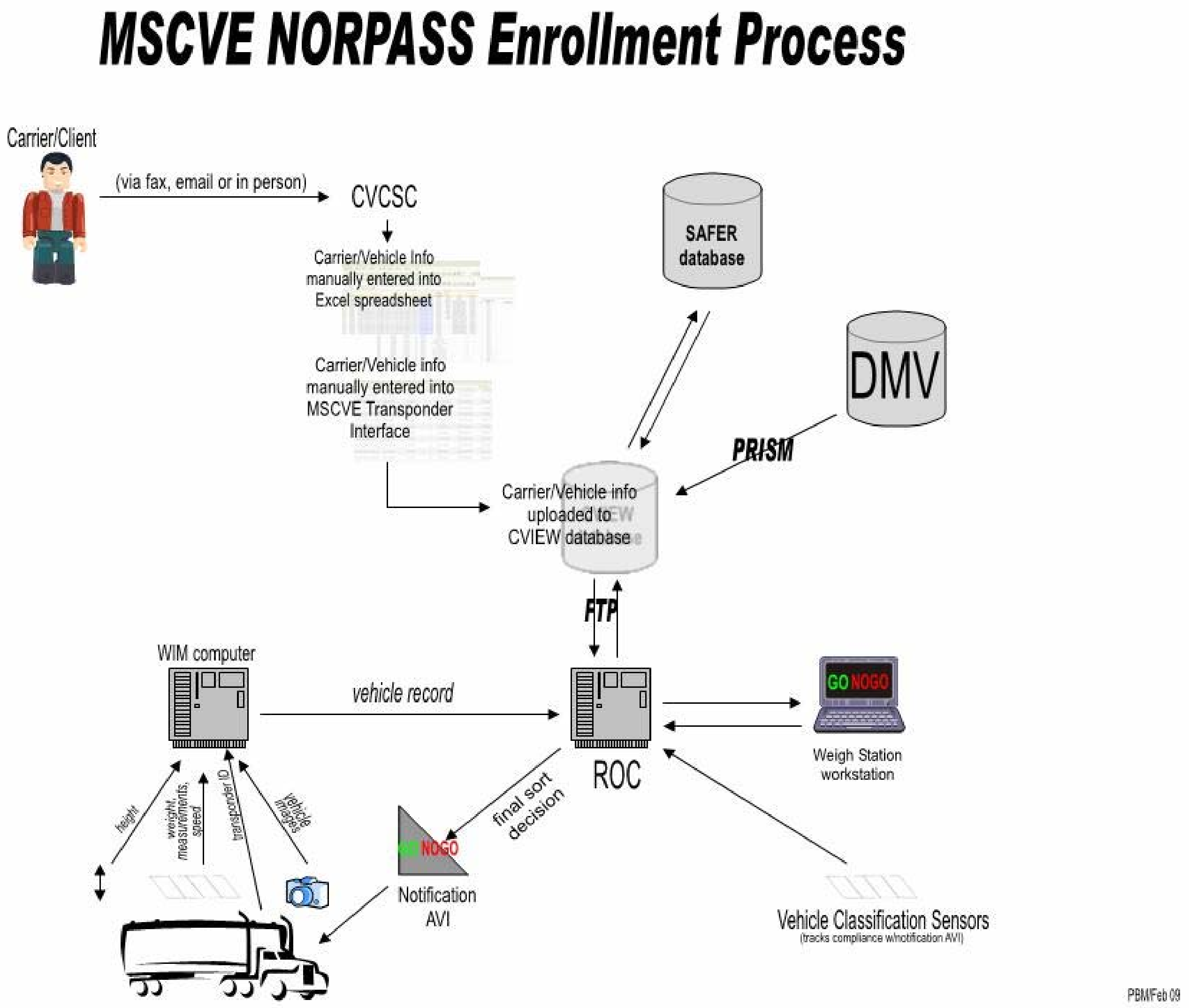
The PSA2 places carriers into specific classes based on each carrier’s SafeStat Safety Evaluation Area (SEA) scores. The PSA2 then compares the carrier’s driver and vehicle OOS rates to national averages to determine the customer’s random pull-in rate, which is applied as their transponder-equipped vehicles approach PrePass locations.

All safety data used to generate PSA2 scores is supplied by the FMCSA and is updated regularly in the PrePass network.

Bypass transactions and carrier business information data are not publicly disclosed and are not permanently retained after payment of relevant transaction fees. Data is not shared with other jurisdictions. Carriers are billed monthly; there is no cost for the transponder.

Based on information from the PrePass Web site:
http://www.prepass.com/Pages/Home.aspx

E-Screening Programs
NORPASS


MSCVE NORPASS Enrollment Process
Carrier/Client
(via fax, email or in person)
CVCSC
Carrier/Vehicle Info manually entered into Excel spreadsheet
Carrier/Vehicle info manually entered into MSCVE Transponder Interface
SAFER database
DMV
PRISM
Carrier/Vehicle info uploaded to CVIEW database
FTP
WIM computer
vehicle record
ROC
GO NOGO
Weigh Station workstation
height
weight, measurements, speed
transponder ID
vehicle images
final sort decision
GO NOGO
Notification AVI
Vehicle Classification Sensors
(tracks compliance w/notification AVI)
PBM/Feb 09

Typical NORPASS state network diagram, provided by Alaska

E-Screening Programs NORPASS

The North American Preclearance and Safety System (NORPASS) is a partnership of state and provincial agencies and trucking industry representatives who are committed to promoting safe and efficient trucking throughout North America. The NORPASS partners work together to deploy mainline screening systems at weigh stations, thus allowing safe and legal trucks to proceed unimpeded while enforcement resources are focused on high-risk motor carriers.

Each trucker who registers his/her vehicle to participate in NORPASS receives a transponder to mount on the windshield (or if the trucker already has a compatible transponder, s/he may enroll it at no cost). As the truck approaches a NORPASS weigh station, a roadside reader detects the transponder, and a screening computer in the scale house checks the credentials. Some stations are also equipped with weigh-in-motion equipment. If everything passes, a signal is sent back to the truck, and the transponder gives a green light indicating that the driver may bypass the weigh station. If a problem is detected with the truck, the transponder returns a red signal, indicating that the driver must pull in.

The state systems may also sample randomly so any participating trucker can expect to receive an occasional red light.

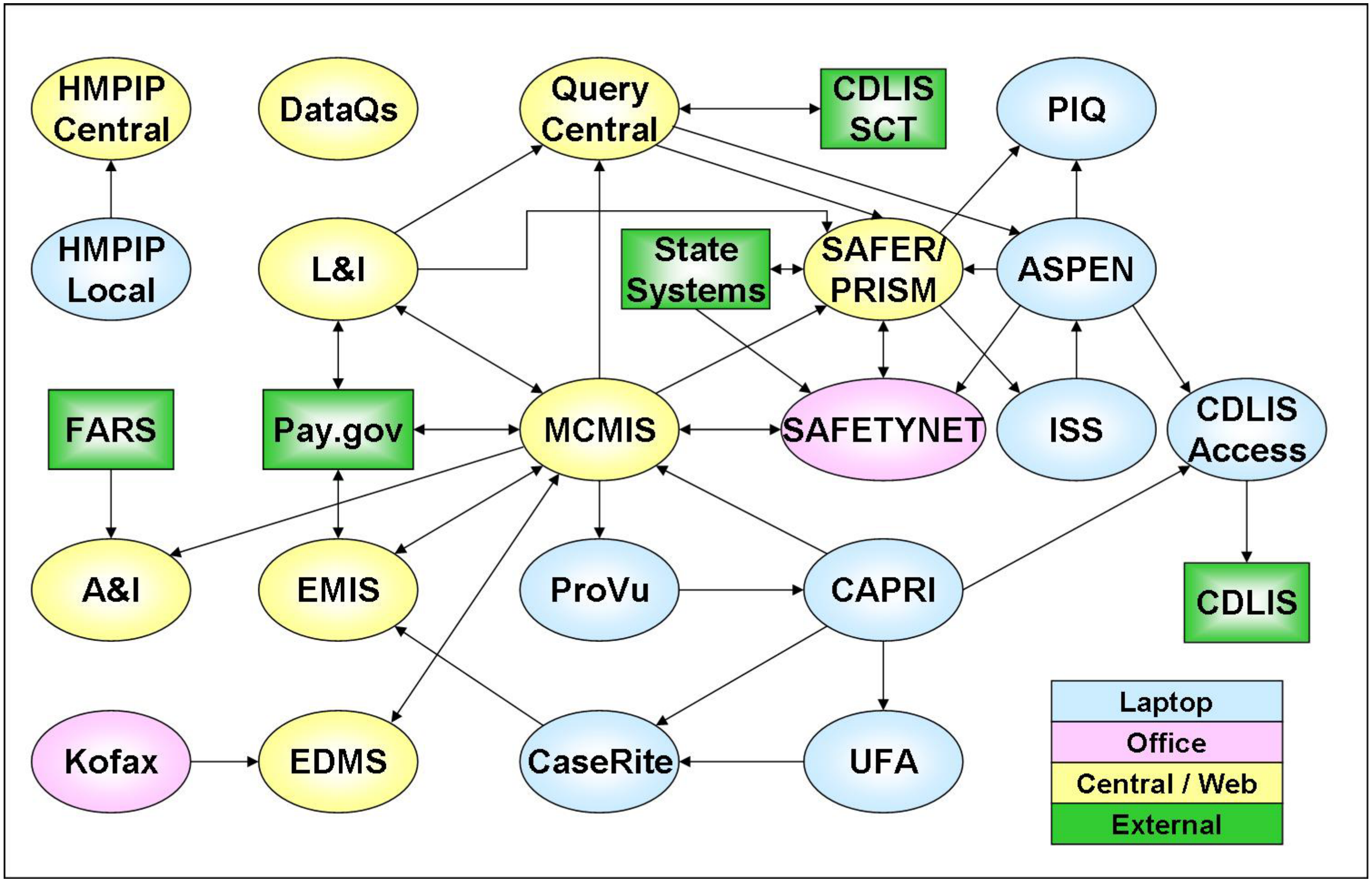
There are no fees to carriers for participating in NORPASS member states. However, the vehicle operator must purchase a transponder which will work with the state systems.

NORPASS is interoperable with North Carolina and Oregon state e-screening programs.

Based on information from the NORPASS Web site:
http://www.norpass.net/

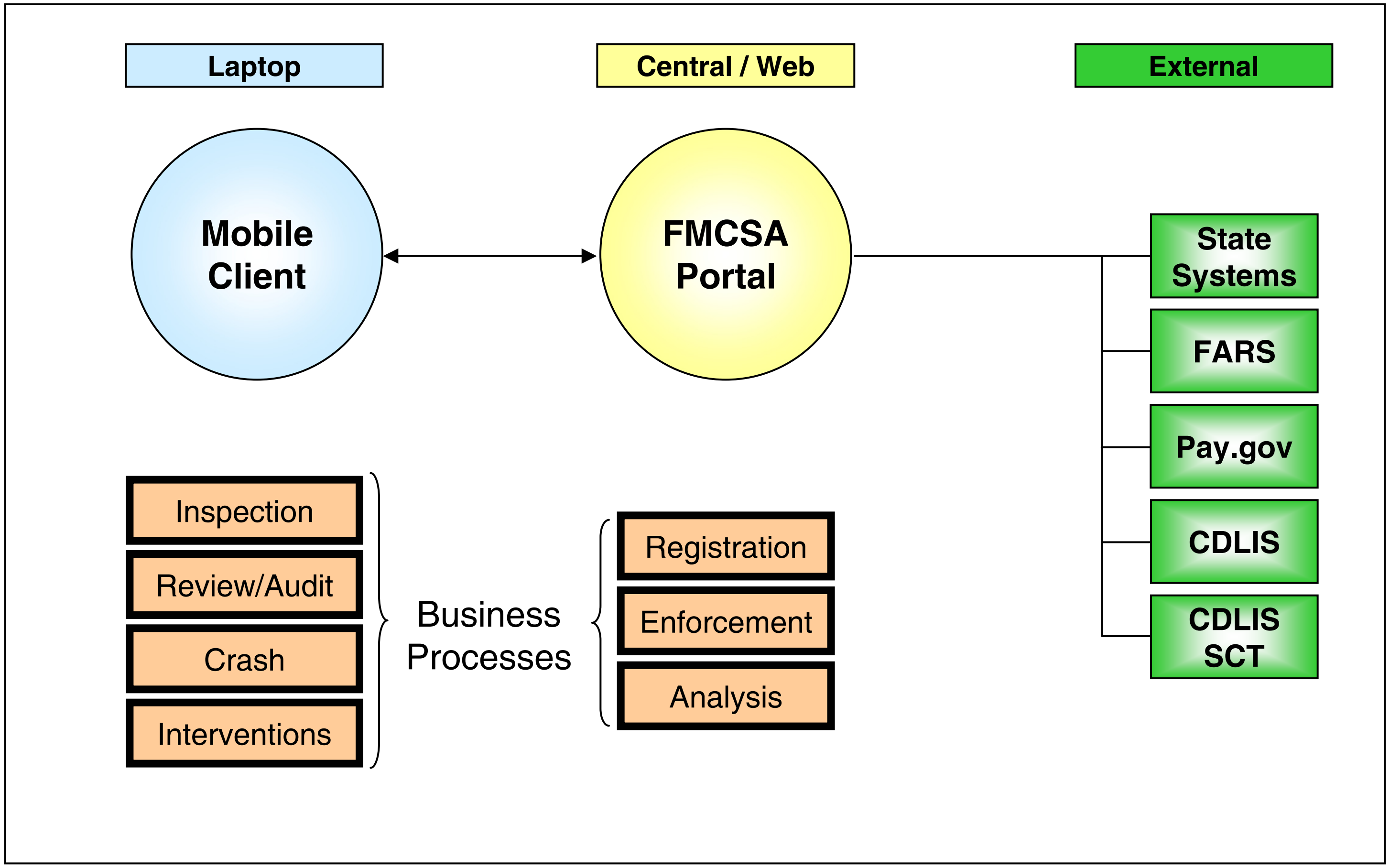
3.5 FMCSA's Plans to Modernize and Improve Systems
Current FMCSA Systems

This diagram shows the current FMCSA information systems and the complexities of FMCSA system interconnections. Not all of these pertain to CVISN. More detail on these systems can be found at FMCSA's Overview – Core Information Systems Web site (click here).



Modernized FMCSA Architecture

Under FMCSA's Information Technology modernization and business process improvement program (COMPASS – Creating Opportunities, Methods, and Processes to Secure Safety), the agency is migrating to a Web-based service-oriented architecture. After COMPASS has been fully deployed, users will access services via the FMCSA Portal.



COMPASS – Creating Opportunities, Methods, and Processes to Secure Safety

The COMPASS program is an FMCSA-wide initiative that is leveraging new technology to transform the way that FMCSA does business. The ultimate goal is to implement an information technology (IT) solution that improves the safety of commercial motor vehicle operations. Key objectives include:

- Creating a single source for crucial safety data via single sign-on access.
- Improving data quality to enable better, more informed decision making.
- Providing actionable information as well as data.

By optimizing FMCSA's business processes and improving the Agency's IT functionality, COMPASS will help FMCSA, state enforcement personnel, and industry make America's roads safer. A key component of COMPASS is the commitment to implementing a new operational model being developed as part of the Comprehensive Safety Analysis 2010 (CSA 2010) initiative. COMPASS is now leveraging a service-oriented architecture and leading technologies to develop a solution that can adapt easily to a changing environment. The FMCSA Portal, the first phase of COMPASS, provides single sign-on access to MCMIS, Enforcement Management Information System (EMIS), L&I, DataQs, Query Central, Analysis and Information (A&I) Online, Hazardous Materials Package Inspection Program (HMPIP), InfoSys, and the National Consumer Complaint Database via a single password and user ID. Over time, the FMCSA Portal will provide access to all FMCSA systems.

COMPASS – Creating Opportunities, Methods, and Processes to Secure Safety

Portal Access for the Enforcement Community

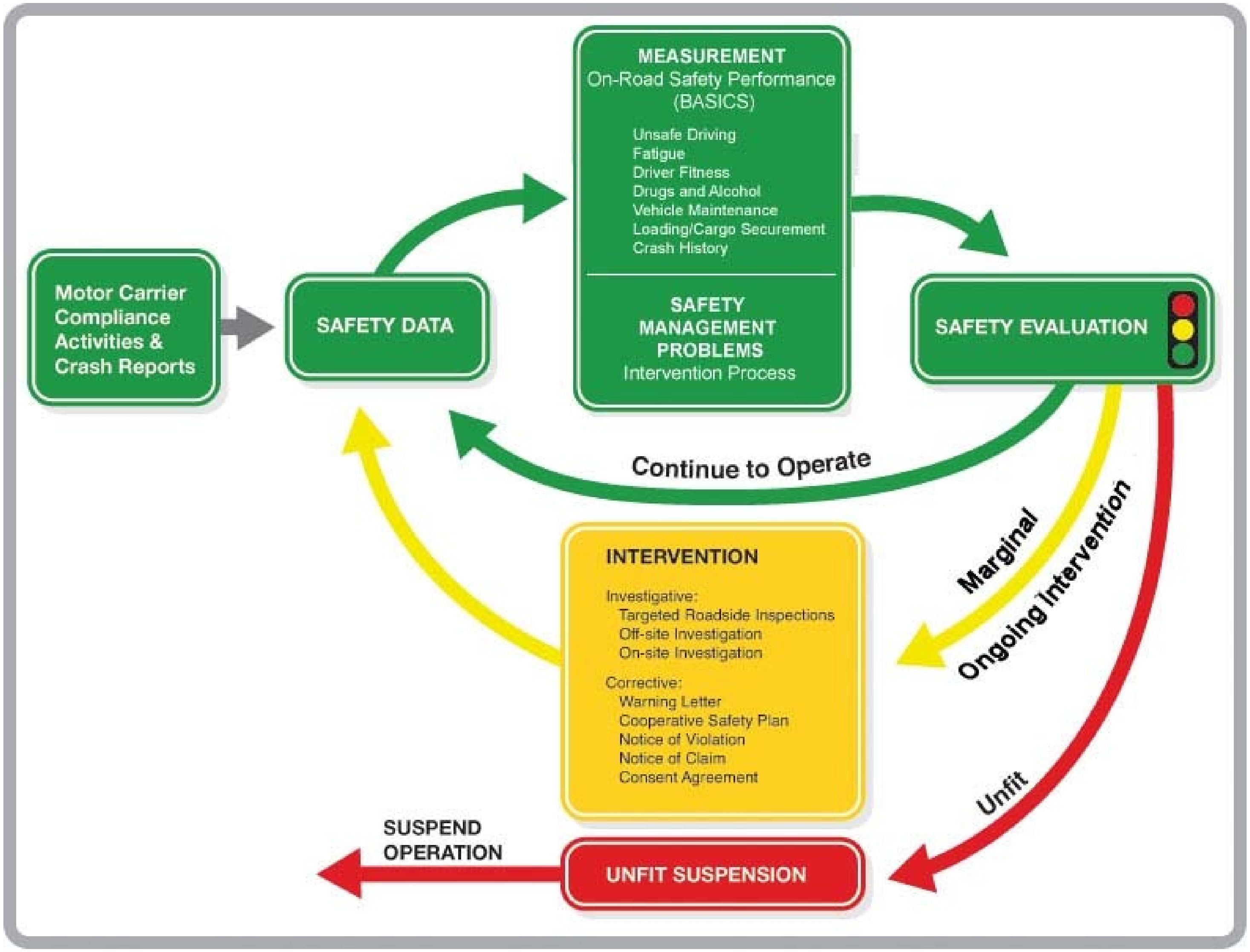
The initial release of the FMCSA Portal improves access to crucial safety information and sets the stage for further improvements in safety and operations as additional systems are integrated. Besides providing single sign-on access, the FMCSA Portal also delivers:

- *Direct access via the Web* – Anyone who can access the Web can access the FMCSA Portal. Because a Virtual Private Network (VPN) is no longer required to access FMCSA systems, users can access crucial data during roadside inspections and when working from other remote locations.
- *Ability to make assignments directly from the FMCSA Portal* – Users can make assignments such as Compliance Reviews and Safety Audits without exiting the FMCSA Portal. All of the user's customized prioritization lists are available in one location and can be exported into an Excel spreadsheet for additional customization.
- *Accounts management* – Users can request FMCSA Portal accounts and modify requests directly from the FMCSA Portal. Users were previously required to submit paper-based forms to the Technical Support Hotline in order to request and modify accounts.
- *Presentation of motor carrier safety data on a single screen* – Enforcement users have access to all company data in the same format as that seen by companies.

Portal Access for Companies

The FMCSA Portal gives companies a single location to view their data. Real-time access to data is improved. Carriers can generate their own safety profiles from within the FMCSA Portal at no cost and designate third-party entities as having online access to their safety and operational data.

Comprehensive Safety Analysis (CSA) 2010



Comprehensive Safety Analysis (CSA) 2010
A New Business Model

FMCSA is developing a new operational model through its CSA 2010 initiative. The goal of CSA 2010 is to develop and implement more effective and efficient ways for FMCSA, its state partners, and industry to reduce commercial motor vehicle crashes, fatalities, and injuries.

CSA 2010 introduces a new approach to assessing the motor carrier safety performance of a larger segment of the motor carrier industry, while optimizing the use of resources. CSA 2010 is designed to help FMCSA affect a larger number of motor carriers and drivers using a broader array of compliance interventions.

The operational model for CSA 2010 will measure safety performance and compliance, determine safety fitness, recommend interventions, apply interventions, and track and evaluate safety improvements for FMCSA-regulated entities. The model will continuously evaluate and monitor regulated entities' compliance and safety performance. It will be significantly different from the Agency's current operational model in that safety fitness determination made under CSA 2010 could be independent of the compliance review. Instead, safety fitness determination will be based on on-road performance data and could lead to a broader array of compliance interventions.

A model of this nature has four major components: 1) measurement; 2) interventions; 3) safety fitness determination; and 4) COMPASS. A motor carrier's safety performance would be measured through the data that has been uploaded from motor carrier compliance activities and crash reports. This measurement would result in a safety evaluation and could, in turn, result in the selection of an intervention. An intervention, such as the off-site investigation, would be selected for the purpose of improving safety performance. In addition, the safety measurement would result in a safety fitness determination for the carrier. The fourth major element, COMPASS, is FMCSA's information technology modernization initiative.

Comprehensive Safety Analysis (CSA) 2010

The CSA 2010 operational model will automatically categorize data into behavioral areas called Behavioral Analysis and Safety Improvement Categories or BASICs. BASICs represent behaviors that lead to or increase the consequences of crashes. Rather than relying solely on the results of a compliance review, FMCSA could use motor carrier or driver performance data in the identified behavioral areas to determine safety fitness.

The CSA 2010 operational model will regularly determine the safety fitness of motor carriers and drivers of commercial motor vehicles for which there is sufficient data and as new data enter the operational model. A compliance review would not be required prior to a safety fitness determination.

Given the data-dependent nature of the CSA 2010 model under consideration, data validation will be essential. As FMCSA deploys its IT modernization project, COMPASS, robust data validation systems and techniques will be employed to ensure the accuracy and completeness of data. The information systems supporting CSA 2010 will track regulated entities and will associate them with the relevant data collected by FMCSA. FMCSA is working to replace existing paperwork tracking systems with automated data collection systems so that safety fitness determinations are made with the most current data available.

Implementation of the CSA 2010 operational model is likely to impact today's e-screening business model. As the BASICs are developed and refined, the algorithm for ISS is likely to change.

Comprehensive Safety Analysis (CSA) 2010 Comparing SafeStat with Safety Measurement System

Today's Model SafeStat	CSA 2010's Safety Measurement System
Organized in four broad categories – Safety Evaluation Areas (SEAs)	**Organized by Behavior Analysis Safety Improvement Categories (seven BASICs)**
Identifies carriers for a compliance review (CR)	**Identifies safety performance problems to determine intervention level**
Uses only out-of-service (OOS) and moving violations from inspections	**Emphasizes on-road safety performance using <u>all</u> safety-based inspection violations**
No impact on safety rating	**Used to propose adverse safety fitness determination based on carriers' own data**
No risk-based violation weightings	**Risk-based violation weightings**
Assesses carriers only	**Two distinct safety measurement systems – carriers and drivers**

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Section 4
Putting It All Together

Section 4
Putting It All Together

The product of a state's CVISN system design is a document that includes this type of information:

- Top-level requirements – Defines the top-level system requirements, software requirements, and interface requirements. The COACH Part 1 checklists are the basis for the requirements, supplemented as needed by state-unique goals, objectives, and requirements.
- Operational concepts and scenarios – Answers basic questions on what existing operational processes will be modified or what new ones will be added; what user interactions will be changed.
- Top-level design – Defines the top-level design of the system hardware, software, and networks. The design includes high-level definitions of processes, data, system elements, and interfaces. The top-level requirements should be allocated to system elements.

The top-level design will serve as the technical starting point for defining state-specific detailed interface requirements and product modification or development specifications. The following subsections address in more detail:

- Allocation of requirements to system components
- State System Design Template: System Interface Summaries
- State Network Template: Top-Level Physical System Design

- Summaries of changes – Describe, at a high-level, the scope of changes to existing systems implied by the top-level design.

4.1 Allocation of Requirements to System Components

This section discusses how the state allocates requirements to specific components of the generic state CVISN system design.

The state should make two templates: a master state system design template and a network template. These templates reflect the initial top-level design decisions. The templates show the major functions, how those functions are allocated to computers, and what network connectivity is envisioned to support system interactions. You might want to do a “current systems” view and a “proposed systems” view of each template to show what you are planning to add.

Besides the drawings, it is a good idea to provide textual descriptions. In particular, descriptions of the interfaces and of the functions assigned to each new or modified system component should be included.

4.2 State System Design Template

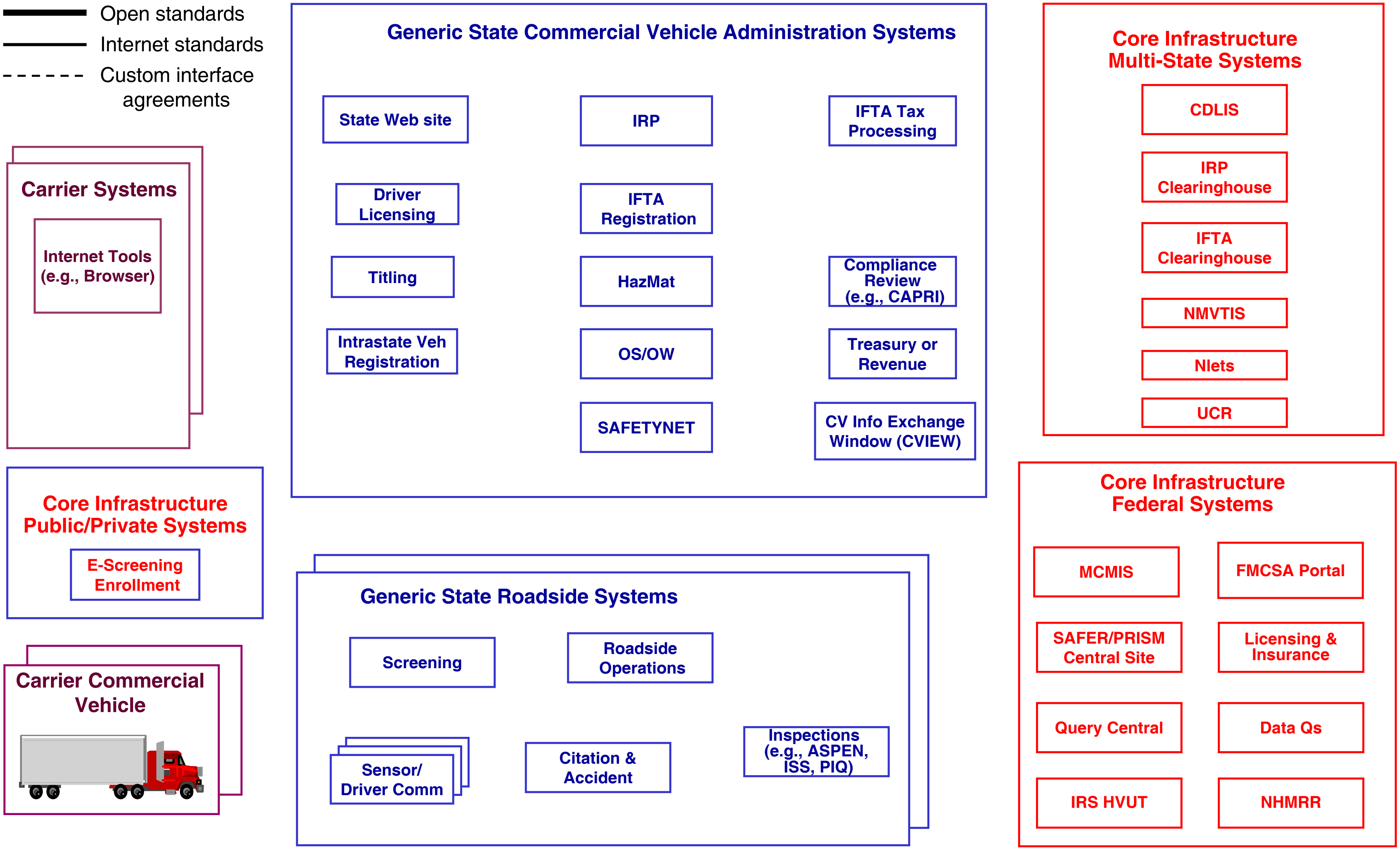
The state system design template will be used to illustrate operational scenarios. It should include all the major functions in the state that support CVO. There should be exactly one box representing each major function. Start by reviewing the generic state system design template and then tailor it to your state. Recall your project objectives and the answers you gave when completing the COACH Part 1 tables. Remove functions that don't relate to your CVISN project. Add a box for each major function that is missing.

The CVISN scope is expressed in four top-level interface drawings.

- Carrier-related interfaces
- Interfaces within the state
- Interfaces between the state and the CVISN core infrastructure
- Interfaces among CVISN core infrastructure systems

The drawings use the state system design template, overlaying lines to show connectivity among systems. If a state chooses not to implement the open standard specified for within-state exchanges, it will apply a unique legacy system interface (LSI) to accomplish the information exchange between two of its own systems. The sample state-specific diagrams on the following pages focus on interfaces to support Core CVISN capabilities. For simplicity, legacy modifications (LMs) and LSIs are not shown in these diagrams.

Generic State System Design Template



━━ Open standards

── Internet standards

- - - - - - Custom interface agreements

Carrier Systems

Internet Tools (e.g., Browser)

Core Infrastructure Public/Private Systems

E-Screening Enrollment

Carrier Commercial Vehicle

Generic State Commercial Vehicle Administration Systems

State Web site

IRP

IFTA Tax Processing

Driver Licensing

IFTA Registration

Titling

HazMat

Compliance Review (e.g., CAPRI)

Intrastate Veh Registration

OS/OW

Treasury or Revenue

SAFETYNET

CV Info Exchange Window (CVIEW)

Generic State Roadside Systems

Screening

Roadside Operations

Sensor/ Driver Comm

Citation & Accident

Inspections (e.g., ASPEN, ISS, PIQ)

Core Infrastructure Multi-State Systems

CDLIS

IRP Clearinghouse

IFTA Clearinghouse

NMVTIS

Nlets

UCR

Core Infrastructure Federal Systems

MCMIS

FMCSA Portal

SAFER/PRISM Central Site

Licensing & Insurance

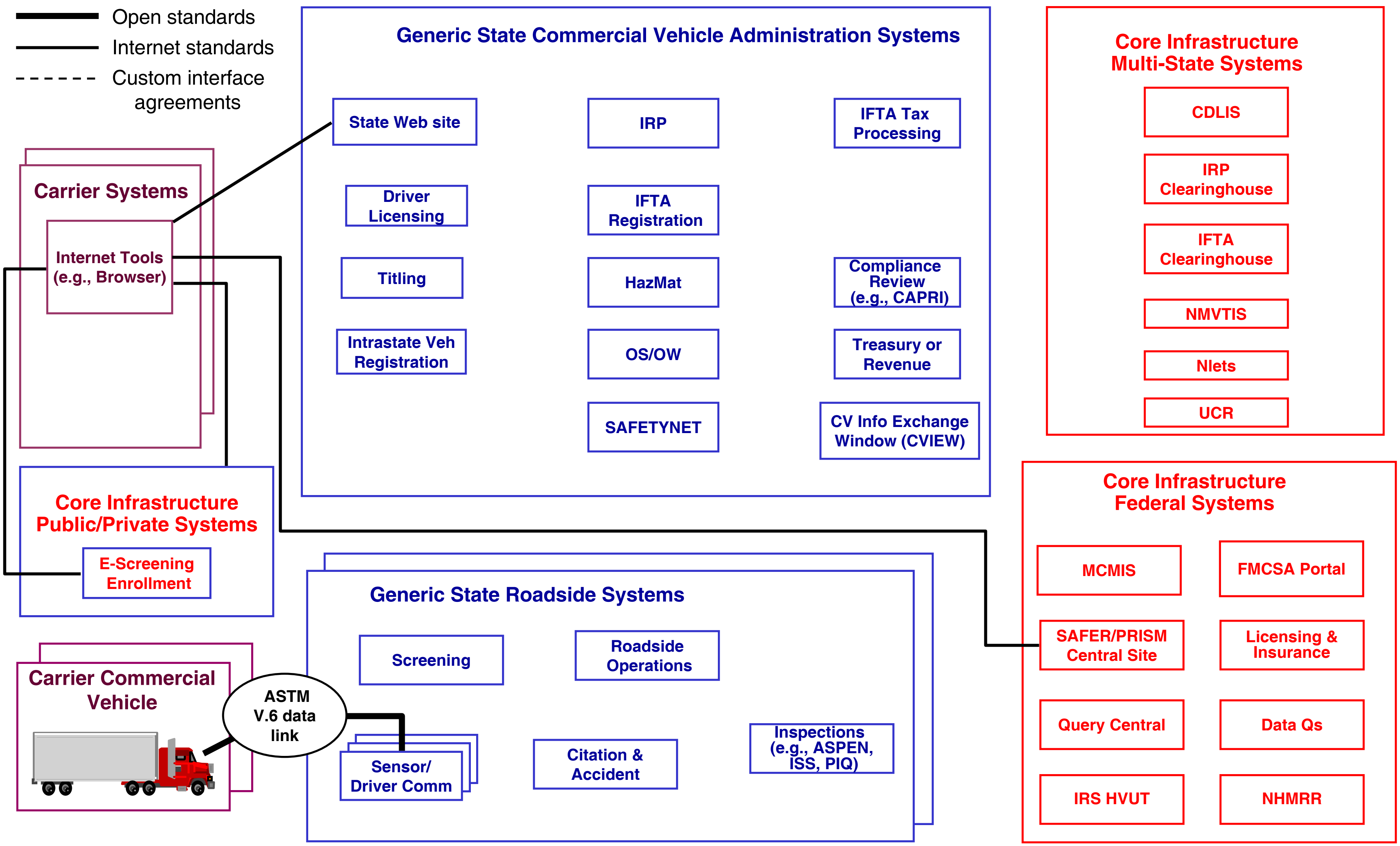
Query Central

Data Qs

IRS HVUT

NHMRR

Core CVISN: Carrier-Related Interfaces



Open standards

Internet standards

Custom interface agreements

Carrier Systems

Internet Tools (e.g., Browser)

Core Infrastructure Public/Private Systems

E-Screening Enrollment

Carrier Commercial Vehicle

ASTM V.6 data link

Generic State Commercial Vehicle Administration Systems

State Web site

IRP

IFTA Tax Processing

Driver Licensing

IFTA Registration

Titling

HazMat

Compliance Review (e.g., CAPRI)

Intrastate Veh Registration

OS/OW

Treasury or Revenue

SAFETYNET

CV Info Exchange Window (CVIEW)

Generic State Roadside Systems

Screening

Roadside Operations

Sensor/ Driver Comm

Citation & Accident

Inspections (e.g., ASPEN, ISS, PIQ)

Core Infrastructure Multi-State Systems

CDLIS

IRP Clearinghouse

IFTA Clearinghouse

NMVTIS

Nlets

UCR

Core Infrastructure Federal Systems

MCMIS

FMCSA Portal

SAFER/PRISM Central Site

Licensing & Insurance

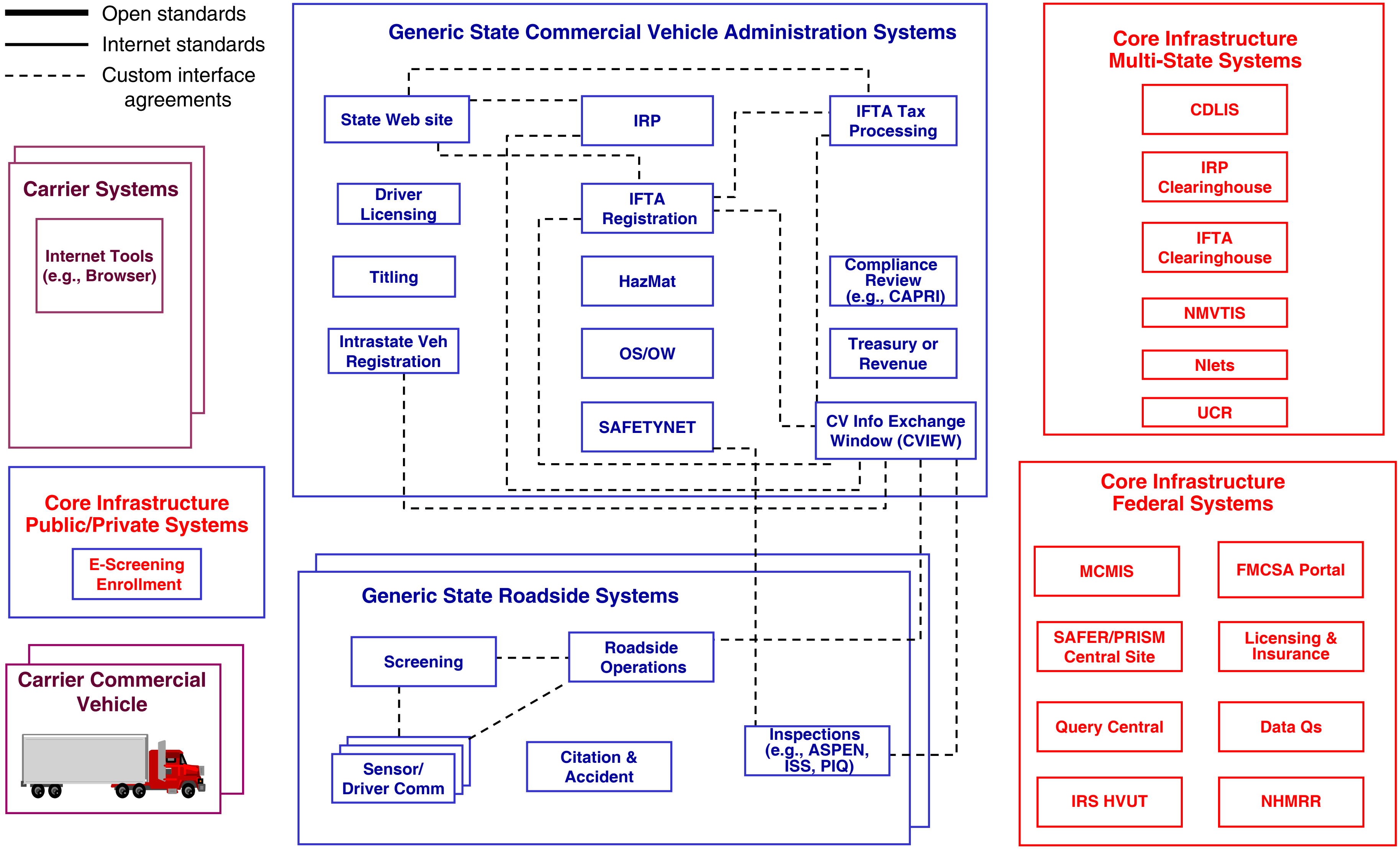
Query Central

Data Qs

IRS HVUT

NHMRR

Core CVISN: Interfaces Within the State



Open standards

Internet standards

Custom interface agreements

Carrier Systems

- Internet Tools (e.g., Browser)

Core Infrastructure Public/Private Systems

- E-Screening Enrollment

Carrier Commercial Vehicle

Generic State Commercial Vehicle Administration Systems

- State Web site
- IRP
- IFTA Tax Processing
- Driver Licensing
- IFTA Registration
- Titling
- HazMat
- Compliance Review (e.g., CAPRI)
- Intrastate Veh Registration
- OS/OW
- Treasury or Revenue
- SAFETYNET
- CV Info Exchange Window (CVIEW)

Generic State Roadside Systems

- Screening
- Roadside Operations
- Sensor/ Driver Comm
- Citation & Accident
- Inspections (e.g., ASPEN, ISS, PIQ)

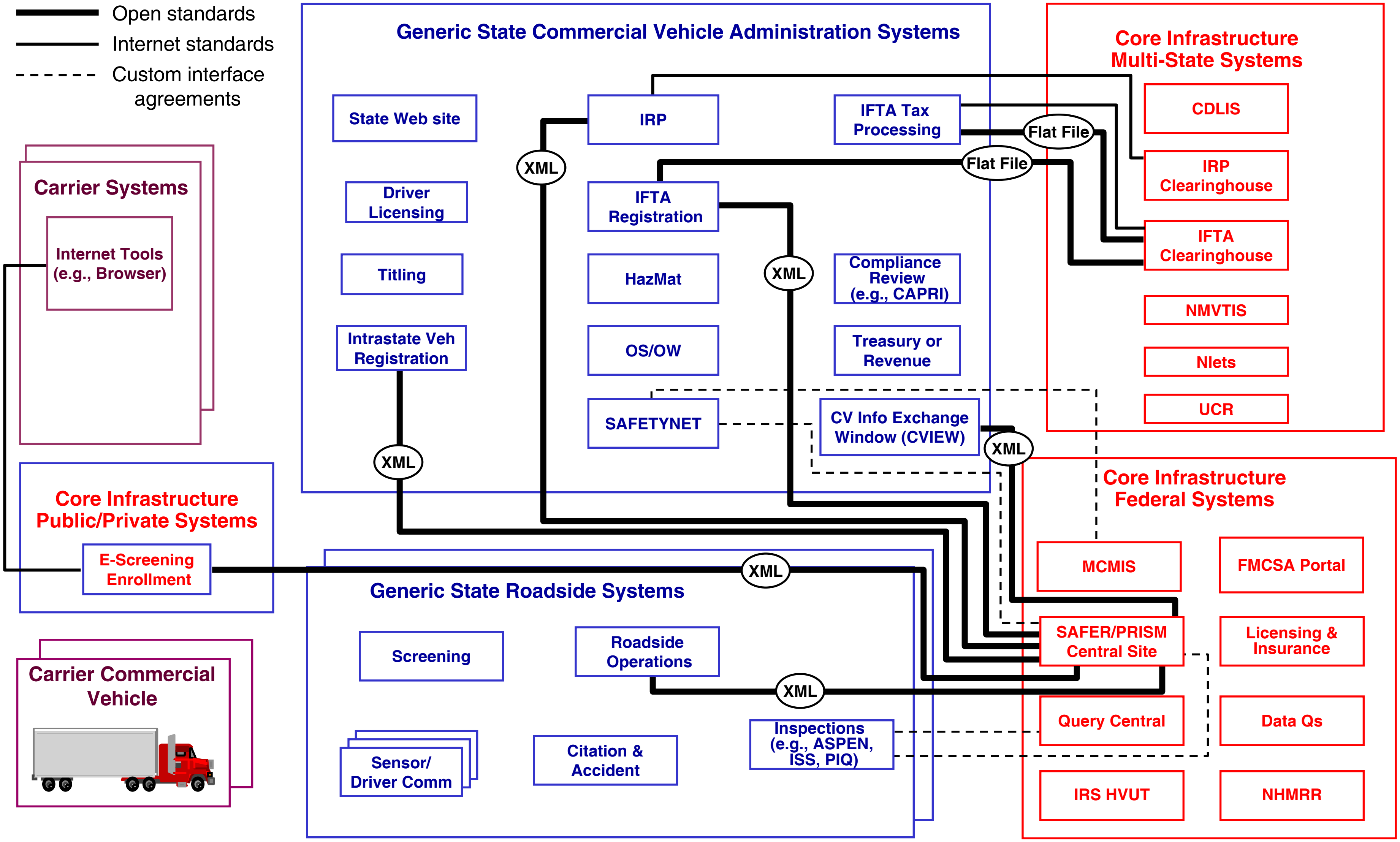
Core Infrastructure Multi-State Systems

- CDLIS
- IRP Clearinghouse
- IFTA Clearinghouse
- NMVTIS
- Nlets
- UCR

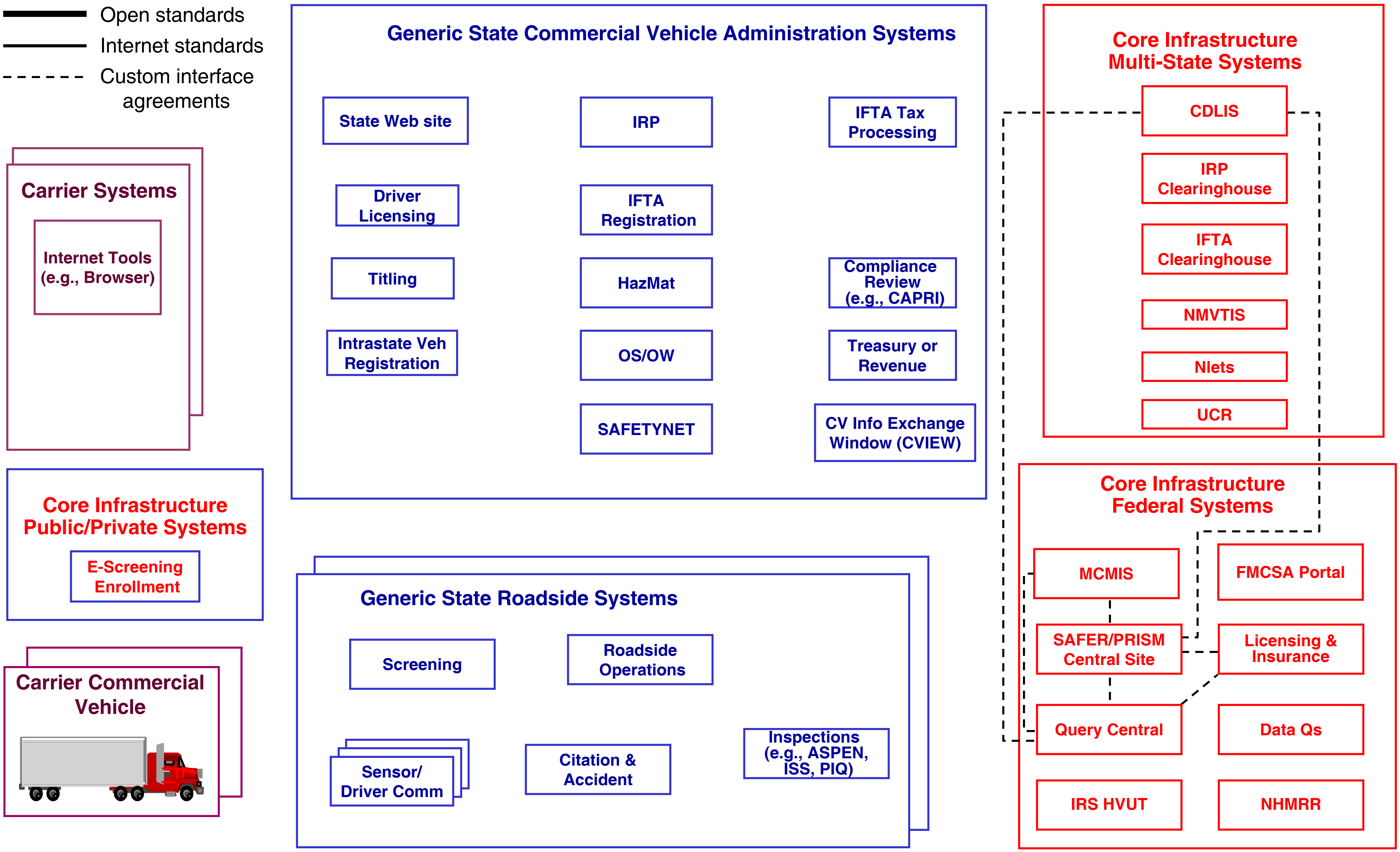
Core Infrastructure Federal Systems

- MCMIS
- FMCSA Portal
- SAFER/PRISM Central Site
- Licensing & Insurance
- Query Central
- Data Qs
- IRS HVUT
- NHMRR

Core CVISN: Interfaces Between the State and the CVISN Core Infrastructure



Core CVISN: Interfaces Among CVISN Core Infrastructure Systems



Open standards

Internet standards

Custom interface agreements

Carrier Systems

Internet Tools (e.g., Browser)

Core Infrastructure Public/Private Systems

E-Screening Enrollment

Carrier Commercial Vehicle

Generic State Commercial Vehicle Administration Systems

State Web site

IRP

IFTA Tax Processing

Driver Licensing

IFTA Registration

Titling

HazMat

Compliance Review (e.g., CAPRI)

Intrastate Veh Registration

OS/OW

Treasury or Revenue

SAFETYNET

CV Info Exchange Window (CVIEW)

Generic State Roadside Systems

Screening

Roadside Operations

Sensor/ Driver Comm

Citation & Accident

Inspections (e.g., ASPEN, ISS, PIQ)

Core Infrastructure Multi-State Systems

CDLIS

IRP Clearinghouse

IFTA Clearinghouse

NMVTIS

Nlets

UCR

Core Infrastructure Federal Systems

MCMIS

FMCSA Portal

SAFER/PRISM Central Site

Licensing & Insurance

Query Central

Data Qs

IRS HVUT

NHMRR

4.3 State Network Template

The network template shows how the state allocates the major functions to computers and how those computers are connected using various kinds of network technologies.

The network template is used to show network connections as well as the allocation of software products to computers. Proposed new computers and network connections can be added. As decisions are made, the designer should update the diagram to show which network protocols have been selected for each segment.

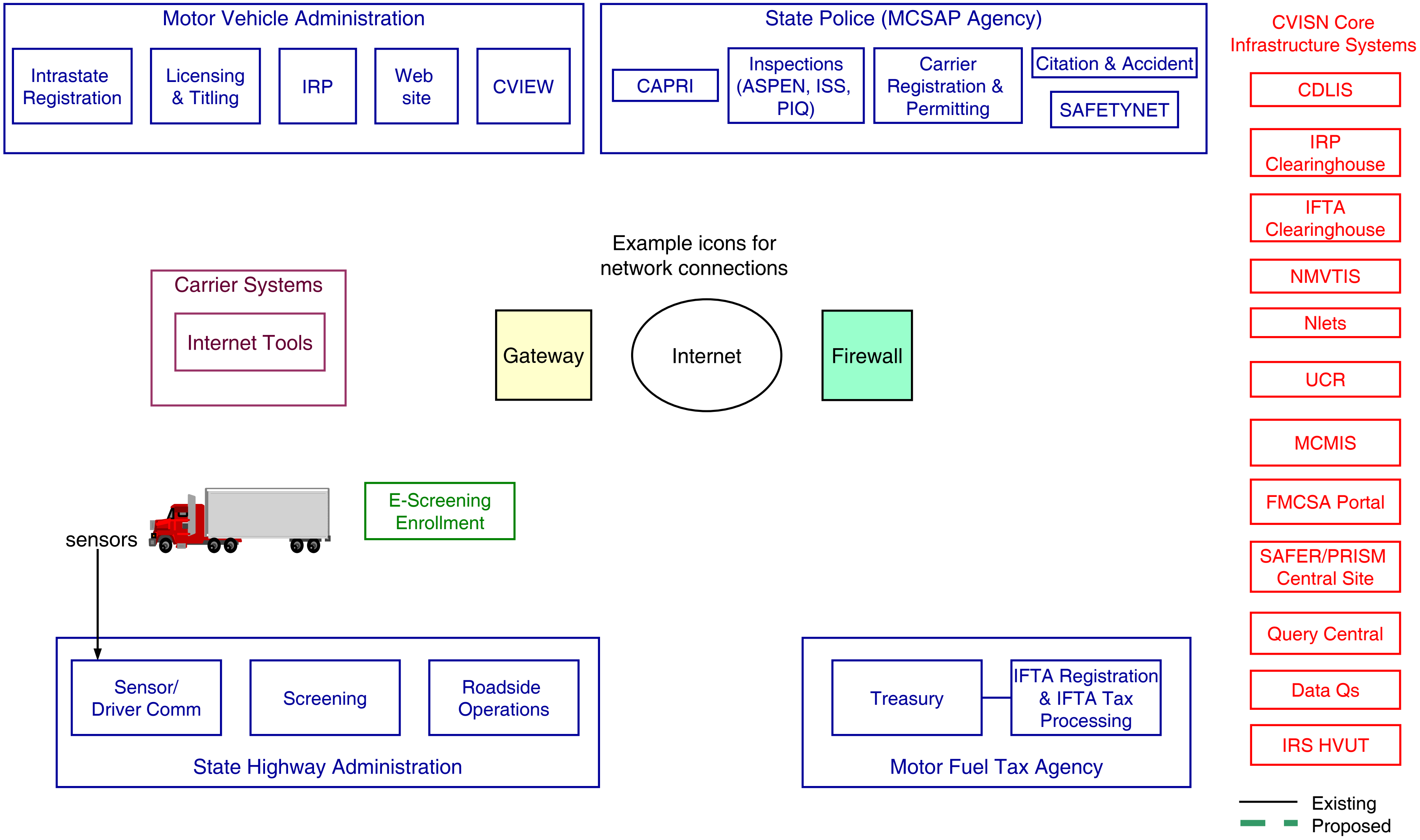
The diagram can be used to verify how two or more systems are connected physically and where network "translations" are needed. It can also show where potential bottlenecks exist.

To make the master network template, the designer reviews the generic network template and tailors it to the state.

The diagram includes all the existing computers and networks that support the systems included in the state's current systems inventory. New computers and network components are also shown. The major functions from the state system design template are allocated to some computer on the network template.

On the network template, each small box represents a computer system. The state should show all the computer systems that support (or will support) the CVISN project functions. List the major functions (software applications) handled by that computer inside the box. Group the small boxes into large boxes according to the state agency or facility that is responsible for the computers. Show LANs (Local Area Networks) and WANs (Wide Area Networks) as lines connecting the computers. Don't forget the Internet, firewalls, and wireless connections (example icons are provided).

Generic State Network Template



Motor Vehicle Administration

Intrastate Registration

Licensing & Titling

IRP

Web site

CVIEW

State Police (MCSAP Agency)

CAPRI

Inspections (ASPEN, ISS, PIQ)

Carrier Registration & Permitting

Citation & Accident

SAFETYNET

CVISN Core Infrastructure Systems

CDLIS

IRP Clearinghouse

IFTA Clearinghouse

NMVTIS

Nlets

UCR

MCMIS

FMCSA Portal

SAFER/PRISM Central Site

Query Central

Data Qs

IRS HVUT

Example icons for network connections

Gateway

Internet

Firewall

Carrier Systems

Internet Tools

E-Screening Enrollment

sensors

Sensor/ Driver Comm

Screening

Roadside Operations

State Highway Administration

Treasury

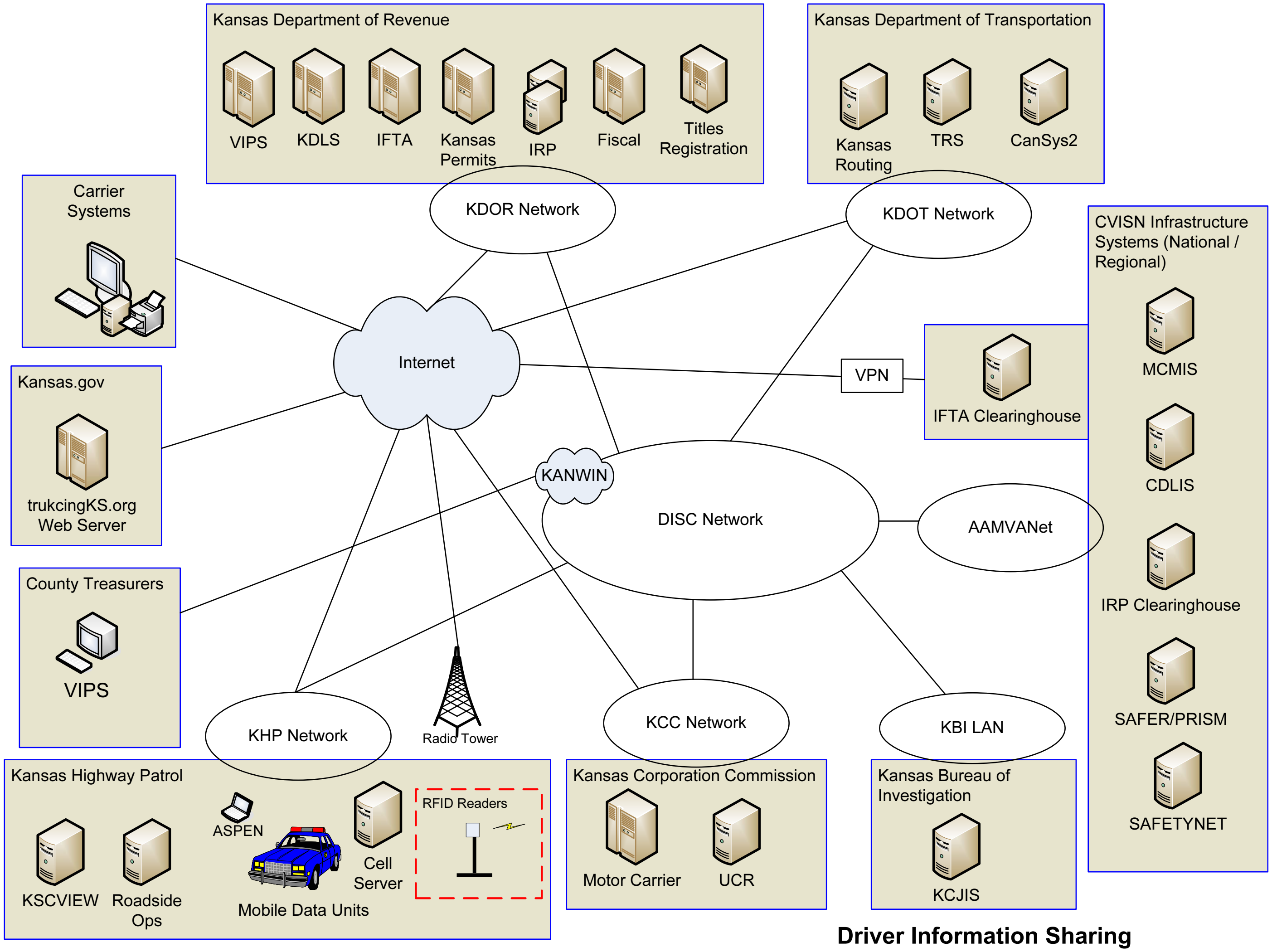
IFTA Registration & IFTA Tax Processing

Motor Fuel Tax Agency

— Existing

▬ ▬ Proposed

Example State Network Template



Driver Information Sharing

Section 5
References and Acronyms

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5.2 Acronyms

A&I	Analysis & Information
AAMVA	American Association of Motor Vehicle Administrators
ACCB	Architecture Configuration Control Board
ACE	Automated Commercial Environment
ASPEN	Not an acronym
ASTM	American Society for Testing and Materials
AVC	Automatic Vehicle Classification
AVI	Automatic Vehicle Identification
BASICs	Behavioral Analysis and Safety Improvement Categories
CANSYS2	Not an acronym
CAPRI	Carrier Automated Performance Review Information
CaseRite	Not an acronym
CDL	Commercial Driver's License
CDLIS	Commercial Driver's License Information System
CH	Clearinghouse
CMV	Commercial Motor Vehicle
COACH	CVISN Operational and Architectural Compatibility Handbook
COMPASS	Creating Opportunities, Methods, and Processes to Secure Safety
CR	Change Request
CR	Compliance Review
CSA	Comprehensive Safety Analysis
CV	Commercial Vehicle
CVCS	Commercial Vehicle Check Subsystem
CVCSC	Commercial Vehicle Customer Service Center
CVIEW	Commercial Vehicle Information Exchange Window
CVIS	Commercial Vehicle Information System
CVISN	Commercial Vehicle Information Systems and Networks
CVO	Commercial Vehicle Operations
CVS	Commercial Vehicle Subsystem
CVSA	Commercial Vehicle Safety Alliance
DIR	Driver Information Resource
DISC	Division of Information Systems and Communications
DL	Driver's License
DMV	Department of Motor Vehicles
DOB	Date of Birth
DQ	DataQs
DSL	Digital Subscriber Line
DSRC	Dedicated Short Range Communications
DUNS	Data Universal Numbering System
EDMS	Electronic Data Management System
EFT	Electronic Funds Transfer
EMIS	Enforcement Management Information System
ENS	Employer Notification Service
FARS	Fatal Accident Reporting System

Acronyms

FMCSA	Federal Motor Carrier Safety Administration
FTP	File Transfer Protocol
HazMat	Hazardous Materials
HELP	Heavy Vehicle Electronic License Plate Program
HMPIP	HazMat Package Inspection Program
HVUT	Heavy Vehicle Use Tax
ICD	Interface Control Document
ICMS	Integrated Corridor Management Systems
ICP	Interface Certification Procedure
IEEE	Institute of Electrical and Electronics Engineers
IFTA	International Fuel Tax Agreement
IRP	International Registration Plan
IRPCH	International Registration Plan Clearinghouse
IRS	Internal Revenue Service
ISO	International Standards Organization
ISS	Inspection Selection System
IT	Information Technology
ITDS	International Trade Data System
ITS	Intelligent Transportation Systems
JHU/APL	Johns Hopkins University/Applied Physics Laboratory
KANWIN	Kansas Wide Area Information Network
KBI	Kansas Bureau of Investigation
KCC	Kansas Corporation Commission
KCJIS	Kansas Criminal Justice Information System
KDLS	Kansas Drivers License System
KDOR	Kansas Department of Revenue
KDOT	Kansas Department of Transportation
KHP	Kansas Highway Patrol
Kofax	Not an acronym
L&I	Licensing & Insurance
LAN	Local Area Network
LM	Legacy Modification
LPR	License Plate Reader
LSI	Legacy System Interface
MCCO	Motor Carrier Compliance Office
MCMIS	Motor Carrier Management Information System
MCSAP	Motor Carrier Safety Assistance Program
MCSIP	Motor Carrier Safety Improvement Process
MSCVE	Measurement Standards and Commercial Vehicle Enforcement (Alaska)
Nlets	International Justice and Public Safety Information Sharing Network
NMVTIS	National Motor Vehicle Title Information System
NORPASS	North American Preclearance and Safety System
OCR	Optical Character Recognition
OOS	Out of Service
OS/OW	Oversize/Overweight

Acronyms

PIQ	Past Inspection Query
PRISM	Performance and Registration Information Systems Management
ProVu	Profile Viewer
PSA2	PrePass Safety Algorithm 2
QC	Query Central
RITA	Research and Technology Administration
ROC	Roadside Operations Computer
SAFER	Safety and Fitness Electronic Records
SafeStat	Safety Status/Motor Carrier Safety Status Measurement System
SCT	Department of Communications and Transportation (Mexico)
SEA	Safety Evaluation Area
SGML	Standard Generalized Markup Language
SOAP	Simple Object Access Protocol
SPCS	SAFER/PRISM Central Site
SSL	Secure Socket Layer
TaCS	(Fuel) Tax Compliance System
TCP/IP	Transmission Control Protocol/Internet Protocol
TLS	Transport Layer Security
TraCS	Traffic and Criminal Software
TRS	Traffic Records System
UCR	Unified Carrier Registration
UEFM	Universal Electronic Freight Management
UFA	Uniform Fine Assessment
USDOT	United States Department of Transportation
VII	Vehicle Infrastructure Integration
VIN	Vehicle Identification Number
VIPS	Vehicle Information Processing System
VMS	Variable Message Sign
VPN	Virtual Private Network
W3C	World Wide Web Consortium
WAN	Wide Area Network
WAVE	Wireless Access in Vehicular Environments
WiFi	Wireless Fidelity (IEEE 802.11)
WIM	Weigh-in-Motion
WiMAX	Worldwide Inter-operability for Microwave Access
WRI	Wireless Roadside Inspection
WSDL	Web Services Definition Language
WWW	World Wide Web
XML	eXtensible Markup Language

Appendix
Change Requests

This section lists CVISN Architecture Change Requests (CRs) incorporated into this version of the document. The CRs are:

- CR 4760 – Update CVISN Architecture to keep pace with changes to the National ITS Architecture (Versions 5.1 and 5.1.1)
- CR 4764 – Eliminate distinction between wireline and wireless lines on CVISN Architecture Flow Diagram
- CR 4778 – Update CVISN Architecture to better address Expanded CVISN capabilities
- CR 4966 – Add new architecture flow CVS-to-CVCS to report “commercial vehicle disable status”
- CR 5792 – Update architecture-related (equipment packages) figure
- CR 5804 – Update the CVISN Architecture "sausage" diagram to conform to the National ITS Architecture V6.0 and V6.1
- CR 6318 – Match Border Information Flow Architecture changes in National ITS Architecture version 6.0 and 6.1
- CR 6319 – Update to reflect National ITS Architecture Version 6.0 and 6.1 VII changes

Appendix
Change Requests (cont.)

- CR 6320 – Expand CVISN to include Vehicle Subsystem and Driver Terminator interfaces
- CR 6321 – Update to reflect National ITS Architecture Version 6.0 and 6.1 Clarus and ICMS changes
- CR 6322 – Update to reflect miscellaneous National ITS Architecture Version 6.0 and 6.1 changes and to simplify the CVISN Architecture document
- CR 6333 – Update to reflect National ITS Architecture Version 6.1 UEFM – Universal Electronic Freight Management changes
- CR 6359 – Update System Design Description, General Updates, new Section 1 Introduction and Section 6 Change Requests
- CR 6360 – Update System Design Description, Section 1 Introduction
- CR 6361 – Update System Design Description. Merge Section 2 Architecture and System Design and Section 3 System Design
- CR 6362 – Update System Design Description, Section 4 Putting It All Together
- CR 6363 – Update System Design Description, Section 5 References