UNDERSTANDING ITS/CVO TECHNOLOGY APPLICATIONS

STUDENT MANUAL
COURSE 3

NOTE TO READER:

THIS IS A LARGE DOCUMENT

Due to its large size, this document has been segmented into multiple files. All files separate from this main document file are accessible from links (blue type) in the table of contents or the body of the document.

Understanding ITS/CVO Technology Applications

Student Manual

Prepared for:

U.S. Department of Transportation
Office of Motor Carriers - ITS/CVO

Version 2.0, January 1999

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Reference Manual:

0. Introduction

UNDERSTANDING ITS/CVO TECHNOLOGY APPLICATIONS
Student Manual

MODULE 0 - INTRODUCTION

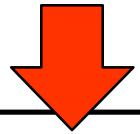
US Dept of Transportation

Course Purpose

Develop An Understanding of

- Existing ITS/CVO (Intelligent Transportation Systems/Commercial Vehicle Operations) Technologies
- How those technologies can be applied
- Emerging ITS/CVO Technologies

ITS/CVO Technical Training Course Descriptions



Course Title	Introduction to ITS/CVO	ITS/CVO Technical Management for Non-Technical managers	Understanding ITS/CVO Technology Applications
Duration	1.5 days (12 hours)	2 days (16 hours)	2 days (16 hours)
Content	ITS/CVO program's purpose, structure, components, current and future implementation, and technology	Skills development for managing the design and implementation of ITS/CVO technology	Overview of CVISN architecture, technology, and standards; how to apply them to ITS/CVO
Target Audience	Technical or non-technical managers and staff from the states, FHWA (OMC and Federal-aid), motor carrier industry, and other key stakeholders	Technical managers and staff from the states and FHWA (OMC and Federal-aid)	Technical managers and staff from the states, FHWA (OMC and Federal-aid), motor carrier industry, and other key stakeholders

Housekeeping

- ✓ Time Period (daily start/stop times)
- ✓ Breaks/Lunch
- ✓ Restrooms
- ✓ Smoking Policy
- ✓ Emergency/Evacuation Policy
- ✓ Introductions

Housekeeping (cont.)

Time Period:

Course Duration: Two days (approximately 16 hours)

Daily Start / Stop Times: _____

Breaks/Lunch:

Breaks will be provided as appropriate.

One hour will be given for lunch at: _____

Restrooms are located at/in: _____

Smoking Policy:

A no smoking policy is in effect.

Emergency/Evacuation Policy:

Information and directions_____

Introductions:

Please be very brief when introducing yourself. State your name, job position and function, and very briefly, your past experience with ITS/CVO, if any.

Housekeeping (cont.)

- ✓ Expectations/Experience
- ✓ Course Evaluations
- ✓ Course Materials
- ✓ Lesson Learning Objectives
- ✓ Activities
- ✓ Case Study

Housekeeping (cont.)

Expectations/Experience:

Do you have any specific expectations about this course?

Do you have any concerns or issues with ITS/CVO?

Is there anything in particular that you need to take away from this course?

Course Evaluations:

The course evaluation form will be provided by the instructor. The evaluation forms will be collected before you leave.

Course Materials:

The Participant Manual contains all of the material we will be discussing in this course. Other references are also contained in your manuals for later use. Any exercise worksheets or forms are included or will be provided as needed. You have copies of all overhead slides for your use, should you provide briefings and/or training to others. The participant manual is meant to be an interactive tool and to provide you with valuable reference material. Take notes as needed.

Lesson Learning Objectives:

Each module will have specific learning objectives which will be stated at the beginning of the instruction. The material in the course is designed to achieve each of these objectives. These objectives were derived from an analysis of learning needs conducted with ITS/CVO stakeholders from around the country.

Activities:

Many different types of learning activities are used in this course. Your participation will make the learning more effective and enjoyable. Relax and enjoy yourself!

Case Study:

A Case Study has been developed to help clarify many of the concepts you will learn. During case study work, consider how the information will affect your own state, and participate fully.

Course Overview

FOUNDATION
1 What technologies?
2 Midland
3 Architecture & Design

- A list of technologies to use throughout the course
- How to evaluate alternatives
- System design template

THE TECHNOLOGIES
4 Information Systems
5 Connecting Information Systems
9 Sensors, Communications, Control
10 Technology Apps for Carrier Ops

- Rudimentary understanding of the technologies
- Exposure to alternatives & issues
- Network template

APPLYING THE TECHNOLOGIES TO:
6 Credentials Administration Problems
11 Electronic Screening Problems
12 Safety Administration Problems

- Goals
- Process changes & technologies
- Evaluating alternatives
- Exposure to using the templates

13 Pulling it All Together
14 Questions & Wrap Up

- It all makes some sense
- The workshop process and workshop series

Course Overview

- This slide shows how the course is structured.
- Major sections of the course are grouped into boxes.
- The strategy is to lay the foundation, then introduce some technologies, then apply those technologies to real problems. Then more technologies are introduced, followed by more applications to problem areas.
- At the end, we pull it all together in Module 13 and 14.

Course Agenda - Day 1

0 Course Introduction (33 min)

1 What Technologies? (15 min)

2 Facts about Midland (Case Study) (40 min)

3 Architecture & Design (63 min)

The Technologies, part 1

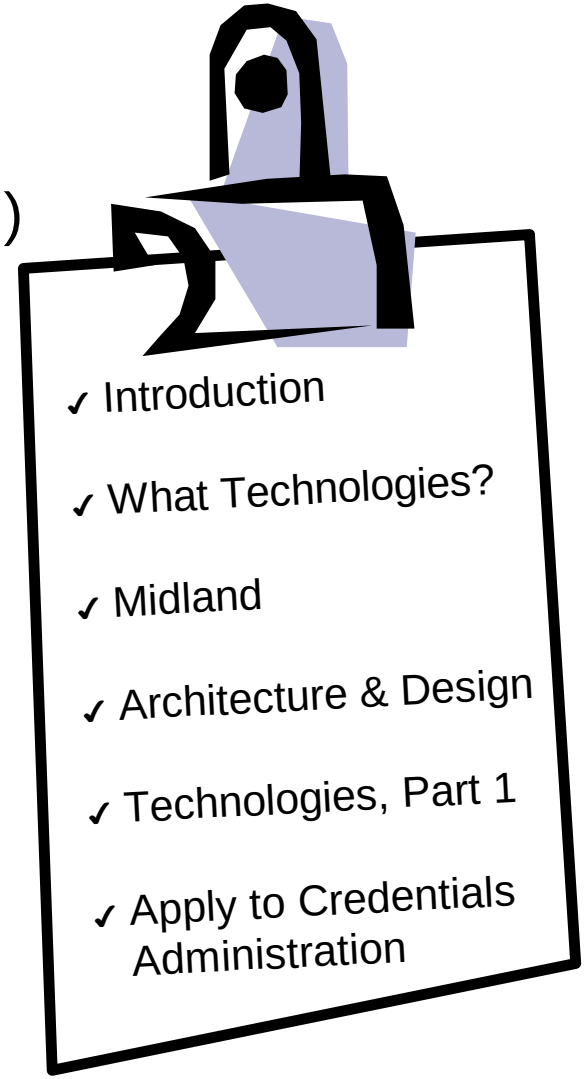
4 Information Systems (99 min)

5 Connecting Information Systems to Each Other & to Users (95 min)

Applying the Technologies

6 Applying the Technologies to Credentials Administration Problems (55 min)

7 Day 1 Wrap-Up (10 min)



Course Agenda - Day 1

0. Introductions

a. Instructor introduction
b. Course purpose and other elements of training program
c. Housekeeping
d. Trainee introduction & expectations
e. Course materials
f. Agenda
g. Business process re-engineering

1. What are the ITS/CVO technologies?

Set the expectations for the technologies the course will address

2. The facts about Midland (Case Study)

a. Refresher: Midland Case Study - map, organizations, facts, issues, scenarios
b. What technologies might help Midland?
c. Which technologies are "best" for Midland?

3. Architecture & design

a. National ITS Architecture
b. CVISN & IBC Architectures
c. Architecture ➡ Top-Level Design
d. What technologies apply where
e. Standards that apply to ITS/CVO
f. Drawing a design template for Midland

4. Information Systems

a. What is an information system?
b. System development example
c. System demonstration: CAT
d. System development issues

5. Connecting Information Systems to Each Other and to Users

a. Overview
b. Networks
c. Using the Internet to reach users
d. EDI
e. Issues
f. A concrete example: Midland – improving connectivity

6. Applying the technologies to Credentials Administration Problems

7. Day 1 Questions & Wrap-up

Course Agenda - Day 2

8 Goals for Day 2 (5 min)

The Technologies, part 2

9 Sensors, Communications, Control (80 min)

10 Technology Applications for Carrier Operations (35 min)

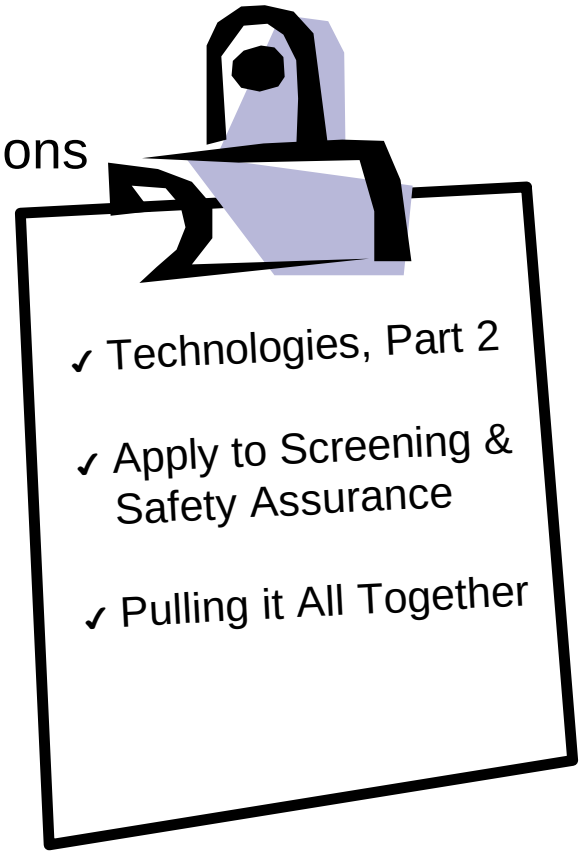
Applying the Technologies

11 Applying the Technologies to Screening Problems (52 min)

12 Applying the Technologies to Safety Assurance Problems (50 min)

13 Pulling it All Together (123 min)

14 Day 2 Wrap-Up (29 min)



Course Agenda - Day 2

8. Goals for Day 2

9. Sensors, Communications, Control

a. Sensor technology

b. Control technology (algorithms like ISS, automatic signing)

c. Communications technology

d. Issues – putting the technologies together

e. A concrete example: instrumenting Midland's Scrunch Alley

10. Technology Applications for Carrier Operations

a. Overview of existing & emerging technologies

b. Carrier/state ITS partnerships

11. Applying the Technologies to Screening Problems

12. Applying the Technologies to Safety Assurance Problems

13. Pulling it All Together

a. A common process

b. Describing existing design

c. New operational concepts

d. Establish templates

e. Operational scenarios

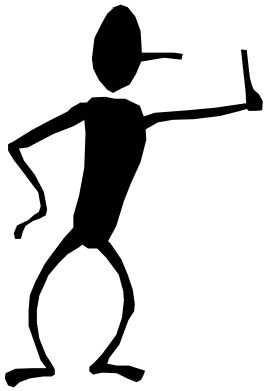
f. Interfaces

g. System change summary

h. Issues

14. Questions & Wrap-up

Not covered, but important!



Before looking to technology for answers to CVO problems,

- Understand the problems
- Evaluate the underlying processes
- Re-engineer the business processes, if necessary

This course is about understanding the technologies.
But don't forget to understand and assess the business processes, too!

Not covered, but important!

- This course focuses on the technologies used in ITS/CVO. It does not address the business process reengineering (BPR) which should accompany any discussion of significant change.
- Typical Steps in business process reengineering
  - Organization asks itself:
    - Why do we do what we do
    - Why do we do it the way we do
  - Organization determines how to fix the basic business processes
  - Organization evaluates how technologies can be applied to help
- The ITS/CVO Mainstreaming Initiative focuses on business planning

Recap and Questions

- Purpose and scope of the course
- Course Agenda
- Housekeeping

Any questions?

1. The Technologies

UNDERSTANDING ITS/CVO TECHNOLOGY APPLICATIONS

Student Manual

MODULE 1 - WHAT ARE THE ITS/CVO TECHNOLOGIES?

US Dept of Transportation

Learning Objectives

You will be able to:

- Identify several ITS technologies

Module Structure

- ITS technologies
- Recap & Questions

Recall the program areas from the Introduction to ITS/CVO course . . .

Program Areas

Safety Assurance	Credentials Administration	Electronic Screening	Carrier Operations
• Access to driver, vehicle, and carrier information on inspections and accidents • Automated inspections and reviews • On-board safety monitoring	• Electronic credentialing • Clearinghouses • Interagency data exchange • Interstate data exchange	• Automated weight and credentials screening • International electronic border clearance	• Fleet and vehicle management • Traveler information systems • Hazardous Materials incident response

CVISN Architecture (Technical Infrastructure)

Mainstreaming (Organizational Infrastructure)

In this course . . .

- We focus on the ITS/CVO technologies
- And then look at which of those technologies help address problems in each program area

What are the technologies?

- *Technology* = the application of science and/or engineering, especially to industrial or commercial objectives.
- Brainstorming Exercise:

  What are the technologies involved in ITS/CVO?

  Think of the different components/kinds of information systems, networks, and sensors.

  - Computers
  -
  -
  -
  -

What are the technologies?

- Different technologies are used to address different problems
- In the National ITS Architecture, they divided the ITS/CVO technologies into these categories: Information Management, Sensors, Location Determination, Algorithms, Communications, User Interfaces, Control

Definitions modeled after those found in American Heritage College Dictionary, third edition, 1993, Houghton Mifflin Co.

What technology applications does this course cover?

Information Systems

Photo courtesy of Micron Electronics

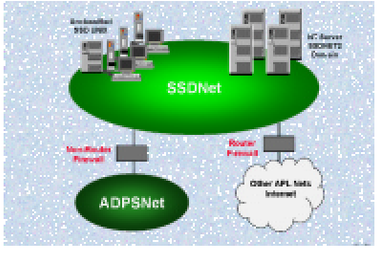
DATABASES

Sensors, Communications, Control

JHU/APL Photo

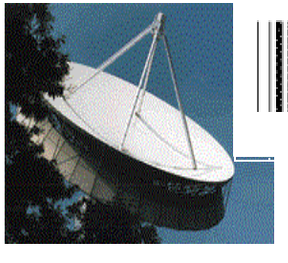
JHU/APL Photo

Connecting Information Systems



Carrier ITS Technology

Smartcard photo courtesy of IBC



What technology applications does this course cover?

The focus is on existing technology applications actually being used

- In Information Systems

  Databases, computers, software, GUIs

- To Connect Information Systems to each other and to Users

  Networks and protocols, information exchange standards (Electronic Data Interchange), Internet

- Sensors, Communications, Control at the roadside

  WIM, AVC, tracking loops, DSRC, Sensors, ISS, automatic signing

- By Carriers

  Bar codes, smart cards, DSRC, GPS, dead reckoning, on-board computers, cell phones, pagers, EDI

Recap & Questions

Objectives . . .

- Identify several ITS technologies

Any Questions?

3. Architecture & Design

UNDERSTANDING ITS/CVO TECHNOLOGY APPLICATIONS

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MODULE 3 - ARCHITECTURE & DESIGN

US Dept of Transportation

Learning Objectives

You will be able to:

- Identify the CVO-unique subsystems in the National ITS Architecture
- Identify 2 standards that apply to ITS/CVO
- Describe the CVISN and IBC architectures
- Draw a design template

Module Structure

- National ITS Architecture
- CVISN & IBC Architectures
- Architecture ➡ Top-Level Design
- What technologies apply where
- Standards that apply to ITS/CVO
- Drawing a design template for Midland

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

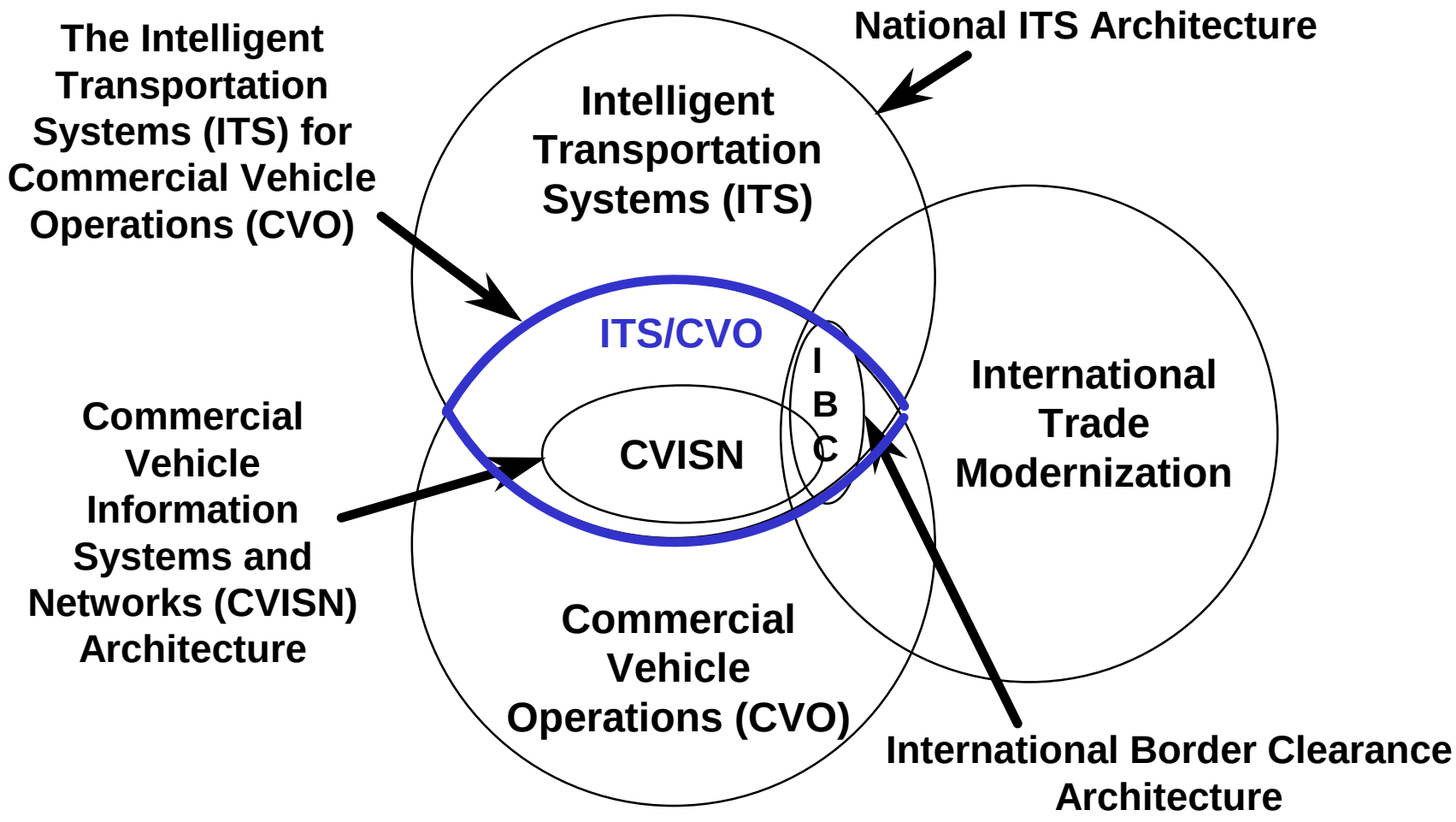
The architecture defines:

- 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.

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

- Architecture provides a common framework upon which systems can be developed, modified, or refined.
- Using a common framework makes it easier to communicate with your peers to exchange ideas.
- The architecture identifies where standards are needed to support interoperability between systems and jurisdictions.

The ITS/CVO architecture is part of the National ITS Architecture



Relationships among the architectures

National ITS Architecture

The common framework for interoperability adopted by the Secretary, and which defines the functions associated with ITS user services; the physical entities or subsystems within which the functions reside; the data interfaces and information flows between physical subsystems; and the communications requirements associated with the information flows. The ITS/CVO elements are a subset of the National ITS Architecture.

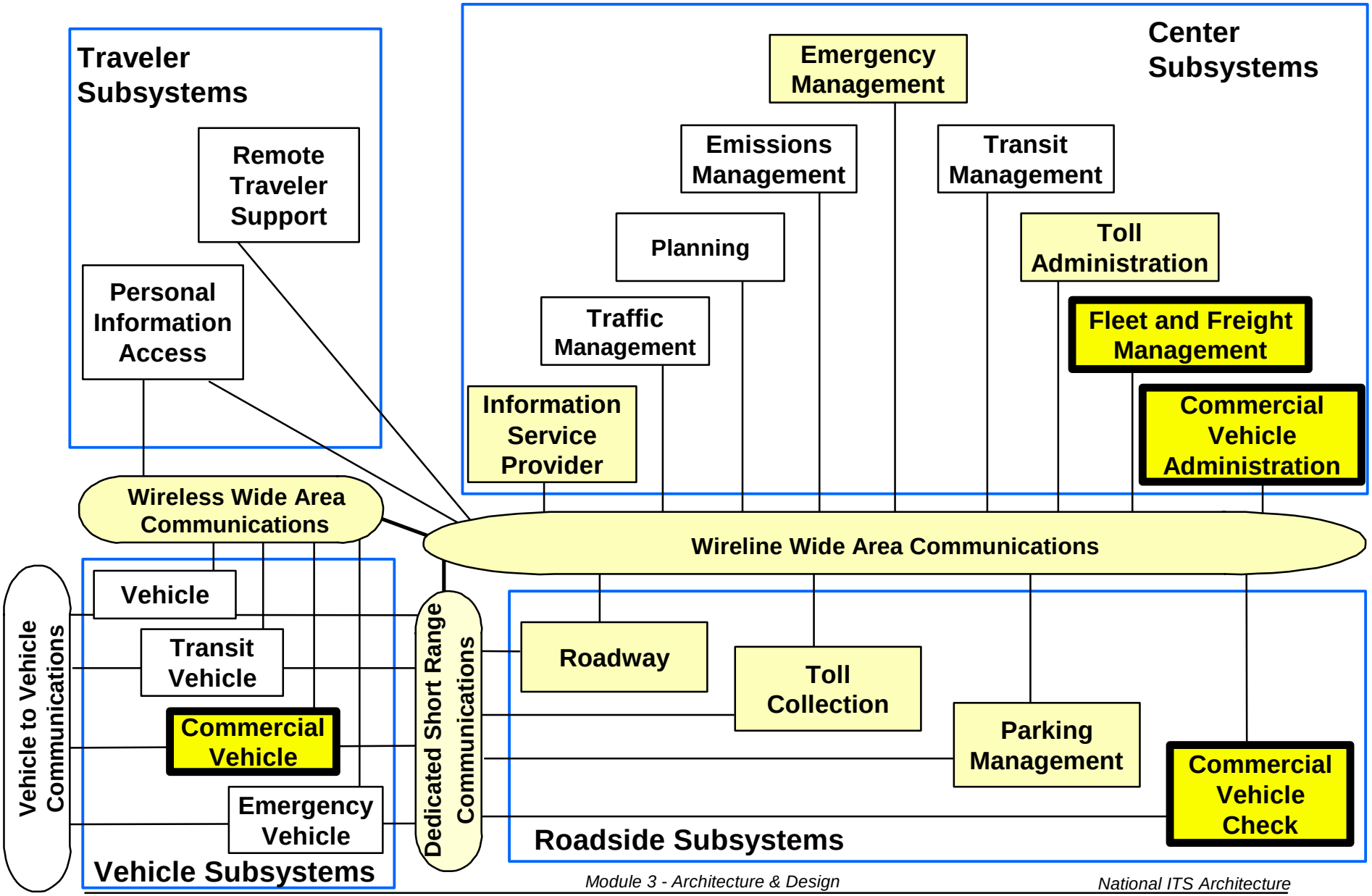
CVISN Architecture

The ITS/CVO information systems and networks portion of the National ITS Architecture. The CVISN Architecture documentation begins with the National ITS Architecture and adds more detail in some areas (e.g., operational concepts and the Electronic Data Interchange (EDI) message requirements) to facilitate further development.

International Border Clearance Architecture

The commercial vehicle border crossing portion of the National ITS Architecture. The structure and unifying design characteristics of an IBC Architecture will permit electronic clearance of commercial motor vehicles at North American land border crossings. This architecture addresses both transportation and non-transportation stakeholders in the IBC community.

This version of the national ITS architecture subsystems interconnect diagram highlights the CVO subsystems



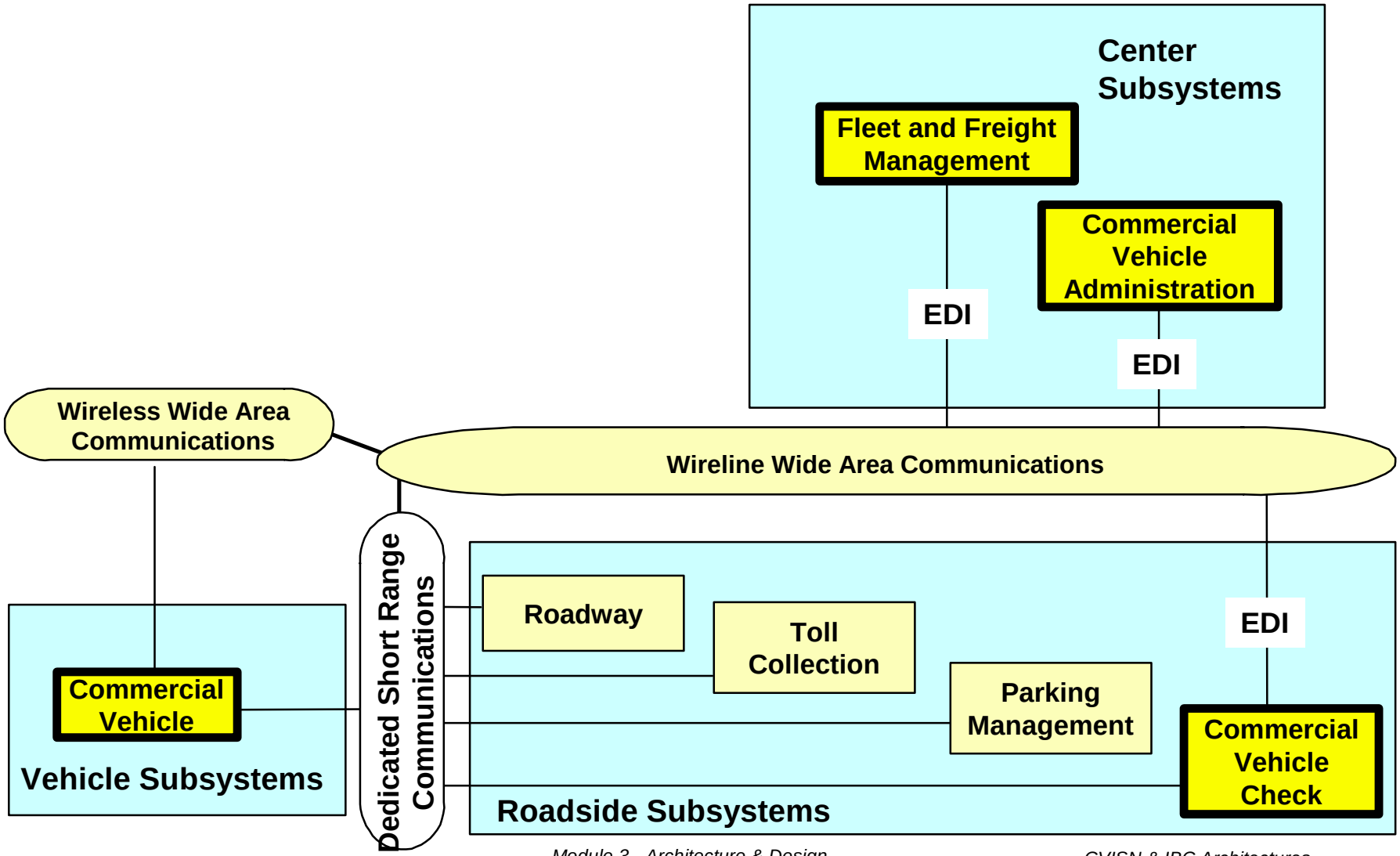
National ITS Architecture Subsystems Interconnect Diagram

- 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 shaded and those which interface with the CVO-unique elements are shown with thick borders.

- 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 their 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, Roadside Subsystems, and Vehicle Subsystems.**

The CVISN architecture connects subsystems via a combination of EDI and DSRC interface standards



CVISN Architecture Subsystems

- This figure focuses on the ITS subsystems that support Commercial Vehicle Operations (CVO). The subsystems shown with thick borders are unique to CVO. The other boxes contain functions that support CVO and as well as other transportation elements.
- The diagram highlights **two interface types critical to the CVO portion** of ITS: **DSRC** (Dedicated Short Range Communications) and **EDI** (Electronic Data Interchange).
- **DSRC** will occur via a transponder (tag) on the vehicle that is read from and written to by a roadside reader. The tag supplies screening data, safety data, and HazMat flags unique to CVO.
- **EDI** transactions, as defined by ANSI Accredited Standards Committee (ASC) X12, will be used to communicate CVO-related business information among trading partners using pre-defined formats so that computers can process information such as credential applications, safety data, etc. EDI transactions are used for CVO data interfaces that must be standardized across jurisdictions.

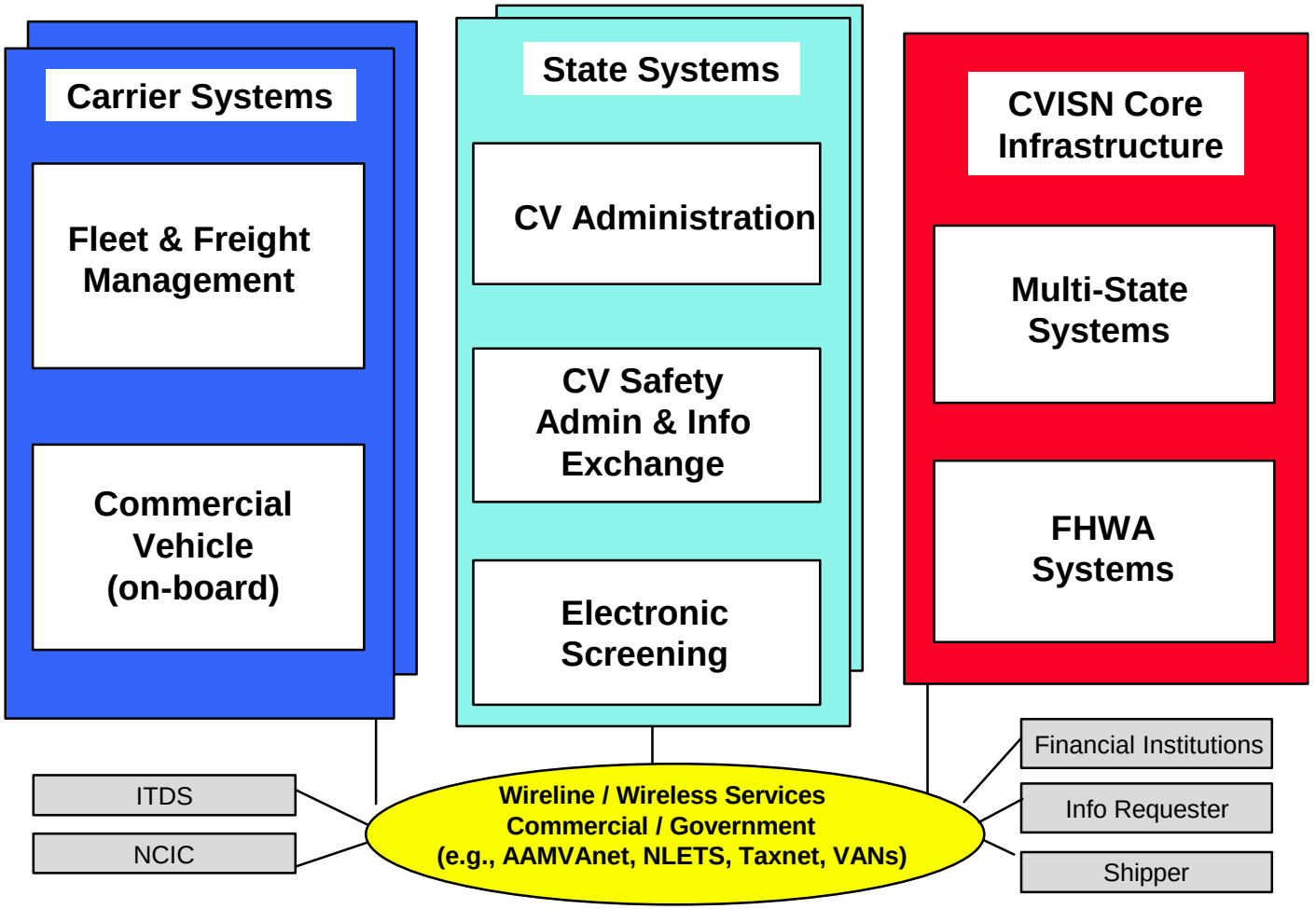
The architectures are used to drive model and final deployments

- The CVISN and International Border Crossing architectures are consistent with the National ITS Architecture.
- The CVISN Model Deployment projects and IBC Operational Tests are demonstrating the concepts, technologies, and initial deployment of the CVISN and IBC architectures. These items are emerging:
  - Interface Standards
  - Recommendations
    - Technologies
    - Operational Practices
    - Designs
  - Products
    - Infrastructure
    - Commercial
  - Interoperability Tests
- These all lead to deployment of systems that should be interoperable.

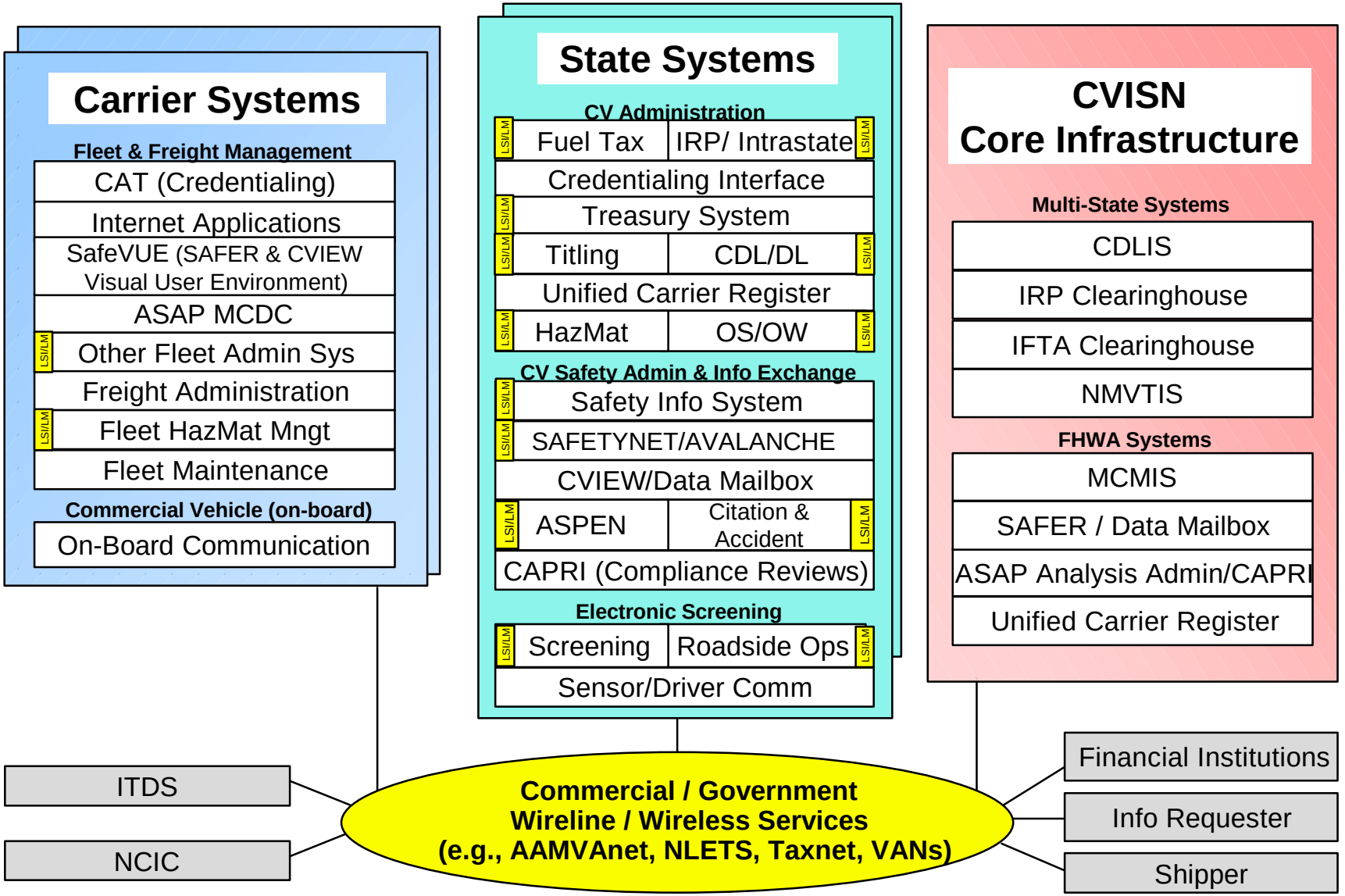
Technical documentation and products support the architectures

- Baseline from the architectures:
  - Guiding Principles
  - Operational Concepts
  - Architecture & Design
  - COACH
  - Interoperability Tests
- Baseline from the Model Deployment & Op Tests
  - Standards
  - Sample Designs, Plans, Methods
  - Vendor Products

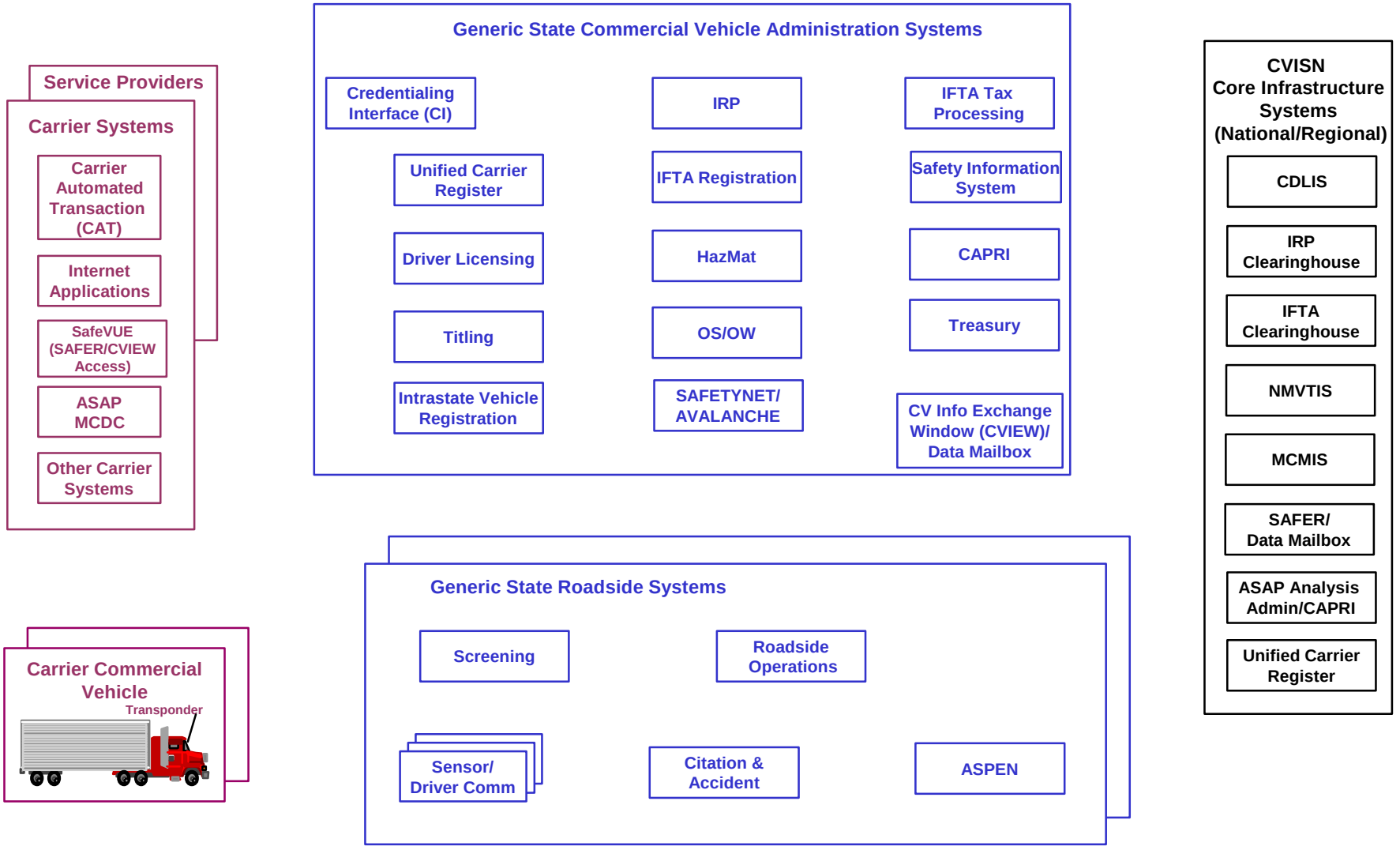
This view of the CVISN design groups elements by stakeholder category



CVISN System Design - Stakeholder View



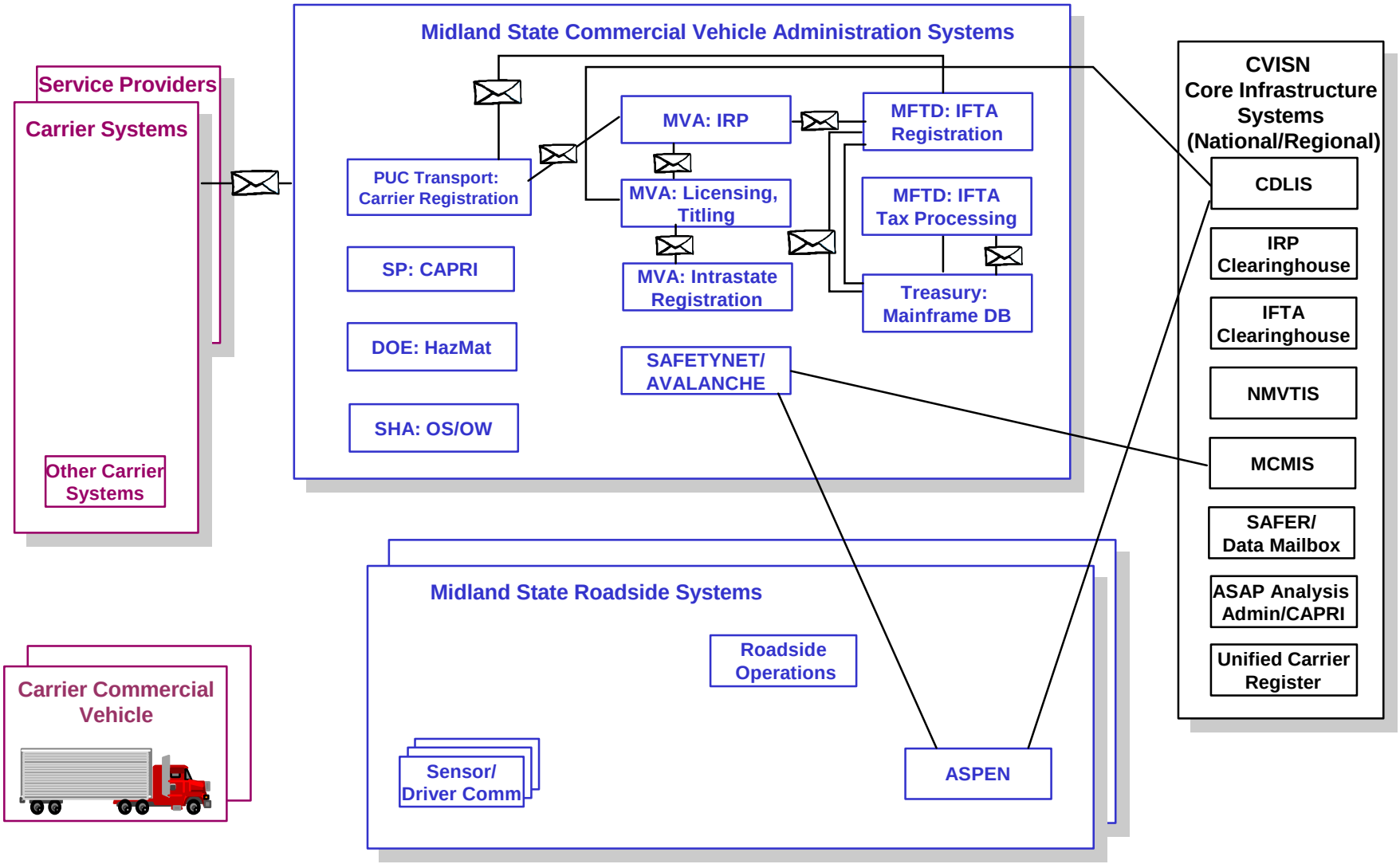
The CVISN Prototype & Pilot states successfully used this system design template



The state system design template

- This style uses a design template that shows the system elements as boxes. It has been used successfully by the CVISN prototype and pilot states.
- The template helps to identify the principal players. Managers, developers and support staff for depicted systems must be on the CVISN team if system development and deployment are to succeed.
- By connecting boxes with arrows, and numbering the arrows, the template provides the context for description of key operational scenarios.
- By connecting boxes with lines and labeling the lines, the template is also used to summarize interfaces. Accompanying tables describe the interfaces to appropriate levels of detail for specialized audiences.

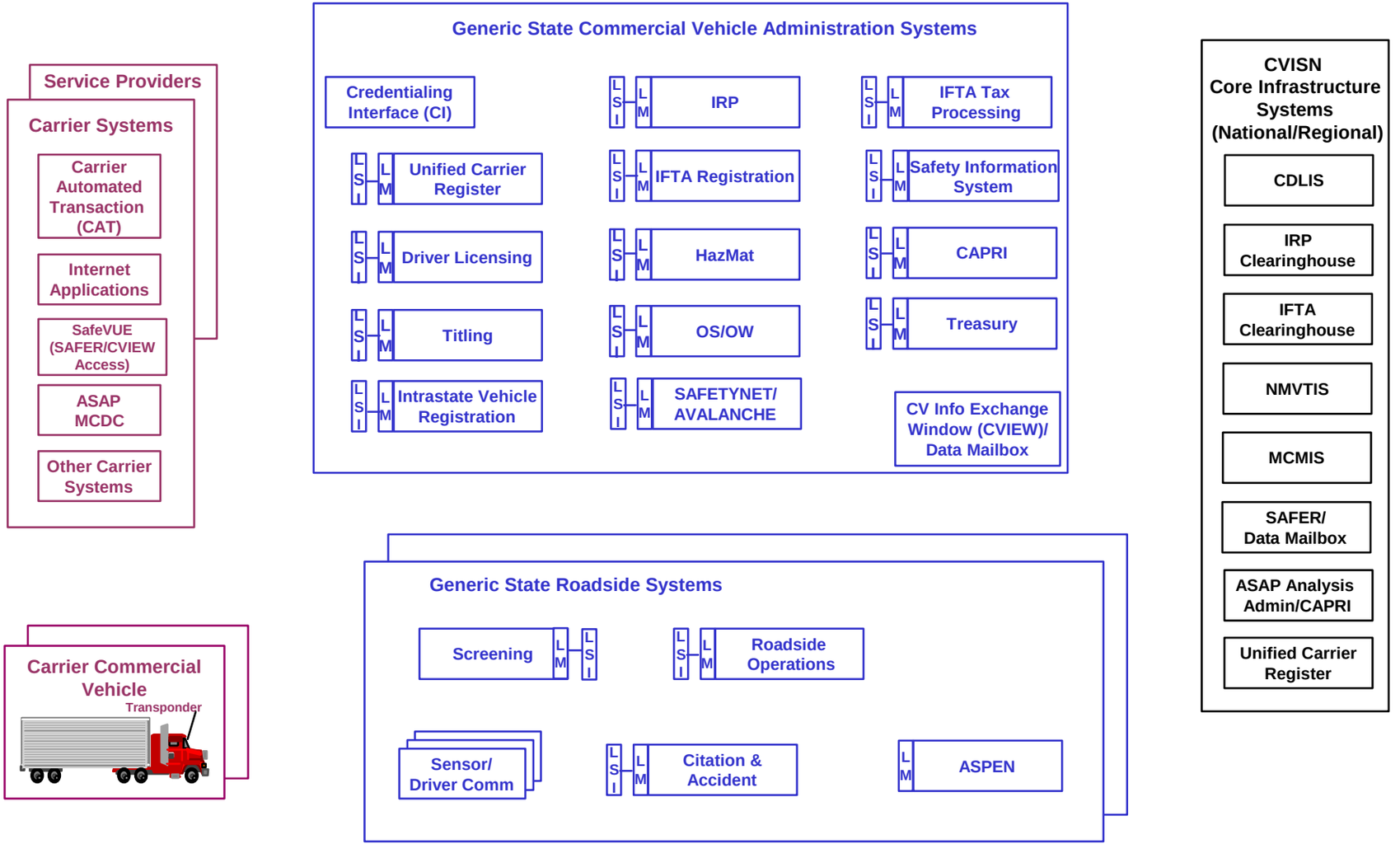
Current Midland Design - many paper interactions



Current Midland Design

- This diagram shows how Midland operates today.
- Carrier applications for credentials are handled manually, through paper forms and responses. If there are questions, either the state agency phones the applicant, or sends them a letter.
- Most administrative offices are somewhat automated, but most interaction between offices is through paper documents.
- The Treasury Database was started to support the IFTA processes, so the IFTA Registration and IFTA Tax Filing are connected directly to the database, and make updates of records online.
- Roadside inspections are reported through SAFETYNET to MCMIS.
- Licensing and ASPEN have access to CDLIS.

Each state must decide whether to modify legacy systems, or build legacy system interfaces

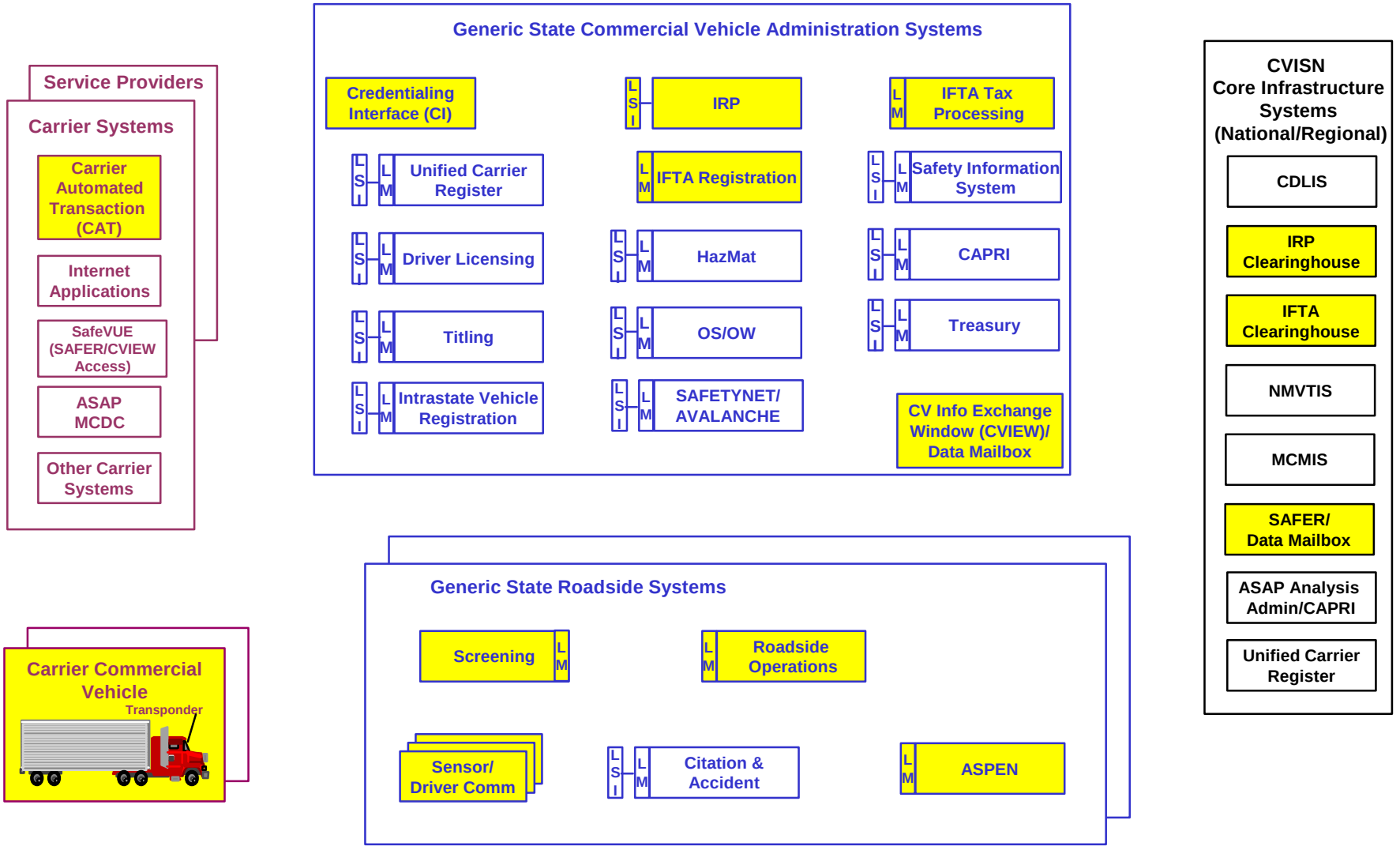


Each state must decide whether to modify legacy systems, or build legacy system interfaces

- The state chooses whether to modify the legacy system (LM - legacy modification) to support EDI (and other new functions and interfaces), or to create a Legacy System Interface (LSI) to deal with the EDI-to-native form interface.
- Many CVISN states are implementing a mix of LSIs and LMs.
- Often for credentials-related products, the LSIs are small applications running on the same computer as the Credentialing Interface.

How the system design template can be used:

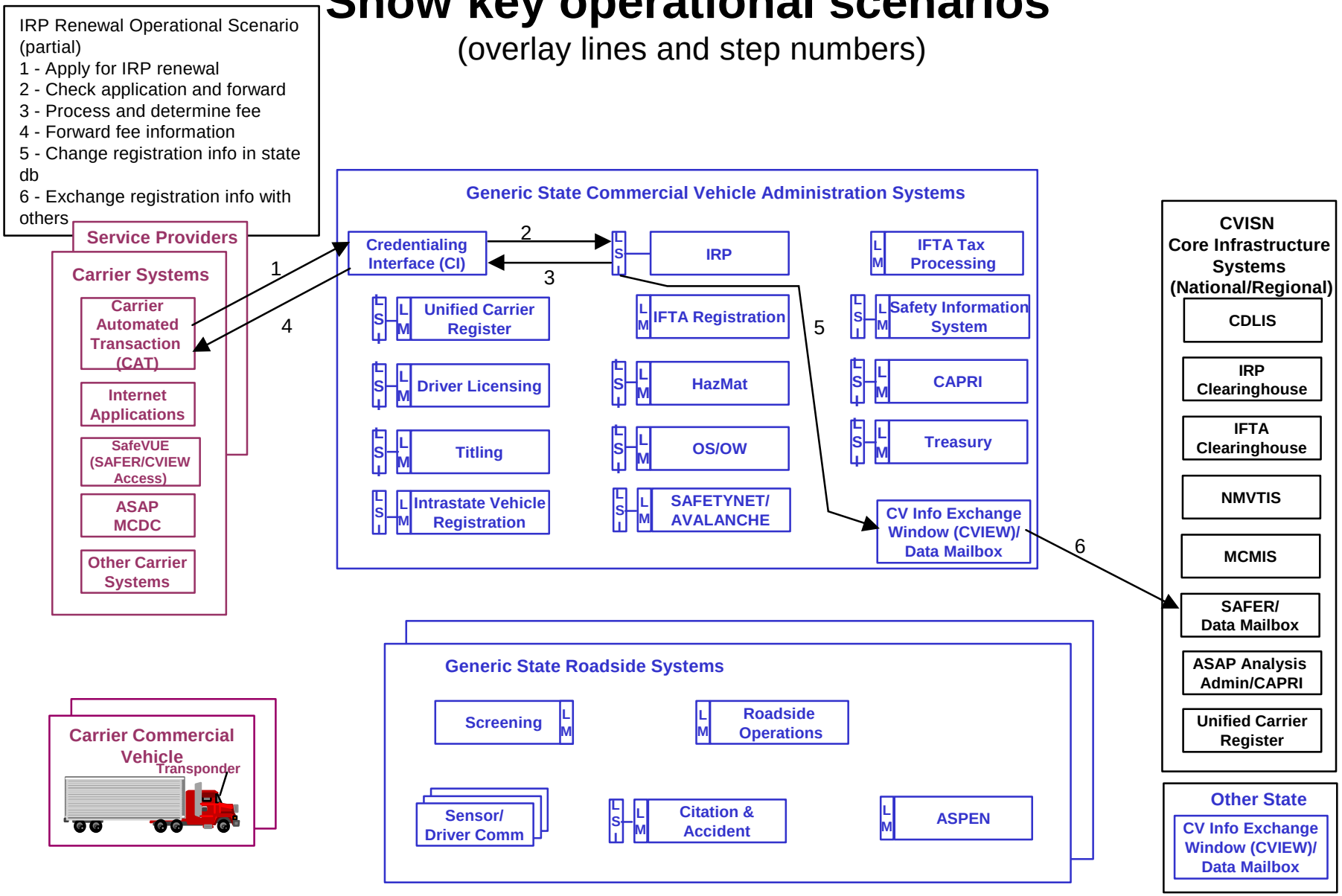
Identify the principal system elements being changed or added



How the system design template can be used:

Show key operational scenarios

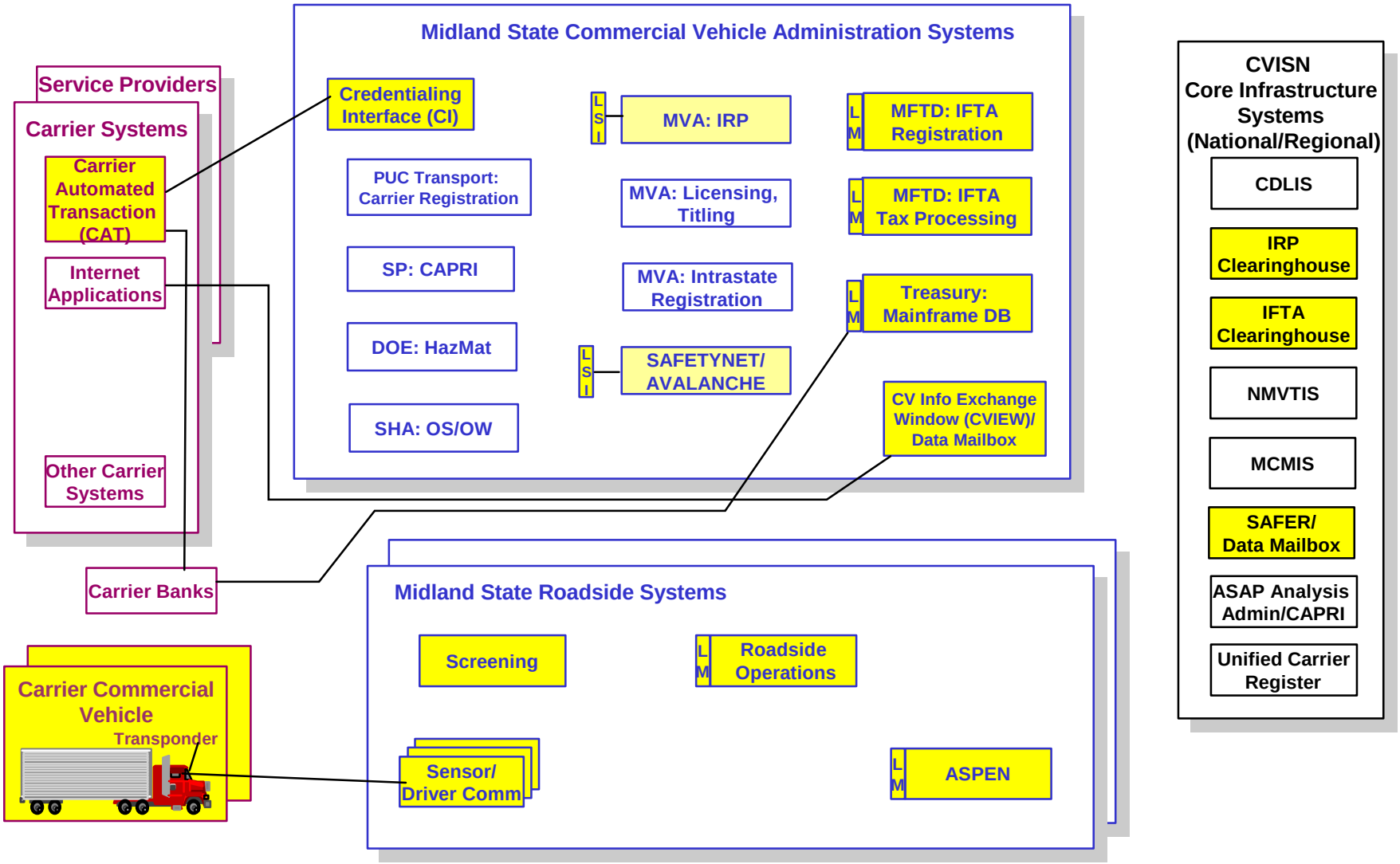
(overlay lines and step numbers)



How the system design template can be used:

Summarize interfaces

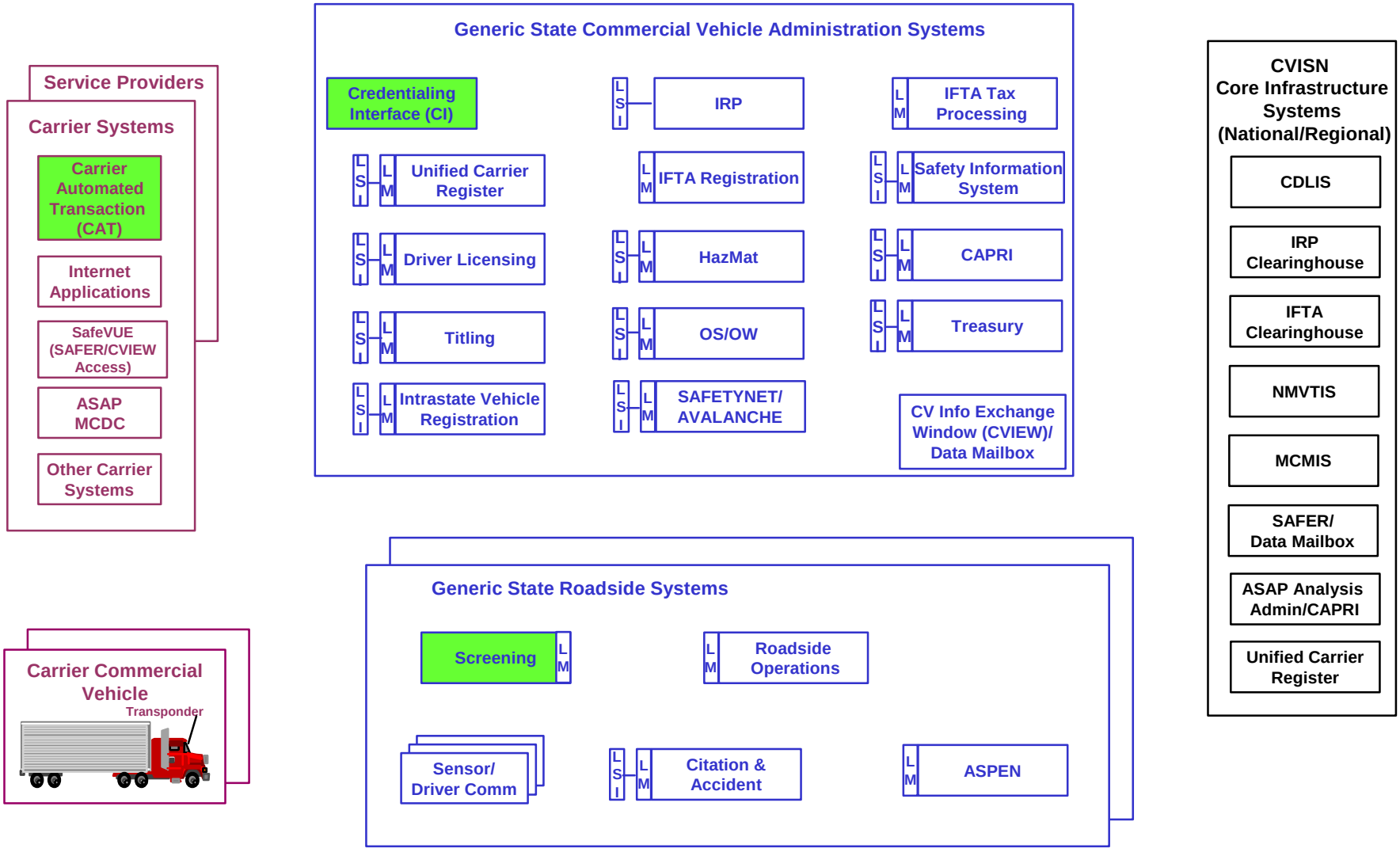
(connect the products that exchange data)



How the system design template can be used:

Communicating status

(turn boxes green as modifications are completed)

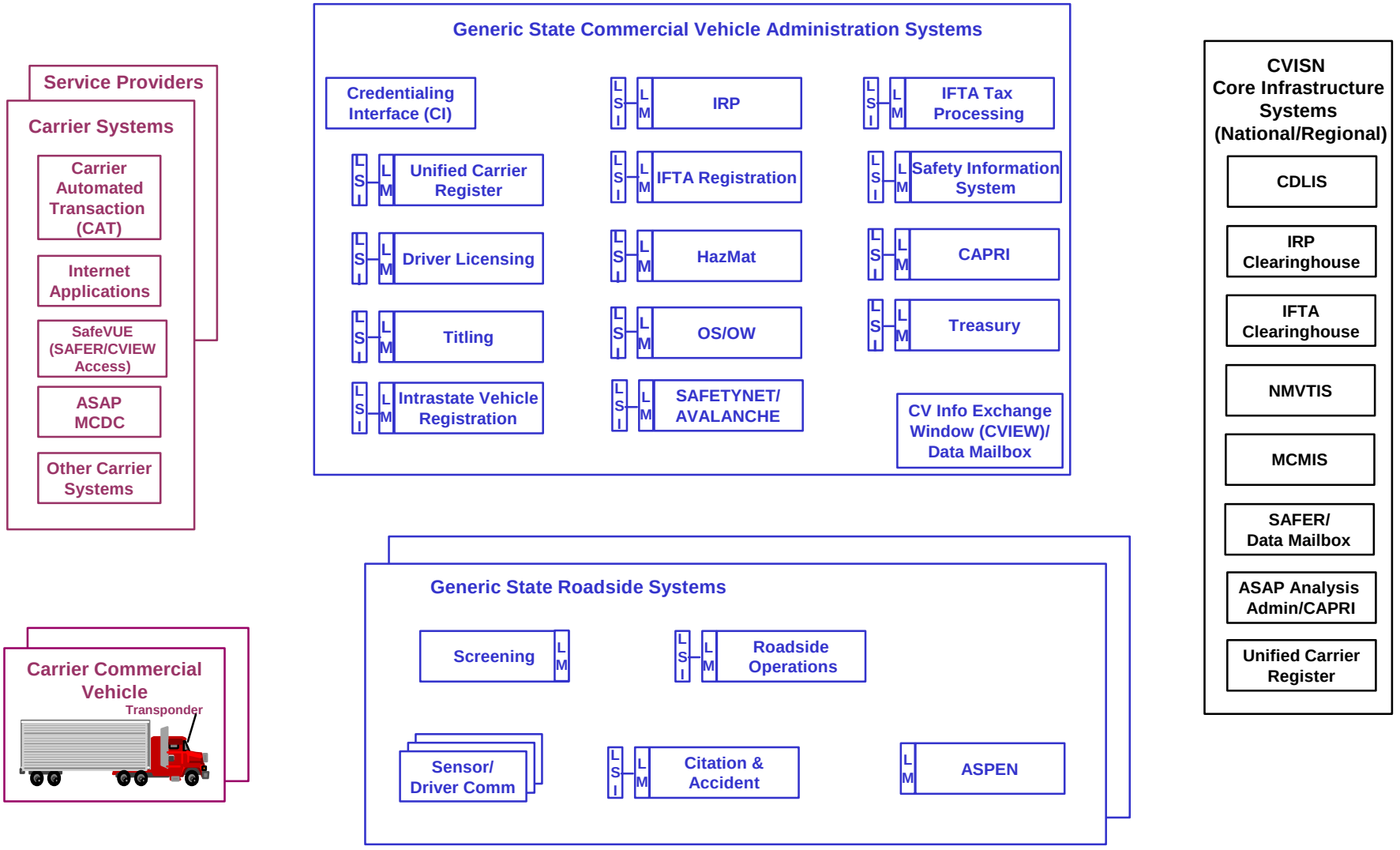


What kinds of technologies apply to the system design template, and where?

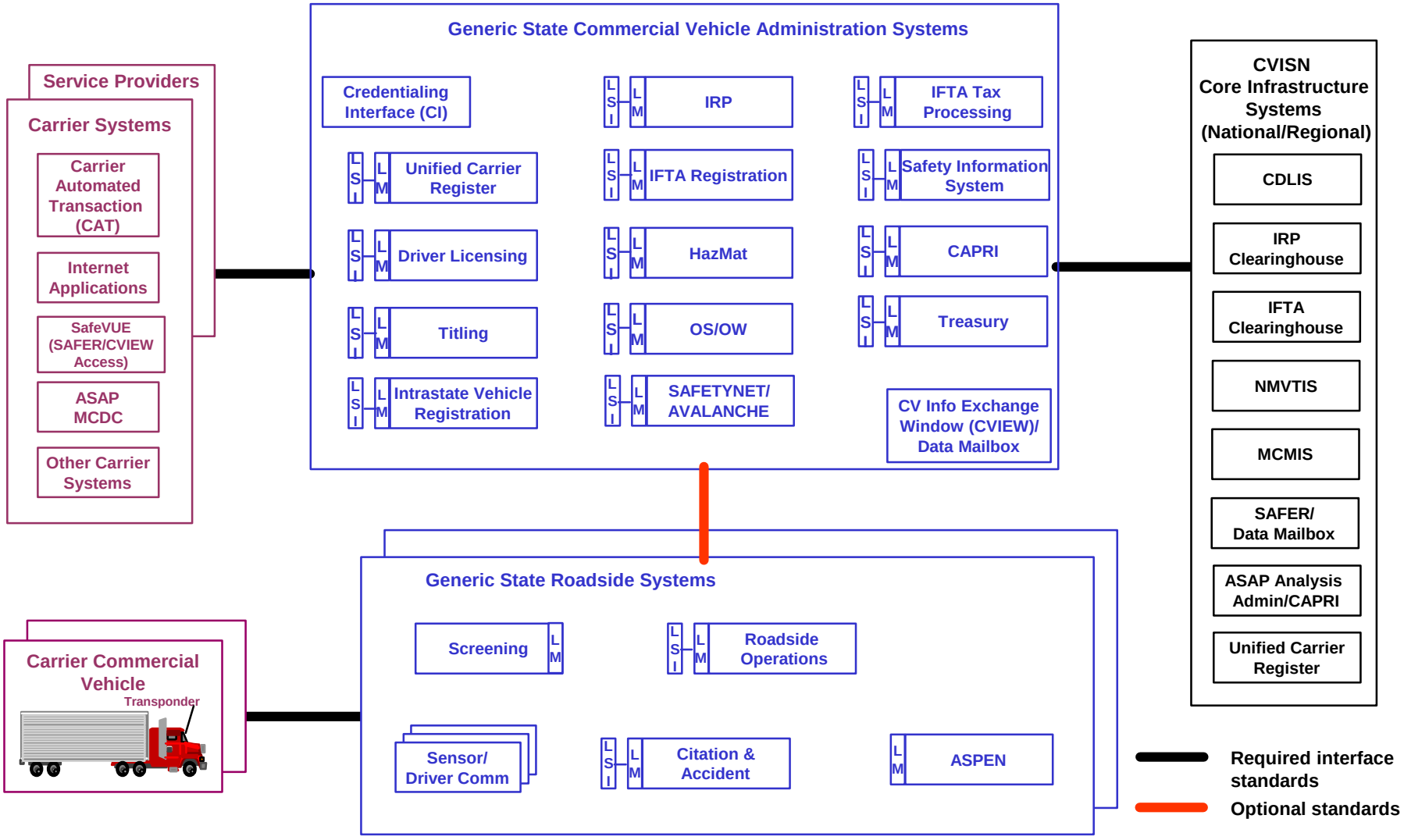
Let's look at a few kinds of technologies from the list. Which kind would you expect to find in each area on the system design template (carrier, state CV admin, state roadside, core infrastructure)?

- Information systems (e.g., computers, databases)
- Networks (e.g., LANs, WANs)
- Sensors (e.g., WIM)

What technologies will be used where?



Generally, where should interfaces be standardized?



Generally, where should interfaces be standardized?

- Why standardize? Why open standards?
- Standardize interfaces between public and private (state and carrier) entities
  - Vehicle to roadside (Dedicated Short Range Communications - DSRC)
  - Computer to computer (Electronic Data Interchange - EDI)
- Standardize interfaces between different “jurisdictions”
  - Computer to computer (EDI)
- Optionally, standardize interfaces between different agencies or products within a single jurisdiction
  - Computer to computer (EDI)

CVISN Level 1 Deployment Summary

- CVISN is the collection of information systems and communications networks that provide support to commercial vehicle operations (CVO).

- CVISN “levels” are being defined to allow definition of a specific set of capabilities that can be deployed by a state and its motor carriers. The definition of CVISN Level 1 has been baselined.

- Interface standards either exist or are being developed to support CVISN Level 1 capabilities.

Definition of CVISN Level 1 Deployment

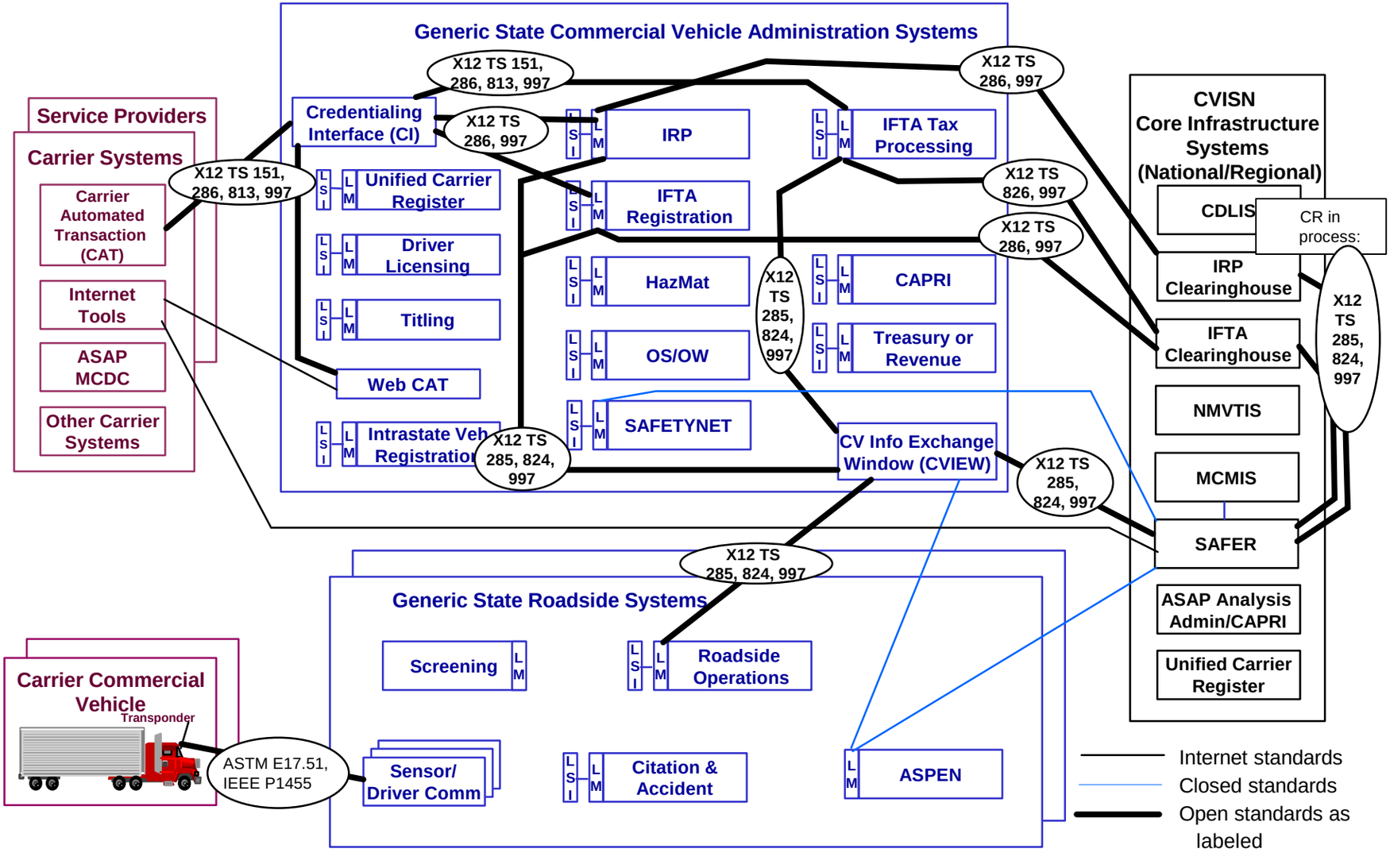
An organizational framework for cooperative system development has been established among state agencies and motor carriers.

A State CVISN System Design has been established that conforms to the CVISN Architecture & can evolve to include new technology & capabilities.

All the following elements of 3 capability areas have been implemented using applicable architectural guidelines, operational concepts, & standards:

- **Safety Information Exchange**
  - ASPEN (or equivalent) at all major inspection sites
  - Connection to SAFER
  - CVIEW (or equivalent) for snapshot exchange within state and to other states
- **Credentials Administration**
  - Automated processing (i.e., carrier application, state application processing, credential issuance) of at least IRP & IFTA credentials; ready to extend to other credentials (intrastate, titling, OS/OW, carrier registration, HAZMAT). *Note: Processing does not include e-payment.*
  - Connection to IRP & IFTA Clearinghouses
  - At least 10% of the transaction volume handled electronically; ready to bring on more carriers as carriers sign up; ready to extend to branch offices where applicable
- **Electronic Screening**
  - Implemented at a minimum of one fixed or mobile inspection site
  - Ready to replicate at other sites

CVISN Level 1 Interface Standards



CVISN Level 1 Interface Standards

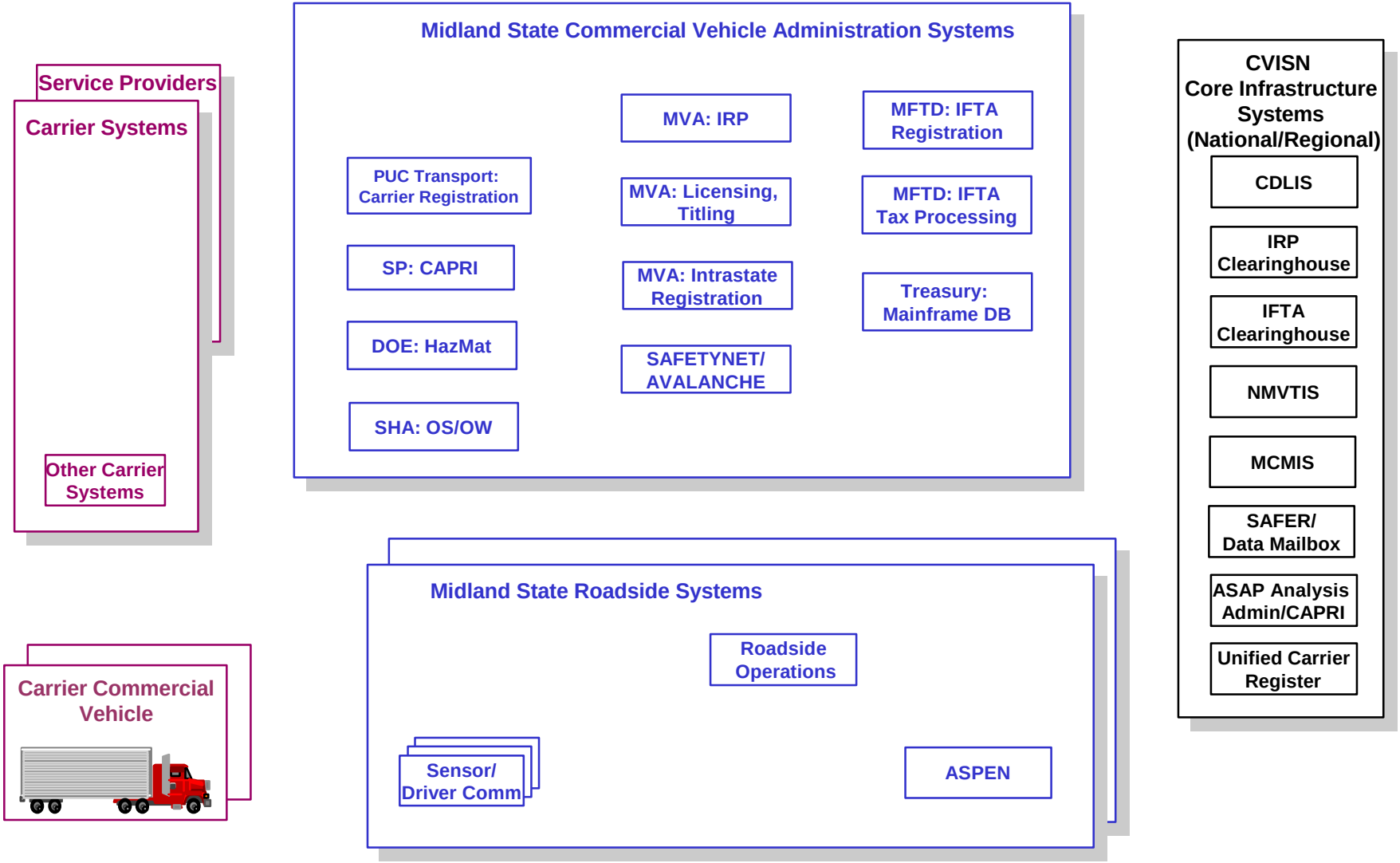
ANSI ASC X12 EDI Standard Transaction Sets

- TS 151 Electronic Filing of Tax Return Data Acknowledgement
- TS 284 CV Safety Reports (inspections)
- TS 285 CV Safety & Credentials Information Exchange (snapshots)
- TS 286 Commercial Vehicle (CV) Credentials
- TS 813 Electronic Filing of Tax Return Data
- TS 826 Tax Information Exchange
- TS 824 Application Advice
- TS 997 Functional Acknowledgement

DSRC-Related Standards

- ASTM E17.51 Physical & Data Link Layers
- IEEE P1455 Message Set

Exercise:
Update Midland's template to show new products



Update the system design template for Midland, based on these new/modified operational concepts

- Record more inspections using ASPEN.
- Report inspections electronically to MCMIS and SAFER.
- Install weigh-in-motion and electronic screening equipment at a few sites; use snapshots (safety & credentials info) to focus on higher-risk operators. Do so for both interstate and intrastate operators. (Note: SAFER handles interstate snapshots; some state system is needed for intrastate snapshots).
- Implement electronic credentialing; check safety records (via snapshots and other databases) when reviewing credential applications.
- Support electronic payment for credentials.

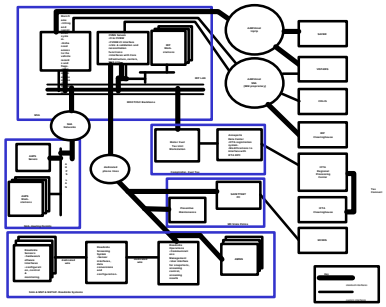
So, what do those new operational concepts imply in terms of changes to the existing information systems & networks? What new products might Midland consider?

Note that the system design template doesn't show everything . . .

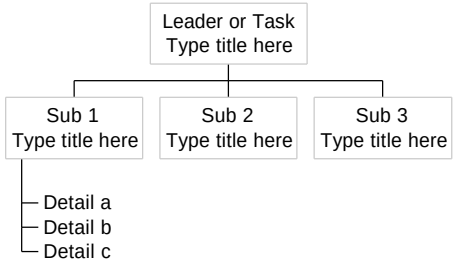
- Computer-application mapping
- Networks
- Work Breakdown Structure (WBS)
- Organizational responsibilities
- Schedule or milestones or incremental progress

Other illustrative techniques

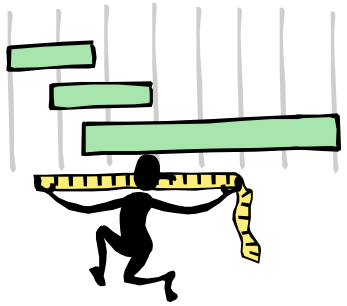
- Network diagrams are useful to show how systems connect physically, and what protocols are used for those connections



- The work breakdown structure (WBS) and organizational responsibilities are often illustrated using hierarchical charts



- Progress against the planned schedule is shown using a Gantt chart



Recap and Questions

The objectives . . .

- Identify the CVO-unique subsystems in the National ITS Architecture
- Identify 2 standards that apply to ITS/CVO
- Describe the CVISN and IBC architectures
- Draw a design template for Midland

Any questions?

11. E-Screening Applications

UNDERSTANDING ITS/CVO TECHNOLOGY APPLICATIONS

Student Manual

MODULE 11 - APPLYING THE TECHNOLOGIES TO SCREENING PROBLEMS

US Dept of Transportation

Learning Objectives

You will be able to:

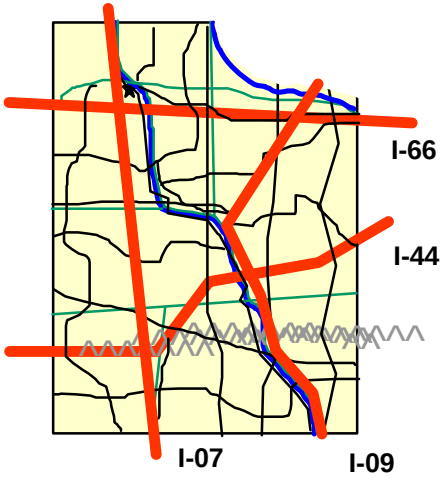
- Determine how the technologies could improve CVO screening

Module Structure

- Review the screening process and related issues in Midland today (pre-ITS)
- Exercise:
  - What improvements could Midland make?
  - What kinds of enabling technologies need to be in place to make these improvements?
  - Describe a better screening scenario, using information systems technology, DSRC, snapshots, and related interface standards. Illustrate it using the Midland system design template.
  - Describe the computer and connectivity enhancements needed to support the scenario. Illustrate using the Midland network template.

Screening in Midland today - long lines and some avoid weigh stations

- Heavy traffic sometimes closes a few existing weigh stations
- Vehicles are increasingly using bypass routes to avoid weigh stations



Screening in Midland today

- Inspections occur at all fixed CV check sites. CV check sites also weigh vehicles using static scales.

- The weigh stations have been maintained well, but not upgraded to take advantage of technology.
  - All vehicles must pull off the highway
  - All vehicles are weighed
  - Sorting for inspection is done on the ramp based on visual factors only
  - Credentials checks are done manually if and when a vehicle is inspected

- The stations closest to the agriculture and manufacturing industries are often swamped with vehicles and must close temporarily to avoid creating roadway hazards.

- The number of OS/OW permits issued has skyrocketed as existing carriers struggle to keep up with the increased demands of those with goods to move.

- Midland's neighbors are trying to improve their roadside operations using *electronic screening*.
  - Use roadside readers and vehicle-mounted transponders to identify approaching vehicles.
  - Use weigh-in-motion and automatic vehicle classification to measure critical vehicle characteristics while the vehicle is in motion.
  - To help make the pass/pull-in decision, perform quick look-ups of safety history data and credentials information available from on-line information systems.

  This process helps them focus on potential problems more effectively.

- Midland's neighbors have offered to help Midland get started in their program. The state legislature has earmarked funds to start electronic screening in Midland.

Midland's projected CVO improvements

Broad Goals:

- Improve highway safety
- Streamline credentials and tax administration
- Reduce congestion costs for motor carriers
- Ensure regulatory compliance and equitable treatment

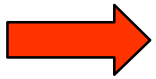
Stakeholders Cite These As Keys to Achieving the Goals:

- Technology

- Revised regulatory environment & re-engineered business practices

Recap of Midland's Issues

- Safety Assurance
  - A few carriers in 30% of all crashes
  - 11th in fatal large truck crashes
  - Scrunch Alley
  - Expand use of ASPEN



- Screening
  - Heavy traffic sometimes closes a few weigh stations
  - More commercial vehicles using bypass routes

- Credentials Administration
  - Delays
  - Pressure from carriers
  - Flat personnel budget

- Carrier Operations
  - Wide variety among carriers regarding use of technology
  - Many new carriers
  - Just-in-time deliveries

Discussion

- What kinds of improvements could your state (and Midland) make?
  - What are the outcomes you want to achieve?
  - Why do you want to achieve those particular outcomes?
  - How will you have to change existing processes and/or operational concepts to achieve these outcomes?
  - What alternatives should be evaluated?

  Note: we'll discuss the enabling technologies in a few minutes.

Discussion: Screening improvements in Midland

- Improvements? Jot down your ideas. For each, summarize the proposed improvement and for each one,
  - identify desired outcomes,
  - describe supporting changes required in your business processes or operational concepts,
  - explain why you make that recommendation, and
  - list what alternatives you should evaluate.

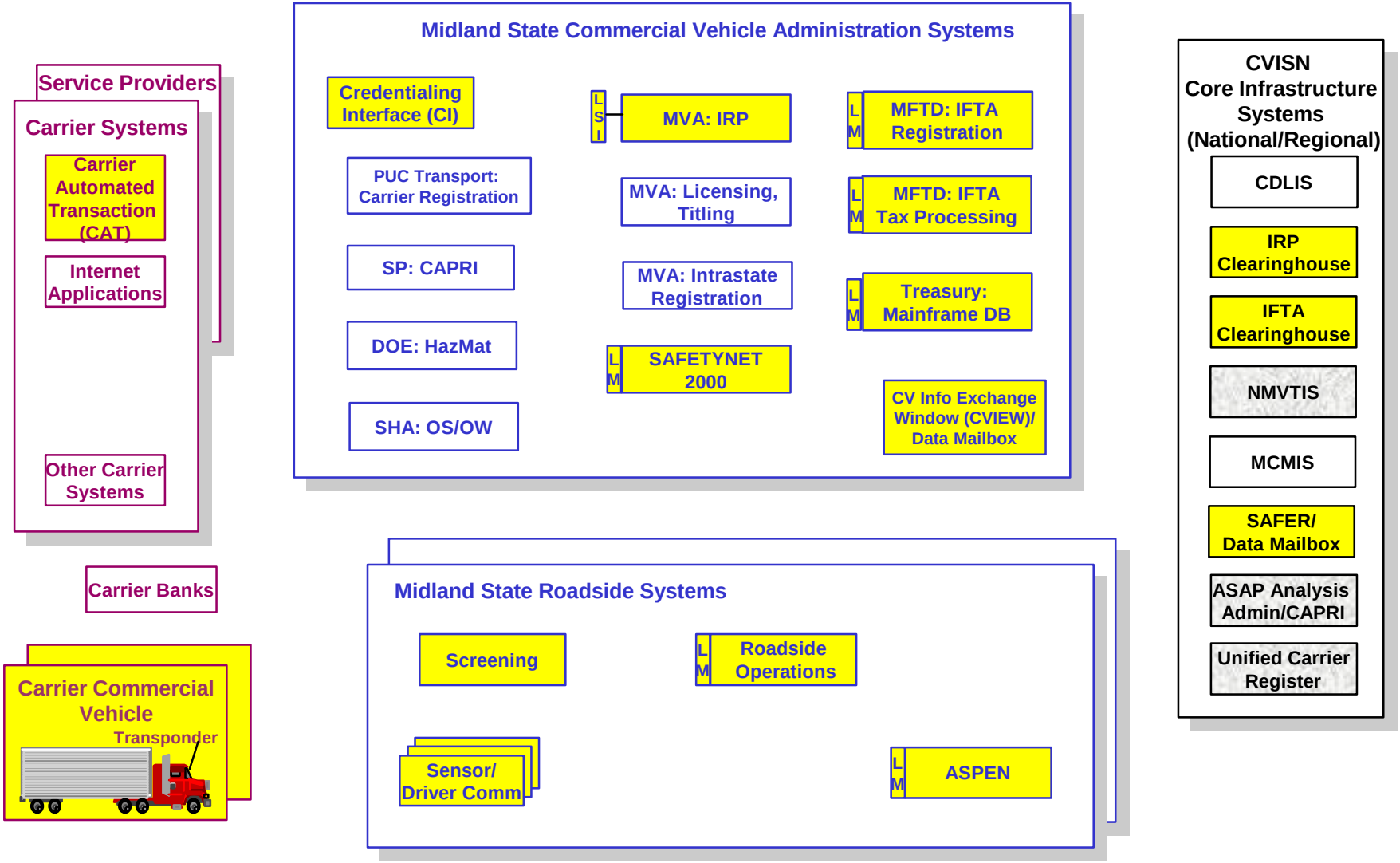
Brainstorm

- What technologies support the desired outcomes and improved processes or operation scenarios for screening in Midland?

Brainstorm

Midland's Problem Areas	Technology Areas													
Screening														

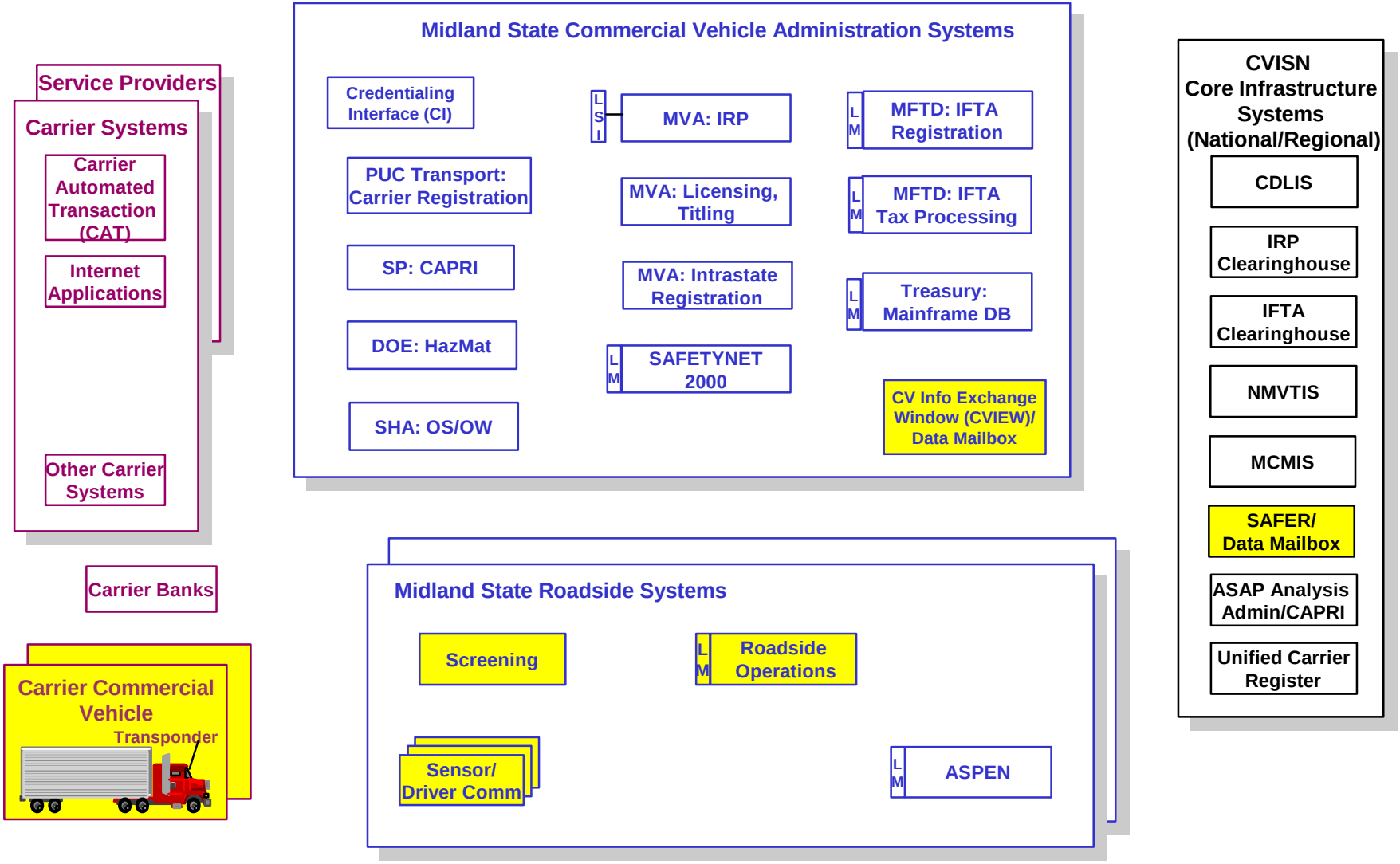
Recall the proposed Midland System Design Template



Proposed Midland Design Template

- This is the template introduced in the Architecture & Design module earlier.
- We're going to use it to illustrate a new operational scenario for screening in Midland.
- This is the same process used in the first (Scope) workshop.

Improved operational scenario:
Screen Vehicle Electronically



Screen Vehicle Electronically
List steps in scenario

1.

2.

3.

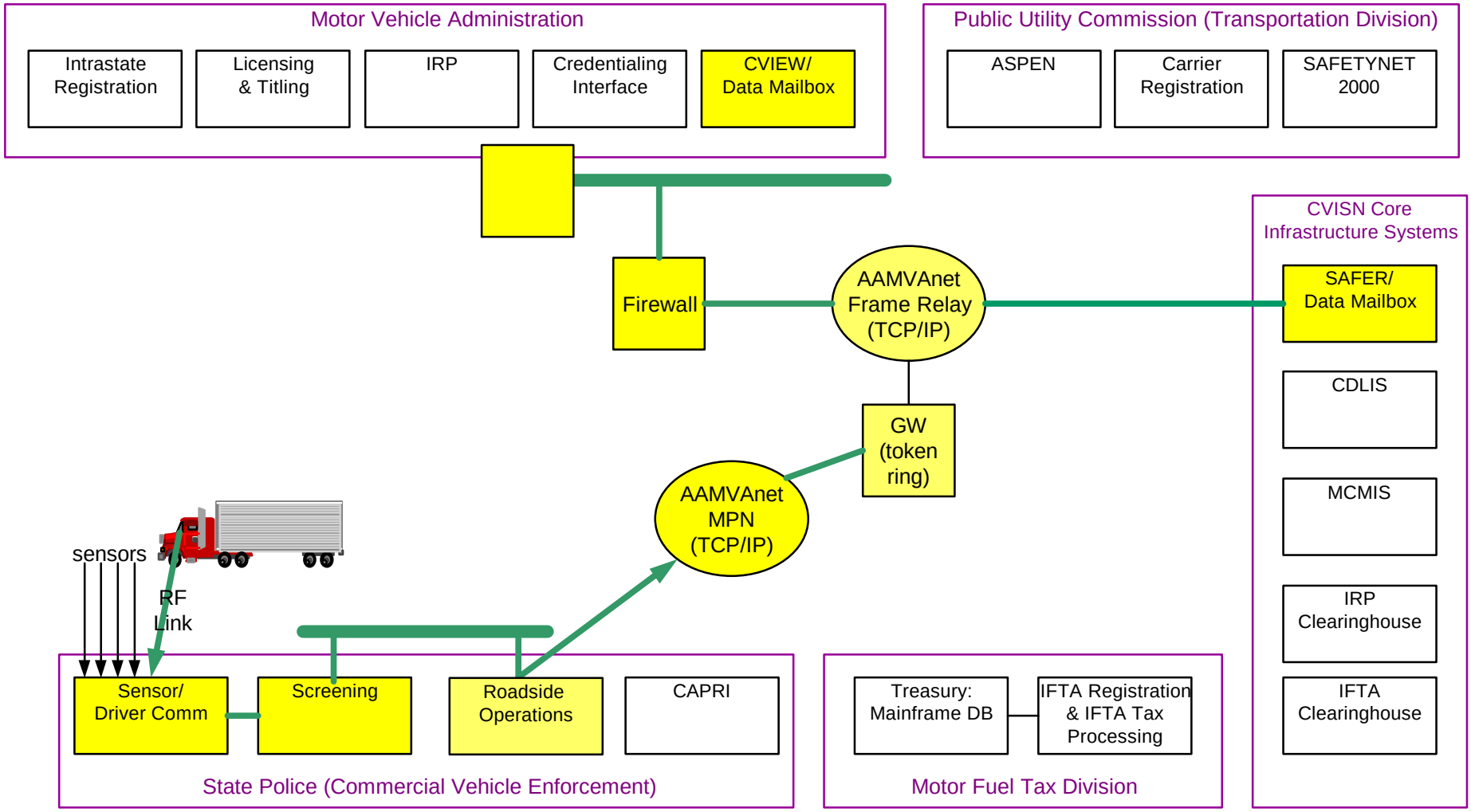
4.

5.

6.

7.

Screen vehicle electronically: Connectivity changes required



Screen vehicle electronically: Computer and connectivity changes required

New/Upgraded Computers

- CVIEW (new)
- Screening (new)
- Roadside Operations (upgraded)
- Sensor/Driver Communications (upgraded)

Connectivity Changes

- Within State:
  - ROC - CVIEW via AAMVAnet (dial-up)
- At the Roadside:
  - DSRC RF link from transponder via Sensor/Driver Communications
  - Communications between Screening and Roadside Operations
- Between State & CVISN Core Infrastructure:
  - CVIEW - SAFER via AAMVANet frame relay

Recap and Questions

The objectives . . .

- Determine how the technologies could improve CVO screening

Any questions?

12. Safety Applications

UNDERSTANDING ITS/CVO TECHNOLOGY APPLICATIONS

Student Manual

MODULE 12 - APPLYING THE TECHNOLOGIES TO SAFETY ASSURANCE PROBLEMS

US Dept of Transportation

Learning Objectives

You will be able to:

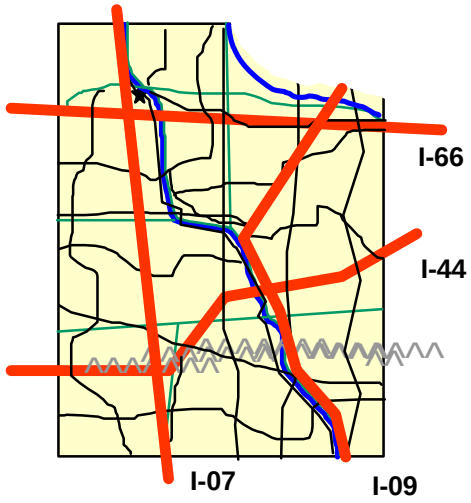
- Determine how the technologies could improve safety assurance

Module Structure

- Review safety assurance and related problems in Midland today (pre-ITS)
- Exercise:
  - What improvements could be made for safety information exchange using ASPEN, SAFER, CVIEW, and snapshots?
  - What modifications or new products should be implemented?
  - Why?
  - Where?
  - Using what technologies?
  - Use the design templates to record operational scenarios and network upgrades.

Safety assurance in Midland today - too many crashes

- A few local and interstate carriers are involved in ~30% of all the crashes in Midland
- Midland is ranked 11th in the nation with 3.5% of the fatal large truck crashes
- Study provides new insight into crash patterns in Scrunch Alley
- Aspen is used by 50% of the inspectors; want to expand



Safety assurance in Midland today

Crashes

Normally, crashes seem to be spread out fairly evenly across carriers. But Midland has found that there is a fairly small group which is involved in an inordinately high number of crashes. The vehicles are carrying a variety of goods, ranging from agricultural to manufactured products.

The number of large commercial vehicles involved in fatal crashes has been on the rise in Midland. There has been a steady increase in large truck traffic over the past few years, and a corresponding increase in fatalities. Non-fatal crashes have also increased.

Aspen

An inspection support system used on a portable computer, makes inspection reporting faster, and most inspectors want it.

Scrunch Alley

A recently completed study provides new insight about the patterns of crashes in Scrunch Alley:

- Many crashes involve trucks with poorly-balanced loads (65%)
- Many crashes occur during the first few hours of precipitation just after a long dry spell (30%)

Since so many crashes occur in this short stretch of road, Midland hopes to be able to focus efforts here to significantly improve the state-wide crash figures.

Discussion:
Safety Assurance improvements

- What kinds of improvements could your state (and Midland) make?
  - What are the outcomes you want to achieve?
  - Why do you want to achieve those particular outcomes?
  - How will you have to change existing business processes and/or operational concepts to achieve these outcomes?
  - What alternatives should be evaluated?

  Note: we'll discuss the enabling technologies in a few minutes.

Discussion:
Safety Assurance improvements

- Improvements? Jot down your ideas. For each, summarize the proposed improvement and for each one,
  - identify desired outcomes,
  - describe supporting changes required in your business processes or operational concepts,
  - explain why you make that recommendation, and
  - list what alternatives you should evaluate.

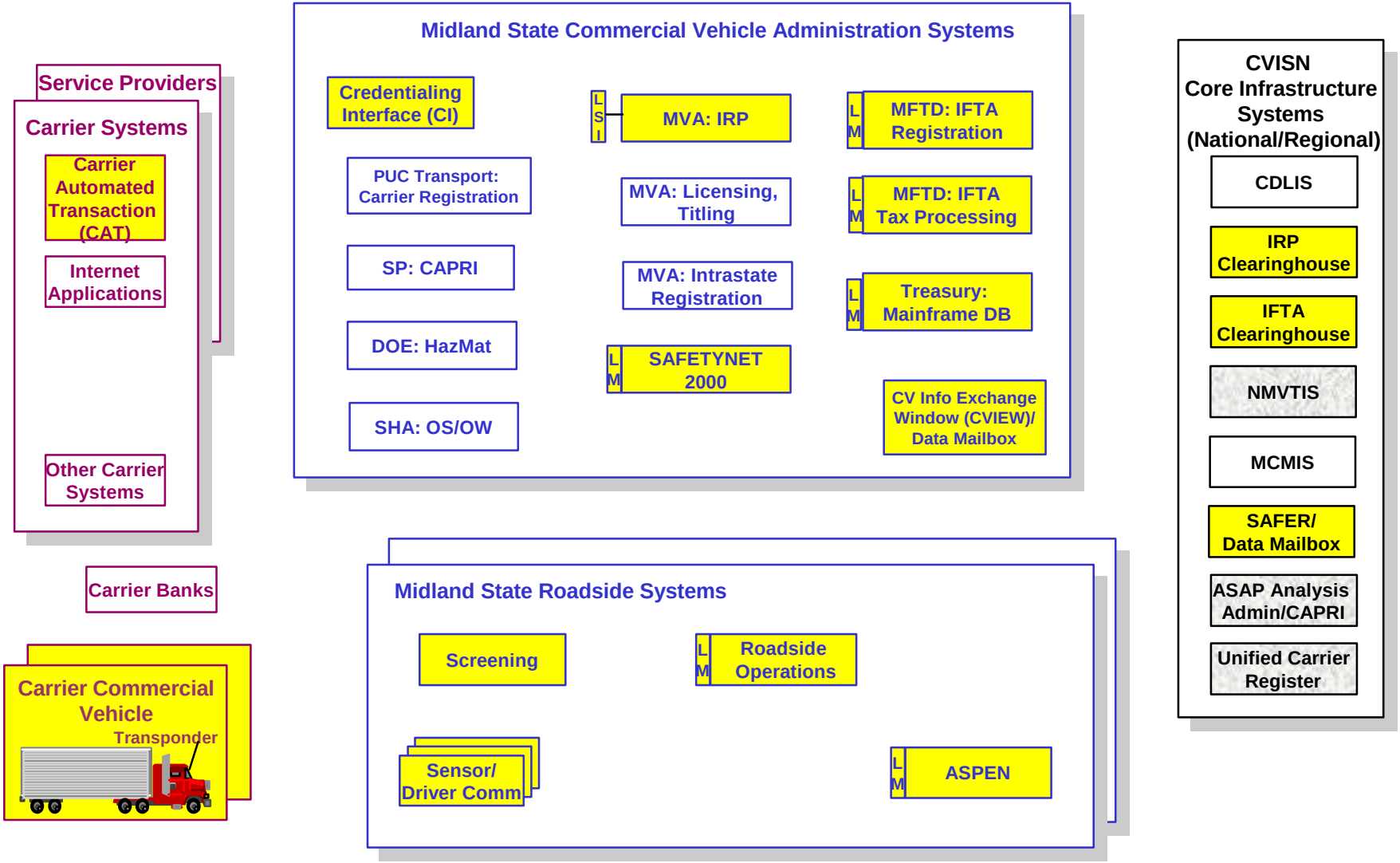
Brainstorm

- What technologies support the safety assurance-related outcomes and improved business processes/operational scenarios?

Brainstorm

Midland's Problem Areas	Technology Areas													
Safety Information Exchange/Safety Assurance														

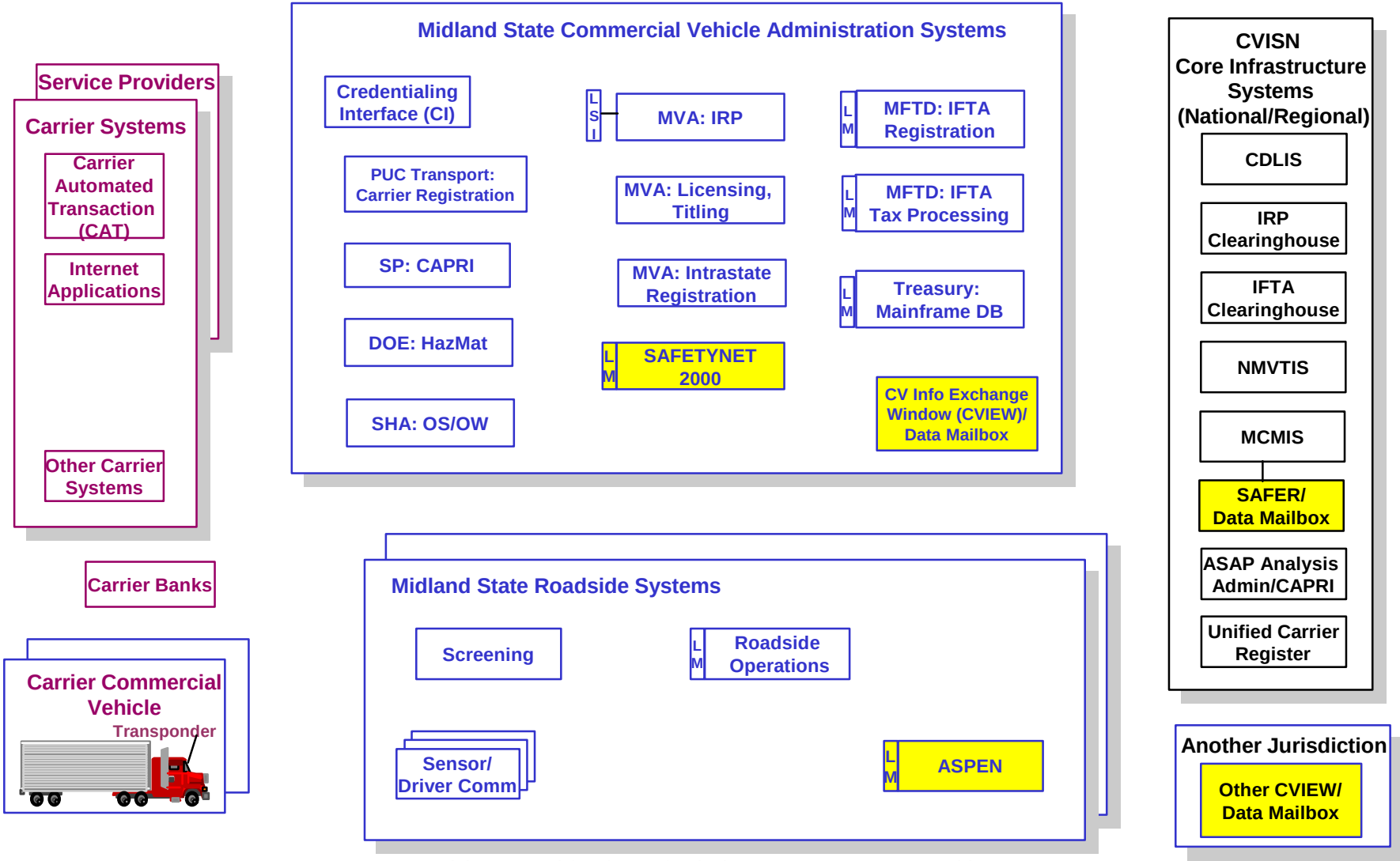
Recall the proposed Midland System Design Template



Proposed Midland Design Template

- This is the template introduced in the Architecture & Design module earlier.
- We're going to use it to illustrate an improved operational scenario for Inspection Recording & Reporting in Midland.
- This is the same process used in the first (Scope) workshop.

Improved operational scenario: Record & report inspection electronically



Record & report inspection electronically
List steps in scenario

1.

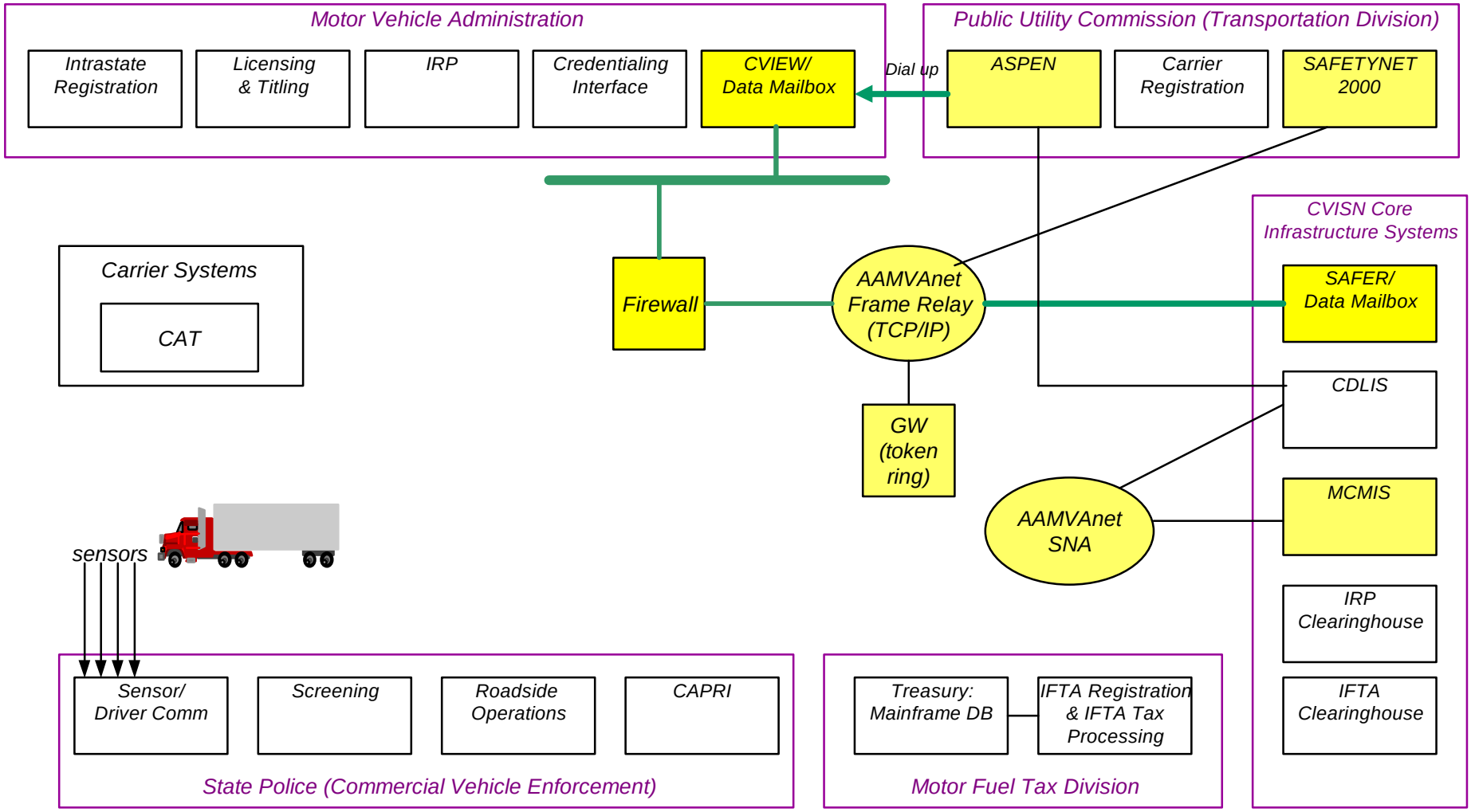
2.

3.

4.

5.

Improved inspection reporting: Computer & connectivity changes required



Improved inspection reporting: Computer & connectivity changes required

New/Upgraded Computers:

- CVIEW (new)
- ASPEN and SAFETYNET 2000 (upgraded)

Connectivity Changes

- Within State:
  - ASPEN - CVIEW via dial-up
- Between State & CVISN Core Infrastructure
  - CVIEW - SAFER via LAN and AAMVAnet (WAN)
  - SAFETYNET 2000 - SAFER via AAMVAnet

Recap and Questions

The objectives . . .

- Determine how the technologies could improve safety assurance

Any questions?

13. Pulling it All Together

UNDERSTANDING ITS/CVO TECHNOLOGY APPLICATIONS

Student Manual

MODULE 13 - PULLING IT ALL TOGETHER

US Dept of Transportation

Learning Objectives

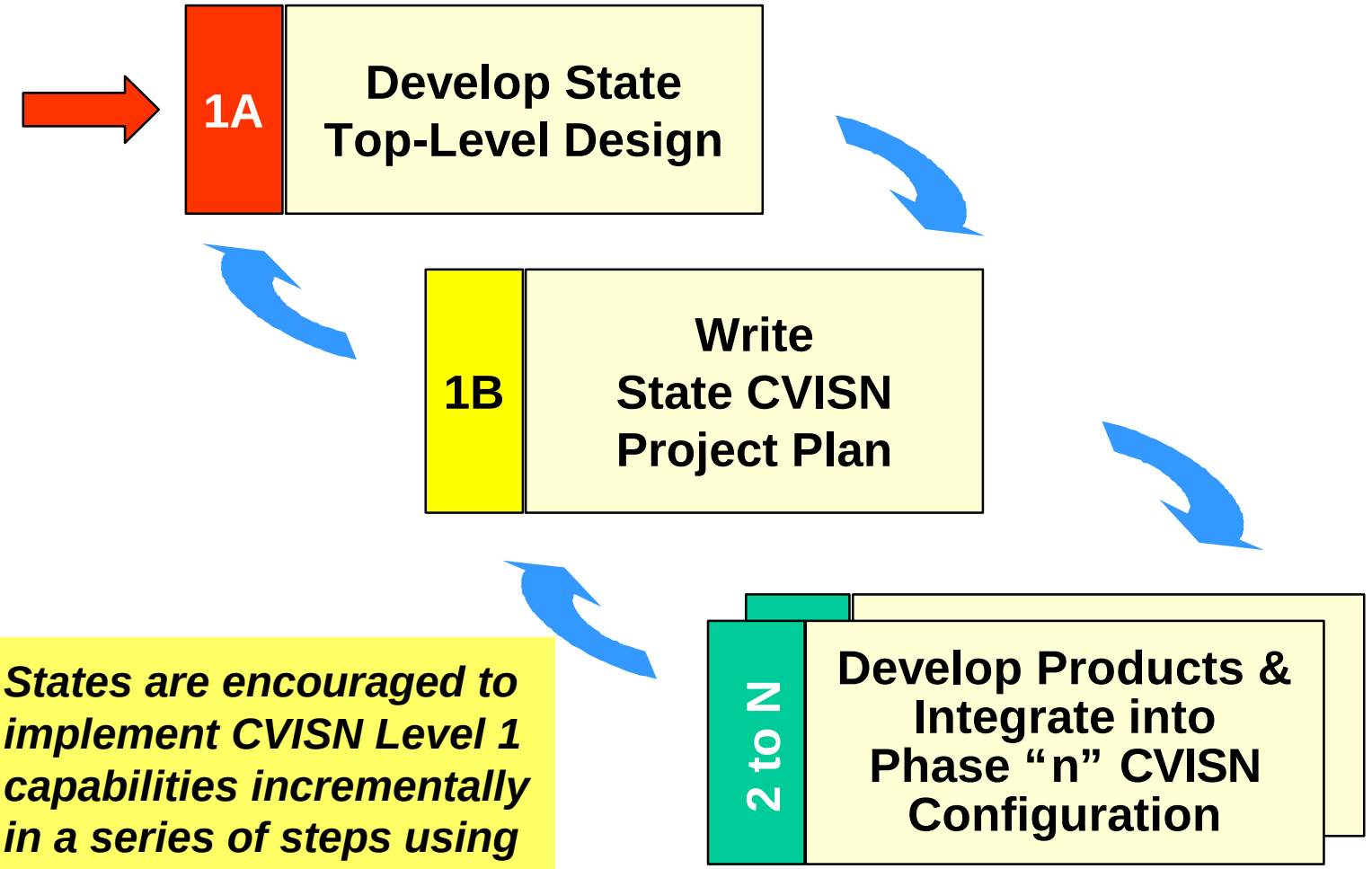
- Organize the tools used in the course, and be able to participate in the first CVISN workshop (Scope). The Scope workshop process includes:
  - Reviewing your existing systems and operating concepts (as pre-work)
  - Refining your operational scenarios
  - Identifying systems that support the scenarios
  - Identifying system interface modifications required to implement the scenarios
  - Identifying related issues

Module Structure

As in previous modules, we'll use Midland as an example to illustrate the process. In the workshop, you'll work on your own state.

- Walk through the process
- Describe existing design
- Review new operational concepts
- Establish templates for illustrating system design and network/computer upgrades
- Review sample operational scenarios, and discuss how they compare to what you have in mind
- Interfaces
- System Change Summary
- Issues

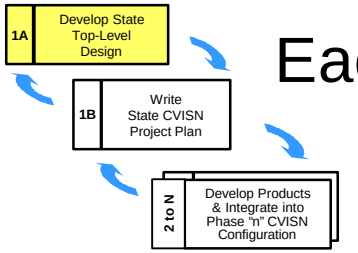
The CVISN implementation process as presented in the workshops



States are encouraged to implement CVISN Level 1 capabilities incrementally in a series of steps using a structured process.

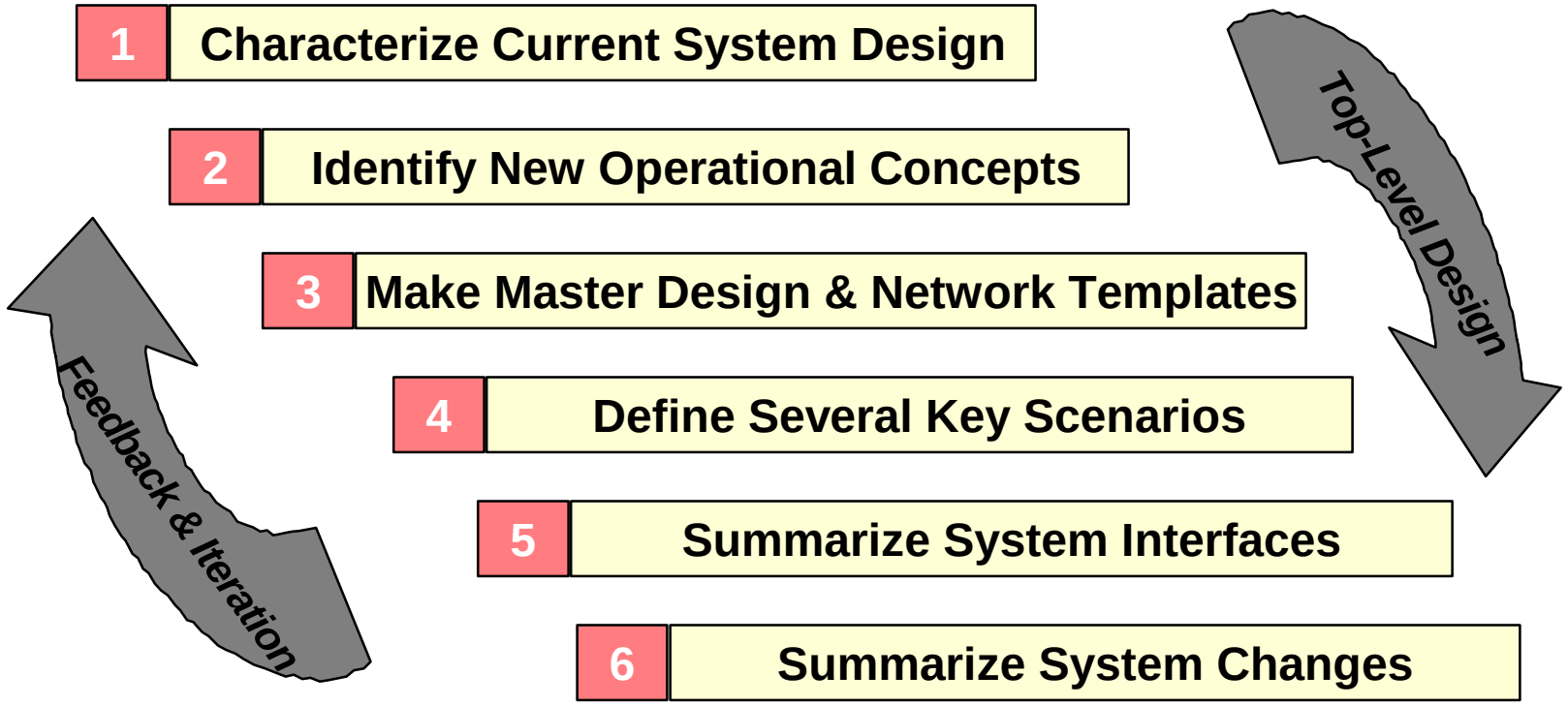
The CVISN implementation process as presented in the workshops

- The first phase (1A and 1B) is devoted to system design and project planning. The first 2 workshops are related to this phase.
- Each subsequent phase focuses on delivering a coordinated set of product versions (a.k.a. releases) that incrementally build to the overall CVISN Level 1 capability. Refer to Module 3, Architecture & Design, for the definition of CVISN Level 1 capability.
- For each phase, states are encouraged to update the Project Plan and System Integration Schedule.



Each state develops a top-level design by adding CVISN capabilities to existing systems

(Phase 1A)



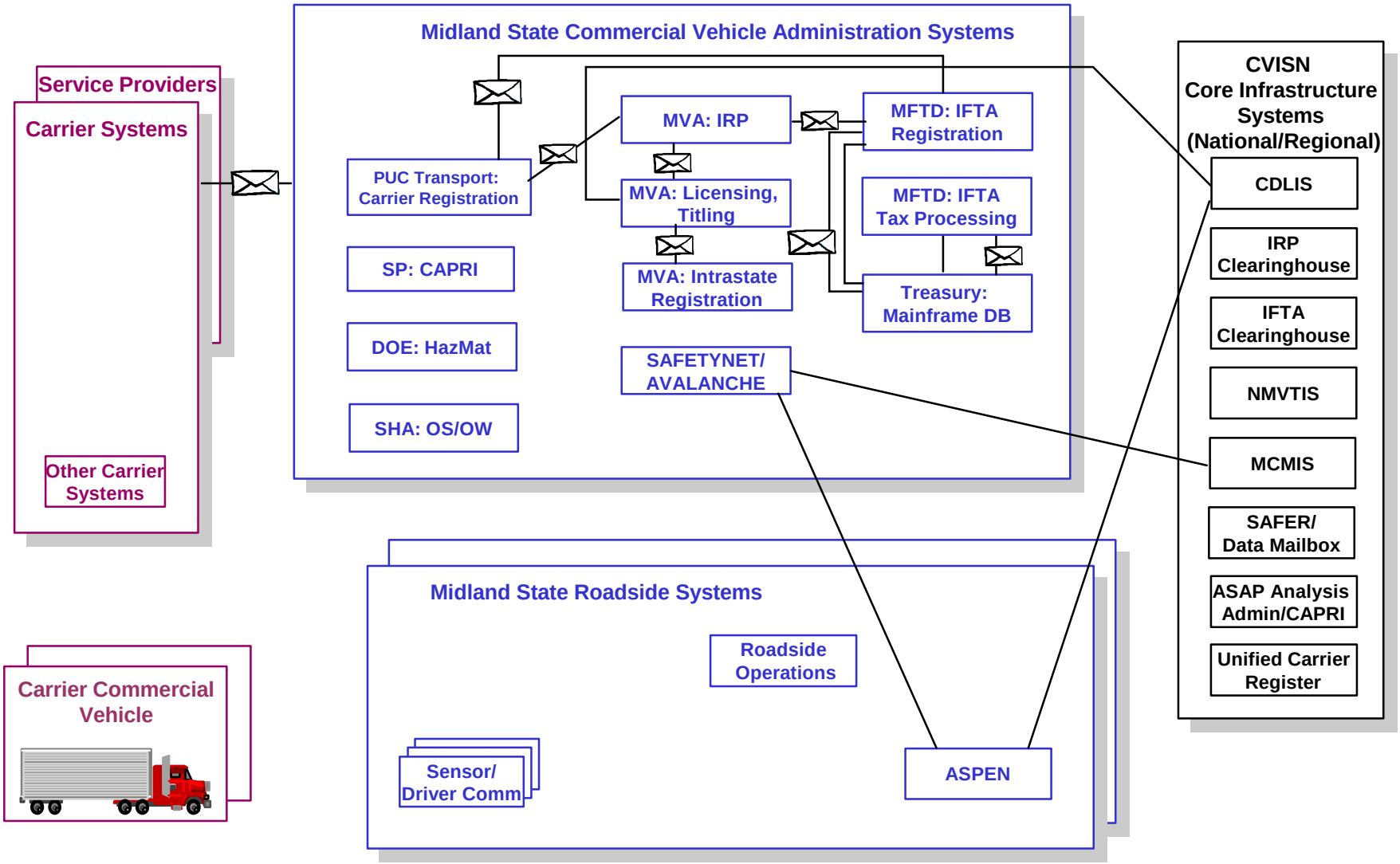
Phase 1A

1. Characterize your current system design, by completing system inventory sheets.
2. Identify where your current and planned operational concepts and design are and are not compatible with CVISN.
3. Make a master state system design template. Include all the systems in your state that support CVO. Start by reviewing the generic template and tailor it to your state.

   Make a master network design template. Include all the computers and networks that support the systems on your system design template. Start with the state system design template, and review the generic network template, tailoring them to your state.
4. Think about the key operational scenarios you want to affect during the CVISN project. Identify threads of activity corresponding to those operations. Use the COACH (CVISN Architecture and Operational Compatibility Handbook) checklists as reminders of what your state intends to do. Use a copy of your state's CVISN system design template to show what systems will interact to support the operational scenario. Do this by drawing lines between boxes to show how your state's systems, the carriers' systems, and the CVISN core infrastructure will interact to support the operational scenario. Label the lines with the steps in the operational scenario. Use arrowheads to indicate flow direction. We call this a drawing a "functional thread diagram"
5. Summarize system interactions using three copies of your state system design template, one for "Carrier-Related Interfaces", another "Interfaces within the State", and a third "State Interfaces with CVISN Core Infrastructure." On each of these system design interface summary drawings, indicate whether legacy system interfaces (LSIs) or legacy modifications (LMs) will be required for the functions being supported.

   Reflect the operational scenarios on your network template. Show which computers will connect, and what networks and protocols will support those connections.
6. Identify the scope of the system changes/additions needed to become (more) compatible with CVISN to support the operational scenario. Consider issues such as connectivity, interfaces, system capacity, data compatibility, process/policy changes, institutional barriers, etc.

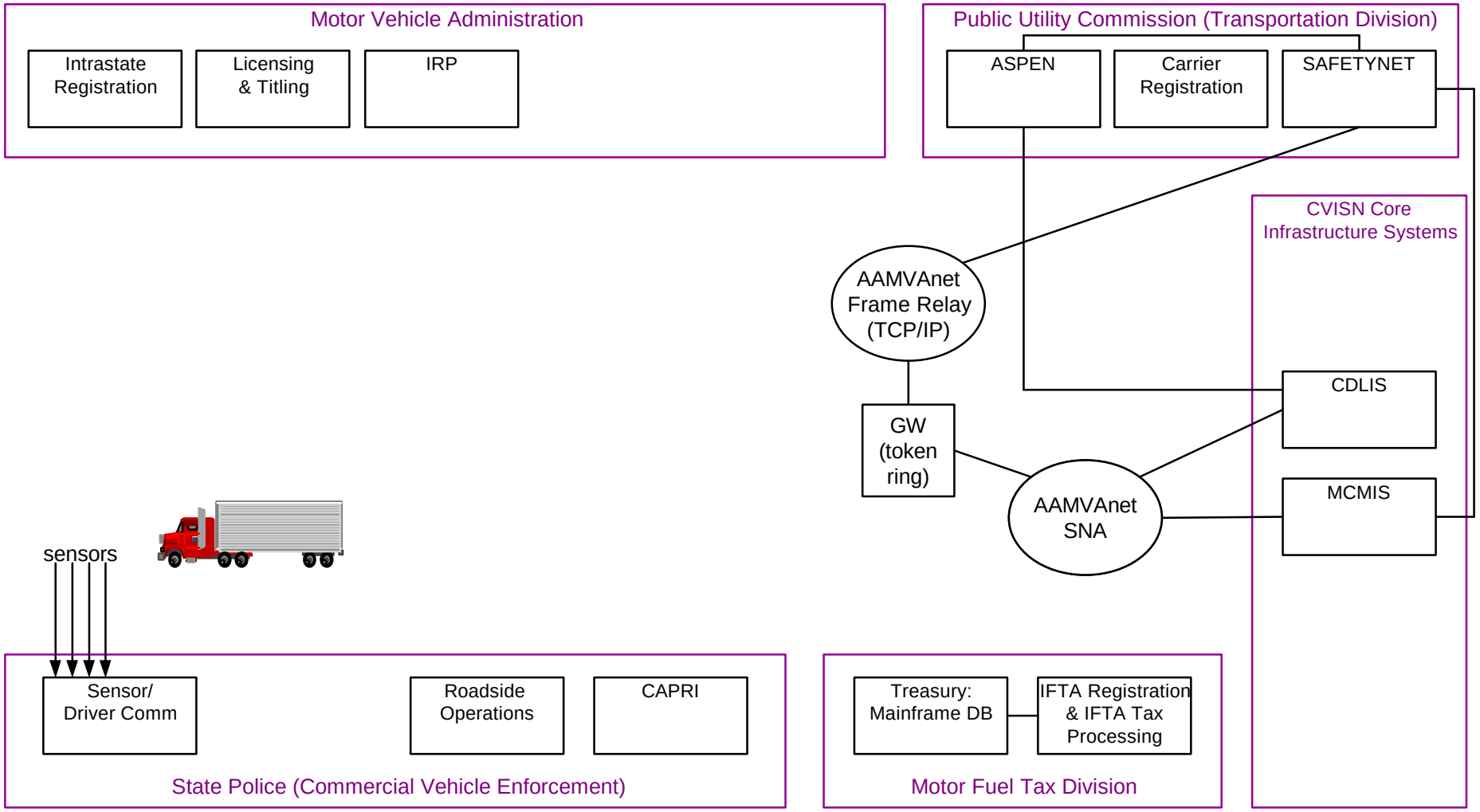
Current Midland Design
Summarizing System Inventory Sheets



Current Midland Design

- Manual credentialing process.
- Most interaction between administrative offices is through paper documents.
- The Treasury Database was started to support the IFTA processes.
- Roadside inspections are reported through SAFETYNET to MCMIS.
- Licensing and ASPEN have access to CDLIS.
- No electronic screening.
- Very limited safety information sharing.

Current Midland computers & networks



Current Midland computers & networks

- There are five “areas”, indicated by the large rectangles:
  1. Motor Vehicle Administration
  2. Public Utility Commission
  3. CVISN Core Infrastructure
  4. Motor Fuel Tax Division
  5. State Police

- Each small box drawn with solid lines represents a computer system. The software applications running on the computer are listed inside the box.

- There is currently, only one external network: AAMVAnet SNA.

- The solid lines indicate which computers are currently connected to each other:
  a) ASPEN is connected to SAFETYNET and CDLIS
  b) SAFETYNET is connected to ASPEN and MCMIS
  c) CDLIS is connected to ASPEN and MCMIS
  e) MCMIS is connected to SAFETYNET and CDLIS

- Notice that there are no other connections on this current network.

Midland's Projected CVO Improvements

Broad Goals:

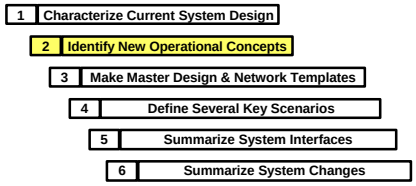
- Improve highway safety
- Streamline credentials and tax administration
- Reduce congestion costs for motor carriers
- Ensure regulatory compliance and equitable treatment

Stakeholders Cite These As Keys to Achieving the Goals:

- *Technology*
- *Revised regulatory environment & re-engineered business practices*

Recap of Midland's Issues

- Safety Assurance
  - A few carriers in 30% of all crashes
  - 11th in fatal large truck crashes
  - Scrunch Alley
  - Expand use of ASPEN
- Credentials Administration
  - Delays
  - Pressure from carriers
  - Flat personnel budget
- Screening
  - Heavy traffic sometimes closes a few weigh stations
  - More commercial vehicles using bypass routes
- Carrier Operations
  - Wide variety among carriers regarding use of technology
  - Many new carriers
  - Just-in-time deliveries



Discussion

- What technologies support Midland's goals?
- What operational concepts or process changes are implied by the technologies?

	Technology Areas														
Midland's Problem Areas	Computers	Software Algorithms	Databases	User Interfaces	WAN/LAN	Transponder	Reader	Roadway/Ramp measurement devices	On-Board sensors	EDI	DSRC	Other ID Devices (smart card, bar code)	Position location	Variable Message Signs	Inspection Devices (e.g. brake testers)
Safety Information Exchange/Safety Assurance	X	X	X	X	X				X	X		X			X
Credentials Administration	X	X	X	X	X					X					
Screening	X	X	X	X	X	X	X	X			X			X	
Carrier Operations	X	X	X	X	X	X	X		X	X	X	X	X	X	

New operational concepts

- Provide ASPEN to all inspectors.
- Install weigh-in-motion and electronic screening equipment at a few sites; use snapshots (safety & credentials info) to focus on higher-risk operators. Do so for both interstate and intrastate operators. (Note: SAFER handles interstate snapshots; some state system like CVIEW is needed for intrastate snapshots).
- Implement electronic credentialing and process at least 10% of applications electronically; check safety records (via snapshots and other databases) when reviewing credential applications.
- Support electronic payment for credentials.

Discussion - How do the concepts support the goals?

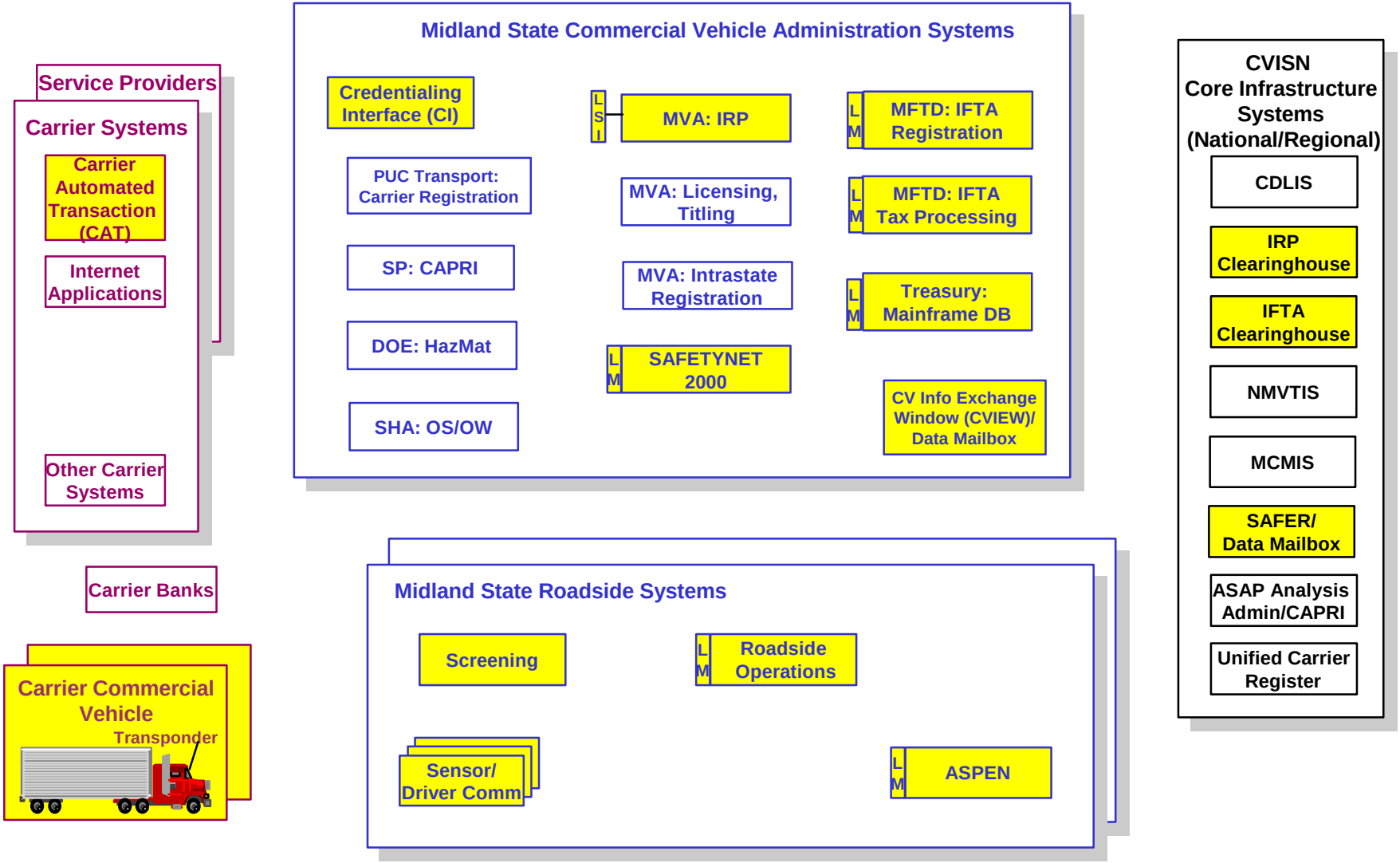
GOALS

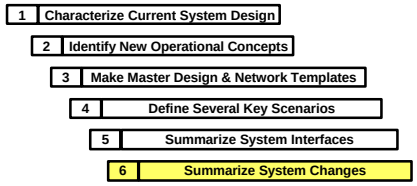
- Improve highway safety
- Streamline credentials and tax administration
- Reduce congestion costs for motor carriers
- Ensure regulatory compliance and equitable treatment

CONCEPTS

- Provide ASPEN to all inspectors.
- Install weigh-in-motion and electronic screening equipment at a few sites; use snapshots (safety & credentials info) to focus on higher-risk operators. Do so for both interstate and intrastate operators. (Note: SAFER handles interstate snapshots; some state system like CVIEW is needed for intrastate snapshots).
- Implement electronic credentialing and process at least 10% of applications electronically; check safety records (via snapshots and other databases) when reviewing credential applications.
- Support electronic payment for credentials.

Proposed Midland System Design Template

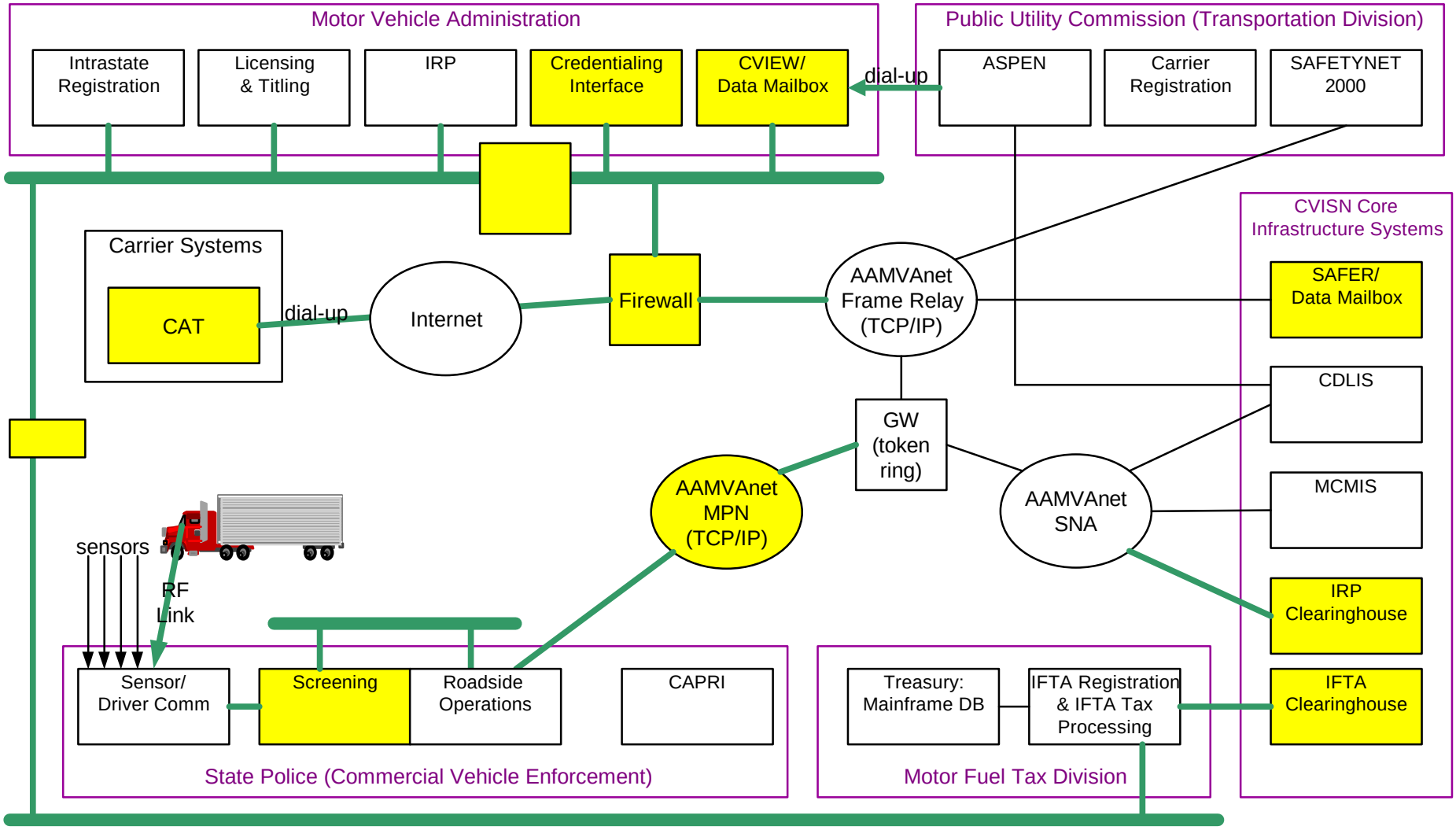


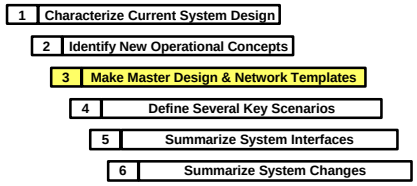


Proposed Midland System Design

- New products:
  - CAT, beginning with Internet-based version
  - CI
  - CVIEW
  - Screening
- Mods to existing products:
  - LSI/LM = Midland chose to modify the legacy IFTA, Treasury, and Roadside Operations products to handle EDI. ASPEN is already being modified by FHWA. Midland's homegrown IRP product will not be modified to handle EDI; instead, an IRP LSI running on the same computer as the CI will pass a flat file to the IRP product.
  - Sensor/Driver Comm will be modified for DSRC
  - SAFETYNET 2000 will retrieve inspections reported by ASPEN via the SAFER/Data Mailbox
  - Connections to SAFER and Clearinghouses

Proposed Midland computers & networks





Proposed Midland Computers & Networks

A few highlights about Midland's computer and network changes

Computers

- Host the CI and CVIEW on PCs (two PCs: one for each software product)
- ASPEN pen-based units for the roadside
- Upgrade Roadside Operations computer to handle Screening functions as well
- Upgrade SAFETYNET 2000 computer to host new software

Networks

- LAN - connections within Midland
- WAN - connections between carriers and Midland, and between Midland and the CVISN Core Infrastructure systems
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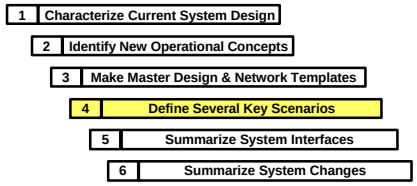


Key operational scenarios for Midland

- Use ASPEN to record inspections, and report them through CVIEW to SAFER and MCMIS
- Screen vehicles electronically at a weigh station/inspection site in Midland, using snapshots
- Accept electronic IFTA credential applications
- Accept electronic IRP credential applications for supplements like adding a vehicle to an existing account
- Accept electronic filing of and payment for IFTA quarterly tax returns

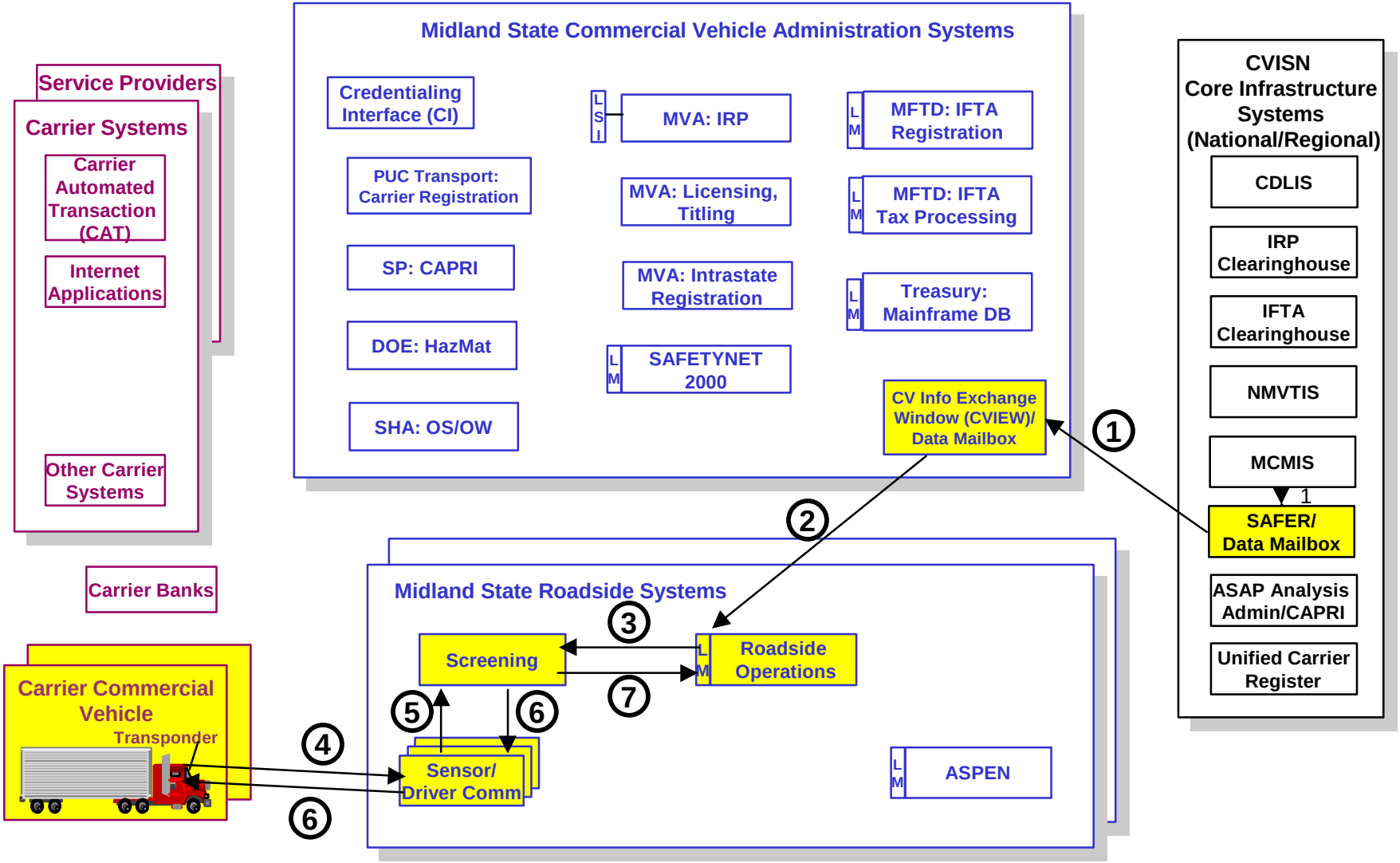
Note: You worked on several of these in the "Applying the Technologies" modules earlier in the course.

Key scenarios for Midland

- List steps in the scenario
- Keep in mind the technologies, and Midland's new operational concepts
  - Record more inspections using ASPEN
  - Report inspections electronically to SAFETYNET 2000 and SAFER
  - Install WIM and electronic screening equipment at a few sites; use snapshots to focus on high-risk operators
  - Implement electronic credentialing; check safety records (via snapshots and other databases) when reviewing credential applications
  - Support electronic payment for credentials
- Use the system design template. Record the product connections, data flow direction arrows, and step numbers on the proposed system design template
- Identify issues that must be addressed to implement the scenario, or to complete the scenario definition

1 Characterize Current System Design
2 Identify New Operational Concepts
3 Make Master Design & Network Templates
4 Define Several Key Scenarios
5 Summarize System Interfaces
6 Summarize System Changes

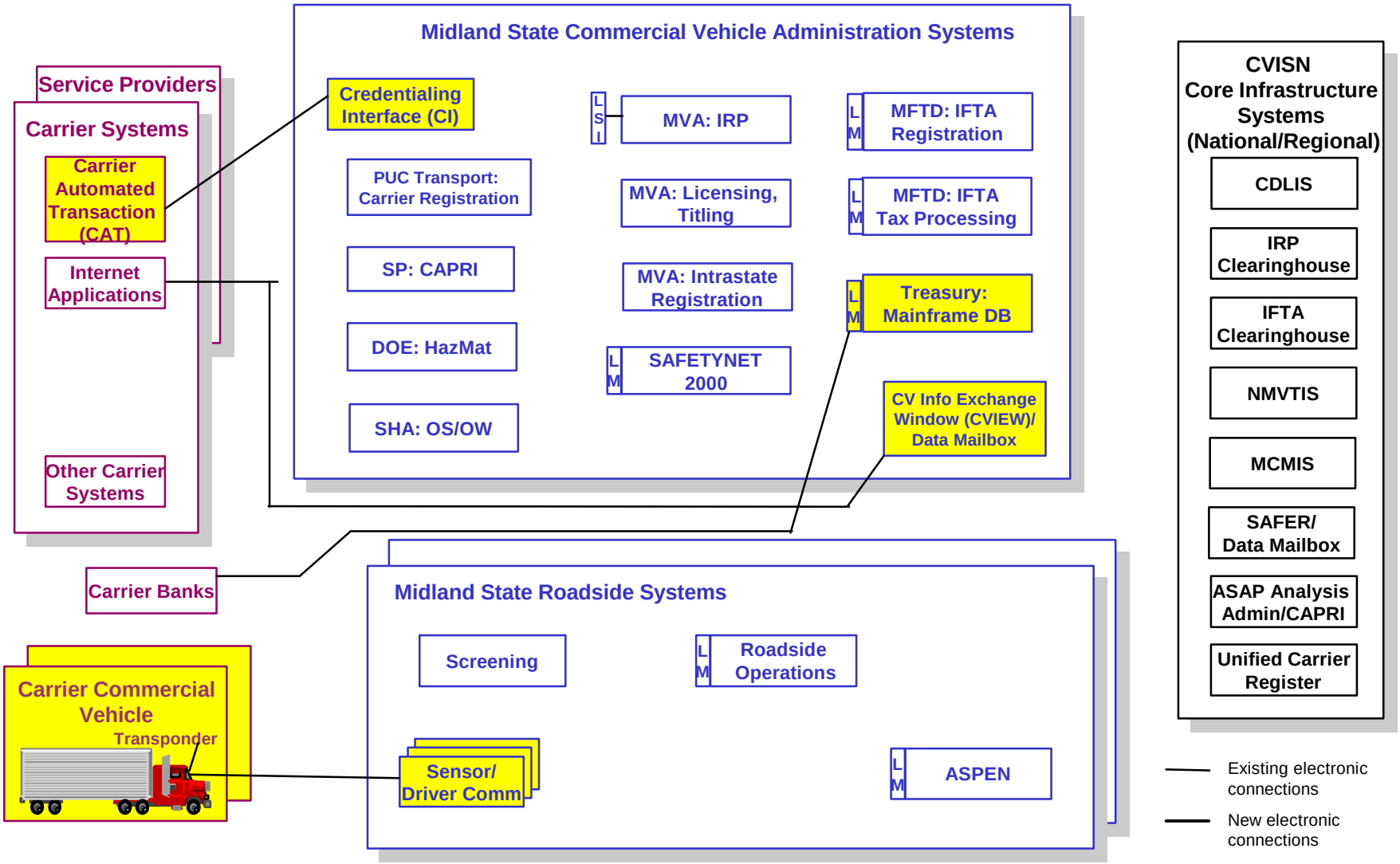
For example, one of the scenarios we completed earlier: Screen Vehicles Electronically

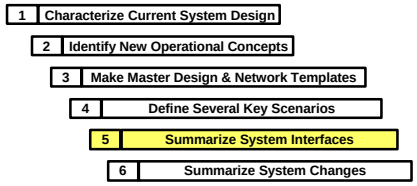


Screen Vehicles Electronically

1. SAFER sends subscription updates to the state CVIEW for carrier and vehicle snapshots, based on state-specified subscriptions. These snapshots are sent as TS 285 transactions. (See reference manual for summary of standards that apply to screening applications).
2. CVIEW distributes carrier and vehicle snapshots to roadside sites, also based on specified subscriptions. These are also sent as TS 285 transactions.
3. Site operators may interact with ROADSIDE OPERATIONS to control local screening criteria, which will be based on the snapshot information. The resulting carrier and vehicle specific screening "scores" or values are sent to the new screening system. This is a local interface which is not subject to standards.
4. Carrier and/or vehicle specific identifiers are transmitted from the DSRC transponder on board the COMMERCIAL VEHICLE to the Sensor/Driver Communications interface using the ASTM standard for the physical and data link layers.
5. The identifying information is extracted from the DSRC message in accordance with the IEEE P1455 message set for use in the SCREENING system. A screening decision is made.
6. The screening decision is communicated back to the driver, again using the ASTM standards and the IEEE P1455 message set.
7. Screening information is communicated back to ROADSIDE OPERATIONS for use by site staff. This may be a non-standard interface.

Summarize interfaces using the state system design template. For example, Carrier - State Interfaces





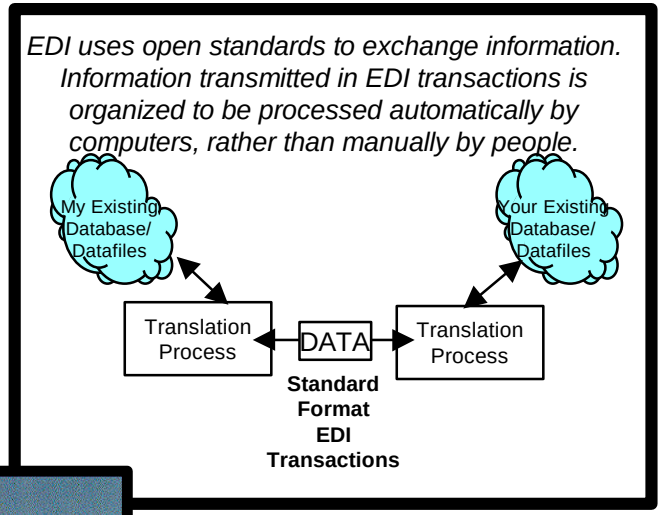
Summarize System Interfaces

- Based on the operational scenarios, make three drawings using the system design template to summarize which products connect:
  - Carrier-State interfaces
  - Interfaces within the State
  - State interfaces with the Core Infrastructure

Interface standards

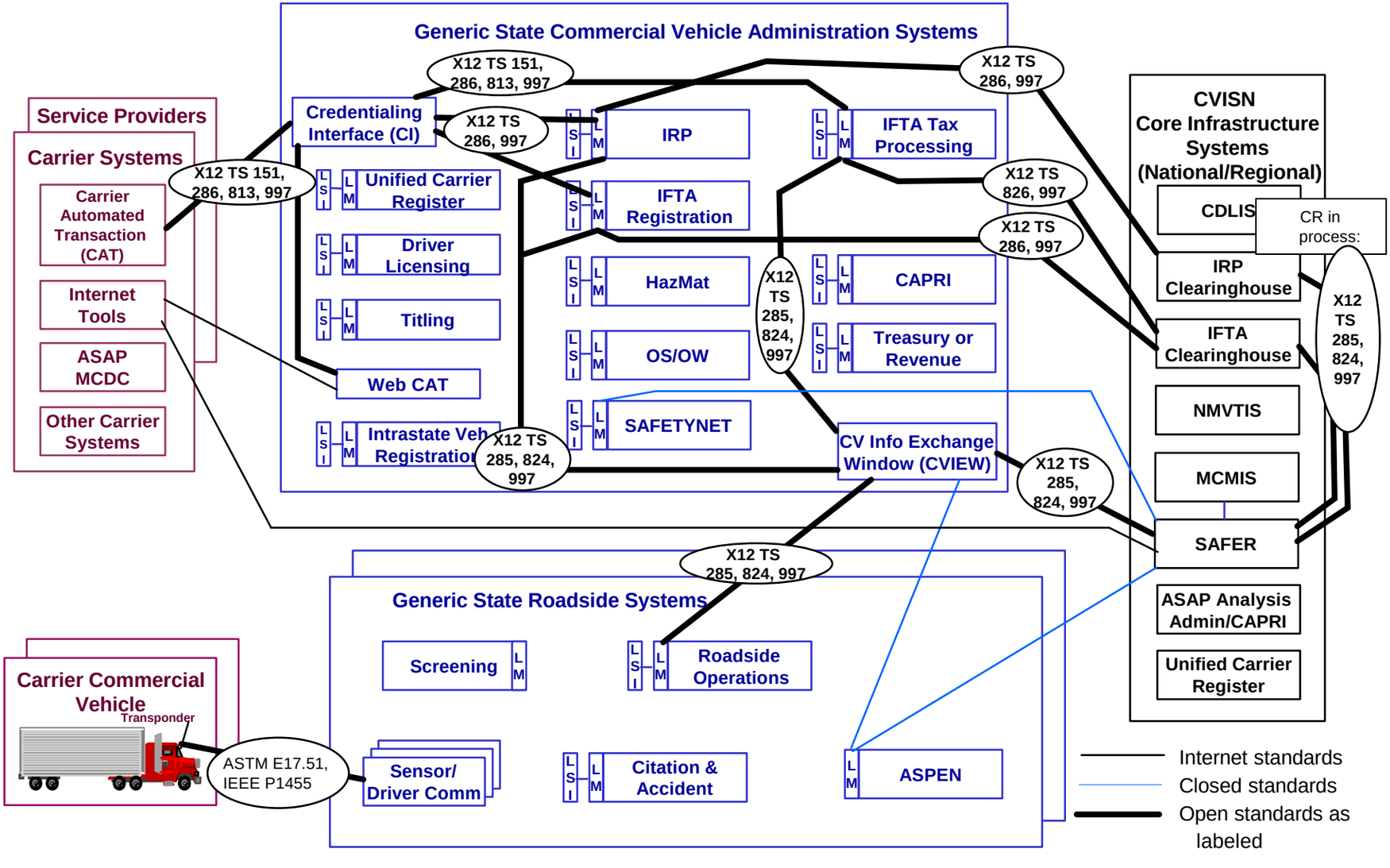
What interface standards are required to support the scenarios we worked on?

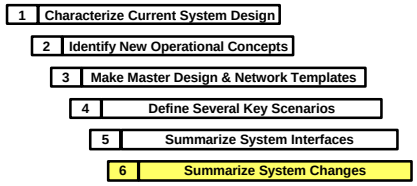
- EDI?
  (computer-to-computer, across boundaries)



- DSRC?
  (vehicle to roadside)

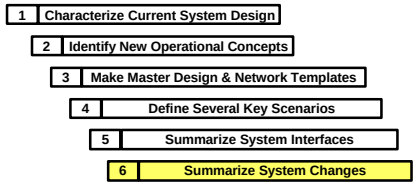
CVISN Level 1 Interface Standards





Summarize System Changes

- Summarize system changes, based on the operational scenarios each system supports.
- To do this,
  - Identify which software products will be changed and what new ones added to support the operational scenarios
  - Identify which computers will be upgraded and what new computers added to support the new or changed products
  - Identify which networks will be upgraded and what new connectivity is required to support the operational scenarios.



Proposed Changes in Midland

A few highlights about the changes implied by Midland's top-level system design

New products:

- CAT, beginning with Internet-based version
- CI
- CVIEW
- Screening

Mods to existing products:

- LSI/LM = Midland chose to modify the legacy IFTA, Treasury, and Roadside Operations products to handle EDI. ASPEN is already being modified by FHWA. Midland's homegrown IRP product will not be modified to handle EDI; instead, an IRP LSI running on the same computer as the CI will pass a flat file to the IRP product.
- Sensor/Driver Comm will be modified for DSRC
- SAFETYNET 2000 will retrieve inspections reported by ASPEN via the SAFER/Data Mailbox
- Connections to SAFER and Clearinghouses

A few highlights about Midland's computer and network changes

Computers

- Host the CI and CVIEW on PCs (two PCs: one for each software product)
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- Wireline - makes sense for fixed site to fixed site connections

Open Issues

- What kind of issues apply to all the scenarios?

- What issues are unique to each area?

Kinds of issues

- Data privacy, integrity, compatibility
- How to implement process changes
- Policy changes required
- Institutional barriers
- What expertise exists and what must be borrowed or acquired
- Build vs. buy
- System integration
- Testing

Recap & Questions

The objectives . . .

- Organize the tools used in the course, and be able to participate in the first CVISN workshop (Scope). The Scope workshop process includes:
  - Reviewing your existing systems and operating concepts (as pre-work)
  - Refining your operational scenarios
  - Identifying systems that support the scenarios
  - Identifying system interface modifications required to implement the scenarios
  - Identifying related issues

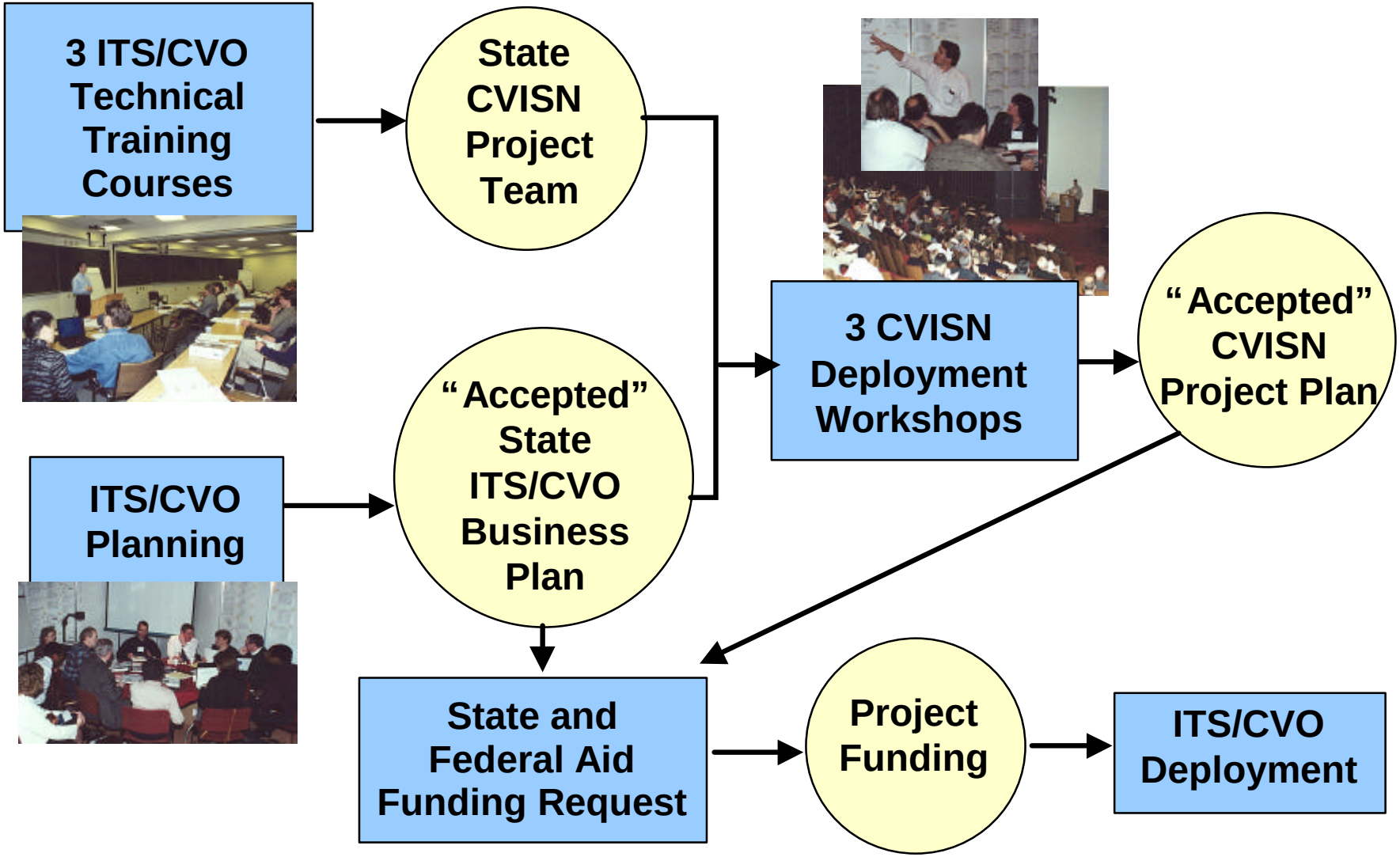
Any questions?

14. Wrap-up

UNDERSTANDING ITS/CVO TECHNOLOGY APPLICATIONS
Student Manual

MODULE 14 - QUESTIONS & WRAP-UP

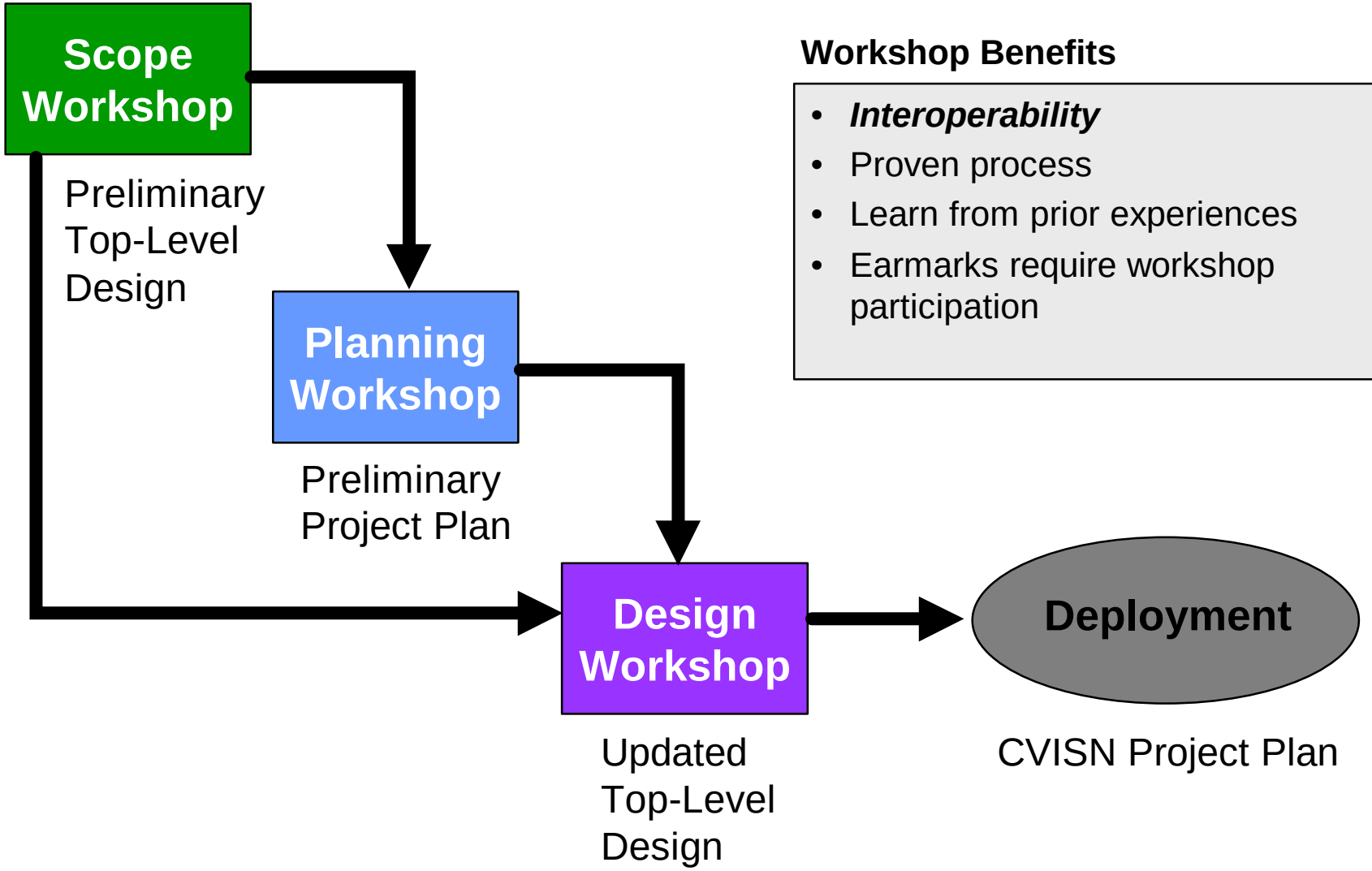
ITS/CVO Deployment Strategy



The deployment strategy comprises several activities and products

- ***Three ITS/CVO Technical Training Courses*** provide awareness-level training. Following completion of the courses, an ITS/CVO project team is formed and commitment to CVISN is established.
  - Introduction to ITS/CVO
  - ITS/CVO Technical Management for Non-Technical Managers
  - Understanding ITS/CVO Technology Applications
- ***ITS/CVO Planning*** establishes the long-range approach for ITS/CVO, as expressed in a Business Plan.
- ***Three CVISN Deployment*** Workshops (Scope, Planning, Design) guide participants through the production of a CVISN Project Plan and Top-Level Design.
- The Plans provide a foundation for ***State and Federal Aid Funding Requests***, which aim to secure Project Funding.
- Based on Funding, ***ITS/CVO Deployment*** ensues.

The Workshop Series



Workshop Benefits

- ***Interoperability***
- Proven process
- Learn from prior experiences
- Earmarks require workshop participation

The Workshop Series

- The three primary workshops:
  - Scope
  - Planning
  - Design

- Participants will work in teams, sometimes with own state partners, sometimes with counterparts from other states.
- Objective for each workshop is to generate at least a partial draft version of a useful product.

Prerequisites for attending the workshops

- State ITS/CVO Business Plan has been accepted by FHWA
- Technical training courses have been completed
  - Introduction to ITS/CVO (recommended)
  - ITS/CVO Technical Project Management for Non-Technical Managers (required)
  - Understanding ITS/CVO Technology Applications (required)
- A core CVISN project team is committed to participating in all three workshops
- Completion of pre-work prior to each workshop

Prerequisites for attending the workshops

- The core CVISN project team
  - Project Manager
  - System Architect
  - Project Administrator/Facilitator
  - Operations Person from 3-5 areas
  - Staff from the state department of information technology or comparable IT units within the State CVO agencies
  - State DOT representative
  - FHWA Division Representative
  - Motor carrier industry representative (invited)

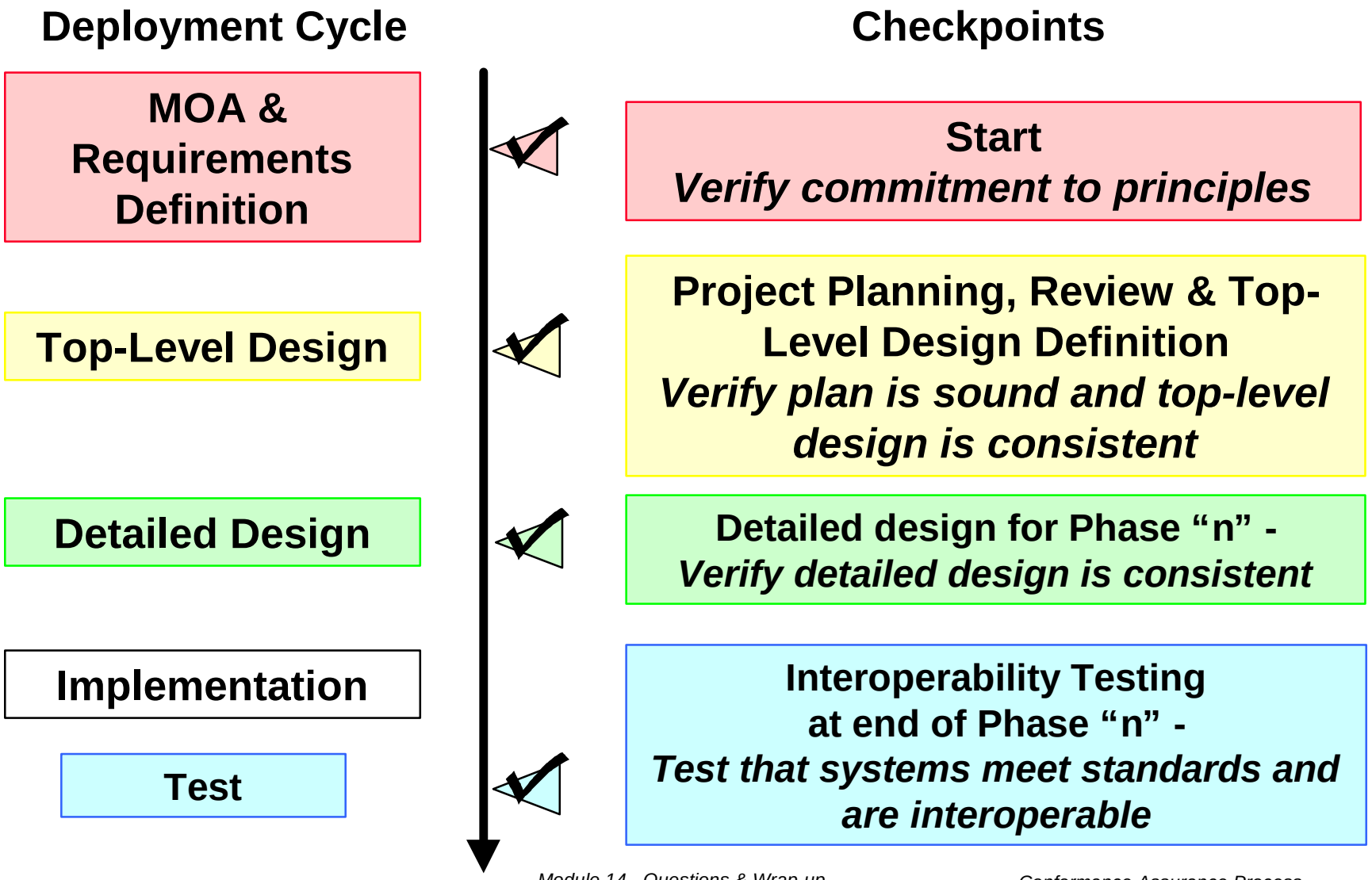
Benefits of the workshops

- ***Interoperability***
- Proven process
- Learn from experiences of the CVISN Prototype and Pilot states
- Provide states with tools to move toward ITS/CVO and CVISN deployment goals

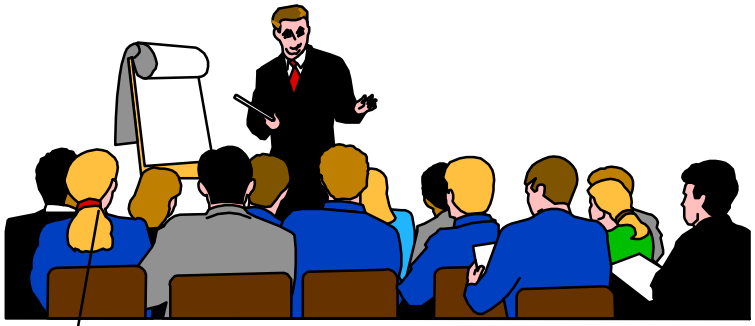
Benefits of the workshops

- ***Interoperability***
  - Projects using FHWA funds must conform with the architecture
  - Architecture guidance is provided through the workshops
- Proven process
  - The 10 CVISN Model Deployment States (MD, VA; CA, CO, CT, KY, MI, MN, OR, WA) used the process successfully
  - Process refined based on feedback
- Learn from experiences of the CVISN Prototype and Pilot states
  - Designs used by CVISN states are part of workshop materials
  - Contact list
- Provide states with tools to move toward ITS/CVO and CVISN deployment goals
  - Workshop products aid the deployment process

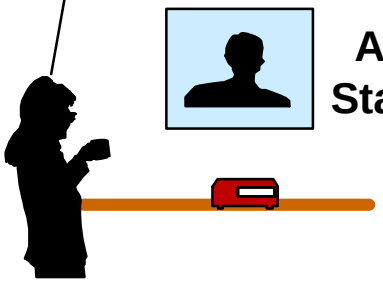
The Conformance Assurance Process checkpoints ITS/CVO deployment throughout the lifecycle



A Conformance Assessment Team (COAT) supports the Conformance Assurance Process for each project



The project team is responsible for meeting development milestones



Architecture & Standards Agent

Project System Architect

The COAT makes sure the project conforms with the architecture and standards.

Preparing for the Scope Workshop

- What will you do at the workshop? Develop a preliminary top-level design for your state.

- When should you plan to attend the workshop? Who should attend? Several factors influence these answers . . . Funding, staffing, when the workshop is offered. The core CVISN project team identified earlier should attend the workshop.

Scope Workshop Products

- Preliminary state system design template
- Preliminary network template
- Using the system design template:
  - A few preliminary operational scenarios
  - System interface summaries
- Using the network template
  - Computer upgrades
  - Network upgrades
- List of open issues
- Summary of system changes

Once you've signed up for the Scope Workshop . . .

- When should you start to prepare? ~ 6 weeks before attending, you will receive a packet of references and pre-work.

- What to do?
  - Review the reference documents
  - Complete the Pre-Work
  - Get plenty of rest before attending, because it's an intense few days!
  - Remember to have fun!!!

Preparing for the Scope Workshop

REFERENCE DOCUMENTS

- CVISN System Design Description
- CVISN Operational and Architectural Compatibility Handbook (COACH) Part 1, Operational Concepts and Top-Level Design Checklists
- Recommendations for Common Carrier, Vehicle, Driver, Shipment, and Trip Identifiers
- CVISN Glossary
- CVISN Guides

PRE-WORK

- COACH Part 1 - to show level of commitment to each concept/top-level design item
- Active CVO Projects
- System Inventory
- Transponder Usage
- Electronic Interchanges in Use
- Keys/Identifiers Used in Your Databases

Feedback, please

- We value your feedback on this course.
- Please complete your evaluation form before you leave, and place it in the designated spot.

15. Acronyms

ITS/CVO Acronyms

AAMVA	American Association of Motor Vehicle Administrators
AASHTO	American Association of State Highway and Transportation Officials
ACRP	Automated Compliance Review Pilot
ADVANCE	Advanced Driver and Vehicle Advisory Navigation Concept
AEI	Automatic Equipment Identification
AHS	Automated Highway System
AMASCOT	Automated Mileage and Stateline Crossing Operational Test
ANSI	American National Standards Institute
APL	The Johns Hopkins University Applied Physics Laboratory
APPN	Advanced Peer-to-Peer Networking
APTS	Advanced Public Transportation Systems
ASAP	Automated Safety Assurance Program
ASC	Accredited Standards Committee
ASPEN	(Not an acronym)
ASTM	American Society for Testing and Materials
ATA	American Trucking Associations
ATIPE	Advanced Technologies for International and Intermodal Ports of Entry
ATIS	Advanced Traveler Information Systems
ATM	Asynchronous Transfer Mode
ATMS	Advanced Traffic/Management Systems
AVC	Automatic Vehicle Classification
AVCS	Advanced Vehicle Control Systems
AVI	Automatic Vehicle Identification
AVL	Automatic Vehicle Location
BAH	Booz-Allen & Hamilton
BSWG	Base State Working Group
CI	Credentialing Interface
CIS	Credential Input System; Central Information Site
CMV	Commercial Motor Vehicle
CMVSA	Commercial Motor Vehicle Safety Act
COACH	CVISN Operational and Architectural Compatibility Handbook
COAT	COnformance Assessment Team
COVE	COmmercial VEhicle
CR	Compliance Review
CSFR	Carrier Safety Fitness Rating
CSI	Cambridge Systematics, Inc.
CV	Commercial Vehicle
CVIE	(Obsolete; see CVIEW)
CVIEW	Commercial Vehicle Information Exchange Window
CVIS	Commercial Vehicle Information System
CVISN	Commercial Vehicle Information Systems and Networks
CVL	Commercial Vehicle Licensing
CVO	Commercial Vehicle Operations
CVSA	Commercial Vehicle Safety Alliance
DARPA	Defense Advanced Research Projects Agency
DBA	Doing Business As
DHCP	Dynamic Host Configuration Protocol
DL	Drivers License
DMV	Department of Motor Vehicles
DNA	Digital Network Architecture
DOT	Department of Transportation
DPIU	Data Processing Interface Unit
DSRC	Dedicated Short Range Communication
DTSW	Dynamic Downhill Truck Speed Warning System
ETC	Electronic Toll Collection
ETTM	Electronic Toll and Traffic Management
FARS	Fatal Accident Reporting System
FDDI	Fiber Distributed Data Interface
FFE	Flat File Equivalent
FHVUT	Federal Heavy Vehicle Use Tax
FHWA	Federal Highway Administration
FIPS	Federal Information Processing Standards
FMCSR	Federal Motor Carrier Safety Regulations
FMMS	HazMat Fleet Management and Data Monitoring System
FNC	Federal Networking Council
FTA	Federation of Tax Administrators; Federal Transit Administration
FTP	File Transfer Protocol
FTS2000	Federal Telecommunications System 2000
GCWR	Gross Combination Weight Rating
GIS	Geographical Information System
GPS	Global Positioning System
GVW	Gross Vehicle Weight
GVWR	Gross Vehicle Weight Rating
HAZMAT	Hazardous Material
HELP	Heavy Vehicle Electronic License Plate Program
HM	Hazardous Material
HMTA	Hazardous Material Transportation Act
HMTUSA	Hazardous Material Transportation Uniform Safety Act
HOS	Hours of service
HOV	High Occupancy Vehicle
HSWIM	High Speed Weigh-In-Motion
HTTP	Hypertext Transfer Protocol
HVUT	Heavy Vehicle Use Tax
IBC	International Border Clearance
IBEX	International Border Electronic Crossing
IBTTA	International Bridge, Tunnel, and Turnpike Association
ICC	Interstate Commerce Commission
IDT	Intelligent Decision Technologies
IEEE	Institute of Electrical and Electronics Engineers
IEN	Information Exchange Network

ITE	Institute of Transportation Engineers
ITS	Intelligent Transportation Systems (formerly IVHS)
ITSA	Intelligent Transportation Society of America
IVI	Intelligent Vehicle Initiative
JHU / APL	The Johns Hopkins University Applied Physics Laboratory
LAMP	Licensing Application Migration Project
LAN	Local Area Network
LCL	Less-Than-Carload
LIMS	Lockheed Martin Information Management Systems
LM	Legacy Modification
LPR	License Plate Reader
LSI	Legacy System Interface
LTL	Less-Than-Truckload
MACS	Mainline Automated Clearance System
MAPS	Multi-Jurisdictional Automated Preclearance System (MAPS)
MCMIS	Motor Carrier Management Information System
MCSAP	Motor Carrier Safety Assistance Program
MEOSS	Mid-West Electronic One-Stop Shopping
MOE	Measure Of Effectiveness
MONY	Michigan / Ontario / New York
MOOO	Multi-Jurisdictional Oversize and Overweight Organization
MPO	Metropolitan Planning Organization
NAFTA	North American Free Trade Agreement
NATAP	North American Trade Automation Prototype
NCHRP	National Cooperative Highway Research Program
NCIC	National Crime Information Center
NDR	National Driver Register
NETC	New England Transportation Consortium
NGA	National Governors' Association
NHTSA	National Highway Traffic Safety Administration
NIER	National Institute for Environmental Renewal
OMC	Office of Motor Carriers
OOIDA	Owner-Operator Independent Driver Association
OOS	Out of Service
OOSD	Out of Service Driver
OOSV	Out of Service Vehicle
OS / OW	Oversize / Overweight
OSI	Open System Interconnection
OST	Office of the Secretary of Transportation
PASS	Port of Entry Advanced Sorting System
PDPS	Problem Driver Pointer System
POE	Port of Entry
PRISM	Performance and Registration Information Systems Management
PSC	Public Service Commission
PUC	Public Utility Commission
RAPP	Regional Automated Permit Processing
RES	Roadside Electronic Screening
RFTA	Regional Fuel Tax Agreement
ROC	Roadside Operations Computer
ROVER	CVO ROving VERification Van
RPC	Regional Processing Center; Remote Procedure Call
RSIS	RS Information Systems
RSPA	Research and Special Program Administration
RTVDM	Registration, Title, Vehicle Dealers and Manufacturers
SAE	Society of Automotive Engineers
SAFER	Safety and Fitness Electronic Records
SafeStat	Safety Status
SAFETYNET	(Not an acronym)
SafeVUE	SAFER and CVIEW Visual User Environment
SASHTO	Southern Association of State Highway and Transportation Officials
SCE	Selective Compliance Enforcement
SDO	Standard Development Organization
	System
TCC	Transportation (US DOT) Computer Center
TCP / IP	Transmission Control Protocol / Internet Protocol
TIA	Telecommunications Industry Association
TIN	Tax Identification Number
TOCM	Transportation Operation Coordination Committee
TPM	Technical Performance Measure
TRALA	Truck Rental And Leasing Association
TRANSCOM	Transportation Operations Coordination Committee
TRB	Transportation Research Board
TS	Transaction Set
UCR	Unified Carrier Register
UDP	User Datagram Protocol
UKY	University of Kentucky
VAN	Value-Added Network
VIN	Vehicle Identification Number
VISTA	Vehicle Information System for Tax Apportionment
VISTA / RS	VISTA Registration System
VISTA / TS	VISTA Tax System
VMS	Variable Message Sign
VRC	Vehicle to Roadside Communication
VRTC	Vehicle Research Testing Center
VTAM	Virtual Telecommunications Access Method
VTIE	Vehicle Title Information Exchange
WAN	Wide Area Network
WASHTO	Western Association of State Highway Officials
WBS	Work Breakdown Structure
WIM	Weigh-In-Motion
WRA	Western Regional Agreement
WTA	Washington Trucking Associations

Commercial Vehicle Information Systems and Networks (CVISN)

CVISN is the collection of state, federal and private sector information systems and communications networks that support commercial vehicle operations (CVO).

Many improvement initiatives are currently underway to develop new systems and upgrade existing systems to add new capabilities and allow electronic exchange of information using open interface standards. This will enable delivery of new electronic services to states and carriers in the broad areas of safety, credentials administration, and electronic screening. Specific examples of new services include:

- providing timely safety information to inspectors at the roadside,
- providing operating credentials to motor carriers electronically,
- allowing states to exchange registration and fuel tax information electronically, and
- conducting electronic screening of commercial vehicles at fixed and mobile sites while vehicles travel at highway speeds.

In summary, CVISN components apply emerging technologies to improve the effectiveness and efficiency of state and private CVO stakeholders in the three broad functional areas of safety, credentials, and electronic screening

ITS/CVO and CVISN

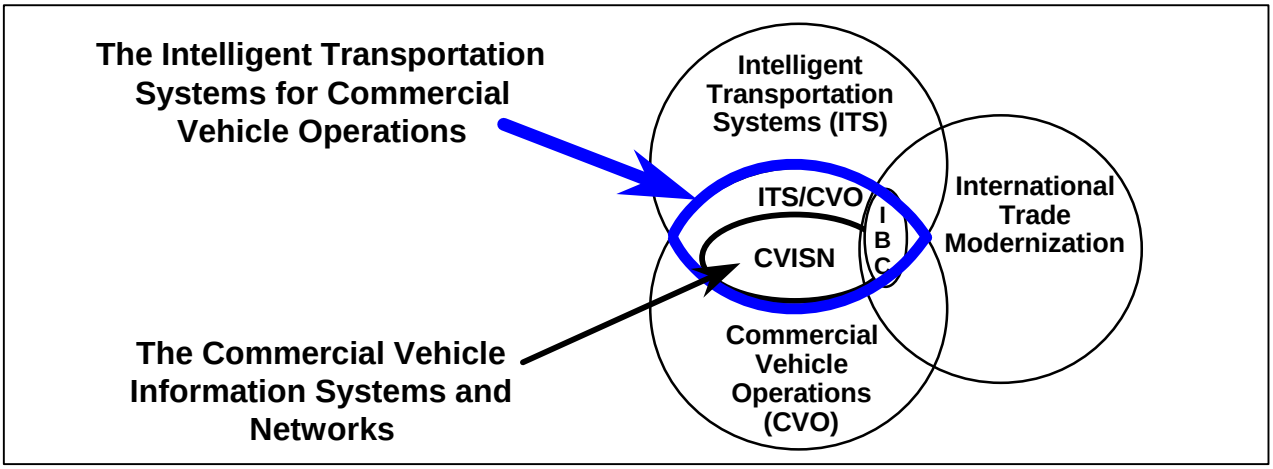
ITS (Intelligent Transportation Systems) - Electronics, communications, or information processing used singly or in combination to improve the efficiency or safety of a surface transportation system.

CVO (Commercial Vehicle Operations) - The motor carrier operations and motor vehicle regulatory activities associated with the commercial movement of goods, including hazardous materials, and passengers. With respect to the public sector, includes the issuance of operating credentials, the administration of motor vehicle and fuel taxes, and roadside safety and border crossing inspection and regulatory compliance operations.

ITS/CVO - The ITS elements that support commercial vehicle operations. These include information systems, networks, sensor systems such as weigh in motion, technologies such as brake testing equipment, border crossing systems, and the components of the intelligent commercial vehicle. The ITS National Program Plan defines these Commercial Vehicle Operations UserServices: Commercial Vehicle Electronic Clearance, Automated Roadside Safety Inspection, On-Board Safety Monitoring, Commercial Vehicle Administrative Processes, Hazardous Materials Incident Response, Freight Mobility.

CVISN (Commercial Vehicle Information Systems and Networks) - The information systems and communications networks that support commercial vehicle operations. CVISN includes information systems owned and operated by governments, carriers, and other stakeholders. It excludes the sensor and control elements of ITS/CVO.

IBC (International Border Clearance) - The clearance of commercial carriers and vehicles at US borders with Canada and Mexico using transponders, the information exchange infrastructure, and roadside sensors.



Architecture -The overall structure (elements & interfaces) and unifying design characteristics (principles, concepts, & standards) of a system.

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

CVISN Architecture - The ITS/CVO information systems and networks portion of the National ITS Architecture. The CVISN Architecture documentation begins with the National ITS Architecture and adds more detail in some areas (e.g., operational concepts and the Electronic Data Interchange (EDI) message requirements) to facilitate further development.

IBC Architecture - The commercial vehicle border crossing portion of the National ITS Architecture. The structure and unifying design characteristics of an IBC Architecture will permit electronic clearance of commercial motor vehicles at North American land border crossings. This architecture addresses both transportation and non-transportation stakeholders in the IBC community.

ITS/CVO and CVISN

ITS/CVO and CVISN are often used as adjectives to describe on-going projects associated with deploying ITS/CVO and the CVISN components. For example,

ITS/CVO Program. A voluntary effort involving public and private partnerships focused on improving highway safety and motor carrier productivity through the use of technology. The Federal Highway Administration (FHWA) is the lead Federal agency for the program, and the ITS/CVO Division is directly responsible for oversight of the program. The role of the ITS/CVO Program is to foster the development and implementation of technology designed to assist trucks and buses in moving safely and freely throughout North America. The program includes many parts including the CVISN program, the IBC project, ITS/CVO mainstreaming and outreach, ITS/CVO training, and various operational tests and technical support. There are also commercial vehicle elements of the Intelligent Vehicle Initiative.

The CVISN Program consists of the:

- CVISN Architecture & Standards Project
- CVISN Model Deployment Project (Prototype & Pilot)
- DSRC Demonstration Project

CVISN Architecture and Standards Project. Developed the CVISN operational concepts and CVISN Architecture and refined them through the design stage. Developing EDI interface standards through the standards development organization (SDO) to promote information exchange through common open interfaces. Continues to feed back lessons learned from model deployment and standards efforts into the architecture/design. Developing interoperability tests.

CVISN Model Deployment Project (Prototype & Pilot). **CVISN Prototype**, started demonstrating CVISN in MD and VA in 1996 to verify the operational concepts, architecture, design, standards, deployment methodology, and interoperability tests.

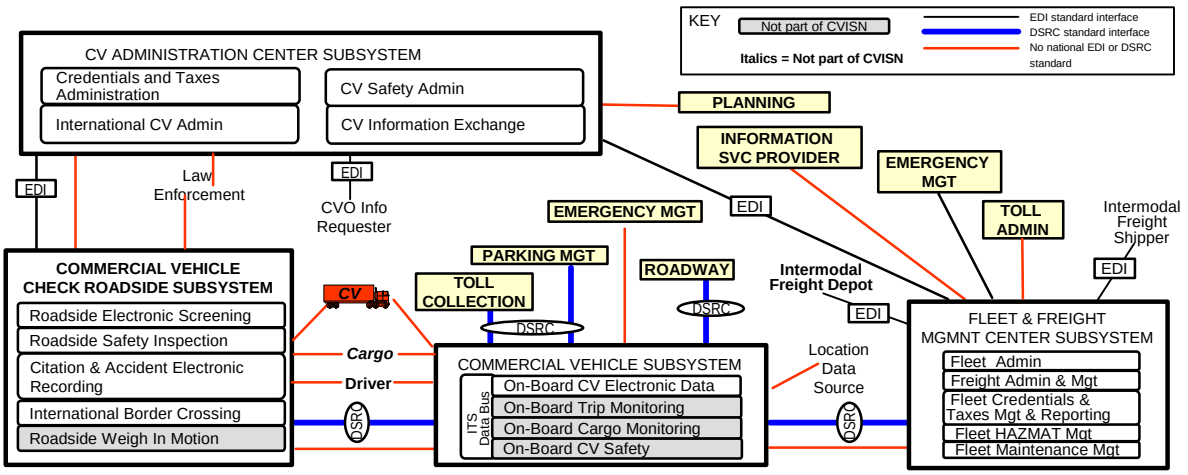
CVISN Pilot, started the model deployment of CVISN in CA, CO, CT, KY, MI, MN, OR, WA in 1996 to put CVISN operational concepts, designs, standards, methods, and interoperability testing into practice.

The CVISN Prototype & Pilot states are deploying **CVISN Level 1 capabilities**: safety information exchange through snapshots, inspection reporting using ASPEN, electronic screening using transponders and snapshot data, electronic credentialing for IRP and IFTA, and supporting base state agreements via the IRP and IFTA Clearinghouses.

CVISN was originally defined to be a very broad term covering all ITS/CVO information systems and networks. In common usage, many people use "CVISN" to refer to only the parts of CVISN being developed as part of the CVISN prototype and pilot projects.

DSRC Demonstration Project. Assisting SDOs in developing dedicated short range communications (DSRC) message set standards. Assisting FHWA in refining a migration plan by demonstrating simultaneous deployment of existing messages and standard messages, identifying technological and institutional barriers, and gaining "real world" experience in deploying ITS concepts. Seed deployment by prototyping related infrastructure software and conducting interoperability tests.

The CVISN architecture includes the information systems and networks in the ITS/CVO architecture



R14. Workshop Interest Letter

CVISN Deployment Workshops
Director, Office of Motor Carrier HSA-20
Safety & Technology

State Directors, Office of Motor Carriers

This memorandum is a call for expressions of interest by States in the Commercial Vehicle Information Systems and Networks (CVISN) Deployment Workshops that will begin in mid-1999 and continue on into calendar year 2000. Please share the following information with your State partners as well as your FHWA Federal-aid ITS counterparts.

As you know over the past two years, two Prototype States and eight Pilot States have participated in the model deployment of the architecture, standards, and core information systems being developed under the auspices of the CVISN initiative. In addition, 30 other States have been developing ITS/CVO Business Plans and participating in technical training programs under the auspices of the ITS/CVO Mainstreaming initiative. Our immediate goal now is to transition interested States from this group of 30 from business planning and training activities to design and deployment activities that are consistent with the CVISN Architecture.

Our primary approach for ensuring this smooth transition will be to offer a series of three CVISN Deployment Workshops in which interested States will work closely with members of the CVISN architecture and training teams, as well as representatives of the CVISN Prototype and Pilot States, to develop initial State CVISN Project Plans with top-level system designs. These Project Plans can serve as the blueprint for future ITS/CVO deployment in each State, as well as a tool for securing the financial, human, and technological resources that are necessary to meet each State?s deployment goals. This workshop process has proven to be remarkably successful in the Prototype and Pilot States.

For the convenience of your state, we are providing further detail on the CVISN Deployment Workshops in Attachment 1 to this memorandum; sample job descriptions for a CVISN Project Manager and System Architect in Attachment 2; and a preliminary registration form in Attachment 3.

If your State is interested in participating in the workshops in 1999, then please have them fill out the registration form and submit it to your office with a carbon copy faxed to Mr. Jeffrey Loftus of ITS/CVO Division by **January 31, 1999**. (Mr. Loftus?s fax number is 202-366-7908.) We are planning an additional round(s) to begin in mid-2000. This information will help the FHWA ITS/CVO Division to determine specific workshop dates and locations. We will then send you

additional information on the workshop dates and locations in February 1999 to aid your State's planning and preparation.

It is our intention that the ITS/CVO Division in headquarters and resource center ITS staff will work closely with you and your States, industry, and other stakeholders on this program. I am confident that this approach will save the States time and money as we collectively move toward our goal of the nationwide CVISN deployment in a majority of States by 2003 as stated in Section 5209 of the TEA-21.

Thank you for your cooperation and support for this important program. Please direct any questions to Mr. Loftus at 202-366-4516.

Rose A. McMurray

Attachments (3)

cc: Resource Center Directors
Operations Managers
Virtual Resource Directors

Attachment 1

CVISN Deployment Workshops

12/23/98

What Is CVISN?

The term CVISN (Commercial Vehicle Information Systems and Networks) refers to the collection of information systems and communications networks that support commercial vehicle operations (CVO). These include information systems owned and operated by governments, motor carriers, and other stakeholders. The FHWA CVISN program is not trying to create a new information system, but rather to create a way for existing and newly designed systems to exchange information through the use of standards and available communications infrastructure. The CVISN program provides a framework or "architecture" that will enable government agencies, the motor carrier industry, and other parties engaged in CVO safety assurance and regulation to exchange information and conduct business transactions electronically. The goal of the CVISN program is to improve the safety and efficiency of commercial vehicle operations.

The CVISN Architecture is the CVO part National ITS Architecture. It includes standards for communications technologies such as electronic data interchange (EDI) and dedicated short-range communications (DSRC). These standards are being developed to promote interoperability and efficiency. The Transportation Equity Act for the 21st Century (TEA21) requires that ITS projects funded from the Highway Trust Fund must be consistent with the National ITS Architecture and applicable standards.

TEA-21 also sets a goal of nationwide deployment of the CVISN Architecture in a majority of the States by September 30, 2003. Over the past three years, the FHWA has sponsored the model deployment of the CVISN architecture in two Prototype States (Maryland and Virginia) and eight Pilot States (California, Connecticut, Colorado, Kentucky, Michigan, Minnesota, Oregon, and Washington). The FHWA is now committed to provide all interested remaining States the CVO architecture and standards, tools (training and workshops), and guidance necessary to achieve this goal.

As part of this goal, the FHWA is emphasizing that the States deploy CVISN Level 1 Capability as described below:

1. Safety information exchange -- ASPEN (or equivalent) at major inspection sites; connection to the Safety and Fitness Electronic Records (SAFER) system, which provides interstate carrier, vehicle, and driver safety snapshots among States; and implementation of the Commercial Vehicle Information Exchange Window (CVIEW) or an equivalent method of exchanging intrastate carrier and vehicle safety snapshots within States.

2. Credentials administration -- End-to-end processing (i.e., carrier application, State

application processing, and credential issuance) of at least the International Registration Plan (IRP) and the International Fuel Tax Agreement (IFTA) credentials, with readiness to extend to other credentials (intrastate, titling, oversize/overweight, carrier registration, hazardous materials); connection to IRP and IFTA Clearinghouses; having at least 10 percent of the transaction volume conducted electronically, with readiness to bring on more carriers as carriers sign up and readiness to extend to branch offices where applicable.

3. Electronic screening -- Implemented at a minimum of one fixed or mobile inspection site and ready to replicate at other sites.

What Are the CVISN Deployment Workshops?

The CVISN Deployment Workshops are a series of three workshops to assist States in implementing the CVISN Level 1 Capability. At the workshops, the States will develop preliminary products necessary to prepare for CVISN deployment. These products include a preliminary CVISN Project Plan and a top-level system design.

It is anticipated that the series will include three workshops:

- **Scope Workshop**, which will produce a preliminary CVISN top-level system design. This design will include a project scope, State system design templates, and initial operational scenarios.
- **Planning Workshop**, which will produce a preliminary CVISN Project Plan. This Project Plan will include a work breakdown structure, performance milestones, and organizational responsibilities.
- **Design Workshop**, which will produce an updated top-level design, based on the cost and schedule constraints in the Project Plan.

Each workshop will last approximately four days.

Why Should My State Participate in the Workshops?

There are several important reasons that a State should participate in these workshops:

- The workshops are a proven process that has worked successfully for the CVISN Prototype and Pilot States. The workshop content has been refined based on feedback from this initial group of 10 States.

- The workshops will provide an opportunity to learn from the experience of the Prototype and Pilot States. These lessons learned may help new CVISN States save time & money by avoiding mistakes and maximizing their ITS/CVO investments. The designs and Project Plans used by these States will be part of the workshop materials. In addition,

representatives of several States will be available as a resource during the workshops.

- The workshops will provide States with the tools to move toward their ITS/CVO and CVISN deployment goals. The Project Plan with top-level system design will provide a blueprint for future systems development and implementation in a manner that is consistent with the National ITS Architecture and applicable standards. In addition, the Project Plan will provide estimates of staffing requirements, costs, and technical needs that will guide States in obtaining and allocating necessary resources to ensure effective implementation.

- The workshops will emphasize consistency with the National ITS Architecture. As noted, Section 5206 of TEA-21 requires that all ITS projects funded from the Highway Trust Fund, including Congressionally-designated projects, must be consistent with the National ITS Architecture and applicable standards.

How Do the Workshops differ from the ITS/CVO Technical Training Courses?

Over the past year, the FHWA has sponsored a series of three technical training courses for the States:

- Introduction to ITS/CVO, a 1 ? day course that provides an overview of the ITS/CVO program's purpose, structure, components, current and future implementation, and technology;
- ITS/CVO Technical Project Management for Non-Technical Managers, a 2 day course that emphasizes skills development for managing the design and implementation of ITS/CVO technology; and
- Understanding ITS/CVO Technology Applications, a 2-day course that provides an overview of the CVISN architecture and standards, technology, and interoperability.

These training courses are precursors to, but not replacements for, the workshops. The second and third courses are required for States who wish to participate in the workshops. Some of the important differences between the training courses and workshops are the following:

- The training courses are designed to build awareness of and commitment to ITS/CVO deployment among the States, while the workshops are designed to produce specific products including the system design and the CVISN Project Plan.

- The training courses are offered to individual States or small groups of States on an ongoing, as-needed basis, while the workshops will be offered according to a specific schedule at a limited number of locations.

- The training courses include a mix of lectures, exercises, and case studies, and emphasize individual learning. The workshops will include brief introductory lectures followed by

hands-on technical sessions, and will emphasize teamwork.

- The target audience for the training courses includes State managerial staff, FHWA field staff, and industry representatives. The target audience for the workshops is State CVISN project managers and CVISN system architects, State operations and information technology staff, state motor carrier association representatives, and FHWA field staff.

How Does the CVISN Project Plan differ from the ITS/CVO Business Plan?

The CVISN Project Plan is the logical next step for States that have completed their ITS/CVO Business Plan. The business plans have a strategic focus, and define program goals and projects at a conceptual level. The Project Plans have a technical focus, and define the State information system design. Other important differences between the business plans and Project Plans are the following:

- The business plans have a medium- to long-term planning horizon of three years or more. The Project Plans have a short-term planning horizon of less than three years.

- The business plan's scope is the broad application of ITS technologies to CVO in the areas of safety assurance, credentials administration, roadside screening, and carrier operations. The Project Plan's scope is the information systems and networks that are related to implementing CVISN Level 1 Capabilities in the areas of safety information exchange, electronic credentialing, and electronic screening.

- The business plan describes projects at a conceptual level, including general approaches and organizational responsibilities, relative priorities, approximate duration, and order-of-magnitude cost estimates. The Project Plan includes specific work assignments, phases, schedules, and budgets.

What Are FHWA's Expectations of States that Attend the Workshops?

The FHWA expects that each participating State will be committed to complete the full cycle of the workshops, and upon completion, to begin deployment of the ITS/CVO systems and services that meet its unique economic, administrative, and transportation needs, as outlined in the State ITS/CVO Business Plan. The workshop process will help the State to ensure that its deployment activities will be consistent with the National ITS Architecture and standards. This architectural consistency, in turn, will ensure that each State has a solid platform for future deployment activities and that each State's ITS/CVO systems will be interoperable with other States' systems and national systems.

The CVISN Prototype and Pilot States, as a condition for receiving Federal funds, were required to agree to undertake the series of activities described in the CVISN?Level 1" definition. The FHWA believes that these are a core set of capabilities that, when implemented as a group, will

maximize the potential safety and efficiency benefits of ITS/CVO. The new group of CVISN States will be expected to follow this model, based on the positive experience of many of the Pilot States. The new CVISN states will develop a project plan and top-level design for full deployment of the CVISN Level 1 capabilities, set priorities among these capabilities, and implement them in a manner that is consistent with the CVISN architecture and standards.

Is Additional Work Required Before and Between the Workshops?

The participating States will be given "prework" to complete before attending the first workshop, and in preparation for subsequent workshops. The purpose of this prework is to ensure that the States bring to each successive workshop the baseline information and ideas that they need to work effectively over the four-day period. For example, prior to the first workshop the project team from each State will be asked to review a series of reference documents (e.g., the CVISN System Design Description, the CVISN Operational and Architectural Compatibility Handbook, and the CVISN Glossary). In addition, the project team will be asked to complete a series of prework templates such as an inventory of active CVO projects and existing information systems.

At the workshops, each state initiates a part of their Project Plan that they then complete in preparation for the next workshop. At each of the subsequent workshops, a new part of a State's Plan is initiated with the final product of the workshops--a State's completed CVISN Project Plan--as the work initiated from the third workshop. Therefore, the commitment to participate fully in terms of completing deliverables on time and having a State's CVISN Project Team attend all three workshops cannot be stressed enough to interested States.

What Type of Support Will My State Receive in the Workshops?

The workshops will be led by ITS/CVO subject matter experts from the Johns Hopkins University Applied Physics Laboratory (JHU/APL), the organization that managed the design of the CVISN architecture and the model deployment initiative. Additional support will be provided by members of the ITS/CVO Technical Training Program course delivery teams. These trainers include CVISN Pilot State project managers, ITS/CVO regional champions, and other public and private sector personnel with experience in ITS/CVO. The trainers will be available to work with individual States during the workshop breakout sessions. In addition, other CVISN Pilot State personnel will be available to assist with the workshops in their regions.

Depending on the availability of Federal funding, some of the trainers will be available to make visits to individual States either before the workshops begin or between the workshops, to assist with prework and homework.

Which People from a State Should Attend the Workshops?

Each State must identify a core project team that will participate in all three of the workshops. This project team must include the following individuals:

- The State's CVISN project manager;
- The State's CVISN systems architect;
- A project facilitator or administrator, who could be a representative of a participating State agency or a consultant working with the State;
- Operations staff representing the agencies responsible for the State's major CVO functional areas (i.e., IRP, IFTA, safety information systems, roadside safety inspections, size and weight enforcement, and credentials enforcement);
- Staff from the State department of information technology or comparable information technology units within the State CVO agencies;
- Representative of the State Department of Transportation
- Representative of the FHWA Division office; and
- A motor carrier industry representative (invited).

In total, each State will need to bring approximately nine people to the workshops. The above list can have some of the roles combined. As background information, the current CVISN State representatives have provided general job descriptions for the CVISN Project Manager, System Architect, and Project Administrator are included as Attachment 2 to this memorandum.

What Are the Requirements for Participating in the Workshops?

The workshops are open to all States that are interested in pursuing ITS/CVO deployment. Based on the experience of the Prototype and Pilot States, the FHWA has set the following criteria for interested States to complete prior to attending the workshops:

Required

- Have a State ITS/CVO Business Plan that has been accepted by the FHWA. The completion of the ITS/CVO Business Plan represents the successful collaboration of multiple agencies and the motor carrier industry, and signifies the State's commitment to using ITS/CVO technologies to improve the safety and efficiency of commercial vehicle operations.

- Complete technical training courses. The technical training courses are designed to provide non-CVISN states an understanding of the national ITS/CVO program; its components, objectives, and expected outcomes; and the challenges inherent in planning for and deploying ITS/CVO technologies. The first course, Introduction to ITS/CVO, is recommended for workshop participants but can be waived for personnel with prior ITS/CVO knowledge and experience. The second course, ITS/CVO Technical Project Management for Non-Technical Managers, and third course Understanding ITS/CVO Technology Applications, are required for the personnel who will represent each State at the workshops.

- Commit a core CVISN project team to workshop participation. The States must commit the core members of its CVISN project team, as described above, to participation in all

three of the workshops.

Recommended

- Obtain high level commitment for implementing the State ITS/CVO Business Plan. A State may not be ready for the workshops if it is having difficulty obtaining the commitment of State agencies to begin Business Plan implementation.

- Establish a State ITS/CVO working group. States are encouraged to develop ongoing working groups, advisory committees, or steering committees to oversee their ITS/CVO programs, particularly CVISN-related activities. These committees should include representatives of all CVO-related agencies, the trucking and motor coach industries, the FHWA, and other key stakeholder groups.

- Identify potential sources for project funding. It is recommended that States identify potential funding sources for ITS/CVO deployment prior to and during the workshops, so that they may begin deployment upon completion of the workshops and Project Plans. Potential funding sources include State agency operating budgets and general funds, Federal-aid highway funds, Motor Carrier Safety Assistance Program (MCSAP) grants, and Congressionally designated projects to individual States or priority corridors. States that have difficulty identifying potential funding sources may wish to delay workshop participation.

- Support of senior management of CVO agencies. Similarly, it is strongly recommended that the States obtain the support of the senior management of CVO agencies, as well as, where appropriate legislators, governors, and state budget officials, for ITS/CVO deployment before or during workshop participation. This high-level support will help the State to obtain the human, financial, and technical resources necessary to support deployment once the workshops and Project Plans are completed.

- Identify and work toward the resolution of any Y2K problems among CVO agencies. It is strongly recommended that States resolve any Year 2000 computer problems among CVO agencies before beginning the workshops. Due to the urgency of meeting Y2K needs, some CVISN States have had to devote significant resources to Y2K information system changes and have not had sufficient resources for their CVISN initiative. However, other CVISN States have used a portion of their State's funds for Y2K issues on implementing parts of CVISN Level 1 Capability.

States that are interested in participating in the CVISN workshops should contact their OMC State Director and discuss whether the State has met all of these criteria or not. The State Director may recommend specific activities (e.g., designation of the CVISN project manager and systems architect) that the State should undertake in preparation for the workshops. In some cases, the OMC may recommend that a State delay workshop participation until the next round in 2000.

Where Will the Workshops Take Place?

To ensure that a manageable number of States participates in each workshop, the FHWA will sponsor three or four series of workshops largely in parallel, with each workshop series incorporating up to 10 states. Unlike the CVISN Pilot State Workshops, which were held at the JHU/APL in Maryland, these next series of workshops will be held in different regions of the country. The goal of the regional delivery is to reduce travel costs for participating States, as well as to ensure that States sharing common economic and transport needs are working together.

It is anticipated that three series of workshops will be offered in calendar year 1999: one in the central part of the country, and one in the west, and one in the Northeast (jointly sponsored by the FHWA and the I-95 Corridor Coalition). Depending on the level of interest among the States, a fourth series of workshops may be scheduled in the central part of the country. Where possible, the workshops will be hosted by the CVISN Pilot States in each region.

When Will the Workshops Take Place?

The workshop delivery schedule will be finalized based on the anticipated number of States that will participate in 1999. It is expected that the delivery schedule will be staggered by one to two months. For example, the workshops in the central region will begin in July 1999, with the western and northeastern series following in September and November 1999. Generally, the lag period between the individual workshops in each series will be three to four months, with allowances for holidays and summer vacations. Each initial series of workshops should be completed by May 2000. A final workshop series will begin in mid-2000 to incorporate any States that are not ready in 1999.

What Is the Cost of Participation in the Workshops?

There is no registration fee for participating in the workshops. The FHWA will attempt to minimize travel expenses by holding the workshops at locations in different regions. In addition, the FHWA will provide grants of $20,000 with a 50/50-match requirement to help defray the cost of travel expenses to the workshops by a State?s CVISN Project Team. These grant funds are only for those States that have not received ITS funds through Congressionally designated projects. However, States that have received funds from congressionally designated projects may use a portion of their monies to cover their CVISN Project Team?s travel expenses to the workshops.

How Does My State register for the Workshops?

States may register for the workshops by completing the preliminary registration form in Attachment 3 and sending it to the appropriate FHWA State Director. The State Director will follow up with more specific information to assist the State in getting ready for these workshops. States that are members of the I-95 Corridor Coalition will receive future information directly

from the Coalition.

Attachment 2

Sample Job Descriptions for State CVISN Project Manager & Systems Architect

State CVISN Project Manager

POSITION OBJECTIVE:
This position has specific delegated authority to manage the statewide deployment of separate projects identified to implement CVISN Level 1 Capabilities. This position will be responsible for accomplishing the design and development of these projects. The Project Manager also will be responsible for planning, managing, and directing the work of senior managers and private contractors in multi-disciplined design, plan review, including right-of-way plans, and review of computer system design impacts on construction projects.

The Project Manager also will be responsible for the development of project contracts, Requests for Proposals (RFP), reviewing and making effective recommendation for acceptance of scope of work documentation, and project cost estimations. This position also will represent the Department of Transportation at meetings of regional and national ITS/CVO committees.

KNOWLEDGE AND SKILLS REQUIRED:
This position is a high level management position requiring broad experience in managing a multi-disciplined staff, strong managerial skills, and a strong command of international, federal, state, and local transportation policies and guiding principles.

This position requires the ability to negotiate with diverse interest groups to bring about consensus with both the public and private sector partners. A broad knowledge of the transportation agencies regulatory functions is necessary to ensure that appropriate expertise is available and utilized throughout all phases of the project deliverables.

Specific areas of knowledge should include:

- CVISN architecture and principles;
- Message switching;
- Contract development and administration involving Federal cooperative agreements;
- Federal grant application/development process;
- Generally accepted accounting principles;
- Application of advanced project management principles;
- State and Federal budget management, planning, and administration for inter-agency budget proposals;
- Advanced principles of management, staff development, constituent and consensus building, and training

- State and federal legislative processes, including practical experience in working with legislative committees;
- State agency functions in the commercial vehicle arena;
- State and federal commercial vehicle laws and regulations, industry practices, and other states' commercial vehicle operations;
- Methods needed to create and communicate strategic and business plans for Intelligent Transportation Systems (ITS) related projects;
- State information technology reporting requirements;
- State procurement and acquisition policies, procedures, and contract management; and
- Total Quality Management principles.

The project manager should have the skills to:

- Coordinate activities of multiple projects to achieve one coordinated outcome;
- Display strategic and creative thinking regarding the deployment methods of multiple projects having long-term impacts on the state's infrastructure;
- Provide effective oversight to projects, identifying problems and constructing plans of actions to mitigate risks;
- Communicate effectively and interface with customers who use data switching techniques, private sector business executives, and other high level regulatory agency managers, executive management level and technical staff;
- Communicate effectively in the legislative process;
- Work without direct supervision; and
- Interact with external stakeholders.

NATURE AND SCOPE:

The scope, authority, and impact of this position will have significant impact from within and outside of state government. The incumbent will be expected to develop ITS policy regarding CVISN, which will have a visible impact on a substantial portion of the state's economy and which will be critical to the central business purpose of the state.

Because of the high visibility of CVISN, the Project Manager will retain full oversight for all technical aspects of the projects. This position will be expected to practice the full utilization of management principles in carrying out the duties of this job. This position will direct supervisors and managers from the other transportation agencies while fulfilling the goals and objectives of the CVISN project. The implementation of this project demands that this position have the ability to strategically implement the work breakdown structure and work tasks so that they have the least impact on the operations of each regulatory agency. The position will be responsible for making decisions in all maters of the design process, advising senior management of decisions, and soliciting input and alternatives on decisions of major impact to the CVISN program.

PRINCIPAL RESPONSIBILITIES:

- Provide administration for the CVISN project through which the design of all deployment sites will be coordinated and controlled.
- Provide technical, schedule, and financial/funding oversight and guidance during the design process for all CVISN deployment sites to ensure conformance with state and

national standards.

- Ensure that the proper documentation is processed and appropriately submitted for all design decisions.
- Work with the public and private sectors to develop and ensure consensus about project definition that protects the integrity of the transportation infrastructure and meets the needs of our customers.
- Negotiate with the project partners to ensure that strategic business requirements of performance goals are met, system security is adequate, user system testing is completed satisfactorily, and user activities for system conversions and implementation are planned and achieved within project budgets and time frames.
- Receive and resolve complaints or concerns from the public about project definition.
- Interface with executive level management, administrators, managers, and both project and non-project staff.
- Provide guidance to the CVISN Steering Committee as to the approval of the system architecture deliverables, functional design deliverables, changes to architecture, budget expenditures, assignments of work, as well as plans needed to achieve integration of the existing databases.
- Assist with the development of strategic ITS/CVO regional business plans to ensure compatibility with adjoining states.
- Assist with testimony to the appropriate legislative committees regarding the deployment of CVISN.
- Work with industry in the deployment of CVISN.

State CVISN System Architect

POSITION OBJECTIVE:
The position has delegated authority from the CVISN Project Manager to direct the technical engineering, research, and development of CVISN compliant systems and networks for safety information exchange, credentials administration, and electronic screening. The engineering and research will involve planning for interfaces and modifications to existing statewide legacy systems, and ensuring CVISN compatibility on a national level through to the developmental stage.

The System Architect, in addition to providing technical network engineering services, will manage professional, technical personnel responsible for a variety of tasks, which include protocols such as: data system design and documentation; implementation and installation of CVISN software and hardware; and communication systems development and design.
The System Architect also will provide technical expertise to all CVISN partners (both state and industry) and will be responsible for monitoring the data design deliverables from private sector vendors.

KNOWLEDGE AND SKILLS REQUIRED:
- Data design and system documentation principles;
- Strategic planning and organizational development;
- CVISN system architecture;
- CVISN data sets and national standards;
- Identifying and managing conflict within the work environment;
- Quality management techniques;
- Problem solving using quality principles to effectively facilitate change;
- State procurement and budgeting processes;
- Project management principles and tools;
- Operational and technical principles of analog and digital microwave carrier systems;
- Operational and technical principles of mobile data communication systems;
- Operational and technical principles of wide area networks (WAN), local area networks (LAN), and their associated protocols; and
- Federal Communication Commission Regulations.

<u>The System Architect should have the ability to</u>
- Work without direct supervision;
- Successfully represent the State at the national and international level in the development of CVISN standards and protocols, providing expertise in the research and development of CVISN components (Commercial Vehicle Information Exchange Windows, Credentials Interface, Carrier Automated Transactions);
- Perform people management skills, including successful team building, coaching, mentoring, and persuasive and influential leadership;
- Provide effective leadership; with demonstrated ability to work with employees at all levels within the organization including the executive level;

- C Communicate effectively technical and non-technical information (written, oral, and presentations);
- C Make sound management decisions;
- C Develop CVISN internal team operating procedures, set goals and objectives;
- C Design, develop and manage multiple projects simultaneously; and
- C Work with multiple state and federal agencies on highly technical issues and projects;

NATURE AND SCOPE:

The position will:

- C Report to the CVISN Project Manager and the CVISN Steering Committee;
- C Provide appropriate and desirable guidance to outside technical mangers in such a manner as to strategically cause a unified approach to the project;
- C Assist the CVISN team in identifying, developing, implementing, and managing data system policies regarding the deployment and maintenance of the CVISN project;
- C Advise managers at all levels within the state transportation agencies and private sector partners on issues of an architectural nature that might affect them;
- C Identify, develop, and implement policies regarding the design, installation, maintenance and coordination of data systems supporting local, state, and federal customers;
- C Develop data and communication policy having system wide application;
- C Consult with other State agencies, other states with their respective agencies, and federal agencies on the potential policy impacts regarding the implementation of new technologies, their associated standards, and communication system designs; and
- C The Technical Manager will have project management and leadership responsibilities for technical employees, such as engineering supervisors, electronic design engineers, and computer information systems specialists;

Other employees who may be indirectly managed by this position have responsibility for duties such as: designing and managing the implementation of statewide communication systems; providing consultation to local, state and federal agencies; and developing and implementing standards and practices for the agency's statewide voice and data communication systems

Decision-making responsibilities brought to this position for action, include:

- C Establishing and managing work priorities and their corresponding work schedule for the CVISN project;
- C Development of Requests For Proposals (RFP) for technical projects;
- C Approval of requests for redistribution of funds;
- C Data system and communication system design, implementation and maintenance decisions; and
- C Technical training evaluation and the development of technical training programs.

Decision-making responsibilities taken to the CVISN Project Manager for action or consultation, include:

- C Significant changes in policy, practices, design or maintenance affecting the project's data and communications systems or their customers;

- Future budget request issues; and
- Unplanned budgetary items of significant impact.

PRINCIPAL RESPONSIBILITIES:

- Develop an “open systems” technical infrastructure that allows different Intelligent Transportation Systems/Commercial Vehicle Operations (ITS/CVO) systems to communicate easily and consistently using common principles, data, and standards;
- Monitor engineering and data gathering deliverables identified in contracts with vendors;
- Oversee the Independent Validation and Verification process of the CVISN architecture to ensure nationwide compatibility;
- Identify, develop, and implement policies having multi-agency application regarding the design, installation, maintenance, and coordination of CVISN related data systems;
- Works with other state, and federal personnel to ensure interoperability between CVISN deployment activities;
- Identify, assess, and communicate to state and federal CVISN partners and private industry the impacts of current and developing technologies;
- Participate in the development of national and international CVISN related data communication standards;
- Design and manage the development of multiple data communication systems simultaneously; and
- Provide technical expertise to CVISN partners.

Attachment 3

Preliminary CVISN Deployment Workshops Registration Form

Date:
State:
State Lead Agency:

State Contact Person:

Name:
Title:
Agency:
Address:
Phone:
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State CVISN Project Team[1] (For as many as possible, please provide name, title, agency, address, phone, fax, email for the following)

- CVISN Project Manager
- CVISN System Architect
- CVISN Project Facilitator/Administrator
- IRP Agency Representative
- IFTA Agency Representative
- Safety Information Systems Representative(s)
- Enforcement Representative(s)
- Information Technology Representative(s)
- State Department of Transportation Representative
- Motor Carrier Representative(s) (invited)
- FHWA Division Office Representative
- Other

[1] Some of these roles can be combined.

Interim Guidance on Conformity with the National ITS Architecture and Standards

I. Introduction

The Transportation Equity Act for the 21st Century (TEA-21) contains a provision requiring Intelligent Transportation System (ITS) projects implemented with funds from the Highway Trust Fund (including the Mass Transit Account) to conform to the national architecture [National ITS Architecture], applicable or provisional standards, and protocols. This document provides Interim Guidance for meeting this section of the law (Section 5206(e)—Conformity with National Architecture). Included with the Interim Guidance is a recommended approach to assist in meeting the legislative intent.

II. Background and Goals

Section 5206 of the legislation aims to accelerate the integrated deployment of ITS in metropolitan and rural areas and in commercial vehicle operations through the use of the National ITS Architecture or locally developed regional architectures. The legislation also aims to facilitate interoperability through the use of standards and protocols. The National ITS Architecture is a tool to help agencies identify and plan for the many functions and information sharing opportunities which may be desired.

The greatest benefit from ITS accrues when ITS projects are planned and designed within a broad regional context that supports the operation and management of the transportation system. Additionally, the development and use of a regional ITS architecture to guide the integration of ITS projects and programs and enable information sharing among stakeholders within an area is good, sound practice. Due to the variety of ITS services and stakeholders, a "region" can be defined as metropolitan, statewide, multi-state, and, for some applications, national.

Implementation of this legislative provision will foster sound ITS systems planning and design practices to achieve the following goals:

- involve and unite a wide range of stakeholders in planning for ITS
- support flexibility in tailoring ITS deployment and operations to local requirements
- achieve integration of ITS systems and components
- enable information sharing among stakeholders
- facilitate future ITS expansion in a cost-effective way
- provide for future interoperability of key ITS services at a national level.

The achievement of these goals will ultimately be manifested in five ways:

1. The consideration of transportation system operations and management will be integrated into the transportation planning process and reflected in regional transportation goals and objectives.

2. ITS strategies that effectively address regional goals and objectives will be considered and prioritized within regional planning efforts to promote efficient system management and operation. The development of a regional ITS architecture will complement this framework.
3. ITS projects will provide for all applicable information sharing opportunities.
4. ITS projects will use open standards and protocols in support of interoperability.
5. The National ITS Architecture will be used as a tool in regional architecture development and project design, as appropriate.

III. Applicability and Exceptions

The processes and practices being promoted in this document are sound practices for any project; however, listed below are the factors that affect whether or not this Interim Guidance applies:

Type of Project

For the purposes of the Interim Guidance, projects are classified into four categories:

(1) projects without ITS,
(2) ITS projects that affect regional integration,
(3) ITS/Commercial Vehicle Operations (CVO) projects, and
(4) other ITS projects

Categories (2), (3), and (4) are all considered to be ITS projects. ITS projects include both stand-alone ITS projects and projects that contain ITS elements. (See Appendix A for definitions). The Interim Guidance applies to all ITS projects, with particular attention to those ITS projects that affect regional integration. In the case of category (3), ITS/CVO projects, the Interim Guidance references other procedures that have been developed to support Commercial Vehicle Information Systems and Networks (CVISN) deployment. The Interim Guidance does not apply to category (1), projects without ITS.

Funding Source

All ITS projects receiving funding in whole or in part from the Highway Trust Fund are subject to the Interim Guidance.

Stage of Development

As of the date of issuance of the Interim Guidance, all ITS projects that are under construction or projects for which final design is complete are exempt from this Interim Guidance.

Legislative Exceptions

TEA-21 allows the Secretary to authorize exceptions to the conformity requirement for projects designed to achieve specific research objectives [as defined in Section 5206 (e) (2) (A)] and for projects to upgrade or expand an ITS in existence as of the date TEA-21 was enacted. Only those projects meeting three specific criteria are eligible for exception as an upgrade or expansion. These criteria [as defined in Section 5206 (e) (2) (B)] are that the project:

(i) (would) not adversely affect the goals or purposes of this subtitle [The ITS Act of 1998];

(ii) is carried out before the end of the useful life of such system; and

(iii) is cost-effective as compared to alternatives that would meet the conformity requirement.

TEA-21 also includes a general exception on funds used for the operation or maintenance of an ITS in existence on the date TEA-21 was enacted. A copy of the TEA-21 ITS Act goals, purposes, and exception language is provided in Appendix C.

Meeting the intent of the TEA-21 conformity language (and this Interim Guidance) does not in any way require replacements or retrofitting of existing systems. Logically planned enhancements take existing (or legacy) systems into account. Because one of the purposes of the ITS Act is to improve regional cooperation and operations planning, ITS projects that affect regional integration would generally not satisfy exception criteria (i) above. If an exception is granted, documentation of the determination and rationale should be kept in the project files.

IV. Interim Guidance

For the period of this Interim Guidance, to ensure conformity with the National ITS Architecture and applicable standards, the following applies:

A. ITS Projects

1. Recipients of funds from the Highway Trust Fund for ITS projects that affect regional integration shall evaluate those projects for institutional and technical integration with transportation systems and services within the region, and consistency with the applicable regional ITS architecture or the National ITS Architecture. Based upon this evaluation of the project(s), Highway Trust Fund recipients shall take the appropriate actions to ensure that development of the project(s): (a) engages a wide range of stakeholders, (b) enables the appropriate electronic information sharing between shareholders, (c) facilitates future ITS expansion, and (d) considers the use of applicable ITS standards.

2. Recipients of funds from the Highway Trust Fund for ITS/CVO projects should follow the ITS/CVO Conformance Assurance Process Description to guide development of the project(s). These procedures are provided in the National ITS Architecture and Standards Resource Guide. Projects having a CVO technology component, but not meeting the definition of an ITS/CVO Project, should be treated as either ITS projects that affect regional integration or other ITS projects for the purposes of this Interim Guidance, and are subject to (IV.A.1) above or (IV.A.3) below.

1.Recipients of funds from the Highway Trust Fund for other ITS projects (not deemed to affect regional integration and not defined as ITS/CVO projects) should consider the same evaluation and actions described in (IV.A.1) above.

B. ITS Considerations in Transportation Planning

Statewide and metropolitan planning activities should include consideration of the efficient management and operation of the transportation system. This should include the regional implementation and integration of ITS services and development of a regional ITS architecture(s), as appropriate. Regional consideration of ITS should address (a) the integration of ITS systems and components, (b) inclusion of a wide range of stakeholders, (c) flexibility in tailoring ITS deployment and operations to local needs, (d) electronic information sharing between stakeholders, and (e) future ITS expansion.

The Interim Guidance is anticipated to be in effect for approximately one year. The Interim Guidance is the first step in a phased approach for implementing the TEA-21 conformity provision. The final implementing policy may contain additional requirements.

V. Recommended Approach

An approach for meeting the Interim Guidance (given in section IV) is suggested below.

A. Immediate Actions

1. Agencies should cooperatively work with FHWA Division (Federal Aid and Office of Motor Carriers) and/or FTA Region staff and other local agencies, including the applicable Metropolitan Planning Organization (MPO) or planning agency, to categorize projects receiving funding through the Highway Trust Fund into four categories: (1) projects without ITS, (2) ITS projects that affect regional integration, (3) ITS/CVO projects, and (4) other ITS projects. These categories will help to determine the projects for which the Interim Guidance applies. As a minimum, this action applies to all projects included in transportation plans, Statewide Transportation Improvement Programs (STIPs), Transportation Improvement Programs (TIPs), Commercial Vehicle Safety Plans (CVSPs), projects in design, and other projects that are under consideration. If an overall categorization is not carried out, then determination should be made on a case by case basis by recipient agencies and federal field staff.

2. In consultation with FHWA Division and/or FTA Region field staff and the applicable MPO or planning agency, agencies should determine if a regional ITS architecture exists within which individual ITS projects and programs should fit (at a metropolitan, statewide, corridor, or multi-state level). The regional ITS architecture should be defined at the subsystem and information (architecture) flow level, showing the type of information exchanges planned between specific agencies.

B. ITS Projects

The suggested approach for meeting the Interim Guidance on ITS Projects is provided below for the different categories of ITS projects. It is suggested that these steps be accomplished early in the planning and/or design process, as there will be greater ease in making modifications in the scoping and early design stages.

For ITS Projects that Affect Regional Integration and Other ITS Projects :

The suggested approach provided below (or an alternative approach that meets the intent of the Interim Guidance) should be applied to ITS projects that affect regional integration. The same approach is also recommended for other ITS projects, to a degree that is appropriate to the local situation, integration needs, and the type of project being implemented. The approach is tailored to accommodate areas both with and without a regional ITS architecture.

1A. For areas with a regional ITS architecture:

Scope the project to be consistent with the regional ITS architecture. If the project is under design, determine if that project fits within (is addressed by) the regional ITS architecture. If the project does not fit within the regional ITS architecture, consider whether the regional ITS architecture needs revision or whether the project scope/design needs modification.

1B. For areas without a regional ITS architecture:

Determine the applicable portions of the National ITS Architecture within which the project generally fits. As closely as possible, define the project using the subsystems and information (architecture) flows from the National ITS Architecture.

1. Early in project design (and periodically throughout the design process), the following considerations should be addressed:

    a. Include all relevant agencies/stakeholders (including agencies responsible for transportation operations and appropriate planning agencies) in the project design process and ensure their continuing participation.
    b. Ensure that all applicable subsystems and information (architecture) flows from the regional ITS architecture [or from the National ITS Architecture, for areas without a regional ITS architecture] have been considered in the project design. If not, consider modifications. It may be helpful to include, in the design documentation, listings or illustrations of the subsystems and information flows that are being provided by the project, and any relevant supporting discussion that indicates why information flows suggested by the regional ITS architecture [or from step 1B, for areas without a regional ITS architecture] may not have been included.
    c. Consider incorporating additional information flows, as appropriate to the situation, in anticipation of future needs.

d. Ensure that relevant technology and operating agreements are reached between the affected parties.
e. Ensure that future expansion and information sharing opportunities are kept open through the project design strategy.

2. Identify any applicable standards and protocols that are appropriate for the project. Consider incorporating them into the project design and specifications. Wherever feasible, open systems should be considered in lieu of systems with proprietary interfaces. It may be helpful to clearly identify, in the design documentation and specifications, the standards which are being used in the project.

   Even if a regional ITS architecture exists, the National ITS Architecture can be used as a valuable resource for many of the above steps (e.g., for consideration of additional information flows, item 2c).

For ITS/CVO Projects:

1. Review the ITS/CVO Architecture Utilization Policy and, at a minimum, the following two related documents: the ITS/CVO Conformance Assurance Process Description and the Interoperability Testing Strategy. All three documents are included in the National ITS Architecture and Standards Resource Guide.

2. Follow the recommendations in the ITS/CVO Conformance Assurance Process Description:

   a. Assess commitment to the architecture and operational concepts,
   b. Assess project and work plans, reviews, and top-level design,
   c. Assess detailed design, and
   d. Assess implemented systems through interoperability testing.

   The Conformance Assurance Process Description defines evaluation criteria for ITS/CVO architectural conformity, and establishes a mechanism for fostering conformance in a deployment or implementation. Each ITS/CVO project should have aplan which includes an incremental checkpoint system for assessing architecture conformance. At each checkpoint, documents should be reviewed against architecture criteria and issues and potential interoperability problems identified. If problems are discovered, remedial actions should be developed and implemented to resolve the problems. Progress toward resolution should be tracked, and action assignments/resolutions should be documented to serve as a monitoring and lessons learned tool for future CVO deployments.

3. Use the standards recommended for ITS/CVO to facilitate interoperability.

C. ITS Considerations in Transportation Planning

The activities within the suggested approach given below are intended to encourage sound consideration of the operations and management of the transportation system, including the development of a regional ITS architecture and related efforts to advance ITS in a region.

It should be noted that what constitutes a region is locally determined based on the needs for sharing information and coordinating operational strategies. For a metropolitan region, it is recommended that the size of a region not be smaller than a metropolitan planning area boundary. For ITS/CVO projects, it is recommended that the size of the region not be smaller than a state, with consideration for multi-state, national, and international applications. The size of the region should promote integration of transportation systems by fostering the exchange of information on operating conditions across a number of agencies and jurisdictions. Likewise, the determination of the leadership or "champion" role in carrying out these planning activities is a local decision.

Engage a broad range of stakeholders

An open and inclusive process for engaging a broad range of transportation stakeholders in developing ITS activities is key to achieving integration and information sharing. As appropriate, stakeholders should include but are not limited to the following:

state transportation agencies, transit providers, metropolitan planning organizations, local (city/county) transportation agencies, police departments, fire departments, emergency medical services, toll authorities, traveler information providers, the media, telecommunications providers, other private transportation providers, port authorities, airport authorities, commercial trucking associations, freight railroad associations, motor carrier regulatory or enforcement agencies, non-governmental organizations, and the general public.

Identify needs that can be addressed by ITS

The transportation problems and needs that can potentially be addressed through operations and management strategies should be identified. These needs should be developed in the context of the needs, goals, and objectives already developed as part of the applicable transportation planning process. Participants should discuss opportunities for using ITS applications as part of the overall mix of strategies to meet identified needs and goals.

Describe existing and planned ITS enhancements

A sound understanding of current and committed ITS projects, operational agreements, and information sharing arrangements is needed before future plans for ITS development are discussed. Participants should (1) identifyexisting ITS components and integration and (2) then develop a list of planned ITS enhancements that will address identified needs and improve the operations and management of the transportation system. The existing situation and planned ITS enhancements should be described in terms of the physical system description and the extent of information sharing. Metropolitan ITS and CVISN Deployment Tracking Surveys and indicators provide a useful starting point and approach for describing existing and planned ITS enhancements.

Define a regional ITS architecture

Given the existing and planned ITS enhancements, identified needs, and using the National ITS Architecture as a tool, a regional ITS architecture can be developed to serve as a high-level template for ITS project development and design. The regional ITS architecture should include subsystems and information flows relevant to the area. The regional ITS architecture should be periodically revisited and updated to reflect ongoing discussions and improvements. An existing regional ITS architecture should be assessed to ensure that it provides an appropriate level of detail.

Define operating requirements

Implementation of the planned ITS enhancements and information sharing arrangements requires further definition of the operational agreements between the various agencies and jurisdictions. An operating concept should be established that identifies the general roles and responsibilities of the stakeholders in the development and day-to-day operation of the system. This includes establishing requirements or agreements on information sharing and traffic device control responsibilities and authority (e.g., deciding if back-up control capability is desired given a loss of power or failure condition). These decisions will be factored into the regional ITS architecture and will also flow-down through ITS projects as they are phased in. Because many ITS services and strategies involve communication and coordination, this step should not be overlooked.

Coordinate with planned improvements

As agencies begin to determine ITS projects that can be implemented in the near to mid-term time frame, potential opportunities should be explored for leveraging activities with planned capital projects such as facility reconstruction, capacity expansion, or new bus purchases. These projects are likely already contained in Transportation Improvement Programs (TIPs), Statewide Transportation Improvement Programs (STIPs), Commercial Vehicle Safety Plans (CVSPs), applicable transportation plans, or specific agency plans. An example of this coordination would be adding the ITS communications and

surveillance infrastructure (or other components) at the same time as a reconstruction project, resulting in overall cost savings and minimized traffic disruption compared to adding the ITS infrastructure after the reconstruction project was completed.

Develop phasing schedule

The phasing of ITS projects and strategies into the regional transportation system and planning process will need to be considered. Phasing considerations include anticipated time frame for implementation, geographic context (both within and between jurisdictions), functional capabilities, and funding considerations. Geographic considerations involve decisions such as the initial and future system coverage area, which jurisdictions in the region will be upgraded first, which transit agencies in the region will participate in the electronic fare media project, etc. Functional considerations include deciding which basic functions of a system should be implemented first and which should be deferred. The phasing considerations and decisions made in the initial stages may be conceptual, with flexibility for changes and further definition during future project development and design.

Develop regional technology agreements

As potential ITS actions are advanced, it may become necessary for stakeholders to reach agreement on some technologies, standards, or deployment choices that have regional significance. This particularly applies to the near-term projects that have been identified. For example, regional choices on technologies or standards may be required for the telecommunications infrastructure, electronic toll tags, signal controllers and interfaces, electronic fare media, and specialized mobile radio systems. For ITS/CVO projects, public and private stakeholders need to reach agreement on hardware, software, operational, and programmatic requirements for interoperability to exist in multi-state and national systems. Standards should be identified to foster interoperability of systems and interchangeability of components. When identifying standards, agencies should consider the current status of ITS standards development activities and determine how and when these can best be incorporated into the designs of projects within the region.

Identify ITS projects for incorporation into transportation planning products

ITS projects utilizing funds from the Highway Trust Fund will be incorporated, as appropriate, into transportation planning and programming products (such as the transportation plan, the STIP, TIP, and the CVSP) and adopted by the metropolitan planning organization or other applicable planning agency. Ultimately, this can be best achieved when the consideration of ITS is consistent with the goals and objectives adopted by regional transportation planning bodies and carried out in the context of the transportation planning process

Section Tabs

4. Information Systems
5. Connecting Systems
6. Cred Admin Applications
7. Day 1 Wrap-up

8. Day 2 Goals

9. Sensors, Communications, Control

10. Carrier ITS/CVO Technology

11. E-Screening Applications

12. Safety Applications
13. Pulling it All Together
14. Wrap-up
15. Acronyms

R2. Midland

R3. Architecture & Design

R4. Information Systems

R5. Connecting Systems

R6. Cred Admin Applications

R9. Sensors, Communications, Control

R10. Carrier ITS/CVO Technology

R11. E-Screening Applications

R12. Safety Applications

R13. Pulling it All Together

R14. Workshop Interest Letter