6 REQUIREMENTS AND DESIGN GUIDANCE

According to the Transportation Equity Act for the 21st century (TEA-21), states using federal funds (Highway Trust Funds) must conform with the National Intelligent Transportation System (ITS) architecture and standards, which include the CVISN and International Border Clearance (IBC) architecture and standards. References 12 and 13 contain initial draft guidance from the United States Department of Transportation related to conformance. Rulemaking related to architecture conformance is expected in 1999. Broadly stated, for electronic screening, "conforming with the architecture" means:

- agreeing with the principles and following the guidance in the *CVISN Operational and Architectural Compatibility Handbook (COACH) Part 1* (Reference 9)
- using the DSRC standards; EDI standards and common identifiers as explained in the *CVISN Operational and Architectural Compatibility Handbook (COACH) Part 4* (Reference 14)
- conducting interoperability tests to demonstrate the criteria defined in the *CVISN Operational and Architectural Compatibility Handbook (COACH) Part 5* (Reference 15).

In TEA-21, Congress strongly supports the theme of interoperability. Section 5206(a)(2), "Interoperability and Efficiency", states that "to the maximum extent practicable, the national architecture shall promote interoperability among, and efficiency of, ITS technologies implemented throughout the U.S." The ITS America (ITSA) CVO Technical Committee, with representatives from most CVO stakeholder groups, has adopted a set of guiding principles (Reference 10) in recognition of the importance of promoting interoperability. The ITSA CVO Technical Committee has also adopted the Fair Information Principles for ITS CVO (Reference 11). These principles were developed in recognition of the importance of protecting individual privacy in implementing ITS for CVO.

The CVISN Level 1 requirements in the electronic screening capability area, as stated in Reference 9, are as follows:

- Implemented at a minimum of one fixed or mobile inspection site
- Ready to replicate at other sites

The *CVISN System Design Description* (Reference 16) includes the top-level requirements for electronic screening, and shows the generic CVISN state design approach. The *CVISN COACH Part 3* (Reference 17) takes the *CVISN COACH Part 1* state screening-related requirements and allocates them to components of the generic CVISN state design, providing a model for states to tailor.

6.1 Electronic Screening – Conforming with the Architecture

In this section, we illustrate various approaches to electronic screening which conform to the architecture. The approaches illustrated here represent several of the electronic screening options being pursued by CVISN prototype and pilot states. The examples do not exhaust the possibilities, but do represent a variety of choices that have been considered by early implementers.

To achieve interoperability, the CVISN architecture calls for the use of open standards for carrier-state and state-state (via the CVISN Core Infrastructure) interfaces. Use of DSRC and EDI X12 standards for these interfaces is required for architecture conformance. Interfaces that are wholly within a state government's control (e.g., between state agencies) are not required to use open standards. Most CVISN Model Deployment States have chosen to use open standards for some within-state interfaces, and have chosen to use existing custom interface agreements for others.

Figure 6-1 illustrates the various interfaces using a generic functional thread diagram for electronic screening. The following list summarizes the interface requirements related to electronic screening from the *CVISN COACH Part 4* (Reference 14).

- To conform with the architecture, ASTM E17.51, v6-compliant DSRC readers and transponders should be used for vehicle-to-roadside communications
- To conform with the architecture, EDI standard transactions (285, 824, 997) should be used to transfer snapshots between the state systems and SAFER

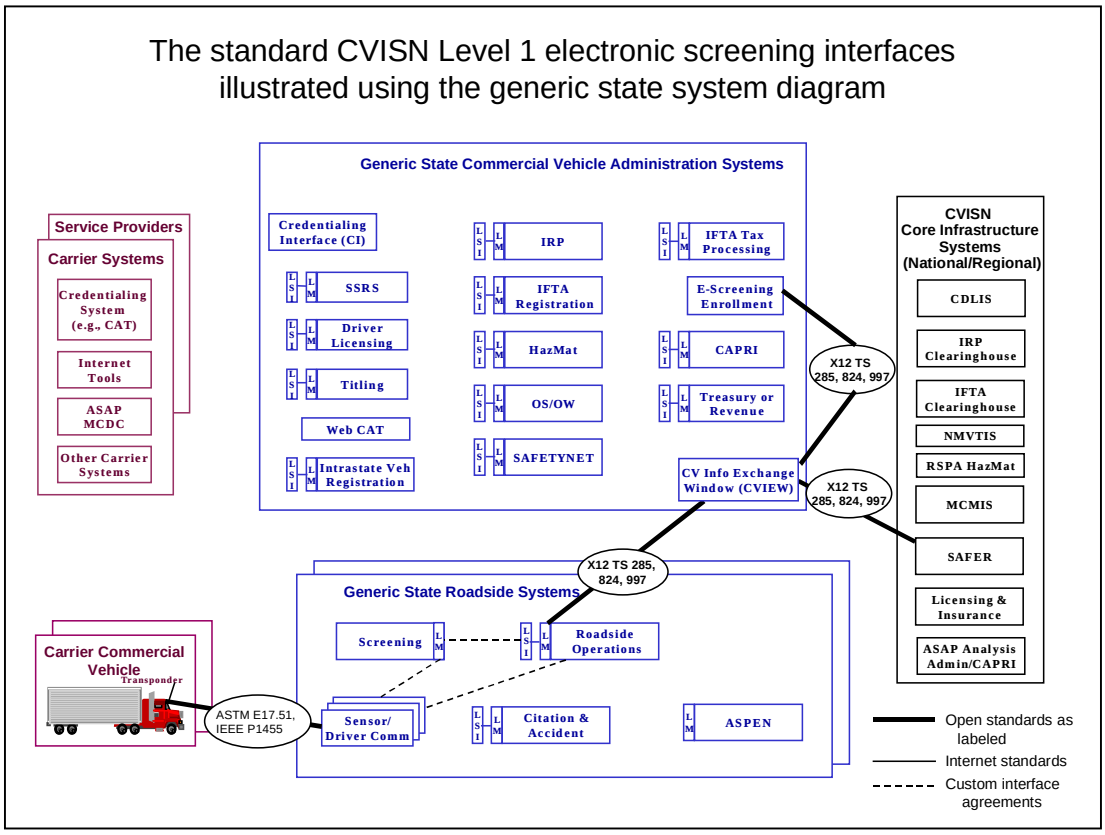

Figure 6–1. CVISN Level 1 Interfaces Related to Electronic Screening

Figure 6-2 illustrates the interface between the commercial vehicle and the roadside facilities using DSRC. DSRC is used to provide data communications between a moving vehicle and the roadside equipment to support the screening process. In electronic screening, DSRC may be used to:

- Transmit the factory-programmed transponder ID, which can be used to derive carrier and vehicle identifiers, to the roadside
- Transmit the carrier and vehicle identifiers to the roadside
- Store and transmit data from a prior screening event, to the roadside
- Signal the vehicle with the bypass/pull-in decision

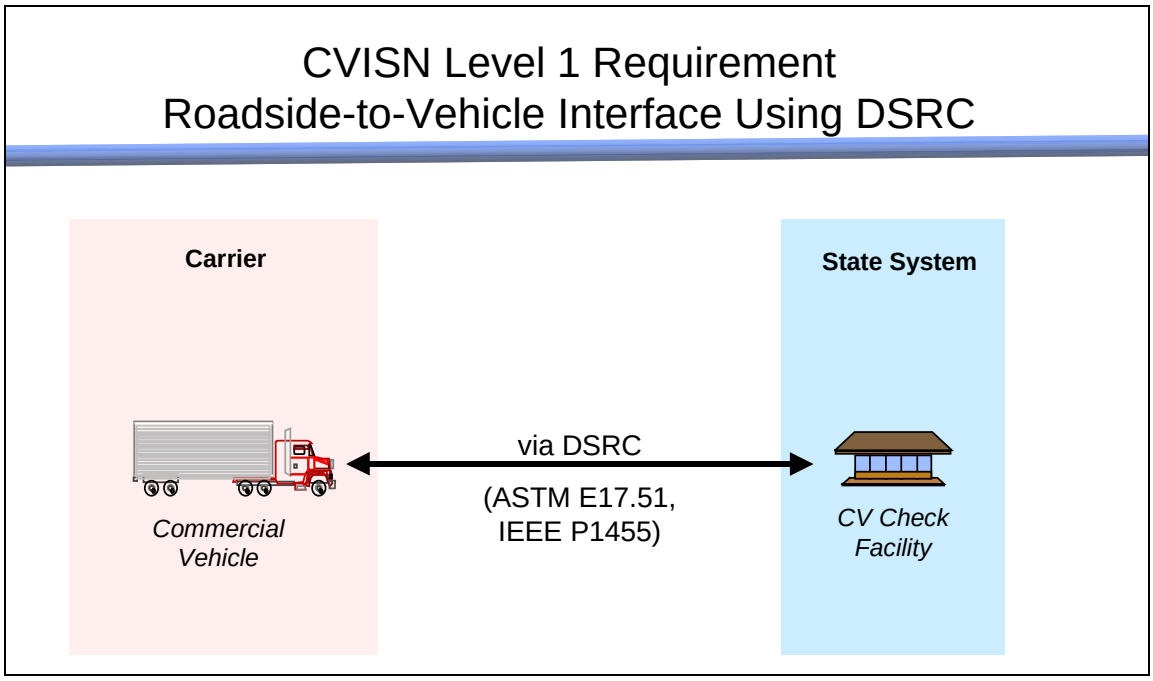

Figure 6–2. CVISN Level 1 Interface Requirement: DSRC

To conform with the architecture and current USDOT policy, ASTM E17.51, v6-compliant DSRC readers and transponders should be used for the immediate future. Raytheon (formerly Hughes Aircraft) and Mark IV Industries are currently the only hardware vendors manufacturing DSRC equipment using this protocol.

USDOT is in the process of defining a new policy for DSRC in CVO applications (see Section 3.4.1). According to the current draft policy, "Beginning January 1, 2001, all CVO and Border crossing projects will use an active sandwich configuration that is backward compatible with the current configuration…" JHU/APL is currently working with both Raytheon and Mark IV Industries to define the DSRC active sandwich specification. Equipment meeting this specification is designed to be backwards compatible with current ASTM v6 products, allowing a smooth migration to the new configuration.

Figure 6-3 illustrates the CVISN Level 1 requirement to transmit and receive carrier and vehicle snapshots, via EDI, between SAFER and the state credential system. As required to meet CVISN Level 1, these carrier and vehicle snapshots are used to perform safety and credential checks in support of the screening decision.

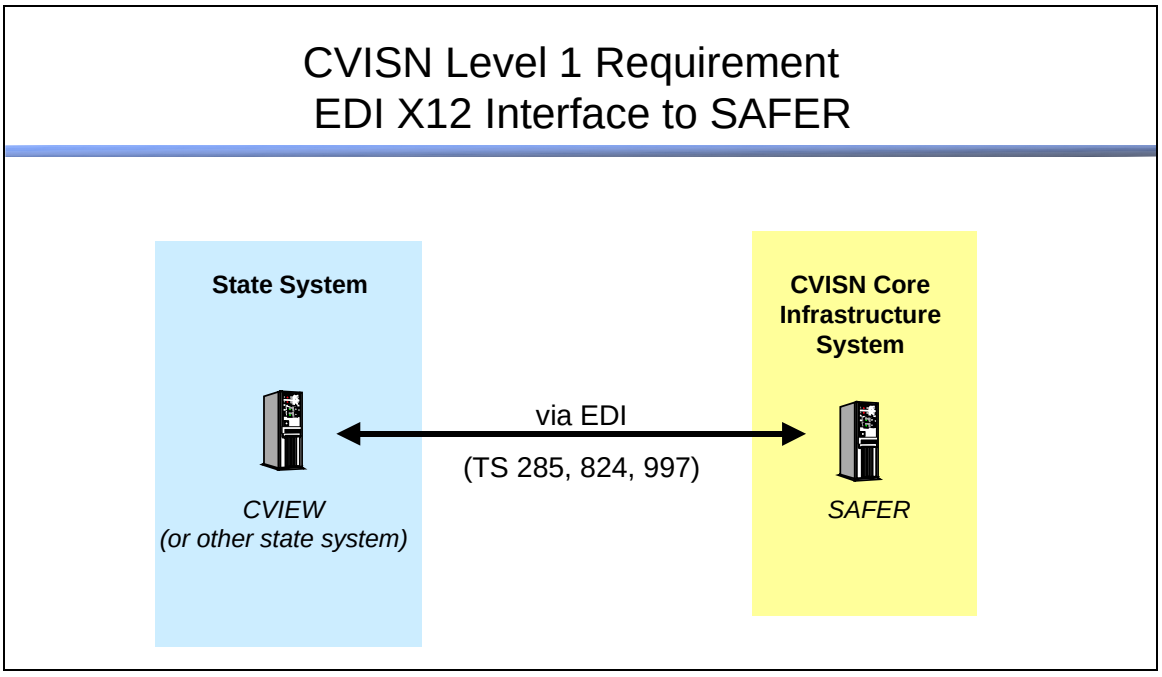

Figure 6-3. CVISN Level 1 Interface Requirement: EDI

The X12 EDI Transaction Set (TS) 285 is used to carry snapshot information. TS 824 is used to report the results of processing the TS 285 request. TS 997 acknowledges the receipt of EDI messages.

Complete snapshots or snapshot views may reside in a local database at the Roadside to support electronic screening or query functions. For these systems, the EDI X12 standard transactions (285, 824, 997) are used to transmit the snapshots from the state credential system to the Roadside, as shown in Figure 6-4. The electronic screening systems implemented in both MD and VA use this configuration, with a local database of snapshots residing in the ROC. Snapshots are downloaded from the state CVIEW to the ROC, using EDI transactions.

Also shown in Figure 6-4 is the option to transmit and store safety and credential data in a form, other than snapshots. In this design, derived data, such as a pre-clearance list, resides in the Roadside system. A non-standard, state-specific interface may be used to transfer the data. In KY, a NorPass state, an Enrolled Vehicle List is transmitted from the operations center to the roadside stations. HELP PrePass™ states also use a similar configuration, where stations typically receive a pre-clearance list from the PrePass™ Processing center.

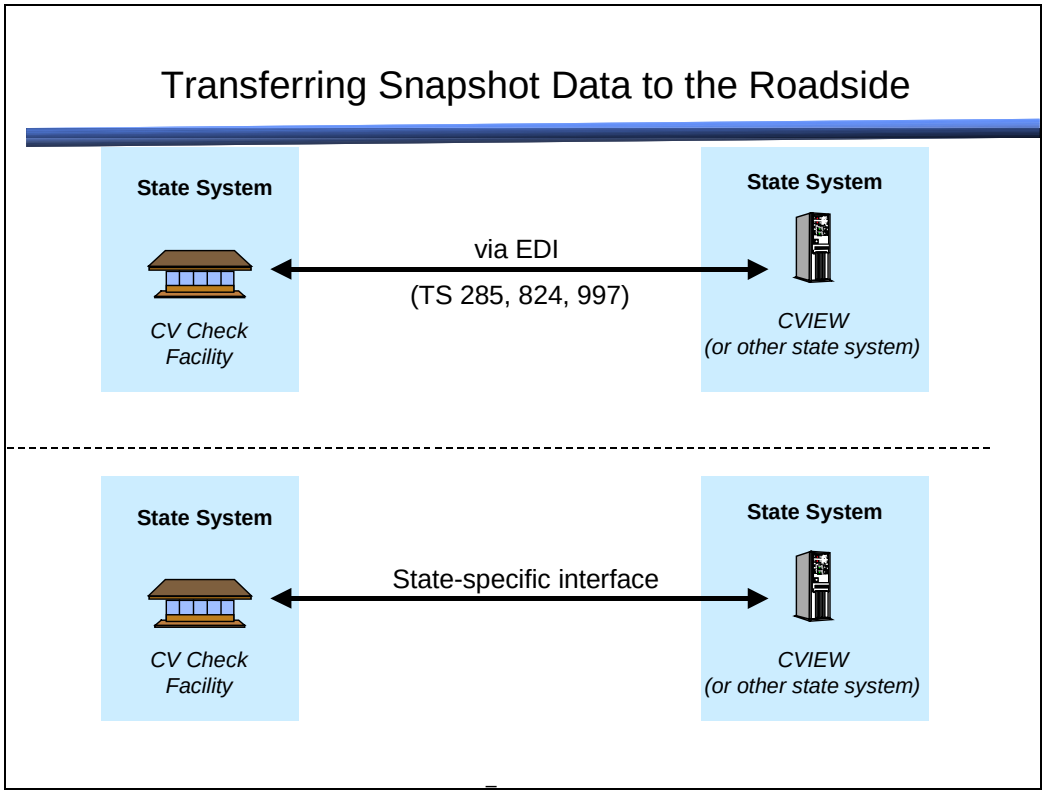

Figure 6-4. Transferring Snapshot Data to the Roadside Systems

E-screening enrollment data are stored in SAFER carrier and vehicle snapshots. A state may choose to have separate E-screening enrollment software that processes applications and generates snapshot segment updates. These snapshot segment updates are transmitted to the state CVIEW (or other system), using EDI X12 standard transactions (285,824, 997), then forwarded to SAFER.

An alternative is to have a state agency or administrator accept the E-screening enrollment applications and transmit the required information over a state-specific, non-standard interface, as shown in Figure 6-5. The snapshots in the state CVIEW (or other system) are modified using existing mechanisms, which also populate other snapshot data fields.

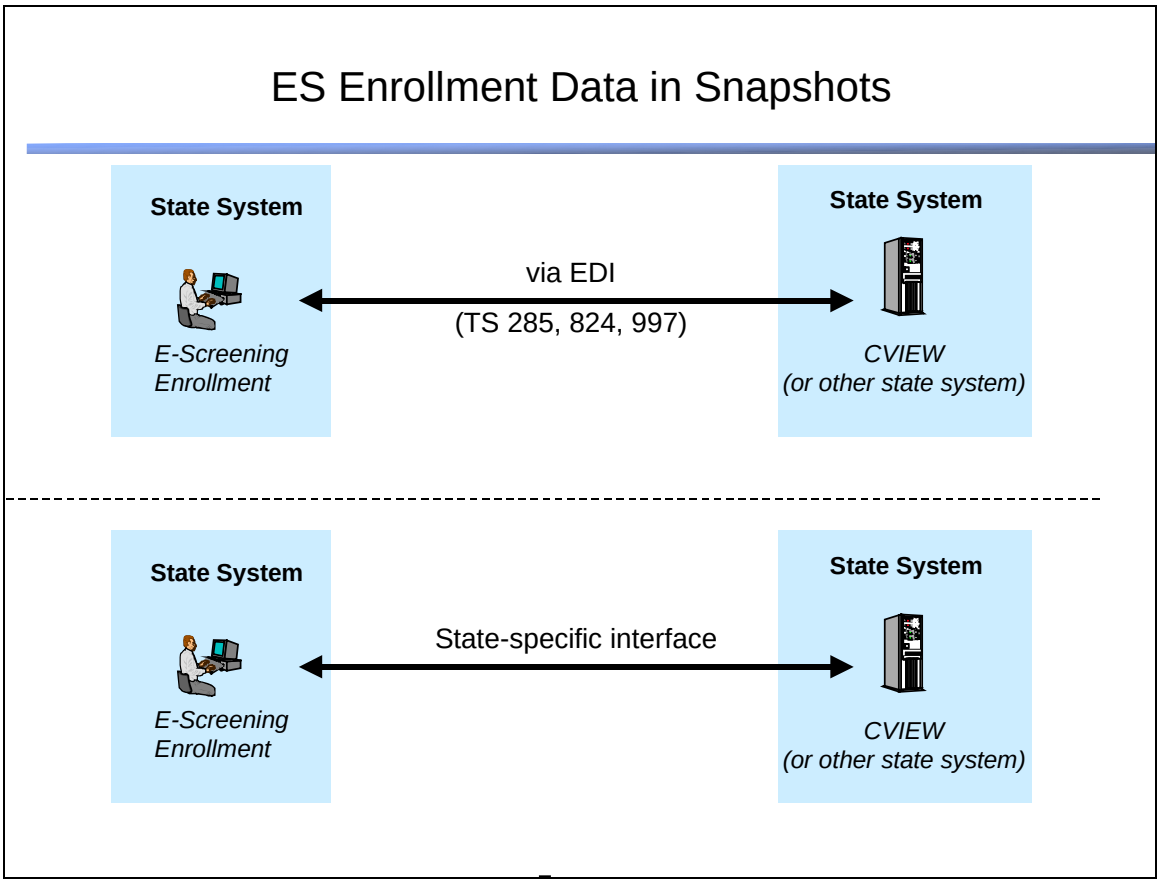

Figure 6-5. Accessing E-Screening Enrollment Data in Snapshots

HELP PrePass™ handles transponder administration and enrollment functions for its member states. NorPass is contracting with a separate transponder administrator to process enrollment requests. Currently, the enrollment data from these programs are not stored in SAFER snapshots. In the future, these programs may choose to populate the snapshots with enrollment data for their member states.

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