

MODULE 7 REFERENCES

Commercial Vehicle Information Systems & Networks (CVISN)



US Dept of Transportation



CVISN Statement of Direction

Safety - Simplicity - Savings

Intelligent Transportation Systems (ITS) are transportation systems which utilize information, communication, sensor, and control technologies to achieve improved levels of performance. The US DOT has developed a National ITS Program Plan for ITS which provides a new vision for surface transportation in America. The ITS Program includes seven major elements:

Travel & Transportation Management

- Travel Demand Management
- Public Transportation Management
- Electronic Payment
- Commercial Vehicle Operations (ITS/CVO)
- Emergency Management
- Advanced Vehicle Control & Safety Systems

The ITS/CVO element includes the ITS technologies which uniquely support Commercial Vehicle Operations (CVO). The scope of CVO includes the operations associated with moving goods and passengers via commercial vehicles over the North American highway system and the activities necessary to regulate these operations. It includes activities related to safety assurance, commercial vehicle credentials and tax administration, roadside operations, freight & fleet management, and vehicle operation.

The term commercial vehicle information systems and networks (CVISN, pronounced "see' vision") refers to the ITS information system elements that support CVO. CVISN

includes information systems owned and operated by governments, carriers, and other stakeholders. It excludes the sensor and control elements of ITS/CVO.

The DOT has sponsored the development of a National ITS Architecture to provide a technical framework which describes how ITS elements fit together into an overall system. The CVISN Architecture is the ITS/CVO information systems portion of the National ITS Architecture.

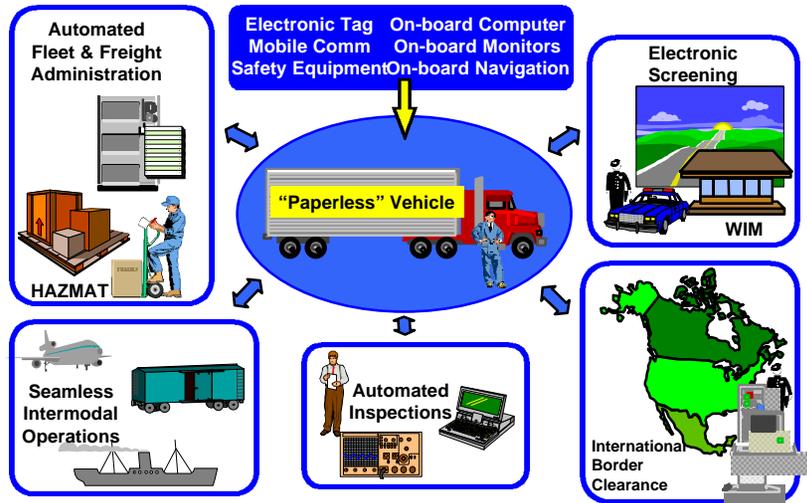
The CVISN Architecture was baselined in 1996. It is being used to develop open standards and provide a technical framework for implementing the CVISN Prototype and Pilot. These are an initial deployment of selected CVISN elements in ten states to demonstrate the operational feasibility and effectiveness of CVISN prior to full scale national deployment. These include systems in the prototype and pilot states, carrier systems, and the CVISN Core Infrastructure. The CVISN Core infrastructure is a selected group of key CVO information systems that provide a mechanism for exchange of safety information, registration, fuel tax, HAZMAT, and commercial driver license information among states.

The ITS/CVO Program is being organized to develop and deploy eight primary capabilities. Some of these are undergoing operational test or are in use now. Others will be developed over the next five to ten years.

ITS/CVO Capabilities

Safety Information
Credentials Administration
Electronic Screening
International Border Clearance
Automated Inspection
On-Board Safety
HM Incident Response
Fleet & Freight Admin

Vision: Safe and Efficient Shipping Operations



It is envisioned that in the year 2005, trucking operations will have become much more efficient, largely due to the availability of accurate information in electronic form.

In 2005, carriers are able to equip their vehicles with a variety of productivity and safety improvements: mobile communications systems, navigation and tracking systems, on-board vehicle monitors, collision avoidance devices, crash restraints, and vision enhancement equipment.

Most trucks are equipped with ITS dedicated short range communications (DSRC) transponders which transmit messages to and receive messages from the roadside.

En-route delays at weigh stations have been virtually eliminated. Electronic screening is used to check the vast majority of vehicles at mainline speeds. A screening

message transmits vehicle, carrier, driver, and specially regulated load type identifiers to roadside readers. The identifiers are used to access information stored in government information systems. Safety, credentials, tax, and permit information are checked at mainline speeds. Carriers which participate in screening programs can operate trucks with no paper credentials on-board.

Carriers which voluntarily adopt driver alertness management programs and equipment are exempted from maintaining trip logs. Other carriers maintain trip logs electronically.

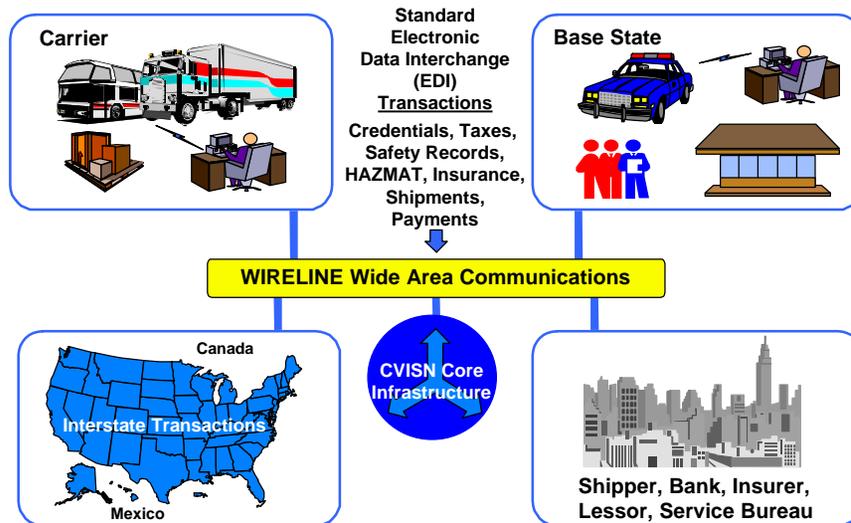
International border crossings occur with little or no delay. Routine shipments are cleared by use of EDI well in advance of the vehicle approaching the border, and more often than not, the vehicle passes with less than a minute delay.

When inspections occur, they are conducted quickly with the aid of automated safety inspection equipment.

Electronic transactions support intermodal interchange among trucks, railroads, ships, and air freight lines. All trailers and containers are equipped with a standard intermodal tag. This tag can be read on highways, on rail lines, at truck and rail terminals, and at shipyards.

Carriers use fleet management systems to optimize schedules, routing, and maintenance. Accurate highway and traffic data is available to support routing. Carriers can choose to track vehicles throughout North America. Many carriers maintain databases of the location of each shipment. Standards are available to support cross carrier queries and tracking, so a shipper can find the location of their shipment via an electronic query. HAZMAT handling data required to respond to HAZMAT incidents is available on-line to emergency personnel.

Vision: Electronic Business Transactions



It is envisioned that in the year 2005, the vast majority of CVO business transactions are being conducted electronically. This includes transactions among carriers, shippers, government agencies, insurance companies, and other CVO stakeholders.

In 2005, carriers apply and pay for credentials electronically, including registration, HAZMAT permits, and oversize/overweight permits. They file and pay fuel taxes electronically. Carriers deal with a base state for all business transactions, including registration, permits, taxes, and screening. The base state handles any allocation of fees or taxes to other states, simplifying carrier administration. Credentials are distributed electronically. No bingo cards, stamps, decals, or paper permits are required for participating carriers.

Information from one process (e.g., registrations) is available to other processes (e.g., fuel tax) in a timely manner. This avoids redundant data entry, improves data accuracy, and provides data to support better decision making. It permits cross checks such as denying registration to a carrier with a poor safety history.

Some aspects of audits are conducted electronically with participating carriers. State systems send queries to carrier systems. The responses are compared to state records and often the audit is completed with little or no manual intervention.

States deal with carriers electronically, and states also deal with each other electronically. They routinely interchange electronic information about business transactions relating to safety, registration, tax, and screening.

Shipping transactions are primarily electronic. Shippers place orders, track freight movement, receive invoices, and make payments electronically.

State highway planning and enforcement operations are planned and managed based on comprehensive, timely information. The information is gathered as a by-product of the administrative processes and roadside processes. It is anonymous; in other words, carrier and driver identifiers are removed and only the overall statistics are used.

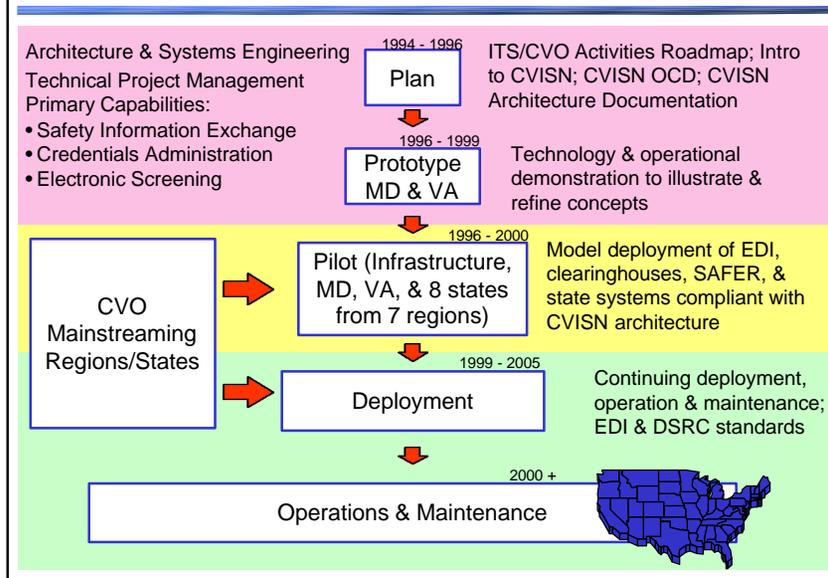
Data privacy and integrity are assured via encryption and password techniques. In addition, the legal issues associated with the Privacy Act of 1974 are supported.

The FHWA ITS/CVO Management Approach

The FHWA has established several related ITS/CVO Programs and Projects to carry out the CVO portion of ITS and achieve the vision summarized above and described in the National ITS Program Plan. The program management approach is summarized below.

- The **FHWA ITS CVO Division** is providing the focal point for Federal leadership in the development of ITS/CVO systems.
- The FHWA ITS JPO has set a **high priority** on the development and deployment of CVO/ITS user services.
- The **ITS America CVO Technical Committee** and its subcommittees are providing an interactive stakeholder forum relating to ITS/CVO Program planning activities.
- This Statement of Direction (SOD) is one of a series of documents that will be used to **fully inform CVO stakeholders** of FHWA concepts and plans.
- The FHWA is using the **CVISN Architecture as a technical framework** for the development of interoperable information systems which support ITS/CVO services.
- The FHWA is sponsoring **studies & operational tests** to validate concepts and develop benefit/cost information.
- The FHWA is conducting **mainstreaming** activities to expedite the widespread deployment of ITS/CVO concepts and systems. These will include support for state business planning, regional and national forums, and outreach.
- The FHWA is sponsoring a **CVISN Prototype Program** to demonstrate the operational feasibility and effectiveness of CVISN concepts and systems in two states, Maryland and Virginia.
- The FHWA is sponsoring a **CVISN Pilot Program** to demonstrate selected ITS/CVO services in **eight additional states** from seven regions (a.k.a. “trucksheds”). The pilot will run from 1996 through 1999. Pilot states were selected based on their endorsement of CVISN objectives, institutional readiness, participation in regional programs, technical experience, and intent to support inter-agency data sharing.
- The FHWA is providing funding and technical support to critical **multi-state data sharing** projects (e.g., the IRP Clearinghouse) to connect to pilot project states via standard interfaces. These projects are collectively referred to as the **CVISN Core Infrastructure**.
- The FHWA will provide the results of the CVISN Pilot to other states in the form of a **CVISN Deployment Tool Kit**. This will include computer-based management and technical documentation and planning tools to facilitate deployment of CVISN in other states.
- The FHWA will **foster the national deployment** of CVISN after the pilot to the extent that funding allows.
- It is anticipated that CVISN Pilot & deployment tasks will stimulate **process improvement & reengineering** efforts in CVO that will provide significant benefits beyond those obtained through automation alone.

CVISN Nationwide Deployment Strategy



The CVISN Program is proceeding in five major steps. The first step develops the **management (plans) and technical (architecture) frameworks** necessary to coordinate the subsequent phases. The second step is to **prototype** the technology in an integrated way in two states to demonstrate operational concepts and validate requirements. The third step is to **pilot** the approach in eight additional states. This allows testing and evaluating in a project of manageable size before proceeding to widespread deployment. The fourth step, **expansion**, will expand from the pilot states to a number of partner states. This should be a smooth expansion, since each partner state will be coordinating with a pilot state in the same region throughout the pilot. The final step allows for **deployment** to all interested states. By this time the technology, concepts, costs, and benefits should be well understood and documented. Deployment should be straightforward with little risk.

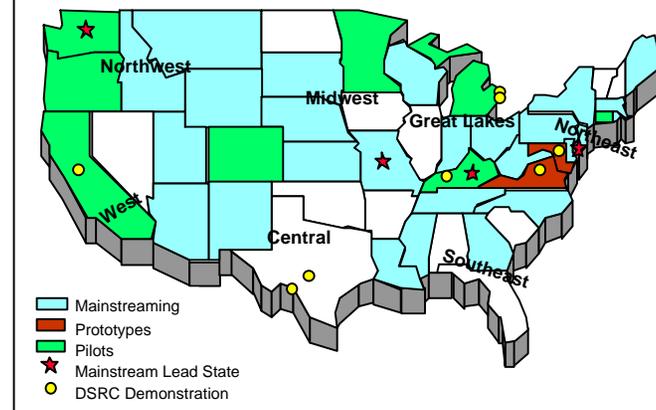
Mainstreaming

Throughout this process, FHWA is focusing on mainstreaming, which means the organizational aspects of moving ITS/CVO services beyond the concept development phase and into operation. As part of mainstreaming, certain organizational strategies will be implemented to support the technical activities. The ITS/CVO Program will develop policies, plans, programs, and projects at the state, regional, and national levels: at the state level because the states have the power and responsibility for building and maintaining highways and for taxing and regulating the motor carriers that use them; at the regional level because most trucks operate at the regional level; and at the national level because of the need to ensure uniformity of services for interregional and international motor carriers.

Planned mainstreaming activities include:

- State CVO Business Plans
- Regional CVO Champions & Planning Forums.
- National Clearinghouse Agreements
- Benefit / Cost Studies

FHWA is Facilitating Transfer of ITS/CVO Technology to any Interested State



CVISN Guiding Principles

Statements of principle are being used to document fundamental concepts and guidelines supported by the CVO community. These are summarized here and listed below.

Summary

- A **balanced approach** involving ITS/CVO technology as well as institutional changes will be used to achieve measurable improvements in efficiency and effectiveness for carriers, drivers governments, and other CVO stakeholders. Specific technology and process choices will be largely **market-driven**.
- The CVISN architecture will enable **electronic information exchange** among authorized stakeholders via open standards.
- The architecture **deployment will evolve incrementally**, starting with legacy systems where practical and proceeding in manageable steps with **heavy end-user involvement**.
- Safety assurance activities will **focus resources on high risks**, and be structured so as to reduce the compliance costs of low-risk carriers and drivers.
- Information technology will support improved practices and procedures to **enhance CVO credential and tax administration efficiency** for carriers and government.
- Roadside operations will **focus on eliminating unsafe and illegal operations by carriers, drivers, and vehicles** without undue hindrance to productivity and efficiency of safe and legal carriers and drivers.

Status of CVISN Guiding Principles

These principles were developed by the ITSA CVO Program Subcommittee. They will be updated as required to reflect the consensus of the CVO community. (2/25/97)

General CVO

- To the extent possible, ITS/CVO technology development and deployment will be **market-driven**. The federal role in ITS deployment will be limited to instances in which a government role is indispensable and in which the technology is proven and reliable.
- Investment and participation in ITS/CVO technology will be voluntary.
- The relative benefits of various ITS/CVO technology applications and investments will be assessed quantitatively using **measures of effectiveness** and established methods of quality control.
- Potential ITS/CVO technology applications will be evaluated against regulatory choices involving low-technology and non-technological options to ensure applications are **cost-effective for both government and industry**.
- Government CVO policies and regulatory practices will permit safe and legal carriers and drivers to operate **without unnecessary regulatory and administrative burdens**.
- Stakeholders will use **technology and institutional reform** to implement continuous process improvement and cost-effective process re-engineering.
- The **confidentiality** of proprietary and other sensitive stakeholder information will be preserved.
- The United States CVO community will work to implement **compatible policies** and architecture and **interoperable systems** in all states.
- The United States CVO community will work with those in Canada, Mexico, and other nations to encourage **compatible policies** and architecture and to implement **interoperable systems** throughout North America and, when possible, worldwide.

● CVISN Architecture

- The CVISN architecture will be **open**, modular, and adaptable.
- The architecture will enable **data exchange** among systems, a key to reaching CVO objectives. Methods used to exchange data will ensure **data integrity and prevent unauthorized access**.
- Data exchange will be achieved primarily via **common data definitions**, message formats, and communication protocols. These enable development of interoperable systems by independent parties.
- A jurisdiction shall have and maintain **ownership of any data** collected by any agent on its behalf.
- The architecture will accommodate **existing** and near-term **communications** technologies.
- The architecture will accommodate **proven technologies and legacy systems** whenever possible.
- The CVISN architecture will allow government and industry a **broad range of options**, open to competitive markets, in CVO technologies.

● CVISN Deployment

- The feasibility of the **architecture will be demonstrated incrementally** and quickly in simulations, prototypes, operational tests, and pilots. There will be **heavy end-user involvement** in each step of the process.
- After feasibility has been demonstrated, key architectural elements will be incorporated into appropriate national and international **standards**.
- The architecture **deployment will evolve incrementally**, starting with legacy systems where practical and proceeding in manageable steps.
- **Strong federal leadership** will foster voluntary cooperative efforts within government jurisdictions and among groups of other stakeholders to develop systems which are in accord with the architecture.

● Safety Assurance

- **Carriers and drivers will be responsible** for the safe and legal operation of commercial vehicles.
- Jurisdictions will develop and implement **uniform standards, practices, procedures, and education programs** to improve safety. These activities will leverage market forces that encourage safety.
- Jurisdictions **will focus** safety **enforcement** resources **on high risk** carriers and drivers. They will remove chronic poor performers from operation and help cooperative marginal performers to improve.
- Jurisdictions will conduct **inspections** and **audits** to provide **incentives** for carriers and drivers to improve poor performance and to collect information for assessing carrier and driver performance.
- Jurisdictions will use a **safety risk rating** for all carriers based on best available information and common criteria.
- Jurisdictions will identify **high risk drivers** based on best available information and common criteria.
- Safety programs will provide **benefits which exceed costs** for carriers and drivers as well as governments.

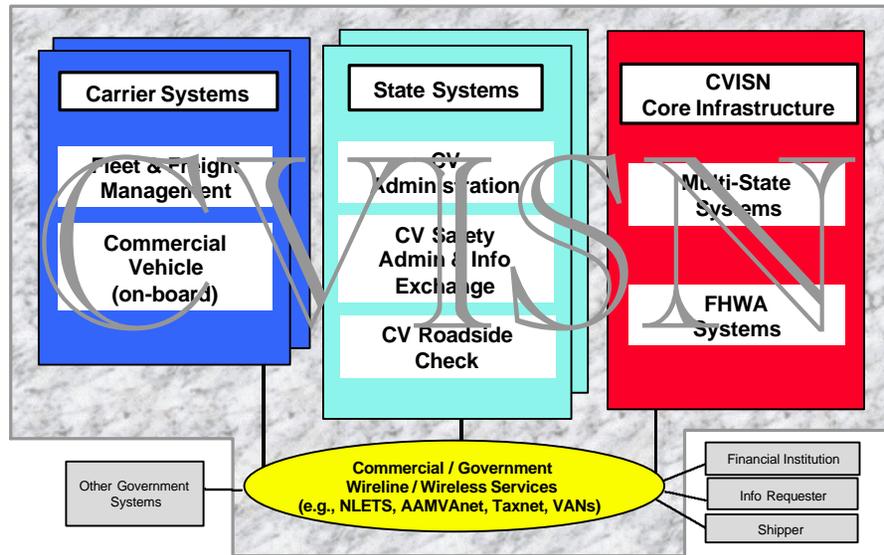
● Credential & Tax

- **Electronic information** will be used in place of paper documents for the administration of CVO credential and tax requirements.
- Authorized users will be able to electronically exchange credential and tax-related information and funds via **open standards** and transmission options.
- The information needed to administer tax and credential programs involving carriers, drivers, and vehicles will be **available to authorized officials**, on a need-to-know basis.
- Individual jurisdictions, or their designated agent, will be the **authoritative source** of information on credentials they issue.

● Roadside Operations

- Roadside operations will **focus on eliminating unsafe and illegal operations by carriers, drivers, and vehicles** and will be designed and administered to accomplish this in a manner that does not unduly hinder the productivity and efficiency of safe and legal motor carriers and drivers.
- Jurisdictions will support CVO roadside operations programs with **timely, current, accurate, and verifiable electronic information**, making it unnecessary for properly equipped vehicles to carry paper credentials.

CVISN Prototype & Pilot Programs



The CVISN Prototype and Pilot Programs have been initiated by FHWA to move ITS/CVO user services beyond the concept phase and into operation. They are a cooperative effort of the FHWA, states, government and industry associations (e.g., ITSA, AAMVA, IRP, IFTA), and carriers. The CVISN Prototype and Pilot Programs provide funding to supplement funds currently being provided by other federal, state, and private sources as required to enhance or modify existing projects and legacy systems to meet the objectives of the CVISN Prototype and Pilot.

Build the CVISN Core Infrastructure

There are several multi-state data sharing projects currently planned, under development, or operational that are required to support the CVISN Prototype and Pilot. These are collectively referred to as the CVISN Core Infrastructure. The CVISN Prototype and Pilot will cooperate with these projects to expedite their development.

Establish Two Prototype & Eight Pilot States

FHWA selected ten states to participate in the Prototype & Pilot Programs. Each state committed to enhancing its information systems in order to implement ITS/CVO user services over a 3 year period in a manner compatible with the CVISN architecture.

Involve Carriers in Prototype and Pilot States

Each Prototype and Pilot state will establish cooperative agreements with representative carriers based in their state to participate in the program. The carriers will participate in all phases, from planning through implementation and operation. They must commit to enhancing their information systems to implement ITS/CVO user services in a manner compliant with the CVISN architecture.

Establish Formal Standards

The Prototype and Pilot efforts are using draft EDI and DSRC standards in their early stages. As the programs proceed, they will support standards development organizations (SDO's) to develop formal, open standards that incorporate lessons learned. The states will incorporate the updated standards into the final releases of their systems.

Demonstrate Three Critical ITS/CVO User Services

An important purpose of the Prototype and Pilot Programs is to demonstrate the synergistic effects of providing multiple user services in an integrated way. The programs are focusing on safety information distribution, credentials administration (electronic credentialing and clearinghouses), and electronic screening.

Prepare for Full Scale Deployment

The CVISN Pilot will help prepare for the full deployment of CVISN in four ways. First, it will establish the CVISN Core Infrastructure as an operational set of systems. Future states that wish to implement ITS/CVO services will be able to connect to this infrastructure using documented and proven techniques. Second, the pilot will support the definition of open DSRC and EDI standards. Third, the pilot effort will produce a *CVISN Deployment Tool Kit*. This will be a set of work products and lessons learned organized into a personal computer based set of tools that can easily be distributed to and used by other states. Fourth, it results in a number of vendor products that will be available for purchase by other states.



06/24/97

CVISN Prototype - Major Activity Areas

- **Safety Information**

Exchange safety information between deskmade and roadside to improve safety performance.

- State CV Information Exchange Window
- ASPEN & ISS
- SAFER

- **Electronic Screening**

Demonstrate weight, safety & credentials screening using WIM & DSRC, for DSRC-equipped vehicles.

- Roving Verification (ROVER) Van
- Fixed Site
- Toll Facility

- **Electronic Credentialing**

Accept electronic credential applications; provide better information to carriers.

- Carrier Automated Transactions
- IRP, IFTA, OS/OW Credentials & Permits
- IFTA Tax Filing
- Motor Carriers' Home Page

- **Clearinghouses**

Interface state systems to clearinghouses to support base state agreements.

- IRP
- IFTA

CVISN Pilot Program Purpose

To implement the primary CVO user services through a FHWA, state, and industry partnership in multiple states. To demonstrate the technical and institutional feasibility, costs, and benefits and to encourage further deployment.

The specific services to be implemented are:

- Safety Information Exchange
- Electronic Credentialing
- Electronic Clearinghouses
- Electronic Screening

Implementing these ITS/CVO services leads to

- **Safety**
- **Simplicity**
- **Savings**

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