

USDOT ITS Joint Program Office  
**National ITS Architecture Overview**

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# Outline

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- Context Setting: U.S. DOT National ITS Program
- National ITS Architecture
- Regional ITS Architectures and Conformity
- Operationalizing through Standards

# National ITS Program

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A national, multi-modal surface transportation system that features a connected transportation environment among vehicles, the infrastructure, and portable devices to serve the public good by leveraging technology to maximize safety, mobility and environmental performance

**Achieved Through**

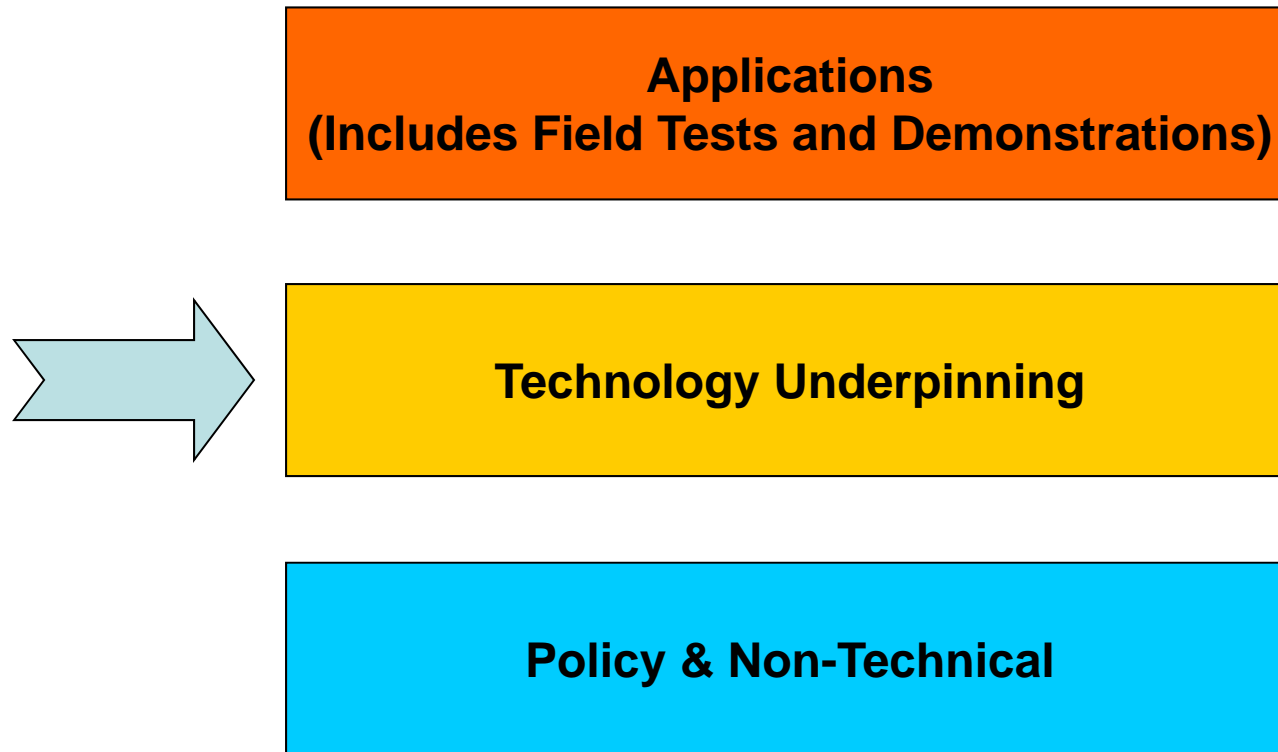


**IntelliDrive**<sup>SM</sup>  
*Safer.  
Smarter.  
Greener.*

...and a suite of targeted research and development initiatives that support cross-modal ITS solutions

# ITS Strategic Plan – Multi-Modal Research Framework

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# ITS Strategic Plan – Technology Underpinning

## ▪ IntelliDrive Test Environment

- Objective: Create a common resource for public and private sector multi-modal testing

## ▪ Harmonization of International Standards and Architecture

- Objective: Develop internationally harmonized standards, particularly around vehicle-based applications

## ▪ IntelliDrive Certification

- Objective: Establish a technology & application certification approach, particularly for active safety applications

## ▪ IntelliDrive Systems Engineering

- Objective: This revised baseline architecture and requirements will serve as the technical foundation for the next generation of IntelliDrive field tests, for initial and ongoing deployments of IntelliDrive, and for continued research as the core technologies and program evolve

## ▪ Data and Communications Security

- Objective: Develop and test a secure communications network that is scalable and ensures privacy
- Funding: Included in V2V research activities

FY 2010 investment up to:	
IntelliDrive Test Environment	\$1,000,000
Harmonization of International Standards & Architecture	\$700,000
IntelliDrive Certification	\$1,500,000
IntelliDrive Systems Engineering	\$2,000,000

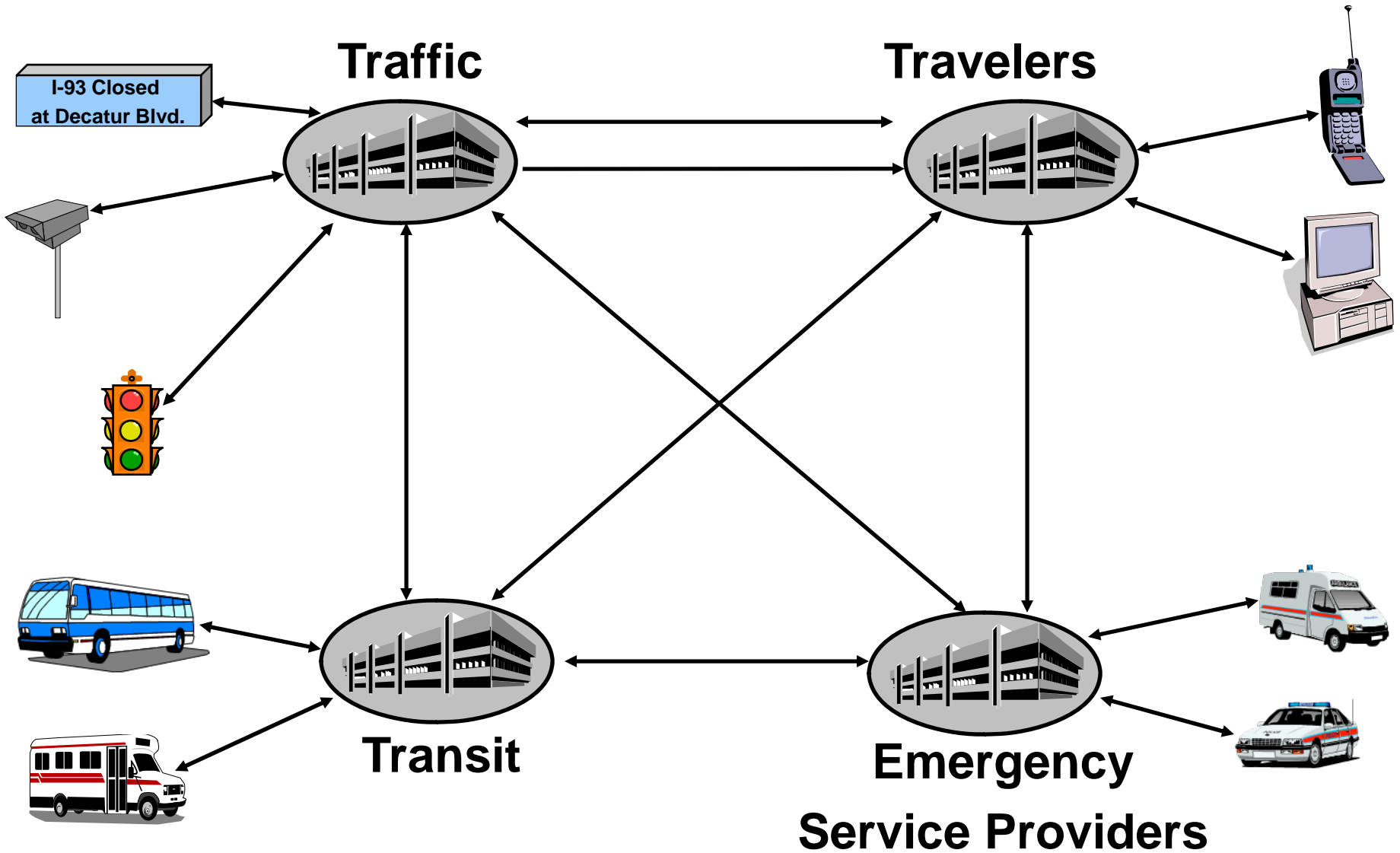
# What is an ITS Architecture?

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- Framework for Developing Integrated Transportation Systems
- Identifies:
  - Organizations
  - Systems operated
  - Functions performed
  - Communications
  - Information exchanged



# Integration Framework



# What is the National ITS Architecture?

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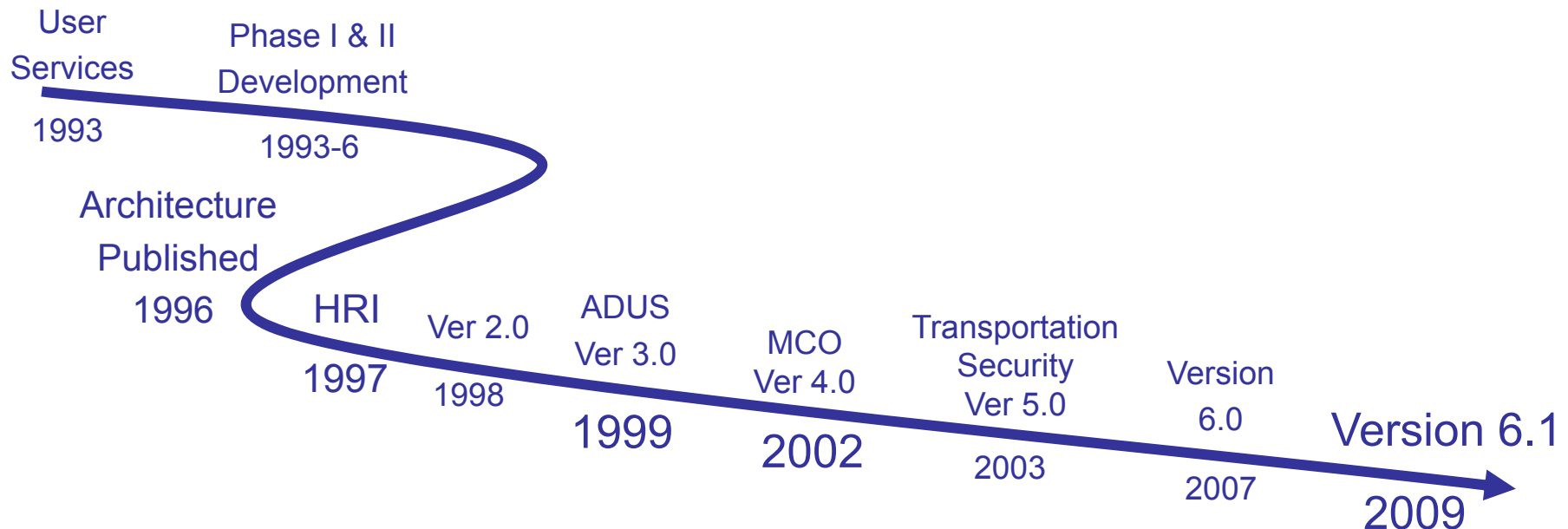
- **High-Level** national framework, “blueprint”, used to help guide ITS deployment and transportation planning
- Based on 33 transportation related ITS User Services:
  - Physical Entities – Subsystems/Terminators
  - Logical Architecture – Processes, Data Flow
  - Interfaces – Information Flows
  - Deployment oriented Market Packages



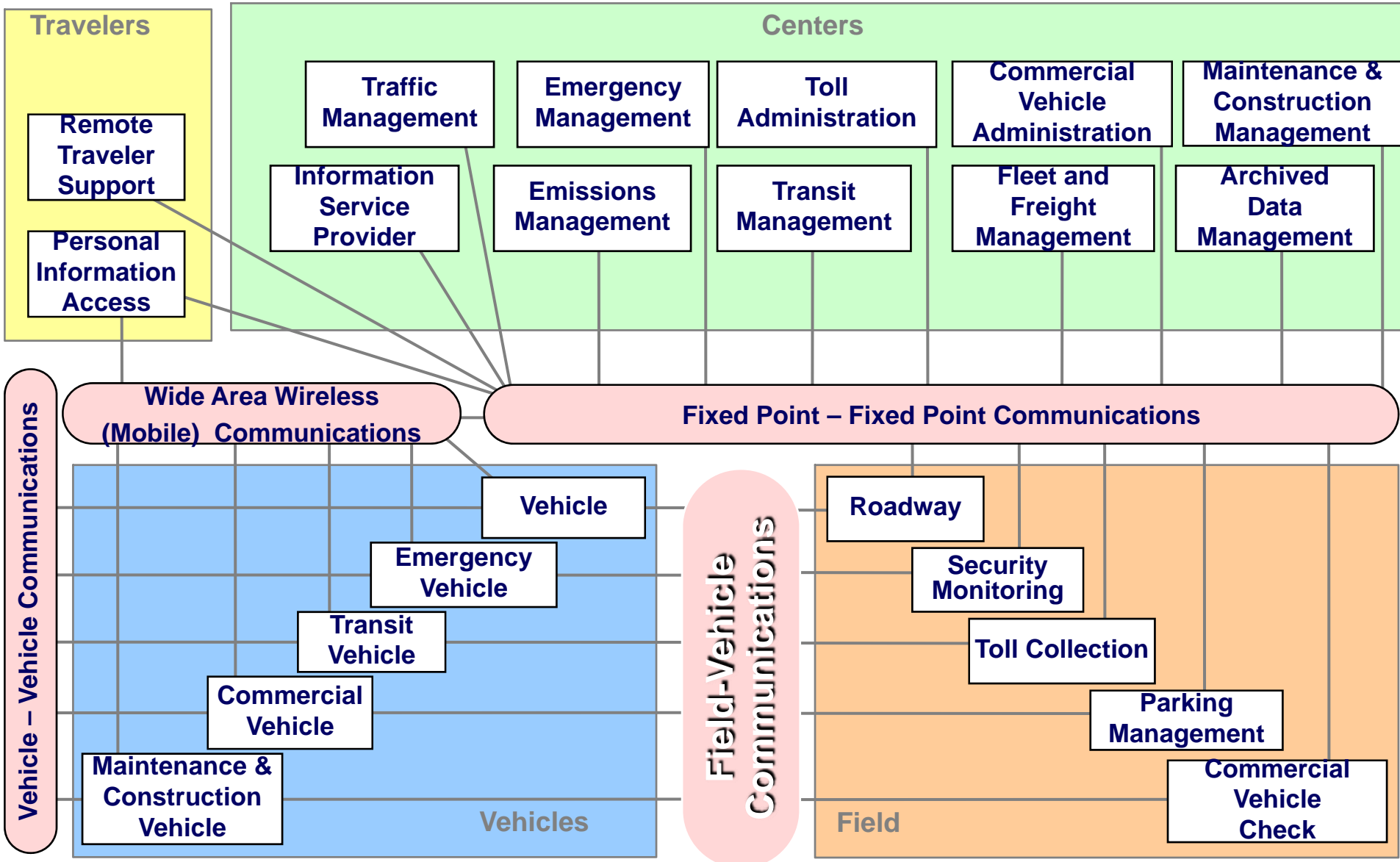
# Current Status

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- National ITS Architecture is a “Living Document”
  - Continuing evolution of the architecture over 13 years
  - Version 6.1 continues support for ITS technical evolution and deployment
- Evolution in Step with Industry



# National ITS Architecture V6.1



# Regional ITS Architectures

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- The carrot (or stick) to promote the use of the National ITS Architecture at the regional level
- TEA-21: Promoted regionally integrated transportation systems
- FHWA Rule/FTA Policy (January 2001)  
*“All ITS projects funded through HTF must be in conformance with the National ITS Architecture and appropriate standards”*
- What is Conformance?  
*“...developing regional ITS architectures that are tailored to address the local situation and ITS investment needs...”*



# What is a Regional ITS Architecture?

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A document that contains\* ...

1. Architecture scope
2. Stakeholder identification
3. System inventory
4. **Needs and services**
5. Operational concept
6. Functional requirements
7. **Interfaces/flows**
8. **Agreements**
9. **Standards identification**
10. Project sequencing
11. Implementation plan
12. Maintenance plan

*\*it's not necessarily glamorous!*

# ITS Standards

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- The National ITS Architecture provides a consistent framework
- Regions develop ITS Architectures
- What is the role of standards?
  - Standards operationalize the framework through the promotion of interoperability among systems
  - Standards specify how systems and components interconnect with each other



# What are standards?

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- Voluntary, consensus-based, and open
- Encourages industry growth
  - Minimizing development costs
  - Increasing compatibility and interoperability
  - Increase buyer and seller confidence in products
- ITS standards...
  - ...define how ITS systems, products, and components can interconnect, exchange information and interact to deliver services within a transportation network



# ITS Standards Related to Transit

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- APTA is a Recognized SDO
  - IEEE / ANSI Process
  - Funding through APTA Members, ITS JPO, FTA
- Standards Development Areas
  - Passenger Rail Equipment Safety
  - Rail Transit
  - ITS
    - Transit Communication Interface Profiles (TCIP)
  - Accessibility
  - Procurement
  - Security
  - Fare Systems
    - Contactless Fare Media System (CFMS)



# TCIP

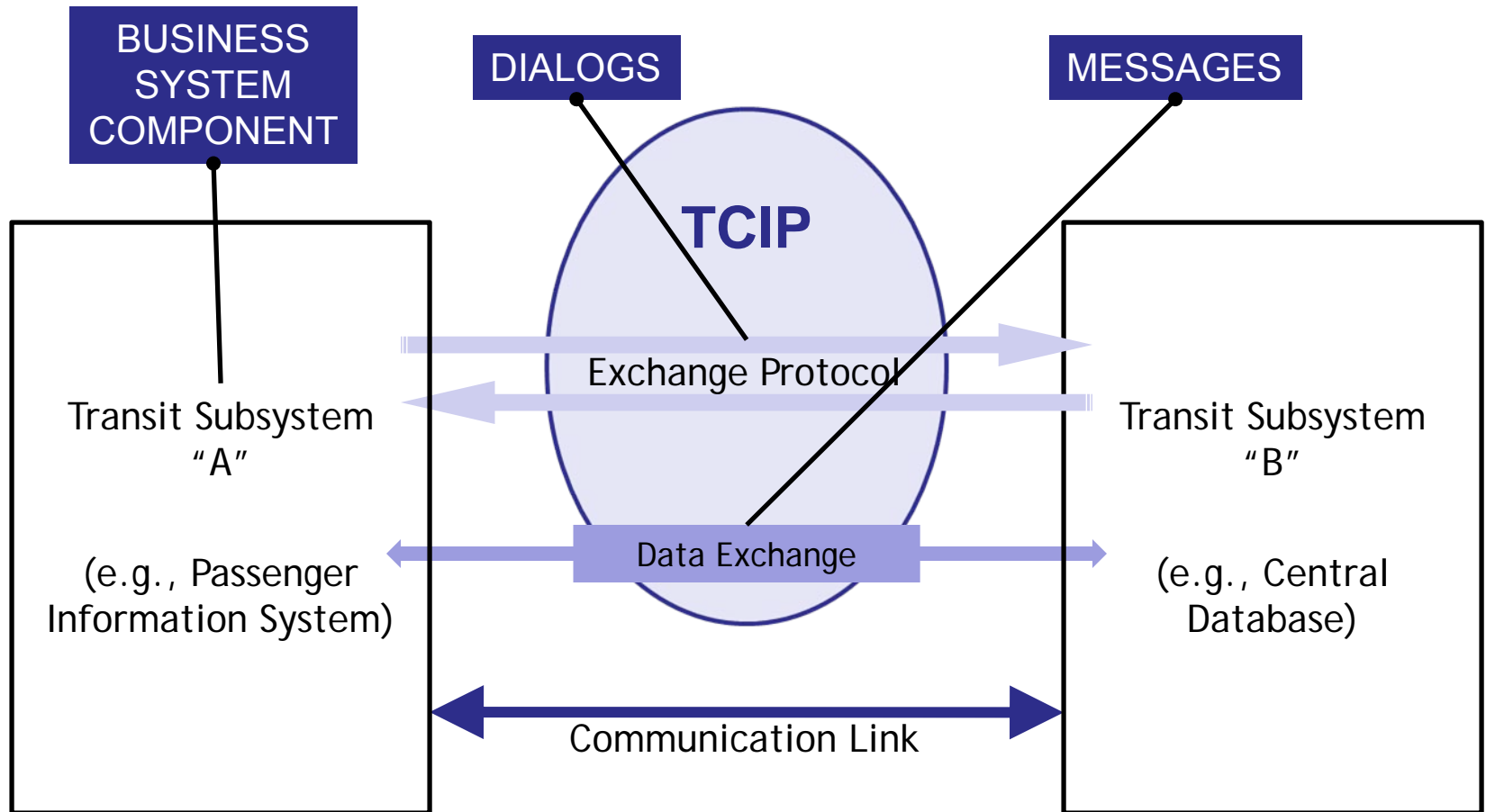
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- TCIP is the primary Transit Component of the ITS Standards effort
- TCIP is a balloted and approved APTA Transit Standard
- TCIP provides data exchange standards intended to promote interoperability between transit business systems and components, including:
  1. Scheduling
  2. Passenger Information
  3. Incident Management
  4. Onboard
  5. Control Center
  6. Fare Collection
  7. Spatial Data
  8. Signal Priority





# TCIP



# CFMS

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- Improve competitiveness through interoperability
- Provide Agencies Greater Control & Flexibility Over their Fare Collection Systems
- Open Architecture Environment – non proprietary
- Multi-modal and Multi-application
- Regional Partnerships
- Integration with ITS and TCIP



# Summary

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- National ITS Architecture provides a consistent framework for developing integrated transportation systems
- Regional ITS architectures must be created that conform to the National ITS architecture
  - Promote interoperability
- Standards are a critical element in operationalizing ITS architectures
  - Published and balloted standards  $\neq$  readily used standard
  - TCIP versus GTFS for transit schedule data

