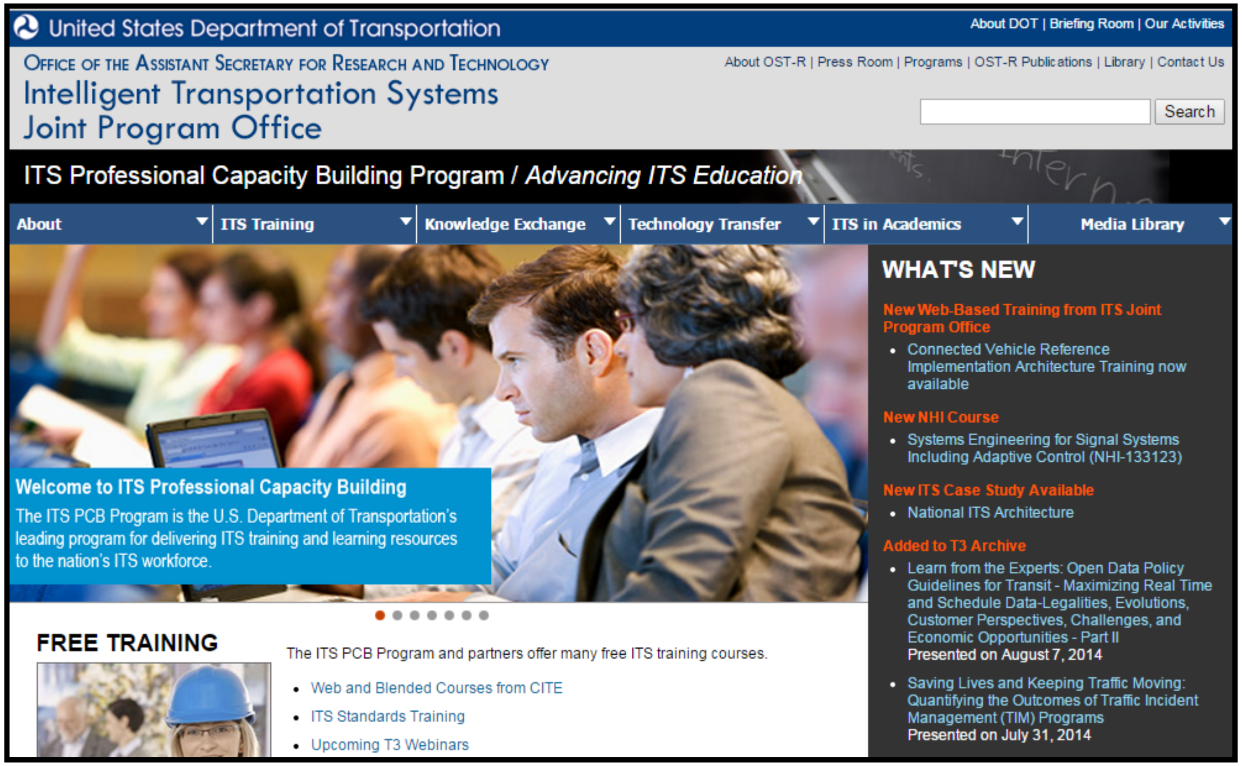
STANDARDS ITS TRAINING

WELCOME

U.S. Department of Transportation

Office of the Assistant Secretary for Research and Technology

Mac Lister



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FTA Federal Transit Administration

STANDARDS ITS TRAINING

ITS Transit Standards
Professional Capacity Building Program

Module 8:
Arterial Management and Transit Signal Priority: Understanding User Needs for Signal Control Priority (SCP) Based on NTCIP 1211 Standard, Part 1 of 2

ACTIVITY

U.S. Department of Transportation
Office of the Assistant Secretary for
Research and Technology

Instructor

Patrick Chan, P.E.

Senior Technical Staff

Consensus Systems Technologies

Flushing, NY, USA

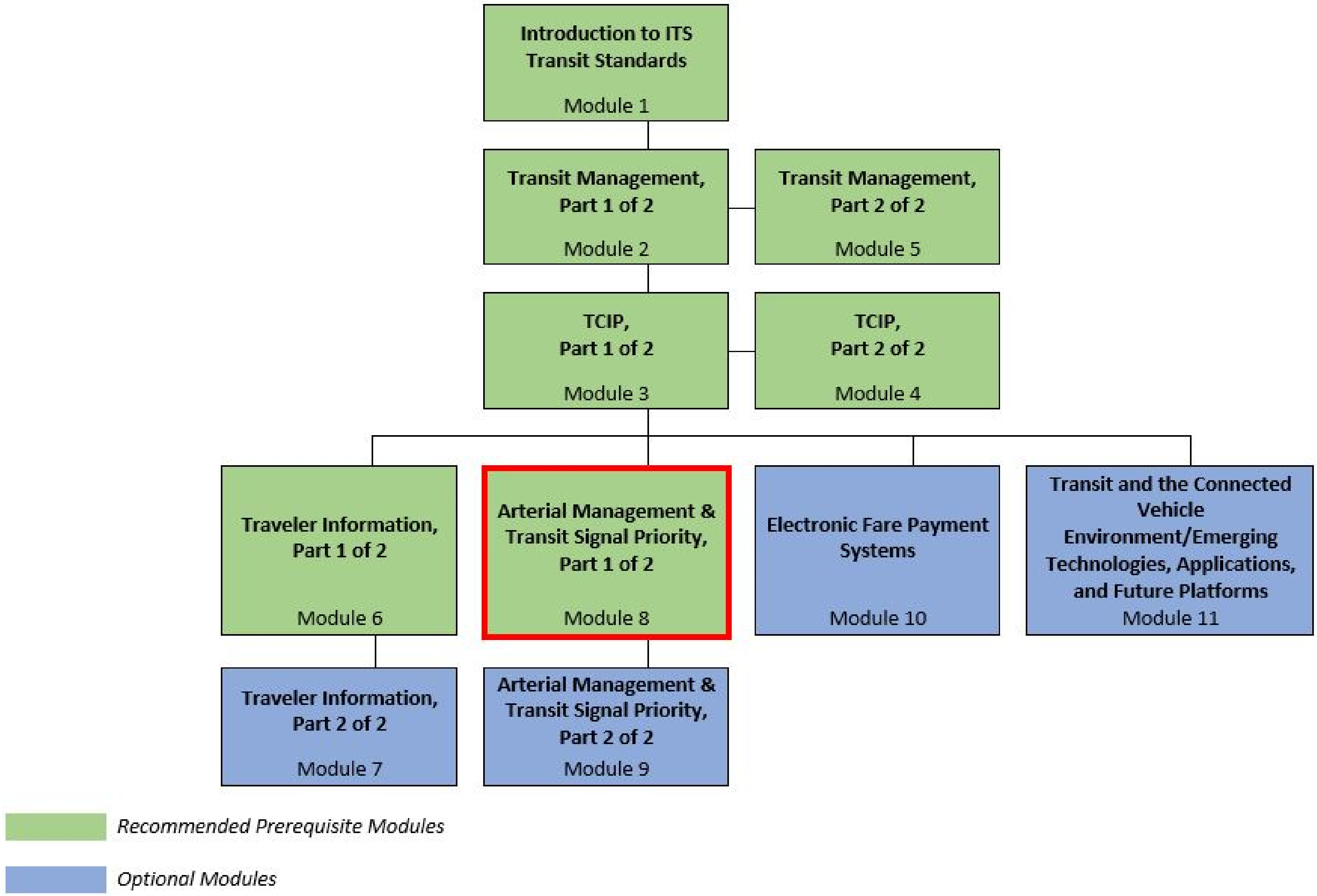
Target Audience

- Transit managers;
- Transit planning, operations, and maintenance staff;
- Traffic management operations staff;
- Transit and Traffic systems acquisitions staff;
- Transit electronic maintenance staff;
- Integrated Corridor Management project and operations team;
- Transit technology vendors; and
- Transit ITS contractors and consultants.

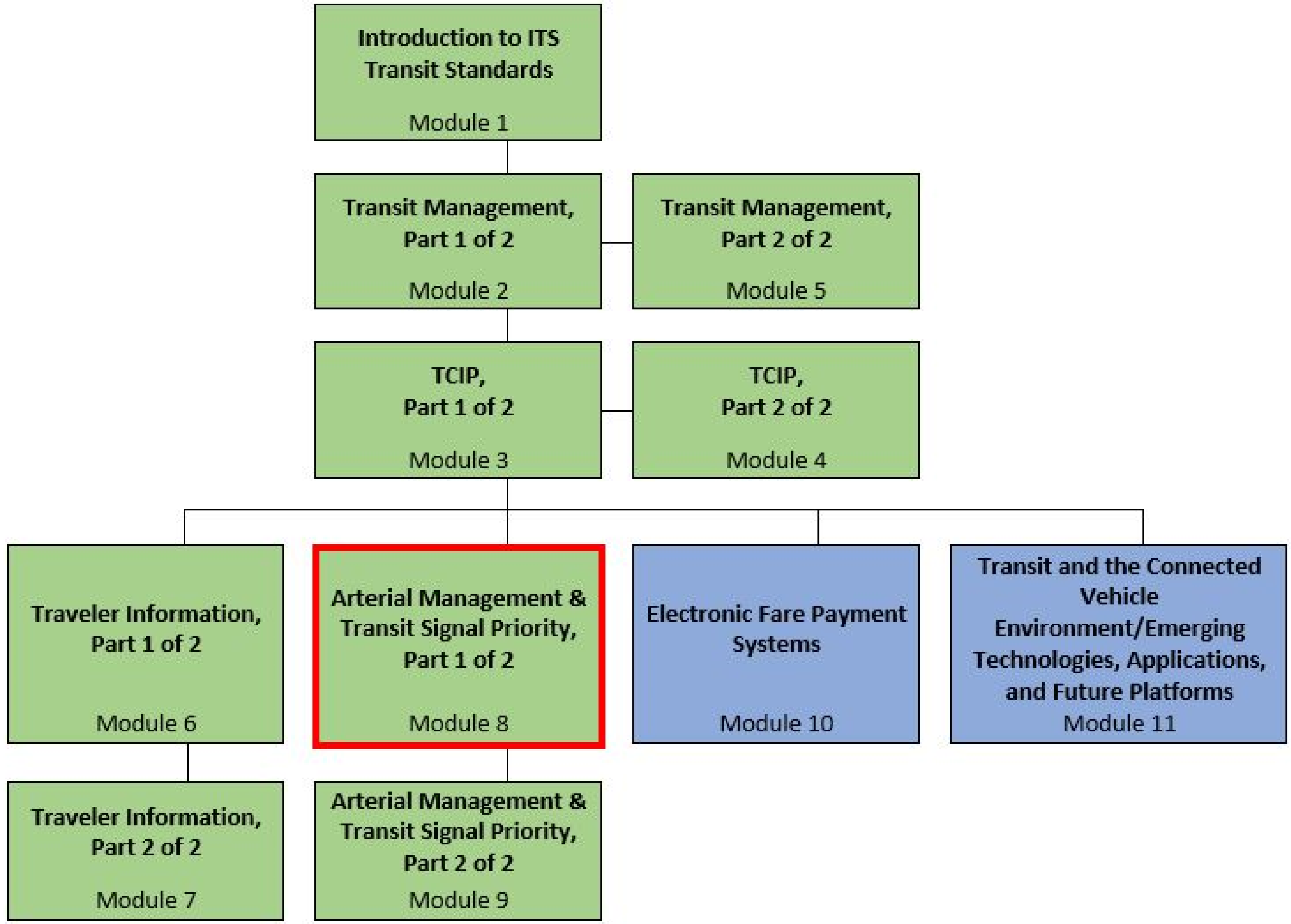
Recommended Prerequisite(s)

	Decision-Maker	Project Manager	Project Engineer
Module 1: Introduction to ITS Transit Standards	✔	✔	✔
Module 2: Transit Management Standards, Part 1 of 2	✔	✔	✔
Module 3: Transit Communications Interface Profiles (TCIP), Part 1 of 2	✔	✔	✔
Module 4: Transit Communications Interface Profiles (TCIP), Part 2 of 2	N/A	✔	✔
Module 5: Transit Management Standards, Part 2 of 2	N/A	✔	✔

Curriculum Path (Project Manager)



Curriculum Path (Project Engineer)



Recommended Prerequisite Modules

Optional Modules

Learning Objectives

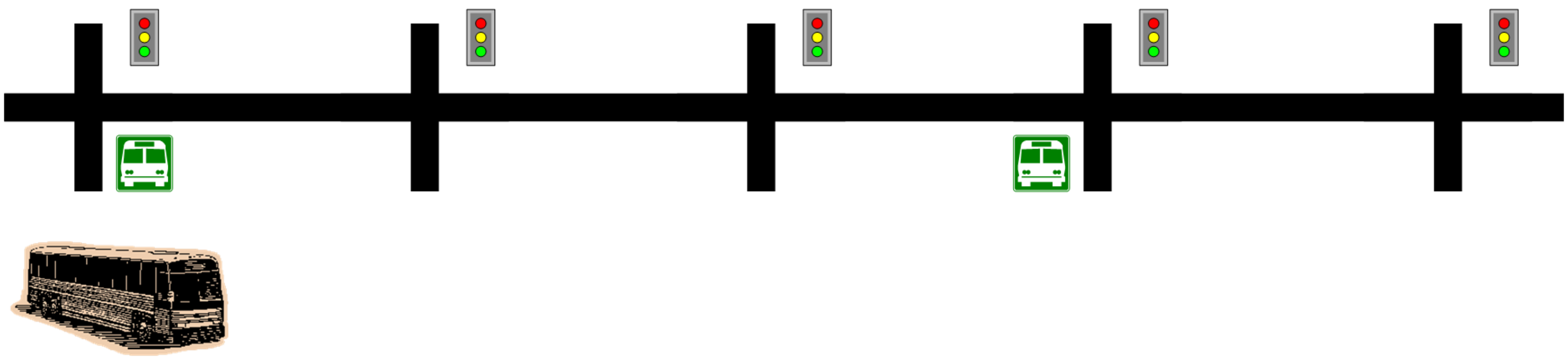
1. Identify the needs addressed by and the benefits of Signal Control Priority (SCP) on an arterial
2. Identify the components that form an SCP System
3. Describe the different SCP system architectures and the considerations in selecting an architecture for implementation
4. Identify the interfaces in an SCP System and the ITS standards that addresses each of these interfaces
5. Identify the user needs addressed by the standards
6. Describe at a high level how to incorporate ITS standards into an SCP system procurement
7. Describe other arterial management tools and strategies

Learning Objective #1: Identify the Needs Addressed by and the Benefits of Signal Control Priority (SCP) on an Arterial

- Describe the purpose of an SCP System
- Describe how an SCP may improve transit operations

Describe the Purpose of an SCP System

Typical Scenario



Describe the Purpose of an SCP System

Transit Challenges

What does a transit manager need:

- Reduce unreliable travel times and/or poor schedule adherence due to recurring or non-recurring congestion
- Reduce slow travel times on arterials due to recurring or non-recurring congestion
- Reduce delay or unreliability due to traffic signals
- Reduce high energy usage by fleet vehicles due to congestion or intersection queues

Describe the Purpose of an SCP System

Signal Control Priority (SCP)

- An operational strategy that provides preferential treatment (priority) to facilitate the movement of fleet vehicles through signalized intersections

An SCP system improves transportation system operations by:

- Providing preferential treatment for certain pre-identified vehicles at signalized intersections without degrading the overall performance of the traffic network
- Providing more efficient use of the street network by improving the throughput of travelers and goods
- Improving on-time performance and schedule adherence of public transportation

Describe the Purpose of an SCP System (cont.)

Signal Control Priority (SCP)

How can traffic signal engineers provide priority?

- Provide a green phase earlier
  - Clear queues ahead of the fleet vehicle
  - Allow the fleet vehicle to move earlier
- Extend the green phase
- Activate a special phase for the vehicle
  - Queue jump
  - Protected turn

Describe How an SCP may Improve Transit Operations

Transit Signal Priority (TSP)

- A subset of Signal Control Priority (SCP) focusing on transit fleet vehicles.

The benefits of an SCP System for transit service includes:

- Increased attractiveness of transit to travelers
  - Improved transit vehicle schedule adherence efficiency, resulting in improved reliability of service
  - Reduction of traffic signal delay, resulting in a decrease in travel times
- Improved transit vehicle efficiency

Describe How an SCP may Improve Transit Operations (cont.)

Transit Signal Priority (TSP)

Traffic Signal Priority vs Traffic Signal Preemption

- Signal priority **modifies** the normal signal operation process to better accommodate fleet vehicles
- Signal preemption **interrupts** the normal process for special events

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How can SCP directly improve the attractiveness of transit to travelers?

Answer Choices

- A) Lower cost of transit
- B) Improve reliability of service
- C) Provide more frequent transit service
- D) Improve passenger loads

Your answer:
The correct answer is:

k anywhere or
Y to continue

You did not answer this

You must answer the question before continuing

Submit

Clear

Review of Answers

a) Lower cost of transit

Incorrect. SCP may improve transit efficiency, but does not directly impact cost of transit to travelers.

b) Improve reliability of service

Correct! SCP can reduce traffic signal delay and improve transit vehicle schedule adherence, resulting in improved reliability of service.

c) Provide more frequent transit service

Incorrect. With SCP and through more efficient run cutting, a transit agency may be able to provide more frequent transit service, but it is not a direct benefit.

d) Improve passenger loads

Incorrect. SCP does not directly impact the number of passengers on a vehicle, but rather impacts the vehicle's on-time performance.

Summary of Learning Objective #1

Identify the Needs Addressed by and the Benefits of Signal Control Priority (SCP) on an Arterial

- The goal of an SCP system is to improve transportation operations by improving the overall efficiency of the street network for travelers and goods
- SCP improves transit operations by improving transit vehicle schedule adherence and efficiency

Learning Objective #2: Identify the Components that Form an SCP System

- List the centers, vehicles, and field equipment that may be part of an SCP system
- Describe the functions of a Priority Request Generator (PRG), Priority Request Server (PRS), and Coordinator (CO)

List the Centers, Vehicles, and Field Equipment that may be Part of an SCP System

Primary Components of an SCP System

- Priority Request Generator (PRG)
- Priority Request Server (PRS)
- Coordinator (CO)

Describe the Functions of a Priority Request Generator (PRG), Priority Request Server (PRS), and Coordinator (CO)

Priority Request Generator

- Alerts the traffic control system that a vehicle would like to receive priority
- Produces an estimated time of arrival for the vehicle to reach an intersection
- Produces an estimated time of departure for the vehicle to leave the intersection
- Sends a request for signal priority to the PRS
- Receives the status of a priority request from the PRS

Describe the Functions of a Priority Request Generator (PRG), Priority Request Server (PRS), and Coordinator (CO)

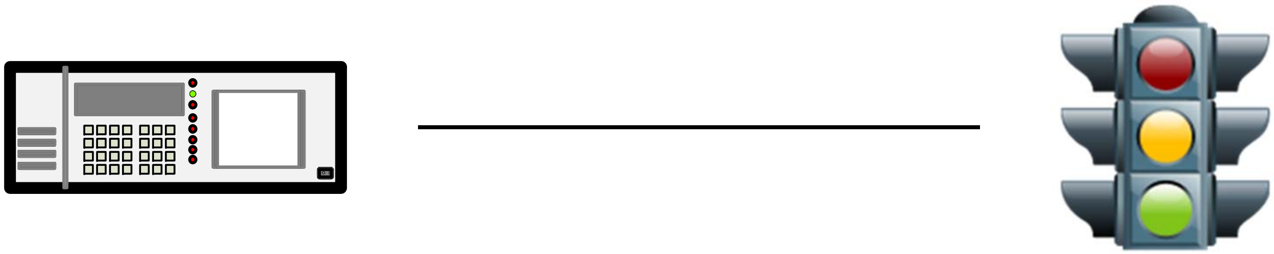
Priority Request Server

- Receives priority requests from PRGs, processes the request, and decides whether and how to grant priority based on the programmed strategies
- Prioritizes different priority requests
- Sends the status of priority requests back to the originating PRG
- Exchanges service requests and service request statuses with the CO
- Optionally, logs priority requests receives and sends contents of the log back to the traffic management center (TMC)

Describe the Functions of a Priority Request Generator (PRG), Priority Request Server (PRS), and Coordinator (CO)

Coordinator

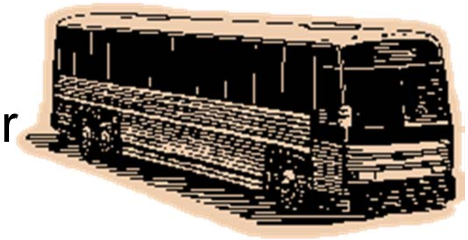
- Receives a service request from a PRS and implements the requested priority strategy based on the programmed strategies
- Sends the status of this service request back to the PRS
- Optionally, logs service requests received and sends contents of the log back to the TMC



List the Centers, Vehicles, and Field Equipment that may be Part of an SCP System

Secondary Components of an SCP System

- Fleet Management Center (e.g., Transit Management Center)
  - CAD/AVL
- Fleet Vehicle
- Traffic Management Center
- Management Station



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Which of the following components determines which priority requests to service?

Answer Choices

- A) Priority Request Generator
- B) Priority Request Server
- C) Coordinator
- D) Transit Vehicle

Your answer:

The correct answer is:

...ywhere or
...continue

You did not answer this

You must answer the question before continuing

Submit

Clear

Review of Answers

a) Priority Request Generator

Incorrect. A PRG generates the priority requests.

b) Priority Request Server

Correct! A PRS receives priority requests from PRGs, processes the request and decides whether and how to grant priority based on the programmed strategies.

c) Coordinator

Incorrect. A Coordinator receives service requests from a PRS and implements the priority strategy.

d) Transit Vehicle

Incorrect. The transit vehicle may generate a priority request, but it does not determine what priority request to service.

Summary of Learning Objective #2

Identify the Components that form an SCP System

An SCP system consists of:

- Priority Request Generator (PRG) to generate the priority requests
- Priority Request Server (PRS) to determine which priority requests to service
- Coordinator (CO) to implement the service requests

An SCP system may also include:

- Fleet Management Center
- Fleet Vehicle
- Traffic Management Center

Learning Objective #3: Describe the Different SCP System Architectures and the Considerations in Selecting an Architecture for Implementation

- Identify the different system architectures supported by the standards.
- Review the technical factors and institutional challenges that affect the selection of an SCP system architecture.

Identify the Different System Architectures Supported by the Standards

The system architecture for the SCP system to be implemented will depend on:

- Physical location of the PRG
- If the PRS is part of the signal controller or the traffic management software, or a separate physical entity
- The intermediary entities between the PRG and PRS, if any
- The communications infrastructure

Identify the Different System Architectures Supported by the Standards

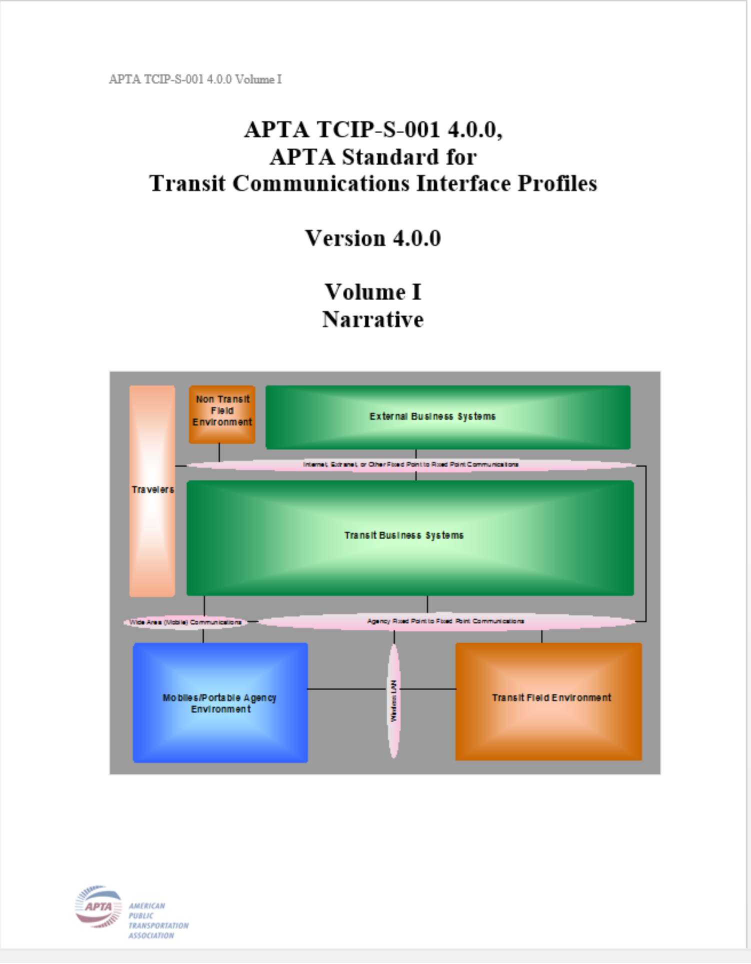
Standards

- Support interoperability
- Minimize future integration costs
- Facilitate regional integration
- Makes procurements and testing easier

Identify the Different System Architectures Supported by the Standards

TCIP

- **T**ransit **C**ommunications **I**nterface **P**rofiles
- Published by American Public Transportation Association (APTA)
- Defines standardized interfaces for the exchange of information (data) among transit business systems, subsystems, components, and devices
- Transit Signal Priority is 1 of 10 business processes defined
- Standardizes the interface primarily within the transit agency



APTA TCIP-S-001 4.0.0 Volume I

APTA TCIP-S-001 4.0.0,
APTA Standard for
Transit Communications Interface Profiles

Version 4.0.0

Volume I
Narrative

Identify the Different System Architectures Supported by the Standards

NTCIP

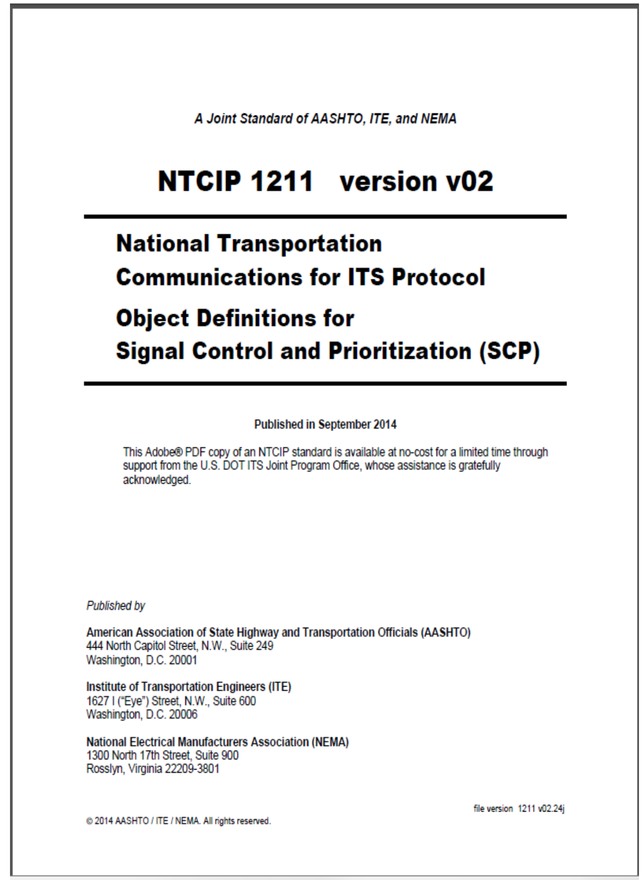
NTCIP Family

- NTCIP (National Transportation Communications for ITS Protocols): a family of standards for the ITS industry
  - Provides rules for communicating (called protocols)
  - Provides the vocabulary (called objects) necessary to control traffic field equipment

Identify the Different System Architectures Supported by the Standards

NTCIP 1211

- Information Content Standard
- Standardizes the interface between some of the components of an SCP system



A Joint Standard of AASHTO, ITE, and NEMA

NTCIP 1211 version v02

National Transportation Communications for ITS Protocol

Object Definitions for Signal Control and Prioritization (SCP)

Published in September 2014

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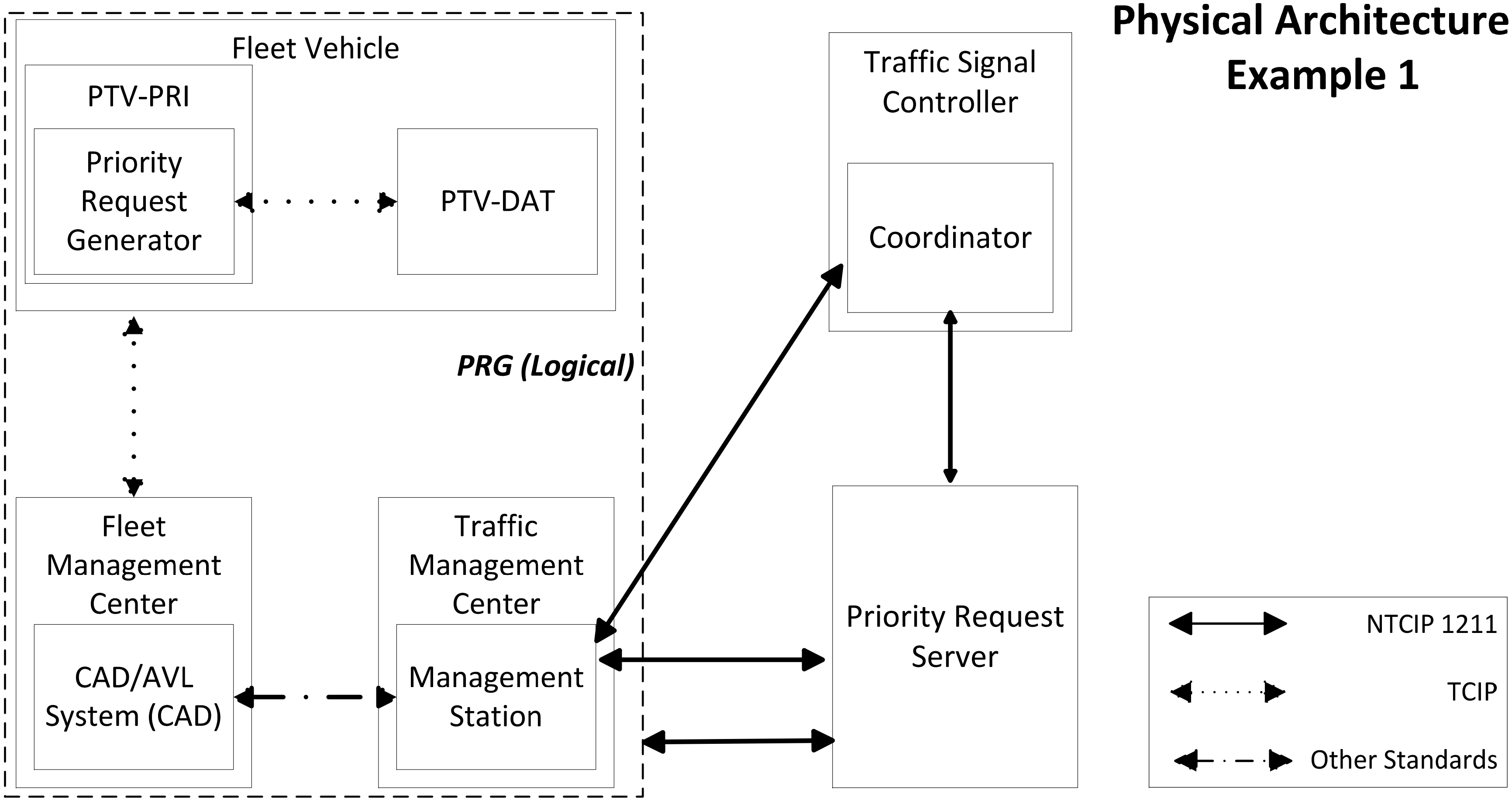
Identify the Different System Architectures Supported by the Standards

System Architecture

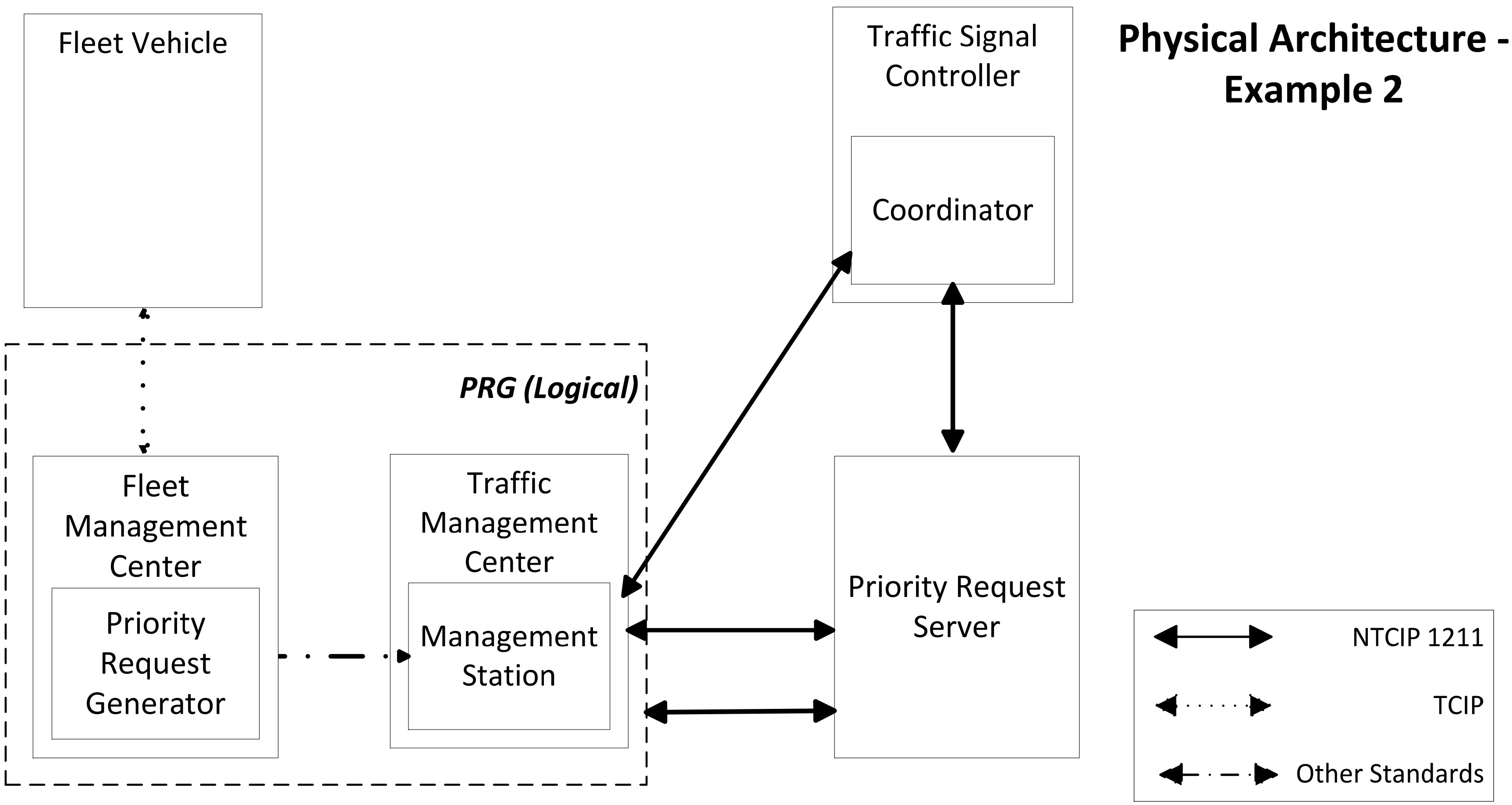
- Describes the overall framework of the (SCP) system, including the physical components and the logical entities
- TCIP defines five system architectures
- NTCIP 1211 v02 defines the same system architectures plus one additional
- These represent only some of the more common systems architectures of an SCP system

Identify the Different System Architectures Supported by the Standards

Physical Architecture - Example 1

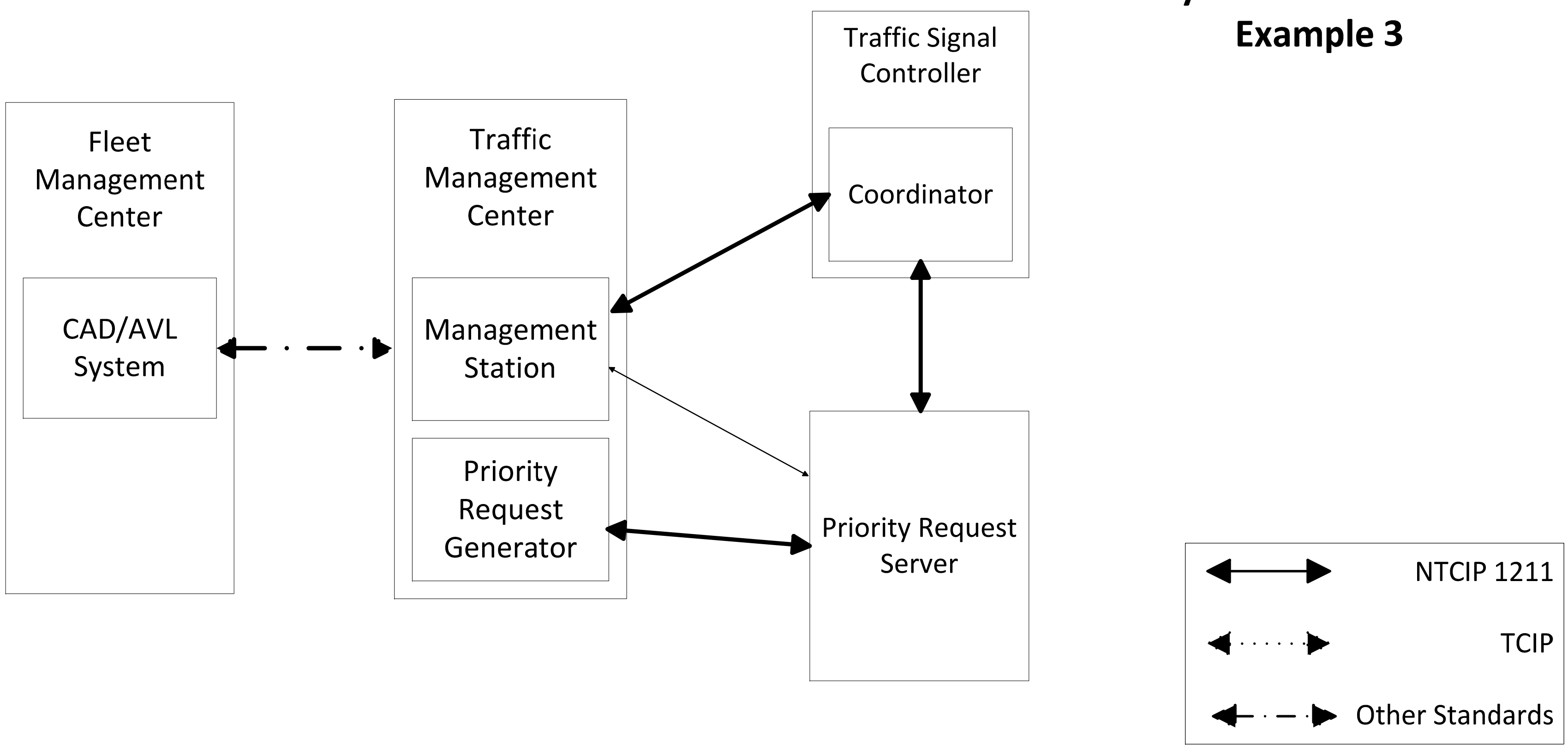


Identify the Different System Architectures Supported by the Standards

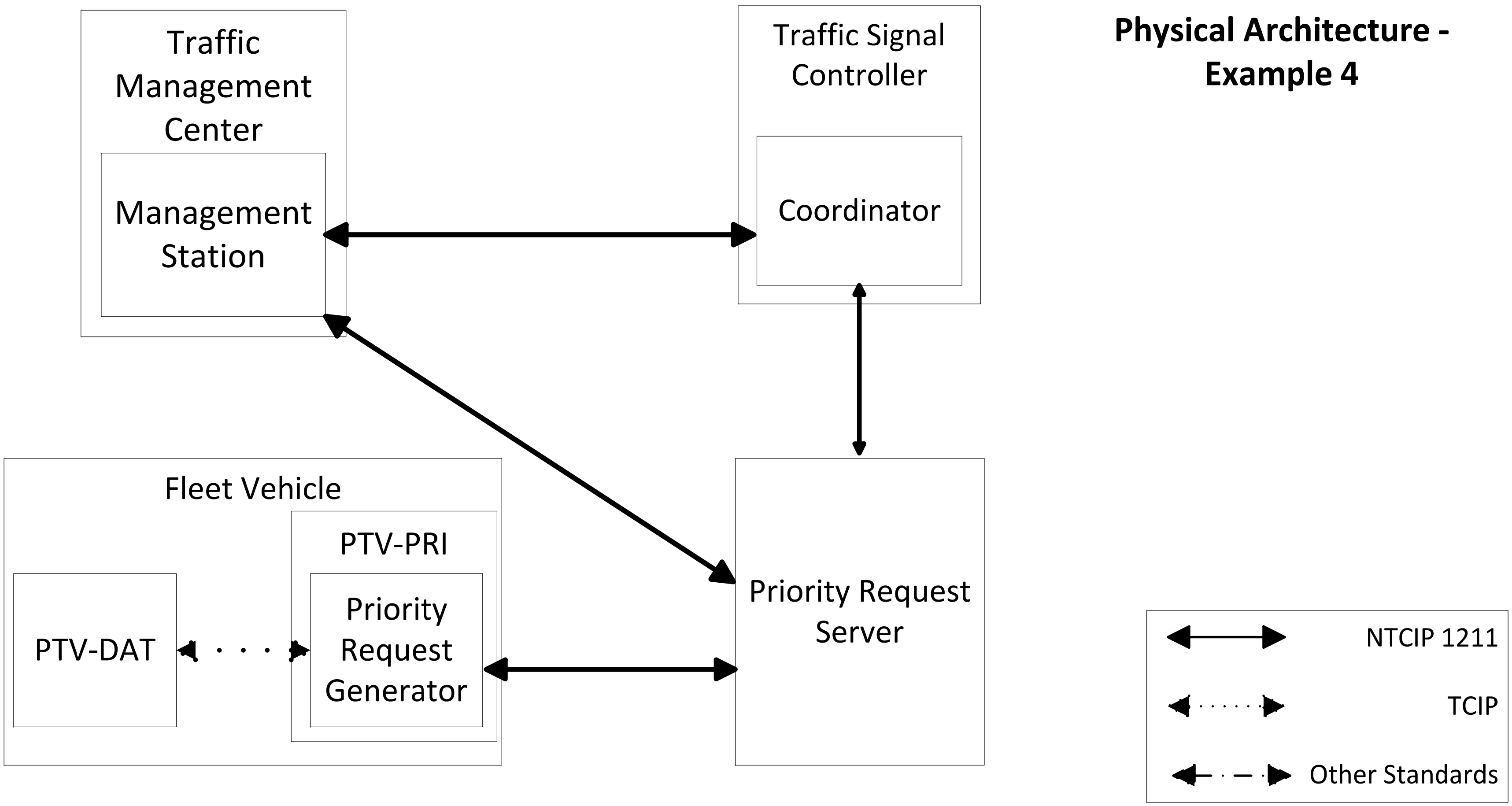


Identify the Different System Architectures Supported by the Standards

Physical Architecture - Example 3



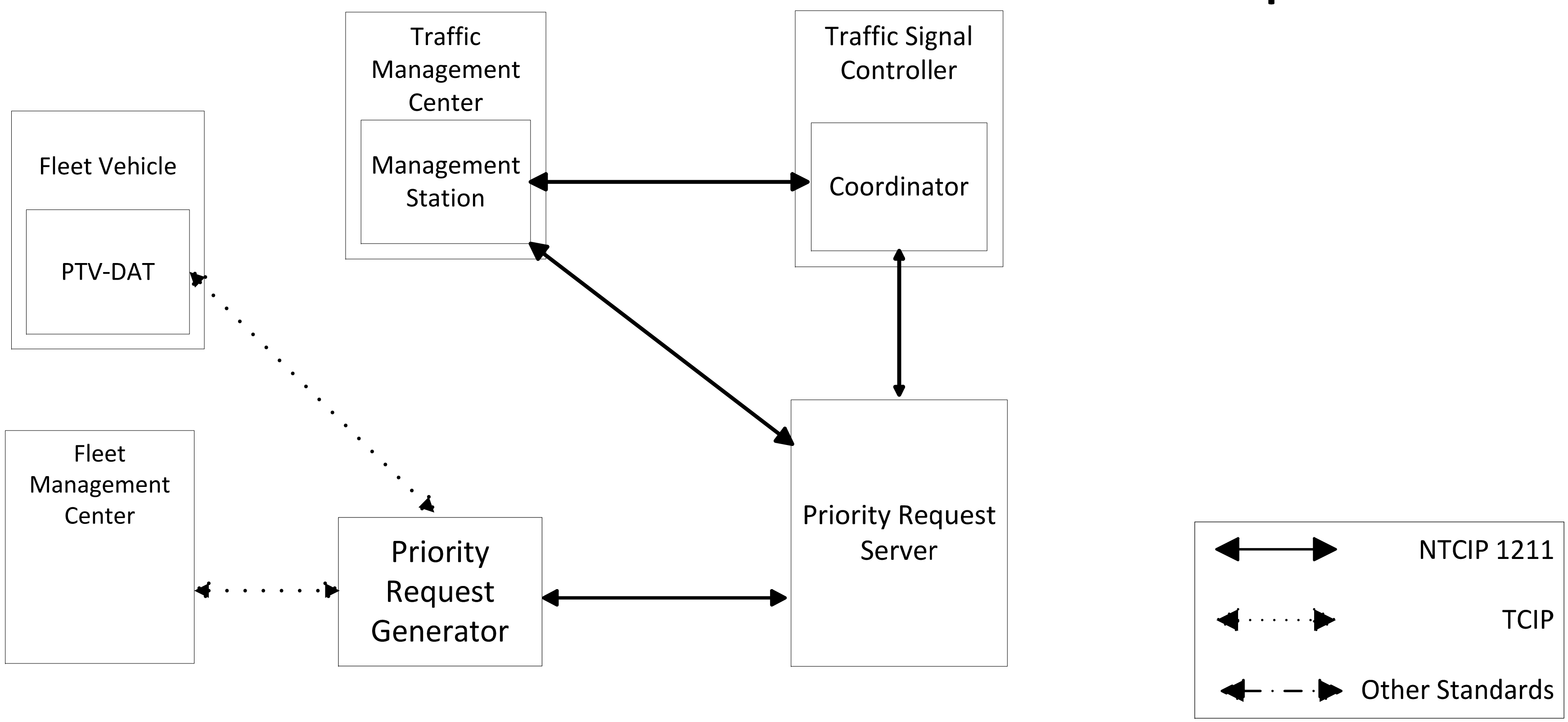
Identify the Different System Architectures Supported by the Standards



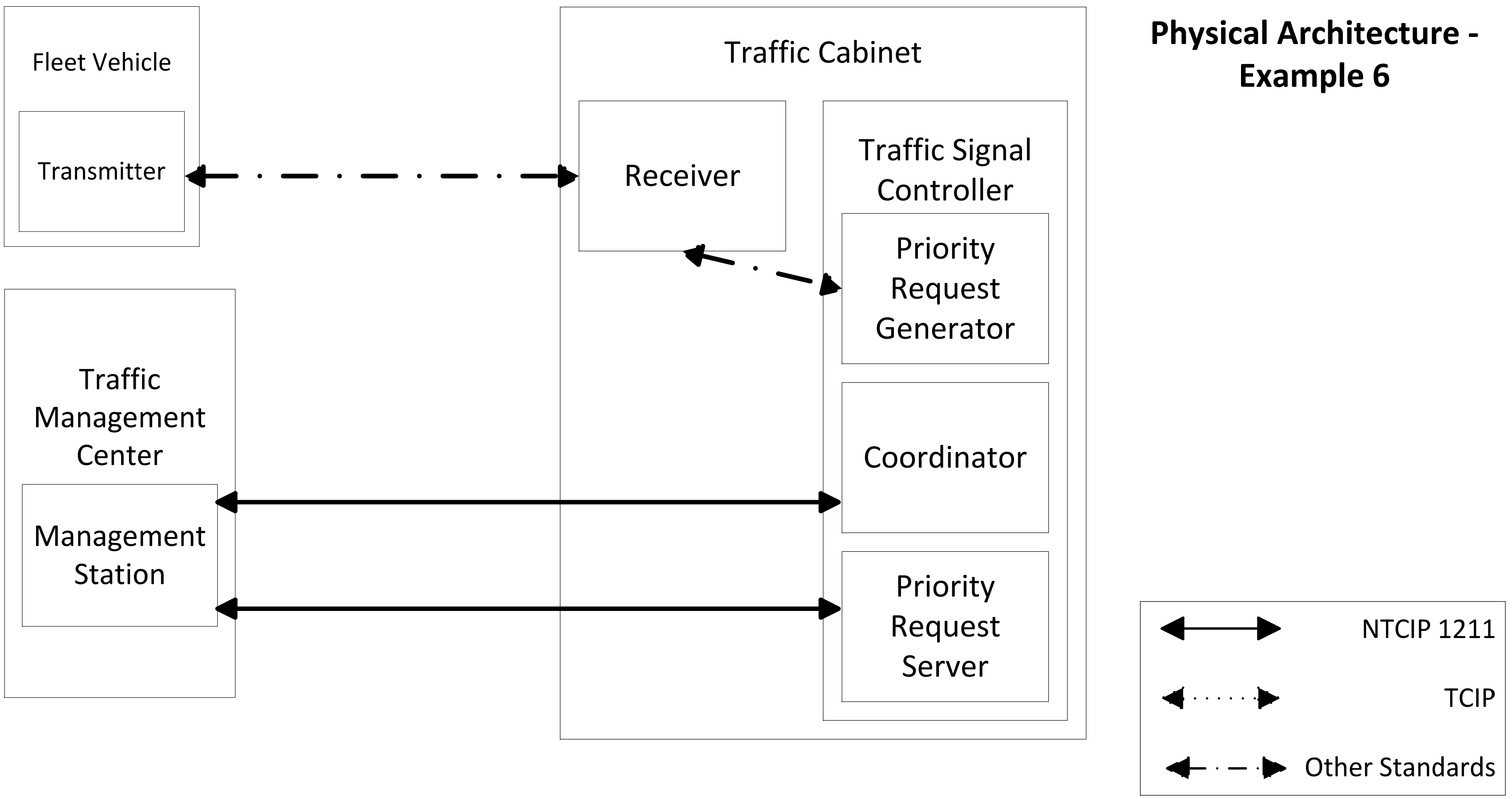
Physical Architecture - Example 4

Identify the Different System Architectures Supported by the Standards

Physical Architecture - Example 5



Identify the Different System Architectures Supported by the Standards



Review the Technical Factors and Institutional Challenges that Affect the Selection of an SCP System Architecture

The selection of an SCP system architecture may depend on a number of factors, including technical factors and institutional challenges.

Technical factors include:

- Signal system capabilities
- Fleet vehicle capabilities
- Communications infrastructure

Institutional factors may include:

- Does the SCP cross institutional boundaries?
- Are priority requests initiated at the vehicle or center level?

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Which factor is most likely to lead to changes in communication systems?

Answer Choices

- A) Communications Infrastructure
- B) Current capabilities on the transit vehicle
- C) Current capabilities of the transit vehicle driver
- D) Current capabilities of the traffic signal controller

anywhere or
to continue

Your answer:

The correct answer is:

You did not answer this

You must answer the question before continuing

Submit

Clear

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Review of Answers

a) Communications Infrastructure

Incorrect. The current communications infrastructure can play a role in selecting a system architecture.

b) Current capabilities on the transit vehicle

Incorrect. This is an important factor for selecting a system architecture, particularly depending on whether the transit vehicle has AVL.

c) Current capabilities of the transit vehicle driver

Correct! All of the functions of the SCP system can be automated without any intervention or input from the driver.

d) Current capabilities of the traffic signal controller

Incorrect. The capabilities of traffic system controller is extremely important – this plays a large role in infrastructure costs.

Summary of Learning Objective #3

Describe the Different SCP System Architectures and the Considerations in Selecting an Architecture for Implementation

The standards describe several system architectures, which identifies the relationships between the different components of an SCP system.

Selection of a system architecture involves an evaluation of :

- Goals and objectives
- Capabilities of the signal controllers and fleet vehicles
- Communications infrastructure
- Institutional factors

Learning Objective #4: Identify the Interfaces in an SCP System and the ITS Standards that Addresses each of these Interfaces

- Identify the interfaces addressed by the TCIP Standard
- Identify the interfaces addressed by the NTCIP Standards

Identify the Interfaces Addressed by the TCIP Standard

ITS Standards

Define how ITS components interact and exchange information

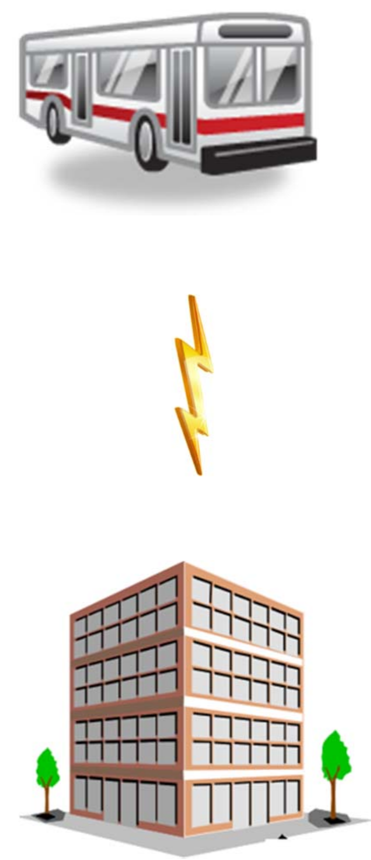
- Benefits of ITS Standards:
  - Supports interoperability
  - Lowers integration costs
  - Makes procurements and testing easier

Identify the Interfaces Addressed by the TCIP Standard

TCIP Interfaces

Interfaces addressed by the TCIP standards include:

- Between the Public Transit Vehicle – DATa manager (PTV-DAT) and the Public Transit Vehicle – PRIority (PTV-PRI)
  - PTV-DAT – logical entity on the PTV responsible for data management
  - PTV-PRI – logical entity responsible on the PTV for signal priority functions
- Between the PTV-PRI and the Computer Aided Dispatching/Automatic Vehicle Location (CAD/AVL) System
- Between the PTV-DAT and a Roadside PRG



Identify the Interfaces Addressed by the NTCIP Standards

Interfaces addressed by the NTCIP standards include:

- Interfaces between traffic control equipment and transportation management centers
- Interfaces between traffic control equipment and fleet vehicles

Identify the Interfaces Addressed by the NTCIP Standards

The following are the interfaces addressed by NTCIP 1211:

- Between a management station and a PRS
- Between a management station and a CO
- Between a PRG and a PRS, and
- Between a PRS and a CO

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Which is not a benefit of using ITS Standards?

Answer Choices

- A) Supports interoperability
- B) Eliminates institutional issues
- C) Lowers integration costs
- D) Makes procurements easier

Your answer:

The correct answer is:

ck anywhere or

Y to continue

You did not answer this

You must answer the question before continuing

Submit

Clear

Review of Answers

a) Supports interoperability

Incorrect. ITS Standards support interoperability, which help keep users from being limited to a single vendor's products when deploying more devices.

b) Eliminates institutional issues

Correct! ITS Standards helps with resolving and mitigating technical issues, but not institutional issues.

c) Lowers integration costs

Incorrect. ITS Standards lower integration costs by providing a common language between systems that are being integrated.

d) Makes procurements easier

Incorrect. ITS standards make procurements, as well as testing, easier by defining the language used by ITS devices.

Summary of Learning Objective #4

Identify the Interfaces in an SCP System and the ITS Standards that Addresses Each of these Interfaces

- TCIP standards address interfaces between transportation management centers and fleet vehicles, and between logical entities within the fleet vehicles, such as the CAD/AVL system on a transit vehicle
- The NTCIP 1211 standard addresses the interfaces between specific components of an SCP system

Learning Objective #5: Identify the User Needs Addressed by the Standards

- Identify architectural needs addressed by the standards
- Identify the features addressed by the standards

Identify Architectural Needs Addressed by the Standards

SCP operational needs may vary depending on physical architecture used to implement the system

The following operational needs should be considered when implementing an SCP system:

- Integral entities
  - E.g., the functions of the PRS and the CO may be physically within the same traffic signal controller
- Provide live data
- Support multiple instances of an entity
  - i.e., needs to support requests from multiple PRGs
- Provide compressed data
  - Bandwidth efficient

Identify the Features Addressed by the Standards

NTCIP 1211 user needs, or features, are organized by the interface they address:

- Management station to PRS
- Management station to CO
- PRG to PRS
- PRS to CO

Identify the Features Addressed by the Standards

Features supported between a management station and a PRS:

- Manage the PRS
    - Determine PRS Identity
    - Determine PRS Configuration
    - Configure Reservice Period
    - Configure Time to Live Period
    - PRS Clock Synchronization
- Determine Priority Request Criteria
- Monitor the PRS
- Retrieve Log Data from the PRS

Identify the Features Addressed by the Standards

Features supported between a management station and a CO:

- Configure Priority Strategies
- Determine Priority Strategies
- Monitor the CO
- Retrieve Log Data from the CO

Identify the Features Addressed by the Standards

Features supported between the PRG and the PRS:

- Exchange Priority Requests
  - The PRG sends priority requests to the PRS
- Exchange Priority Request Status
  - The PRS sends the status of a priority request to the PRG

Identify the Features Addressed by the Standards

Features supported between a PRS and a CO:

- Exchange Service Requests
  - The PRS sends a service request to a CO, specifying a priority strategy to be implemented, the time of service requested, and the estimated time of departure
- Exchange Service Request Status
  - The CO returns the status of a service request to the PRS

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Which of the following user needs are not supported by NTCIP 1211 v02?

Answer Choices

- A) Need to know the distance of the transit vehicle from the intersection
- B) Need to configure priority strategies
- C) Need to exchange priority requests
- D) Need to exchange service requests

The correct answer is:

anywhere or
to continue

You did not answer this

You must answer the question before continuing

Submit

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Review of Answers

a) Need to know the distance of the transit vehicle from the intersection

Correct! This need is not addressed by NTCIP 1211 v02. However, it may be addressed by TCIP.

b) Need to configure priority strategies

Incorrect. This need is addressed as part of the interface between a management station and a CO.

c) Need to exchange priority requests

Incorrect. This need is addressed as part of the interface between a priority request generator and a priority request server.

d) Need to exchange service requests

Incorrect. This need is addressed as part of the interface between a priority request server and a coordinator.

What do the ITS standards define?

Answer Choices

- A) The conditions that must be satisfied for the PRG to generate a priority request
- B) The process that the PRS prioritizes priority requests
- C) How the CO implements the priority strategy
- D) The interfaces between the components of an SCP system

Your answer:

The correct answer is:

...k anywhere or ...Y to continue

You did not answer this

You must answer the question before continuing

Submit

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Review of Answers

a) The conditions that must be satisfied for the PRG to generate a priority request

Incorrect. Standards do not define the conditions for the PRG to generate a priority request – that is specific to each implementation.

b) The process that the PRS prioritizes priority requests

Incorrect. The process and how the PRS prioritizes priority request is also implementation specific.

c) How the CO implements the priority strategy

Incorrect. How the CO implements the priority strategy is also implementation specific

d) The interfaces between the components of an SCP system

Correct! The standards defines the interfaces between the components—what information is exchanged and how.

Summary of Learning Objective #5

Identify the User Needs Addressed by the Standards

- SCP architectural needs vary depending on the physical architecture to be implemented
- SCP user needs are organized by the interface they address

Learning Objective #6: Describe at a High Level how to Incorporate ITS Standards into an SCP System Procurement

- Present a case study where ITS Standards were incorporated in an SCP system procurement

Identify a Case Study where ITS Standards were Incorporated in an SCP System Procurement

Current Situation

- The Alphaville Transit Agency
  - experiencing increasing travel times on one of its routes
  - Due to recurring and non-recurring congestion
  - Transit signal priority (TSP) will help improve travel time reliability
  - Vehicles already equipped with AVL and radio communications
  - Far-side and near-side transit stops

Identify a Case Study where ITS Standards were Incorporated in an SCP System Procurement

Current Situation (cont.)

- Traffic agency
  - Planning to upgrade the signal controllers
  - Concerned about maintaining traffic flow but willing to provide signal priority
  - On the City's fiber optic network
  - Existing communications links with each controller

Identify a Case Study where ITS Standards were Incorporated in an SCP System Procurement

Goals

- The primary goal is to increase travel time reliability
- A secondary goal is to decrease travel times
- Performance measures are desired to verify benefits because the Transit Agency has identified other corridors that may benefit from transit signal priority

Identify a Case Study where ITS Standards were Incorporated in an SCP System Procurement

Institutional Issues

- Develop an agreement
- Agree on the conditions for providing priority
  - A vehicle is more than two minutes behind schedule
  - Does not have to be a revenue run
  - Conditions allow for queue jump

Identify a Case Study where ITS Standards were Incorporated in an SCP System Procurement

Traffic Agency Capabilities

- The traffic agency is upgrading several, but not all, of the traffic signal controllers along the arterial
    - The traffic agency agreed to adjust their procurement specifications for new signal controllers to support transit signal priority
    - The new signal controllers will include the functions of an CO
- For signalized intersections not scheduled to be replaced with new traffic signal controllers, a device may need to be installed at the signal controller cabinet

Identify a Case Study where ITS Standards were Incorporated in an SCP System Procurement

Cost Analysis

- Based on the cost analysis, the PRG should be located in the transit dispatch center
  - The transit dispatch center system constantly knows the location of each transit vehicles because of the AVL system
  - The transit dispatch center system knows the schedule for each transit vehicle and can maintain the performance measures

Identify a Case Study where ITS Standards were Incorporated in an SCP System Procurement

Cost Analysis

- Based on the cost analysis, the PRS is determined to be located in the traffic management center
  - The PRS knows the operating status of the traffic signal controllers
  - The dispatch center sends the priority request to the PRS in the TMC. The PRS will consider all the priority requests along the corridor and select the appropriate strategy(ies). The TMC will then forward the strategy to the CO
- Low cost because it takes advantage of the existing communications infrastructure and most processing is performed at the centers, minimizing costs for equipment on individual vehicles or intersections

Identify a Case Study where ITS Standards were Incorporated in an SCP System Procurement

User Needs

Review the user needs supported by the standards. Determine if each user need is applicable to the corridor.

- Management Station to PRS
  - Manage the PRS
  - Determine Priority Request Criteria
  - Monitor the PRS
  - Retrieve the Log Data from the PRS   Not Selected

Identify a Case Study where ITS Standards were Incorporated in an SCP System Procurement

User Needs (cont.)

- Management Station to CO
  - Configure Priority Strategies
  - Determine Priority Strategies
  - Monitor the CO
  - Retrieve Log Data from the CO

Identify a Case Study where ITS Standards were Incorporated in an SCP System Procurement

User Needs

Review the user needs supported by the standards. Determine if each user need is applicable to the corridor.

- PRG to PRS
  - Exchange Priority Requests
  - Exchange Priority Request Status
- PRS to CO
  - Exchange Service Requests
  - Exchange Service Request Status

Identify a Case Study where ITS Standards were Incorporated in an SCP System Procurement

Other Changes

- Near-side bus stops require significantly more information for transit signal priority
- Green extension more valuable than early green
- Can't make significant timing adjustments in some environments
- Tuned schedules to capture value of TSP on a reliable manner

Summary of Learning Objective #6

Describe at a High Level how to Incorporate ITS Standards into an SCP System Procurement.

ITS Standards can be used:

- To identify the scope of an SCP System
- To determine the features of an SCP system

Learning Objective #7: Describe Other Arterial Management Tools and Strategies

- Define the purpose of an integrated corridor management (ICM)
- Describe how transit traveler information improves transit service along arterials

Define the Purpose of an Integrated Corridor Management

Integrated Corridor Management (ICM)

- Allows institutional partner agencies to manage multi-modal transportation corridors as a system rather than as individual assets.

Define the Purpose of an Integrated Corridor Management

Integrated Corridor Management (ICM)

Manage corridor as an integrated asset in order to:

- Improve travel time reliability and predictability
- Manage congestion
- Empower travelers through better information and choices
- Improve incident response times
- Reduce the impacts of incidents on transportation operations
- May require integration of multiple ITS Standards

Define the Purpose of an Integrated Corridor Management

Integrated Corridor Management (ICM)

Other Standards

- TCIP – manage transit assets
- NTCIP – manage traffic devices (traffic signals, dynamic message signs, ramp meters)
- TMDD – center-to-center communications

- http://www.its.dot.gov/icms/ for more information

Describe How Transit Traveler Information Improves Transit Service Along Arterials

Transit Traveler Information

Transit traveler information can improve transit service along arterials by:

- Providing travelers with information about alternatives
- Managing traveler expectations
- Increased sense of system reliability

Describe How Transit Traveler Information Improves Transit Service Along Arterials

Transit Traveler Information

Other Standards

- GTFS – General Transit Feed Specification – for schedule information
- NTCIP 1203 – Dynamic Message Signs
- TMDD – center-to-center communications

ACTIVITY

U.S. Department of Transportation
Office of the Assistant Secretary for
Research and Technology

Which of the following is NOT a characteristic of an ICM program?

Answer Choices

- A) Sharing information between agencies
- B) Coordinating between different modes of transportation
- C) Providing traveler information
- D) Improving maintenance of transit vehicles

Your answer:

The correct answer is:

where or
continue

You must answer the question before continuing

Submit

Clear

Review of Answers

a) Sharing information between agencies

Incorrect. The goal is ICM is to optimize the entire transportation network by leveraging unused capacity along corridors. This is accomplished by sharing information between transportation agencies.

b) Coordinating between different modes of transportation

Incorrect. Coordinating between different transportation modes is a key component of the ICM program.

c) Providing traveler information

Incorrect. Providing traveler information allows travelers to make better informed choices that can impact the level of congestion on the transportation network.

d) Improving maintenance of transit vehicles

Correct! Maintenance of transit vehicle is the responsibility of the operating agency.

Summary of Learning Objective #7

Describe Other Arterial Management Tools and Strategies

Other arterial management strategies include:

- ICM, where regional agencies collaborate to manage a corridor as a system, rather than as separate assets
- Transit traveler information, including real-time traveler information, such as bus arrival times and incident notifications

What We Have Learned

1) Signal control priority is an operational strategy to facilitate the movement of fleet vehicles through signalized intersections.

2) A signal control priority system consists of:

   a) A priority request generator

   b) A priority request server

   c) A controller

3) Technical factors for the selection of a system architecture include signal system and fleet vehicle capabilities and communications.

4) ITS Standards can be used to design, procure, and operate a signal control priority system.

5) Integrated corridor management strategies and transit traveler information can improve service along a transportation corridor.

Resources

- NTCIP 1202 v2.19 – Object Definitions for Actuated Signal Controllers (ASC): http://www.ntcip.org/
- NTCIP 1211 v2.24 – Object Definitions for Signal Control and Prioritization: http://www.ntcip.org/
- Transit Communications Interface Profiles (TCIP) Standard Development Program: http://www.aptatcip.com/
- Transit Signal Priority (TSP): A Planning and Implementation Handbook: http://www.fta.dot.gov/documents/TSPHandbook10-20-05.pdf
- TCIP Volume 1: http://www.aptatcip.com/Documents.htm

Next Course Module

Module 9:

Arterial Management and Transit Signal Priority: Specifying Requirements for SCP based on NTCIP 1211 Standard, Part 2 of 2

- Builds on the content of Module 8
- Provides detailed information on how to identify and use applicable ITS standards to procure and operate a signal control priority system following a Systems Engineering process
- Focuses on using the tools provided with NTCIP 1211 – Object Definitions for Signal Control and Prioritization Standard v02

Thank you for completing this module.

Feedback

Please use the Feedback link below to provide us with your thoughts and comments about the value of the training

Thank you.