

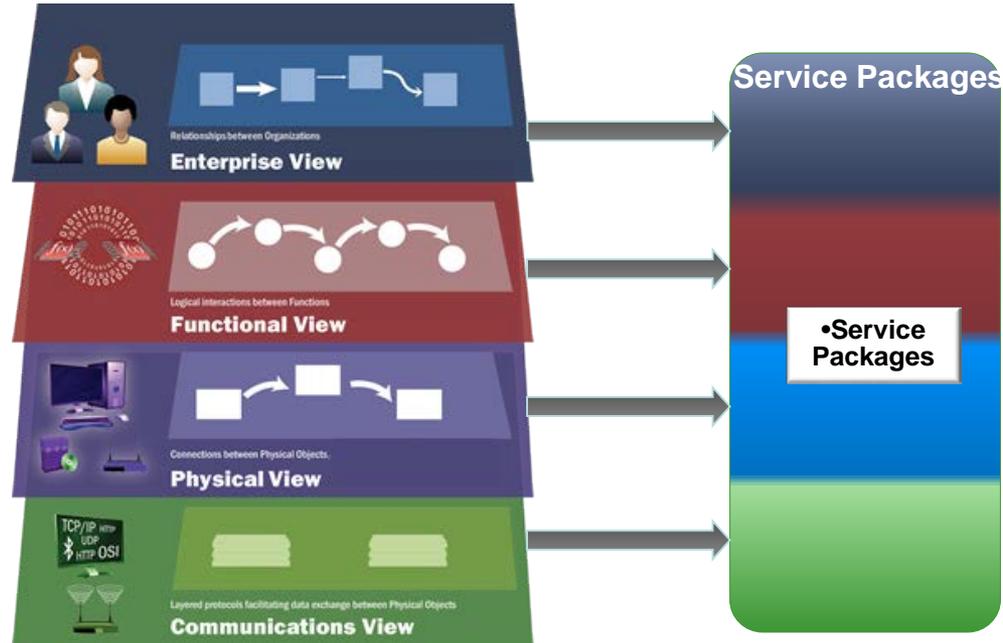


ARC-IT V8 Workshop

# ARC-IT COMPONENTS

# ARC-IT Components

- Lets take a closer look at ARC-IT Components through examination of **Service Packages** as described on the **Website**



# ARC-IT Website

Just type [arc-it.net](http://arc-it.net)

**ARC-IT** Version **8.0**  
Including the National ITS Architecture and CVRIA

Architecture ▾ Architecture Use ▾ Architecture Resources ▾ Architecture Terminology ▾ Contact The Architecture Team

[Home](#)

## Architecture Reference for Cooperative and Intelligent Transportation

The Architecture Reference for Cooperative and Intelligent Transportation (ARC-IT) provides a common framework for planning, defining, and integrating intelligent transportation systems. It is a mature product that reflects the contributions of a broad cross-section of the ITS community (transportation practitioners, systems engineers, system developers, technology specialists, consultants, etc.).

The architecture defines:

- The functions (e.g., gather traffic information or request a route) that are required for ITS
- The physical entities or subsystems where these functions reside (e.g., the field or the vehicle).
- The information flows and data flows that connect these functions and physical subsystems together into an integrated system.

If you would prefer a summary document that you can print and read over coffee, a brief document is available that presents the [key architecture concepts](#).

The information contained on these web pages ([www.iteris.com/itsarch](http://www.iteris.com/itsarch) and its sub-pages) were developed for the U.S. Department of Transportation and are in the public domain. The information is free from copyright restrictions except where noted.

**Connected Vehicle Reference Implementation Architecture**

**Enterprise View**

**Functional View**

**Physical View**

**Communications View**

# ARC-IT Website: Architecture Pull-Down

ARC-IT
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Architecture

- Service Packages
- Views and Models
  - Physical
  - Functional
  - Communications
  - Enterprise
- Methodology
- Architecture Structure
- Viewpoint Specifications
- Security

## Reference for Cooperative and Intelligent Transportation

ARC-IT provides a common framework for planning, defining, and integrating intelligent transportation systems of a broad cross-section of the ITS community (transportation practitioners, systems integrators, and vendors).

ARC-IT provides the information that are required for ITS systems (e.g., the field or the vehicle), and how these systems and physical subsystems together into an integrated system.

For more information, or for coffee, a brief document is available that presents the [key architecture concepts](#).

The Connected Vehicle Reference Implementation Architecture (and its sub-pages) were developed for the U.S. Department of Transportation and are in the public domain. All other content on this site is copyright where noted.

### Connected Vehicle Reference Implementation Architecture

# ARC-IT Website: Service Packages Page

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[Home](#) > Service Packages

## Service Packages

Type Sort

Area ▲	Short Name	Name
Commercial Vehicle Operations	 CVO02	<a href="#">CVO01: Carrier Operations and Fleet Management</a>
	CVO02	<a href="#">CVO02: Freight Administration</a>
	CVO03	<a href="#">CVO03: Electronic Clearance</a>
	CVO04	<a href="#">CVO04: CV Administrative Processes</a>
	CVO05	<a href="#">CVO05: International Border Electronic Clearance</a>
	CVO06	<a href="#">CVO06: Freight Signal Priority</a>
	CVO07	<a href="#">CVO07: Roadside CVO Safety</a>
	CVO08	<a href="#">CVO08: Smart Roadside and Virtual WIM</a>
	CVO09	<a href="#">CVO09: Freight-Specific Dynamic Travel Planning</a>
	CVO10	<a href="#">CVO10: Road Weather Information for Freight Carriers</a>
	CVO11	<a href="#">CVO11: Freight Drayage Optimization</a>
	CVO12	<a href="#">CVO12: HAZMAT Management</a>

# ARC-IT Website: Service Packages

Data Management	<a href="#">DM01</a>	<a href="#">DM01: ITS Data Warehouse</a>
	<a href="#">DM02</a>	<a href="#">DM02: Performance Monitoring</a>
Maintenance and Construction	<a href="#">MC01</a>	<a href="#">MC01: Maintenance and Construction Vehicle and Equipment Tracking</a>
	<a href="#">MC02</a>	<a href="#">MC02: Maintenance and Construction Vehicle Maintenance</a>
	<a href="#">MC03</a>	<a href="#">MC03: Roadway Automated Treatment</a>
	<a href="#">MC04</a>	<a href="#">MC04: Winter Maintenance</a>
	<a href="#">MC05</a>	<a href="#">MC05: Roadway Maintenance and Construction</a>
	<a href="#">MC06</a>	<a href="#">MC06: Work Zone Management</a>
	<a href="#">MC07</a>	<a href="#">MC07: Work Zone Safety Monitoring</a>
	<a href="#">MC08</a>	<a href="#">MC08: Maintenance and Construction Activity Coordination</a>
	<a href="#">MC09</a>	<a href="#">MC09: Infrastructure Monitoring</a>
Parking Management	<a href="#">PM01</a>	<a href="#">PM01: Parking Space Management</a>
	<a href="#">PM02</a>	<a href="#">PM02: Smart Park and Ride System</a>
	<a href="#">PM03</a>	<a href="#">PM03: Parking Electronic Payment</a>
	<a href="#">PM04</a>	<a href="#">PM04: Regional Parking Management</a>



# ARC-IT Website: Service Packages

Public Safety	<a href="#">PS03</a>	<a href="#">PS03: Emergency Vehicle Preemption</a>	
	<a href="#">PS04</a>	<a href="#">PS04: Mayday Notification</a>	
	<a href="#">PS05</a>	<a href="#">PS05: Vehicle Emergency Response</a>	
	<a href="#">PS06</a>	<a href="#">PS06: Incident Scene Pre-Arrival Staging Guidance for Emergency Responders</a>	
	<a href="#">PS07</a>	<a href="#">PS07: Incident Scene Safety Monitoring</a>	
	<a href="#">PS08</a>	<a href="#">PS08: Roadway Service Patrols</a>	
	<a href="#">PS09</a>	<a href="#">PS09: Transportation Infrastructure Protection</a>	
	<a href="#">PS10</a>	<a href="#">PS10: Wide-Area Alert</a>	
	<a href="#">PS11</a>	<a href="#">PS11: Early Warning System</a>	
	<a href="#">PS12</a>	<a href="#">PS12: Disaster Response and Recovery</a>	
	<a href="#">PS13</a>	<a href="#">PS13: Evacuation and Reentry Management</a>	
	<a href="#">PS14</a>	<a href="#">PS14: Disaster Traveler Information</a>	
	Public Transportation	<a href="#">PT01</a>	<a href="#">PT01: Transit Vehicle Tracking</a>
		<a href="#">PT02</a>	<a href="#">PT02: Transit Fixed-Route Operations</a>
<a href="#">PT03</a>		<a href="#">PT03: Dynamic Transit Operations</a>	
<a href="#">PT04</a>		<a href="#">PT04: Transit Fare Collection Management</a>	
<a href="#">PT05</a>		<a href="#">PT05: Transit Security</a>	
<a href="#">PT06</a>		<a href="#">PT06: Transit Fleet Management</a>	
<a href="#">PT07</a>		<a href="#">PT07: Transit Passenger Counting</a>	
<a href="#">PT08</a>		<a href="#">PT08: Transit Traveler Information</a>	
<a href="#">PT09</a>		<a href="#">PT09: Transit Signal Priority</a>	
<a href="#">PT10</a>		<a href="#">PT10: Intermittent Bus Lanes</a>	
<a href="#">PT11</a>		<a href="#">PT11: Transit Pedestrian Indication</a>	

# ARC-IT Website: Service Packages

Support	<a href="#">SU01</a>	<a href="#">SU01: Connected Vehicle System Monitoring and Management</a>
	<a href="#">SU02</a>	<a href="#">SU02: Core Authorization</a>
	<a href="#">SU03</a>	<a href="#">SU03: Data Distribution</a>
	<a href="#">SU04</a>	<a href="#">SU04: Map Management</a>
	<a href="#">SU05</a>	<a href="#">SU05: Location and Time</a>
	<a href="#">SU06</a>	<a href="#">SU06: Object Registration and Discovery</a>
	<a href="#">SU07</a>	<a href="#">SU07: Privacy Protection</a>
	<a href="#">SU08</a>	<a href="#">SU08: Security and Credentials Management</a>
Sustainable Travel	<a href="#">ST01</a>	<a href="#">ST01: Emissions Monitoring</a>
	<a href="#">ST02</a>	<a href="#">ST02: Eco-Traffic Signal Timing</a>
	<a href="#">ST03</a>	<a href="#">ST03: Eco-Traffic Metering</a>
	<a href="#">ST04</a>	<a href="#">ST04: Roadside Lighting</a>
	<a href="#">ST05</a>	<a href="#">ST05: Electric Charging Stations Management</a>
	<a href="#">ST06</a>	<a href="#">ST06: HOV/HOT Lane Management</a>
	<a href="#">ST07</a>	<a href="#">ST07: Eco-Lanes Management</a>
	<a href="#">ST08</a>	<a href="#">ST08: Eco-Approach and Departure at Signalized Intersections</a>
	<a href="#">ST09</a>	<a href="#">ST09: Connected Eco-Driving</a>
	<a href="#">ST10</a>	<a href="#">ST10: Low Emissions Zone Management</a>



# ARC-IT Website: Service Packages

Traffic Management	<a href="#">TM05</a>	<a href="#">TM05: Traffic Metering</a>	
	<a href="#">TM06</a>	<a href="#">TM06: Traffic Information Dissemination</a>	
	<a href="#">TM07</a>	<a href="#">TM07: Regional Traffic Management</a>	
	<a href="#">TM08</a>	<a href="#">TM08: Traffic Incident Management System</a>	
	<a href="#">TM09</a>	<a href="#">TM09: Integrated Decision Support and Demand Management</a>	
	<a href="#">TM10</a>	<a href="#">TM10: Electronic Toll Collection</a>	
	<a href="#">TM11</a>	<a href="#">TM11: Road Use Charging</a>	
	<a href="#">TM12</a>	<a href="#">TM12: Dynamic Roadway Warning</a>	
	<a href="#">TM13</a>	<a href="#">TM13: Standard Railroad Grade Crossing</a>	
	<a href="#">TM14</a>	<a href="#">TM14: Advanced Railroad Grade Crossing</a>	
	<a href="#">TM15</a>	<a href="#">TM15: Railroad Operations Coordination</a>	
	<a href="#">TM16</a>	<a href="#">TM16: Reversible Lane Management</a>	
	<a href="#">TM17</a>	<a href="#">TM17: Speed Warning and Enforcement</a>	
	<a href="#">TM18</a>	<a href="#">TM18: Drawbridge Management</a>	
	<a href="#">TM19</a>	<a href="#">TM19: Roadway Closure Management</a>	
	<a href="#">TM20</a>	<a href="#">TM20: Variable Speed Limits</a>	
	<a href="#">TM21</a>	<a href="#">TM21: Speed Harmonization</a>	
	<a href="#">TM22</a>	<a href="#">TM22: Dynamic Lane Management and Shoulder Use</a>	
	<a href="#">TM23</a>	<a href="#">TM23: Border Management Systems</a>	
	Traveler Information	<a href="#">TI01</a>	<a href="#">TI01: Broadcast Traveler Information</a>
		<a href="#">TI02</a>	<a href="#">TI02: Personalized Traveler Information</a>
		<a href="#">TI03</a>	<a href="#">TI03: Dynamic Route Guidance</a>
		<a href="#">TI04</a>	<a href="#">TI04: Infrastructure-Provided Trip Planning and Route Guidance</a>
<a href="#">TI05</a>		<a href="#">TI05: Travel Services Information and Reservation</a>	
<a href="#">TI06</a>		<a href="#">TI06: Dynamic Ridesharing and Shared Use Transportation</a>	
<a href="#">TI07</a>		<a href="#">TI07: In-Vehicle Signage</a>	

# ARC-IT Website: Service Packages

Vehicle Safety	<a href="#">VS01</a>	<a href="#">VS01: Autonomous Vehicle Safety Systems</a>
	<a href="#">VS02</a>	<a href="#">VS02: V2V Basic Safety</a>
	<a href="#">VS03</a>	<a href="#">VS03: V2V Situational Awareness</a>
	<a href="#">VS04</a>	<a href="#">VS04: V2V Special Vehicle Alert</a>
	<a href="#">VS05</a>	<a href="#">VS05: Curve Speed Warning</a>
	<a href="#">VS06</a>	<a href="#">VS06: Stop Sign Gap Assist</a>
	<a href="#">VS07</a>	<a href="#">VS07: Road Weather Motorist Alert and Warning</a>
	<a href="#">VS08</a>	<a href="#">VS08: Queue Warning</a>
	<a href="#">VS09</a>	<a href="#">VS09: Reduced Speed Zone Warning / Lane Closure</a>
	<a href="#">VS10</a>	<a href="#">VS10: Restricted Lane Warnings</a>
	<a href="#">VS11</a>	<a href="#">VS11: Oversize Vehicle Warning</a>
	<a href="#">VS12</a>	<a href="#">VS12: Pedestrian and Cyclist Safety</a>
	<a href="#">VS13</a>	<a href="#">VS13: Intersection Safety Warning and Collision Avoidance</a>
	<a href="#">VS14</a>	<a href="#">VS14: Cooperative Adaptive Cruise Control</a>
	<a href="#">VS15</a>	<a href="#">VS15: Infrastructure Enhanced Cooperative Adaptive Cruise Control</a>
	<a href="#">VS16</a>	<a href="#">VS16: Automated Vehicle Operations</a>
Weather	<a href="#">WX01</a>	<a href="#">WX01: Weather Data Collection</a>
	<a href="#">WX02</a>	<a href="#">WX02: Weather Information Processing and Distribution</a>
	<a href="#">WX03</a>	<a href="#">WX03: Spot Weather Impact Warning</a>



# Finding Service Packages

---

- Click 'Area Sort'
  - SPs are re-sorted according to type, group identifiers
  - Group and SP Name are also sortable
- Type: High Level non-transportation assignment
  - The service package provides and/or facilitates a <type> service:
    - Convenience, Environmental, Informational, Management, Mobility, Regulatory, Safety, Support
- Group: transportation-specific
  - The service package provides and/or facilitates <group> transport-related service(s)
    - Commercial vehicle operations, electronic payment, public safety, traffic network, transit, ...etc.



# ARC-IT Website- Service Package Details

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Architecture ▼ Architecture Use ▼ Architecture Resources ▼ Architecture Terminology ▼ Contact The Architecture Team

[Home](#) > [Service Packages](#) > Queue Warning

<< [VS07](#) : VS08 : [VS09](#) >>

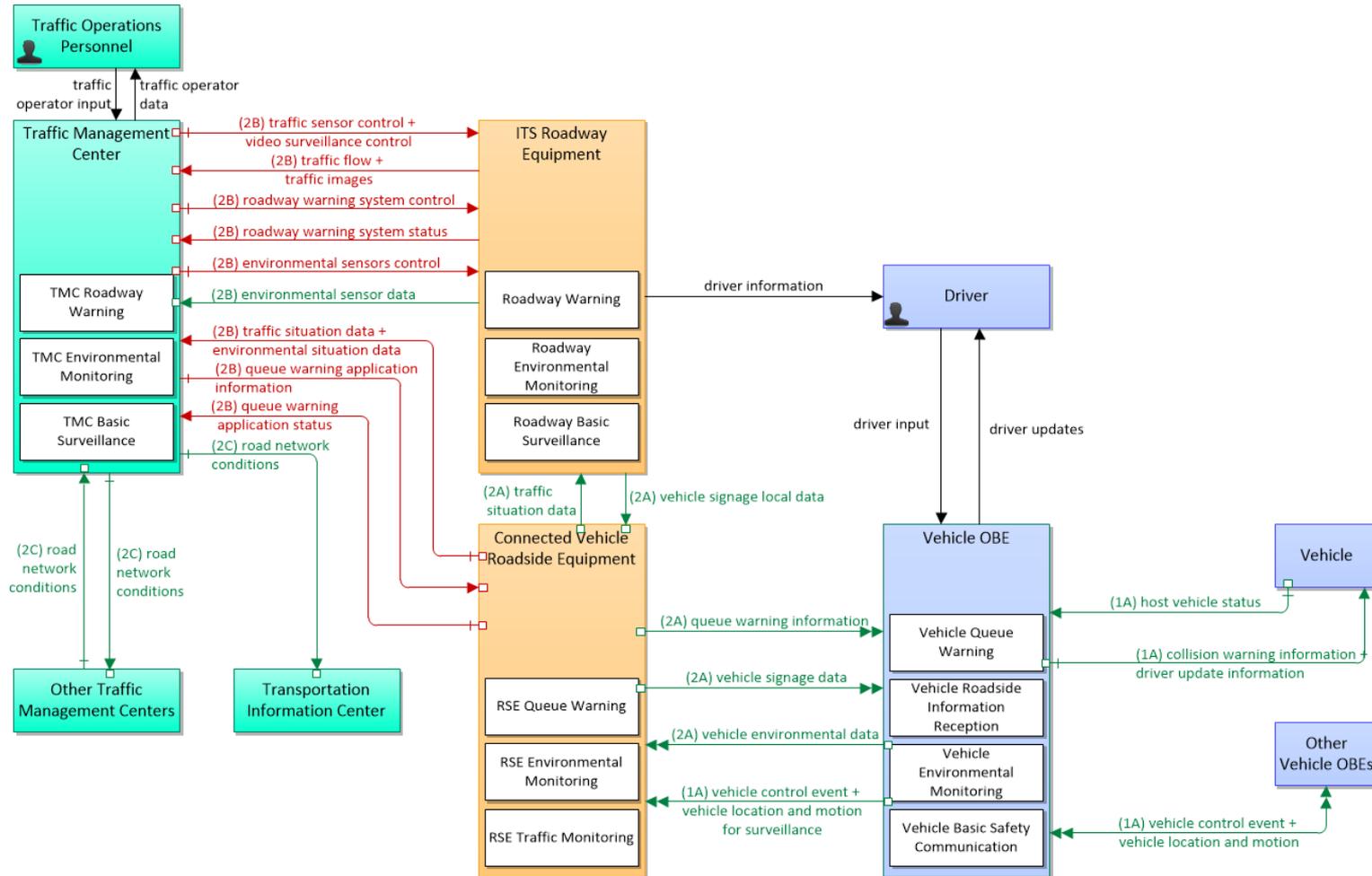
## VS08: Queue Warning

This service package utilizes connected vehicle technologies, including vehicle-to-infrastructure (V2I) and vehicle-to-vehicle (V2V) communications, to enable vehicles within the queue event to automatically broadcast their queued status information (e.g., rapid deceleration, disabled status, lane location) to nearby upstream vehicles and to centers (such as the TMC). The infrastructure will broadcast queue warnings to vehicles in order to minimize or prevent rear-end or other secondary collisions. This service package is not intended to operate as a crash avoidance system. In contrast to such systems, this service package will engage well in advance of any potential crash situation, providing messages and information to the driver in order to minimize the likelihood of his needing to take crash avoidance or mitigation actions later. It performs two essential tasks: queue determination (detection and/or prediction) and queue information dissemination using vehicle-based, infrastructure-based, or hybrid solutions.

Enterprise Functional **Physical** Goals and Objectives Requirements Sources Security

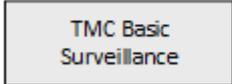
**Physical**

# Service Package Example 1: Queue Warning

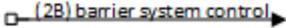
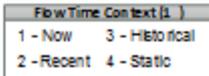
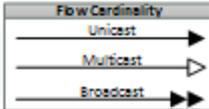
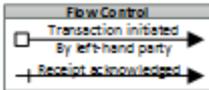


VS08: Queue Warning			
6	Physical	Nov 2, 2016	NAT

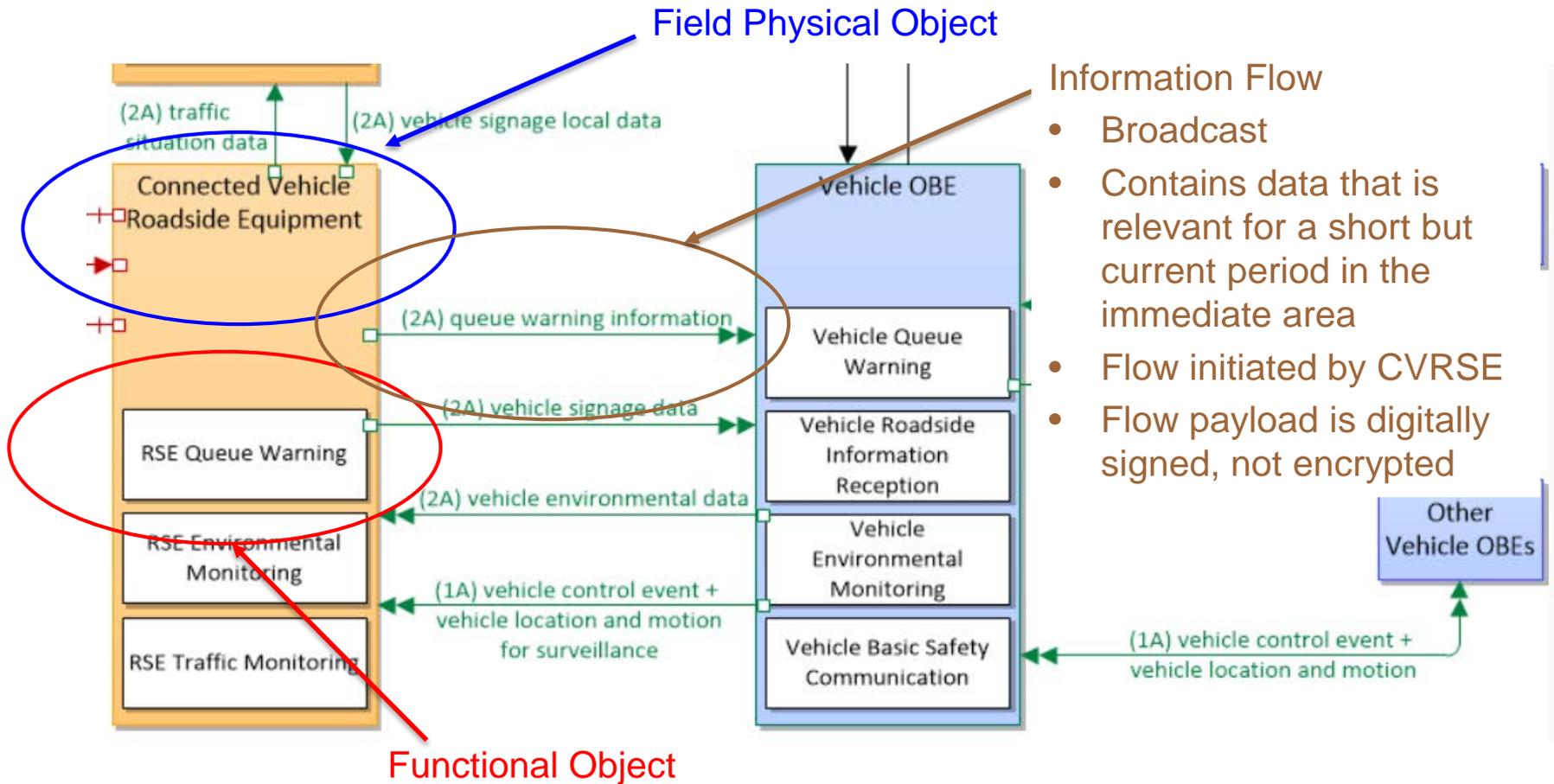
# Physical Service Package Diagram Objects

	<p>Physical objects are illustrated as colored rectangles. These are color coded according to the type of physical object. Size of the object varies only for diagram efficiency, and to include all of the Functional Object the P-Object may include in the given service package.</p> 
	<p>Functional Objects appear as white rectangles placed inside the P-Object whose functionality they express.</p>
	<p>Human actors appear as P-Objects with a small 'human' icon in the southwest corner. Humans p-objects never include Functional Objects.</p>

# Physical Service Package Diagram Flows

	<p>Information Flows are shown as solid lines that include arrowheads to indicate the primary direction information is flowing. Flow appearance is further encoded as shown in the following rows</p>
	<p>Flow Time Context is represented as a number to the left of the flow name. This indicates the time constraints that that the destination places on receipt of the information provided by this flow. These are high level constraints, dependent on more detailed performance specification in standards and interface control documents.</p>
	<p>Flow Spatial Context is represented as a letter adjacent to Time Context. This indicates the distance constraints around which the data provided by the Source is relevant. These are high level constraints, dependent on more detailed performance specification in standards and interface control documents.</p>
	<p>Flow Cardinality is represented by arrowhead style. It indicates whether a flow is unicast (sent to one destination), multicast (sent to multiple, specified destinations) or broadcast (sent to all possible destinations, limited only by media and protocol constraints).</p>
	<p>Flow Control is represented by a box (initiator) and a slash (acknowledgement required) attached to the flow.</p>
	<p>Flow Security is represented by color. These are typically derived from the security analysis; any flow with Integrity of MODERATE or HIGH requires Authenticability; any flow with Confidentiality of MODERATE or HIGH requires encryption.</p>

# ARC-IT Website Queue Warning Page – Physical View



# Queue Warning Example – details of Physical View Page



## Includes Physical Objects:

Physical Object	Class	Description
<a href="#">Connected Vehicle Roadside Equipment</a>	Field	'Connected Vehicle Roadside Equipment' (CV RSE) represents the Connected Vehicle roadside devices that are used to send messages to, and receive messages from, nearby vehicles using Dedicated Short Range Communications (DSRC) or other alternative wireless communications technologies. Communications with adjacent field equipment and back office centers that monitor and control the RSE are also supported. This device operates from a fixed position and may be permanently deployed or a portable device that is located temporarily in the vicinity of a traffic incident, road construction, or a special event. It includes a processor, data storage, and communications capabilities that support secure communications with passing vehicles, other field equipment, and centers.



Functional Object	Description	Physical Object
<a href="#">RSE Queue Warning</a>	'RSE Queue Warning' provides V2I communications to support queue warning systems. It monitors connected vehicles to identify and monitor queues in real-time and provides information to vehicles about upcoming queues, including downstream queues that are reported by the Traffic Management Center.	<a href="#">Connected Vehicle Roadside Equipment</a>



## Includes Information Flows:

Information Flow	Description
<a href="#">collision warning information</a>	Information provided to support computer-based intervention of vehicle controls. Analogous to driver warnings, these are warnings issued to on-board control systems of an impending collision or other situation detected by the Vehicle OBE that may require control intervention.



# Queue Warning Example – Functional Object

## RSE Queue Warning

Physical Object:  
Connected Vehicle  
Roadside Equipment

Overview

Functionality

Information Flows

### Overview

'RSE Queue Warning' provides V2I communications to support queue warning systems. It monitors connected vehicles to identify and monitor queues in real-time and provides information to vehicles about upcoming queues, including downstream queues that are reported by the Traffic Management Center.

This functional object is included in the "Connected Vehicle Roadside Equipment" physical object.

This functional object is included in the following service packages:

- [Queue Warning](#)



# Queue Warning Example – Information Flow

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[Home](#) > [Views](#) > [Physical](#) > [Triples](#) > Connected Vehicle Roadside Equipment --> Vehicle OBE: queue warning information

 **Connected Vehicle Roadside Equipment** --> **Vehicle OBE:**  
**queue warning information**

Link Type: Short Range Wireless

**Definition** | **Included In** | **Communication Diagrams** | **Characteristics** | **Security**

**Definitions**

**queue warning information (Information Flow)**: Information regarding formed or impending queues (location of the end of queue, estimated duration of the queue, and other descriptions of the queue condition) and recommendations for upstream vehicles including speed reduction, lane change, or diversion recommendations.

**Connected Vehicle Roadside Equipment (Source Physical Object)**: 'Connected Vehicle Roadside Equipment' (CV RSE) represents the Connected Vehicle roadside devices that are used to send messages to, and receive messages from, nearby vehicles using Dedicated Short Range Communications (DSRC) or other alternative wireless communications technologies. Communications with adjacent field equipment and back office centers that monitor and control the RSE are also supported. This device operates from a fixed position and may be permanently deployed or a portable device that is located temporarily in the vicinity of a traffic incident, road construction, or a special event. It includes a processor, data storage, and communications capabilities that support secure communications with passing vehicles, other field equipment, and centers.

**Vehicle OBE (Destination Physical Object)**: The Vehicle On-Board Equipment (OBE) provides the vehicle-based processing, storage, and communications functions necessary to support connected vehicle operations. The radio(s) supporting V2V and V2I communications are a key component of the Vehicle OBE. This communication platform is augmented with processing and data storage capability that supports the connected vehicle applications.

# Queue Warning Example – Needs and Requirements

- Each Service Package defined by Needs met
- Each Functional Object defined by Requirements addressed

Enterprise		Functional	Physical	Goals and Objectives	Requirements	Sources	Security
<b>Requirements</b>							
Need		Functional Object	Requirement				
01	Traffic Operations needs to be able to detect a queue formation using both infrastructure and connected vehicle sources of information.	RSE Queue Warning	01	The field equipment shall communicate with the connected vehicles to gather real-time vehicle-collected data including vehicle speed, location and localized weather condition from the vehicle network.			
		RSE Traffic Monitoring	01	The field element shall communicate with on-board equipment on passing vehicles to collect current vehicle position, speed, and heading and a record of previous events (e.g., starts and stops, link travel times) that can be used to determine current traffic conditions.			
		TMC Roadway Warning	01	The center shall monitor data on traffic, environmental conditions, and other hazards collected from sensors along the roadway.			
			07	The center shall have the capability to receive real-time traffic (including location and speed), road conditions (e.g. ice, wet, etc.), and weather data (clear, rainy and snowy) from connected vehicles.			

itaric.com/arc-it/html/servicepackages/en52.html#tab-1

# Queue Warning Example – Security

Enterprise

Functional

Physical

Goals and Objectives

Requirements

Sources

Security

## Security

In order to participate in this application, each physical object should meet or exceed the following security levels.

Physical Object Security				
Physical Object	Confidentiality	Integrity	Availability	Security Class
<u>Connected Vehicle Roadside Equipment</u>	Moderate	Moderate	Moderate	<u>Class 2</u>
<u>ITS Roadway Equipment</u>	Moderate	Moderate	Moderate	<u>Class 2</u>
<u>Other Traffic Management Centers</u>	Low	Moderate	Moderate	<u>Class 1</u>
<u>Other Vehicle OBEs</u>	Low	High	Moderate	<u>Class 3</u>
<u>Traffic Management Center</u>	Moderate	High	Moderate	<u>Class 3</u>
<u>Transportation Information Center</u>	Low	Low	Moderate	<u>Class 1</u>
<u>Vehicle</u>				
<u>Vehicle OBE</u>	Low	High	Moderate	<u>Class 3</u>

In order to participate in this application, each information flow triple should meet or exceed the following security levels.

Information Flow Security					
Source	Destination	Information Flow	Confidentiality	Integrity	Availability
			Basis	Basis	Basis
<u>Connected Vehicle Roadside Equipment</u>	<u>ITS Roadway Equipment</u>	<u>traffic situation data</u>	Low	Moderate	Moderate
			This is all directly observable data.	This information is used to help with incident detection. It should be verified to ensure that it is not incorrectly influencing this.THEA: only limited adverse effect if raw/processed connected vehicle data is bad/compromised; could be LOW for ISIG	This information is used as supplemental information. It should operate correctly if not every single message is received. THEA: only limited adverse effect if info is not timely/readily available, could be LOW for ISIG

# Queue Warning Example – Triple Communication View

DSRC-WSMP		
queue warning information -->		
Connected Vehicle Roadside Equipment		Vehicle OBE
ITS Application Information Layer SAE J2735	Security Plane IEEE 1609.2	ITS Application Information Layer SAE J2735
Application Layer Undefined		Application Layer Undefined
Presentation Layer ISO ASN.1 UPER	Security Plane Undefined	Presentation Layer ISO ASN.1 UPER
Session Layer Undefined		Session Layer Undefined
Transport Layer IEEE 1609.3 WSMP		Transport Layer IEEE 1609.3 WSMP
Network Layer IEEE 1609.3 WSMP		Network Layer IEEE 1609.3 WSMP
Data Link Layer IEEE 1609.4, IEEE 802.11		Data Link Layer IEEE 1609.4, IEEE 802.11
Physical Layer IEEE 802.11		Physical Layer IEEE 802.11



# Pit Stop 1

---

- Find the Broadcast Traveler Information SP
- What P-Objects communicate directly with Vehicles?
- What P-Object initiates the flow of 'local traveler information' between CVRSE and Vehicle OBE?
- The triple "Transit Management Center -> transit and fare schedules -> Transportation Information Center" identifies what information layer standards for conveyance of this information?



## Pit Stop 2

---

- Find the Functional Object that controls reversible lanes in the field
- How many functional requirements are associated with this object?
- How many information flows does this functional object exchange with functional objects in the Traffic Management Center?



## Pit Stop 3

---

- Find the Map Update System Physical Object
- How many service packages does this object participate in?
- What is the Security Classification of this object?
- The triple that provides data to be used by the MUS directly from vehicles is what?
- What communications mechanisms are appropriate for this flow?



# Questions?

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- Questions on the ARC-IT components

