

KAJIAN PELAN INDUK SISTEM PENGANGKUTAN PINTAR

**Development of ITS System Architecture
for Malaysia**

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Volume IV – Architecture Flows

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1 PHYSICAL ARCHITECTURE FLOWS

1.1 Introduction

In the Physical Architecture, Architecture Flows exchange information between subsystems, and between subsystems and terminators. Architecture Flows indicate the type of information that is expected to be exchanged. Each Architecture Flow contains one or more Data Flow from the Logical Architecture. The mapping of Architecture Flows to Data Flows can be found in the Traceability Matrix document.

1.2 Summary of Physical Architecture Flows

activity reports

Activity reports containing records of citations, accidents, inspections, etc.

AHS control data

Information required for vehicles to operate on AHS lanes.

AHS control information

Control data to AHS roadway equipment

AHS status

Status of AHS equipment, lane controls etc.

AHS vehicle data

AHS route and vehicle condition data

alerts, messages

Specific alerts and messages related to Commercial Vehicles (e.g. trucks not advised, trucks over 10 tons not allowed on bridge, route details)

archive analysis requests

A user request that initiates data mining, analytical processing, aggregation or summarisation, report formulation, or other advanced processing and analysis of archived data. The request also includes information that is used to identify and authenticate the user and support electronic payment requirements, if any.

archive analysis results

Processed information products, supporting meta data, and any associated transaction information resulting from data mining, analytical processing, aggregation or summarisation, report formulation, or other on-line processing and analysis of archived data.

archive coordination

Catalogue data, meta data, published data, and other information exchanged between archives to support data synchronisation and satisfy user data requests.

archive management data

Information used to support the management of an ITS archive including database reports on the condition and quality of the archived data, status of the import and collection process, reports that monitor archive usage, and any special requests that require direct action by the administrator (e.g., requests for access to new data sources).

archive management requests

Commands, requests, and queries that support the administration and management of an ITS data archive.

archive request confirmation

Confirmation that an archive request has been received and processed with information on the disposition of the request

archive requests

A request to a data source for information on available data (i.e. "catalogue") or a request that defines the data to be archived. The request can be a general subscription intended to initiate a continuous

or regular data stream or a specific request intended to initiate a one-time response from the recipient

archive status

Notification that data provided to an archive contains erroneous, missing, or suspicious data or verification that the data provided appears valid. If an error has been detected, the offending data and the nature of the potential problem are identified.

archived data product requests

A user-specified request for archived data products (i.e. data, meta data, or data catalogs). The request also includes information that is used to identify and authenticate the user and support electronic payment requirements, if any.

archived data products

Raw or processed data, meta data, data catalogs and other data products provided to a user system upon request. The response may also include any associated transaction information.

arriving train information

Information for a train approaching a highway-rail intersection that may include direction and allow calculation of approximate arrival time and closure duration.

bad tag list

List of invalid commuter tags which may have previously failed a fare payment transaction.

basic vehicle measures

Information provided to on-board ITS equipment from the vehicle platform indicating current vehicle status.

border clearance event record

Results of border clearance check.

broadcast advisories

General broadcast advisories that are provided over wide-area wireless communications direct to the vehicle radio. These analogue advisory messages may provide similar content to ITS broadcast information flows, but include no digital data component. Existing Highway-Advisory Radio (HAR) advisory messages are a prime example of this flow.

broadcast information

General broadcast information that contains link travel times, incidents, advisories, public transport services and a myriad of other traveller information.

cargo data

Measures associated with the cargo inside a container, like temperature.

cargo data request

Request for measures associated with the cargo inside a container, like temperature; may require authentication.

chassis data

Measures from chassis systems like brakes, tyres, and fasteners.

chassis status

Indication of operational readiness of a chassis.

citation data

Safety problems related to the carrier, driver and vehicle that may lead to a citation.

clearance event record

Results of vehicle clearance activity.

closure coordination

Coordination between subsystems regarding construction and maintenance closure times and durations.

Commercial Vehicle Administration Subsystem information exchange

Tax and credential fee information exchanged between cooperating commercial vehicle administration offices.

commercial vehicle archive data

Information describing commercial vehicle travel and commodity flow characteristics. Content may include a catalogue of available information, the actual information to be archived, and associated meta data that describes the archived information.

Commercial Vehicle Check override mode

Manual override by the commercial vehicle roadside facility inspector of automated pass/pull-in signage information.

commercial vehicle data

Information about the commercial vehicles cargo, credentials, and payments.

commercial vehicle data request

Request for commercial vehicle information (cargo, driver's credit, vehicle location).

commercial vehicle measures

Commercial vehicle, driver, and cargo safety status measured by on-board ITS equipment.

commuter fare status

Status of fare transaction for commuter.

commuter information

Information about individual commuters boarding a public transport vehicle, used to track a user's progress on a scheduled public transport trip.

commuter inputs

Requests from commuter through either an on-board or fixed location traveller information station.

commuter outputs

Information for traveller from either an on-board or fixed location traveller information station.

compliance review report

Report containing data from facility activity logs from various roadside facilities.

consignment contract

Contract to pickup and deliver freight.

construction and maintenance archive data

Information describing road construction and maintenance activities identifying the type of activity, the location of the activity, and the activity status. Content may include a catalogue of available information, the actual information to be archived, and associated meta data that describes the archived information.

container arrival information

Information on the time, location, identification and point-of-origin of a container arriving at an intermodal facility, which is provided to Royal Customs Malaysia.

container availability request

Request for information on the availability of a container at an Intermodal Terminal

container availability status

Information regarding the availability of a container at an Intermodal Terminal

container delivery confirmation

Notice confirming the arrival and transfer of control of a container at a container handling facility, for example an intermodal terminal.

container delivery request

Request for permission to deliver a container to an intermodal facility.

container identification

A unique identification of a container that can be used to associate the container with a manifest and other important data.

container location

The location of a container, to sufficient accuracy to allow efficient container management.

container location request

Request to a container to provide its location; may require the requestor to authenticate their identity.

container manifest

Official statement of the cargo held in a container.

container pickup confirmation

Notice confirming that a container has been picked up at an intermodal facility and that control has been transferred to a shipping or drayage agency.

container pickup request

Request for permission to pickup a container at an intermodal transfer facility.

container release status

Information regarding whether a container has been released (by Royal Customs Malaysia, or by the Other Intermodal FMS)

container seal interrogation

Royal Customs Malaysia inspection of the electronic seal on a container to verify the container has not been opened or tampered with; requires proper authentication.

container seal status

The status of an electronic seal on a container, indicating sealing time, location, and authority, and any openings or tampering.

container status

Measures from systems on-board the container, possibly including refrigeration, shock measurement, controlled atmosphere sensing and any other systems that support special needs of the cargo.

container status request

Request for data from the sensing systems on-board the container.

container transfer location

Location within an intermodal facility that a container is to be received at or delivered to; may include guidance as well as location.

container transfer location request

Request for the location within an intermodal facility for the transfer of a container.

container transport assignment

Instructions to a commercial vehicle for the transportation of a container.

credential application

Application for commercial vehicle credentials for a particular route/trip.

credentials and safety information request

Request for additional credentials and safety information.

credentials and safety information response

Instructions to commercial vehicle managing and/or information systems indicating which vehicles are to be allowed to pass and which are out of service or have not been credentialed.

credentials information

Response containing credentials information.

credentials information request

Request for credential information.

crossing call

Request for pedestrian crossing.

crossing permission

Signal to pedestrians indicating permission to cross roadway.

current network conditions

Current traffic information, road and weather conditions, and camera images that can be used to locate and verify reported incidents, and plan and implement an appropriate response.

CVO database update

Credential information and safety problem list updates.

CVO driver initialisation

Commercial vehicle driver and vehicle information and requests to the commercial vehicle managing system.

CVO inspector information

Credential, safety, and preclearance information and instructions to the commercial vehicle inspector.

CVO inspector input

Requests from the commercial vehicle inspector to operate the commercial vehicle inspection station.

CVO Pull in Message

Message sent to commercial vehicle driver requesting pull in to inspection/verification stop along with inspection results.

CVO weight and presence

Weigh-In-Motion message to indicate presence of commercial vehicle and its weight.

demand responsive public transport plan

Plan regarding overall demand responsive public transport schedules and deployment.

demand responsive public transport request

Request for paratransit support.

device control data

Control data for roadside devices that is exchanged between roadside devices or from a maintenance management system to the roadside.

device status

Roadside control system and device status provided to maintenance management, for purposes of system maintenance and control

disaster advisories

Broadcast information on disaster extent, response activities, and recommended traveller actions.

disaster response coordination

Information supporting the coordination of disaster and emergency response assets and activities.

disaster response status

Broadcast of disaster response status and activities specifically for emergency management and public safety.

dispatch information

Dispatch information and command to emergency personnel.

driver and vehicle information

Requests from the driver and vehicle for routing, payment, and enrolment information.

driver information

General advisory and traffic control information provided to the driver while en-route.

driver inputs

Driver commands to the vehicle.

driver instructions

Public transport service instructions for both public transport and paratransit drivers.

driver roadway warning

Warning information provided to the driver based on dynamic sensing of localised factors affecting safe roadway usage.

driver updates

Information displayed or otherwise conveyed by the vehicle to the driver.

electronic clearance data

Information required for electronic clearance (toll, safety, Royal Customs Malaysia, etc.).

electronic clearance request

Request for electronic clearance data (Toll, safety, Royal Customs Malaysia, etc.).

electronic credentials

Authenticated credentials including route enrolment and payment confirmation.

emergency acknowledge

Acknowledge request for emergency assistance and provide additional details regarding actions and verification requirements.

emergency archive data

Logged incident information that characterises the identified incidents and provides a record of the corresponding incident response. Content may include a catalogue of available information, the actual information to be archived, and associated meta data that describes the archived information.

emergency data request

A request for additional information or a control command issued by the emergency response agency in response to an emergency request for assistance from a traveller.

emergency dispatch requests

Emergency vehicle dispatch instructions including incident location and available information concerning the incident.

emergency dispatch response

Request for additional emergency dispatch information (e.g., a suggested route) and provision of en-route status.

emergency notification

An emergency request for assistance originated by a traveller using an in-vehicle, public access, or personal device. Sufficient information is

provided so that the recipient can determine the location of the emergency as a minimum. Additional information identifying the requestor and requesting device and the nature and severity of the emergency may also be provided (and required) by some systems.

emergency operations request

Emergency operator inputs supporting call taking, dispatch, and other operations and communications centre operator functions.

emergency operations status

Emergency operations data supporting a range of emergency operating positions including call taker, dispatch, and various other operations and communications centre operator positions.

emergency response personnel inputs

Current incident status information and requests from emergency response personnel in the field for information and/or resources.

emergency request

An emergency assistance request originated by a commuter using an in-vehicle, public access, or personal device.

emergency traffic control request

Special request to pre-empt the current traffic control strategy in effect at one or more signalised intersections or highway segments. For example, this flow can request all signals to red-flash, request a progression of traffic control preemptions along an emergency vehicle route, or request another special traffic control plan.

emergency traffic control response

Status of the special traffic signal control strategy implemented in response to the emergency traffic control request.

emergency vehicle tracking data

The current location and operating status of the emergency vehicle.

entry permission

Permission for a commercial vehicle to enter an intermodal transfer facility.

entry request

Request by a commercial vehicle for permission to enter an intermodal transfer facility.

environmental archive data

Raw or aggregated environmental data for archiving.

environmental conditions

Current environmental and roadway conditions (e.g., air temperature, wind speed, road surface and sub-surface temperatures) as measured by environmental sensors and communicated by supporting field equipment.

environmental data

Measured environmental data and associated imagery collected by roadside equipment.

environmental data display

Both reference and current environmental status details for a given geographic area.

environmental hazards

Detection of specific localised hazards affecting the roadway, like strong winds, mudslides, landslides and flooding.

environmental information

Aggregated region-wide measured environmental data and possible environmental incident information.

environmental levels

Environmental levels as monitored by sensors.

environmental sensor data

Raw or processed data from sensors on vehicles and roadside equipment, that describes roadway environmental conditions; this data is exchanged between traffic and maintenance management.

environmental state criteria

Environmental state acceptance criteria.

environmental state data parameters

Nominal environmental state data compliance (reference) levels for each sector of an urban area.

environmental state data request

Aggregated environmental state data information request.

equipment maintenance status

Current status of field equipment maintenance actions.

evacuation status

Plans and progress for the use of public transport to support a mass evacuation effort.

evacuation support request

Request to public transport to support efforts to implement an evacuation strategy.

event confirmation

Confirmation that special event details have been received and processed.

event plans

Plans for major events possibly impacting traffic.

exit permission

Permission for a commercial vehicle to leave an intermodal transfer facility.

exit request

Request by a commercial vehicle for permission to leave an intermodal transfer facility.

external reports

Traffic and incident information that is collected by the media through a variety of mechanisms (e.g., radio station call-in programs, air surveillance).

fare and payment status

Current fare collection information including the operational status of the fare collection equipment and financial payment transaction data.

fare and price information

Current public transport, parking, and toll fee schedule information.

fare management information

Public transport fare information and transaction data used to manage public transport fare processing on the public transport vehicle.

fault reports

Reports from field equipment (sensors, signals, signs, controllers, etc.) which indicate current operational status.

fleet manager inquiry

Inquiry from fleet manager requesting data from commercial vehicle management system.

fleet status

Fleet status information including enrolment status, routing information, current vehicle information, and emergency information.

fleet to driver update

Updated instructions to the driver including dispatch, routing, and special instructions

freeway control data

Control commands and operating parameters for ramp meters, dynamic message signs, mainline metering/lane controls and other systems associated with freeway operations.

freeway control status

Current operational status and operating parameters for ramp meters, dynamic message signs, mainline metering/lane controls and other control equipment associated with freeway operations.

freight consignment request

Request from a shipper (consignor) for services to handle shipping of a container or freight load.

government reporting data receipt

The acknowledgement of satisfactory receipt of information used as input to government data systems or a report identifying problems or issues with the data submittal.

government reporting system data

Information provided by an ITS archive, formatted as appropriate, that can be used as input to government data reporting systems.

HAZMAT information

Information about a particular hazmat load including nature of the load and unloading instructions. May also include HAZMAT vehicle route and route update information

HAZMAT information request

Request for information about a particular hazmat load.

highway control status

Current traffic control equipment status that indicates operational status and right-of-way availability to the non-highway transportation mode at a multimodal crossing.

HOV data

Current HOV lane information including both standard traffic flow measures and information regarding vehicle occupancy in HOV lanes.

HRI advisories

Notification of Highway-Rail Intersection equipment failure, intersection blockage, or other condition requiring attention, and maintenance activities at or near highway rail intersections.

HRI control data

Data required for HRI information transmitted at railroad grade crossings and within railroad operations.

HRI operational status

Status of the highway-rail grade crossing equipment including both the current state or mode of operation and the current equipment condition.

HRI request

A request for highway-rail intersection status or a specific control request intended to modify HRI operation.

HRI status

Status of the highway-rail intersection equipment including both the current state or mode of operation and the current equipment condition.

in-vehicle transaction status

The status of an electronic payment transaction presented to the driver by in-vehicle equipment.

incident command information

Information that supports local management of an incident. It includes resource deployment status, hazardous material information, traffic, road, and weather conditions, evacuation advice, and other information that enables emergency personnel in the field to implement an effective, safe incident response.

incident command information presentation

Presentation of information to emergency personnel in the field that supports local tactical decision-making within an incident command system structure.

incident command request

Request for resources, commands for relay to other allied response agencies, and other requests that reflect local command of an evolving incident response.

incident data

Data and imagery from the roadside supporting incident detection and verification.

incident information

Notification of existence of incident and expected severity, location, time and nature of incident.

incident information for disaster

Report of current disaster incident information prepared for the Disaster Command Authority.

incident information for media

Report of current desensitised incident information prepared for public dissemination through the media.

incident information request

Request for incident information, clearing time, severity. The request can be a subscription that initiates as-needed information updates as well as a one-time request for information.

incident notification

An incident request for assistance originated by a traveller using an in-vehicle, public access, or personal device. Sufficient information is provided so that the recipient can determine the location of the incident as a minimum. Additional information identifying the requestor and requesting device and the nature and severity of the incident may also be provided (and required) by some systems.

incident notification response

Interactive acknowledgement and verification of the incident information received, requests for additional information, and general information on incident response status.

incident report

Report of an identified incident including incident location, type, severity and other information necessary to initiate an appropriate incident response.

incident response coordination

Incident response procedures, resource coordination, and current incident response status that are shared between allied response agencies to support a coordinated response to incidents. This flow also coordinates a positive hand off of responsibility for all or part of an incident response between agencies.

incident response status

Status of the current incident response including traffic management strategies implemented at the site (e.g., closures, diversions, traffic signal control overrides).

incident status

Information gathered at the incident site that more completely characterises the incident and provides current incident response status.

information on violators

Response from law enforcement agency to violations notification request

information request

General purpose information request for data stored within the commercial vehicle operations information exchange network.

intermodal CVO co-ordination

Exchange of information between different Intermodal Freight Management centres regarding cargo or intermodal container movement. The information may involve unit ID, location, and status.

intermodal dispatch

Directions for dispatch for pickup or delivery of an intermodal load.

intermodal freight archive data

Information describing demand at intermodal freight terminals including loading/unloading activities of trailers and containers. Content may include a catalogue of available information, the actual information to be archived, and associated meta data that describes the archived information.

intermodal status

Information from a commercial vehicle on the status of container and chassis systems that the vehicle is transporting.

intermodal status request

Request from a fleet manager for the status of an intermodal load.

intermodal terminal operator data

Information provided to the operator of an intermodal terminal.

intermodal terminal operator inputs

Inputs and control actions by an intermodal terminal operator.

international border crossing data

Cleared commercial vehicle data to allow pass-through international border crossings.

international border crossing data update

Update from commercial vehicle check stations of international border crossing events.

intersection blockage notification

Notification that a highway-rail intersection is obstructed and supporting information.

intersection status

Status of intersection congestion, approaching vehicles, etc.

ISP coordination

Coordination and exchange of transportation information between centres. This flow allows a broad range of transportation information collected by one ISP to be redistributed to many other ISPs and their clients.

ISP operating parameter updates

Tuning and performance enhancement parameters to ISP algorithms

ISP operating parameters

Parameters provided to the ISP Operator by the ISP including broadcast information settings, route selection controls, and travel optimisation algorithms.

licence request

Request supporting registration data based on licence plate read during violation.

local signal pre-emption request

Direct control signal or message to a signalised intersection that results in pre-emption of the current control plan and grants right-of-way to the requesting vehicle.

local signal priority request

Request from a vehicle to a signalised intersection for priority at that intersection.

location request

Request for the location of a commercial vehicle.

lock tag data

Tag information on cargo lock.

lock tag data request

Request to supply lock information on cargo lock for retransmission to international border crossing station.

log information

Request information to be entered into the driver log.

logged special vehicle route

Anticipated route information for special vehicles (e.g., oversized vehicles) or groups of vehicles (e.g., Sultan's motorcade) that may require changes in traffic control strategy.

maintenance archive data

Raw or aggregated maintenance data for archiving.

maintenance dispatch status

Status of maintenance vehicle dispatching and deployment for traffic management.

maintenance vehicle driver data

Information and instructions provided to the driver of a maintenance vehicle.

maintenance vehicle driver inputs

Information and control actions provided by the driver of a maintenance vehicle.

maintenance management operator data

Information provided to the operator of maintenance management.

maintenance management operator inputs

Information, control, and dispatching inputs from the maintenance operator.

maintenance resource request

Request for road maintenance resources that can be used in the diversion of traffic (cones, portable signs), clearance of an incident, and repair of ancillary damage.

maintenance resource response

Current status of maintenance resources included availability and deployment status.

maintenance response status

Maintenance management response to a request for coordinated assistance in a disaster situation.

maintenance status

Current maintenance status of vehicle.

maintenance status data

Information and measures from specialised maintenance equipment on-board of a maintenance vehicle.

maintenance support request

Request for maintenance fleet support during a disaster situation.

maintenance vehicle controls

Control data sent from on-board ITS systems to control maintenance vehicle equipment.

maintenance vehicle dispatch

Maintenance activity instructions for a maintenance vehicle.

maintenance vehicle measures

Maintenance vehicle status to be measured by on-board ITS equipment.

maintenance vehicle status data

Operational status, location, and other measures associated with the operation of a maintenance vehicle.

manifest request

Royal Customs Malaysia request for the electronic manifest associated with a container; requires proper authentication.

map update request

Request for a map update which could include a new underlying map or map layer updates.

map updates

Map update which could include a new underlying static or real-time map or map layer(s) update.

media information request

Request from the media for current transportation information.

medical facility availability

Specific care capabilities and available space in a medical facility.

medical facility request

Request for specific emergency care or for the capabilities and capacity of a facility in a disaster situation.

multimodal archive data

Operational information from alternate passenger transportation modes including air, rail transit, taxis, and ferries. Content may include a catalogue of available information, the actual information to be archived, and associated meta data that describes the archived information.

multimodal crossing status

Indication of operational status and pending requests for right-of-way from equipment supporting the non-highway mode at multimodal crossings.

multimodal information

Schedule information (static and real-time) for non-vehicular transportation providers. (in areas such as train, ferry, and air).

multimodal information request

Information request for alternate mode transportation providers such as train, ferry, air and bus.

non-vehicular presence

Sensed presence of pedestrians and other non-motor vehicle travellers at roadway crossing or control points.

on-board safety data

Vehicle safety data measured by vehicle sensors and sent to inspection stations

on-board safety request

Request for on-board vehicle safety data.

on-board vehicle data

Condition of the commercial vehicle sent to commercial vehicle manager primarily for maintenance purposes.

other data source archive data

Data extracted from other data sources. A wide range of ITS and non-ITS data and associated meta data may be provided.

parking archive data

Data used to analyse and monitor trends in parking demand, pricing, and operational actions. Content may include a catalogue of available information, the actual information to be archived, and associated meta data that describes the archived information.

parking availability

Current parking lot occupancy, parking availability, and cost information.

parking coordination

Information that enables parking management activities to be coordinated between different parking operators or systems in a region.

parking demand management request

Request to change the demand for parking facility use through pricing or other mechanisms.

parking demand management response

Response to parking demand management change requests indicating level of compliance with request.

parking information

General parking information and current parking availability.

parking instructions

Information that allows local parking facilities to be managed to support regional traffic management objectives.

parking lot data request

Request for parking lot occupancy, fares, and availability. The request can be a subscription that initiates as-needed information updates as well as a one-time request for information.

parking lot reservation confirmation

Confirmation for parking lot reservation.

parking operator inputs

Local parking operator inputs that query current status and control the operation of the parking management system.

parking reservations request

Reservation request for parking lot.

parking status

Parking lot operational status.

pass/pull-in

Command to commercial vehicle to pull into inspection station.

payment

Information passing from a payment instrument (e.g., smart card) to a payment device to provide electronic payment of some kind (e.g., toll, parking, fare) by traveller. In most cases the payment can be related to a credit account.

payment request

Request for payment from financial institution.

personal public transport information

General and personalised public transport information for a particular fixed route, flexible route, or paratransit system.

physical presence

Detection of an obstacle by a vehicle or roadside equipment. Obstacle could include fallen trees, fallen utility lines, animals, other vehicles, pedestrians, rocks in roadway etc.

position fix

Information which provides a traveller or vehicles geographical position.

probe data

Aggregate data from probe vehicles including location, speed for a given link or collection of links.

provider profile confirmation

Confirmation of profile information received by a service provider (e.g. for a hotel or restaurant).

provider profile data

Information supplied by a service provider (e.g., a hotel or restaurant) that identifies the service provider and provides details of the service offering. This flow covers initial registration of a service provider and subsequent submittal of new information and status updates so that data currency is maintained.

public transport archive data

Data used to describe and monitor public transport demand, fares, operations, and system performance. Content may include a catalogue of available information, the actual information to be archived, and associated meta data that describes the archived information.

public transport and fare schedules

Specific public transport and fare schedule information including schedule adherence.

public transport demand management request

Request to change the demand for public transport facility use through pricing or other mechanisms.

public transport demand management response

Response to public transport demand management change requests indicating level of compliance with request.

public transport emergency coordination data

Data exchanged between centres dealing with a public transport-related incident.

public transport emergency data

Initial notification of public transport emergency at a public transport stop or on public transport vehicles and further coordination as additional details become available and the response is coordinated.

public transport fare payment requests

Information provided from the commuter location that supports fare payments and associated record-keeping.

public transport fare payment responses

Information provided by public transport management that supports a fare payment transaction

public transport fleet manager inputs

Instructions governing service availability, schedules, emergency response plans, public transport personnel assignments, public transport maintenance requirements, and other inputs that establish general system operating requirements and procedures.

public transport incident information

Information on public transport incidents that impact public transport services for public dissemination.

public transport incidents for media

Report of an incident impacting public transport operations for public dissemination through the media.

public transport information

Information on public transport services, schedules, and availability that is exchanged between different public transport mode providers.

public transport information for media

Report of public transport schedule deviations for public dissemination through the media.

public transport information request

Request for public transport operations information including schedule and fare information. The request can be a subscription that initiates as-needed information updates as well as a one-time request for information.

public transport information user request

Request for special public transport routing, real-time schedule information, and availability information.

Public Transport Management System coordination

Co-ordination information between local/regional public transport organisations including schedule, on-time information, connection co-ordination, and ridership.

public transport multimodal information

Public transport schedule information for coordination at modal interchange points.

public transport operations planning data

Accumulated schedule and fare information, emergency response plans, public transport personnel information, maintenance records, and other information intended to support overall planning and management of a public transport property.

public transport operator display

Display for public transport operations personnel regarding performance of the public transport fleet, current ridership and on-time performance.

public transport operator management data

Information and control provided by public transport system operators involving many aspects of managing public transport operations.

public transport parking coordination

Request for coordinated fare payment and parking lot price data.

public transport parking lot response

Response to public transport occupancy inquiries and coordination with parking lots.

public transport request confirmation

Confirmation of a request for public transport information or service.

public transport schedule information

Current and projected public transport schedule adherence.

public transport system data

Current public transport system operations information indicating current public transport routes, the level of service on each route, and the progress of individual vehicles along their routes for use in forecasting demand and estimating current transportation network performance.

public transport traveller information

Public transport information prepared to support commuter and other travellers. It contains public transport schedules, real-time arrival information, fare schedules, and general public transport service information.

public transport trip plan

An origin-destination public transport trip that may involve multiple modes and connections.

public transport trip request

Request for a public transport trip plan that is responsive to traveller requirements such as schedule, cost, or duration.

public transport vehicle conditions

Operating conditions of public transport vehicle (e.g., mileage).

public transport vehicle driver availability

Public transport vehicle driver availability data that can be used to develop driver assignments and detailed operations schedules.

public transport vehicle driver display

Display (either video or audio) to public transport vehicle driver containing status of various ITS services.

public transport vehicle driver inputs

Public transport vehicle driver emergency request as well as fare transaction data.

public transport vehicle location data

Current public transport vehicle location and related operational conditions data provided by a public transport vehicle.

public transport vehicle measures

Public transport vehicle status measured by on-board ITS equipment.

public transport vehicle passenger and use data

Data collected on board the public transport vehicle pertaining to availability and/or passenger count.

public transport vehicle schedule performance

Estimated times of arrival and anticipated schedule deviations reported by a public transport vehicle.

public transport work schedule

Orders for maintenance of public transport vehicle or other public transport system equipment.

railroad advisories

Real-time notification of railway-related incident or advisory.

railroad schedules

Train schedules, maintenance schedules, and other information from the railroad that supports forecast of HRI closures.

registration

Registered owner of vehicle and associated vehicle information.

regulations

Regulations imposed on Commercial Vehicle Administration agencies including safety ratings, facility locations and credential fee structure.

remote surveillance control

The control commands used to remotely operate another centre's sensors or surveillance equipment so that roadside surveillance assets can be shared by more than one agency.

request fare and price information

Requests for current fare and price information from a service

request for bad tag list

Request for list of bad vehicle tag IDs.

request for information on violators

Request for law enforcement information on vehicles and drivers suspected of violations.

request for payment

Request to deduct cost of service from user's payment account.

request for performance data

Request issued by a service provider for current parking service performance data.

request for right-of-way

Forwarded request from signal prioritisation, signal pre-emption, pedestrian call, multi-modal crossing activation, or other source for right-of-way.

request for service

A traveller service request initiated by a driver or traveller. The request may result in a financial transaction, summon an emergency response, or initiate another service at the behest of the driver.

request for traffic information

Request for traffic information that specifies the region/route of interest, the desired effective time period, and other parameters that allow preparation of a tailored response. The request can be a subscription that initiates as-needed information updates as well as a one-time request for information.

request for vehicle measures

Request for vehicle performance and maintenance data collected by onboard sensors.

request tag data

Request for tag information including credit identity, stored value card cash, etc.

request public transport information

Request for public transport service information and current public transport status.

resource deployment status

Status of traffic management centre resource deployment identifying the resources available and their current deployment status.

resource request

A request for traffic management resources to implement special traffic control measures, assist in clean up, verify an incident, etc.

resource response

Plan for deploying maintenance resources to address a specific maintenance request from traffic management.

reversible lane status

Current reversible lane status including traffic sensor and surveillance data and the operational status and mode of the reversible lane control equipment.

road and weather data

Roadway weather and environmental data and road maintenance information gathered by traffic management from roadside sensor systems.

road network status request

Request from an authority coordinating a disaster response for information on the usability and congestion of the road network.

road network use

Aggregated route usage and associated travel data from clients for planning and analysis.

road weather prediction

Prediction of weather information, customised to a particular users needs and region.

roadside archive data

A broad set of data derived from roadside sensors that includes current traffic conditions, environmental conditions, and any other data that can be directly collected by roadside sensors. This data also indicates the status of the sensors and reports of any identified sensor faults.

roadside display data

Information conveyed between roadside devices for display to travellers (e.g. temperature for a DMS).

roadside log update

Update of activities at commercial vehicle check stations including clearance events and

roadside transaction status

The status of an electronic payment transaction provided directly to the driver via sign or other roadside infrastructure.

roadway characteristics

Detectable or measurable road characteristics such as friction coefficient and general surface and sub-surface conditions, road geometry and markings, etc. These characteristics are monitored or measured by vehicle ITS components or roadside sensors and used to support advanced vehicle safety and control capabilities.

roadway information system data

Information used to initialise, configure, and control roadside systems that provide driver information (e.g., dynamic message signs, highway advisory radio, beacon systems). This flow can provide message content and delivery attributes, local message store maintenance requests, control mode commands, status queries, and all other commands and associated parameters that support remote management of these systems.

roadway information system status

Current operating status of dynamic message signs, highway advisory radios, beacon systems, or other configurable field equipment that provides dynamic information to the driver.

roadway maintenance information

Summary of maintenance activities affecting the road network.

roadway micro prediction

Prediction of weather and roadway conditions at a fine level of resolution (e.g. for individual links in the road network).

roadway warning data

Information provided to roadway systems that support the dissemination of roadway warnings to vehicles and drivers, based on local road hazard conditions.

roadway warning status

Status of devices providing roadway hazard warnings.

route assignment

Route assignment information for public transport driver.

route plan

Tailored route provided by ISP in response to a specific request.

route request

Request for a tailored route based on given constraints.

safety information

Response containing commercial vehicle safety information.

safety information request

Request for commercial vehicle safety information.

safety inspection record

Record containing results of commercial vehicle safety inspection.

screening data

Data stored in vehicle's tag allowing electronic clearance at border crossings, debits at toll plazas, and clearance at safety inspections.

screening request

Request for screening data based on vehicle and possibly cargo's tags.

secure area characteristics

Characteristics (visual, audible, other) that are monitored by surveillance security systems via sensors.

secure area monitoring support

Commands that control surveillance equipment and security sensors that monitor secure public transportation areas. Also includes information for general advisories and alerts intended for general dissemination in these same public areas.

secure area surveillance data

Data collected from surveillance systems used to monitor secure areas. Includes video, audio, and other security sensor outputs.

selected routes

Routes selected based on route request criteria.

sensor and surveillance control

Control of roadway elements that provide control and monitoring of roadway and mixed use roadway and right-of-way interfaces, supporting mixed vehicular and pedestrian usage.

sensor control

Control of roadside sensors used by maintenance management to monitor traffic flow in and around work zones.

service request

Request to multimodal (possibly non-roadway) transport provider for general services information and specific trip information or reservations.

service response

Multimodal (possibly non-roadway) transport provider services information and trip reservation confirmations.

shelter availability

Available (unused) capacity of an emergency shelter.

shelter location

The location of an emergency shelter.

shelter status request

Request for information about and current occupancy status of an emergency shelter.

shipment status

Current location and public transport status of a freight shipment, for the consignor or consignee.

shipment status request

Request from consignor or consignee for the current location and public transport status of a freight shipment.

signal control data

Information used to configure and control traffic signal systems.

signal control status

Status of surface street signal controls.

suggested route

Suggested route for a dispatched emergency vehicle that may reflect current network conditions and the additional routing options available to en-route emergency vehicles that are not available to the general public.

surveillance data

Data acquired by work zone sensing systems for management of work zones.

tag data

Unique tag ID and related vehicle information for payment for services and access control purposes.

tag update

Update data held in tag which can be read at another screening.

tax filing, audit data

Commercial vehicle tax filing and audit data.

tax-credentials-fees request

Request to government agency for tax, credential and/or fee data.

toll administration requests

Instructions indicating toll fees which should be charged.

toll archive data

Data indicating toll facility usage and pricing schedules. Content may include a catalogue of available information, the actual information to be archived, and associated meta data that describes the archived information.

toll data

Current toll schedules for different types of vehicles as well as advanced toll payment information.

toll data request

Request made to obtain toll schedule information or pay a toll in advance. The request can be a subscription that initiates as-needed information updates as well as a one-time request for information.

toll demand management request

Request to change the demand for toll road facility use through pricing or other mechanisms.

toll demand management response

Response to toll demand management change requests indicating level of compliance with request.

toll instructions

Demand management toll pricing information based on current congestion.

toll operator requests

Request for information from toll operator at toll collection site.

toll revenues and summary reports

Summary of toll revenues and toll-related reports to toll service provider.

toll transaction reports

Summary report sent to toll collection point operator containing

toll transactions

Detailed list of transactions from a toll station.

track status

Current status of the wayside equipment and notification of an arriving train.

traffic archive data

Information describing the use and vehicle composition on transportation facilities and the traffic control strategies employed. Content may include a catalogue of available information, the actual information to be archived, and associated meta data that describes the archived information.

traffic characteristics

Physical traffic characteristics which are monitored and translated into macroscopic measures like occupancy, volume, density, and average speed. Point measures support presence detection and individual

vehicle measures like speed. This may also include detection of non-vehicular traffic in the roadway, such as bicycles and pedestrians.

traffic control coordination

Information transfers that enable remote monitoring and control of traffic management devices. This flow is intended to allow cooperative access to, and control of, field equipment during incidents and special events and during day-to-day operations. This flow also allows 24-hour centres to monitor and control assets of other centres during off-hours, allows system redundancies and fail-over capabilities to be established, and otherwise enables integrated traffic control strategies in a region.

traffic control enforcement

Settings for parameters that dictate what conditions constitute a violation of speed limits and traffic signals.

traffic control priority request

Request for signal priority at one or more intersections along a particular route.

traffic control priority status

Status of signal priority request functions at the roadside (e.g. enabled or disabled).

traffic equipment status

Identification of field equipment requiring repair and known information about the associated faults.

traffic flow

Raw and/or processed traffic detector information which allows derivation of traffic flow variables (e.g., speed, volume and density measures) for mixed use vehicles.

traffic images

High fidelity, real-time traffic images suitable for surveillance monitoring by the operator or for use in machine vision applications.

traffic information

Current and forecasted traffic information, road and weather conditions, and incident information. Either raw data, processed data, or some combination of both may be provided by this architecture flow.

traffic information coordination

Traffic information exchanged between TMC's. Normally would include incidents, congestion data, traffic data, signal timing plans, and real-time signal control information.

traffic information for media

Report of current traffic conditions, incidents, maintenance activities and other traffic-related information prepared for public dissemination through the media.

traffic information for public transport

Current and forecasted traffic information and incident information.

traffic operator data

Presentation of traffic operations data to the operator including traffic conditions, current operating status of traffic control equipment, maintenance activity status, incident status, and other information. This data keeps the operator appraised of current road network status, provides feedback to the operator as traffic control actions are implemented, and supports review of historical data and preparation for future traffic operations activities.

traffic operator inputs

Traffic operations requests for information, configuration changes, commands to adjust current traffic control strategies (e.g, adjust signal timing plans, change DMS messages), and other traffic operations data entry.

transaction status

Response to transaction request. Normally dealing with a request for payment.

travel service information

Reservation information or yellow pages data.

travel service request

Request for reservation or other service (e.g., yellow pages).

traveller advisory request

In vehicle communication between public transport and vehicle systems includes advisories and advance payment deductions.

traveller archive data

Data associated with traveller information services including service requests, facility usage, rideshare, routing, and traveller payment transaction data. Content may include a catalogue of available information, the actual information to be archived, and associated meta data that describes the archived information.

traveller information

Traveller information comprised of traffic status, advisories, incidents, payment information and many other travel-related data updates and confirmations.

traveller information for media

General traveller information regarding incidents, unusual traffic conditions, road weather conditions and forecasts, public transport issues, or other advisory information that has been desensitised and provided to the media.

traveller inputs

Request by a traveller to summon assistance, request travel information, make a reservation, or request any other traveller service.

traveller interface updates

Visual or audio information (e.g., routes, messages, guidance) to the traveller.

traveller profile

Information about a traveller including equipment capabilities, personal preferences and recurring trip characteristics.

traveller request

Request by a traveller to summon assistance, request information, make a reservation, or initiate any other traveller service.

trip confirmation

Acknowledgement by the driver/traveller of acceptance of a route.

trip plan

A sequence of links and special instructions comprising of a trip plan indicating efficient routes for navigating the links. Normally coordinated with traffic conditions, weather, other incidents, preemption and prioritisation plans.

trip request

Request by a driver/traveller for special routing.

variable speed limit

Legally enforceable speed limit information presented to a driver that can be varied as appropriate for roadway and weather conditions.

vehicle characteristics

The physical or visible characteristics of an individual vehicle that can be measured to classify a vehicle and imaged to uniquely identify a vehicle.

vehicle control

Vehicular control commands

vehicle identification

Identification of a commercial vehicle to an intermodal terminal for the purpose of entrance and exit control, guidance, and safety monitoring.

vehicle location

Location of vehicle and other vehicle characteristics which are exchanged between vehicle subsystems.

vehicle pollution criteria

Vehicular pollution acceptance criteria.

vehicle probe data

Vehicle probe data indicating identity, route segment identity, link time and location.

vehicle roadway warning data

Warnings about local roadway hazards or operating limits, conveyed to in-vehicle equipment.

vehicle signage data

In-vehicle signage data generated by the roadway infrastructure indicating either road conditions, street names, or special information which will be useful for a vehicle passing a specific point on the roadway.

vehicle signal violation

Detection of a vehicle violating a control signal.

vehicle speed violation

Detection of a vehicle violating a speed limit.

vehicle to vehicle coordination

Any type of advanced vehicle to vehicle communication.

vehicle variable speed limit data

Current speed limit in effect, conveyed to in-vehicle equipment.

vehicular presence

Non-traditional road vehicle user (bicycles, golf carts, etc.) approach and presence at the roadway.

violation detection

Roadside detection of a vehicle violating a speed limit, traffic signal, or control signage.

violation notification

Notification to enforcement agency of violation of a traffic law, emission requirement, or commercial vehicle regulation.

volume weather information

Accumulated forecasted and current weather data (e.g., temperature, pressure, wind speed, wind direction, humidity, precipitation, visibility, light conditions, etc.).

weather conditions

Weather and roadway conditions that serve as the input environmental data for sensors at the roadside or in maintenance and other vehicles.

wide-area statistical environmental information

Aggregated region-wide measured environmental data and possible environmental incident information.

work zone status

Status of maintenance work zone.

yellow pages information

Travel service information covering tourist attractions, lodging, restaurants, service stations, emergency services, and other services and businesses of interest to the traveller.

yellow pages request

Request for information through a yellow pages type service.
