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Intelligent transport systems — Commercial freight — Automotive visibility in the distribution supply chain —

Part 1: Architecture and data definitions

Systèmes intelligents de transport — Fret commercial — Visibilité automobile dans la chaîne d'approvisionnement de la distribution —

Partie 1: Architecture et définitions des données

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html

The committee responsible for this document is ISO/TC 204, *Intelligent transport systems*.

ISO 18495-1 is the first of potentially several parts of this family of International Standards deliverables relating to automotive visibility in the distribution supply chain. Subsequent parts will provide specifications for particular aspects within this architecture.

Introduction

The automotive distribution supply chain, which includes newly manufactured vehicles, second hand vehicles, industrial machines, construction machines and agricultural equipment (but, particularly, that for the supply of newly manufactured vehicles and machines), can be defined as a logistics chain from point of origin to an intended destination. The related parties are many, consisting of automotive manufactures, dealers, truckers, terminal operators, shipping lines, tally body, customs authorities, automotive dealers and other logistic related companies such as labelling, forwarding, stevedoring among others and this complexity makes the distribution chain difficult to control and financially inefficient. Most of the logistics process occurs at land transport and parks of new manufactured and used automotive terminals, both prior to international shipping and post international shipping.

Most distribution supply chain operations that manage the movement of automobiles through the distribution supply chain are currently handled manually, on a company by company basis, and generate a very significant amount of paperwork, which is duplicated at each stage throughout the distribution chain, causing duplication of unharmonized data and difficulty in matching these different data concepts associated with a single item in shipment.

Transport movements are made by international shippers and forwarders, and not on a single company basis. Inconsistent availability and format of data creates problems in the management of the distribution chain.

The many parties involved in the distribution supply chain, and lack of data or inconsistency in its format and presentation, causes inefficient land transport and highly labour intensive and complicated operations in terminals and increases the required minimum stock levels required to ensure contingency of supply in order to avoid stock-out situations.

Further, it is very common for dealers to request changes of finished vehicle options and destination based on final customers request in an actual business environment. This is complex and difficult to achieve without visibility throughout the distribution supply chain.

Improving the efficiency of the automotive distribution supply chain will make a significant contribution to reducing pollution, reducing waste of finite resources and reduction of environmental problems.

Considerable work and effort has already been undertaken to formalize, harmonize and standardize the documentation and the formal business processes associated with the documentation management of the automotive supply chain for finished vehicles, and these processes and data concepts are acknowledged and accepted with regards to the formal documentation processing and management of such systems. The existing (and standardized) supply chain documentation and data processing are not affected by this part of ISO 18495, which is complementary to those processes, and designed mostly for use by logistics operators. However, unlike many items in supply chains, automotives can be, and are, informally physically moved around car parks and holding centres during the logistics of operations.

As there are many existing practices within the process of automotive fabrication, and very local practices within dealers, it is recognized that these aspects of vehicle build and delivery will have their own domestic architectures. Similarly, there are established practices and procedures on the maritime leg of the journey. However, if the manufacturer, dealer, shipper or dealer wishes, at their option, to extend this architecture and data definitions into their domains, this architecture enables them to do so, should they so elect to do.

This part of ISO 18495 establishes a framework and architecture for data collection of the physical movement of vehicles, construction machinery and agricultural equipment, in the distribution chain between a point of origin (start of logistics movement) and an intended destination, and provides a means to monitor their actual physical movement at and between various stages of the distribution supply chain, including informal movements within any of these stages/locations, and provides consistent data architecture, harmonized data concepts and presentation for such data.

Intelligent transport systems — Commercial freight — Automotive visibility in the distribution supply chain —

Part 1: Architecture and data definitions

1 Scope

This part of ISO 18495 establishes a framework and architecture for data collection and to provide data definitions for visibility of vehicles, self-propelled construction machinery and agricultural equipment (hereinafter referred to as "automotives" or "automobiles") in the distribution supply chain between a point of origin (start of logistics movement) and an intended destination.

This architecture is designed to cover any undocumented movements at any location. The scope of this part of ISO 18495 is to

a) enable dynamic location within a storage area/compound,

b) provide consistent use of the ISO 3779/ ISO 3780 VIN (where available) as the prime identifier, and

c) where a VIN is not available, provide consistent and standardized identification throughout the distribution chain movement.

NOTE 1 The scope of this part of ISO 18495 does not standardize the data carriers or their interrogation means.

NOTE 2 This part of ISO 18495 is expected to be the first part of multipart standard relating to this subject.

NOTE 3 This specification is complementary to, and does not replace any supply chain documentation standardized and in use by JAIF or ODETTE in the new vehicle supply chain, nor does it impose any specification or change on the representation, nor exchange of, their data concepts nor documentation.

NOTE 4 The movement of automobiles within containers is outside of the scope of this part of ISO 18495.

2 Conformance

No specific conformance requirements are specified in this part of ISO 18495.

3 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 3779, *Road vehicles — Vehicle identification number (VIN) — Content and structure*

ISO 3780, *Road vehicles — World manufacturer identifier (WMI) code*

ISO 14816, *Road transport and traffic telematics — Automatic vehicle and equipment identification — Numbering and data structure*

ISO 14817 (all parts), *Intelligent transport systems — ITS central data dictionaries*

ISO 17262, *Intelligent transport systems — Automatic vehicle and equipment identification — Numbering and data structures*

4 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

4.1
architecture
fundamental concepts or properties of a system in its environment embodied in its elements, relationships and its *framework* (4.9)

4.2
automobile
automotive
any self-propelling motorized vehicle including cars, vans, trucks, self-propelling construction machinery and self-propelling agricultural equipment

Note 1 to entry: See also *vehicle* (4.14).

4.3
current location
physical position at the time of the enquiry

4.4
data concept
characterization which describes and defines the essential features of a distinct entity such as a *data element* (4.5), group of data entities or metadata, normally described by defining all or some of its object class, properties, value domain, data element concept, data element, data frame, message, interface dialogue, associations, but does not define the specific value domain

Note 1 to entry: *Data concepts* (4.4) can be classified into the following categories: object class, value domain, data element, aggregate domain, data frame, message, interface dialogue, dictionary document, term, symbol or module.

4.5
data element
union of a specific *data concept* (4.4) with a specific value domain creates a data element

Note 1 to entry: For example, the *Person-date of birth* can be combined with the *Date DDMMYYYY* value domain to create the *data element*: *Person-date of birth, DDMMYYYY*; alternatively, the *data element* could be formed using the *Date YYYY* value domain making a distinct *data element Person*.

4.6
destination
destination location
most recently updated end point of the journey

4.7
distribution chain
series of businesses or organizations that are involved in transporting, storing and selling goods to customers (Cambridge ED)

Note 1 to entry: See also *distribution supply chain* (4.8) and *supply chain* (4.13).

4.8
distribution supply chain
process of transportation and distribution, of *vehicles* (4.14) and mobile plant and equipment, through a *distribution chain* (4.7)

4.9
framework
particular set of beliefs or ideas referred to in order to describe a scenario or solve a problem

4.10
location type
function of the facility/point where the data was collected

4.11
point of origin
start point of a logistical movement of an *automotive* (4.2) to a *destination* (4.6)

4.12
status definition
identifier indicating whether the *automotive* (4.2) is “Not Ready” or “Ready” for the next function of the facility or the next READ POINT of the journey

4.13
supply chain
system of organizations, people, activities, information and resources involved in moving a (new) product or service from supplier to customer (OED)

Note 1 to entry: See also *distribution chain* (4.7) and *distribution supply chain* (4.8).

4.14
vehicle
automobile (4.2) such as automotive, van, truck, tractor unit, self-driven agricultural equipment, self-driven construction equipment

Note 1 to entry: The term vehicle within the context of this part of ISO 18495 embraces all forms of self-driven automotive.

4.15
VIN
structured combination of characters assigned to a *vehicle* (4.14) by the manufacturer for identification purposes as defined in ISO 3779 and ISO 3780

Note 1 to entry: See Annex B.

5 Symbols and abbreviated terms

ASN.1	Abstract Syntax Notation One
DD	Delivery to Destination
DFE	Destination Final Egress
DPT	Despatching Port Terminal
DVP	Dealer Vehicle Park
FVP	Finished Vehicle Park
M	Mandatory
MT	Marine Transport
O	Optional
PoO	Point of Origin
RPT	Receiving Port Terminal

UML Unified Modelling Language

VIN Vehicle Identification Number (ISO 3779/ISO 3780)

XML Extensible Markup Language

6 General requirement

6.1 Business modelling and core use cases

A high level Unified Modelling Language (UML) view of the business process actors and their data dependencies is shown in Figure 1.

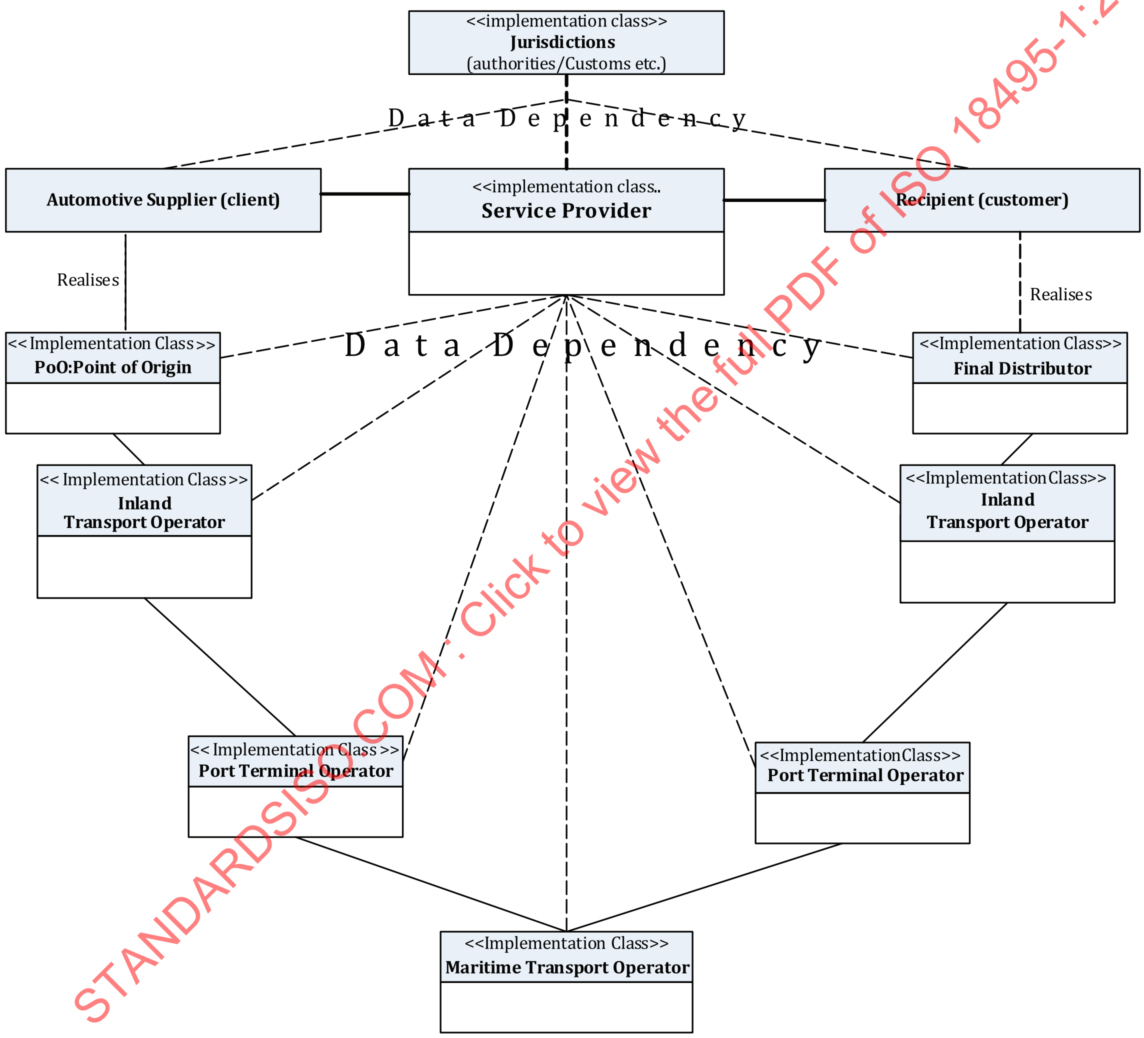


Figure 1 — UML high level view of international automotive distribution actors and their data dependency

6.2 Business process overview

6.2.1 Distribution supply chains liable to "informal" movements of automotives

Vehicle and self-powered construction and agricultural machinery manufacture (automotive production) is a global business. Specific models of vehicles are made at one or more assembly plants, then shipped to customers in all countries of the world. An automotive manufacturer of one nationality will frequently have assembly plants in many countries. But, the trend of efficient manufacturing is not that one assembly plant services the country in which it is based, but that it specializes in one or a few models at a time. The resultant product is then shipped around the world to the dealer network. A similar business environment operates for self-powered construction and agricultural machinery.

In addition to this, there is a growing movement of pre-owned automobiles from countries that habitually have a young car park, to those who tend to drive older pre-owned vehicles, and for construction and agricultural equipment to move from highly sophisticated markets to lesser developed or poorer countries as they age.

Although within countries and to some extent, continents, automobiles will be moved by road transport (driving the individual automobile or more frequently, using a transporter to move small groups of automobiles), because of the size and weight of automobiles, these international movements are overwhelmingly made by sea.

As with most business aspects, the current trends have been away from manufacturer owned and managed in-house transport towards the use of specialized logistics handlers and marine shipping organizations. A relatively small number of specialist marine shippers therefore perform large numbers of automotive movements for multiple automotive manufacturers.

As, in most cases, the automobile assembly point is not adjacent to the dockyard, this further involves road transport from the factory of assembly to a holding yard adjacent to the dock. Prior to its transport to that dockyard holding facility, automobiles are likely to be marshalled in holding pens/parks at the assembly factory, while awaiting the organization of transport. These land movements may be made by very large transport logistics companies or by small local hauliers.

Once a ship loaded with automobiles arrives at its destination port, the automobiles will be transferred into holding parks and, subsequently, transported by road, usually using “transporter” vehicles to dealerships, who may in turn hold the automobiles in vehicle parks, before shipping them to a particular dealer outlet for final inspection and handing over to the end customer, or on other circumstances may be delivered directly to the final distributor.

Throughout the process, and particularly at the assembly factory and at ports, these vehicle parks can be very large, often covering several hectares, so locating automotives for the next function of the facility or the next “Read Point” of their transport is a considerable challenge. The exigencies of the physical situation at any point in time, such as poor weather, congestion, automobiles loading at the same time as the park is being filled, etc., mean that, in practice, whatever careful planning is made, the reality is that some automotives are parked in the wrong place. Picking them for transport is therefore frequently complex and inefficient.

While consignment data is usually available electronically, and/or on paper, in the control office, consignments typically relate to batches or groups of multiple automotives, frequently of tens, sometimes hundreds, of vehicles. But, most of the physical movement of these automotives is made manually, item by item, usually simultaneously by multiple drivers. Consignments typically only identify the facility where the automotive is to be found, and not where it is precisely in that facility. Even where a scheduled location is designated in consignment documentation, the exigencies described above mean that it may not be in that exact location, so time is lost locating the vehicle, and there are cases where the nearest match vehicle that can be found is used with the consequent complication on subsequent logistics both for the substitution and substituted automotive.

Figures 2 and 3 provide visual examples.

Figure 2 — Example finished vehicle park

Figure 3 — Example of despatching port terminal

6.2.2 Business process for automotives in the distribution supply chain

Figure 4 shows the scope of this this part of ISO 18495 in the distribution supply chain elements, from point of origin to the destination. In practice, the routing may be more complex with additional holding parks.

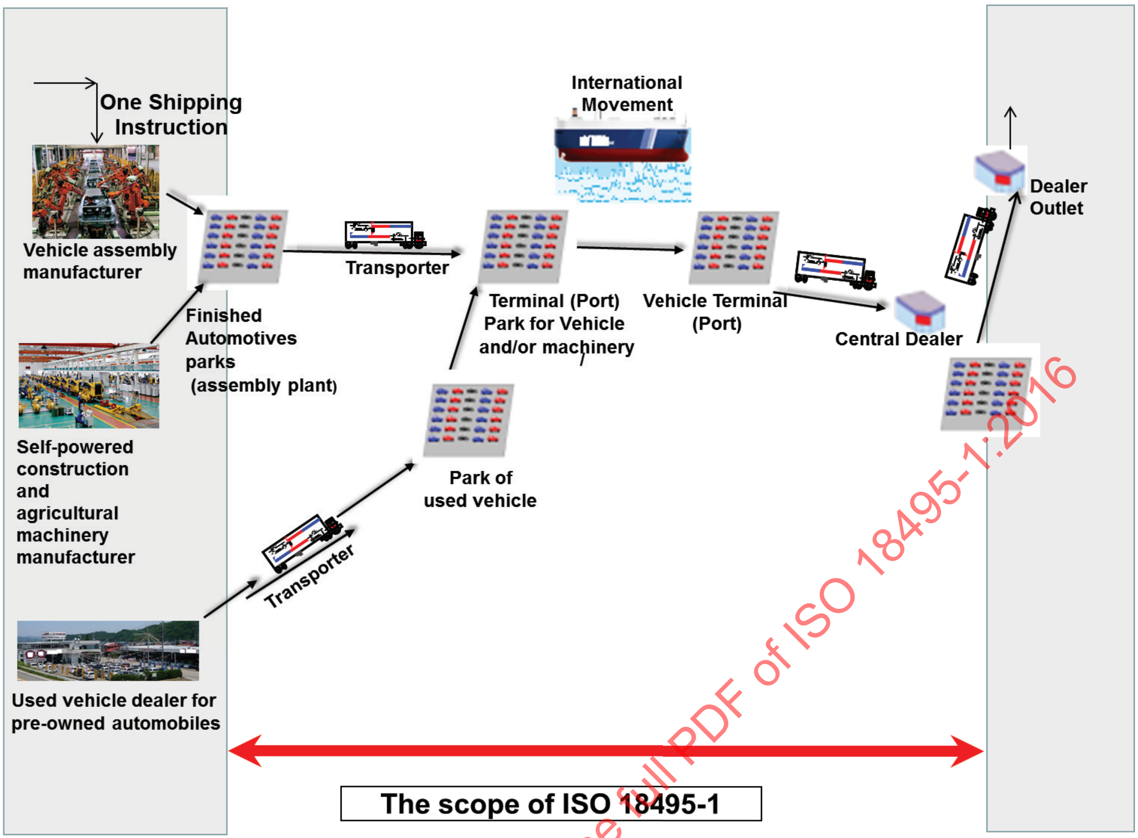


Figure 4 — Overall end-to-end logistics from an assembly factory to a dealer

Annex C provides some examples of the business process use case, example business case sequence diagrams and an example work flow, using UML representation. These are examples, and other configurations and flows are possible.

Figure D.1 provides an example of the amount of administration required behind this process.

While standards such as ISO 24533 manage and control freight at a consignment level, this part of ISO 18495 considers and characterizes the data collection points and defines the core data required for this process between the points when the automobile leaves the production line to its final movement to the dealer. This part of ISO 18495 focuses on the individual automotives in a shipment and tracks and, if necessary, traces their location en-route.

As there are many existing practices within the process of automobile fabrication, and very local practices within dealers, it is recognized that these aspects of automotive build and delivery will have their own domestic architectures. Similarly, there are established practices and procedures on the maritime segment of the journey. However, if the manufacturer, shipper or dealer wishes, at their option, to extend this architecture and data definitions into their domains, this architecture enables them to do so, should they so elect to do.

The means by which the data are stored and collected (so called data carriers) is not defined in this part of ISO 18495, but may be defined in further parts of ISO 18495.

It is important to understand that not every “Read Point” of the list, shown in Table D.1 as an example, will be present or required in any distribution supply chain. The “Read Points” of this logistics chain can be described as broadly sequential, but may vary according to the physical location and nature of the business of the manufacturer, dealer or shipper, with some of these points replicated to accommodate the physical instantiation of the distribution chain, and with other “Read Points” not present in a particular instantiation of a particular distribution chain.

The optional extension uses are shown to indicate that they are not a principal, nor required, part of this architecture and data definitions, but are available to manufacturers, shippers and dealers, should they wish, at their discretion, to extend this architecture into their domains, in order to harmonize data types and content throughout their aspects of the extended distribution supply chain.

However, many of these read points occur within the domestic environments of automotive and equipment manufacturers or the final distributor domestic logistics chains. While embracing the context of a fully consistent end-to-end information chain, this part of ISO 18495 is focused towards the aspects of these information chains which are shared through the international movement of automobiles in the distribution supply chain.

Table D.1 describes nine principle “Read Point” stages of the automotive supply chain, each comprising several sub-“Read Points” or activities where data capture may be appropriate. Not all of these sub-“Read Points”/activities, or even “Read Points”, are present in all physical instantiations of this distribution supply chain, which vary from one manufacturing plant to another, dependent on the geographic location, local terrain and business model of the manufacturer.

The logistics operator for the ”common” shared “Read Point” stages is likely to have to deal with automobiles from multiple manufacturers, through storage and distribution facilities operated by different operators, and ports, both despatching and receiving. It is of considerable benefit, therefore, that the data definition and its management are standardized.

The standardization of the architecture and data architecture is the objective of this part of ISO 18495.

Each “Read Point” stage comprises several sub-“Read Points” or activities where data capture may be appropriate. Not all of these sub-“Read Points”/activities, even “Read Points”, are present in all physical instantiations of this distribution supply chain, which vary from the instantiation of one chain to another, dependent on the geographic location, origin and destination country, local terrain and business model of the managers of the instantiation.

Column 2 of Table D.1 provides an acronym for each “Read Point” and a decimal reference for each “Read Point”. Column 3 indicates the activity at that “Read Point” and column 4 provides a unique reference code for the type of activity.

6.3 High level system data architecture

Without trying to prescribe or define the management system of any manufacturer, dealer, carrier or party involved in this distribution chain, it is the objective of the data definitions in this part of ISO 18495 to standardize a similar data capture process throughout this distribution supply chain, such that inconsistency of data and its presentation is eliminated, and without redundant data overload, when collated in the management information system, can meet any likely requirement for management information.

Regardless of where the enquirer is in the distribution system, he needs to know the following:

a) type of unambiguous identification code (see 6.5.1);

b) an unambiguous identification of the automobile;

c) the day/date/time that the data was captured;

d) the geographic location coordinates of the automobile at the time of the data capture;

e) the location ”type” that identifies the nature of activity at the location;

f) transport status code [UNECE code (Rec 24) for logistics activities];

g) status definition (whether the automotive is ready for a next step of handling).

It is also beneficial when interpreting this data to have an unambiguous “name” for the interrogation point. This enables more rapid visual interpretation of the mass of data by humans. However, while a) to f) are essential data, the system will operate without a location type or a transport status code or a status definition, so these components are "optional", but recommended.

Assuming that the management information system updates its owner and makes information also available to the automobile manufacturer or dealer (by means to be determined by the management information system of the party that captures the data), this record will identify, uniquely for each automobile, when it came into its presence, what "Read Points" it has passed through (and when) and where it was last recorded to be.

Without designing the database, the data elements of this data concept, will enable

a) search by/for automobile,

b) identify its current location,

c) identify its movement history, and

d) identify its progress through the system to date.

Table D.2 provides an example of how a manufacturer might display a record for an individual automobile using the data defined in this part of ISO 18495.

6.4 Data architecture

6.4.1 Concept

The data architecture has been determined from the highest level view with the objectives to

— minimize the number and complexity of data concepts and their constituent elements,

— provide objectivity for data repositories,

— simplify in-transit data operations,

— enable implementation specific instantiations without compromising data interoperability, and

— avoid different data requirements (and definitions) at different "Read Points" of the supply chain.

Within the scope of this part of ISO 18495, data concept semantics shall be consistent with the principles established in ISO 14817. Data concept syntax shall be defined and presented using ASN.1 (ISO 8824/ISO 8825). See Annex A.

NOTE ISO 14813-6 requires that all data are specified in a consistent format in ITS standards and ASN.1 is the selected format because it is both terse and unambiguous. This requirement does not mean that data shall always be presented/transmitted to other parties using ASN.1. The data for which there is an ASN.1 definition is easily converted to XML, UBL, UN/EDIFACT, etc. as appropriate for the media it is transmitted across and the end user application standards to which it is complying.

The simplified data architecture is defined as the AutomotiveMovementRecord aggregate domain and shall comprise two primary data concepts:

a) an automotive identifier, which uniquely identifies the automotive unit being tracked;

b) tracking event(s), which contains time stamped information about the actual tracked physical location (and related information) of the automotive/vehicle as it is being shipped.

Figure 5 provides an overview of the structure and the full definition of these concepts are provided in 6.5.

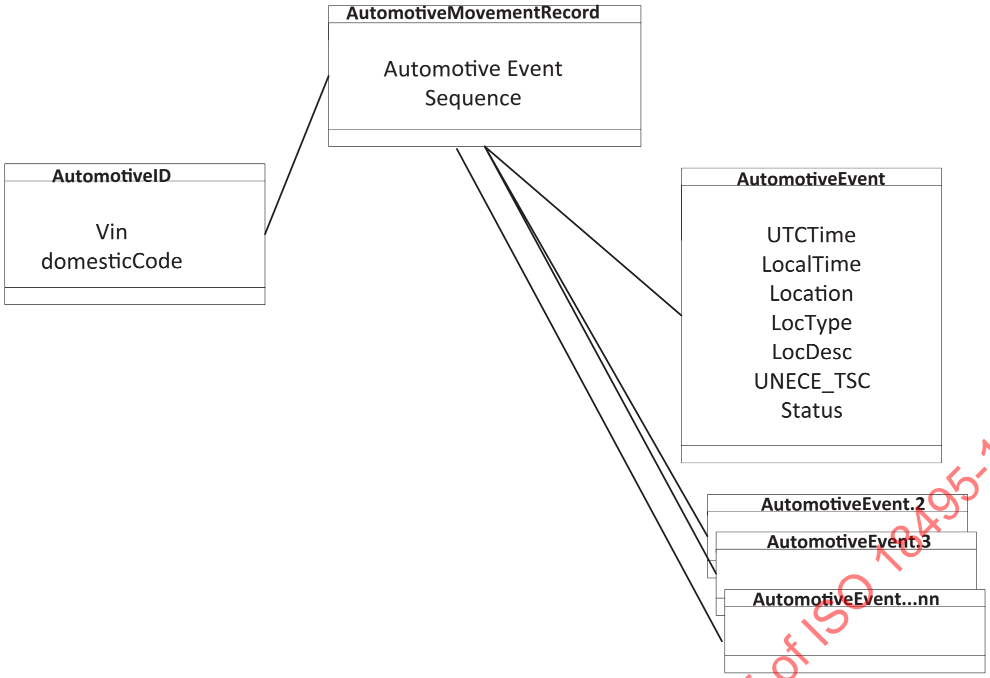


Figure 5 — Overview of the data structure

6.5 Data concept definitions

6.5.1 Automotive Identifier

This provides the identification for the automotive unit, for dynamic tracking purposes, throughout its journey. It shall be created at the commencement of the journey by the first actor in the logistics chain, or at the first opportunity thereafter.

There are two options for the automotive identifier (see below), vehicle-vin being the preferred option. Where ISO 3779/ISO 3780 VIN is readily visible, it shall always be used as the “Automotive Identifier” in preference to the automotive domestic code.

Once assigned, this “Automotive Identifier” shall be used to identify the automotive unit for whom a record of its actual physical movements is being made, throughout its journey from supplier to destination.

This tracking identification is complementary to and does not replace any ODETTE/JAIF/AIAG shipping documentation.

The automotive identifier shall be defined in ASN.1 as:

```
Automotive18495Identifier      CHOICE {
   vin    Vehicle-vin,
   Automotive18495-domesticCode,
}
WHERE
```

6.5.1.1 Vehicle-vin

The vehicle-vin data element shall be defined as:

Vehicle-vin UTF8String(17), — Vehicle VIN expressed as a string of characters: The unique

— identifier for the vehicle as defined in ISO 3779/ISO 3780

— presented as defined in an ISO 14816 or ISO 17262 coding

— scheme

6.5.1.2 Automotive Domestic Code

The automotive domestic code data element concept shall be defined as an ASN.1 SEQUENCE of 5 data elements:

Automotive18495-domesticCode :: = SEQUENCE {

startCompanyIdentifier UTF8String(1),3f — ?

companyCode UTF8String(3), — 3 letter or symbol code of the company

— generating the domestic code

endCompanyIdentifier UTF8String(1), — ?

domesticCode UTF8String(9), — Domestic code generated by company

endDomesticCode UTF8String(1),25 — %

}

— example ?MOR?123abc789 %

6.5.2 Automotive event

The Automotive event is a data concept comprising eight data elements, seven of which are simple elements and one is an aggregate element of 10 sub-elements. Automotive event shall be defined in ASN.1 as:

```
ISO-18495-1 DEFINITIONS AUTOMATIC TAGS::= BEGIN

automotive18495Event□= SEQUENCE {
   id              Automotive18495Identifier,  - Automotive18495-identifier
   utcTime          DATE-TIME,                 -- Automotive18495Event-utcTime
   localTime        VisibleString(SIZE(18..21)), - Automotive18495Event-localTime
   location         Location18495,             - Automotive18495Event-location
   locType          INTEGER (0..99)  OPTIONAL, - Automotive18495Event-locationType
   locDesc                     UTF8String(1..10) OPTIONAL, - Automotive18495Event-
locationDescription
   unece-tsc        INTEGER  (0..999) OPTIONAL, - Automotive18495Event-uneceTscCode
   statusDefinition BOOLEAN          OPTIONAL - Automotive18495Event-statusDefiniton
}
Automotive18495Identifier CHOICE {
   vin              VisibleString(SIZE(17)),   - Vehicle-vin
   domestic         VisibleString (SIZE(15)),  - Automotive18495-domesticCode
   ...
}

Location18495::= CHOICE {
   Universal        GeoLocation3D,  - Automotive18495Event-geoLocation
   localLocation    VisibleString(SIZE(7..20)) - Automotive18495Event-localLocation
}

GeoLocation3D::= SEQUENCE {
```

```
   lat      INTEGER (-900000000..900000001),    – GeoLocation-latitude
   lon      INTEGER (-1800000000..1800000001),   – GeoLocation-longitude
   alt      INTEGER (-8191..57344)              – GeoLocation-altitude
}

END
```

Annex A
(informative)

ASN.1 modules for the data concepts defined in this part of ISO 18945

A.1 General

Data can be presented in many ways, however, in an open system it has to be understood and exchangeable and understood by all parties. In order to do this, common data formats have to be used in all data definitions. ISO/TC 204 has determined that the most abstract, agnostic and commonly understood data syntax is ASN.1 and ISO 14813-6 requires that all data presentation in ISO/TC 204 standards provide a definition of the data in ASN.1 in order to promote data reuse and interoperability. However, please note that administrative control systems often use XML.

NOTE A particularly useful new application of ASN.1 is Fast Infoset. Fast Infoset is an International Standard that specifies a binary encoding format for the XML Information Set (XML Infoset) as an alternative to the XML document format. It aims to provide more efficient serialization than the text-based XML format.

Figures A.1 and A.2 provide a concept of the layer of standards and data usage.

It is important to understand that in the context of these figures, data collected from the vehicle is normally the vehicle ID and other data are normally added by the reader/interrogator and or local computers processing the data.

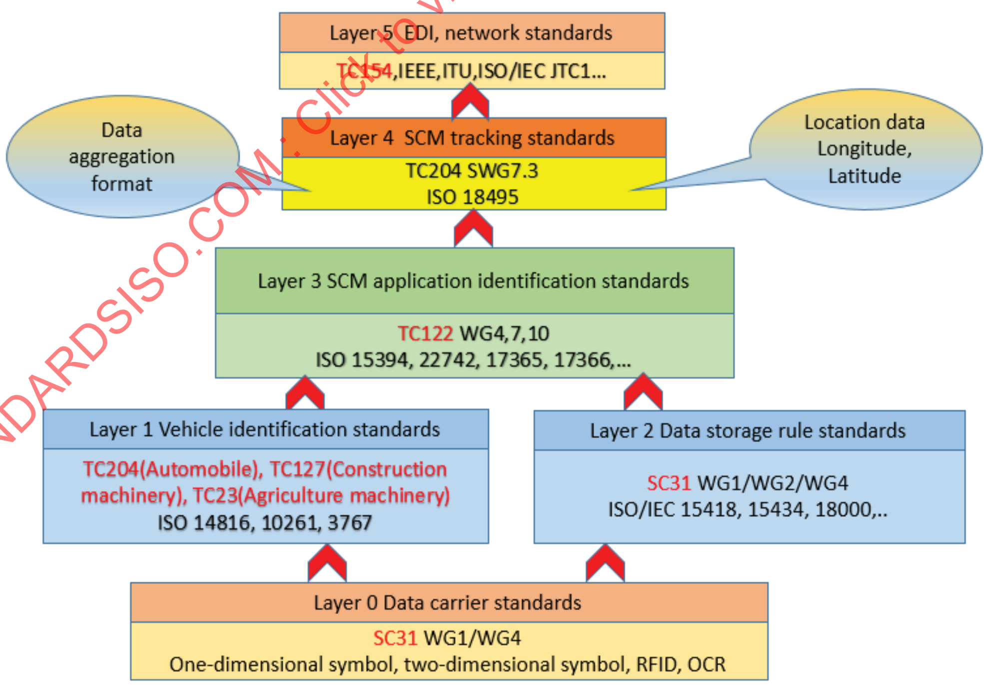


Figure A.1 — Layer concept of supply chain management standards for ISO 18495-1

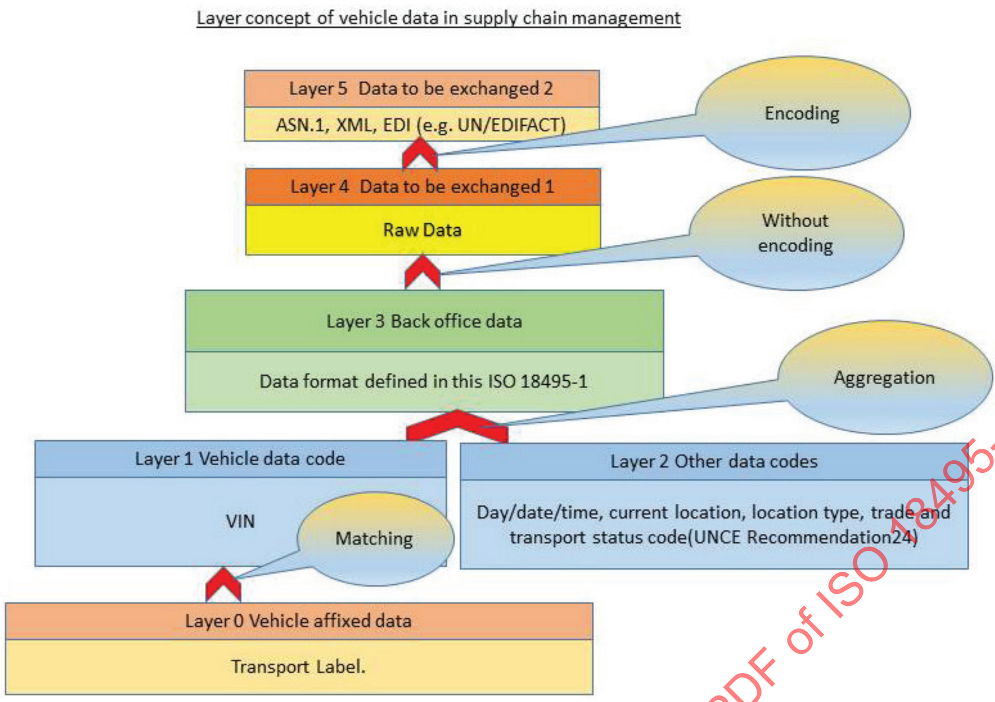


Figure A.2 — Layer concept of vehicle data in supply chain management for ISO 18495-1

The following is an example ASN.1 module for the data concepts defined in this part of ISO 18495.

A.2 ASN.1 example module

ASN.1 statement

```
  – ASN1START
  AutomotiveVisibilityDataInTheSupplyChain  {iso (1)  standard (0)  iso18495 (18495) }
AUTOMOTIVE VISIBILITY DATA IN THE SUPPLY CHAIN::= BEGIN

  AutomotiveMovementRecord::= SEQUENCE {
    Automotive18495Identifier          Automotive-unambiguousIdentifier,
  Automotive14895Events (1..n) □= SEQUENCE {
      Automotive18495Event              Automotive-event related data
             }
    }

  END
  –ASN1STOP
```

Annex B
(informative)

Interpreting a VIN number

B.1 What is a VIN?

VIN stands for Vehicle Identification Number. All vehicles are assigned a VIN when they are manufactured. They are used to uniquely identify all vehicles. VINs are recorded in accidents, insurance records and when work is done on a vehicle by a body shop, dealership or mechanic.

The VIN, as specified in ISO 3779, with the World Manufacturer Identifier (WMI) code outlined in ISO 3780, specifies the content and structure of a vehicle identification number (VIN) in order to establish, on a world-wide basis, a uniform identification numbering system for road vehicles.

The VIN consists of three sections: first, the world manufacturer identifier (WMI) section, second, the vehicle descriptor section (VDS) and last, the vehicle indicator section (VIS).

B.2 What does the VIN look like?

Sample VIN: 1 G 1 F P 2 2 P X S 2 1 0 0 0 0 1

	CHARACTER POSITION																
STANDARD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
ISO 3779	World Manufacturer Identifier (WMI)			Vehicle Descriptor Section (VDS)						Vehicle Indicator Section (VIS)							
EUROPEAN UNION (more than 500 vehicles per	WMI			Indication of "the general characteristics of the vehicle"						Indication which provide "clear identification of a particular vehicle"							
EUROPEAN UNION (fewer than 500 vehicles per	WMI		9	Indication of "the general characteristics of the vehicle"						Indication which provide "clear identification of a particular vehicle"							
NORTH AMERICA (more than 500	WMI			Vehicle Attributes					Check Digit	Model Year	Plant Code	Sequential Number					
NORTH AMERICA (fewer than 500 vehicles per year)	WMI		9	Vehicle Attributes					Check Digit	Model Year	Plant Code	Manufacturer Identifier			Sequential Number		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	CHARACTER POSITION																

Figure B.1

B.3 Interpretation of the sample VIN

1 = Country it was produced in (1 USA, 2 CAN)

G = Motor Company (General Motors)

1 = Make (Chevrolet)

F = Carline Code (F-Body)

P = Carline Series (Camaro)

2 = Body Type (2 Door-Coupe Hatchback)

2 = Restraint System (Manual belts (driv+pass inflatable))

P = Engine Code (5.7L V8 (LT1) (1993-present))

X = Check Digit (most likely “X”)

S = Model Year (1995)

2 = Assembly Plant (St.Therese)

100001 = Production Sequence

VINs do not use the letter “I” or “O” in order to avoid confusion with “1” and “0”.

B.4 Post 1981 and Pre 1981

Vehicles from 1981 to present have 17 character VINs.

Before 1981 the VIN may be shorter.

B.5 Physical position of Vehicle Identification Number (VIN) location

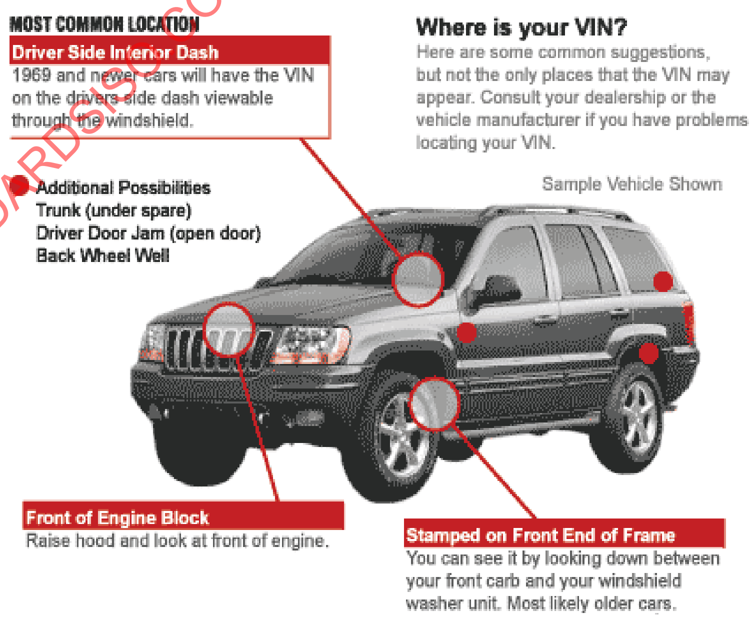


Figure B.2

Annex C
(informative)

Example business processes and work flows

C.1 UML use case diagram of business process

Figure C.1 shows an example "Use Case" for the business process associated with this part of ISO 18495, in UML representation.

NOTE Other business Use Cases are also possible.

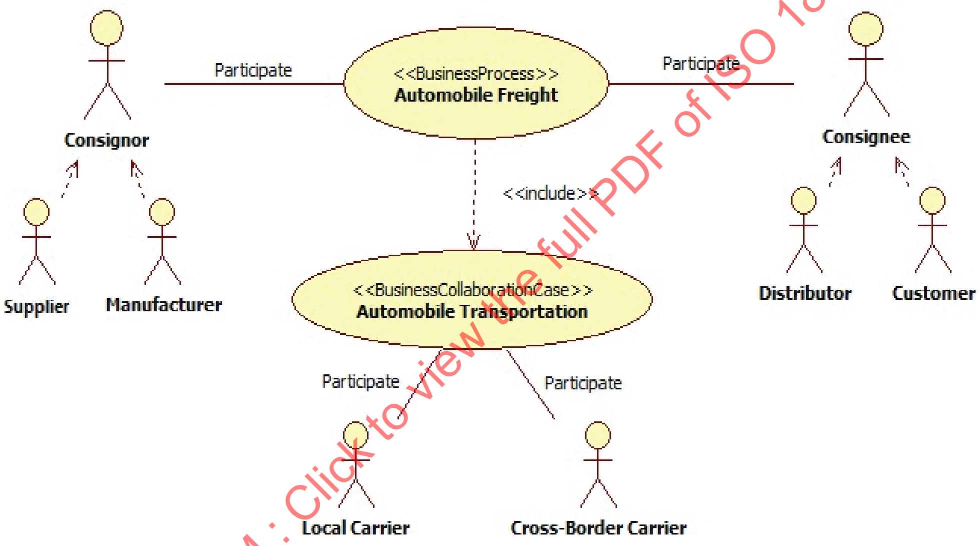


Figure C.1 — Example use case diagram of international automotive freight business process

C.2 Sequence diagram of business process

Figure C.2 describes an example of business transactions and activities when a "Consignor" delivers automobiles to a "Consignee".

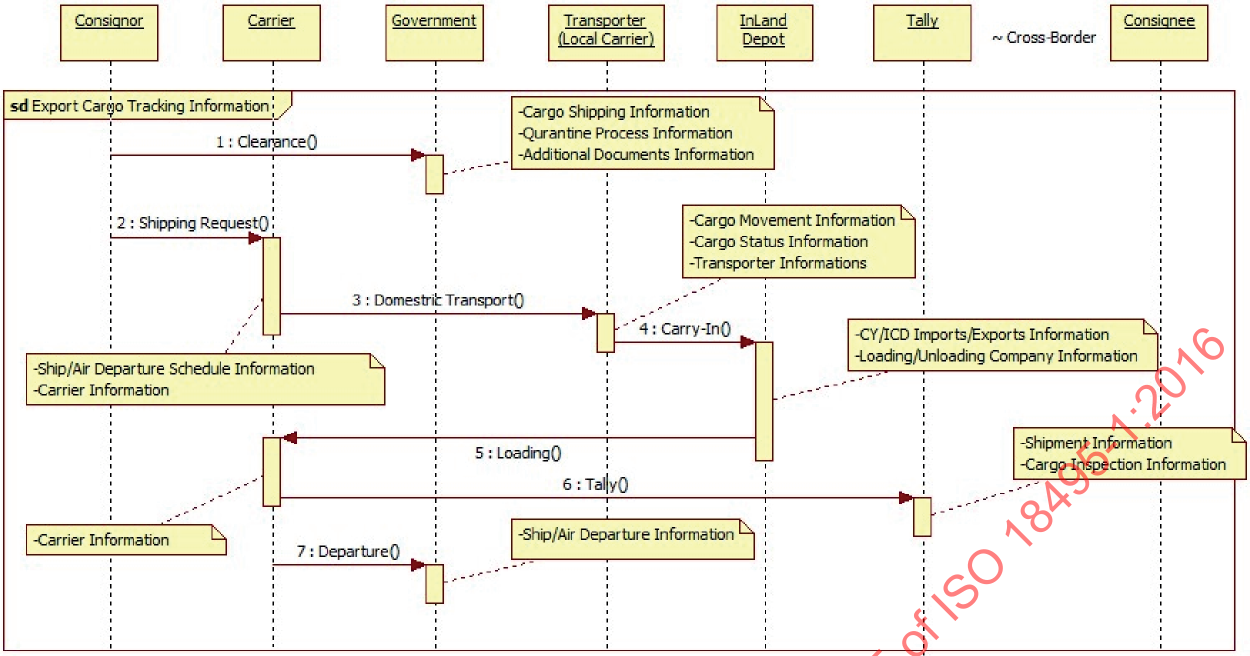
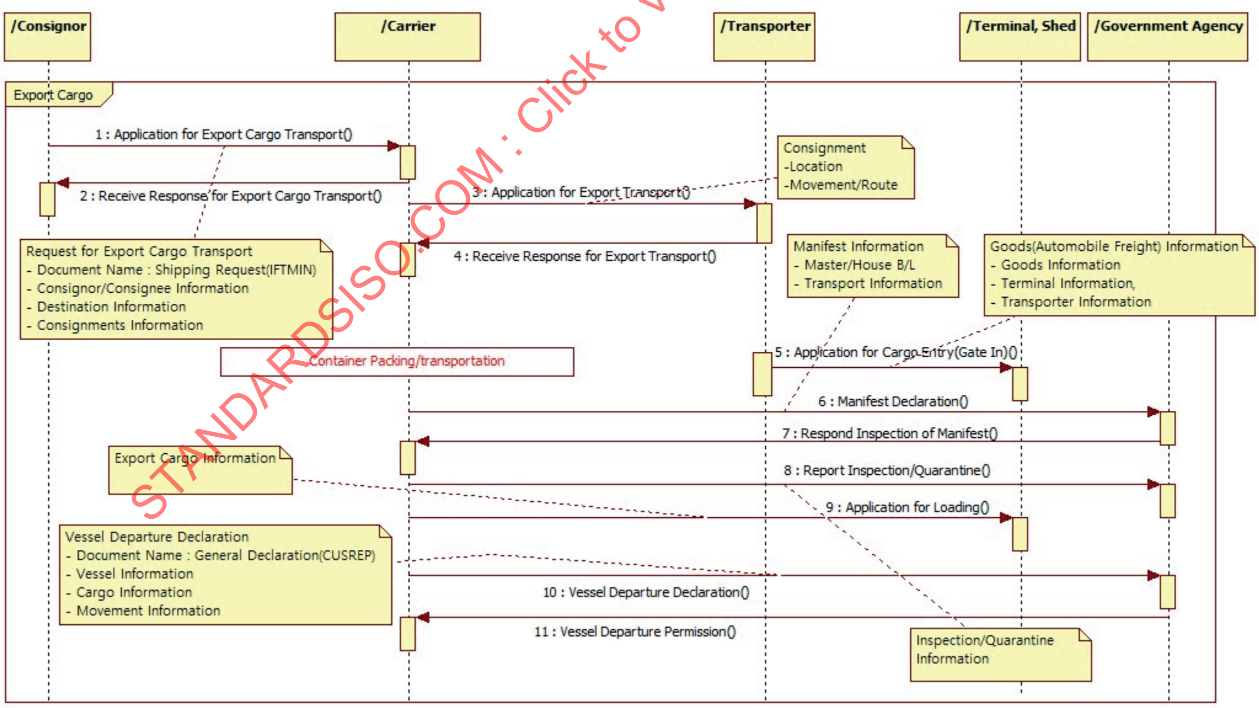


Figure C.2 — Example of business process

Figure C.3 describes business transactions and activities when a “Consignor” delivers automobiles to a Consignee including e-documentation.

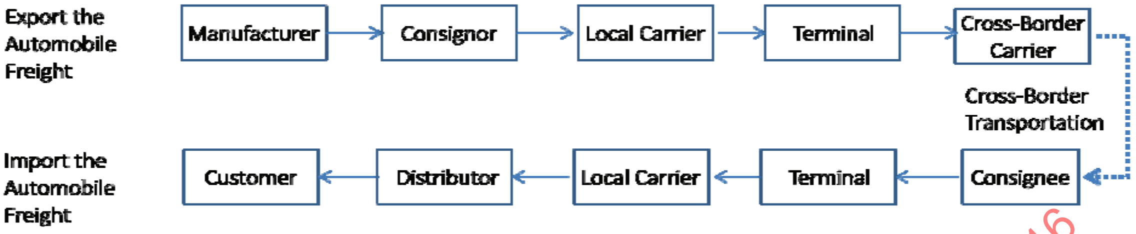


NOTE Other business transaction scenarios are also possible.

Figure C.3 — Example of business process including eDocumentation

C.3 Work Flow

The work flow in Figure C.4 shows an example of the delivery of automobiles (new or used) from "Consignor" to "Consignee".



NOTE 1 Figure C.4 broadly follows the UN/CEFACT technical specification, Business Requirement Specifications (BRS).

NOTE 2 Other work flow scenarios are also possible.

Figure C.4 — Example of work flow for delivery of automobiles from "Consignor" to "Consignee"