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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.

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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.

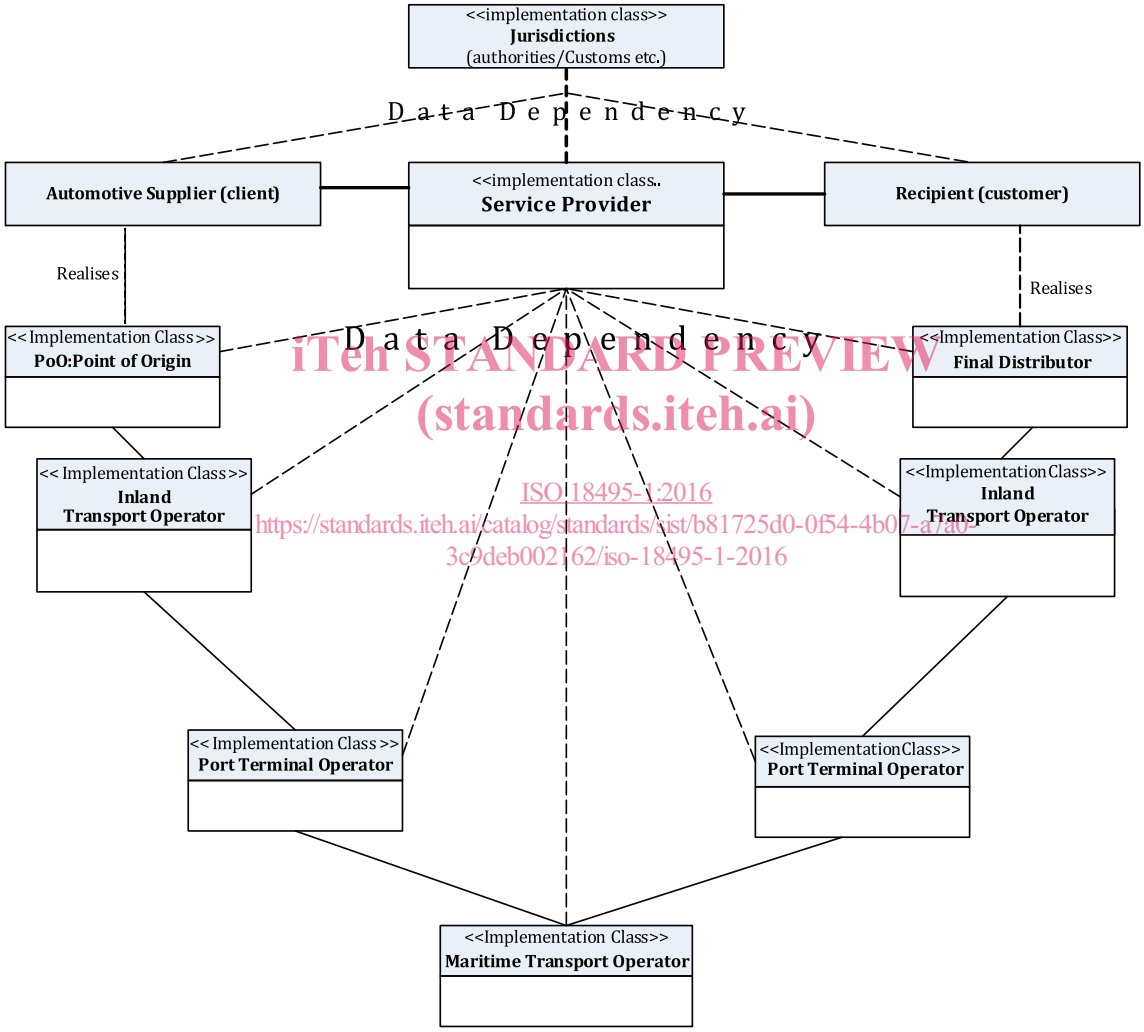

Figure 1 — UML high level view of international automotive distribution actors and their data dependency

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.