DCSA Interface Standard for Track and Trace

Version 2.1

August, 2021

Purpose

This document provides the DCSA interface standard for Track & Trace as applied in container shipping to ensure that all members and partners in the container shipping industry can base their interfaces on a common understanding.

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Preface

The vision of the Digital Container Shipping Association (DCSA) is to shape the digital future of container shipping by being the industry's collective voice, working towards alignment and standardization, setting the frameworks for effective and universally adoptable solutions, exploring possibilities of innovation, and moving the industry forward through standards for IT and non-competitive business practices. The DCSA aims at paving the way for interoperability in the container shipping industry through digital transformation and standardization. It is the DCSA's mission to represent, lead and serve the container shipping industry for safer, more secure, and more efficient operations of container shipping companies.

The DCSA has five key objectives:

objective 01 Develop standards for IT and business

objective 02 Simplify and harmonize the value chain

objective 03 Represent the container shipping industry

objective 04 Ensure efficient, safe, and secure operations

objective 05 Explore innovative and disruptive technologies

Figure 1. The DCSA's key objectives

The objective of the DCSA's Data and Interface Standard project workstream is to strengthen the container shipping industry's ability to send and receive data across the parties in the industry. Furthermore, it aims at enhancing intercarrier cooperation based on shared requirements, and ensuring interoperability by using a shared data language, preferably inspired by existing standards, and aligned with the industry process definitions in the DCSA Industry Blueprint 3.0.

The standards published by the DCSA are technology agnostic. The DCSA does not point to the use of specific vendor's technologies or systems but relies on open-source shared requirements for the industry that can be used by all parties, regardless of the choice of technology.

This document

This document is the publication related to the DCSA Interface Standard for Track and Trace. The aim of the DCSA Interface Standard for Track and Trace 2.1 is to ensure that all members and partners in the container shipping industry can base their interfaces on a common understanding of the data and processes of the industry to enable consistency, simplicity, and timeliness in the solutions for tracking and tracing across the industry, supporting the interoperability in container shipping.

This document is supported by a range of supplementary publications by the DCSA, which will be referenced in the relevant sections. The supporting publications are:

- **DCSA Industry Blueprint 3.0**
  Provides insights on as-is carrier processes. The DCSA Industry Blueprint 3.0 comprises processes related to the movement of a container from one location to another, processes that are linked to shipment processes that are considered critical for industry digitization and standardization efforts, and finally processes that are not considered commercially sensitive or of competitive advantage.

- **DCSA Information Model 3.2**
  The DCSA Information Model 3.2 organizes and catalogs the information being generated or consumed in connection with the processes described in the DCSA Industry Blueprint 3.0. The DCSA Information Model 3.2 is also a collective term that describes all the products that model the data needed to meet the interface requirements. Further, the DCSA Information Model 3.2 also includes a diagrammatic representation of entities and their interrelationships.

- **DCSA Web Glossary of Terms**

This publication promotes alignment between terms across all DCSA stakeholders in the container shipping industry. The first version of the glossary was published on the DCSA website in the summer of 2019, in the context of the Industry Blueprint.

- **Reading Guides on the DCSA Information Model 3.2, and on the DCSA Interface Standard for Track and Trace 2.1**

  The two reading guides on the DCSA Information Model 3.2 and the DCSA Interface Standard for Track and Trace 2.1, respectively, should help set the context around the DCSA initiatives. The guides provide insight into the different concepts and methods utilized in the production of the documents, and they suggest ways on how the documents can be used as a foundation for future implementations.

- **DCSA Event Naming Convention 2.1, and Event Structure Definitions 2.1**

  Throughout the years, track and trace solutions have become a commonly seen service in the container shipping industry. However, due to misalignment of terminology and ways of working, each carrier has designed its own events that have been published on the carriers' websites. To align this across the industry, the DCSA has developed a naming convention that sets the standards for naming as well as understanding customer-facing track and trace events.

Document ID & Version history

The below table contains the introductory information regarding the project workstream.

Name	Description
Project name	Data and Interface Standards
Project workstream	Interface Standard for Track and Trace
Project number	1
Version 1.0	DCSA Interface Standard for Track and Trace 1.0
Version 1.1	DCSA Interface Standard for Track and Trace 1.1 Amendments: - OpenAPI definitions, - Versioning markdown on DCSA GitHub, - Error handling guideline on DCSA GitHub.
Version 1.2	DCSA Interface Standard for Track and Trace 1.2 Major changes compared to 1.0: - Addition of Push Model (Subscribe & Publish) - Addition of 'Event Type' in 'Events' outputs - Addition of 'Mode of Transport Code' in 'Transport' and 'Transport Equipment' event outputs - Addition of 'Booking Reference' as optional to track and trace events outputs

Name	Description
Version 2.1	DCSA Interface Standard for Track and Trace 2.1

Major changes compared to 1.2:

- Updated property types for Shipment, Equipment, Transport Call entities.

- Added attributes for Shipment, Equipment and Transport Events, deleted TransportEquipment Event.

- Renaming of Event codes to Shipment Event type, Equipment Event type and Transport Event type.

- Addition of Transport Call Entity, Reference, and Seal Type Entities

- Addition of Ramp in Facility type.

- Addition of Inspected, Resealed, Removed, Pickup and Drop Off in Equipment events.

- Updated list of Track and Trace Events

Table 1. Document ID

Referenced documents

- DCSA Industry Blueprint 3.0
- DCSA Web Glossary of Terms
- DCSA Information Model 3.2
- DCSA Information Model 3.2 Reading Guide
- DCSA Interface Standard for Track and Trace 2.1 Reading Guide
- DCSA Event Naming Convention 2.1
- DCSA Event Structure Definitions 2.1

The above-mentioned documents can be found on the DCSA.org website.

Legal disclaimer

1 Introduction

1.1 Objective

The objective of the DCSA Interface Standard for Track and Trace is to standardize the fundamental information provided across the carrier liner domain through track and trace interfaces. Focus is to ensure agreement within the industry on the shared requirements and standards that the industry must follow to streamline inter-operational functionality and data sharing across parties within the industry. This agreement should be further supported by use-cases or designated subject areas.

This agreement on standardization is made to ensure that the interfaces, including the functionality and the data provided via the interfaces, are and will be defined and designed in the same way so that the end-user experience remains consistent across all industry partners using these standards. This means that it should not matter whether an interface is built using EDI messages, interactive UIs, APIs, manual data exchanges or any other interface technology, the interface elements must remain consistent regardless of the technology adopted.

The DCSA Interface Standard for Track and Trace 2.1 extends the existing DCSA Interface Standard for Track and Trace 1.0 and the publications on error handling and versioning (release 1.1). While the DCSA Interface Standard for Track and Trace 1.0 supported a synchronous pull model of an interface, DCSA Interface Standard 2.1 includes an asynchronous push model of an interface.

DCSA Interface Standard for Track and Trace

1.2 Overview

In defining a technology-agnostic interface standard, the interface describes all exchanges of information between any two parties. For tracking and tracing, the primary parties are:

- The sender or receiver (shipper or consignee) of goods wanting to maintain information about the goods being transported.
- The main party contracting the movement of the goods, which, from the DCSA's point of view, is the ocean carrier.

Many other parties may be involved in the movement of goods, such as haulers, freight forwarders, feeder operators and barge operators, though the DCSA considers the ocean carrier to be the main party acting as the provider of track and trace information to the parties interested in that information.

The DCSA Interface Standard for Track and Trace 2.1 is meant to describe a standard for the exchange of information in the form of inputs and outputs. Figure 2 shows how this interface interplays with the different technology elements.
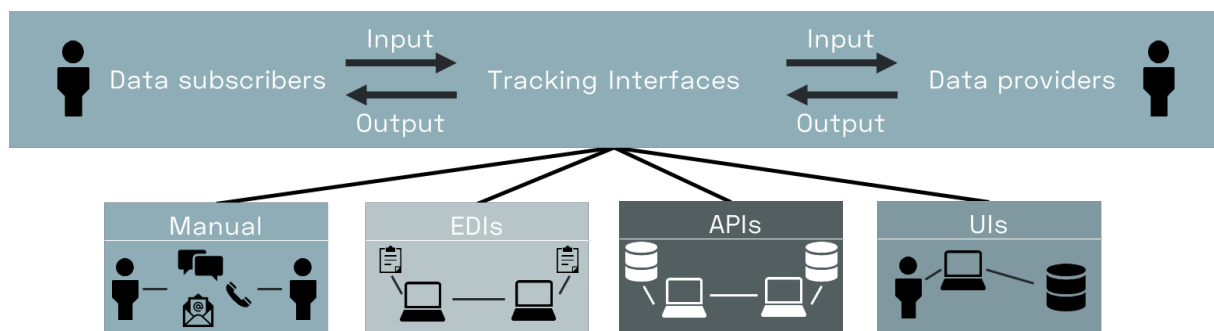
Figure 2. Interface illustration of input and output

To define the DCSA Interface Standard for Track and Trace 2.1, the DCSA is inspired by the Unified Modeling Language (UML) methodology.

1.3 Conformance

All parties in the container shipping industry are encouraged to implement and follow the data and interface requirements outlined and specified in this document. The requirements are linked to the UML version 2.0 diagrams for design requirements as well as the DCSA

Logical Data Model and data definitions for information requirements, which must be implemented in order to conform to the agreed standards within the DCSA framework.

1.4   Normative references

The documents listed below constitute the normative references for publication of the DCSA Interface Standard for Track and Trace 2.1:

- DCSA Industry Blueprint
- DCSA Web Glossary of Terms
- DCSA Information Model
- DCSA Information Model Reading Guide
- DCSA Interface Standard for Track and Trace Reading Guide
- DCSA Event Naming Convention
- DCSA Event Structure Definitions

2   User stories

The user stories in the table below illustrate potential ways of using the interface, within the context of tracking and tracing of shipments. Please note that the below-mentioned user stories relate to the use case definition in the next section. User stories that take a glance at the wider container shipping universe and other actors such as service providers or forwarders are out of scope for this publication. The user stories described here are examples and they do not constitute a comprehensive list.

ID	As a [persona]	I [want to]	[so that]
1	As a carrier	I want to share information about certain track and trace shipment events with my clients	so that I have a smooth communication experience with my clients.
2	As a shipper or consignee	I want to receive information for all shipments that I have booked	so that I can track my own shipments in an optimal manner.
3	As a shipper or consignee	I want to be able to receive events related to shipment(s) limited to a specific location (region, port)	so that I know if the shipment is on track and so I can carry out operational activities in an optimized manner.
4	As a shipper or consignee	I want to be able to receive events related to my shipments as soon as they are available	so that I know if my shipments are on track and so I can carry out operational activities in an optimized manner.

ID	As a [persona]	I [want to]	[so that]
5	As a shipper or consignee	I want to be able to receive information on delays on my shipment	so that I know if my shipment is on track and so I can carry out operational activities in an optimized manner.
6	As a shipper or consignee	I want to be able to choose how often I receive events related to my shipment	so that I know if my shipment is on track and so I can carry out operational activities in an optimized manner.
7	As a shipper or consignee	I want to be able to subscribe to receive events about shipments that are relevant to me	so that I do not need to retrieve information about each shipment separately.

Table 2. Examples of user stories

Following these user stories, the DCSA Interface Standard for Track and Trace 2.1 pertains to these use cases:

1. Use case - Retrieve track and trace information for shipment(s)
2. Use case - Subscribe to track and trace information for shipments
    a. Use case - Create a subscription
    b. Use case - Update a subscription
    c. Use case - Cancel a subscription
3. Use case - Publish track and trace information for shipment(s)

The following sections of this document describe these use cases.

3   Pull Model

3.1   Retrieve track and trace information for shipment(s)

3.1.1   Use case definition

This section describes the use case 'Retrieve track and trace information for shipment(s) from carriers' section via an exemplified interaction between the shippers, consignees and carriers. The UML (use case) diagram below supports the use case displaying the interactions between the different actors involved.
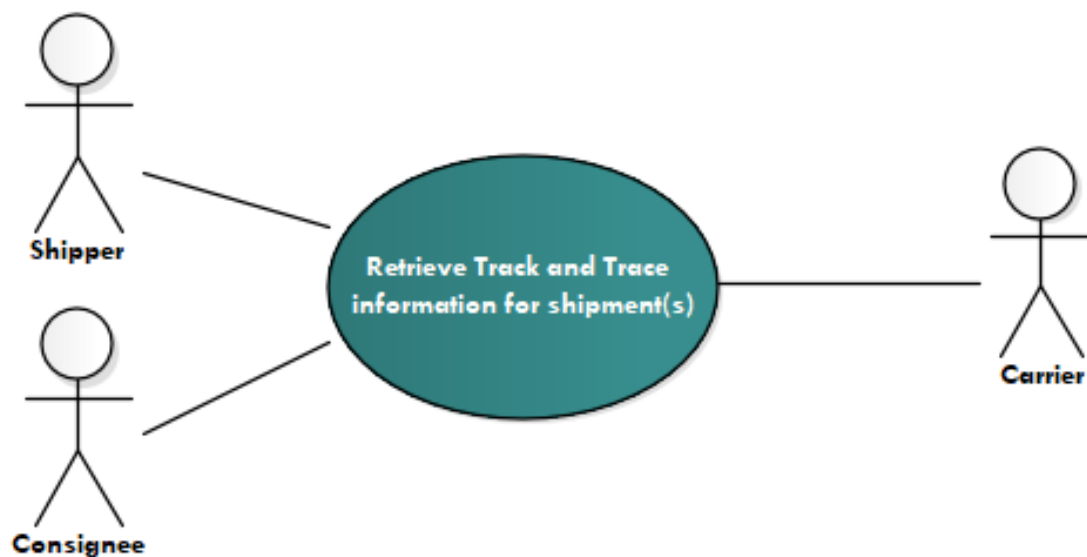
Figure 3. Use case diagram - Retrieve track and trace information for shipment(s)

Name of use case	Retrieve track and trace information for shipment(s)
Created by	DCSA **Last updated by** DCSA P1
Date Created	11 November 2019 **Last revision date** 22 April 2021
Description	Provide shipment track and trace information in the form of events
Actors	Shipper, Consignee, Carrier
Preconditions	• Shipper has made a booking request • Carrier has confirmed shipper's booking request • Shipper/consignee has the Carrier Booking Reference, Equipment Reference, Transport Document Reference, Transport Document Type, Vessel IMO number, Carrier Voyage Number, Carrier Service Code and Transport Call ID, (Shipment, Equipment, Transport) Event Type Code from carrier
Postconditions	None applicable
Flow	1. Shipper/consignee requests track and trace details with a Carrier Booking Reference, Equipment Reference, Transport Document Reference, Transport Document Type, Vessel IMO number, Carrier Voyage Number, Carrier Service Code and Transport Call ID, (Shipment, Equipment, Transport) Event Type Code 2. Carrier prepares a response containing all events for the shipment 3. Shipper/consignee gets response from the carrier

Alternative flows	1a. Shipper/consignee requests track and trace details with equipment reference.
	   o Carrier prepares a response containing all events for the active shipment that the equipment is allocated to. Furthermore, these events are specific to the equipment in question
	   o Shipper/consignee gets response from the carrier

Name of use case	Retrieve track and trace information for shipment(s)
Exceptions	1a. Carrier identifies that the Carrier Booking Reference, Equipment Reference, Transport Document Reference, Transport Document Type, Vessel IMO number, Carrier Voyage Number, Carrier Service Code and Transport Call ID, (Shipment, Equipment, Transport) Event Type Code is invalid or does not exist
	o Shipper/consignee gets a response with an output error suggesting that the Carrier Booking Reference, Equipment Reference, Transport Document Reference, Transport Document Type, Vessel IMO number, Carrier Voyage Number, Carrier Service Code and Transport Call ID, (Shipment, Equipment, Transport) Event Type Code is invalid

Table 3. Use case definition – Retrieve track and trace information for shipment(s)

3.1.2   Activity diagram

The purpose of the activity diagram is to capture dynamic behaviour in the system to demonstrate a message flow. Figure 4 provides the activity flow of the interface for retrieving track and trace information for shipment. The activity begins when a user requests track and trace details in relation to a shipment. The request contains input, which is validated against the active shipments available to the interface: an active shipment is a shipment that has an active relevant identifier. An active shipment in this sense refers to the latest shipment which can comprise either future or completed shipments.

The interface's activity flow can follow two paths: the main success path or the exception path. The main success path is followed if the input ID corresponds to that of an active shipment. If that is not the case, the exception path is followed. The main success path results in the application returning track and trace information related to the input ID. The exception path results in an error message.
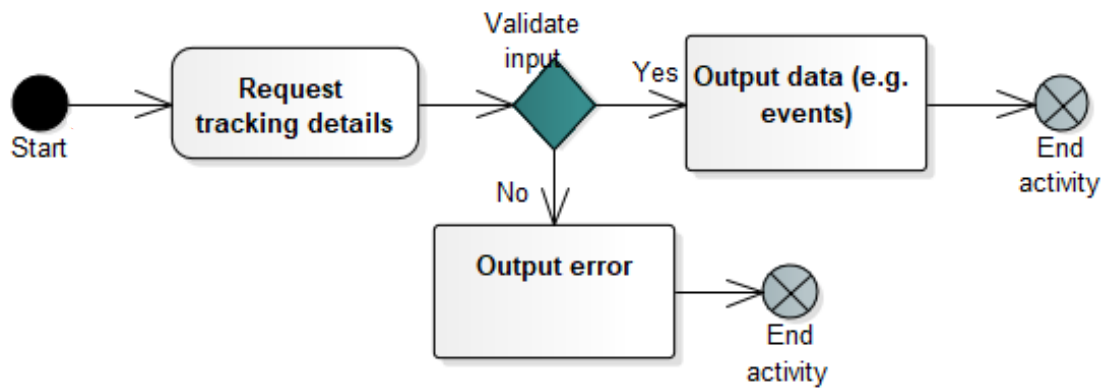
Figure 4. Activity diagram - Retrieve track and trace information for shipment(s)

Error messages should be implemented based on an underlying technology standard. For instance, HTTP error codes should be used in case implementation is in the form of REST APIs. They are defined in RFC2616. Similarly, for EDI based implementations, error codes should follow an existing standard, i.e., UN/EDIFACT.

3.1.3   Inputs

Carrier Booking Reference, Equipment Reference, Transport Document Reference, Transport Document Type, Vessel IMO number, Carrier Voyage Number, Carrier Service Code and Transport Call ID, (Shipment, Equipment, Transport) Event Type Code individually are identifiers that link to a shipment per carrier. At least one of the identifiers (See Table 4 below) must be provided to constitute a valid request.

When equipment reference is used, the output only consists of events that correspond to an active shipment to which the equipment has been allocated. Additionally, only events connected to the equipment are to be returned. Furthermore, it must be highlighted that certain security considerations must be given in relation to the implementation and usage of the interface. When the interface allows tracking and tracing (active) of shipment by means of the equipment reference alone – and not in conjunction with either a Carrier Booking Reference or Transport Document Reference – the risk of unintended usage occurs. Carriers are recommended to ensure that only diligently defined information, respectively events, are returned to the requester in this case. Carriers are encouraged to take care of access management and specific roles in this respect, and it remains an individual carrier decision how to handle this security aspect.

Input Name (One of the following)	Type	Description	Example
Carrier Booking Reference	String	The identifier for a shipment, which is issued by and unique within each of the carriers.	Booking Reference: "CAX698840"
Equipment Reference	String	The unique identifier for the equipment, which should follow the BIC ISO Container Identification Number where possible. If a container is not yet assigned to a shipment, the interface cannot return any information when an equipment reference is given as input. If a container is assigned to an (active) shipment, the interface returns information on the active shipment.	"CARX4812090"
Transport Document Reference	String	A unique number allocated by the shipping line to the transport document and the main number used for the tracking of the status of the shipment	"ABCD421911263977"
Transport Document Type Code	String	The code for the transport document type, e.g., BOL for Bill of Lading.The values available are: BOL (Bill of Lading) SWB (Sea Waybill)	"BOL, SWB"
Transport Event Type Code	String	Identifier for type of Transport event.	"ARRI"
Vessel IMO Number	String	The identifier of vessel for which schedule details are published. Depending on schedule type, this may not be available yet.	"9801346"
TransportCall ID	String	The unique identifier for a transport call	"123e4567-e89b-12d3-a456-426614174000"

Input Name (One of the following)	Type	Description	Example
Carrier Voyage Number	String	The vessel operator-specific identifier of the Voyage.	"2103S"
Equipment Event Type Code	String	Unique identifier for equipment Event Type.	"LOAD"
Shipment Event Type Code	String	The status of the document in the process.	RECE (Received) DRFT (Drafted)
Carrier Service Code	String	The code of the service for which the schedule details are published.	FE1

Table 4. List of inputs – Retrieve track and trace information for shipment(s)

3.1.4   Outputs

The interface output is built around the events that occur for a shipment. This means that every shipment contains multiple events. An event can be categorized as a shipment, transport, or an equipment event. Within Transport and Equipment events, Transport Call and Document Reference objects have been added as deep events to give clarity on the details of a shipment such as – mode of transport, facility type, location etc.

The list of events supported by this standard is specified in Table 13. A list of track and trace events.

The sections below describe the different entities that facilitate the tracking and tracing of a shipment. The information presented here is one way to organize all information to be produced by this interface. The entities themselves and how they are organized in relation to each other can be mapped directly to an implementation, but there are potentially multiple different ways in which the entities can be organized in an implementation. A class diagram is also presented below to display how the different entities relate to each other.

Class diagram

The class diagram presented below provides an overview of all entities described in the previous sections and how they work together to support the functionality around the tracking and tracing of shipment. Following the DCSA Information Model 3.2, these interface standards incorporate a many-to-many relationship between shipment and Bill of Lading.

Even though this class diagram can be directly translated to an implementation, it should ideally be used as a reference and the actual implementation should be carried out using an arrangement that best supports the underlying technology and methodology used.

In the description of entities and the class diagram, the choice has been made to distinguish between events that correspond to only a shipment, a transport, or an equipment. This is because it should be possible to classify an event in either one of those three categories. Making this classification is important when thinking of the implementation, where abstraction of data and functionality is a key concept. At the same time, this classification also helps in translating the requirements in an optimal manner into an actual implementation, for instance, in the form of an API. Please look at Table 13. A list of track and trace events. for further clarification on how the different event entities represent the events in scope for this publication.
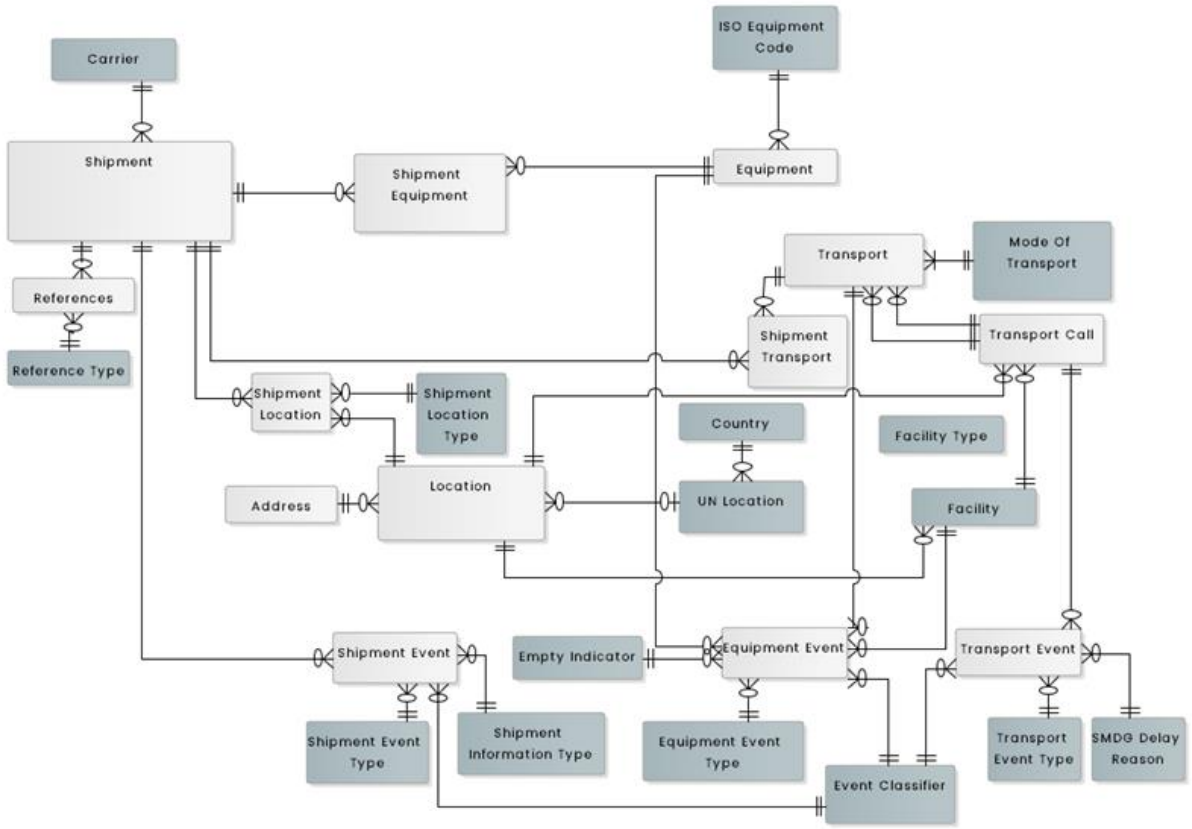
Figure 5. Track And Trace Model

Shipment

The shipment entity is a reference entity in the context of tracking and tracing of shipment.

Attribute	Definition	Data type	Example
Shipment ID	The unique identifier for a shipment.	UUID	"123e4567-e89b-12d3-a456-426614174000"
Carrier Booking Reference	A set of unique characters provided by carrier to identify a booking.	Text(35)	"CAX698840"
Collection DateTime	The date and time that the cargo items need to be collected from the origin.	DateTime	2021-04-01T14:12:56+01:00
Delivery DateTime	The date and, when possible, time that the cargo items need to be delivered to the destination.	DateTime	2021-04-01T14:12:56+01:00
Carrier ID	Links to the carrier entity containing the SCAC and/or the SMGD code to specify the responsible carrier.	UUID	MAEU

Table 5. Shipment entity properties

Transport

The transport entity is a reference entity that describes a transport in the context of tracking and tracing of shipment. For vessels, the transport entity essentially represents a transport leg, where the transport reference and transport leg reference together identify the entity. For other types of transports, if the references are not available, then a dummy value can be used. An event can contain a reference to the transport entity if it belongs to the appropriate event category.

Attribute	Definition	Data type	Example
Transport ID	The unique identifier for the transport.	UUID	"123e4567-e89b-12d3-a456-426614174000"
Transport Reference	The reference for the transport, e.g. when the mode of transport is a vessel, the Transport Reference will be the vessel IMO number.	Text(50)	1801323
Transport Name	The name of the transport instance, e.g. for a vessel, this is the vessel name.	Text(100)	Emma Maersk
Mode of Transport code	The code specifying the mode of transport.	Text(6)	Vessel
Load Transport Call ID	Identifies the departure transport call of the shipment.	Text(100)	"123e4567-e89b-12d3-a456-426614174000"
Discharge Transport Call ID	Identifies the arrival transport call of the shipment.	Text(100)	"123e4567-e89b-12d3-a456-426614174000"
Vessel IMO Number	The vessel carrying out the transport identified by its IMO number.	Text(7)	9801293

Table 6. Transport entity properties

Equipment

The equipment entity is a reference entity that describes an equipment in the context of tracking and tracing of shipment. An event can contain a reference to the equipment entity if it belongs to the appropriate event category.

Attribute	Definition	Data type	Example
Equipment Reference	The unique identifier for the equipment, which should follow the BIC ISO Container Identification Number where possible. According to ISO 6346, a container identification code consists of a 4-letter prefix and a 7-digit number (composed of a 3-letter owner code, a category identifier, a serial number, and a check-digit). If a container does not comply with ISO 6346, it is suggested to follow Recommendation #2 "Container with non-ISO identification" from SMDG.	Text(15)	APZU4812090
ISO Equipment Code	Unique code for the different equipment size/type used for transporting commodities. The code is a concatenation of ISO Equipment Size Code and ISO Equipment Type Code A and follows the ISO 6346 standard.	Text(4)	STRI

Table 7. Equipment entity properties

Event

The event entity is described as a generalization of all the specific event categories. An event always takes place in relation to a shipment and can additionally be linked to a transport or an equipment.

Figure 6. Event Entity properties

Shipment event

The shipment event entity is a specialization of the event entity to support specification of data that only applies to a shipment event.

In table below (*) asterisk represents required data fields

Attribute	Definition	Data type	Example
Shipment Event ID	A unique identifier for the shipment event captured.	UUID	84db923d-2a19-4eb0-beb5-446c1ec57d34
Event Created DateTime*	The date and time when the event entry was created.	DateTime	2021-01-09T14:12:56+01:00
Event DateTime*	The date and time when the event occurred or will occur.	DateTime	2021-01-09T14:12:56+01:00
Event Classifier Code*	Code for the event classifier (PLN, ACT or EST).	Text (3)	ACT
Shipment Event Type Code*	The code to identify the event that is related to the shipment.	Text (4)	DRFT

Attribute	Definition	Data type	Example
Document Type Code*	The code to identify the type of information that is related to the shipment.	Text (3)	SHI
Document ID*	The id of the object defined by the documentTypeCode	Text(50)	String
Reason	Reason field in a Shipment event. This field can be used to explain why a specific event has been sent	Text(100)	"the following attributes are missing…"

Table 8. Shipment event entity properties

Transcription Transport event

The transport event entity is a specialization of the event entity to support specification of data that only applies to a transport event.

In table below (*) asterisk represents required data fields

Attribute	Definition	Data type	Example
Transport Event ID	Unique identifier for the transport event captured.	UUID	84db923d-2a19-4eb0-beb5-446c1ec57d34
Event Created DateTime	The date and time when the event entry was created.	DateTime	2021-01-09T14:12:56+01:00
Event DateTime	The date and time when the event occurred or will occur.	DateTime	2021-01-09T14:12:56+01:00
Event Classifier Code	Specifies the code for the classifier of the event, e.g. Actual.	Text(3)	ACT

Attribute	Definition	Data type	Example
Transport Event Type Code	The code to identify the type of event that is related to transport.	Text (4)	ARRI
Delay Reason Code	Code for the delay reason as provided by SMDG.	Text (3)	WEA
Change Remark	Free text description of the reason for the change in schedule.	Text(250)	String
Transport Call*	Specifies the transport call involved in the event. (See Table 11)	Text(100)	123e4567-e89b-12d3-a456-426614174000
Document References	An optional list of key-value (documentReferenceType-documentReferenceValue) pairs representing links to objects relevant to the event. The documentReferenceType-field is used to describe where the documentReferenceValue-field is pointing to.		List [OrderedMap { "documentReferenceType": "BKG", "documentReferenceValue": "ABC123123123" }
References	References provided by the shipper or freight forwarder at the time of booking or at the time of providing shipping instruction. Carriers share it back when providing track and trace event updates, some are also printed on the B/L. Customers can use these references to track shipments in their internal systems.	String	FF (Freight Forwarder's Reference)

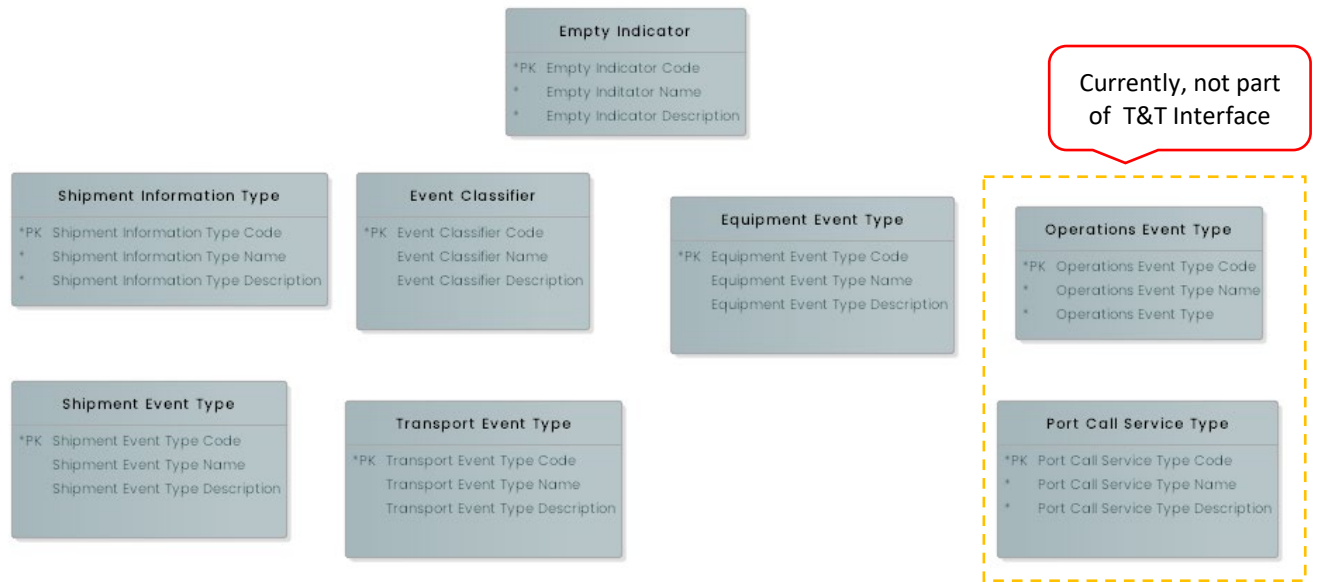Table 9. Transport event entity properties

Equipment event

The equipment event entity is a specialization of the event entity to support specification of data that only applies to an equipment event.

In table below (*) asterisk represents required data fields

Attribute	Definition	Data type	Example
Equipment Event ID	Unique identifier for the equipment event captured.	UUID	84db923d-2a19-4eb0-beb5-446c1ec57d34
Event Created DateTime*	The date and time when the event entry was created.	DateTime	2021-01-09T14:12:56+01:00
Event DateTime	The date and time when the event occurred or will occur.	DateTime	2021-01-09T14:12:56+01:00
Event Classifier Code	The code for the event classifier, e.g., Actual.	Text (3)	ACT
Equipment Event Type Code	The code to identify an equipment-related event type.	Text (4)	LOAD
Equipment Reference	Reference that uniquely identifies the equipment involved in the event.	Text(15)	APZU4812090
ISO Equipment Code	Unique code for the different equipment size/type used for transporting commodities. The code is a concatenation of ISO Equipment Size Code and ISO Equipment Type Code A and follows the ISO 6346 standard.	Text(4)	stri
Empty Indicator Code*	Code to denote whether the equipment is empty or laden.	Text (5)	EMPTY
Shipment ID	Unique identifier for the shipment.	UUID	

Attribute	Definition	Data type	Example
Transport Call*	Specifies the transport call involved in the event.	Text(100)	123e4567-e89b-12d3-a456-426614174000
Document References	An optional list of key-value (documentReferenceType-documentReferenceValue) pairs representing links to objects relevant to the event. The documentReferenceType-field is used to describe where the documentReferenceValue-field is pointing to.		List [OrderedMap { "documentReferenceType": "BKG", "documentReferenceValue": "ABC123123123" }
References	References provided by the shipper or freight forwarder at the time of booking or at the time of providing shipping instruction. Carriers share it back when providing track and trace event updates, some are also printed on the B/L. Customers can use these references to track shipments in their internal systems. (See Table 12)	String	FF (Freight Forwarder's Reference)
Seals	Addresses the seal-related information associated with the shipment equipment. A seal is put on a shipment equipment once it is loaded. This seal is meant to stay on until the shipment equipment reaches its final destination. (See Table 14)	String	CUS

Table 10. Equipment event entity properties

Transport Call Entity

Provides a list of all the locations involved in a transport journey

In table below (*) asterisk represents required data fields

Attribute	Definition	Data type	Example
Transport Call ID*	The unique identifier for a transport call	String	123e4567-e89b-12d3-a456-426614174000
Carrier Service Code	The code of the service for which the schedule details are published.	String	FE1
Carrier Voyage Number	The vessel operator-specific identifier of the Voyage. In case there are multiple voyages the export voyage is chosen.	Text(5)	2103S
UN Location Code	The UN Location code specifying where the place is located.	String	USNYC
Facility Code	The code used for identifying the specific facility. This code does not include the UN Location Code	String	ADT
Facility Code List Provider	The provider used for identifying the facility Code	String	BIC, SMDG
Facility Type Code	A specialized version of the facilityCode to be used in TransportCalls. The code to identify the specific type of facility.	Text(4)	POTE
Other Facility	An alternative way to capture the facility when no standardized DCSA facility code can be found	Text(50)	Depot location or address
Mode of Transport*	The mode of transport as defined by DCSA	Text(6)	VESSEL
Location	Location of the facility. Can often be omitted when it is just repeating the contents of the UNLocationCode field	String	USNYC

Attribute	Definition	Data type	Example
Vessel	Details of the Vessel including: • Vessel IMO Number* • Vessel Name • Vessel Flag • Vessel Call Sign Number • Vessel Operator Carrier Code • Vessel Operator Carrier Code List Provider	String	• 9801324 • King of Seas • DE • NCVV • MAEU • NMFTA

<div align="right">Table 11. Transport call entity properties</div>

Reference Type entity: an entity containing the reference data for the different reference types.

In table below (*) asterisk represents required data fields

Attribute	Definition	Data type	Example
Reference Type Code*	The reference type codes defined by DCSA.	Text(3)	FF
Reference Value*	The actual value of the reference	Text(100)	String

<div align="right">Table 12: Reference Type entity</div>

Table 15 contains the reference types defined by DCSA based on UN/CEFACT. These references are assigned by the parties and are not used to identify the parties themselves.

Reference Type Code	Reference Name	Reference Description
FF	Freight Forwarder's Reference	Reference assigned to the shipment by the freight forwarder.
SI	Shipper's Reference	Reference assigned to the shipment by the shipper.

Reference Type Code	Reference Name	Reference Description
PO	Purchase Order Reference	The PO reference that the shipper or freight forwarder received from the consignee and then shared with the carrier.
CR	Customer's Reference	Reference assigned to the shipment by the customer.

Table 13: Reference Type Description

Seal entity: addresses the seal-related information associated with the shipment equipment. A seal is put on a shipment equipment once it is loaded. This seal is meant to stay on until the shipment equipment reaches its final destination.

In table below (*) asterisk represents required data fields

Attribute	Definition	Data type	Example
Seal Number*	Identifies a seal affixed to the container.	Text(15)	string
Seal Source	The source of the seal, namely who has affixed the seal. This attribute links to the Seal Source ID defined in the Seal Source reference data entity.	Text(5)	CUS
Seal Type*	The type of seal. This attribute links to the Seal Type ID defined in the Seal Type reference data entity.	Text(5)	WIR

Table 14: Seal entity

3.2   A list of track and trace events – Version 2.1

The table below lists the track and trace events standardized in the DCSA Event Naming Convention 2.1 and Event Structure Definitions 2.0. It further outlines how the output data attributes defined in this section together constitute the different events. Furthermore, all events listed here can be used either as planned, estimated or actual events depending on the situation. This classification is defined through the attribute "Event Classifier Code". It should be stated here that the interface can also be applied to any future additions or amendments to the current selection of standardized events.

#	Event Type	Event Classifier	Event Type Code	Empty Indicator	Transport Mode	Facility Type	Event Description
1	Equipment	EST,PLN,ACT	LOAD	Empty	Truck	DEPO	**Load of Empty Equipment onto Truck at Depot**
2	Equipment	EST,PLN,ACT	LOAD	Empty	Truck	INTE	**Load of Empty Equipment onto Truck at Inland terminal**
3	Equipment	EST,PLN,ACT	LOAD	Empty	Rail	DEPO	**Load of Empty Equipment onto Rail at Depot**
4	Equipment	EST,PLN,ACT	LOAD	Empty	Truck	RAMP	**Load of Empty Equipment onto Truck at Ramp**
5	Equipment	EST,PLN,ACT	LOAD	Empty	Rail	RAMP	**Load of Empty Equipment onto Rail at Ramp**
6	Equipment	EST,PLN,ACT	GTOT	Empty	Truck	DEPO	**Gate out of Empty Equipment by Truck at Depot**
7	Equipment	EST,PLN,ACT	GTOT	Empty	Truck	INTE	**Gate out of Empty Equipment by Truck at Inland terminal**

#	Event Type	Event Classifier	Event Type Code	Empty Indicator	Transport Mode	Facility Type	Event Description
8	Equipment	EST,PLN,ACT	GTOT	Empty	Rail	DEPO	Gate out of Empty Equipment by Rail at Depot
9	Equipment	EST,PLN,ACT	GTOT	Empty	Truck	RAMP	Gate out of Empty Equipment by Truck at Ramp
10	Equipment	EST,PLN,ACT	GTOT	Empty	Rail	RAMP	Gate out of Empty Equipment by Rail at Ramp
11	Transport	EST,PLN,ACT	DEPA		Truck	DEPO	Departure by Truck at Depot
12	Transport	EST,PLN,ACT	DEPA		Truck	INTE	Departure by Truck at Inland terminal
13	Transport	EST,PLN,ACT	DEPA		Rail	DEPO	Departure by Rail at Depot
14	Transport	EST,PLN,ACT	DEPA		Rail	RAMP	Departure by Rail at Ramp
15	Transport	EST,PLN,ACT	DEPA		Truck	RAMP	Departure by Truck at Ramp
16	Transport	EST,PLN,ACT	ARRI		Truck	CLOC	Arrival by Truck at Customer location
17	Transport	EST,PLN,ACT	ARRI		Truck	INTE	Arrival by Truck at Inland terminal
18	Transport	EST,PLN,ACT	ARRI		Truck	COFS	Arrival by Truck at Container freight station
19	Transport	EST,PLN,ACT	ARRI		Rail	CLOC	Arrival by Rail at Customer location

#	Event Type	Event Classifier	Event Type Code	Empty Indicator	Transport Mode	Facility Type	Event Description
20	Transport	EST,PLN,ACT	ARRI		Rail	RAMP	Arrival by Rail at Ramp
21	Transport	EST,PLN,ACT	ARRI		Truck	RAMP	Arrival by Truck at Ramp
22	Transport	EST,PLN,ACT	ARRI		Rail	COFS	Arrival by Rail at Container freight station
23	Equipment	EST,PLN,ACT	GTIN	Empty	Truck	DEPO	Gate in of Empty Equipment by Truck at Depot
24	Equipment	EST,PLN,ACT	GTIN	Empty	Truck	INTE	Gate in of Empty Equipment by Truck at Inland terminal
25	Equipment	EST,PLN,ACT	GTIN	Empty	Truck	COFS	Gate in of Empty Equipment by Truck at Container freight station
26	Equipment	EST,PLN,ACT	GTIN	Empty	Rail	DEPO	Gate in of Empty Equipment by Rail at Depot
27	Equipment	EST,PLN,ACT	GTIN	Empty	Truck	RAMP	Gate in of Empty Equipment by Truck at Ramp
28	Equipment	EST,PLN,ACT	GTIN	Empty	Rail	RAMP	Gate in of Empty Equipment by Rail at Ramp
29	Equipment	EST,PLN,ACT	GTIN	Empty	Rail	COFS	Gate in of Empty Equipment by Rail at Container freight station
30	Equipment	EST,PLN,ACT	DISC	Empty	Truck	DEPO	Discharge of Empty Equipment from Truck at Depot

#	Event Type	Event Classifier	Event Type Code	Empty Indicator	Transport Mode	Facility Type	Event Description
31	Equipment	EST,PLN,ACT	DISC	Empty	Truck	INTE	Discharge of Empty Equipment from Truck at Inland terminal
32	Equipment	EST,PLN,ACT	DISC	Empty	Truck	COFS	Discharge of Empty Equipment from Truck at Container freight station
33	Equipment	EST,PLN,ACT	DISC	Empty	Rail	DEPO	Discharge of Empty Equipment from Rail at Depot
34	Equipment	EST,PLN,ACT	DISC	Empty	Rail	RAMP	Discharge of Empty Equipment from Rail at Ramp
35	Equipment	EST,PLN,ACT	DISC	Empty	Truck	RAMP	Discharge of Empty Equipment from Truck at Ramp
36	Equipment	EST,PLN,ACT	DISC	Empty	Rail	COFS	Discharge of Empty Equipment from Rail at Container freight station
37	Equipment	EST,PLN,ACT	STUF	Empty		COFS	Stuffing of Empty Equipment at Container freight station
38	Equipment	EST,PLN,ACT	STUF	Empty		CLOC	Stuffing of Empty Equipment at Customer location
39	Equipment	EST,PLN,ACT	LOAD	Laden	Truck	CLOC	Load of Laden Equipment onto Truck at Customer location
40	Equipment	EST,PLN,ACT	LOAD	Laden	Truck	POTE	Load of Laden Equipment onto Truck at Port terminal
41	Equipment	EST,PLN,ACT	LOAD	Laden	Truck	INTE	Load of Laden Equipment onto Truck at Inland terminal

#	Event Type	Event Classifier	Event Type Code	Empty Indicator	Transport Mode	Facility Type	Event Description
42	Equipment	EST,PLN,ACT	LOAD	Laden	Truck	COYA	Load of Laden Equipment onto Truck at Container yard
43	Equipment	EST,PLN,ACT	LOAD	Laden	Truck	COFS	Load of Laden Equipment onto Truck at Container freight station
44	Equipment	EST,PLN,ACT	LOAD	Laden	Rail	CLOC	Load of Laden Equipment onto Rail at Customer location
45	Equipment	EST,PLN,ACT	LOAD	Laden	Rail	POTE	Load of Laden Equipment onto Rail at Port terminal
46	Equipment	EST,PLN,ACT	LOAD	Laden	Truck	RAMP	Load of Laden Equipment onto Truck at Ramp
47	Equipment	EST,PLN,ACT	LOAD	Laden	Rail	COYA	Load of Laden Equipment onto Rail at Container yard
48	Equipment	EST,PLN,ACT	LOAD	Laden	Rail	COFS	Load of Laden Equipment onto Rail at Container freight station
49	Equipment	EST,PLN,ACT	LOAD	Laden	Rail	RAMP	Load of Laden Equipment onto Rail at Ramp
50	Equipment	EST,PLN,ACT	PICK	Laden	Truck	CLOC	Pick-up of Laden Equipment by Truck at Customer location
51	Equipment	EST,PLN,ACT	GTOT	Laden	Truck	POTE	Gate out of Laden Equipment by Truck at Port terminal
52	Equipment	EST,PLN,ACT	GTOT	Laden	Truck	INTE	Gate out of Laden Equipment by Truck at Inland terminal

#	Event Type	Event Classifier	Event Type Code	Empty Indicator	Transport Mode	Facility Type	Event Description
53	Equipment	EST,PLN,ACT	GTOT	Laden	Truck	COYA	Gate out of Laden Equipment by Truck at Container yard
54	Equipment	EST,PLN,ACT	GTOT	Laden	Truck	COFS	Gate out of Laden Equipment by Truck at Container freight station
55	Equipment	EST,PLN,ACT	PICK	Laden	Rail	CLOC	Pick-up of Laden Equipment by Rail at Customer location
56	Equipment	EST,PLN,ACT	GTOT	Laden	Rail	POTE	Gate out of Laden Equipment by Rail at Port terminal
57	Equipment	EST,PLN,ACT	GTOT	Laden	Truck	RAMP	Gate out of Laden Equipment by Truck at Ramp
58	Equipment	EST,PLN,ACT	GTOT	Laden	Rail	COYA	Gate out of Laden Equipment by Rail at Container yard
59	Equipment	EST,PLN,ACT	GTOT	Laden	Rail	COFS	Gate out of Laden Equipment by Rail at Container freight station
60	Equipment	EST,PLN,ACT	GTOT	Laden	Rail	RAMP	Gate out of Laden Equipment by Rail at Ramp
61	Transport	EST,PLN,ACT	DEPA		Truck	CLOC	Departure by Truck at Customer location
62	Transport	EST,PLN,ACT	DEPA		Truck	POTE	Departure by Truck at Port terminal
63	Transport	EST,PLN,ACT	DEPA		Truck	COYA	Departure by Truck at Container yard

#	Event Type	Event Classifier	Event Type Code	Empty Indicator	Transport Mode	Facility Type	Event Description
64	Transport	EST,PLN,ACT	DEPA		Truck	COFS	**Departure** by Truck at Container freight station
65	Transport	EST,PLN,ACT	DEPA		Truck	BOCR	**Departure** by Truck at Border crossing
66	Transport	EST,PLN,ACT	DEPA		Rail	CLOC	**Departure** by Rail at Customer location
67	Transport	EST,PLN,ACT	DEPA		Rail	POTE	**Departure** by Rail at Port terminal
68	Transport	EST,PLN,ACT	DEPA		Rail	COYA	**Departure** by Rail at Container yard
69	Transport	EST,PLN,ACT	DEPA		Rail	COFS	**Departure** by Rail at Container freight station
70	Transport	EST,PLN,ACT	DEPA		Rail	BOCR	**Departure** by Rail at Border crossing
71	Transport	EST,PLN,ACT	ARRI		Truck	POTE	**Arrival** by Truck at Port terminal
72	Transport	EST,PLN,ACT	ARRI		Truck	COYA	**Arrival** by Truck at Container yard
73	Transport	EST,PLN,ACT	ARRI		Truck	BOCR	**Arrival** by Truck at Border crossing
74	Transport	EST,PLN,ACT	ARRI		Rail	POTE	**Arrival** by Rail at Port terminal
75	Transport	EST,PLN,ACT	ARRI		Rail	COYA	**Arrival** by Rail at Container yard

#	Event Type	Event Classifier	Event Type Code	Empty Indicator	Transport Mode	Facility Type	Event Description
76	Transport	EST,PLN,ACT	ARRI		Rail	BOCR	Arrival by Rail at Border crossing
77	Equipment	EST,PLN,ACT	GTIN	Laden	Truck	POTE	Gate in of Laden Equipment by Truck at Port terminal
78	Equipment	EST,PLN,ACT	GTIN	Laden	Truck	INTE	Gate in of Laden Equipment by Truck at Inland terminal
79	Equipment	EST,PLN,ACT	GTIN	Laden	Truck	COYA	Gate in of Laden Equipment by Truck at Container yard
80	Equipment	EST,PLN,ACT	GTIN	Laden	Rail	POTE	Gate in of Laden Equipment by Rail at Port terminal
81	Equipment	EST,PLN,ACT	GTIN	Laden	Truck	RAMP	Gate in of Laden Equipment by Truck at Ramp
82	Equipment	EST,PLN,ACT	GTIN	Laden	Rail	COYA	Gate in of Laden Equipment by Rail at Container yard
83	Equipment	EST,PLN,ACT	GTIN	Laden	Rail	RAMP	Gate in of Laden Equipment by Rail at Ramp
84	Equipment	EST,PLN,ACT	DISC	Laden	Truck	POTE	Discharge of Laden Equipment from Truck at Port terminal
85	Equipment	EST,PLN,ACT	DISC	Laden	Truck	INTE	Discharge of Laden Equipment from Truck at Inland terminal
86	Equipment	EST,PLN,ACT	DISC	Laden	Truck	COYA	Discharge of Laden Equipment from Truck at Container yard
87	Equipment	EST,PLN,ACT	DISC	Laden	Rail	POTE	Discharge of Laden Equipment from Rail at Port terminal

#	Event Type	Event Classifier	Event Type Code	Empty Indicator	Transport Mode	Facility Type	Event Description
88	Equipment	EST,PLN,ACT	DISC	Laden	Truck	RAMP	Discharge of Laden Equipment from Truck at Ramp
89	Equipment	EST,PLN,ACT	DISC	Laden	Rail	COYA	Discharge of Laden Equipment from Rail at Container yard
90	Equipment	EST,PLN,ACT	DISC	Laden	Rail	RAMP	Discharge of Laden Equipment from Rail at Ramp
91	Equipment	EST,PLN,ACT	LOAD	Laden	Vessel	POTE	Load of Laden Equipment onto Vessel at Port terminal
92	Equipment	EST,PLN,ACT	LOAD	Laden	Barge	POTE	Load of Laden Equipment onto Barge at Port terminal
93	Transport	EST,PLN,ACT	DEPA		Vessel	POTE	Departure by Vessel at Port terminal
94	Transport	EST,PLN,ACT	DEPA		Barge	POTE	Departure by Barge at Port terminal
95	Transport	EST,PLN,ACT	ARRI		Vessel	PBPL	Arrival by Vessel at Pilot boarding place
96	Transport	EST,PLN,ACT	ARRI		Vessel	POTE	Arrival by Vessel at Port terminal
97	Transport	EST,PLN,ACT	ARRI		Barge	POTE	Arrival by Barge at Port terminal
98	Equipment	EST,PLN,ACT	DISC	Laden	Vessel	POTE	Discharge of Laden Equipment from Vessel at Port terminal
99	Equipment	EST,PLN,ACT	DISC	Laden	Barge	POTE	Discharge of Laden Equipment from Barge at Port terminal

#	Event Type	Event Classifier	Event Type Code	Empty Indicator	Transport Mode	Facility Type	Event Description
100	Equipment	EST,PLN,ACT	DROP	Laden	Truck	CLOC	Drop-off of Laden Equipment by Truck at Customer location
101	Equipment	EST,PLN,ACT	GTIN	Laden	Truck	COFS	Gate in of Laden Equipment by Truck at Container freight station
102	Equipment	EST,PLN,ACT	DROP	Laden	Rail	CLOC	Drop-off of Laden Equipment by Rail at Customer location
103	Equipment	EST,PLN,ACT	DROP	Empty	Rail	CLOC	Drop-off of Empty Equipment by Rail at Customer location
104	Equipment	EST,PLN,ACT	DROP	Empty	Truck	CLOC	Drop-off of Empty Equipment by Truck at Customer location
105	Equipment	EST,PLN,ACT	DISC	Laden	Truck	CLOC	Discharge of Laden Equipment from Truck at Customer location
106	Equipment	EST,PLN,ACT	DISC	Laden	Truck	COFS	Discharge of Laden Equipment from Truck at Container freight station
107	Equipment	EST,PLN,ACT	DISC	Laden	Rail	CLOC	Discharge of Laden Equipment from Rail at Customer location
108	Equipment	EST,PLN,ACT	DISC	Laden	Rail	COFS	Discharge of Laden Equipment from Rail at Container freight station
109	Equipment	EST,PLN,ACT	STRP	Laden		CLOC	Stripping of Laden Equipment at Customer location
110	Equipment	EST,PLN,ACT	STRP	Laden		COFS	Stripping of Laden Equipment at Container freight station

#	Event Type	Event Classifier	Event Type Code	Empty Indicator	Transport Mode	Facility Type	Event Description
111	Equipment	EST,PLN,ACT	LOAD	Empty	Truck	CLOC	Load of Empty Equipment onto Truck at Customer location
112	Equipment	EST,PLN,ACT	LOAD	Empty	Truck	COFS	Load of Empty Equipment onto Truck at Container freight station
113	Equipment	EST,PLN,ACT	LOAD	Empty	Rail	CLOC	Load of Empty Equipment onto Rail at Customer location
114	Equipment	EST,PLN,ACT	LOAD	Empty	Rail	COFS	Load of Empty Equipment onto Rail at Container freight station
115	Equipment	EST,PLN,ACT	PICK	Empty	Truck	CLOC	Pick-up of Empty Equipment by Truck at Customer location
116	Equipment	EST,PLNACT	GTIN	Empty	Truck	POTE	Gate in of Empty Equipment by Truck at Port terminal
117	Equipment	EST,PLNACT	GTOT	Empty	Truck	POTE	Gate out of Empty Equipment by Truck at Port terminal
118	Equipment	EST,PLN,ACT	GTOT	Empty	Truck	COFS	Gate out of Empty Equipment by Truck at Container freight station
119	Equipment	EST,PLN,ACT	PICK	Empty	Rail	CLOC	Pick-up of Empty Equipment by Rail at Customer location
120	Equipment	EST,PLN,ACT	GTOT	Empty	Rail	COFS	Gate out of Empty Equipment by Rail at Container freight station
121	Transport	EST,PLN,ACT	ARRI		Truck	DEPO	Arrival by Truck at Depot

#	Event Type	Event Classifier	Event Type Code	Empty Indicator	Transport Mode	Facility Type	Event Description
122	Transport	EST,PLN,ACT	ARRI		Rail	DEPO	**Arrival by Rail at Depot**
123	Equipment	EST,PLN,ACT	RMVD	Laden			**Seal Removal**
124	Equipment	EST,PLN,ACT	INSP	Laden			**Seal Inspection**
125	Equipment	EST,PLN,ACT	RSEA	Laden			**Packed transport equipment sealed after inspection**
126	Transport	EST,PLN,ACT	ARRI		Barge	INTE	**Arrival by Barge at Inland terminal**
127	Transport	EST,PLN,ACT	DEPA		Barge	INTE	**Departure by Barge at Inland terminal**
128	Shipment	ACT	RECE				Booking Received
129	Shipment	ACT	CONF				Booking Confirmed
130	Shipment	ACT	REJE				Booking Rejected
131	Shipment	ACT	RECE				Shipping instruction Received
132	Shipment	ACT	APPR				Shipping instruction Approved
133	Shipment	ACT	REJE				Shipping instruction Rejected

#	Event Type	Event Classifier	Event Type Code	Empty Indicator	Transport Mode	Facility Type	Event Description
134	Shipment	ACT	PENA				Shipping instruction Pending approval
135	Shipment	ACT	ISSU				Transport document Issued
136	Shipment	ACT	ISSU				Arrival notice Issued
137	Shipment	ACT	SURR				Transport document Surrendered
138	Shipment	ACT	ISSU				Shipment release message Issued

Table 15. A list of track and trace events

4   Push Model

4.1   Subscribe to track and trace information for shipment(s)

4.1.1   Use case - Create a subscription

4.1.1.1   Use case definition

This section describes the use case of 'Create a subscription' via an exemplified interaction between the shippers, consignees, and carriers. The respective UML diagram below supports the use case displaying the interactions between the different actors involved: shipper, consignee, and carrier.
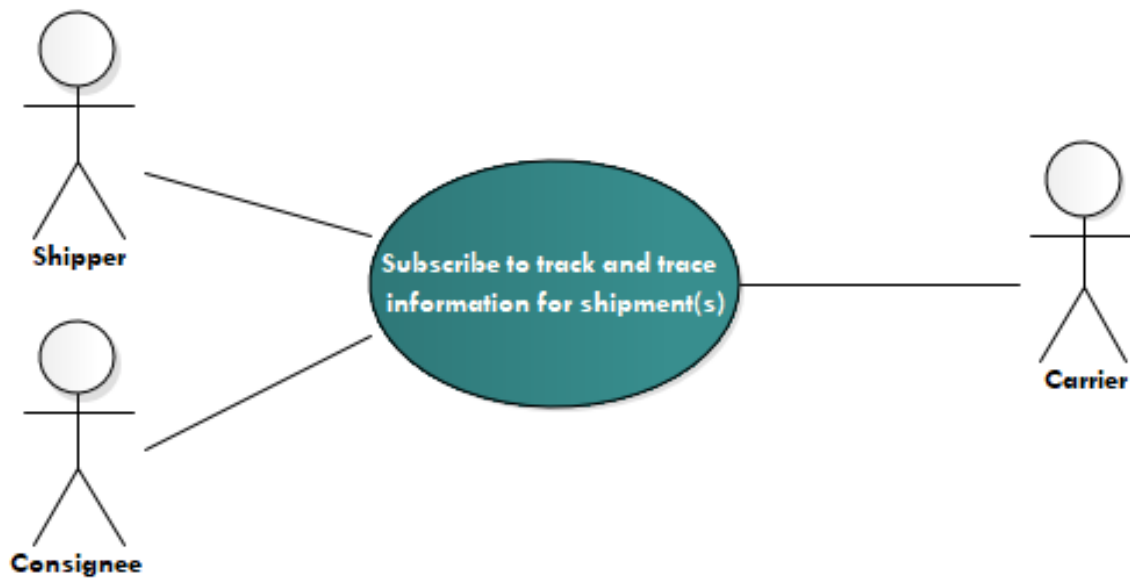

Figure 7. Use case diagram - Create a subscription

Name of use case	Create a subscription to track and trace information for shipment(s)
Created by	DCSA **Last updated by** DCSA P1
Date Created	21 February 2020 **Last revision date** 22 July 2021
Description	Create a subscription to track and trace shipment information in the form of events
Actors	Shipper, Consignee, Carrier
Preconditions	Not applicable
Postconditions	A subscription is created by the carrier for the shipper or consignee
Flow	1 Shipper or consignee sends request to carrier to create subscription to track and trace information for shipment(s) 2 Carrier creates subscription for the shipper or consignee 3 Carrier sends confirmation of creation of subscription with subscription ID to the shipper or consignee
Alternative flows	Not applicable
Exceptions	2a. Carrier identifies that subscription criteria are invalid or do not exist 2b. Shipper or consignee receives a response with an output error suggesting that the subscription option is invalid 3a. Carrier is unable to create subscription for shipper or consignee due to unforeseen circumstances 3b. Shipper or consignee receives a response with an output error including the reason for the failure

Table 16. Use case definition - Create a subscription

4.1.1.2 Activity diagram

The purpose of the activity diagram is to capture dynamic behavior in the system to demonstrate a message flow. Figure 7 describes the activity flows that the interface for subscribing to track and trace information for shipments provides. The activity flow for 'Create a subscription' can follow two paths: the main success path or the exception path. The main success path for 'Create a subscription' begins when a user sends a request to a carrier to subscribe to track and trace events. If the request is valid, the carrier creates a subscription for the shipper or consignee. If the subscription is created, the carrier sends a subscription ID to the subscriber (shipper or consignee). If that is not the case or if the request from the subscriber is invalid, the exception path is followed.
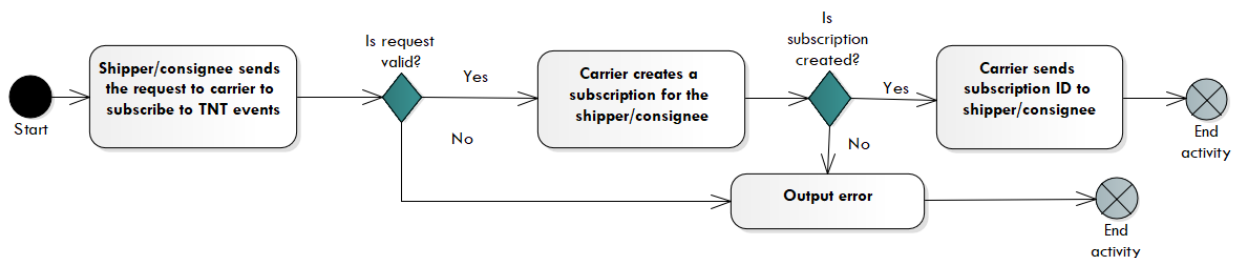

Figure 8. Activity diagram - Create a subscription

4.1.1.3 Inputs

By default, a subscription request has no filtering parameters, indicating that the carrier should send all events that are considered relevant for the subscriber organization, such as events where the subscriber organization is a party. The set of data that is provided in the published event messages is described in section 4 Use case - Publish track and trace information for shipment(s).

Carriers may wish to offer subscription filters that allow subscribers to limit the amount of data they receive; however the set of filters will not be standardized and it will be a carrier decision whether or not to implement such filters.

Furthermore, certain security considerations must be given in relation to the implementation and usage of the interface. An authentication of clients and, if applicable, users is required. Carriers are encouraged to take care of access management and specific

roles in this respect, and it remains an individual carrier decision how to handle this security aspect.

Finally, being technology agnostic, this interface standard does not indicate which channel should be used for receiving published events. It is assumed the event messages use the same channel as the subscription message.

4.1.1.4 Outputs

After a shipper or consignee has subscribed to a carrier's track and trace interface, the carrier issues a unique subscription ID. Besides, it is assumed that when a subscription interface is implemented there will be the ability to read, cancel or update the subscription.

Output Name	Type	Description	Example
Subscription ID	String	**REQUIRED.** The carrier issues a unique ID to the shipper or consignee for that subscription.	jlke213j

Table 17. List of outputs - Create a subscription

4.1.2 Use case - Update a subscription

4.1.2.1 Use case definition

This section describes the use case of 'Update a subscription' via an exemplified interaction between shippers, consignees, and carriers. The UML diagram below supports the use case displaying the interactions between the different actors involved.
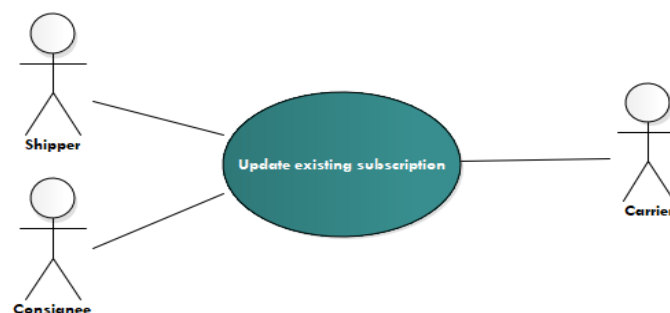

Figure 9. Use case diagram - Update a subscription

DCSA Interface Standard for Track and Trace

Name of use case	Update a subscription
Created by	DCSA **Last updated by** DCSA P1
Date Created	14 April 2020 **Last revision date** 22 July 2021
Description	Update a subscription for track and trace shipment information in the form of events
Actors	Shipper, Consignee, Carrier
Preconditions	A subscription exists
Postconditions	An updated subscription is created by the carrier for the shipper or consignee
Flow	1. Shipper or consignee - using its subscription ID - sends update request regarding subscription to carrier to filter differently on track and trace information for shipment(s) 2. Carrier creates updated subscription for the shipper or consignee 3. Carrier sends confirmation of updated subscription to the shipper or consignee
Alternative flows	Not applicable
Exceptions	2a. Carrier identifies that new subscription criteria are invalid or do not exist 2b. Shipper or consignee receives a response with an output error suggesting that the new subscription option is invalid 3a. Carrier is unable to update a subscription for shipper or consignee due to unforeseen circumstances 3b. Shipper or consignee receives a response with an output error including the reason for the failure

Table 18. Use case definition - Update a subscription

4.1.2.2   Activity diagram

The purpose of the activity diagram is to capture dynamic behavior in the system to demonstrate a message flow. Figure 9 describes the activity flows that the interface for updating a track and trace subscription for shipments, provides. This activity flow for 'Update a subscription' can follow two paths: the main success path or the exception path. The main success path for 'Update a subscription' begins when a user sends a request to a carrier to update the subscription for track and trace events. If the request is valid, the carrier creates an updated subscription filter scheme for the shipper or consignee. If the updated subscription is created, the carrier sends a confirmation of the updated subscription to the subscriber (shipper or consignee). If that is not the case or if the request from the subscriber is invalid, the exception path is followed.
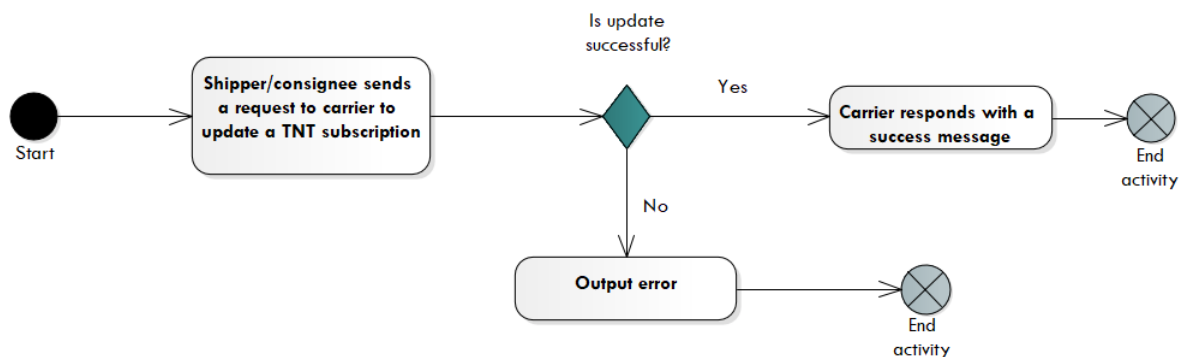

Figure 10. Activity diagram - Update a subscription

4.1.2.3   Inputs

The input is the subscription ID that was generated by the carrier for the subscription.

Property Name	Type	Description	Example
Subscription ID	String	**REQUIRED**. The subscription ID of the subscription to be updated.	jlke213j

Table 19. List of inputs - Update a subscription

4.1.2.4   Outputs

The output is a message confirming the updated subscription with the new, carrier-specific parameters.

4.1.3   Use case - Cancel a subscription

4.1.4   Use case definition

This section describes the use case of 'Cancel a subscription' via an exemplified interaction between the shippers, consignees, and carriers. The UML (use case) diagram below supports the use case displaying the interactions between the different actors involved.
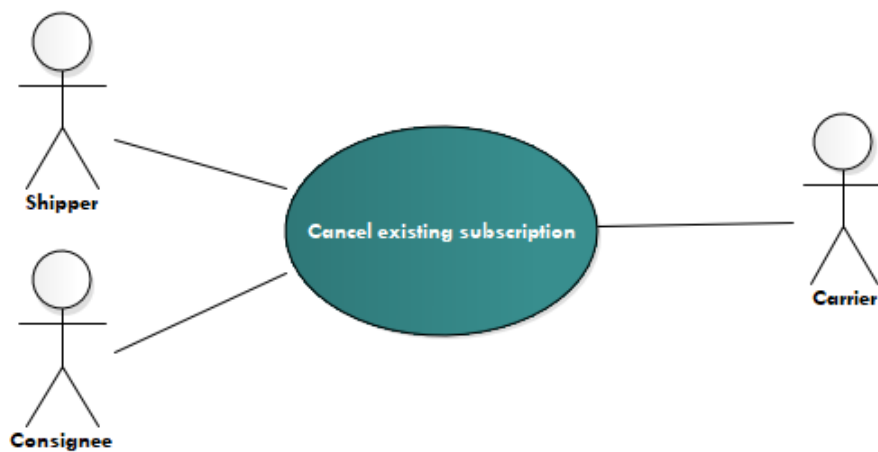

Figure 11. Use case diagram - Cancel a subscription

Name of use case	Cancel a subscription		
Created by	DCSA	**Last updated by**	DCSA P1
Date Created	14 April 2020	**Last revision date**	22 July 2021
Description	Cancel a subscription for track and trace shipment information in the form of events		
Actors	Shipper, Consignee, Carrier		
Preconditions	A subscription exists		
Postconditions	A subscription is cancelled by the carrier for the shipper or consignee		
Flow	1. Shipper or consignee sends cancellation request regarding subscription to carrier to 2. Carrier cancels subscription for the shipper or consignee 3. Carrier sends confirmation of cancellation for subscription to the shipper or consignee		
Alternative flows	Not applicable		
Exceptions	2a. Carrier is unable to cancel a subscription for shipper or consignee due to unforeseen circumstances 2b. Shipper or consignee receives a response with an output error including the reason for the failure		

Table 20. Use case definition - Cancel a subscription

4.1.4.1 Activity diagram

The purpose of the activity diagram is to capture dynamic behavior in the system to demonstrate a message flow. Figure 11 describes the activity flows that the interface for canceling subscriptions for track and trace information for shipments provides. This activity flow for 'Cancel a subscription' can follow two paths: the main success path or the exception path. The main success path for 'Cancel a subscription' begins when a user sends a request to a carrier to cancel the subscription for track and trace events. If the request is valid, the carrier creates cancels the subscription for the shipper or consignee. After the subscription is canceled, the carrier sends a confirmation of the cancelled subscription to the subscriber (shipper or consignee). If that is not the case or if the request from the subscriber is invalid, the exception path is followed.
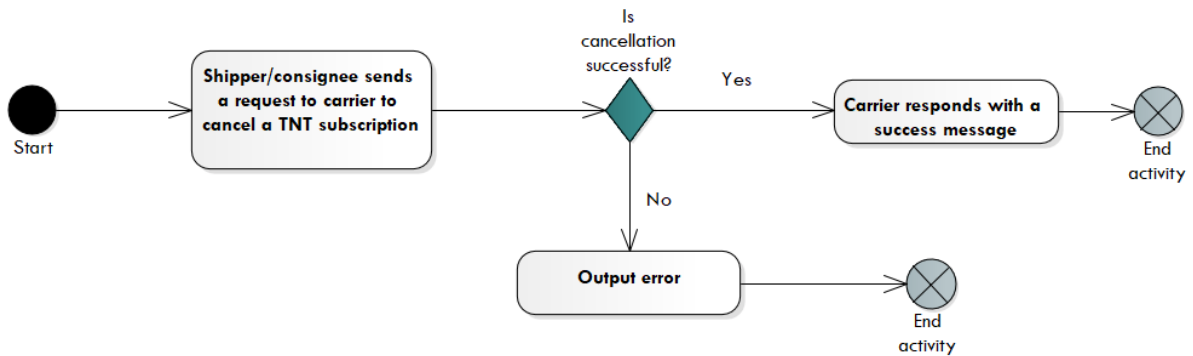
DCSA Interface Standard for Track and Trace

Figure 12. Activity diagram - Cancel a subscription

4.1.4.2 Inputs

The input is the subscription ID that was generated by the carrier for the subscription.

Property Name	Type	Description	Example
Subscription ID	String	**REQUIRED**. The subscription ID of the subscription to be cancelled.	jlke213j

Table 21. List of inputs - Cancel a subscription

4.1.4.3 Outputs

The output is a message confirming the success of the cancellation operation.

4.2 Use case - Publish track and trace information for shipment(s)

4.2.1 Use case definition

This section describes the use case 'Publish track and trace information for shipment(s)' to shippers or consignees' section via an exemplified interaction between the shippers, consignees, and carriers. The UML (use case) diagram below supports the use case displaying the interactions between the different actors involved.
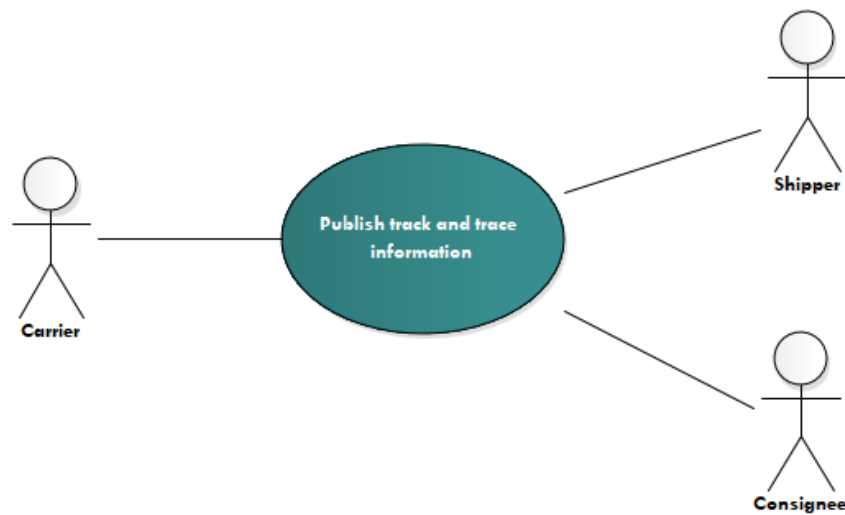

Figure 13. Use case diagram - Publish track and trace information for shipment(s)

Name of use case	Publish track and trace information for shipment(s)		
Created by	DCSA	**Last updated by**	DCSA P1
Date Created	21 February 2020	**Last revision date**	22 July 2021
Description	Publish track and trace shipment information in the form of events		
Actors	Shipper, Consignee, Carrier		
Preconditions	A subscription is created by the carrier for the shipper or consignee		
Postconditions	None applicable		
Flow	4. Carrier receives new event(s) 5. Carrier publishes track and trace information in accordance with chosen subscription criteria		
Alternative flows	Not applicable		
Exceptions	2a. Carrier fails to publish track and trace information to shipper or consignee due to unforeseen circumstances		

Table 22. Use case definition – Publish track and trace information for shipment(s)

4.2.2 Activity diagram

The purpose of the activity diagram is to capture dynamic behavior in the system to demonstrate a message flow. Figure 13 provides the activity flow of the interface for publishing track and trace information for shipment(s). The main path for 'Activity diagram – Publish track and trace information for shipment(s)' begins when a carrier receives new events. The carrier then publishes the received events to the subscriber (shipper or consignee).
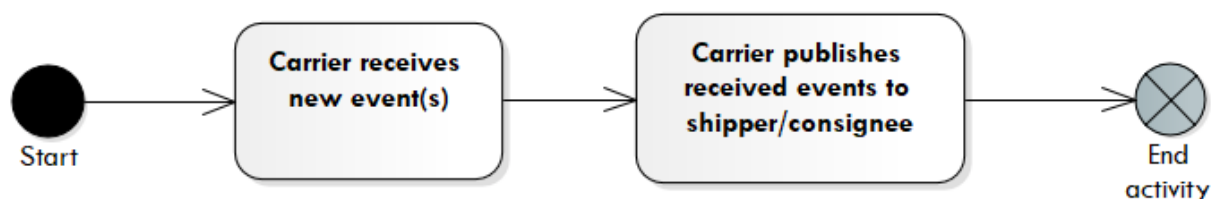

Figure 14. Activity diagram – Publish track and trace information for shipment(s)

4.2.3   Inputs

The previously created subscription is considered as an input.

4.2.4   Outputs

At least one change must occur to create a push message. All relevant parties in the container shipping industry should aim at having the event data configured and available in their interfaces.

The shipper or consignee as receiver of the published messages should consider the relevant security implications and implement authentication and access management to ensure that messages are coming from a trusted source and have not been modified in transit.
The assumption is that each published message will only contain the most recent change.

Subscription identifiers

Property Name	Type	Description	Example
Subscription ID	String	**OPTIONAL**. The subscription ID for which this published message is intended.	jlke213j

Table 23. Subscription identifiers

The full description of all event outputs can be found in the section 3.1.4 of this document. Additionally, a list of possible track and trace events can be found in Table 15 above.

5   Conclusion

This DCSA Interface Standard for Track and Trace 2.1 defined in this document is meant to serve as a foundation for all interfaces implemented, henceforth by the entire shipping industry in relation to the tracking and tracing of shipment(s). It is a cooperative effort that has been backed and supported by invaluable input from many of the major shipping carriers around the world.

Furthermore, this document brings into focus the data and the content of the DCSA Interface Standard for Track and Trace 2.1, which is supported by DCSA SwaggerHub and OpenAPI definitions. Users of other technologies are required to adopt the standards in other channels, for example, the data delivered through EDI interfaces, manual interfaces, and GUI-based interfaces.

This document also intends to facilitate discussions around the exchange of track and trace data between the different counterparts involved in shipment(s) and should lead to better accountability and traceability of activities in relation to the shipment of goods.