Standards for a just-in-time port call

Standard data definitions as the first step towards a digital port call ecosystem for the container shipping industry

October 20, 2020
Version: 1.0

Purpose

To establish the initial set of standardised data definitions to be used in the port call planning and execution process for container shipping.

Preface

DCSA envisions a digitally interconnected container shipping industry. Our mission is to shape the digital future of container shipping by being the industry's collective voice, working towards alignment and standardisation. Together with our member carriers, DCSA creates vendor-neutral, technology-agnostic standards for IT and non-competitive business practices. By working towards the widespread adoption of these standards, our aim is to move the industry forward in terms of customer experience, efficiency, collaboration, innovation and respect for the environment.

The objective of the DCSA Just-in-Time (JIT) Port Call programme is to enable a digital, just-in-time port call process, which will facilitate vessel speed optimisation, reduce CO_2 emissions, improve schedule reliability and increase operational efficiency overall. This document is the first in a series of publications from this multi-year program. To provide a global industry framework that builds on existing standards, DCSA port call data definitions align with existing standards from IMO and ITPCO, among others.

Please refer to the DCSA website, https://dcsa.org/about/ for more information.

Change history

Version	Issue	Contributors	Description
1.0	20 October	DCSA, Steering Committee	Processed feedback on 0.99 version that was shared with P6 Steering Committee members
0.95	23 September	DCSA, RISE, ITPCO and TIC4.0	Processed feedback on the 0.9 version that was shared with the DCSA members, RISE, ITPCO and TIC4.0
0.9	9 September 2020	Subject Matter Experts	Processed feedback on the 0.8 version that was shared with the SMEs
0.8	20 August 2020	DCSA	Updated structure and content after feedback from internal DCSA team
0.7	4 August 2020	DCSA	Updated structure and content after feedback from internal DCSA team

Table 1: Revised versions

Glossary

Term	Definition
Timestamp	A digital record of the time of occurrence of a particular event
Data owner	The entity that owns and is accountable for a data set
Data definition	A definition that explains the meaning of a data element, data entity or concept, and the context in which it is used

Table 2: Glossary

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1 Introduction

1.1 Challenges

There is an urgent call for the maritime industry to reduce CO_2 intensity in international shipping. The International Maritime Organization (IMO) agreed to reduce greenhouse gas emissions by at least 40% over 2008 levels by 2030 and 70% by 2050. The GloMeep GIA Just In Time Arrival Guide (2018) and recent DCSA research show that an optimised JIT port call process facilitates vessel steaming speed optimisation, thereby reducing CO_2 emissions. Additionally, the just-in-time port call is an important building block for improving operational efficiency on an industry level.

DCSA research further shows that the current port call process is sub-optimal, complex and locally managed, with numerous interlinked stakeholders, timelines and events. Current inefficiencies per port call can be attributed to:

- Inefficient communication;
- Silo-based optimisations;
- Lack of standardised data;
- Lack of transparency;
- Lack of system interoperability.

Carriers face these inconsistencies on a daily basis. At every port call they encounter different methods of communication, different processes, data definitions and supporting systems. In this context it is worthwhile to mention that delay and complexities during one port call have the potential to negatively impact timely arrivals at subsequent ports.

1.2 Vision

DCSA aims to overcome these challenges in the port call process through standardisation and digitalisation that will ultimately lead to digital transformation in the industry:

Current state A sub-optimal, locally managed port call process, mostly facilitated by traditional technology	Future state A digital, global, transparent Just-in-Time port call ecosystem
- Waste due to inefficiencies in port call process - Limited digitisation & data driven decisions - Significant carbon emissions - Schedule reliability issues - Customer experience re exceptions below expectation	- Reduced waste and increased value for all stakeholders - Reduced carbon emissions and costs - Enabled data driven decision making. - Improved schedule reliability - Enriched customer proposition

Figure 1: Current and future state of the port call process

The DCSA Just-in-Time Port Call programme shall:

- Drive global data and interface standards;
- Optimise and digitalise the port call process and information exchange;
- Drive adoption among all port call stakeholders.

The aim is to enable a shared, functional language as a basis for standardised, digital (real time) communication between carriers, ports, terminals and other stakeholders in the global shipping ecosystem.

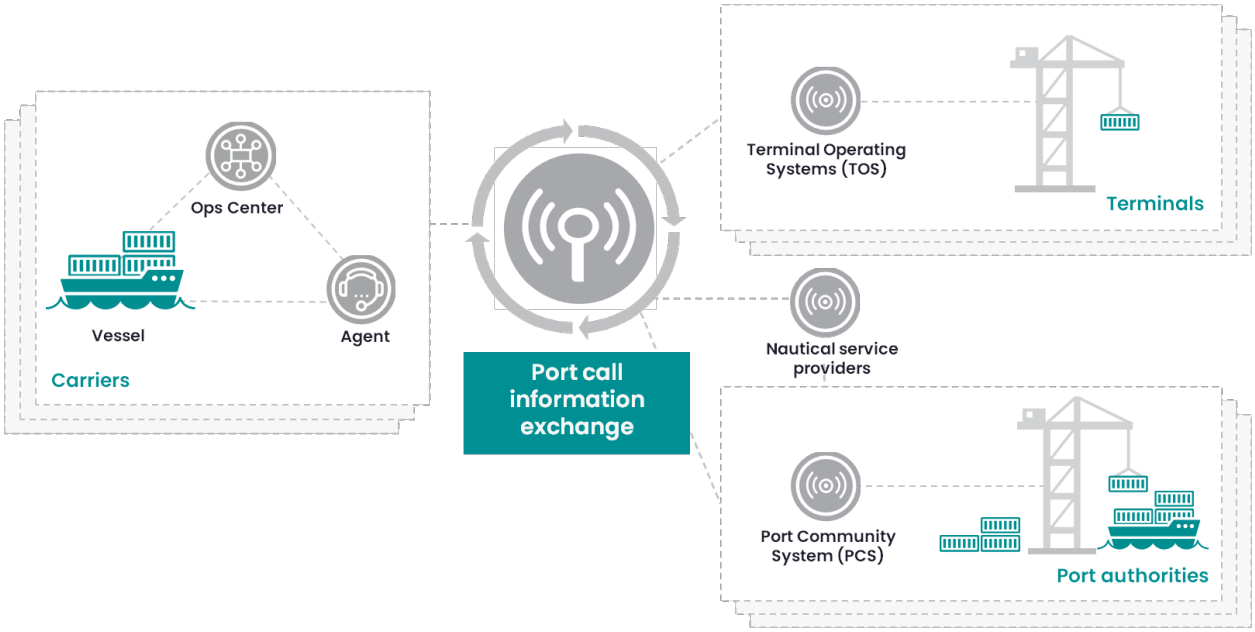

Figure 2: Concept of digital Information exchange in the JIT port call

The digital exchange of standardised data will enable stakeholders to frequently plan, re-plan and measure the different steps in the JIT port call, resulting in more predictable and reliable planning and execution. This enables each actor in the port call process to optimise business performance within its own context. For example:

- Carriers can optimise the planning and steaming speed of their vessels within the context of their global operations;
- Ports can optimise their operations within the context of their local community;
- Terminals can enhance their berth productivity within their local terminal context.

1.3 Scope of the first release

The scope of this publication includes the initial set of 17 standardised data definitions[1] for the JIT port call process. Each data definition describes a different timestamp. Adoption of these standards is a key building block for enabling all stakeholders in the ecosystem to digitally (real time) exchange planning and event data in a standardised way.

The data definitions cover the planning and execution of events. These events are: (1) arrival at Pilot Boarding Place, (2) arrival at berth, (3) start of cargo operations, (4) completion of cargo operations and (5) departure from berth. They are spread out across 5 phases in the high-level port call process which will be explained in more detail in the next chapter.

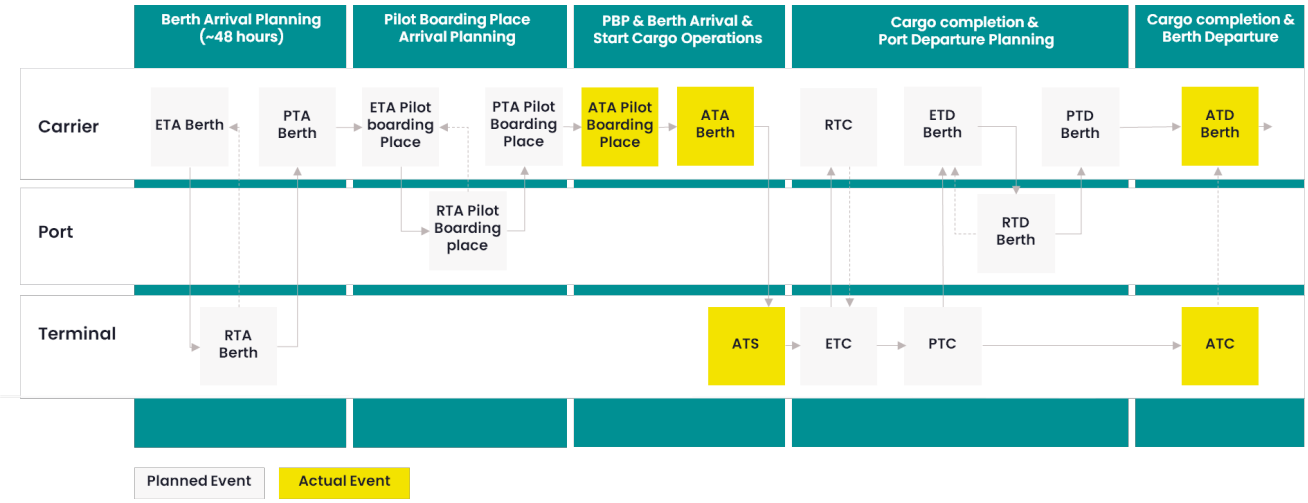

Figure 3: The 17 data definitions in scope for this publication

[1]The data definitions extend the previously published Operational Vessel Schedule Definitions from DCSA (2020), and leverage the standards as defined in the Port Information manual of ITPCO et al. (2020) and as submitted to IMO FAL in FAL 43/7/1 and FAL EGDH 2/XX.

During these events, process waste in the form of lost time might occur. DCSA has standardised process waste definitions to label this lost time in a standardised way, which forms the basis of effective improvement measures.

2 The port call process and key data definitions

In this section, standard data definitions are presented for the 17 timestamps in the JIT port call process. For context, the high-level port call process is described below.

2.1 High-level port call process

The high-level port call process, as shown in figure 3 above, consists of 5 phases.

Berth Arrival Planning (~48 hours)	1. The carrier and terminal operator align on the short-term plan and the approximate time of availability of the berth.
Pilot Boarding Place Arrival Planning	2. The carrier[1] and the port align on the arrival plan. A planned time at the Pilot Boarding Place (PBP) is agreed.
PBP and Berth Arrival & Start Cargo Operations	3. The vessel arrives at the PBP and is manoeuvred to the berth where cargo operations will start.
Cargo completion & Port Departure Planning	4. The terminal operator shares the planned time of cargo operations completion with the carrier, which enables departure planning with the port.
Cargo completion & Berth Departure	5. Cargo operations are completed, port clearance is granted, and the vessel departs for the next port from the berth.

Figure 4: High-level port call process

In each phase, an event is planned or executed. The steps within each phase fall into one of the following 4 subsequent categories:

- **Estimated**: When an entity expects to arrive, depart or complete a service or operation. For example: a carrier provides the terminal operator with an estimate of when it will arrive at berth.
- **Requested**: When the receiving party requests the service to take place at a specific time. For example: a terminal operator requests a carrier to change its Time of Arrival due to a delay at berth of a previous vessel.
- **Planned**: The confirmation of the requested time by the sending entity. For example: when a carrier confirms the Requested Time of Arrival at berth from the terminal.
- **Actual**: The actual execution of the planned event. For example: arrival Pilot Boarding Place.

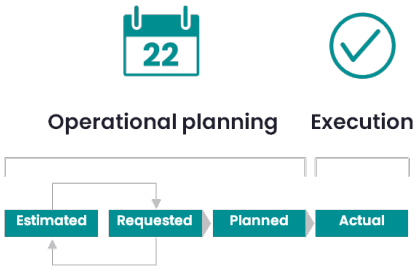

Figure 5: Planning and execution

The planning and execution of an event always follows this same sequence, in which several instances of the estimated, requested and planned times can occur if a new estimated or requested time is given after the initially planned time.

[1] Carrier can be represented by either the captain of the vessel, operations center or the agent depending on the organisation. This comment applies to every next mention of "Carrier" in this document.

2.2 Data definitions of the 17 timestamps

For 12 event planning and 5 actual event timestamps, DCSA created data definitions. Each data definition consists of the following data elements:

Element	Explanation
[Time destination]	– A time indicator for the arrival, departure or completion of a service or operation. For example: estimated, requested, planned or actual.
[Location destination]	– A location of the arrival, departure or completion of a service or operation. For example: Pilot Boarding Place or berth.
[Data owner]	– The entity that owns and is accountable for data related to a planning or execution event. For example: carrier, terminal or port authority.
[Timing measurement]	– A trigger event for a measurement. For example: 48 hours upfront for the first ETA Berth, and 'first line ashore' for the arrival at berth.

Table 3: Data definition structure

These data elements combined with the data owners and definitions give the following overview.

#	[Time destination] & [Location destination]	[Data Owner]	[Timing measurement]	Data definition
1	Estimated Time of Arrival Berth (ETA Berth)	Carrier	Whenever an ETA Berth is communicated, starting at departure of the previous berth	The date/time when a vessel estimates it will arrive at berth
2	Requested Time of Arrival Berth (RTA Berth)	Terminal operator	Whenever an RTA Berth is communicated	The date/time when a vessel is requested to arrive at berth
3	Planned time of Arrival Berth (PTA Berth)	Carrier	Whenever a PTA Berth is agreed	The date/time when a vessel confirms arrival at berth
4	Estimated Time of Arrival Pilot Boarding Place (ETA PBP)	Carrier	Whenever an ETA PBP is communicated, starting when the PTA Berth is agreed	The date/time when a vessel estimates it will arrive at Pilot Boarding Place
5	Requested Time of Arrival Pilot Boarding place (RTA PBP)	Port authority	Whenever an RTA PBP is communicated	The date/time when a vessel is requested to arrive at Pilot Boarding Place
6	Planned Time of Arrival Pilot Boarding Place (PTA PBP)	Carrier	Whenever a PTA PBP is agreed	The date/time when a vessel confirms arrival at Pilot Boarding Place

7	Actual Time of Arrival Pilot Boarding Place (ATA PBP)	Carrier	Arrival Pilot Boarding Place	The date/time when a vessel arrives at Pilot Boarding Place
8	Actual Time of Arrival Berth (ATA Berth)	Carrier	First Line Ashore	The date/time when a vessel arrives at berth
9	Actual Time of Start Cargo Operations (ATS)	Terminal operator	First commercial lift	The actual date/time when a terminal starts Cargo Operations
10	Estimated Time of Cargo Completion (ETC)	Terminal operator	Initially provided as the Cargo Operations start. Whenever an ETC is updated, at minimum 12, 6 and 3 hours before vessel departure	The date/time when a terminal operator estimates cargo operations will be completed/last commercial lift
11	Requested Time of Cargo Completion (RTC)	Carrier	Whenever an RTC is communicated	The date/time when the carrier is requesting to complete cargo operation/last commercial lift
12	Planned Time of Cargo Completion (PTC)	Terminal operator	Whenever an RTC is agreed, PTC shall be communicated at minimum 12 hours before vessel departure	The date/time when the terminal operator plans to complete cargo operations/last commercial lift
13	Estimated Time of Departure Berth (ETD Berth)	Carrier	Whenever an ETD Berth is communicated, at minimum 12 hours before vessel departure	The date/time when a vessel estimates it will depart from berth
14	Requested Time of Departure Berth (RTD Berth)	Port authority	Whenever an RTD Berth is communicated	The date/time when a vessel is requested to depart from berth
15	Planned Time of Departure Berth (PTD Berth)	Carrier	Whenever RTD Berth is agreed, first PTD is communicate, at minimum 6 and 3 hours before departure	The date/time when a vessel confirms to depart from berth
16	Actual Time of Completion Cargo Operations (ATC)	Terminal operator	Last commercial lift	The actual date/time when the terminal operator completes cargo operations
17	Actual Time of Departure (ATD)	Carrier	Last mooring has been released	The date/time when a vessel departs from berth

Table 4: Overview of 17 Data Definitions

2.3 Process waste definitions

Even a digitalised and standardised process can have inherent inefficiencies. To identify these inefficiencies and improve on them, DCSA has defined three types of time-based waste in the port call process. This is a starting point for further root cause analysis.

Waste types	Definition	Example formula:
Waiting time	– The time a vessel waits before it arrives in the port	– For PBP: The difference between the ATA PBP - ETA/PTA PBP – For berth: The difference between ATA Berth - ETA/PTA Berth
Idle time	– The time the vessel is alongside berth before cargo operations – The time the vessel is alongside berth after cargo operations	– The difference between the ATA Berth - ATS cargo operation The differences between ATD Berth - ATC cargo operations
Delay	– The time cargo operations are delayed	– The difference between the ATC cargo operations - ETC/PTC cargo operations

Table 5: Process waste definitions

It should be noted that not all waiting time, idle time or delay is waste for the carrier. There are two reasons for this. First, a carrier might purposely create waiting time and delay by delaying an individual port call if that will benefit its global operations. Second, idle time may include activities such as preparation for cargo operations and preparation for departure that are executed respectively after the vessel is alongside berth and after the end of cargo operations.

3 Conclusions and call to action

This publication contains the first set of 17 standardised data definitions for the planning and execution of key events in the JIT port call process for container shipping.

A robust set of data definitions creates a shared functional language across the port call ecosystem, which builds consistency and predictability into the time-dependent port call processes. Being able to accurately and digitally exchange (real time) information enables carriers, ports, terminals and service providers to optimise vessel speed, reduce CO_2 emissions, improve schedule reliability and increase operational efficiency overall.

One of the main goals of the DCSA Just-in-Time Port Call programme is to drive adoption of data and interface standards among all port call stakeholders on a global scale. Standardising the data definitions, therefore, could be considered the first step towards a fully standardised, digital (real time) data exchange across the entire ecosystem.

Moving forward, DCSA would like to collaborate with other key stakeholders in the port call ecosystem (e.g. terminal operators, ports, service - and solution providers). Therefore, this publication also serves as a call to action to the reader. If you have feedback, suggestions for improvement, or would like to get involved in the DCSA Just-in-Time Port Call programme, please get in touch with us via DCSA.org/contact. We would appreciate you joining us on our journey to co-create a standardised, digital, optimised JIT port call process.

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