



FInest – **F**uture **I**nternet enabled optimisation
of **t**ransport and logistics networks



D1.3

Business Requirements

for future transport and logistics ICT solutions

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Abstract

International transport and logistics operations are concerned with the planning and execution of the world-wide shipment of goods and people. The Finest project addresses this domain as a useful example for how Future Internet based services can improve operations within a complex domain while “leveling the playing field” so that small companies can better participate. The Finest project has identified three different use case scenarios in this domain that characterize different aspects of transport and logistics operations that will serve as examples for building Future Internet based services. Based on the preliminary analysis of the domain business requirements, and based on the project’s initial analysis of these use cases, the next step for the project was to analyze the domain to develop detailed Business Requirements for possible future ICT (information and computer technology) solutions based on Future Internet technologies.

This document is being submitted as specified in the Finest Description of Work (DoW) as the foundation of deliverable D1.3 – Business Requirements for future transport and logistics ICT solutions. The work done in this deliverable has been one of collaboration with all other work packages in the project. The need to use the detailed information flows that pass between partners in the project to define technical requirements for work packages 5 – 8 required that business requirements be examined from the perspective of the development of an ICT solution to the opportunities for improvement identified in work package 2. This theme/perspective necessarily biases the analysis. However, given the parallel nature of the project work packages where technical deliverables require information about certain business needs before requirements definition has been completed, this approach was selected so that the greatest benefit to the project in total could be achieved. The reader interested in the detailed information passed between domain partners, its format, source, and destination should review the Appendix to this document, which has been provided as part of this deliverable.

The use cases that have been identified for analysis within the project are:

- **Use Case 1 – Fish Transport from Ålesund (Norway) to Europe:** The use case is covered by three companies (Port of Ålesund, NCL and Tyrholdm&Farstad), and focus has been put on the perspective of three different roles covering one part of a transport chain: the port, the shipping line and the container terminal. The intention has been to understand the challenges of this shipment process from the perspective of these three roles, and on understanding the interactions among business partners in the process. Focus has not been on covering a complete door-to-door transport chain.
- **Use Case 2 – Air Transport of Equipment:** The use case is covered by two companies (Kuehne + Nagel and Air France-KLM Cargo) representing the two main parties in this transport chain. Focus has been put on describing a complete door-to-door transport chain. This transport chain has been divided into three main parts: 1. Shipper-to-Carrier, 2. The Carrier process (Forwarder-to-Carrier, then Carrier-to-Forwarder), and 3. Carrier-to-Consignee.

- **Use Case 3 – Global Consumer Goods Production and Distribution:** The use case is covered by one company (Arcelik). The perspective is, therefore, of the manufacturer, and the use case consists of three transport chains: two covering the inbound logistics of materials (from the Far East and Europe to Turkey), and one covering the export of manufactured products to the UK.

The initial business requirements identified that the FInest platform should address include the following:

- Improved information exchange to ensure that the right information arrives at the right time, with easy access, but with security in transfer
- Improved coordination of business activities among all involved actors
- The ability to integrate with legacy systems
- Event-driven monitoring and real time tracking of processes
- A standardized communication interface between all participants
- Improved operational transparency between partners
- Flexible operations to respond to variable market demands
- Pro-active alerts to allow for problem avoidance
- Improvement in resource planning
- Automated data entry (eliminate paper and manual processes)
- Improvement in visibility to resources and their availability
- Safe and efficient transfer of documents
- Ability to plan and replan activities based on real time market conditions
- Improve operational efficiency to lower carbon emissions

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Table of Contents

Abstract	3
Disclaimer	5
Document History	5
Table of Contents	6
Acronyms.....	9
1 Introduction.....	11
1.1 Work Package 1	11
1.2 Relationship with other Work Packages	12
1.3 Task 1.2: Detailed Business Requirements Analysis	13
2 Business requirements for transport and logistics domain	14
2.1 4Phases methodology.....	14
2.1.1 Sales / Marketing.....	15
2.1.2 Planning.....	15
2.1.3 Execution	16
2.1.4 Completion	17
2.2 Requirements Analysis.....	17
2.2.1 Introduction.....	17
2.2.2 General Requirements identified in the Domain Analysis (D1.1).....	17
2.3 Generic requirements identified in the Analysis of the Transport and Logistics Domain	19
3 Generic requirements overview	20
3.1 Collaboration	20
3.2 Planning	21
3.3 Resource Management.....	22
3.4 Monitoring and Visibility.....	22
3.5 Targets to be achieved	23
3.5.1 Simplifying the ICT landscape	23
3.5.2 Reduction of manual input and tasks.....	23
4 Communication / Information Exchange.....	23
4.1.1 Data Flow	24
4.1.2 Communication Analysis.....	25
5 Use case requirement analysis	26
5.1 Use Case 1 – Fish Transport from Ålesund (Norway) to Brasil.....	28
5.2 Use case 2 – Air Transport of Equipment.....	34
5.3 Use case 3 – Global Consumer Good Production and Distribution	39
5.4 Message detail consolidation	44

6	Detailed Domain Business Requirements.....	48
6.1	Business Collaboration.....	48
6.1.1	Business alignment	49
6.1.2	E-market place	49
6.1.3	E-Contracting	49
6.1.4	Administrating of business partners	50
6.1.5	Security and privacy	50
6.1.6	Technical Collaboration	50
6.2	Planning.....	50
6.2.1	Event management	51
6.2.2	Re-planning (multiple solution planning)	51
6.2.3	Strategic planning	51
6.3	Resource Management.....	52
6.4	Monitoring & Visibility.....	52
6.5	Business opportunities for SME.....	52
7	Conclusion.....	52
8	Next steps.....	54
9	References.....	55
10	Appendix – Detailed data flows by use case.....	57

List of Figures

Figure 1: Interactions between WP1-WP3 and WP5-WP8	13
Figure 2: FInest domain mapping approach	15
Figure 3: Generic requirements identified in D1.1 Analysis of the TL Domain	20
Figure 4: Data Flow Example (MARINTEK, 2011)	24
Figure 5: IBM and KN Secure Trade Lanes Project	25
Figure 6: Big picture Use Case 1	28
Figure 7: Information Flow UC1 1	29
Figure 8: Information Flow UC1 2	30
Figure 9: Big picture Use Case 2 (IATA, 2011)	34
Figure 10: Document Flow Airfreight (IATA, 2012)	35
Figure 11: Information Flow UC3 Export (ARCELIK, 2011)	39
Figure 12: Information Flow UC3 Import (ARCELIK, 2011).....	40
Figure 13: UC1 Port Information flow consolidation	45
Figure 14: UC1 NCL information flow consolidation	45
Figure 15: UC2 information flow consolidation	46
Figure 16: UC3 Import information flow consolidation	46
Figure 17: UC3 Export information flow consolidation.....	47
Figure 18: Requirements related to 4 phase methodology	53

List of Tables

Table 1: High level Use Case Requirements	27
Table 2: Challenges and needs UC1	33
Table 3: Challenges and needs UC2	39
Table 4: Challenges and needs UC3	44
Table 5: Needs related to business functions	48

Acronyms

Acronym	Explanation
AFKLM	Air France KLM
ANSIX12	EDI format
ARC	Arcelik
ÅRH	Port of Ålesund
AS2	Data transport specification
AWB	Air Waybill
BL	Bill of lading
C2k	Cargo2000
D	Deliverable
D2D	Door-to-door
EDI	Electronical data interchange
ERP	Enterprise Resource Planning
ETA	Estimated time of arrival
ETD	Estimated time of departure
FFM	Flight manifest
FHL	IATA message
FSU	Freight status update
FTP	File transfer protocol
FWB	Freight Waybill
HTTP	Hypertext transfer protocol
HWB	House Waybill
ICT	Information and Communication Technology
ISPS	International Ship and Port Facility Security
IT	Information technology
KN	Kuehne+Nagel
LSP	Logistics service providers
NCL	North*Sea Container Line
OP	Operation Plan
PCS	Port Community System
PPP	Private Public Partnership
RCS	IATA message
RFID	Radio frequency identification
SCM	Supply chain management
SLA	Service level agreement
SME	Small and medium enterprises
SoftShip	Specialized ERP System
TEU	Ton Equivalent unit
TF	Tyrholm og Farstad
TIP	Transport Information Provider
TL	Transport and Logistics
TR	Transport Regulator
TSP	Transport Service Provider
TSU	Transport Service User

ULD	Unit Load Device
UNEDifact	EDI format
VHF	Very high frequency
WB	Waybill
WP	Work package
XML	Extensible Markup Language
XML	Data interchange format

1 Introduction

The Future Internet Public Private Partnership (FI-PPP) focuses on the development of innovative open network and service ICT solutions with generic common enablers serving a multiplicity of demand-driven use cases in "smart applications". The work in Objective FI-ICT-2011.1.8: Use Case Scenarios and Early Trials, focuses on vertical use case scenarios whose intelligence, efficiency, sustainability and performance can be radically enhanced through a tighter integration with advanced Internet-based network and service capabilities. The work includes use case characterization; specification of ICT solution requirements; development and technological validation of prototypes, and large scale experimentation and validation.

The FInest (Future Internet Enabled Optimisation of transport and Logistics Business Networks) project aims to develop such an infrastructure on the basis of Future Internet technologies for the Transport and Logistics (T&L) domain. Modern transport and logistics activity is often a highly distributed, inter-business activity spanning several countries with each of the involved business partners aiming at optimizing their individual complex supply and production chains while not considering what these actions may do to the efficiency of the entire supply chain process.

The FInest project addresses international transport and logistics businesses that are concerned with the planning and execution of world-wide shipments of goods. These companies operate in a highly competitive industry, one that demands novel ICT solutions for enhancing their inter-organizational collaboration in cooperative business networks.

1.1 Work Package 1

The overall goal of **Work Package 1 (WP1): Domain Characterization and Requirements Analysis**, is to determine the generic business requirements for the next generation of ICT solutions for the transport and logistics domain. In the context of the FInest project, logistics is considered to be the summation of individual tasks and actions within the supply chain. It includes all supply activities from planning through execution and delivery completion. WP1's purpose is to ensure the suitability of the technological solution that shall be designed by the project team for satisfying the business needs across these logistics activities.

To ensure a common understanding by all users of the results of the FInest project, the domain analysis has been conducted with a view towards the development of a shared understanding of the central domain elements. The identified business requirements form the foundation for designing the technological solution to be developed in WP3 of the project and the conceptual prototypes to be designed in WP5 – WP8. The use case scenarios, defined in WP2 of the project, will be used to demonstrate the ability of these technical artifacts to address the identified business requirements.

The specific objectives of this work package are, therefore, to:

- Establish a common understanding of the important elements of the transport and logistics domain,
- Identify the business challenges arising in transport and logistics, and define a detailed set of business requirements for the next generation of ICT solutions,
- Provide a comprehensive state-of-the-art analysis of ICT solutions for collaboration and integration that are currently employed in the transport and logistics domain,
- Review and assess the design of the envisioned technological solution with respect to its suitability for satisfying the identified business requirements, and
- Investigate business models and identify business opportunities for the envisioned technological solution for involved industries.

1.2 Relationship with other Work Packages

Work packages 1 and 2 (WP1 and WP2) of the FInest project are concerned with collecting general domain requirements from the domain-partners involved in the project. Domain requirements are relevant throughout the entire project as the FInest project is – in contrast to many other research projects – not technology driven, but domain driven. This means that domain requirements define the need for certain technical services (they “pull” the proper technology from designers). These services are not pre-defined and “pushed” onto the domain partners who are then forced to fit them to their business requirements if they can. Additionally, WP1 and WP2 define concrete use cases that will be applied to demonstrate the effectiveness of the FInest extension to the FI PPP Core ICT solution and that address the business requirements of the transport and logistics domain. WP1 and WP2 provide the essential inputs for all other work packages in the FInest project as displayed in Figure 1.

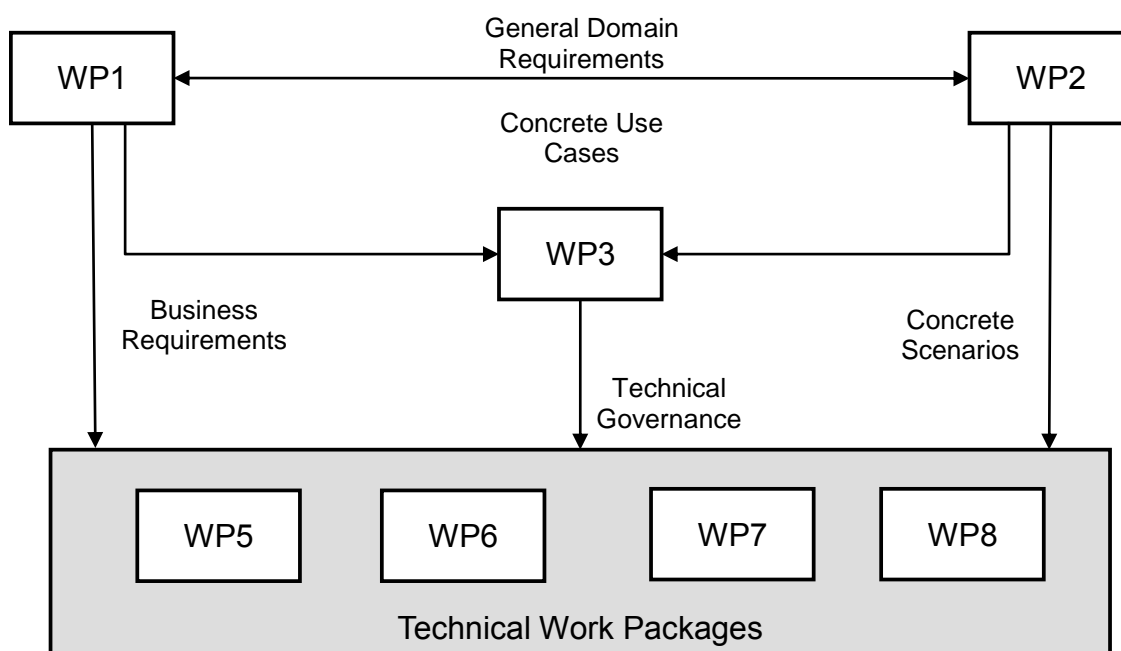


Figure 1: Interactions between WP1-WP3 and WP5-WP8

WP1 is concerned with eliciting and documenting business requirements and to understand the actual status of current ,ICT systems for collaboration'. These Business Requirements provide the overall design goals and rationale for the development of the technical solutions in WPs 3 and 5-8.

WP2 is concerned with the definition of use case scenarios, which serve two main purposes:

1. They support the refinement and illustration of the business requirements and “state of affairs” (from WP1), and
2. They are used as demonstration, test and evaluation scenarios for assessment of prototypes (in WP3) and the design of the experimentation environment (in WP4)

Additionally, WP2 provides a methodology that is used by WPs 5-8 to provide a refined “as-is” and “to-be” situation analysis.

1.3 Task 1.2: Detailed Business Requirements Analysis

The **Task 1.2: Detailed Business Requirements Analysis** aims to identify the detailed business requirements for various forms of the international and domestic shipment of goods (air, sea, land, etc.). The requirements documentation is developed based on standard protocols that the consortium has established for this purpose. The identified business requirements serve as the basis for designing of the technical solution (WP3) and are addressed for detailed demonstration and evaluation in particular use case scenarios (WP2), therewith forming the principal foundation for achieving the objectives of the project.

2 Business requirements for transport and logistics domain

This deliverable will provide the detailed business requirements analysis, presenting the central result of the domain analysis that forms the principal foundation for technology and use case scenario design.

The 4phases process model methodology (Section 2.1) has been chosen by the FInest team as the framework and standard tool for documenting all business process tasks, investigations and results. To identify the business requirement for the transport and logistics domain, a high level domain analysis has been conducted (deliverable 1.1). Beside the business requirements identified in deliverable 1.1, current communication processes and protocols among domain business partners has been another focus of the research. The messages exchanged, regardless of the technology used, are crucial elements in the proper execution of a shipment and without which a supply chain could not function. The evaluation of general business requirements from the domain and requirements derived from communication flows among the parties involved in a supply chain act as the input to the detailed business requirements analysis of this deliverable.

2.1 4Phases methodology

Within WP2 (D2.1) a methodology has been introduced that segregates supply chain activities into 4 process phases. These phases represent different states of the process and facilitate the modularization of supply activities.

The 4phase methodology segments a logistics process into four distinct activities. These activities are:

1. Sales and marketing of the service;
2. Planning of the service execution;
3. Execution of the service; and
4. Completion of the service.

An example of how this approach is used for organization of information concerning domain processes is shown in Figure 2 following.

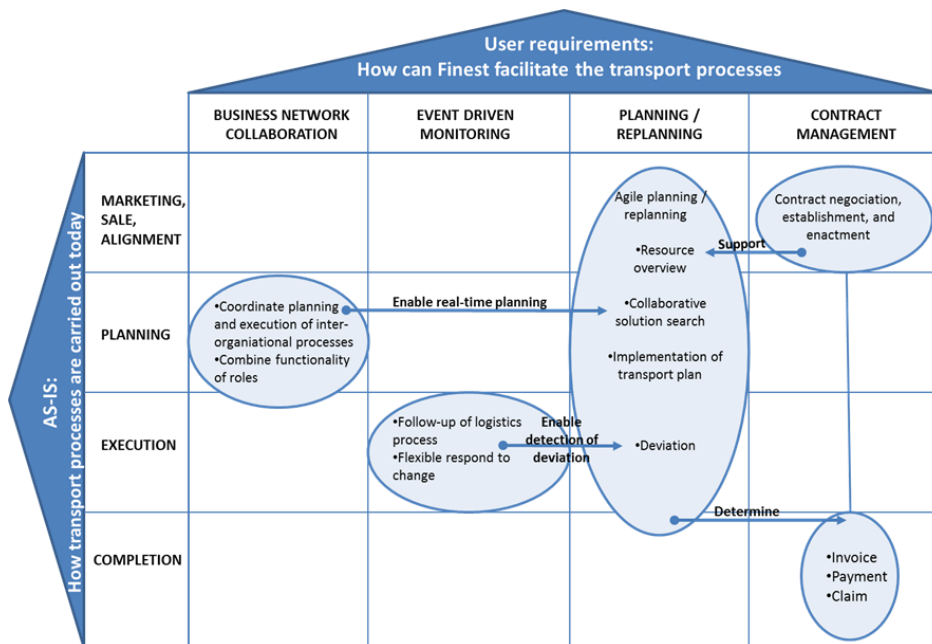


Figure 2: Finest domain mapping approach

2.1.1 Sales / Marketing

Marketing, Sales, and Alignment processes are concerned with creating contact between parties that have a need for transport or logistics services and those who can offer transport and logistics services that fulfil the demand. This activity consists of the following steps:

- publishing of needs or offered services,
- establishing contact between the parties,
- agreeing on the terms of the service, and
- sale of the service.

2.1.2 Planning

The provision of transport and logistics services is planned and managed based on actual and forecast demand, information about the transportation network infrastructure, and traffic conditions. Planning includes decisions about:

- routes,
- schedules,
- service types, and
- utilization of resources.

Shipping consolidation and load/trip planning is the planning of the physical loads for placement in a transport unit (truck trailer, sea freight container, ULD, etc. depending on the

mode of transport). This type of planning assigns shipments (goods) to a transport mode, taking into account constraints like pickup and delivery time windows and allowed combination of goods. Trip planning is used to define the most efficient trip, based on geographical maps and plans. Combining both load and trip planning is necessary to create the most efficient transportation trip.

Load design means to plan how the goods will be stored in the container (three dimensional). Design is done based on criteria such as sequence of loading and unloading and stackability of the products. This process can include load design for pallets using alternative stacking patterns driven by product, customer and transport unit data/constraints.

Route planning is based on the created trip. The actual route is determined by customer delivery requirements, carrier network design and more granular information depending on the type of transport being used.

In case the planner's own equipment is used to execute the actual shipment, the planning process needs to allocate loads appropriate to the equipment and schedule the correct operating personnel to the equipment and routes. Constraints that typically can be taken into account are operating hours, the current location of personnel, equipment and the condition of the transport equipment.

Carrier selection can include transport mode selection and the selection of the actual carrier. In its most basic form the planner assigns a transport mode and/or carrier to the shipment. Decision rules might be used that simplify the selection criteria, such as having an approved carrier for each mode or lane. It is also possible that carrier selection is supported by tendering of loads amongst contract carriers or via public tendering on the web.

2.1.3 Execution

The Execution phase begins when work processes are initiated in accordance with the execution plans and ends when the shipment is completed or cancelled. The execution of the operations includes movement of goods, cargo handling, document handling, monitoring and control of operations and goods, supporting effective coordination and accomplishment of the whole transport chain. This may include transport and terminal operations managed by several logistics service providers (LSPs). This phase also deals with detection and management of deviations.

Order entry and consolidation is the registration, validation and management of orders. The exact content differs considerably depending on the user role; either shippers, LSPs or carriers. For a shipper it is the key to register the relation between the customer order and the transportation/orders/deliveries that are being created as part of the fulfilment process.

A logistics service provider typically receives transportation orders from customers, either by phone, fax, email or electronically. Depending on the activities being outsourced and the IT

solutions used, LSPs and carriers might only get a transportation order, possibly with a reference to a client customer order.

When dispatching the carriers internal execution resources need to be informed. Confirmation may need to be obtained, especially when subcontracted carriers are used. At this point additional information, such as vehicle identification and operator information, might be part of the confirmation.

The process used to record order status information related to the pick-up/collection and delivery of shipments is sometimes called the visibility or track and trace process. This process is used to monitor the execution of transportation and logistics services for every order. Information captured during this process can be used for financial settlement later.

Global logistic execution/customs and transport documentation generation processes support international transportation with trade compliance information for import and export. These processes provide compliance information about rules and regulations and support printing of specific import/export documents. (Lidasan 2012)

2.1.4 Completion

The completion phase commences when the shipment has been delivered. It includes all “after shipment” processes such as the handling of payment and claims when the actual service has deviated from the agreed terms. Note that while the handling of payment for services may come at any time in the process (e.g. prepayment), it fits in the completion phase from a logical viewpoint.

2.2 Requirements Analysis

2.2.1 Introduction

This section formulates the high level business requirements. It aims to be self-contained, thus providing the necessary background, where needed, in order to understand these requirements. It builds on top of the terminology and the definitions introduced in the previous sections. An important aspect of the requirements definition at this level is to define precisely which business problems should be solved in lieu of proposing technical solutions. This is done by means of describing scenarios, actors, incentives and use cases.

2.2.2 General Requirements identified in the Domain Analysis (D1.1)

Within a supply chain several parties are linked together. These parties have the common purpose of fulfilling the service requested by a shipper and consignee. Managing the supply chain requires that certain activities for aligning the partners, suppliers and subcontractor be carried out. These activities include those of Collaboration, Planning, Resource Management,

Monitoring and Tracking so that the shipment can be observed and actions taken in case of expected or unexpected deviations from the defined process.

Defining business requirements for supply chain operations, therefore, requires that the particular supply chain process be documented and the information flows between process stakeholder be defined. The approach taken in this deliverable was to develop a questionnaire that asked domain partners to document their current inter-company processes (intra-company processes were “black boxed” to ensure that competitive internal activities were not revealed) along with the volume, format and frequency of the information that is sent between process partners. The goal of the survey process was to describe the information flow among the partners involved in managing a supply chain so that proper ICT services can be designed. The assumptions made in using this methodology can be summarized as:

- Input data is that information that a preceding process steps creates as output so that the following process step can perform the particular tasks assigned to the step and generate outputs required as inputs to the next downstream process.
- Output data is the result of certain processes performed by a partner in the supply chain on the input data, as well as new data generated by the process. It is mandatory input for the process step(s) that follow.

The data collected in the survey included information about:

- who the sender / receiver of the data was,
- what technology was used to exchange the data (e-mail, fax, EDI, etc.),
- if applicable, which format was used (e.g., ANSIX12, UNedifact, XML, etc.) ,
- the content to be delivered / sent (e.g. order ID, quantity, weight and dims, DG code, etc.).

Gaps, missing information that is important for the receiver, was also identified to ensure that any ICT solution includes this information.

The results of these inquiries form the basis for the information exchange study.

In cooperation with WP2 the use case gap analysis, part of D2.3, has provided very valuable input and assistance in identifying the detailed requirements. Within the gap analysis, the investigation and documentation of challenges and root causes in the as-is use case scenarios has been approached in two steps.

1. Challenges

- Collection and consolidation of Challenges
- Localization of Challenges in the supply chain
- Challenge description (what, why, where, etc)

2. Root Causes

- Hierarchy
- Categorization

All uses cases have been investigated and a certain number of challenges, as well as their root causes, have been identified. A number of requirements have been identified based on the work performed in the development of D2.3. While the detailed analysis of the «as is» processes for each use case is a part of D2.3, the results of this work has informed the work performed in D1.3 as well.

2.3 Generic requirements identified in the Analysis of the Transport and Logistics Domain

This section summarizes the findings of D1.1 where generic high level requirements were identified. These requirements were developed based on an analysis of the current state of the transport and logistics domain. What is found in the domain today is a complex set of service providers, shippers, consignees and regulatory bodies interacting with one another using a fragmented ICT landscape and multiple modes of communication. As has been documented elsewhere (e.g., Kummer, 2009), in this business domain where information is critical to the success of shipment processes, the complex, heterogeneous makeup that exemplifies the ICT and information exchange landscapes means that organizations must develop operational and strategic “patches” to overcome the various information exchange failures.

The figure below shows the generic requirements identified in D1.1 in relation to the 4phases process model and the FInest core modules. .

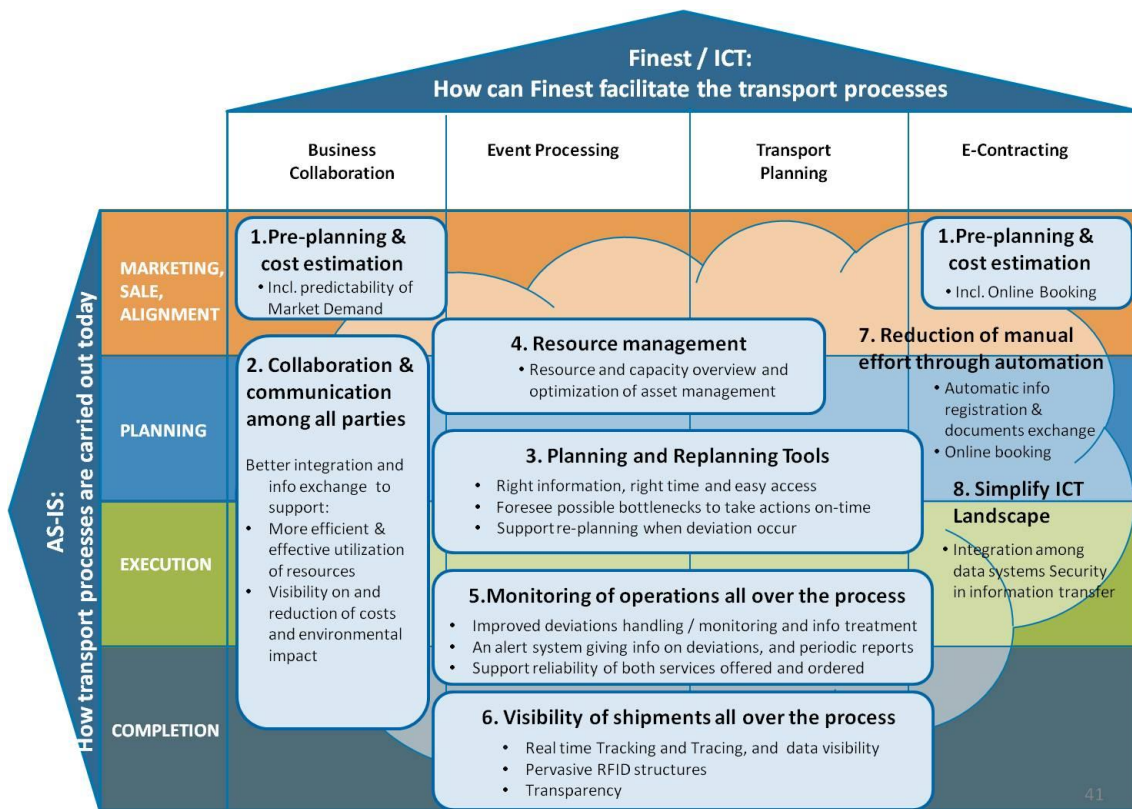


Figure 3: Generic requirements identified in D1.1 Analysis of the TL Domain

3 Generic requirements overview

3.1 Collaboration

Collaboration within the supply chain has two main parts:

1. Business alignment and contracting, and
2. Technical collaboration / communication.

Business alignment part is part of the sales and marketing activities of each party. When looking for business partners, a supply chain entity needs to have knowledge concerning the capabilities of potential partners. A service in which both parties could meet each other and negotiate rates, terms and conditions would be more efficient than the common current process of calling or sending e-mails to potential partners.

Collaboration requires the definition of information flows between partners. In addition, to properly collaborate, partners need to define the methods and technologies they will use to exchange the defined information (Blecker, 2000).

The definition of the information to be exchanged is a basic requirement for all interactive tasks and action within a supply chain. Information that is required to as input to a task, as well the information the task has to provide, are mandatory definitions that must be developed.

Communication standards, such as e-mail and fax (basic), or EDI (advanced), need to be defined. Also, the content of the information to be provided has to be agreed to. With respect to EDI, the protocol (AS2, FTP, HTTP, etc.) and the message standard (UN/EDIFACT, ANSI X12, XML, etc.) have to be agreed to among the partners.

While collaboration is a relationship that must be organized between two parties, to efficiently operate and manage a supply chain requires a more global approach.

3.2 Planning

The main function of planning is to guarantee availability, which is used to procure or produce the required quantities on time. The planning process includes the monitoring of stocks and, in particular, the creation of procurement proposals for purchasing and production.

Planning tries to strike the best balance between:

- optimizing service levels, and
- minimizing costs and capital lockup.

These objectives are often in conflict, thus making the planning process a very difficult one to carry out effectively in complex supply operations.

Planning in a supply chain has two primary tasks. The first is to plan material flows for the procurement of raw and semi-finished products, the production of goods, as well the distribution of finished goods and ensuring their market availability. This task is generally covered by ERP solutions that could provide essential inputs to a global collaborative supply chain ICT solution.

The second task concerns planning the efficient physical flow of items within the supply chain. This task requires an overview of available resources, technical constraints/capabilities on the legs of the supply chain, as well as costs, risks and the points at which responsibilities transfer.

The coordination of several legs in the supply chain requires reliable input from suppliers and partners. The risk of deviations increases rapidly with the level of uncertainty in shipment data or transport operator reliability.

Planning is closely linked to resource management, monitoring and visibility. It requires transparency from all parties involved. Transparency facilitates monitoring, which is mandatory if one wishes to pro-actively manage their supply chain.

3.3 Resource Management

Resource management is the efficient and effective deployment of an organization's resources when they are needed. Such resources may include financial resources, inventory, human skills, production resources, or information technology.

The requirement for resource management within the transport and logistics domain consists of:

- demands for various resources based on shipment type, logistics process, etc.,
- forecasts of resource demands by time period,
- resource configurations required based on demand requirements, and
- resource availability based on demands, again forecast by time period into the future.

The goal of resource management is to achieve 100% utilization of each resource, but this goal must be traded off against other constraints such as maintenance requirements, service level impacts and costs.

Efficient resource management is a key factor in the successful operation of a supply chain. It is also a critical component of any planning system used to plan supply chain operations. Since resources must be planned and consumed in each step of supply chain operations, the requirement for resource management demands that there be transparent access to resource requirements for each task, the availability of appropriate (and alternative) resources for each task (by partner), the constraints that impinge on each resource by task, the costs of each resource, their capabilities, etc. Resource management is an essential part of the planning.

3.4 Monitoring and Visibility

Management of the execution activities within a supply chain requires access to information about where shipments are, what state/condition they are in, notifications about status changes and any one of numerous other pieces of real time information concerning the shipment. Since there are numerous partners providing services during the shipment of goods, there are several ways to retrieve the necessary information from the business partners. (E-Freight, 2012)

The events to be monitored are different for each party involved in a shipment. This means that information can be provided in different formats with different levels of timeliness. Systems that are used to address these varying requirements for status and notification data should be flexible and have the ability to be configured appropriately for the event being monitored and tracked.

3.5 Targets to be achieved

Along with the high level generic requirements identified in D1.1, a set of objectives, or targets, was developed in that deliverable for the Finest project. These targets are discussed briefly in the paragraphs that follow.

3.5.1 Simplifying the ICT landscape

SCM software is a highly fragmented collection of software applications. Each of the major supply chain transport and storage modes is composed of dozens of specific tasks, most of which have separate software solutions. Organizations need to track supply, demand, manufacturing status, logistics and distribution on a real-time basis. They also need to share data with supply chain partners at an ever increasing rate. Vendors assemble these different chunks of software under a single roof, but no single vendor will have a complete package that is right for every company. (OECD,2012)

3.5.2 Reduction of manual input and tasks

While the ICT landscape within the transport and logistics domain is highly fragmented, the physical processes performed by those providing execution services is also fragmented. This leads to the requirement of employing multiple organizations in any international shipment of goods. Each of these organizations have their own information processing systems that may, or may not, be integrated. The need for multiple organizations to perform execution tasks, the highly fragmented nature of the ICT landscape and the lack of common standards contribute to numerous manual information exchange and input processes. (Freightwise, 2006) This reality requires that any system developed in the Finest project should take as a target the net reduction in manual input required to maintain accurate information for system partners.

4 Communication / Information Exchange

Building a well-organized supply chain requires a well-defined communication mechanism to provide a precise and complete set of definitions for both business communication and transaction data. A common communication mechanism is needed to manage individual member companies. It can also be useful for creating an operation strategy in a supply chain. Furthermore, the data specification for the chain can be used to support the design of a distributed database among companies using Electronic Data Interchange (EDI) or an internet protocol. There are several information modelling methodologies, modelling languages, and implementation methods available to support the development of such communication mechanism. The approach to developing this communication mechanism and the data specification are listed here:

- Perform case studies to investigate a real supply chain system.
- Identify the scope of the target application.

- Identify core processes of supply chain management.
- Analyze communication data flow.
- Layout data specification.

This deliverable provides a generic specification of supply chain management data with which the supply chain members use to communicate with one another.

4.1.1 Data Flow

The transport and logistics domain is highly fragmented with a large number of participating companies in all sizes, offering numerous different services and approaching the marking in various levels of capabilities and professionalism (Kaltenbrunner, 2012). To manage the complexity that this highly fragmented structure yields requires smooth data exchange between partners so that each partner can do their part in fulfilling the supply chain’s objectives. Unfortunately, data flow becomes more fragmented and difficult to align with the supply chain’s overall objectives as the number of heterogeneous parties involved in the transport process increases. This is one of the main issues in the set up and execution of modern supply chains (Evangelista, 2012).

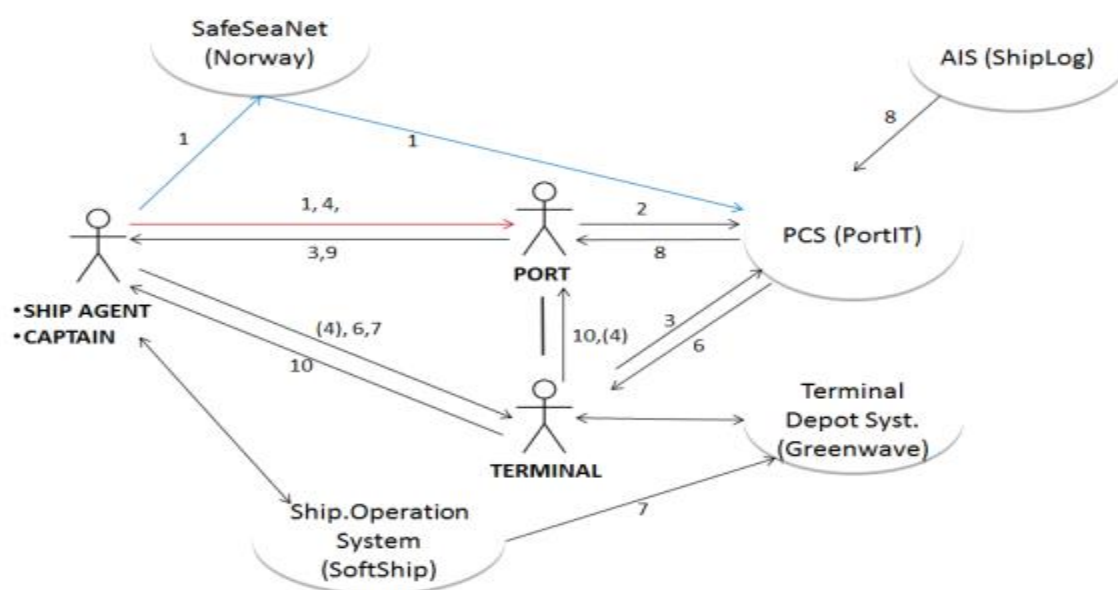


Figure 4: Data Flow Example (MARINTEK, 2011)

As an example of how quickly fragmentation of partners and activities within the supply chain can lead to complex information exchange patterns, take a small slice from the activities that occur in shipping fish from Norway to Brazil. The figure above is taken from the gap analysis of Use Case 1 in the FInest project (D2.3). This figure shows just a small part of the of the complete use case process (the scheduling of ship into port for unloading and loading), but

displays the complex and fragmented communication processes among the partners and their ICT systems.

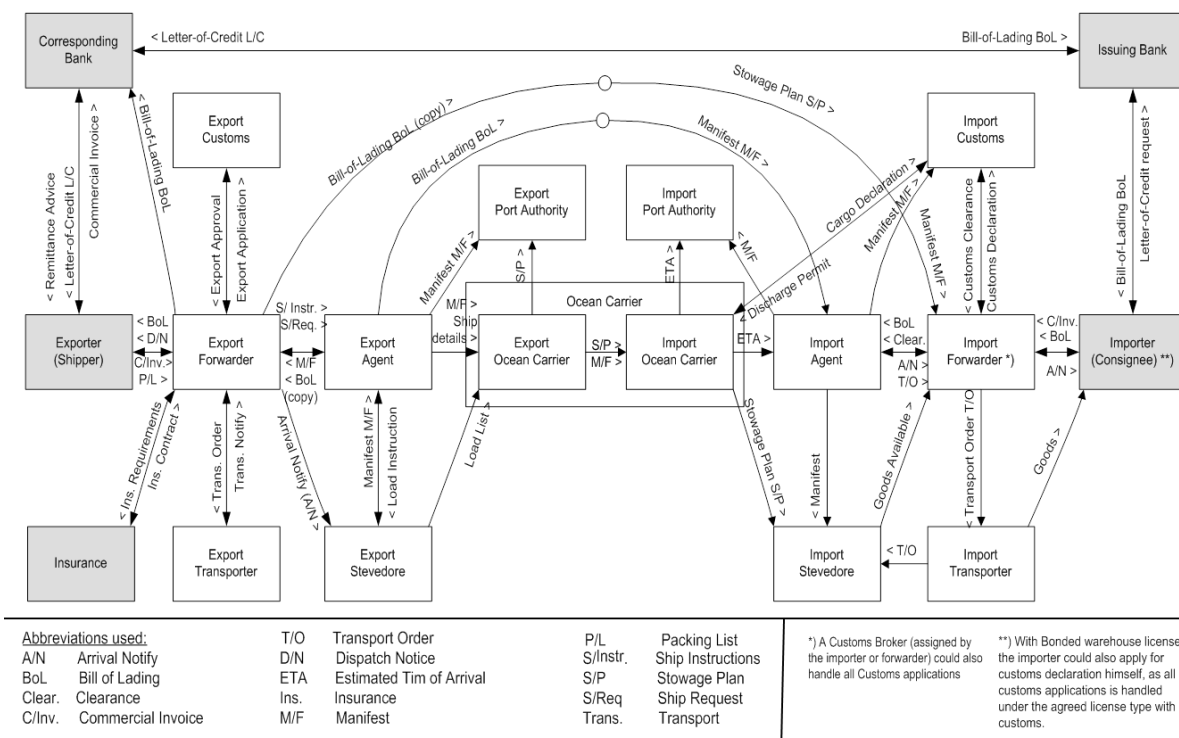


Figure 5: IBM and KN Secure Trade Lanes Project

Figure 5 above shows the complex relationships among partners when attempting to clear customs. This complex process occurs in parallel to the process noted in Figure 4 and is performed by an entirely different group of actors using entirely different systems from those used by the ship captain, the port and the terminal operator. Complexity is layered on top of complexity at each step in the supply chain creating a significant challenge for any supply chain manager to keep track of their goods and ensure that they arrive at the required destination at the right time. Expanding this complexity on a global scale indicates that the effort to seamlessly share information and align partners in a global shipment process is an extremely difficult task given current approaches to communications and data management.

Within this deliverable the information flow of the three Finest use cases will be used as examples for documenting the concrete information flows in a supply chain. These use cases will also be used to document the content of the information being exchanged as well as the technologies typically employed for exchanging and managing this information.

4.1.2 Communication Analysis

Based on the use cases chosen for the Finest project, detailed requirements have been developed through an in depth analysis of each use case scenario. The flow of information

among the parties with regard to tasks and actions has been used as the foundation for business requirements to establish a supply chain. The information exchange that is required to execute the tasks identified in the use case scenarios enables the parties to collaborate, plan and manage resources while monitoring the flow of goods through their supply chains. The next section of this report documents the requirements that have been derived from this analysis.

5 Use case requirement analysis

Based on the results of Work Package 2 “Use Case Specification”, and especially based on deliverable D2.2 “High level specification of use case scenarios”, this chapter will describe the resulting requirements identified for each of the three use cases. The following table summarizes the high level requirements determined in WP2 – Root Cause Analysis.

<i>Use Case 1</i> <i>Fish Transport from Norway to the EU</i>	<i>Use Case 2</i> <i>Air Transport – Import from Asia to NL</i>	<i>Use Case 3</i> <i>Global Consumer Goods Production and Distribution</i>
<ul style="list-style-type: none"> • Centralized and improved exchange of information: right information, right time, easy access, higher coordination among all involved actors. • More automation of information registration (reduced manual work) • A system adapted to current systems in place • Online Booking • Improved predictability of market demand (Statistics, forecasts, market portal) • Enabling high cooperation and capacity overview and management (resource hub; one virtual meeting place for all actors) • Increase transparency and enable flexibility (Networking/pooling could be a valuable strategy) • Facilitate Port Call and more flexible use of slot-time (need more coordination) • Improved handling of deviations; Better monitoring and immediate 	<ul style="list-style-type: none"> • Event-driven monitoring and tracking of logistic processes • Collaboration manager (A standardized communication interface between all participants) • Transparency • Pervasive RFID structures • Real -time Tracking and Tracing • Clear responsibilities# • Predictability • Resource overview 	<ul style="list-style-type: none"> • Better overview over available capacity / availability • Real-time tracking and data visibility • Automation of information and documents exchange • Ensure security in information transfer • Legal documents: need for e-transfer of legal documents • Integration with the data systems with the partners to reduce manual inputs • Need to access the right information • Needs an alert system which gives info on deviations, and/or periodic reports • Foresee possible bottlenecks & problems to take action on-time • Re-planning of the routes when deviations from the plans • Need less manual work • A unique reference number which can be used to trace the materials/products and data associated with them

<p>treatment of information (e.g. PTI check)</p> <ul style="list-style-type: none"> • Real- time tracking of container and vessels around the world. 		<p>through all the phases of the transport</p> <ul style="list-style-type: none"> • Visibility on environmental carbon footprint and reduction of carbon emissions
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Table 1: High level Use Case Requirements

As one can see, the requirements of the different use cases are either the same or strongly correlated with one another. This indicates that many of the seemingly different modal requirements could be fulfilled through a few common, but configuration, features in an ICT system.

Because of these observations, a requirements analysis has been performed for each of the three use cases with a focus on ICT. Several interviews with each domain partner who is involved in one of the use cases were performed to gather all the needed information regarding processes and information flows in their respective supply chain scenarios. A set of core processes in the use cases was identified. The input and output flow of information in these processes between the different stakeholders was categorized and analyzed. As a result, the information required for the integration of this processes in an ICT system has been identified. These information requirements are a set of different kinds of messages that are exchanged or shared among all stakeholders through different communication channels.

The information flow of each use case was examined for the amount of three kinds of information that are necessary to transport every kind of good:

Addresses:

Addresses can be the address of the shipper or the consignee, which identifies the start and end points of the transport chain or, for example, the port of loading / discharge or an airport or any other stopover in the chain.

Freight details:

Freight details include the basic facts concerning the goods that have to be transported. This could be the measurements (volume / size / weight / etc.) or the number / type / weight of containers that have to be shipped, depending on the use case.

Time:

Information about time contains the date of the start / end of a shipment and estimated times of arrival / departure.

These three kinds of information have been identified as the most important information types in every use case. It does not matter by which means goods have to be transported, without knowledge about addresses, details on cargo and critical times in the supply chain it is not possible to effectively execute a supply operation. Using this fact as a basis of analysis, each of the Finest use cases business requirements (documented in the next sections) were analyzed and a set of requirements for the Finest ICT solution was developed.

5.1 Use Case 1 – Fish Transport from Ålesund (Norway) to Brasil

BUSINESS PROCESSES

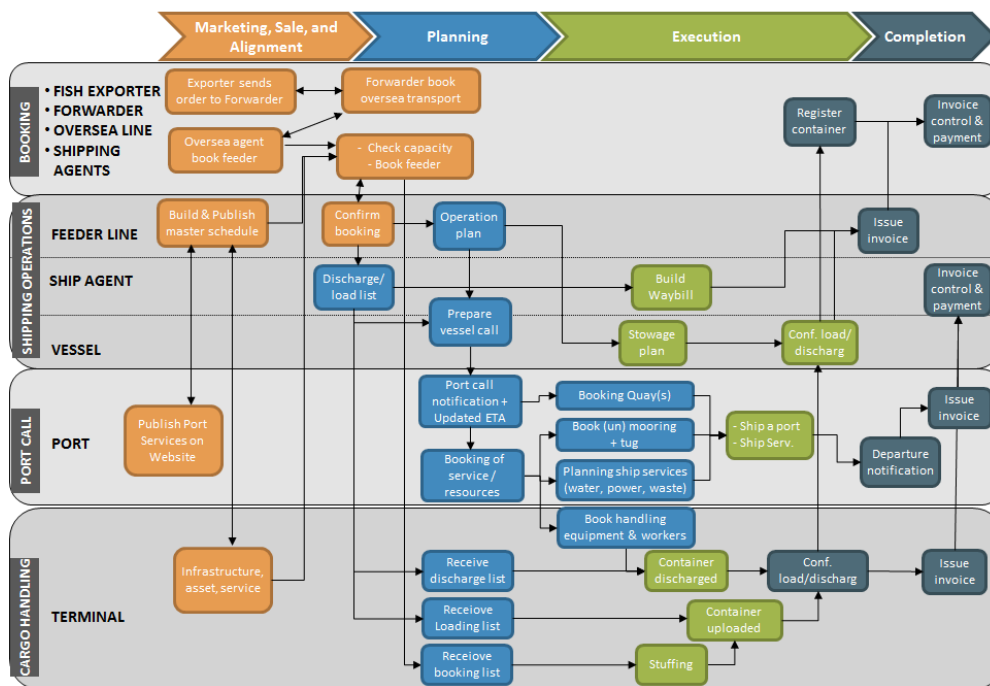


Figure 6: Big picture Use Case 1

This first of the Finest use cases consists of the export of fish in containers from Norway to Brazil. The business process is documented above in Figure 6. The project partners represented in the use case are the shipping operator (feeder operations) NCL, the container terminal operator Tyrholm & Farstad, and the Port of Ålesund. The use case focuses on the parts of this chain in which the three domain partners are engaged in order to highlight their main processes and challenges, but especially the interaction among these three actors

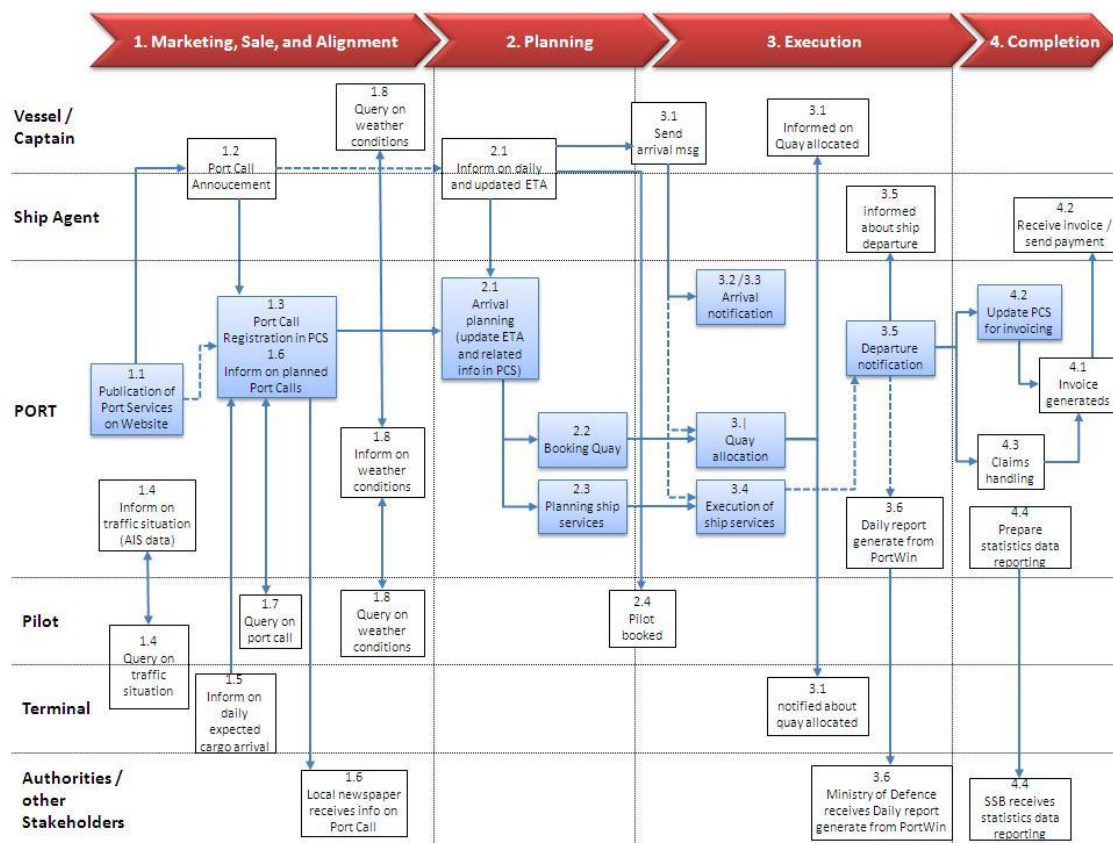


Figure 7: Information Flow UC1 1

As depicted in Figures 7 and 8, and refined in the detailed process flow analysis in the appendix, a large amount of information is carried through this link in the transport chain. Because of the importance of information to effective and efficient execution of these partners' operations, it is critical that every message reaches the intended receiver at the right time. For example if customs is not informed about the kind of goods that are being imported before they arrive, the whole transport process is forced to pause until the shipment is inspected, the proper paperwork received, reviewed and signed off and the goods get released. By evaluating the data that is exchanged it comes clear that some kinds of information are transmitted more often than others.

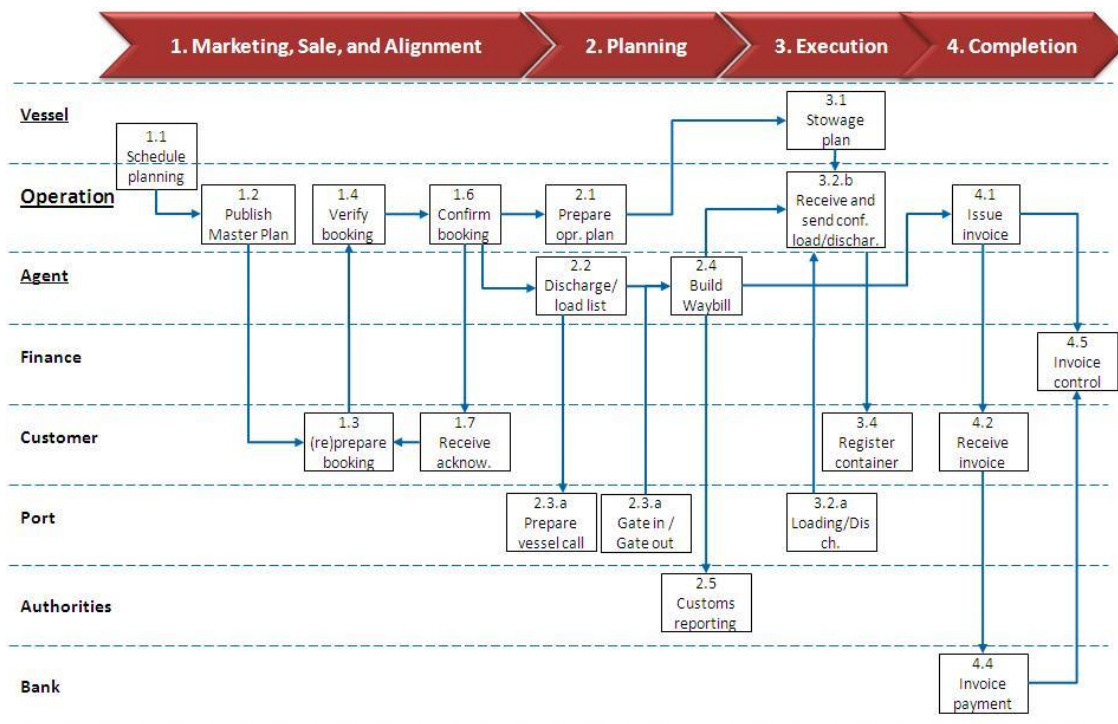


Figure 8: Information Flow UC1 2

Based on the analysis of gaps or current challenges that the partners have experienced, a set of requirements and potential ICT “solutions” were developed. A summary of this information appears in Table 2 following.

Challenge	Needs	Possible IT Solution
Late cancellations: Dummy booking + No-show	<i>A. Open reservation of capacity (Maintain flexibility for customers)</i>	<i>Online Market place:</i> •Collect and display transport needs and transport services offer
	<i>B. Alternative cancellation windows & price models (Incentives for less cancellations)</i>	<i>Booking Manager:</i> •Register booking according to status (reservation / confirmed booking) •Impossible to register several identical bookings
	<i>C. Early warning of cancellation (for longer reaction time and replanning window)</i>	<i>Booking manager:</i> •Register cancellations and update of booking list •Simultaneous warning of all actors (forwarder, shipping agents, terminals)
	<i>D. Search for new alternatives with match</i>	<i>Match maker</i>

	<p>(find replacement to the cancelled booking)</p>	<ul style="list-style-type: none"> •Integration with external market places •Identify available capacity short time before departure •Identify pending transport needs •Suggest best match •Send offer to shipper on behalf of carrier (both replacement bookings and rebooking of cancelled shipment)
	<p>E. Offer alternatives to keep cancellation (to minimize the consequences of cancellations)</p>	
Change in booking (Late notification)	<ul style="list-style-type: none"> •Real- time information •Immediate notification of changes in TEP •Single source of information 	<p>Early-warning: Signalising any cancellation of booking</p>
Late Changes in Booking	<ul style="list-style-type: none"> •Improved planning upstream i SC •Reduce number and frequency of cancellation •Reduce number of late cancellation •Enable the quick replacement of cancellation with cargo available at terminal 	<ul style="list-style-type: none"> •Booking manager (carrier-shipper) with more binding booking •Match maker (carrier-shipper) enabling last minute booking of available cargo at terminal
Information Exchange	<ul style="list-style-type: none"> • Less one-to-one communication • single information source • Less manual processing of data • standard format •All trucks equipped with PC to remove paper communication 	<ul style="list-style-type: none"> -Integration with backend system -Standard e-document (Iad/Idis charge list and booking list) for automatic transfer and registration
Ship delay	<p>Early warning Single information source</p>	<p>Port traffic information platform:</p> <ul style="list-style-type: none"> •Combining all information and real-time data related to port call and maritime traffic •Provide up-to-date info on planned port calls •Sends automatic warnings in case of changes in ETA/ETD (event characteristics to be defined by receiver of warning)
Cargo delayed	<ul style="list-style-type: none"> •Early warning •Right data 	<p>Early warning from cargo owner</p>

<p>LOW AWARENESS ABOUT SEA TRANSPORT LOW USE-FRIENDLYNESS</p>	<ul style="list-style-type: none"> •More coordinated marketing of sea transport •Simplified regulations •Centralization of information 	<p>A "information centre" for the entire maritime transport community, combining:</p> <ul style="list-style-type: none"> -up-to-date information on any TSD -Simulation tools (as a support for TEP)
<p>INCOMPLETE OVERVIEW OF PORT & TERMINAL SERVICES</p>	<ul style="list-style-type: none"> •Centralization of information (one place) •Easy-to-find information •Centralization of real-time data •Support for benchmarking of services •Support for planning 	<ul style="list-style-type: none"> ✓Partly presented in DEMO2 (only for information on destination (port & terminal services))
<p>BOOKING PORT / TERMINAL SERVICES: LOW USER-FRIENDLYNESS</p>	<ul style="list-style-type: none"> •A single login for any registration of port call and booking of all related services •A single platform for any destination (port/terminal) •Harmonization of information (voyage nr) and messages •Automatic retrieval of information from existing systems •Booking based on real-time information on resource availability •Handling of booking confirmation •Centralization of reporting 	<p>A "booking portal"enabling:</p> <ul style="list-style-type: none"> -Captain or ship agent to register all information related to port call in a same place, both legal and commercial information. -Access to all existing registration systems (SSN), -Send booking request and automatic updates to the concerned suppliers/stakeholders, -The port/terminal service suppliers to confirm booking directly in the platform. -Access to real-time information about resource availabilities so that the booking can be as accurate as possible. -Prepares a resource plan centralising all resources booked, and showing real time status of resource booking. <p>Single window for centralizing all mandatory legal reporting</p> <ul style="list-style-type: none"> ✓Already tackled by SingleWindow concept (e-Freight/e-maritime)
<p>LATE OR NO UPDATES OF PORT CALL AND BOOKINGS OF SERVICES</p>	<ul style="list-style-type: none"> •Notification asap of any changes in ETA / ETD •Notification asap of any changes in services / resources needed •Correct information 	<p>A "booking portal" that allows for:</p> <ul style="list-style-type: none"> -direct updates in plan, -Automatic reception of deviation messages (directly from AIS system, or other local system etc)

	<ul style="list-style-type: none"> •Centralization of information 	<ul style="list-style-type: none"> -Distribution of warning msg, so that all concerned stakeholders receive notification about updated information at same time and from same source..
DEVIATIONS IN BOOKINGS (NEED REPLANNING)		
RESOURCE UNAVAILABILITY	<ul style="list-style-type: none"> •Up-to-date information about all port & terminal resources available •Access to this information at the time of booking •Automatic warning of resource unavailability, automatic change in resource plan or need for the ship to rebook resources. 	<p>A "booking portal" that:</p> <ul style="list-style-type: none"> -Indicates the real-time information about resource availabilities so that the booking can be as accurate and immediate as possible. -Coordinate the bookings and sends the booking request automatically to the suppliers; and register confirmations. -Prepares a resource plan centralising all resources booked, and showing real time status of resource booking.
LACK OF SYNCHRONIZATION OF RESOURCES	<ul style="list-style-type: none"> •One place featuring all services and resource available in real-time •Accessible by all service suppliers from a single destination (port call) •Connection to all local/back-end systems 	<p>A "resource coordination" portal :</p> <ul style="list-style-type: none"> -Collecting / with access to all information about service suppliers, by destination -Access to real-time information -Enable automatic sending of booking requests to suppliers -Enable booking confirmation through the portal (less dependency on back-end systems) -Able to prepare resource plan based on any booking criteria and constraints . -Provide information to suppliers about all port calls and related resources requested / booked.

Table 2: Challenges and needs UC1

5.2 Use case 2 – Air Transport of Equipment

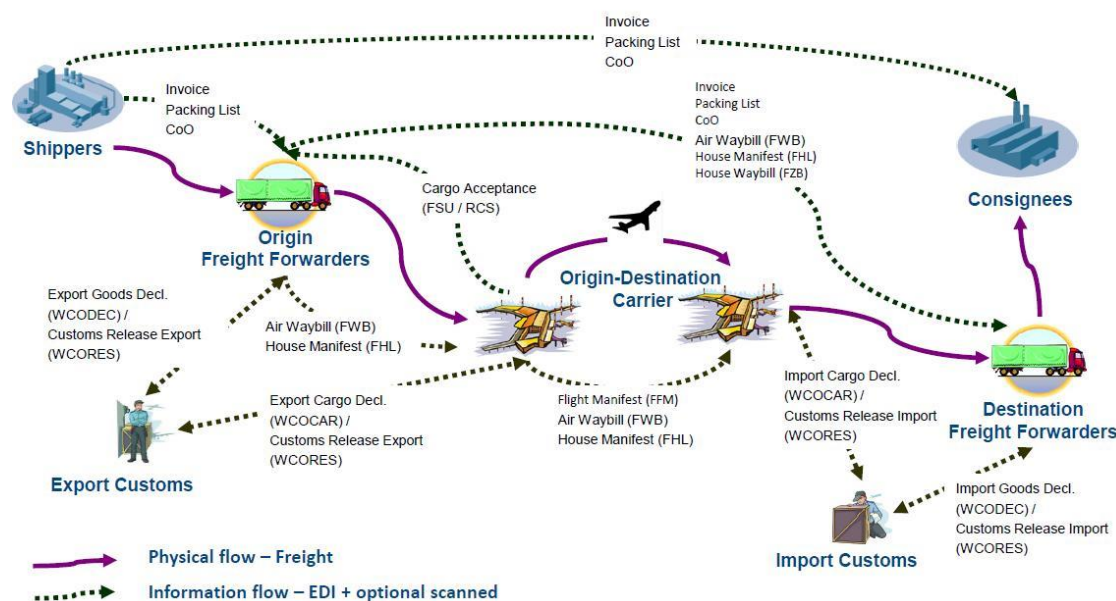


Figure 9: Big picture Use Case 2 (IATA, 2011)

The second Finest use case is covered by the companies (Kuehne+Nagel and AirFrance-KLM Cargo) representing the two main roles in the transport chain. Focus has been put on describing a complete door-to-door transport chain by dividing it into three main parts:

1. Shipper to Carrier,
2. Carrier process (Forwarder to Carrier, then Carrier to Forwarder), and
3. Carrier to Consignee.

Figure 10 shows the standard flow of documents that occurs in the airfreight shipping process used for the Finest use case. This flow has been established by work of member of the International Air Transport Association (IATA) and is one of the few true standards in any of the international shipment processes.

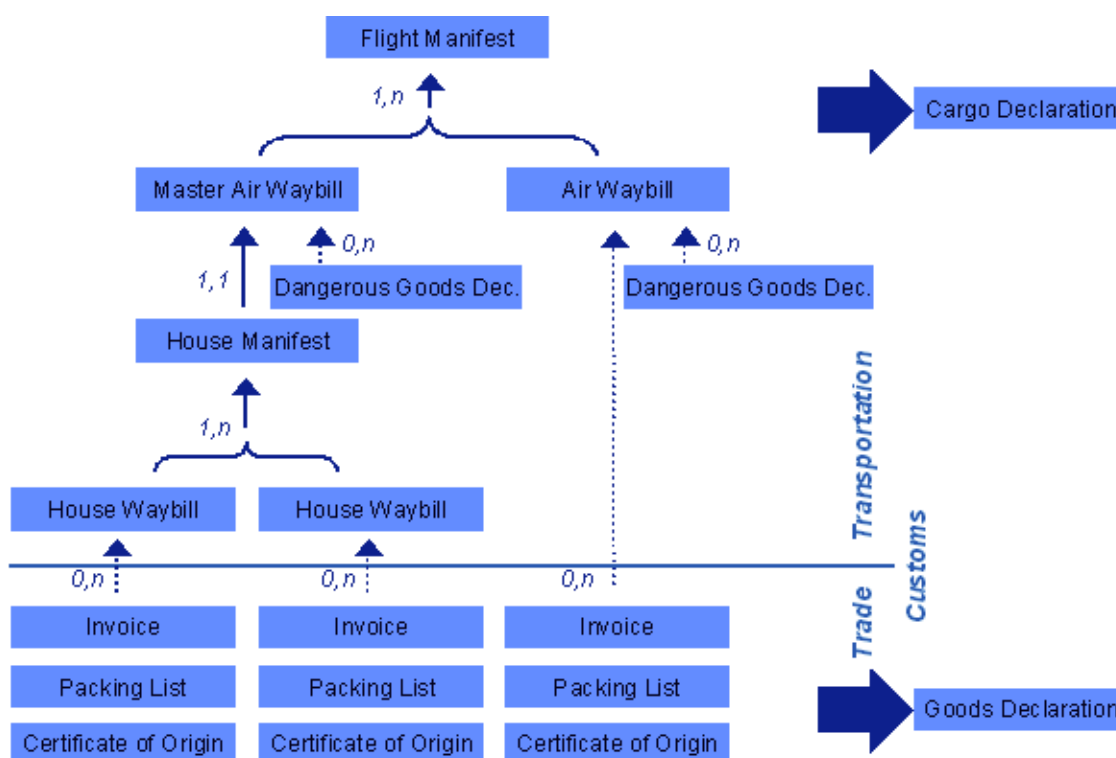


Figure 10: Document Flow Airfreight (IATA, 2012)

Note: 0,n means that there may be no associated documents but possibly more, i.e. zero to many
 1,1 means that there must be only 1 associated document, i.e. one to one
 1, n means that there must be at least 1 associated document but possibly more, i.e. one to many

The various documents that are exchanged in Figure 10 are described below (note that this information is provided to maintain the self-contained nature of this document. This information is available in the Finest domain dictionary at www.finest-ppp.eu).

Air Waybill:

A shipping document used by the forwarders and airlines for air freight. It is a contract for carriage that includes carrier conditions of carriage including such items as limits of liability and claims procedures. The air waybill also contains shipping instructions to airlines, a description of the commodity and applicable transportation charges. Air waybills are used by many truckers as through documents for coordinated air/truck service. Air waybills are not negotiable. The airline industry has adopted a standard formatted air waybill that accommodates both domestic and international traffic. The standard document was designed to enhance the application of modern computerized systems to air freight processing for both the carrier and the shipper.

Flight Manifest:

Details of consignments loaded onto a specified flight.

House Waybill:

Document made out by an agent / consolidator which specifies the contract between the shipper and the agent/consolidator for the arrangement of carriage of goods

House Manifest:

Document containing the same information as a cargo manifest and additional details on freight amounts, etc

Receipt for the Cargo:

A document which is provided to the shipper, upon shipper's request, by the Carrier creating a shipment record as a substitution for the issuance of an air waybill and which permits identification of the shipment.

Shipment Record:

Any record of the contract of carriage preserved by Carrier, evidenced by means other than an air waybill.

The Shipment Record is initiated by the FWB information and confirmed or modified by the subsequent FSU(RCS). FSU/RCS would only modify the information regarding Total Number of Pieces, weight and Volume Amount of the shipment. Only at that time the Cargo Contract shall be deemed concluded.

FFM Message:

The FFM message provides the details of consignments loaded onto a specified flight. It is the electronic message of the Flight Manifest.

FHL Message:

The main objective of the FHL message (type 1) is to provide a "check-list" of Freight Forwarder house waybills associated with a Master Air Waybill.

A second type of FHL (type 2) has been accommodated to provide details of one House Waybill consignment in order for the carrier to provide Customs with advance information based on the house waybill information provided by the origin freight forwarder.

Under IATA e-freight the IATA Cargo-IMP Consolidation List (FHL type 1) message serves as the house manifest document.

FWB Message:

The FWB message is used to transmit a complete set of Air Waybill data in accordance with the IATA Cargo Services Conference Resolutions.

FSU(RCS) Message: The FSU message is used to notify/update interested parties with a (change of) status of a specified consignment as recorded in the system of a handling party.

The standard code "RCS" specifies that "The consignment has been physically received from the shipper and is considered by the Carrier as ready for carriage on this date at this location".

FHL' Message:

For the purpose of these specifications, the message that contains House WayBill (HWB) data sent by the Origin Freight Forwarder with potential updates made by the Origin Ground Handler.

FWB' Message:

For the purpose of these specifications, the message that contains Air WayBill (AWB) data sent by the Origin Freight Forwarder with potential updates made by the Origin Ground Handler on data such as weight, number of pieces, volumes. (IATA, 2012)

Some of the documents shown in Figure 10 already have an electronic standard message format developed through IATA:

- Flight Manifest (CIMP-FFM),
- Air Waybill (CIMP-FWB),
- Shipper's Declaration for Dangerous Goods (CIMP-FDD or XML-SDDG).
- House Manifest (CIMP-FHL),
- House Waybill (CIMP-FZB),
- Invoice (XML),
- Packing List (XML),
- Certificate of Origin (XML),

Generally, the Flight Manifest is a list of all Air Waybills that are loaded onto a specific flight. The Shipper's Declaration or Dangerous Goods is associated to the Air Waybill.

The flow of information required to ship goods by air, while relatively well documented (Figure 10) is still open to implementation interpretations. Those documents that are exchanged that have not been standardized in message form by IATA are still exchanged in formats that vary by partner. In addition, even though IATA has defined standard electronic formats for many of the documents, not all partners are able to exchange information in electronic form. This leads to many paper based documents being exchanged and numerous manual data entry processes in a normal goods shipment.

Based on the detailed root cause analysis conducted in WP2, the following **challenges** have been identified:

- **Order management: From booking to actual receipt**
- **Better information availability for local authorities ahead of shipment**

- **Monitoring and visibility of shipment**
- **Deviation management**
- **Optimize data quality**

Similar to the first use case, analysis of the business processes results in different kinds of requirements that are listed in Table 3.

Challenge / Root Causes	Needs	Ideas for solutions
• Volatile Market demand	• <i>Correct booking information</i>	• <i>A collaboration platform that delivers in real time information to all parties in the supply chain chain, when a deviation occurs in the process from booking to the actual shipment.</i>
• Forget to communicate due to daily operational priorities • Human Errors, wrong processing of information/data input • Not informing other partners about changes • Traffic Jams	• <i>Being informed about changes as soon as possible/when the moment it occurs</i>	• <i>A booking intelligence applications who combines booking information from different supply chain partners and gives a trigger when inconsistencies occur. For example: products, dimensions versus weight.</i>
• Measurements often are bottle neck, creating wrong dimensions for further planning	• <i>The right dimensions of the freights, on different aggregation levels, from smallest package to total.</i>	• <i>Weighing at the source / shipper, sharing via the Finest Platform to all relevant parties.</i>
• Information too late available	• <i>Information being exchanged with several supply chain partners, including authorities, without or with a minimum of human interface</i>	• <i>A collaboration platform that delivers in real time information to all parties in the supply chain chain, including authorities. This system also monitors deadlines and gives triggers on time when information needs to be sent to be in the 'safe zone'</i>
• Missing or Wrong information	• <i>The right information on time in full</i>	• <i>Data quality management in within the platform</i> • <i>Next "step" in transport can only be initiated if all necessary input (correct, weight, dimension etc) is filled in</i>
• Shipper not aware of information needed or documentation	• <i>Shippers and forwarders fill in and deliver all the required documents</i>	• <i>A push system for shippers & forwarders regarding the right information delivery system. Based on the booking & product, the system forces the shipper to fill in all relevant documents.</i>
• Data Quality existing measurements	• <i>Time stamping done without human interface</i>	• <i>A collaboration platform that collects data from containers via tags. This should be a solution where the internet of things is combined with the Finest Collaboration Manager to exchange the data.</i>
• Not enough milestones	• <i>Time stamping done without human interface</i>	• <i>Use of RFID chips included in every shipment</i>

<ul style="list-style-type: none"> •IT capabilities Supply Chain Partner 	<ul style="list-style-type: none"> •Low threshold tooling available for supply chain partners, via internet. Assumption: all partners have access to internet 	<ul style="list-style-type: none"> •A Collaboration Platform, accessible via the internet where tooling can be downloaded and used.
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Table 3: Challenges and needs UC2

5.3 Use case 3 – Global Consumer Good Production and Distribution

Use Case 3 „Global Consumer Good Production and Distribution“, can be divided into two main scenarios, the export of finished goods and the import of raw materials for production. These two scenarios are described below.

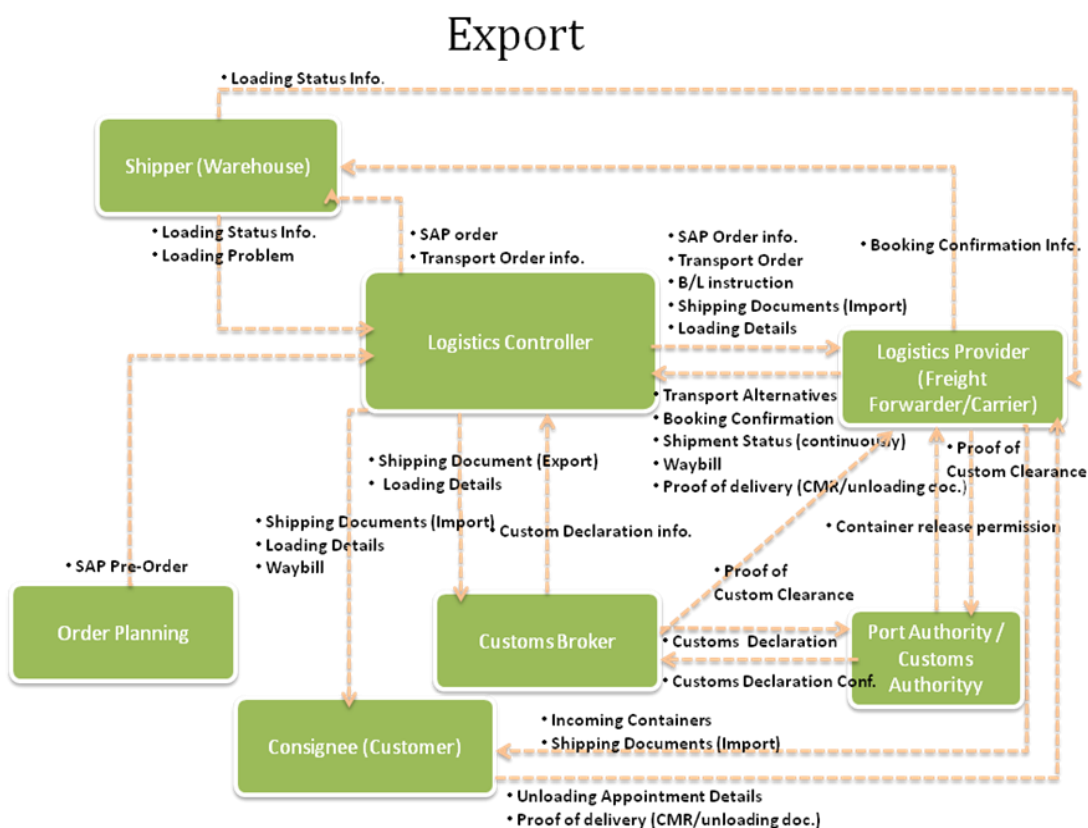


Figure 11: Information Flow UC3 Export (ARCELIK, 2011)

Finished goods are loaded into containers and containers are transferred to the port of loading (Gemlik Port) in Turkey. After customs clearance at Gemlik Port, they are loaded on a vessel and shipped to the UK. After the vessel has arrived in Felixtowe Port in the UK, containers are unloaded from the vessel and transferred to the warehouse of customers after customs clearance.

Import

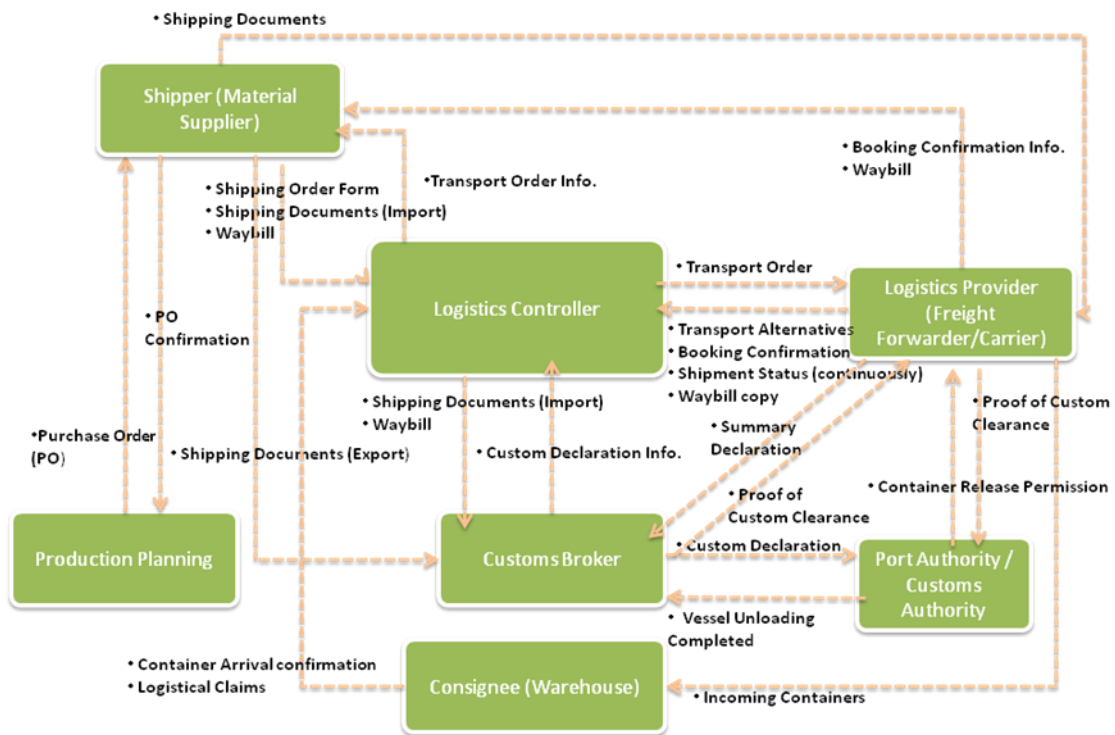


Figure 12: Information Flow UC3 Import (ARCELIK, 2011)

Purchased items (raw materials) from the material supplier in Korea are loaded into containers and transported to the port of loading (Busan Port). Then containers are customs cleared and loaded on a vessel and shipped to the Gebze Port in Turkey. After the ship has arrived in Gebze Port, the containers are unloaded from the vessel to the unloading area at the port. They are then loaded onto a truck and transferred either to a bonded warehouse or to a normal warehouse after customs clearance.

The following table summarizes the requirements that have to be addressed regarding Use Case 2 for both Import and Export processes.

Challenges	Needs	Ideas for solutions
INFORMATION INACCURACY	<ul style="list-style-type: none"> • <i>Visibility of the status of the shipment (considering the points of interest, comparison with pre-defined transit time etc.)</i> • <i>Right data, standard format, on-time</i> 	<p>A “monitoring” portal:</p> <ul style="list-style-type: none"> • Takes (semi) automated input from the tracking systems of logistics service providers regarding the status of the cargo • Status of the cargo (or event) is visible to all relevant parties on their request (search option)

		<ul style="list-style-type: none"> • (semi) integration with ERP systems so that electronic extraction of data can be realized • A manual input taking option for cases where electronic data extraction is not possible • Standardized format for manual inputs where system gives alerts if the input is not inline with the standards defined
<p>DATA COLLECTION AND PROCESSING IS COMPLEX AND TIME CONSUMING</p>	<ul style="list-style-type: none"> • Right data, standard format, on-time • Less manual communication • Less manual processing • Trigger re-planning with ease (less man hours spent) • Workload monitoring 	<p>A platform that supports automatic data transfer regarding the status of the cargo & deviations and creates alerts for deviations:</p> <ul style="list-style-type: none"> • Data sharing through one channel leads to one truth for all the relevant parties hence data is retrieved from one source • Enable defining points of interests/alert rules • Enable defining expected performance criteria for points of interests • Real-time alerts for deviations are generated automatically by comparing actual performance with expected performance criteria and alerts are notified to the transport planner and other related parties • In case of critical deviations (alerts) system does not allow further processing without confirmation • Alerts that are directly connected to re-planning • Automatic record of changes (e.g. a change in ETA results in change in plans and change in records)
<p>Delay in document/data transfer</p>	<ul style="list-style-type: none"> • Less manual communication • Information sharing through one channel • Less manual processing of data • Alerts for delays in document / data flow 	<p>A portal that facilitates document exchange:</p> <ul style="list-style-type: none"> • Automated creation and electronic transfer of some documents through integration (e.g. Freight invoice, B/L, Packing List etc.) • Monitoring the status of document transfer • Automatic alert creation for delays in document transfer and responsible are notified
<p>Incorrect document/data</p>	<ul style="list-style-type: none"> • Right data, standard format, on-time 	<p>A portal that:</p> <ul style="list-style-type: none"> • Checks the correctness of documents (e.g. Compares the Freight invoice with agreement in the contracts) • Standardized format for documents where system gives alerts if the input is not in line with the standards defined
<p>Manual data registration</p>	<ul style="list-style-type: none"> • Less manual data 	<p>A portal that:</p>

	<i>processing</i>	<ul style="list-style-type: none"> Automatically links the data/documents to purchase/sales order ((Semi) Automated Input & (Semi) Integration with ERP systems
Legal restrictions	<ul style="list-style-type: none"> E-document E-customs 	-
DATA COLLECTION & PROCESSING IS COMPLEX AND TIME CONSUMING FOR TRANSPORT PLANNING	<ul style="list-style-type: none"> Right data, standard format, on-time Overview of schedules, voyages, transshipments Overview of contracts Less manual communication Less manual data processing Planning & booking with ease Booking confirmation & billing with ease Transport plans overview Open orders and shipments status tracking 	<p>A “booking” portal:</p> <ul style="list-style-type: none"> Enables extracting transport demand data from ERP systems through integration Enables manual inputting transport demand data or uploading it using a standardized template where electronic extraction is not possible That takes service information electronically from LSPs (schedule, voyage details etc.) Creates overview of alternatives using contracts (e-contracting) and criteria defined (best price, best lead time etc.) Provides cost estimation to transport planner Enable automatic sending of booking requests to logistics service providers when planning is completed Enable booking confirmation through the portal Enable monitoring the status of the booking
COMPLEXITY OF PERFORMANCE OVERVIEW	<ul style="list-style-type: none"> Overview of contracts Data handling for performance calculation Less manual data processing Contract based control with ease 	<p>A “booking” portal:</p> <ul style="list-style-type: none"> Takes agreed performance criteria from the contracts Historical booking / transport data recording Calculating KPIs comparing agreed performance with actual performance for the transport plan (automated contract based control)
MANUAL PROCESS OF SPOT BUYING	<ul style="list-style-type: none"> Overview of contracts Less manual processing 	<p>A “booking” portal that facilitates spot buying:</p> <ul style="list-style-type: none"> Publish the service request on market place Get quotations Enables sending booking requests to spot service providers Enable booking confirmation through the portal Enable monitoring the status of the booking
DELAYS IN INFORMATION	<ul style="list-style-type: none"> Less manual communication 	A “monitoring” portal:

<p>FLOW</p>	<ul style="list-style-type: none"> • Information sharing through one channel • Less manual processing of data 	<ul style="list-style-type: none"> • Takes (semi) automated input from the tracking systems of logistics service providers regarding the status of the cargo • Status of the cargo (or event) is visible to all relevant parties on their request (search option) • (semi) integration with ERP systems so that electronic extraction of data can be realized • A manual input taking option for cases where electronic data extraction is not possible • Standardized format for manual inputs where system gives alerts if the input is not inline with the standards defined • Creates alerts for delays in information flow (e.g. Status of the cargo has not changed for 3 days) ✓ Planned to be included in DEMO for AUTOMATED SHIPMENT TRACKING (After M12)
<p>LIMITED EARLY WARNING MECHANISM</p>	<ul style="list-style-type: none"> • Early indicators 	<p>A “platform” that:</p> <ul style="list-style-type: none"> • Enables defining points of interests, early indicators /alert rules • Enables defining expected performance criteria for points of interests • Real-time alerts for deviations are generated and notified to the transport planner and other related parties • Enables sharing disruption information / critical changes at early indicators through one channel • Ability to determine which operations are affected in case of disruptions
<p>DELAYS IN RE-PLANNING</p>	<ul style="list-style-type: none"> • Right data, standard format, on-time • Overview of schedules, voyages, transshipments and contracts • Less manual communication • Less manual data processing • Re-planning & re-booking with ease • Transport plans overview • Open orders and shipments status tracking 	<p>Direct link to “monitoring” portal to “booking” portal:</p> <ul style="list-style-type: none"> • Trigger re-planning using the real-time alerts • Option to close/cancel the alert if the change does not require re-planning • Creates overview of alternatives using contracts and provides cost estimation to transport planner • Enable automatic sending of booking requests to logistics service providers and getting booking confirmation through the portal • Enable monitoring the status of the booking • If the booking is cancelled or updated, informs all the relevant parties

LACK OF A FAST AND CONVENIENT APPOINTMENT MAKING SYSTEM	<ul style="list-style-type: none"> • <i>Real- time visibility of information</i> • <i>Timely monitoring of vehicles on road</i> • <i>Advanced shipping notifications</i> • <i>Defined resources</i> • <i>Defined constraints</i> • <i>Integrated systems with actors involved</i> 	<p>A “appointment making” portal for loading & unloading:</p> <ul style="list-style-type: none"> • <i>Linked to “booking” portal</i> • <i>Automatic information input from “monitoring” portal regarding the status of the shipment</i> • <i>Real- time updates depending on status of the shipment</i> • <i>Facilitates communication between shipper/consignee and logistics service provider</i> • <i>Enables appointment making on the defined time interval depending on capacity and working hours of warehouses and local regulations</i> • <i>Pre- organized daily schedules for a frozen period</i> • <i>(Semi) automated prioritization of loading & unloading depending on constraints defined</i>

Table 4: Challenges and needs UC3

The outcome of this detailed analysis of the business needs in the use cases clearly is that the main requirement is the availability of basic product and status information throughout the supply chain. This means a solution is needed for all stakeholders that provides them with access to this information in an easy and comprehensive manner.

5.4 Message detail consolidation

After analyzing and comparing all the messages in the information flows for each use case (see the Appendix to this deliverable for the detailed information on data that is passed between partners in each use case, its format, the source of the elements in the data and the recipient of the processed data) , the assumption that the most important kinds of messages concern:

- Address (shipper / consignee ...)
- Freight details (weight / volume...)
- Time (ETA / ETD...)

appears to be valid. These messages are important for each party because they are essential for the proper execution of each process step. The following figures show the large proportion that messages focused on these three areas are of the total volume of messages exchanged between partners for each of the use cases.

The information flow of Use Case 1 is divided into two parts: the flow of information in the port and the flow in NCL.

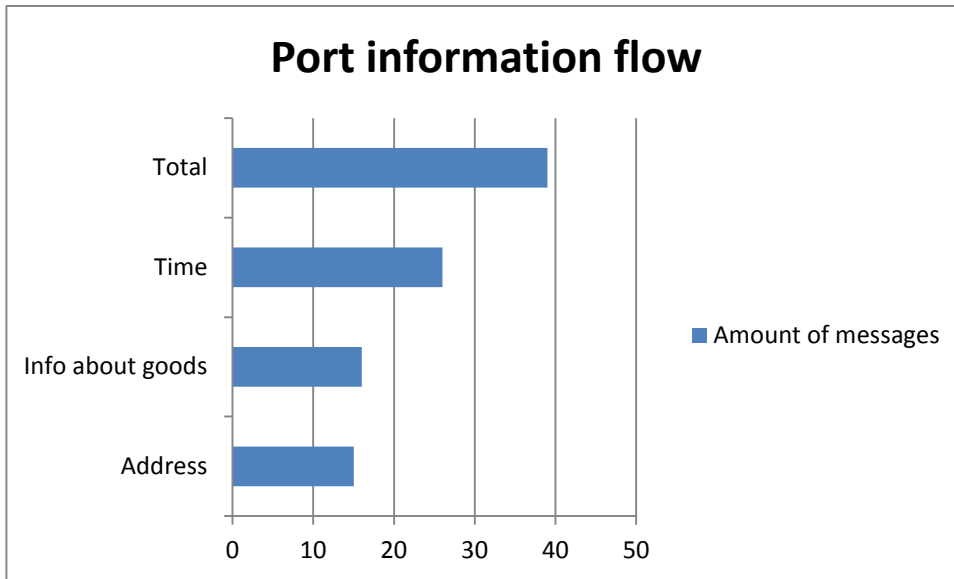


Figure 13: UC1 Port Information flow consolidation

The total number of different message types exchanged by the port is 39. 15 messages contain address related data, 16 messages contain information about the goods and 26 are related to some aspect of time.

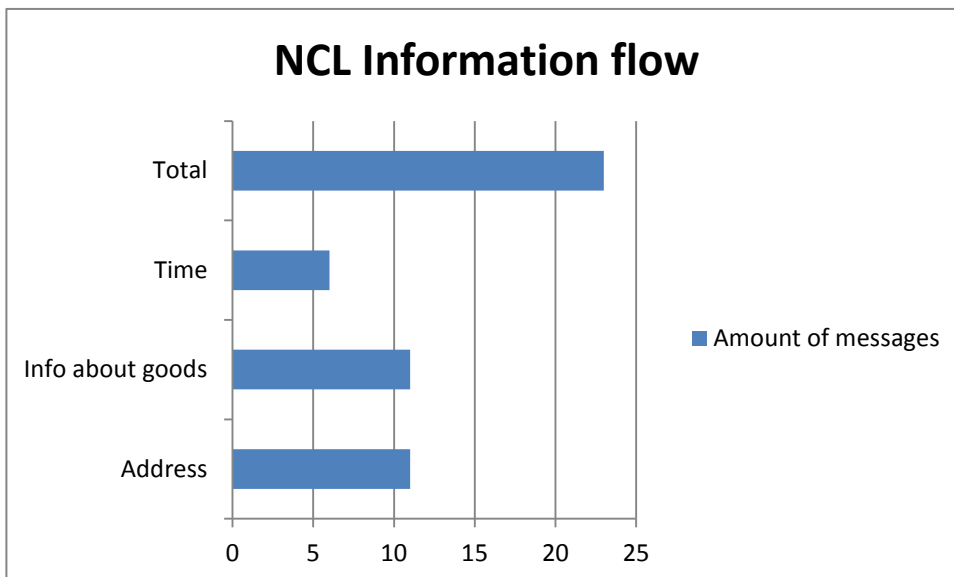


Figure 14: UC1 NCL information flow consolidation

For the NCL information flow there are a total number of 23 messages exchanged. 11 messages contain information about the goods as well as address information and 6 messages contain information about time.

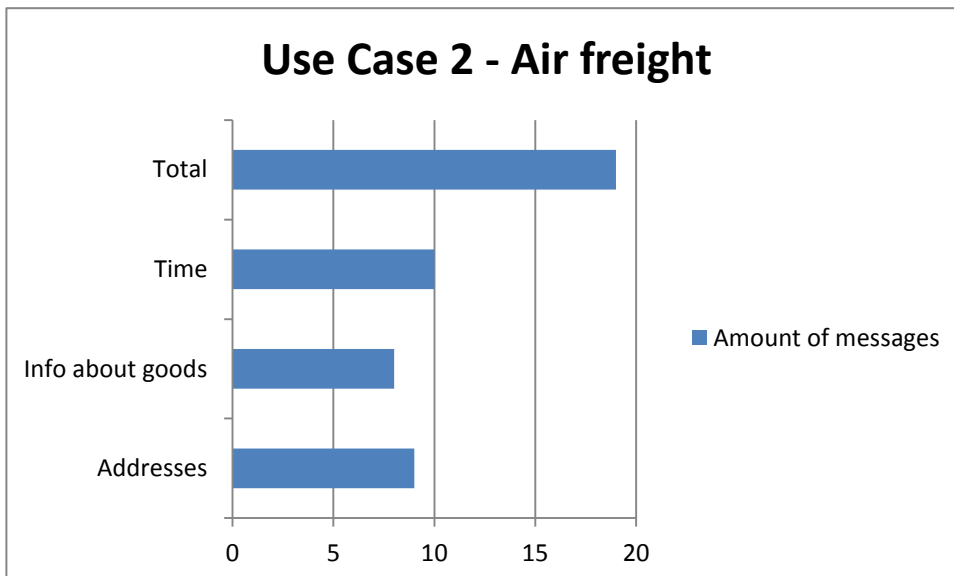


Figure 15: UC2 information flow consolidation

The information flow in Use Case 2 consists of 19 messages of which 10 contain data regarding time, 8 include information about goods and 9 contain essential addresses.

Use Case 3 information flows are split into Import and Export flows.

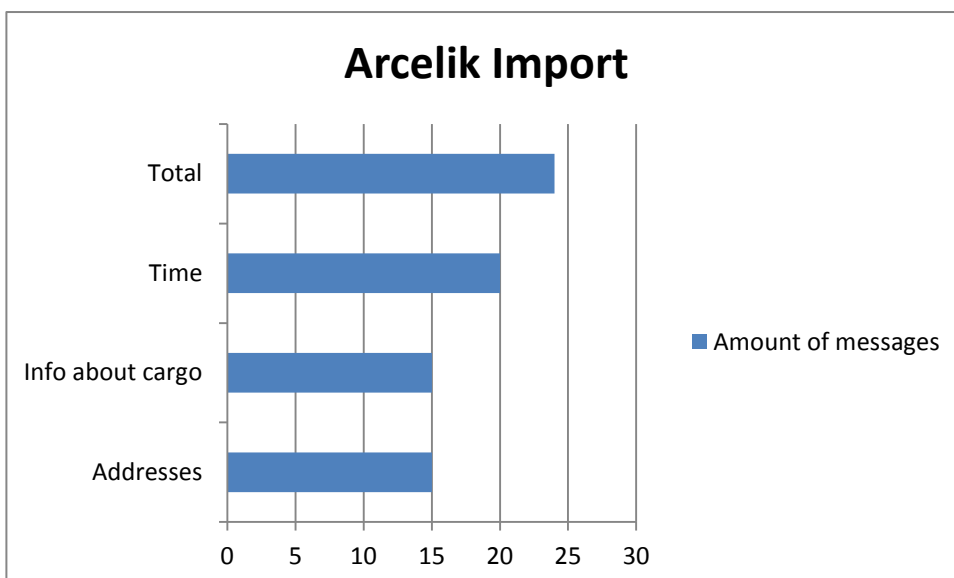


Figure 16: UC3 Import information flow consolidation

The import process includes a total of 24 messages. 20 contain information about time, and 15 about the cargo and addresses.

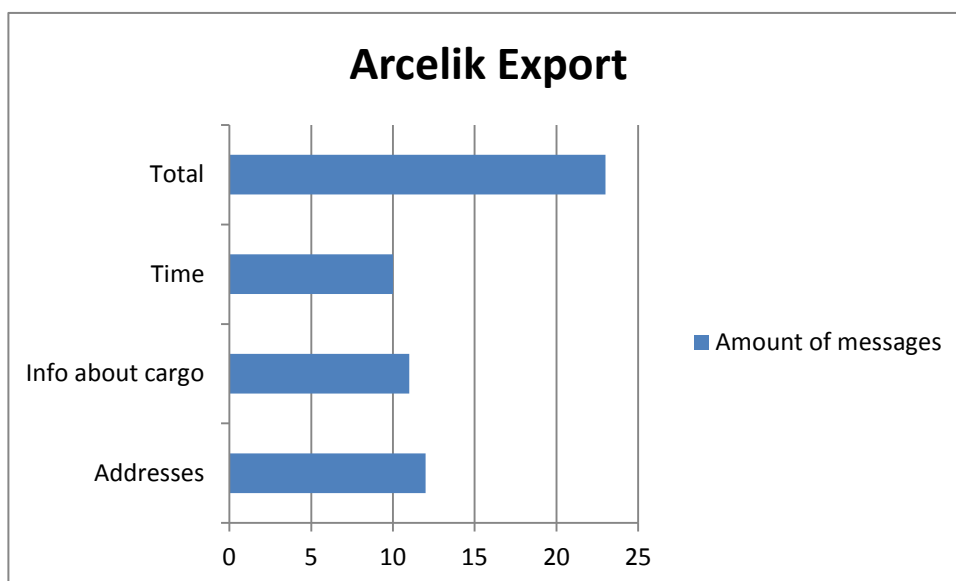


Figure 17: UC3 Export information flow consolidation

For the export process there are 23 messages used. 10 messages contain information about time, 11 about cargo, and 12 messages include addresses.

The diagrams above show that in every use case there are similarities in the type of information that is exchanged between partners. While formats vary for this information, it is clear that similar information is required by each partner and this observation provides a valuable input into any ICT solution that will result from the Finest project.

Closely examining the consolidated needs developed in cooperation between WPs 1 and 2 it has become clear that many issues identified can be solved by bettering the flow of information and making common information available for every stakeholder whenever it is needed.

Needs	Business Functions
Easy-to-find real-time information on available services for enabling voyage planning, and overview of transport demand	CENTRALIZATION OF INFORMATION
Single information source for all parties, less one-to-one communication	CENTRALIZATION OF INFORMATION
Overview of contracts	CONTRACT OVERVIEW
Improved planning upstream i SC and reduce cancellations by implementing alternative cancellation windows & price models	PLANNING
Transport plans overview	PLANNING
Booking based on real-time information on resource availability, Synchronizing of resources and automatic resource planning	PLANNING
Booking with ease, Less manual communication	BOOKING
One place featuring all services and resource available in real-time accessible by all service suppliers from a single destination	REAL-TIME INFORMATION AVAILABILITY
Single platform for port call & service booking at any destination	ONE STOP SHOPPING
Visibility of the status of the shipment (ref points of interest)	VISIBILITY

Contract based control with ease	PERFORMANCE MANAGEMENT
The right information and documentation on time with Alerts for delays in document / data flow	INFORMAITON REALIABILITY
Correct booking information	INFORMATION RELIABILITY
Detection and immediate notification of deviations. Real-time information	SIGNALING
Handle late cancellations (rebook and find replacement)	CAPACITY UTILIZATION
Trigger re-planning with ease	REPLANNING
Less manual processing of data, minimum human interface	AUTOMATED DATA GATHERING
Time stamping done without human interface	AUTOMATED DATA GATHERING
Links between documents / messages	ELECTRONIC INFORMATION AVAILABILITY
Low threshold tooling available for supply chain partners, via internet. Assumption: all partners have access to internet	ONLINE APPLICATIONS
Immediate and fast communication between supply chain partners when deviations occur	COLLABORATION

Table 5: Needs related to business functions

6 Detailed Domain Business Requirements

Merging the identified general requirements with the results of the investigations of the information flows facilitates detailing the business requirements for domain operations in a more detailed way. These descriptions of the requirements will be used for further investigations and assessments of existing or future ICT applications.

6.1 Business Collaboration

Business relationships and cooperation on a global level requires communication and coordination of tasks and events. The related parties have to collaborate intensively. Manual interaction causes a lot of time consuming and inefficient manual effort. A collaboration ICT solution allowing parties to establish smart modes of interacting and that facilitate the easy exchange of information is required. Easy exchange of information requires that electronic message formats and protocols must be established/used and instantiated in the ICT solution to ensure that all parties can communicate and that messages are really exchanged in a timely and automated fashion.

6.1.1 Business alignment

Finding a business partner and figuring out their capabilities is not easy in a global environment. SMEs face particularly difficult problems as they do not cover the globe with branches, contact offices or representatives who could provide an insight into the local or regional markets and know about possible qualified partners or sub-contractors. (Alt, 2012)

A collaboration ICT solution will assist companies in identifying potential partners for transport and logistics operations that have the skills, resources and capabilities to execute the specific supply chain activity required, no matter where in the world the activities is required. The solution should also assist in qualifying the potential partners so that historical performance with similar activities can be assessed and informed partnership decisions made. Finally, the solution should provide the individuals with information about what will be required to consummate a partnership (e.g., legal requirements depending on the partner's location and business practices). Such an ICT solution will need to provide for, and manage, the different stages of partnership development and relationship execution.

To facilitate partnership development, the solution should provide potential partner organizations with the ability to list their services, capabilities, business rules, legal stipulations, etc. in a directory. This directory would be searchable using standard search keys for partners by type, service, location, scope of services, capabilities, ratings, etc. Membership and access to the directory should be controlled so that only "approved" entities can be listed or view the information in the directory.

6.1.2 E-market place

When partners are not available through the solution directory, the ICT service should facilitate or provide the use of an eMarketplace for bidding out requirements and obtaining proposals from potential partners. Such a service should include:

- company profile, locations services and capabilities,
- specific service offered in response to bid,
- browsing for target profiles with customizable browsing criteria.

6.1.3 E-Contracting

Once partners decide to conduct business with one another, the ICT solution should provide them with the means to develop formal contracts for the services that they will be providing/consuming. The types of capabilities that such a service should include are:

- Facilities for providing offers and quotes for requested services
- Facilities for negotiating quotes and offers
- Facilities for defining service levels (SLA) and agreeing on terms and conditions
- Facilities for closing legally binding contracts
- Security so that contract information is not accessible by unauthorized parties.

6.1.4 Administrating of business partners

Tools must be provided to authorized users so that they can administer their data and relationships in the ICT solution. Setting up profiles, user authorizations, company information, contract standards, etc., must be facilitated in the solution through easy to use administrative tools.

6.1.5 Security and privacy

The ICT solution must provide the user with a secure and private means of conducting their business. This requirement means that information stored in the ICT solution must be accessible only by those authorized by the information owner to see the information. There should be alerts provided concerning how the owner's desired levels of security are affected by where data is stored, how the information is being accessed and whether individuals have tried to access the information in an unauthorized manner. Multiple levels of security and access control should be configurable to the data owner to ensure that the appropriate levels of data security are maintained.

6.1.6 Technical Collaboration

As is noted throughout this deliverable, transparent information exchange is critical to the success of a supply chain operation. For an ICT solution this means that the information being used on in the solution is managed to well defined standards and exchanged in well defined protocols. The solution should facilitate integration with existing systems through easy to use mapping services that allow legacy system data to be mapped quickly to the internal formats used by the solution. In addition, the system should accommodate manual data interactions as well as emerging technologies so that data from any source that is required within the solution can be obtained in an easy to use fashion.

6.2 Planning

Planning how a shipment will be made (for setting up relationships as well as for understanding whether a particular model for the shipment will yield the performance required), tracking the shipment during execution against the plan, and replanning the shipment should problems arise, is a key component of any ICT solution to the requirements identified during this study. A planning service should facilitate creating shipment plans based on available solution partner information so that the planner can determine if current partners are capable of meeting a particular shipment's demands. The service should facilitate the integration of new partners into the plan as tentative potential service providers based on the information that these partners have provided in their service descriptions.

Once all identified partners in the logistics chain have agreed to the plan, the plan should become locked in as the basis for execution of the supply chain service. The plan now forms

the basis against which the service should track performance. Should events arise that affect the plan, the planner should be notified and the planning service should allow the remaining links in the chain to be replanned based on the type of issue that has arisen so that delivery of the goods can be made as close to the originally agreed to requirements as possible. As the development of feasible plans requires that the planner have access to resource availability and capability data, the planning service should integrate with partner information sources in a sufficiently detailed manner such that the plan that is ultimately generated is actually feasible. Once the plan has been agreed to the planner should be able to track progress not only against link time gates, but against resource utilization factors as well.

6.2.1 Event management

Event monitoring and management is critical to ensuring that shipment processes are executed as planned. An event monitoring and management system should be provided by the ICT solution that can be configured based on KPIs arising from the contract established between execution partners, the plan created for the shipment and external inputs that could influence the progress of the shipment. The event manager should listen for the configured events and notify the system when any event occurs that it has been configured to listen for.

A potential additional service of the event manager would be the pro-active alerting of conditions that might affect the shipment. Such alerts might be a change in weather conditions, congestion on a highway or a mechanical problem in an assigned shipment vehicle. This type of additional service would allow the planner to take action before a problem occurs and replan the shipment so that delivery parameters are met.

6.2.2 Re-planning (multiple solution planning)

The planning tool should facilitate feasible plans that meet the requirements of the shipment. The tool should offer alternatives and facilitate replanning activities if events occur that put the original shipment requirements at risk. The tool should allow for multiple layers of plans to be developed in a hierarchy so that contractors can “roll up” the plans of sub-contractors to arrive at a total link and chain plan.

6.2.3 Strategic planning

The planning tool should be able to be run in both real time and off line modes. Real time modes would be used for operational execution of agreed to supply chain activities. Off line modes would be used to initially develop tentative plans for a potential shipment that require agreement by the selected business partners (a quotation plan) or for the development of strategic and “what if” plans to facilitate new products or process improvements.

6.3 Resource Management

The efficient and effective utilization of resources throughout the supply chain is critical to ensuring the cost effective shipment and delivery of goods. The ICT solution that is provided should allow users to identify which resources will be used for a shipment and to manage that resource to ensure that they execute as planned. This may require the system to manage resource capacities, capabilities, assignments, etc.

6.4 Monitoring & Visibility

The ICT solution should provide all members of a supply chain execution process to observe, in an authorized manner, the state of the shipment at any point in real time. The service should provide alerts as to when a milestone or KPI has been reached or if one of these key metrics is about to be exceeded. Viewing of supply chain statuses should be provided to any authorized user on fixed as well as mobile devices.

6.5 Business opportunities for SME

Today the worldwide market for global supply chain services is dominated by a few big players who have established a worldwide network of branches and agents. Small and medium-size service providers have difficulties in competing with these large players because they lack presence and knowledge in markets outside of their local areas. By providing these service providers with the ability to connect with partners across the globe an open, collaboration solution with the capabilities identified should be able to “level the playing field.” In addition, as SMEs usually do not have the financial wherewithal to afford the costly systems that are required for managing complex supply chains, the ICT solution that is developed based on the identified requirements should be able to overcome the cost constraints that these organizations labor under. This implies that the solution should be an “on demand” service that facilitates rapid setup and integration of partners without the costly need for premise based IT infrastructure or IT staff. How the service will be provided is the topic of D1.6.

7 Conclusion

Global logistics activities are complicated and difficult to handle not because of complex production processes or technologies, but because inter-company communications processes have developed in an ad hoc manner and make having the right information at the right time a difficult process to achieve. The analysis summarized in this deliverable identifies the gaps in the communications processes and documents the business requirements that lead to these gaps. The analysis also documents a set of business requirements that must be met if an ICT solution is to be developed that will be of use to domain practitioners.

Using the 4phase framework that is a foundation for analysis in the FInest project, the business requirements that have been identified can be mapped to show where they provide the greatest contribution to the process of managing a supply chain (Figure 18).

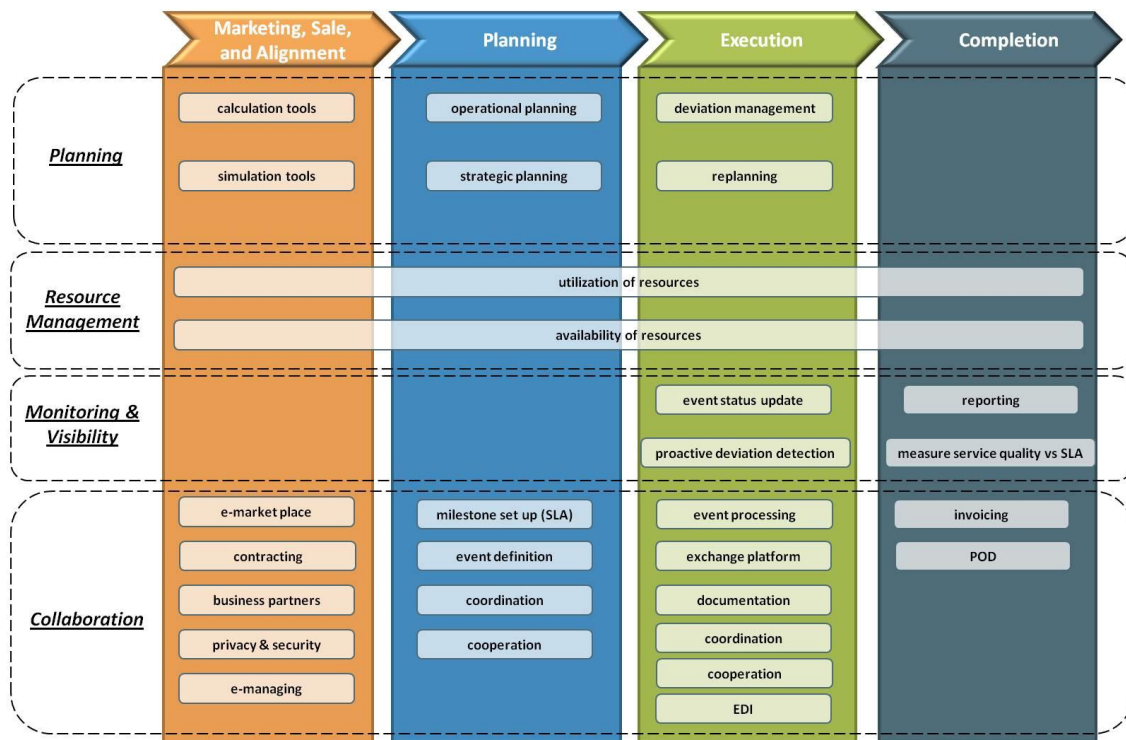


Figure 18: Requirements related to 4 phase methodology

Certain high level business requirements have detailed requirements in multiple phases of the model. This is particularly the case of the requirement for collaboration.

Collaboration demands that information flow smoothly between phases and between partners. This fact requires any ICT solution that hopes to provide effective collaboration facilities to be able to speak a common language across all of its services while facilitating the rapid mapping of legacy data to this internal format. This fact also requires that partners in a supply chain openly exchange data so that information on shipments can be seen by all parties as the information is generated and that appropriate actions can be taken in a timely manner so that shipment requirements can be met.

8 Next steps

The results of this deliverable feed into the analysis of the existing ICT solutions landscape to determine how ICT solutions are currently provided for the transport and logistics domain. This study is documented in D1.4.

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10 Appendix – Detailed data flows by use case

Use Case 1:

Process or activity	Content (information)	Sender	Receiver	Means of transfer
Publication of port services	information on the port's services, capacity, and resources etc	Port Control	Customers (ship agents, terminal operators), + all other stakeholders	Website
Inform stakeholders	AIS-based information about traffic situation, also available on website.	Port Control	Maritime Radio, Customers, Norwegian food safety authority, Ministry of fishing	Phone
Retrieve info on ship arrivals.	Inform about expected cargo or ship arrival for the day: ship name, ETA, cargo type	Ship agents; Terminal operator	Port Control	Phone
Inform stakeholders	Inform newspaper about ship calls planned for next day: ship name, ETA, POO	Port Control	Local community, Newspaper	Phone, Website
Inform stakeholders	Answer phone calls from maritime pilots and ship supply services about ship arrival: ship name, ETA	Port Control	Pilot Ship supply services workers	Phone
Inform stakeholders	Weather condition at port (also available on website)	Port Control	Captains; Pilots	Phone, radio
Admittance of ship calls at port.	Ship name, previous and next port of call, date, nationality of ship, name of master, GT, NT. Some info on of voyage and cargo, number of persons onboard, ISPS information	Ship agent, Vessel (Master)	. Port Control . Norwegian Coastal Administration (SSN)	e-mail, fax, EDI (from SSN to PCS)
Vessel call	Ship name, ETA, ETD, number of persons onboard, type and amount of dangerous goods, agent, depth, port services, etc.	Ship agent, Vessel (Master)	Port Control	Fax, paper, e-mail
Booking of pilot / Pilot exemption	Ship name, ETA, ETD, Previous and next port of call, number of persons onboard, MMSI, type and amount of dangerous goods, agent, depth, etc. Need of pilots and tugs. Pilotage track.	Vessel / Master or Shipping Agent	Norwegian Coastal Administration (SSN)	electronic (registered in SSN)

Booking of pilot / Pilot exemption	Information about pilot booked: ship name, ETA,	Norwegian Coastal Administration (SSN)	Port Control	electronic (SSN => PCS)
Booking of Pilots, Tugs & Mooring	Ship name, ETA, ETD, type and amount of dangerous goods, agent, depth, etc		Pilot, tugs, mooring planner and crew, or via Port Control	fax, paper, electronic or phone/radio
Discharge of waste	Name of ship, flag state, ETA, ETD, previous and next port of call, last port where waste was delivered and date, IMO-nr, Type of waste; oils, garbage, sewage, cargo associated waste and cargo residues	Vessel via shipping agent	Port Control	fax, e-mail
Booking of ship services	Ship name, ETA, ETD, and need for water, energy supply, and other ship services	Vessel / shipping agent	Tug and mooring crew, or via Port Control	fax, e-mail
Custom clearance	Ship name, ETA, ETD, Previous and next port of call, number of persons onboard, agent, etc.	Ship agent, Vessel (Master)	Customs	
Declaration of Dangerous goods	Ship name, arrival and departure date, contents, type and amount of dangerous goods, agent		. Port Control . Norwegian Coastal Administration (SSN)	
Immigration service	Name of ship, flag, port of arrival/departure, date, information on crew and passengers: name, nationality, place and date of birth, position on board	Vessel / Master	Port Control	fax, paper, electronic
Port State Control	Required information by inspection authority: ship identification, checklist of certificates and valid documents, hazardous cargo list, crew list.;	Vessel / Master	Port state inspection authority	Fax, paper, e-mail
Ship notification	Ship position, course, speed, destination	Vessel AIS	Norwegian Coastal Authority Port Control	AIS
Planning berth allocation	Berth allocated: confirmation sent to vessel/captain, and information registered in PCS	Port Control	Captain, Terminal	Phone, email, PCS
Pilot booking	Ship name, ETA, ETD, Previous and next port of call, number of persons onboard, MMSI, type and amount of dangerous goods, agent, depth, etc. Need of pilots and tugs, mooring persons. Pilotage track, purpose of visit.	Ship agent, Captain	1. Norwegian Coastal Administration (register in SafeSeaNet) 2. Port	1. Fax, paper, electronic or phone 2. EDI (SafeSeaNet => PortIT)

			Control	
Updated notification	Announcement of arrival: updated ETA, ship name, IMO nr, cargo type, terminal/destination. cargo, stowage plan, diacharging/laoding list	Shipping agent or vessel	. Port Control . Customs	phone, radio, e-mail/fax
Border crossing	Ship name, position, expected border crossing time	Vessel / Master	Coast Control	Radio
Arrival Clearance	ship identification ,ETA,ETD,port of destination, draft..., cargo type (for quay allocation)	Vessel / Master	Port Control	Telephone, radio
Confirmation of Pilots, Tugs & Mooring	Ship name, ETA, ETD, type and amount of dangerous goods, agent, depth, etc		Pilot, tugs, mooring planner and crew, or via Port Control	fax, paper, electronic or phone/radio
Confirmation of quay	Quay number	Port Control	Vessel / Master	fax, paper, electronic or voice
Cargo handling	Transport movement details, place/location identification, equipment details, number of units, measurements, dangerous goods	ship agent / vessel	. Port Control (in arrival notification) . Terminal operator, cargo workers	Electronic, fax, e-mail
Line passing	AIS actual arrival notification (at port and at quay)	AIS Vessel	Port Control, then transmitted to Port supply services providers; Quay owner; Terminal; Cargo workers	Electronic or radio
Arrival notification	Inform external stakeholders that the ship is in port	Port Control	Ship owner / agent, authorities, customs	electronic, e-mail, sms
Declaration of cargo, port safety and security	Complete list with information regarding the goods (origin, destination, contents, ID number, etc)	Shipping agent, previous port or vessel	Port Control	fax, paper, electronic or voice

Confirmation loaded/unloaded goods	Confirm loading and unloading of units, date, ports of arrival and departure, message recipient and sender, Nature of cargo, Transport movement details, gross weight, etc.	Terminal operator	Agent or shipping company, next port	EDI, fax, e-mail
Ballast message	Contents, Amount, Processed, Previous port	Vessel / Master	Port authority	fax, paper, email
Notice of Readiness	Signed by the ship, its agent and the cargo owners. ATA, ShipName and quay is included	Shipping agent	Vessel operator, Cargo owner	fax
Customs	Name of ship, port of arrival/departure, nationality of ship, crew list, name, period of stay, rank, signature, date; dutiable effects that are dutiable; name of articles, quantity; place of storage	Vessel, via ship agent	Customs	fax, paper
Departure notification	ship identification ,ETD,port of destination, draft...	Vessel / Master	. Norwegian Coastal Administration . Port Control	fax, paper, electronic or voice
Departure notification	AIS info on actual departure time from quay and port	Port Control	Ship owner / agent, authorities, customs	e-mail, sms
Invoicing (Pilot due)	Ship name, nr, date, Pilotage services executed, price, date etc.	Norwegian Coastal Administration	Ship agent	fax, email
Invoicing (Port dues)	ATA, ATD, port and quay fees, port services; .	Port Finance/adm.	Ship agent	e-mail, paper
Monitoring and reporting	Surveillance report generated by PortWin	Port Control	Ministry of Defense	e-mail (pdf)
Statistics reporting	All port calls, including Ship name, previous and next port of call, date, nationality of ship, name of master, GT, NT, Brief particulars of voyage and cargo, number of persons onboard, confirmation of attached documents (cargo declaration, ship's store declaration, crew's effects declaration, crew list, passenger list, dangerous goods, maritime declaration of health)	Port Control	Norwegian statistics register (SSB)	e-mail, paper
Statistics and/or admittance of ship calls at port	Complete list with information regarding the goods (origin, destination, contents, ID number, etc)	Shipping agent or vessel	Port Control	fax, paper
Notification to the owner	Name of ship, cargo, time of arrival and departure, Discharge hours, number of crews in ports, agent name	Shipping agent	Vessel owner	fax, paper, e-mail

A short description of the purpose of the message, when is it used?	Information fields in the message (e.g. ship size, no. of containers to be loaded or unloaded, shipname, ETA etc.)	Sender of message	Receiver of message	Typical communication channels (e.g. phone, fax, e-mail) used for this message
Schedule planning	For each vessel: vessel, name, description of voyage, schedule (Arrival / Departure), booking place, transhipments,	Shipping Line / Feeder Operator - NCL Operations Dept.	Vessel	e-mail (pdf)
Schedule planning	For each vessel: vessel, name, description of voyage, schedule (Arrival / Departure), booking place, transhipments,	Shipping Line / Feeder Operator - NCL Operations Dept.	Ship Agents	Softship (agent has access to softship)
Schedule planning	For each vessel: vessel, name, description of voyage, schedule (Arrival / Departure), booking place, transhipments,	Shipping Line / Feeder Operator - NCL Operations Dept.	Stakeholders	Website
Prepare booking	Number of container, type (reefer), size, origin and destination	Fish exporter	Freight Forwarder	
Prepare booking	Number of container, type (reefer), size, origin (port) and destination (port)	Forwarder informs	Overseas Line Agent (Norwegian branch office)	e-mail, telephone, EDI (IFTMIN)
Prepare booking	Number of container, type (reefer), size, origin (port) and destination (port)	Overseas Line Agent (Norwegian branch office)	Overseas line Agent at port of loading in Rotterdam	e-mail, telephone, EDI (IFTMIN)
Prepare booking	Number of container, type (reefer), size, origin (port) and destination (port)	Overseas Line Agent at port of loading	Feeder Agent	e-mail, telephone, EDI (IFTMIN)
Prepare booking	Vessel name/number, voyage, number of container, type (reefer), size, origin (port) and destination (port), consignee direction, cargo type (EU code) , container number and seal number (if known)	Feeder Agent	Feeder Operator - NCL Operations Dept.	e-mail, telephone, EDI (IFTMIN)

Confirm booking	Booking reference, vessel name, number, schedule	Feeder Operator - NCL Operations Dept.	Feeder Agent	e-mail,
Confirm booking	Booking reference, vessel name, number, schedule	Feeder Operator - NCL Operations Dept.	Overseas Line Agent (Norwegian branch office)	e-mail
Prepare Operation Plan	Operation plan summarising all bookings, specifying cargo (type, volume, number), port of loading, and discharging, customer	Feeder Operator - NCL Operations Dept.	Vessel	Email (pdf)
Prepare Operation Plan	Operation plan summarising all bookings, specifying cargo (type, volume, number), port of loading, and discharging, customer	Feeder Operator - NCL Operations Dept.	Ship Agent	Softship
Prepare Stowage Plan	Information on cargo to be loaded and discharged, type of container, location on ship. Based on information from operation plan.	Vessel	. NCL Operations Dept. . Ship agent . Terminal	e-mail (pdf)
Prepare Discharge / Loading List	Discharge/loading list established based on information from Softship: Transport movement details, place/location identification, equipment details, number of units, measurements, dangerous goods	Ship Agent	Port, Terminal	e-mail (pdf), EDI (COPRAR / COARRI)
Prepare Vessel Call	Announce planned port call based on operation plan and disch/load list; info included: vessel name, number, ETA	Ship Agent	Port	email, EDI (COPRAR)
Prepare Vessel Call	Announce planned port call based on operation plan and disch/load list; info included: vessel name, number, ETA	Ship Agent	Terminal	e-mail (pdf), EDI (COPRAR / COARRI)
Send waybill	information and instruction about the shipment.	Ship Agent	Customer (Fish exporter / Forwarder)	e-mail (pdf)
Send manifest to authorities	Summary of all waybills	Ship Agent	Authorities	EDI (IFTMCS)
Gate-in / Gate-out	Container number, booking number of all container coming in (empty) and out (full) of the terminal, and which are part of an active shipment order	Terminal		EDI (CODECO)
Conf. load/dischARGE	Confirmation of loading/discharging of cargo	NCL Operations Dept.	Customer (Fish exporter / Forwarder)	e-mail, EDI (IFTSTA)

Conf. load/discharge	SOB list	Vessel	Customer (Fish exporter / Forwarder)	
Issue invoice	Electronic invoice specifying cargo, ports of loading and discharge, and price (ref information form waybill)	NCL Finance Dept.	Customer (Fish exporter / Forwarder)	e-mail, EDI (INVOIC), snail-mail
Invoice Acceptance		Customer (Fish exporter / Forwarder)	NCL Finance Dept.	e-mail, EDI (APERAK)
Invoice control	Payment information:	Bank / NCL	NCL Finance Dept.	

Use Case 2

Process or activity	Content (information)	Sender	Receiver	Means of transfer
Shipping order	addresses (bill to, pick up, ship to), pick up times, goods description, measurements, delivery deadline (if available, etc (see shipping order)	shipper	forwarder	E-Mail, Fax, EDI, KN website
Shipment booking		forwarder	carrier	Telephone, E-Mail, EDI
agreement about shipment taking over	time and place	forwarder	shipper	Telephone, E-Mail
flight confirmation	forwarder to shipper can content HAWB as well	carrier forwarder	forwarder shipper	Telephone, E-Mail, website, EDI
Invoicing	invoicing according to incoterm, in case Import has to invoice Export or the other way around	forwarder	carrier / customer / shipper	KN intern EDI, Extern Mail
pre carriage status confirmation	to shipper depending on from Condition (from Airport or from Door)	forwarder	shipper / carrier	EDI
FWB	The FWB message is used to transmit a complete set of Air Waybill data in accordance with the IATA Cargo Services Conference Resolutions.	forwarder	carrier	EDI
FHL	The main objective of the FHL message (type 1) is to provide a "check-list" of Freight Forwarder house waybills associated with a Master Air Waybill. A second type of FHL (type 2) has been accommodated to provide details of one House Waybill consignment in order for the carrier to provide Customs with advance information based on the house waybill information provided by the origin freight forwarder. Under IATA e-freight the IATA Cargo-IMP Consolidation List (FHL type 1) message	forwarder	carrier	EDI

	serves as the house manifest document.			
flight status confirmation		carrier	forwarder shipper/cnee	EDI, website, telephone, email
Freight Forwarding Request/Answer (FFR/FFA)	Kind of goods	Between airlines		EDI
RCS	Freight received from Shipper/Agent	Between forwarder/agent	airline	EDI
RCT	Freight received from other carrier	Between forwarder/agent	airline	EDI
RCF	Freight received from a flight	Between forwarder/agent	airline	EDI
BKD	Freight booked on a flight	Between forwarder/agent	airline	EDI
MAN	Freight manifested on a flight	Between forwarder/agent	airline	EDI
DEP	Freight departed on a flight	Between forwarder/agent	airline	EDI
PRE	Freight ready to load	Between forwarder/agent	airline	EDI
TFD	Freight handed over to other carrier	Between forwarder/agent	airline	EDI
NFD	Forwarder/Agent informed regarding arrival	Between forwarder/agent	airline	EDI
CCD	Freight released by Customs	Between forwarder/agent	airline	EDI
DLV	Freight delivered to Forwarder/Agent	Between forwarder/agent	airline	EDI
DIS	Freight with deviations / specialties	Between forwarder/agent	airline	EDI
prealert customs	FFM = Flight Manifest (which AWB are manifested on which Flight?) FWB = Airway bills, connected to the FFM FHL = House way bills	forwarder	customs	EDI
entry in Country	NFD: Freight & Documents ready for forwarder pick up	carrier(handling agent)	customs/forwarder	EDI, email
customs declaration	Content of imported goods HS code Volume Weight Consignee Usage of goods Shipper Export Country Origin of goods	cnee/forwarder	customs	EDI, original docs if needed

shipment releasement	Shipment is out of customs hands and can be moved freely within EU now	customs	carrier/forwarder(cnee)	E-Mail
Delivery	time and place	forwarder	cnee	Telephone, E-Mail
POD document	signed by cnee	forwarder	cnee	original hand over
delivery/handover status confirmation	Shipment handover confirmation or Delivery confirmation	forwarder	cnee	EDI, telephone, email
Invoicing	invoicing according to incoterm, in case Import has to invoice Export or the other way around	forwarder	cnee/customer	KN intern EDI, Extern Mail
CASS	AWB number costs	forwarder	carrier	EDI

Use case 3

Process or activity	Content (information)	Sender	Receiver	Means of transfer
Purchase Order	PO number, PO date, Product type, Product description, Quantity, Delivery date, Supplier code, Supplier Name, Supplier Address, Supplier Responsible contact details, Incoterms, Consignee name, Consignee address, Consignee contact details, Contract Reference number (reference to Payment terms, Value, Delivery Conditions etc.), Requested document list (Invoice, packing list, ATR or EURO-1 for EC or EFTA originated materials, Certificate of Origin, Certificate of Analysis, B/L,AWB,FCR)	Production Planning	Shipper (Material Supplier)	SAP and email
Purchase Order Confirmation	PO number, PO date, Product type, Product description, Agreed quantity, Agreed shipment date, Agreed Incoterms, Agreed payment terms, Agreed value	Shipper (Material Supplier)	Production Planning	phone, fax, email
Shipping Order Form	Shipper Name, Shipper Address, Contact Details (Name, Tel, e-mail), Consignee Details, Notify, Incoterms, Pick up address, Ready Date, Port of Loading, Port of Discharge, PO Number, Description of Goods, Total Number and Kind of Packages/Pallets, Net Weight in kgs, Gross Weight in Kgs, Number of Containers and Type, If Hazardous Cargo / IMCO Class + Page No + UNO No, Notes	Shipper (Material Supplier)	Logistic Controller	email
Transport Alternatives	Vessel Schedules (Vessel names, Voyage number, ETD, ETA, Port of Discharge, Port of Loading, Cutoff date), Freight Cost, Truck Availability, Transit time, Truck type, Airplane type	Logistics Provider	Logistic Controller	phone, email

Transport Order	Transport order number, Shipper Name, Shipper Address, Contact Details (Name, Tel,e-mail), Consignee Details, Notify, Incoterms, Pick up address, Ready Date, Port of Loading, Port of Discharge, PO Number, Description of Goods, Total Number and Kind of Packages/Pallets, Net Weight in kgs,Gross Weight in Kgs, Number of Containers and Type, If Hazardous Cargo / IMCO Class + Page No + UNO No, Notes, Commercial Invoice details, Customs broker name, Customs point	Logistic Controller	Logistics Provider	Logistic Portal, email
Transport Order Info.	Transport Order number, PO number, Ready date, Incoterms, Shipment type/Quantity, Gross Weight, Package Quantity, Volume, Commercial Invoice, Notes, Logistics provider name, Logistics provider address, Logistics provider contact person's name, Logistics provider contact person's email, Logistics provider contact person's phone	Logistic Controller	Shipper (Material Supplier)	email
Booking Confirmation	Transport Order number, Confirmed date, Confirmed capacity	Logistics Provider	Logistic Controller	phone, email, Logistic Portal
Booking Confirmation Info.	Transport Order number, Confirmed date, Confirmed capacity, Package dimensions, WH working hrs	Logistics Provider	Shipper (Material Supplier)	phone, email
Shipment Status	Shipment Status (Has not departed, Has not arrived, Waiting for customs clearance, Waiting for inland transport, Waiting for arrival to WH, Vessel Actual Arrival time (ATA), Vessel Unloading Completed time, Departure time of the container from the Port), Schedule change	Logistic Provider	Logistic Controller	Logistic Portal, email ,phone
Shipping Documents (except waybill)	Invoice (Seller name, Buyer name, Ship to address, Bill to address, Date, Payment terms, Value, Bank Details, Product Name, Unit Price, Currency, Country of Origin, VAT, Incoterms), Packing list (Product type, Product description, Gross Weight, Net	Shipper (Material Supplier)	Logistic Controller	email, post

	Weight, Type and Number of Packages, Package dimensions, Quantity per pallet/box, Total volume, Total quantity),ATR, EURO-1, Certificate of Origin, Certificate of Analysis			
Shipping Documents (except waybill)	Invoice (Seller name, Buyer name, Ship to address, Bill to address, Date, Payment terms, Value, Bank Details, Product Name, Unit Price, Currency, Country of Origin, VAT, Incoterms), Packing list (Product type, Product description, Gross Weight, Net Weight, Type and Number of Packages, Package dimensions, Quantity per pallet/box, Total volume, Total quantity), ATR, EURO-1, Certificate of Origin, Certificate of Analysis	Shipper (Material Supplier)	Logistics Provider	email, hand-in
Waybill	B/L (Bill of Lading number, Name of the shipping company,Shipper's name, Shipper's address, Order and notify party, Consignee's name, Consignee's address, Product Type, Description of goods, Gross/net/tare weight,Freight rate/measurements and weighment of goods/total freight, Vessel and Voyage number, Port of Loading, port of Discharge, Place of Delivery, Container Numbers, Seal Numbers and Marks, Container Type, Place and Date of Issue, Demurage details, Customs Tariff Number, Package Type), AWB (Master Waybill number, House Waybill number, Shipper's name, Consignee name and address, Carrier's name, Carrier's address, Carrier's phone, Airport of Departure, Airport of Arrival, Routing and Destination, Currency,Flight Name, Flight Date, Number of Packages, Gross Weight, Chargable Weight, Dimensions, Notes)	Logistics Provider	Shipper (Material Supplier)	hand-in, post, telex release (email)

Waybill	<p>B/L (Bill of Lading number, Name of the shipping company, Shipper's name, Shipper's address, Order and notify party, Consignee's name, Consignee's address, Product Type, Description of goods, Gross/net/tare weight, Freight rate/measurements and weightment of goods/total freight, Vessel and Voyage number, Port of Loading, port of Discharge, Place of Delivery, Container Numbers, Seal Numbers and Marks, Container Type, Place and Date of Issue, Demurage details, Customs Tariff Number, Package Type), AWB (Master Waybill number, House Waybill number, Shipper's name, Consignee name and address, Carrier's name, Carrier's address, Carrier's phone, Airport of Departure, Airport of Arrival, Routing and Destination, Currency, Flight Name, Flight Date, Number of Packages, Gross Weight, Chargable Weight, Dimensions, Notes)</p>	Shipper (Material Supplier)	Logistic Controller	hand-in, post, telex release (email)
Waybill copy	<p>B/L (Bill of Lading number, Name of the shipping company, Shipper's name, Shipper's address, Order and notify party, Consignee's name, Consignee's address, Product Type, Description of goods, Gross/net/tare weight, Freight rate/measurements and weightment of goods/total freight, Vessel and Voyage number, Port of Loading, port of Discharge, Place of Delivery, Container Numbers, Seal Numbers and Marks, Container Type, Place and Date of Issue, Demurage details, Customs Tariff Number, Package Type), AWB (Master Waybill number, House Waybill number, Shipper's name, Consignee name and address, Carrier's name, Carrier's address, Carrier's phone,</p>	Logistics Provider	Logistic Controller	email

	Airport of Departure, Airport of Arrival, Routing and Destination, Currency, Flight Name, Flight Date, Number of Packages, Gross Weight, Chargable Weight, Dimensions, Notes)			
Shipping Documents (Export) -	Invoice (Seller name, Buyer name, Ship to address, Bill to address, Date, Payment terms, Value, Bank Details, Product Name, Unit Price, Currency, Country of Origin, VAT, Incoterms), Packing list (Product type, Product description, Gross Weight, Net Weight, Type and Number of Packages, Package dimensions, Quantity per pallet/box, Total volume, Total quantity), Certificate of Origin, Certificate of Analysis	Shipper (Material Supplier)	Customs Broker	hand-in, post, email
Shipping Documents (Import)	Invoice (Seller name, Buyer name, Ship to address, Bill to address, Date, Payment terms, Value, Bank Details, Product Name, Unit Price, Currency, Country of Origin, VAT, Incoterms), Packing list (Product type, Product description, Gross Weight, Net Weight, Type and Number of Packages, Package dimensions, Quantity per pallet/box, Total volume, Total quantity), Certificate of Origin, Certificate of Analysis	Logistics Controller	Customs Broker	hand-in, post, email
Waybill	B/L (Bill of Lading number, Name of the shipping company, Shipper's name, Shipper's address, Order and notify party, Consignee's name, Consignee's address, Product Type, Description of goods, Gross/net/tare weight, Freight rate/measurements and weightment of goods/total freight, Vessel and Voyage number, Port of Loading, port of Discharge, Place of Delivery, Container Numbers, Seal Numbers and Marks, Container Type, Place and Date of Issue,	Logistics Controller	Customs Broker	hand-in, post, email

	Demurrage details, Customs Tariff Number, Package Type), AWB (Master Waybill number, House Waybill number, Shipper's name, Consignee name and address, Carrier's name, Carrier's address, Carrier's phone, Airport of Departure, Airport of Arrival, Routing and Destination, Currency, Flight Name, Flight Date, Number of Packages, Gross Weight, Chargable Weight, Dimensions, Notes)			
Summary Declaration	(Stamped, signed original document) (For Sea Transport: Logistics provider name, Summary Declaration number, Summary Declaration date, Vessel name, Voyage number, Flag of nationality, B/L number, Port of Loading, Total Gross Weight, Number of packages, Container numbers, Loading at Port Permission Info (?), Date of signature (date of signing process), Name of the Owner of Goods, Port of Discharge) (For road: Truck plate, Summary Declaration number, Summary Declaration date, Total Gross Weight, Number of packages, Name of the Owner of Goods, Description of Goods, TIR CARNET number, Border Gate name)	Logistics Provider	Customs Broker	Customs Online system, hand-in
Customs Declaration Info.	Invoice number, Invoice date, Contract reference number, Requested Custom Clearance date, Actual Custom Clearance date, Payment type (?), Supplier name, Custom Clearance Reference number, Customs point/port, Product/Material code, Product/Material description, Quantity, Unit (KG,PCS), Consignee name, Customs Tariff Number, Monetary value, Currency, Incoterms)	Customs Broker	Logistics Controller	Logistics Portal, email
Customs Declaration info.	Customs Clearance Reference number	Customs Broker	Port Authority /Customs Authority	hand-in
Vessel Unloading Completed Info.	Vessel Unloading Completed time	Port Authority /Customs Authority	Customs Broker /Customs Authority	phone, email

Proof of Custom Clearance	Customs Declaration, Proof of Customs tax payment, Proof of the payment of port expenses	Customs Broker	Logistics Provider	hand-in
Proof of Custom Clearance	Customs Declaration, Proof of Customs tax payment, Proof of the payment of port expenses	Logistics Provider	Port Authority /Customs Authority	hand-in, show
Container Release Permission	Container Release Confirmation	Port Authority /Customs Authority	Logistics Provider	-
Incoming Containers	Expected arrival time of trucks (container) to the Consignee (Warehouse), Truck plate numbers, Driver name, Driver phone, Invoice number, Container number, Waybill number, Supplier name	Logistics Provider	Consignee (Warehouse)	Logistic Portal ,phone, email
Container Arrival Confirmation	Actual arrival time of truck (container) to the Consignee (Warehouse)	Consignee (Warehouse)	Logistics Controller	SAP, Logistic Portal, phone, email
Logistical Claims	Claim Description, Transport Order Reference number, Customs Broker's name, TIR carnet number, Truck plate, Container number, Logistics Provider's name, Summary Declaration reference number, Supplier name, Invoice number, Production Planning Responsible	Consignee (Warehouse)	Logistics Controller	phone, email

Process or activity	Content (information)	Sender	Receiver	Means of transfer
SAP Pre-Order	Pre-Order Number, Product Type, Quantity, Description of Goods, Delivery address, Incoterm, Shipment Type, Requested Date	Order Planning	Logistic Controller	SAP or email or excel files on common webfolder
Transport Alternatives	Vessel Schedules (Vessel names, Voyage number, ETD, ETA, Port of Discharge, Port of Loading, Cutoff date), Freight Cost, Truck Availability, Transit time, Truck type, Airplane type	Logistics Provider	Logistic Controller	phone, email
SAP Order info.	SAP Order Number, Product type, Quantity, Description of goods, Gross Weight in Kgs, Port of Loading, Port of Discharge, Vessel name, Voyage number, Vessel Cut-off date, Number of Containers and types, Consignee Details (Delivery address etc.), Inland Logistics Provider,	Logistics Controller	Logistics Provider (Forwarder, Carrier)	SAP, email

	International Logistics Provider, Pick-up address			
SAP Order	SAP Order Number, Product type, Quantity, Description of goods, Gross Weight in Kgs, Port of Loading, Port of Discharge, Vessel name, Voyage number, Vessel Cut-off date, Number of Containers and types, Consignee Details (Delivery address etc.), Inland Logistics Provider, International Logistics Provider, Pick-up address	Logistics Controller	Shipper (Warehouse)	SAP
Transport Order info.	SAP Order Number, Transport Order Number, Port of Loading, Port of Discharge, Vessel name, Voyage number, Vessel Cut-off date, Number of Containers and types, Consignee Details (Delivery address etc.), Inland Logistics Provider, International Logistics Provider, Pick-up address, Pick-up date	Logistics Controller	Shipper (Warehouse)	Logistics Portal, email
Transport Order	SAP Order Number, Transport Order Number, Port of Loading, Port of Discharge, Vessel name, Voyage number, Vessel Cut-off date, Number of Containers and types, Consignee Details (Delivery address etc.), Inland Logistics Provider, International Logistics Provider, Pick-up address, Pick-up date	Logistics Controller	Logistics Provider (Forwarder, Carrier)	Logistic Portal, email
Booking Confirmation	Confirmed/ Not Confirmed , Container number, Truck plate	Logistics Provider	Logistic Controller	Logistics Portal, email
Booking Confirmation info.	Confirmed/ Not Confirmed , Container number, Truck plate	Logistics Provider	Shipper (Warehouse)	Logistics Portal, email
Problem	Loading Problem content	Shipper (Warehouse)	Logistic Controller	Logistics Portal, email
Loading Status Info.	Truck/Container Arrival (driver contact details), Loading Started, Loading Completed	Shipper (Warehouse)	Logistic Controller	Logistics Portal

Loading Status Info.	Truck/Container Arrival (driver contact details),Loading Started, Loading Completed	Shipper (Warehouse)	Logistics Provider	Logistics Portal
Loading details	SAP Order Number, Port of Loading, Port of Discharge, Vessel name, Voyage number, Vessel Sailing date, Invoice number, Quantity, Net Weight, Gross weight, Container number, Product type, Customs tariff number, Packaging type, Volume,Consignee Name, Consingee Address, Shipper Name, Shipper Adress	Logistics Controller	Customs Broker	email
Loading details	SAP Order Number, Port of Loading, Port of Discharge, Vessel name, Voyage number, Vessel Sailing date, Invoice number, Quantity, Net Weight, Gross weight, Container number, Product type, Customs tariff number, Packaging type, Volume, Consignee Name, Consingee Address, Shipper Name, Shipper Adress	Logistics Controller	Consignee (Customer)	email
Loading details	SAP Order Number, Port of Loading, Port of Discharge, Vessel name, Voyage number, Vessel Sailing date, Invoice number, Quantity, Net Weight, Gross weight, Container number, Product type, Customs tariff number, Packaging type, Volume,Consignee Name, Consingee Address, Shipper Name, Shipper Adress	Logistics Controller	Logistics Provider (Forwarder, Carrier)	email
B/L instruction	Consignee name, Consingee address, Shipper name, Shipper address, Notify name, Notify address, Delivery address, Port of Loading, Port of Discharge, Description of goods, Packaging type, Gross weight, Net weight, Sap order number, Incoterms, Truck plate number, Customs point, Invoice number, Payment terms, Contact details of the responsible	Logistics Controller	Logistic Provider	email

Waybill	<p>B/L (Bill of Lading number, Name of the shipping company, Shipper's name, Shipper's address, Order and notify party, Consignee's name, Consignee's address, Product Type, Description of goods, Gross/net/tare weight, Freight rate/measurements and weightment of goods/total freight, Vessel and Voyage number, Port of Loading, port of Discharge, Place of Delivery, Container Numbers, Seal Numbers and Marks, Container Type, Place and Date of Issue, Demurage details, Customs Tariff Number, Package Type), AWB (Master Waybill number, House Waybill number, Shipper's name, Consignee name and address, Carrier's name, Carrier's address, Carrier's phone, Airport of Departure, Airport of Arrival, Routing and Destination, Currency, Flight Name, Flight Date, Number of Packages, Gross Weight, Chargable Weight, Dimensions, Notes)</p>	Logistics Provider	Logistic Controller	hand-in, post, telex release (email)
Waybill	<p>B/L (Bill of Lading number, Name of the shipping company, Shipper's name, Shipper's address, Order and notify party, Consignee's name, Consignee's address, Product Type, Description of goods, Gross/net/tare weight, Freight rate/measurements and weightment of goods/total freight, Vessel and Voyage number, Port of Loading, port of Discharge, Place of Delivery, Container Numbers, Seal Numbers and Marks, Container Type, Place and Date of Issue, Demurage details, Customs Tariff Number, Package Type), AWB (Master Waybill number, House Waybill number, Shipper's name, Consignee name and address, Carrier's name, Carrier's address, Carrier's phone,</p>	Logistics Controller	Consignee (Customer)	post, telex release (email)

	Airport of Departure, Airport of Arrival, Routing and Destination, Currency, Flight Name, Flight Date, Number of Packages, Gross Weight, Chargable Weight, Dimensions, Notes)			
Shipping Documents (Export)	Commercial Invoice (Seller name, Buyer name, Ship to address, Bill to address, Date, Payment terms, Value, Bank Details, Product Name, Unit Price, Currency, Country of Origin, VAT, Incoterms)	Logistics Controller	Customs Broker	Post, hand-in
Shipping Documents (Import)	Commercial Invoice (Seller name, Buyer name, Ship to address, Bill to address, Date, Payment terms, Value, Bank Details, Product Name, Unit Price, Currency, Country of Origin, VAT, Incoterms), Packing list (Product type, Product description, Gross Weight, Net Weight, Type and Number of Packages, Package dimensions, Quantity per pallet/box, Total volume, Total quantity), Certificate of Origin, ATR, Euro-1, Insurance policy	Logistics Controller	Logistics Provider (Forwarder, Carrier)	hand-in
Customs Declaration info.	Customs Declaration is completed.	Customs Broker	Logistic Controller	email
Proof of Customs Clearance	Customs Declaration, Proof of the payment of port expenses	Customs Broker	Logistics Provider	hand-in
Proof of Customs Clearance	Customs Declaration, Proof of the payment of port expenses	Logistic Provider	Port Authority	hand-in, show
Container Release Permission	Container Release Confirmation	Port Authority /Customs Authority	Logistic Provider	-
Shipment Status	Vessel departure (Vessel departure time, Estimated Arrival Time (ETA), Arrival Port, Customer list, B/L), Vessel Arrival (Actual Arrival Time (ATA))	Logistics Provider	Logistic Controller	Logistics Portal, email

Shipping Documents (Import)	Commercial Invoice (Seller name, Buyer name, Ship to address, Bill to address, Date, Payment terms, Value, Bank Details, Product Name, Unit Price, Currency, Country of Origin, VAT, Incoterms), Packing list (Product type, Product description, Gross Weight, Net Weight, Type and Number of Packages, Package dimensions, Quantity per pallet/box, Total volume, Total quantity), Certificate of Origin, ATR, Euro-1, Insurance policy	Logistics Controller	Consignee (Customer)	email, post
Shipping Documents (Import)	Commercial Invoice (Seller name, Buyer name, Ship to address, Bill to address, Date, Payment terms, Value, Bank Details, Product Name, Unit Price, Currency, Country of Origin, VAT, Incoterms), Packing list (Product type, Product description, Gross Weight, Net Weight, Type and Number of Packages, Package dimensions, Quantity per pallet/box, Total volume, Total quantity), Certificate of Origin, ATR, Euro-1, Insurance policy	Logistics Provider	Consignee (Customer)	hand-in
Incoming Containers	Expected arrival time of trucks (container) to the Consignee (Warehouse), Truck plate numbers, Driver name, Driver phone, Invoice number, Container number, Waybill number, Supplier name	Logistics Provider	Consignee (Customer)	phone, email
Unloading Appointment details	Unloading time, Unloading dock	Consignee (Customer)	Logistic Provider	email
Proof of delivery (CMR/unloading doc.)	Proof of delivery (CMR/unloading doc.)	Consignee (Customer)	Logistic Provider	hand-in
Proof of delivery (CMR/unloading doc.)	Proof of delivery (CMR/unloading doc.)	Logistics Provider	Logistic Controller	Logistic Portal