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FREIGHTWISE

Management Framework for Intelligent
Intermodal Transport

Integrated Project (IP)

Sustainable surface transport - Rebalancing and integrating different transport modes

Work Package 17.1b
Validation Plan

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WP 17 Validation Plan

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Contents

1 Introduction

1.1 Scope of the document

Currently, there is an increasing understanding of the power of an integrated architecture in servicing the stakeholders of an intermodal transport chain. The FREIGHTWISE architecture must be very well validated in order to ensure completeness and functionality with existing business applications. Intermodal integration is a far cry from data processing. Today, the cutting edge lies on integrating and leveraging the relationships and interactions across the entire intermodal transport chain.

The purpose of this document is to set out in detail the scope, principles, actions and guidelines, which will establish the FREIGHTWISE validation procedure. Based on the guidelines of WP17.2, the current report suggests a comprehensive and practical plan for the validation of the FREIGHTWISE framework architecture (FWF) and the Information Packages (IPs). Clear reference is made in the evaluation of the business cases/ demonstrators, which will be one of the main means for data collection.

This document is concerned with the following questions concerning the validation of the FWF and IPs:

> What has to be done?

> How it has to be done?

> By whom it has to be done?

> When it has to be done?

> What will be the interim and final results?

Before answering these questions, a first insight into the FREIGHTWISE framework and the Information Packages is provided.

1.2 Background

FREIGHTWISE overall objective is to support the modal shift of cargo flows from road to intermodal transport using road in combination with short sea shipping, inland waterways and rail. This objective will be achieved by means of improved management and facilitation of information access and exchange between large and small, public and private stakeholders across all business sectors and transport modes. FREIGHTWISE aim is also to support the Commission in formulating future legislation and to develop initiatives that can provide a platform, based on which the industry can develop management solutions thus helping to increase the competitiveness of intermodal transport. Under the heading of the FREIGHTWISE FRAMEWORK – FWF – the project intends to develop generic system architecture for intermodal transport management based on previous European and national efforts.

For the purposes of this validation plan it is essential to have a close dialogue with the business cases. Firstly the measurements should be carried out in a common way, where the architecture matters can be used as references when doing the studies.

Therefore it is recommended that the same methodology and templates should be utilised in all cases, but it is expected that the architecture needs to be tailored-made to suit in to the cases.

1.3 Interrelation with other project activities

The current draft of the validation plan anticipates the results that will arise from the recent findings of WP11-WP15 as the task of identifying the user requirements will take the situation analysis of WP11 a step further by moving away from desk research to engaging the whole range of freight transport stakeholders. It considers requirements for business settings, harmonisation, interoperability and interconnectivity. The case-related "as is" studies of WP21-WP26 add specific requirements, problems and limitations.

Task 12.2 has categorised the requirements with a view to support the definition of the Intermodal Framework in WP13. The requirement handbook is now a living reference document, to be augmented in the course of the project. The result will be checked against other practical examples from R&D and commercial projects and will supply the validation plan with valuable information regarding the systems functionality and user's acceptance. The key work packages for the validation plan are WP13 and WP15 and the case related work packages WP24 and WP25.

What is needed from WP13 is to present to the consortium the findings of their so far activities and more specifically the first draft of the FREIGHTWISE framework architecture. The key objective of WP13 is to provide a common understanding on roles, functionality, information and work processes more specifically by defining the FREIGHTWISE framework architecture in 13.1. WP15 on the other side of the spectrum is expected after the completion of 13.1 to produce 15.1, which will define the technical reference systems for the complete FREIGHTWISE framework architecture and to define the VTS concept in 15.2.

There hasn't been yet an official release of 13.1 nor of 15.1. This document contains information relevant to the anticipated material for the needs of the validation plan (i.e. the FREIGHTWISE framework) that have produced in meetings and workshops (such as the recent Norway meeting) and have been uploaded on Teamspace (presentation files, minutes of meetings etc.). The FREIGHTWISE framework architecture has not yet been produced and published, and the current document is a conceptual document based on available material. When the FREIGHTWISE framework architecture and the description of the business cases are available, the validation plan may need to be updated to incorporate the recent developments.

The case related work packages WP21-WP26 will play the most significant role for the validation procedure as this is where case leaders perform their activities, surveys and identify their actions for improvement. More specifically WP23 includes Task 23.dem.4 where a trials and technical validation phase is required to be carried out. Additionally, WP25 is the cases' evaluation related work package following the integration and demonstration work packages and it is suggested that the validation plan must be in line with WP25. So far only Tasks 21.dem.1 has been completed by the case leaders and WP23 is expected to start after M18. The tools for the validation procedure though must be produced as early as possible.

Finally, the validation of the FWF and the evaluation of the business cases have been separated. The present document describes the validation plan for the FWF in the framework of the WP17.2, taking into account the new tasks allocation illustrated in the WP17 Work Plan released by Mobycon. The Deliverable D17.2 provides a detailed description for the evaluation of the cases and the current document makes reference to the cases evaluation plan, as extensive input is expected from the cases assessment.

2 Overview of user needs and requirements

This section provides an overview of the main needs and requirements of the users that the FWF should meet in order to enhance its sustainability, usability and prospect. This input is necessary for the validation of the FWF in order to ensure and validate that these needs and requirements are met. The information provided below has been derived from the project deliverables D12.3 (Requirements Handbook) and D13.1 (Harmonization Strategy), which include a comprehensive picture of the needs of the business cases stakeholders.

The analysis of the market driven requirements as well as the requirements derived from the business cases, revealed areas for improvement. In this sense the changes that should be done, refer to the area of information systems and the common understanding of the current situation by all actors, which in turn means common definitions, basic rules, rules for co-operation and communication. Moreover, issues about safety and protection of users are also important.

The analysis of market driven requirements and the analysis of each business case separately indicated the current situation. Thus, in many cases there is a system which works relatively smooth, but the flow of information is not in such level so that it covers every aspect of the supply chain. Consequently, the requirements for improvement depend on the current situation in each geographical area and each supply chain.

Although the analysis refers to different supply chains, the findings revealed common requirements differing only to the extent of necessary changes. However, these changes are essential to be done in order to apply an effective communication system.

Moreover, the analysis of the aforementioned supply chains results in the development of a process model, which handles the transport operation, where this is broken down into three parts: transport planning, transport execution and transport completion. Each of these parts requires different management of information, different types of information and also involves different types of actors.

The focus of FREIGHTWISE is co-modal freight transport. Hence, the architectural framework to be used and further developed in FREIGHTWISE needs to include all aspects related to co-modal freight transport. This holds true even in the light of the revised EU transport policy where the concept of co-modality has been introduced. All transport modes should be used to the best of their ability, alone or in combinations.

In all forms of freight transport a number of actors are involved (one or more logistics terminals are typically also involved in road only transport operations typically one or more logistics terminals are involved). Efficient cooperation between actors is mandatory in order to secure smooth and effective operations. Each actor performs a set of functions, or, in other words, plays one or more roles during a door-to-door transport operation. In order to ensure commonality between modes, as much as possible, the architecture should focus on the roles in co-modal transport and interaction between roles.

FREIGHTWISE is about freight transport management. This means selecting the most appropriate transport alternative (chain) and ensuring that the cargo moves smoothly from origin to destination. Should deviations occur, then corrective actions should be possible. In the light of this, FREIGHTWISE is not about managing or optimising the resources to be used for transport. This is the responsibility of the service providers (fleet managers of transport companies ensure the best possible use of vehicles and terminal managers ensure the best possible use of equipment and space). As a consequence, the FREIGHTWISE architecture should not have fleet or terminal equipment management as a core, but need to deal with these issues in order to ensure that the service providers are given sufficient information form other roles such that they may be able to use their resources efficiently.

The FREIGHTWISE architecture should enable all stakeholders involved in freight transport to have maximum freedom to decide internal operations and to design information and communication systems. The focus of the FREIGHTWISE architecture should ensure the best possible cooperation between the relevant stakeholders to ensure efficiency and control. Furthermore, the architecture needs to be open such that it may be developed in concert with possible changes in the need for services and it needs to be technology independent.

The requirements and decisions with respect to the framework architecture in FREIGHTWISE can be summarized as follows:

- The architecture should be multimodal. By multimodal we mean that the architecture is common to all transport modes.
- The framework architecture must have significant focus on the overall, generic issues enabling interoperability and efficiency in co-modal transport chains (efficient procedures, efficient information exchange and coordination between stakeholders, etc.). The objective is to simplify procedures and information exchange between stakeholders.
- The focus should be on the generic roles of the stakeholders taking part in co-modal transport and interaction between these roles.
- Fleet or terminal resource management is not focused, but the service providers must be given sufficient information form to be able to use their resources efficiently.
- The internal solutions in the systems of separate stakeholders are not focused.
- The framework architecture shall form a basis for a future European Directive for co-modal freight transport.

3 Description of the Validation subjects

3.1 Purpose and scope

The purpose of this chapter is to define and describe the subjects and elements that will be validated during the validation phase. These are the FREIGHTWISE architectural framework (FWF) and the Information Packages (IPs), which are briefly described following. Since, the business cases are an integral part of the FWF and IPs validation procedure, an overview of the business cases is provided as well.

3.2 The FREIGHTWISE Framework

The main FREIGHTWISE framework elements are the following:

> The identification of the related functions and business processes

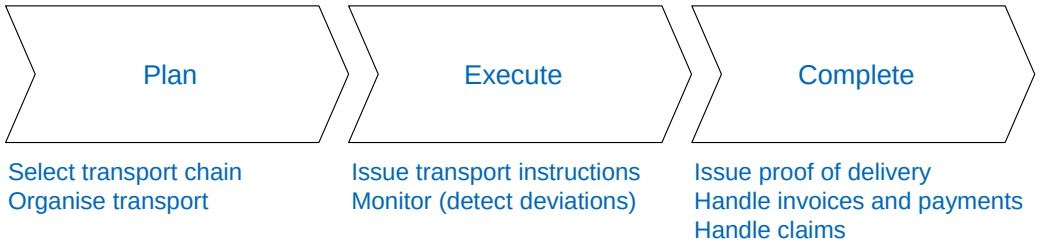
> The identification of roles

> The identification of messages

and

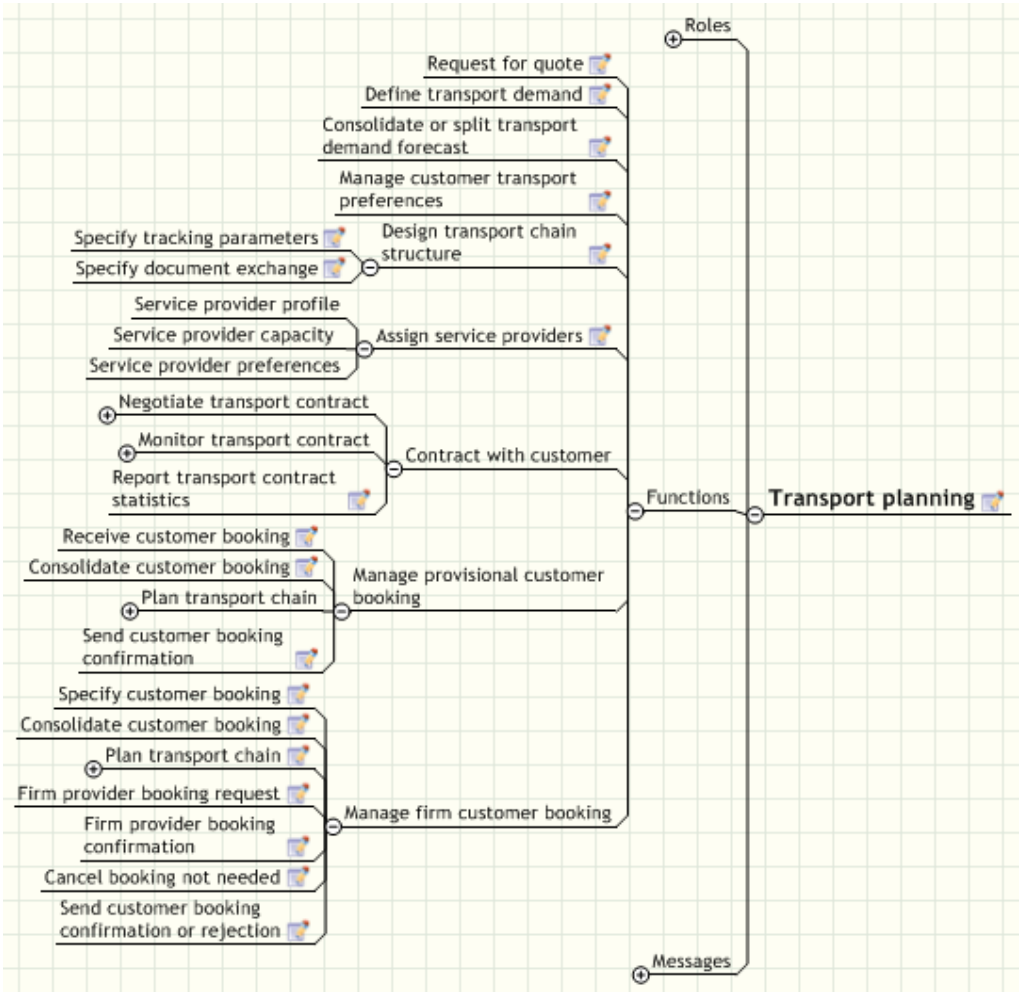
> The identification of which information should be published as part of the VTS concept.

Recent findings from the internal workshops and meetings in the FREIGHTWISE project have revealed the following set of generic service processes that aim to define the set of interrelated tasks or activities that are required to deliver the service in an appropriate sequence:



This validation plan recognises that all services are delivered within a structure or environment, which utilises technology and information. The first and crucial task in planning intermodal transport is to select the transport chain to be used. A prerequisite for making it possible for many transport users to select transport chains for freight is that all available transport chains for the intended combination of origin/destination can be easily found.

The following model maps in great detail the planning phase of a potential transport chain and has been generated by Work Package 13:



It is clearly indicated here that a number of functions have been identified and mapped by work package 13 in order to demonstrate the importance of the design and management of the specific service process.

The operations at the planning phase of the FREIGHTWISE services comprise many interrelated processes. Some tasks and activities may be located in the transport service providers back office away from the transport users (customers), while other tasks or activities take place in the virtual presence of the customer by the transport providers' front office.

At this point the following key tasks have been outlined within the consortium at this phase of the FREIGHTWISE service design:

1 The selection process

2 The standard specification of transport services

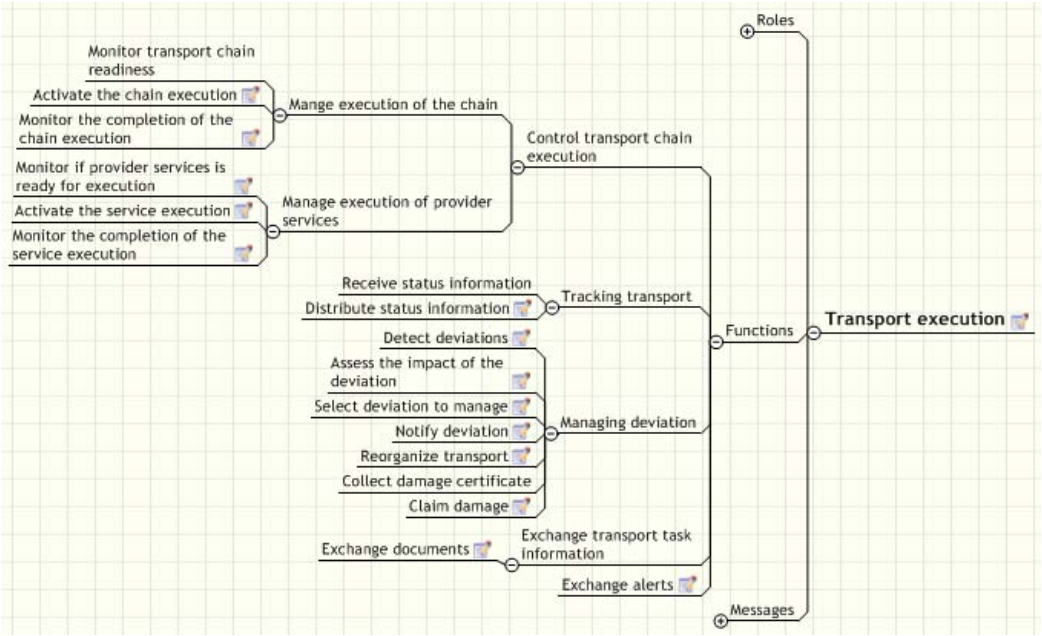
3 Locations

4 Cargo and loading unit terminology

5 Identification of alternative chains

6 Information exchange

The following model maps the transport execution process in the context of the FREIGHTWISE framework architecture:



The detailed execution process as mapped by WP13 is concerned with both what service is going to be delivered and it will be delivered to the involved stakeholders. It follows when transport has been successfully organised.

This includes issuing instructions to the transport service providers and sending information to the Transport Controller about the cargo to be transported.

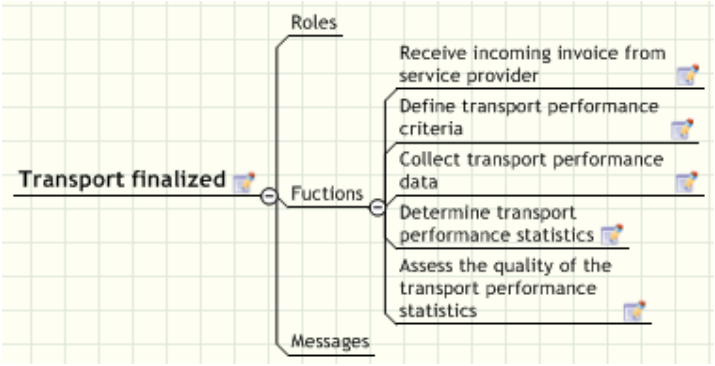
Once transport is in motion, its status is monitored, to ensure that agreements between sender and receiver etc. are being honoured. Should anything go wrong, the necessary corrective actions need to be taken, unless early warnings are given such that preventive actions are possible.

The key tasks here are:

> Issuing Transport instructions

> Monitoring Transport

The finalisation part of the transport chain in addition to issuing a proof of delivery, also deals with invoicing and payment between transport users and transport service providers. Should cargo have been damaged or should there be any other anomaly, handling of claims also needs to be handled as part of this business process.



The key tasks here are:

> Managing payments

> Handling claims

3.3 The Information Packages

The development of Information Packages is a major goal of the project. The aim is to standardize the transport services accomplished by a transport company or a fleet manager. The transport business is administrated; strategically, tactical and operational planning and preparation of fleet operations are done; and on-going transport operations are managed. The main purpose is to be able to plan and accomplish transport services based on actual and foreseen demands from the Transport Demand side, as well as on available infrastructures and resources provided by the Transport Network Management and Terminal Management sides.

Six are the information Packages developed within FREIGHTWISE:

1. TSD - Transport Service Description
2. TEP - Transport Execution Plan
3. TEP - Transport Execution Status
4. TIS - Transport Item Status
5. NTS - Network and Traffic Status
6. TOS - Transport Operation Status

The following figure demonstrates the components of the Transport Service Description.

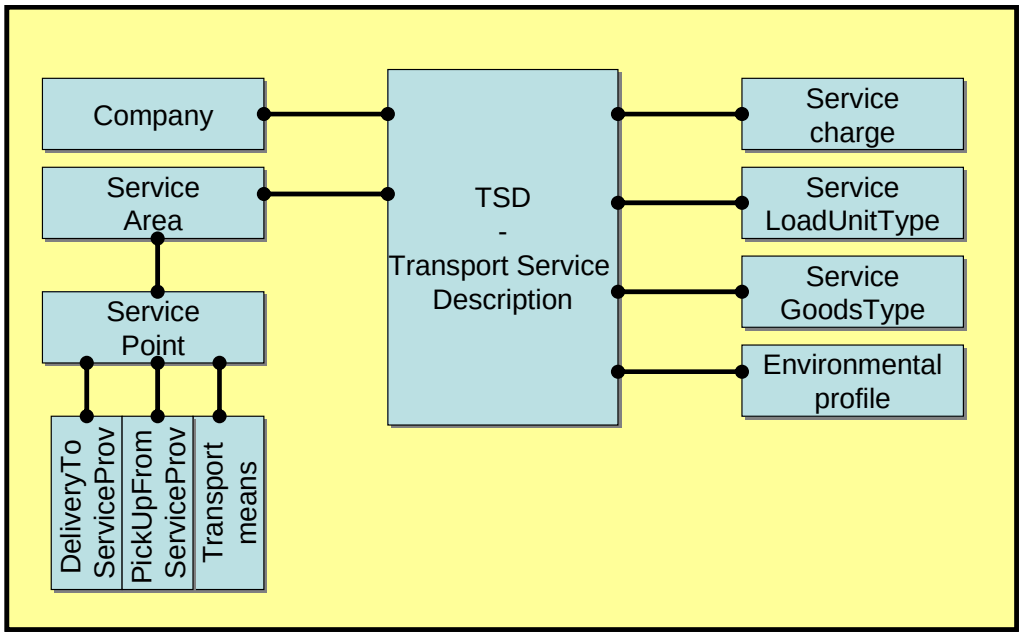


Figure 1: The Transport service description

3.4 The FREIGHTWISE business cases

Validation of the FWF through the business cases will focus on examining whether current needs, processes and applications in the pilot sites conform to the FREIGHTWISE system architecture. Figure 2 below demonstrates the geographical coverage of the business cases, while a short description for each case is provided following.

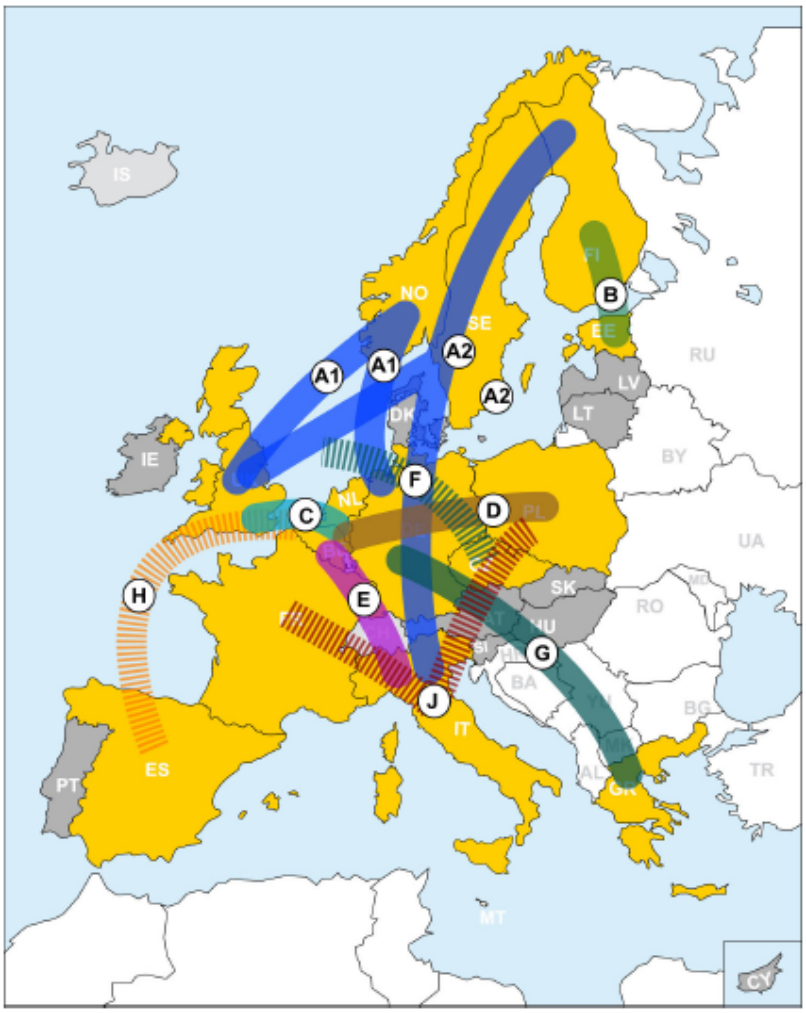


Figure 2: The FREIGHTWISE Business Cases

Case A1 North West

The forest industry in Scandinavia has long distances to the markets in central Europe. This has led to a need to develop highly competitive intermodal solutions involving road, rail and maritime transport; environmental concerns have also been a factor. Due to the distances and the production pattern, rail has good chances to compete with road transport and there are good examples of competitive solutions, although more could be done to shift cargo from the road to rail. The long distances and the necessary integration with maritime links make the logistics systems rather vulnerable to disturbances and delays. There is a need for efficient management systems, to integrate shippers, rail and short sea carriers, ports and traffic administrations.

Case A2 North West (Sweden)

The case addresses a number of critical interfaces in the logistics chain:

Shipper (SCA Transforest) - rail infrastructure operator (Swedish Rail Administration)

Tracking and tracing information collected by automatic reading (RFID) of wagon identity transmitted from the Rail Administration to the paper manufacturer in order to ensure the links between paper unit identity - wagon identity - geographical location. The wagons run back and forth in a closed system with craft-liner products from the production plant in Piteå to the port in Holmsund and return load of paper fibre.

Shipper (SCA Transforest) - 3PL-provider (Hangartner) - rail transport operators (Green Cargo, Kombiverkehr) - private wagon leasing companies - port terminals (Trelleborg, Rostock) – ferry line (Scandlines AB)

Rail wagons for paper rolls running from Sundsvall to Verona in Italy including a ferry leg Trelleborg-Rostock. The wagons are leased by Hangartner from TWA per one way trip.

Hangartner organises the trip from Sundsvall to Verona together with Green Cargo, the ferry operator and Kombiverkehr. The objective is to automate some of the information exchange related to loading, organising and tracking the progress of the wagons through Europe.

Shipper (Volvo Logistics) - port terminal operator (Port of Gothenburg) - road haulier(s) - RoRo-operator (DFDS Torline) - customs

Provision of in-advance information for the planning of pick-up and delivery of intermodal units in the port of Gothenburg.

The objective is improve port terminal and road haulier efficiency (combination of visits, reduction of waiting times, faster unit throughput) by facilitating port access (under secure conditions) through better planning information before a unit is discharged, booked or cleared by customs.

The objective here is to Improve tracking and tracing of rail cargo and facilitate information exchange in the intermodal chain (data capture, automated information exchange).

Enhancing a port community system with an application for improved planning of road hauliers´ pick up and delivery of unit loads in a port terminal.

Case B North East

Competitiveness of intermodal transport can be improved and transport costs reduced if better information was available. Case B will pilot an information system for a cross-border transport network, providing information on arriving and waiting traffic at terminals, ports and border crossings, and support in managing traffic at the corresponding parking areas. The route includes cross-border sea links (Finland – Estonia), and land transport links (Finland – Russia and Estonia – Russia) and terminal transfer points (ports, inland terminals) in Finland and Estonia.

80% of the Finnish import and export is transported by sea. Thus it is most important to improve the level of service of ports and their connections to the inland transport networks. Case B will provide a set of tool for improving these links.

Border crossings from Finland and Estonia to Russia are continuously congested. Vehicles stand queuing for tens of kilometres at all three southern border crossings in Finland and similarly at the Narva border crossing in Estonia. This is not only a logistic problem but also s traffic safety problem and a safety problem for the inhabitants along the roads. Infrastructure improvements are planned and realised but Case B will to provide the authorities also with a tool to manage the arriving traffic.

Uncertainty of the situation at ports, terminals and border crossings as well as the understandable wish to be as close as possible to the head of the queues at these may lead into drivers taking unnecessary risks on the road. Correct understanding of the situation may reduce unnecessary speeding ad thus contribute to improved traffic safety.

Case D Central

Case D, as opposed to several other cases, is not focussed on deploying intermodal management tools to single shippers, logistics integrators, or service providers. It is rather looking at a community approach, where various actors in intermodal freight operations meet vertically (different types of actors engaged in the same freight operation) but also horizontally (the same type of actors engaged in possibly different freight operations). There can be several reasons for this approach.

A wider range of logistics service providers, especially in the SME range, should be able to use or offer intermodal freight management services. An internet based portal (with the necessary security measures installed) could provide new user categories of shippers, freight forwarders, freight integrators (TCM) with such services, without already being established in an existing business network as a subcontractor or customer.

This applies especially to SME's which are most often involved in spot operations. High investment costs for technological solutions to efficient intermodal transport will create a barrier for SME's to enter that should be avoided.

Demonstrating an innovative solution for horizontal collaboration providing SMEs with low cost intermodal management capabilities and supporting other forms of information sharing within intermodal networks, by implementing a portal for intermodal transport management on a network of services in transport hubs and on links from Benelux to the Baltic.

Sequoyah will develop the central business framework, including the business model and legal, administrative, operating conditions. The central technical framework will be established by LogIT, based on the deployment of the TCMS (Logit D2D) and its extension with portal functionality like authentication, collaboration, closed user group mechanisms, etc. TuTech will provide access to its EURIFT geo-coded database, to support networking activities in the pre-contract phase, in order to promote the transport integration portal and encourage users to engage in the intermodal freight management activities.

Case E Benelux

Transport in the congested Benelux area requires good planning and efficient tools. This case centres on the community system Port Infolink in the port of Rotterdam and a major road transport operator Jan de Rijk (JDR). The business idea is to provide support for the optimisation of the (intermodal) transport chains.

For this, Port Infolink will develop a transport order service that will enhance the present services. The Transport Order case will involve a number of companies (shipping lines, forwarders/shippers, on-carriage operators) in developing a working demo by which standard transport orders for on-carriage transport can be sent and received electronically between different players in the logistics chain in an easy way (e.g. via internet which is also available for less automated companies).

Besides, the demo will enable players to exchange orders between each other and between inland modes. The result will support shipping lines and forwarders/shippers in communicating electronically with all their inland logistic service providers in an easy and standardised way. This will improve the performance of the inland logistics chain (speed and utilisation) and especially of the barge and trail modalities. Once the on-carriage operators receive the transport orders, they can re-use the information for other logistic and administrative purposes. As a result, companies do not have to retype the information and fewer mistakes will be made.

JDR already uses very advanced IT systems, including EDI, mobile data communication, TMS, WMS (Warehouse Management System), trip planning, route planning, navigation systems, etc. and is thus well equipped to exchange information with the port. The company wants to make better use of the systems it already operates, by integrating road traffic management data with its transport management system, to deal with the increasing congestion on the European road network. This integration can take several forms:

- Integration of statistical traffic information into the trip and route planning system
- Integration of road network characteristics (maximum speed, speed bumps, round-abouts) into the trip and route planning system
- Integration of planned ‘distortions’ into the trip and route planning system
- Integration of real-time traffic information into the onboard navigation system.

The key issue is to get all the relevant information in a uniform and standardised format from all the different national and regional traffic network operators. The FREIGHTWISE project will explore the options for standardisation, business models and international co-operation, through co-operation with RWS.

Case F Elbe

Manufacturers in Europe are exporting power generating equipment, complete processing plants as well old plants which are obsolete in Europe. The parts to be shipped are often heavy and/or cumbersome and inland waterway is a feasible alternative. Hamburg is an important gateway for the export due a strong position in the trade between Europe and India, Southeast Asia and China.

The actual case is focused on an intra-German transport of transformers manufactured by Siemens in Dresden for export overseas via Hamburg. The port operator Sächsische Binnenhäfen (SBO) and its sister company CSPD take care of the transport from the factory to the inland port and the loading onto the barge operated by Deutsche Binnenreederei (DBR).

Case G Southeast

Greece is transforming from an EU "island" to a multimodal transport gate for Europe on its eastern limit, serving as a gateway between EU and the countries of the Eastern Mediterranean and beyond.

In this context, it is important to promote solutions, which can absorb the increased freight transport demand without generating more traffic on the road networks. In the Southeast case, Proodos holds a central role as a major multimodal freight transport integrator. In co-operation with various rail networks, including OSE, Proodos organises complete trains with general cargo or containers from central Europe for all Balkan countries, ending up in Greece and Turkey.

Case H South west

ARCELOR in cooperation with Port of Gijón and CTIC as communication support shall use the FREIGTHWISE work to develop its understanding of intermodal management systems, contribute with its requirements and assess the feasibility of concrete test cases.

The inputs of the system would be, together with the experience and specific requirements of the intermodal transport needed by ARCELOR, the framework developed by the consortium in other work packages, with the clear target in improving the flow of information mainly in the container transportation used for moving and delivering world-wide finished steel products.

Case J Central South

Case J Central South is separated into two sub-case related feasibility studies focussing the problem of VTS (Virtual Transport Services) from two distinct point of view: the definition of new connections based on intermodal services (sub-case J.1) and the enhancement of an existing potential chain with new virtual services (sub-case J.2).

In both sub-pilot a FREIGHTWISE partner will lead the sub-case with the participation of companies involved in the real business that will provide elements for the analysis of the existing processes and potential improvements.

The two sub-case related feasibility studies are:

1 Sub-case J.1: Integrated information management system for an intermodal rail-road corridor from Germany to Pomezia

2 Sub-case J.2: Development of advanced logistics information exchange in rail transport services. The study will be developed using the existing business

relationships and logistics chains connecting Paris – Piacenza and Piacenza–Gliwice.

4 Pre-Assessment of expected impacts

Through FWF, the FREIGHTWISE project intends to provide a generic system architecture for intermodal transport management and support in the use of management tools. It will demonstrate some new developments intended to facilitate market transparency and a management framework supporting the organisation of intermodal transport chains. The Information Packages and the demonstration of selected business cases are also expected to generate positive impacts. These impacts need to be checked and proved through the implementation of the project, but also beyond the life cycle of FREIGHTWISE.

Thus, it has been necessary to identify the expected impacts and associated target groups and to assess their approximate impact magnitude on these target groups, prior to deciding which specific impacts should be assessed within the project (pre-assessment). Five main impacts have been identified, which have mainly been derived from the project "Description of Work":

1. Standardization and harmonization: The aim is to create input for a European standard framework for the development and integration of ICT systems and modules in intermodal freight transport management. If FWF becomes a de facto standard, the availability of interoperable software solution will be significantly improved, and so will the competitiveness of intermodal transport. The same applies to the IPs, which aim to standardize the messaging process among industrial parties of the freight transport business.
2. Interoperability in intermodal transport chains: FREIGHTWISE sets out to create a framework which, together with technical standardisation and the alignment of business rules, contributes to interoperability. Interoperability in terms of information exchange between stakeholders, business models and processes. The project envisages creating a Directive (or suggestion for a possible Directive) for Interoperability in Intermodal Transport Chains.
3. Industrial competitiveness: The FREIGHTWISE project will make intermodal transport more competitive. As a result, European industries will be able to reduce costs and become more competitive, and at the same time develop more environmentally friendly solutions.
4. Co-modality: The focus of FREIGHTWISE is on co-modal freight transport. Hence, the architectural framework to be used and further developed in FREIGHTWISE needs to include all aspects related to co-modal freight transport. This holds true even in the light of the revised EU transport policy where the concept of co-modality has been introduced. All transport modes should be used to the best of their ability, alone or in combinations.
5. Innovation: Once the FWF and IPs are developed, they will promote an increased development and utilisation of open and "free" systems for management of intermodal transport operations. The project will bring a new concept on transport chain planning and management, and it will promote a great modernization drive in the field of framework architectures, envisaging to provide a solid foundation for future ICT initiatives.

In Table 1, an overall picture of the FWF and IPs pre-assessment is depicted, providing the expected impacts, the affected target groups and an estimation of the expected magnitude of each impact.

Table 1: FWF and IPs expected impacts pre-assessment

Impacts expected on	Target groups	Impact magnitude (*)
Standardization and harmonization	Standardization bodies, ICT systems developers, intermodal transport stakeholders	+
Interoperability in intermodal transport chains	Policy makers, intermodal transport stakeholders	++
Industrial competitiveness	Freight transport industry	+
Co-modality	Intermodal transport stakeholders	+
Innovation	ICT systems developers, Research community, intermodal transport stakeholders	++

(*) ++ very positive; + positive; 0 neutral; - negative; -- very negative

5 The Validation Plan

5.1 The Validation process

The following steps have been considered for the definition and specification of the validation process for the FWF and IPs:

- Determination and study of user needs and business cases characteristics;
- Choice of assessment categories;
- Formulation of assessment objectives and indicators;
- Selection of the user groups to be involved;
- Selection of data collection methods;
- Selection of data analysis methods;
- Execution of the validation process;
- Synthesis and presentation of results.

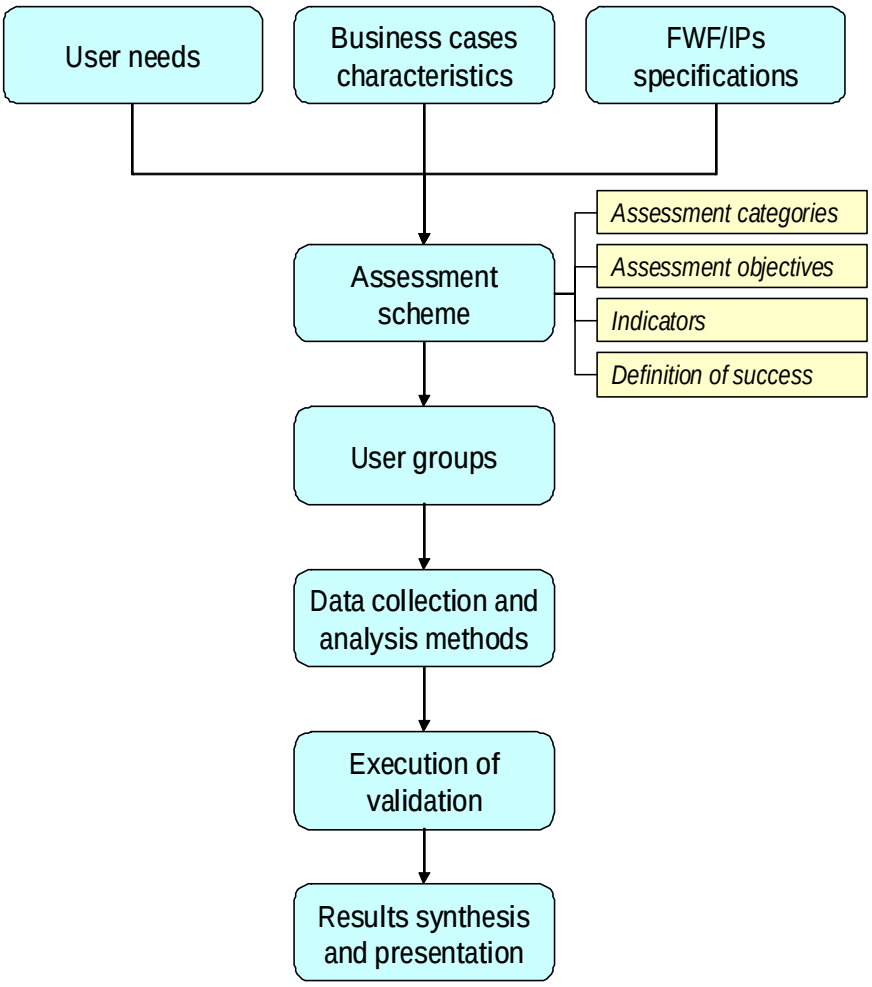


Figure 3: The FWF Validation process

5.2 Validation phases

The whole FWF/IPs validation will be carried out in two phases. The assessment objectives of the two phases are totally dependent on the availability of the FWF and its implementation in the business cases, which are expected close to the end of the project. Therefore, each phase will include the following:

Phase 1: This phase will mainly include the usefulness and functional completeness of the FWF/IPs based on the opinion of stakeholders of selected business cases. It will mainly be a desk validation that will be carried out through questionnaire surveys and interviews. The results of this phase will be documented in the first Validation Report that will be released in Month 24.

Phase 2: This phase will include a validation through the live operation of FWF/IPs on selected business cases assessing both user acceptance and functional completeness. This phase also foresees interviews with stakeholders, policy makers and standardization bodies assessing user acceptance and future potential of the FWF/IPs. The first phase Validation Report will be updated with the results and conclusions of the second phase that will be released towards the end of the project.

The IPs are actually a subset of the overall FWF covering a major part of its messaging/information architecture. Based on this fact, the validation of the IPs is mostly covered by the validation of the FWF and where a differentiation is necessary, the appropriate indications and assessment additions are provided.

5.3 Assessment scheme

The validation plan for both FWF and IPs contains two **assessment categories**:

- User acceptance: In order to assess the applicability of FWF/IPs principles and architecture various user groups have been defined. For the different stakeholders, user acceptance will be estimated in terms of perceived benefits and satisfaction, through questionnaires, interviews or meetings.
- Technical assessment: The objective is to validate on one hand that the architecture is complete and "behaves" correctly, and on the other hand that the user needs have been effectively addressed.

Other assessment categories that will be used supplementary to the above are Impact assessment, which however will be carried out in Task 17.3, and SWOT analysis that will be carried out in Task 17.4.

The validation of an architectural framework, such as the FWF, requires a different validation and assessment approach than a typical ICT application. The primary concern is on the completeness and usefulness of the framework within the context set by the user requirements and specifications of the systems that will be developed based on this framework.

The **assessment objectives** defined for the validation of both FWF and IPs are driven by the primary issues tackled by the reference model, the overall requirements that an effective architectural framework should serve and the needs of the project business cases. Thus, the assessment objectives for the FWF/IPs are:

A. User acceptance by the full range of the intermodal freight transport stakeholders.

B. Functional completeness, in terms of roles, functions, information (messages/ attributes) and work processes.

C. Simplicity, as a contribution to the establishment of a simple and common conceptual model of the transport domain in the minds of transport stakeholders.

D. Stability, since FWF/IPs shall last through changes in user needs, user requirements and technology.

E. Independence, as FWF/IPs should be independent of organisational issues as well as the physical realisation of the ITS solutions.

F. Contribution to interoperability between stakeholders and ICT solutions by means of well defined information exchange message-based interfaces.

G. Contribution to harmonisation across transport modes by providing a co-modal architecture.

For each of the above assessment objectives, two or more **indicators** have been defined, to be used for the quantitative and qualitative assessment. The indicators will be measured using the methods presented below to come to a judgement (personal or subjective) about the usefulness, completeness and expected performance of the FWF and the IPs. The indicators are presented in Table 4, while their description, measurement considerations and definition of success are provided in Annex I.

5.4 Tools and methods to be used

In this section, the tools and methods to be used for the data collection and analysis are described:

1 Data collection:

> Interviews: a series of interviews with a variety of actors/market players in the intermodal transport business will be carried out. The interviewees can be internal (business cases) or external to the project. In these interviews, the FWF will be presented and discussed in order to assess the acceptance of the framework, and to gain feedback about possible missing elements, lack of completeness and input for improvements.

> Questionnaires: this data collection mean will be used as instrument to gather the opinions of both internal and external bodies in a common template and structure. The respondents will be invited to answer to specific questions about

the user acceptance, simplicity and practicality of the FWF/IPs, on a one to five scale in order for the data to be further processed.

> Business cases: the business cases will provide an excellent field for assessing the FWF/IPs operational validity and user acceptance. In particular, through the selected business cases, the FWF and IPs will be evaluated for their functional completeness, ease of use, independence, interoperability and other assessment objectives. The variety of the business cases and their excellent coverage of the European intermodal transport sector (in terms of geography, transport modes, business processes, etc.) will allow the extraction of safe conclusions in all assessment objectives identified for the validation of the FWF/IPs. The business cases will be used as follows:

✓ One meeting will be organized per business case for collecting the data to be used for the above assessment criteria. The main actors involved in each case (particularly industrial) will be brought together and the FWF/IPs will be presented. An open discussion will then take place with these actors based on templates that will be produced for this purpose. The meetings will take place in Months 22-23 (calendar months: August-September 2008) and the stakeholders to participate in each business case meeting are presented below:

Table 2: Participants in the business cases meetings

Business case	Actors to participate
B: North East	Destia Ltd, Eficode Oy, Mobisoft Oy, Traficon Oy
E: Benelux	Jan de Rijk Logistics BV
G: Southeast	Proodos, Thessaloniki Port Authority

✓ The implementation of the FWF/IPs in the business cases will provide additional and valuable input for their operational validation. Three business cases (Elbe, Arcelor Mittal and Case Central) have been selected for the data collection process. This activity will take place close to the end of the project when the demonstration of the FWF/IPs is completed.

In relation to the two phases of the validation process mentioned previously, the following table indicates the methods to be used per phase.

Table 3: The data collection methods to be used per validation phase

Method	Phase 1	Phase 2
Interviews	●	●
Questionnaires	●	●
Business cases - Meetings	●	●

Business cases - Demonstration		•

2 Data analysis and assessment:

> Comparative analysis: This type of data analysis will be employed in the data collected through the business cases – demonstration stage. The as-is situation will be compared with the implemented FWF applications.

> The qualitative data collected through interviews and questionnaires will undergo a typical qualitative analysis to extract the acceptance, usefulness and added value of the FWF and IPs based on the opinion of the intermodal transport stakeholders and to obtain their feedback for improvements.

> The importance/satisfaction matrix will be used. This is similar to the importance/performance matrix, however using the satisfaction element instead of performance, since the FWF and IPs will not have been implemented and demonstrated when this type of data analysis will be carried out. A series of assessment criteria will be defined, while internal (business cases) and external to the project stakeholders will be asked to provide two scores for each criterion: i) importance: meaning how important the specific criterion is according to them and ii) satisfaction: meaning the extent to which FWF/IPs satisfies this criterion always according to the respondents. In that way, diagrams like the following one will be produced for each assessment criterion. In relation to the previous data analysis method, the aim here is to indicate the FWF/IPs elements where immediate improvements are needed.

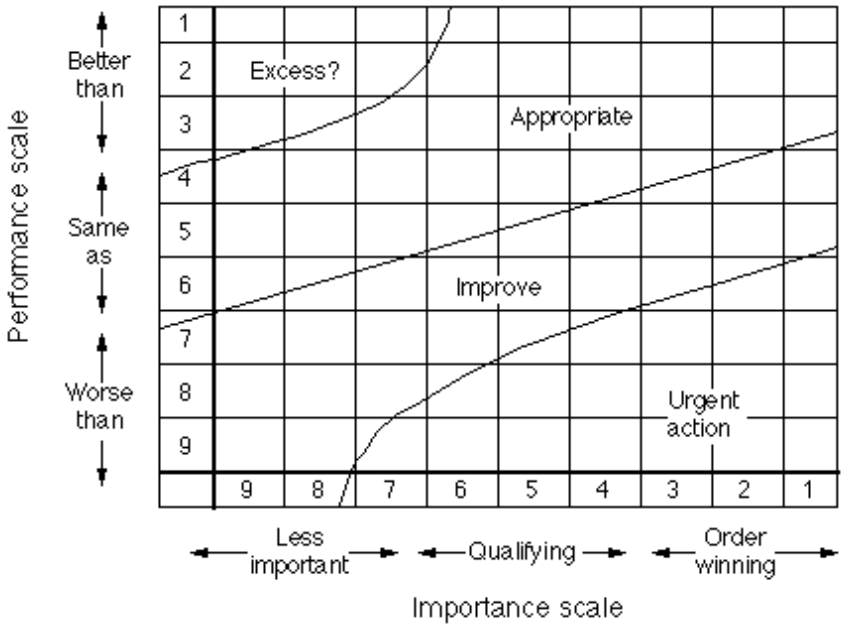


Figure 4: Structure of the importance/satisfaction matrix

5.5 User groups and their role in validation

This section defines the target groups as users of the FWF that will give feedback for the validation of the FWF and IPs. In general, the FWF/IPs are to be used by the majority of the freight transport community, which involves:

- Freight transport industry, intermodal transport stakeholders
- ICT systems developers
- Policy makers
- Standardization bodies
- Research community and academia

Each of the above user categories has different interests in the FWF/IPs and their level of involvement and type of data to be provided varies.

Two user groups' categories have been identified to be involved in the validation of the FWF according to their participation in the project:

Internal This category includes the stakeholders involved in the business cases that will participate in both the evaluation of the cases and the validation of the FWF and the IPs. The FREIGHTWISE project covers all types of user groups mentioned above and therefore it is expected that their feedback will cover the majority of the FWF and IPs elements. The actual industrial partners per business case that will participate in the validation (1st phase) are mentioned in Table 2.

External This category includes other external to the project stakeholders that will be invited to assess the usefulness and prospect of the FWF and the IPs. The third and supportive partners involved in the business cases fall in this category. These mainly include authorities and intermodal transport stakeholders. All these will be defined and approached in the 2nd phase of the FWF/IPs validation.

5.6 Overview of the FWF/IPs validation plan

Table 4 below provides and overview of the FWF/IPs validation plan described in the previous sections. For each assessment objective and associated indicator, the table gives the data collection and assessment methods, the user groups involved and measurement elements.

Table 4: Overview of the FWF/IPs Validation Plan

Assessment objective	Indicator	Definition of success	Data collection method	Assessment method	User group involved	Sampling
A. User acceptance	A.1. Stakeholders coverage by roles	≤ 2.5	Interviews, questionnaires, business cases	Qualitative analysis, Importance/ satisfaction matrix	Intermodal transport stakeholders	In both phases of validation: the stakeholders of 3 selected business cases
	A.2. Sufficiency of the standardized format of messages	≤ 2.5	Interviews, questionnaires, business cases	Qualitative analysis, Importance/ satisfaction matrix	Intermodal transport stakeholders	In both phases of validation: the stakeholders of 3 selected business cases
	A.3. Adaptability to the users' business processes	≤ 2.5	Interviews, questionnaires, business cases	Qualitative analysis, Importance/ satisfaction matrix	Intermodal transport stakeholders	In both phases of validation: the stakeholders of 3 selected business cases
	A.4. Applicability to different standards	≤ 2.5	Interviews, questionnaires, business cases	Qualitative analysis, Importance/ satisfaction matrix	ICT systems developers and standardization bodies	Phase 2: all systems developers per business case and 2 standardization bodies
	A.5. Degree of satisfaction by the business cases entities	≤ 2.5	Interviews, questionnaires, business cases	Qualitative analysis, Importance/ satisfaction matrix	Intermodal transport stakeholders	In both phases of validation: the stakeholders of 3 selected business cases

Assessment objective	Indicator	Definition of success	Data collection method	Assessment method	User group involved	Sampling
B. Functional completeness	B.1. Completeness of roles	≤ 2.5 (qualitative), 100% (quantitative)	Interviews, questionnaires, business cases (meetings and demonstrations)	Qualitative analysis, Importance/ satisfaction matrix, Comparative analysis (as-is)	Intermodal transport stakeholders	In both phases of validation: the stakeholders of 3 selected business cases
	B.2. Completeness of functions	≤ 2.5 (qualitative), ≥ 90% (quantitative)	Interviews, questionnaires, business cases (meetings and demonstrations)	Qualitative analysis, Importance/ satisfaction matrix, Comparative analysis (as-is)	Intermodal transport stakeholders	In both phases of validation: the stakeholders of 3 selected business cases
	B.3. Completeness of messages/attributes	≤ 2.5 (qualitative), ≥ 80% (quantitative)	Interviews, questionnaires, business cases (meetings and demonstrations)	Qualitative analysis, Importance/ satisfaction matrix, Comparative analysis (as-is)	Intermodal transport stakeholders	In both phases of validation: the stakeholders of 3 selected business cases
	B.4. Completeness of processes	≤ 2.5 (qualitative), ≥ 80% (quantitative)	Interviews, questionnaires, business cases (meetings and demonstrations)	Qualitative analysis, Importance/ satisfaction matrix, Comparative analysis (as-is)	Intermodal transport stakeholders	In both phases of validation: the stakeholders of 3 selected business cases

Assessment objective	Indicator	Definition of success	Data collection method	Assessment method	User group involved	Sampling
	B.5. No of change requests	≤10%	Interviews, questionnaires, business cases	Qualitative analysis	Intermodal transport stakeholders	In both phases of validation: the stakeholders of 3 selected business cases
	B.6. No of adaptations	≤10%	Interviews, questionnaires, business cases	Qualitative analysis	Intermodal transport stakeholders	In both phases of validation: the stakeholders of 3 selected business cases
C. Simplicity	C.1. Contribution of roles	≤ 2.5	Interviews, questionnaires, business cases	Qualitative analysis, Importance/ satisfaction matrix	Intermodal transport stakeholders	In both phases of validation: the stakeholders of 3 selected business cases
	C.2. Contribution of functions	≤ 2.5	Interviews, questionnaires, business cases	Qualitative analysis, Importance/ satisfaction matrix	Intermodal transport stakeholders	In both phases of validation: the stakeholders of 3 selected business cases
	C.3. Contribution of messages and interfaces	≤ 2.5	Interviews, questionnaires, business cases	Qualitative analysis, Importance/ satisfaction matrix	Intermodal transport stakeholders	In both phases of validation: the stakeholders of 3 selected business cases
	C.4. Contribution of processes	≤ 2.5	Interviews, questionnaires, business cases	Qualitative analysis, Importance/ satisfaction matrix	Intermodal transport stakeholders	In both phases of validation: the stakeholders of 3 selected business cases

Assessment objective	Indicator	Definition of success	Data collection method	Assessment method	User group involved	Sampling
	C.5. Time for framework understanding	≤ 2.5	Interviews, questionnaires, business cases	Qualitative analysis, Importance/ satisfaction matrix	Intermodal transport stakeholders	In both phases of validation: the stakeholders of 3 selected business cases
D. Stability	D.1. Stability over technological changes	≤ 2.5	Interviews, questionnaires, business cases	Qualitative analysis, Importance/ satisfaction matrix	ICT systems developers	Phase 2: all systems developers per business case
	D.2. Stability over business processes	≤ 2.5	Interviews, questionnaires, business cases	Qualitative analysis, Importance/ satisfaction matrix	Intermodal transport stakeholders	In both phases of validation: the stakeholders of 3 selected business cases
E. Independence	E.1. Independence from organizational changes	≤ 2.5	Interviews, questionnaires, business cases	Qualitative analysis, Importance/ satisfaction matrix	Intermodal transport stakeholders	In both phases of validation: the stakeholders of 3 selected business cases
	E.2. Independence from technological advancements	≤ 2.5	Interviews, questionnaires, business cases	Qualitative analysis, Importance/ satisfaction matrix	ICT systems developers	Phase 2: all systems developers per business case

Assessment objective	Indicator	Definition of success	Data collection method	Assessment method	User group involved	Sampling
F. Interoperability	F.1. Facilitation of the communication between stakeholders	≤ 2.5	Interviews, questionnaires, business cases	Qualitative analysis, Importance/ satisfaction matrix	Intermodal transport stakeholders	In both phases of validation: the stakeholders of 3 selected business cases
	F.2. Interoperability between ICT solutions	≤ 2.5	Interviews, questionnaires, business cases	Qualitative analysis, Importance/ satisfaction matrix	ICT systems developers	Phase 2: all systems developers per business case
	F.3. Interoperability between ICT solutions and local infrastructure	≤ 2.5	Interviews, questionnaires, business cases	Qualitative analysis, Importance/ satisfaction matrix	ICT systems developers	Phase 2: all systems developers per business case
G. Harmonization	G.1. Harmonization of messages serving co-modality	≤ 2.5	Interviews, questionnaires, business cases	Qualitative analysis, Importance/ satisfaction matrix	Intermodal transport stakeholders	In both phases of validation: the stakeholders of 3 selected business cases
	G.2. Validity of roles across all modes	≤ 2.5	Interviews, questionnaires, business cases	Qualitative analysis, Importance/ satisfaction matrix	Intermodal transport stakeholders	In both phases of validation: the stakeholders of 3 selected business cases
	G.3. Contribution of processes templates	≤ 2.5	Interviews, questionnaires, business cases	Qualitative analysis, Importance/ satisfaction matrix	Intermodal transport stakeholders	In both phases of validation: the stakeholders of 3 selected business cases

Assessment objective	Indicator	Definition of success	Data collection method	Assessment method	User group involved	Sampling
	G.4. Contribution to standardization	≤ 2.5	Interviews, questionnaires, business cases	Qualitative analysis, Importance/ satisfaction matrix	Intermodal transport stakeholders, ICT systems developers, standardization bodies	Phase 1: the stakeholders of 3 selected business cases Phase 2: the stakeholders of 3 selected business cases, all systems developers per business case, 2 standardization bodies

5.7 Allocation of roles

HIT will act as the FWF/IPs validation manager and will have the main responsibility for the effective implementation of the present validation plan by all partners involved. HIT will be involved in all tasks of the validation process and will be in close cooperation with the project evaluation manager (Mobycon). In summary within the responsibilities of HIT will be:

- Monitor the entire validation process and ensure efficient data collection and analysis within the predefined time schedule.
- Provide templates and questionnaires to be used in the validation process.
- Provide support to all partners involved.
- Organize the FWF/IPs validation through business cases.
- Organize interviews with standardization bodies at the end of the project.
- Gather and consolidate all data collected by all partners.
- Analyse the data.
- Release the validation reports in both phases.

The FREIGHTWISE evaluation manager, **Mobycon**, will be in close cooperation with the FWF/IPs validation manager in all issues related to the validation of the FWF/IPs and they will interact on a regularly basis. In summary within the responsibilities of Mobycon will be:

- Organize the FWF/IPs validation through business cases.
- Participate in the interviews with standardization bodies at the end of the project.
- Gather and report the findings of its validation actions.
- Review the validation reports.
- Cooperate with HIT in all aspects regarding the validation of the FWF/IPs and the evaluation of the business cases.

The WP13 leader, **Marintek**, will have a key role in the FWF/IPs validation, as main developer of the Framework architecture. In summary within the responsibilities of Marintek will be:

- Cooperate with HIT in the production of a comprehensive and attractive presentation of the FWF/IPs to be used in validation through the business cases.
- Organize the FWF/IPs validation through business cases.
- Gather and report the findings of its validation actions.
- Review the validation reports.
- Incorporate the feedback of the users and the validation results in an improved version of the FWF/IPs.

TREDIT, **CIEM** and **BMT** are the project partners also involved in the validation of the FWF/IPs with similar roles. In summary within their responsibilities will be:

> Organize the FWF/IPs validation through business cases.

> Gather and report the findings of their validation actions.

> Review the validation reports.

The level of involvement of all partners in terms of man-months divided in the two phases of the validation process is presented in Table 5 below.

Table 5: Allocation of resources among the partners involved

Phase	Mobycon	HIT	BMT	CIEM	TREDIT	Marintek	Total
1 (months 1-18)	1	1.5	0.5	0.5	0.5	0.5	**4.5**
2 (months 19-42)	1	1.5	0.5	0.5	0.5		**4**
Total	**2**	**3**	**1**	**1**	**1**	**0.5**	**8.5**

5.8 Timetable

As mentioned earlier, the FWF/IPs validation will be implemented in two phases. The first phase will be concluded in project Month 24 (calendar month October 2008), while the second phase towards the end of the project. Table 6 illustrates the timetable for the main activities to be carried out by the various partners involved.

Table 6: Time planning of activities for the validation of the FWF/Ips

No	*Project month*	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	Who
	Calendar month	2008							2009																
		J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	
1	Prepare the FWF presentation to be used in the business cases meetings																								Marintek, HIT
2	Prepare templates and questionnaires																								HIT
3	Organize the FWF validation through the business cases																								All
4	Gather and consolidate all data collected and report to HIT																								All
5	Data analysis																								HIT
6	Prepare draft validation report of Phase 1																								HIT
7	Review and comments																								All
8	Final validation report of Phase 1																								HIT
9	Instructions for the Phase 2 validation																								HIT
10	Organize the FWF validation through the business cases stakeholders																								All
11	Organize the FWF validation through the business cases ICT developers																								All
12	Organize the FWF validation through standardization bodies																								HIT, Mobycon
13	Validate FWF through the business cases demonstrations																								All
14	Gather and consolidate all data collected and report to HIT																								All
15	Data analysis																								HIT
16	Prepare draft validation report of Phase 2																								HIT
17	Review and comments																								All
18	Final validation report of Phase 2																								HIT

5.9 Outcomes

The main outcome of the validation process will be the results and conclusions from the validation of the FWF/IPs. A provisional structure (table of contents) of the final report (deliverable) is provided below:

1. Introduction
    a. *Aim of the report*
    b. *The role of Validation in FREIGHTWISE*
    c. *Overview of the FWF*
    d. *Structure and content of the report*
2. Outline of the FREIGHTWISE Validation Methodology
3. The Validation results
    a. *Results per assessment objective*
4. Conclusions
    a. *Synthesis of results*
    b. *Recommendations for improvements*
5. References

The above structure will be followed in both phases of the validation. The first release will include the results of the first phase of the validation process, while the second release will be an update of the first release with the results of the second phase of the FWF and IPs validation.

Annex I: Definition of indicators

This annex provides explanatory notes and measurement elements for the indicators identified per assessment objective.

A. User acceptance

A.1. Stakeholders coverage by roles: the extent to which the Roles of the FWF cover all types of stakeholders of the intermodal transport sector. This is a qualitative indicator to be measured through interviews and questionnaire surveys, and to be filled in during meetings with the stakeholders of the business cases.

Definition of success: using a 5 to 1 scale, average score ≤ 2.5

Measured in validation phase: 1 & 2

A.2. Sufficiency of the standardized format of messages: the extent to which the content and structure of the standardized messages (Information Packages) of FWF meets the needs and expectations of the intermodal transport stakeholders. This is a qualitative indicator to be measured through interviews and questionnaire surveys, and to be filled in during meetings with the stakeholders of the business cases.

Definition of success: using a 5 to 1 scale, average score ≤ 2.5

Measured in validation phase: 1 & 2

A.3. Adaptability to the users' business processes: the extent to which the FWF can easily be adapted to the business processes of the intermodal transport stakeholders. This is a qualitative indicator to be measured through interviews and questionnaire surveys, and to be filled in during meetings with the stakeholders of the business cases.

Definition of success: using a 5 to 1 scale, average score ≤ 2.5

Measured in validation phase: 1 & 2

A.4. Applicability to different standards: ICT systems developers and standardization bodies may assess the applicability of the FWF to various standards currently available facilitating their work in developing interoperable systems and modules. This is a qualitative indicator to be measured through interviews and questionnaire surveys, and to be filled in during meetings with ICT systems developers and standardization bodies.

Definition of success: using a 5 to 1 scale, average score ≤ 2.5

Measured in validation phase: 2

A.5. Degree of satisfaction by the business cases entities: an indicator providing the overall satisfaction on the usability, comprehensiveness and usefulness of the FWF by the business cases industrial partners. This is a qualitative indicator to be measured

through interviews and questionnaire surveys, and to be filled in during meetings with the stakeholders of the business cases.

Definition of success: using a 5 to 1 scale, average score ≤ 2.5

Measured in validation phase: 1 & 2

B. Functional completeness

B.1. Completeness of roles: the coverage of the various types of stakeholders of the intermodal transport system and their responsibilities by the FWF. It is both a qualitative and quantitative indicator. In its qualitative form, it will be to be measured through interviews and questionnaire surveys, and will be filled in during meetings with the stakeholders of the business cases. In its quantitative form, it will be measured during the demonstration of the FWF in selected business cases against the as-is situation.

Definition of success: using a 5 to 1 scale, average score ≤ 2.5 (qualitative), 100% of roles are covered (quantitative)

Measured in validation phase: 1 & 2

B.2. Completeness of functions: the coverage of the transport and business processes of the various stakeholders of the intermodal transport system by the FWF. It is both a qualitative and quantitative indicator. In its qualitative form, it will be to be measured through interviews and questionnaire surveys, and will be filled in during meetings with the stakeholders of the business cases. In its quantitative form, it will be measured during the demonstration of the FWF in selected business cases against the as-is situation.

Definition of success: using a 5 to 1 scale, average score ≤ 2.5 (qualitative), ≥ 90% of functions are covered (quantitative)

Measured in validation phase: 1 & 2

B.3. Completeness of messages/attributes: the coverage of the content (fields and attributes) of the messages currently interchanged by the various stakeholders of the intermodal transport system by the attributes of the standardised messages (Information Packages) of the FWF. It is both a qualitative and quantitative indicator. In its qualitative form, it will be to be measured through interviews and questionnaire surveys, and will be filled in during meetings with the stakeholders of the business cases. In its quantitative form, it will be measured during the demonstration of the FWF in selected business cases against the as-is situation.

Definition of success: using a 5 to 1 scale, average score ≤ 2.5 (qualitative), ≥ 80% of attributes are covered (quantitative)

Measured in validation phase: 1 & 2

B.4. Completeness of processes: the coverage of the stakeholders' collaboration in terms of information exchange by the processes of the FWF. It is both a qualitative and quantitative indicator. In its qualitative form, it will be to be measured through interviews and questionnaire surveys, and will be filled in during meetings with the stakeholders of the business cases. In its quantitative form, it will be measured during the demonstration of the FWF in selected business cases against the as-is situation.

Definition of success: using a 5 to 1 scale, average score ≤ 2.5 (qualitative), ≥ 80% of processes are covered (quantitative)

Measured in validation phase: 1 & 2

B.5. No of change requests: the number of changes and modifications requested by stakeholders of the business cases on the functions, messages and processes of the FWF.

Definition of success: ≤10% of the functions, messages and processes of the FWF

Measured in validation phase: 1 & 2

B.6. No of adaptations: the number of adaptations requested by stakeholders of the business cases on the functions, messages and processes of the FWF. These adaptations may be requested by the users to better reflect their business processes and work.

Definition of success: ≤10% of the functions, messages and processes of the FWF

Measured in validation phase: 1 & 2

C. Simplicity

C.1. Contribution of roles: FWF claims that the roles ensure flexibility and simplicity, and enable the establishment of a generic framework architecture. This is a qualitative indicator to be measured through interviews and questionnaire surveys, and to be filled in during meetings with the stakeholders of the business cases.

Definition of success: using a 5 to 1 scale, average score ≤ 2.5

Measured in validation phase: 1 & 2

C.2. Contribution of functions: the contribution of the functions to the overall simplicity, understanding and straightforwardness of the FWF. This is a qualitative indicator to be measured through interviews and questionnaire surveys, and to be filled in during meetings with the stakeholders of the business cases.

Definition of success: using a 5 to 1 scale, average score ≤ 2.5

Measured in validation phase: 1 & 2

C.3. Contribution of messages and interfaces: the contribution of the current structure and content (attributes) of messages and interfaces to the overall simplicity, understanding and straightforwardness of the FWF. This is a qualitative indicator to be measured through interviews and questionnaire surveys, and to be filled in during meetings with the stakeholders of the business cases.

Definition of success: using a 5 to 1 scale, average score ≤ 2.5

Measured in validation phase: 1 & 2

C.4. Contribution of processes: the contribution of the current structure and content of processes to the overall simplicity, understanding and straightforwardness of the FWF. This is a qualitative indicator to be measured through interviews and questionnaire surveys, and to be filled in during meetings with the stakeholders of the business cases.

Definition of success: using a 5 to 1 scale, average score ≤ 2.5

Measured in validation phase: 1 & 2

C.5. Time for framework understanding: the time required by the users of the FWF to understand and interpret its structure, content and elements. This will not be a quantitative but a qualitative indicator, which will be measured through interviews and questionnaire surveys, and will be filled in during meetings with the stakeholders of the business cases.

Definition of success: using a 5 to 1 scale, average score ≤ 2.5

Measured in validation phase: 1 & 2

D. Stability

D.1. Stability over technological changes: FWF should last through changes in the technology and ICT applications used by the various actors. This will be validated by the ICT systems developers of the business cases through interviews, meetings or questionnaire surveys.

Definition of success: using a 5 to 1 scale, average score ≤ 2.5

Measured in validation phase: 2

D.2. Stability over business processes: FWF should last through changes in the business and transport processes of the various parties. This is a qualitative indicator to be measured through interviews and questionnaire surveys, and to be filled in during meetings with the stakeholders of the business cases.

Definition of success: using a 5 to 1 scale, average score ≤ 2.5

Measured in validation phase: 1 & 2

E. Independence

E.1. Independence from organizational changes: FWF should be independent from any changes in the organizational structure of the intermodal transport stakeholders that will adopt it. This is a qualitative indicator to be measured through interviews and questionnaire surveys, and to be filled in during meetings with the stakeholders of the business cases.

Definition of success: using a 5 to 1 scale, average score ≤ 2.5

Measured in validation phase: 1 & 2

E.2. Independence from technological advancements: as any architectural framework, FWF should be independent from any technological advancements and developments. This will be validated by the ICT systems developers of the business cases through interviews, meetings or questionnaire surveys.

Definition of success: using a 5 to 1 scale, average score ≤ 2.5

Measured in validation phase: 2

F. Interoperability

F.1. Facilitation of the communication between stakeholders: the extent to which FWF contributes to the interoperability between stakeholders. This is a qualitative indicator to be measured through interviews and questionnaire surveys, and to be filled in during meetings with the stakeholders of the business cases.

Definition of success: using a 5 to 1 scale, average score ≤ 2.5

Measured in validation phase: 1 & 2

F.2. Interoperability between ICT solutions: the extent to which FWF contributes to the interoperability between different and diverse ICT solutions by means of well defined information exchange message-based interfaces. This will be validated by the ICT systems developers of the business cases through interviews, meetings or questionnaire surveys.

Definition of success: using a 5 to 1 scale, average score ≤ 2.5

Measured in validation phase: 2

F.3. Interoperability between ICT solutions and local infrastructure: the extent to which FWF contributes to the interoperability between ICT solutions and local IT infrastructure by means of well defined information exchange message-based interfaces. This will be validated by the ICT systems developers of the business cases through interviews, meetings or questionnaire surveys.

Definition of success: using a 5 to 1 scale, average score ≤ 2.5

Measured in validation phase: 2

G. Harmonization

G.1. Harmonization of messages serving co-modality: the harmonization of messages used by various actors in co-modal transport is a major requirement and also hindrance affecting current cooperation and transport chain control. The contribution of FWF messages (Information Packages) to this issue will be measured through interviews and questionnaire surveys, and will be filled in during meetings with the stakeholders of the business cases.

Definition of success: using a 5 to 1 scale, average score ≤ 2.5

Measured in validation phase: 1 & 2

G.2. Validity of roles across all modes: in order to cope with co-modal flexibility, the roles of FWF should be valid across all transport modes. This is a qualitative indicator to be measured through interviews and questionnaire surveys, and to be filled in during meetings with the stakeholders of the business cases.

Definition of success: using a 5 to 1 scale, average score ≤ 2.5

Measured in validation phase: 1 & 2

G.3. Contribution of processes templates: the processes of FWF are described on a high level to enable generalisation and independency from local procedures. These process descriptions may be used as a template for harmonisation and local customisation. This is a qualitative indicator to be measured through interviews and questionnaire surveys, and to be filled in during meetings with the stakeholders of the business cases.

Definition of success: using a 5 to 1 scale, average score ≤ 2.5

Measured in validation phase: 1 & 2

G.4. Contribution to standardization: one of the aims of FWF is to create input for a European standard framework for the development and integration of ICT systems and modules in intermodal freight transport management. This is a qualitative indicator to be measured through interviews and questionnaire surveys, and to be filled in during meetings with the stakeholders ICT systems developers of the business cases. Standardization bodies will also be asked.

Definition of success: using a 5 to 1 scale, average score ≤ 2.5

Measured in validation phase: 1 & 2