User-friendly access to information about last-mile infrastructure for rail freight

Final report

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UIC - Union Internationale Des Chemins De Fer, Paris (FR)

UIRR - Union Internationale des sociétés de transport combiné Rail-Route (BE, subcontractor)

Triona AB (SE, subcontractor)

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Table of contents

Table of figures

Abbreviations

ADIF	Administrador de Infraestructuras Ferroviarias (Administrator of Spanish railway infrastructures)
AIEP/IVA	International Association of Sidings' Owner
API	Application Programming Interface
ASP.NET	Active Server Pages.NET
ASTOC	Association of Swedish Train Operating Companies
AT	Austria
AZ	Aktenzeichen (Reference number)
B2B	Business to Business
BA	Bosnia-Hercegovina
BE	Belgium
BeWag	Belgian Wagon Association
BG	Bulgaria
BGH	Bundesgerichtshof (Federal high court of justice)
BME	Bundesverband Materialwirtschaft, Einkauf und Logistik e.V. (German Association Materials Management, Purchasing and Logistics))
BÖB	Bundesverband öffentlicher Binnenhäfen (Federal association of public inland ports)
C	Curia
C#	C-Sharp (programming language)
Ca.	Circa
CEFIC	The European Chemical Industry Council
CEMAT	Combined European Management and Transportation SpA
CEPI	Confederation of European Paper Industries
CER	Community of European Railway and Infrastructure Companies
CESAR	Co-operative European System for Advanced Information
CH	Switzerland
CIP	Customer Information Platform
CIS	Charging Information System

CL	Connecting Line
CP	Comboios de Portugal (Trains of Portugal)
Cp	Compare
CRD	Central Reference Data
CRSC	Cargo Rail Service Center e.V.
CSS	Cascading Style Sheet
CUI	Common User Interface
CZ	Czech Republic
DB	Deutsche Bahn (German railway company)
DBSR	DB Schenker Rail (Company for the transportation and logistics activities of Deutsche Bahn)
DE	Deutschland (Germany)
DIUM	Distancier International Uniforme Marchandises (Uniform distance table for international freight traffic)
DK	Denmark
DUSS	Deutsche Umschlaggesellschaft Schiene-Straße (German terminal operator)
EBA	Eisenbahnbundesamt (German Federal Railway Authority)
EC	European Commission
ECG	European Car-Transport Group
EE	Estonia
EEA	European Economic Area
EEIG	European Economic Interest Grouping
EFIP	European Federation of Inland Ports
E.g.	For example
EIM	European Rail Infrastructure Managers
EN	English
ENEE	Register of European station codes
ERA	European Railway Agency (succeeded by European Union Agency for Railways)
ERFA	European Rail Freight Association

ES	España (Spain)
ESC	European Shippers' Council
ESPO	European Sea Ports Organisation
Etc.	Et cetera
EU	European Union
e.V.	Eingetragener Verein (registered association)
FI	Finland
FR	France
FTP	File Transfer Protocol
GIS	Geographic Information System
GmbH	Gesellschaft mit beschränkter Haftung (company with limited liability)
GR	Greece
GUID	Globally Unique IDentifier
GYSEV	Győr-Sopron-Ebenfurti Vasút (Hungarian rail infrastructure manager)
HC	HaCon Ingenieurgesellschaft mbH
HR	Hrvatska (Croatia)
HTML	HyperText Markup Language
HU	Hungary
IBS	International Rail Freight Business Association
ID	Identification
I.e.	Id est (That is)
IGTL	Izba Gospodarcza Transportu Ladowego (Polish Commercial Chamber of Land Transport)
ILU	European Identifier of Intermodal Loading Units
IM	Infrastructure Manager
IML	Institut für Materialfluss und Logistik (Institute for Material Flow and Logistics)
Int	Integer
IR	Ireland
IRS	International Railway Standard

IT	Information Technology
IT	Italy
IWW	Inland Waterway
JS	JavaScript
JSG	Joint Sector Group (of ERA)
JSON	JavaScript Object Notation
KV	Kombinierter Verkehr (combined transport)
LF	Loading Facility
LKZ	Logistik Kompetenz Zentrum (Competence Center for Logistics)
LMI	Last-Mile Infrastructure
LSP	Logistics Service Provider
LT	Lithuania
LU	Loading Unit
LU	Luxemburg
LV	Latvia
m	meter
Max.	Maximum
ME	Montenegro
Min.	Minimum
MIT	Massachusetts Institute of Technology
MK	Macedonia
MoT	Ministry of Transport
MVC	Model-View-Controller
NL	Netherlands
NN	No Name
NO	Norway
NoSQL	Not Only Structured Query Language
NRE	National Registration Entity

NRW	Nordrhein-Westfalen (North Rhine-Westphalia)
NSA	National safety authority
NVB	Nederlandse Vereniging van Binnenhavensm (Dutch association of inland ports)
OFP	Opérateur Ferroviaire de Proximité (Short line operator)
OLG	Oberlandesgericht (Higher regional court)
OP	Operational Point
ORM	Object Relational Mapping
OSE	Hellenic Railways Organization
ÖBB	Österreichische Bundesbahnen (Austrian federal railways)
PCS	Path Coordination System
PDF	Portable Document Format
PE	Public Enterprise
PL	Poland
PO	Permanent Operation
PT	Portugal
Pz	Projektzentrum (Project center)
Q	Questionnaire
REST	Representational State Transfer
RFC	Rail Freight Corridor
RFG	Rail Freight Group
RID	Dangerous Goods Regulation
RINF	Register of Infrastructure
RKS	Kosovo
RNE	Rail Net Europe
RO	Romania
ROLA	Rollende Landstraße (Rolling road)
Rs.	Rechtssache beim Europäische Gerichtshof (Legal matter in the European court of justice)
RS	Serbia

RU	Railway Undertaking
RU	Russia
SBB	Schweizerische Bundesbahnen (Swiss federal railways)
SE	Sweden
SGKV	Studiengesellschaft für den Kombinierten Verkehr (German promotion center for intermodal transport)
SI	Slovenia
SK	Slovakia
SNCF	Société Nationale des Chemins de fer Français (National society of French railways)
S.p.A.	Società per azioni (Business limited company)
SQL	Structured Query Language
SZ	Slovenske železnice (Slovenian railways)
SZS	Sdružení železničních společností (Association of Czech railway companies)
t	ton
TAF	Telematics Application for Freight
TAP	Telematics Application for Passenger
TEN	Trans-European Networks
TEU	Twenty-Foot Equivalent Unit
TF	Transfer Station
TIS	Train Information System
TP	Transition Period
TR	Turkey
TSI	Technical Specification for Interoperability
U	Berufungen in Zivilsachen (Appeals in the civil matter)
UA	Ukraine
UIC	Union Internationale des Chemins de Fer (International union of railways)
UIR	Unione Interporti Riuniti (Italian association of freight villages)
UIRR	Union Internationale pour le Transport Combiné Rail-Route (International union for road-rail combined transport)

UK	United Kingdom
UrhG	Urheberrechtsgesetz (Copyright act)
URL	Uniform Resource Locator
UWG	Gesetz gegen den unlauteren Wettbewerb (Act against unfair competition)
VABU	Verband für Anschlussbahnunternehmen (Association for siding companies)
VDV	Verband Deutscher Verkehrsunternehmen (Association of German transport companies)
WKÖ	Wirtschaftskammer Österreich (Austrian Chamber of Commerce)
WP	Work Package
WS	Workshop
XML	Extensible Markup Language
ZIP	Zone Improvement Plan
ZR	Revision in Zivilsachen (Revision in the civil matter)

1 Introduction

1.1 Background and objectives of the study

The structure of the European rail freight market has profoundly changed during the last two decades influenced by two important drivers:

- Beside the separation of rail network operation and train operation by the most of the national incumbent railway undertakings, new market entrants offer their services with increasing market shares. In Germany, the latter currently hold a market share of about 25 %. As a result, the operation of rail freight services cannot generally be offered from a single hand.
- Rail freight is competing with road transport that is considered as more flexible. Clients of transport services are demanding for transparent and seamless logistics chains at short notice. Therefore, for the planning and organisation of customer-oriented rail freight offers, all information must become available "at your fingertips".

The above described developments are in particular challenging for last-mile services. The lack of an easy and quick access to information about last-mile infrastructure for rail freight has become a significant barrier to the planning of rail-based transport solutions, in particular across borders. Thus, the general objective of the study is to resolve these difficulties by developing an EU-wide web-based portal with GIS functionalities, capable of presenting in a consistent way all relevant data for different kinds of last-mile infrastructure. The definition of what type of information is regarded as "relevant", and the way information is displayed, shall be closely based on user needs. A further objective is to propose procedures and identify potential entities to manage such a portal on a permanent basis.

1.2 Definition of last-mile infrastructure for rail freight

In order to fulfil the above mentioned objectives, a common understanding of last-mile infrastructure has been developed in the present study. In contrast to the general usage of the term "last-mile" in the logistic world, this study does not capture the entire transport chain (where the last-mile is often performed on road), but concentrates on the last (or first) rail part. Thus, the focus is on all possible access points to or from rail freight with

- The loading facility as the nucleus of last-mile infrastructure, providing all necessary infrastructural, technical and operational components to tranship cargo from or to rail (loading ramps, paved surfaces, handling equipment, etc.). The loading facilities might be located at industrial sites, warehouses, railports, ports or intermodal terminals, etc.

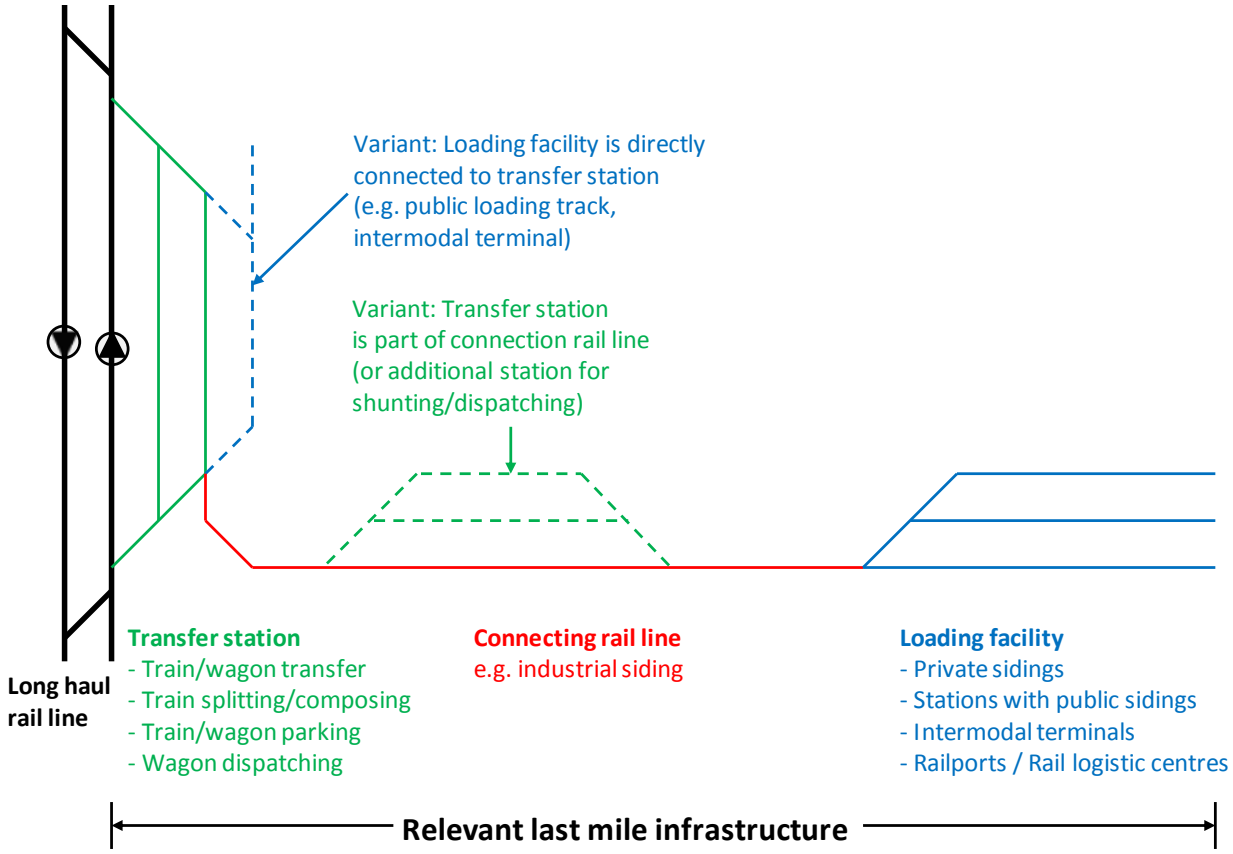
  In order to ensure functionality of the loading facility, supplementing infrastructure is needed in most cases and hence also incorporated into the term "last-mile infrastructure"; these are

- Smaller local shunting yards, indicated as transfer stations, for train formation in the vicinity of above-mentioned sites, if their primary purpose is to enable the collection and delivery of wagons/trains to such specific sites;

- Local rail tracks or connecting lines leading from and to the loading facilities (rail tracks which are not used by other traffic than that from and to these sites);

Figure 1 provides a schematic overview on these parts of last-mile infrastructure for rail freight. On demand, even "historical" sites currently out of service, possibly disconnected and partly or completely dismantled, but with a potential of revitalisation, if applicable, will be considered.

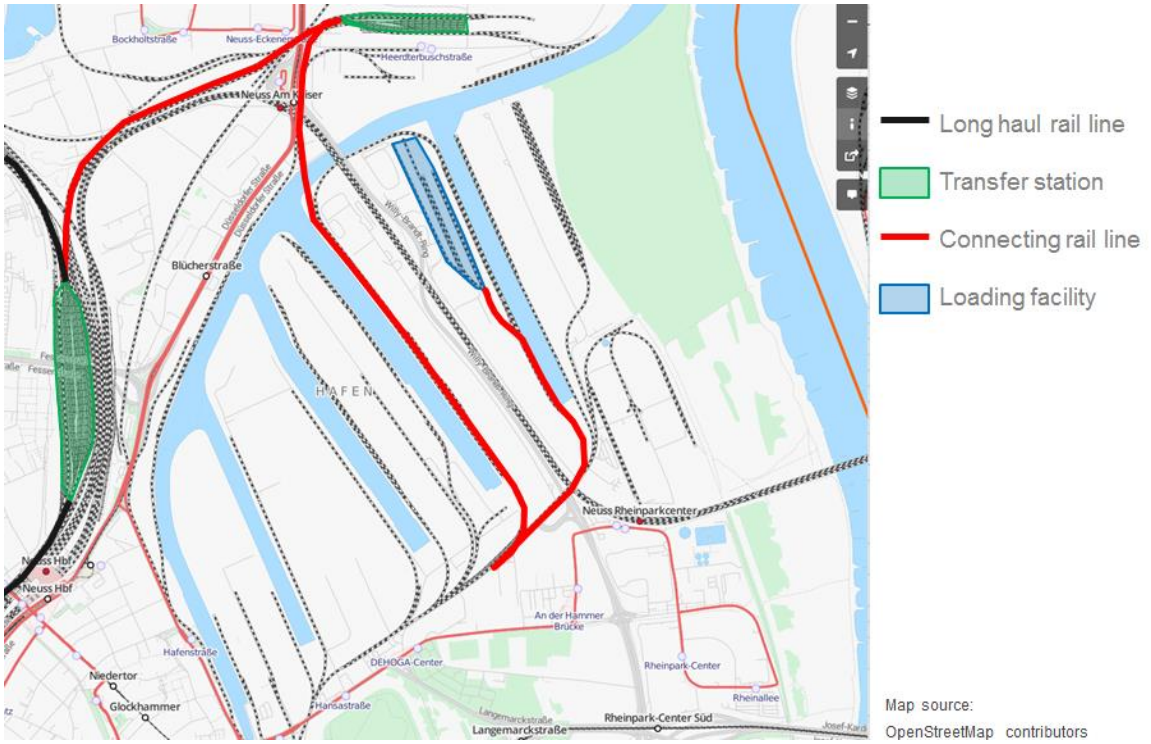
Figure 1: Components of "Last-mile infrastructure"



Source: HaCon

Of course, the constellation of these last-mile infrastructure components shows numerous variants in real life. For example, in many intermodal terminals the transfer station (i.e. tracks for train arrival/departure) is directly connected to the loading facility (i.e. the transhipment tracks) without a connecting line. Other sites might have an additional transfer station for fine-tuning of wagon composition or parking. However, as Figure 2 and Figure 3 clearly show, the general understanding with the defined components can always be detected in existing last-mile rail infrastructure.

Figure 2: Example of last-mile rail infrastructure: Intermodal terminal (Neuss Trimodal, DE)



Source: HaCon

Figure 3: Example of last-mile rail infrastructure: Private siding (Steel plant Differdange, LU)

Source: HaCon

1.3 Structure and concept of the study

In correspondence to the main objectives of the study (see chapter 1.1), the overall service is composed of four technical, content-related work packages (WP), which are described in respective main chapters of this report:

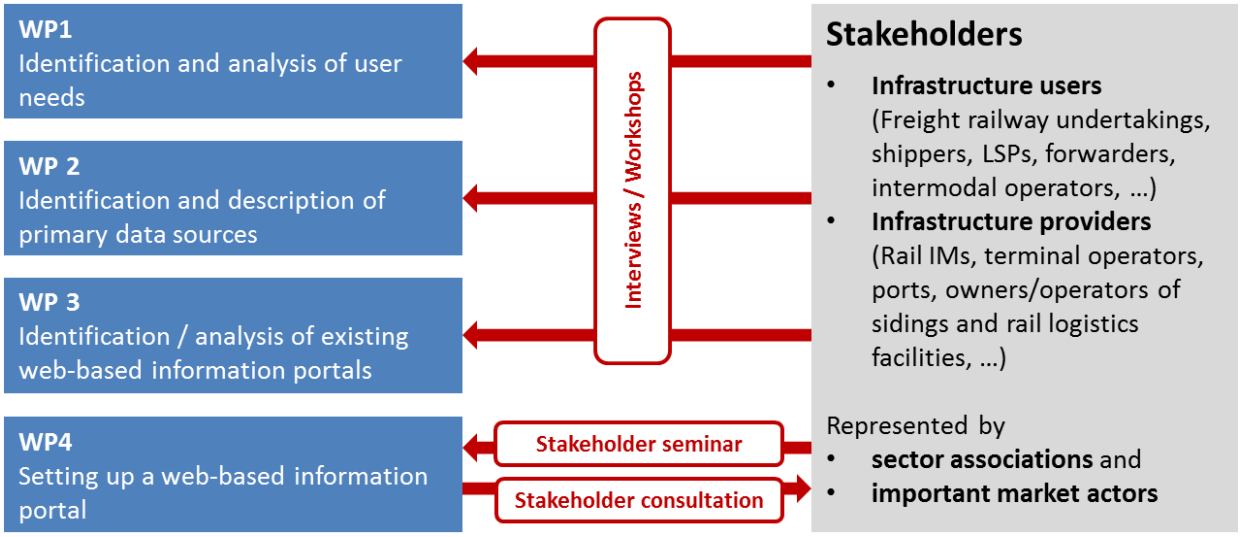
- **WP 1: Identification and analysis of user needs (chapter 2)**: Identification and analysis of user needs regarding information about last-mile infrastructure for rail freight and development of a requirement profile on the content and functionalities of an EU-wide web-based information portal. All relevant stakeholders, such as railway undertakings, shippers, rail logistical service providers (e.g. rail freight forwarders and intermodal operators) must be considered.
- **WP 2: Identification and description of primary data sources (chapter 3)**: Identification and description of primary data sources covering all EU-countries with a rail system, and analysis of conditions of availability of these data for the purpose of a public EU-wide web-based information portal, including proposals for procedures to manage a regular update of the information in the portal, including identification of potential entities for the management of a permanent web-based information portal.
- **WP 3: Identification and comparative analysis of existing web-based information portals (chapter 3)**: Identification and comparative analysis of existing regional, national and international web-based information portals about last-mile infrastructure for rail freight.
- **WP 4: Setting up a web-based information portal (chapters 4 and 5)**: Development and programming of a web-based information portal with GIS-application, which will be put online during the project, filling of the portal with data for at least three major regions (industrial agglomerations) in at least three different Member States - of which one in Central-Eastern Europe - , managing the administration of the portal until the end of the project, organising a stakeholder seminar to demonstrate the online-information portal, carrying out a stakeholder consultation about the content and functionalities of the portal and deriving recommendations for the operation of a possible permanent portal.

The elaboration of the study is done in close cooperation with relevant stakeholder organisations to secure a European wide data coverage, market-orientation and high user acceptance. A proper stakeholder involvement has been secured by different channels (see Figure 4) which are:

- Workshops with specific user groups, especially for user requirements on data and features;
- Supplemented by interviews (questionnaires) in case of gaps and for verification of findings;
- Stakeholder seminar to present online last-mile portal and

- Stakeholder consultation for getting feedback to the online portal and input for a potential permanent portal.

Figure 4: Stakeholder involvement

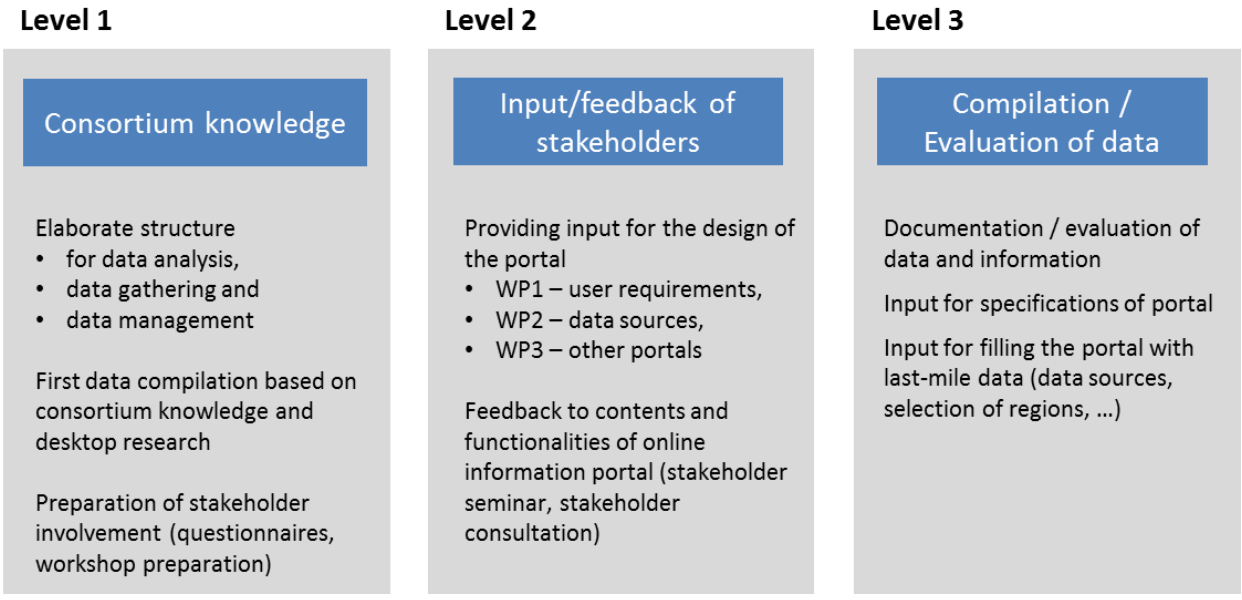


Source: HaCon

The collection and verification of data is the main basis for all tasks within the study. This concerns especially the identification of user requirements and sources of last-mile infrastructure data to be exploited for the portal.

An efficient methodology for the gathering of data is mandatory to ensure the identification and exploitation of all relevant information that are available. The applied methodology for collection of data is divided in three levels, comprising the exploitation of knowledge within the consortium, the involvement of stakeholders and finally a compilation and evaluation of the combined data sets (see Figure 5).

Figure 5: Methodology of data collection



Source: HaCon

Level 1: The project team has combined all the required expertise and significant experiences in rail based logistics and state-of-the-art GIS information systems on a European level. The result is a balanced blend of market knowledge as well as consulting and software development skills – covering all types of rail freight services (intermodal, single wagon load and block trains including last-mile operations). Consequently, the first level of data collection exploits this extensive knowledge of the consortium. On this basis, a first compilation of data and information from consortium partners and subcontractors supplemented by desktop research has been carried out.

The data have been used to prepare the involvement of stakeholders properly, e.g. by elaborating questionnaires. This is absolutely necessary for achieving the desired input/feedback, needed for the development of a user-oriented information portal.

Level 2 comprises the involvement of stakeholders. The consortium itself has an outstanding network to the entire range of relevant stakeholders, involving the main sector associations from rail transport and industry; some of these are part of the study team (UIC, UIRR); others are well known to the consortium partners. These stakeholders are especially important for identifying user requirements (cp. WP 1). For this purpose the data collection process involves workshops in the starting phase of the study with specific user groups. In order to fill gaps and verify the findings, interviews are carried out with selected experts / organisations / companies.

After having developed the system and implementing a prototype version, the portal will be presented to stakeholders in a dedicated seminar. Potential users will be invited to test the system and to give feedback in the scope of the concluding stakeholder consultation.

Level 3 represents the concluding part within each work package. It summarises the combined data de-livered by the consortium and the stakeholders. All data and information will be analysed and evaluated to draw the necessary conclusions

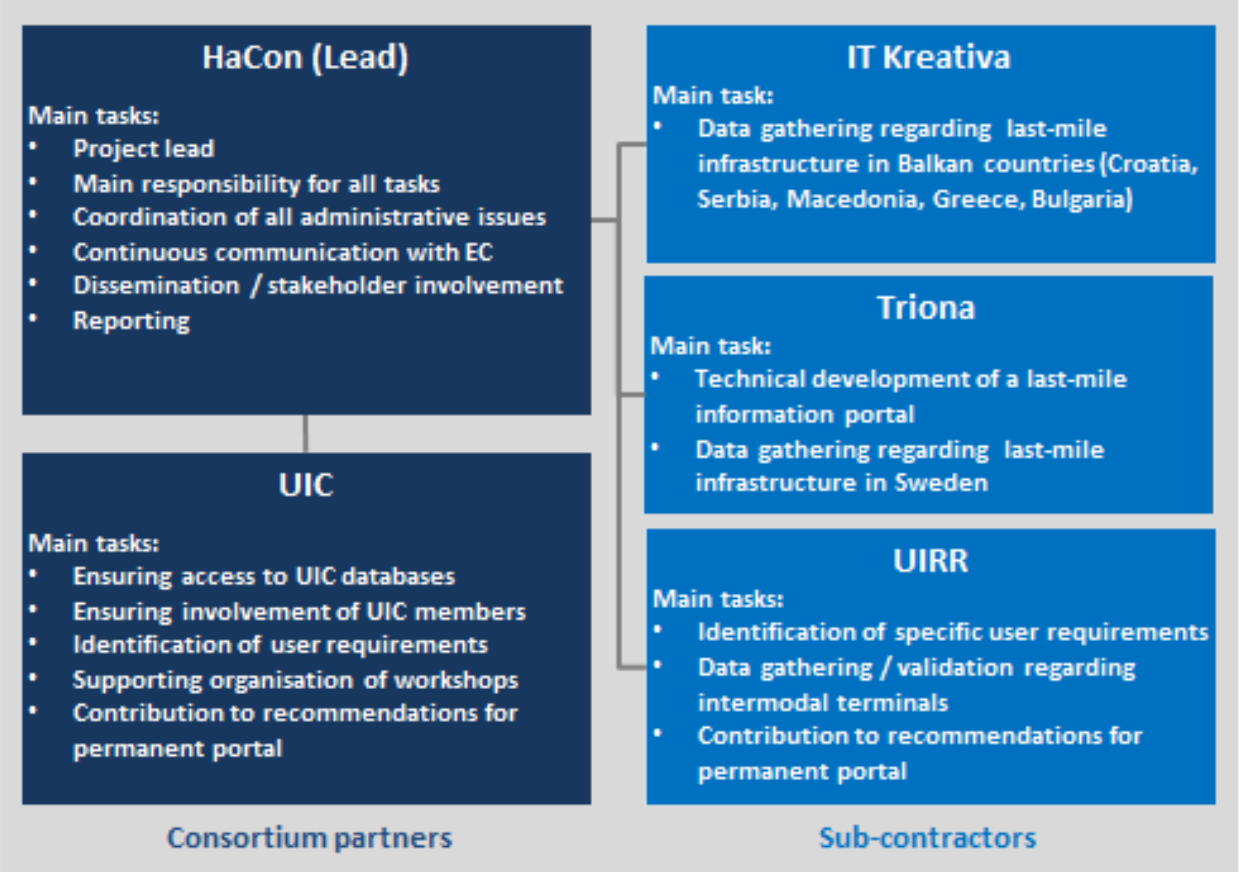
- for the development of the portal,
- data feeding sources and processes including appropriate update mechanisms,
- identification of suitable regions for filling of detailed last-mile information and
- final recommendations for a permanent portal.

1.4 Project team

The consultancy consortium consists of the core partners HaCon and UIC. Both can look back on decades of experience in all areas of the rail freight transport business and together they cover all relevant competences for the carrying out the tasks of this study.

In order to guarantee an optimal integration of all European countries / regions, of the intermodal market and of specialised knowledge on GIS-based information portals IT Kreativa, Triona and UIRR have been involved as subcontractors to contribute to the study for specific tasks. Figure 6 provides an overview on the entire project team and displays the main action fields and responsibilities.

Figure 6: Project team with main responsibilities



Source: HaCon

2 Identification and analysis of user needs

2.1 Objectives / Methodology

Last-mile infrastructure for rail freight services is designed for the specific requirements of users based on the type of rail freight services (e.g. single wagonload, block trains, intermodal transport), the requirements of commodities to be transported and transhipped (e.g. liquid goods in chemical industry) and logistical considerations (e.g. frequency of service, total transport volumes, operation concepts). In this context, it has to be considered that last-mile infrastructure on one side can be publicly accessible (e.g. public intermodal terminals, railports, public loading tracks in railway stations or ports) and on the other side can be privately-owned (e.g. private sidings, private intermodal terminals).

Main objective of this task is to specify the envisaged GIS portal regarding

- Information content required by different user groups, represented by stakeholder clusters, and
- Program features to handle and visualise the data.

The methodology for the identification of these user needs and the elaboration of a requirement profile follows a multi-level approach:

1. A classification of last-mile infrastructure into main types and their occurrence in Europe leads to conclusions regarding their specific logistic attributes and their relevance.
2. The identification of stakeholders, which might be potential users and/or data providers for the GIS portal, is the basis for the consultation process.
3. The compilation of "long lists" of information items and program features captures the maximum scope of the GIS portal with respect to data management and processing.
4. The work steps 1-3 were used to specify the requirements in detail by exploiting the results of
    - three workshops held in Paris (26.03.2015), Lugo (26./27.03.2015)[1] and Budapest (21.04.2015);
    - an online questionnaire and
    - interviews with selected operators of existing information portals and owners of data stocks.

[1] Combined with UIRR terminal interest group

2.2 Types of last-mile infrastructure and their occurrence in different countries

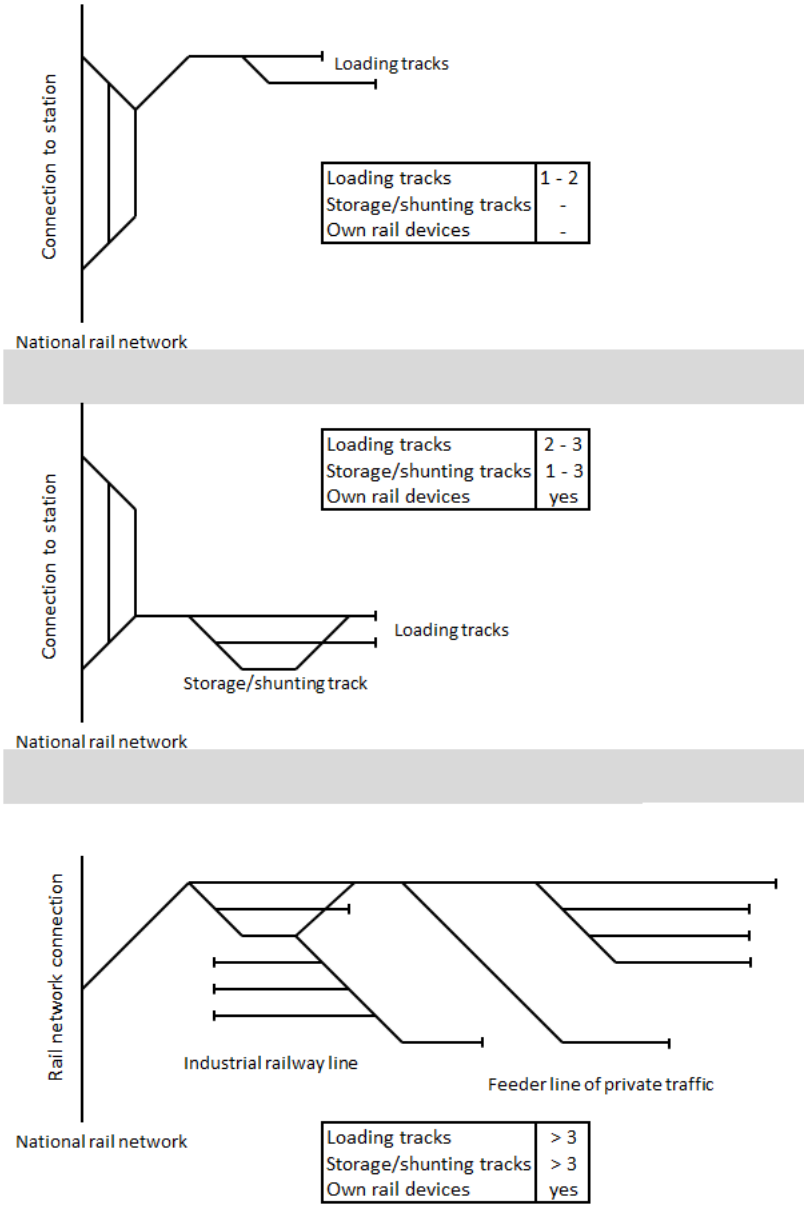
2.2.1 Types of last-mile infrastructure

In order to specify user needs on an information portal properly it is important to understand that "last-mile Infrastructure" comprises a large variety of different infrastructure configurations associated with respective modes of operation. It is therefore necessary to define relevant clusters of last-mile infrastructure, which facilitate overview and allow addressing dedicated information attributes.

This clustering refers to the general understanding of last-mile infrastructure (see Figure 1) with the loading facility itself as a nucleus and further infrastructure components (transfer station, connecting line) required to ensure operation of the loading facility. Thus, the following four main types of last-mile infrastructure have been identified as basis of the following statistical analyses:

- Private sidings: Private sidings are privately owned and operated pieces of rail infrastructure, connecting loading facilities (which are not part of the rail infrastructure) to the public rail network. The layout configuration depends on the individual requirements of the respective customer. It might cover a wide range reaching from a simple loading track connection to complex rail networks (see Figure 7). Sometimes several private sidings are connected to a feeder track, which in turn is connected to the public network (e.g. in ports).

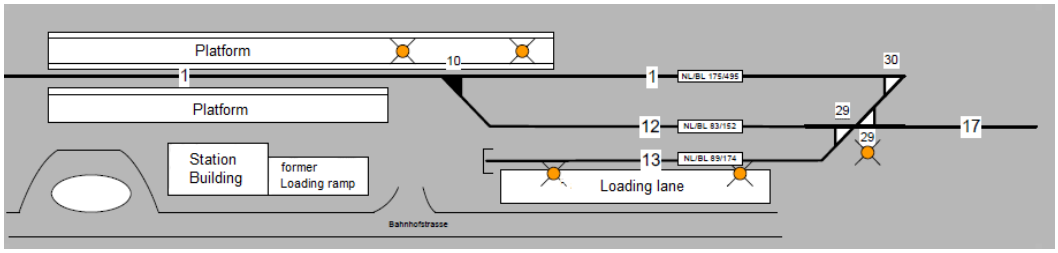
Figure 7: Size range of private sidings



Source: HaCon

- Stations with public sidings: This category contains public accessible loading tracks, mostly located directly in public railway stations and owned by the respective infrastructure manager. Once, almost all railway stations used to provide this kind of rail access "for everybody". Thus, the infrastructure often represents this historical status: rather short tracks, designed for single wagon traffic, enriched by a loading lane and a side/head ramp (see Figure 8), adjusted to the formerly most often used types of freight wagons (class G, E, K). Nowadays, public loading tracks become more and more rare; their relevance is often restricted to few, dedicated types cargo (e.g. wood).

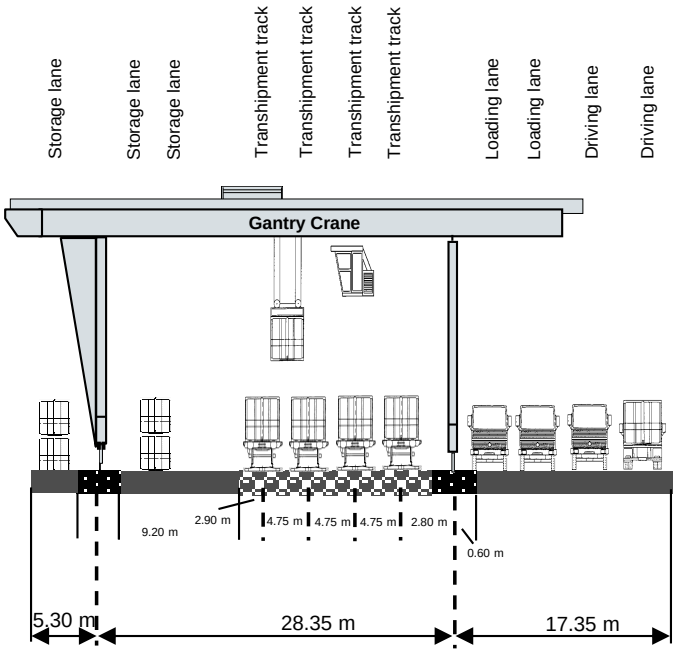
Figure 8: Typical arrangement of a station with public siding



Source: DB Netze

- Intermodal terminals: Intermodal terminals are designed for transhipment of standardised loading units (containers, swap bodies, trailers) between at least two modes. In most cases they are public accessible, but some of them are privately operated (e.g. in seaports), sometimes even as private sidings. Within this study, only terminals with rail connection (rail/road or rail/road/water) have been considered. From the railway infrastructure perspective (Figure 9) they consist of
  - A transhipment area with loading tracks, loading/driving lanes for the trucks and areas for (short term) storage of loading units and
  - Rail operation tracks (train arrival/departure, train splitting/composing, wagon parking).

Figure 9: Example for a "standard" transhipment module of an intermodal rail/road terminal



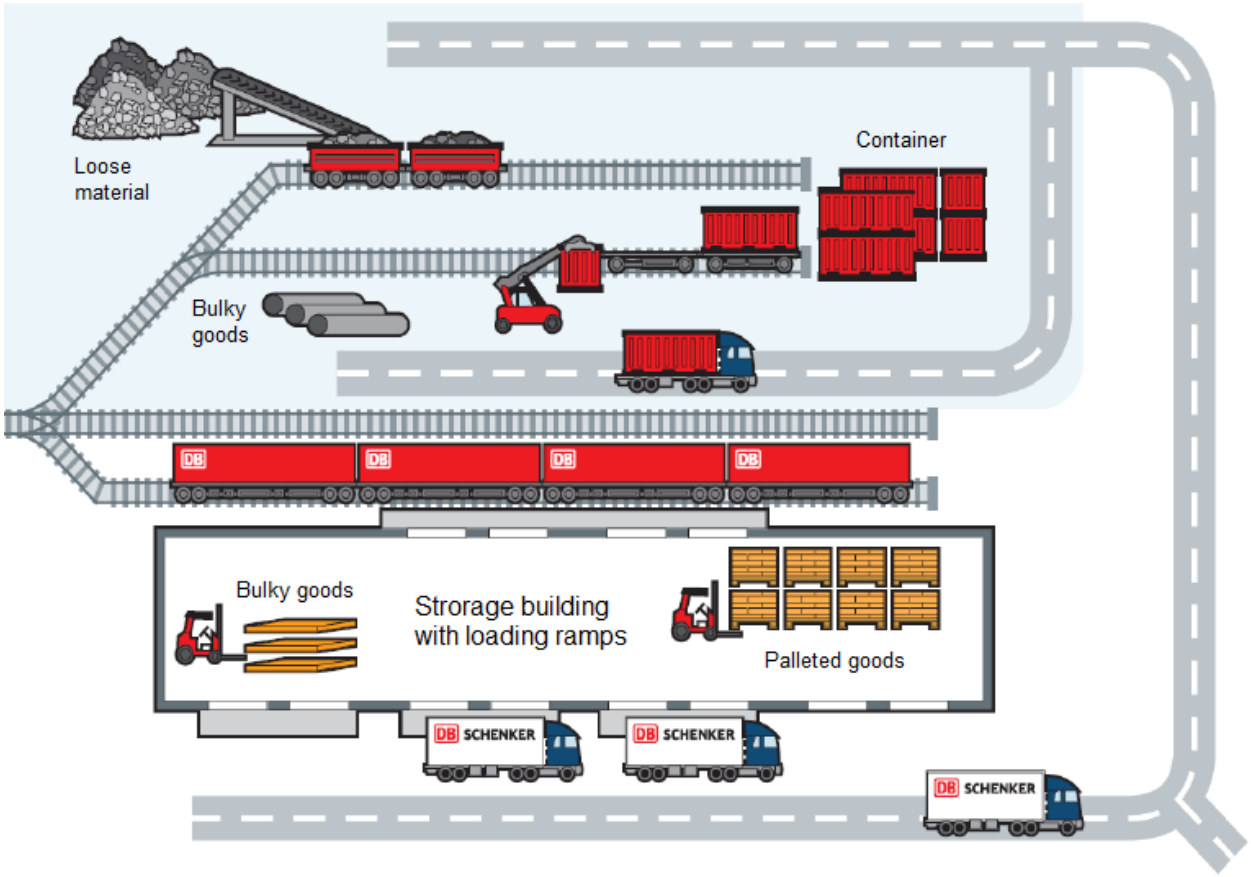
Source: DUSS

Main trends of intermodal transport show a clear tendency towards "industrialisation" with standardised operational procedures and infrastructure configurations (see Figure 9).

- Railports are actually a brand name of DB Schenker Rail. In this study, the term stands for all kinds of rail/road transhipment stations except intermodal terminals (see above). In this respect, also expressions like "conventional terminal" or "rail logistics centre" are commonly used. In most cases, railports are operated either by railway companies directly or by their cooperation partners (e.g. forwarding companies).

  One main intention to establish railports was to substitute private and public sidings which were no longer served by rail. Thus, they are principally open for everybody and for all types of cargo. They do not only provide pure transhipment but also additional services like storage, consignment or road pre-/end-haulage (see Figure 10).

Figure 10: Typical railport configuration and logistics services



Source: DB Schenker Rail

Other terms often used in context with last-mile infrastructure areas (sea-/inland) ports, freight villages or industrial zones. They can be understood as dedicated locations and/or conglomerations of one or more of the infrastructure types listed above. Thus, they are not considered within the following analyses as a dedicated type in order to avoid double counting. However, they are of course included in the GIS portal as an additional search/information item (see also chapter 2.4.1).

2.2.2 Occurrence of last-mile infrastructure types in Europe

Within a next work step, the occurrence of the defined types of last-mile infrastructure in the European countries has been examined. The outcome provides important results in several respects:

- The number of dedicated types of last-mile infrastructure is an indicator of the relevance for rail freight in Europe; this must of course be reflected in the GIS portal;
- The development of these figures within the last years provides an impression on the expected relevance of the last-mile infrastructure types in the future;
- The interest of users in last-mile infrastructure information is expected to depend on the type of this infrastructure;
- The performance of the analysis has illustrated the situation regarding data availability and quality for last-mile infrastructure.

Within this study, all EU-28 countries have been considered, plus Norway and Switzerland, but without Cyprus and Malta, which do not show any rail freight service. Thus, 28 countries have been included into the following overviews.

During this work step, numerous data sources have been used, analysed and evaluated. Summarising, the data availability and quality shows an ambivalent picture: On one hand, sufficient up-to date data on list-mile occurrence is available particularly for intermodal terminals. This is due to international organisations like UIRR, AGORA or SGKV collecting and providing terminal data of their members towards (potential) customers. On the other hand, such international databases do not exist for private or public sidings. Respective information - as far as available at all - is provided by infrastructure managers on national level, either directly via web-sites and personnel contacts or via network statements. Moreover, these sources do not provide homogenous data structures: while some figures only include loading tracks, other values refer to all kinds of tracks in the respective station. In this context, the status of the infrastructure is mostly unknown as well: are the listed private/public sidings merely exiting, is there a service contract or are they actually served on a regular basis? Such questions could often not be answered even by the interviewed infrastructure managers. These circumstances must be kept in mind when interpreting the following figures on last-mile infrastructure occurrence.

The following paragraphs and Annex 1 provide an overview on the occurrence of the defined four main types of last-mile infrastructure. In most cases, not all European countries could be covered by one single data source. However, the number of actually used data sources was limited as far as possible in order to avoid merging of figures with possibly different meaning/content (see above).

As a second condition, the selected data source had to be up-to date (not older than 2013). This is most important to receive a consistent picture, as the number of all last-mile infrastructure types showed a significant development during the last years in nearly all European countries:

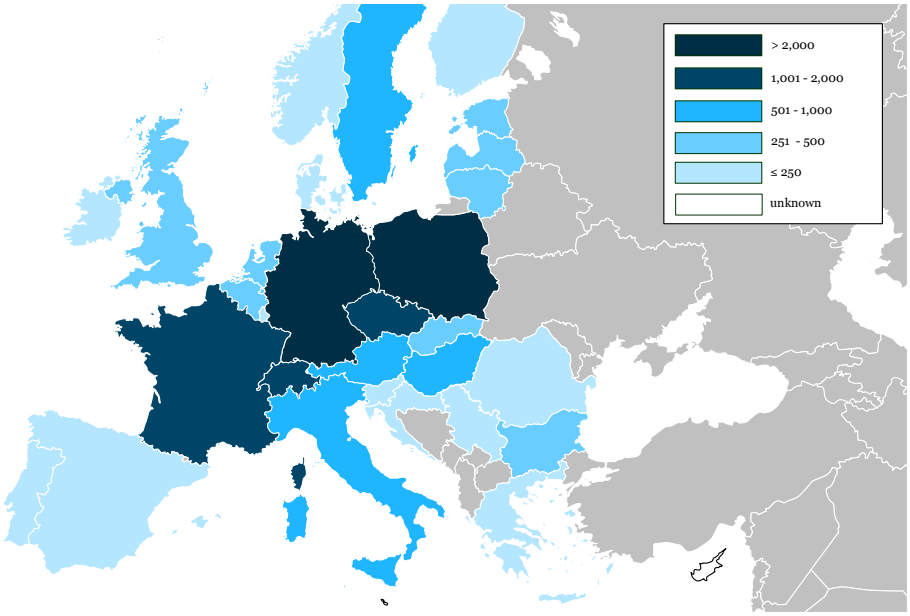
- Private sidings: decrease;
- Stations with public sidings: decrease;
- Intermodal terminals: increase;
- Railports/conventional terminals: increase.

Finally, it has to be underlined that the present overview refers to an analysis performed within a time frame between January 2015 and September 2015. Therefore, all later findings within the overall data picture have not been taken into account.

Figure 11 shows the occurrence of private sidings in the European countries included. As indicated above, these values are of numerous origins, as a central database for such infrastructure does not exist. Moreover, for about half of all countries no figures on private sidings were available at all, or available figures were too old to be compared to the more recent ones of other countries. In order to cover these gaps, the missing values for private sidings were estimated according to the country specific share on the overall rail freight volume in Europe.

In total, some 15,600 private sidings were identified in Europe, nearly half of them located in Germany, Poland, France, Switzerland and Czech Republic. In contrast, rather low figures have been detected in southern and south-eastern Europe.

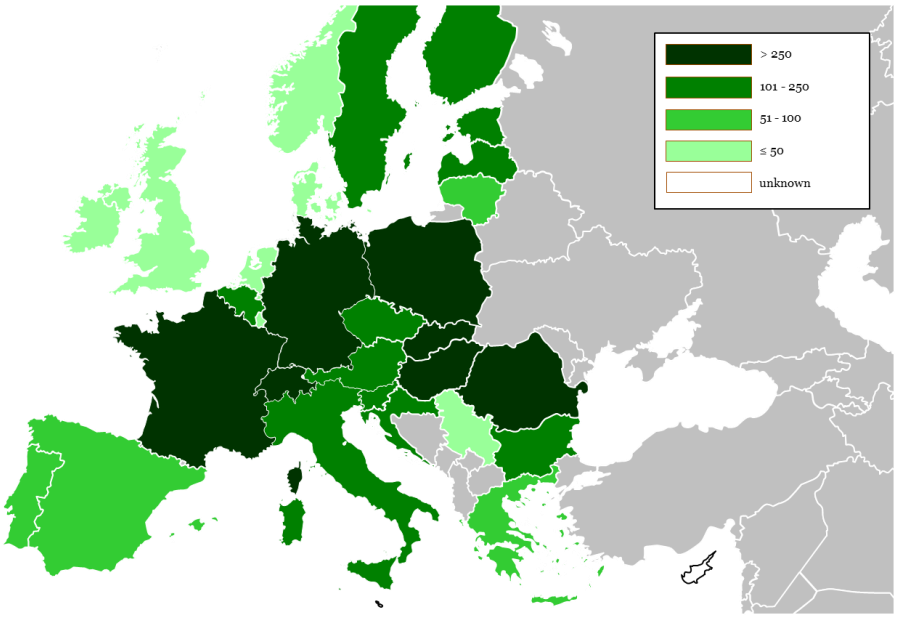
Figure 11: Private sidings – occurrence in Europe



Source: HaCon based on German MoT, Networkrail, SNCF, ÖBB Infra, SZ, SBB, Network Statements, own estimations

The occurrence of stations with public sidings (Figure 12) shows a slightly more balanced allocation to the European countries, but on a particular lower level. Again, numerous sources had to be exploited; and again, remaining data gaps had to be filled by approximation analogous to the private sidings procedure (see above). As a result, about 5,600 stations with public accessible loading tracks currently have been detected, with a clear tendency of further decrease. Most likely, a nameable share of these sidings merely exists, but is not regularly served any more.

Figure 12: Stations with public sidings – occurrence in Europe

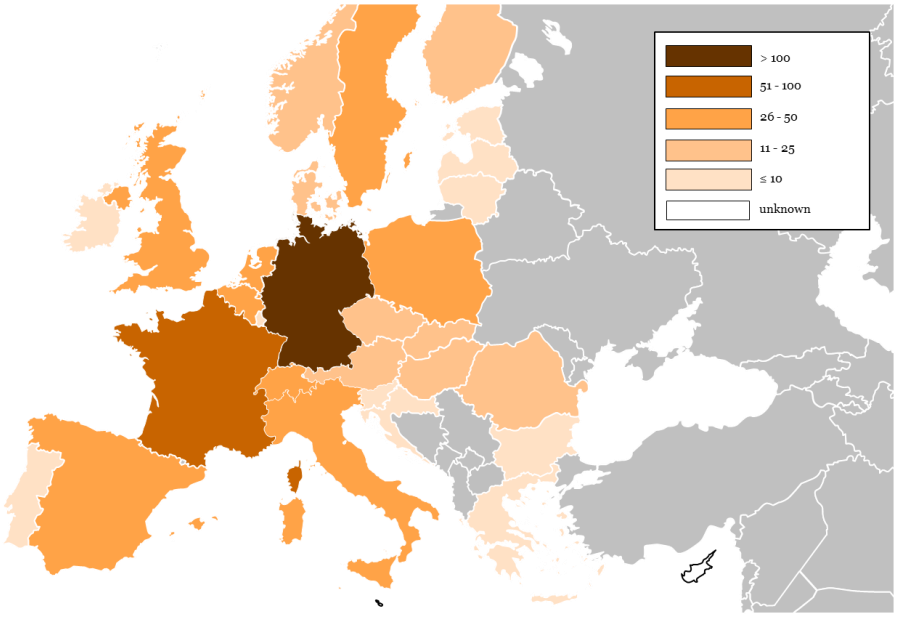


Source: HaCon based on SBB Cargo, DB Schenker, Green Cargo, SZ, VDV, Network Statements, own estimations

In contrast to the private and public sidings, the information for intermodal terminals could be gathered from one single source: the "intermodal map" by SGKV is the currently most up-to-date, Europe wide database in this respect.

The statistic on occurrence sees Germany in front with some 150 terminals accessible by rail (compare Figure 13), followed by France, Belgium, Italy, UK and Spain. In total, all examined European countries showed at least one intermodal terminal, totally about 730.

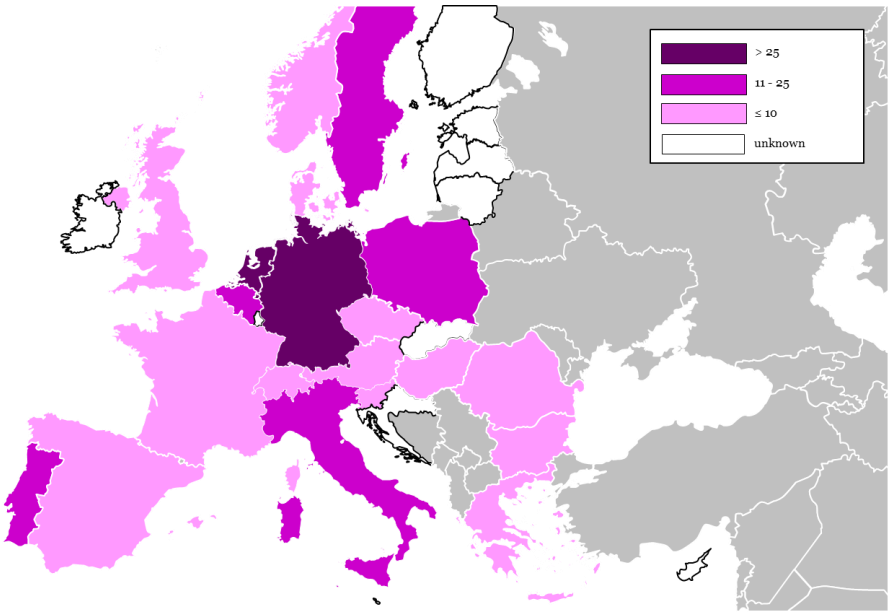
Figure 13: Intermodal terminals with rail access – occurrence in Europe



Source: HaCon based on SGKV

Railports or other conventional rail/road terminals could be detected in 20 (out of 28) countries, most of them associated to DB Schenker Rail and cooperation partners. Due to this, the majority of these terminals is allotted to central Europe plus Sweden (see Figure 14). The total number is however small, compared to the other types of last-mile infrastructure; totally some 190 railports have been identified altogether.

Figure 14: Railports/conventional rail-road terminals – occurrence in Europe



Source: HaCon based on CP Carga, DB Schenker, RailScout, SZ

2.2.3 Conclusions

Figure 15 shows the summary of the last-mile infrastructure occurrence in Europe. In total, more than 22,000 access points to rail freight have been identified. On principle, all of these facilities would have to be integrated in an overall Europe-wide information portal.

The vast majority (more than 70%) refers to private sidings, followed by stations with public sidings, intermodal and conventional rail terminals. For the foreseeable future, it is expected that these figures will develop as follows:

- The number of private sidings has been decreased significantly within last years (e.g. in Germany from about 13,000 in 1993 to 2,400 in 2013). In consequence, only sidings with high volume for block trains or at least strong wagon groups have survived and are still in operation. Many North-, West-, South- and Middle-European countries have shown a similar development, whereas in Eastern and South-Eastern Europe this process will reach its peak within the next years. For the future, a further consolidation process is expected: Large existing private sidings will be used more extensively than today, smaller facilities will be abandoned. In total, the number of private sidings in Europe will further decrease. This decrease will only partially be balanced by new or revitalised facilities, due to national and international funding programmes or to relocation of industrial manufacturing towards (South) Eastern Europe.

- Stations with public siding are an anachronism nowadays. They are a relic of former times, when single wagon traffic used to be an area-wide transport system "for everybody". Apart from dedicated niche markets or services provided by regional rail operators they will disappear. Some of them will be replaced by railports.
- Intermodal transport is the rail freight market segment with the highest expected growth rates. Thus, many existing terminals will reach their capacity limits. This will demand either expansion of existing facilities or construction of additional ones. The trend towards industrialisation of intermodal transport will furthermore lead to a replacement of old terminals with complex infrastructure and processes by modern configurations. However, some countries already show intentions to limit the further increase of intermodal terminal in order to avoid "volume cannibalism", e.g. by implementing respective surveys in the funding schemes. In consequence, a moderate growth of the number of intermodal terminals is expected.
- Railports/conventional terminals are intended to (partially) balance volume losses of single wagon transport. Moreover, these facilities offer additional services like warehousing, storage etc., making them attractive for integration in dedicated logistic concepts (e.g. steel or paper industry). Their number is expected to rise strongly, especially in those countries that intend to give up single wagon transport. In total however, this will (by far) not equalise the number of abandoned private and public sidings.

Figure 15: Occurrence and main logistic parameters of LMI types

	Private sidings	Stations with public sidings	Intermodal terminals	Railports, conv. terminals
Number of sites in Europe (EU 28+2) **Total: ca. 22,120**	ca. 15,600	ca. 5,600	ca. 730	ca. 190
Trend for future development	↘	↓	↗	↑
Main rail freight markets	Single wagon/ wagon groups Block trains	Single wagon/ wagon groups	Intermodal trains	Single wagon/ wagon groups
Open to rail freight customers?	Mostly no	Yes	Mostly yes	Yes
Open to all RUs?	No	Yes	Mostly yes	Mostly yes
Restriction for commodities	Depending on owner	Generally no restrictions, actually only few dedicated commodities (e.g. wood)	Standardised loading units only	Generally no restrictions, actually affinity to dedicated commodities (e.g. steel, paper)

Source: HaCon

2.3 Stakeholders of last-mile infrastructure information

The selection of suitable stakeholders is of relevance in several respects, since they represent potential users of the GIS information portal as well as owners of last-mile infrastructure data and possible partners to represent their services in the portal. Thus, the scope of stakeholders addressed within the subsequent work steps covered all activities directly associated with access to rail freight infrastructure and operation:

- Railway operators,
- Shippers (industry),
- Forwarders,
- Intermodal operators,
- Infrastructure managers,
- Intermodal terminal operators,
- Railport operators,
- Owners/operators of private sidings,
- Wagon providers.

Additionally, other parties like government, spatial planning administrations, consultants or economic promotion agencies might also be interested in the information provided by the last-mile portal.

A first general assessment on which LMI information is needed and/or can be provided per stakeholder cluster is shown in Figure 16. It is evident that this interest strongly depends on the respective core business and is related to the type of last-mile infrastructure. Railway operators for instance will concentrate on operational conditions in the respective facility. In case of long-haul rail operators, this interest will focus on the transfer station, as this is the terminus/beginning of the train movement. In contrast, rail shunting operators will primarily be interested in the connection between the transfer station and the loading facility itself. Other stakeholders might have more interest to sell their infrastructure and thus to present their facility to the public. This particularly applies to infrastructure managers.

All in all, a general interest in last-mile information can be assumed for all types of stakeholders. However, the scope of this interest is widely spread and differs considerably. It is therefore necessary to specify the requirements of the stakeholder groups in detail.

Figure 16: General assessment of LMI owner-/operatorship and interest in information receiving/presenting, clustered by stakeholder groups

	Private sidings	Stations with public sidings	Intermodal terminals	Railports, conv. terminals
Railway operators	Operator LMI rail service conditions (shunting resources, transfer station attributes)	Operator Renting/usage of tracks with dedicated attributes (e.g. tanking brake test facility)	Operator LMI attributes, (track length, slots, electrification, etc.)	Owner/operator LMI attributes, (track length, slots, electrification, etc.)
Shippers (industry)	Owner/operator Long haul rail service conditions (destinations, schedule, booking, tariffs, etc.) LMI attributes for new destinations		Long haul rail service conditions (destinations, schedule, booking, tariffs, etc.) Additional services	Long haul rail service conditions (destinations, schedule, booking, tariffs, etc.) Additional services
Forwarders		LMI qualification for dedicated transhipment (e.g. wood) Road access	Long haul rail service conditions (destinations, schedule, booking, tariffs, etc.) Road access	Owner/operator Road access
Intermodal operators			Opening times, slots, capacities, transhipment facilities, accepted loading units	
Infrastructure managers		Owner Conditions for infrastructure usage	Owner Conditions for infrastructure usage	
Intermodal terminal operators			Owner/operator Long haul rail service conditions (destinations, schedule, booking, tariffs, etc.) Opening times, slots, capacities, transhipment facilities, accepted loading units	
Railport operators	LMI attributes for new destinations			Owner/operator Additional services
Owners / operators of private sidings	Owner/operator LMI attributes for new destinations			
Wagon providers		Renting/usage of tracks for wagon parking		
Government	Connection of (rail freight) corridors to LMI, funding programs, regulations for rail freight access (minimum standards, abandoning of LMI)			
Spatial	Ensuring equal conditions for economic development			

	Private sidings	Stations with public sidings	Intermodal terminals	Railports, conv. terminals
planning				
Economic promotion agencies	Promotion of locations for industry settlement			

LMI owner-/operatorship LMI information need LMI presentation interest

Source: HaCon

The identification of detailed needs and interests with respect to the GIS portal was performed in several steps:

- Three workshops were held in Paris (26.03.2015), Lugo (26./27.03.2015)[2] and Budapest (21.04.2015) with invitation to all listed stakeholder groups, either by direct contact or via respective associations;
- In addition, the information items were included in an online questionnaire published on the UIC website, addressing all relevant stakeholder groups as well;
- Interviews with selected operators of existing information portals and owners of data stocks were performed (see chapter 3.3.2).

The methodical approach and main results of these consultations are comprised in the following chapter.

2.4 Requirements on information content and system features

2.4.1 Methodology

As basis for the identification and evaluation of user needs, "long lists" have been elaborated, providing a collection of information items as well as of program features. The content of these long lists was gathered by analysing existing information portals and data stocks and was enriched by internal workshops amongst the consortium partners. The participants of the workshops confirmed that no important items were missing in the long lists; thus, they can be considered as an appropriate basis for the subsequent work steps.

Figure 17 shows the "long list" of possible information items. It consists of 125 single criteria grouped to 13 information clusters. With reference to the general understanding of last-mile infrastructure (see chapter 1.2) it is obvious that some criteria are relevant for all parts, whilst other items correspond to either the loading facility or the transfer station or the connection line.

This clustering does not only facilitate overviewing this rather complex list; at the same time it can be understood as a possible approach for a structured information search/display in the GIS portal:

[2] Combined with UIRR terminal interest group

1. The location cluster (12 items) comprises all data needed to identify the location of the facility, preferably address and contact data, but also geo coordinates and facility codes. Except for the station coding they refer to all parts of last-mile infrastructure.
2. The types of facility (11 items) cluster the locations according to the defined main types of last-mile infrastructure (see chapter 2.2.1). Accordingly, this kind of information is dedicated to the loading facility itself. Additionally, public and private stations for wagon transfer have been included in the list, as they are of particular interest e.g. for wagon fleet owners looking for parking tracks.
3. The size of facility cluster (3 items) specifies the loading and storage capacity in stations with public sidings. Thus, these criteria refer to the loading facilities of conventional (= non-intermodal) transport.
4. The rail infrastructure parameters (14 items) indicate the number/function of available tracks and the most important technical parameters specifying capacity and possible access restrictions to the respective parts of last-mile infrastructure.
5. The cluster "Rail infrastructure equipment" (9 items) provides service attributes of the rail infrastructure, mostly important for rail operation procedures.
6. The transhipment equipment (5 items) contains transhipment devices for intermodal and conventional transport. This kind information is of course restricted to the loading facility itself.
7. The cluster "Type of loading unit/cargo transhipment" (19 items) comprises different kinds of (intermodal) loading units as well as commodities for conventional transport that can be transhipped from/to rail in the respective loading facility.
8. Analogously, the type of loading unit/cargo storage cluster (12 items) deals with loading units and commodities that might be stared in the respective location.
9. The general conditions for rail operation (9 items) specify terms of use for all parts of last-mile infrastructure. This covers opening times as well as fees and conditions for different kinds of track usage.
10. The rail operation/ service - last-mile cluster (10 items) provides information on the scope and the conditions for rail service on the last-mile infrastructure.
11. In contrast, the rail operation/ service - long haul (8 items) refers to the kind and quality of rail service that connects the respective transfer station to the long-haul network.
12. Additional services (10 items) become more and more important next to pure transhipment activities. This cluster comprises service components associated to the rail operation (e.g. wagon/locomotive parking) as well as to loading handling (e.g. stuffing/stripping).
13. Finally, the "Connection to road" cluster (3 items) deals with road connection between the last-mile location and the high level road network and with possible restrictions for road when accessing the loading facility.

Figure 17: "Long list" of potential information items with specification of relevance for different parts of last-mile infrastructure

Information cluster	Information content (data item)	Explanation	Relevance for		
			LF[1)]	CL[2)]	TF[3)]
Location	Country		✓	✓	✓
	Region		✓	✓	✓
	Postal code		✓	✓	✓
	City		✓	✓	✓
	Geo coordinates		✓	✓	✓
	NUTS	Geocode standard for subdividing countries for statistical purposes in the EU	✓	✓	✓
	Name of facility/line		✓	✓	✓
	Address of facility/line		✓	✓	✓
	Infra operator name	Company that is responsible for the use of the facility´s infrastructure	✓	✓	✓
	Infra operator contact data	see above	✓	✓	✓
	UIC station code		✓	---	✓
	National station code	Station codes of the respective infrastructure managers; partially compatible with the UIC station code	✓	---	✓
Type of facility	Rail-Road terminal (intermodal)		✓	---	---
	Rail-Road-IWW terminal (intermodal)		✓	---	---
	Rail-Road terminal (Rolling Road)		✓	---	---
	Railport / Rail Logistics Centre / Rail-Road terminal (conventional)	Rail/road transhipment facility for all kinds of cargo, enriched by additional services (storage etc.). Focus is on conventional (= non-inter-modal) transhipment and transport services. Intention is to replace former (private) sidings that are not served any more.	✓	---	---

Information cluster	Information content (data item)	Explanation	Relevance for		
			LF[1)]	CL[2)]	TF[3)]
	Station with public loading track	Public accessible loading tracks in rail stations. Focus is on conventional (=non-intermodal) transhipment and transport services.	✓	---	---
	Private siding, track in industrial site	Privately owned loading facility; might be also accessible for third parties. Focus is on conventional (=non-intermodal) transhipment and transport services.	✓	---	---
	Freight village	Dedicated industrial park, consisting of independent companies and an intermodal terminal. Focus is on intermodal transhipment and transport services.	✓	---	---
	Seaport	Seaport, combining several kinds of above mentioned facilities in various constellations: intermodal terminals, railports, private sidings, public loading tracks	✓	---	---
	Inland port, Rail-Road-IWW terminal (conventional)	Inland port, combining several kinds of above mentioned facilities in various constellations: intermodal terminals, railports, private sidings, public loading tracks	✓	---	---
	Public station for wagon transfer	Public accessible rail station. Focus is on rail operation (e.g. train splitting/composing, wagon parking), NOT transhipment	---	---	✓
	Private station for wagon transfer	Privately owned rail station; might be also accessible for third parties. Focus is on rail operation (e.g. train splitting/composing, wagon parking), NOT transhipment	---	---	✓
Size of facility	Size of loading area (conventional transhipment)	Area in stations with public loading tracks that is dedicated to rail/road loading purposes. Focus is on conventional (= non-intermodal) transhipment and transport services.	✓	---	---
	Size of storage area (conventional transhipment)	Area in stations with public loading tracks that is dedicated to cargo storage purposes. Focus is on conventional (= non-intermodal) transhipment and transport services.	✓	---	---

Information cluster	Information content (data item)	Explanation	Relevance for		
			LF[1)]	CL[2)]	TF[3)]
	Width of loading lane (for conventional transhipment)	Width of the loading lane in stations with public loading tracks. Focus is on conventional (= non-intermodal) transhipment and transport services.	✓	---	---
Rail infrastructure parameters	Number of tracks (for loading facility and transfer station)		✓	---	✓
	Single/double track (only for the connecting line)		---	✓	---
	Track function (e.g. in-/outbound, parking, allocation etc.)		✓	---	✓
	Usable track length		✓	---	✓
	Length of line		---	✓	---
	Rail connection of tracks (one-/two-sided)		✓	---	✓
	Electrified/diesel		✓	✓	✓
	Loading gauge		✓	✓	✓
	Axle load		✓	✓	✓
	Min. radius		✓	✓	✓
	Max. inclination		---	✓	
	Permitted rail speed		✓	✓	✓
	RID allowed Infrastructure		✓	✓	✓
Rail infrastructure equipment	Fuel station		✓	---	✓
	Sanding station		✓	---	✓
	Water supply		✓	---	✓
	Electricity supply		✓	---	✓
	Track scale		✓	---	✓

Information cluster	Information content (data item)	Explanation	Relevance for		
			LF[1)]	CL[2)]	TF[3)]
	Cable shunting installation		✓	---	✓
	Brake test facility		✓	---	✓
	Hump		---	---	✓
	Track area lighting		✓	---	✓
Transhipment equipment of facility	Loading lane (for conventional transhipment)		✓	---	---
	Head/side ramp (for conventional transhipment)		✓	---	---
	Gantry crane		✓	---	---
	Mobile Crane		✓	---	---
	Fork Lift		✓	---	---
Type of loading unit/cargo transhipment	Container		✓	---	---
	Tank Container		✓	---	---
	Swap body		✓	---	---
	Trailer		✓	---	---
	Truck + trailer (ROLA)		✓	---	---
	Palletised goods		✓	---	---
	Plates		✓	---	---
	Bale goods		✓	---	---
	Vehicles/Machinery		✓	---	---
	Coils		✓	---	---
	Foods		✓	---	---
	Long goods		✓	---	---

Information cluster	Information content (data item)	Explanation	Relevance for		
			LF[1)]	CL[2)]	TF[3)]
	(e.g. steel, wood)				
	Paper roll		✓	---	---
	Bagged goods (Big Bags)		✓	---	---
	Bulk		✓	---	---
	Dangerous goods		✓	---	---
	Wood		✓	---	---
	Heavy load		✓	---	---
	Other goods		✓	---	---
Type of loading unit/cargo storage	Container		✓	---	---
	Swap body		✓	---	---
	Trailer (parking)		✓	---	---
	Truck (parking)		✓	---	---
	Palletised goods		✓	---	---
	Bulk		✓	---	---
	Dangerous goods		✓	---	---
	Wood		✓	---	---
	Heavy load		✓	---	---
	Reefer		✓	---	---
	Silo storage for loose material		✓	---	---
	General goods depot (without further specification)		✓	---	---
General conditions for	Site/line in regular operation		✓	✓	✓

Information cluster	Information content (data item)	Explanation	Relevance for		
			LF[1)]	CL[2)]	TF[3)]
rail operation	Site/line out of operation		✓	✓	✓
	Site/line planned		✓	✓	✓
	Public/private		✓	✓	✓
	Opening times		✓	✓	✓
	Infrastructure available for booking/usage (time period)	yes/no answer for questioning a dedicated time period of availability	✓	✓	✓
	Restrictions for usage (time, activities, commodities, gauge)		✓	✓	✓
	Fees for track renting/usage		✓	✓	✓
	Fees for wagon parking/cargo storage		✓	✓	✓
Rail operation/ service - last-mile	Shunting engine/ staff/service available	yes/no answer for questioning availability of shunting resources/service	✓	✓	✓
	Rail service provider name		✓	✓	✓
	Rail service provider contact		✓	✓	✓
	Operation days/times for rail service		✓	✓	✓
	Block train loading/ operation possible		✓	✓	✓
	Wagon group loading/ operation possible		✓	✓	✓
	Single wagon loading/ operation possible		✓	✓	✓
	Order deadline for rail service		✓	✓	✓
	Fees for wagon providing		✓	✓	✓

Information cluster	Information content (data item)	Explanation	Relevance for		
			LF[1)]	CL[2)]	TF[3)]
	Fees for rail service		✓	✓	✓
Rail operation/ service - long haul	Regular long-haul rail service available	yes/no answer for questioning availability of regular long-haul service of the facility	---	---	✓
	Rail service provider name	Traction company to provide the regular long-haul service of the facility (only applicable, if B122 = "yes")	---	---	✓
	Rail service provider contact		---	---	✓
	Destinations		---	---	✓
	Frequency / Timetable		---	---	✓
	Operation days		---	---	✓
	LU/loading gauges accepted		---	---	✓
	Quality levels of rail service		---	---	✓
Additional services	Additional services (without further specification)		✓	---	✓
	Wagon/locomotive parking		✓	---	✓
	Repair/maintenance of loading units		✓	---	✓
	Repair/maintenance of wagons		✓	---	✓
	Repair/maintenance of locomotives		✓	---	✓
	Customs clearance		✓	---	✓
	Cleaning service		✓	---	✓
	Stuffing/stripping		✓	---	✓
	Container Service Centre		✓	---	✓

Information cluster	Information content (data item)	Explanation	Relevance for		
			LF[1)]	CL[2)]	TF[3)]
	Security	Security service to protect the facility against non-authorised access	✓	---	✓
Connection to road	Distance to high level road network	Distance to next motorway (or comparable road standard) connection point	✓	---	---
	Location of next connection to high level road network	Geo coordinates of next motorway (or comparable road standard) connection point	✓	---	---
	Access restrictions (e.g. height, weight)		✓	---	---

1) LF = Loading facility

2) CL = Connecting line

3) TF = Transfer station

Source: HaCon

The "long list" of possible program features" (see Figure 18) was gathered in the same way as the long list of information items. It contains six clusters with total 42 associated single program features:

1. The Language cluster (6 features) defines the multi-language approach of search and information display.
2. The administration features (9 features) specify access to the portal as well as terms of use and contact between users and the system administrator.
3. Search mode (3 features) might refer to single or multiple items.
4. Site selection and result visualisation (10 features) might be performed via selection of symbols displayed on a map, enriched by e.g. photos, layout plans or satellite pictures. Another important issue of this subject is the export of results to other file formats (e.g. Excel or pdf).
5. The map navigation cluster (6 features) contains all standard tools to navigate in maps and to display view on a screen.
6. Map tools (8 features) might be added to the portal in order to further process the identified results. This might refer e.g. to distance/area measuring or to snapshot/printing functionalities.

Figure 18: "Long list" of potential GIS portal program features

Feature cluster	Portal feature	Remarks/Explanation
Languages	English	
	French	
	German	
	Italian	
	Other	
	Multi language capability	
Administration	Password protected area for registered users	
	Display terms of use	English only
	Display status of data	
	Contact for system administrator	
	User manual/instructions	English only
	User feedback via E-Mail (both system and content)	Both the System and Content Administrators
	Display terms of data protection	
	Data update by user possible	
	Send location (geo coordinates) to map portals (Google, Bing etc.)	
Search mode	Single criteria	
	Multiple criteria	
	Predefined configurable searches	
Site selection and result visualisation	Map	
	Satellite picture	If possible
	Layout plan	If possible
	Photos	

Feature cluster	Portal feature	Remarks/Explanation
	Selection from (station) listing	Facility name
	Road access description	
	Road access navigator	
	pdf export of results	
	Excel export of results	
	Reference to LMI operator website (link)	
Map navigation	Zoom with scale bar/buttons	Best ergonomic choice
	Zoom with mouse wheel	See above
	Zoom with mouse (double) klick	See above
	Move map with mouse	See above
	Full-screen view	See above
	Display geo coordinates	See above
Map tools	Zoom box	
	Graphic tools (line drawing etc.)	
	Snapshot	
	Distance measuring	
	Area measuring	
	Print	
	Selection of background map possible (Google Maps, OpenStreetMap, etc.)	
	Change saturation of background map	

Source: HaCon

2.4.2 Results from stakeholder workshops

On occasion of stakeholder workshops held in Paris (26.03.2015), Lugo (26./27.03.2015) and Budapest (21.04.2015), the "long lists" were discussed with stakeholders covering the entire scope listed in chapter 2.3. The Paris workshop focused on the information items,

whereas the Budapest event concentrated on the program features. All participants agreed that the reviewed list is complete and no important items are missing. The proposed procedure to develop the portal based on this list was accepted.

Generally, the participants supported the initiative to provide a Europe-wide information portal, containing all kinds of rail access points. They furthermore agreed that the envisaged GIS portal could help to simplify information gathering, which is currently a time and resource consuming process in many cases. Thus, the need for a last-mile information portal has been confirmed by relevant market participants. The participants expressed their opinion that such a portal should be open to all kinds of rail freight access point, but should however focus on infrastructure facilities open for third parties rather than on sites reserved to the owner or a restricted group of users. With regard to the potential purposes of the portal, the following items were of particular interest:

- What access points are available (locations)?
- What kinds of services are provided at a particular point?
- Who manages the access point (contact person)?
- What are the operating times of the facility?
- What are the core technical parameters and equipment?

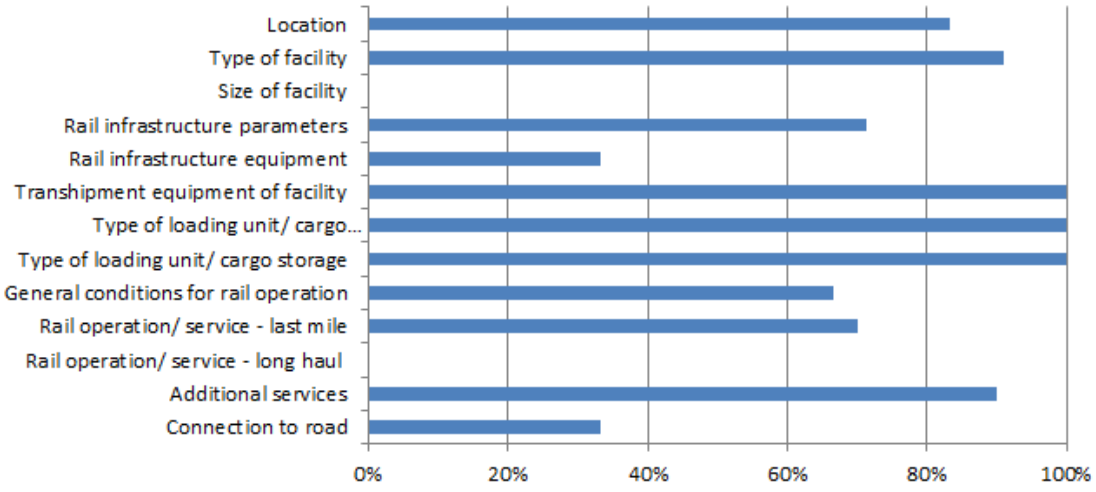
A detailed review of the long lists amongst the participants led to a majority vote of each included item to be "important", "nice to have" or "less important" for the envisaged GIS portal. These detailed results are displayed in Annex 2 (information items) and Annex 3 (program features).

Summarising it can be stated that 92 information items were estimated as "important" (= 74% of all items of the long list) by the participant groups of the workshops. As

Figure 19 shows, above-average importance has been assigned to the information clusters "Location", "Type of facility", "Transhipment equipment", "Type of loading unit/cargo transhipment", "Type of loading unit/cargo storage" and "Additional services".

In contrast, information with context to conventional (= non-intermodal) transhipment and rail operation attributes were regarded as generally less important. However, also these under-average clusters also contain single information items evaluated as important.

Figure 19: Share of "important" information items by cluster – workshop result



Source: HaCon based on workshop results

The proposed program features of the long list were considered as "important" for the most part by the Budapest workshop participants. This estimation refers to all feature clusters.

2.4.3 Results from online questionnaire

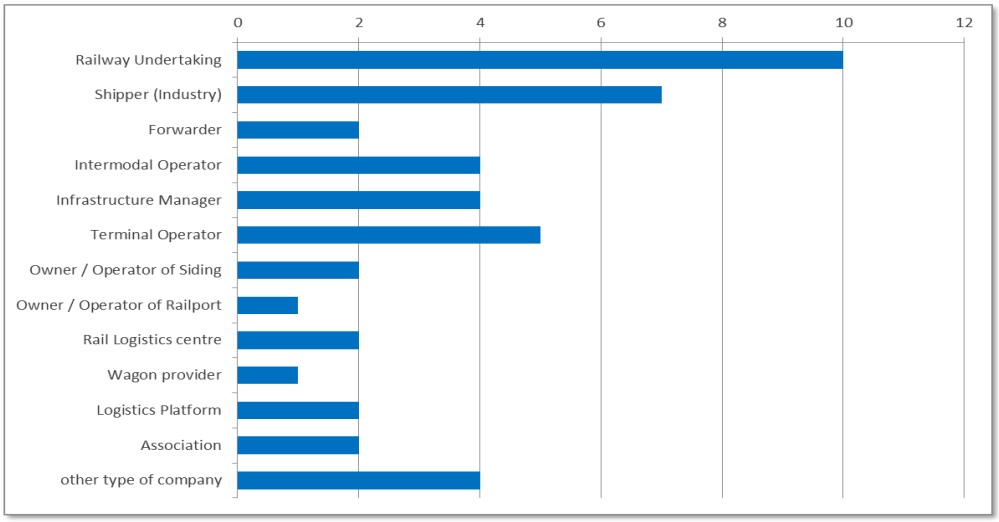
In order to validate the outcomes of the workshops, an online questionnaire was issued. This questionnaire shows the same structure as the "long list" of information items; the participants were asked to click all items they considered as "important". In addition, the name and company of the participants was questioned as well as the assignment to dedicated stakeholder clusters. Furthermore, the participants should classify themselves as a data user and/or a data provider.

The questionnaire has been published on the UIC website after the Budapest workshop. Relevant participants were addressed making use of the same communication procedure as for the workshop invitation, i.e. a combination of direct, personnel contacts and addressing respective associations, which in turn forwarded the invitation to their member companies.

By end of June 2015, representatives of 31 companies answered the questionnaire, thereof 19 as "data user" and 12 as "data provider".

As Figure 20 points out, the structure of this feedback covers the entire bandwidth of relevant stakeholders, as defined in chapter 2.3, with a focus on railway undertakings and industry companies.

Figure 20: Structure of questionnaire response, status: 30.06.2015

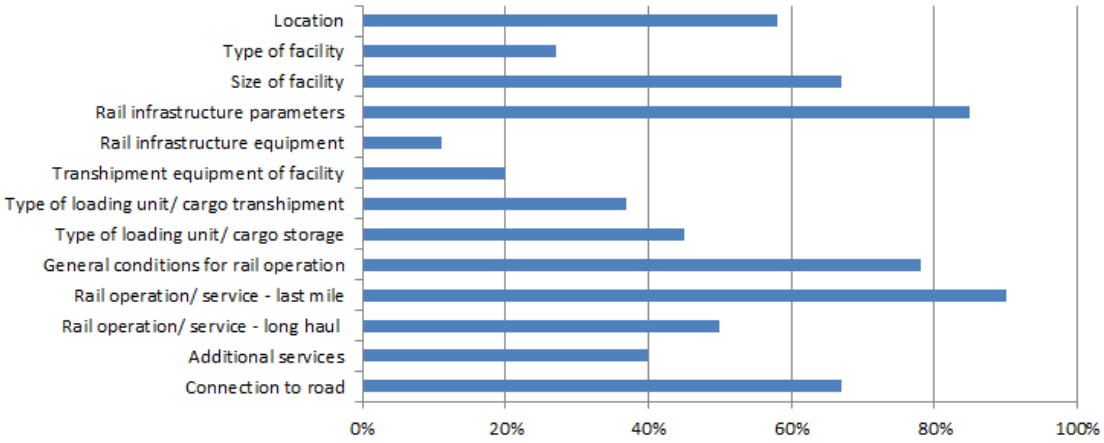


Source: UIC based on questionnaire results

The detailed voting of the participants assessing the information items as "important" is displayed in Annex 4. In contrast to the workshop results, these percentage values do not represent joint statements of the entire participant group, but a compilation of single decisions on each information item. In order to make the results of both consultations comparable, each item of the questionnaire was counted as "important", if more than 50% of the participants voted for this option. In so doing, both the workshop and the questionnaire show majority votes for the importance of each information item.

The outcome of this procedure is shown in Figure 21. In total, 51% of all 123 information items were evaluated as "important" – compared to 74% of the workshops (see chapter 2.4.2).

Figure 21: Share of "important" information items by cluster – questionnaire result



Source: HaCon / UIC based on workshop results

The lower level of important information is also valid for almost all information clusters. The only clusters with rather high shares of important information items in the workshop and the questionnaire result are "Rail operation – last-mile", "Rail infrastructure parameters" and "General conditions for rail operation". This is due to the high representation of railway undertakings in both participant groups.

Apart from this, the results of the questionnaire differ significantly from the outcome of the workshops. It can be assumed that the following reasons are mainly responsible for this:

The evaluation of the workshops has been the result of a moderated group discussion with explanations and a subsequent majority decision. Thus, the understanding of the information items and their possible importance might have changed during the discussions; possible misunderstandings have been clarified in advance of the voting. These effects were missing in case of the questionnaire autarkic decisions without further explanations. Thus, the deviating results might be due to a different understanding, at least partially. Apart from that, the sample of the questionnaire was rather small by deadline of this report (19 data users) and the composition of this sample was not statistically significant. Therefore, the impact of single decisions (possibly based on misunderstandings) on the overall result is overrepresented.

2.4.4 Consolidated results

The previous paragraphs have shown a high level of interest for a Europe-wide information portal for last-mile rail infrastructure amongst all relevant stakeholder clusters. However, regarding the detailed requested information items the situation turned out to be inhomogeneous. Between the outcomes of the workshops and the online questionnaire a nameable difference has to be stated, regarding the assessment of information relevance. It can be assumed that the difference between the results is at least partially due to the methodical approach. In case of rather small groups of participants a moderated discussion with following (majority) decision is likely to show better results compared to an unaccompanied online questionnaire, since the voting is based on a joint understanding.

With consideration of these circumstances, the following main requirements for the portal development can be deducted from the outcomes of the workshops and the questionnaire as well as from stakeholder statements:

1. Selection of different facility types on the first application level (= "portal entry" for the user);
2. Immediate display of contact data for infrastructure and operation of the respective facility;
3. No general exclusion of information items from the long list;
4. Display of information items with high requirements on confidentiality and frequent updates (e.g. schedules, tariffs) possibly by linking to respective websites;
5. Particular relevance of information items have been evaluated as "important" in both the workshops and the online questionnaire.

The latter aspect applies for 47 (out of 125 = 38%) information items. They show a clear tendency towards railway operation issues on the last-mile, with a focus on transports between intermodal rail/road terminals, railports and private sidings, including the related basic information items on (railway) infrastructure and services. In contrast, information items outside these "core" railway activities (e.g. freight villages, ports, public sidings, detailed specification of commodities or long haul rail operation) are not included in this list.

Figure 22: Information items rated as "important" in both workshops and questionnaire

Information cluster	Information content (data item)	Explanation
Location	Country	
	Postal code	
	City	
	Name of facility/line	
	Address of facility/line	
	Infra operator name	Company that is responsible for the use of the facility´s infrastructure
	Infra operator contact data	see above
Type of facility	Rail-Road terminal (intermodal)	

Information cluster	Information content (data item)	Explanation
	Railport / Rail Logistics Centre / Rail-Road terminal (conventional)	Rail/road transhipment facility for all kinds of cargo, enriched by additional services (storage, order picking etc.). Focus is on conventional (= non-intermodal) transhipment and transport services. Intention is to replace former (private) sidings that are not served any more.
	Private siding, track in industrial site	Privately owned loading facility; might be also accessible for third parties. Focus is on conventional (=non-intermodal) transhipment and transport services.
Rail infrastructure parameters	Number of tracks (for loading facility and transfer station)	
	Track function (e.g. in-/outbound, parking, allocation etc.)	
	Usable track length	
	Electrified/diesel	
	Loading gauge	
	Axle load	
	RID Allowed Infrastructure	
Rail infrastructure equipment	Brake test facility	
Transhipment equipment of facility	Loading lane (for conventional transhipment)	
Type of loading unit/cargo transhipment	Container	
	Tank Container	
	Swap body	
	Trailer	
	Truck + trailer (ROLA)	

Information cluster	Information content (data item)	Explanation
	Bulk	
	Dangerous goods	
Type of loading unit/cargo storage	Container	
	Swap body	
	Trailer (parking)	
	Truck (parking)	
	Dangerous goods	
General conditions for rail operation	Site/line in regular operation	
	Public/private	
	Opening times	
	Restrictions for usage (time, activities, commodities, gauge)	
Rail operation/ service - last-mile	Shunting engine/ staff/service available	yes/no answer for questioning availability of shunting resources/service
	Rail service provider name	
	Rail service provider contact	
	Operation days/times for rail service	
	Block train loading/ operation possible	
	Wagon group loading/ operation possible	
	Single wagon loading/ operation possible	

Information cluster	Information content (data item)	Explanation
Additional services	Wagon/locomotive parking	
	Repair/maintenance of wagons	
	Customs clearance	
	Security	Security service to protect the facility against non-authorised access
Connection to road	Access restrictions (e.g. height, weight)	

Source: HaCon based on workshop and questionnaire results

3 Identification and analysis of potential data sources including other information portals

3.1 Objectives / Methodology

The success of the aimed at information portal on last-mile infrastructure in terms of market acceptance strongly depends on the matching with user requirements, as identified within WP1. It is important that the portal provides the information on last-mile facilities mostly requested by potential users. Moreover it is crucial that the data provides a high geographical coverage and filling rate in all EU countries and related major economic regions. It goes without saying that the acceptance of the portal also depends on a high quality level in terms of data reliability and completeness. Currently, a comprehensive European database does not exist. Instead, existing databases and information portals generally focus on specific geographical regions or types of infrastructure. Due to (1) growing rail transport volumes in international transport chains, (2) the EU policy towards separating infrastructures and operations and (3) the trend for mixed production systems, there is an increasing need for improved transparency on last-mile infrastructure for rail freight.

To fill the portal with the relevant information, there are the following questions to be answered:

- Which data sources exist in correspondence to the requested types of infrastructure (as identified within WP1) and geographical coverage (all EU countries with a rail system)?
- What information is provided by the identified data sources?
- Are these data sources available to be exploited and how? In this context technical, legal and commercial questions need to be clarified.

The following main types of data sources will be evaluated and exploited if appropriate:

- Other existing information portals;
- European registers on railway infrastructure e.g. RINF (Register of Infrastructure), CRD database ENEE (Register for European station codes), DIUM (Database for distances between rail freight stations and borders);
- Direct information from infrastructure providers to be extracted from the network statements of the national and regional rail infrastructure managers, the national safety authorities (NSAs) or provided directly e.g. from terminal operators, railport managers or managers of other loading facilities.

The evaluation of other portals and potentially further data sources is based on a desktop research considering the focussed last-mile facility type (e.g. terminals, railports etc.), the geographical coverage (countries included) and the specific information provided by the respective source.

The comparative analysis of portals also takes account of the provided system features. Generally, the evaluation of portals and other information sources will be based on the so-called ‘long lists’ of information contents and system features that have been also used for the discussion with stakeholder and the identification of user needs (WP 1).

Another major issue – relevant for the portal conception and development - is the availability of data for the planned European last-mile information portal. For this purpose interviews have been conducted with potential data providers – mainly other portal operators. Corresponding interviews guidelines contain questions regarding technical, legal and commercial aspects with respect to data access and potential data transfer. Further questions deal with the motivation to set up the considered information portal and the experience from running the portal. This concerns aspects like business model/financing, portal usage (number of active users, number of klicks, mostly requested information).

3.2 Overview on existing information sources and their contents

The analysis of existing information sources and their contents comprises

- Other existing information portals,
- European registers on railway infrastructure and
- Direct information from infrastructure providers (e.g. network statements or other databases).

3.2.1 Other information portals

When thinking about the development of a new portal it is important to know what already exists. In this sense there are a few questions to be answered:

- Are there other portals in place that provide information on "last-mile infrastructure for rail freight"?
- If the answer is yes, which portals do provide such information (portal name / promoter)?
- Which kind of last-mile infrastructure is included?
- What countries or regions are covered?
- Which kind of information is provided?
- Which portals are designed as a GIS portal and provide an interactive map?
- Who is the promoter?
- Is it possible to exploit the information from the portal?
- If yes, how and under which conditions?

In line with the general methodology of data collection – applied in this study, following steps have been conducted for identifying other relevant information portals. A structure (Excel table) for the collection of relevant information has been prepared; this includes base data (portal name, promoter) and information on geographical scope (countries listed), type of last-mile infrastructure (Intermodal terminals, Railports / Rail logistics centres, Rail sidings / Loading points, Rail stations / Shunting yards, Other loading facilities, Local rail lines), specific remarks and a link to the specific portal or website.

For the identification of portals and the data collection of respective information itself, consortium knowledge (HaCon, UIC and subcontractors) has been exploited supported by a desktop research and information from stakeholders. With this procedure in total 43

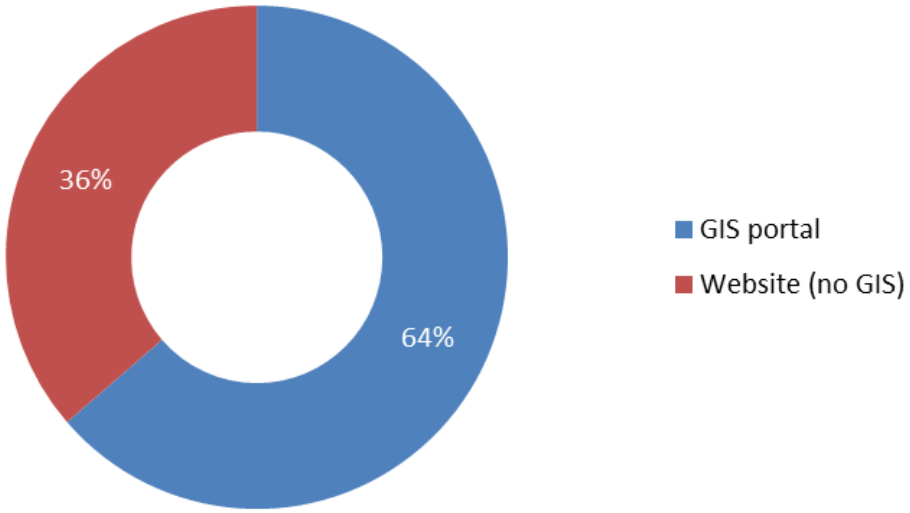
potential data sources (GIS online portals, websites (without GIS functionality), other source (not website)) have been identified.

In a first screening ten of them have been considered as not relevant regarding potential data transfer or other information exploitation for the planned European last-mile portal. Main reasons are that the respective portal or database

- is not focussed on "last-mile information for rail freight" (e.g. CRSC Service Platform);
- does not provide a sufficiently filled and accessible database (e.g. Viacombi) or
- is not updated any more (e.g. Informationssystem Gleisanschluss Ruhr).

In contrast 21 GIS online portals and 12 websites without GIS functionalities have been selected for a more detailed analysis (see Figure 23).

Figure 23: Type of analysed data sources



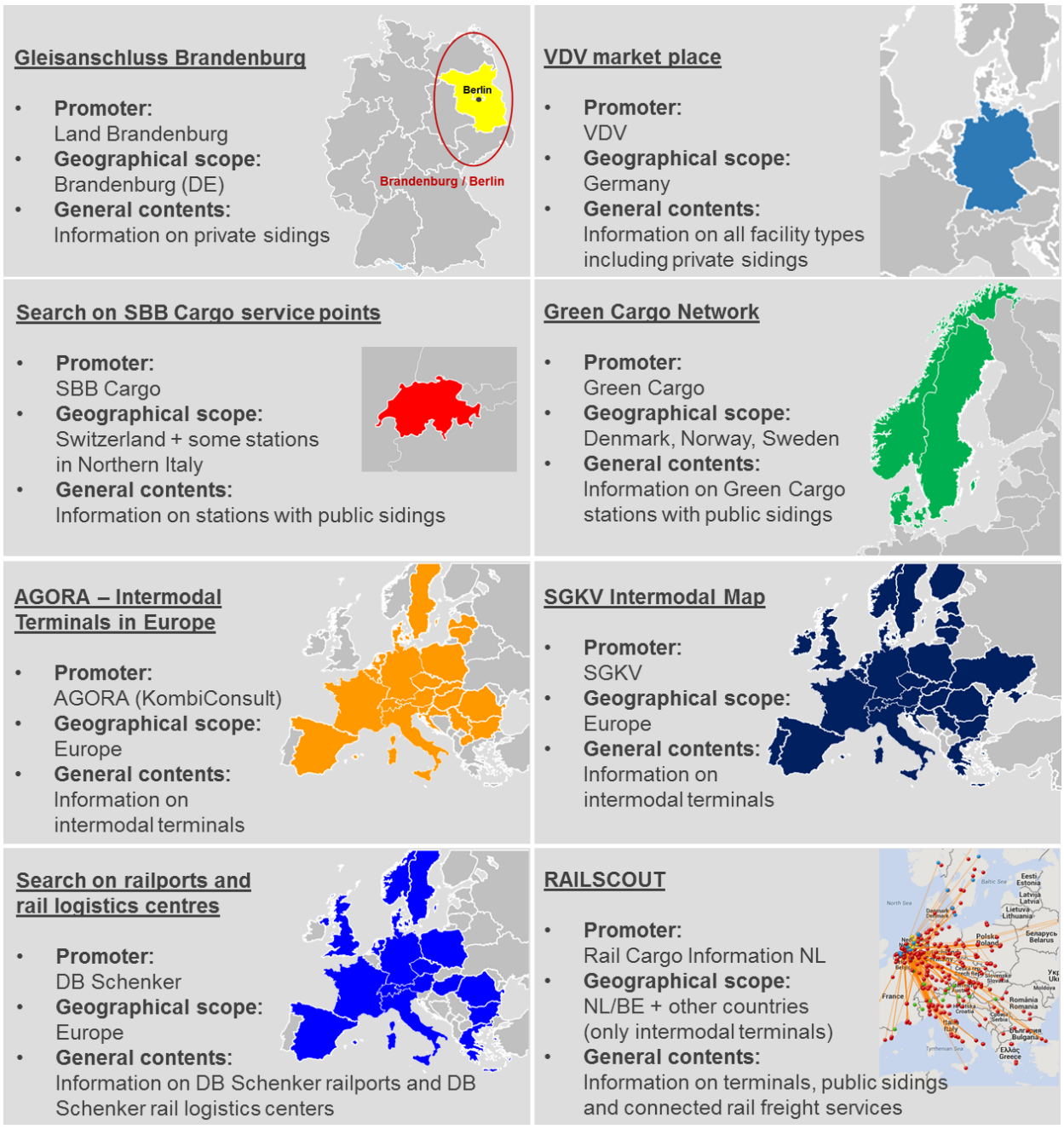
Source: HaCon

Some examples on the analysed portals are displayed in

Figure 24. Respectively two examples are associated with portals including information on

- Private sidings (Gleisanschluss Brandenburg, VDV market place);
- Stations with public sidings (Search on SBB Cargo service points, Green Cargo Network);
- Intermodal terminals (AGORA portal, SGKV Intermodal map) and
- Other conventional loading points (DB Schenker search on railports, RAILSCOUT).

Figure 24: Types of analysed portals / websites



Source: HaCon

Figure 25 provides an overview on the analysed portals. A more comprehensive list of portals with details on the analysed criteria is included in Annex 5.

Figure 25: Overview on analysed portals / websites

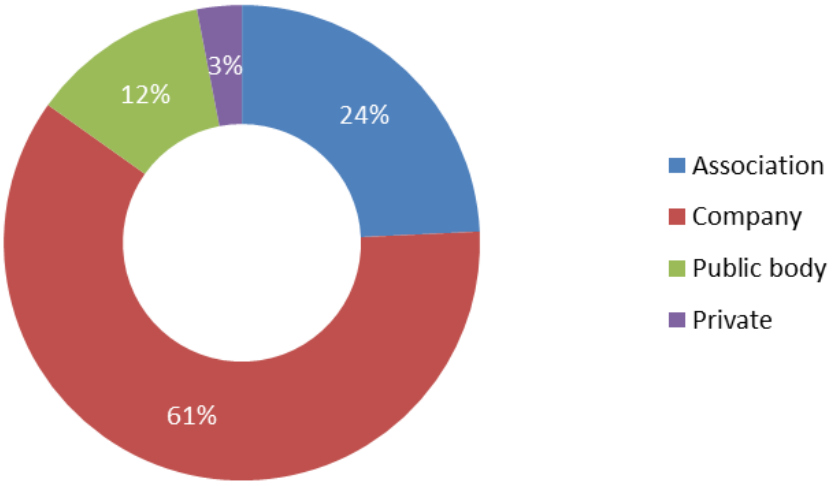
Portal / website name	Portal / website promoter	Source type	Geographical coverage (category)	Intermodal terminals	Railports / Rail logistics centres	Stations with public sidings	Private sidings	Other	Other (explanation)
Adif Logistic facilities	Adif	GIS portal	National			x			
Agora portal on Intermodal Terminals in Europe	AGORA	GIS portal	International	x					
BÖB member map	BÖB	GIS portal	National					x	Inland ports
Interaktive KV Terminal Karte (Interactive map on intermodal terminals)	DB Netz	GIS portal	International	x					
Interaktive Ladestellenkarte (Interactive map on loading points)	DB Netz	GIS portal	International			x			
Anlagenportal-Netz	DB Netze	GIS portal	National			x			
Freiladegleissuche (Team tracks)	DB Schenker Rail	GIS portal	National			x			
DB Schenker Railports and Rail Logistics Center Search	DB Schenker Rail	GIS portal	International		x				
Timber loading point search (Holzverladebahnhofssuche)	DB Schenker Rail	GIS portal	National			x			
Green Cargo Network	Green Cargo	GIS portal	International	x					
Gleisanschluss Brandenburg	Land Brandenburg	GIS portal	Regional			x	x	x	Inland ports
Logistikportal Rheinland-Pfalz	Land Rheinland-Pfalz	GIS portal	Regional	x		x		x	Freight villages, inland ports
Nederlandse Vereniging van Binnenhavens (NVB)	Nederlandse Vereniging van Binnenhavens (NVB)	GIS portal	National					x	Inland ports
Antwerp Intraport Terminal Tool	Port of Antwerp	GIS portal	Regional	x				x	also terminals suitable for conventional cargo listed
CONTAINERZUG.DE	Private portal run by Patrick Böttger, Karl Arne Richter und Georg Ringler	GIS portal	International	x					
Rail Scout	Railcargo.nl	GIS portal	International	x		x		x	also conventional terminals
SBB Cargo Bedienpunktsuche (Search of SBB Cargo service points)	SBB Cargo AG	GIS portal	International	x		x			
Intermodal Map	SGKV	GIS portal	International	x					
Trafikverket	Trafikverket	GIS portal	National	x		x			
TX LOGISTIK Netze	TX LOGISTIK	GIS portal	International	x					
UIRR terminal application	UIRR	GIS portal	International	x					
ASSOLOGISTICA website	Assologistica	Website (no GIS)	National					x	Port terminals, other logistics facilities
Cargo Sped Terminals	Cargo Sped	Website (no GIS)	National	x	x				
Cemat Intermodal Terminals	CEMAT	Website (no GIS)	International	x					
DUSS Terminals	DUSS	Website (no GIS)	National	x					
EFIP website	EFIP	Website (no GIS)	International					x	Inland ports
Zugangsstellen zum Schienennetz für den Güterverkehr in Hessen (Documentation on rail freight access points in Hessia)	Hessen Mobil	Website (no GIS)	Regional	x		x	x		
HUPAC Terminal Research	HUPAC	Website (no GIS)	International	x					
ITALCONTAINER Spa	ITALCONTAINER Spa (controlled by Trenitalia)	Website (no GIS)	National	x					
Terminali Italia Terminals	Terminali Italia	Website (no GIS)	National	x					
Trenitalia Cargo Railway Network	Trenitalia Cargo	Website (no GIS)	National					x	focussed on (transfer) stations
UIR website	Unione Interporti Riuniti (UIR)	Website (no GIS)	National					x	Freight villages
VDV Kooperationsbörse (VDV market place)	VDV	Website (no GIS)	National	x	x	x	x		

Source: HaCon

In correspondence to the above listed questions there are different possibilities for clustering e.g. regarding the type of organisation that is responsible for running and promoting the analysed portals and websites ("portal promoter", see Figure 26). The type of portal promoter might give indications for the motivation of setting up such a public database, the business model for running the portal and procedures for updating information. The following main promoter types are distinguished:

- Companies (20 = 61%) represent the biggest group of portal/website promoters; this can be infrastructure managers promoting their own infrastructure or related facilities (e.g. DB Netz, Port of Antwerp), railway operators informing about the infrastructure they serve (e.g. Green Cargo, SBB Cargo) and companies that offer a specific information service (e.g. Railcargo.nl). In most cases (14), these companies only inform on their own facilities.
- The second largest group of portal promoters are associations (8 = 24%). All information portals, operated by associations, inform about facilities of different companies. Sometimes information is limited to locations of association members (e.g. EFIP, UIR). In most cases the associations use their portal to promote rail freight transport in general or a specific type of transport and therefore include locations from different entities (e.g. Agora, SGKV, UIRR, VDV).
- 12% of the portals or websites are operated by public bodies (4 = 12%). All identified public bodies are economic support agencies promoting a specific region.
- One private portal (Containerzug.de) is included in the list of further analysed portals/websites – offering comprehensive information on terminals, operators and train connections.

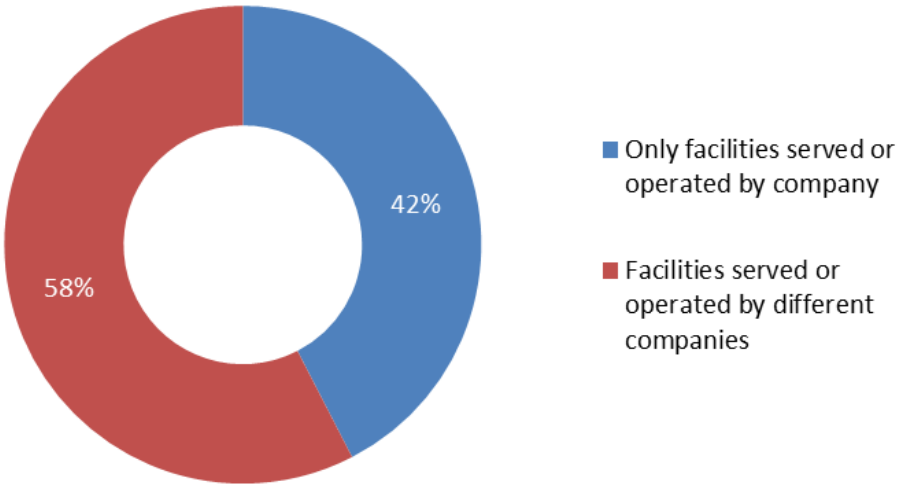
Figure 26: Types of portal promoters



Source: HaCon

14 GIS portals and 5 websites contain data on more than one entity (19 = 58% of all analysed sources). 7 GIS portals and 7 websites (14 = 42%) provide information for one company exclusively (cp. Figure 27).

Figure 27: Facilities included

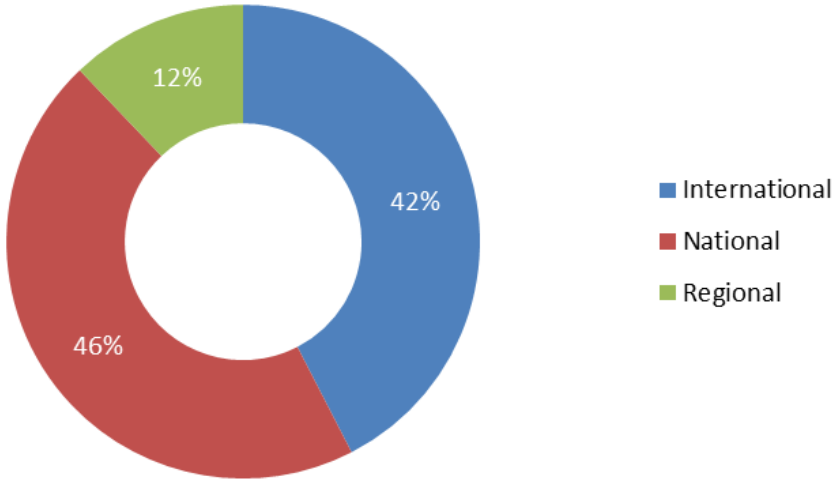


Source: HaCon

With regard to the geographical scope the following main clusters have been observed (see Figure 28):

- Portals with an international scope (14 = 42%) mainly correspond with the portals operated by international operators (7) and international associations (3).
- 15 (46%) of the analysed portals have a national focus. These portals are linked to national associations as well as to infrastructure managers or operators with a national network.
- Some identified portals (4 = 12%) have only a regional coverage. These refer to economic support agencies promoting specific regions or ports (e.g. Port of Antwerp).

Figure 28: Geographical scope – general assessment (international, national, regional)



Source: HaCon

The type of loading point is a major criterion to cluster portals regarding their general contents. The following main loading points are distinguished (see also chapter 2.2.1):

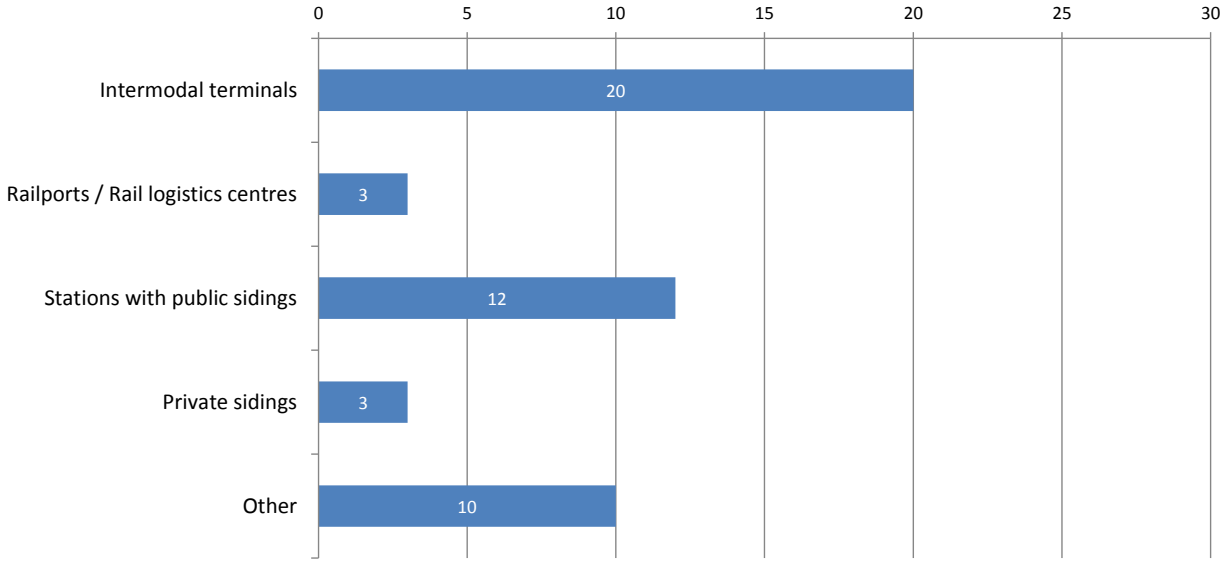
- Intermodal terminals (including RoLa terminals),
- Railports / rail logistics centres,
- Stations with public sidings,
- Private sidings,
- Other; this includes transhipment terminals for conventional cargo and areas where loading facilities can be located (e.g. freight villages, ports).

In the analysis of portals regarding this aspect following issues have been observed (see

Figure 29 and Figure 30):

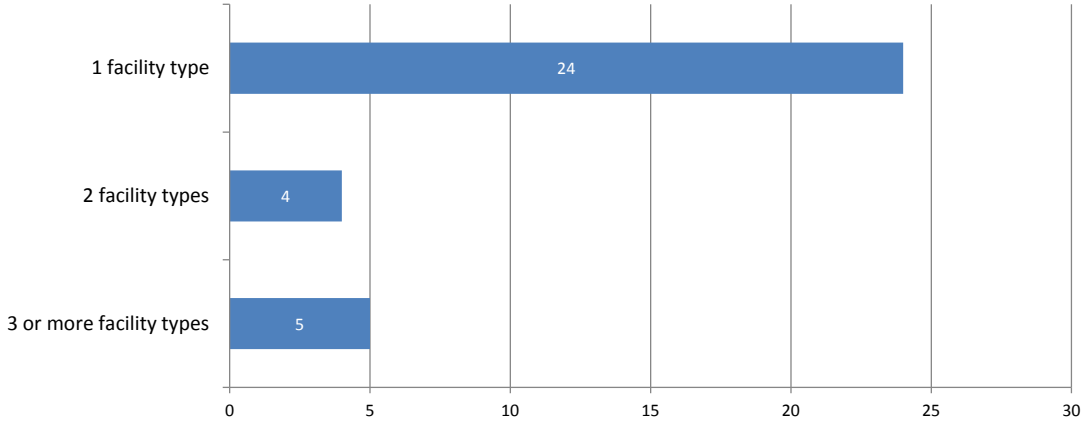
- There is a large group of portals that focus on intermodal terminals (20 = 61%);
- Information on stations with public sidings is facilitated by 12 (= 36%) portals.
- Only a minor share of portals is linked with railports / rail logistics centres (3 = 9%) and private sidings (3 = 9%).
- There are 10 (= 30%) portals that provide information on other facility types, mainly inland ports (5), freight villages (2) and terminals for conventional cargo (2).
- Most portals focus on only one "last-mile" facility type (24 = 73%).
- 9 portals facilitate at least two facility types. Most of them are regional portals (4 = all listed regional portals) aiming at providing a comprehensive overview of rail logistics facilities in a certain area.

Figure 29: Number of portals/websites providing information per facility type



Source: HaCon

Figure 30: Number of portals/websites providing information on 1, 2, 3 or more facility types



Source: HaCon

Figure 31 provides an overview which countries and facility types are covered by how many portals. The analysis covers 35 countries in total. This includes all EU28 member states apart from Malta and Cyprus. Further considered countries, relevant for the European transport market are Bosnia-Hercegovina (BA), Switzerland (CH), Montenegro (ME), Macedonia (MK), Norway (NO), Serbia (RS), Russia (RU), Turkey (TR) and Ukraine (UA).

The table confirms that the information coverage in relation to intermodal is exceptional good. Apart from Estonia (one identified portal) all countries are covered by at least two portals. Moreover 25 countries are covered by at least five information portals on intermodal terminals.

The coverage for other facility types is much lower. Only 20 out of 35 countries (or 14 out of 26 listed EU28 countries) are served with portals regarding stations with public sidings.

That means that in 15 countries information on public sidings is not offered via the listed portals. Further 11 countries are served with only one portal including this facility type.

Information on private sidings is almost completely missing. Only for Germany there are three portals listed which include private sidings: two regional portals (Brandenburg, Hessen) and one national portal ("VDV Kooperationsbörse"). Still this does not say anything about the completeness of these databases.

A railport or a rail logistics centre is a specific type of public siding. The term "Railport" has been created by DB Schenker. Generally, this type of logistics facility is not very well known in all European countries. As mentioned before there are only three portals at all providing information about this facility type. All countries listed with one portal regarding railports are only served by the DB Schenker portal (see Figure 31).

Figure 31: Number of portals/websites per facility type AND country

	Total per country	Intermodal terminals	Railports / Rail logistics centres	Stations with public sidings	Private sidings	Other
Total per type		**20**	**3**	**12**	**3**	**10**
>AT	**11**	8	1	2	0	2
>BA	**4**	4	0	1	0	1
>BE	**10**	9	0	1	0	3
>BG	**7**	5	1	0	0	1
>CH	**11**	9	0	3	0	2
>CZ	**8**	6	1	1	0	2
>DE	**21**	13	2	9	3	5
>DK	**9**	9	0	1	0	1
>EE	**1**	1	0	0	0	0
>ES	**10**	8	1	2	0	2
>FI	**4**	8	1	2	0	2
>FR	**9**	8	1	2	0	2
>GR	**8**	6	1	0	0	1
>HR	**7**	6	0	0	0	1
>HU	**9**	7	1	1	0	2
>IR	**2**	2	0	0	0	0
>IT	**16**	11	1	2	0	5
>LT	**3**	3	0	0	0	0
>LU	**7**	6	0	0	0	1
>LV	**3**	3	0	0	0	0
>ME	**2**	2	0	0	0	0
>MK	**6**	6	0	1	0	1
>NL	**10**	8	0	1	0	3
>NO	**9**	9	0	1	0	1
>PL	**8**	7	2	0	0	0
>PT	**5**	4	0	0	0	1
>RO	**9**	7	1	1	0	2
>RS	**6**	8	1	2	0	2
>RU	**6**	6	0	1	0	1
>SE	**11**	10	0	2	0	2
>SI	**5**	5	0	0	0	0
>SK	**7**	6	0	1	0	2
>TR	**5**	4	1	0	0	0
>UA	**3**	2	0	0	0	1
>UK	**5**	4	1	0	0	0

Source: HaCon

3.2.2 European registers on railway infrastructure

European registers on railway infrastructure that might be exploited for the planned information portal are for instance

- RINF (Register of Infrastructure),
- CRD (Central Repository Domain),
- ENEE (Register for European station codes),
- DIUM (Database for distances between rail freight stations and borders).

RINF (Register of Infrastructure)

The Register of Infrastructure (RINF) is a web-based application facilitating access to the data of national railway infrastructure registers of EU member states. RINF has been introduced on the legal basis of Article 35 of Directive 2008/57/EC and shall ensure a transparent access to the main features of the considered railway infrastructure. The common technical specifications are set out in a Commission Implementing Decision (RINF Decision).

The most recent RINF Decision (Decision 2014/880/EU, dated 26 November 2014) repeals the previous Decision 2011/633/EU and introduces a computerised common user interface (CUI) which simplifies queries of infrastructure data. This interface, set up and managed by the European Railway Agency (ERA), is publicly available. Furthermore the RINF Decision obliges each Member State to nominate an entity (NRE) in charge of setting up and maintaining its register of infrastructure and to notify an implementation plan. The first sets of data were expected to be available via CUI in the second half of 2015.

The RINF database includes data on operational points and sections of lines. Data concerning operational points contain generic information (e.g. name of operational point, unique OP ID, OP TAF TAP primary code, type of operational point, geographical location), track information (e.g. IM code, track ID, TEN classification, line type, traffic type, gauges) and siding information (e.g. Siding ID, length, gradient, radius). Lines are defined by line sections. Data of line sections include e.g. allocations to lines, freight corridors, location points (from/to) and a comprehensive set of technical parameters.

CRD (Central Repository Domain)

The central reference file database CRD (Central Repository Domain) is part of the TAF-TAP TSI common components and provides modules for managing related reference data and metadata. The reference data module is used to add and edit the details of countries, companies and the related locations. There are two location types supported by the application:

- Primary Locations are geographical points inside or outside the rail network which must be identified for operational, technical, administrative or statistical purposes. Locations can be for instance stations, marshalling yards, terminals or other transhipment points. The basic set of data for primary location includes location code, name, country, responsible IM and a description of the location, start/end date. The set of additional information – relevant for rail freight – includes geo coordinates (longitude, latitude), freight activities possible (checkbox), start/end

date of freight activity, container handling possible (checkbox), handover point (checkbox) and NUTS code.

- A subsidiary location is generally connected to a primary location. Examples for subsidiary locations are sidings, factory tracks, etc. In many cases, subsidiary locations are administered by a company other than the one administering the primary location. A subsidiary location code is unique and always used in combination with a (primary) location code.

Since January 2015 RailNetEurope is responsible for managing and further developing the CRD data-base.

ENEE (Register for European station codes)

The ENEE database is a European register of railway stations. It provides unique coding per station (or station part) consisting of a two-digit country code and a five-digit national location code. Each registered location is listed with geo coordinates from the town. The database contains in total almost 70,000 stations; roughly 35,000 stations are accessible to freight trains[3]. ENEE is operated by UIC and accessible by all UIC members. Data updates are submitted to the ENEE database by the connected RUs and IMs in XML format. For data transfer from ENEE an FTP interface is provided. Currently, ENEE codes are being transferred to the CRD database as a part of the TAF-TSI centralised data exchange process.

DIUM (Database for distances between rail freight stations and borders)

DIUM stands for "Distancier international uniforme marchandises" (EN: "Uniform Distance Table for International Freight Traffic". The DIUM database contains tariff distances between the internal stations and border points of the participating railways. They are applicable when calculating carriage charges for all international freight and livestock consignments, as far as the considered stations are listed in DIUM. Currently, the database contains almost 14,000 stations from 23 European countries[4]. The data set per station includes some other helpful commercial and/or technical information e.g. "Stations for which supplementary or ancillary charges are payable", "Internal Station with Customs Clearance facilities", Station open only for wagon-load traffic, Station open only for wagon-load traffic to or from private sidings. The DIUM data is published on the UIC website and is currently updated twice a year. It is planned that the locations listed in DIUM will be included as subsidiary locations in the CRD database.

It is recommended to coordinate the database of the aimed at last-mile information portal with RINF and CRD and to harmonise common elements in order to avoid creating multiple data channels for the same kind of data with different data structures and formats. Within this coordination process compatibility with the IRS 30100 data model (RailTopoModel) shall be checked, too. In contrast, a non-coordinated approach would increase complexity of the entire information framework and related costs.

3.2.3 Network statements

According to the European Directives 2001/14 and 2012/34 each rail infrastructure manager is obliged to publish a Network Statement. These Network Statements shall provide

[3] Source: UIC analysis, 02/2015
[4] Source: UIC analysis, 02/2015

information on the railway net-works and their commercial and legal access conditions. The general idea is to provide train operators with a single access point to relevant up-to-date information on the respective network and ensure a fair and non-discriminatory access to the corresponding infrastructure.

Within Directive 2013/13/EU, Article 27 it is stated that "the network statement shall

- be published in at least two official languages of the Union;
- available free of charge in electronic format on the web portal of the infrastructure manager and accessible through a common web portal;
- contain information setting out the conditions for access to the relevant railway infrastructure and service facilities connected to the network of the infrastructure manager."

The content of the network statement is laid down in Annex IV of Directive 2013/34/EU.

UIC, then RailNetEurope have been promoting the harmonisation and publication of user-friendly, customer-oriented Network Statements – designed to enable the user to find the information you need very quickly. To this end, the Members of RailNetEurope have agreed a common structure and an implementation guide for drafting Network Statements in accordance with EU regulations. According to the "Network Statement Common Structure" of RNE published on 10 March 2015 specifically the section 7 "Terminal / Service Facility Information" is expected to provide information about last-mile infrastructure for rail freight.

Apart from the harmonised structure and rules defined by European legislation and promoted by RNE, each Network Statement has to be evaluated regarding facilities listed, information provided and accessibility of information.

3.2.4 Direct data provision by rail facility operators

Currently, European legislation and related TAF-TSI rules require actions mainly from rail infrastructure managers to provide data on railway infrastructure and services in common formats and via standardised interfaces. Operators of other rail facilities such as terminals, railports or other loading facilities may feed the official centralised databases (RINF, CRD) and other information portals on a voluntary basis. Additionally they may publish information on their websites with individual contents and formats.

3.3 Exploitation of existing information sources – availability of data and access conditions

The success of all kinds of information portals is greatly dependent on the filling rate with correct data. Therefore data availability regarding the information items mostly requested by potential data users and efficient updating procedures are important aspects to be considered for the design of the European portals. In this respect it has to be checked if other sources provide requested information (cf. chapter 3), if the data is up-to-date, if data can be exploited for the European last-mile portal and if yes under which conditions. The analysis within this chapter focusses on the accessibility of information from other GIS information portals and websites and looks at

- General legal aspects of data usage from other sources and
- Availability of data from other portals and websites for the usage in the planned European last-mile portal including corresponding technical and commercial conditions.

3.3.1 General legal aspects of data usage from other sources

The gathering of data from the World Wide Web is as old as the Internet itself. In the beginnings of it in 1993, the first so called "WebCrawler" named "World Wide Web Wanderer" was established at the Massachusetts Institute of Technology (MIT). Its task was to measure the development and growth of the World Wide Web. Since then, the World Wide Web has grown fast, likewise its content. This led to the necessity to indicate the content of the internet, keeping findability and reachability handy.

Today search engines or other web service platforms use screen scraping as a tool to collect and gather information for their users. Generally, screen scraping collects all information which is shown on a computers screen. Currently, the most common meaning of it is to read out websites and its content (web scraping). Web scraping is a more detailed search of data. It means that it only extracts dedicated or specific data which is needed for the processing of the information that the user of a web service platform has requested.

However, not all owners of content or databases want others' services to read out their provided information. In the past, this led to several important legal proceedings and national legislation[5].

While talking about screen or web scraping, it is important to define the kind of data that should be captured. The reason for that is that different data forms have different legal regulations which govern its access or protection.

Legal basis for the protection of databases in Europe

In March 1996 the European Parliament enacted the Directive 96/6/EC which regulates the legal protection of Databases in the European Union. The Directive created a law sui generis that primarily protects the commercial interests of the database owners. The legal protection focuses on the temporal, financial and personnel investment that the owner has made. Independent from the question whether the database creation is based on an inventive process it gives the owners the possibility to protect a database which is not

[5] Compare Major Court decisions on page 64

protected by copyright law. Prior to the new regulation, database owners could only profit form a legal protection if their databases had met a certain threshold of originality. This threshold excluded databases which hosted compilations of information like Telephone directories, hit lists or time table information portals. The database law of Directive 96/6/EC is independent from other laws like the copyright law; it is the bases for all national database legislation in the European Union.

In the following paragraphs the principals of Directive 96/6/EC will be demonstrated using the German database law. Moreover these principles of law are similarly applicable in all EU Member States.

Database law described in this example of German law

Guideline for the German Database law is the "Directive 96/9/EC of the European parliament and of the council of 11 March 1996 on the legal protection of databases", which has been transposed into respective national law. In Germany it has been ratified in the copyright act called "Urheberrechtsgesetz (UrhG)". The Germany copyright act distinguishes between databases and database works. Database works are regulated in § 4 UrhG while databases are regulated in §87a-e UrhG.

A database work in the sense of § 4 (2) UrhG is a collection of elements which are systematically or methodically arranged and each element is accessible by electronic or other means. The elements themselves are not copyright protected.

The definition of databases is regulated in §87a (1) UrhG. Following this regulation databases are collections of works, data or other independent elements which have been arranged systematically or methodically and are accessible either by electronic or other means individually. The compilation, verification or presentation of a database needs a substantial investment which is defined by type and extent. The ownership of a database is defined in § 87a (2) UrhG. The entity that yielded the substantial input is the owner of the database.

The object of protection of a database work (§4 (2) UrhG) targets the structure of the database as a personal intellectual creation. Primarily, this protection right focuses on the selection and arrangement of the elements of the database. In contrast, the database protection focuses on the substantial investment performance.

In this context, the object of protection of a database work (§4 (2) UrhG) and of a database (§87a UrhG) are coexisting and can unfold their effect independently from each other.

The rights of the creator of the database are regulated in § 87b UrhG. As written before the creator of the database is the owner of it. According to § 87b (1) UrhG the owner of the database has the exclusive right to entirely copy it or to copy a substantial part of it, to distribute or to present it to the public. However, unsubstantial, systematical and recurring use of the database by a third party is illegal if it unreasonably impairs the legitimate interest of the owner of the database.

Nonetheless, a reproduction of a database may be legal if the reproduction corresponds to the specifications of § 87c (1) UrhG. The database owner has to accept the reproduction of its database if the third party uses it for private, scientific or educational purposes.

In accordance with § 87d UrhG, the rights of the owner of the database last for 15 years from the moment of publication. If the owner of the database has not published the database until the end of the year in which it has been compiled, then the rights of the owner of the database last 15 years from the moment of creation of the database.

In the case of a closed contract for the use of a database, § 87e UrhG has to be considered. Agreements which exclude the use of parts of the database which are, by type and scope, unsubstantial are legally void, as far as the use of the database is not exceeding the normal procedure and extent of appraisal of the database and does not impair the legitimate interest of the database owner.

Content protection

The most common technique to extract or collect data is screen scraping. The operators of data or content websites, e.g. airlines like Ryanair, want to defend their data because they lose the influence and form of presentation of their data. Furthermore they fear to suffer from comparability with business rivals or even from lower advertising revenue if their websites are financed by advertisements. Hence, protection of data is the key to hinder third parties to extract, collect, and use the operator's provided data.

In general, the owner of a database does not have to fear any illegal extraction, aggregation or use if the data is copyright protected. But not all data do fulfil the minimum requirements for a copyright protection. In the sense of a possible copyright infringement, readout of this data is uncritical (compare: OLG Frankfurt (Decision from 05.03.2009 Az. 6 U 221/08).

Besides the aforementioned copyright protection, the rights of the database creator could often be protected by § 87b (1) s.1 UrhG against the usage by any third party. On the one hand, the consequence of such regulation is that the creator is the only one who has the right to use and exploit the database or a substantial part of it, but on the other hand it means that an unsubstantial part of the data set could be screen scraped, aggregated and used by a third party for its own purposes without infringing the owners right. The question that arises in such situation is always what kind of data has or will be extracted from a database. However, a third party that wants to use an unsubstantial part of the data set has to consider that, according to § 87 b (1) s.2 UrhG, an examination of an unsubstantial part of the database may not run contrary to a normal exploitation of the database. In addition, the legitimate interest of the creator of the database may not be unreasonably impaired by the usage of the unsubstantial part of the data set.

Furthermore database creators can protect themselves against screen scraping by explicitly excluding it in the Terms and Conditions of the website. For the correct integration of the Terms and Conditions it is important that the database cannot be accessed without accepting the Terms and Conditions, both for the manual usage via the website interface or via an automated screen scraping procedure. If the owner of the database puts its terms and conditions on the website only, without an explicit acceptance obligation, an access to the data set without the acceptance of the Terms and Conditions is not sufficient for a legal protection against screen scraping[6]. Nonetheless, a contractual regulation of the access to the database is strictly bound to the terms of § 87e UrhG, which regulates the contractual access restriction only to databases that are not protected by law (§ 87b UrhG). This means, if a data collection is a database in the sense of §87a UrhG, the owner of the database has to tolerate a possible use of unsubstantial data by screen scraping, as far as the use of data is not exceeding the normal procedure and extent of appraisal of the database and does not impair the legitimate interest of the database owner. Due to § 87e UrhG contractual agreements which exclude the unsubstantial use of a database are invalid.

Due to a decision[7] of the European Court of Justice (ECJ), a possibility to exclude such unsubstantial use by contractual agreement only exists, if the data collection is not a

[6] Bundesgerichtshof decision 22.06.2011 – I ZR 159/10
[7] European Court of Justice decision 15.01.2015, Rs. C-30/14

database in the sense of § 87a UrhG. The reason for that is that the rules of §87e UrhG do not apply to the simple data collections. In the case of the European Court of Justice it was a flight booking portal from Ryanair. Nonetheless, the ECJ did not define whether such flight data is a database or not.

The legal protection could be supported by technical protection mechanisms to avoid runaway access of the data set. Theses technical mechanisms could be either the constraint to register at the website to get access to its services, or so called captchas which are letter-number combinations that could only be read by humans and have to be entered before the access to the data set is granted.

Another possibility to use data (copyright-protected or not) of a database is the setting of links or deep links to the content. This procedure is, according to a decision[8] of the German BGH, not illegal. Following this decision, it is crucial, whether the owner has technically protected his copyright-protected data or content against uncontrolled access via links. If an owner is granting access to a copyright-protected work on his website without any technical protection mechanism, he is making the use of the content available to the public by himself. Hence, he has to accept that a third party is setting a link or a deep link to his content. Furthermore, the court pointed out that the owner had used the medium internet for its business purposes. The common interest in the internet is, to access the desired information as fast as possible and without unnecessary crawling through the wealth of accessible information. The owner of the database has to take this common rule into account when using the internet as publication means.

Legal consequences of illegal content gathering

Basically, all unfair business activity which is capable of drastically impair the interest of any competitor, consumer or other market actor is illegal, according to § 3 (1) UWG. To be illegal in that sense, the used type of screen-scraping has to fit to one of the examples of unfair competition which are listed in § 4 UWG. A systematic impediment of a competitor which is named in § 4 No.10 UWG could be a possible element of offence. To impede the competitor, the screen scraping has to have a negative effect on the legitimate interests of the competitor. These negative effects could be of various kinds. An example of a negative effect would be decreased advertising revenue, or an interruption of the operating schedule of the competitor. If such negative effects have been detected, then the competitor may plead for the rights which are defined in §§8-10 UWG. These are:

- Elimination and omission, § 8 UWG,
- Indemnity, § 9 UWG,
- Skimming of excess profit, § 10 UWG.

According to § 11, the aforementioned titles expire as follows:

- Elimination and omission in 6 months,
- Indemnity in 6 months,
- Skimming of excess profit in 3 years.

The limitation period starts if the claim has arisen and the obligee has gained knowledge of the circumstances which cause the claim.

[8] Bundesgerichtshof decision 17.07.2003 – I ZR 259/00

Conclusions

At first, it could be noted that the extraction of foreign data and its publication on an own internet portal is not generally forbidden.

However, the use of screen-scraping can be critical, and the user of it has to be very careful and precise when using it. Two significant criteria have to be considered. On the one hand, the extent and the type of data which should be extracted from the website and used for other purposes are critical criteria. If the extracted data is copyright protected, the use for other purposes may be illegal in most cases. To obtain copyright protection, the concerned data must show a certain level of originality and creativity. For data sets like those airlines are using for their booking and timetable information services, it can be assumed that the addressed level of originality and creativity does not exist. Data sets for last-mile information portals correlate to this assumption. As far as the respective data which should be extracted (e.g. last-mile information) does not have any copyright protection, the extent to which it should be extracted is the critical point for the appraisal whether such extraction is illegal or not. The German law has elaborated the term of substantiality. In the context of screen scraping it means that the type and extent of data that may be extracted is not suitable to impair the legitimate interests of the creator of the database. This leads to the assumption that the extraction of a partial dataset does not fulfil the criteria to impair the legitimate interest of the database creator. The German BGH has decided that the simple extraction of single data does not qualify for substantiality[9].

Furthermore, it is important to know if the creator of the database has protected it by implementing technical procedures that should control the access to the data set. If such technical procedures have been established, a bypassing of such procedure by the screen scraper could become an infringement of the rights of the database creator. If such technical procedure has not been established to protect the data set, the creator of the database has to tolerate the data extraction by third parties[10].

The aforementioned principles should be taken in to account if an organisation wants to extract and aggregate data from other's databases on the internet. In short:

- Data which has been extracted can only be published on a third party's web-portal if they are not protected by the copyright act.
- Data may be extracted and used, if it is only an unsubstantial part of the whole data set.
- Technical procedures which control the access to the database should not be bypassed.
- If a web-database protects its content, which is not copyright protected, by the acceptance of terms and conditions that explicitly exclude the extraction of unsubstantial data by screen scrapping, one should not use such unsubstantial and legally unprotected data for another portal.
- The setting of links or deep links into a database is not forbidden if the owner of the database has not protected its data.

[9] Bundesgerichtshof decision dated 22.06.2011 – I ZR 159/10
[10] Bundesgerichtshof decision dated 17.07.2003 I ZR 259/00

If the extracted data are protected by copyright or are protected as database, then the owners of the database do not have to tolerate the data extraction and could plead for elimination and omission, indemnity and skimming of excess profit.

Ultimately, the best solution for the extraction of external data is to ask the content owner and to mutually agree on the terms and conditions of the data extraction and usage. If the owner of the data is not willing to share his data, for the particular case a legal expertise would be advisable to avoid all potential legal pitfalls.

Major Court decisions

- Deep link to Content: Bundesgerichtshof decision dated 17.07.2003 I ZR 259/00
- Screen scraping: Bundesgerichtshof decision dated 22.06.2011 – I ZR 159/10
- Screen scraping: Oberlandesgericht Frankfurt decision dated 05.03.2009 Az. 6 U 221/08
- Contractual access restriction to databases: European Court of Justice decision dated 15.01.2015, Rs. C-30/14

3.3.2 Exploitation of other portals

The evaluation of other portals regarding their exploitation potential for the development of the European last-mile portal is based on two levels

1. **Testing of portals / websites**

   Identification of scope and contents (cp. chapter 3.2.1; assessment on exploitation potential; pre-selection of generally suitable portals.

2. **Consultation of portal promoters (of generally suitable portals)**

   General aspects: data availability; conditions for data exploitation / transfer; support for European last-mile portal.

In total promoters of 14 portals have been consulted (see Figure 32), mostly in form of telephone interviews.

Generally, the interviews were conducted based on interview guidelines covering the following aspects:

- General aspects / experience, e.g. Motivation to set up the portal, development status/plans, portal usage (user groups, number of clicks);
- Data updates/ownership;
- Data availability and conditions;
- Interest in supporting European last-mile portal.

Figure 32: Consultation of other portal promoters

Portal	Promoter
AGORA portal on Intermodal Terminals in Europe	AGORA
Interaktive KV Terminal Karte (Interactive map on intermodal terminals)	DB Netze
Interaktive Ladestellenkarte (Interactive map on loading points)	DB Netze
Anlagenportal-Netz	DB Netze
Freiladegleissuche (Team tracks)	DB Schenker Rail
DB Schenker Railports and Rail Logistics Center Search	DB Schenker Rail
Timber loading point search (Holzverladebahnhofssuche)	DB Schenker Rail
Green Cargo Network	Green Cargo
Antwerp Intraport Terminal Tool	Port of Antwerp
SBB Cargo Bedienpunktsuche (Search of SBB Cargo service points)	SBB Cargo AG
Intermodal Map	SGKV
UIRR terminal application	UIRR
DUSS Terminals	DUSS
VDV Kooperationsbörse	VDV

Source: HaCon

The main findings are summarised as follows:

General aspects

The motivation for setting up the information portal is mainly linked to the purpose of promoting the listed transhipment and logistics facilities (>50%) and connected services (~40%). Portals of the interviewed rail infrastructure manager (DB Netze) have been set up to promote rail freight by better information in order to sell more train paths and consequently generate a better exploitation of the rail network. Three portals (~20%) have been set up to promote a specific type of transport (intermodal). Additionally image reasons have been mentioned.

The usage of existing information portals supports the findings from the analysis of user needs that there is an appreciable demand on last-mile infrastructure information; specifically information on transhipment facilities is requested from intermodal operators and other transport and logistics companies that use such information tools. For two portals information on access numbers have been given; they range between 450 and 3000 clicks per month.

Data updates/ownership

Updates for information on own facilities should be generally up-to-date; updates are partially automated. Information gathering for facilities and services that are managed by other companies is a process that takes a lot of efforts. In most cases such data has to be

depicted manually from numerous different information sources. Only one evaluated portal directly involves facility operators in the update procedure. Apart from this case – where terms of use have to be checked in detail – all interviewed portal operators are in the position to decide on the usage of their portal data.

Data availability and conditions

Most interviewed portal promoters would generally agree to connect their portal with the European LMI portal. In this respect we aggregated the interview answers to three different access levels.

- **"Link to portal":**
  Almost all interviewed portal promoters agree to include a link to their portal in the European LMI portal. In fact, they are aware of the legal situation that linking websites is allowed in any case.
- **"Search portal":**
  Most portal promoters answered that they would agree with searching their portal regarding sites and/or certain parameters, provided that the performance of their portal would not be limited due to extensive search requests. It has been stated in most interviews that information on publically accessible information is public and consequently searching the existing portals cannot be forbidden. Some promoters left this question open due to uncertainties regarding legal aspects and the specific usage terms of their portal.
- **"Direct data transfer":**
  For some 50% of the portals, responsible promoters could generally imagine to directly transfer data to the European LMI portal to ensure a better visibility of this data in a European context. For almost half of the portals this would be not possible. Main reasons against data transfer are the budget and time efforts connected with the gathering of data and image reasons.

Following technical conditions for the access to data from other portals have been investigated:

- **Interfaces:** the existing of an interface has been confirmed for only few portals; this is Excel.
- **Search API:** Information regarding Search APIs have been left open in most considered case.
- **URL linking:** URL linking to specific subpages – associated with specific facilities – is possible for four portals and needs to be clarified for the others.

Generally, information on technical characteristics have been given only to a limited extent, mainly due to the fact that the interviewed persons are not the responsible technical experts. It is recommended to investigate further technical details in correspondence with a potential exploitation for the permanent portal. Such links and data transfers need to be negotiated and contractually fixed between the future last-mile portal operator and the respective data providers (operators of other portals).

Interest to support European last-mile portal

The interviews show that there is a general interest to support and get involved in the planned European LMI portal. One entity (UIRR) already stated their interest to be involved in the later operation of a permanent portal. They can imagine taking care of the provision and updating of data on intermodal terminals.

3.4 Selection of pilot regions

Data from other information portals has been exploited for the pilot portal, based on agreements with respective data owners. Additionally it was a task within the study to further fill the portal with data from at least three major regions in at least three different Member States. Some suitable locations have been identified already in the proposal phase, considering different regions/countries (4 x Central Eastern Europe, 2 x Southern Europe) and types of facilities:

- Czech Republic e.g. Ostrava – centre of a major industrial region, intermodal terminal;
- France e.g. facilities of short line operators OFPs "Opérateur Ferroviaire de Proximité";
- Germany, e.g. Duisburg – hinterland location to the Port of Rotterdam, inland port, intermodal terminals, sidings;
- Greece, e.g. Thessaloniki – port, intermodal terminals, warehouses with railway sidings;
- Hungary e.g. Sopron, Györ – industrial region Györ and rail logistics hub Sopron;
- Italy, e.g. Bologna, Verona, Milano – highly industrialised Italian region comprising industrial sites, freight villages, intermodal terminals and other rail logistics facilities. Northern Italy still has a considerable share in wagonload transports;
- Luxembourg – industrial node (e.g. steel) composing all kinds of last-mile infrastructure, e.g. a shunting yard, sidings, intermodal terminal;
- Poland, e.g. Wroclaw (Breslau), Dolny Śląsk – one of the economically most developed regions in Poland;
- Romania, e.g. Timisoara, the second largest city in Romania and a booming economic centre in the West of Romania;
- Sweden e.g. number loading points.

The discussions with potential data users have shown that information might be required with focus on a specific type of transport, e.g. intermodal transport, transport for forestry products or dangerous goods. Proposals will be elaborated and evaluated by the consortium. Based on the identified user needs and in agreement with the European Commission the following pilot regions have been selected: Sweden, West-Hungary/East-Austria greater Vienna region, Balkan region.

4 Pilot web-based information portal

4.1 Objectives / Methodology

The technical development of a state-of-the-art GIS-portal designed to manage and access information about last-mile infrastructure for rail freight is subject of WP 4 ("Setting up a web-based information portal"). The conception and development of this portal is based on the findings from WP 1 ("user needs") and WP 2/3 ("data sources" / "data availability" / "access conditions"). In summary, this work package consists of the following tasks:

Task 1 of this work package contains the development and programming of the portal application. From the user point of view it is important to make the portal intuitive and easy to use; everybody should be able to access the information regardless of the level of GIS-knowledge.

Behind this user interface, a generic data driven data model is required that supports adding any custom data source into the system without the need of changing the storage model. The data model also needs to support mechanisms for allowing updates coming from external data sources that change over time. The general concept of the data model must also consider different options for data provision/updating. In this context, the main questions are:

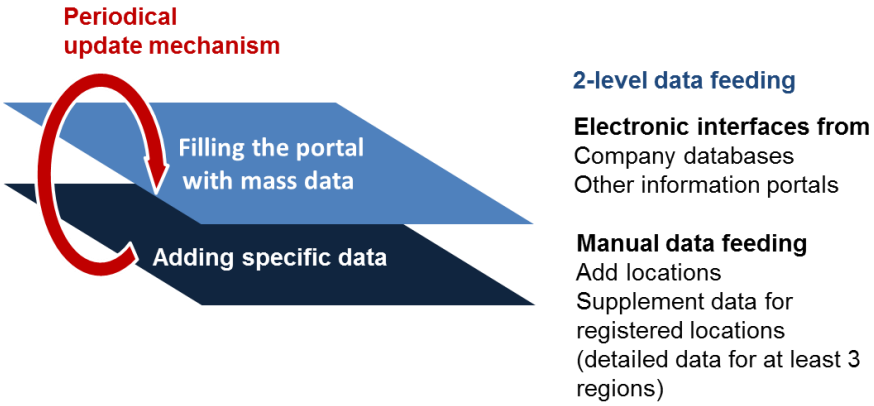
- Should data generally be stored and managed directly in the portal?
- Which data should be stored and updated directly in the portal?
- Which data should be provided by linking to other information portals or websites?

Purpose of task 2 is filling the portal with data for the selected pilot regions (compare chapter 3.4), considering all types of last-mile infrastructure. This data collection process includes

- Identifying suitable data sources,
- Negotiations with the respective data owners and agreement on the data usage within the pilot portal,
- Transfer of the data into the model,
- Plausibility checks and validation of the data,
- Update/complement of data stock.

Within this task, multiple procedures of data gathering and update shall be performed and tested. The bandwidth of these procedures covers a wide range from partially automated data transfer towards completely manual data input. A general way might be to start with a "basic feeding" of core data; in a second step this data stock might be supplemented successively by additional data. In an optimum case, this basic feeding could be performed automatically by standardised data interfaces; further data could then be inserted manually (see Figure 33).

Figure 33: Example for a 2-level data feeding and update mechanism



Source: HaCon

Task 3 deals with the operation of the portal. A pilot version of the application fed with at least basic data shall be taken into operation, to be running until the end of this project. This pilot version serves as test case for different methods of administration of the web-site as well as for public use and resulting feedback/recommendations.

These recommendations are to be collected systematically within task 4. For this purpose, a stakeholder seminar shall capture opinions of relevant users and data providers from the logistic business. Further feedback shall be collected from interviews with dedicated stakeholders and from statements of portal users.

Another main topic of task 4 are recommendations for a permanent operation of the portal. For this purpose, a business model has to be developed, containing a management structure, possible entities/associations for the key positions in this structure, a detailed task description and a cost/revenue compilation. This concept for permanent portal operation is described in a dedicated chapter (chapter 5).

4.2 General portal data concept

Data feeding and update is the most crucial item of the entire GIS-portal requirement profile. While quality of program features "only" influences the scope of functionalities, the significance of results, the user-friendliness or the (non-)availability of data decide, if the portal is usable at all. Moreover, other items like quality check of data or data update have a strong impact on the business model and thus on the finding/selection of a portal operator after finalisation of the project.

The analysis of the legal framework for data gathering/usage as well as the interviews already carried out with other portal operators (see chapter 3.3.1) have resulted in some important conclusions. In short form they say that portal operators and data owners were often positive to support the demo-version of a research project. However, this might change when it comes to a permanent operation under commercial conditions; data usage rights and ownerships would then have to be re-negotiated at least.

Thus, the consortium partners developed three general concepts for data gathering and update. The decision, which way to follow, will determine not only the data model, but also the development of the system features, the search algorithms and the user interface. The main ideas of these three concepts are as follows:

- Principle idea of the "Database Concept" is to own, to store, to manage, to process and to display all data in the GIS-portal database and its applications. This means that the GIS-portal operator does not only possess the data; he is also fully responsible for data gathering, update and check of the data. A reference to other portals/websites is foreseen for "dynamic" data that is likely to change rather often and/or has high requirements on confidentiality (e.g. schedules, fees).
- The "Meta Portal" is designed just the opposite way; the main idea is to possess as few data as possible. In fact, only dedicated "core data" (e.g. contact to site owners/operators) would be stored and processed inside the GIS-portal. All other information would be provided by linking to other websites. Thus, all data checking and updates would be performed by the data owners on the respective websites.
- The "Database Meta Portal" generally follows the "Meta Portal" approach. However, an own database would be provided to capture data for locations that are not included in other portals. These own data are in the responsibility of the GIS-portal operator.

In order to enable a reasonable decision on the further procedure, these three concepts have been checked and evaluated from a user´s as well as from an operator´s perspective. The main findings are compiled in the followings paragraphs.

4.2.1 Assessment from the user´s perspective

From a user´s/customer´s point of view, convenience of portal handling, multiple search possibilities and quick access to reliable results are of particular interest. These aspects have been evaluated by three parameters, as shown in Figure 34.

Figure 34: Evaluation of data management concepts form user´s perspective

Requirement	Database Concept	Meta Portal	Database Meta Portal
Search/filter options	4	2	3
Immediate/exact display of all data	4	2	3
Uniform presentation of results	5	1	2

Scale: 1 (no matching with requirements) – 5 (complete matching with requirements)

Source: HaCon

All three criteria clearly favour the "Database Concept", due to the advantages that storage of data in an own, self-created database brings along.

Criterion 1: Search/filter options

In the "Database Concept", all data (except "dynamic" data) might be filtered by numerous and multiple criteria; thus, the user might search for almost any combination of data included in the database. In contrast, within the "Meta Portal" and also within the "Database Meta Portal" concept, search/filter options are depending on data structure/encoding on

other portals. This means that the pure occurrence of dedicated data might be looked up on other web-sites; however, combination or search criteria or filtering of data will be possible only in exceptional cases.

Criterion 2: Immediate/exact display of all data

The principle of the "Database Concept" includes ranking different results and displaying only the one with the highest reliability. This means that the result would be displayed immediately without the need for the user to look up additional websites. In contrast, the latter would be required in both other concepts: both the "Meta Portal" and also (partially) of the "Database Meta Portal" would deliver no final result, but only a list of websites containing the requested search item(s). This means that the user would have to scan these links and select the appropriate result by himself.

Criterion 3: Uniform presentation of results

"In the "Meta Portal" and mostly also in the "Database Meta Concept", there will be a different presentation of results for (1) the "core data" (part of the portal database) and (2) data in each of other portals with identified results. The "Database" concept in contrast allows for unique display of search results.

4.2.2 Assessment from the portal operator´s perspective

Main interests for a portal operator are to minimise effort, costs and risks of data collect, update and check. For these aspects, Figure 35 shows an opposite result compared to the user´s requirements.

Figure 35: Evaluation of data management concepts form portal operator´s perspective

Requirement	Database Concept	Meta Portal	Database Meta Portal
Data gathering	2	4	4
Data check/update	2	5	4
Technical data processing	2	3	4

Scale: 1 (no matching with requirements) – 5 (complete matching with requirements)

Source: HaCon

Criterion 1: Data gathering

The criterion deals with possibilities and problems of data collection and with associated legal and financial issues. This aspect favours the "Meta Portal" and the "Database Meta Portal" concepts. This is simply due to the fact that mostly links to other websites will be displayed as a result. Thus, the operators of these websites are responsible for the data content, and the user is responsible to select the appropriate result out of all websites containing the respective search item. This enables smooth integration of additional websites to a search catalogue. A Europe-wide data availability is therefore easier achieve than in the "Database Concept", where individual negotiations would have to be led with each of the data providers with unsecure result and with respective consequences for legal and financial effort.

Criterion 2: Data update

This criterion measures the effort within the course of data check and update. It shows similar pros and cons as the data gathering section: in the "Database Concept" the GIS-portal operator would have to organize the complete update process. This also includes checking of all data updates (incl. discussions with data providers in case of errors/ inconsistencies/ questions). In contrast, responsibility for data updates and all subsequent work steps is transferred to other website owners when following the "Meta Portal" or the "Database Meta Portal". The only data that remains in the hand of the GIS-portal operator for updating are the "core data" and (possibly) additional data for locations not covered by external links.

Criterion 3: Technical data processing

Efficient data processing requires standardised ways to transfer and/or to read data from other websites/portals. In this respect, the "Database Portal" is expected to cause particular effort, if data is received from various sources directly. In this case, due to the general lack of standardised interfaces, the technical processes of data transfer need to be clarified for each feeding portal individually. These problems can be reduced when implementing the "Meta Portal" or the "Database Meta Portal" concept, because only dedicated "core data" will have to be transferred electronically from other websites. Just reading out data is expected to be much less complicated than data transfer.

An opposite assessment of the concepts has been selected for the compatibility with future TAF TSI driven data formats (see chapter 3.2.2). This aspect sees the "Database Concept" clearly in front, because this concept ensures a database development exactly fitting to the structures of those standards, even if databases like RINF or CRD do not provide a sufficient data stock yet. This would generally allow switching completely to at TAF TSI compatible methodology in the future.

4.2.3 Conclusions

The compilation points out that the providing and management of data in an own database ("Database Concept") promises advantages particularly regarding user-friendliness. Moreover, it keeps all options for connecting to future, Europe-wide standard databases and structures like RINF or CRD. The main problem will be the gathering of data with respect to legal, technique and effort related issues. These challenges will set dedicated requirements for a suitable management concept.

The other two concepts ("Meta Portal" and "Database Meta Portal") try to substitute storing own data more or less by link to other websites which include the requested search item. This leads to a transfer of responsibilities to operators of those websites (data gathering, checking, update) and to customers of the GIS-portal (selection of "best" results). This will on one hand facilitate the implementation of the portal and the selection of an operator. However, on the other hand it will reduce user-friendliness and thus also the acceptance of the portal.

General feedback to the portal demonstration and dedicated interviews with potential users lead to the conclusion that the market expects a portal application with all positive aspects assigned to the "Database Concept" (see Figure 34). All nameable diminutions to this standard would lead to a loss of acceptance that would severely jeopardize permanent and long-term operation of the GIS portal. Thus, a portal design and a management concept are required, which are suitable to balance the identified disadvantages of the "Database Concept", while simultaneously preserving its user-friendliness.

4.3 Pilot portal structure and specifications

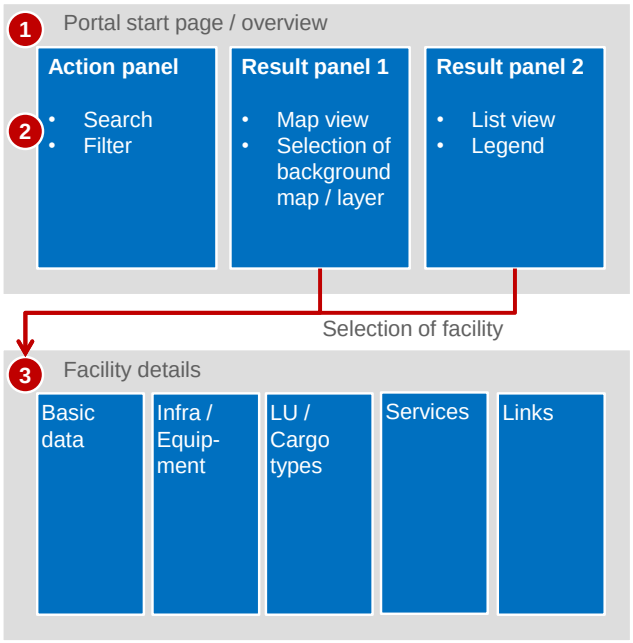
The purpose of this chapter is to describe the basic structure of the portal and the relevant data fields to be considered for the programming work of the pilot portal. The definitions back on the identified user requirements (cp. chapter 2.3) and the proposed portal concept (cp. chapter 4.2). The guiding principle for all aspects dealing with the portal design is to ensure a satisfactory user experience. Based on this principle the portal shall be easy to use and shall ensure an optimum accessibility to all relevant information items. It is important that all user actions can be done in an intuitive way so that no training or comprehensive user manuals are necessary to work with the system. Moreover, the portal system's performance shall facilitate short reaction times for all user actions, considering usage of different browsers and mass system usage. Portal language shall be English.

A detailed specification document has been elaborated (see Annex 6) and used as a basis for the technical design and programming work. Further details for the portal development have been defined in an iterative coordination process between HaCon and Triona.

The portal is structured around the following main components (cp. Figure 36)

- Portal start page with map as an entry point;
- Search/filter module;
- Facility details.

Figure 36: Portal structure



Source: HaCon

Portal start page

The screen of the start page shall be clearly arranged to provide a good overview and easy usage. The proposed screen layout is divided into three areas: the action panel with search/filter module, a results panel with map view and a results panel with all matches displayed in a list. Further viewing configurations concern background maps and layers as

well as a legend for all items on the map. It goes without saying that the navigation through the page is supported by standard tools like zoom in/out or hide/display of boxes.

Search/filter module

The search/filter module (in the action panel) is a comfort feature that enables a quick and easy identification of specific transhipment facilities. The portal shall enable the following basic filter/search options:

- Facility type filter;
- Geographical location search;
- Free text search.

Further requested (advanced) filter options concern

- Area type;
- Mode;
- Rail Freight Corridor;
- Loading unit;
- Cargo type and
- Services.

The above listed filter criteria contain three to nine specific groups of information items that can be selected by check boxes. Each filter criterion contains one additional group 'Other / Not specified' summarising all facilities that have not been allocated to one of the specific groups. Figure 37 provides an overview on the specified filters and related information items.

Figure 37: Specification of filters

Filter	Selection groups ('check boxes')
Facility type	Intermodal terminal, Railport / Rail logistics centre, Station with public siding, Private siding, Other / Not specified
Area type	Sea port, Inland port, Freight village, Other / Not specified
Mode	Rail; Road, Sea freight, Inland waterways, Other / Not specified
Rail Freight Corridor	RFC 1, RFC 2, RFC 3, RFC 4, RFC 5, RFC 6, RFC 7, RFC 8, RFC 9, Other / Not specified
Loading units	Container, Swap body, Trailer, Truck+trailer (RoLa), Conventional cargo
Cargo types	Palletised goods, Bulk, Dangerous goods, Wood, Heavy loads, Reefer, Other / Not specified
Services	Wagon/locomotive parking, Container repair/maintenance, Wagon repair/maintenance, Locomotive repair/maintenance, Cleaning service, Stuffing/stripping, Trucking, Other / Not specified

Source: HaCon

Facility details

Specific facilities can be selected from the results panel 1 (map) or results panel 2 (list) to show the facility details. The details focus on static data (that will only change e.g. in case

of infrastructure projects) but include also mostly requested information from a user's perspective (e.g. contact details). Figure 38 provides an overview on the specified information items within the facility details and related subpages.

Figure 38: Specification of facility details

Sub page	Information items / Components
General elements for all sub pages	Name of facility (heading), Satellite picture of area incl. reduced overview map
Basic data	Facility type, Facility address, Facility contact data (Facility operator, Contact person, Phone, Fax, Email, Website), Opening times, Modes, Facility area type (facility located in Sea port, Inland port, Freight village, Other area), Operation status (public/private, planned/closed)
Infrastructure / equipment	transhipment facility (Cranes, Mobile cranes, Number of loading tracks, Length of loading tracks [m], Total length of loading tracks [m]). Other equipment, Rail infrastructure (Total number of tracks, Thereof electrified, Min. track radius [m], Max. permitted axle load [t])
Loading units / cargo types	transhipment type (Intermodal/Conventional), Possible loading units (Container, Swap body, Trailer, Truck+trailer (RoLa), Conventional cargo), Possible cargo types (Palletised goods, Bulk, Dangerous goods, Wood, Heavy loads, Reefer, Other / Not specified)
Services	Wagon/locomotive parking, Container repair/maintenance, Wagon repair/maintenance, Locomotive repair/maintenance, Cleaning service, Stuffing/stripping, Trucking, Other / Not specified
Links	Links that may provide additional information for the specific facility (e.g. regarding access conditions)

Source: HaCon

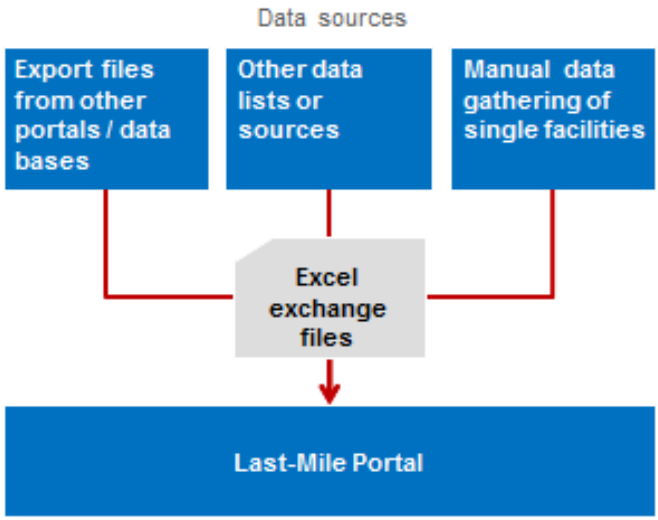
Data feeding

The data feeding procedure of the portal shall facilitate the exploitation of different kinds of data sources. For the pilot portal following input sources need to be considered:

- Export files from other portals;
- Other lists and documents with information on last-mile infrastructure;
- Manually gathered data.

The analysis of existing portals has shown that automatic interfaces are generally not facilitated. The most commonly used exchange format is Excel which has been also evaluated as the most appropriate tool to gather data from other stakeholders and supporters. For a smooth data transfer to the pilot portal a common Excel data exchange template has been defined that considers all data items as defined before.

Figure 39: Data feeding procedure



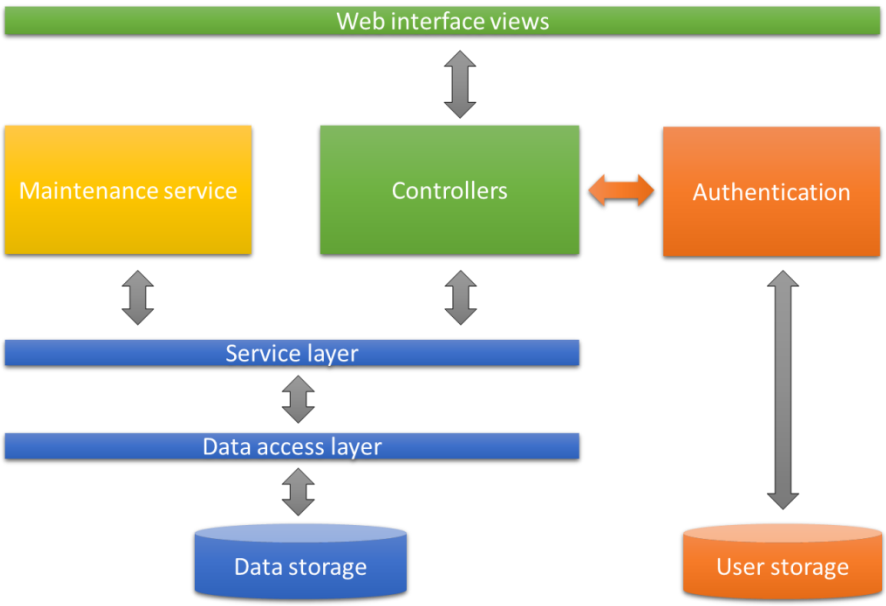
Source: HaCon

4.4 Portal system description

4.4.1 Overall architecture

The last-mile web portal architecture includes a website built on a Model-View-Controller (MVC) design pattern as well as service layer and data layer for the data storage. The solution also includes a Microsoft Windows service performing maintenance tasks on the data. Figure 40 shows the overall building blocks that are described more thoroughly in the following sections.

Figure 40: Portal system architecture



Source: Triona

4.4.2 Development environment and components

The portal is developed using Microsoft Visual Studio 2013. The programming languages used are C# and ASP.NET/Razor for server-side parts and Javascript for client-side functionality. The portal is hosted on a Microsoft IIS web server.

A number of open source libraries/components/techniques have been used during for the development:

- **ASP.NET**
  Core web technology in the portal.
- **Entity Framework**
  Database access library and ORM.
- **Razor**
  Script language for the views in the portal.
- **jQuery**
  JavaScript library.
- **Bootstrap**
  HTML, CSS, and JS framework for developing responsive web sites.
- **Leaflet**
  JavaScript library for mobile-friendly interactive maps.
- **Leaflet MarkerCluster**
  Plugin to Leaflet enabling marker clustering in the map.
- **Font Awesome**
  Font, icon and CSS toolkit.
- **Chosen**
  jQuery plugin to improve forms.
- **DataTables**
  jQuery plugin for improved and interactive HTML tables.

In the pilot portal we have chosen to use map data from HERE, OpenStreetMap and OpenRailwayMap, but map data provider can be easily changed to other providers due to the flexible components used.

4.4.3 System parts

The pilot portal contains the following main system parts

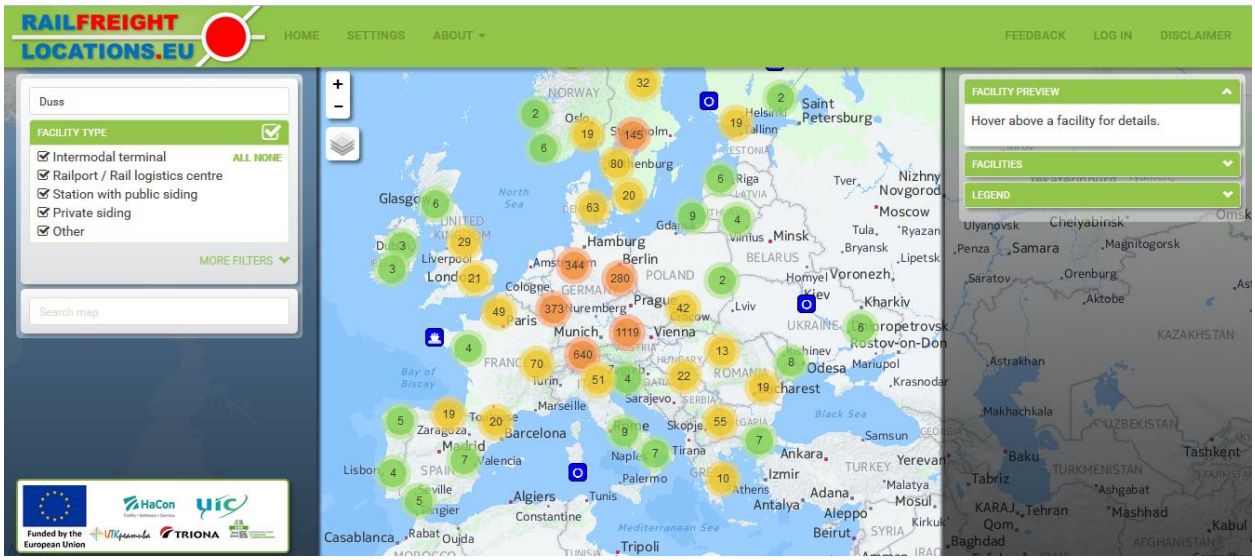
- Web portal;
- Data management;
- User management;
- Maintenance service.

Web portal

Main page

One of the main requirements for the portal was ease of use and immediate access to relevant information using the fewest user actions possible without the need for delving down into pages and submenus. In order to fulfil the requirement a map-centric design has been chosen where data can be displayed and immediately accessed. The map have an active part (not dimmed) that contains the currently active content on the site such as search results and so on. In order to make it easier for the user to stay oriented in the map especially when zoomed in the outer non-active parts were preserved but dimmed to mark them as not active (see Figure 41).

Figure 41: Pilot portal main page (=start page)



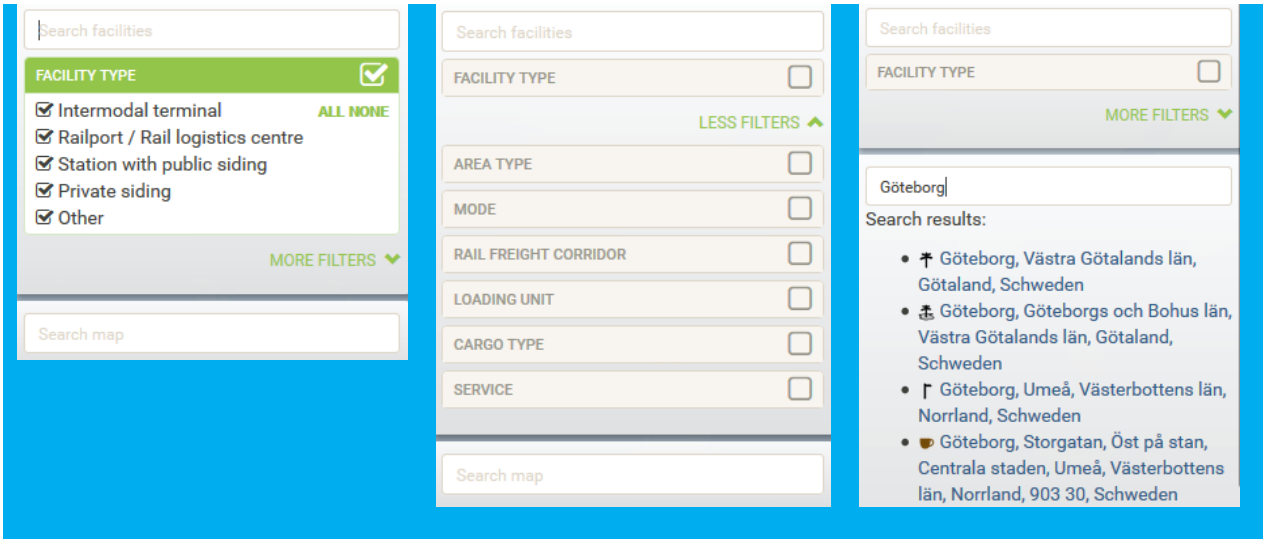
The map supports all standard functions that can be expected on an online map-based portal. This includes panning, scroll-zoom, zoom-to-box etc. In the top left corner of the map's active part there are controls for zoom and also a layer selection control. In the layer selection the background layer in the map can be switched between standard maps and satellite view. In addition to this also the facilities layer as well as an OpenRailwayMap layer can be turned on or off.

The map supports a marker clustering feature which improves performance as well as reduces cluttering. If there are too many facilities to display them separately in the screen they will automatically be converted to marker clusters. The clusters can have one of three colours; green indicates 1-10 facilities, yellow 10-100 facilities and red > 100 facilities. A text on the cluster marker also indicated the number of facilities in the area. Clicking on the marker will zoom in to the area. The clusters are dynamic and recalculated on each pan/zoom operation.

The map is to the left accompanied by a search/filtering section that adds functionality for filtering the portal data on relevant attributes and/or searching for addresses or other map data. The filtering part enables the user to filter on one or more attributes in the data, such as facility type or type of loading unit. Upon filtering the map and facilities list will immediately reflect the filter change.

The map search box uses an online geographic search engine which returns a list of relevant hits for any given search text. When the user clicks on a result the map will immediately pan and zoom to the area.

Figure 42: Search/Filtering module (basic filter, advanced filter, geographical search)



On the right side on the main page there are three sections that can be minimised or expanded as needed.

- The facility preview displays information about a facility when the user hover the mouse pointer above the facility on the map.
- The facilities list displays the facilities currently shown in the active part of the map. This list will be kept in sync with the map and thus redrawn whenever the map is zoomed or panned.
- The legend section shows a legend over the various symbols and colours used on facilities in the map. It also contains a legend for the optional OpenRailwayMap map layer.

Main menu

The top main menu of the portal contains a number of items which in short are described below.

- **Home**
  This is the main portal home page.
- **Settings**
  The Settings page for the portal contains an option for "Zoom to search results". This option is checked by default and makes the map to automatically zoom to any search result.
- **About**
  The About menu contains a number of pages about the portal, project and project partners as well as contact information.
- **Feedback**
  The Feedback menu links to a feedback form where users can enter feedback about the portal and/or data in the portal.
- **Log in**

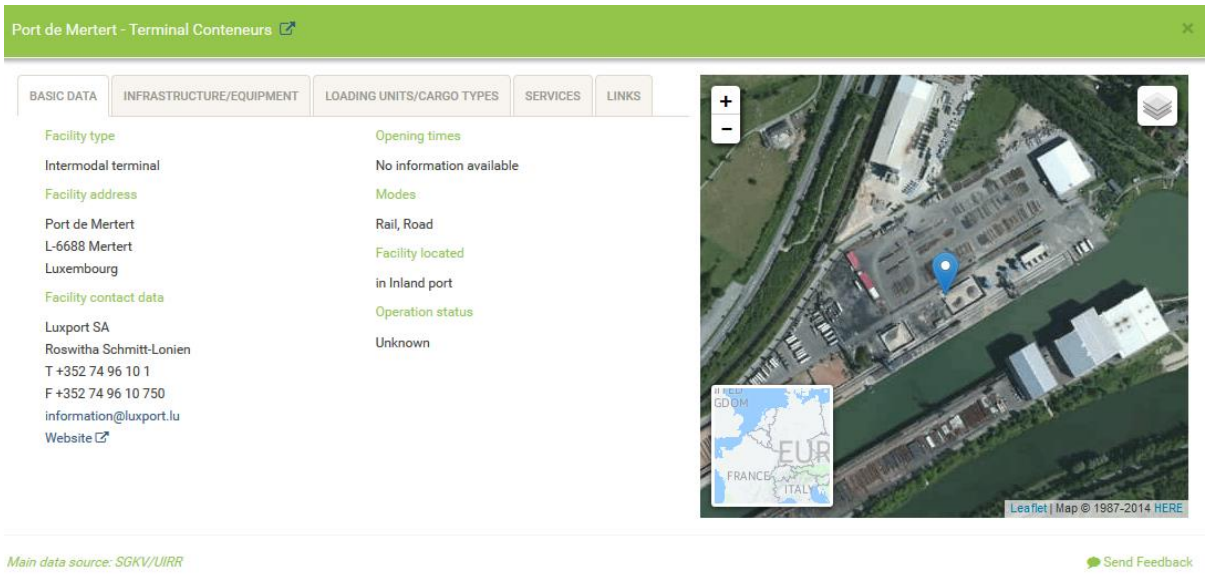
This menu item link to log-in page where registered users can log in to the portal. From the log in page new users can also register on the portal.

- **Disclaimer**
  The Disclaimer page shows disclaimers for the use of the site and the data contained in the site.

The facility details dialog

Clicking on a facility in the map or in the facilities list will open a dialog with detailed information about the facility (see Figure 43).

Figure 43: Facility details



To the left in the dialog there are five tab pages showing detailed information about the facility. To the right a map component is available to see a zoomed in map of the location of the facility. By default this map opens in satellite image mode, but it can be switched to the other background maps just like the main map of the portal. The map also includes an overview map which is linked to the detailed map to get the user a hint on where the facility is located even though the facility map is zoomed in to a detailed level.

By clicking on the blue open icon to the right of the facility name in the header a new web browser tab is opened with the content should the user want to keep the information available and still continue to browse the portal.

In the bottom-right corner of the dialog there are two options to either leave feedback on the facility or to make a change request on the facility data. The Send Feedback link will open the standard feedback page for the portal. The Request Change link will open an edit page for the facility where the user can make any changes to the data and send the request for review by an authorised editor.

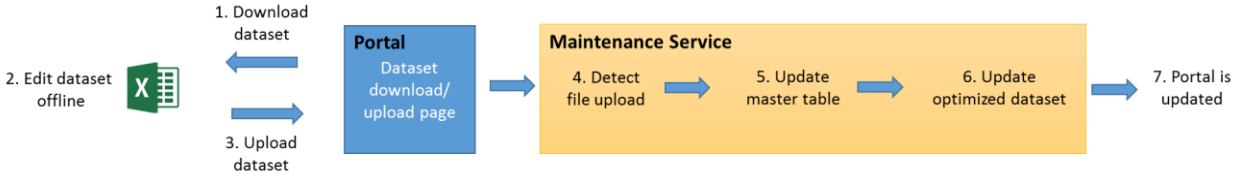
Data maintenance and editing

The portal supports functions for uploading offline-edited changes to entire datasets as well as on-site editing functions for single facilities.

Updating entire datasets

The portal contains functions for downloading and uploading data for entire datasets. Through this function an authorized user can download a dataset as an Excel file (formatted according to a specified dataset template), make the necessary changes and upload the file again to update the dataset. Since the import process can be a lengthy operation, the import process has been divided into a two-step operation where the user upload is step 1 after which the operation can return and make it possible for the user to continue with other tasks in the portal. Step 2 is that the Maintenance Service on the server will detect the uploaded file, check the dataset and do the actual import and updating of the data in the web site. Only facilities with changed data will get new versions in the data storage. After updating the master list of facilities the maintenance service will trigger an update of the optimized dataset used in the live portal. Below is a figure describing the dataset update process.

Figure 44: Dataset update process



Source: Triona

Editing data for a single facility

Editing data for a single facility can be done directly in the portal through the facility editing page. The editing page can be reached through the Request Change link in the facility detail dialog or by searching for the facility in the master list which is available to authorized users. If the user is authorized to make edits to the data an update to a facility will be stored as a new version and the portal will automatically create an updated dataset with the new data.

Data management

Data storage

The data storage in the last-mile portal is based on a Microsoft SQL Server database server. The database is used to store all data about all facilities as well as information about users, roles and other meta-data needed for the web site.

The data model for the storage of facilities is intentionally kept simple to enable effortless changes to the data schema. The facility data is stored in a master table as a **FacilityDefinition** that also keeps all previous versions of the facilities as well as any change requests on existing facilities. The actual data about the facility is stored as xml data in this table.

Every facility is assigned to one dataset called **FacilityDataset**. The dataset is used in the website for performance purposes and to create a basis for a future data editing model with caretaker organizations responsible for updating certain datasets.

The master table FacilityDefinitions contains the following fields (Figure 45):

Figure 45: 'FacilityDefinitions' master table

Field name	Field type	Description
Id	String	The id is a GUID automatically generated when the facility is imported the first time. Using a GUID ensures that the id is globally unique and that the data can be transferred between databases without id conflicts.
Dataset	Int	Dataset allocation for the facility.
Name	String	Name for the facility. Included here mainly for convenience and readability.
Created	DateTime	Time when this version of the facility was created.
CreatedBy	String	Identity of the user responsible for the version creation.
Status	Int	Status = 0: This is a historic version. Status = 1: This is the active version. Status = 2: This is a change request not yet approved.
Definition	String	Definition of the facility model objects serialized to XML text.
Revision	Int	Indicates to which revision this version relates.

Source: Triona

The FacilityDefinitions table is not used directly for the standard web site search and list operations. Instead a compiled version of each dataset contain the definitions is stored in the table definition the datasets, FacilityDatasets. The FacilityDatasets table includes the following fields (Figure 46):

Figure 46: 'FacilityDatasets' table

Field name	Field type	Description
Id	Int	Identity of the dataset.
Name	String	Name of the dataset.
Description	String	Additional description of the dataset.
Definition	String	The compiled set of facility model objects for the set serialized to XML.
Updated	DateTime	Time when the dataset was last updated
DownloadFilename	String	The value serves as a base for the file name when downloading the dataset.

Field name	Field type	Description
ImportFilename	String	When a file with updates for the dataset is uploaded it will get a unique name which is stored here and used by the import functions.
Status	Int	Status of the dataset.
StatusText	String	Status text. This is use to indicate progress by the import functions.
IncludeInDefaultSiteSet	Bool	Specifies whether this dataset should be included in the public web site.

Source: Triona

Service layer

The service layer provides the data gathering and processing functions needed in the various web site controllers as well as the maintenance service. The functions include list and search functions on facility data as well as functions that provide support for edit, import and export functionality.

Data access layer

The service layer is used to encapsulate the actual database access and to isolate the business logic from the data storage model. For the actual database access Microsoft Entity Framework is used. The data is also translated to an object model for use in various business logics. In order to improve the portal performance and keeping the portal from having to desterilize the datasets from XML on each access the data is cached in the data layer as much as possible. This means that search and list functions can work on an in-memory copy of the data enabling great performance although the data storage can be kept flexible for future schema updates.

User management

The portal uses a standard ASP.NET Identity authentication scheme and the portal includes functions for user registration and role management. As of today three roles are defined in the portal, Administrator, Editor and User. In addition to these three user roles a fourth role, the public user, can be identified. The roles are not hierarchical, each role simply provide access to a certain set of functionality. Regardless of role assignment any user will have access to the functions of the public users in addition to the role specific functions. The differences between the roles are described below.

- **Public user**
  A public user is a user that access the portal but is not logged-in on the portal. The user will have access to the standard browse and search functions on the site.
- **User**
  A registered and logged-in user o the site can make change requests to the data on the site without having to provide contact details with every request.
- **Editor**
  An editor on the portal is able to perform edits on the data set and commit the changes to the public site.

- **Administrator**
  The administrator role contains functions for (1) Role administration and assignments, (2) User administration and (3) Dataset administration.

Maintenance service

The Maintenance Service is a Windows Service running on the server taking care of long-running tasks and other background processes that are triggered by data changes in the data storage. The current main task of the service is to import datasets uploaded by editors of the portal.

4.5 Documentation of pilot operation

4.5.1 Portal operation during pilot phase

The pilot version of the GIS portal was officially launched on the occasion of a stakeholder seminar in Vienna on 19 October 2015. This seminar took place in the context of the 9th international BME/VDV railway congress and thus attracted numerous high level participants, representing associations as well as companies from all facets of rail freight business (infrastructure managers, rail service providers, rail freight corridors, intermodal (terminal) operators, etc.). Within the course of this seminar, the scope of this study was presented and a live-demo of the pilot portal was performed (Figure 47).

Figure 47: Presentation of the pilot portal on stakeholder seminar in Vienna, featuring representatives from (left to right) Triona, HaCon, European Commission, UIC

Picture source: HaCon

The feedback to the portal demonstration was entirely positive. All participants stressed the need of a Europe-wide information portal for all types of last-mile infrastructure and thus appreciated the presented pilot solution explicitly. The scope of application functionalities as well as the detailedness of information items was assessed as sufficient and adequate. During the subsequent discussions, several representatives announced their (association´s) interest to make use of or even connect to a permanent operation of the GIS portal.

Starting with this presentation, the portal has been made available to the public and thereby been set into regular pilot operation. During this operation phase, further positive reactions from potential users and data providers of the portal (rail freight operators, infrastructure managers, forwarders, regional administrations, rail corridor promoters) have been provided to the project team. Similar to the feedback within the stakeholder seminar, these consecutive reactions covered the whole range from (a) interest in using the portal for information purposes, via (b) readiness to contribute data, towards (c) interest in connecting the portal to own applications and services.

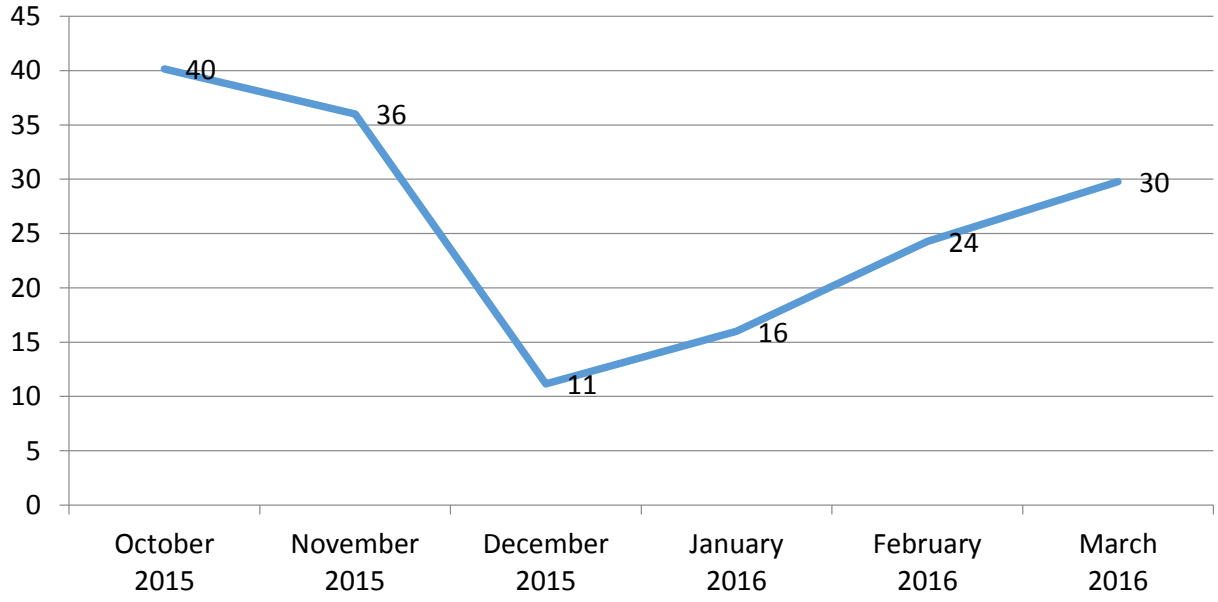
During the entire operation phase of the pilot portal, continuous test runs were performed in order to

- Check consistency of data (and correct, if necessary),
- Complete data (number of facilities and information per facility),
- Ensure robustness of the application,
- Test of additional functionalities,
- Optimize performance for all types of commonly used browsers.

As a result of these activities, the data stock incorporated in the pilot portal has been substantially expanded to approximately 4,000 last-mile facilities (compare chapter 4.5.2). Moreover, the portal application showed a completely stable performance and permanent availability for users.

Between 9th October 2015 and 10th March 2016, more than 3,800 "human" people (i.e. without robots or other search machines) have visited the web-site railfreighlocations.eu. This is equivalent to 11-40 visitors per day (Figure 48).

Figure 48: Visitor statistic of the pilot portal between October 2015 and March 2016



Source: Triona, HaCon

The statistic shows a dedicated peak in October/November right after the stakeholder seminar in Vienna. According to expectations, the number of visits decreased during

Christmas vacations. In 2016, visits are increasing continuously. Summarising, the statistic shows the importance of dissemination activities in order to raise publicity of the portal.

4.5.2 Evaluation of data in pilot portal

A crucial work step within the study was the data feeding of the developed portal, which has been carried out with a particular focus on three selected pilot regions, i.e. Sweden, West-Hungary/East Austria (greater Vienna region) and the Balkan region. At the end of the study, an evaluation of data completion within the pilot portal is of great importance in order to:

- Verify/estimate the performed work on the correspondent task of the study;
- Understand and learn how the provision of such data works;
- Support the conception of permanent portal management structure, in particular regarding to data gathering;
- Identify how big the gap on data completion between the pilot portal and a professional portal is.

The present evaluation is structured in two levels. The first level consists of the evaluation of the number of facilities included in the portal and their location on the active map. The second level focuses on the degree of completeness of information per facility. The structure of the evaluation reflects the results from several user needs requests carried out during the study (i.e. three workshops, online questionnaire and interviews with other portal operators).

At present, the pilot portal includes just over 4,000 entries which have been mainly gathered from the sources DB Schenker Rail, Green Cargo, GYSEV, OSE, PE Macedonian Railways Infrastructure, SBB Cargo, Serbian Railways, SGKV, Trafikverket, VDV and VABU. This amount represents 15-20 % of the about 22,000 estimated last-mile infrastructures for rail freight in Europe. However, the overall percentage value is not homogenously distributed within the different LMI types considered in the context of the study, i.e.:

- The coverage of data on intermodal terminals and railports is almost complete (respectively 100% and 85-90%);
- Data regarding stations with public sidings and private sidings only cover 25-30% and 8-10% of the estimated value.

Figure 49 provides an overview of the pilot portal data coverage per country and last-mile infrastructure type. As Figure 49 clearly shows, with exception of some few cases, the pilot portal includes for each EU 28 + 2 country almost all intermodal terminals and railports. This is not valid for private sidings and stations with public sidings, where only in some isolated cases countries exceed 20% of data coverage (i.e. for private sidings: 100% in Austria; for stations with public sidings: 100% in Austria, 100% in Germany, 100% in Sweden, 20-25% in Norway and 95-100% in Switzerland). The reason for such a difference has to be detected in the development trend characterising each LMI type (see also chapter 2.2.3). In the last years, the number of stations with public sidings and private sidings has been decreased significantly, making any efforts for an accurate estimation challenging. Therefore, it can be assumed that the elaborated LMI picture overestimates the effective occurrence of stations with public sidings and private sidings in Europe. Moreover, in such a contest it has become very difficult to get the right points of contact for data on these LMI. This aspect has to be taken into account for the organisation of data gathering of the permanent portal. The data gathering for these kinds of LMI should be realised with care

takers organised per country, taking advantage of the common native language, cultural background and contact network.

Figure 49: Pilot portal data coverage per facility type and country

EU 28 +2	Total per country	Private sidings	Stations with public sidings	Intermodal terminals	Railports	All access points
AT	1.300					
BE	55					
BG	41					
HR	52					
CZ	24					
DK	20					
EE	8					
FI	18					
FR	82					
DE	1.122					
GR	28					
HU	43					
IR	6					
IT	67					
LV	6					
LT	7					
LU	3					
NL	40					
PL	51					
PT	4					
RO	31					
SK	13					
SI	2					
ES	42					
SE	355					
GB	54					
NO	38					
CH	427					

81-100%
61-80 %
41-60 %
21-40%
1-20%
0
not applicable

Source: HaCon

A more comprehensive data filling has been performed for three selected pilot regions. The total amount of entries for the three regions is about 1,900 facilities and this covers 40% of the roughly 4,600 estimated access points for these regions. West-Hungary/East Austria covers about 45% of the estimated infrastructures, Sweden 30% and the Balkan region only 8-10%. Again, the data distribution within different LMI differs:

- Intermodal terminals and railports of the pilot regions are completely included in the portal (~100% coverage);
- 50-55% of data on stations with public sidings are included in the portal, while only 20-25% of private sidings are collected in the database. Data for these two LMI types for the Greater Vienna/Western Hungary region are covered for about 40-50%. Stations with public sidings in Sweden have been completely covered (100%) thanks to the sources Green Cargo and Trafikverket, while only 3-5% of private sidings have been collected for this region. Finally, the Balkan region presents a low amount of data collected for stations with public sidings and private sidings (in both cases about 5-10% only). The filling experience of the pilot portal showed that data gathering for private sidings and stations with private sidings in the Balkan region is even harder

than in other European countries. Therefore, an organisation of data gathering per country is essential, in order to complete the data on these LMI types as far as possible.

Figure 50: Information completeness of pilot portal entries

Information displayed in the Portal			Analysed fields	Portal data completion (%)	
Basic Data	Facility type	Intermodal facility, Railport, Station with public siding, Private sidings, Other/not specified	x	100%	**100%**
	Facility address	Street, house number	x	64%	**85%**
		ZIP	x	80%	
		Town	x	95%	
		Country	x	100%	
	Facility contact data	Facility operator	x	90%	**52%**
		Contact person	x	17%	
		Phone	x	73%	
		Fax	x	39%	
		Email	x	31%	
		Website	x	60%	
	Opening times	Opening times, Search filters	x	15%	**15%**
	Modes	Rail	x	100%	**100%**
		Road	x (only intermodal terminals, railports, stations with public sidings)	99%	**99%**
		Sea freight			
		Inland waterways			
		Others/not specified			
	Facility located in	Seaport			
		Inland port			
		Freight village			
		Other			
	Operation status	Operation status	x	60%	**60%**
Infrastructure/ Equipment	Transhipment facility	Cranes	x (only intermodal terminals)	53%	**53%**
		Mobile cranes			
		Head/Side ramp	x (only stations with public sidings)	76%	**76%**
		Loading lane			
		Number of loading tracks	x	32%	**23%**
		Min loading track length	x	17%	
		Max loading track length	x	17%	
		Total length of loading tracks	x	25%	
	Other equipment	Track scale			
		Brake test facility			
		Other equipment			
	Rail infrastructure	Number of electrified tracks			
		Total number of tracks	x	4%	**3%**
		Min tracks radius	x	0%	
		Max. permitted axle load	x	5%	
Loading units/ Cargo types	Transhipment type	Intermodal (i.e. containers, swap bodies, trailers or RoLa)	x	73%	**73%**
		Conventional (i.e. Conventional cargo)			
	Loading units	Containers	x (only intermodal terminals)	63%	**63%**
		Swap bodies			
		Trailers			
		RoLa			
	Cargo types	Palletised goods			
		Bulk			
		Dangerous goods			
		Wood			
		Heavy loads			
		Reefer			
		Other			
Services	Services	Wagon/locomotive parking			
		Loading unit repair			
		Wagon repair/maintenance			
		Locomotive repair/maintenance			
		Loading unit cleaning service			
		Stuffing/Stripping			
		Trucking			
		Other			

Source: HaCon

The second level of data evaluation concerns the information completeness degree of the pilot portal entries. For this purpose, only some information items could be taken into account, i.e. items for which an empty field clearly means that the information is not known. Indeed, there are a lot of items for which an empty field could either mean that the information is unknown or that the infrastructure isn't characterised by that feature; an evaluation of these items could not been carried out.

Figure 50 shows the results of the analysis. The fields marked by an "x" are the evaluated item fields. From the outcomes of the workshops and the questionnaire, basic information on facility location, facility type and contact data were considered among the most important. The results of the present analysis reveal that a good completion level for these fields has been reached (i.e. "Facility type" = 100%, "Facility location" = 85%, "Facility contact data" = 52%). Data completion for the item "Facility contact data" is not as high as for the other two fields; however information on "Facility operator" and "Phone" cover respectively 90% and 73% of facilities and this ensures a point of contact for the majority of LMI included in the portal. From the stakeholder workshops, also the "Opening time" item was evaluated of particular interest. However, its coverage in the pilot portal is only 15%, showing the difficulty in providing such information.

The experience within the pilot portal showed that technical information on "Infrastructure / Equipment" is quite difficult to collect as well. For the category "Rail infrastructure" data for only 3% of infrastructures are covered. "Transhipment facility" fields concerning all LMI types just reach the 23% coverage, with no sub-fields exceeding 32% completion (i.e. "Number of loading tracks"). On the other hand, "Transhipment facility" fields regarding specific facility types, i.e. "Cranes" and "Mobile cranes" for intermodal terminals, "Head/side ramp" and "Loading lane" for stations with public sidings, reach a higher completion level with 53% and 76% respectively.

Finally, data coverage for the analysed information on "Loading units / Cargo types" has reached a very good level. The field that refers to the "Transhipment type" (i.e. intermodal or conventional) is filled out for 73% of the infrastructure in the portal while information on "Loading units" (only for intermodal terminals) is given for 63% of the LMI taken into account.

Thus, information on intermodal terminals and in part on railports are generally included in comprehensive databases owned/ operated by associations. These databases are in the most of cases accessible by everybody and they provide information at a detailed level. For the purpose of a permanent portal, data gathering and updating for intermodal terminals and railports can be realised with care takers organised per LMI type.

Also information on stations with public sidings is available in some public portals. However, existing databases generally refer to single countries. This suggests to assign data gathering and data updating to care takers focussing on specific European regions.

The experience within the pilot portal showed that data on private sidings are the hardest to collect and update. No publically available portals exist and data cannot be collected in a systematic way. Moreover, available data are often not up-to-date because this type of infrastructure has been strongly reducing in the last years. Therefore, an organisation of data gathering per country is essential for private sidings, in order to take advantage of the common native language, cultural background and contact network of care takers.

4.6 Conclusions for a permanent portal

4.6.1 Need for further technical portal development

The work in the transition phase towards a permanent portal is to a large extent related to efficient management of the portal and to ensuring data management on production-level. Moreover, change requirements due to customer feedback might lead to necessary modification of both application and data management. From today´s point of view, this will particularly concern the following tasks to be performed within the transition period (TP) and/or during permanent operation (PO):

(1) Review of the architecture to ensure that all choices made for the pilot still hold for the production system (TP).

(2) General review of the portal pilot code base to further improve the robustness of the portal and to establish a suitable platform for continuous development and maintenance (TP).

(3) Regular updates of the data model in order to reflect changes and needs discovered since the pilot was first specified. This might include additions due to new requirements and extended scope, but also in parts streamlining (TP + PO).

(4) Completion of the portal pilot's proof-of-concept solution for data versioning which includes traceability of changes and other standard versioning functions. Features like revision numbering, possibility to revert individual and/or batch updates, change logs and so on will be key factors when managing data in the portal (TP).

(5) Review and enhance the included general role-based authentication scheme to fully model the roles of Portal Operator, Care Taker and Data Collector/Portal User (TP).

(6) Improve the functions for offline import/export data editing as well as on-line editing, to reach production-level consistency regarding checks on data and robustness. This also includes processes of the Care Takers for review and for acceptance/rejection of change requests provided by Portal Users/Data Collectors (TP).

(7) Review and update the main portal user functions, such as searches, to reflect new and changed requirements (TP + PO).

(8) The design of the portal will be prepared for additional functional features that can be foreseen in the near future. During the pilot period a number of requirements have been identified that might be implemented depending on the road map for the portal. These requirements include (in no particular order):

- Marketplace functionality allowing infrastructure managers, transport and other service providers to offer their services to the public (PO).
- Automatic linking of facilities to rail freight corridors based on GIS data. This feature would generate particular benefit to the Rail Freight Corridors and their information systems (TP).

- Embedding of parts of the portal in other web sites optionally together with initial display of custom facility data selections. This feature has been requested explicitly by railway companies. It would allow them to make use of the GIS portal instead of providing an own portal and just linking additional functions and services on demand (TP + PO).
- Multi-lingual support for the portal (PO).
- Improvements of the analytics integration in the portal code (user statistics) to give better support for evaluation of portal use for the Portal operator (TP).
- Changes and/or extensions to the API to support data export/feeding to/from external systems (TP).
- Optimisation of the portal for mobile use (PO).
- History view on LMI development.

(9) Standard deployment activities such as packaging, delivery, overall tests and documentation (TP + PO).

4.6.2 Conclusions regarding data gathering

Generally, the experiences made throughout the process of data collection and validation confirmed the main findings of the occurrence of last-mile infrastructure in Europe (see chapter 2.2.2):

For intermodal terminals, several databases are (publicly) available, covering nearly entire Europe and providing information on rather detailed level (e.g. number and length of tracks, transhipment equipment) at least for some of the facilities. The pilot portal data stock was based on the intermodal map provided by SGKV, which can be regarded as the most comprehensive and up-to-date data collection currently available. However, it turned out that substantial reworking still was required for quality check, comparison with other data sources and merging of all information available to one unique data row per facility. These procedures cannot (or only to a minor share) performed automatically; "manual" work and respective know-how is required. This will also apply for permanent portal operation, particularly for adding further information items and for updating the existing data.

Railports have been identified mostly by the main operator of this kind of facility (DB Schenker Rail), which uses the term "Railport" as a brand name and as a service description, too. However, from the pure functional perspective, railports generally might combine intermodal and conventional transhipment, each plus additional logistic service components. This means that railports might also be found within terminal databases (if the intermodal aspect prevails) or within private sidings (particularly forwarders with own siding and logistic services for conventional rail transport). In fact, this lack of criteria, how to clearly distinguish railports from other types of last-mile infrastructure, has been a problem throughout the entire data gathering process. In consequence, it is likely that the number of railports (taking the functional understanding) is under-estimated in the portal, as many of these facilities might have been captured as "intermodal terminal" or particularly as "private siding". For the permanent portal operation and the task definition of the Care Takers (compare chapter 5.2.1), a clear and easily manageable separation procedure is required that must be applied also on the existing data stock for re-assignment of LMI types, as far as necessary.

Private sidings represent the vast majority of all last-mile infrastructure facilities in Europe (compare chapter 2.2.2). However, concerning the data gathering procedure, this type of last-mile infrastructure turned out to be particularly difficult. On one hand, private siding owners have a contract with the connecting rail network infrastructure managers; so those IMs must know about the existence of private sidings. On the other hand such compilations of private sidings are usually not public, apart from some (inland and sea-) port authorities. Generally, the owner of the siding, the provider of rail service for the siding, the railway infrastructure manager and the entity responsible for the certification of railway infrastructure are the most promising data sources. However, when it comes to the point of actual data gathering, many obstacles must be overcome, as a sample survey conducted in Belgium and France shows:

In Belgium, the owner of the sidings could not easily been identified, as no public register on owners of private sidings exists. The railway infrastructure manager Infrabel communicated a list of the sidings, but without any details (even the GPS coordinates were missing) and was not aware of official registers containing all Belgian public sidings. For any railway infrastructure (public or private), it is requested to receive an official approval issued by the Ministry of Transport who also declared not compiling all this information into a single register (paper registry is still the most used means). The same comments can be applied for France.

For the pilot portal, numerous hand-picked sources of private sidings have been exploited; most of this data has been transferred manually into the portal. Moreover, many of the available data sources are not updated regularly, some of them being one-time-actions and rather old in the meantime. This is a disadvantage particularly for private sidings, as many of these facilities have been abandoned within the last years. In consequence, old data sources are very likely to provide locations for private sidings that do not exist anymore.

For the upcoming permanent portal operation, actors responsible for data gathering of private sidings must show particular regional knowledge on rail infrastructure and good personal contacts to the owners and service providers of this infrastructure. However, data gathering for private sidings will remain a "single piece" procedure in many cases, even if only core data for the facilities are collected.

Data for stations with public sidings are available in some existing portals already. The pilot GIS portal made use of these data stocks after agreement with the respective portal operators. Besides, all infrastructure managers should be able to provide at least core data for all public sidings, which are still served; this information is also (partially) published in the Network Statements. For the future operation of the portal, similar requirements for the responsible entities as for private sidings can be postulated.

Generally, the data feeding concept of the portal should account for related European framework and data exchange standards as defined within TAF/TAP-TSI regulation. As stated in chapter 3.2.2, it is recommended to coordinate the database of the aimed at last-mile information portal with RINF and CRD and to harmonise common elements in order to avoid creating multiple data channels for the same kind of data with different data structures and formats. Within this coordination process compatibility with the IRS 30100 data model (RTM) shall be checked, too. In contrast, a non-coordinated approach would increase complexity of the entire information framework and related costs.

5 Recommendations for a permanent web-based information portal (business model)[11]

5.1 General purpose/design

The evaluation of different data models (chapter 4.2) has shown diverging preferences between the user and the portal operator perspectives. Furthermore, experiences gathered throughout the pilot operation (chapter 4.5) have pointed out clearly, that permanent portal operation will not be feasible right after finalisation of this study. In order to provide a "professional" portal version to the market, a "transfer period" is foreseen in order to upgrade the portal application and particularly the data stock (number of facilities, information per facility). These additional works as well as continuous portal operation result in costs that must be covered by adequate revenues.

Concluding, it is necessary to design a business model that on one side exactly determines the roles of the parties involved. On the other side the concept must provide sufficient flexibility to select appropriate entities and to adjust the business model to framework conditions (e.g. budget constraints, user requirements) as far as necessary. The proposed business model consists of the following parts:

- A management structure, identifying the parties involved in permanent portal operation and defining their roles/tasks as well as their contractual connections;
- Requirement/qualification profiles for selecting suitable companies for the main levels of the management concept;
- (Non-exclusive) pre-selection of organisations to take over the permanent portal operation;
- Specification of tasks to be performed within a transfer period and during permanent operation and deriving respective costs;
- Scenarios for revenue generation;
- Roadmap for implementation steps towards permanent portal operation.

During elaboration of the business model, the question arose if a dedicated company shall be established for permanent portal operation. The evaluation of pros and cons showed a preference to abstain from such idea, mainly in order to avoid additional effort associated to legal and formal procedures and consequently (fixed) costs and also time loss until start of permanent operation. Thus, the following business model is based on a consortium of partners and sub-contractors.

[11] The recommendations for a permanent web-based information portal stated hereunder are to be understood as a proposal from the authors that needs to be further discussed and negotiated between the Commission and the potentially involved organisations.

5.2 Management structure

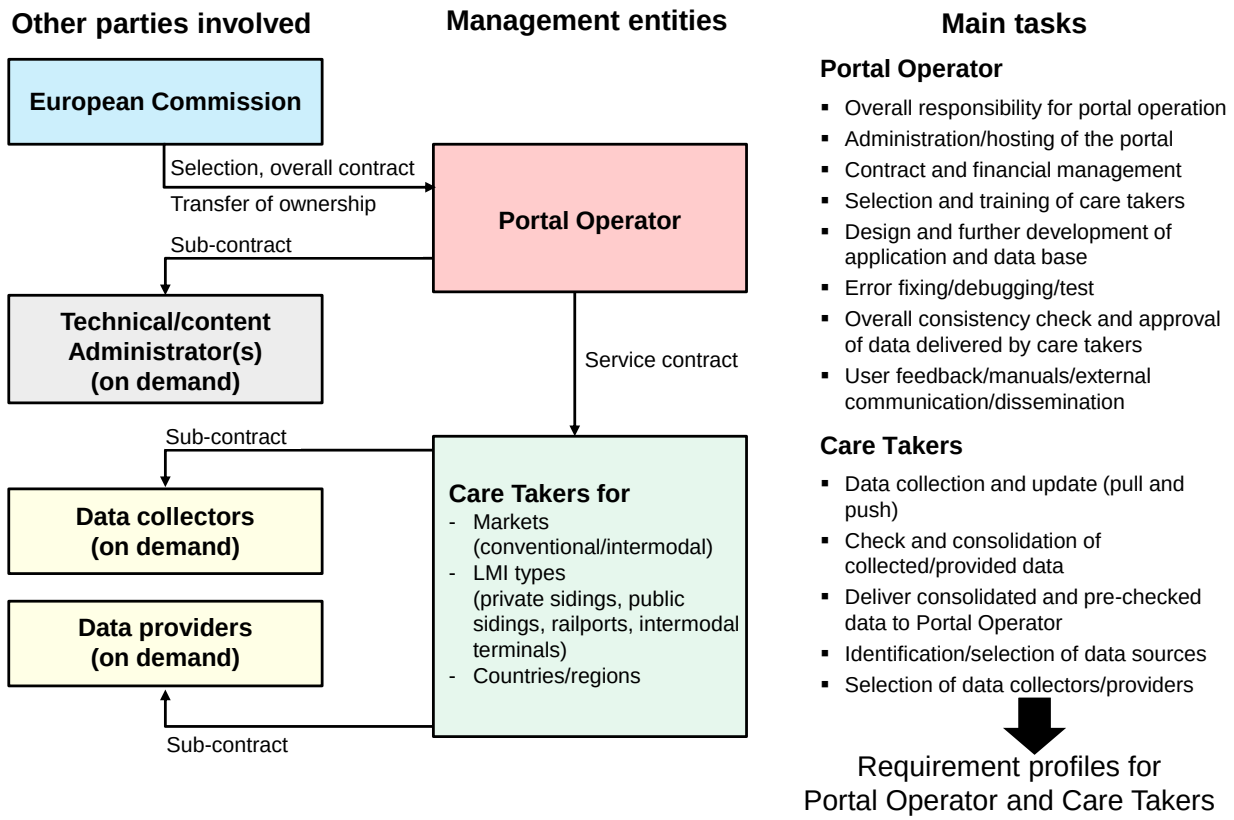
5.2.1 Roles and tasks of the entities involved

The proposed management model primarily consists of two levels: The Portal Operator and the Care Takers (see Figure 51). The two entities are directly connected via contracts with each other and also with the European Commission.

The Portal Operator is overall responsible for successful operation of the portal with regard to content (database, application), administration (portal hosting, contract/financial management) and data (final approval before publishing). In this respect he will be mandated by the European Commission and receive ownership or only user rights of the portal (application, database). The contract between EC and Portal Operator must furthermore contain minimum requirements concerning operating time of the portal, scope of information to be provided and budget.

The Portal Operator takes care for design and further development of the portal including error fixing, debugging and testing. He is also in charge of contractual issues with the Care Takers. He will furthermore take over external communication and representative functions (dissemination, training activities, user feedback etc.). On demand, one or several of these activities might be sub-contracted.

Figure 51: Proposed management/business model for permanent portal operation



Source: HaCon, UIRR

The Care Takers are responsible for data gathering (collection, update, check, consolidation) in quantitative and qualitative respects. They will be selected by the Portal Operator and

provided with a service contract. This service contract will accurately specify the type, frequency and quality of data to be delivered to the Portal Operator and will furthermore fix the available budget. In the simplest case, the data gathering is assigned only to two Care Takers, representing intermodal and conventional freight market and the associated last-mile infrastructure. Other possible differentiations refer to types of last-mile infrastructure (private sidings, public sidings, railports, intermodal terminals, compare chapter 2.2.1) or to countries/regions. According to experiences derived from the pilot operation of the portal, a mixture of these categories is likely to be applied. With view on the administrative effort and the costs to be expected (see chapter 5.3.1) it is recommended to limit the number of Care Takers (max. four).

In case the Care Takers do not cover the entire information and geographical scope, they might sub-contract either to data collectors (i.e. companies gathering data from dedicated sources) and/or data providers (i.e. data owners directly providing data to the Care Taker) for specific tasks. In any case the Care Takers are responsible for consolidation of all data within their contractual scope. This includes pre-checks and quality inspections before sending them to the Portal Operator.

Summarising, this management concept ensures that exactly one data row per last-mile facility will be gathered on Care Taker level and provided to the Portal Operator. This is one of the main differences compared to the pilot operation, where the portal database was fed by numerous sources. This inter alia led to multiple data sets for some facilities with often inconsistent information. Thus, a process of quality control, data verification, replacement and merging had to be executed at Portal Operator level. Moreover, no automatism or routine was available for this purpose; the respective works had to be performed manually through the specific knowledge of the consultants. For permanent operation, this procedure is not acceptable as it leads to high efforts and a high likeliness of errors. The proposed business model alleviates these problems by assigning clear responsibilities for each Care Taker and thus eliminates one of the crucial disadvantages of the "Database concept" (see chapter 4.2).

5.2.2 Requirement profiles

The specific tasks of the Portal Operator and the Care Takers lead to a demand of dedicated qualifications and subsequently to respective requirement profiles as shown in Figure 52. In this context, red fields state a "must have" qualification, yellow stands for further important attributes, whereas green fields indicate less important competences, which, however, might be the deciding factor between otherwise equal competitors. As already stated above, missing qualifications might be balanced by sub-contractors; this does however not influence the responsibilities of the Portal Operator and the Care Takers, as described in chapter 5.2.1.

For the Portal Operator, management qualifications are of particular importance. As a leader of a consortium consisting of several partners (Care Takers) and possibly further sub-contractors he must show respective competence and experience in content related, administrative and financial respect. Further necessary qualifications refer to legal issues towards data owners and providers in order to negotiate using rights of data stocks to be integrated into the portal. In this context, knowledge on databases is essential; the same applies for application (software) design and operation.

As a direct contract partner to the European Commission, the Portal Operator must show particular interest in running and optimising the GIS-portal and must provide financial capability. The requirements are indispensable in order to enable long-term operation of the portal.

The reliability and thus the acceptance of the portal services will be highly influenced by the reputation of the Portal Operator in the logistic business. This also requires strict neutrality towards all parties involved (policy, data owners/providers, users). Official roles in relevant bodies (e.g. RFC boards, TAF-TSI) will help to facilitate access to last-mile data and to raise awareness of the portal.

Figure 52: Requirement profiles for Portal Operator and Care Takers

Qualification requirement	Relevance for Portal Operator	Relevance for Care Taker
Reputation of the entity		
Neutrality of the entity		
Economic and financial capability		
Interest in operating the planned European GIS-portal		
Experience as manager of a consortium (concerning legal, administrative and financial issues)		
Experience in legal issues related to data ownership and usage		
Official roles in international sector related bodies (e.g. RFC, TAF-TSI)		
Experience in data management/database issues		
Experience in application design and operation		
Expertise/knowledge in the field of rail freight transport		
(Direct) Access to last-mile infrastructure data		
Access to networks of last-mile infrastructure owners/operators		

Criterion crucial for selection		
Criterion important for selection		
Criterion less important for selection		

Source: HaCon, UIRR

Some of the named qualifications are also relevant for selection of the Care Takers. This particularly applies to the reputation, the financial capability as well as for experiences with data management and usage rights. However, the main action field of the Care Takers will be the data stock itself. Hence, expertise in the field of rail freight transport is necessarily required in order to select appropriate data sources, data collectors and (most of all) to be able to perform a thorough quality check of all gathered data.

Care Takers must of course show particular knowledge of existing data stocks/owners and must able to exploit these data with consideration of relevant legal issues. In case direct access to data is not possible or known, this must be enabled via networks (associations with member companies) or via sub-contracted data collectors with dedicated knowledge on specific types of last-mile infrastructure or European countries/regions (including language!).

5.2.3 (Pre) identified organisations

As part of the study a screening of potential organisations has been conducted that may be involved in the later permanent portal. Relevant criteria for the screening are the requirement profiles as described within chapter 5.2.2. In detail organisations have been identified for the following subgroups:

- Suitable organisations for 'portal operator' role:

  The screening focuses on international and officially recognised sector organisations e.g. members of the Joint Sector Group (JSG) of ERA.

- Suitable organisations for 'care taker' role:

  The screening focuses on organisations with international focus and specific expertise for care taker role.

- Suitable organisations for 'data collector' role – international focus and sector specific:

  The screening focuses on organisations with international focus that may support the data gathering process for specific last-mile infrastructure groups or aspects; borders to care taker role are fluent.

- Suitable organisations for 'data collector' role – national focus (selection non-exhaustive):

  The screening focuses on national sector organisations. For countries with the highest identified transhipment volumes there is at least one organisation identified; further organisations exist but shall be identified at later stage in case of remaining data gaps in the portal.

Figure 53: Overview of suitable organisations for 'portal operator' and 'care taker' roles

Organi-sation	Potential portal operator role	Potential care taker role					Remarks
		Private Sidings	Public Sidings	Railport	Intemod. Terminal	Countries	
CER			x			Europe	
EIM			x	x	x	Europe	
ERA	x	(x)	(x)	(x)	(x)	Europe	Capability to ensure recommended link with RINF and TAF-TSI framework; experience in GIS systems
ERFA		x		x		Europe	
RNE	x	(x)	x	x	x	Europe	Link with RFC CIP recommended; experience in GIS systems
SGKV					x	DE / Europe	Potential task sharing with UIRR

Organi-sation	Potential portal operator role	Potential care taker role					Remarks
		Private Sidings	Public Sidings	Railport	Intemod. Terminal	Countries	
UIC	x		x			Global / Europe	Potential advisory role for common IT framework; experience in infrastructure data models and systems
UIRR	x				x	Europe	
Xrail		x	x	x		Europe	
NSAs		x	x	x	x	Country-specific	If national register exist

Source: HaCon

Figure 54: Overview of suitable international organisations for 'data collector' role

Organisation	Potential care taker role					Remarks
	Private Sidings	Public Sidings	Railport	Intermodal Terminal	Countries	
AGORA				x	Europe	
CEFIC	x	x				
CEPI	x	x				
ESC	x				Europe	
ECG	x	x				
EFIP	x	x			Europe	
ESPO	x	x			Europe	
EUROFER	x	x	x			
EUROPLATFORMS				x	Europe	
IBS			x		DE / Europe	
RFC EEIGs				x	Europe	

Source: HaCon

Not included in the lists of organisations are the European Commission that is in charge to determine the organisations for the permanent portal. Also not included are rail infrastructure managers and rail freight operators that may contribute to the filling of the portal with company specific data sets as it has been facilitated in the pilot application already (e.g. for Green Cargo, SBB Cargo and DB Schenker Rail).

The country-specific screening of potential 'data collectors' focuses exclusively on national sector organisations. The experience from the pilot phase has shown that the conditions per country and region regarding documented and accessible data stocks are very diverse. The detailed selection shall consider the specific organisation profiles and may also involve individual experts with native language skills and a good network in the respective domestic markets.

Detailed information about the identified organisations and entities are compiled in Annex 7 - Annex 10.

5.3 Financing structure

The financing structure consists of estimations on expected costs and revenues, based on dedicated tasks, which in turn correspond to the selected management model. In this respect, the following clusters have been differentiated:

- Tasks/costs/revenues for a transfer period and for permanent operation: the transfer period includes all activities (and subsequent costs) to further develop the pilot portal into a "professional" version, including all necessary application and database upgrades. This "professional" version will then be used in permanent operation (including regular updates).
- One-time tasks/costs/revenues and continuous tasks/costs/revenues, each for the transfer period and for the permanent operation: generally, one time tasks are predominantly assigned to the transfer period, whereas continuous tasks primarily occur during in permanent operation.

For these clusters, the tasks have been specified on a level of detailedness allowing for estimation of costs and revenues. These tasks are described in the following paragraphs. The explicit cost and revenue figures however are not part of this (public) report. They will be provided to the European Commission for internal discussions and for specification of the upcoming steps towards a permanent portal operation (road map, compare chapter 5.4).

5.3.1 Specification of tasks and subsequent costs

A compilation of tasks, associated with four main action fields, and the assignment to the clusters "Transfer period"/"Permanent operation" and "One-time costs"/"Continuous costs" is shown in Figure 55.

Figure 55: Overview of tasks towards and during permanent portal operation

				Transfer period		Permanent operation	
Action field	**Task**	**Specification of tasks/costs**	**Tasks/costs are addressed to**	**One-time costs [€]**	**Continuous costs [€/a]**	**One-time costs [€]**	**Continuous costs [€/a]**
1	**Software operation**						
1.1	Hardware provision	Server/Mirror server renting costs	Portal Operator	-	X	-	X
1.2	Software licences	Database software	Portal Operator	-		-	
1.3	Website/domain fees	Possibly combination with server providing	Portal Operator	-		-	
1.4	Technical support/maintenance, data back-up, facilitating interfaces	- Support of users - Maintenance of portal software - Implementation and supervision of back-up routines - Check of data transfer	Portal Operator	-	X	-	X
1.5	Training	Training of care takers, data collectors	Portal Operator/ Care Taker	X	-	-	-
1.6	Documentation and manuals	Technical documentation + user manual	Portal Operator	X	-	-	X
2	**Software development**						
2.1	Consolidation/refactoring		Portal Operator	X	-	-	-
2.2	Data storage/update/roll-back/tracing management		Portal Operator	X	-	-	-
2.3	Data editing/validation	See chapter 4.6.1	Portal Operator	X	-	-	-
2.4	General portal functionality		Portal Operator	X	-	-	-
2.5	API and interfaces/		Portal Operator	X	-	-	-
2.6	New features due to new use cases/requirements (e.g. history of LMI development)		Portal Operator		-	-	X
2.7	Error fixing/repair/test	including packaging, delivery, overall tests and documentation	Portal Operator	X	-	-	X
3	**Data management**						
3.1	Data collection/check/update	- Initial data collection/completion for main countries (highest transhipment volumes) for securing sufficient content for "professional" operation start of permanent portal - Continuous checks/updates of other countries included in database	Care Taker	X	X	-	X
3.2	Consistency check/validation of data sets from care takers ; allocation of responsibilities in case of overlaps (e.g. railports)	- Consistency check of data sets provided by care takers - Check of contractual obligations - Formal approval of data for transfer to public portal	Portal Operator	X	-	-	X
3.3	Identification of (additional) data sources		Care Taker	-	X	-	X
4	**Management of portal consortium/other parties**						
4.1	Setting up organisational structures	- Development of consortium structure - Elaboration of consortium agreement - Definition of usage conditions	Portal Operator	X	-	-	-

				Transfer period		Permanent operation	
4.2	Contract management with care takers/data collectors and data providers (incl. negotiations on data ownership)	- Negotiation for further usage of existing data negotiation/contracts with care takers and subcontractors - Negotiations with further data providers	Portal Operator	X	-	-	X
4.3	User feedback/ communication		Portal Operator	-	X	-	X
4.4	Dissemination	Presentations, publications etc.	Portal Operator	-	X	-	X
4.5	Financial issues	Cost/revenue management	Portal Operator	-	X	-	X

Source: HaCon, UIRR

- Action field 1 contains activities necessary to run and administrate the portal. The firstly refers to providing the requested hardware (servers, possibly mirror server for back-up), licences for the database software and website/domain fees. Within the pilot operation phase, these three items have been rented within a package service. This bears the advantage that costs for hardware capacities and associated maintenance services can be adjusted to actual needs. Hence, this procedure is proposed for the transfer period and for permanent operation as well.

  Beyond the pure hardware and operating system, also continuous maintenance of the portal software and the data included are requested. This exemplarily refers to implementation and supervision of back-up routines, check of data transfer processes (from/to Care Takers and Data Providers) and also to technical support of Care Takers and other users.

  Further tasks allotted to this action field are the training of Care Takers (system usage, work flow of data consolidation and quality check etc.) as well as the elaboration of manuals for Care Takers and of system descriptions for technical administration. The latter will be a one-time action to be performed within the transfer period with regular updates of all documentation during the permanent operation phase.

- Action field 2 comprises the further development of the portal software. According to the specification in chapter 4.6.1, the following application and database upgrades are foreseen within the transfer period (compare Figure 55):
  - Consolidation/refactoring
  - Data storage/update/roll-back/tracing management
  - Data editing/validation
  - General portal functionality
  - API and interfaces/
  - New features due to new use cases/requirements.

  During permanent operation, tasks of this action field refer to error fixing/repair and to adjustments of the application according customer needs.

- Action field 3 deals with the complementation of the data stock, including all necessary procedures of check, validation, correction and consolidation on both

Portal Operator and Care Taker level. During the transfer period, a substantial expansion of the data stock will be necessary in order to reach a status of data completion that will generate benefits consequently sufficient acceptance within major parts of the logistic market (Task 3.1). This "professional" status must provide a roughly complete set of at least basis data for the most import European countries (indicator: transhipment volume): Austria, Belgium, Czech Republic, France, Germany, Italy, Netherlands, Poland, Romania, Sweden, United Kingdom and Switzerland.

Additionally, the already existing data stock of the pilot operation has to be updated and completed with further information.

Task 3.2 comprises the quality check of Portal Operator level. This firstly includes a consistency/quality check of the data sets provided by the Care Takers as pre-condition for final approval and release. These checks will secondly be used to validate the contractual obligations of the Care Takers.

As a continuous task, additional data sources and providers have to be identified to close the remaining gaps of the data stock.

- In action field 4, management issue are compiled. During the transfer period, one-time effort will occur from setting up the organisational structures needed to compose the consortium and make it ready for permanent operation. This of course implies that a Portal Operator has been selected and mandated within the transfer period.

  The contract management between the Portal Operator and all other parties of the consortium (Care takers, sub-contractors, data owners) is subject to Action Field 4.2. The main part will be allotted to one-time costs during the transfer period to conclude all contracts the consortium members. Moreover, re-negotiations with owners of data already incorporated into the pilot database have to be performed. In many of these cases it is not clear if the rights to use these data also refer to a (commercial) permanent operation. As continuous costs, regular updates of these contracts have to be taken into account as well negotiations with additional data owners/providers.

  All other items of action field 4 are continuous costs and will occur within the transfer period as well as during permanent operation. Issues to highlighted are communication with users (answers to user feedback sent via the portal), representation/dissemination and the management of the consortium´s costs/revenues.

5.3.2 Specification of revenues

The assessment of revenues is a particular sensitive issue as it always presumes readiness to pay of other parties. Generally, users of internet applications nowadays expect such services to be completely free of charge. The readiness to pay for "normal", sporadic users (e.g. by mandatory registration to the portal with associated fees for usage) must be evaluated as very close to zero; it is therefore no realistic scenario.

Based on these pre-conditions, the following sources of revenues have been identified:

(1) Free access to basic data (contact data, location, type of last-mile infrastructure) for all users and access to all data against payment. This model requires nearly complete information for the last-mile facilities. Only in this case payment for more than basic data might become an interesting option for some users. Experiences of other companies with such model show that likeliness of generating substantial revenues is low. It is thus included into this catalogue rather for reasons of completeness.

(2) Usage fees for companies (depending on company turnover or individual licences per company). Implementation is subject to similar conditions as model (1).

(3) Funding by the European Commission could be suitable especially as start-up financing (for transfer period + begin of permanent operation); a continuous funding on lower level could be considered for permanent operation.

(4) Licence fees from institutions and associations that will include the portal in their business operation and will therefore use the portal continuously. In this context, institutions that are equipped with funding dedicated to such activities are of particular interest (e.g. Rail Freight Corridors);

(5) Licence fees from portal operators, which will replace their applications by the GIS portal in order to save operating costs for an own portal. These users would incorporate the portal application into their web-sites, possibly enriched by additional services. This type of customer will preferably be found amongst railway operators and infrastructure managers. Interviews that have been performed within the course of this study show that this might be an interesting, although limited market. Of course this requires adequate coverage of last-mile infrastructure data in Europe. This model is therefore relevant only in the permanent operation phase.

(6) Fees from companies using the portal as show case to promote their transport related services (e.g. wagon fleet owners, shunting operators, last-mile truck services). This will only be an interesting option for those companies if the portal has reached a dedicated publicity and frequency of usage; it is thus relevant only within the permanent operation phase.

(7) Special services enabling companies to incorporate dedicated portal data and applications into their own web-sites (e.g. B2B interface for direct import of data). This would generate revenues on regular basis as it also includes data updates and adjustment of the portal services. This option is also relevant only for the permanent operation phase.

Concluding, the general recommendations are as follows:

- The portal could be linked with the Customer Information Platforms (CIPs) of the Rail Freight Corridors (RFCs). The CIP is a tool that is intended to be implemented by the RFCs to provide customer information, including technical details and access conditions of freight terminals along the corridors. In this case, it is recommended

that RailNetEurope (RNE) ensures the coordination of a common approach for all RFCs and a link between the CIPs and the LMI portal. This would be a first step towards a single interface providing information and other services to rail freight operators and customers in Europe;

- For individual users, the portal should be generally free of charge; all other alternatives would lead to critical lack of acceptance;
- RINF and CRD (TAF TSI) should be used as data sources and data harmonisation should be ensured;
- Revenues should not be based on only one origin, but preferably on multiple sources in order to avoid complete drop-out of cash flow, if one source of revenues should fail;

A certain degree of public funding would most likely guarantee long-term reliability of cash flow. This would be justified, since the portal will provide services and benefits for the public and could therefore (at least partially) also be paid by the public. The compilation of potential sources for revenues has shown that most models might be applied only within the permanent operation phase, when a "professional" portal application including a "saleable" data stock completion is at hand. However, as Figure 55 has shown, the major part of the (particularly one-time) costs is allotted to the transfer period. Thus, the revenue scenario should distinguish between these two phases.

For the transfer period it is recommended to cover the expected one-time costs preliminary by a follow-up study, which could be funded by the European Commission. This study should refer to the follow tasks (according Figure 55):

- Action field 1: Software operation

  Task 1.6: Documentation and manuals

- Action field 2: Software development

  All tasks according Figure 55

- Action field 3: Data management

  Task 3.1: Data collection/check/update

  Task 3.2: Consistency check/validation of data sets from Care Takers

  Task 3.3: Identification of additional data sources

- Action field 4: Management of portal consortium/other parties

  Task 4.3: User feedback/communication

  Task 4.4: Dissemination

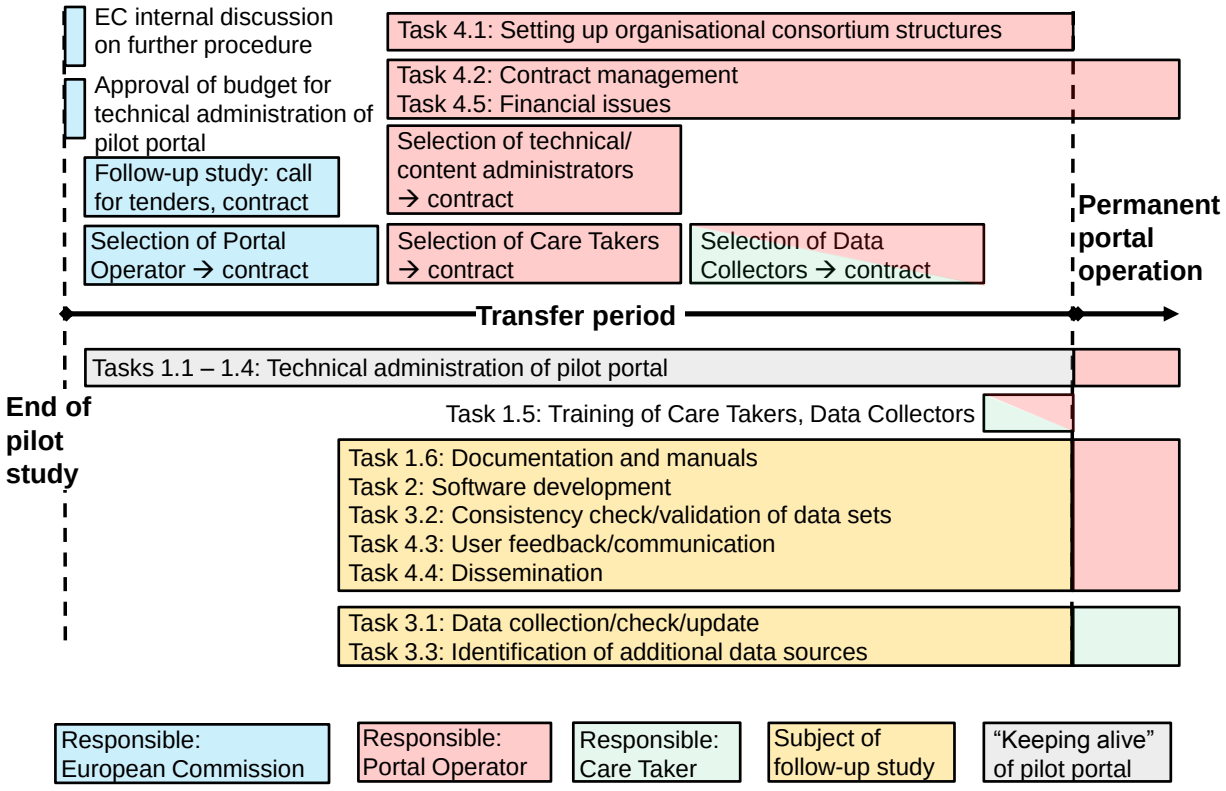
The other tasks of the transfer period should be financed out of the Portal Operator budget. As there are no nameable revenues to be expected during this transfer period, this budget would have to be covered also mostly by the Commission. In any case it should be secured that at least running costs for the (existing) pilot portal are covered throughout the transfer period.

For permanent operation, a mixture of revenue models (3) – (7) is recommended. With view on ensuring long-term operation of the portal, basis financing could be composed of model (4): the GIS portal would help the Rail Freight Corridors to provide a customer information platform that fulfils all requirements and release them from collecting own data. This basis financing could be supplemented by direct EC funding (e.g. for dissemination, linking to RINF/CRD databases). The revenue models (5) – (7) should then be integrated occasionally; however, they are of rather sporadic nature and/or reach only a limited clientele and are therefore not suitable as reliable basis financing for permanent and long-term operation.

5.4 Steps towards permanent portal operation (roadmap)

As already explained above, the most important steps towards a permanent operation of the GIS portal are allocated to the "Transfer period" that directly connects to the finalisation of this study. Figure 56 provides an overview on the main implementation steps, their temporal sequence and the responsibilities (roadmap).

Figure 56: Roadmap for implement permanent operation of the portal



Source: HaCon

Explicit time figures have not been specified; however, the expansions along the time axis provide at least a qualitative assessment on the durations, which are on one hand needed to perform all necessary actions and which on the other hand, must fit into the overall time frame. This overall time frame (= duration of the transfer period) should not extend approximately one year in order not to lose publicity of the portal in the logistic world and to reduce the risk of total abandoning due to lack of progress.

The upper part of the roadmap shows the actions related to management and contractual issues. Immediately after finalisation of the study, the Commission should come to a

general decision to continue portal operation or not. In case this decision is positive, a budget would have to be approved that allows keeping the pilot portal alive on during the transfer period and making it accessible for the public. This is important to set up permanent operation from an active portal and to avoid a complete new start. This budget is allocated to tasks 1.1-1.4 according to the overall task list in Figure 55.

Next important steps for the European Commission would be to order a follow-up study that shall perform all necessary developments and data collection towards a "professional" portal version (compare chapter 5.3.2). Simultaneously, selection of a Portal Operator should be initiated, negotiated and finalised. By signing of a contract between EC and a Portal Operator, the main obligations of the European Commission within this roadmap are concluded.

The Portal Operator will then take over and set up all required organisational and management structures. This firstly refers to the selection of Care Takers and to provide them with a service contract. The same applies for administrational sub-contractors, as far as needed. In cooperation with the Care Takers, the Portal Operator will select appropriate data collectors for specific tasks. Of course, many of these management issues are not limited to the transfer period, but will be continued throughout the entire lifetime of the portal.

In the lower part of the roadmap, the content related tasks according Figure 55 are visualised. They mainly consist of two parts: The technical administration that shall keep the pilot portal running and the expansion of application and database. The latter shall be subject to the follow-up study; the respective tasks will be taken over by the Portal Operator or the Care Takers during the permanent operation.

6 Summary and conclusions

In order to cope with rising challenges of customers' demands and competition with road, rail freight transport providers must be able to provide reliable and transparent transport solutions at short notice. This is particularly challenging for last-mile operations. The lack of an easy and quick access to information about last-mile infrastructure for rail freight has become a significant barrier to the efficient planning of rail freight services, in particular across borders.

Against this background, HaCon and UIC, supported by UIRR, Triona and IT Kreativa, were mandated by DG MOVE to develop an EU-wide web-based portal with GIS functionalities, capable of presenting all relevant data for different kinds of last-mile infrastructure in a transparent way. The respective study "User-friendly access to information on last-mile infrastructure for rail freight" was started in January 2015 and concluded in March 2016.

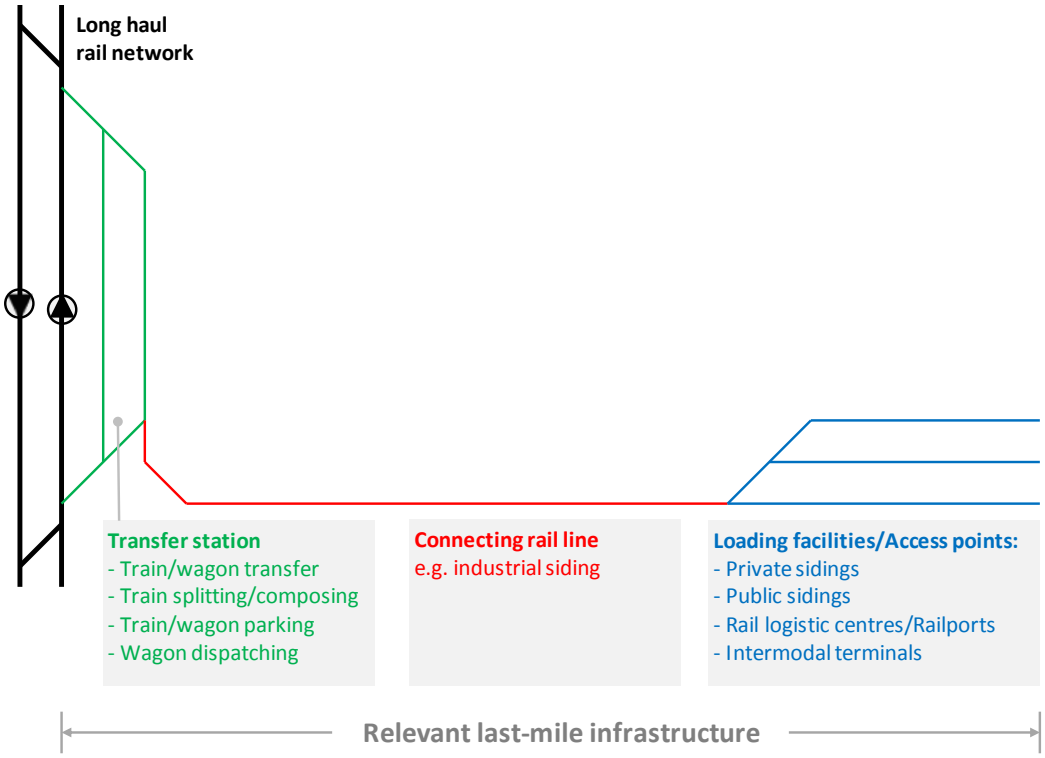
The main objectives of this study were

- Capturing of user needs regarding relevant information criteria and features of a web application;
- Identification of existing data sources on last-mile infrastructure and evaluation of their usability in terms of technical and legal aspects;
- Elaboration of a technical specification for a web-based application and database;
- Development of the portal and performing operation on pilot level;
- Feeding the portal with last-mile infrastructure data from three selected regions in Europe;
- Recommendations for an operation concept (management structure, business model) for a permanent portal operation after the pilot phase.

"Last-mile infrastructure" - Definition and occurrence in Europe

In contrast to the general usage of the term "last-mile" in the logistic world, this study does not capture the entire transport chain (where the last-mile is often performed on road), but concentrates on the last (or first) rail part. This comprises the loading facility itself as well as all infrastructures necessary to connect the loading facility to the (mainline) rail network. As Figure 57 visualises, the latter refers to a "transfer station", where the train run goes over to shunting operation and to the connecting rail line between the transfer station and the loading facility.

Figure 57: Last-mile infrastructure for rail freight



It is important to understand that "last-mile Infrastructure" comprises a large variety of different infrastructure configurations with respective modes of operation. It is therefore necessary to define relevant clusters of last-mile infrastructure, which facilitate overview and allow addressing dedicated users/operators with specific information demands.

- Private sidings are privately owned and operated rail infrastructure, connecting loading facilities to the public rail network. Within this study, private sidings mainly refer to industry sites (manufacturing of goods).
- Public sidings used to be an access to rail freight "for everybody" in former days. Meanwhile, they have lost most of their relevance. They consist of publicly accessible team tracks with or without loading ramps and are incorporated into conventional rail production systems (normally single wagon load).
- Intermodal terminals are designed for the transhipment of standardised loading units (containers, swap bodies, trailers) between at least two modes. In most cases they are publicly accessible, but some of them are privately operated. Within this study, only terminals with rail connection (rail/road or rail/road/water) are considered.
- Rail logistic centres ("Railports") are loading facilities both for conventional and intermodal transhipment. Beyond pure transhipment, Rail logistic centres also provide additional services like storage, consignment, or road pre-/end-haulage. Rail logistic centres are also known as "Railports", which actually is a brand name of DB Cargo.

In addition, areas that combine several of these access points have been included into the analysis and into the portal application. This applies for freight villages and sea/inland ports.

The four described types of last-mile infrastructure cover all access points to rail freight. They have been used not only to define users' requirements to the information portal, but also as a main structure of the portal´s database and for the management concept ("care takers").

By status of autumn 2015, about 22,120 of these access points to rail freight existed in Europe (EU-28 + Switzerland + Norway). The vast majority of these pieces of last-mile infrastructure was allotted to Private sidings (~ 15,600), followed by Stations with public sidings (~ 5,600), Intermodal terminals (~ 730, only terminals with rail access) and Rail logistic centres (~ 190).

User needs

In the first instance, the envisaged portal addresses users and providers of rail freight transport who need the last-mile information to plan and to optimise their services. Furthermore, operators and managers of last-mile infrastructure are of relevance, since the portal might be also used to promote facilities and associated services. Additionally, politicians, consultants etc. could make use of the information for planning purposes. Consequently, the following stakeholder groups are considered to comprise the requirement profile for the portal: railway operators, shippers (industry), forwarders, intermodal operators, (rail) infrastructure managers, intermodal terminal operators, railport / rail logistics centre operators, owners/ operators of private sidings, wagon providers and other parties like government, spatial planning administration, consultants or economic promotion agencies.

Specific user needs regarding information content and portal features have been collected in three steps: first, three workshops were performed in Paris, Budapest and Lugo between March and April 2015, incorporating all stakeholder groups listed above. In a second stage, the results of these workshops were validated by means of an online questionnaire. Finally, interviews with selected stakeholders and also with operators of existing online portals have been used to discuss specific aspects.

As a basis for all these three steps, a "long list" of more than 120 information attributes had been prepared. These information attributes covered aspects like location (address, contact data), type and size of the facility, rail infrastructure (layout and equipment), transhipment equipment, type of loading unit / cargo transhipment, storage capabilities, shunting and other services. All these issues were evaluated and ranked by the stakeholders. Concerning possible features of a portal application, a second respective "long list" was provided and discussed.

The results of this three-step-survey show that the planned portal will facilitate an easy and quick identification of possible rail freight loading facilities associated with a limited set of core information relevant for a commercial decision to use the facility. In summary the portal will provide quick answers to the following questions:

- What access points are available (locations)?
- Who manages the access point (contact person)?
- What are the operating times of the facility?
- What are the core technical parameters and equipment?
- What kinds of services are provided at a particular point?

The results also show that almost each information item has been considered as important by a certain group. This means that no attribute should be generally ignored and excluded from the portal.

Data sources and pilot regions

A main issue for the last-mile information portal is the provision of complete, accurate and up-to-date data. In this respect, the following questions have been investigated:

- Which data sources exist in correspondence to the requested types of infrastructure in Europe?
- What kind of information is provided by the identified data sources?
- Are these data sources available to be exploited and how? In this context technical, legal and commercial aspects need to be clarified.

In order to answer these questions, more than 40 existing web-based portals, which may serve as data suppliers for the last-mile portal, have been analysed. In addition, other data sources were identified that also provide useful information, even though the data might not be available in electronic form. Examples for such additional data sources are the Network Statements of the rail infrastructure managers or data provided directly e.g. from terminal operators, railport managers or managers of other loading facilities.

The majority of the investigated data sources provide information about intermodal terminals, often within Europe-wide web portals (e.g. AGORA, SGKV). The overall data availability for this type of last-mile infrastructure can be regarded as sufficient, both concerning the identification of facilities and the specification of their characteristics (infrastructure layout, transhipment equipment etc.).

Information on stations with public sidings is available mostly through country-specific websites of infrastructure managers or rail freight operators (e.g. DB Netz, SBB Cargo, Trafikverket). In some cases, these data might be enriched by information from the Network Statements.

Most data of Rail logistic centres are provided by DB Schenker (now: DB Cargo) as the owner and operator of many "Railports" in Europe. Occasionally, a clear separation from intermodal terminals (that also provide additional services) and from forwarders with rail access (that are captured as private sidings) is not possible.

Private sidings are the most problematic type of last-mile infrastructure with respect to data availability. This is most unsatisfying, as private sidings represent not only the lion´s share of all access points, but also the vast majority of rail freight volume in Europe. The few exploitable data sources are mostly assigned to regional level (e.g. portal "Gleisanschluss Brandenburg" or terms of use for infrastructure in ports). In single cases, additional surveys are available (e.g. by chambers of commerce), which however are performed uniquely and thus not updated.

In order to verify the usability of these data sources, the most important promoters/providers of existing web-portals have been approached for interviews on the following topics:

- General aspects/ experience (e.g. motivation for the portal, development status, portal usage);
- Data ownership, availability and conditions;

- Data updates and
- Interest in supporting a European last-mile portal.

It turned out that most interviewed portal promoters would generally agree to connect their portal with the European last-mile portal, but the willingness to transfer/update the complete database to another portal is rather limited. However, for the feeding of the pilot portal, agreements have been reached with some most relevant portals and other data providers. Technically, no standard interfaces are facilitated.

In the short term, this procedure of merging data from several origins is the only realistic way to keep the envisaged deadlines for implementation. Generally however, the data feeding concept of the portal should take account of related European framework and data exchange standards, as defined within TAF/TAP-TSI regulation. Data from TAF-TSI common components like CRD (Central Reference Data) and RINF (European Register of Infrastructure) should be exploited as far as possible. Additionally, data stocks of national safety authorities should be considered.

The European Register of Infrastructure will ultimately become available as a separate web application, populated with extensive data encompassing the EU railway network. Therefore, the opportunity will arise to link information systems for the rail network and for the last mile.

However, it should be borne in mind that RINF only contains data about sections of lines, rather than individual tracks, and about operational points but with no internal details. Such level of detail is suitable for the legal purposes of RINF, which are conformity records and rolling stock compatibility checks, but not for other usages such as pathfinding. Moreover, the RINF and CRD databases provide only data for a limited number of information items. It has been also perceived that reliable and regular input data flows to RINF and CRD have been established for lines and stations but need to be clarified for other transhipment points such as terminals or private sidings. Consequently, the data that is currently available is considered as limited in terms of facilities included and associated contents.

Nevertheless, the maintenance of multiple geographic information systems is not sustainable in the long run, unless the cost, delays and quality issues associated with data links and data transfers are kept under tight control. For this to happen, information systems must share a common, consistent topological model. For example, such a model is under development with UIC (RailTopoModel, IRS30100, to be released in spring 2016). The corresponding data exchange formats will allow data exchange with RINF, among others.

For the pilot application, three regions have been selected for a more comprehensive data input which are Sweden, West-Hungary/East-Austria (greater Vienna area) and the Balkan region. The data gathering made use of the identified portals and data sources as far as appropriate and furthermore involved regional subcontractors such as Triona (for Sweden) and IT Kreativa (for the Balkan region).

The pilot portal – design, features and data stock

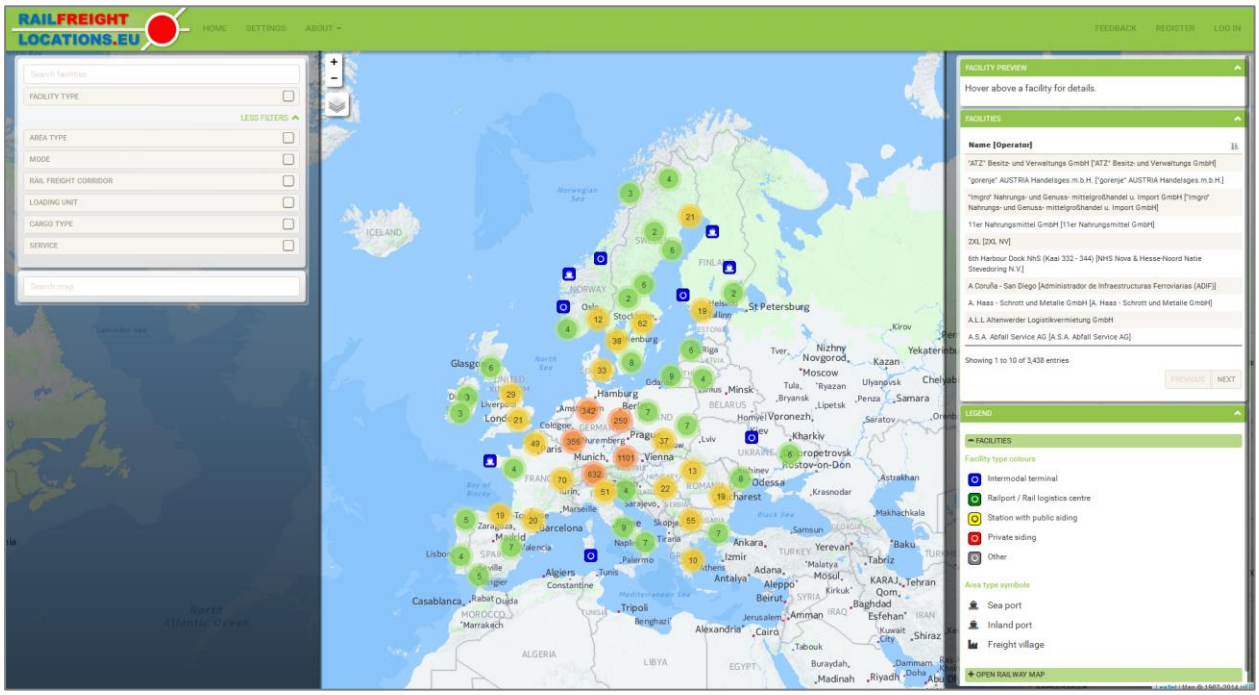
Based on the identified user requirements and the evaluated data management concepts, a detailed functional and technical specification document was developed. The guiding principle for all aspects dealing with the portal design was to ensure that the application is usable in an intuitive way and ensures an optimum accessibility to all relevant information items. Moreover, the portal's system performance should facilitate short reaction times for all user actions, considering usage of different browsers and mass system usage.

The portal was developed and filled with data according to the technical specification. The pilot version of the GIS portal was officially launched on the occasion of a stakeholder seminar in Vienna on 19 October 2015. Since then the application, the database and the data model have been continuously further developed in order to

- Ensure robustness of the application,
- Implement additional functionalities,
- Optimise performance for all types of commonly used browsers and to
- Complement the data stock.

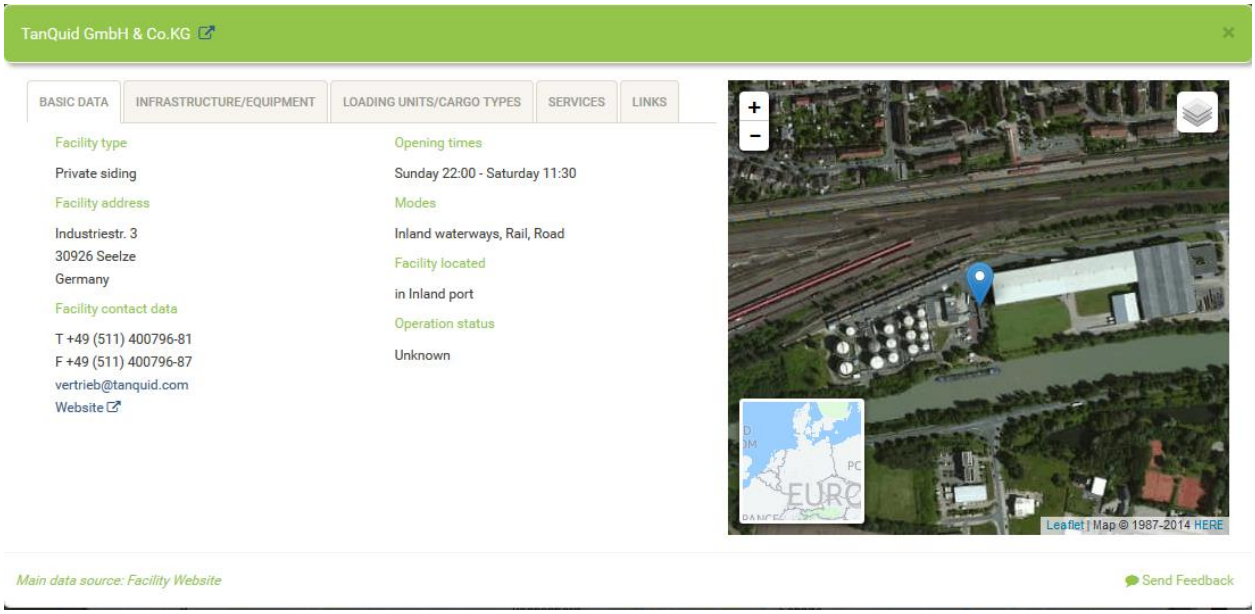
The current version of the portal can be reached under "railfreightlocations.eu". When accessing this web page, the start screen opens with the map in the centre; search and filter features are located on the left, the list display and the legend on the right (see Figure 58).

Figure 58: Overview on the last-mile infrastructure portal railfreightlocations.eu



By narrowing the search criteria, zooming of the map or direct picking from the list, dedicated access points to rail freight may be selected. By clicking on the symbol in the map or by navigating to the list´s entry, detailed information about the respective last-mile facility will be displayed (see Figure 59).

Figure 59: Example for detailed information of a last-mile facility



This detailed information provides a satellite picture of the site and data referring to the following subjects:

- Basis data: type of last-mile infrastructure, address, contact data, opening times etc.;
- Infrastructure/Equipment: Number and type of transhipment devices, track configuration (type, number, usable length of track, electrification, min. track radius, permitted axle load);
- Loading units/Cargo types: Intermodal loading unit types, commodities, dangerous cargo;
- Services: Maintenance/repair for locomotives, wagons and loading units, parking of wagons and locomotives, storage facilities, pre-/end haulage etc.;
- Links to other websites that may provide additional data. This particularly refers to "dynamic" information like schedules or prices. Such dynamic data is generally not included in the last-mile portal.

By status of March 2016 the pilot portal contains more than 3,700 last-mile infrastructure facilities. This means that for about 17% of all access points to rail freight in Europe, at least basic information is available. The focus of the included data was on the selected three pilot regions and supplemented data for further countries. In summary it can be concluded that the data coverage regarding intermodal terminals is almost complete whereas the data availability for other types, in particular for private sidings, remains a challenge.

Recommendations for a permanent portal operation

In order to transfer the pilot portal into permanent operation, an operating model is proposed with the following parts:

- A management concept, identifying the parties expected to take part in the permanent portal operation and defining their roles/tasks as well as their contractual connections. The principle idea is a two-pillar-structure with the main management levels "Portal Operator" (overall responsible for portal operation) and "Care Taker" (in charge of data gathering, updating and validation);
- Requirement/qualification profiles for selecting suitable companies for the main levels of the management concept;
- A (non-exclusive) pre-selection of organisations to take over the permanent portal operation;
- A business model outlining main tasks and associated costs, as well as different possible scenarios for revenue generation;
- A Roadmap towards permanent portal operation, consisting of two implementation phases: permanent operation making use of a "professional" version of the portal, which is able to generate revenues from the market, and a "transfer operation", converting the pilot portal into the "professional" version. This procedure needs additional features, particularly with respect to data management, as well as completion of the data stock.

Regarding the business model the following recommendations have been given:

- The portal could be linked with the Customer Information Platforms (CIPs) of the Rail Freight Corridors (RFCs). The CIP is a tool that is intended to be implemented by the RFCs to provide customer information, including technical details and access conditions of freight terminals along the corridors. In this case, it is recommended that RailNetEurope (RNE) ensures the coordination of a common approach for all RFCs and a link between the CIPs and the LMI portal. This would be a first step towards a single interface providing information and other services to rail freight operators and customers in Europe;
- For individual users, the portal should be generally free of charge; all other alternatives would lead to critical lack of acceptance;
- RINF and CRD (TAF TSI) should be used as data sources and data harmonisation should be ensured.
- Revenues should not be based on only one origin, but preferably on multiple sources in order to avoid complete drop-out of cash flow, if one source of revenues should fail;
- A certain degree of public funding would most likely guarantee long-term reliability of cash flow. This would be justified, since the portal will provide services and benefits for the public and could therefore (at least partially) also be paid by the public.

The components of the described management concept provide a tool-box for the Commission to initiate the next steps to achieve permanent portal operation. Main items addressed are:

- A general decision to continue the operation of the portal should be taken by the Commission (DG MOVE). In case this decision is positive, the Commission would have to consider providing a budget that would allow the pilot portal to be kept alive during the transfer period and for it to be made accessible to the public.
- A follow-up study could be initiated to perform all necessary developments and data collection towards a "professional" version that is needed for a permanent portal.
- Simultaneously, a Portal Operator should be selected. In the pre-selection process three organisations have been identified: European Railway Agency (ERA; now: European Union Agency for Railways), RailNetEurope (RNE) and the International Union for Road-Rail Combined Transport (UIRR). All these entities have expressed their general or potential (i.e. subject to management approval, availability of resources, etc.) willingness to undertake this task. By signing a contract with the assigned Portal Operator, the main task of the European Commission within the roadmap towards a permanent portal would be concluded.
- Transfer of responsibilities to the assigned Portal Operator and set up all required organisational and management structures. This firstly refers to the selection of Care Takers and conclusion of respective service contract. The same applies for other subcontractors, as far as needed. In cooperation with the Care Takers, the Portal Operator will select appropriate data collectors for specific tasks.

7 Annexes

Annex 1: Occurrence of different types of last-mile infrastructure per country, last update: September 2015

Country	Private sidings[1]	Stations with publ. sidings[2]	Intermodal terminals[3]	Railports[4]	All access points	Network length[5]	Private sidings per 1000 km	Stations with public sidings per 1000 km	Intermodal terminals per 1000 km	Railports per 1000 km	All access points per 1000 km
Austria	716	107	21	7	851	5.566	129	19	4	1	153
Belgium	484	113	49	13	659	3.578	135	32	14	4	184
Bulgaria	331	250	5	2	588	4.070	81	61	1	0	144
Croatia	92	211	8	0	311	2.722	34	78	3	0	114
Czech Republic	1.242	244	21	3	1.510	9.570	130	25	2	0	158
Denmark	69	29	11	6	115	3.181	22	9	3	2	36
Estonia	379	127	8	0	514	1.196	317	106	7	0	430
Finland	172	224	17	0	413	5.944	29	38	3	0	69
France	1.500	332	72	6	1.910	29.273	51	11	2	0	65
Germany	2.395	475	154	32	3.056	41.427	58	11	4	1	74
Greece	17	99	3	2	121	2.552	7	39	1	1	47
Hungary	711	456	16	9	1.192	8.141	87	56	2	1	146
Ireland	5	2	6	0	13	1.931	3	1	3	0	7
Italy	762	199	46	11	1.018	16.742	46	12	3	1	61
Latvia	484	162	6	0	652	1.859	260	87	3	0	351
Lithuania	416	54	7	0	477	1.768	235	31	4	0	270
Luxembourg	60	15	3	0	78	275	218	55	11	0	284
Netherlands	337	10	27	41	415	3.013	112	3	9	14	138
Poland	2.016	414	35	11	2.476	20.094	100	21	2	1	123
Portugal	81	86	4	14	185	2.541	32	34	2	6	73
Romania	109	559	24	6	698	10.777	10	52	2	1	65
Slovakia	420	495	11	0	926	3.631	116	136	3	0	255
Slovenia	182	223	3	1	409	1.209	151	184	2	1	338
Spain	207	53	41	2	303	13.976	15	4	3	0	22
Sweden	584	180	34	12	810	11.206	52	16	3	1	72
United Kingdom	308	40	46	6	400	15.884	19	3	3	0	25
Norway	*234*	*50*	*19*	*2*	*305*	*3.891*	*60*	*13*	*5*	*1*	*78*
Switzerland	*1.300*	*401*	*33*	*3*	*1.737*	*5.124*	*254*	*78*	*6*	*1*	*339*
EU28 + 2[6)]	**15.613**	**5.610**	**730**	**189**	**22.142**	**231.141**	**68**	**24**	**3**	**1**	**96**
On average	**558**	**200**	**26**	**7**	**791**	**8.255**	**99**	**43**	**4**	**1**	**147**

[1]Source: HaCon, based on German MoT, Networkrail, SNCF, ÖBB Infra, SZ, SBB, network statements, own estimations

[2]Source: HaCon, based on SBB Cargo, DB Schenker, Green Cargo, SZ, VDV, network statements, own estimations

[3]Source: HaCon, based on SGKV

[4]Source: HaCon, based on DB Schenker, RailScout, SZ, CP Carga

[5]Source: Eurostat

[6]without Cyprus and Malta

Annex 2: Evaluation of potential information items by workshop participants

Information cluster	Information content (data item)	Remarks/Explanation	Evaluation
Location	Country		1
	Region		3
	Postal code		1
	City		1
	Geo coordinates		1
	NUTS	Geocode standard for subdividing countries for statistical purposes in the EU	3
	Name of facility/line		1
	Address of facility/line		1
	Infra operator name	Company that is responsible for the use of the facility´s infrastructure	1
	Infra operator contact data	see above	1
	UIC station code		1
	National station code	Station codes of the respective infrastructure managers; partially compatible with the UIC station code	1
Type of facility	Rail-Road terminal (intermodal)		1
	Rail-Road-IWW terminal (intermodal)		1
	Rail-Road terminal (Rolling Road)		3
	Railport / Rail Logistics Centre / Rail-Road terminal (conventional)	Rail/road transhipment facility for all kinds of cargo, enriched by additional services (storage, order picking etc.). Focus is on conventional (= non-intermodal) transhipment and transport services. Intention is to replace former (private) sidings that are not served any more.	1
	Station with public loading track	Public accessible loading tracks in rail stations. Focus is on conventional (=non-intermodal) transhipment and transport services.	1
	Private siding, track in industrial site	Privately owned loading facility; might be also accessible for third parties. Focus is on conventional (=non-intermodal) transhipment and transport services.	1
	Freight village	Dedicated industrial park, consisting of independent (transport) companies and an intermodal terminal. Focus is on intermodal transhipment and transport services.	1
	Seaport	Seaport, combining several kinds of above mentioned facilities in various constellations: intermodal terminals, railports, private sidings, public loading tracks	1

Information cluster	Information content (data item)	Remarks/Explanation	Evaluation
	Inland port, Rail-Road-IWW terminal (conventional)	Inland port, combining several kinds of above mentioned facilities in various constellations: intermodal terminals, railports, private sidings, public loading tracks	1
	Public station for wagon transfer	Public accessible rail station. Focus is on rail operation (e.g. train splitting/composing, wagon parking), NOT transhipment	1
	Private station for wagon transfer	Privately owned rail station; might be also accessible for third parties. Focus is on rail operation (e.g. train splitting/composing, wagon parking), NOT transhipment	1
Size of facility	Size of loading area (conventional transhipment)	Area in stations with public loading tracks that is dedicated to rail/road loading purposes. Focus is on conventional (= non-intermodal) transhipment and transport services.	3
	Size of storage area (conventional transhipment)	Area in stations with public loading tracks that is dedicated to cargo storage purposes. Focus is on conventional (= non-intermodal) transhipment and transport services.	3
	Width of loading lane (for conventional transhipment)	Width of the loading lane in stations with public loading tracks. Focus is on conventional (= non-intermodal) transhipment and transport services.	3
Rail infrastructure parameters	Number of tracks (for loading facility and transfer station)		1
	Single/double track (only for the connecting line)		3
	Track function (e.g. in-/outbound, parking, allocation etc.)		1
	Usable track length		1
	Length of line		3
	Rail connection of tracks (one-/two-sided)		3
	Electrified/diesel		1
	Loading gauge		1
	Axle load		1
	Metre load		1
	Min. radius		1
	Max. inclination		1
	Permitted rail speed		3
	RID Allowed Infrastructure		1
Rail infrastructure equipment	Fuel station		2
	Sanding station		2
	Water supply		2

Information cluster	Information content (data item)	Remarks/Explanation	Evaluation
	Electricity supply		2
	Track scale		1
	Cable shunting installation		2
	Brake test facility		1
	Hump		1
	Track area lighting		2
Transhipment equipment of facility	Loading lane(for conventional transhipment)		1
	Head/side ramp (for conventional transhipment)		1
	Gantry crane		1
	Mobile Crane		1
	Fork Lift		1
Type of loading unit/cargo transhipment	Container		1
	Tank Container		1
	Swap body		1
	Trailer		1
	Truck + trailer (ROLA)		1
	Palletised goods		1
	Plates		1
	Bale goods		1
	Vehicles/Machinery		1
	Coils		1
	Foods		1
	Long goods (e.g. steel, wood)		1
	Paper roll		1
	Bagged goods (Big Bags)		1
	Bulk		1
	Dangerous goods		1
	Wood		1
	Heavy load		1
	Other goods		1
Type of loading unit/ cargo storage	Container		1
	Swap body		1
	Trailer (parking)		1
	Truck (parking)		1
	Palletised goods		1
	Bulk		1
	Dangerous goods		1
	Wood		1
	Heavy load		1
	Reefer		1

Information cluster	Information content (data item)	Remarks/Explanation	Evaluation
	Silo storage for loose material		1
	General goods depot (without further specification)		1
General conditions for rail operation	Site/line in regular operation		1
	Site/line out of operation		1
	Site/line planned		1
	Public/private		1
	Opening times		1
	Infrastructure available for booking/usage (time period)	yes/no answer for questioning a dedicated time period of availability	3
	Restrictions for usage (time, activities, commodities, gauge)		1
	Fees for track renting/usage		3
	Fees for wagon parking/cargo storage		3
Rail operation/ service - last-mile	Shunting engine/ staff/service available	yes/no answer for questioning availability of shunting resources/service	1
	Rail service provider name		1
	Rail service provider contact		1
	Operation days/times for rail service		1
	Block train loading/ operation possible		1
	Wagon group loading/operation possible		1
	Single wagon loading/operation possible		1
	Order deadline for rail service		3
	Fees for wagon providing		3
	Fees for rail service		3
Rail operation/ service - long haul	Regular long-haul rail service available	yes/no answer for questioning availability of regular long-haul service of the facility	3
	Rail service provider name	Traction company to provide the regular long-haul service of the facility	3
	Rail service provider contact		3
	Destinations		3
	Frequency / Timetable		3
	Operation days		3

Information cluster	Information content (data item)	Remarks/Explanation	Evaluation
	LU/loading gauges accepted		3
	Quality levels of rail service		3
Additional services	Additional services (without further specification)		3
	Wagon/locomotive parking		1
	Repair/maintenance of loading units		1
	Repair/maintenance of wagons		1
	Repair/maintenance of locomotives		1
	Customs clearance		1
	Cleaning service		1
	Stuffing/stripping		1
	Container Service Centre		1
	Security	Security service to protect the facility against non-authorised access	1
Connection to road	Distance to high level road network	Distance to next motorway (or comparable road standard) connection point	3
	Location of next connection to high level road network	Geo coordinates of next motorway (or comparable road standard) connection point	3
	Access restrictions (e.g. height, weight)		1
	important		1
	nice to have		2
	less important		3

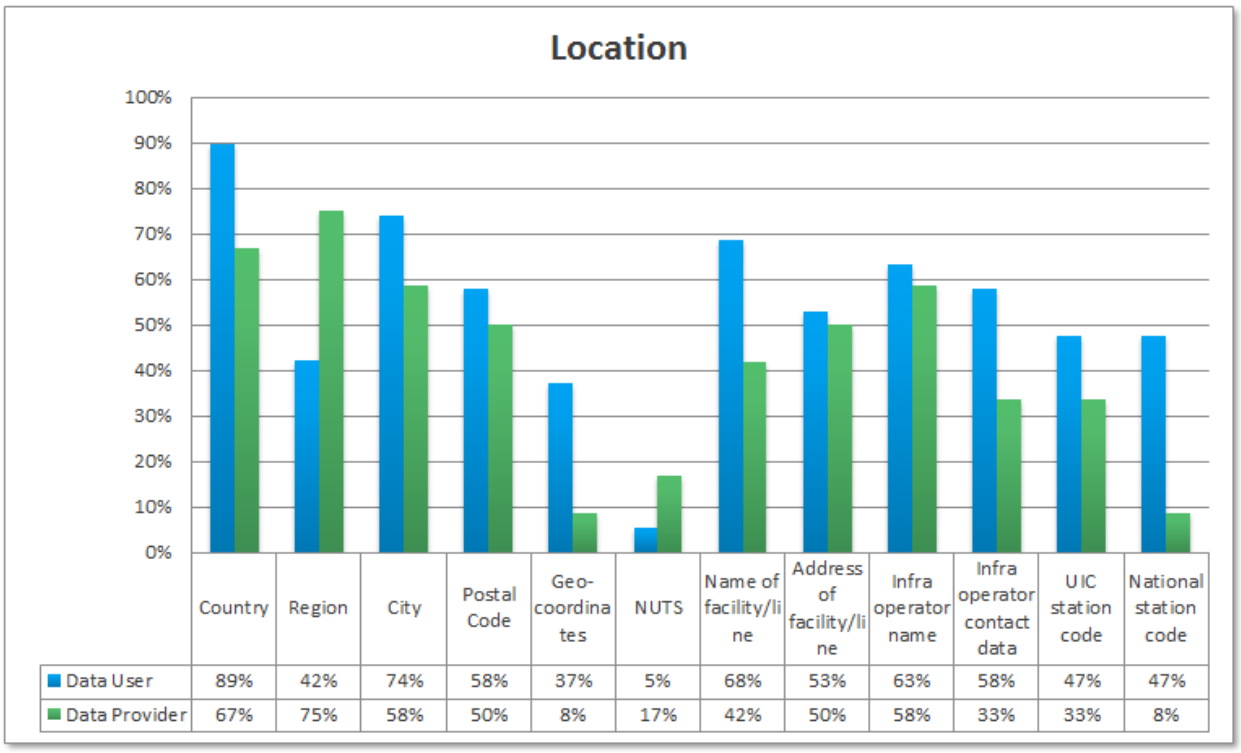
Annex 3: Evaluation of potential system features by workshop participants

Feature cluster	Portal feature	Remarks/Explanation	Relevance
Languages	English		1
	French		1
	German		1
	Italian		
	Other		
	Multi language capability		1
Administration	Password protected area for registered users		1
	Display terms of use	English only	1
	Display status of data		1
	Contact for system administrator		1
	User manual/instructions	English only	1
	User feedback via E-Mail (system and content)		1
	Display terms of data protection		
	Data update by user possible		
	Send location (geo coordinates) to map portals (Google, Bing etc.)		
Search mode	Single criteria		1
	Multiple criteria		1
	Predefined configurable searches		2
Site selection and result visualisation	Map		1
	Satellite picture	If possible	1
	Layout plan	If possible	1
	Photos		3
	Selection from (station) listing	Facility name	1
	Road access description		3
	Road access navigator		3
	pdf export of results		1
	Excel export of results		1
	Reference to LMI operator website (link)		1
Map navigation	Zoom with scale bar/buttons	Best ergonomic choice	
	Zoom with mouse wheel		
	Zoom with mouse (double) klick		
	Move map with mouse		
	Full-screen view		
	Display geo coordinates		
Map tools	Zoom box	Best ergonomic choice	
	Graphic tools (line drawing etc.)		
	Snapshot		
	Distance measuring		
	Area measuring		
	Print		
	Selection of background map possible (Google, OpenStreetmap etc.)		
	Change saturation of background map		

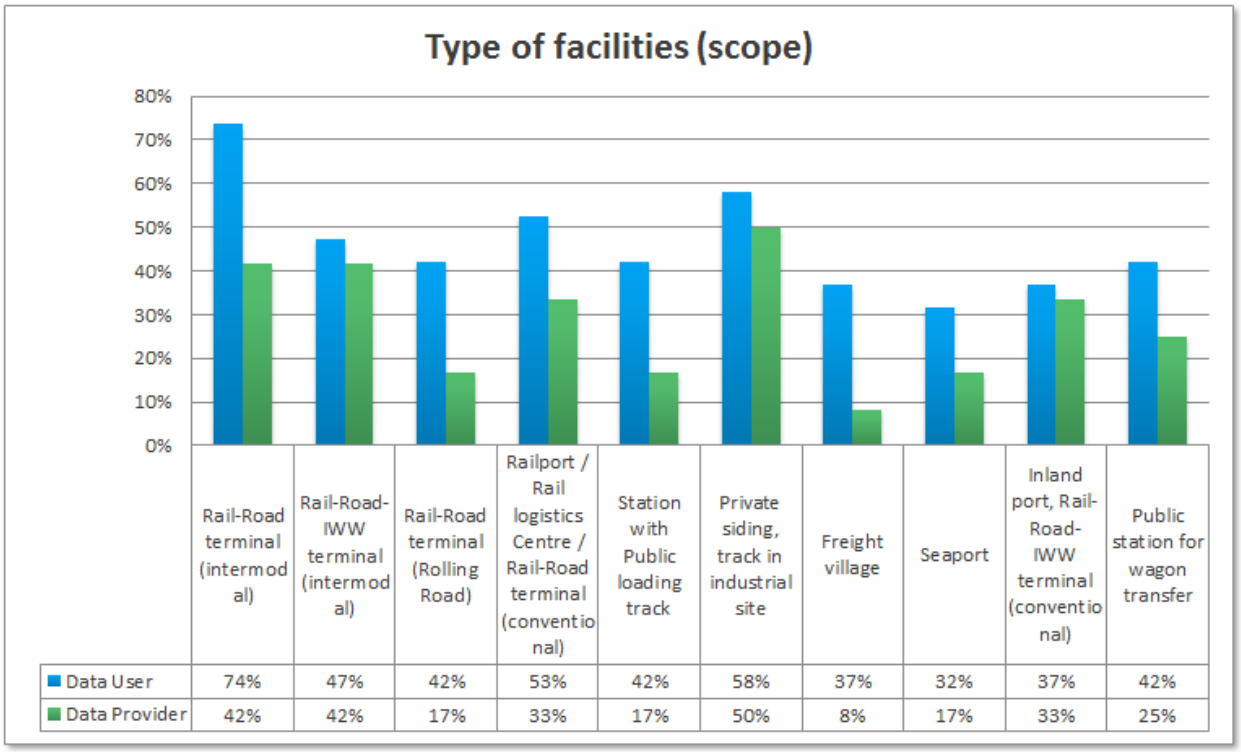
Annex 4: Detailed results of the online questionnaire consultation

Source: UIC based on questionnaire results, status: 30.06.2015

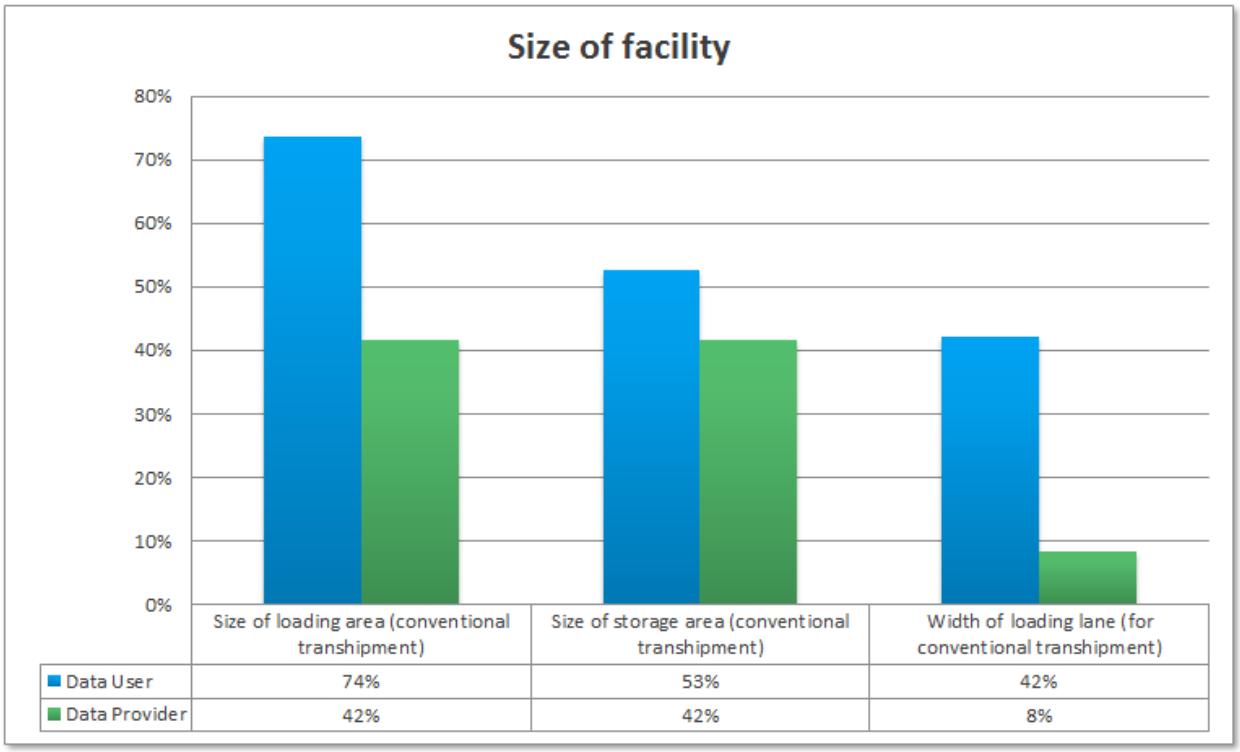
Note: Percentage values indicate the voting of all participants for the respective information item as "important"



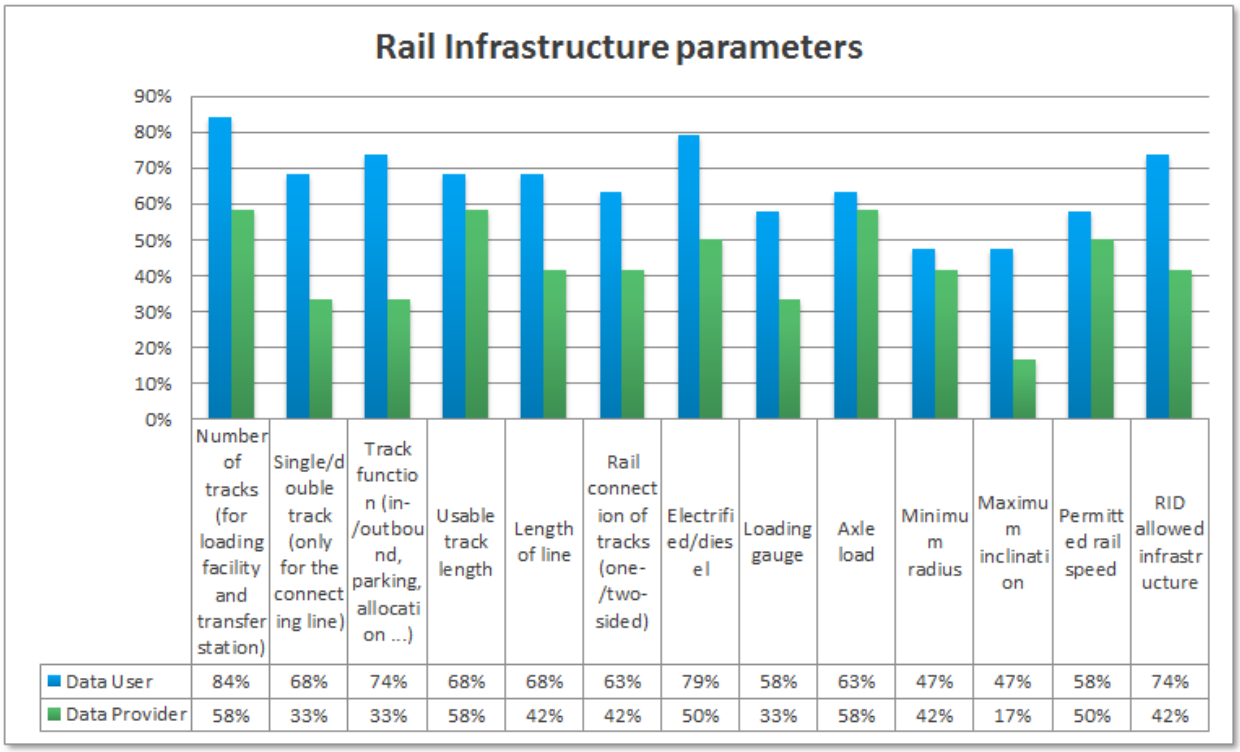
	Country	Region	City	Postal Code	Geo-coordinates	NUTS	Name of facility/line	Address of facility/line	Infra operator name	Infra operator contact data	UIC station code	National station code
Data User	89%	42%	74%	58%	37%	5%	68%	53%	63%	58%	47%	47%
Data Provider	67%	75%	58%	50%	8%	17%	42%	50%	58%	33%	33%	8%



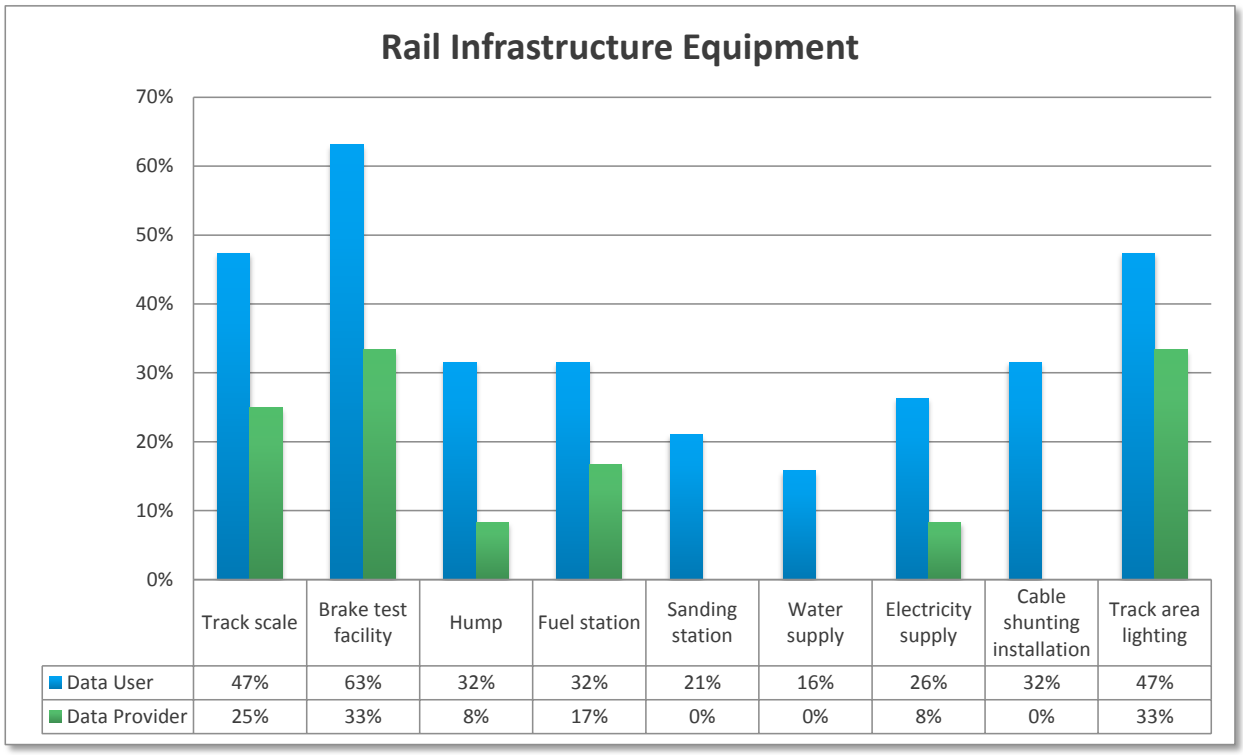
	Rail-Road terminal (intermodal)	Rail-Road-IWW terminal (intermodal)	Rail-Road terminal (Rolling Road)	Railport / Rail logistics Centre / Rail-Road terminal (conventional)	Station with Public loading track	Private siding, track in industrial site	Freight village	Seaport	Inland port, Rail-Road-IWW terminal (conventional)	Public station for wagon transfer
Data User	74%	47%	42%	53%	42%	58%	37%	32%	37%	42%
Data Provider	42%	42%	17%	33%	17%	50%	8%	17%	33%	25%



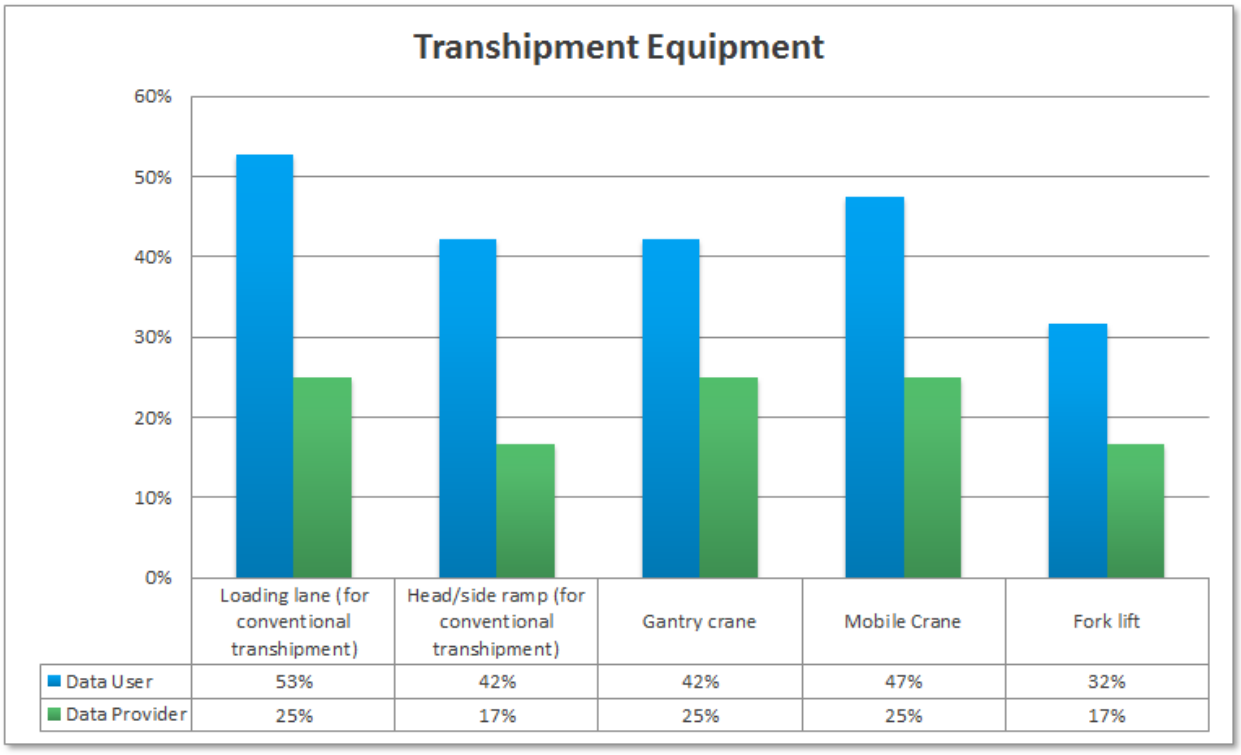
	Size of loading area (conventional transhipment)	Size of storage area (conventional transhipment)	Width of loading lane (for conventional transhipment)
Data User	74%	53%	42%
Data Provider	42%	42%	8%



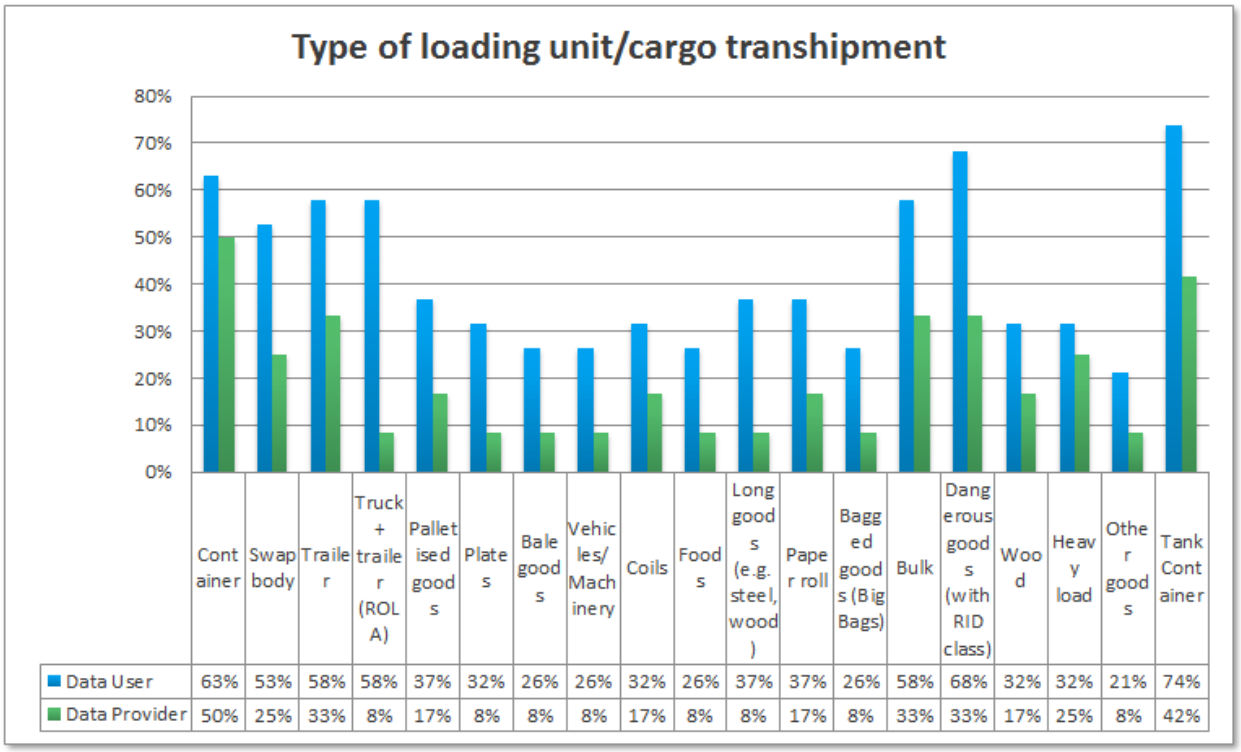
	Number of tracks (for loading facility and transfer station)	Single/double track (only for the connecting line)	Track function (in-/outbound, parking, allocation ...)	Usable track length	Length of line	Rail connection of tracks (one-/two-sided)	Electrified/diesel	Loading gauge	Axle load	Minimum radius	Maximum inclination	Permitted rail speed	RID allowed infrastructure
Data User	84%	68%	74%	68%	68%	63%	79%	58%	63%	47%	47%	58%	74%
Data Provider	58%	33%	33%	58%	42%	42%	50%	33%	58%	42%	17%	50%	42%

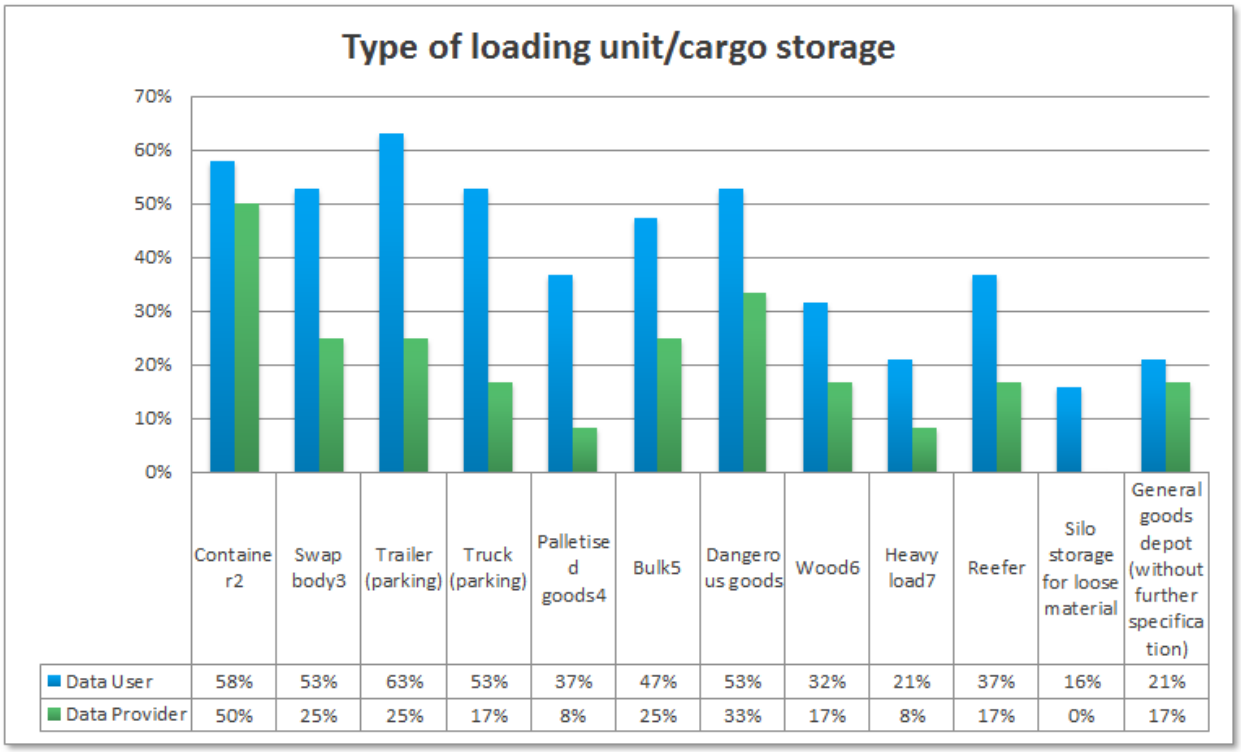


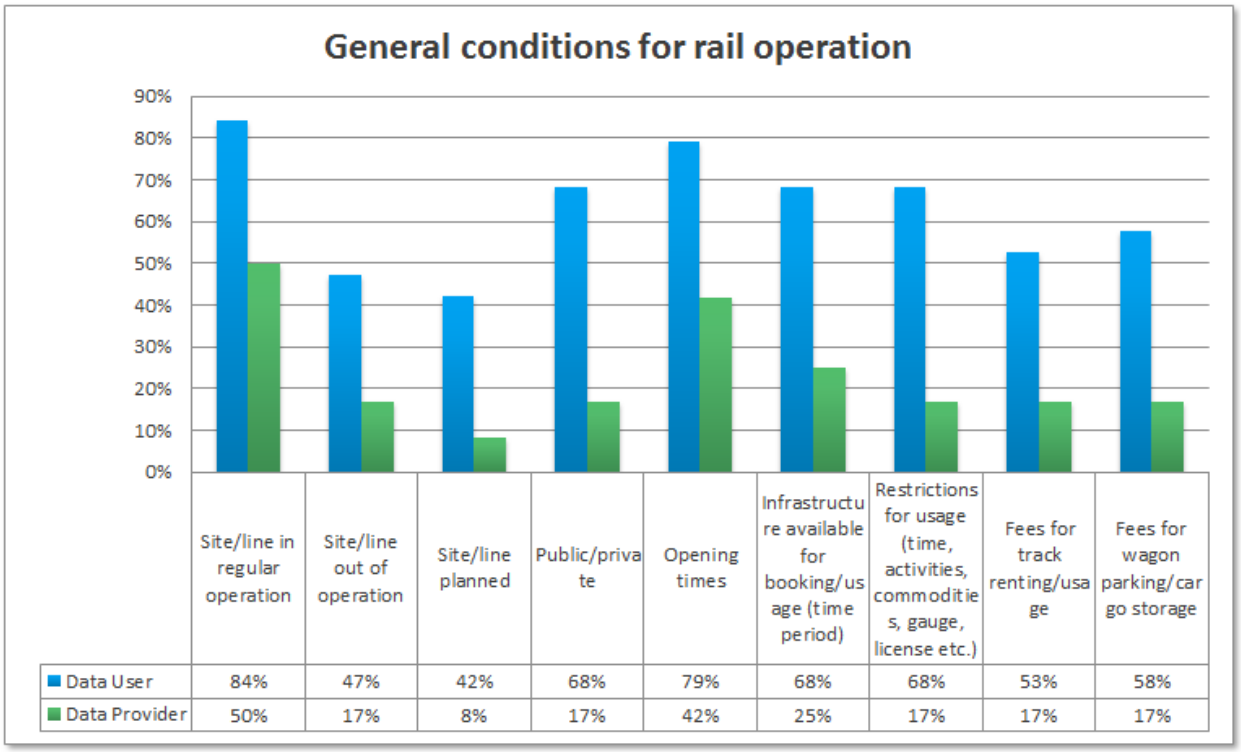
	Track scale	Brake test facility	Hump	Fuel station	Sanding station	Water supply	Electricity supply	Cable shunting installation	Track area lighting
Data User	47%	63%	32%	32%	21%	16%	26%	32%	47%
Data Provider	25%	33%	8%	17%	0%	0%	8%	0%	33%



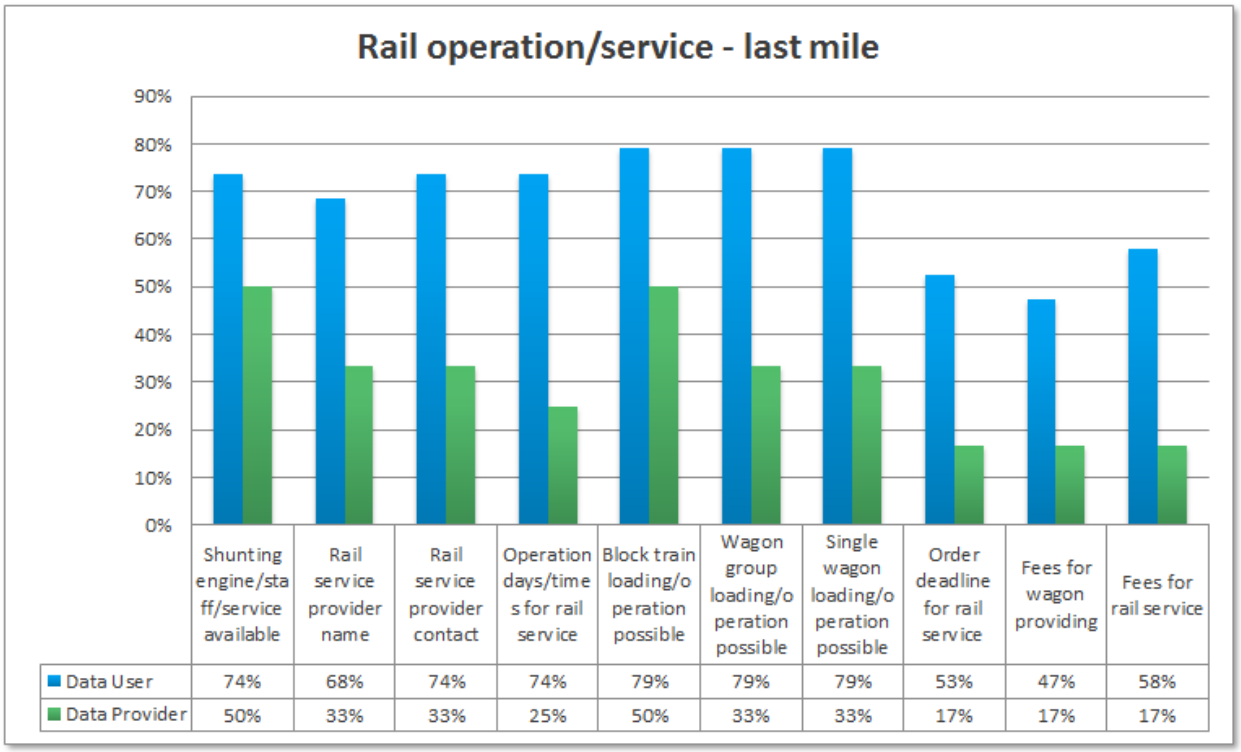
	Loading lane (for conventional transhipment)	Head/side ramp (for conventional transhipment)	Gantry crane	Mobile Crane	Fork lift
Data User	53%	42%	42%	47%	32%
Data Provider	25%	17%	25%	25%	17%


Type of loading unit/cargo transhipment
80%
70%
60%
50%
40%
30%
20%
10%
0%
Container
Swap body
Trailer
Truck + trailer (ROLA)
Palletised goods
Plates
Bale goods
Vehicles/ Machinery
Coils
Foods
Long goods (e.g. steel, wood)
Paper roll
Bagged goods (Big Bags)
Bulk
Dangerous goods (with RID class)
Wood
Heavy load
Other goods
Tank Container
Data User 63% 53% 58% 58% 37% 32% 26% 26% 32% 26% 37% 37% 26% 58% 68% 32% 32% 21% 74%
Data Provider 50% 25% 33% 8% 17% 8% 8% 8% 17% 8% 8% 17% 8% 33% 33% 17% 25% 8% 42%

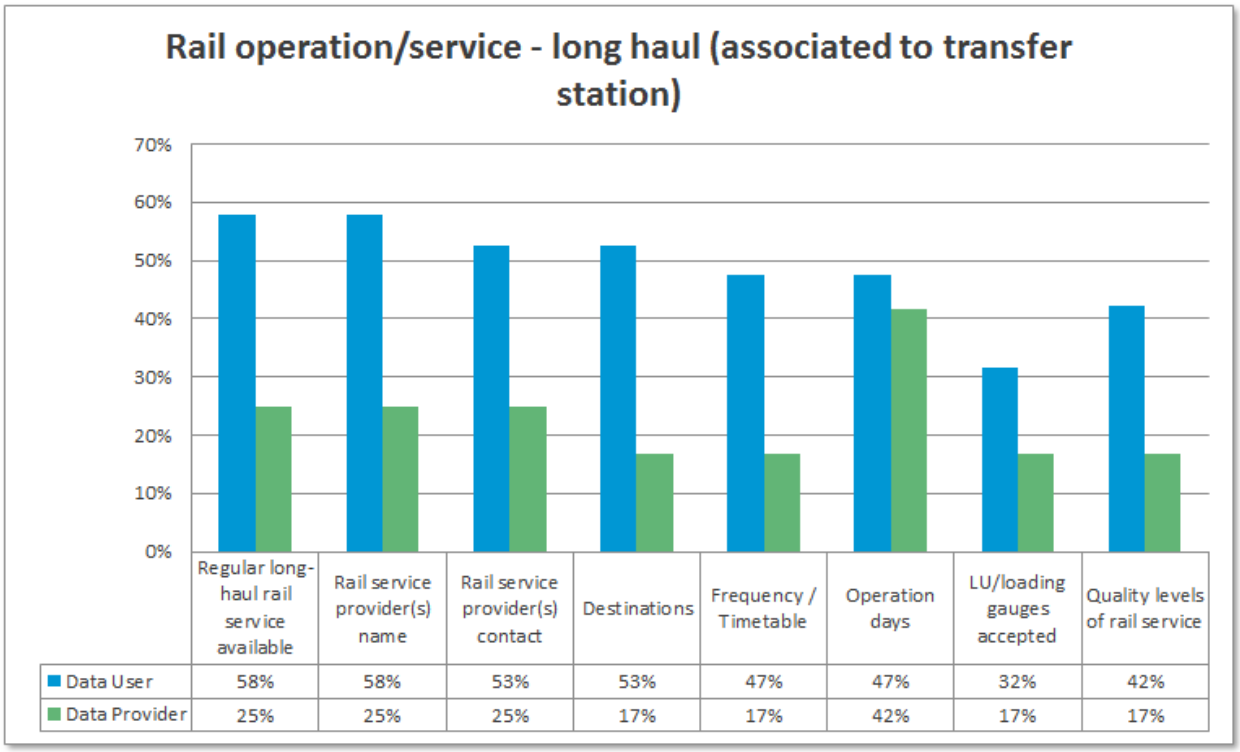

Type of loading unit/cargo storage
70%
60%
50%
40%
30%
20%
10%
0%
Container2
Swap body3
Trailer (parking)
Truck (parking)
Palletised goods4
Bulk5
Dangerous goods
Wood6
Heavy load7
Reefer
Silo storage for loose material
General goods depot (without further specification)
Data User 58% 53% 63% 53% 37% 47% 53% 32% 21% 37% 16% 21%
Data Provider 50% 25% 25% 17% 8% 25% 33% 17% 8% 17% 0% 17%

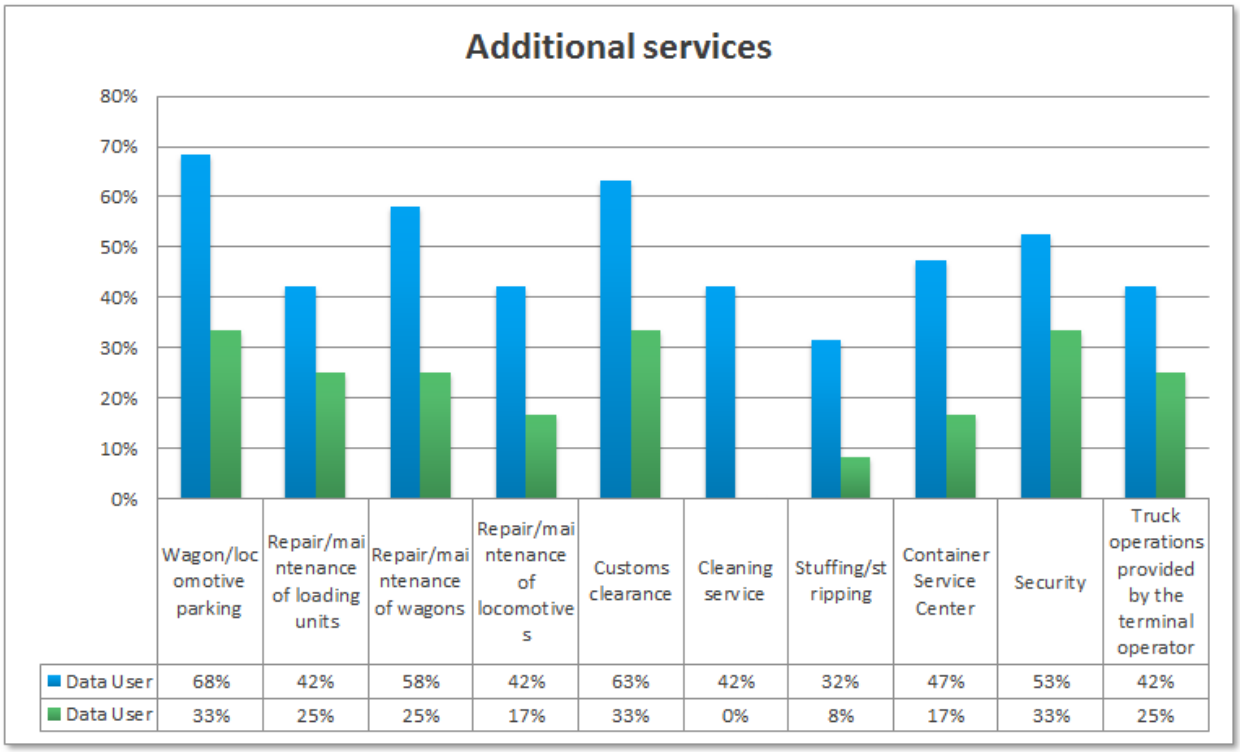


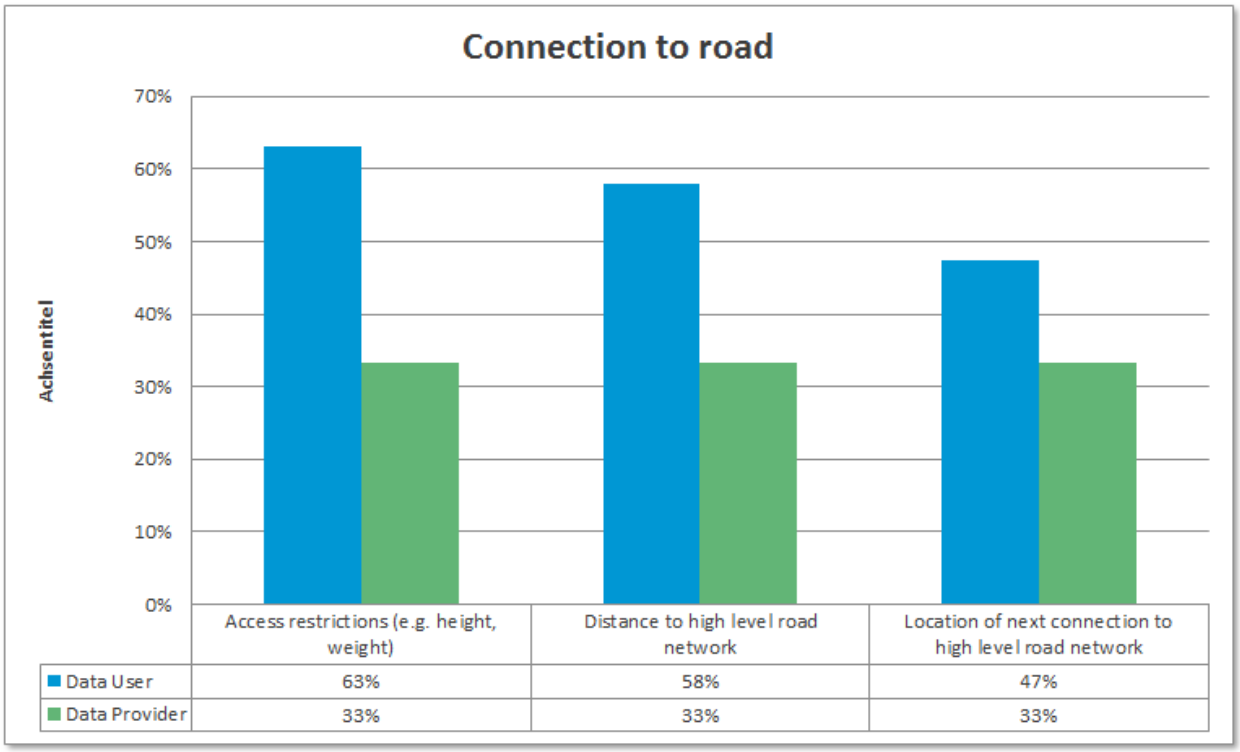
	Site/line in regular operation	Site/line out of operation	Site/line planned	Public/private	Opening times	Infrastructure available for booking/usage (time period)	Restrictions for usage (time, activities, commodities, gauge, license etc.)	Fees for track renting/usage	Fees for wagon parking/cargo storage
Data User	84%	47%	42%	68%	79%	68%	68%	53%	58%
Data Provider	50%	17%	8%	17%	42%	25%	17%	17%	17%



	Shunting engine/staff/service available	Rail service provider name	Rail service provider contact	Operation days/times for rail service	Block train loading/operation possible	Wagon group loading/operation possible	Single wagon loading/operation possible	Order deadline for rail service	Fees for wagon providing	Fees for rail service
Data User	74%	68%	74%	74%	79%	79%	79%	53%	47%	58%
Data Provider	50%	33%	33%	25%	50%	33%	33%	17%	17%	17%


Rail operation/service - long haul (associated to transfer station)
70%
60%
50%
40%
30%
20%
10%
0%
Regular long-haul rail service available
Rail service provider(s) name
Rail service provider(s) contact
Destinations
Frequency / Timetable
Operation days
LU/loading gauges accepted
Quality levels of rail service
Data User 58% 58% 53% 53% 47% 47% 32% 42%
Data Provider 25% 25% 25% 17% 17% 42% 17% 17%


Additional services
80%
70%
60%
50%
40%
30%
20%
10%
0%
Wagon/locomotive parking
Repair/maintenance of loading units
Repair/maintenance of wagons
Repair/maintenance of locomotives
Customs clearance
Cleaning service
Stuffing/stripping
Container Service Center
Security
Truck operations provided by the terminal operator
Data User 68% 42% 58% 42% 63% 42% 32% 47% 53% 42%
Data User 33% 25% 25% 17% 33% 0% 8% 17% 33% 25%


Connection to road
Achsentitel
70%
60%
50%
40%
30%
20%
10%
0%
Access restrictions (e.g. height, weight)
Distance to high level road network
Location of next connection to high level road network
Data User
63%
58%
47%
Data Provider
33%
33%
33%

Annex 5: Analysis of other information portals and websites

	Portal name	Source type	Relevant (yes/no), explanation	Portal promoter	Promoter type	Considered facilities	Geographical coverage (countries >regions)	Intermodal terminals	Railports / RLC	Stations with public sidings	Private sidings	Other	Other (explanation)
1	**Adif Logistic facilities**	GIS portal	Yes	Adif	Company	only facilities served or operated by company	>ES				x		
2	**Agora portal on Intermodal Terminals in Europe**	GIS portal	Yes	AGORA (KombiConsult)	Association	facilities served or operated by different companies	>AT >BE >BG >CH >CZ >DE >DK >ES >FR >GR >HR >HU >IT >LT >LU >LV >MK >NL >PL >RO >RS >SI >SK	x					
3	**BÖB member map**	GIS portal	Yes	BÖB	Association	facilities served or operated by different companies	>DE					x	Inland ports
4	**Interaktive KV Terminal Karte (Interactive map on intermodal terminals)**	GIS portal	Yes	DB Netz	Company	facilities served or operated by different companies	>AT >BE >BG >BY >CH >CZ >DE >DK >ES >FI >FR >GR >HR >HU >IT >LU >MK >NL >NO >PL >PT >RKS >RO >RS >RU >SE >SI	x					

	Portal name	Source type	Relevant (yes/no), explanation	Portal promoter	Promoter type	Considered facilities	Geographical coverage (countries >regions)	Intermodal terminals	Railports / RLC	Stations with public sidings	Private sidings	Other	Other (explanation)
							>SK >TR >UK						
5	**Interaktive Lade-stellenkarte (Interactive map on loading points)**	GIS portal	Yes	DB Netz	Company	facilities served or operated by different companies	>AT >CH >DE			x			
6	**Anlagenportal-Netz**	GIS portal	Yes	DB Netze	Company	only facilities served or operated by company	>DE			x			
7	**Freiladegleissuche (Team tracks)**	GIS portal	Yes	DB Schenker Rail	Company	only facilities served or operated by company	>DE			x			
8	**DB Schenker Railports and Rail Logistics Center Search**	GIS portal	Yes	DB Schenker Rail	Company	facilities served or operated by different companies	>AT >BG >CZ >DE >FR >GR >HU >IT >PL >RO >TR >UK		x				
9	**Timber loading point search (Holzverlade-bahnhofssuche)**	GIS portal	Yes	DB Schenker Rail	Company	only facilities served or operated by company	>DE			x			

	Portal name	Source type	Relevant (yes/no), explanation	Portal promoter	Promoter type	Considered facilities	Geographical coverage (countries >regions)	Intermodal terminals	Railports / RLC	Stations with public sidings	Private sidings	Other	Other (explanation)
10	**Green Cargo Network**	GIS portal	Yes	Green Cargo	Company	only facilities served or operated by company	>DK >NO >SE	x					
11	**Gleisanschluss Brandenburg**	GIS portal	Yes	Land Brandenburg	Public body	facilities served or operated by different companies	>DE (Brandenburg)			x	x	x	Inland ports
12	**Logistikportal Rheinland-Pfalz**	GIS portal	Yes	Land Rheinland-Pfalz	Public body	facilities served or operated by different companies	>DE (Rheinland-Pfalz)	x		x		x	Freight villages, inland ports
13	**Nederlandse Vereniging van Binnenhavens (NVB)**	GIS portal	Yes	Nederlandse Vereniging van Binnenhavens (NVB)	Association	facilities served or operated by different companies	>NL					x	Inland ports
14	**Antwerp Intraport Terminal Tool**	GIS portal	Yes	Port of Antwerp	Company	facilities served or operated by different companies	>BE (Antwerp)	x				x	also terminals suitable for convention al cargo listed

	Portal name	Source type	Relevant (yes/no), explanation	Portal promoter	Promoter type	Considered facilities	Geographical coverage (countries >regions)	Intermodal terminals	Railports / RLC	Stations with public sidings	Private sidings	Other	Other (explanation)
15	**CONTAINERZUG.DE**	GIS portal	Yes	Private portal run by Patrick Böttger, Karl Arne Richter und Georg Ringler	Private	facilities served or operated by different companies	>AT >BA >BE >BG >CH >CZ >DE >DK >ES >FI >FR >GR >HR >HU >IR >IT >LT >LU >LV >ME >MK >NL >NO >PL >PT >RO >RS >RU >SE >SI >SK >TR >UA >UK	x					
16	**Rail Scout**	GIS portal	Yes	Railcargo.nl	Company	facilities served or operated by different companies	>AT >BE >BA >CZ >DK >DE >FR >HU >IT >MK >NO >PO >RO >RU >SI >SK >ES >SE >CH >NL > TR	x		x		x	also conventional terminals
17	**SBB Cargo Bedien-punktsuche (Search of SBB Cargo service points)**	GIS portal	Yes	SBB Cargo AG	Company	only facilities served or operated by company	>CH >IT	x		x			
18	**Intermodal Map**	GIS portal	Yes	SGKV	Association	facilities served or operated by different companies	>AT >BA >BE >BG >CH >CZ >DE >DK >EE >ES >FI >FR >GR >HR >HU >IR >IT >LT	x					

	Portal name	Source type	Relevant (yes/no), explanation	Portal promoter	Promoter type	Considered facilities	Geographical coverage (countries >regions)	Intermodal terminals	Railports / RLC	Stations with public sidings	Private sidings	Other	Other (explanation)
							>LU >LV >ME >MK >NL >NO >PL >PT >RO >RS >RU >SE >SI >SK >TR >UA >UK						
19	**Trafikverket**	GIS portal	Yes	Trafikverket	Public body	facilities served or operated by different companies	>SE	x		x			
20	**TX LOGISTIK Netze**	GIS portal	Yes	TX LOGISTIK	Company	only facilities served or operated by company	>AT >DE >DK >IT >NL >NO >SE	x					
21	**UIRR terminal application**	GIS portal	Yes	UIRR	Association	facilities served or operated by different companies	>AT >BA >BE >BG >CH >CZ >DE >DK >ES >FI >FR >GR >HR >HU >IT >LU >MK >NL >NO >PL >PT >RO >RS >RU >SE >SI >SK >TR >UK	x					
22	**ASSOLOGISTICA website**	Website (no GIS)	Yes	Assologistica	Association	facilities served or operated by different	>IT					x	Port terminals, other logistics

	Portal name	Source type	Relevant (yes/no), explanation	Portal promoter	Promoter type	Considered facilities	Geographical coverage (countries >regions)	Intermodal terminals	Railports / RLC	Stations with public sidings	Private sidings	Other	Other (explanation)
						companies							facilities
23	**Cargo Sped Terminals**	Website (no GIS)	Yes	Cargo Sped	Company	only facilities served or operated by company	>PL	x	x				
24	**Cemat Intermodal Terminals**	Website (no GIS)	Yes	CEMAT	Company	only facilities served or operated by company	>BE >CH >DE >DK >ES >FR >GR > IT >LU > NL >NO >SE	x					
25	**DUSS Terminals**	Website (no GIS)	Yes	DUSS	Company	only facilities served or operated by company	>DE	x					
26	**EFIP website**	Website (no GIS)	Yes	EFIP	Association	facilities served or operated by different companies	>AT >BE >BG >CH >CZ >DE >ES >FR >GR >HR >HU >IT >LU >NL >PT >RO >SE >SK >UA					x	Inland ports
27	**Zugangsstellen zum Schienennetz für den Güterverkehr in Hessen (Documentation**	Website (no GIS)	Yes	Hessen Mobil	Public body	facilities served or operated by different companies	>DE (Hessen)	x		x	x		

	Portal name	Source type	Relevant (yes/no), explanation	Portal promoter	Promoter type	Considered facilities	Geographical coverage (countries >regions)	Intermodal terminals	Railports / RLC	Stations with public sidings	Private sidings	Other	Other (explanation)
	on rail freight access points in Hessia)												
28	**HUPAC Terminal Research**	Website (no GIS)	Yes	HUPAC	Company	only facilities served or operated by company	>AT >BE >CH >DE >DK >ES >HR >HU >IT >NL >NO >PL >RO >RS >RU >SE	x					
29	**ITALCONTAINER Spa**	Website (no GIS)	Yes	ITALCONTAINER Spa (controlled by Trenitalia)	Company	only facilities served or operated by company	>IT	x					
30	**Terminali Italia Terminals**	Website (no GIS)	Yes	Terminali Italia	Company	only facilities served or operated by company	>IT	x					
31	**Trenitalia Cargo Railway Network**	Website (no GIS)	Yes	Trenitalia Cargo	Company	only facilities served or operated by company	>IT					x	focussed on (transfer) stations
32	**UIR website**	Website (no GIS)	Yes	Unione Interporti Riuniti (UIR)	Company	facilities served or operated by different companies	>IT					x	Freight villages

	Portal name	Source type	Relevant (yes/no), explanation		Portal promoter	Promoter type	Considered facilities	Geographical coverage (countries >regions)	Intermodal terminals	Railports / RLC	Stations with public sidings	Private sidings	Other	Other (explanation)
33	**VDV Kooperationsbörse (VDV market place)**	Website (no GIS)	Yes		VDV	Association	facilities served or operated by different companies	>DE	x	x	x	x		
34	***Informationssys-tem Gleisanschluss Ruhr***	*GIS portal*	*No*	*abandoned*	*Projekt Ruhr GmbH*	*Not specified*	*Not specified*	*DE (NRW)*			*x*			
35	***Gleisanschluss Mittel-deutschland***	*GIS portal*	*No*	*abandoned*	*Ralf Jentges, Planungs-büro für Schienen-Logistik und Infrastruktur*	*Private*	*facilities served or operated by different companies*	*DE*	*x*		*(x)*			
36	***CRSC Service Plattform***	*GIS portal*	*No*	*Portal not related to LM infrastructure; contains information on services*		*Association*	*facilities served or operated by different companies*						*x*	

	Portal name	Source type	Relevant (yes/no), explanation		Portal promoter	Promoter type	Considered facilities	Geographical coverage (countries >regions)	Intermodal terminals	Railports / RLC	Stations with public sidings	Private sidings	Other	Other (explanation)
37	***ERFA Gleis-anschluss***	*Other source (no website)*	*No*	*Kind of association; no database*	*Fraunhofer IML Pz. Mobilität und Umwelt in Prien am Chiemsee; LKZ Prien; AnschlussBahnProfis*	*Association*	*facilities served or operated by different companies*	*DE (Bayern)*			*x*			
38	***Abandoning of rail infrastructure***	*Other source (not website)*	*No*	*Database of abandoned infrastructure*	*Eisenbahn-bundesamt (EBA)*	*Public body*	*Not specified*	*DE*				*x*		
39	***Assofer Portal***	*Website (no GIS)*	*No*	*Link does not work*	*ASSOFER*	*Association*	*facilities served or operated by different companies*	*IT*					*x*	
40	***Gleisanschluss.info (Offensive Gleisanschluss)***	*Website (no GIS)*	*No*	*Only information related to planning and funding of sidings;*	*DB Schenker Rail*	*Company*	*only facilities served or operated by company*	*DE*			*(x)*			

	Portal name	Source type	Relevant (yes/no), explanation		Portal promoter	Promoter type	Considered facilities	Geographical coverage (countries >regions)	Intermodal terminals	Railports / RLC	Stations with public sidings	Private sidings	Other	Other (explanation)
41	***Sachsenschiene***	*Website (no GIS)*	*No*	*Private website on infrastructure and rail vehicles with focus on historical details; due to private nature not suitable as regular data source*	*Jens Herbach (Private website)*	*Private*	*facilities served or operated by different companies*	*DE (Sachsen)*						
42	***Piattaforma logistica nazionale/National logistics platform***	*Website (no GIS)*	*No*	*Only services, no infrastructure*	*UIRnet spa*	*Company*	*facilities served or operated by different companies*	*IT*					*x*	
43	***Viacombi***	*Website (no GIS)*	*No*	*No access / no data*	*Viacombi project partners*	*Not specified*	*Not specified*	*Europe (?)*	*x*					

Annex 6: Working document regarding portal specifications (status: June 2015)

Contents

(1)Overview (start page)

Module	Remarks
Map	Colour scheme for facility type and area type
List	Terminal name, operator name
Search	

Specifications/Remarks:

- Interactive update between search results and map/list
- Fast reaction times / good performance necessary ("user friendliness")
- Idea: Position search and list on one side to enable free view on map

(2)Search/Filter module

Overview

Criterion	Type	Basic / Advanced search	Remarks
Opening times	Filter		
Facility type	Filter	Basic	
Area type	Filter	Advanced	
Rail Freight	Filter	Advanced	

Corridor			
Mode	Filter	Advanced	
Location	Search	Basic	Zip code area or location + radius
Loading unit / Cargo type 1	Filter	Advanced	
Loading unit / Cargo type 2	Filter	Advanced	
Services	Filter	Advanced	
Free text	Search	Basic	

Specifications/Remarks:

- For each filter with check boxes integrate possibility to select/delete ALL items
- Search results are added within each criterion e.g. if facility intermodal terminal and railport is selected, both types are displayed in list and map
- Search results are filtered between different criteria e.g. facility type / intermodal terminal and area type inland port is selected means that only intermodal terminals that are located in an inland port are displayed

Details – search/filter criteria

Opening days

Information content (check boxes)	**Remarks**
Monday-Friday	
Saturday	
Sunday	
On demand	

Facility type

Information content (check boxes)	Map colour
Intermodal terminal	Blue
Railport / Rail logistics centre	Green
Station with public siding	Yellow
Private siding	Red
Other / Not specified	Grey

Area type

Information content (check boxes)	Map colour
Sea port	Blue
Inland port	Blue
Freight village	Red
Other / Not specified	Grey

Rail Freight Corridor

Information content (check boxes)	Remarks
RFC1	
RFC2	
RFC3	
RFC4	

RFC5
RFC6
RFC7
RFC8
RFC9
Other / Not specified

Mode

Information content (check boxes)	**Remarks**
Rail	Pre-selected; cannot be skipped
Road	Pre-selected
Sea freight	
Inland waterways	
Other / Not specified	

Location

Information content (check boxes)	**Remarks**
Country	
City or Zip code (area)	Partial zip code areas or exact zip code / city + radius
Radius	Slide or classes (0, 5, 10, 20, 30, 50, 100, 200km)

Loading unit

Information content (check boxes)	Remarks
Container	
Swap body	
Trailer	
Truck+trailer (RoLa)	
Conventional cargo	

Cargo type

Information content (check boxes)	Remarks
Palletised goods	
Bulk	
Dangerous goods	
Wood	
Heavy loads	
Reefer	
Other / Not specified	

Services

Information content (check boxes)	Remarks
Wagon/locomotive parking	

Container repair/maintenance

Wagon repair/maintenance

Locomotive repair/maintenance

Cleaning service

Stuffing/stripping

Trucking

Other / Not specified

Free text

(3)Facility details

Overview

Information groups (Subpages)	Remarks
Basic data	Base data (Terminal name, contact data, modes, loading units, opening times) + Reduced overview map (idea) + Satellite picture of area (e.g. Google – possible?)
Infrastructure / equipment	
Loading units / cargo types	
Services	Idea: display services to be entered by service providers
Links	Rename "sources"; we should show all possible links that may provide additional information for specific facility

Specifications/Remarks:

- Details of selected facility shall be displayed in dedicated subpages (layout similar to Agora portal)
- Detailed data sets will be specified for each facility type (differences regarding facility layout/features, focussed rail production types and information needs)

Details – sub pages

Basic data

Information content	Remarks
Name of facility	
Facility operator	
Contact person	

Phone	
Fax	
Email	
Website	
Opening times	Selected from the filters
Modes	Selected from the filters
Loading units	Selected from the filters
Reduced overview map	
Satellite picture of area	

Infrastructure/ equipment

Rail infrastructure - loading track information

Information content (check boxes)	**Remarks**
Number of loading tracks	
Min. loading track length [m]	
Max. loading track length [m]	
Total loading track length [m]	

Rail infrastructure - general track information

Information content (check boxes)	**Remarks**
Total number of tracks	

Number of electrified tracks
Min. track radius
Max. axle load

Equipment

Information content (check boxes)	**Remarks**
Number of gantry cranes	
Number of mobile cranes	
Brake test facility	
Track scale	
Storage area [m^2]	
Storage area [TEU]	
Head/ side ramp	

Services (selected from the filters)

Information content (check boxes)	**Remarks**
Wagon/locomotive parking	Including additional information, e.g. contact data of the service provider..
Container repair/maintenance	Including additional information, e.g. contact data of the service provider..
Wagon repair/maintenance	Including additional information, e.g. contact data of the service provider..
Locomotive repair/maintenance	Including additional information, e.g.

	contact data of the service provider..
Cleaning service	Including additional information, e.g. contact data of the service provider..
Stuffing/stripping	Including additional information, e.g. contact data of the service provider..
Trucking	Including additional information, e.g. contact data of the service provider..
Other	Including additional information, e.g. contact data of the service provider..

Link

Information content (check boxes)	**Remarks**
Link	Links that may provide additional information for the specific facility

Annex 7: Screening of suitable organisations for 'portal operator' role

Organisation	Justification
ERA	• European Railway Agency (succeeded by European Union Agency for Railways since 16 June 2016) • Expertise/knowledge in the field of rail transport and especially in related technical and EU legislation matters. • ERA is experienced in developing and maintaining registers and databases for the railway market including systems with GIS functionalities. • ERA has proven experience having and maintaining interfaces for data exchange, for instance the local instance in ERA of the TAF-CRD (replication of TAF centralized registers) hosted by RNE or the European Centralised Virtual Vehicle Register (ECVVR) . • ERA is operator of the European register for Infrastructure (RINF) and would therefore be able to facilitate harmonisation of data structures as well as coordination with RINF deployment. • ERA has already in place a proven network of information sources composed of the RINF-NREs (entities nominated at national level in charge of setting up and maintaining its register of infrastructure) and the TAF-NCPs (National Contact Points). • Based on the transparency principle, ERA as a neutral institution ensures a non-monopolistic use of the data granting access to different actors. • ERA announced their willingness in taking over the operator role of a permanent portal.
RNE	• European umbrella organisation for railway Infrastructure Managers and Allocation Bodies; RNE aims at enabling a fast and easy access to European rail (infrastructure), as well as to increase the quality and efficiency of international rail traffic. • Expertise/knowledge in the field of rail transport and specifically of intermodal transport. • Experience as database manager and IT system operator (e.g. PCS, TIS, CIS). • Leader of the IM cluster within the TAF/TAP TSI project organisation; manager of the CRD database as part of the TAF-TSI common components. • Service provider and expert support provider for RFC organisations in the areas of developing methods and processes, and developing and operating tools, specifically the RFC customer information platforms (CIP). • RNE announced their interest in supporting the setup of a permanent portal for last-mile infrastructure information and linking the system to the CIPs.
UIC	• Worldwide international organisation of the railway sector including 197 members across all 5 continents; the membership network comprises especially integrated railway companies, infrastructure managers, railway operators and intermodal operators; focus of the activities are on strategic and technical issues. • Expertise/knowledge in the field of rail transport. • Experience in e-freight issues and data exchange standards e.g. as initiator and coordinating organisation of the TAF/TAP-TSI framework. • Experience as database manager (e.g. DIUM, ENEE). • Experience as a consortium coordinator for different European projects and initiatives (e.g. Marco Polo, EU framework programmes). • UIC is consortium partner in the study regarding "User-friendly access to information about last-mile infrastructure for rail freight" (MOVE/B2/827-2013) and announced their interest in supporting the setup of a permanent portal for last-mile infrastructure information.
UIRR	• Acknowledged European sector organisation for intermodal road-rail transport; the membership network comprises intermodal operators as well as terminal operators. • Expertise/knowledge in the field of rail transport and specifically of intermodal transport. • Experience as database manager and portal operator (e.g. previous UIRR terminal database, ILU code, CESAR). • Experience as a consortium coordinator for different European projects and initiatives (e.g. Marco Polo, EU framework programmes). • The provision of infrastructure information related to terminals is also a task within the RFC customer information platforms (CIP). UIRR is the designated spokes organisation for the terminal advisory groups of all European rail freight corridors (RFC). • UIRR announced their willingness in taking over the operator role of a permanent portal and care taker role for last-mile infrastructure information related to intermodal transport.

Source: HaCon

Annex 8: Screening of suitable organisations for 'care taker' role

Organisation	Justification	Focus				
		Private Sidings	Public Sidings	Railport	Intermodal Terminal	Countries
CER	• Community of European Railway and Infrastructure Companies (CER) • Potential data collector role refers to served rail freight stations of CER members and related public/private sidings.		x			Europe
EIM	• European Rail Infrastructure Managers (EIM), established in 2002, promotes the interests of all rail infrastructure managers in the EU and the EEA. • Potential care taker role for all types of rail freight transhipment points (e.g. exploiting information from network statements of EIM members)		x	x	x	Europe
ERFA	• European Rail Freight Association (ERFA) represents new entrants in rail freight especially rail freight operators and national rail freight associations. • Potential care taker role for all types of rail transhipment points. • Potential data collector role refers to service points (stations) of ERFA members and related rail transhipment points (mainly private sidings and railports)	x		x		Europe
RNE	• Also listed as potential portal operator (see previous table) • Potential care taker role for all types of rail freight transhipment points (exploiting information e.g. from RFC terminal advisory groups and network statements of RNE members)	(x)	x	x	x	Europe
SGKV	• Studiengesellschaft für den Kombinierten Verkehr e.V. (SGKV; EN: German Promotion Centre for Intermodal Transport); some 100 member terminal operators, universities and haulage companies. • Operator of the web portal 'Intermodal Map', a comprehensive database of intermodal terminals in Europe. • Potential care taker role for intermodal transport (intermodal terminals and partially railports).				x	DE / Europe
UIC	• Also listed as potential portal operator (see previous table) • Potential care taker role for all types of rail freight transhipment points. • Potential data collector role refers to served rail freight stations of UIC members and related public/private sidings.		x			Global / Europe
UIRR	• Also listed as potential portal operator (see previous table) • Potential care taker role for intermodal transport (intermodal terminals and				x	Europe

Organisation	Justification	Focus				
		Private Sidings	Public Sidings	Railport	Intermodal Terminal	Countries
	partially railports).					
Xrail	• Xrail is the production alliance for single wagonload transport • Potential care taker role for LM infrastructure related to conventional rail transport (private sidings, public sidings, railports) • Potential data collector role refers to service points (stations) of Xrail partners and related public/private sidings	x	x	x		Europe

Source: HaCon

Annex 9: Screening of suitable organisations for 'data collector' role – international focus and sector specific

Organisation	Justification	Focus				
		Private Sidings	Public Sidings	Railport	Intermodal Terminal	Countries
AGORA	• Terminal Interest Group AGORA; members represent intermodal terminals for either continental and/or container hinterland services. • Operator of the AGORA 'Intermodal Terminals' web portal, providing information on roughly 300-400 intermodal terminals throughout Europe. • Potential data collector role refers to intermodal terminals.				x	Europe
CEFIC	• The European Chemical Industry Council (CEFIC) represents national industry federations and some 700 members all over Europe. • Potential data collector role refers to (public & private) rail sidings relevant for rail-borne chemistry logistics.	x	x			
CEPI	• Confederation of European paper industries (CEPI) facilitates cooperation of whole forest and paper chain; CEPI members are national associations from 18 European countries. • Potential data collector role refers to (public & private) rail sidings relevant for rail-borne forestry logistics.	x	x			
ESC	• European Shippers' Council; members include transport user organisations/shippers' councils and European commodity trade associations. • ERA recognised stakeholder. • Potential data collector role refers to private sidings of ESC members	x				Europe
ECG	• Association of European Vehicle Logistics represents around 100 leading vehicle logistics companies from 27 countries across Europe • Potential data collector role refers to road-rail transhipment sites for finished cars.	x	x			
EFIP	• European federation of inland ports (EFIP); members contain more than 200 inland ports and port authorities in 18 countries of the European Union, Moldova, Switzerland and Ukraine • Potential data collector role refers to (public & private) rail sidings in inland ports.	x	x			Europe
ESPO	• European Sea Ports Organisation (ESPO); members contain port authorities, port administrations and port associations of the seaports of the European Union and Norway • Potential data collector role refers to (public & private) rail sidings in sea ports.	x	x			Europe

Organisation	Justification	Focus				
		Private Sidings	Public Sidings	Railport	Intermodal Terminal	Countries
EUROFER	• European Steel Association; members are steel companies and national steel federations throughout the EU + Switzerland and Turkey as associate members. • Potential data collector role refers to (public & private) rail sidings relevant for rail-borne steel logistics.	x	x	x		
EUROPLATFORMS	• European Association of Freight Villages and Logistics Centres; members contain national associations and individual logistics platforms. • Potential data collector role for intermodal terminals at facilities of Europlatforms members				x	Europe
IBS	• International Rail Freight Business Association (IBS) represents forwarders and rail operators; founded as a national organisation in Germany the organisation is now focussing entire Europe • IBS promotes new organisation forms of wagonload transport based on the 'Railport' concept • Potential data collector role for railports			x		DE / Europe
RFC EEIGs	• Europe-wide there are 9 RFC with one organisation (EEIG) each; coordination by RNE. • Potential data collector role refers to intermodal terminals via respective terminal advisory groups. • Linking with CIP is recommended and may be facilitated in coordination with RNE.				x	Europe

Source: HaCon

Annex 10: Screening of suitable organisations for 'data collector' role – national focus (selection non-exhaustive)

Organisation	Justification	Focus				
		Private Sidings	Public Sidings	Railport	Intermodal Terminal	Countries
VABU(WKÖ)	• Verband der Anschlussbahnen in Österreich (VABU) organised under the roof of the Austrian chamber of commerce (WKÖ) • Has elaborated a register for rail sidings and related owners/operators (Anschlussbahnverzeichnis) • Potential data collector role refers to public/private sidings and railports of VABU/WKÖ members	x		x		AT
BeWag	• Belgian Wagon Association (BeWag); members are keepers and users of railcars (Railways Undertakings), maintenance workshops, also several industrial companies. • Potential data collector role refers to facilities of BeWag members.	x	x	x		BE
VAP / Cargo Rail Europe	• VAP represents about 300 enterprises of the shipping industry and logistics in Switzerland, Germany, Italy, Poland, Austria and France • Regular member questionnaires regarding existing rail sidings. • Cargo Rail Europe is connected to VAP and has been expanded from the International Association of Sidings' Owners (AIEP/IVA).	x		x		CH (+DE, IT, PL, AT, FR)
SZS	• Sdružení železničních společností (SZS; EN: Association of Czech railway companies); represents all railway operators in CZ apart from the incumbent operator Czech Railways. • Potential data collector role refers to facilities of SZS members.	x		x	x	CZ
VDV	• Verband Deutscher Verkehrsunternehmen (VDV); members are German rail infrastructure managers (other than DB) and transport operators. • Facilitates an own database (VDV marketplace) of different types of rail freight services and infrastructure • Potential data collector role refers to service points (stations) of VDV members and related private/public sidings or railports.	x	x	x		DE
Objectif OFP	• French association of rail freight short line operators (OFP; FR: Operateurs Ferroviaire de Proximité)	x		x		FR
Hungrail	• Hungarian Rail Association	x	x	x	x	HU
Assologistica	• Italian association of logistics enterprises; totally 250 members including warehouse operators, port terminal operators and freight villages.	x		x	x	IT
FerCargo	• FerCargo is an association composed by twelve private Railway undertakings that operate in rail freight market. • Potential data collector role refers to	x	x	x	x	IT

Organisation	Justification	Focus				
		Private Sidings	Public Sidings	Railport	Intermodal Terminal	Countries
	facilities of BeWag members.					
UIR	• Unione Interporti Riunti, association of Italian freight villages ('Interporti').				x	IT
Railcargo NL	• Rail Cargo Information Netherlands is the information centre for rail freight transport in the Netherlands. • Operator of t web information portal 'railcargo.nl' regarding terminals(NL hinterland) and sidings (NL only)	x	x	x	x	NL (+other)
IGTL	• IZBA GOSPODARCZA TRANSPORTU LĄDOWEGO (IGTL; EN: Polish Commercial Chamber of Land Transport). • Member of ERFA	x				PL
Club Feroviar	• Club Feroviar is a Romanian rail association representing both passenger and freight operators. • Provider of online communication and information platform 'clubferoviar.ro' that is dedicated to Romanian rail transport.	x	x	x	x	RO
ASTOC	• Association of Swedish Train Operating Companies - ASTOC (Branschföreningen Tågoperatörerna)		x	x	X	SE
Rail Freight Group	• Rail Freight Group (RFG) is the leading representative body for rail freight in the UK; members include ports, terminal operators, property developers, equipment suppliers and support services. • Potential data collector role refers to all types of rail transhipment points of RFG members	x	x	x	x	UK
SEETO	• South-East Europe Transport Observatory	x	x	x	x	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