

Reference data

Telematics TSI - Technical document - 103

Version 4.0

Table of content

A	Document management	8
A.1.	Document properties.....	8
A.2.	Change management.....	8
A.3.	Configuration management.....	8
A.4.	Availability.....	8
A.5.	Application and actors in the scope.....	8
A.6.	Document history	9
B	Acronyms, definitions and external references.....	10
B.1.	Acronyms	10
B.2.	Definitions.....	11
B.3.	External references	11
0	Document management	13
1	Acronyms, definitions and external references.....	14
2	Scope, purpose and objectives	15
2.1	Scope.....	15
2.2	Purpose	15
2.3	Objectives	16
2.4	References	16
3	Common elements across reference data.....	17
3.1	Use cases.....	17
3.2	Data accessibility and enquiries.....	17
3.2.1	Data dump (bulk download)	17
3.3	Data security and access rules and rights.....	17
3.4	Archival requirements.....	18
4	Location codes	19
	Definitions.....	19
4.1	Location.....	19
4.1.1	Location types.....	19
4.1.1.1	Location primary code (Primary Location Code)	19
4.1.1.2	Location subsidiary code (Subsidiary Location Code).....	19
4.1.2	Functions of organisations/companies and their hierarchical positions	20
4.1.2.1	Allocation (assigning) Authority – role.....	22
4.1.2.2	Company - entity.....	22
4.1.2.3	Freight customer - actor	23
4.1.2.4	Intermodal transport operator - actor.....	23
4.1.2.5	Coordinating infrastructure manager - actor	23
4.1.2.6	Declaring Railway Undertaking - actor	23
4.1.2.7	Infrastructure Manager Partner - actor	23
4.1.2.8	Infrastructure Manager – actor	23
4.1.2.9	Keeper - actor	23
4.1.2.10	Lead railway undertaking - actor	23

4.1.2.11	Responsible railway undertaking - actor	24
4.1.2.12	Railway undertaking - actor	24
4.1.2.13	Responsible infrastructure manager - actor	24
4.1.2.14	Next responsible infrastructure manager – actor	24
4.1.2.15	Next responsible railway undertaking – actor	24
4.1.2.16	Previous responsible railway undertaking – actor.....	24
4.1.2.17	Receiving railway undertaking - actor	24
4.1.2.18	Carrier – actor	24
4.1.2.19	Section carrier - actor	25
4.1.2.20	Sending railway undertaking - actor	25
4.1.2.21	Central administration service - actor	25
4.1.2.22	Distributor - actor	25
4.1.2.23	Station Manager - actor	25
4.1.2.24	Retailer - actor	25
4.1.2.25	Issuer - actor	25
4.1.2.26	Ticket Control Organisation - actor.....	25
4.1.2.27	Third-party Information Aggregator - actor.....	25
4.1.2.28	Service Facility Operator - actor	26
4.2	Location codes user profiles	27
4.3	Location primary code - use cases	28
4.3.1	Submission of existing location primary codes.....	28
4.3.2	Submission of new location primary codes	29
4.3.3	Submission of amendments/deletions (logical closure) of location primary codes	29
4.3.4	Enquiries to the reference dataset	30
4.4	Process requirements	31
4.4.1	Populating the database	31
4.4.1.1	Propose existing location primary codes	31
4.4.1.2	Validate existing codes within country	31
4.4.1.3	Input existing location primary codes.....	31
4.4.1.4	Submit Request for new location primary code	32
4.4.1.5	Validate Submission of Request by ERA (Allocation Authority).....	32
4.4.1.6	Input the new location primary code	32
4.4.2	Amendments to, or deletion of, location primary codes	32
4.4.2.1	Submit request for amendment to, or deletion of, location primary codes	32
4.4.2.2	Validate submission of request by ERA	32
4.4.2.3	Input the amendment to or deletion of location primary codes.....	32
4.4.3	Enquiry	32
4.5	Location subsidiary code use cases	33
4.5.1	Submission of existing location subsidiary codes	33
4.5.2	submission of new location subsidiary code	33
4.6	Amendment/deletion of location subsidiary code	34
4.6.1	Location subsidiary code process requirements	34

4.6.2	Populating the database	34
4.6.2.1	Propose existing codes.....	34
4.6.2.2	Validate existing codes	34
4.6.2.3	Input existing codes	34
4.6.2.4	Submit Request for new LocationSubsidiaryCode.....	35
4.6.2.5	Validate Submission of Request.....	35
4.6.2.6	Input the new location subsidiary code.....	35
4.6.3	Amendments to or deletion of location subsidiary codes.....	35
4.6.3.1	Submit Request for amendment to or deletion of location subsidiary code	35
4.6.3.2	Validate Submission of Request.....	35
4.6.3.3	Input the amendment to or deletion of location subsidiary codes.....	35
4.7	Archival requirements.....	35
4.8	Data security and access rules and rights	35
4.8.1	Location dataset data requirements.....	35
4.9	Location file subsidiary codes and responsibilities for their maintenance.....	36
4.10	Location code for retail locations	39
4.10.1	Coding Principles.....	39
4.10.1.1	Numeric Country code	39
4.10.1.2	Code Structure	40
4.10.2	Process for retail location code allocation.....	40
4.11	Location data detailed data requirements	40
5	Organisation codes reference dataset.....	42
5.1	Organisation codes	42
5.2	User management	42
5.2.1	User roles and permissions.....	42
5.2.2	Authorisation workflow	42
5.3	Organisation code - use cases.....	43
5.3.1	Company identification function	43
5.3.2	Enquiries to the reference data	43
5.4	Process requirements	45
5.4.1	Populating the database	46
5.4.1.1	Request to validate an existing RICS code	46
5.4.1.2	Request to get a new organisation code	46
5.4.1.3	Validation of the submitted requests	46
5.4.2	Enquiry	46
5.5	Archival requirements.....	46
5.6	Organisation code data requirements	46
6	Keepers' rolling stock reference databases (RSRD)	47
6.1	Introduction	47
6.2	Roles and responsibilities	47
6.3	Functional requirements specifications.....	47
6.3.1	Administrative data.....	47
6.3.2	Design data	48

6.3.3	Users of rolling stock data.....	48
6.3.3.1	"ALLOCATIONAUTHORITY" actor	49
6.3.3.2	"CENTRALADMINSVC" actor	49
6.3.3.3	"COMPANY" actor	49
6.3.3.4	"INFRASTRUCTUREMANAGER" actor	49
6.3.3.5	"KEEPER" actor.....	49
6.3.3.6	"NOTIFIEDBODY" actor	50
6.3.3.7	"NEXTRESPONSIBLERU" actor.....	50
6.3.3.8	"RAILWAYUNDERTAKING" actor.....	50
6.3.3.9	"RESPONSIBLERU" actor	50
6.3.3.10	"ROLLINGSTOCKACTOR" actor.....	51
6.3.3.11	"SERVICEFACILITYOPERATOR" ACTOR	51
6.3.3.12	"SUPERVISINGBODY" actor	51
6.3.3.13	"OTHERACTOR" actor.....	51
6.3.3.14	"ECM" actor	51
6.4	Data use	51
6.5	Use cases for processes	51
6.5.1	Creation, modification and deletion processes	52
6.5.1.1	Record Creation	52
6.5.1.2	Record Modification	52
6.5.1.3	Record Deletion	52
6.5.2	Enquiry use case for the rolling stock reference data	52
6.5.3	Data security, access rules and rights	52
6.5.4	RollingStockDataSetQueryMessage to RSRD	54
6.5.5	RollingStockDataSetQueryMessage Enquiry	54
6.5.5.1	Validation of User Access Rights by RSRD.....	55
6.5.5.2	RollingStockDatasetMessage Response from RSRD	55
6.6	Reference to external systems	55
6.6.1	European Vehicle Register	55
6.6.2	Operational data	55
6.7	Non-functional requirements	56
6.7.1	System integrity and security ([4 & 5], chapter 4.2.11.3).....	56
6.7.1.1	Authentication	56
6.7.1.2	Security	56
6.7.1.3	Consistency	56
6.7.1.4	Access Control.....	56
6.7.1.5	Tracing.....	56
6.7.1.6	Lock strategy	56
6.7.1.7	Multiple Access	57
6.7.1.8	Reliability.....	57
6.7.1.9	Availability.....	57
6.7.1.10	Maintainability.....	57

6.7.1.11	Compatibility.....	57
6.7.1.12	Import facility.....	57
6.7.1.13	Export facility	57
6.7.1.14	Mandatory Fields	57
6.7.1.15	Plausibility Checks.....	57
6.7.1.16	Response times.....	57
6.7.1.17	Performance aspects	57
6.7.1.18	Capacity aspects.....	57
6.7.1.19	Backup strategy.....	57
6.8	Interfaces specific to rolling stock	58
6.8.1	Technical interface.....	58
6.8.2	Human-Computer Interface (HCI).....	59
6.9	Keeper's rolling stock data requirements.....	59
6.10	Rolling Stock Data – Detailed Data Requirements.....	59
7	The single centralised intermodal loading unit reference database (ILURD)	60
7.1	Definitions	60
7.2	Functional requirements specifications.....	60
7.2.1	Requirements according to telematics TSI	60
7.2.2	Users of intermodal loading unit data	60
7.2.2.1	"ILURD ADMINISTRATOR" ACTOR.....	60
7.2.2.2	"COMPANY" ACTOR	60
7.2.2.3	"COMPETENT AUTHORITY" ACTOR.....	60
7.2.2.4	"KEEPER" ACTOR	61
7.3	Use cases for processes	61
7.3.1	Creation, modification and deletion processes	61
7.3.1.1	Record Creation	61
7.3.1.2	Record Modification	61
7.3.1.3	Record Deactivation.....	61
7.3.2	ENQUIRY USE CASE FOR THE ILURD.....	61
7.3.3	Data security, access rules and rights	62
7.4	Technical requirements	63
7.4.1	System integrity and security.....	63
8	Common requirements for all Reference datasets.....	65
8.1	Physical security requirements	65
8.2	System reliability	65
8.3	Backup/recovery	65
8.4	Scheduled maintenance.....	65
8.5	Multiple access and lock strategy	65
8.6	Data quality	65
8.6.1	Prerequisite.....	65
8.6.2	Level 1 compliance checking.....	66
8.6.3	Level 2 application validation	66
8.7	Interfaces	66

8.7.1	Technical interface.....	66
8.7.2	Human-Computer Interface (HCI).....	66
8.7.2.1	Manual Inputs	67
8.8	Change management.....	67
8.9	Technical requirements	67
8.10	System testing and acceptance	67

A Document management

A.1. Document properties

- File name: ERA_TD_103.docx
- Subject and document type: Telematics TSI - Technical document - 103
- Author: European Union Agency for Railways
- Version: 4.0

A.2. Change management

Updates to this technical document shall be subject to Change Control Management procedure managed by the Agency pursuant:

- the applicable requirements in the reference TSI
- Art. 23(2) of the Agency Regulation

If necessary, working groups are created in line with Art. 5 of the Agency Regulation.

A.3. Configuration management

A new version of the document will be created if new changes are considered following the Change Control Management Process led by ERA.

More specifically:

- if there is a change in the requirements which influences the implementation
- if information is added to or deleted from the technical document
- adding test cases to the field checking in messages or databases.

Modifications will have to be highlighted, so they can be easily identified.

Disclaimer:

Specific legal references to technical documents and legal acts shall be revised after the enter into force of the Telematics TSI. In some sections this text can be highlighted.

A.4. Availability

The version in force of this document is available on Agency's Gitlab repository. Any printed copy is uncontrolled.

A.5. Application and actors in the scope

Date of entry into force of reference TSI.

This document applies to all the actors in the scope of the reference TSI.

A.6. Document history

Table 1 - Document history

<i>Version</i>	<i>Date</i>	<i>Comments</i>
1.0	25.01.2011	Initial version
1.1	15.05.2012	Removal of xml elements and incorporation of new elements according to ERA TAF CCM Board agreements (03.05.2012).
1.1	15.05.2012	Chapter 2.18 has been modified. Chapters 2.19, 2.20 and 2.21 have been deleted.
1.1	15.05.2012	This chapter has been removed.
2.0	08.08.2013	All the chapters were revised due to the TAF TSI Revision Process and the TAF TSI CCM WP cycle 2012 – 2013.
2.0	17.10.2013	Validated by the ERA TAF CCB on 11.09.2013
2.1	10.02.2015	New definition of RSRD database(s), new control access mechanism to retrieve data from RSRD and exchange of data between RSRD and WIMO. Endorsed by ERA TAF TSI CCM Board. Published on 18.03.2018
2.5	27.05.2020	Validated by the ERA TAF CCB on 27.05.2020
3.0	15.6.2022	Introduction of chapter 4 concerning the ILU database
4.0	XX.XX.2024	New structure for references files for RU/IM and retail and input from the revised Telematics TSI.

B Acronyms, definitions and external references

B.1. Acronyms

Table 2 – Acronyms

Acronym	Full text
API	Application Programming Interface
CAS	Central Administration Service
CCB	Change Control Board
CCM	Change Control Management
CR	Change Request
EC	European Commission
EN	European Norm
ENEE	European Railway Location Database
ERA	European Union Agency for Railways also called “the Agency”
ERADIS	Interoperability and Safety database managed by the European Union Agency for railways
ERATV	European Register of Authorised Types of Vehicles
EVR	European Vehicle Register
EU	European Union
FRS	Functional Requirements Specification
IC	Interoperability Constituent
HCI	Human Computer Interface
IM	Infrastructure Manager
INF	Infrastructure
ILU	Intermodal Loading Unit
ILURD	Intermodal Loading Unit Reference Database
ISO	International Organisation for Standardisation
OC	Organisation Code
OCR	Organisation Code Register
OSJD	Organisation for Co-operation between Railways
PLC	Primary Location Code
RICS	Railway Interchange Coding System
RINF	Register of Infrastructure
RSRD	Rolling Stock Reference Database
RU	Railway Undertaking
SLA	Service Level Agreement
SLC	Subsidiary Location Code
SRM	Stakeholder Relationship Management Tool
TAF	Telematics Applications for Freight
TAP	Telematics Applications for Passenger
TD	Technical Document
TSI	Technical Specification for Interoperability
UIC	International Union of Railways (Union Internationale des Chemins de Fer)

WIMO	Wagon and Intermodal Unit Operating Database
WP	Working Party

B.2. Definitions

Terms contained in this document are defined in the ERA Ontology.

B.3. External references

The referenced documents listed in **Error! Reference source not found.** are indispensable for the application of this document:

- For dated references, only the edition cited applies;
- For undated references, if any, the latest edition of the referenced document (including any amendments) applies.

Table 3 - Reference document

<i>Id</i>	<i>Title</i>	<i>Doc ID, Edition</i>	<i>Date</i>	<i>Author/ Publisher</i>
1.	Directive 2012/34/EU of The European Parliament and of The Council establishing a single European railway area.	Directive 2012/34/EU	21/11/2012	EC
2.	DIRECTIVE (EU) 2016/797 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 11 May 2016 on the interoperability of the rail system within the European Union (Recast)	Directive (EU) 2016/797	11/06/2016	EC
3.	COMMISSION IMPLEMENTING REGULATION (EU) 2019/773 of 16 May 2019 on the technical specification for interoperability relating to the operation and traffic management subsystem of the rail system within the European Union and repealing Decision 2012/757/EU	COMMISSION IMPLEMENTING REGULATION (EU) 2019/773	16/05/2019	EC
4.	Technical Specification for Interoperability subsystem« Telematic Applications	COMMISSION REGULATION (EU) No xxxx/2025 of xx June 2025		EU
5.	Telematics TSI TD-100 Figures and Sequence Diagrams of the TAF TSI Messages	ERA_Technical_Document_TD-100.pdf	10/06/2025	ERA
6.	Telematics TSI TD-103 Reference files	ERA_Technical_Document_TD-103.pdf	10/06/2025	ERA
7.	Telematics TSI TD-104 Common Interface	ERA_Technical_Document_TD-104.pdf	10/06/2025	ERA
8.	Telematics TSI TD-105 Data and Message Model	ERA_Technical_Document_TD-105.pdf	10/06/2025	ERA
9.	Codes for the Representation of Names of Countries and their Subdivisions - Part 1: Country Codes Definitions and Abbreviations.	ISO 3166-1	2020	ISO

10.	ERA Ontology - Link	Version 4.0.0.	10/06/2025	ERA
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0 Document management

(Empty, see Chapter A and B above)

1 Acronyms, definitions and external references

(Empty, see Chapter A and B above)

2 Scope, purpose and objectives

2.1 Scope

The scope of this document, required by the Telematics TSI – Appendix C Index [103], includes the following elements:

- Common Reference Data
 - Location reference dataset:
 - Primary Location Codes (PLC)
 - Retail Location Codes (RLC)
 - Subsidiary Location Codes (SLC)
 - Organisation reference dataset:
 - Organisation Codes (OC)
- Freight-specific reference data:
 - Rolling Stock Reference Database (RSRD)
 - Intermodal Loading Unit (ILU).

Please note that RSRD and ILU Reference Database are content of this TD but are not Reference datasets.

When a PLC (or SLCs) is requested for a non-EU country, special attention will be paid that this domain is governed by other railway organisations (such as UIC or OSJD). This means that regular coordination with those organisations must take place as to ensure the uniqueness of the newly attributed PLCs (or SLC) which are the result of above request.

When an Organisation Code is requested for an organisation from a non-EU country, special attention will be paid that this domain is governed by other railway organisations (such as UIC or OSJD). This means that regular coordination with those organisations must take place as to ensure the uniqueness of the newly attributed OC which are the result of above request. Even organisations that hold a UIC RICS Code must obtain an ERA Organisation Code if they interact with ERA registers. ERA will allocate an Organisation Code that matches their UIC RICS Code.

The intended audience for these reference datasets is anyone who is involved in the rail transportation chain and who is defined in any message prescribed in the Telematics-TSI, to all Service Providers (e.g. IMs, RUs, ticket vendors, Logistic providers, Fleet managers and also the broader public).

It will be used to unequivocally and uniquely identify a location, a partner in various applications and for different purposes (documents, messages, marking, etc.).

2.2 Purpose

The purpose of this document is to standardise both the logic for location coding and the codes needed to support data exchange within the scope of Telematics TSI and process to it also defines the processes for requesting, generating, assigning and managing the codes in the scope of Telematics Applications TSI. Establishing standardized procedures and centralized data storage is essential for ensuring high data quality.

To ensure data quality, the TSI Telematics requires a central repository to be set up for these codes to be stored and administered as reference datasets.

These codes and reference datasets ensure consistency of data interpretation across various application systems and must be available and accessible to all entitled participants subject to the data exchange specified in the Telematics-TSI.

The data must represent the actual status at all times (be up to date).

2.3 Objectives

The objectives of this document is to define the following:

- Users of the Reference data
- Use Cases and Process Requirements
- User Rights and Access
- Data Security and Access Rules and Rights

This document also sets out:

- System Reliability and Quality Measures
- Location Code Data Requirements
- Organisation Code Data Requirements
- Rolling Stock File Data Requirements
- Intermodal Loading Unit File Data Requirements
- Associated messaging for reference data population and maintenance
- Data Quality Assurance
- Interfaces
- External System References

2.4 References

The referenced documents listed in chapter 1 are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

3 Common elements across reference data

This section describes elements which are common across the different types of reference data:

3.1 Use cases

The relevant use cases for the management and use of location codes, organisation codes, rolling stock reference data and the intermodal loading data can be found in chapters 4, 5, 6 and 7.

3.2 Data accessibility and enquiries

Common Reference Data is stored in to the ERA knowledge graph, open and available to public users. The common central repository shall contain a link to access the source of freight specific reference data and of data needed for rail ticketing processes.

ERA ontology (Knowledge Graph - KG) shall be the common basis for all datasets (reference files) mentioned in this document, both at ERA and sector level:

- ERA KG is the ERA common reference file
- If there will be duplicates at sector level, they shall be synchronised with the ERA KG

For the KGs, ERA shall be the responsible for the creation, maintenance and application of procedure and SLA for assignment and hosting of reference codes at EU level. With that it will be ensured that ERA will be the assignment entity for reference codes at EU level. ERA may subcontract (based on defined SLAs) sector organisations to:

- assign codes on behalf of ERA;
- host codes linked to an ERA register as single EU-wide source of reference codes.

Telematics stakeholders may subcontract (a) sector organisation(s) to request a reference code to ERA on behalf of a telematics stakeholder.

Enquiries may be made either via:

- Human Computer Interface (HCI, typically a web page), or
- other electronic means through the system interface with the CAS (Central Administration Service).

The enquiry and response will be delivered through the API in the valid Telematics TSI standard format . A telematics stakeholder who needs a PLC must contact the responsible IM (or alternatively an RU for location codes for retail locations). The IM has to request the PLC from ERA as the IM is the owner of the infrastructure (or alternatively the RU as the owner of location codes for retail locations), however response data shall be filtered to exclude personal data, commercially sensitive data or data subject to national security measures.

3.2.1 Data dump (bulk download)

The data dump option is a tool by which the entire data file may be supplied to the registered user. This can support comparison of data against the current centralised reference data. In This case, centralised data is usually a copy of source data which is placed on local level. Making sure that data is coherent and reliable in both cases, the actor is allowed to perform comparison between its copy and central level. For bulk download from RSRD, ILURD and WIMO additional requirements may be applied.

3.3 Data security and access rules and rights

Reference data is publicly available, specific access policies limiting the amount of visible data might be set out in the sections linked to the type of dataset. Please note that additional access rights for RSRD, ILURD and WIMO may be applied.

ERA is responsible for the security of reference data hosted in the knowledge graph.

3.4 Archival requirements

Archival requirements for the reference data must be timely coordinated with all other systems of the Telematics TSI (WIMO, Wagon Technical Data, etc) in order to provide complete traceability data transformation and history.

It is necessary to have traceability of previous amendments. This history should be archived and retrievable within a period of time of at least one year from the data storage place for locations and organisations codes.

4 Location codes

The Telematics TSI Annex states in chapter “1.2. Common reference data” the references to single location codes.

According to Art. 10(1)(a) of the Telematics TSI - Act, geographical points shall be identified by location codes. The process to issue them and their data presentation are respectively defined in this section and in the TD – ERA Ontology.

4.1 DefinitionsLocation

4.1.1 Location types

A location is a place, a geographic point, inside or outside of the rail infrastructure which is used for planning, technical, commercial, operating or administrative purposes.

A location is a place, which is used in the rail telematics information exchange for

- Capacity Management, Train Preparation, and Traffic Management (such as Point of Origin, Point of Destination, Point of Handover, Point of Interchange, Rail Freight Service Facilities, Terminals, Scheduled Intermediary Stops, Any Other Point Where the Train is Passing Through, Location Where Composition Changed, Location of Service Disruption);
- Management of Freight Wagons and Their Load (such as Specified Loading or Unloading Location, Freight Customer Sidings, Yards, Point of Interchange, Departure Rail Service Facility (Origin), Specified Intermediate Location, Rail Service Facility of Destination);
- Rail Ticketing in Relation to Rail Passenger Services and Rail Passenger Travel Information (such as Rail Passenger Stations, Intermediate Station Stops, Stations of Origin and Destination, PRM Assistance Offices, Ticketing Offices).

Please note that above locations can have connections between themselves and be connected to multimodal transport (such as local public transport or maritime transport).

Please note that above locations will be shared with various registers used by the Telematics Stakeholders as defined in Article 3(9) of the Telematics regulation.

Any reference to a geographical or operational point necessary for data sharing subject to the Telematics Regulation **shall be identified by a unique location code**.

4.1.1.1 Location primary code (Primary Location Code)

Label: locationPrimaryCode

This element identifies a location part of the network of an infrastructure manager in a unique manner by a unique code per country. This location must be part of the network managed by an Infrastructure Manager. In addition, the provisions of chapter 4.1.1 apply.

4.1.1.2 Location subsidiary code (Subsidiary Location Code)

Label: locationSubsidiaryCode

This element identifies a location as a part of primary location e.g. a junction, a signal, a marker point, etc. It is unique and is always used in combination with a location primary code. This may be a rail related point or not that is not necessarily managed by an Infrastructure Manager . In addition, the provisions of chapter 4.5. apply.

The Locations Reference dataset will combine two centrally stored and administered reference datasets specified in the Telematics TSI as follows:

- Reference dataset of the Location primary codes
- Reference dataset of the Location subsidiary codes.

4.1.2 Functions of organisations/companies and their hierarchical positions

The following functions are specifically defined within the Telematics TSI, however this list is not exhaustive. Each of these functions will require singl coding of organisations to improve data exchange and to interpret and correctly apply the exact location in their application system.

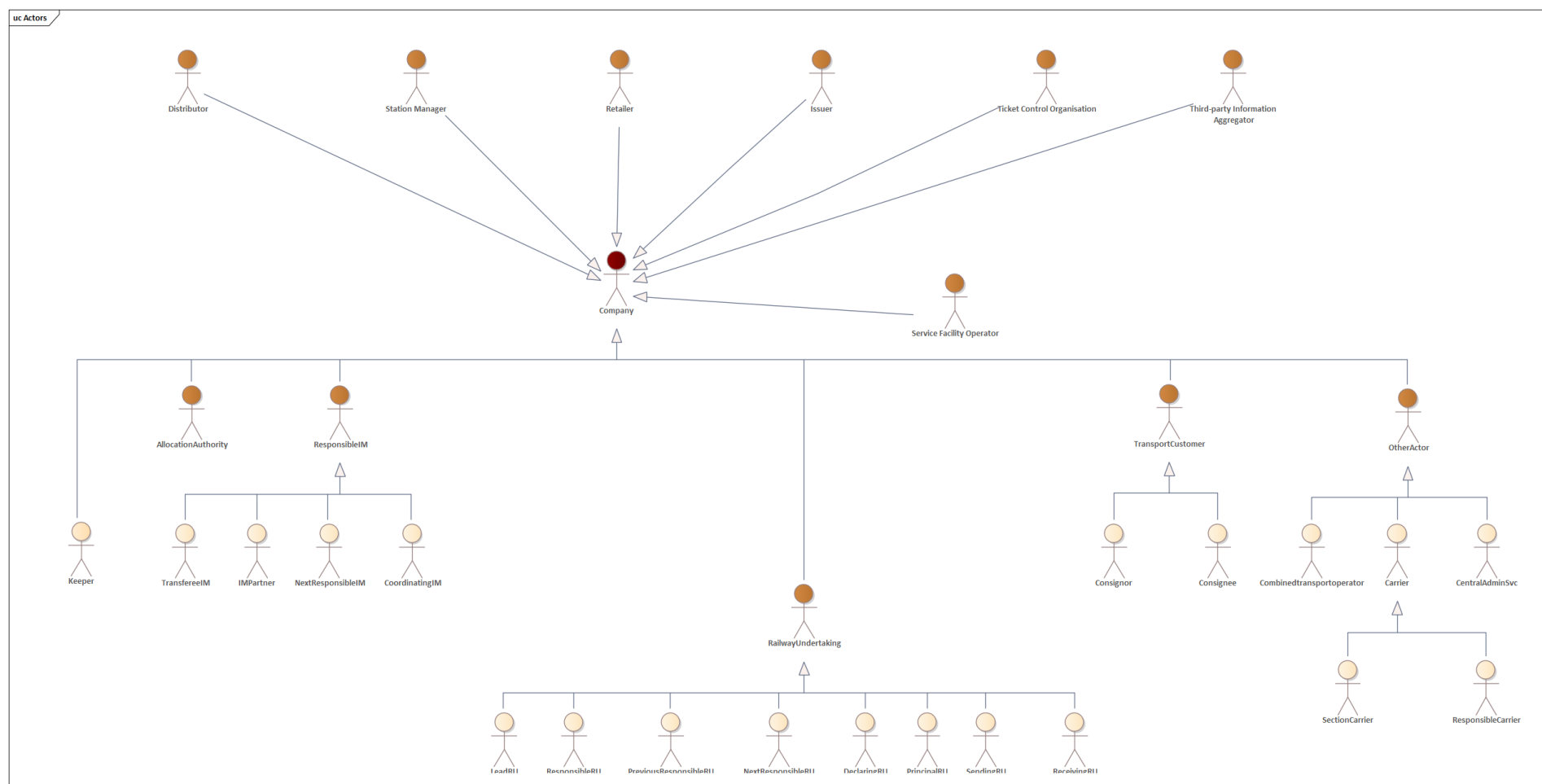


Figure 1: Diagram 1.1 Users (and their roles) of the Location Code File

4.1.2.1 Allocation (assigning) Authority – role

Label: allocationAuthority or allocationCompany

This element defines the organisation responsible for assigning and maintaining codes within a Member States. It could be a Union body (such as the EU Agency for Railways) or a public sector body entrusted with the responsibility of code assignment and maintenance.

It specifies the entity “Company”.

4.1.2.2 Company - entity

Label: company

Company identifies any telematics stakeholder.

The definition of Company (actors identifiable via the type “organisationCode”) comprehends the following as defined in the Telematics TSI.

- AllocationCompany
- Attributor
- Carrier
- intermodalTransportOperator
- coordinatingIM
- DeclaringRU
- Distributor
- ImpactedRU
- IMPartner
- Issuer
- Keeper
- LeadRU
- NextResponsibleIM
- NextResponsibleRU
- PreviousResponsibleRU
- PrincipalRU
- Recipient
- ResponsibleCarrier
- ResponsibleIM
- ResponsibleRU
- Retailer
- PreviousResponsibleRU
- ReceivingRU
- SectionCarrier
- Sender
- SendingRU
- StationManager
- Ticket Control Organisation
- Third-party Information Aggregator
- TransportCustomer (Customer / Consignee)
- TransfereeIM

It specifies the role “Partner” and must use location codes (of common reference data) in the information exchange within the Telematics TSI.

All actors above and in particular all ‘telematics stakeholders’ listed in Act Article 3(9) of the Telematics Application TSI shall receive an Organisation Code.

4.1.2.3 Freight customer - actor

Label: freightCustomer

The freight customer is the entity which has issued the consignment note, which may be an intermodal transport operator, a freight forwarder, a logistics service provider, or a fleet manager of empty wagons.

4.1.2.4 Intermodal transport operator - actor

Label: intermodalTransportOperator

Is an entity that organises freight transport services connecting freight terminals for more than one transport mode.

It may be a shipper, a logistics service provider, or a freight forwarder and specialises the actor 'Company'.

4.1.2.5 Coordinating infrastructure manager - actor

Label: coordinatingIM

The coordinating (leading) infrastructure manager coordinates the agreement process for the infrastructure managers. It is the primary point of contact for the Railway Undertakings. Certain critical stages in the international timetabling process are initiated by the leading IM, such as transfer the path request to path elaboration to involved infrastructure managers in order to prepare the offer with the partner-infrastructure managers.

It specialises the actor responsibleIM.

4.1.2.6 Declaring Railway Undertaking - actor

Label: declaringRU

Code of the railway undertaking, who added a declaration within the consignment note.

It specialises the actor railwayUndertaking

4.1.2.7 Infrastructure Manager Partner - actor

Label: imPartner

Infrastructure manager which indicates that an exceptional Gauging is in the train or the wagon within the consignment note.

It specialises the actor responsibleIM.

4.1.2.8 Infrastructure Manager – actor

Label: infrastructureManager

means an infrastructure manager as defined in point (2) of Article 3 of Directive 2012/34/EU of the European Parliament and of the Council

4.1.2.9 Keeper - actor

Label: keeper

The entity, who being the owner or having the right to dispose of it, exploits a vehicle economically in a permanent manner as a means of transport and is registered as such in the Rolling Stock Register. A railway undertaking owning wagons equally has the role of keeper.

It specialises the actor company.

4.1.2.10 Lead railway undertaking - actor

Label: leadRU

Responsible railway undertaking, which organises and manages the transport line according to the customer's commitment. It is the single point of contact for the customer. If more than one railway undertaking is involved in the transport chain, the lead railway undertaking is responsible for the co-ordination of the various Railway Undertakings. In case of freight transport, a customer may be, especially for Intermodal transport, an Intermodal service integrator.

The lead railway undertaking is a service integrator.

It specialises the actor railwayUndertaking.

4.1.2.11 Responsible railway undertaking - actor

Label: responsibleRU

Railway undertaking responsible for the current operation of the train or wagon.

It specialises the actor railwayUndertaking.

4.1.2.12 Railway undertaking - actor

Label: railwayUndertaking

means a railway undertaking as defined in point (45) of Article 2 of Directive 2016/797/EU

4.1.2.13 Responsible infrastructure manager - actor

Label: responsibleIM

Infrastructure manager responsible for the movement of the train currently operated on its network

It specialises the actor infrastructureManager.

4.1.2.14 Next responsible infrastructure manager – actor

Label: nextResponsibleIM

Infrastructure manager responsible for the movement of the train on its network after handover.

It specialises the actor infrastructureManager.

4.1.2.15 Next responsible railway undertaking – actor

Label: nextResponsibleRU

Railway undertaking responsible for the operation of the train or wagon after interchange.

It specialises the actor railwayUndertaking.

4.1.2.16 Previous responsible railway undertaking – actor

Label: previousResponsibleRU

Railway undertaking responsible for the operation of the train or wagon before the previous interchange.

It specialises the actor railwayUndertaking.

4.1.2.17 Receiving railway undertaking - actor

Label: receivingRU

Freight railway undertaking, which is the recipient of the 'consignmentNote' message.

It specialises the actor railwayUndertaking.

4.1.2.18 Carrier – actor

Label: carrier

Carrier as defined in Art. 3(29) of Directive (EU) 2016/798: an enterprise which carries out a transport operation pursuant to a contract of carriage.

It specialises the actor otherActor

4.1.2.19 Section carrier - actor

Carrier which is specified for an invoiced section.

It specialises the actor carrier.

4.1.2.20 Sending railway undertaking - actor

Label: sendingRU

Freight railway undertaking, which created/amended the 'consignmentNote' message.

It specialises the actor railwayUndertaking.

4.1.2.21 Central administration service - actor

Label: centralAdminSvc

The Central Service administering the reference data.

It specialises the actor otherActor.

4.1.2.22 Distributor - actor

Entity that compiles and distributes rail products in a fair, transparent, and non-discriminatory manner, handling availability checks and reservation requests for rail services.

It specialises the actor Company.

4.1.2.23 Station Manager - actor

Entity that is responsible for managing station operations, including providing passenger travel information, defining minimum connection times, and granting access to connection time data.

It specialises the actor Company.

4.1.2.24 Retailer - actor

Entity that sells rail products to passengers, using data from distributors or railway undertakings, and displays conditions of carriage and other relevant information.

It specialises the actor Company.

4.1.2.25 Issuer - actor

Entity that is responsible for issuing tickets or reservations, generating security data, creating dossier references, and reporting issued tickets to railway undertakings.

It specialises the actor Company.

4.1.2.26 Ticket Control Organisation - actor

Entity that checks tickets and shares ticket control data and ticket state changes with issuers, ensuring compliance with conditions of carriage.

It specialises the actor Company.

4.1.2.27 Third-party Information Aggregator - actor

Entity that aggregates rail product information for journey planning but is not authorized to sell or distribute these products, linking to authorized sales channels.

It specialises the actor Company.

4.1.2.28 Service Facility Operator - actor

See Chapter 6.3.

4.2 Location codes user profiles

Users will have allocated the following characteristics:

- User Identification
- User name / Password (or other advanced identity providers)
- Organisation
- Contact details
- Role (defined by <x-reference> below)
- Data usage Domain
- User Type/Group

All users of the **Central Administration Service** will fall into 3 classes with the following rights:

- **System Administrators** maintaining the central register. They will also be responsible for the administration of users. Users must be validated and allocated within one working day of application.
- **Authorised Users** (including IMs) representing approved or user companies who need access to the registries in real time and have access to submit updates to or to retrieve data from the **Central Administration Service**.
- **Public Users** who have read access only

Table 4 - Type of Users

<i>Type of user</i>	<i>Read</i>	<i>Write</i>
Administrators	Y	Y, assign codes on request and publish the changes requested by the stakeholders.
Authorised users	Y	N, can request new codes or request amendments.
Public users	Y	N

Table 5 – User profiles

	<i>User profiles</i>		
<i>Permissions sets</i>	<i>System Administrator</i>	<i>Authorised Users</i>	<i>Public User</i>
<i>Manage user accounts</i>	X		
<i>Request code</i>	X	X	
<i>Assign code</i>	X		
<i>Request an update of a code</i>	X	X	
<i>Update code</i>	X		
<i>Publish code</i>	X		
<i>Request a deletion of a code</i>	X	X	
<i>Delete code</i>	X		
<i>View codes</i>	X	X	X

4.3 Location primary code - use cases

The four use cases for location primary codes processes are defined below and illustrate the actors involved in each process.

1. Submission of existing codes
2. Submission of new codes
3. Submission of amendments or deletions of existing codes
4. Enquiries to the reference data

When primary location codes are assigned, special attention must be paid to the possible existence of retail primary location codes as defined in chapter 4.11 “Location code for retail locations”.

Before the submission of the location primary codes to the assignment procedure, harmonisation with the RINF database pursuant to Articles 9(6) and 9(7) must be carried out according to the RINF Application Guide [10] where the linkage of Primary Location Codes to RINF Infrastructure Objects (such as Operational Points or to Sections of Lines) is described.

Further harmonisation with the retail location primary code (4.10.1) and retail location subsidiary code (4.10.1) must be carried out as to ensure the uniqueness of the submitted code.

4.3.1 Submission of existing location primary codes

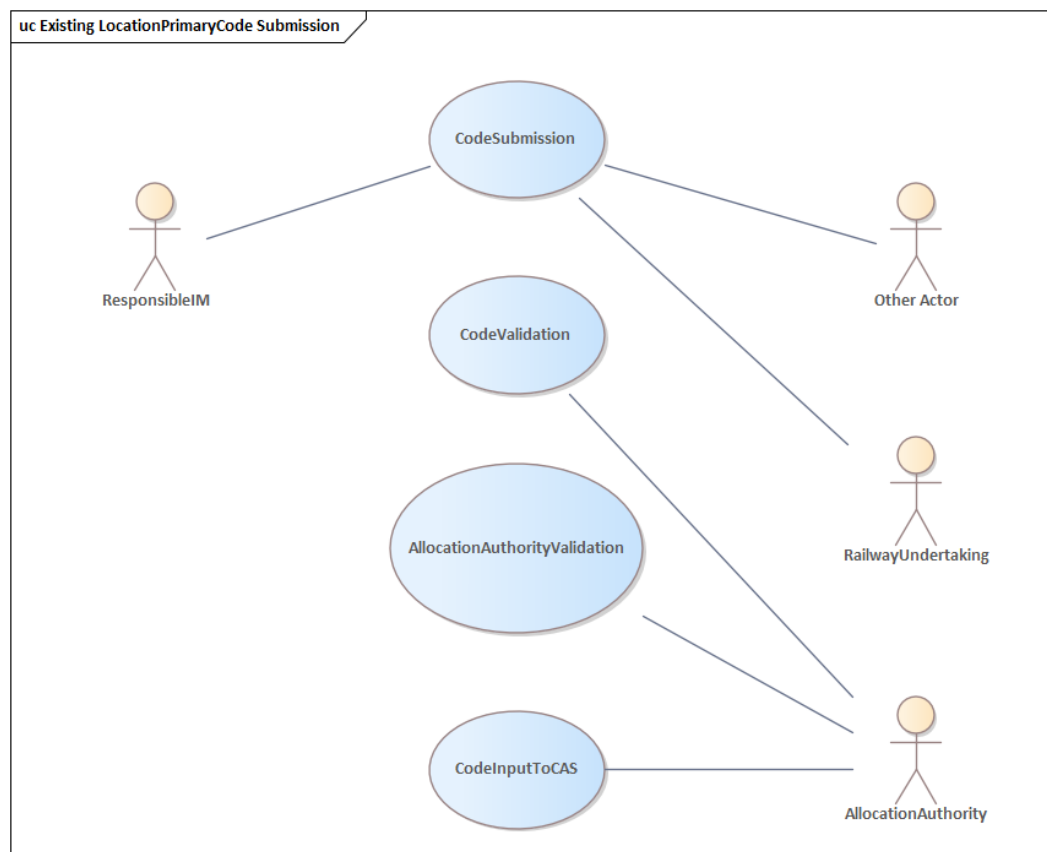


Figure 2: Diagram 1.2 Existing location primary code submission process

4.3.2 Submission of new location primary codes

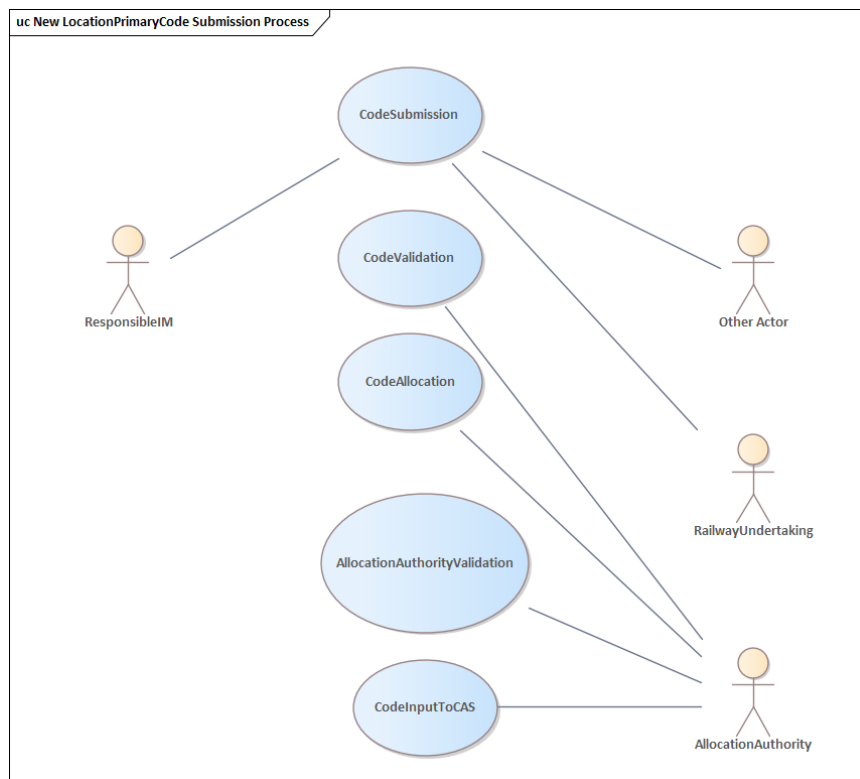


Figure 3: Diagram 1.3 New Location Primary Code Submission Process.

4.3.3 Submission of amendments/deletions (logical closure) of location primary codes

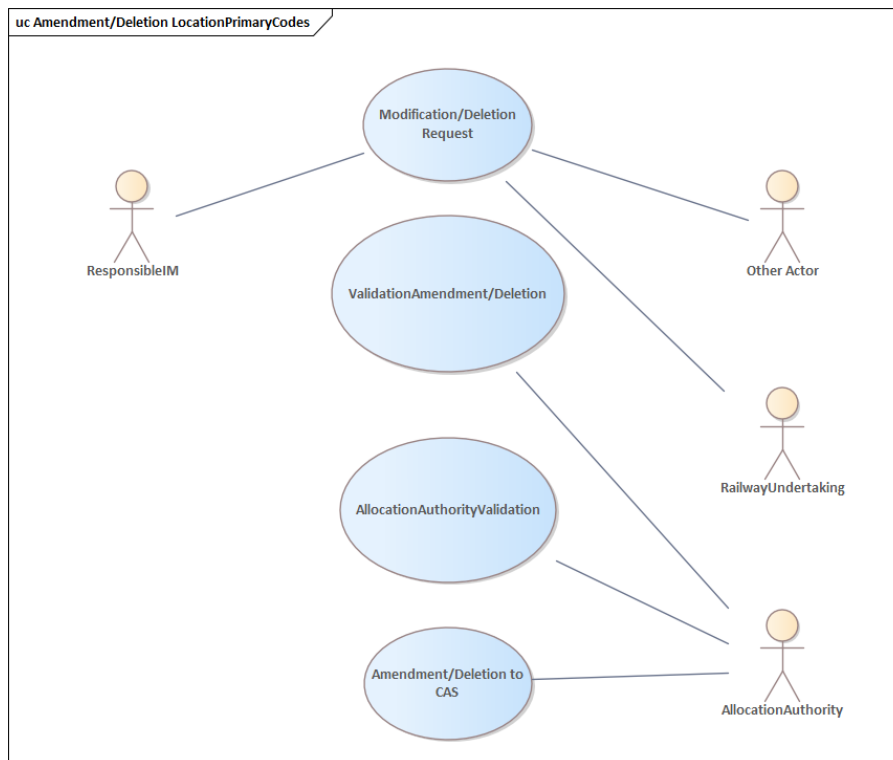


Figure 4: Diagram 1.4 Amendment/Deletion of Location Primary Codes.

4.3.4 Enquiries to the reference dataset

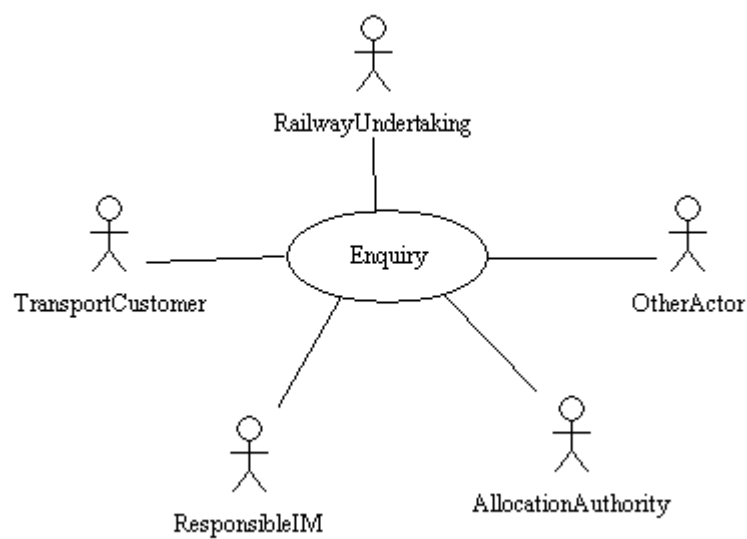


Figure 5: Diagram 1.5 Enquiries to the Reference dataset.

4.4 Process requirements

This section describes the process requirements for the management of the Location Primary Code. The following activity diagram shows the high-level interaction and the following subsections describe the detailed processes.

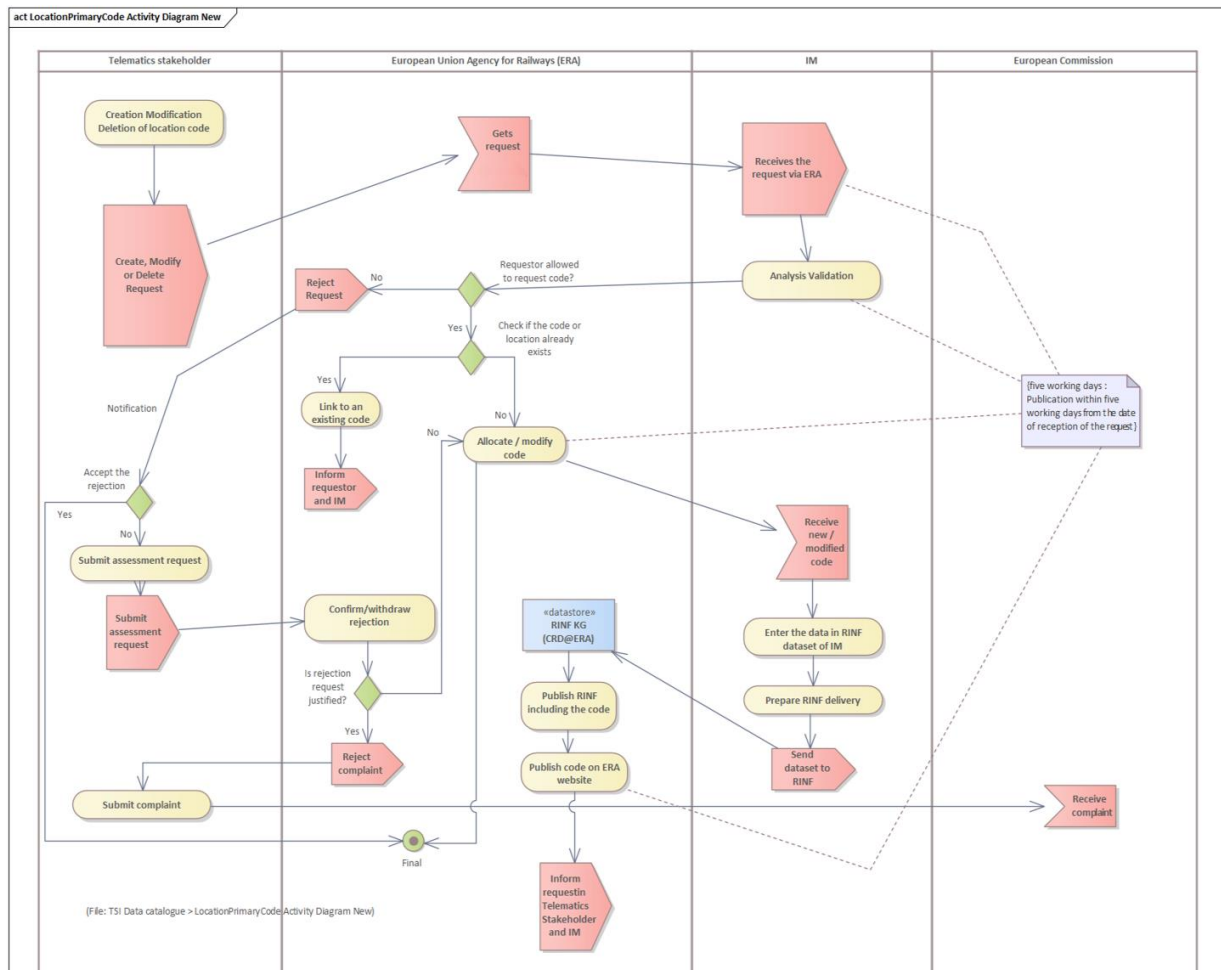


Figure 6 - Diagram 1.6 LocationPrimaryCode Activity Diagram.

4.4.1 Populating the database

4.4.1.1 Propose existing location primary codes

Any telematics stakeholders as e.g. IM, RU or Other Actors as Public Authorities, Workshop Owners and freight customers may ask for or propose codes from their existing IM reference sources. Freight customer primary rail points should be included through the intervention of their RU Suppliers or by freight customers themselves under contractual agreement with the entity hosting the database and following the rules established on this document and in the Telematics TSI.

If there is more than one IM within a Member State, ERA shall co- ordinate the codes they allocate to avoid the same code being allocated to more than one location.

4.4.1.2 Validate existing codes within country

The submitted Request shall be validated by ERA entity.

4.4.1.3 Input existing location primary codes

The Allocation Entity shall input the validated codes to the RINF KG.

4.4.1.4 Submit Request for new location primary code

This submission should be possible for any telematics stakeholders as e.g. IM, RU or Other Actors as Public Authorities, Workshop Owners. The telematics stakeholder may request the allocation of a specific code value in their submission, or may opt to leave the code value blank, in which case the allocation authority (ERA) will assign the code.

If there is more than one IM within a Member State, ERA shall co- ordinate the codes they allocate to avoid the same code being allocated to more than one location.

4.4.1.5 Validate Submission of Request by ERA (Allocation Authority)

Once submitted, the request shall be validated by ERA in conformance with its procedures and requirements.

4.4.1.6 Input the new location primary code

The ERA shall input the validated code to the CAS.

4.4.2 Amendments to, or deletion of, location primary codes

4.4.2.1 Submit request for amendment to, or deletion of, location primary codes

This submission should be possible for any telematics stakeholders as e.g. IM, RU or Other Actors as Public Authorities, Workshop Owners.

Customers may be authorised to ask the IM directly for the amendment of a code under contractual agreement or through the RU supplier because they give the commitment to an RU for a Transport.

4.4.2.2 Validate submission of request by ERA

The Request shall be validated by ERA in accordance with its procedures and requirements.

4.4.2.3 Input the amendment to or deletion of location primary codes

ERA shall input the validated amendment to the CAS. To ensure uniform and correct entry of a PLC in the database, only the operator of an operating site can be entered with its organization code for that PLC.

4.4.3 Enquiry

Enquiries may be made either via the Human Computer Interface (HCI) or via other electronic means through the system interface with the CAS. The enquiry and response will be delivered through the API in the valid Telematics TSI standard format (See Chapter 3). Anyone has the right to make an enquiry, however response data shall be filtered to exclude personal data or confidential data subject to national security measures. The enquiry response will be visible in the HCI if the request has been made through the HCI.

4.5 Location subsidiary code use cases

4.5.1 Submission of existing location subsidiary codes

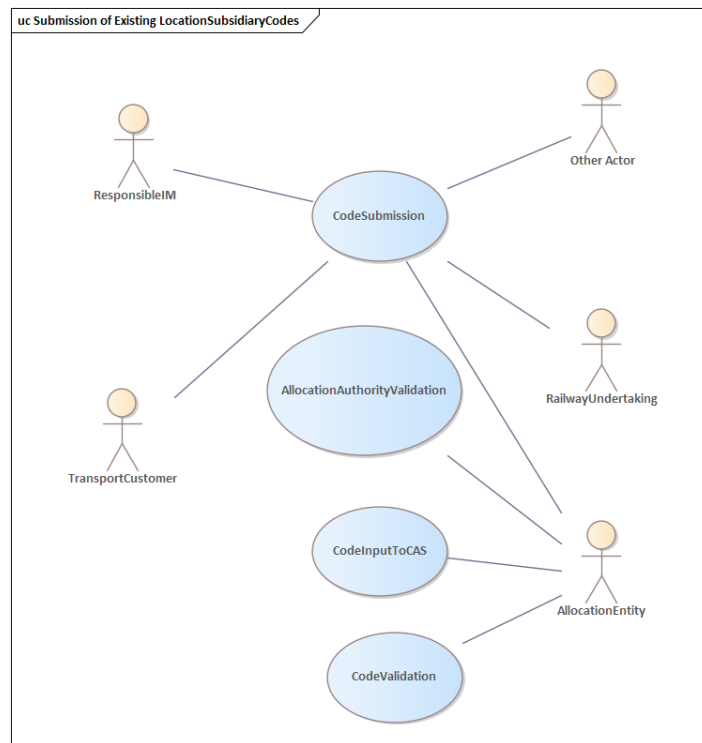


Figure 7: Diagram 1.7 Submission of Existing LocationSubsidiaryCodes.

4.5.2 submission of new location subsidiary code

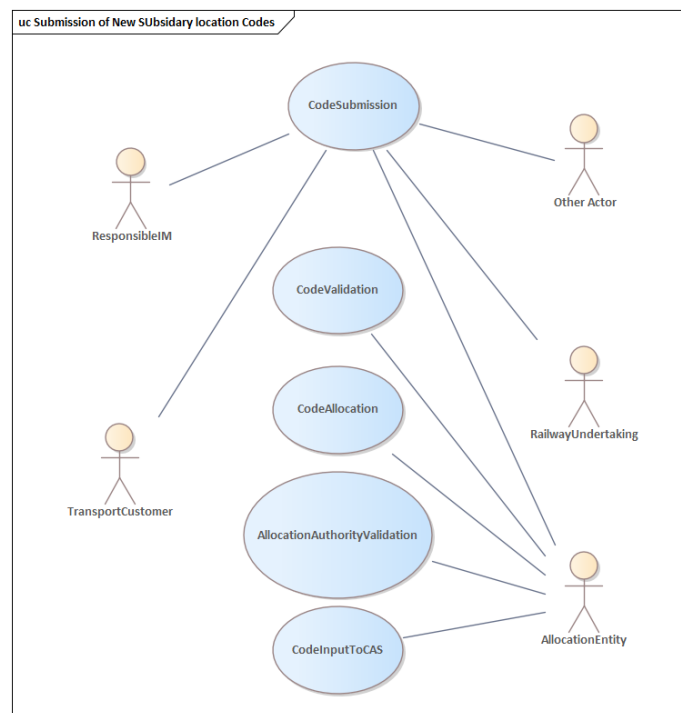


Figure 8: Diagram 1.8 Submission of New Codes.

4.6 Amendment/deletion of location subsidiary code

4.6.1 Location subsidiary code process requirements

This section describes the process requirements for the management of the Location Subsidiary Code. The pre-requisite for the creation of a Location Subsidiary Code is the existence of a corresponding Primary Location Code. Subsidiary Location is created by an actor and the request to ERA should contain the proposed SLC.

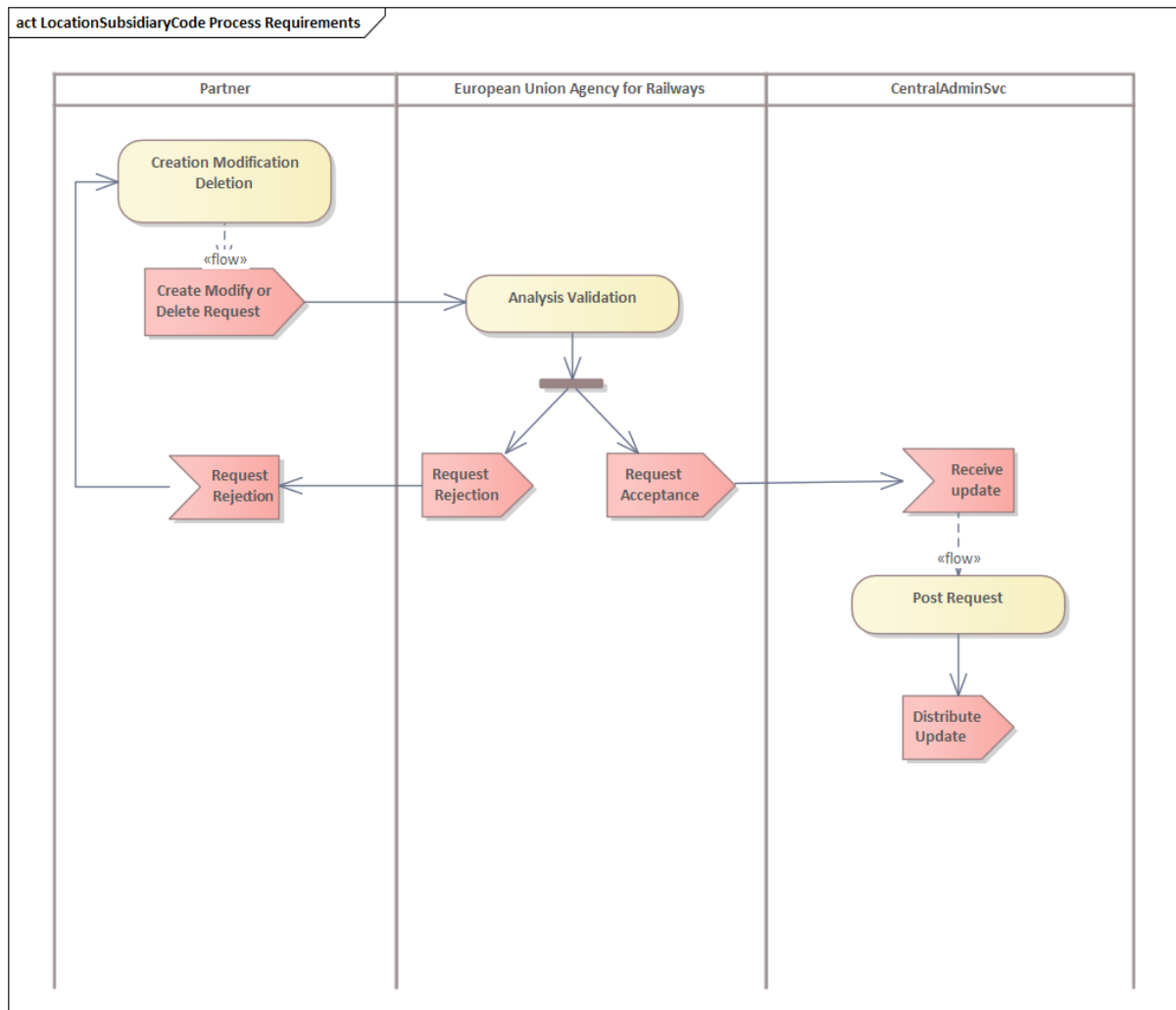


Figure 9 - Diagram 1.10 Location subsidiary code process requirements.

4.6.2 Populating the database

4.6.2.1 Propose existing codes

Any telematics stakeholder may propose codes after consultation and alignment with the responsible IM to ERA from their existing reference sources.

4.6.2.2 Validate existing codes

The Request shall be validated by the ERA .

4.6.2.3 Input existing codes

The first population of the reference data will be performed by ERA with the information provided by the requesting telematics stakeholder. Every subsidiary location must have a type code.

4.6.2.4 Submit Request for new LocationSubsidiaryCode

Any telematics stakeholder may request the allocation of a specific code value after consultation and alignment with the responsible IM from ERA or may opt to leave the code value blank, in which case the ERA will assign the code.

4.6.2.5 Validate Submission of Request

The Request shall be validated by the ERA.

4.6.2.6 Input the new location subsidiary code

The ERA shall input the validated code to the CAS.

4.6.3 Amendments to or deletion of location subsidiary codes

4.6.3.1 Submit Request for amendment to or deletion of location subsidiary code

Any telematics stakeholder may request an amendment or deletion of a location subsidiary code after consultation and alignment with the responsible IM. ERA will then amend or delete the code.

4.6.3.2 Validate Submission of Request

The Request shall be validated by ERA.

4.6.3.3 Input the amendment to or deletion of location subsidiary codes

ERA shall input the validated amendment to the CAS.

4.7 Archival requirements

No specific archival functionalities are required. See section 3.4.

4.8 Data security and access rules and rights

Locations are identified with a dataset named “Location Ident” which is unrestricted and publicly available.

Creation of new data and updating existing data can be performed only by ERA.

4.8.1 Location dataset data requirements

The data presentation is available in the KG (see chapter 3.2 above).

4.9 Location file subsidiary codes and responsibilities for their maintenance

The management of the subsidiary location codes is assigned to the following parties:

Table 6 Responsible organisations for the maintenance of subsidiary location codes

Type code	Name	Allocation Entity	Requestor	Definition
00	Not Defined			
01	Track	ERA	IM	Track defines uniquely a part of Primary location.
03	Border points	ERA	RU	Special code for the Border Points are allocated at the country border and the points between different IM networks. Location of these points sometimes are not geographically same with the station or yard. Therefore, these points are "logical point". Legacy UIC codes used for routing across state borders. Attribute of primary location. Different coding of primary location. Same "code" appears used on both sides of the border referring to the PLC within each country
04	Sorting Code	ERA	IM or RU	Destination station of the single wagon forwarding has a code in order to provide shunting technology.
05	Vehicle Parking Points	ERA	IM	Place for parking rail vehicles.
06	Public Loading Places	ERA	IM	Public sidings consist of one or more publicly accessible installation of loading tracks, possibly with a loading lane and/or a side/head ramp. These may be located directly in public railway stations and owned by the respective infrastructure manager. (Sub type to Freight terminal)
07	Private sidings	ERA	Owner of a private siding	Private sidings consist of one or more installations of rail infrastructure and loading facilities whose access is generally restricted to the owner. They often belong to industrial, commercial, military or other types of premises connected to the public rail network. The layout configuration depends on the individual requirements of the respective user. Sometimes several private sidings are connected to a feeder track, which in turn is connected to the public network (e.g. in ports). (Sub type to Freight terminal)
09	Depot	ERA	Owner of depot	Place for overhaul or maintenance of the rolling stock.
10	Switch/turnout	ERA	IM	The point where two tracks meet or diverge.
15	Platform	ERA	Station Manager or IM	Place next to the track which has been raised to make access to railway vehicles easier. Code is defined by IM.
22	Level crossing	ERA	IM	Place where rail and road crossing on the same level (grade).
23	Bridge	ERA	IM	Special built structure is over the road etc.
24	Tunnel	ERA	IM	Structure to allow a railway line to pass under the surface.
25	Underpass	ERA	Station Manager or IM	Undercrossing or underground passage under the railway track. (Not used by trains).

27	Signal	ERA	IM	Trackside equipment related to the status of the line ahead to train drivers.
28	Sign and board	ERA	IM	Static equipment to inform the board staff for train traffic and shunting or the passengers in a station (indication on platforms).
29	Phase break	ERA	IM	Border of the power supply systems (catenary).
33	Hot spot detector	ERA	IM	Trackside equipment which detects hot wheels or axle-box on passing trains.
36	Freight yard	ERA	RU	A production location which can be used as an origin, intermediate or destination station of a freight train
37	Loading point	ERA	RU	A usage of a physical location. Each loading point is assigned to a DIUM station. Loading point is a customer siding (public or private) used in communication with RUs
39	Reservation code	ERA		Attribute of the location that can be start or end point of traveling with seat reservation.
40	Metastation	ERA		A location that forms the link between different stations that are considered as equal for the traveler.
41	Company specific Identifier	ERA	Owner of legacy coding	Similar code as primary location code. used as key to legacy location coding.
42	DIUM	ERA	RU	DIUM stations - Places of acceptance/delivery/handover Commercial Station open into international traffic of goods (tariff point or contract station included in DIUM) – consignment acceptance/delivery station (loading points are excluded and covered by TypeCode 37). Could be a location to handover wagons.
43	Passengers' cars loading	ERA	Owner	A place of physical location on the open access network where passengers can load/unload their car on a carrying train.
45	Sewage dump	ERA	Owner	A place for cleaning purposes - disposal of the waste.
46	Refuelling Point	ERA	Owner	Location where refuelling takes place.
47	Mains Supply	ERA	Owner	Location where energy supply can be provided for the rolling stock e.g. preheating.
48	Water Supply	ERA	Owner	Location where water supply can be provided for the rolling stock.
50	Indoor cleaning platform	ERA	Owner	Place for interior cleaning.
51	Car-wash plant	ERA	Owner	Place for outdoor cleaning.
52	Short drycleaning track	ERA	Owner	Place for special cleaning
54	Sand-filling station	ERA	Owner	Location where sand is filled.
56	Signal box	ERA	IM	A building containing signalling equipment and staff.
57	Intermodal Terminal	ERA	Owner	Intermodal Terminal is a location which provides the space, equipment and operational environment under which the transfer of loading units (freight containers, swap bodies, semi-trailers or trailers) takes place.

58	OSJD system based location	ERA	RU	Location code used within OSJD.
59	Train Service Substitute Stop	ERA	Owner	Place outside of railway station or railway stop, where passengers board or leave bus or any other transport mean as substitution of train service.
60	Multifunctional rail terminal	ERA	Terminal manager or IM	Facilities for conventional and/or intermodal rail/road transshipment principally open for public use and for all types of cargo. This kind of facility does not only provide transshipment, but also additional services like storage, consignment or road pre/end haulage.
61	Relief facility	ERA	IM	Facilities providing equipment and infrastructure used to overcome a disruption (derailment, collision or other accidents).
70	Network Border	ERA	IM	Network border between two neighboring IM's; first or last Primary Location on a network.
71	State border	ERA	IM	Political border between two member states.
72	Administrative border	ERA	IM	Border point inside a member state to define federal structures or administrative districts or local areas.
74	Operational handover	ERA	IM	Location where the responsibility for operation changes or can change between two involved IMs.
75	Planning handover	ERA	IM	Location where the responsibility for timetable planning and path allocation changes or can change between two involved IMs
76	Stopping point	ERA	IM	This SLC defines a point along a track where the head of the train is supposed to stop upon arrival. Multiple stopping points can be defined on a track, to take into account different train compositions, direction of arrival and/or departure. The SLC shall be used on main lines. Should be used mainly for passenger traffic to define the stopping point at the platform.
99	Relation to Station	ERA		An indicator used to show that this location is a subsidiary of another location.

Above list is subject to possible regular changes stemming from the ERA telematics change control management.

4.10 Location code for retail locations

The location codes for retail are needed for rail ticketing, access to the stations and PRM assistance processes. To these locations, specific subsidiary location codes can be assigned, as defined in the Table 6 Responsible organisations for the maintenance of subsidiary location codes”.

In this Technical Document “location” can mean a railway location, this can be of administrative, operational, commercial or technical use and which belongs to a public undertaking being in general an Infrastructure Manager (IM) or a Railway Undertaking (RU) or service providers and managers commissioned by these. For a non-exhaustive locations list see chapter 4.1.1.

Any location, required for the railway operations and the business process of the Telematics TSI is to be coded as railway location.

4.10.1 Coding Principles

4.10.1.1 Numeric Country code

This element identifies the country to which the location belongs with a two-character code in accordance to the Code List B.9.1.

A railway location is identified by a standard location code:

- The general railway location - Primary Code for retail locations.

Depending on the specific application

- Several special Subsidiary Codes could be associated to the corresponding PLC.

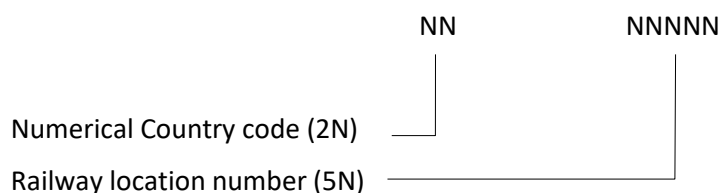
The Primary Code shall be compulsory for all relevant locations of a RU or an IM.

In order to assure uniqueness in one Member State of the European Union, the code shall be assigned by the ERA according to section 5 of this Technical Document. Each Primary Code shall have an unambiguous and compulsory designation which shall be defined by ERA .

The relevant allocation authority attributes to each Primary Code a unique official Location name. Additional shortened names may be attributed.

This code identifies a location. A Primary Code may be assigned to any railway location specified in paragraph 0.1 - Definitions.

The Primary Code shall contain seven alphanumeric characters structured as follows:



- › The numerical country code is a two digit code identifying the country as defined in paragraph 4.10.1.1
- › The railway location number identifies the location within the relevant country with a five-digit code. The code is assigned according to paragraph 4.10.2.

Subsidiary Codes may be assigned to IM or RU locations

Subsidiary Codes shall be assigned e.g. for: Retail related subsidiary location codes are:

- › Reservation code (SLC 39)
- › Metastation (SLC 40)
- › State border (SLC 03)

4.10.1.2 Code Structure

Both the Primary Code and the numerical Subsidiary Codes shall have a fixed length.

These are positioned right-justified and filled up if necessary with zeros.

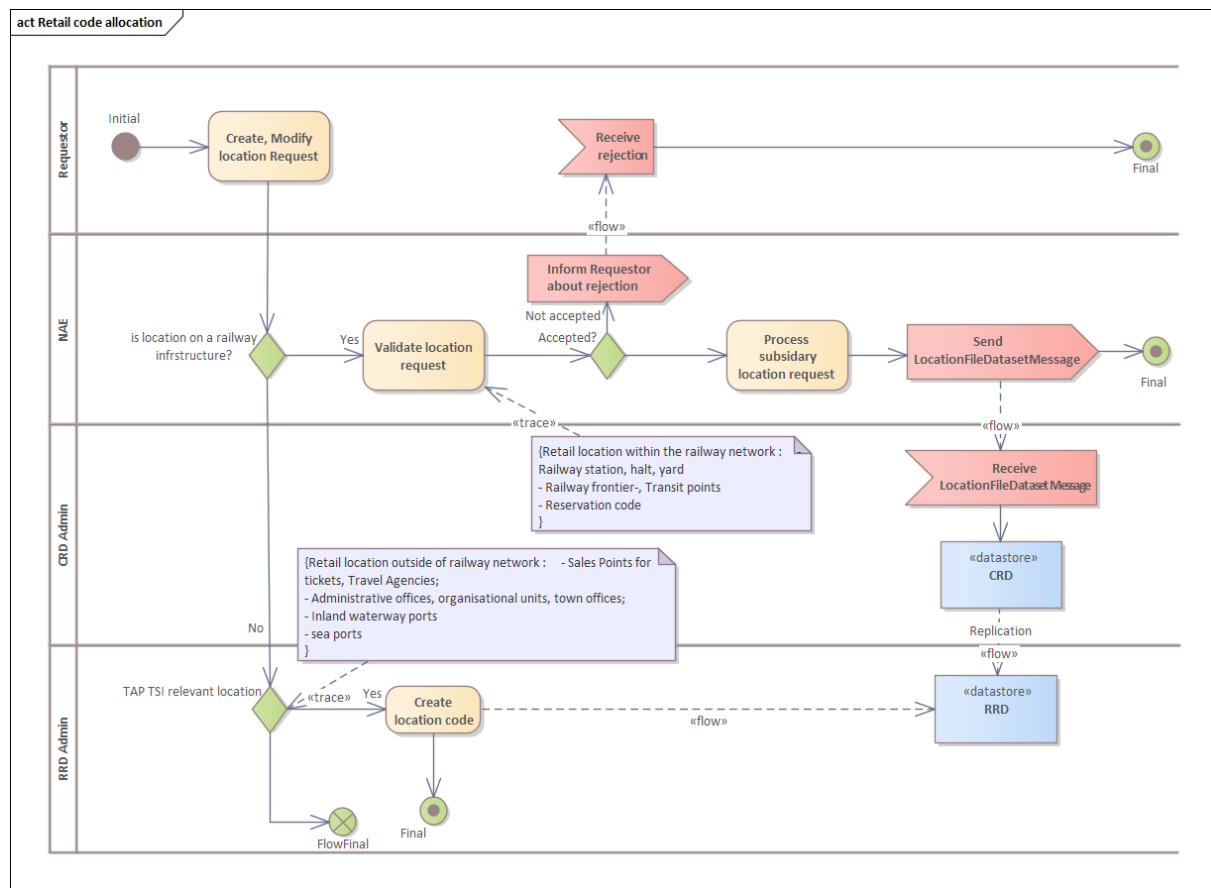
4.10.2 Process for retail location code allocation

The process of retail code allocation and the interaction between the involved telematics stakeholders is described in the process below.

When retail location codes are assigned, special attention must be paid to the possible existence of primary location codes as defined in chapter 4.3.1 “Submission of existing” as to avoid location code doublets.

Before the submission of the retail location codes to the allocation procedure, harmonisation with the RINF database must be carried out pursuant to Article 10(10) and in accordance with to the RINF Application Guide [10] where the linkage of Primary Location Codes to RINF Infrastructure Objects (such as Operational Points or to Sections of Lines) is described. In such case the submitter must obtain a prior validation from the concerned IM and then from ERA.

Further harmonisation with the Location primary code (4.1.1.2) and Location subsidiary code (4.1.1.2) must be carried out as to ensure the uniqueness of the submitted code.



4.11 Location data detailed data requirements

The complete definition of all the elements to be used for the location data are located at the technical document ERA-TD-105 which encloses the whole XML data catalogue and the technical document ERA Ontology for the implementation of Telematics TSI after every Change Control Management Cycle.

Within this document are specified all the different simple elements and complex elements of the so called Telematics TSI Catalogue, among them the elements and messages used to implement the

functionality described on this Appendix C for References Files. Consequently, the corresponding XML element definitions of this document have been deleted.

5 Organisation codes reference dataset

5.1 Organisation codes

The purpose of organisation codes⁴ is to have a mandatory unique identifier for legal persons (organisations) having a role in data generation, provisioning and consumption in the railway industry, including the telematics domain. All ‘telematics stakeholders’ listed in Act Article 3(9) of the Telematics Application TSI shall receive an Organisation Code.

One code identifies an organisation, which might have one or more roles played in the railway system.

The process to an organisation code is described here after, the data presentation is defined in the TD – ERA Ontology

5.2 User management

5.2.1 User roles and permissions

Role	Permissions	Actor
Admin	Full access to all system functionalities, including user management	ERA
OC Manager	Full access to organisation code dataset. Full access to user management in relation to the OC dataset Can assign, suspend or withdraw codes.	ERA
Power user	Can allocate roles to accounts of the same organisation. Can request the assignment of an organisation code and request modifications to the underlying company data.	Organisation
Standard User	Can request the assignment of an organisation code and request modifications to the underlying company data.	Organisation
Guest⁵	Read-only access to the organisation codes dataset, including only the parameters: <ul style="list-style-type: none"> - Name of the organisation - Organisation code 	Public

Table 7 - User roles and permission table for organisation codes

5.2.2 Authorisation workflow

To get a user account, the user has to register to the ERA user management system⁶. By default, new users are assigned the role “Guest”.

Authenticated guest users can then request a role upgrade:

- To become a ‘power user’: the user will have to provide digital evidence of having the power to act on behalf of the organisation. ‘Power user’ rights are granted by an OC manager.
- To become a ‘standard user’: ‘standard user’ rights can be granted by the ‘Power user’ within the same organisation (i.e. same organisation code).

Admins and OC managers can revoke accounts or downgrade user role at any time based on activity and violations of the terms of use.

The Agency provides operational instructions on its website in the respective OCR webpage.

⁴ Art. 9(1)(a) of Regulation XXX/2025 - Telematics TSI

⁵ Public, non-authenticated users, are guest users.

⁶ [User Manual for Organisation Codes requests](#)

5.3 Organisation code - use cases

5.3.1 Company identification function

The use case diagram below illustrates the actors and functions involved in the management of the reference data. The Central Administration Service is a generalisation of 'Other Actor' and is involved in all functions. This actor is also responsible for the publication of codes.

The maintenance processes (updates, deletion requests) can only be made by the authorised representative - owning entity.

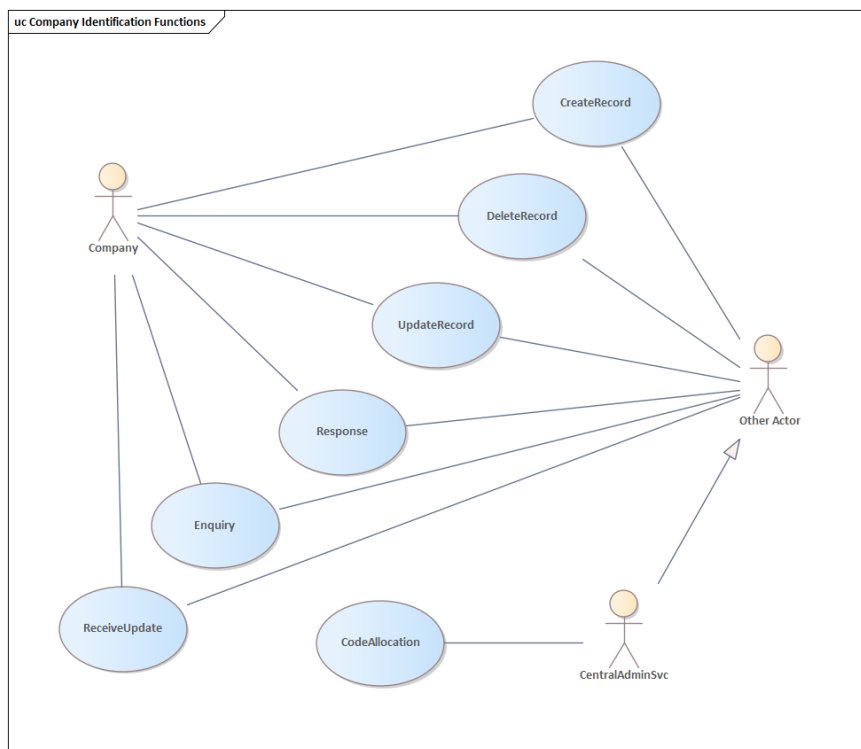


Figure 10: Diagram 2.2 Use Cases for the Company Identification functions.

5.3.2 Enquiries to the reference data

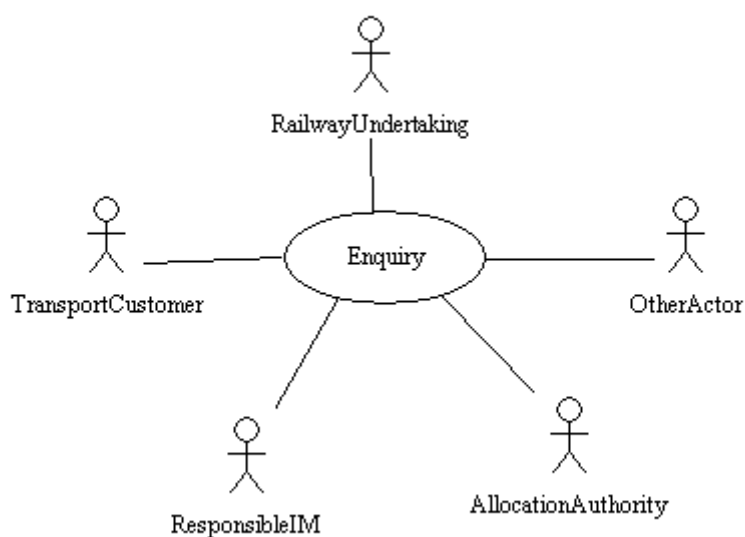


Figure 11 - Enquiries to the reference dataset

5.4 Process requirements

This section documents the underlying requirements adopted to prepare the document: [“User Manual for Organisation Codes requests”](#).

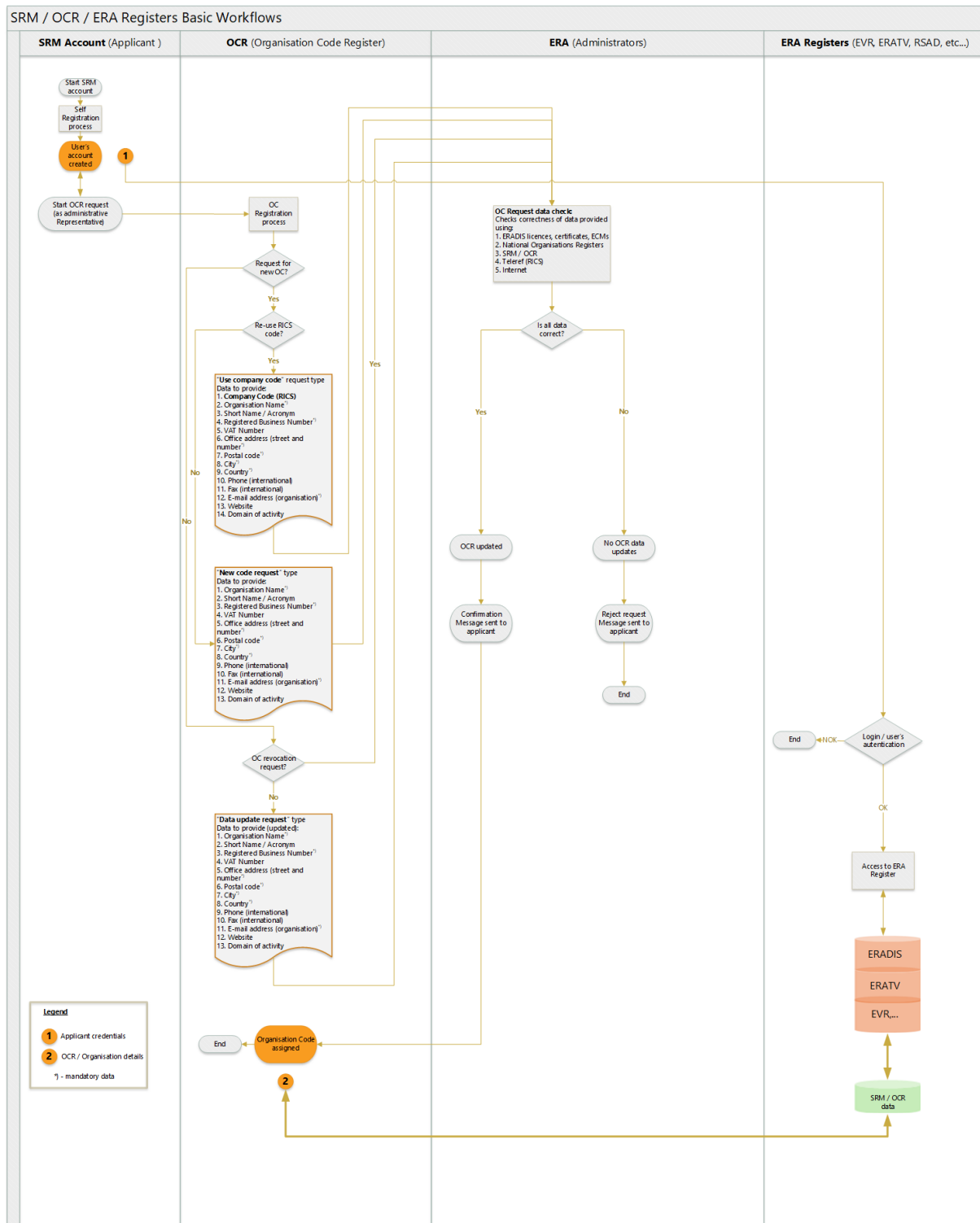


Figure 12 - OCR code allocation flowchart

5.4.1 *Populating the database*

5.4.1.1 *Request to validate an existing RICS code*

Any legal person holding a RICS code can request an Organisation Code. The request shall be done via an IT tool prepared by the Agency and accompanied by a digital proof of identity of the legal person. In addition, the user shall provide evidence of a delegation to represent the organisation for this task.

In requesting the code, the organisation will have to indicate the possession of a RICS code, including the code itself. More details are available at: [Organisation Code Register \(OCR\) | European Union Agency for Railways](#)

5.4.1.2 *Request to get a new organisation code*

Any legal person can request a new organisation code. The request shall be done via an IT tool prepared by the Agency and accompanied by a digital proof of identity of the legal person. In addition, the user shall provide evidence of a delegation to represent the organisation for this task.

5.4.1.3 *Validation of the submitted requests*

The requests submitted in line with section 5.4.1.1 or section 5.4.1.2 can be validated by ERA, after having checked the validity of the digital credentials.

5.4.2 *Enquiry*

Please see section 3.2.

5.5 **Archival requirements**

Organisation codes do not require any specific archival functionalities. See section 3.4

5.6 **Organisation code data requirements**

The application managing organisation codes is the Organisation Code Register (OCR). The data is stored in the ERA Knowledge Graph. Moreover, the organisations will be registered centrally and there is no need of update message for that, as the number of updates don't require really an update by message.

6 Keepers' rolling stock reference databases (RSRD)

6.1 Introduction

Section 3.3.2 of the Annex to the Telematics TSI requires the keepers to cooperate, under the coordination of the Agency, to setup, manage and maintain standardised EU Rolling Stock Reference Databases (RSRD).

6.2 Roles and responsibilities

Vehicle keepers are responsible for populating and maintaining reference data in an RSRD and for its quality.

6.3 Functional requirements specifications

Data provided in an RSRD shall allow:

- The identification of the relevant railway vehicle
- The performance of Route Compatibility Check, meaning:
 - o Parameters flagged as relevant in the ERATV decision
 - o Parameters required in the NOISE TSI
 - o Access conditions to stations for specific vehicle categories
 - o Etc.
- The provision of relevant reference data for freight wagons to all stakeholders, in particular railway undertakings, for the planning and operation of trains.
- The parameters flagged as relevant for the technical compatibility between Vehicle and the network(s) of area of use in the ERATV decision⁸
- Relevant loading characteristics
- Brake characteristics relevant to calculate the maximum speed
- Maintenance data, including the EIN of the ECM certificate(s)
- Environmental characteristics

An RSRD shall ensure traceability of changes applied to the rolling stock with the help of the available data elements

- RollingStockDatasetMessage/RollingStockDataset/AdministrativeDataSet/
 - o PreviousWagonNumberFreight,
 - o DatePutIntoService,
 - o AuthorisationValidUntil,
 - o ECM value.

The entries in the Rolling Stock Reference Database can be grouped as per the following sections.

6.3.1 Administrative data

Administrative data is related to certification and registration items such as reference to the EC registration file, id of the notified body, etc.; this may include historical data related to ownership, rental, etc.

Administrative data include at least:

- European Vehicle Number
- Vehicle registration:
 - o Status
 - o Date
- Reference to EC declarations for the following subsystems:

⁸ [*Commission Implementing Decision of 4 October 2011 on the European register of authorised types of railway vehicles – Consolidated version*](#)

- Rolling Stock
- Entity in Charge of Maintenance:
 - EIN of the ECM certificate
- Keeper:
 - VKM
- Authorisation data for vehicles authorised before the entry into force of the relevant EU legislation

6.3.2 Design data

Design data describes the technical characteristics of the vehicles, including at least:

- Vehicle length ERATV par. 4.1.8.
- Total vehicle mass ERATV par. 4.5.5.
- Brake weight percentage or braked mass ERATV par. 4.7.6.
- Static axle load under normal payload ERATV par. 4.5.2.2.
- Maximum design speed ERATV par. 4.1.2.1.
- Reference profile (clearing gauge) ERATV par. 4.2.1.
 - › Loaded weight
 - › Wheels

Design data, which shall include all constitutive (physical) elements of the rolling stock, including characteristics related to the environment, and all information that is expected to remain valid throughout the life of the rolling stock - this part may contain a history of major modifications, major maintenance, overhaul, etc.

6.3.3 Users of rolling stock data

The following telematics stakeholders are specifically defined within the Telematics TSI, however this list is not exhaustive. Each of these users will require unique organisation coding to improve data exchange and to interpret and correctly apply the partner identification in their application system.

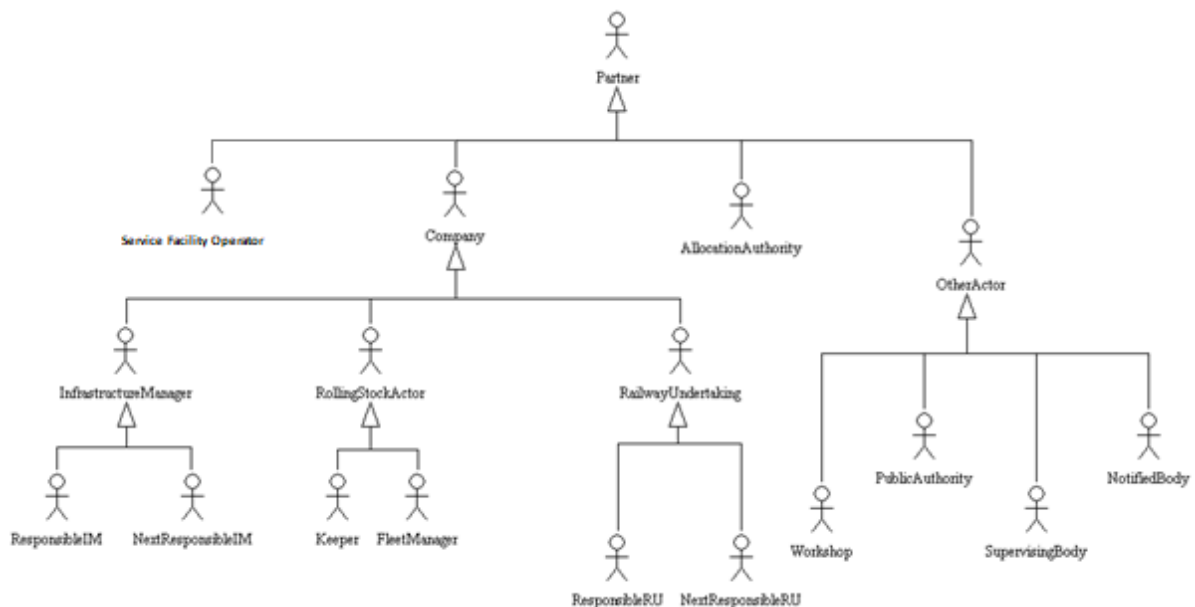


Figure 13: Diagram 3.1 Users of Rolling Stock Data.

6.3.3.1 "ALLOCATIONAUTHORITY" actor

The organisation responsible for allocating (assigning) codes within a country. It could be a national or private authority or any other Actor entrusted with the responsibility of code maintenance.

It specialises the actor Partner.

It cooperates with the following use cases:

- › AllocationAuthorityValidation
- › CodeInputToCAS
- › Amendment/Deletion to CAS
- › CodeSubmission
- › Enquiry

6.3.3.2 "CENTRALADMINSVC" actor

The Central Service Administering the Reference data. It specialises the actor OtherActor.

It cooperates with the following use cases:

- CodeAllocation

6.3.3.3 "COMPANY" actor

This element identifies the company (RU or IM) responsible for a specific location

It specialises the actor Partner.

It cooperates with the following use cases:

- › CreateRecord
- › DeleteRecord
- › UpdateRecord
- › Response
- › Enquiry

6.3.3.4 "INFRASTRUCTUREMANAGER" actor

During the normal transportation process with trains there is no interaction between Infrastructure Manager and keeper. Infrastructure managers obtain their data directly from the RU, including the wagon reference data. In the case of damages or accidents the Infrastructure Manager might need direct access to the keeper's data in addition to the fact that the railway undertaking is the duty holder and therefore the primary partner for the Infrastructure Manager.

Concerning Telematics TSI reference data, an Infrastructure Manager is a partner in the transportation / train production / wagon use process and should have access to the rolling stock reference data.

According to the Telematics TSI reference data, each Infrastructure Manager is a partner and should be handled by the coding methods as pointed out in Company identification documentation.

It specialises the actor Company.

It cooperates with the following use cases:

- Enquiry

6.3.3.5 "KEEPER" actor

The entity, who being the owner or having the right to dispose of a vehicle, exploits it economically in a permanent manner as a means of transport and is registered as such in the European Vehicle Register. A railway undertaking or other entities owning wagons equally have the role of keepers.

In the context of the Telematics TSI the keeper is managing his wagon fleet from both a technical and commercial point of view when his wagons are used by railway undertakings or transport customers.

Keepers have the right to assign the operational fleet management tasks to a specific fleet manager (e.g. a company on its own) but remain liable for the operational status and safety of their wagons.

Concerning Telematics TSI reference data, each keeper is a partner in the transportation / wagon use process concerning his own wagons and shall allow access to his rolling stock reference database. According to the Telematics TSI reference data, each keeper is a partner and should be handled by the coding methods as pointed out in Company Identification documentation.

A Keeper may also appoint an **IT Service Provider**. In the context of the keeper's rolling stock reference data an IT service provider is hosting / operating IT systems and offering IT services to the keeper. This enables the keeper to outsource his IT tasks i.e. running the keeper's rolling stock reference database etc.

It specialises the actor RollingStockActor. It cooperates with the following use cases:

- › Creation
- › Modification
- › Deletion

6.3.3.6 “NOTIFIEDBODY” actor

The bodies which are responsible for assessing the conformity or suitability for use of the interoperability constituents or for utilising the EC procedure for verification of the subsystems.

It specialises the actor OtherActor.

It cooperates with the following use cases:

- Enquiry

6.3.3.7 “NEXTRESPONSIBLERU” actor

RU responsible for the physical movement of the train after interchange. It specialises the actor RailwayUndertaking.

It cooperates with the following use cases:

- Enquiry

6.3.3.8 “RAILWAYUNDERTAKING” actor

A Railway Undertaking is any private or public-law company primarily involved in the provision of rail transportation services for the carriage of goods and/or persons and in all cases also provides the traction for same.

It specialises the actor Company.

It cooperates with the following use cases:

- Enquiry

6.3.3.9 “RESPONSIBLERU” actor

RU Responsible for the physical operation of the train.

Whilst using the keeper's wagons the railway undertaking is the Duty Holder who is the legal entity responsible for the risk which he imports onto the network.

Concerning Telematics TSI reference data, a railway undertaking is a partner in the transportation / train production / wagon use process (after signing the common contract of use) and should have

access to the rolling stock reference data. According to the Telematics TSI reference data, each railway undertaking is a partner and should be handled by the coding methods as pointed out in Company Identification documentation.

It specialises the actor `RailwayUndertaking`. It cooperates with the following use cases:

- Enquiry

6.3.3.10 "ROLLINGSTOCKACTOR" actor

The Keeper, Wagon Owner or Fleet Manager It specialises the actor `Organisation`.

It cooperates with the following use cases:

- Enquiry

6.3.3.11 "SERVICEFACILITYOPERATOR" ACTOR

A Service Facility Operator is any private or public-law company primarily involved in managing a marshalling yard, multimodal or intermodal terminal, bulk terminal, port terminal. It may also include management of parts of mainline trackwork, be part of paths and thus assume responsibilities of an Infrastructure Manager.

It specialises the actor `Company`. It cooperates with the following use cases:

- Enquiry

6.3.3.12 "SUPERVISINGBODY" actor

Supervising/Investigating body (delegated safety authority) providing an audit role as authorised by the State.

It specialises the actor `OtherActor`.

It cooperates with the following use cases:

- Enquiry

6.3.3.13 "OTHERACTOR" actor

`OtherActor` refers to other telematics stakeholders

It specialises the actor `Partner`.

It cooperates with the following use cases:

- Modification/Deletion Request
- Enquiry

6.3.3.14 "ECM" actor

It specialises the actor `OtherActor`. It cooperates with the following use cases:

- Enquiry

6.4 Data use

As mentioned in point 6.3, RSRD is a provision/query function for freight wagon reference data. According to the Telematics TSI, this data must be provided via the Common Interface. The way in which the Vehicle Keeper connects his IT systems to the Common Interface, and whether this is done via a database system, should actually be irrelevant for the function.

6.5 Use cases for processes

The Use Cases for Rolling Stock Data processes are defined below and illustrate the actors involved in each process. There are four distinct use cases (processes) defined:

- › CreationProcess
- › ModificationProcess
- › Deletion Process
- › Enquiry Process

6.5.1 *Creation, modification and deletion processes*

As seen below, the Keeper (or through its designated IT Service Provider) is the only actor allowed to physically create, modify or delete a database record. All other actors have read-only access. The creation and update procedures for maintaining a correct and useful data content involve the following roles and process steps. When the Keeper creates, modifies or deletes Rolling Stock data locally the information must be shortly available via the API.

6.5.1.1 *Record Creation*

A record is created by the Keeper when a vehicle is manufactured and has been authorised and registered by the “AllocationAuthority” in the first State of registration. The record will contain full information as defined in the Telematics TSI Schemas in Appendix I, ERA-TD-105, TSI — Annex D.2: Appendix F — TSI Data and Message Model.. A copy of the created record is available to the authorized users via the API.

6.5.1.2 *Record Modification*

Any data in the database may be altered except for the Wagon Number. A new Wagon Number is linked to a new registration. A record may be modified by the Keeper in the following cases (list is not inclusive):

- › As a result of regular overhaul standard maintenance/repair or reconstruction information supplied by a workshop
- › As a result of changes in relevant date in the National Vehicle Registers (NVRs)

A copy of the modification data is available to authorized users via API.

6.5.1.3 *Record Deletion*

In the case that a wagon is transferred to another Keeper, the record for the wagon shall be archived after the new Keeper has been registered in the National Vehicle Register of the Authorising State.

6.5.2 *Enquiry use case for the rolling stock reference data*

The following defines the actors involved in the enquiry process and their rights controlling their access to the rolling stock reference data via the API:

The Message (RollingStockDatasetQueryMessage) is sent by the enquirer (e.g. RU/WIMO) to the Rolling Stock Reference Database of the keeper.

The RSRD processes the query for each wagon number included in the message as follow:

The RSRD checks the existence of the wagon number in the database and the authorisation of the enquirer. If the wagon number exists and if the enquirer is authorized for the requested wagon number, the RSRD system fills the “RollingStockDatasetMessage” with the respective wagon data.

If the wagon number is not recorded or if the enquirer is not authorized, RSRD uses the data element RefusedWagonNumbers. The element RefusedWagonNumbers includes the refused wagon number as well as the refusal reason. After all the wagon numbers have run through the loop, RSRD returns the “RollingStockDatasetMessage”.

6.5.3 *Data security, access rules and rights*

Access to the Rolling Stock Reference Database via the API and any other access point like a web GUI requires a valid user ID and a password. The User ID is linked with profile information defining the scope of user and access rights.

The Keeper or IT System Operator of the Rolling Stock Reference Database is responsible for the maintenance of user profiles. Each information provider maintains their own users' information or forwards the information to the operative party responsible for user information updates in the RSRD.

The following actors may have read-only access to the data under the following conditions:

The Fleet Manager other than the Keeper's Own/Direct Fleet Manager

The Fleet Manager may have read only access rights, based on vehicle number enquiry only, to all wagon technical and administrative data for the period that wagons are directly consigned by or to them.

Infrastructure Manager (IM)

The responsible IM may have read only access rights to all wagon technical and administrative data, based on vehicle number enquiry only, for the period that a vehicle is either on their infrastructure or en route.

Railway Undertaking (RU)

The responsible and next responsible RU may have read only access rights, based on vehicle number enquiry only, to all wagon technical and administrative data for the period that wagons are in trains directly under their control or en route to them.

Workshop

The Workshop may have read only access rights, based on vehicle number enquiry only, to all wagon technical data for the period that wagons are directly under their control in their shops, en route to them for attention.

Notified Body

The Notified Body may have read only access rights, based on vehicle number enquiry only, to all wagon technical and administrative data for the period only that wagons are requested to be approved or assessed by them.

Allocation Authority

The Allocation Authority may have read only access rights, based on vehicle number enquiry only, to all wagon administrative, design and technical data, as specified in the TSI WAG in their own directory and other Allocation Authorities' Directories as granted by the European Railway Agency requirements for the National Vehicle Register.

Supervising Body (Investigating/delegated Safety Authority)

The Supervising Body may have read only access rights, based on vehicle number enquiry only, to all wagon administrative, design and technical data, as specified in the TSI WAG being supervised in their own State directory and other States Allocation Authorities' Directories as granted by the European Railway Agency requirements for the National Vehicle Register.

Service Facility Operator

The Service Facility Operator may have read only access rights to all wagon technical and administrative data, based on vehicle number enquiry only, for the period that a vehicle is either on their infrastructure or en route.

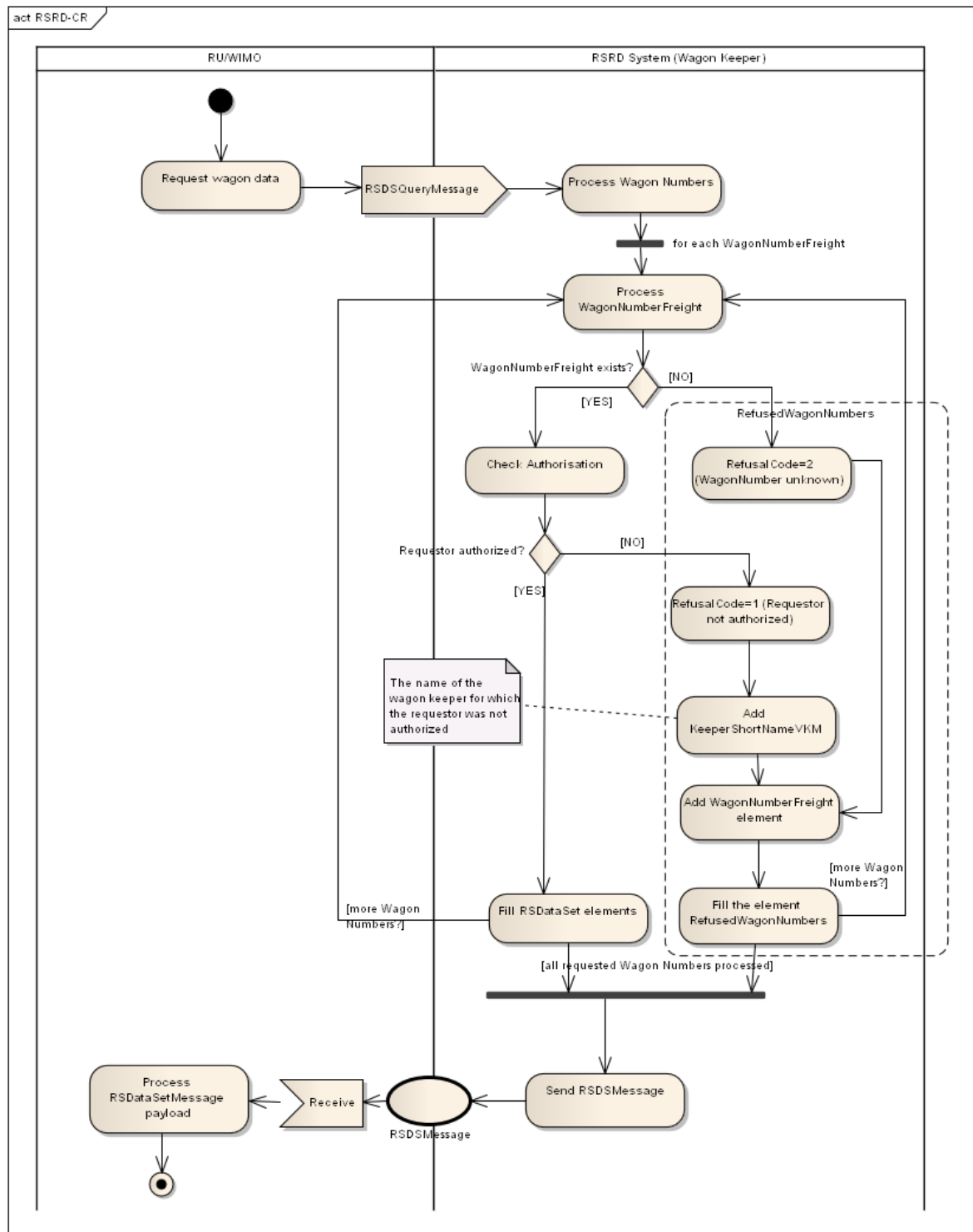
6.5.4 *RollingStockDataSetQueryMessage to RSRD*

Figure 14 Diagram 3.4 Enquiry Activity - RSRD.

6.5.5 *RollingStockDataSetQueryMessage Enquiry*

The actors as defined above may make an enquiry by wagon number(s). They must create an enquiry message in the defined *RollingStockDataSetQueryMessage* format. This message is sent through the API to the RSRD of the keeper of the wagon.

6.5.5.1 Validation of User Access Rights by RSRD

The appropriate application within the RSRD performs a validation of the enquiring party and its rights, checked against the user specific profile.

6.5.5.2 RollingStockDatasetMessage Response from RSRD

If the user fulfils the criteria contained in the 'Access Rules and Rights' subchapter above, the RSRD will deliver a *RollingStockDatasetMessage* to the Requester. If the Requester does not fulfil the access requirements, a negative response message (*RollingStockDatasetMessage* with the element *RefusedWagonNumbers*) will be sent via the API.

6.6 Reference to external systems

6.6.1 European Vehicle Register

The European Vehicle Register (EVR) is the reference source for vehicles data.

Established under Art. 47(5) of the Interoperability Directive⁹, EVR is the repository of all the vehicle registrations. As stated in Art. 22(1) of the Interoperability Directive, railway vehicles must be registered in the EVR before their use.

The keeper is responsible to request the registration, which is granted by the Registration Entity.

6.6.2 Operational data

The requirements for Rolling Stock as Part of the optional Wagon and Intermodal Operational Database (WIMO) as defined in Chapter 3.3.4 "Wagon and intermodal loading unit operational database" states that:

Beside the reference data for rolling stock, the data representing the actual status of the rolling stock is the most important data for operational purposes.

This data shall include temporary data, such as restrictions, current and projected maintenance actions, km and fault counters, etc.; and all data that could be considered as "status" (temporary speed restrictions, brake isolated, needs for repair and fault description, etc.).

For use of the operational rolling stock data three different entities must be considered taking into account the different parties responsible for rolling stock during transport operation:

- Railway Undertaking as Duty holder during its transport control
- Vehicle keeper
- User (or hirer) of rolling stock

For all three different parties the operational rolling stock data must be accessible by the authorised user, down to his predefined authorised level, using the single key given by the wagon id (wagon number).

The operational rolling stock data is a part of the optional European wide Wagon and Intermodal Unit Operational Database as described in chapter 4.2.11.2 Other Databases.

Conclusions/Approach

In line with the existing roles and rules the railway undertaking which is using the keeper's wagon during the transport process is the legal duty holder. Thereby the railway undertaking is responsible for the operational status of the wagons, e.g. the railway undertaking, as duty holder, is responsible for the detection and documentation of damages.

⁹ [Directive \(eu\) 2016/797 of the european parliament and of the council of 11 May 2016 on the interoperability of the rail system within the European Union \(recast\)](#)

According to the standard contract of use for rail freight wagons valid from 01.06.2006 the railway undertaking is responsible for sending appropriate data describing the actual wagon status to the keeper.

Therefore two obligations will exist in parallel for railway undertakings:

- › As soon as a railway undertaking and a keeper have both signed the standard contract of use, the railway undertaking is obliged by the standard contract of use to send status information to the keeper.
- › As soon as the relevant regulations for the use of the WIMO (not yet defined) are obligatory for a railway undertaking, the railway undertaking will have to send status information to the WIMO. The information available in the WIMO database must also be able to be accessed electronically by:
 - Registration Authorities
 - National Safety Authorities

This document describes only the keeper's rolling stock reference database.

Therefore any further descriptions concerning the data exchange between railway undertaking and the WIMO are not part of this document (see the optional TSI - ANNEX D.2 : APPENDIX B - WAGON AND INTERMODAL UNIT OPERATING DATABASE (WIMO) for details).

6.7 Non-functional requirements

6.7.1 System integrity and security ([4 & 5], chapter 4.2.11.3)

Under the following points are listed the requirements which must be supported by the database(s) according [4 & 5] chapter 4.2.11.3. These are:

6.7.1.1 Authentication

The database must support the authentication of users of the systems before they can gain access to the database.

6.7.1.2 Security

The database must support the security aspects in the meaning of controlling access to the database. The possible encryption of the database contents itself is not required.

6.7.1.3 Consistency

The database selected shall support the ACID principle (Atomicity, Consistency, Isolation, Durability).

6.7.1.4 Access Control

It must be ensured that only authorised users may gain access to RSRD and that they can only gain access to the relevant parts and information of the system as defined in chapter 3.10.3. The access control shall be supported down to a single attribute of a data record. The database shall support configurable, role-based access control for insertion, update or deletion of data records.

6.7.1.5 Tracing

The database must support logging all actions applied to the database to allow for tracing the detail of the data entry (Who, What, When did the contents change).

6.7.1.6 Lock strategy

The database must implement a locking strategy which allows access to the data even when other users are currently editing records. Rolling Stock records will be locked when a wagon record is open in the RSRD.

6.7.1.7 Multiple Access

The database must support that data can be accessed simultaneously by several users and systems.

6.7.1.8 Reliability

The reliability of the database must support the required availability.

6.7.1.9 Availability

The database must have an availability on demand of at least 99,9 %.

6.7.1.10 Maintainability

A maintainability of the database must support the required availability.

6.7.1.11 Compatibility

The database must support a data manipulation language that is widely accepted, such as SQL or XQL.

6.7.1.12 Import facility

The database shall provide a facility that allows the import of formatted data that can be used to fill the database instead of manual input.

6.7.1.13 Export facility

The database shall provide a facility allowing an export of the contents of the complete database or its part as formatted data.

6.7.1.14 Mandatory Fields

The database must support mandatory fields that are required to be filled before the relevant record is accepted as input to the database.

6.7.1.15 Plausibility Checks

The database must support configurable plausibility checks before accepting the insertion, update or deletion of data records.

6.7.1.16 Response times

The database must have response times that allow users to insert, update or delete data records in a timely manner.

6.7.1.17 Performance aspects

The database shall support the queries necessary to allow the effective run of about 60.000 train runs per 24 hours. About 50% of these train runs are deemed to take place within two hours.

The number and kind of queries or updates per train are dependent on the overall process for planning and running a train.

6.7.1.18 Capacity aspects

The database shall support the storage of the relevant data for all freight wagons respectively on the network. It shall be possible to extend the capacity by simple means (i.e. by adding more storage capacity and computers). The extension of the capacity shall not require replacement of the subsystem.

6.7.1.19 Backup strategy

A backup strategy shall be in place to ensure that the complete database contents for up to a 24 hour period can be recovered.

The above requirements shall be handled by a standard Database Management System (DBMS). The usage of the database is embedded into various workflows.

The general workflow is a request / response mechanism, where an interested party requests information from the database through the Application programming interface (Ref. [4 & 5] chapter 4.2.12.1 and 4.2.12.6). The DBMS responds to this request either by providing the requested data or by responding that no data can be made available (no such data exists or access is refused due to access control i.e if the wagon number is not recorded or if the enquirer is not authorized, RSRD uses the data element “RefusedWagonNumbers”. The element “RefusedWagonNumbers” includes the refused wagon number as well as the refusal reason.).

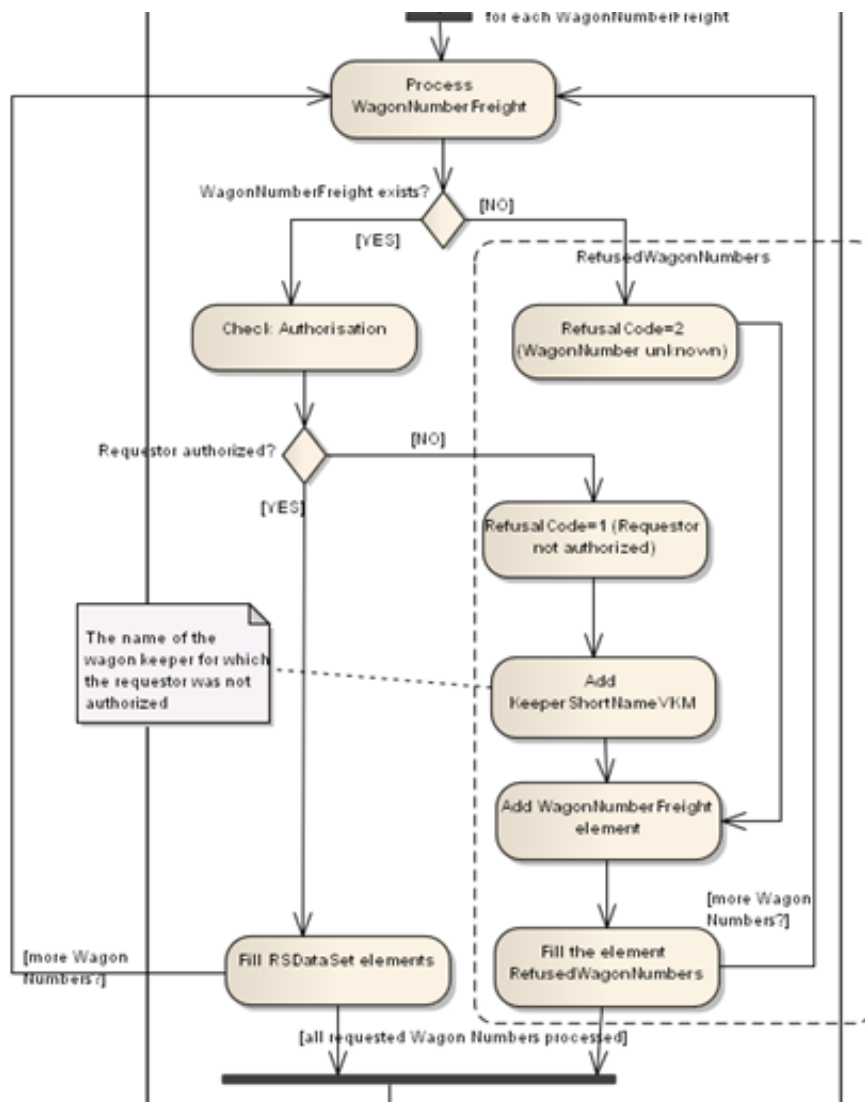


Figure 15: System Security - Access.

If the response cannot be made available within the time interval of 5 Minutes a message “Receipt Confirmation” must be sent from the RSRD module to the sender of the request.

6.8 Interfaces specific to rolling stock

6.8.1 Technical interface

Access to the RSRD must follow the specifications of the Application Programming Interface (API) referenced in Art. 14 of the Telematics TSI¹⁰.

¹⁰ Reference to the legal text

The API is documented in a separated set of specification and provides for connections to existing and future systems and centralized / individual databases, directories and systems.

Each access to rolling stock data in the RSRD must be possible, in accordance with the defined access rights, via the defined API.

6.8.2 Human-Computer Interface (HCI)

The HCI (also known as User Interface) is a mean by which a user may interact with the application. In addition to the API, as mentioned above, the application will also need to have the ability for direct input and output by the user. The API will be used to communicate standard messages while the HCI will allow a user direct access to the database.

The HCI should be able to handle the following:

Inputs	Outputs
Manual input Standard messages	Screen Paper Electronic Media Pdf file Email Spreadsheet Text File Standard messages

The manual input screens (GUI) must be menu driven for each section of related messages or groups of data. The following manual input screens shall be created for all use cases (creation, modification, deletion and enquiry).

6.9 Keeper's rolling stock data requirements

The Keeper is responsible for maintaining the following data in the RSRD as defined in Specification 2 – Wagon and Intermodal Unit Database.

6.10 Rolling Stock Data – Detailed Data Requirements

The complete definition of all the elements to be used for the Rolling Stock Data are located at TSI [4] [5] [6] in Appendix I, ERA-TD-105, TAF TSI — Annex D.2: Appendix F — TSI Data and Message Model, which encloses the whole xml catalogue for the implementation of Telematics TSI after every Change Control Management cycle. Within this document is specified all the different elements, complex types and simplex types of the so called Telematics TSI catalogue, among them the elements and messages used to implement the functionality described on this Appendix C for References Files. Consequently the corresponding xml elements from this document have been deleted.

7 The single centralised intermodal loading unit reference database (ILURD)

7.1 Definitions

Intermodal loading unit (ILU) means a container, swap body or semi- trailer.

7.2 Functional requirements specifications

7.2.1 Requirements according to telematics TSI

The Telematics TSI obliges keepers of an Intermodal Loading Unit (ILU) to share technical and administrative data of their loading units in the Intermodal Loading Unit Single Reference Database as stated in the Annex Chapter 3.3.1 on *The Intermodal Loading Unit Single Reference Database* (see text below).

It must be noted that maritime ISO containers are excluded from the database requirements stated below and they have a registration authority named in the relevant international standard (ISO 6346) for ISO containers which operate both the register of ISO owner codes and an equipment database for these containers.

7.2.2 Users of intermodal loading unit data

The stakeholders listed below are specifically defined within the Telematics TSI and are potential users of the ILURD (either as data providers or as data users). Each user will need its unique Company Code for system-to-system data exchange and to interpret and correctly apply the partner identification in their application system. The ILURD will be managed by a unique system administrator.

The Data Users of Intermodal Loading Unit Data are:

- › Railway Undertakings (RUs)
- › Infrastructure Managers (IMs)
- › Combined Transport Operators (CTOs)
- › Terminal Operators (TOs)
- › Logistic Service Providers (LSPs)
- › Competent Authorities
- › Freight Forwarders (FF)

The Data providers of Intermodal Loading Unit Data are Keepers of an ILU.

7.2.2.1 "ILURD ADMINISTRATOR" ACTOR

The ILURD Administrator is defined in the standard EN 13044-1 clause 4.2.1. Its main tasks will be:

- › Software installation and maintenance
- › User Management and Support
- › Data Management
- › Database backup and recovery
- › Performance monitoring
- › Database Tuning

7.2.2.2 "COMPANY" ACTOR

This actor identifies the company (TOs, CTOs, LSPs, RUs, FFs or IMs) who queries the database.

It cooperates with the following use cases:

- Enquiry

7.2.2.3 "COMPETENT AUTHORITY" ACTOR

This actor identifies the Competent Authority who queries the database.

It cooperates with the following use cases:

- Enquiry

7.2.2.4 "KEEPER" ACTOR

'Keeper' of an ILU (ILUK) means the natural or legal person that, being the owner of an intermodal loading unit or having the right to use it, exploits the intermodal loading unit as a means of transporting goods. In the context of the Telematics TSI the keeper is managing his ILUs from both a technical, operational and commercial point of view.

It cooperates with the following use cases:

- › Creation
- › Modification
- › Deactivation

7.3 Use cases for processes

The Use Cases for Intermodal Loading Unit Data processes are defined below and illustrate the actors involved in each process. There are two distinct use cases (processes) defined:

- Creation, Modification and Deactivation/Deletion Process
- Enquiry Process

7.3.1 Creation, modification and deletion processes

The Keeper of an ILU is the only actor allowed to physically create, modify or deactivate a database record. All other actors have a read-only access. The creation and update procedures for maintaining a correct and useful data content involve the following roles and process steps.

7.3.1.1 Record Creation

A record is created by the Keeper when an ILU has been authorised for railway transport and for which a unique ILU-Code has been attributed. The record will contain full information (with the payload for the "ILUDataMessage") as defined in the Telematics TSI Schemas in Appendix I, ERA-TD-105 — Annex D.2: Appendix F — Message Model.

7.3.1.2 Record Modification

A record may be modified by the Keeper in the following cases (list is not inclusive):

- › As a result of regular overhaul standard maintenance/repair or reconstruction that modify one of the technical data
- › As a result of a purchase/selling of ILUs

The revised record will contain full information (with the payload for the "ILUDataMessage") as defined in the Telematics TSI Schemas in Appendix I, ERA-TD-105, TSI — Annex D.2: Appendix F — TSI Data and Message Model.

7.3.1.3 Record Deactivation

In the case that an Intermodal Loading Unit is taken out of service, the record for this specific ILU shall be deactivated by the Keeper. The ILU record remains stored in the ILURD.

In the case that an Intermodal Loading Unit is transferred to another Keeper or is taken out of service, the record for this specific ILU shall be deactivated by the previous Keeper and created by the new keeper.

7.3.2 ENQUIRY USE CASE FOR THE ILURD

The following defines the enquiry process and the rights of the users to the ILURD.

The query message record will contain full information as defined in the Telematics TSI Schemas in Appendix I, ERA-TD-105, TSI — Annex D.2: Appendix F — TSI Data and Message Model. The name of the message is “ILUDataSetQueryMessage”.

The Message is sent by the enquirer (e.g. an IM, RU, CTO, TO) to the ILURD. The ILURD processes the query for each Intermodal Loading Unit number included in the message as follows:

The ILURD checks the existence of the Intermodal Loading Unit number (ILU-Code as defined in EN 13044-1 clauses 3.2 and 4.2.1) in the database and the authorisation of the enquirer. If the loading unit number exists and if the enquirer is authorized for the requested Intermodal Loading Unit number¹¹, the ILURD system sends to the enquirer the “ILUDatasetMessage” with the respective loading unit data.

If the Intermodal Loading Unit number is not recorded or if the enquirer is not authorized, the system will respond with a corresponding response message being the “ILUDatasetMessage” with the value “no answer possible”.

7.3.3 Data security, access rules and rights

Access to the ILURD requires a valid user ID / password and Multifactor Identification. The User ID is linked with profile information defining the scope of user and access rights.

The system administrator of the ILURD is responsible for the maintenance of user profiles. Each user maintains their own users’ information or forwards the information to the operative party responsible for user information updates in the ILURD. The following actors may have read-only access to the data under the following conditions:

Infrastructure Manager (IM)

The responsible IM may have read-only access rights to all ILU technical and administrative data, based on ILU number enquiry only.

Railway Undertaking (RU)

The responsible and next responsible RU may have read-only access rights, based on loading unit number enquiry only.

Competent Authority

The Competent Authority may have read-only access rights, based on loading unit number enquiry only, to all loading unit administrative and technical data.

Terminal Operator

The terminal operator may have read-only access rights, based on loading unit number enquiry only, to all loading unit administrative and technical data.

Combined Transport Operator

The Combined Transport Operator may have read-only access rights, based on loading unit number enquiry only, to all loading unit administrative and technical data.

Logistics Service Provider and Freight Forwarder

The Logistics Service Provider and Freight Forwarder may have read-only access rights, based on loading unit number enquiry only, to all loading unit administrative and technical data.

¹¹ The enquirer can be any of the users as mentioned in chapter 4.7.2. For system-to-system enquiries, the enquirer must have a valid company code to be authorised for any request.

7.4 Technical requirements

The design of the ILURD should allow easy access, high performance and response time and low transaction costs.

In addition, the ILURD design must be able to carry the workload of all parts and users, described in this document, even if the implementation will be released in steps.

7.4.1 System integrity and security

Under the following points are listed the requirements which must be supported by the database. These are:

Authentication

The database must support the authentication of users of the systems before they can gain access to the database.

Security

The database must support the security aspects in the meaning of monitored and controlled access to the database, with warning system to the administrator. The possible encryption of the database contents itself is not required.

Consistency

The database selected shall support the ACID principle (**A**tomicity, **C**onsistency, **I**solation, **D**urability).

Integrity

The database system prevents unauthorized access or modification of data.

Access Control

It must be ensured that only authorised users may gain access to ILURD and that they can only gain access to the relevant parts and information of the system. The access control shall be supported down to a single attribute of a data record. The database shall support configurable, role based access control for insertion, update or deletion of data records.

Tracing

The database must support logging all actions applied to the database to allow for tracing the detail of the data entry (Who, What, When did the contents change).

Lock strategy

The database must implement a locking strategy which allows access to the data even when other users are currently editing records. ILU records will be locked when a ILU record is open in the ILURD.

Multiple Access

The database must support that data can be accessed simultaneously by several users and systems.

Reliability

The reliability of the database must support the required availability.

Availability

The database must have an availability on demand of at least 99.5 %.

Maintainability

A maintainability of the database must support the required availability.

Compatibility

The database must support a data manipulation language that is widely accepted, such as SQL or XQL.

Import facility

The database shall provide a facility that allows the import of formatted data that can be used to fill the database instead of manual input.

Export facility

The database shall provide a facility allowing an export of the contents of the complete database or its part as formatted data.

Mandatory Fields

The database must support mandatory fields that are required to be filled before the relevant record is accepted as input to the database.

Plausibility Checks

The database must support configurable plausibility checks before accepting the insertion, update or deletion of data records.

Response times

The database must have response times that allow users to insert, update or delete data records in a timely manner.

Performance aspects

The database shall support a high number of simultaneous queries.

Capacity aspects

The database shall support the storage of the relevant data for all intermodal loading units respectively on the network. It shall be possible to extend the capacity by simple means (i.e. by adding more storage capacity and computers). The extension of the capacity shall not require replacement of the subsystem.

Backup strategy

A backup strategy shall be in place to ensure that the complete database contents for up to a 24 hour period can be recovered. The back-up is stored off-line.

The above requirements shall be handled by a standard Database Management System (DBMS). The usage of the database is embedded into various workflows. The general workflow is a request / response mechanism, where an interested party requests information from the database. The DBMS responds to this request either by providing the requested data or by responding that no data can be made available (no such data exists or access is refused due to access control i.e. if the loading unit number is not recorded or if the enquirer is not authorized).

8 Common requirements for all Reference datasets

8.1 Physical security requirements

Physical security requirements should be fulfilled on a high level. Secure data transformation between authorised users must be guaranteed using the API.

8.2 System reliability

Robustness is part of the reliability in order to handle component malfunction or unexpected behaviour. Requirements of the Telematics TSI production environment must support high availability. The system consists of different equipment, services and components.

The suggested system availability is 99.9% monitored over any 28-day period. The maintenance window may be up to 2 hours of downtime per month. Maintenance is permitted overnight on Sunday night for essential maintenance. This high availability requirement can be achieved through specific implementation measures, such as component and data replication, and fallback/roll-out mechanisms as well.

8.3 Backup/recovery

Backup and recovery functions enable system and data recovery. They encompass the vital system elements (network, database, system equipment, configurations etc.) but the backup could mean staff -issues as well. The system backup/recovery functions must be performed as soon as possible after the failure situation and the maintenance staff must be trained for these operations regularly.

8.4 Scheduled maintenance

Scheduled maintenance relates closely to data and system maintenance. There must be at least one regularly planned maintenance window in the inspection period (eg. 28d). CAS and other related administrators must have access to a help desk or maintenance unit.

8.5 Multiple access and lock strategy

The key element of the lock strategy is that the database can be split into various independent units for updating. These units can be a field, record, file or a larger part of the database. On the database level locks are used for limiting data processing in certain type of situations. In some cases the complete database or part of the databases can be locked, if the information flow needs to be restricted for some reason. In this case information is available but not accessible. In databases, locks can be used as a means of ensuring transaction synchronicity. One of the most important functions of the database is to ensure that users are able to read and write to the database without overwriting each other's changes inadvertently or reading inconsistent data due to in-progress changes. To handle simultaneous access of the same data by several users, the database must take advantage of various types of locks. In order to guarantee data reliability, multiple access rules must be defined. Only one user can handle data on one time. Despite that, other users are allowed to search the same data at the same time.

8.6 Data quality

8.6.1 Prerequisite

Chapter 1.5 of the Telematics TSI (Annex) details the essential requirements for Data Quality. This is a prerequisite for effective data exchange and comprises the following criteria: Completeness, Accuracy, Consistency, Timeliness and Uniqueness.

The sender of each message will be responsible for the correctness of the data sent and must verify that it is in compliance with the guidelines stipulated for that message. This means that the data must not only be complete and conform to the metadata requirements (syntax-level), but must also be

accurate, timely, consistent and unique for the receiving application to effectively import the message. This requires two distinct levels of validation, as described below:

8.6.2 Level 1 compliance checking

As the Telematics TSI messages are defined using WC3 XSDs according to Recommendation 28, the schema contain all metadata needed for strict Level 1 compliance checking. This syntactical-level check validates the interchange, or part of it, for compliance with the schema. This checking normally happens at the translation and validation layer, before the data is treated by the API. It includes validation for field lengths, data types, codification (where enumerations exists), presence or absence of required data, valid payload entries where defined and the order of data transmitted. The schema validation is more robust and provides a higher level of compliance checking than traditional EDI.

The XSD metadata provides a perfect solution to meet the needs for Completeness and some of the Accuracy requirements as defined above. However, in order for an application to effectively utilise the information, a second set of edits must be done either within the API layer or the application itself.

Level 1 Compliance Checking shall be implemented for the validation of inbound and outbound system messages.

8.6.3 Level 2 application validation

According to the Telematics TSI the originator of the message must ensure a data quality assurance check using their own resources. Data quality assurance includes comparison of data from reference data provided as part of the TSI plus, where applicable, logic checks to assure the timeliness and continuity of data and messages.

Data must be of high quality if they are fit for their intended uses, which means they are Error free: accessible, accurate, timely, complete, consistent with other sources, etc., and Possess desired features: relevant, comprehensive, proper level of detail, easy-to-read, easy-to-interpret, etc.

The receiving application must provide the consistency checks necessary to ensure that the information is error free and consistent with the operating rules of the reference file. This level 2 validation shall also be implemented within the application.

8.7 Interfaces

8.7.1 Technical interface

Access to the Reference data must follow the specifications of the API, as referenced in Art 17 of the Telematics TSI.

The API is described in a separate Functional Requirements Specification and provides for connections to existing and future systems and centralised databases, directories and systems.

The Organisation code will be used as an integral part of the metadata contained in the API, indicating the message queue name and trading partner identification for Telematics TSI message exchange.

8.7.2 Human-Computer Interface (HCI)

The HCI (also known as User Interface) is the means by which a user may interact with the application. In addition to the API, as mentioned above, the application will also need to have the ability for direct input and output by the user. The API will be used to communicate standard messages while the HCI will allow a user direct access to the database.

The HCI should be able to handle the following:

Inputs	Outputs
Manual input Standard messages	Screen Paper Electronic Media Pdf file Email Spreadsheet Text File Standard messages

8.7.2.1 Manual Inputs

The manual input screens must be menu driven for each section of related messages or groups of data. The following manual input screens shall be created for use in accordance with the access rights as defined in Chapter 2.6:

- Record Creation
- Record Modification and Updates
- Record Deletion
- Enquiry/Response

8.8 Change management

See section A.2

8.9 Technical requirements

The minimum technical requirement is that the reference data can be implemented using currently available market offerings. The critical assumptions are related to the relative amount of data processing and transfer. The future provider must be able to meet present and future technical requirements. In the case of this centralised architecture, a good DBMS product must be included. The main conclusion is that all DBMS market leaders provide suitable products for the implementation.

Total Cost of Ownership (TCO) shall be considered which can cover the following issues: cost of data, communications, system hardware depreciation, housing and deployment, system management, licenses, changes in the technical infrastructure, maintenance roadmap and expected lifetime of the system. Scalability is part of extensibility and it should include the ability to add new users with as little limitation as possible.

8.10 System testing and acceptance

Provision must be made for a test mechanism which will enable a user to be validated against a reference set of messages. The tests shall be capable of being sent to a remote validation authority. The connection of each user is dependent on successful validation via the API.