




ERJU SYSTEM PILLAR

Stakeholder Requirements Specification : Maintain & Monitor Rolling Stock Capability



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Abstract	Maintaining and monitoring Rolling Stock is key in railway operations, with a huge impact on performance, reliability and safety of the global railway system. Therefore, the maintenance activities and the structure of european are already regulated at a european level. The "Maintain and Monitor Rolling Stock" capability description reflects this regulation, and in particular Article 14 of Directive (EU) 2016/798 and Commission Implementing Regulation (EU) No 2019/779 on a system of certification of entities in charge of maintenance for vehicles, in accordance with Article 19(3) of Regulation (EU) 2016/796 of the European Parliament and of the Council of 11 May 2016. In this document, we describe the works on this capability done for the SC2.3 System Pillar contract, and the CAPELLA description of this capability
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1 Preamble

1.1 Purpose

1.2 Intended Audience

1.3 Document context

1.4 Glossary

1.4.1 Terms

Accident

Accident' means an unwanted or unintended sudden event or a specific chain of such events which have harmful consequences; accidents are divided into the following categories: collisions; derailments; level crossing accidents; accidents to persons involving rolling stock in motion; fires and others.

Serious Accident

Serious accident means any train collision or derailment of trains resulting in the death of at least one person or serious injuries to five or more persons or extensive damage to rolling stock, the infrastructure or the environment, and any other accident with the same consequences which has an obvious impact on railway safety regulation or the management of safety; 'extensive damage' means damage that can be immediately assessed by the investigating body to cost at least EUR 2 million in total.

Allocation

Allocation means the allocation of railway infrastructure capacity by an infrastructure manager

Allocation Body

An Allocation Body is an independent organization responsible for train path allocation to Railway Undertakings and other Applicants; this includes the designation of individual paths and the assessment of their availability. In most cases, the AB is the same organization as the Infrastructure Manager. But if the rail operator is not independent from the Infrastructure Manager, then path allocation must be carried out, according to Directive 2012/34/EU, by an independent Allocation Body.

Allocation process

The process by which capacity is granted to an Applicant by the Infrastructure Manager or relevant capacity Allocation Body; this capacity is available for the duration of the working timetable period only.

Applicant

Applicant means a railway undertaking or an international grouping of railway undertakings or other persons or legal entities, such as competent authorities under Regulation (EC) No 1370/2007 and shippers, freight forwarders and combined transport operators, with a public-service or commercial interest in procuring infrastructure capacity;

Holder of the vehicle type authorization

Holder of the vehicle type authorization means the natural or legal person that has applied for and received the vehicle type authorization, or its legal successor

Certification body

Certification body means a body, responsible for the certification of entities in charge of maintenance or for certification of the entity or organization that fulfill maintenance functions referred to in points (b), (c) or (d) of Article 14(3) of Directive (EU) 2016/798, or parts of those functions

Competent Authority

Competent authority means any public authority or group of public authorities of a Member State or Member States which has the power to intervene in public passenger transport in a given geographical area or any body vested with such authority

Competent Local Authority

Competent local authority means any competent authority whose geographical area of competence is not national

Coordination

Coordination means the process through which the infrastructure manager and applicants will attempt to resolve situations in which there are conflicting applications for infrastructure capacity.

ECM

Entity in charge of maintenance ('ECM') means an entity in charge of the maintenance of a vehicle, and registered as such in a vehicle register referred to in Article 47 of Directive (EU) 2016/797

The maintenance of vehicles is defined in the Article 14 of Directive (EU) 2016/798.

In particular, the four functions of ECMs are described in the Article 14 (3):

(a) a management function to supervise and coordinate the maintenance functions referred to in points (b) to (d) and to ensure the safe state of the vehicle in the railway system; [editorial edition : ECM 1 in this document]

(b) a maintenance development function responsible to manage the maintenance documentation, including the configuration ation management, based on design and operational data as well as on performance and return on experience; [editorial edition : ECM 2 in this document]

(c) a fleet-maintenance management function to manage the vehicle's removal for maintenance and its return to operation after maintenance; [editorial edition : ECM 3 in this document]

(d) a maintenance delivery function to deliver the required technical maintenance of a vehicle or parts of it, including the release to service documentation. [editorial edition : ECM 4 in this document]

The entity in charge of maintenance shall carry out the management function itself, but may

outsource the maintenance functions referred to in points (b) to (d), or parts thereof, to other contracting parties such as maintenance workshops.

Existing Railway System

Existing rail system means the infrastructure composed of lines and fixed installations of the existing rail network as well as the vehicles of all categories and origins traveling on that infrastructure

Fleet

All the vehicles of the railway company

Incident

Incident means any occurrence, other than an accident or serious accident, affecting the safety of railway operations

Infrastructure Capacity

Infrastructure capacity means the potential to schedule train paths requested for an element of infrastructure for a certain period

RNE Glossary

Narrow definition: the maximum number of trains which can be planned to move in both directions over a specified section of track in a 24hour period.

General definition: the totality of potential train paths that can be accommodated on a railway line or a network

Infrastructure Manager

Infrastructure manager means any body or firm responsible in particular for establishing, managing and maintaining railway infrastructure, including traffic management and control-command and signalling; the functions of the infrastructure manager on a network or part of a network may be allocated to different bodies or firms.

Innovative solutions

The article 10 of the INFRA TSI shall be taken into account regarding innovative solutions for maintenance, upgrading and renewal of infrastructure.

Keeper

Keeper means the natural or legal person that, being the owner of a vehicle or having the right to use it, exploits the vehicle as a means of transport and is registered as such in a vehicle register referred to in Article 47

Exchanged Data

Data interchanged between at least two entities (in this case, data generated and processed by the IMs).

Monitoring data

The entity in charge of maintenance shall, either directly or via the keeper provide information to the railway undertakings and infrastructure managers operating the vehicles, keepers, manufacturers, holders of vehicles authorizations and holders of the type authorization of vehicles, subsystems or components, as most appropriate and shall in particular, inform them of exceptional maintenance findings beyond wear and tear.

National Safety Authority definition 1

National safety authority means a safety authority as defined in point (7) of Article 3 of Directive (EU) 2016/798

National Safety Authority definition 2

National safety authority means the national body entrusted with the tasks regarding railway safety in accordance with this Directive [2016 / 798] or any body entrusted by several Member States with those tasks in order to ensure a unified safety regime

Network

Network means the entire railway infrastructure managed by an infrastructure manager;

Network Statement

Network statement means the statement which sets out in detail the general rules, deadlines, procedures and criteria for charging and capacity-allocation schemes, including such other information as is required to enable applications for infrastructure capacity.

Railway Infrastructure

Railway infrastructure means the items listed in Annex I [of DIRECTIVE 2012/34/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 21 November 2012 establishing a single European railway area (recast)]

Railway Undertaking

Railway undertaking means any public or private undertaking licensed according to this Directive, the principal business of which is to provide services for the transport of goods and/or passengers by rail with a requirement that the undertaking ensure traction; this also includes undertakings which provide traction only;

Regulatory authorities

Under European Union legislation, each Regulatory Body (RB) has the task to oversee the application of Community rules and act as an appeal body in case of disputes.

DIRECTIVE 2012/34/EU, Article 55: 'Each Member State shall establish a single national regulatory body for the railway sector. Without prejudice to paragraph 2, this body shall be a stand-alone authority which is, in organizational, functional, hierarchical and decision-making terms, legally distinct and independent from any other public or private entity. It shall also be independent in its organization, funding decisions, legal structure and decision-making from any infrastructure manager, charging body, allocation body or applicant. It shall furthermore be functionally independent from any competent authority involved in the award of a public service contract.'

Thus it shall ensure that charges set by the Infrastructure Manager comply with Chapter II of 2001/14/EU and are non-discriminatory. The RB oversees negotiations between applicants and the IM and intervenes when the requirements of 2001/14 are likely to be contravened.

Applicants have the right to appeal to the RB if they believe that they have been unfairly treated, discriminated against or are in any other way aggrieved. In particular, they may appeal against decisions adopted by the IM (or where appropriate the Railway Undertaking) concerning: a) the network statement; b) criteria contained within it; c) the allocation

process and its outcome; d) the charging scheme; e) level or structure of infrastructure fees which it is, or may be, required to pay; f) arrangements for access.

Renewal

Renewal means any major substitution work on a subsystem or part of it which does not change the overall performance of the subsystem;

Services

Services are one of the two key components of economics, the other being goods. A service is a type of economic activity (or series of activities) that is of a more or less intangible nature, is not stored and does not result in ownership. Normally (but not necessarily) it takes place in interactions between the customer and service employees and /or systems of the service provider, provided as solutions to customer problems. Examples of services include the transfer of goods, such as the postal service delivering mail, and the use of expertise or experience, such as a person visiting a doctor. Services include the provision of what is necessary for maintenance of thing or operation, assistance and advice. RNE dictionary

Service Facility

Service facility means the installation, including ground area, building and equipment, which has been specially arranged, as a whole or in part, to allow the supply of one or more services referred to in points 2 to 4 of Annex II of DIRECTIVE 2012/34/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 21 November 2012 establishing a single European railway area (recast).

Substitution [in the framework of maintenance]

Substitution in the framework of maintenance' means any replacement of components by parts of identical function and performance in the framework of preventive or corrective maintenance

Timetable

Document or system that gives details of a train(s) schedule over a particular route (OPE TSI appendix J)

This definition can be completed by the RNE definition:

' A schedule listing the times at which certain events, such as arrivals and departures at a transport station, are expected to take place. The timetable defines all planned train and rolling-stock movements which will take place on the relevant infrastructure during the period for which it is in force. Example: "annual timetable" ("yearly timetable" is incorrect)'

Working Timetable

Working timetable means the data defining all planned train and rolling-stock movements which will take place on the relevant infrastructure during the period for which it is in force

Traffic Management

Traffic management shall ensure the safe, efficient and punctual operation of the railway, including effective recovery from service disruption.

The infrastructure manager shall determine procedures and means for:

- the real time management of trains,
- operational measures to maintain the highest possible performance of the infrastructure in case of delays or incidents, whether actual or anticipated, and
- the provision of information to the railway undertaking(s) in such cases.

Any additional processes required by the railway undertaking and which affect the interface with the infrastructure manager(s) may be introduced after being agreed with the infrastructure manager.

Operation and Traffic Management

The procedures and related equipment permitting coherent operation of the various structural subsystems, during both normal and degraded operation, including in particular train composition and train driving, traffic planning and management.

Traffic Monitoring

The monitoring of railway traffic involves systematically keeping track of (or supervising) and collecting information concerning parameters such as: train location, train speed, train direction. It uses graphical systems. The main graphic screens of these systems show two kinds of diagrams: train tracks and train schedules. Train track diagrams indicate the actual layout of railway tracks, signals, stations, and so on. They indicate the current position of trains, the condition of signals, the direction of switches, and so on, using simplified drawings of actual railway tracks and signals. To notify operators of this information, the color of tracks and signals are displayed, and a train's number is displayed in text that dynamically changes according to supervisory data. Train schedule diagrams consist of lines which correspond to the movements of trains, train numbers for each train line, and horizontal lines which show the positions of stations. They are presented as charts that illustrate train movements in actual time depicted along a horizontal axis.

Train

Eurostat/ITF/UNECE definition: one or more railway vehicles hauled by one or more locomotives or rail-cars, or one rail-car traveling alone, running under a given number or specific designation from an initial fixed point to a terminal fixed point. (A light engine, i.e. a locomotive traveling on its own, is not considered to be a train.)

UNISIG definition for ERTMS: a traction unit (vehicle from where a train is operated) with or without coupled railway vehicles or a train set of vehicles with train data available.

General definition: one or more railway vehicles capable of being moved. It may consist of a locomotive (sometimes more than one) to provide power with various unpowered vehicles attached to it. It may consist of a multiple unit, i.e. several vehicles formed into a fixed formation or set, which carry their own power and do not require a locomotive. A train may be only a locomotive running light (deadheading) to a point elsewhere on the railway. A train may carry passengers, freight or, rarely nowadays, both.

Train crew

Members of the on-board staff of a train, who are certified as competent and appointed by

a railway undertaking to carry out specific, designated safety related tasks on the train, for example the driver or the guard.

Train dispatch

The indication to the person driving the train that all station or depot activities are completed and that, as far as the staff responsible are concerned, movement authority has been granted for the train.

Train Driver

Train driver means a person capable and authorized to drive trains, including locomotives, shunting locomotives, work trains, maintenance railway vehicles or trains for the carriage of passengers or goods by rail in an autonomous, responsible and safe manner.

Train Path

Train path means the infrastructure capacity needed to run a train between two places over a given period.

Train preparation

Ensuring that a train is in a fit condition to enter service, that the train equipment is correctly deployed and the train composition matches the train's designated route(s). Train preparation also includes technical inspections carried out prior to the train entering service.

Upgrading

Upgrading means any major modification work on a subsystem or part of it which results in a change in the technical file accompanying the 'EC' declaration of verification, if that technical file exists, and which improves the overall performance of the subsystem.

Vehicle

Vehicle means a railway vehicle suitable for circulation on wheels on railway lines, with or without traction; a vehicle is composed of one or more structural and functional subsystems.

1.4.2 Abbreviations

This paragraph contains the definition, abbreviations and symbols used by the Arcadia method with Capella throughout the all document.

Operational Capability



Capability of an organization to provide a high level service leading to an operational objective being reached (for example Provide weather forecasts, etc.);

Operational Entity



Entity belonging to the real world (organization, existing system, etc.) whose role is to interact with the system being studied or with its users (for example Crew, Ship, etc.);

Operational Actor



Particular case of a (human) non-decomposable operational entity (for example Pilot, etc.);

Operational Activity



Process step carried out in order to reach a precise objective by an operational entity, which might need to use the future system in order to do so (for example Detect a threat, Collect meteorological data, etc.);

Operational Interaction



Exchange of information or of unidirectional matter between operational activities (for example meteorological data, etc.);

Operational Process



Series of activities and of interactions that contribute toward an operational capability.

Operational Scenario



Scenario that describes the behavior of entities and and/or operational activities in the context of an operational capability. It is commonly represented as a sequence diagram, with the vertical axis representing time.

2 Introduction

Maintaining and monitoring Rolling Stock is key in railway operations, with a huge impact on performance, reliability and safety of the global railway system. Therefore, the maintenance activities and the structure of european are already regulated at a european level.

The "Maintain and Monitor Rolling Stock" capability description reflects this regulation, and in particular Article 14 of Directive (EU) 2016/798 and Commission Implementing Regulation (EU) No 2019/779 on a system of certification of entities in charge of maintenance for vehicles, in accordance with Article 19(3) of Regulation (EU) 2016/796 of the European Parliament and of the Council of 11 May 2016.

In this document, we describe the works on this capability done for the SC2.3 System Pillar contract, and the CAPELLA description of this capability.

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3 Maintain & Monitor Rolling Stock Architecture Description

3.1 AS-IS

3.1.1 Process followed

The activities pursued on the AS-IS architecture were the following:

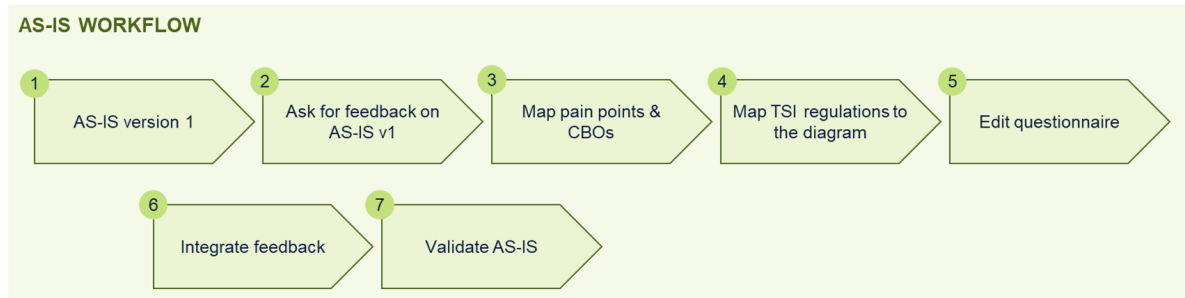





Figure 1 : AS-IS workflow

where:

- AS-IS Version 1: refers to the deliverable from last year, SC2.1:  240307 SP-LOT2-TASK1-Deliverables-SC2_1-v1-1
- Ask for feedback on AS-IS v1: Last year's deliverable was sent out to all contributors of System Pillar in order to collect feedback.
- Map Pain Points & CBOs: From previous years and programs, a list of pain points and Common Business Objectives (CBOs) have been compiled, this activity consisted in locating them on the Maintain & Monitor Rolling Stock capability view.
 - Pain points: are described in the document: *SPT1RailwaySystem/Pain Points/Pain points list : 724236* . The aim of the mapping was to identify current difficulties observed with the 'Maintain & Monitor Rolling Stock' capability and identify the associated activities. A visual representation of the mapping is included in the annexes of this report.
 - Common Business Objectives: are described in the document:  Common Business Objectives . The aim of the mapping is to identify areas of potential improvement of the architecture. A visual representation of the mapping is included in the annexes of this report.
- Map TSI regulations to the diagram: consisted in identifying the field of application of the various TSIs, described in this document:  TSIs & other regulations . The objective for this activity is to identify areas of the diagram that are already constrained or optimised. A visual representation of this mapping is included in the annexes of this report.
- Edit questionnaire: consisted in listing questions relative to the Maintain & Monitor Rolling Stock capability that were either difficult to address or need to be assessed by a broader audience. Therefore, the questionnaire could be sent out to a wider audience and was a different means of collecting feedback. This activity was not performed for Maintain & Monitor Rolling Stock due to lack of time.

3.1.2 Functional Description

On the following page is a view of the validated AS-IS capability view for Maintain & Monitor Rolling Stock:

[OAB] Maintain and monitor rolling stock [Operational activity allocation]

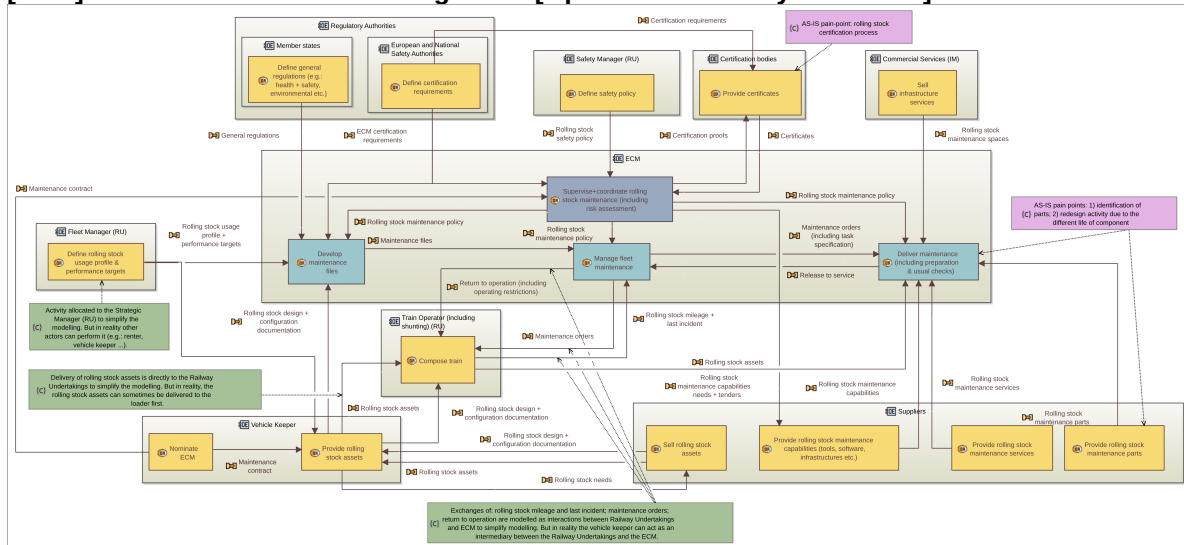


Figure 2 Diagram [OAB] Maintain and monitor rolling stock [Operational activity allocation]

3.1.2.1 Operational Artefacts (Capability, Entity & activity)

Maintain and monitor rolling stock

[C2P-Capability]

[COC] Maintain and monitor rolling stock [Single operational capability context]

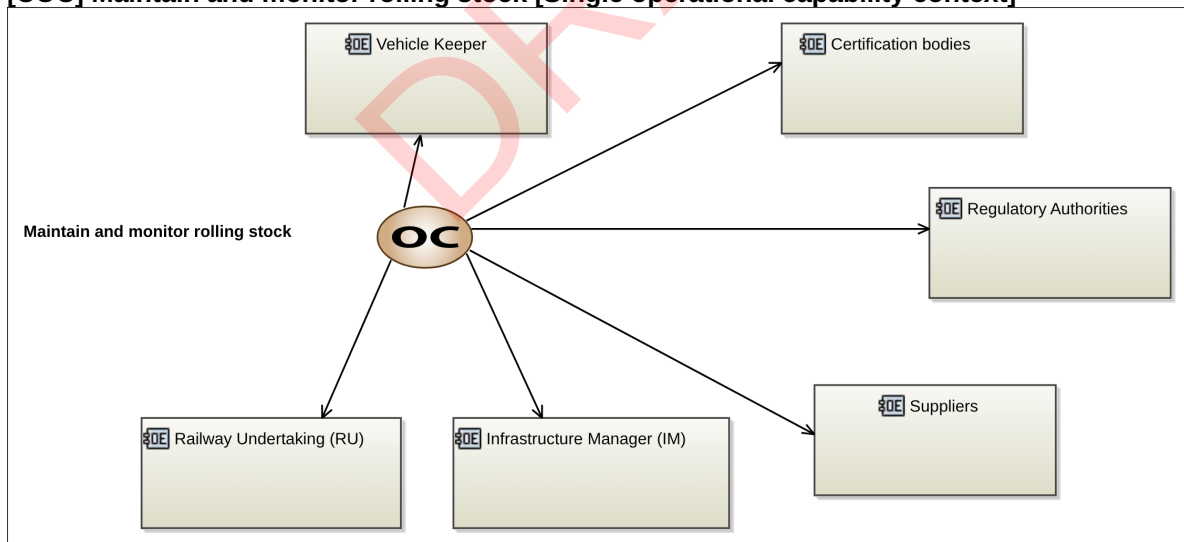


Figure 3 Diagram [COC] Maintain and monitor rolling stock [Single operational capability context]

The Operational Capability "Maintain & Monitor Rolling Stock" is composed of 6 operational entities which are:

- Railway Undertaking (RU)
- Infrastructure Manager (IM)
- Suppliers
- Regulatory Authorities

- Certification bodies
- Vehicle Keeper

3.1.2.1.1 Railway Undertaking (RU)

Railway Undertaking (RU)

'Railway Undertaking' means any public or private undertaking licensed according to this Directive, the principal business of which is to provide services for the transport of goods and/or passengers by rail with a requirement that the undertaking ensure traction; this also includes undertakings which provide traction only;

DIRECTIVE 2012/34/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 21 November 2012 establishing a single European railway area (recast) – Article 3 definition 1


Type	 C2P-Operational Entity
ID	SPMS-4063

The Operational Entity "Railway Undertaking (RU)" is composed of 3 operational entities which are:

- Fleet Manager (RU)
- Safety Manager (RU)
- Train Operator (including shunting) (RU)

Fleet Manager (RU)

The Fleet Maintenance Management covers the removal from/return to operation before/after maintenance and the management of relations with ECM internal/external entities delivering maintenance. (Guide for the application of Article 14 of Directive (EU) 2016/798 and Commission Implementing Regulation (EU) No 2019/779 on a system of certification of entities in charge of maintenance for vehicles, §4.11. What is the ECM)

Type	 C2P-Operational Entity
ID	SPMS-4080


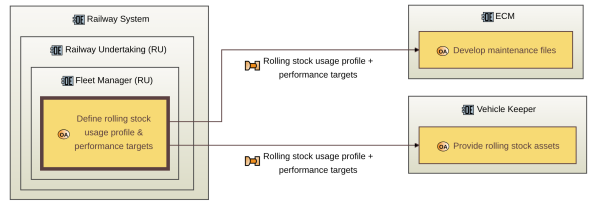
The Operational Entity "Fleet Manager (RU)" is composed of 1 operational activity which is:

- Define rolling stock usage profile & performance targets

Define rolling stock usage profile & performance targets

The definition of the rolling stock usage profile is under the responsibility of the keeper.

Safety risks on performance targets have to be defined depending on the usage in operation conditions (e.g. high speed passenger unit has a user profile, than a freight train dangerous good tank wagon).

Type	 C2P-Operational Activity
Context Diagram	 <p><i>Figure 4 Context Diagram of Define rolling stock usage profile & performance targets</i></p>

Safety Manager (RU)

Entity responsible for the application of the safety directive 2016/798, in accordance to the safety processes defined in the Safety Management System.

Directive (EU) 2016/798 of the European Parliament and of the Council of 11 May 2016 on railway safety.

Type	 C2P-Operational Entity
ID	SPMS-4078

The Operational Entity "Safety Manager (RU)" is composed of 1 operational activity which is:

- Define safety policy

Define safety policy

Safety policy is a basic element of the safety management system and is approved by the organizations / executive and communicated to all staff. (DIRECTIVE (EU) 2016/798 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 11 May 2016 on railway safety, art 9.3 (a))

Type	 C2P-Operational Activity
Context Diagram	 <p><i>Figure 5 Context Diagram of Define safety policy</i></p>

Train Operator (including shunting) (RU)

An entity operating a train through its life-cycle.

IM handles traffic management during crisis situations in coordination with the concerned RUs. This can result in train deviation, rerouting, adding stops , or re-sequencing in case of a reduced 'real-time' capacity, train cancellations can be also decided.


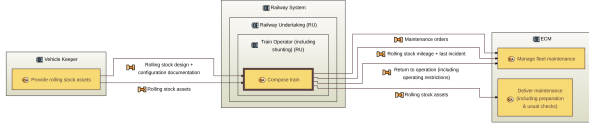
Type	 C2P-Operational Entity
ID	SPMS-4084

The Operational Entity "Train Operator (including shunting) (RU)" is composed of 1 operational activity which is:

- Operate train

Compose train

This activity is part of the capability "Operate train" by the interaction "Return to operation"

Type	 C2P-Operational Activity
Context Diagram	 <p>Figure 6 Context Diagram of Compose train</p>

3.1.2.1.2 Infrastructure Manager (IM)

Infrastructure Manager (IM)

Type	 C2P-Operational Entity
ID	SPMS-4049

The Operational Entity "Infrastructure Manager (IM)" is composed of 1 operational entity which is:

- Commercial Services (IM)

Commercial Services (IM)

Entity that supplies access to the tracks.

Entity that supplies infrastructure services for energy distribution in case of "Manage Energy".

Type	 C2P-Operational Entity
ID	SPMS-4055

The Operational Entity "Commercial Services (IM)" is composed of 1 operational activity which is:

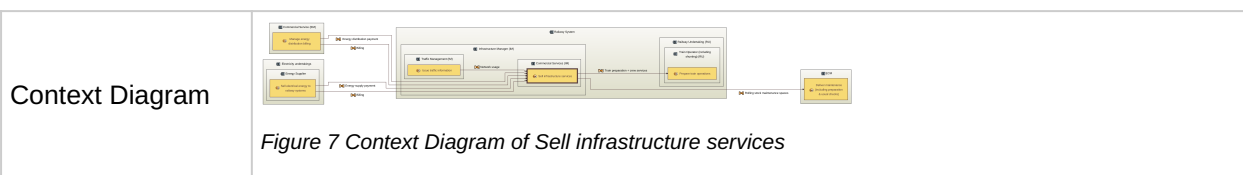
- Sell infrastructure services

Sell infrastructure services

Interface between RU and IM, two missions are taken into account here : selling the services described in the network statement and charging the services based on real usage of infrastructure after the train has run, taking into account the operational deviations.

Selling the service involves considering the capacity and performance of the network, gathering the RUs needs, and defining with the RUs the timetable and services, and conditions of sales

Type	 C2P-Operational Activity
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3.1.2.1.3 Suppliers

Suppliers

ROLLING STOCK: The concerned actors are the contracting entities as defined in Article 5 of ECM Regulation including their suppliers and service providers, or the certification bodies as defined in Article 6 of ECM Regulation. (Guide for the application of Article 14 of Directive (EU) 2016/798 and Commission Implementing Regulation (EU) No 2019/779 on a system of certification of entities in charge of maintenance for vehicles, § 1.1. Scope (Note 2))

INFRA:

- EN 14969:2006 (Railway applications - Track - Qualification system for railway trackwork contractors): This European Standard specifies the definitions, procedures, criteria and their assessment as well as the respective documentation related to a qualification system of trackwork contractors, which relates to the Directive 2004/17/EC). This qualification system identifies trackwork contractors that can be invited for tendering trackwork contracts. Evaluation of the contractors applying for parts of the contract, which are not trackwork, is not covered by this standard. This European Standard may also be used for a qualification system of trackwork contractors applying for contracts with a value below the minimum limit as defined in the Directive 2004/17/EC.
- ISO 22163:2023 (Quality management in the railway sector)

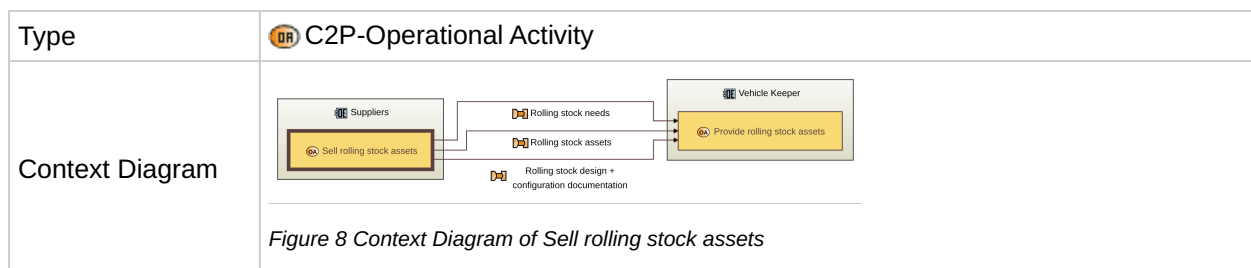
Type	 C2P-Operational Entity
ID	SPMS-4074

The Operational Entity "Suppliers" is composed of 4 operational activities which are:

- Sell rolling stock assets
- Provide rolling stock maintenance capabilities
- Provide rolling stock maintenance services
- Provide rolling stock maintenance parts

Sell rolling stock assets

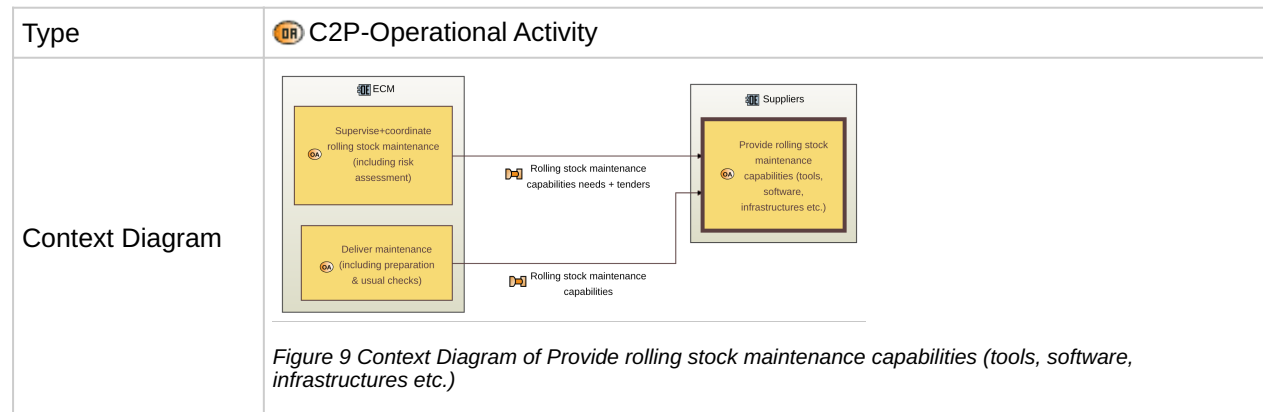
The rolling stock assets procurement are managed by contract between the owner and the supplier.



Provide rolling stock maintenance capabilities (tools, software, infrastructures etc.)

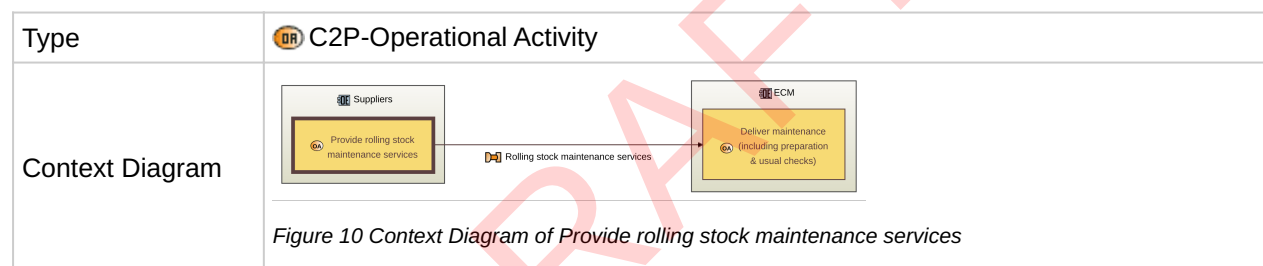
The rolling stock maintenance capabilities are defined in Annex 2, paragraph II.3 of Directive (EU) 2016/798 and Commission Implementing Regulation (EU) No 2019/779 on a system of certification of

entities in charge of maintenance for vehicles.



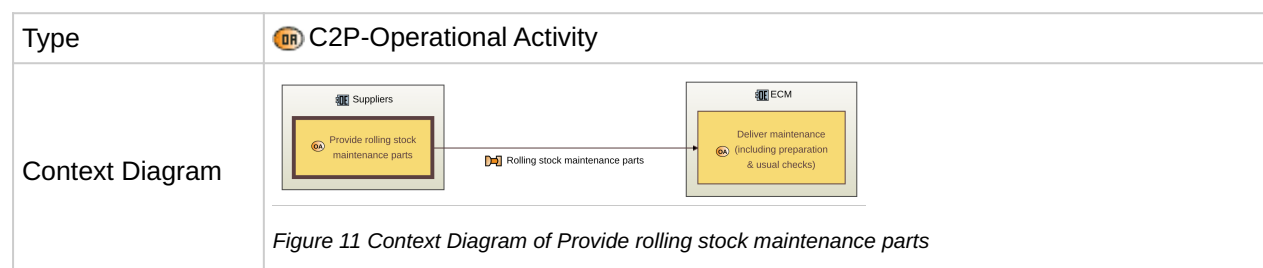
Provide rolling stock maintenance services

The rolling stock maintenance services are defined in Annex 2, paragraph IV of Directive (EU) 2016/798 and Commission Implementing Regulation (EU) No 2019/779 on a system of certification of entities in charge of maintenance for vehicles.



Provide rolling stock maintenance parts

The management of the rolling stock maintenance parts is defined in Annex 2, paragraph IV.2 of Directive (EU) 2016/798 and Commission Implementing Regulation (EU) No 2019/779 on a system of certification of entities in charge of maintenance for vehicles.



3.1.2.1.4 Regulatory Authorities

Regulatory Authorities

Under European Union legislation, each Regulatory Body (RB) has the task to oversee the application of Community rules and act as an appeal body in case of disputes.

DIRECTIVE 2012/34/EU, Article 55: 'Each Member State shall establish a single national regulatory body

for the railway sector. Without prejudice to paragraph 2, this body shall be a stand-alone authority which is, in organizational, functional, hierarchical and decision- making terms, legally distinct and independent from any other public or private entity. It shall also be independent in its organization, funding decisions, legal structure and decision- making from any infrastructure manager, charging body, allocation body or applicant. It shall furthermore be functionally independent from any competent authority involved in the award of a public service contract.' Thus it shall ensure that charges set by the Infrastructure Manager comply with Chapter II of 2001/14/EU and are nondiscriminatory. The RB oversees negotiations between applicants and the IM and intervenes when the requirements of 2001/14 are likely to be contravened. Applicants have the right to appeal to the RB if they believe that they have been unfairly treated, discriminated against or are in any other way aggrieved. In particular, they may appeal against decisions adopted by the IM (or where appropriate the Railway Undertaking) concerning: a) the network statement; b) criteria contained within it; c) the allocation process and its outcome; d) the charging scheme; e) level or structure of infrastructure fees which it is, or may be, required to pay; f) arrangements for access. DIRECTIVE 2012/34/EU, Article 55, all TSI regulations and regulation 2016/798, safety directive, art 3 (8) Beyond this definition, from the operational and technical point of view, regulatory bodies may also be responsible for checking compliance to:

- the european rules, stated in TSIs;
- the 'national rules': means all binding rules adopted in a Member State, irrespective of the body issuing them, which contain railway safety or technical requirements, other than those laid down by Union or international rules, and which are applicable within that Member State to railway undertakings, infrastructure managers or third parties (regulation 2016/798, safety directive, art 3 (8))

Type	 C2P-Operational Entity
ID	SPMS-4087

The Operational Entity "Regulatory Authorities" is composed of 2 operational entities which are:

- Member states
- European and National Safety Authorities

Member states

Each of the 27 Member States is bound by the Treaties and the *acquis communautaire*. Each participates in governing the EU on equal terms.

There are 27 Member States: Belgium, Bulgaria, Czechia, Denmark, Germany, Estonia, Ireland, Greece, Spain, France, Croatia, Italy, Cyprus, Latvia, Lithuania, Luxembourg, Hungary, Malta, the Netherlands, Austria, Poland, Portugal, Romania, Slovenia, Slovakia, Finland and Sweden.

In the summaries of EU legislation, the term 'EU countries' is used often as alternative of 'Member States'.

Type	 C2P-Operational Entity
ID	SPMS-4053

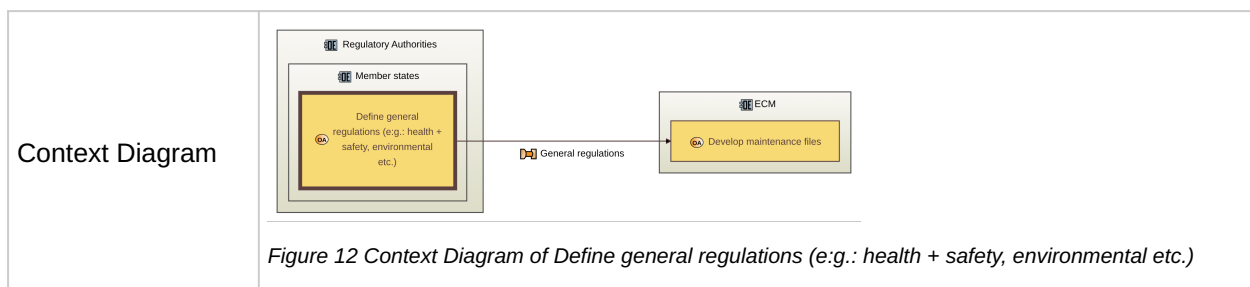
The Operational Entity "Member states" is composed of 1 operational activity which is:

- Define general regulations

Define general regulations (e.g.: health + safety, environmental etc.)

Besides Directive (EU) 2016/798 and Commission Implementing Regulation (EU) No 2019/779 on a system of certification of entities in charge of maintenance for vehicles, ECM must fulfil different European and National regulations about health + safety, environmental etc.

Type	 C2P-Operational Activity
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European and National Safety Authorities

'National safety authority' means the national body entrusted with the tasks regarding railway safety in accordance with this Directive [2016 / 798] or any body entrusted by several Member States with those tasks in order to ensure a unified safety regime.

Type	 C2P-Operational Entity
ID	SPMS-4057

The Operational Entity "European and National Safety Authorities" is composed of 1 operational activity which is:

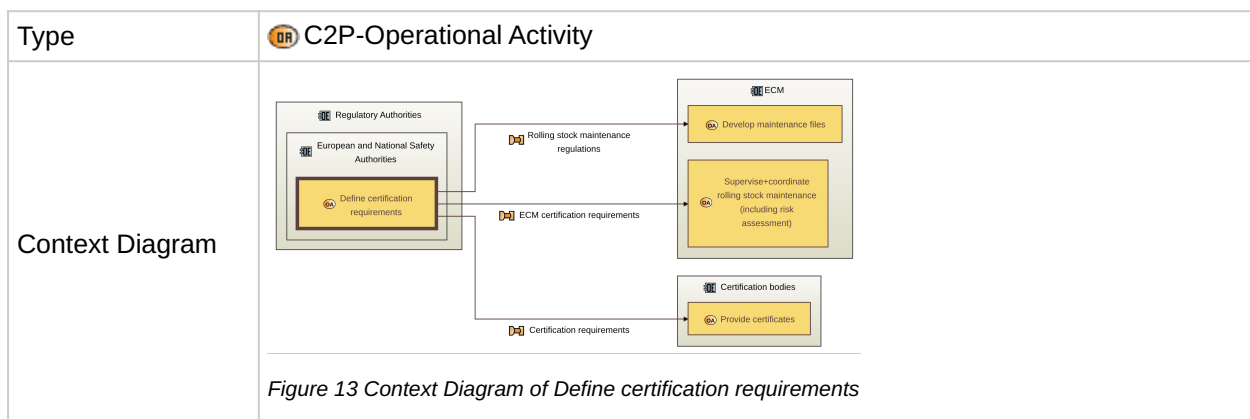
- Define certification requirements

Define certification requirements

ROLLING STOCK: The certification requirements are defined in Annex 2 of Directive (EU) 2016/798 and Commission Implementing Regulation (EU) No 2019/779 on a system of certification of entities in charge of maintenance for vehicles.

INFRA:

- EN 14969:2006 (Railway applications - Track - Qualification system for railway trackwork contractors): This European Standard specifies the definitions, procedures, criteria and their assessment as well as the respective documentation related to a qualification system of trackwork contractors, which relates to the Directive 2004/17/EC). This qualification system identifies trackwork contractors that can be invited for tendering trackwork contracts. Evaluation of the contractors applying for parts of the contract, which are not trackwork, is not covered by this standard. This European Standard may also be used for a qualification system of trackwork contractors applying for contracts with a value below the minimum limit as defined in the Directive 2004/17/EC.
- ISO 22163:2023 (Quality management in the railway sector)




3.1.2.1.5 Certification bodies

Certification bodies

ROLLING STOCK: As per Directive (EU) 2019/779 - article 2 - body responsible for the certification of entities in charge of maintenance or for certification of the entity or organisation that fulfil maintenance functions referred to in points (b), (c) or (d) of article 14 (3) of Directive (EU) 2016/798, or parts of those functions.

INFRA:

- EN 14969:2006 (Railway applications - Track - Qualification system for railway trackwork contractors): This European Standard specifies the definitions, procedures, criteria and their assessment as well as the respective documentation related to a qualification system of trackwork contractors, which relates to the Directive 2004/17/EC). This qualification system identifies trackwork contractors that can be invited for tendering trackwork contracts. Evaluation of the contractors applying for parts of the contract, which are not trackwork, is not covered by this standard. This European Standard may also be used for a qualification system of trackwork contractors applying for contracts with a value below the minimum limit as defined in the Directive 2004/17/EC.
- ISO 22163:2023 (Quality management in the railway sector)

Type	 C2P-Operational Entity
ID	SPMS-4061

The Operational Entity "Certification bodies" is composed of 1 operational activity which is:

- Provide certifications

Provide certificates

ROLLING STOCK: The certification system is defined in article 3 of Directive (EU) 2016/798 and Commission Implementing Regulation (EU) No 2019/779 on a system of certification of entities in charge of maintenance for vehicles.

INFRA:

- EN 14969:2006 (Railway applications - Track - Qualification system for railway trackwork contractors): This European Standard specifies the definitions, procedures, criteria and their assessment as well as the respective documentation related to a qualification system of trackwork contractors, which relates to the Directive 2004/17/EC). This qualification system identifies trackwork contractors that can be invited for tendering trackwork contracts. Evaluation of the contractors applying for parts of the contract, which are not trackwork, is not covered by this standard. This European Standard may also be used for a qualification system of trackwork contractors applying for contracts with a value below the minimum limit as defined in the Directive 2004/17/EC.
- ISO 22163:2023 (Quality management in the railway sector)

Type	 C2P-Operational Activity
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Context Diagram

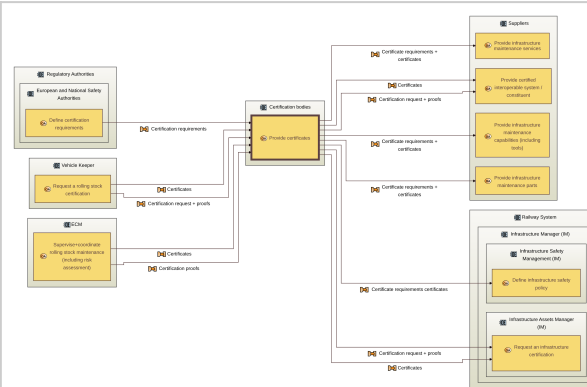


Figure 14 Context Diagram of Provide certificates

3.1.2.1.6 Vehicle Keeper

Vehicle Keeper

As per Directive (EU) 2016/798 - article 3 - definition 19: natural or legal person that, being the owner of a vehicle or having the right to use it, exploits the vehicle as a means of transport and is registered as such in a vehicle register referred to in article 47 of Directive (EU) 2016/797.

Type	C2P-Operational Entity
ID	SPMS-4076

The Operational Entity "Vehicle Keeper" is composed of 2 operational activities which are:

- Nominate ECM
- Provide rolling stock assets

Nominate ECM

After a vehicle is placed in service, an Entity in Charge of its Maintenance has to be designated and to be identified in the National Vehicle Register.

Type C2P-Operational Activity

Context Diagram

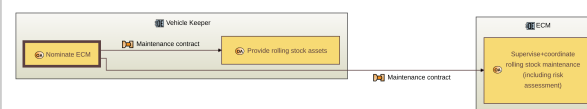


Figure 15 Context Diagram of Nominate ECM

Provide rolling stock assets

The fleet management is defined in Annex 2, paragraph III of Directive (EU) 2016/798 and Commission Implementing Regulation (EU) No 2019/779 on a system of certification of entities in charge of maintenance for vehicles.

Type C2P-Operational Activity

Context Diagram

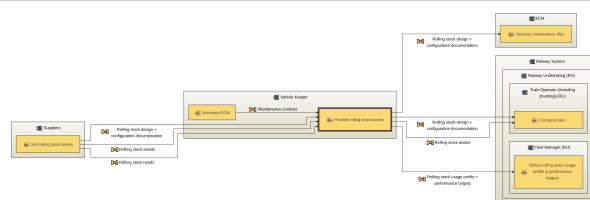


Figure 16 Context Diagram of Provide rolling stock assets

4 Conclusion

The results of the sector consultation on this capability showed a stable definition of the roles of the entities and their interactions, especially as these roles are already defined in the regulation.

No pain points, identified by LynX4Rail, have an impact on the structure of this capability. The ECM functions described here allow to take into account the improvement that can be made in maintenance processes (e.g. predictive maintenance) depending on Innovation Pillar findings.

Nevertheless, further inputs from the sector can be studied later on in order to possibly define a new "to-be" architecture. This study remains to be done in the next contracts of the System Pillar.

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