




ERJU SYSTEM PILLAR

Systems Engineering Management Plan - 03 Engineering Tools



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Abstract	This document contains a high level overview about the platform and used tools in EU-Rail SP and how to access them
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1 Preamble

1.1 Purpose

This document describes the software tools used in the systems engineering process. It covers

- List and description of tools and platform
- Rationale for each tool
- Areas of application
- Responsibilities, maintenance and updating
- Training and resources
- Integration and compatibility

1.2 Intended Audience

The content of this document is valid for all the System Pillar tasks and domains.

1.3 Document Context

tbd

1.4 Glossary

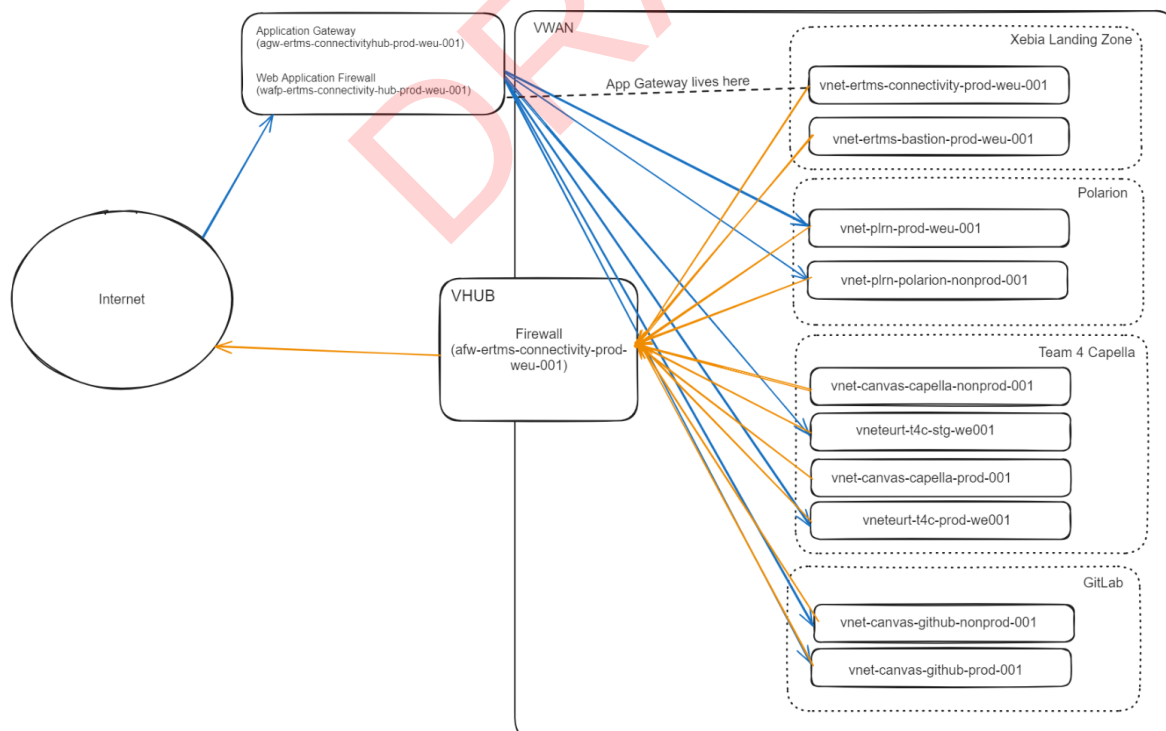
No references


2 Platform

Overview of the platform

The concept of the SP-platform is using the so-called "hub & spoke" paradigm which is a common principle for platform design and widely used on Azure


The landing zone (the hub) is the primary entry towards the platform through an application gateway which allows access to the different tools (the spokes). Currently deployed overview (hi-level):



Detailed description about the concept you find attached here  SPPR-10001 - Overview of the platform [SPPR-10001]

Access to the platform

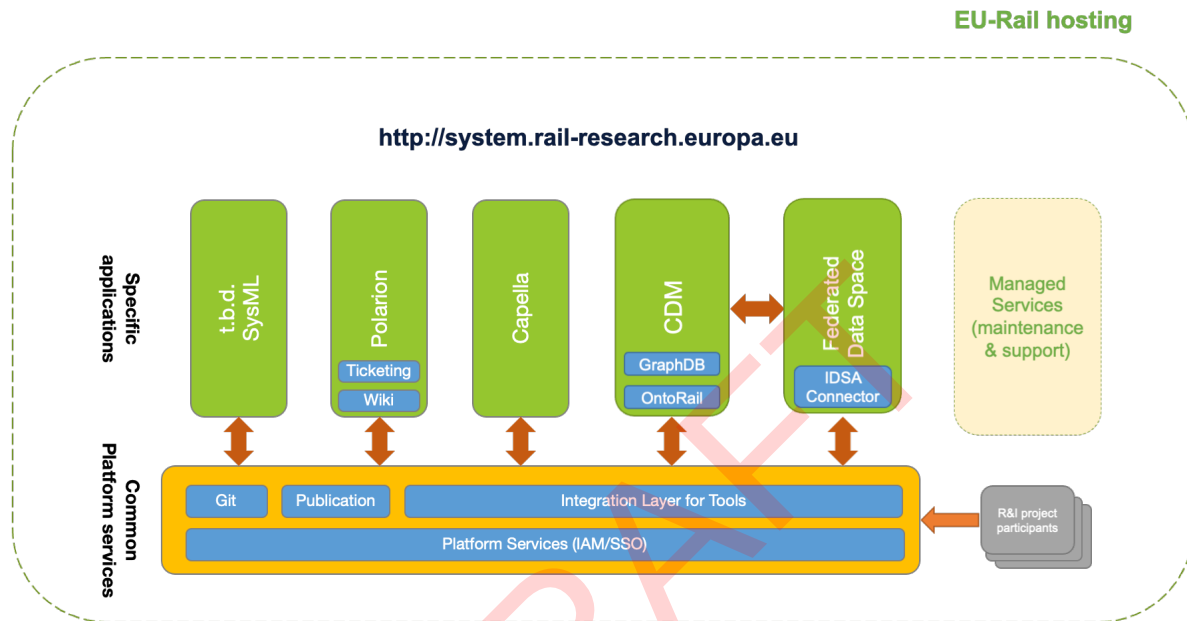
Access is granted by a federated EntraID setup.

Except global-admins, normal users are added by the domain-leads directly in Polarion. Landing page is on the SP-Onboarding project:  Onboard/Update user

As Polarion is revision-safe any change is recorded. Once onboarded to the platform a user will be able to access all tools within the platform. [SPPR-10002]

3 Current tools

Overview of tools



Tools out of scope for EET WP5 is CDM and FDS.

For SC2.3 the SysML and the Publications part are not implemented yet therefore no further information can be provided. Both should change during SC2.4 [SPPR-4512]

3.1 ALM/Polarion tool

Scope and usage of Polarion

Polarion is an highly configurable ALM-Tool and therefore will be used in following areas

- Requirements-Management (including traceability and impact analysis) and Reviews
- Planning of deliverables (including use of Kanban and Gantt)
- Ticketing
- Wiki (generic documentation)

This means that for the mentioned areas no other tool will be available.

Current version of Polarion is **2506** [SPPR-4511]

Rational for selecting Polarion

Polarion is one of the leading ALM Tools worldwide. It has no usual vendor lock due to its history (it wasn't built by Siemens and uses open-source tools) and anytime **all** info can be exported without involving the tool-owner.

Polarion is built being flexible so it is possible to adjust it as you need.

It is already used by some bigger companies of SP e.g.:

- Railroad agencies: SNCF, SBB, DB, Prorail, NS

- Industry: Thales, Hitachirail, Siemens mobility

[SPPR-9994]


Access to Polarion

Production is available under: <https://polarion.rail-research.europa.eu/>

Except for maintenance and backup between 3am - 4am, production is running 24x7

There is a staging environment available under <http://staging.polarion.rail-research.europa.eu>

Staging is only available between 7am - 7pm due to costs.

To access Polarion user must be onboarded by a domain lead. Domain-leads can do the on- and offboarding completely on their own:  Onboard/Update user

After a user is onboarding he/she has to access Polarion and need to setup a 2FA including accepting the terms&condition of using the platform.

[SPPR-4507]

Training material for Polarion

Link to the System Pillar Polarion Sharepoint

[Polarion Sharepoint for System Pillar](#)

Apart from trainings material there are regular trainings via MS-Team. Topics will be announced in the MS-Teams Polarion-chat. [SPPR-10496]

Each domain needs at least one method and tool specialist

Each domain needs at least one method and tool specialist who is the primary contact for the domain and supports the work and adjustments within (e.g. training, reports) [SPPR-4506]

3.2 Capella

Scope of Capella

Capella is used as MBSE tool. Until there is a SysML tool selected Capella is the only modelling tool.

Current used Capella version is **7.0.0** [SPPR-9996]

Rational for selecting Capella

Together with Capella there is the ARCADIA-method. This is a methodology for MBSE which allows straightforward modelling.

Capella is open-source only a specific collaboration version is commercial (Teams4Capella, short: T4C).

This keeps the costs for licenses low.

DB is using it internally and has created tools on-top which are also released open-source: <https://github.com/DSD-DBS> [SPPR-9997]

Access to Capella

<https://capella.rail-research.europa.eu/>




Except for maintenance and backup between production is running 24x7

There is a staging environment available under <http://staging.capella.rail-research.europa.eu> and can be started anytime by a platform admin. It won't started automatically due to costs.

[SPPR-4509]

Training material for Capella

Please have a look into for furthr information

-  Systems Engineering Management Plan - 02 MBSE Methodology Handbook
-  Systems Engineering Management Plan - Annex M2 Viewpoint Guidelines
-  Capella Training Links

[SPPR-4510]

Requirements to facilitate model integration in master model

One of the task of the SP is to consolidate / integrate models issued from the SP tasks and domain. A

means to achieve that is to facilitate access to the models created in former projects to the different

domains in the System Pillar. Therefore, the EET shall provide sandbox repositories from which respective

domains may import existing models for further improvement (essentially deriving from it) or consult existing models as read-only to look up their content (essentially building a new model, albeit taking inspiration).

Each domain needs at least one method and tool specialist (modelling expert) who is included into the work of the domain and supports the formalisation of the model together with domain experts.

While domain experts have only basic knowledge of the methods and rules, the EET modelling experts provide method and modelling knowledge as a service

All modelling experts will be also part of the EET mirror group, so that there is a connection to further discuss and improve MBSE methods in System Pillar with all necessary persons.

The domains shall follow the defined methods, processes modelling rules/guidelines and requirement management guideline. In case of limited resources or when something is missing (e.g. template), the members of the different domains can join the EET and can help to define the missing documentation (e.g. method, process or guideline). [SPPR-5426]

3.3 GitLab

Scope of gitLab

There are currently three main reasons for Git:

1. Exchanging models of Capella adding versioning
2. Exchanging (large-)file.
3. Using git for the capella2polarion transfer
4. Model versioning (see *SPPROCESS/10 SEMP V 01_01/Configuration Management Plan : 723585*)

Link to gitlab: <https://git.rail-research.europa.eu/dashboard/projects>

Current used gitlab version is **17.4** [SPPR-9989]

4 Tools not in responsibility of EET

4.1.1 SharePoint

Scope of Sharepoint

Sharepoint is provided by ERTMS

On sharepoint you will find trainings-videos as Polarion is not meant to be a fileshare [SPPR-9992]

4.1.2 MS-Teams

Scope of MS-Teams

It is provided by ERTMS

MS-Teams is being used for communication. There are multiple channels:

- For Polarion
 - Polarion Chat: default support chat for Polarion usage
 - Superuser chat: chat for superusers of Polarion
 - Polarion Admin: chat for Polarion global and project admins

You get access through invitations. Every existing user can invite - no admin needed. You get the whole history and there might be helpful information. [SPPR-9991]

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5 Current Integrations

5.1 Capella2Polarion interaction

5.1.1 Capella-Polarion overview

Capella-Polarion interaction (introduction)

A bridge has been built between Polarion and Capella for exchanging data.

Notes: - This bridge is neither part of Capella nor Polarion.

- This bridge is developed by SBB and DB for their own purpose (and on their own budget).

- For more information, see [capella-polarion repository and documentation](#)

Functionalities are provided incrementally through several intermediate releases.

The content of this paragraph is related to the version of the bridge currently deployed on ERJU environment.

The **goal of the bridge** is

- to enforce overall consistency
 - by giving visibility of elements (and links between them) in both tools.
 - by being able to link Polarion Work Items to Capella Elements
- to provide in Polarion visibility of all Capella elements and diagrams needed to build documentation
Rationale: This is based on the SP choice made to use Polarion as the tool to generate documentation

Based on type of each element in one tool, the bridge will create the corresponding clone in the other tool. See table below for more details.

The cloned elements will allow the original elements (or links) to be manipulated and displayed in the tool where they do not exist at first instance. The cloned elements shall not be edited. **Only "read-only" manipulation shall be performed on the cloned elements.** In other words, there is no round trip synchronization on the content of the elements.

The only operations allowed on clones created in Polarion (from Capella elements) are:

- representation of the element and its properties in documents. This includes the linked Capella diagrams.
- reference in Work Items
- linking to other elements

[SPPR-7496]

5.1.2 Capella to Polarion

Capella to Polarion synchronization: list of cloned elements and links

Capella2Polarion config is defined in git https://git.rail-research.europa.eu/capella-collaboration-manager/system-pillar-reference-architecture/sp_reference_architecture/-/blob/main/capella2polarion_config.yaml?ref_type=heads.

[SPPR-7501]

Capella to Polarion synchronization: Update period and target in Polarion

The update period is once per day during the night. On demand synchronization could be requested as well to your EET WP4 or WP5 contact point.

Note: Synchronization is performed by a job ("capella2polarion_synchronise") from the [sp_reference_architecture GITLab project](#)

The source Capella model is **System Pillar Reference Architecture (sp_reference_architecture)**

The target Polarion project is  **SP-Model Sync** .

Rationale: Separate Polarion project

- not to overload one of the existing Polarion project,
- to keep the elements from Capella well separated, to keep clear identification of elements from Capella,
- to host elements from several projects created in the central model (several Polarion projects vs central model in Capella)

[SPPR-7502]

5.1.3 Polarion to Capella

The synchronization from Polarion to Capella is not yet available.

The synchronization from Polarion to Capella is not yet available.

Synchronization of Work Items for all kind of requirements is foreseen in the future. [SPPR-7503]

5.1.4 JSON2Capella over Jupiter

Is used for the data model process descried in  Systems Engineering Management Plan - 02 MBSE Methodology Handbook.


Further explanation in <https://github.com/dbinfrago/json2capella/tree/master>.

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6 Additional implementations

6.1 Implementations for Polarion


User Onboarding

User Onboarding is completely done inside Polarion  Onboard/Update user


Only domain-leads can add/remove users to their domain. If the company (based on the email of the user) is not yet approved by EU-Rail, the company need to be approved first. In the background an email is send and an EU-Rail member has to approve inside Polarion.

If the company is approved or the user has already access to Polarion, the user is granted access to the platform immediately (after setting up 2FA for the login which is a requirement) [SPPR-10785]

User Offboarding

User offboarding will be done by global administrator or domain leads through Polarion:  Offboarding Users
[SPPR-10786]

Reset 2FA

If a 2FA for the platform is no longer working (e.g., new mobile) the 2FA has to be reset. This can be done in Polarion directly  Reset 2FA

Every global admin, domain-lead or superuser can do this for every onboarded user [SPPR-10787]

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7 Possible future tools

7.1 SysML based tool

Scope and usage of SysML Tool

The SysML tool is intended to be primarily used for the creation, management and maintenance of System Level 5 models. Of course it can also be used for all other levels but at the current moment Capella will be used for modelling System Level 1-5. The SysML tool is only for System Level 5, if required in specific cases. It can be also used to perform simulation-based requirements verification and validation on those models directly. [SPPR-5485]

Access to SysML Tool

The SysML tool does not yet exist. A first set of tool requirements are available here:  SysML Tool requirements [SPPR-5486]

7.2 Capella-SysML based tool interaction

Capella-SysML Bridge

Capella and SysML-Models are to be linked on the selected Arcadia architecture level. To this end, a Capella-SysML-Bridge is planned. More details will follow after the SysML modelling tool has been selected. [SPPR-4612]

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8 Tables

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