

German
Space Agency
at DLR

Software supported requirements tailoring



Michael Bädorf

✉ michael.baedorf@dlr.de

www.linkedin.com/in/michael-baedorf-0b08881b1

DLR Space Agency; Product Assurance & Project Support Department
Head of Software Quality Assurance

Abstract / Goal

Tailoring the requirements for “how a product should be built”, can be a painful task without the support of an adequate tool. This poster will provide an overview of what needs to be done and how to ease this task. Especially, it will also demonstrate how the tailoringexpert open source platform can be of use for you. But before you can start tailoring, there are a number of prerequisites that need to be fulfilled, therefore let’s take a walk through the process.

Know your domain!

Requirement sources

Before you can start tailoring a project you need some sort of base requirements catalog. This catalog can consist of self-defined requirements or requirements taken from other standards and guidelines, which are relevant to your domain. In the European space domain, it is recommended to at least take ECSS for defining the base requirement catalog. Also CCSDS, ISO NIST or MIL Stds may also be relevant sources. Note that this is not an exhaustive list



ECSS
ISO
CCSDS
.....

Keep in mind: **Don't try to reinvent the wheel!**

Structuring of requirements

Next, how do you structure such a base catalog? There are at least 3 ways:

1. Only refer to the complete source, e.g ECSS-Q-ST-80C, so applying the complete standard,
2. Extract, reference and possibly modify all relevant requirements from a source, e.g ECSS-Q-ST-80C Rev.1, para. 5.1.1.a. , so only a subset of the source will be applied,
3. A combination of 1 and 2.

The approach taken to define the baseline catalog will have impact on the tailoring result and corresponding compliance matrix. While in the approach 1 (complete sources) the detailing of compliance is the task for the contractor as soon as they are not 100% compliant to the complete source. In contrast approach 2 (fine grained requirements) this detailing task remains at customer side. In consequence the discussion of deviations might lead to longer consultations in case of the first approach, but also the first approach runs the risk that the contractor simply states compliance to make life easy.

Project Perimeters

After defining your base requirements catalog you need to define selection criteria to filter the requirements that shall be applied for your product, e.g. based on its characteristics. The most easiest way is to define a screening sheet which contains all possible characteristics/perimeters, so that you just can tick off those relevant for your product and use it as a input for your tailoring. These selected parameters are used to calculate the “selection criterions” also called selection vector. The calculation of this selection vector is very customer specific. The choice of base catalog structure will affect the resulting tailoring.

Requirements criterions

Once you have defined your product perimeters, you can begin to define selection criteria for your requirements to make them applicable. The criteria could be multi-dimensional:

- The first criterion could be a category such as e.g. quality assurance (Q). A list of various criteria may be required.
- The second one could be a level, e.g. ranging from 0 to 10.
- A third criteria could be a screening sheet perimeter, e.g. SAT.

→ This could be result in Q7(SAT).

Define such selection criteria for all requirements and depths as required. For some requirements several selection criteria may apply.

Phases

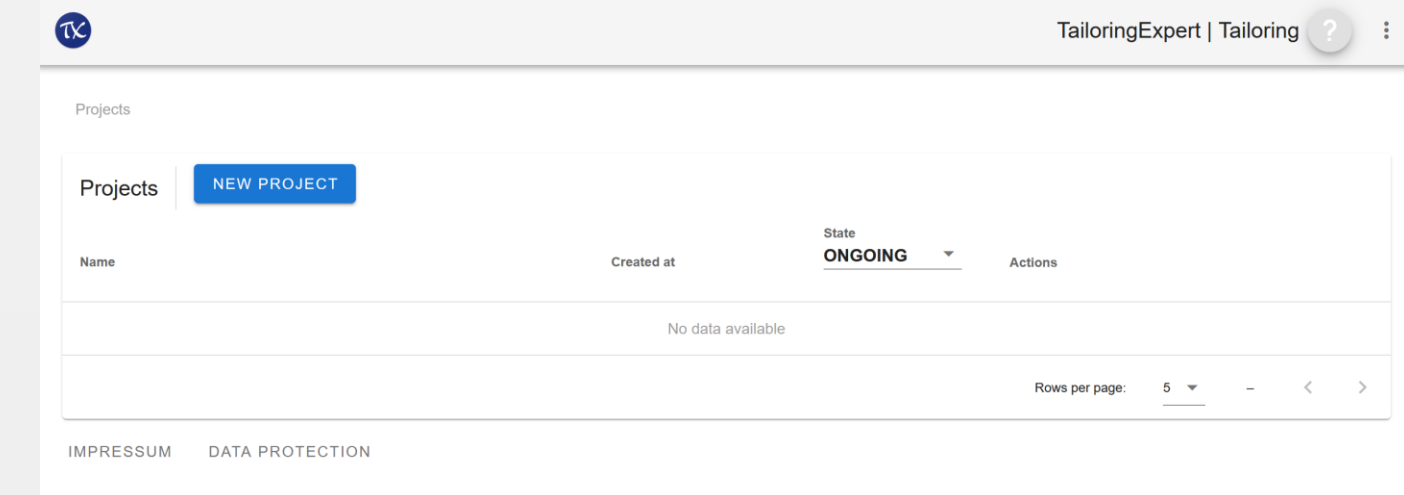
Requirements can also belong to specific phases. It is important to define relevant phases for each requirement. This will shorten discussions with the supplier.

Full requirement definition example

	The supplier shall establish a documented training programme for the personnel whose performance determines or affects product quality.	Q7 (INST) A Q7(SAT) B Q7(SST) C D E F
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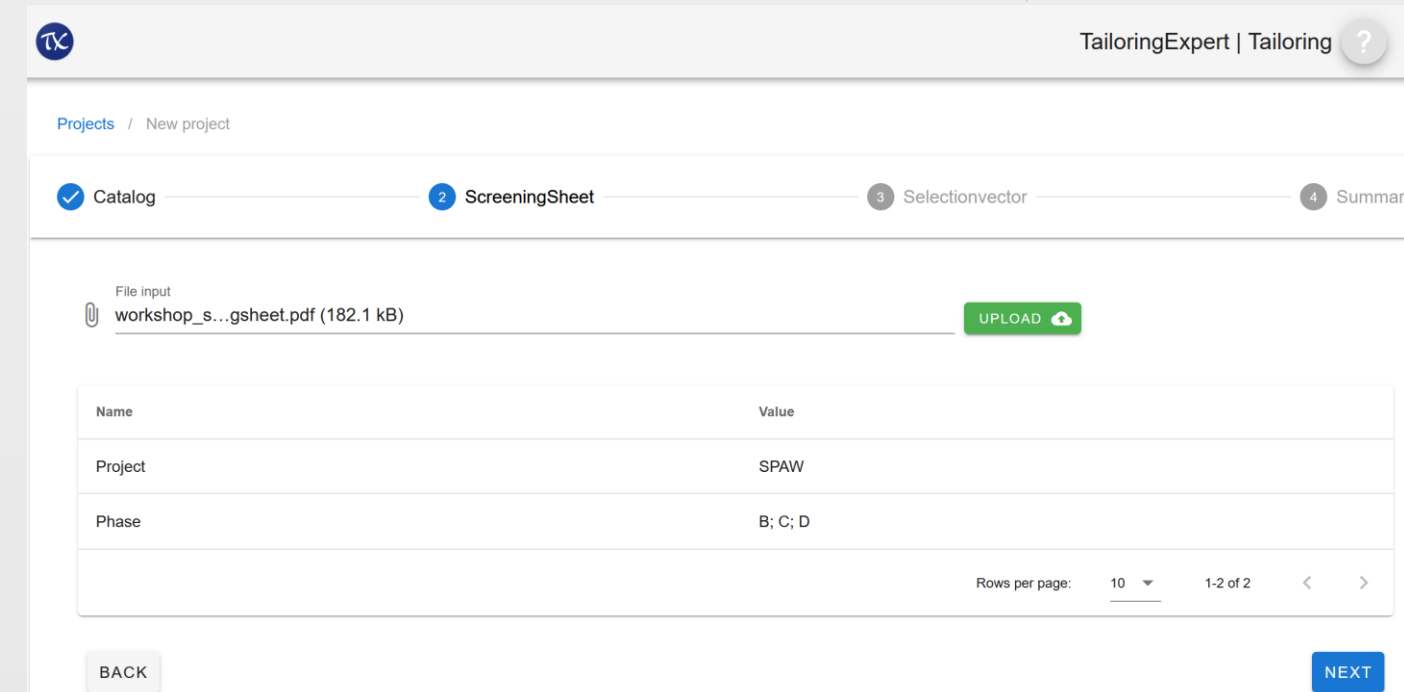
Showcase

Create a new project with an automated initial tailoring



Select a catalog version and, optionally, add a note

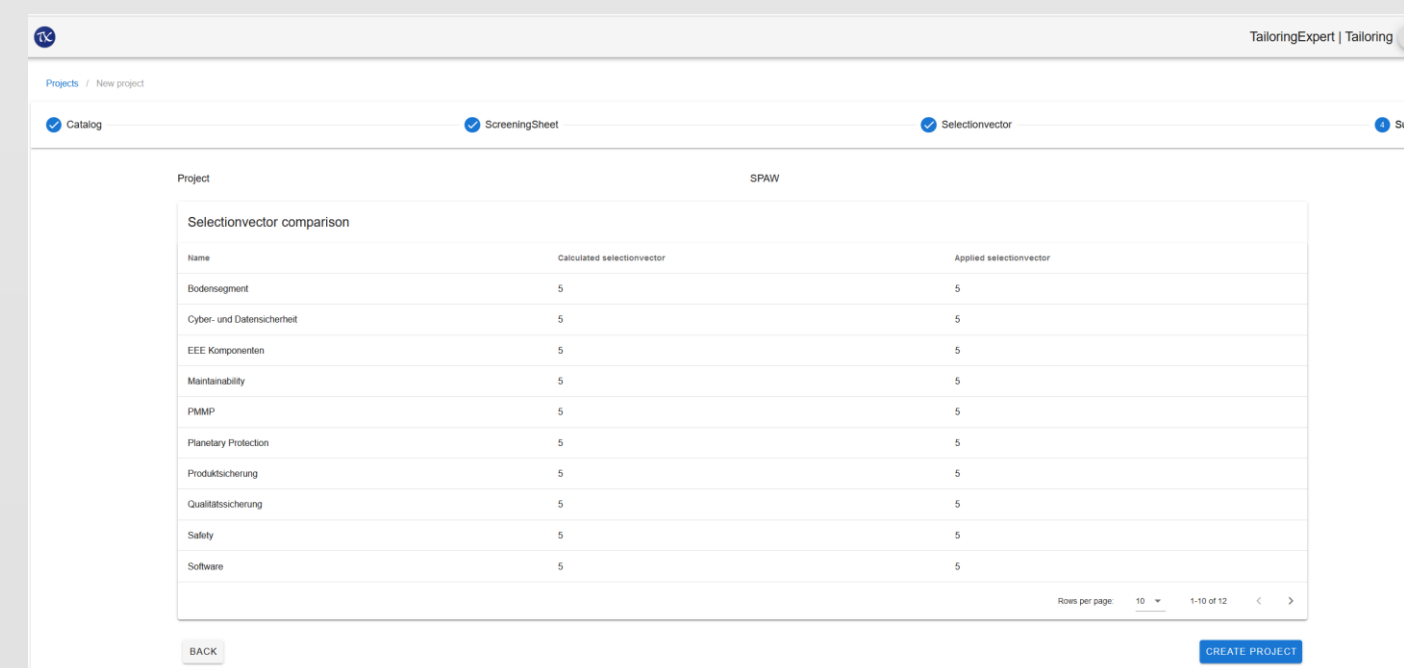
Click NEXT



- You can change all sector values by selecting a profile or
- Change single value(s) by clicking the pencil

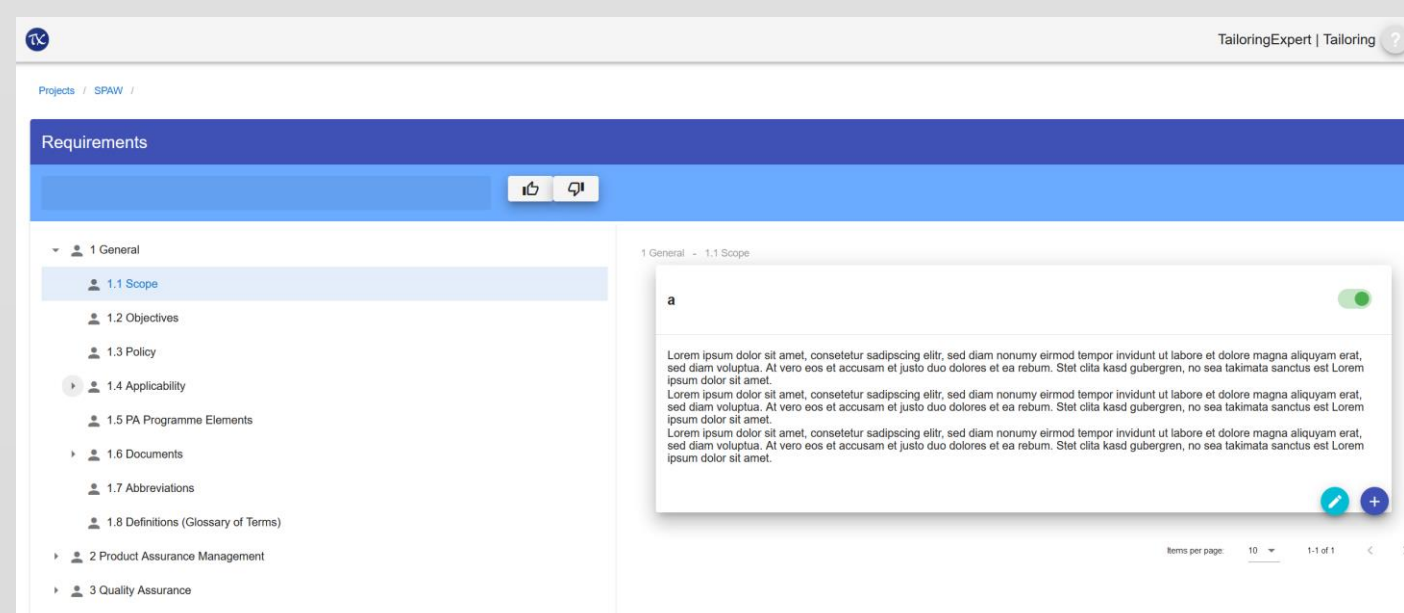
A comparison between the calculated and the applied selection vector will be displayed for information

Click NEXT

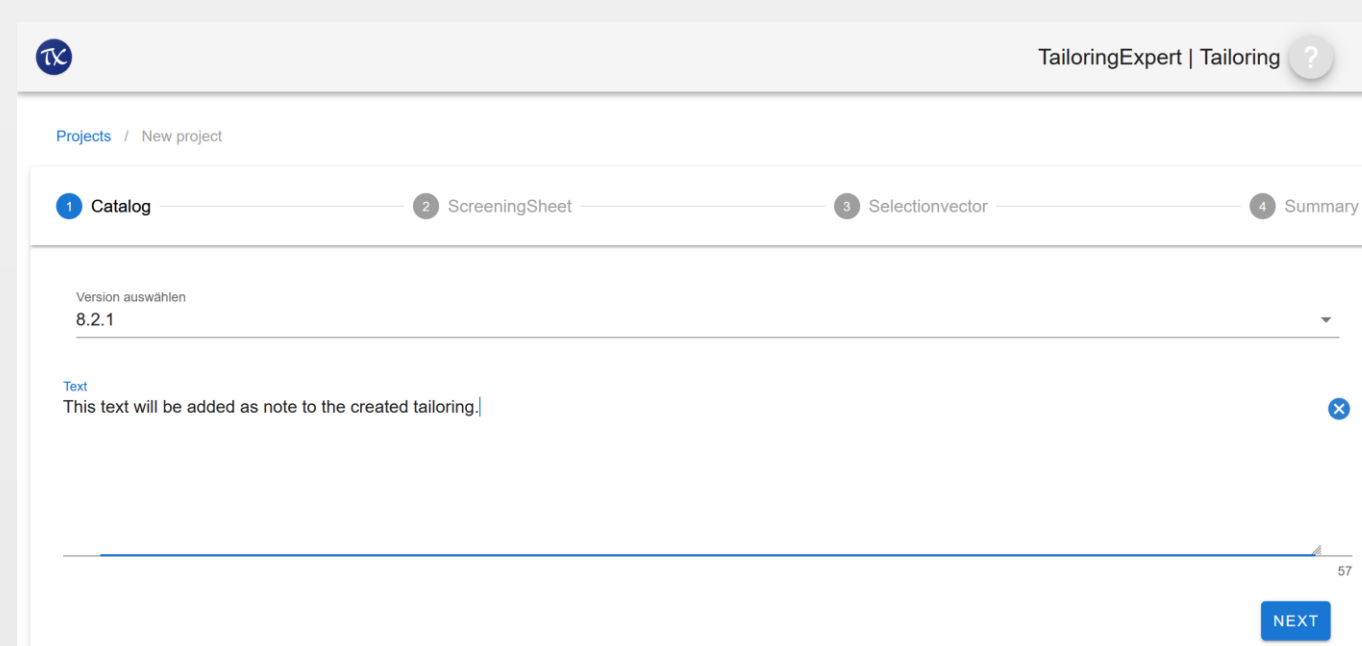


Click pencil in box icon

Modifying requirement state or text



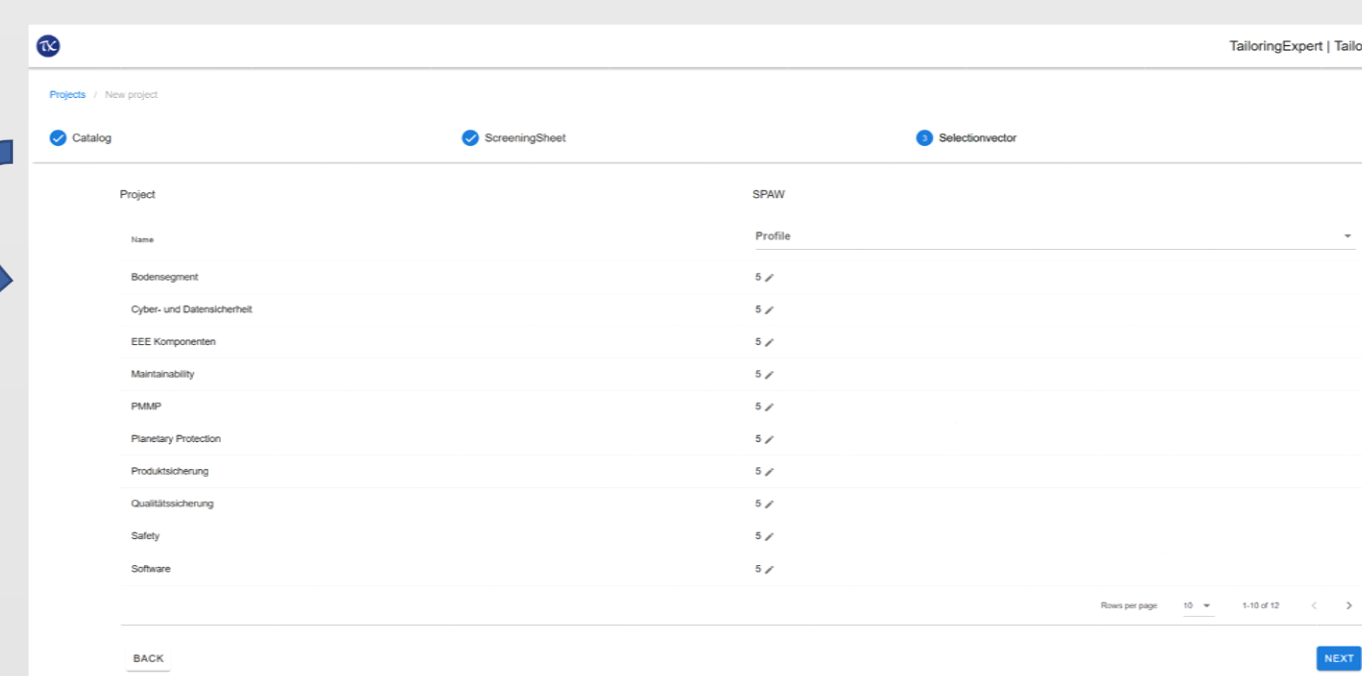
Click NEW PROJECT



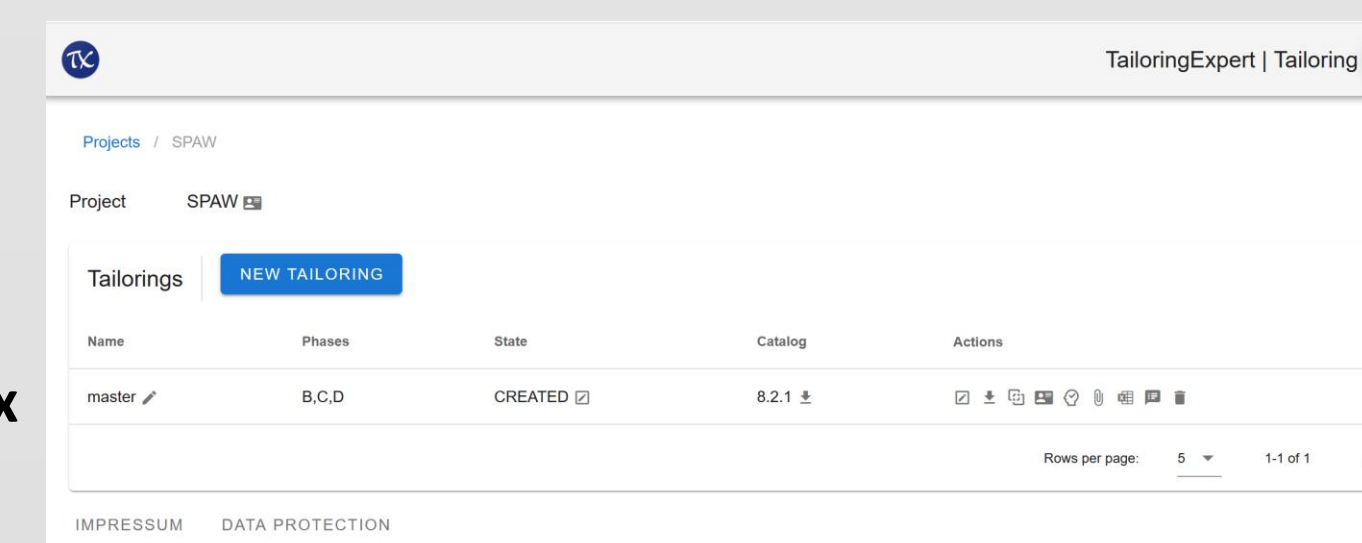
Press **UPLOAD** and select a PDF screening sheet
Evaluated project parameters will be shown

Click NEXT

Calculated selection vector will be shown



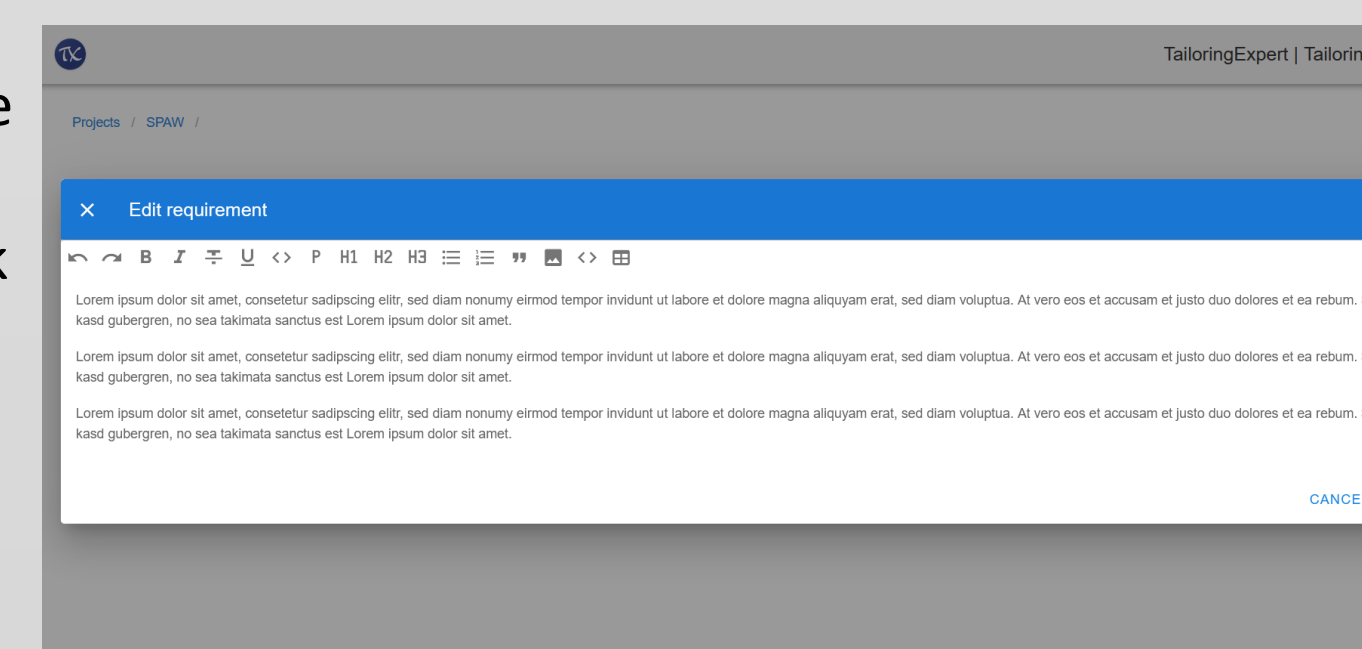
Click **CREATE PROJECT**
Tailoring is created
Project „Cockpit“ is shown



Clicking the switch, the selected state of the requirement will be toggled

Click pencil icon

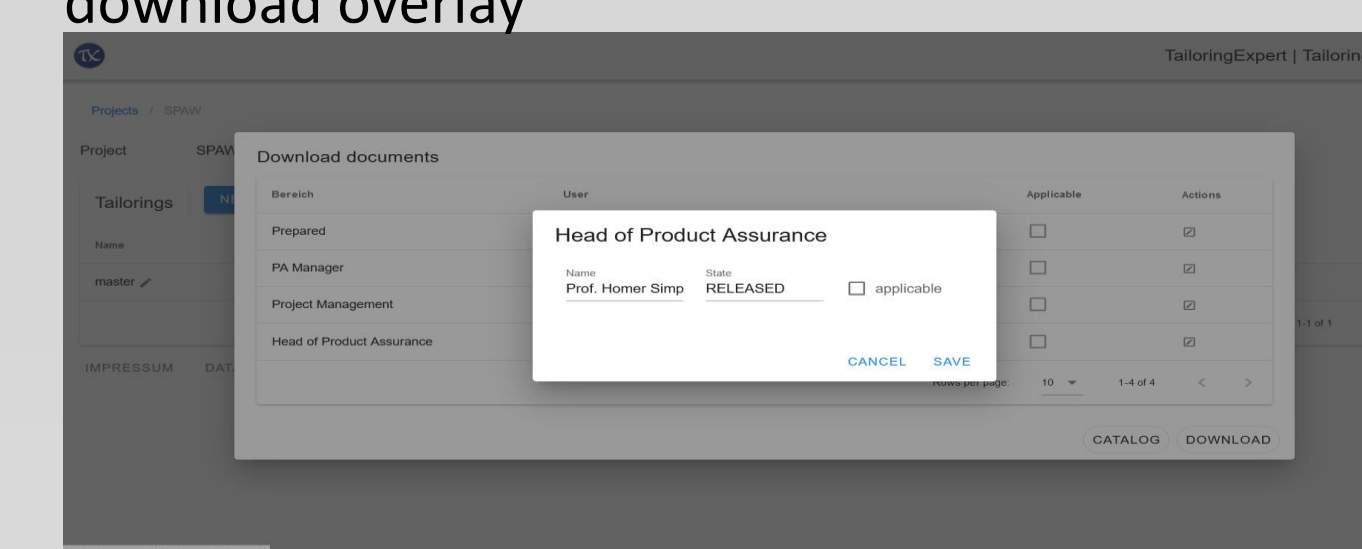
Requirement will be opened in an overlay for editing



Click pencil in box Icon to edit
signee

When you have finished editing you will be returned to the download overlay

Signee will be opened in an overlay for editing



CATALOG

DOWNLOAD

Only the requirements catalog will be created and provided

All documents defined by tenant will be created and provided as zip

Additional Infos

Tailoringexpert

What is tailoringexpert?

Tailoringexpert is a multi tenant open source platform to create easily, fast and reproduceable requirement documentation based on a general requirement catalog on a limited set of parameters, which characterize the specific project. This platform is multi-tenant capable and only a limited number of interfaces are need to be implemented per tenant. It is based on Spring and uses open source libraries to create PDF and Excel files. REST services are implemented as HATEOAS to provide rels that can be used to build your own frontend. The base catalog and tailored requirements catalog, are stored in a relational database using Spring Data JPA.

Because of the fact, that an initial tailoring is created based on fixed rules and requirements, the tailoring is full reproducibile and not dependent on the bias of the tailoring person. However, this approach is flexible enough to fine tune and adapted to the specifics of the project and its stakeholders.

Implemented use cases

Tailoringexpert implements use cases for

1. Create new project with an automated initial tailoring.
2. Modifying requirement state or text.
3. Creating contractually required documents like (complete set is highly dependent on tenant)
 1. Applicable requirements catalog,
 2. Compliance matrix,
 3. Document requirement definitions,
 4. Export of current tailoring, which can also be used as import file for another tailoring.
4. Import of (Excel) requirement file,
5. Adding new tailorings to an existing project.

State Modell

A state model is implemented to protect tailoring of modification and deletion:

- **CREATED**
The tailoring was created and could be edited or deleted.
- **AGREED**
The tailoring is a signature loop and could not be modified or deleted.
- **RELEASED**
The tailoring is signed by all parties involved and cannot be changed or deleted.

Base catalog

The used base catalog containing all requirements and limitations is defined in a json structure and will be imported using a REST interface.

Tailoring results

The result of a tailoring is primarily stored in a database, but it is also generated as an Excel file that can be used as a starting point for other (similar) projects, or to restore the tailoring after a system crash. If you need to restore, you will need to create a new tailoring and then import the Excel file. This is also ensures full traceability and achievability of the contractual relevant tailoring(s).

Files/Attachments to a tailoring

The platform offers the capability to store relevant files, such as the signed documents, in the database. This leads to a single point of truth of the contractual relevant documents.

This poster can, unfortunately, only give a first impression of the tailoring supported by the tailoringexpert platform Please be invited to try out the demosystem (dlr-tailoringexpert-demo.dlr.de). The screening sheet and screenshots are also available via the linkedin post. Any comments are welcome! For further discussion it is possible to arrange a meeting or discussions.