

SafeBook

A SaaS platform for ALM & Requirements Management

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1. SafeBook

SafeBook is a web-browser-based online requirements and architecture manager developed by Safetwice. Commercial versions of SafeBook are licensed as a standalone product. SafeBook follows a V-shape workflow methodology with three levels, as shown in figure [1].

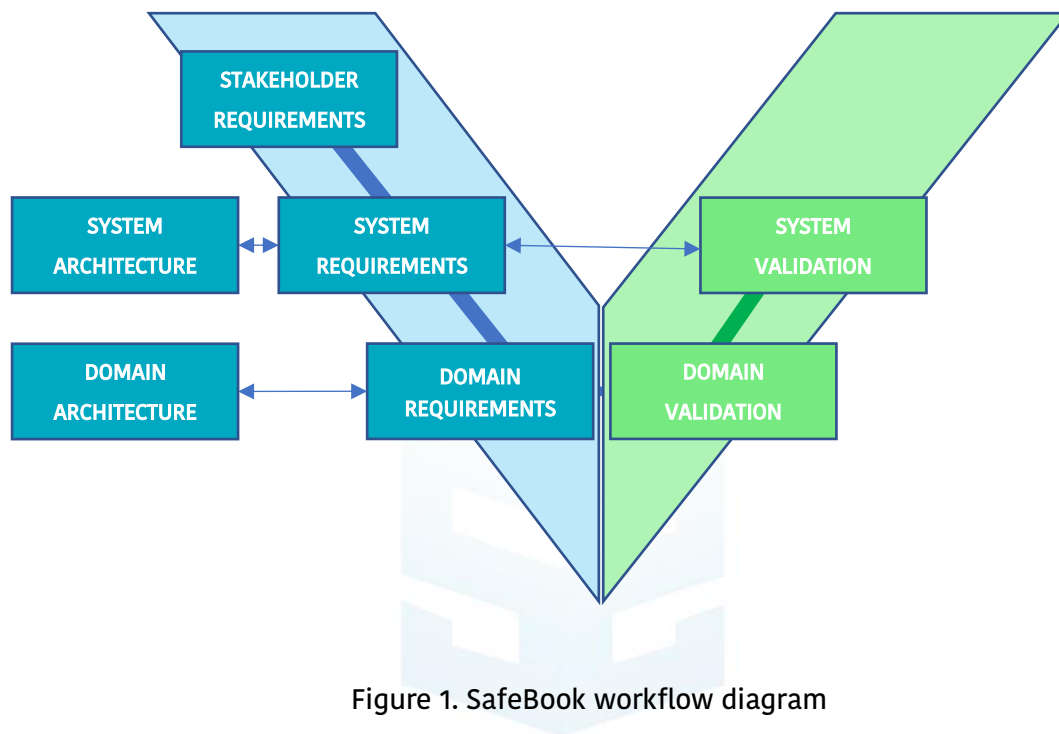


Figure 1. SafeBook workflow diagram

Thus, the software can map and manage a full system-based standard such as ISO 33000, IEC 61508, or EN 50126, including vertical and horizontal multi-traceability to requirements and architecture.

In order to show how this app works, we will briefly explain some basic concepts and terms to provide a basic understanding of the workflow. For that, we will refer to a project example.

1.1 A Simple Workflow

Ideally, an Electrical / Electronic (EE) project has a workflow encompassing:

- High-level functionality, legal constraints, business needs, quality, and production requirements, are applied to the top level “PROJECT” and called **stakeholder requirements**.

The stakeholder is the level where the general requirements for the entire development are defined, determining all the levels below.

- One or several systems, described by **system requirements** and **system architectures**.

The system is composed by the parts and components working together to constitute the project. System requirements can be allocated into one or several stakeholder requirements.

- Each system can be implemented by four different domains divided into hardware, software, firmware, and mechanical. Both **requirements** and **architecture** for every domain will appear.

The domain is the implementation level of each requirement. Each system requirement can be traced to one or several domain requirements.

- Linked to each level of system and domain, the validation tests will define how a quality review of each requirement is carried out.

The validation level shall describe a quality guide and describe in detail how the tests are performed and what results support the assessment of the project. One or several tests can be traced to the different project levels

Browser compatibility

SafeBook recommended browsers for proper performance are either Microsoft Edge 94, Chrome 93, and Mozilla Firefox 92 or later, with JavaScript applet enabled.

2 Project creation

After accessing the [SafeBook website](#), the user will come to a **login window**. This window works in the default language of the user's operating system. The login and password will be provided from Safetwice [support center](#).

After login in, the web browser will land on the main screen of the SafeBook. The **main screen** includes:

1. Project and system selector
2. SafeBook browser:
 - 2.1. Requirement's editor and viewer (Stakeholder, System and four domains): in this section, both the Administrator and the Editor user can add, modify and multi-link the requirements and validation for all the three stages of the V-process.

- 2.2. Architecture management (System, Domain and Architecture Overview): in this section, the Administrator can either create a new project, configure the current project, view existing projects and create a project Baseline (export/import releases).
 - 2.3. Project administration (Create, configure and view project) and Baseline generator. The Administrator and editor can create, view and modify the architectures for current project, systems and domains.
 - 2.4. Reporting (Traceability matrix in xml format, requirement export in docx file and indicators). The Administrator can generate different project reports and download the requirements of the project as a docx and excel file. The project indicators show stats from the project and each defined system.
3. Traceability view: each requirement and validation can be linked with several requirements following the Figure 1. The system requirement window shows all the previous defined requirements. The related stakeholder requirements window, related system test case window and related domain window will be filled with the previously linked statements. Selecting a related domain requirement, a list of related test cases appears in domain test cases.

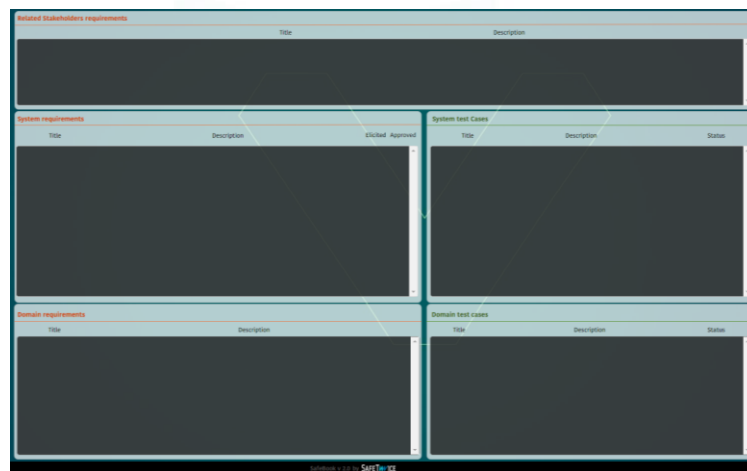


Figure 3. Main screen layout

2.1 Generate a project

After getting familiarized with the main screen, we proceed to click the **Create new project** button. We will jump to the **New Project** screen, where we can assign a name and a description for the project. The admin role has also the privilege of user assignments; we shall click assign user icon. Users that need a granted access to the project can be easily selected in a checklist. Also each system can be assigned to different users.



Figure 4. Project creation screen

We shall click the **Generate project** or **Back to main view** button to return to the main screen. The recently created project can be found in the “Project” list.

The main sections in the main screen menu are:

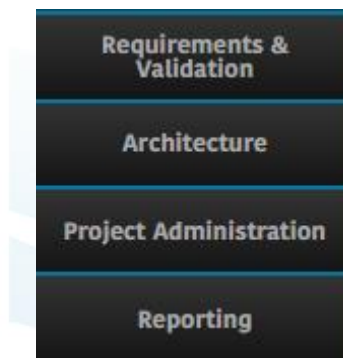


Figure 5. Safebook options

1. **Requirements & Validation:** in this section, both the Administrator and the Editor user can add, modify and multi-link the requirements and validation for all the three stages of the V-process.
2. **Architecture:** The Administrator and editor can create, view and modify the architectures for current project, systems and domains.
3. **Project Administration:** in this section, the Administrator can either create a new project, configure the current project, view existing projects and create a project Baseline (export/import releases).
4. **Reporting**

3 System creation and management

3.1 Project prefixes configuration

In the **Project administration** screen, the Administrator can either define the default prefixes for the ID of each type of requirement, create the systems included in the project, enable the stakeholder view and manage the configuration of both systems.

To Define requirements, a minimum of one system is needed: the core unit of the workflow is the system requirement.

3.2 System creation and configuration

Clicking on the **Add System** button below, we will jump to **New System** screen. When a system is selected in the systems list, the **System configuration** menu comes up. Here, the Administrator can either configure which users can edit the project and systems, configurate prefixes and description.

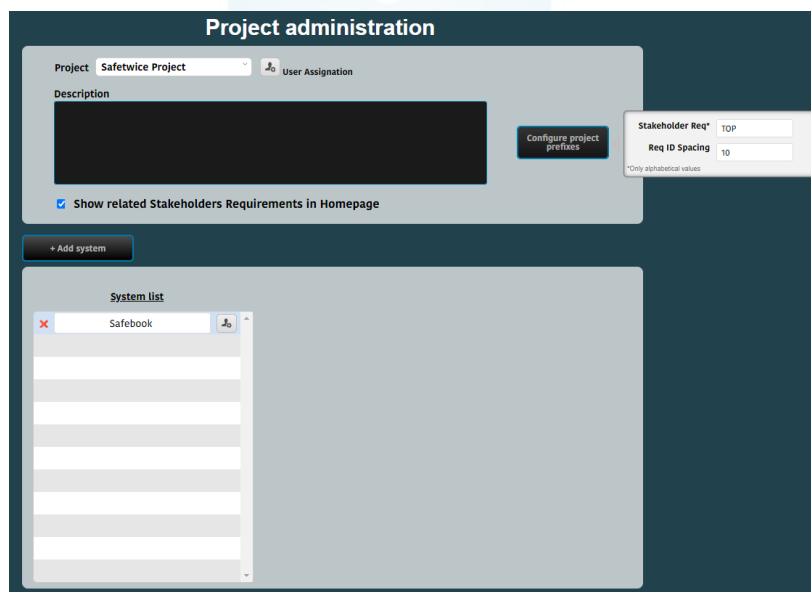


Figure 6. System configuration menu

4 Architecture creation and management

In SafeBook workflow, the creation and management of architectures are NOT mandatory. Requirements for the project, system, and domain levels can be created and managed independently from any architectural consideration. Even so, it is highly recommended for the global and unitary understanding of the project. Checking the **Architectures** section in the main screen menu, the user can manage system and domain architectures.

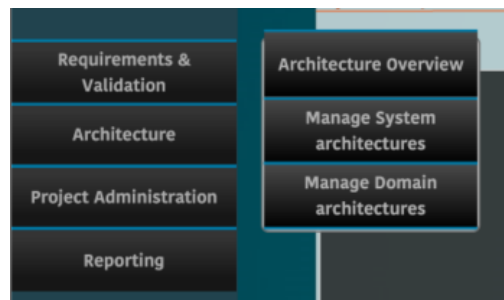


Figure 7. Architectures management menu

4.1 Architecture Overview

The **Architecture Overview** button leads to an overview screen of all the architectures related to the project.

1. **Block list visualizer:** this visualizer shows all the **blocks** that exist in our architecture definition.
2. **Interface list visualizer:** this visualizer shows all the **interfaces** that exist in our architecture definition.
3. **Architecture visualizer:** this area is a drag and drop, where the administrator loads a drawing of the architecture. Also, after loading the drawing of the architecture.

The architecture image uploaded to the Architectures visualizer has only illustrative purposes, so it has no impact on the block or interface definition in SafeBook. SafeBook supports JPEG, PNG, and PDF formats, with a maximum size of 5Mb per file, to be uploaded to the Architecture visualizer.

4.2 System architecture creation and management

Back to the main screen menu, the **Manage System Architectures** button leads to the **System Architectures** screen.

Please notice, though, that the user shall scroll from one system architecture/domain to another (in the case that several systems have been included in the current project). To do so, the scroll-down lists shall be used.

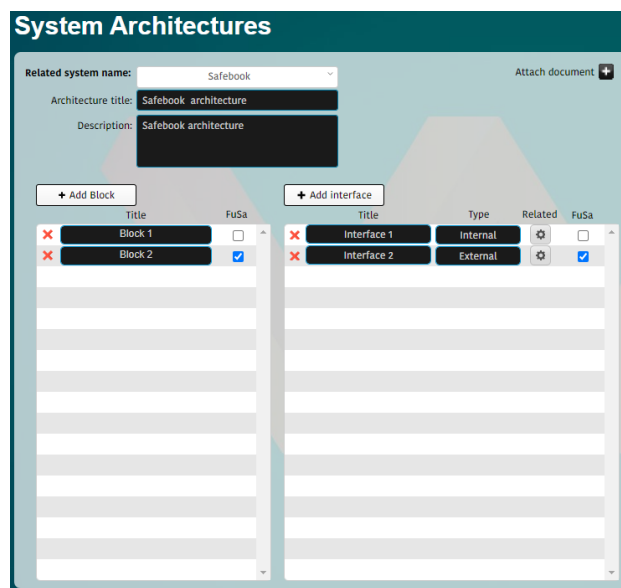


Figure 8. System architecture screen layout

4.2.1. Blocks and interface creation

By means of the **Add Block** button, the user can create a new block for the current project architecture: a blank item is created in the block list so the user can assign a name.

Use the **Add interface** button to create a new interface for the current project architecture: a blank item is created in the block list so the user can assign a name. For each interface, a type (Internal/External) can be selected. Additionally, it can be linked to one or several architectural blocks by using the **Block linker** button.

Both blocks and interfaces can be selected as FuSa (Functional Safety) related by checking / unchecking the tick box at the right of the component. The layout also allows the user to upload an image (JPEG/PNG) for the block diagram of the system architecture.

4.3 Domain architecture creation and management

Back to the main screen menu, the **Manage Domain Architectures** button leads to the **Domain Architectures** screen.

The process for adding blocks and interfaces and linking them together is the same as described in this manual for system architecture. Notice that the user shall scroll from one domain architecture to another. To do so, the scroll-down list shall be used.

5 Requirements creation and management

REMEMBER: IN SAFEBOOK'S WORKFLOW, THE BASIC LOGIC UNIT IS THE SYSTEM REQUIREMENT: any system requirement can be traced to a stakeholder requirement and any system requirement can be implemented with one or several domain requirements. As a result, the simplest PROJECT must have at least ONE SYSTEM linked to it.

5.1 Stakeholder Requirements

Go to the **Stakeholder Requirements** button to reach the **Stakeholder Requirements** screen.

System name: Safebook

Requirements

+ Add Requirement

Title	Description	Status	Attached document
TOP-1	Safebook Stakeholders Requirement	Approved <input checked="" type="checkbox"/> Incomplete <input type="checkbox"/> Ambiguous <input type="checkbox"/>	
TOP-10	Safebook Stakeholders Requirement	Approved <input type="checkbox"/> Incomplete <input checked="" type="checkbox"/> Ambiguous <input type="checkbox"/>	
TOP-20	Safebook Stakeholders Requirement	Approved <input type="checkbox"/> Incomplete <input checked="" type="checkbox"/> Ambiguous <input type="checkbox"/>	
TOP-30	Safebook Stakeholders Requirement	Approved <input type="checkbox"/> Incomplete <input type="checkbox"/> Ambiguous <input checked="" type="checkbox"/>	
TOP-40	Safebook Stakeholders Requirement	Approved <input type="checkbox"/> Incomplete <input checked="" type="checkbox"/> Ambiguous <input type="checkbox"/>	

Figure 9. Stakeholder Requirements screen

A new requirement can be created by clicking on **Add Requirement** button: a new blank line will be added to the list of stakeholder requirements, where the following information related to the requirement can be edited:

1. **ID reference number.** Automatic ID formation and spacing is configured in Project Administration.
2. **Description.**
3. **Status assignation.** The customer obtains the feedback from system engineers and other stakeholders. For example, in the requirement “*Ambiguous check shall mark a state where a requirement has bad information.*” the system developer can report an ambiguous status because the type of information recognized as an ambiguous is not properly defined.
4. **Documentation attached to the requirement.** Files can be added by clicking on the “+” button next to it or deleted at any time by clicking on the red cross button. Files can also be added using the drag-and-drop functionality. Only PNG, JPEG, and PDF are allowed with a maximum size of 5 Mb for each file.
5. The requirement can be selected as “**INFO**”. This status will allow the user to add titles or information. Status will be blocked but the attachment is always available. Such a requirement cannot be linked to any higher or lower level.
6. Comment section.
7. **Sons indicator:** an icon opens a list if there are one or more links with the selected element.

5.2 System Requirements

Back to the main screen menu, the **Requirements → Go to System Requirements** button leads to **System Requirements** screen, as shown in figure 10.

Figure 10. System requirements layout

NOTICE: In the **System Requirements** screen, requirements can be added for the different systems in the current project. The user shall select the system before entering this layout.

A new requirement can be created by clicking on the **Add Requirement** button: a new blank line will be added to the list of system requirements, where it can be edited the following information related to the requirement:

1. **ID number.** Automatic ID formation and spacing are configured in Project Administration (please see Chapter 3.1 in this manual) but can be edited by the user at any moment.
2. **Description.**
3. **Type assignation.** The system manager has a different status for each requirement. Each defined type may be sorted with a filter.
4. **Status assignation.** Elicited and approved status are required aiming to improve the project feedback.
5. **Documentation attached to the requirement.** Files can be added by clicking on the “+” button next to it or deleted at any time by clicking on the red cross button. Files can also be added using the drag-and-drop functionality. Only PNG, JPEG, and PDF are allowed with a maximum size of 5 Mb for each file.

6. The requirement can be selected as “**INFO**”. This status will allow the user to add titles or information. Status will be blocked but the attachment is always available. Such a requirement cannot be linked to any higher or lower level. If a requirement is currently linked a security question will appear.
7. **Orphan**
8. **Sons indicator:** an icon opens a list if there are one or more links with the selected element.
9. **Link with stakeholders.** The requirements can be multilinked to the corresponding stakeholders requirements list. A mark indicates that one requirement is already linked.
10. **Link with block/interface.** The requirement can be multilinked to the corresponding block or interface defined in the architecture. System architecture elements should be previously created. A mark indicates that one requirement is already linked with architecture.

Note: For documentation attachments, SafeBook only supports JPEG, PNG and PDF, with a maximum size of 5 [Mb] per file.

5.3 System Validation test cases

In the **System Requirements** screen, Test cases can easily be managed by clicking on the **Test cases** tab, and a list of the test cases will be displayed.

The screenshot displays the 'System Requirements & Validation' interface. The sidebar on the left contains navigation links: 'Homepage', 'Stakeholder Requirements', 'System Requirements & Validation', 'Hardware Requirements & Validation', 'Software Requirements & Validation', 'Firmware Requirements & Validation', and 'Mechanical Requirements & Validation'. The main content area is titled 'System Requirements & Validation' and shows a table of test cases. The table has columns: 'Test Status', 'Title', 'Description', 'Previous conditions', 'Action', 'Expected results', 'Test type', and 'Attached documents'. The first row shows a test case with status 'INFO' and title 'VAL-1'. Below it, there are three more rows with titles 'VAL-10', 'VAL-20', and 'VAL-30', each with a 'Modify Link' button and an 'INFO' checkbox. The table also includes a search bar and a 'toggle' button in the sidebar.

Figure 11. System test cases edit layout

Click on the **Add Validation** button, a new blank line will be added to the list of project test cases, where the following information related to the test case can be edited:

1. **ID number.** Automatic ID formation and spacing is configured in Project Administration.
2. **Description, previous, action and expected results**
3. **Test type.** Each test case has three types depending on the test-level:
 - a. Qualification Test
 - b. Integration Test
 - c. Unit Test
4. **Documentation attached to the test case.** Files can be added by clicking on the “+” button next to it or deleted at any time by clicking on the red cross button. Files can also be added using drag-and-drop functionality.
5. **Link with system Requirements:** The validation can be multilinked to the corresponding system requirements list. A mark indicates that one validation test is already linked.

5.4 Domain Requirements

Back to the main screen menu or through the requirements buttons **go to Domain Requirements** button that leads to the **Domain Requirements** screen (Hardware, Software, Firmware, Mechanical).

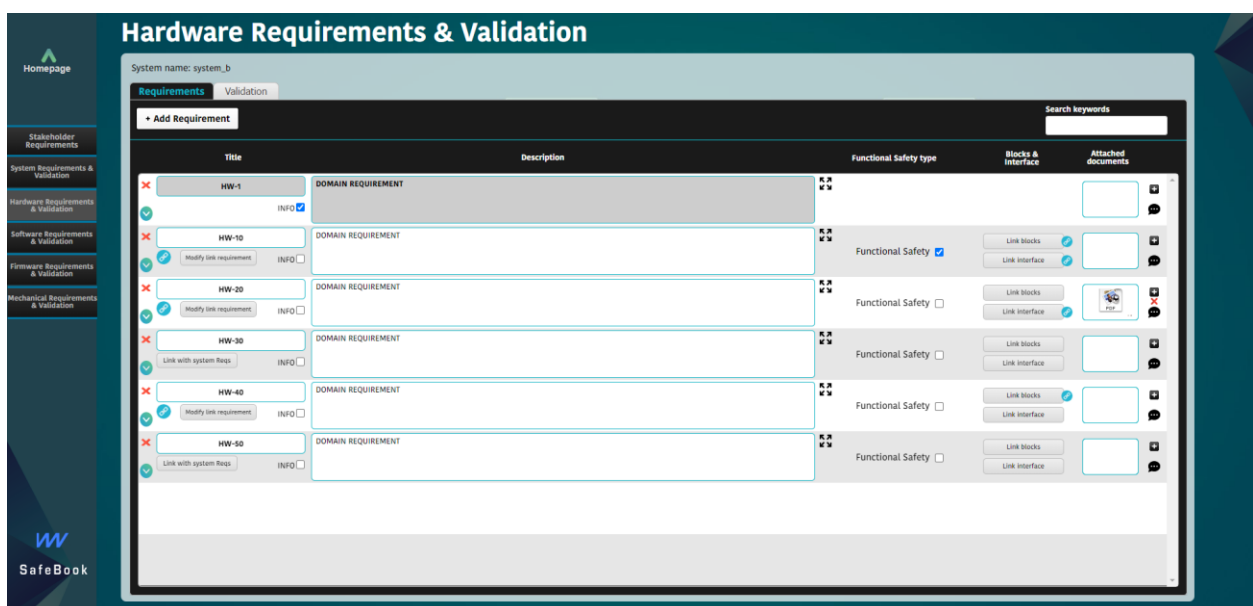


Figure 12. Domain requirements layout

A new requirement can be created by clicking on the **Add Requirement** button: a new blank line will be added to the list of system requirements, where it can be edited the following information related to the requirement:

1. **ID number.** Automatic ID formation and spacing is configured in Project Administration.
2. **Description.**
3. **Safety requirement status**
4. **Link with system.** The requirements can be multilinked to the corresponding system requirements list. A mark indicates that one requirement is already linked.
5. **Link with block/interface.** The requirement can be multilinked to the corresponding block or interface defined in the architecture. System architecture elements should be previously created. A mark indicates that one requirement is already linked with architecture.
6. **Documentation attached to the requirement.** Files can be added by clicking on the “+” button next to it or deleted at any time by clicking on the red cross button. Files can also be added using the drag-and-drop functionality.
7. **Sons indicator:** an icon opens a list if there are one or more links with the selected element.
8. The requirement can be selected as “**INFO**”. This status will allow the user to add titles or information. Status will be blocked but the attachment is always available. Such a requirement cannot be linked to any higher or lower level. If a requirement is currently linked a security question will appear.

5.5 Domain Validation test cases.

In the **System Requirements** screen, Test cases can be managed by clicking on the **Test cases** tab and a list of the test cases will be displayed. Click on the **Add Validation** button; a new blank line will be added to the list of project test cases, where it can be edited and linked to a domain requirement.

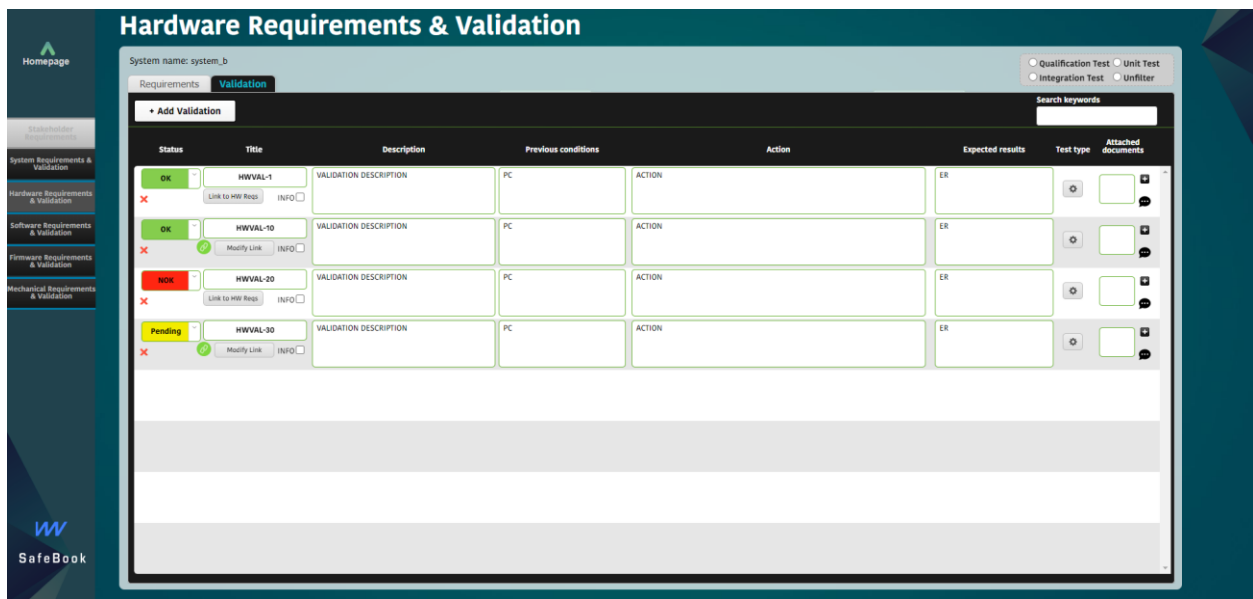


Figure 13. Test Cases for domain requirement

1. **ID number.** Automatic ID formation and spacing are configured in Project Administration but can be edited by the user at any moment.
2. **Description, previous, action and expected results**
3. **Domain type:** Each test case has three types depending on the test-level:
 - a. Qualification Test
 - b. Integration Test
 - c. Unit Test
4. **Documentation attached to the test case.** Files can be added by clicking on the “+” button next to it or deleted at any time by clicking on the red cross button. Files can also be added using the drag-and-drop functionality.
5. **Link with domain.** The requirements can be multilinked to the corresponding domain requirements list. A mark indicates that one requirement is already linked.

5.6 Baseline Management

Back to the main screen menu, **Project Administration** section, the **Project Releases** button leads to the **Project Releases** screen.

NOTICE: A Project Release is a frozen state of the project which is backed up by SafeBook and can be restored at any moment.

A new release can be created by clicking on the **Create new Release** button: an empty form is displayed so the user can configure and save the current state of the project. The following information shall be entered:

1. Name of the release.
2. Description of the release.

After filling in the information and checking it, click the **Export Release** button to save the current state of the project as a new release. When the export operation has been properly saved, the **Release migration status** will change, from '**NOT OK**' to '**OK**.'

NOTICE: If the user does not click the **Export Release** button before exiting the screen, the release will be not saved.

Baseline Release

Create new baseline

Current Project: Safetwice Project

Current baseline name: BASELINE 2

Baseline: BASELINE 2

Import Baseline

Description

Created by: angelesteve

Creation date: 29/11/2021 9:49:35

Release number (chronologic ordering): 2

Modified by: angelesteve

Modification date: 29/11/2021 9:51:09

Release migration status: OK

BASELINE 1

BASELINE 2

Figure 41. Project Releases screen layout description

The box at the bottom of the layout shows the created releases during the history of the project. It can also be used to select a release to apply some operation.

5.7.1 Restoration of previous releases

The current state of the project can be overwritten at any moment with a previously saved release.

IMPORTANT: If not exported as a new release, the status of the project will be permanently lost after a the restoration of a previous release.

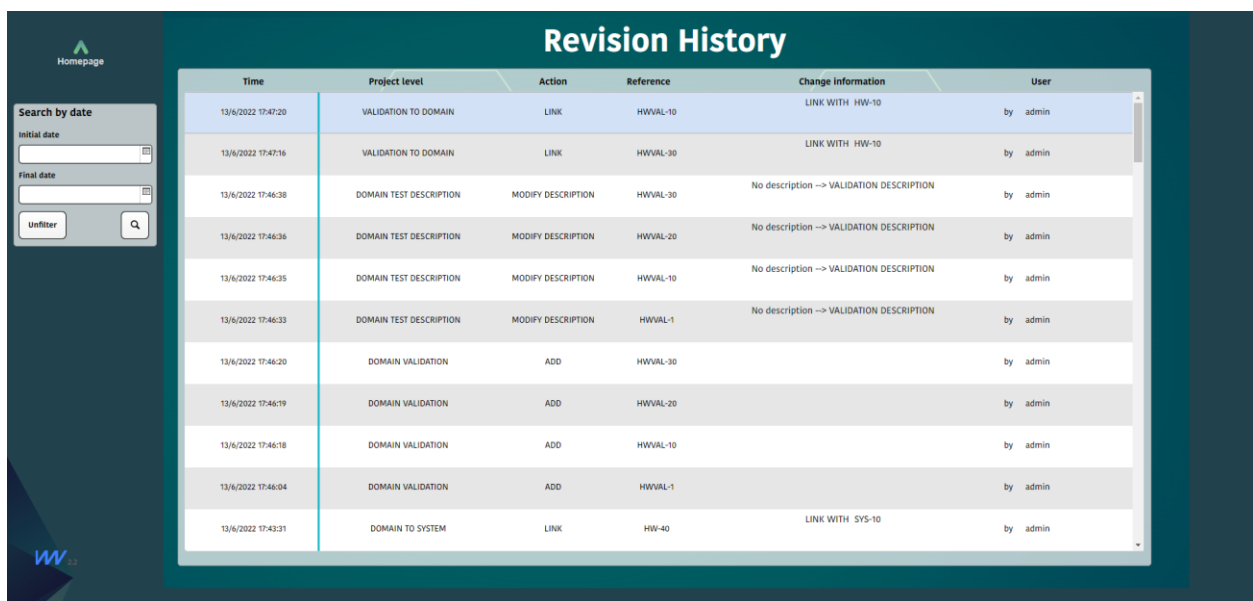
All the previously created releases can be visualized by scrolling down in the **Release** list. After selecting the release to be restored, click on the **Import Release** button. After the operation is completed, the selected release will be restored as the current state of the project.

IMPORTANT: Restoring operation may take some minutes, depending on the state of the service and the dimensions of the project.

6 Reporting

6.1 Revision History

The application monitors all the changes from all the users in a project. The admin has the privilege of checking each movement.



Time	Project level	Action	Reference	Change Information	User
13/6/2022 17:47:20	VALIDATION TO DOMAIN	LINK	HWVAL-10	LINK WITH HW-10	by admin
13/6/2022 17:47:16	VALIDATION TO DOMAIN	LINK	HWVAL-30	LINK WITH HW-10	by admin
13/6/2022 17:46:38	DOMAIN TEST DESCRIPTION	MODIFY DESCRIPTION	HWVAL-30	No description --> VALIDATION DESCRIPTION	by admin
13/6/2022 17:46:36	DOMAIN TEST DESCRIPTION	MODIFY DESCRIPTION	HWVAL-20	No description --> VALIDATION DESCRIPTION	by admin
13/6/2022 17:46:35	DOMAIN TEST DESCRIPTION	MODIFY DESCRIPTION	HWVAL-10	No description --> VALIDATION DESCRIPTION	by admin
13/6/2022 17:46:33	DOMAIN TEST DESCRIPTION	MODIFY DESCRIPTION	HWVAL-1	No description --> VALIDATION DESCRIPTION	by admin
13/6/2022 17:46:20	DOMAIN VALIDATION	ADD	HWVAL-30		by admin
13/6/2022 17:46:19	DOMAIN VALIDATION	ADD	HWVAL-20		by admin
13/6/2022 17:46:18	DOMAIN VALIDATION	ADD	HWVAL-10		by admin
13/6/2022 17:46:04	DOMAIN VALIDATION	ADD	HWVAL-1		by admin
13/6/2022 17:43:31	DOMAIN TO SYSTEM	LINK	HW-40	LINK WITH SYS-10	by admin

Figure 14. Revision History

6.2 Project Indicators

The application creates some indicators regarding the requirements lifecycle of the project. In this case, the user shall go to Reporting → Project Indicators.

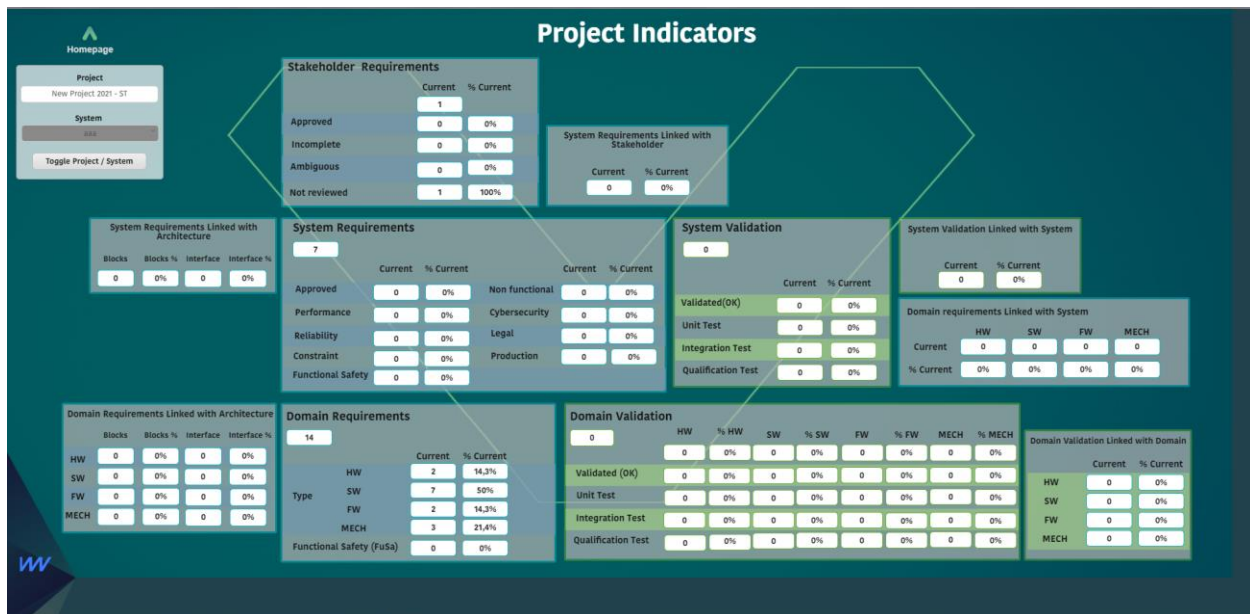


Figure 15. Project Indicators Layout

The application embeds the calculation of a few indicators using the lifecycle checks of the requirements. It also uses the link information to compute some traceability indicators (as the number of orphan requirements or safety requirements). In this layout, the application will only show the system-related data (both indicators and to-configure data).

6.3 Download Traceability matrix

SafeBook also generates the traceability matrix of the current selected system. To generate the matrix report, the user shall go to Reporting → Download Traceability matrix as an Excel file. The window will change to the Project Indicators layout, where a new download button will appear, as marked in Figure 15.

This excel report can be downloaded by clicking on the button and following the instructions. The report will show all the system requirements inserted in the project with its related requirements (both project and domain stages), test cases for every stage, and architectural links (block and interface names).

6.4 Export requirements

Finally, the app allows user to export all the requirements inserted in the project in several docx files. The user shall go to Reporting → Export Requirements as docx file. This procedure will create a new compressed file that can be downloaded on the homepage, as shown in Figure 16.

This file can be downloaded by clicking on it and following the instructions. The compressed file will contain at least one Project folder (with the Project requirement and test cases) and a global project requirement document with all the requirement and test cases information contained in it. If the project has related systems, the file will also contain a subfolder for each defined system.

Each system folder will contain the system and domain data for all the requirements and test cases. Thus, each system folder will be conformed by two subdirectories with the related data.

7 SOFTWARE MANAGEMENT

7.1 Licensing

The Support team at Safetwice (support@safetwice.com) shall be in charge of licenses. According to the commercial agreement the licenses will last from one month to a full year period.

SafeBook license scheme has a three-level approach:

- Administration (full functionality)
- Editor (full functionality except to define and configure a project)
- Viewer (No edit capabilities, just consulting data)

There would be an administration license for each customer.

Should a license be close to expiring, an automatic advice will appear during the last three days as a reminder to renew the payment.

A no renewed administration license will automatically mean the service is not maintained. All customer's data will be exported and sent to the Admin license owner. The data will be kept for one month. After this time it will be destroyed.

7.2 Data storage and Security

Modifications in the database are automatically stored.

Customer data is protected and isolated. The platform guarantees full access to them, as well as an automatic daily back-up.

Back-up recovery and upload request would be made through support@safetwice.com

7.3 Maintenance and Updates

As a SaaS platform, maintenance and updates are automatically included in the price. At the time of applying changes in the platform, a message will be sent in advance to all customers with the schedule and blackout duration. No changes in databases will be allowed during the referred period.

7.4 End User License Agreement

A EULA document is available for the customer. Please contact sales@safetwice.com.

7.5 Other agreements

Contract for data storage responsibilities is available for the customer. Please contact sales@safetwice.com