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FACULTY OF ENGINEERING
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Test Plan, Test Design Specifications, Test Cases and Test Results
Version 1

CENG 408
Innovative System Design and Development II

**CSEK REQUIREMENT
MANAGEMENT SYSTEM**

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1. INTRODUCTION

1.1 Version Control

Version No	Description of Changes	Time
1.0	First Version	March 18, 2025

1.2 Overview

This test plan is intended to provide a comprehensive evaluation of the CSEK Requirement Management System. The system will be tested in the areas of functionality, security, performance and usability. The test plan will consist of a series of scenarios, and test phases to determine whether the system satisfies the user requirements.

1.3 Scope

This test plan aims to ensure that critical components are tested by defining the test scope of the CSEK Requirement Management System. The testing process aims to verify that the system satisfies the specified requirements in terms of functionality, safety, performance, and security.

The testing process will test the core functions of the system such as requirements generation, organization, tracking, and categorization. The bidirectional traceability feature, that allows users to establish links between different types of requirements, will be examined to ensure that it is implemented correctly. Also, the usability and efficiency of the feature that allows users to report their requirements in formats such as PDF and MS Word will be tested.

Security tests will analyze the effectiveness of role-based access control, authentication and authorization mechanisms. The feasibility of Keycloak identity management integration as well as data encryption and secure data transmission methods will be tested. In addition, security analysis will verify whether the system can prevent unauthorized access and protect data protection and confidentiality.

Performance tests will aim to measure the respond time and scalability of the system. As the system is designed to support 500 users at the same time, system efficiency will be evaluated under various loads.

Scalability tests will examine the system's suitability for future extensions. Eureka's dynamic service discovery and Kafka's communication processes will be tested to examine the operation of the system in different conditions. Also, integration tests will be implemented to verify the compatibility between the components of the system. In this context, it will be checked that the system communicates using REST APIs and gPRC without any problems.

However, some system features are very difficult to test because they do not have measurable metrics or it is not possible to determine their long-term impact through immediate testing. For instance, the extent to a system's adaptability to future technologies cannot be tested because future technologies cannot be fully predicted. Additionally, security tests test known vulnerabilities, although it is not possible to predict hazards that have not yet been discovered. The effects of the user interface are also among the features that cannot be tested.

This testing process aims to verify that the CSEK Requirements Management System satisfies all functional, security and performance requirements, to identify features that cannot be tested, and to ensure that the system is compatible with future enhancements.

1.4 Terminology

Acronym	Definition
SRS	System Requirement Specification - A detailed document containing the technical and functional requirements of a system.

Acronym	Definition
UI	User Interface - The visual design and components through which users interact with a software or system.
RBAC	Role-Based Access Control - A security model that determines the operations that users can perform on the system in accordance with certain roles.
UAC	User Access Control - A mechanism that manages users' access rights according to their roles and authorizations within the system.
SDD	Software Design Document - A document in the software development process that contains details about the design of the software.
FT	Functional Testing - The testing process that verifies that the functions of a software system perform in accordance with specified requirements.
UX	User Experience - The overall experience and satisfaction level of users when using a system or software.
PT	Performance Testing - A testing process that evaluates how a system or software performs under a given load.

2. FEATURES TO BE TESTED

This section describes the key features of the CSEK Requirements Management System to be tested. The individual features will be tested to verify that the system functionality satisfies expectations and provides the security and performance requirement.

2.1 User Authentication and Access Control

The login mechanism of the system and role-based access control (RBAC) will be tested. The authentication and session management with Keycloak integration, where unauthorized users are prevented from accessing, will be tested.

2.2 Requirements Creation and Management

The system engineers and administrators will be tested on their ability to create, edit, and delete requirements. Tests will include features such as requirement formalization options, and requirement attribute assignment.

2.3 Requirements Traceability

The bi-directional traceability feature of the system will analyze user, system, and sub-header requirements to ensure that they are correctly connected. Also, the function that highlights the affected requirements when changes are made will be tested.

2.4 Change Management

All changes to the requirements will be verified to be logged and monitored. The visual indicators displaying the changed requirements will be tested. The revocability of deleted requirements will also be examined.

2.5 Reporting and Exporting

Reporting functions of the system will be tested. The accuracy of exporting requirements in MS Word, and PDF formats will be examined.

2.6 Release Management

The system will be tested for releases creation, storage, and comparison capabilities. It will be verified that requirements can be stored in specific releases, and that comparisons can be made between different releases.

2.7 Performance Tests

Since the system offers the capability to support 500 concurrent users, it will be tested with different loads. Also, database efficiency, and response times will be analyzed.

2.8 Security Tests

The system's encryption mechanisms, session management, and prevention of unauthorized access will be tested. Role-based access control will be verified to be functioning.

2.9 Usability Tests

The system will be tested for easy navigation and understandability of error messages. It will be examined how easily the different user roles can complete the specified tasks, and experience routing difficulties within the system.

2.10 Integration Tests

The system must be compatible with external and internal systems. Data exchange using REST APIs, and communication between microservices using gRPC will be tested.

2.11 Database Tests

It will be tested that the system stores the requirements completely and accurately. Tests will be performed to prevent data loss, conflicts, and corruption.

3. FEATURES NOT TO BE TESTED

This section describes the features that will not be tested in the CSEK Requirement Management System.

3.1 Adaption to Future Technologies

The system is designed to integrate with future technologies, but compatibility tests cannot be performed because these technologies do not yet exist or cannot be predicted.

3.2 Impact of UI/UX Design

The impact of interface design on user satisfaction in the long term cannot be directly tested. This is a quality that can only be measured through long-term user testing and analysis.

3.3 Security

Even though testing can be done against known vulnerabilities, the resilience of the system cannot be tested against vulnerabilities that have not yet been discovered.

4. ITEM PASS/FAIL CRITERIA

This section describes the general rules used to pass or fail test cases for the CSEK Requirements Management System.

Pass Criteria:

- If the tested feature works in accordance with the specified requirements.
- If the expected output is produced correctly as specified in the test steps.
- In performance tests, if the system response time is below the specified limits.
- Data integrity is maintained and the system does not cause any loss of information.

Fail Criteria:

- If the tested feature does not produce the expected result or causes an error.
- If the system does not satisfy the functional requirements.
- If data inconsistencies, data loss or incorrect data retention are observed.
- If the system loses stability under load up to certain limits.

4.1 Exit Criteria

The following exit criteria must be satisfied for the test process to be considered complete and the system to be ready.

- All test cases (100%) have been executed.
- At least 95% of the total test cases are successful.
- Passing all high and medium priority test cases.
- Critical errors (errors that affect the essential functions of the system) have been eliminated.
- Functional and safety requirements are fully satisfied.

5. REFERENCES

- [1] CENG407_Group10_SRS_V1.0, December 10, 2024
- [2] CENG407_Group10_SDD_V1.0, December 25, 2024

6. TEST DESIGN SPECIFICATIONS

6.1 Login (LG)

6.1.1 Subfeatures to be tested

6.1.1.1 Admin (LG.AD)

Users with admin role can access all system functions.

6.1.1.2 System Engineer (LG.SE)

System Engineer users can log in, but can only access the requirements management sections.

6.1.1.3 Reviewer (LG.RV)

Reviewer users log in with limited access; they only have read permissions.

6.1.2 Test Cases

TC ID	Requirements	Priority	Scenario Description
LG.AD.01	3.2.1	H	Enter a valid admin username and password
LG.AD.02	3.2.1	H	Enter invalid admin credentials
LG.RV.01	3.2.1	H	Login as reviewer and view requirement list
LG.RV.02	3.2.1	M	Attempt unauthorized access to admin panel as reviewer
LG.SE.01	3.2.1	H	Login with valid system engineer credentials
LG.SE.02	3.2.1	M	Attempt to access admin-only pages as System Engineer

6.2 Add User (AU)

6.2.1 Subfeatures to be tested

6.2.1.1 Admin (LG.AD)

Admin users can add new users to the system and assign roles.

6.2.1.2 System Engineer (LG.SE)

System Engineer users are not authorized to add users. These attempts should be appropriately blocked.

6.2.1.3 Reviewer (LG.RV)

Reviewer users are not authorized to add users. Such an attempt should be blocked and the appropriate error message displayed.

6.2.2 Test Cases

TC ID	Requirements	Priority	Scenario Description
AU.AD.01	3.2.1	H	Add unique admin user
AU.AD.02	3.2.1	H	Add an admin user who already exist
AU.AD.03	3.2.1	M	Add user without assigning a role
AU.RV.01	3.2.1	M	Reviewer tries to access Add User page
AU.SE.01	3.2.1	M	System engineer tries to access Add User page

6.3 Requirement Management (RM)

6.3.1 Subfeatures to be tested

6.3.1.1 Create,Edit,Delete (RM.CR)

System Engineer, and admin user can create, edit and delete system and subheader requirements.

6.3.1.2 Reviewer (RM.RV)

Reviewer can only view requirements, not edit them.

6.3.2 Test Cases

TC ID	Requirements	Priority	Scenario Description
RM.CR.01	3.2.2	H	Create new user requirement with text, date, number
RM.CR.02	3.2.3	H	Create new system requirement linked to user requirement
RM.CR.03	3.2.4	H	Add subheading requirement and assign header
RM.CR.04	3.2.6	H	Delete requirement and verify it's logged
RM.RV.01	3.2.2	H	Reviewer views user/system requirements
RM.RV.02	3.2.2	M	Reviewer attempts to edit a requirement

6.4 Traceability (TR)

6.4.1 Subfeatures to be tested

6.4.1.1 Bi-directional Traceability (TR.BI)

Bidirectional links between requirements can be created and traceability ensured.

6.4.1.2 Impact Analysis (TR.IM)

When a requirement is changed, other affected requirements are visually marked.

6.4.2 Test Cases

TC ID	Requirements	Priority	Scenario Description
TR.BI.01	3.2.5	H	Create bi-directional link between user and system requirements
TR.BI.02	3.2.5	H	Trace from subheading to system requirement
TR.IM.01	3.2.5	M	Edit requirement and verify affected requirements flagged
TR.IM.02	3.2.5	M	Filter requirements by linked/unlinked

6.5 Change Management (CM)

6.5.1 Subfeatures to be tested

6.5.1.1 History Logging (CM.HL)

Every change is logged and stored with user and time information.

6.5.1.2 Visual Inducators (CM.VI)

Changed requirements are indicated by icons.

6.5.2 Test Cases

TC ID	Requirements	Priority	Scenario Description
CM.HL.01	3.2.6	H	Edit a requirement and check change log
CM.HL.02	3.2.6	H	Delete a requirement and recover it
CM.VI.01	3.2.6	M	Verify yellow star for edited unreviewed requirement
CM.VI.02	3.2.6	M	Verify red star on linked requirements after change

6.6 Reporting and Exporting (RE)

6.6.1 Subfeatures to be tested

6.6.1.1 Export Formats (RE.FM)

Users can export requirements in MS Word, PDF, formats.

6.6.1.2 Structure Preservation (RE.SP)

Hierarchical structure and visuals are preserved in export files.

6.6.2 Test Cases

TC ID	Requirements	Priority	Scenario Description
RE.FM.01	3.2.8	H	Export requirements in PDF format
RE.FM.02	3.2.8	H	Export requirements in MS Word format
RE.SP.01	3.2.8	M	Ensure images are included in export
RE.SP.02	3.2.8	M	Use export preview before generating file

6.7 Release Management (RL)

6.7.1 Subfeatures to be tested

6.7.1.1 Baseline Operations (RL.BS)

Admin users can create, version, delete baselines.

6.7.1.2 Comparison (RL.CM)

Different versions should be listed in a comparable way.

6.7.2 Test Cases

TC ID	Requirements	Priority	Scenario Description
RL.BS.01	3.2.7	H	Create a baseline with current requirements
RL.CM.01	3.2.7	H	Compare two baselines and list requirement changes

6.8 Performance (PF)

6.8.1 Subfeatures to be tested

6.8.1.1 Response Time (PF.RT)

System operations should complete in under 2 seconds.

6.8.1.2 Load Testing (PF.LT)

Tests should be performed under different loads.

6.8.2 Test Cases

TC ID	Requirements	Priority	Scenario Description
PF.RT.01	3.3.1	H	Query requirements and check response time < 2 sec
PF.RT.02	3.3.1	M	Save requirements and check time < 5 sec
PF.LT.01	3.3.1	H	Simulate concurrent users and observe system behavior

6.9 Security (SC)

6.9.1 Subfeatures to be tested

6.9.1.1 Data Encryption (SC.ENC)

Data must be encrypted with AES-256.

6.9.1.2 Access Control (SC.AC)

Unauthorized access must be prevented.

6.9.2 Test Cases

TC ID	Requirements	Priority	Scenario Description
SC.ENC.01	3.3.2	H	Check encryption of data
SC.AC.01	3.3.2	H	Try accessing admin page without login

6.10 Usability (US)

6.10.1 Subfeatures to be tested

6.10.1.1 Navigation (US.NV)

Users should take no more than four clicks.

6.10.1.2 Error Feedback (US.ER)

Errors should be pointed out with clear and understandable messages.

6.10.2 Test Cases

TC ID	Requirements	Priority	Scenario Description
US.NV.01	3.3.4	M	Create a requirement in less than four clicks
US.ER.01	3.3.4	M	Trigger validation error and verify message readability

6.11 Integration (IN)

6.11.1 Subfeatures to be tested

6.11.1.1 Rest and gRPC (IN.API)

The system should support internal/external integrations with REST API and gRPC.

6.11.2 Test Cases

TC ID	Requirements	Priority	Scenario Description
IN.API.01	3.3.2	H	Send GET request to requirements endpoint via REST API
IN.API.02	-	H	Test microservice communication with gRPC between modules

6.12 Database (DB)**6.12.1 Subfeatures to be tested****6.12.1.1 Data Storage (DB.ST)**

All data must be correctly saved in PostgreSQL.

6.12.2 Test Cases

TC ID	Requirements	Priority	Scenario Description
DB.ST.01	3.2.9	H	Save and retrieve user/system/subheading requirements
DB.ST.02	3.2.9	H	Save baseline and verify its presence in database

7. Detailed Test Cases

7.1 LG.AD.01

TC_ID	LG.AD.01
Purpose	Log in with valid admin credentials
Requirements	3.2.1
Priority	High
Estimated Time Needed	3 Minutes
Dependency	Admin user must exist
Setup	Access login screen
Procedure	[A01] Enter valid admin username and password [A02] Click 'Login' [V01] System redirects to admin dashboard [V02] Admin role privileges are loaded
Cleanup	Logout

7.2 LG.AD.02

TC_ID	LG.AD.02
Purpose	Enter invalid admin credentials and verify login fails
Requirements	3.2.1
Priority	High
Estimated Time Needed	3 Minutes
Dependency	None
Setup	Ensure admin user exists
Procedure	[A01] Go to login page [A02] Enter invalid admin username or password [A03] Click 'Login' [V01] System should display an error message indicating invalid credentials
Cleanup	None

7.3 LG.RV.01

TC_ID	LG.RV.01
Purpose	Log in as reviewer and view requirements
Requirements	3.2.1
Priority	High
Estimated Time Needed	3 Minutes
Dependency	Reviewer user must exist
Setup	Create a reviewer account
Procedure	[A01] Go to login page [A02] Enter valid reviewer credentials [A03] Click 'Login' [V01] Reviewer is directed to a limited dashboard [V03] Verify the requirements are viewable
Cleanup	Logout

7.4 LG.RV.02

TC_ID	LG.RV.02
Purpose	Reviewer tries to access admin panel
Requirements	3.2.1
Priority	Medium
Estimated Time Needed	4 Minutes
Dependency	LG.RV.01 should pass
Setup	Reviewer must be logged in
Procedure	[A01] Log in as reviewer [A02] Manually navigate to admin dashboard [V01] System should block access and display authorization error
Cleanup	Logout

7.5 LG.SE.01

TC_ID	LG.SE.01
Purpose	Log in as system engineer
Requirements	3.2.1
Priority	High
Estimated Time Needed	4 Minutes
Dependency	SE user must be created
Setup	Create a system engineer user
Procedure	[A01] Go to login page [A02] Enter valid SE credentials [A03] Click login [V02] Access requirements section
Cleanup	Logout

7.6 LG.SE.02

TC_ID	LG.SE.02
Purpose	System engineer tries to access admin-only page
Requirements	3.2.1
Priority	Medium
Estimated Time Needed	3 Minutes
Dependency	LG.SE.01 should pass
Setup	Login as system engineer
Procedure	[A01] Log in as system engineer [A02] Try to access /admin [V01] System denies access with proper error
Cleanup	Logout

7.7 AU.AD.01

TC_ID	AU.AD.01
Purpose	Add a new unique admin user to the system
Requirements	3.2.1
Priority	High
Estimated Time Needed	3 Minutes
Dependency	LG.AD.01 should pass
Setup	Admin user must be logged in
Procedure	[A01] Navigate to “Add User” page.
	[A02] Enter a unique username and valid password.
	[A03] Select “Admin” as role.
	[V01] Verify success message is shown.
Cleanup	Optionally delete the created user

7.8 AU.AD.02

TC_ID	AU.AD.02
Purpose	Try to add an already existing admin user
Requirements	3.2.1
Priority	High
Estimated Time Needed	3 Minutes
Dependency	AU.AD.01 must be completed
Setup	Log in as admin; ensure target username already exists
Procedure	[A01] Go to “Add User”.
	[A02] Enter existing username.
	[A03] Choose “Admin” role and submit.
	[V01] System should show error: "User already exists".
Cleanup	None

7.9 AU.AD.03

TC_ID	AU.AD.03
Purpose	Add user without assigning a role
Requirements	3.2.1
Priority	Medium
Estimated Time Needed	3 Minutes
Dependency	LG.AD.01 must pass
Setup	Log in as admin
Procedure	[A01] Navigate to 'Add User' page. [A02] Fill in username and password. [A03] Leave role unselected. [A04] Click submit. [V01] System should prevent action and display validation error
Cleanup	None

7.10 AU.RV.01

TC_ID	AU.RV.01
Purpose	Reviewer tries to access Add User page
Requirements	3.2.1
Priority	Medium
Estimated Time Needed	3 Minutes
Dependency	LG.RV.01 must pass
Setup	Log in as reviewer
Procedure	[A01] Try to access add-user part. [V01] Access should be denied with proper error or redirection.
Cleanup	Logout

7.11 AU.SE.01

TC_ID	AU.SE.01
Purpose	System engineer tries to access Add User page
Requirements	3.2.1
Priority	Medium
Estimated Time Needed	3 Minutes
Dependency	LG.SE.01 must pass
Setup	Log in as system engineer
Procedure	[A01] Navigate to Add User with menu. [V01] Access should be restricted and error shown.
Cleanup	Logout

7.12 RM.CR.01

TC_ID	RM.CR.01
Purpose	Create new user requirement with text, date, number
Requirements	3.2.2
Priority	High
Estimated Time Needed	5 Minutes
Dependency	LG.SE.01 or LG.AD.01 must pass
Setup	Log in as system engineer or admin
Procedure	[A01] Navigate to 'Requirements' section. [A02] Click on 'Add Requirement'. [A03] Fill in text, date, number fields. [A04] Save the requirement. [V01] Requirement appears correctly in the list.
Cleanup	Optionally delete created requirement

7.13 RM.CR.02

TC_ID	RM.CR.02
Purpose	Create new system requirement linked to user requirement
Requirements	3.2.3
Priority	High
Estimated Time Needed	6 Minutes
Dependency	RM.CR.01 must be completed
Setup	At least one user requirement must exist
Procedure	[A01] Go to 'Add Requirement'. [A02] Choose 'System Requirement'. [A03] Link it to a user requirement. [A04] Save the requirement. [V01] Requirement is saved and correctly linked.
Cleanup	None

7.14 RM.CR.03

TC_ID	RM.CR.03
Purpose	Add subheading requirement and assign header
Requirements	3.2.4
Priority	High
Estimated Time Needed	5 Minutes
Dependency	RM.CR.02 must be completed
Setup	At least one parent requirement must exist
Procedure	[A01] Choose 'Add Requirement'. [A02] Select 'Subheading' as type. [A03] Assign it to an existing requirement. [A04] Save it. [V01] Subheading appears under correct header.
Cleanup	None

7.15 RM.CR.04

TC_ID	RM.CR.04
Purpose	Delete requirement and verify it's logged
Requirements	3.2.6
Priority	High
Estimated Time Needed	5 Minutes
Dependency	RM.CR.01 must be completed
Setup	Log in as admin or SE; requirement must exist
Procedure	[A01] Select a requirement. [A02] Click 'Delete'. [A03] Confirm deletion. [V01] Requirement disappears from list. [V02] Change is logged in history.
Cleanup	None

7.16 RM.RV.01

TC_ID	RM.RV.01
Purpose	Reviewer views user or system requirements
Requirements	3.2.2
Priority	High
Estimated Time Needed	3 Minutes
Dependency	LG.RV.01 must pass
Setup	Log in as reviewer
Procedure	[A01] Navigate to 'Requirements' section. [V01] All requirements are visible. [V02] No edit or delete options are available.
Cleanup	Logout

7.17 RM.RV.02

TC_ID	RM.RV.02
Purpose	Reviewer attempts to edit a requirement
Requirements	3.2.2
Priority	Medium
Estimated Time Needed	3 Minutes
Dependency	RM.RV.01 must pass
Setup	Log in as reviewer
Procedure	[A01] Try to open a requirement in edit mode. [V01] Fields are read-only or blocked. [V02] Unauthorized action is prevented.
Cleanup	Logout

7.18 TR.BI.01

TC_ID	TR.BI.01
Purpose	Create bi-directional link between user and system requirements
Requirements	3.2.5
Priority	High
Estimated Time Needed	5 Minutes
Dependency	RM.CR.01 and RM.CR.02 must be completed
Setup	At least one user and one system requirement must exist
Procedure	[A01] Navigate to Traceability view [A02] Select a user requirement [A03] Choose 'Link System Requirement' [A04] Select the related system requirement [A05] Save the traceability link [V01] User requirement shows a backward link [V02] System requirement shows a forward link
Cleanup	Remove the test link if needed

7.19 TR.BI.02

TC_ID	TR.BI.02
Purpose	Trace from subheading to system requirement
Requirements	3.2.5
Priority	High
Estimated Time Needed	5 Minutes
Dependency	RM.CR.03 must be completed
Setup	At least one subheading linked to a system requirement
Procedure	[A01] Navigate to Traceability page [A02] Select the subheading requirement [V01] Linked system requirement appears in traceability view [V02] Trace path is visible and correct
Cleanup	None

7.20 TR.IM.01

TC_ID	TR.IM.01
Purpose	Edit requirement and verify affected requirements flagged
Requirements	3.2.5
Priority	Medium
Estimated Time Needed	5 Minutes
Dependency	TR.BI.01 must pass
Setup	Requirements should already be linked
Procedure	[A01] Edit one of the linked requirements [A02] Save changes [V01] Linked requirement is visually flagged (e.g., yellow, red star) [V02] Change log shows relation
Cleanup	None

7.21 TR.IM.02

TC_ID	TR.IM.02
Purpose	Filter requirements by linked/unlinked
Requirements	3.2.5
Priority	Medium
Estimated Time Needed	4 Minutes
Dependency	TR.BI.01 must be completed
Setup	Ensure both linked and unlinked requirements exist
Procedure	[A01] Navigate to Requirements page [A02] Use filter dropdown to select Linked [V01] Only linked requirements are shown [A03] Switch filter to Unlinked [V02] Only unlinked requirements are displayed
Cleanup	None

7.22 CM.HL.01

TC_ID	CM.HL.01
Purpose	Edit a requirement and check change log
Requirements	3.2.6
Priority	High
Estimated Time Needed	5 Minutes
Dependency	RM.CR.01 or RM.CR.02 must be completed
Setup	Log in as admin or SE; requirement must exist
Procedure	[A01] Navigate to the requirement list [A02] Select and edit a requirement's description [A03] Save the requirement [A04] Open the change log panel [V01] The edit is listed with user, date, and time [V02] Previous version is accessible if versioning is enabled
Cleanup	Optionally revert the change

7.23 CM.HL.02

TC_ID	CM.HL.02
Purpose	Delete a requirement and recover it
Requirements	3.2.6
Priority	High
Estimated Time Needed	5 Minutes
Dependency	CM.HL.01 must pass
Setup	Requirement must exist
Procedure	[A01] Select a requirement and click 'Delete' [A02] Confirm deletion [A03] Open change/history log [A04] Click 'Recover' [V01] Requirement is restored [V02] Status is logged as 'Recovered'
Cleanup	None

7.24 CM.VI.01

TC_ID	CM.VI.01
Purpose	Verify yellow star for edited unreviewed requirement
Requirements	3.2.6
Priority	Medium
Estimated Time Needed	3 Minutes
Dependency	CM.HL.01 must be completed
Setup	At least one edited, unreviewed requirement must exist
Procedure	[A01] Navigate to the requirements list [V01] Yellow star icon is visible on the edited item [V02] Tooltip explains 'Unreviewed Change'
Cleanup	None

7.25 CM.VI.02

TC_ID	CM.VI.02
Purpose	Verify red star on linked requirements after change
Requirements	3.2.6
Priority	Medium
Estimated Time Needed	4 Minutes
Dependency	TR.BI.01 and CM.HL.01 must be completed
Setup	At least one linked requirement must be edited
Procedure	[A01] Edit one of the linked requirements [A02] Save and return to requirements list or traceability [V01] Red star icon is shown on both edited and linked items [V02] Tooltip explains reason for visual indicator
Cleanup	None

7.26 RE.FM.01

TC_ID	RE.FM.01
Purpose	Export requirements in PDF format
Requirements	3.2.8
Priority	High
Estimated Time Needed	4 Minutes
Dependency	RM.CR.01 must be completed
Setup	At least one requirement must exist
Procedure	[A01] Navigate to the 'Requirements' page [A02] Click on 'Export' [A03] Select format as 'PDF' [A04] Click 'Generate' [V01] A downloadable PDF file is created [V02] File contains all visible requirements
Cleanup	None

7.27 RE.FM.02

TC_ID	RE.FM.02
Purpose	Export requirements in MS Word format
Requirements	3.2.8
Priority	High
Estimated Time Needed	4 Minutes
Dependency	RM.CR.01 must be completed
Setup	At least one requirement must exist
Procedure	[A01] Go to 'Requirements' section [A02] Choose 'Export' > 'MS Word' [A03] Click 'Generate' [V01] A .docx file is downloaded [V02] Content includes requirement fields and formatting
Cleanup	None

7.28 RE.SP.01

TC_ID	RE.SP.01
Purpose	Ensure images are included in export
Requirements	3.2.8
Priority	Medium
Estimated Time Needed	5 Minutes
Dependency	RE.FM.01 or RE.FM.02 must be completed
Setup	Add an image to a requirement
Procedure	[A01] Create or edit a requirement and attach an image [A02] Export to PDF or Word [V01] Open the file and verify that the image appears [V02] Check formatting and size consistency
Cleanup	None

7.29 RE.SP.02

TC_ID	RE.SP.02
Purpose	Use export preview before generating file
Requirements	3.2.8
Priority	Medium
Estimated Time Needed	3 Minutes
Dependency	RE.FM.01 or RE.FM.02 must be completed
Setup	Ensure requirements exist for export
Procedure	[A01] Click 'Export' and select format [A02] Click 'Preview' instead of 'Download' [V01] A preview window or modal is shown [V02] Content in preview matches actual export output
Cleanup	Close the preview window

7.30 RL.BS.01

TC_ID	RL.BS.01
Purpose	Create a baseline with current requirements
Requirements	3.2.7
Priority	High
Estimated Time Needed	5 Minutes
Dependency	RM.CR.01 and LG.AD.01 must pass
Setup	Log in as admin; multiple requirements must exist
Procedure	[A01] Navigate to 'Releases' or 'Baseline Management' [A02] Click on 'Create New Baseline' [A03] Enter version name and description [A04] Confirm and save [V01] New baseline appears in the baseline list [V02] It includes current requirements
Cleanup	Optionally delete the test baseline

7.31 RL.CM.01

TC_ID	RL.CM.01
Purpose	Compare two baselines and list requirement changes
Requirements	3.2.7
Priority	High
Estimated Time Needed	5 Minutes
Dependency	RL.BS.01 should be executed at least twice
Setup	At least two baselines must exist
Procedure	[A01] Go to 'Baseline Comparison' page [A02] Select two different baselines [A03] Click 'Compare' [V01] System displays added, modified, and deleted requirements [V02] Each change is listed with detail
Cleanup	None

7.32 PF.RT.01

TC_ID	PF.RT.01
Purpose	Query requirements and check response time < 2 sec
Requirements	3.3.1
Priority	High
Estimated Time Needed	5 Minutes
Dependency	RM.CR.01 must be completed
Setup	System must contain at least 50 requirements
Procedure	[A01] Log in as any valid user [A02] Go to 'Requirements' page [A03] Use the search/filter functionality [V01] The result list should appear in less than 2 seconds [V02] Response time is measured using dev tools or logs
Cleanup	None

7.33 PF.RT.02

TC_ID	PF.RT.02
Purpose	Save requirements and check save time < 5 sec
Requirements	3.3.1
Priority	Medium
Estimated Time Needed	5 Minutes
Dependency	RM.CR.01 must pass
Setup	A requirement form should be ready for input
Procedure	[A01] Fill in a new requirement form [A02] Click 'Save' [V01] Data is saved and confirmation appears in < 5 seconds [V02] Log or stopwatch confirms save duration
Cleanup	Delete test data if necessary

7.34 PF.LT.01

TC_ID	PF.LT.01
Purpose	Simulate concurrent users and observe system behavior
Requirements	3.3.1
Priority	High
Estimated Time Needed	15–20 Minutes
Dependency	PF.RT.01 must be validated
Setup	Use a load testing tool
Procedure	[A01] Simulate 50-500 concurrent users logging in and accessing requirements [A02] Record server response time [V01] No crashes or major slowdowns occur [V02] 95% requests return within acceptable time limits
Cleanup	Reset test environment if needed

7.35 SC.ENC.01

TC_ID	SC.ENC.01
Purpose	Check encryption of data
Requirements	3.3.2
Priority	High
Estimated Time Needed	10 Minutes
Dependency	User data must be created (e.g., from AU.AD.01)
Setup	Access to backend or database (with admin credentials)
Procedure	[A01] Create a user or requirement [A02] Access the database directly [A03] Locate the corresponding entry [V01] Verify that sensitive fields are encrypted [V02] Confirm encryption method is AES-256
Cleanup	Remove test data

7.36 SC.AC.01

TC_ID	SC.AC.01
Purpose	Try accessing admin page without login
Requirements	3.3.2
Priority	High
Estimated Time Needed	3 Minutes
Dependency	None
Setup	Use incognito mode or logout
Procedure	[A01] Attempt to open /admin or protected page without logging in [V01] System should redirect to login or show 'Access Denied'
Cleanup	None

7.37 US.NV.01

TC_ID	US.NV.01
Purpose	Create a requirement in less than four clicks
Requirements	3.3.4
Priority	Medium
Estimated Time Needed	4 Minutes
Dependency	LG.SE.01 or LG.AD.01 must pass
Setup	Log in as system engineer or admin
Procedure	[A01] Click on 'Requirements' from main menu [A02] Click 'Add Requirement' [A03] Fill required fields [A04] Click 'Save' [V01] Requirement is successfully created within 4 clicks [V02] Interface must be clear and intuitive
Cleanup	Delete test requirement if needed

7.38 US.ER.01

TC_ID	US.ER.01
Purpose	Trigger validation error and verify message readability
Requirements	3.3.4
Priority	Medium
Estimated Time Needed	3 Minutes
Dependency	None
Setup	Go to requirement creation form
Procedure	[A01] Leave a required field empty [A02] Attempt to submit the form [V01] Error message is shown near the field [V02] Message is clear
Cleanup	None

7.39 IN.API.01

TC_ID	IN.API.01
Purpose	Send GET request to requirements endpoint via REST API
Requirements	3.3.2
Priority	High
Estimated Time Needed	5 Minutes
Dependency	At least one requirement must exist
Setup	Use a tool like Postman
Procedure	[A01] Open Postman or terminal [A02] Send a GET request to /api/requirements endpoint [A03] Include valid authentication token [V01] Response code is 200 OK [V02] Response body contains list of requirements in JSON
Cleanup	None

7.40 IN.API.02

TC_ID	IN.API.02
Purpose	Test microservice communication with gRPC between modules
Requirements	-
Priority	High
Estimated Time Needed	10 Minutes
Dependency	System should be deployed in microservice architecture
Setup	Ensure gRPC services are running
Procedure	[A01] Trigger an action that invokes a gRPC call [A02] Monitor logs or traces [V01] gRPC communication is successfully initiated [V02] Response is handled correctly by the receiving service
Cleanup	None

7.41 DB.ST.01

TC_ID	DB.ST.01
Purpose	Save and retrieve user/system/subheading requirements
Requirements	3.2.9
Priority	High
Estimated Time Needed	6 Minutes
Dependency	RM.CR.01, RM.CR.02, RM.CR.03 must be completed
Setup	PostgreSQL database must be accessible; test user must be logged in
Procedure	[A01] Create one user requirement, one system requirement, one subheading [A02] Check frontend for confirmation of saved data [A03] Access database using pgAdmin or psql [A04] Query the requirements table [V01] All three entries exist in the database [V02] Data matches exactly with what was entered via UI
Cleanup	Delete test entries if needed

7.42 DB.ST.02

TC_ID	DB.ST.02
Purpose	Save baseline and verify its presence in database
Requirements	3.2.9
Priority	High
Estimated Time Needed	5 Minutes
Dependency	RL.BS.01 must pass
Setup	At least one baseline must be created
Procedure	[A01] Create a new baseline from the UI [A02] Open database and navigate to 'baselines' table [A03] Run a SELECT query to list baselines [V01] The newly created baseline appears in the table [V02] Linked requirement IDs are also stored in related tables
Cleanup	Delete test baseline from database if needed

8. Test Results

TC_ID	Priority	Date_Run	Run_By	Result	Definition
LG.AD.01	High	13.05.2025	Kıvılcım Işık	PASS	Log in with valid admin credentials.
LG.AD.02	High	13.05.2025	Kıvılcım Işık	PASS	Enter invalid admin credentials and verify login fails.
LG.RV.01	High	13.05.2025	Kıvılcım Işık	PASS	Log in as reviewer and view requirements.
LG.RV.02	Medium	13.05.2025	Kıvılcım Işık	PASS	Reviewer tries to access admin panel.
LG.SE.01	High	13.05.2025	Kıvılcım Işık	PASS	Log in as system engineer.
LG.SE.02	Medium	13.05.2025	Kıvılcım Işık	PASS	System engineer tries to access admin-only page.
AU.AD.01	High	13.05.2025	Sarper Erbar	PASS	Add a new unique admin user to the system.
AU.AD.02	High	13.05.2025	Sarper Erbar	PASS	Try to add an already existing admin user.
AU.AD.03	Medium	13.05.2025	Sarper Erbar	PASS	Add user without assigning a role.
AU.RV.01	Medium	13.05.2025	Sarper Erbar	PASS	Reviewer tries to access Add User page.
AU.SE.01	Medium	13.05.2025	Sarper Erbar	PASS	System engineer tries to access Add User page.
RM.CR.01	High	13.05.2025	Can Mete Bozar	PASS	Create new user requirement with text, date, number.
RM.CR.02	High	13.05.2025	Can Mete Bozar	PASS	Create new system requirement linked to user requirement.
RM.CR.03	High	13.05.2025	Can Mete Bozar	PASS	Add subheading requirement and assign header.
RM.CR.04	High	13.05.2025	Can Mete Bozar	PASS	Delete requirement and verify it's logged.
RM.RV.01	High	13.05.2025	Can Mete Bozar	PASS	Reviewer views user or system requirements.
RM.RV.02	Medium	13.05.2025	Can Mete Bozar	PASS	Reviewer attempts to edit a requirement.
TR.BI.01	High	13.05.2025	Eray Emir	PASS	Create bi-directional link between user and system requirements.
TR.BI.02	High	13.05.2025	Eray Emir	PASS	Trace from subheading to system requirement.
TR.IM.01	Medium	13.05.2025	Eray Emir	PASS	Edit requirement and verify affected requirements flagged.
TR.IM.02	Medium	13.05.2025	Eray Emir	PASS	Filter requirements by linked/unlinked.
CM.HL.01	High	13.05.2025	Eray Emir	PASS	Edit a requirement and check change log.
CM.HL.02	High	13.05.2025	Eray Emir	FAIL	Delete a requirement and recover it.
CM.VI.01	Medium	13.05.2025	Kıvılcım Işık	PASS	Verify yellow star for edited unreviewed requirement.
CM.VI.02	Medium	13.05.2025	Kıvılcım Işık	PASS	Verify red star on linked requirements after change.
RE.FM.01	High	13.05.2025	Eray Emir	PASS	Export requirements in PDF format.
RE.FM.02	High	13.05.2025	Eray Emir	PASS	Export requirements in MS Word format.
RE.SP.01	Medium	13.05.2025	Sarper Erbar	FAIL	Ensure images are included in export.
RE.SP.02	Medium	13.05.2025	Sarper Erbar	PASS	Use export preview before generating file.
RL.BS.01	High	13.05.2025	Kıvılcım Işık	PASS	Create a baseline with current requirements.

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RL.CM.01	High	13.05.2025	Kıvılcım Işık	PASS	Compare two baselines and list requirement changes.
PF.RT.01	High	13.05.2025	Can Mete Bozar	PASS	Query requirements and check response time < 2 sec.
PF.RT.02	Medium	13.05.2025	Can Mete Bozar	PASS	Save requirements and check save time < 5 sec.
PF.LT.01	High	13.05.2025	Can Mete Bozar	PASS	Simulate concurrent users and observe system behavior.
SC.ENC.01	High	13.05.2025	Sarper Erbar	FAIL	Check encryption of data.
SC.AC.01	High	13.05.2025	Sarper Erbar	PASS	Try accessing admin page without login.
US.NV.01	Medium	13.05.2025	Kıvılcım Işık	PASS	Create a requirement in less than four clicks.
US.ER.01	Medium	13.05.2025	Kıvılcım Işık	PASS	Trigger validation error and verify message readability.
IN.API.01	High	13.05.2025	Eray Emir	PASS	Send GET request to requirements endpoint via REST API.
IN.API.02	High	13.05.2025	Eray Emir	FAIL	Test microservice communication with gRPC between modules.
DB.ST.01	High	13.05.2025	Eray Emir	PASS	Save and retrieve user/system/subheading requirements.
DB.ST.02	High	13.05.2025	Eray Emir	PASS	Save baseline and verify its presence in database.