TINF21C, SWE I Praxisprojekt 2022

Software Requirements Specification (SRS)

Project: **AAS-Management**

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0.1	17.10.2022	Paul Brenner	Created
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0.5	08.11.2022	Paul Brenner	Changes 1.4 Features and Layout
0.6	09.11.2022	Paul Brenner	AASM-UC.04, AASM-UC.05 – Modification Involved Roles
0.7	09.11.2022	Paul Brenner	Correction AASM-UC.07 Update Team-Number
0.8	17.03.2022	Paul Brenner	Add user privilege Matrix

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1 Concept and general conditions

This section illustrates the goal and product environment and presents the characteristics of the web application.

1.1 Goal

The goal of this project is to develop a web application that acts as a management system for the "Asset Administration Shell" (AAS). This specific web application shall have an identity and access management as well as a user administration with persistent data storage in MongoDB. The user administration enables a role distribution of the users in the user groups "Admin", "Advanced" and "Basic", whereby the role distribution is carried out manually via the Admin. Each role is equipped with different access rights and read permissions ("Advanced" gets full read access to all AAS and their submodels and "Basic" gets read access only to the basic submodels to all AAS), with the admin also having functions for managing AAS content and user management. This uses the specification of the concept as a REST API in openapi.
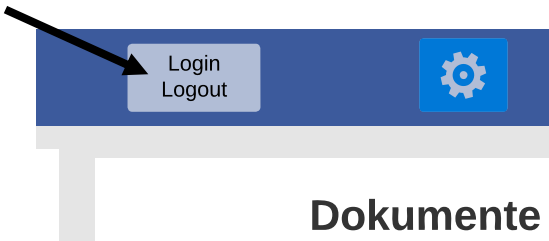
1.2 Product Environment

The AAS is a concept of the Industrie 4.0 platform for the standardized implementation of "Industrie 4.0 components", consisting of the digital twin in the form of the AAS and the associated physical object (the asset). This makes it possible in industry to provide digital twins that can be shared and combined across manufacturers and accessed via standardized interfaces.
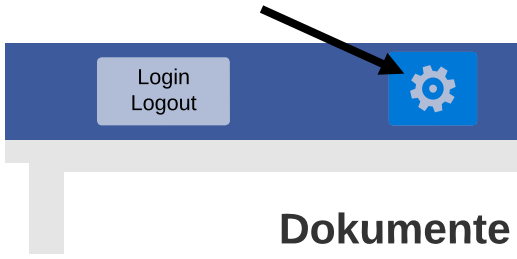
1.3 Product Usage

This section reflects on different business processes and use cases which shall be covered by the web application.

1.3.1 Business Process

Nr. / ID	<AASM-BP.01>	Title	Log-In
Triggering Event	The user opens the GUI and wants to log in his account.		
Result	The user is logged in to their account and the GUI has been customized based on the user's user group.		
Involved Roles	Any user, GUI and database interface		
Implementation	 **Dokumente** - Login button in top right corner - Opens Login window (username and password) - Login checks for user role - User interface according to user role (Admin: User-Management)		

Nr. / ID	<AASM-BP.02>	Title	Log-Out
Triggering Event	The user opens the GUI and wants to log out of his account.		
Result	The user is logged out of their account and the GUI has been customized.		
Involved Roles	Any user and GUI		
Implementation	…		

Nr. / ID	<AASM-BP.03>	Title	Managing own Account
Triggering Event	The user wants to change his password and/or e-mail address.		
Result	The user changed the password and/or e-mail address.		
Involved Roles	Any user, GUI and database interface		
Implementation	Login Logout ⚙ **Dokumente** - User is able to choose Settings in top right corner		

<AASM-BP.04>	Title	Administration
Triggering Event	The user – an admin – opens the GUI to administrate the AAS.	
Result	The user can delete and add AAS content and accounts. Moreover, classify accounts in user groups.	
Involved Roles	Admin, GUI and database interface	

Implementation	

- Logged-In user is provided with a settings option in top right corner (not for Basic Users)
- Additional to above options <AASM-BP.03> user with the role "Admin" has the option "Manage users"
- This option provides the creation and deletion of users, and changing the email and password for existing users
- Furthermore, it provides a selection of the user role for each user (Dropdown-Menu)

Nr. / ID	<AASM-BP.05>	Title	Search for an asset
Triggering Event	The user opens the GUI to find an existing Asset.		
Result	The user finds the Asset on GUI.		
Involved Roles	The user and GUI		
Implementation	- Search option for products is available above the list of products		

1.3.2 Use Cases

Nr. / ID	<AASM-UC.01>	Title	Log-In
Related Business Process	<AASM-BP.01>		
Use Cases Objective	User wants to log into account.		
System Boundary			
Precondition	The user's combination of e-mail address and password are valid and stored in the database, and the database system is in operation.		
Postcondition on success	The web application shall not be closed until the user is logged in to his account and the user interface is customized according to the user group.		
Involved Roles	Any user, GUI and database interface		
Triggering Event	User opens the GUI and wants to log into user's account.		

Nr. / ID	<AASM-UC.02>	Title	Log-Out
Related Business Process	<AASM-BP.02>		
Use Cases Objective	User wants to log out of his account.		
System Boundary			
Precondition	User is already logged in.		
Postcondition on success	The web application shall not be closed until the user is logged out.		
Involved Roles	Any user and GUI		
Triggering Event	User wants to log out of account.		

Nr. / ID	<AASM-UC.03>	Title	Managing own Account
Related Business Process	<AASM-BP.03>		
Use Cases Objective	The user wants to use the self-services for e-mail and password change to modify these components of the account.		
System Boundary			
Precondition	The user is already logged in, has the current password of the account and the database system is running.		
Postcondition on success	The web application may not be closed until these changes have also been changed in the database system.		
Involved Roles	Any user, GUI and database interface		
Triggering Event	User wants to change password and/or e-mail address.		

Nr. / ID	<AASM-UC.04>	Title	Administrate AAS content
Related Business Process	<AASM-BP.04>		
Use Cases Objective	The user wants to add or delete the AAS content.		
System Boundary			
Precondition	The user's user group is Admin, and the database system is operation.		
Postcondition on success	The web application may not be closed until these changes have also been changed in the database system.		
Involved Roles	User with role "Admin", GUI and database interface		
Triggering Event	User wants to add or delete the AAS content and accounts or divide the accounts into user groups.		

Nr. / ID	<AASM-UC.05>	Title	Administrate Accounts
Related Business Process	<AASM-BP.04>		
Use Cases Objective	The user wants to add or delete accounts. The user also wants to divide the accounts into user groups (Basic, Advanced and Admin).		
System Boundary			
Precondition	The user's user group is Admin, and the database system is operation.		
Postcondition on success	The web application may not be closed until these changes have also been changed in the database system.		
Involved Roles	User with role "Admin", GUI and database interface		
Triggering Event	User wants to add or delete the AAS content and accounts or divide the accounts into user groups.		

Nr. / ID	<AASM-UC.06>	Title	Find asset
Related Business Process	<AASM-BP.05>		
Use Cases Objective	The user searches for an asset to find it in the GUI or receives a notification that the asset is not present.		
System Boundary			
Precondition	Assets are successfully loaded		
Postcondition on success			
Involved Roles	Any user, GUI and database interface		
Triggering Event	User enters search term into the search field		

Nr. / ID	<AASM-UC.07>	Title	Display asset
Related Business Process	(<AASM-BP.06>)		
Use Cases Objective	The user finds the asset and clicks on it for display purposes and further details.		
System Boundary			
Precondition	For a role-based access the current user role need to be validated. To view restricted data (based on user role) user may need to be logged in		
Postcondition on success			
Involved Roles	Any user, GUI and database interface		
Triggering Event	User selects an Asset (by click)		

1.4 Features

1.4.1 /AASM-FX0/ GUI Components <?>

The GUI has a home page where the user can browse the package explorer with AAS content and log in to an account. When the user logs in, he gets access to a customized package explorer with an extension of more functions and dynamically customized content depending on the user's user group.

1.4.2 /AASM-F10/ Identity & Access Management

Figure 1 Settings Admin - v0.1

The web application shall have centralized management of identities and access permissions, with role-based access rights. The web application shall have functions for authentication and authorization of users and a self-service for users such as email and password change.

1.4.3 /AASM-F20/ AAS content data management

The user (more precisely the user with the role of Admin) has the possibility to upload and delete AAS content. The content to be uploaded is in a file format.

1.4.4 /AASM-F30/ Search functionalities

The user should be able to effectively find desired AAS content using search functions. The user should be able to effectively find the desired content of the AAS using search functions.

1.4.5 /AASM-F40/ Rest-API Support <tbd>

The software shall support the Rest-API standard for communication between the client and database system.

1.4.6 /AASM-F50/ Error Display

The software should check whether an error has occurred. If an error occurs, the user should receive an easily readable and understandable error message.

1.5 Product Data

The following lists the data structures of the web application.

1.5.1 /AASM-D10/ MongoDB

The web application should enable persistent data storage with MongoDB as the database management system used.

MongoDB is hosted on a Synology NAS using Ubuntu 22.4 and MongoDB Version 4

1.6 Other Product Characteristics

1.6.1 /AASM-NF10/ Usability

Usability is to be ensured by a simple layout and by a human-centered interface. It should be clear and easy to use so that the user can achieve the objectives efficiently and satisfactorily.

1.6.2 /AASM-NF20/ Reliability

Reliability is to be ensured by a responsive GUI with high error tolerance and a database with accurate and consistent data.

1.6.3 System Environment

AAS Management is a web application and therefore only requires an Internet connection and an installed web browser on the computer work.

1.7 User privilege Matrix

	Basic	Advanced	Admin
Login	X	X	X
Managing own account	X	X	X
User management			X
View Asset title	X	X	X
View Asset details – Basic information: - ManufacturerName - Product Name - Product ID *Get-Calls at Core-Level, except Concept-Description*	X	X	X
View Asset details – Advanced information - Picture - Technical Data		X	X

All Get-Calls at Deep-Level			
Download Asset files		X	X
Administrate AAS Content			X
PUT/POST/DELETE API-Calls			X

Release / Approval

Approval is made by the customer and the suppliers

Date:	
Signature Customer:	
Signature Suppliers:	

2 References

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