Requirements Document

Client: Sustainable Buildings

Version 1.2

A visualizing tool for OrientDB

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1 Introduction

Sustainable Buildings is a company that develops the next generation of energy management systems. The goal of this is to reduce energy consumption in office buildings, ease the job of building managers, and make the working environment of building users healthier and more productive. The users can view and manage the energy consumption of multiple buildings from one dashboard. All this means that a lot of hierarchical information is being stored. Our aim is to provide a tool that can display these hierarchies in a clear and structured manner.

2 System Overview

The OrientDB visualising tool will serve as a graphical interface with the scope of visualising the information from the Sustainable Buildings database in a manner that can be easily read and interpreted. This will be done so by creating a hierarchical tree structure with the following levels of entities, in this order: organisations, locations, buildings, floors, rooms. The rooms are considered the leaves of the tree, which contain multiple sensors with information about the environment of the room. By building and using this tool, the user will be able to see the information in a clear and structured way.

3 Users

In its first stages, the only users of this tool will be the SB-Users and the organisations admins. A reason for that could be that, even though the tool will be rather easy to use, the shown information might require expertise knowledge for further analysis. As the application and its functionality grow, multiple users might be added to the system in the future.
One of the main concerns with adding multiple users is the notion of security. Therefore the main focus of this program will remain on the SB-Userrather than the Organisation-Adminas well. The SB-Usershould be able to see the information about the structure of all the organisations.

Organisation Admin:
The organisation admin is the person that works in the administrative level of an organisation which has access to the visualising tool for better energy management of a location. The organisation admin will have read-only access to the tool.

SB users:
A SB user is a person that works for sustainable Buildings. Unlike the organisation admin, the SB users will not have a limited access to the tool. The SB users will be able to see information about all the organisations and, moreover, have access to further developing the tool. On top of that, the SB users will be able to add or edit certain things in the database via this tool.

4 Features

The requirements of this system are represented by using both concise requirements and user stories. The reason for this is that user stories help both the client and the team to understand what the system will consist of and why is that happening. There are 5 categories of requirements, which can be seen below.

4.1 Terminology

First we will explain some of the terminology used in the requirements below.

- **Place** A place can refer to either a location, a building, a floor, a room, an area or a cell.
- **Vertex:**
  The database that is used is graph based. This means that it consists of vertices and edges. A vertex is a concrete object, while the edges refer to the relations between these object. We will also use the term vertex for our program.
- **Tree structure of a location:**
  The data about a location is stored in a hierarchical order. This means that it we can represent it as a tree-like structure. This tree has multiple levels and each of these levels can have multiple vertices.
- **Entity** When we refer to an entity, we refer to sensors. These sensors can be physical, raw message or virtual. These sensors are connected to a place.

4.2 Major features

1. Tree representation of parts of the database.

2. Select an organization from a list of organizations
3. Searching in the list of organizations.
4. Select a location from a a list of locations.
5. Searching in the list of locations.
6. Display a list of entities connected to a place.
7. Display the available details of an organization.
8. Display the available details of a place.
9. Display the available details of an entity.
10. Customize the color scheme of the application
11. Hide and collapse certain windows

4.3 Requirements

1. Tree representation of parts of the database.
   - In the main menu, the user will be able to click a button, which will switch the application from the main menu to the tree view. This tree view is a visual representation of the hierarchy that is present in the database. It will display as its root node a location. A user will be able to double-click on a vertex and it will expand the tree so that it displays all the children of this vertex as well. This action can be repeated until a vertex does not have any children anymore.
2. Select an organization from a list of organizations
   - In the main menu there is a list of organizations. The user will be able to click on an organization in this list in order to select it.
3. Searching in the list of organizations.
   - In the main menu there is a list of organizations. When a user searches for an organization, a list of organizations will be displayed that match the searching criteria. If a user searches for a location x, the application will display all organizations that contain the string x.
4. Select a location from a a list of locations.

- In the main menu there is a list of locations. The user will be able to click on a location in this list in order to select it.

5. Searching in the list of locations.

   - In the main menu there is a list of locations. When a user searches for a location, a list of locations will be displayed that match the searching criteria. If a user searches for a location x, the application will display all locations that contain the string x.

6. Display the available details of an organization.

   - In the main menu, there is a list of organizations. When a user selects one of these organizations, the menu on the right will be updated, so that it displays all the available details of the organization.

7. Display the available details of a place.

   - In both the main menu and in the tree view, the user will be able to see multiple places. When a user selects one of these locations, the menu on the right will be updated, so that it displays all the available details of the location.

8. Display a list of entities connected to a place.

   - In the tree view, the user will be able to select a vertex. When the user selects a vertex, the menu on the right will be updates so that it also displays a list of entities connected to said vertex.

9. Display the available details of an entity.

   - When the user clicks on a place, it will display a list of entities. An entity can be used for a multitude of different things: electricity consumption, electricity generation etc.
     In order to display this to the user, the user will be able to double-click on an entity and view those details and more about said entity.

10. Customize the color scheme of the application

    - Users always have a preference for a certain color scheme. Because of this, the user will be able to select from a list of color schemes.

11. Hide an collapse certain windows

    - The tree view consists of central pane surrounded by two menus. The user will be able to hide these menus. This will make the central pane bigger and thus, the view will be more clear.

4.4 User Stories

4.5 Critical Functional Requirements (MVP)

1. As a Organisation-Admin/SB-User, I would like to see the tree representation of a location and its buildings, floors and rooms.
2. As a Organisation-Admin/SB-User, I would like to see a list of entities connected to a vertex when I click on said vertex.
3. As a Organisation-Admin/SB-User, I would like to select an entity in the entity list so that I can see the id of that entity.

4.6 Important Functional Requirements

1. As a Organisation-Admin/SB-User, I would like to see a list of all available organisations.
2. As a Organisation-Admin/SB-User, I would like to see a list of all available locations.
3. As a Organisation-Admin/SB-User, I would like to select a location so that I can see the total electricity consumption/generation for that respective location.
4. As a SB-User, I would like to filter the list of locations based on organisations/prefixes.
5. As a Organisation-Admin/SB-User, I would like to expand the tree structure of a place.
6. As a Organisation-Admin/SB-User, I would like to collapse the tree structure of a place.

4.7 Useful Functional Requirements

1. As a Organisation-Admin/SB-User, I would like to search for an entity, so that I can find information about that specific entity.
2. As a Organisation-Admin/SB-User, I would like to search for an organisation, so that I can select and find information about that specific organisation.

3. As a Organisation-Admin/SB-User, I would like to search for a location, so that I can select and find information about that specific location.
4. As a SB-User, I would like to rename vertices in the tree structure.
5. As a Organisation-Admin/SB-User, I would like to select an entity in the entity list so that I can see all available data of that entity.
6. As a Organisation-Admin/SB-User, I would like to see a list of all the entities that are connected to the current vertex and its children.
7. As a Organisation-Admin/SB-User, I would like to toggle certain parts of the sensor list.
8. As a Organisation-Admin/SB-User, I would like to select a location so that I can see all available information of that respective location.
9. As a Organisation-Admin/SB-User, I would like to select an organization so that I can see all available information of that respective organization.

4.8 Non-Functional Requirements

1. As a Organisation-Admin/SB-User, I would like to be able to refresh the system so that the data stays synchronised.
2. As a Organisation-Admin/SB-User, I would like the interface to be simple and understandable
3. As a Organisation-Admin/SB-User, I would like the interface to be responsive.
4. As a Organisation-Admin/SB-User, I would like to be able to read the information in the system in a structured manner.

4.9 Won't Do

1. As a (SB)developer, I would not like to have a clustered code.
2. As a SB developer, I would not like to have all the organisations available for testing at the MVP stage.

5 Meeting log

When	What
20 febr 2019	Client Meeting - Introductions of client and the company. - Chose the programming language, Java. We have to research the right visual extension. - Discussed the options with their API. The client will send their documentation for us to study. - The client shared their wishes. - We will hold client meetings every two weeks.
7 mrch 2019	Group Meeting - Discussed the Architect document: - The front-end's task is to learn JavaFX and create the view-controller - The back-end's task is to learn OrientDB and create the model - The all-round's task is to create a skeleton program and make sure everything stays consistent - Everyone should use the project tracker and trello
11 mrch 2019	Client Meeting - Discussed the requirements document feedback - Discussed the architecture document - Showed and discussed the JavaFX demo. We should use dependencies for this. - Discussed the architecture of OrientDB
14 mrch 2019	Group Meeting - TA asked for the current progress - We got introduced to the goal tracker
19 mrch 2019	Group Meeting - Discussing Error with the connection - Discussing first sprint - Deadline for connection to database is Thursday - Discussion about the presentation
25 mrch 2019	Group Meeting - Carlos and Antal need to get the data transfer to work before Thursday - Yona and Albert will do the presentation - The deadline of the slides of the presentation is friday 29 march

1 Apr 2019	Client Meeting - Showed minimum viable product and demo. - Discussed visual representation of sensors and other general feedback - Discussed some questions regarding the database structure Group Meeting - Discussed some group issues - Discussed and practiced presentation
12 Apr 2019	Group Meeting - Discussed sprint 2 - Discussed group issues - Discussed when we will get feedback - Discussed current workflow - Discussed tasks for sprint 3
18 Apr 2019	Group Meeting - Discussed front-end and back-end for part 3 - Discussed menu bar functionality - Discussed way of visualising linked entities - Attempted to fix bug for expanding anchor pane
25 Apr 2019	TA/Group Meeting - Discussed feedback presentation and sprint 2 - Discussed what needs to be finished before sprint 4 ends - Discussed what needs to be done in sprint 5 - Discussed grades for first half of the course - Discussed layout of main menu
13 May 2019	TA/Group Meeting - Discussed feedback sprint 4 - Showed demo of the program - Discussed things that need to be done in the next sprint - Discussed layout of main menu
20 May 2019	Client Meeting - Showed a running demo of the program to client - Discussed how the tree is mapped into a layout - Showed the code organisation and general flow of program - Discussed features to be added in the next sprint - Discussed layout of main menu

6 Change Log

Date	Who	Section	What
21 February 2019	Niels Bugel Albert Dijkstra	Document	Created document and layout
21 February 2019	Niels Bugel	Introduction	wrote the introduction
21 February 2019	Antal Huisman	Meeting Log	Added Client Meeting Log
21 February 2019	Yona Moreda	System Overview	Wrote system overview
22 February 2019	Niels Bugel	User stories	Added the user stories from the meeting document
22 February 2019	Emanuel Nae	User stories	Refined some user stories + added non-functional and won't do requirements
22 February 2019	Emanuel Nae	Document	Refined some writing, changed some sections + added own comments on changes
28 February 2019	Niels Bugel Albert Dijkstra	Document	Resolved some comments, added a few other comments.
4 March 2019	Niels Bugel	Users, User Stories	Adjusted the users and user stories to fit the feedback of the customer.
4 March 2019	Emanuel Nae	User Stories	Adjusted the critical requirements.
7 March 2019	Antal Huisman	Meeting Log	Added Meeting Log
11 March 2019	Niels Bugel	Meeting Log	Added Meeting Log for client meeting
15 March 2019	Antal Huisman	Meeting Log	Added Meeting Log
19 March 2019	Antal Huisman	Meeting Log	Added Meeting Log
25 March 2019	Antal Huisman	Meeting Log	Added Meeting Log
1 Apr 2019	Niels Bugel	Meeting Log	Added Meeting Log for client and group meeting

1 Apr 2019	Niels Bugel	Meeting Log	Added Meeting Log for client and group meeting
12 Apr 2019	Niels Bugel	User stories	changed some requirements. Mainly sensor graph to entity list and sensor to entity
17 Apr 2019	Niels Bugel	Meeting log	added meeting log for group and TA meeting.
17 Apr 2019	Niels Bugel	User stories	changed some requirements.
18 Apr 2019	Niels Bugel	Meeting log	added meeting log for group meeting.
25 Apr 2019	Niels Bugel	Meeting log	added meeting log for TA/group meeting.
29 Apr 2019	Niels Bugel	User, User stories	added a note regarding security, made some things more clear.
13 May 2019	Niels Bugel	Meeting log	added meeting log for TA/group meeting.
20 May 2019	Yona Moreda	Meeting log	added meeting log for client meeting.
21 May 2019	Niels Bugel	User, User stories	added major features and explanation.