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Department of Computer Science
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COS301 - Software Engineering
CAPSTONE PROJECT

Software Requirements and Design Specifications V1

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Team Name: iCreateSoftware

Team Project: Team Utilisation Monitor

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1. Introduction

1.1. Description

Working in a development-based environment has managers managing resource allocation and utilization quite often, a task often made even more difficult with the work from home environment recent years have created. This could range from assigning resources to make the most of their available skills to identifying skills currently lacking in the business based on projects being attained. This interactive web application sets out to streamline these processes by effectively managing such tasks.

1.2. Project Scope

1.2.1. Vision

Our vision is to develop a specialized system capable of efficient utilization of resources and management of teams and their synergies based on information sourced through monitoring individuals performance over continuous projects while using the system

1.2.2. Objectives

Objectives that the system should achieve:

- Provide UI for desktop and mobile devices.
- Provide easy and intuitive usability.
- Provide team utilization percentage targets to ensure work is spread evenly across teams.
- Provide individual utilization targets that can determine if a resource is under/overused, or requires more training.
- Provide Key Performance Indicators to indicate team/individual performance.
- Propose suggestions to lacking team skills based on what projects are currently being looked at, and trends in technology.
- Propose ideal teams for projects based on available skills and team synergy learned over time.
- Provide a visual depiction of all these elements in a clear concise manner

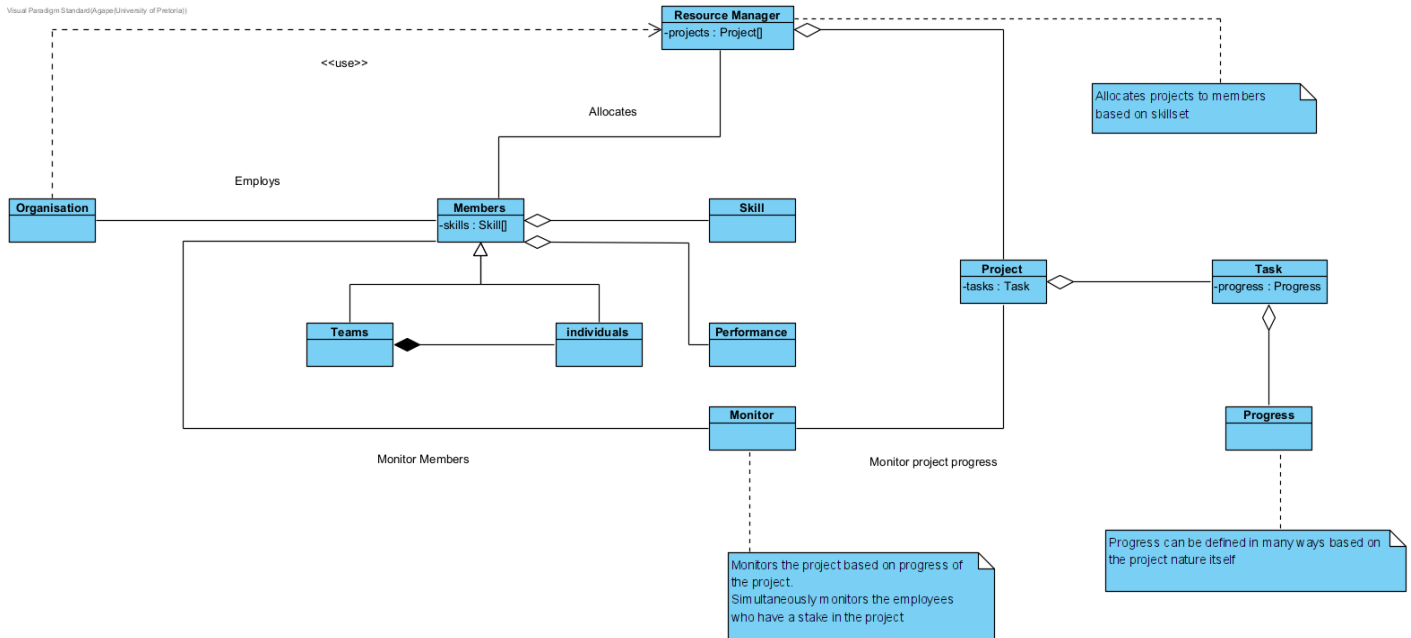
- Integrate with popular team chat applications such as Teams and Slack to notify of key events in the system.

1.2.3. Business Need

The current tools on the market allows for an overview of resources but falls short in the aspect of proper management of them as well as trend analysis. Most of the functionalities for the application can be inferred from gathered data and business rules put in place, however some such technology trends may require information sourcing of some kind from outside environments and predictive analytics using some sort of intelligent learning would be required for metrics such as team synergy over time. To make project management and team utilization easier, our system hopes to correct this gap in the market to allow for proper team utilization.

2. Class Diagram

2.1. Diagram



2.2. Description

- An Organisation employs Members.
- Members can be divided into Teams or Individuals
- Teams are composed of Individuals
- Each Member holds a Skill and Performance attribute used to measure their performance and skill levels for data analysis.
- The ResourceManager holds projects and intelligently allocates them to the Members based on Skill or Performance.
- A Project can be broken down into tasks.
- A Task has progress, which is used to measure the state of the Task.
- A Monitor monitors the Members and the state of their Tasks and feeds that information to the ResourceManager.

3. User Characteristics

3.1. Intended Users

The user should be able to operate a computer and/or be able to use a mobile device to download and use the application. The user should have access to the internet and a Team Utilisation Monitor account to make use of the full functionality of the app. Team Utilisation Monitor system will have two types of users: Admins users and Individual Users.

3.1.1. Admin

- The person that manages the Team Utilisation Monitor and has a better understanding of how the product works .
- This is one user that can assign teams and projects
- They use the system to monitor, manage and maintain teams and individuals.
- Some uses include, but not limited to:
 - Admin creates an invite code for new users to join
 - Admin approves registration requests
 - Admin creates a team
 - Admin can assign members to teams
 - Admin assigns work hours for maximum utilization
 - Admin can remove employee
 - Admin creates projects
 - Admin can view Company Utilisation and Employee Utilisation
 - Admin can create a company's account and manage that account.
 - Admin can change the positions of employees.

3.1.2. Individual User

- Users are members of the company. Users can work independently or be assigned to work as teams. Some include, but not limited to:
 - User can join a team
 - User can request registration approval

- User can receive invite code that he/she can use to register
- User can see personal information including utilization
- User can be assigned a team
- User can be assigned to a project
- User can create profile(add their skillset, interests)

4. User Stories

4.1. Admin User Stories

- As an admin I want to be able to register and create a new company profile
- As an admin I want to be able to add users to the company
- As an admin I should be able to create projects under the company
- As an admin I want to be able to add and remove users as participants from the projects
- As an admin I want to be able to assign teams
- As an admin I want to be able to assign positions to members.
- As an admin i want to be able to assign teams to a project
- As an admin I want to be able to see members of the project/teams with their:
 - Utilization summary
 - Name, surname, email
 - Skills
 - Projects
- As an admin I'd like to have a dashboard giving me an overview of the organization which include:
 - Number of members (Active and non-active)
 - Number of teams
 - Number of open projects
 - Number of completed projects.
 - Overall utilization

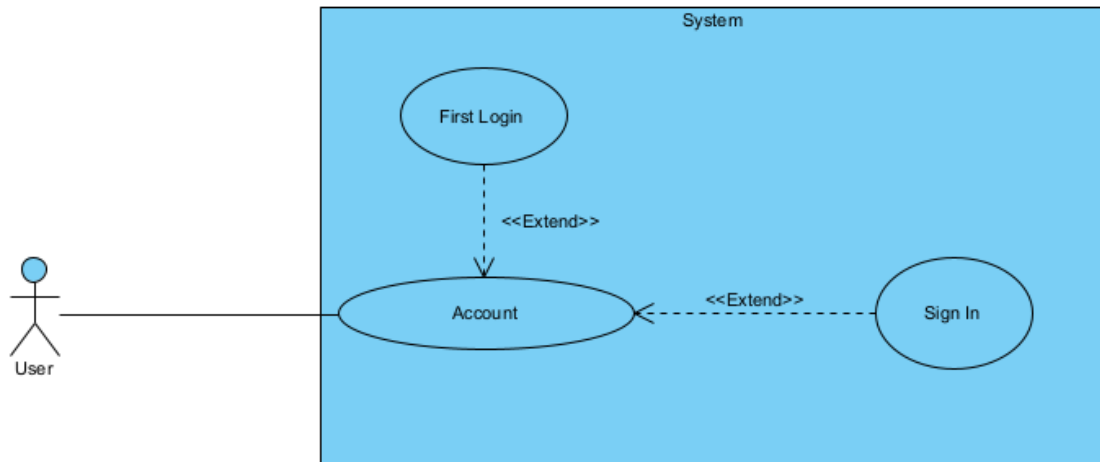
4.2. Individual User stories

- As an Individual user I want to know which team I am assigned to
- As an Individual user I want to be able to see a summary of my skills
- As an Individual user I want to be able to register using an invite from the admin.
- As an Individual user I want to be able to see and update my personal details
- As an Individual user I want to be able to add see the company and project I am working on
- As an Individual user, I want to see if I am being under or over utilized on a project
- As an Individual user, I want to monitor current skills and trends in the workplace so I can improve on them.

5. Functional Requirements

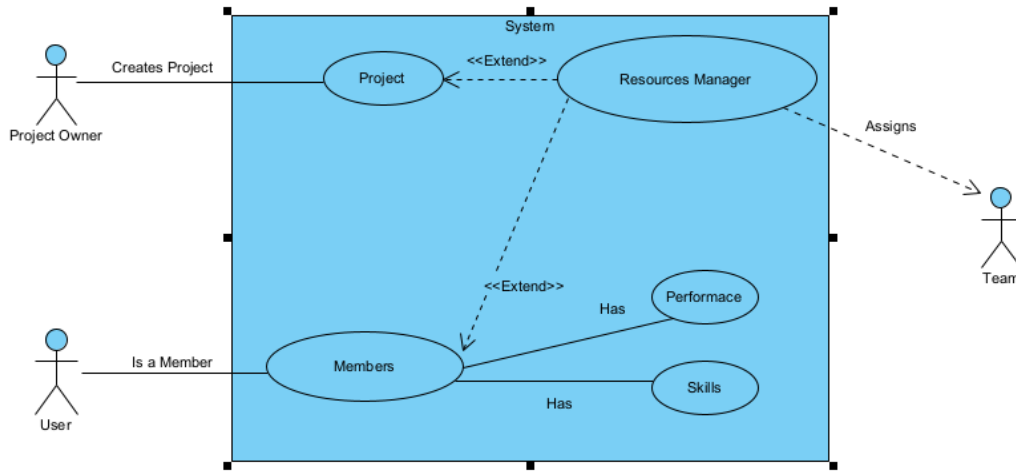
5.1. Use Cases

5.1.1. User Sign In



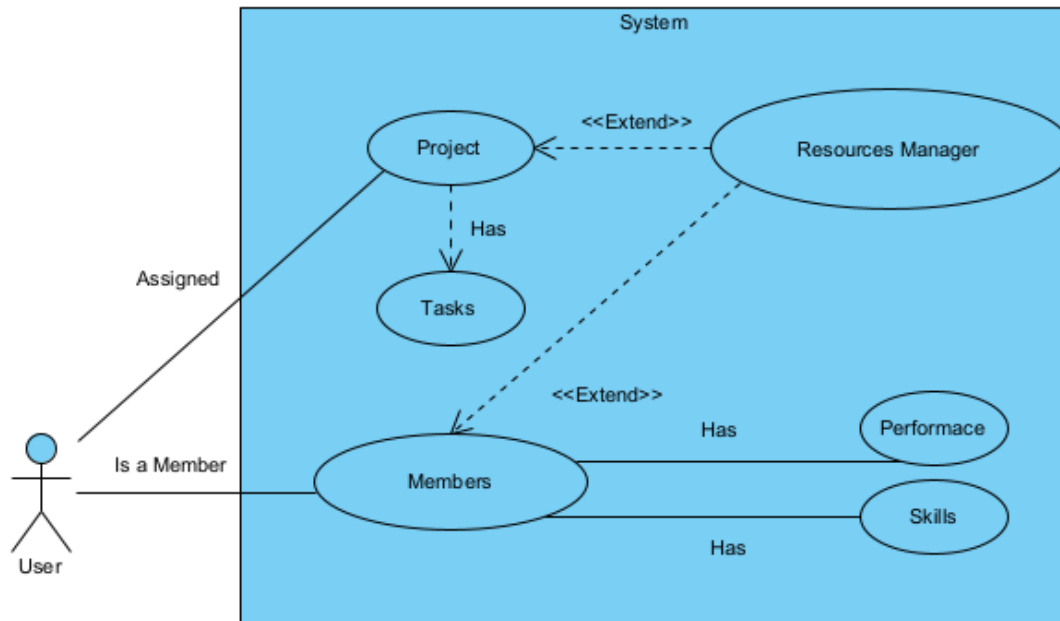
- **First Login:** This use case is identical to the “sign in” use case, but additionally it also ensures that when the user is logging in for the first time, they create an account and are assigned to a company.
- **Sign In:** This use case is for all the subsequent logins after the user has first signed in and created an account.

5.1.2. Team Allocation



- Project: Allows a Project owner to upload a project
- Members: Allows a user to monitor their progress with performance and skills based off of previous projects
- Resource Manager: Views an uploaded project and determines resources needed to be allocated. Based on previous results the Resource Manager views and calculator members best suited for the project based on performance and skills. The Resource Manager then allocates members to a team to complete the project

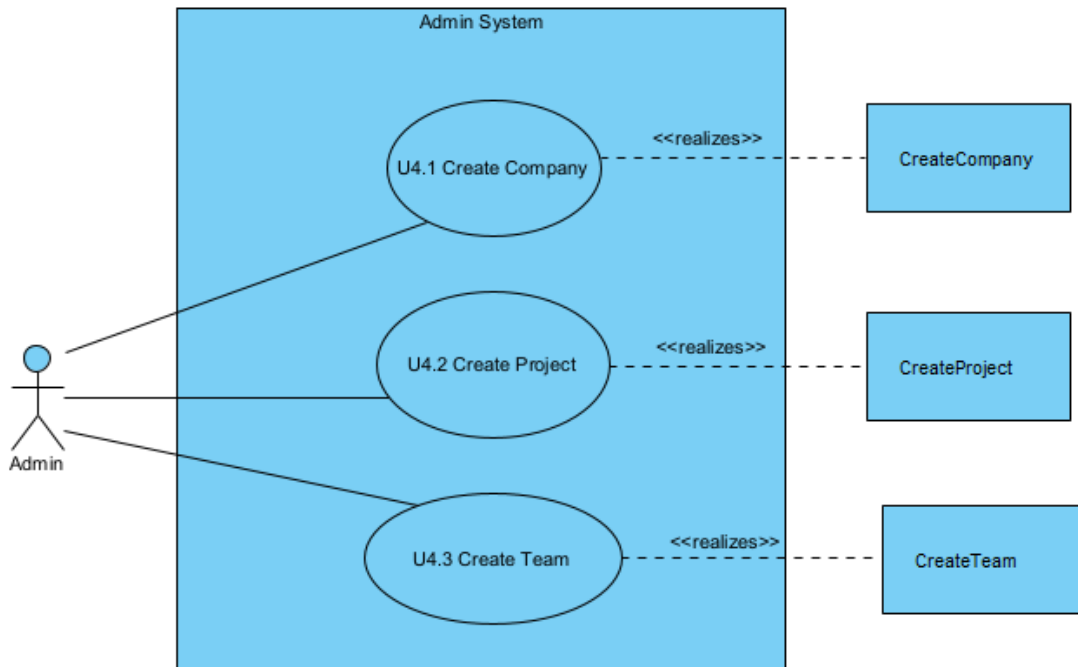
5.1.3. Performance Monitoring



- Project: Once a team is assigned to a project the project gets broken down into tasks
- Members: A user's performance is monitored through the completion rate of a task by the resource manager.
- Resource Manager: Resource Manager will reallocate members to tasks based on skills and performance, a members performance is updated according to the completion of a task assigned by the resource manager

5.1.4. Admin Viewing Dashboard

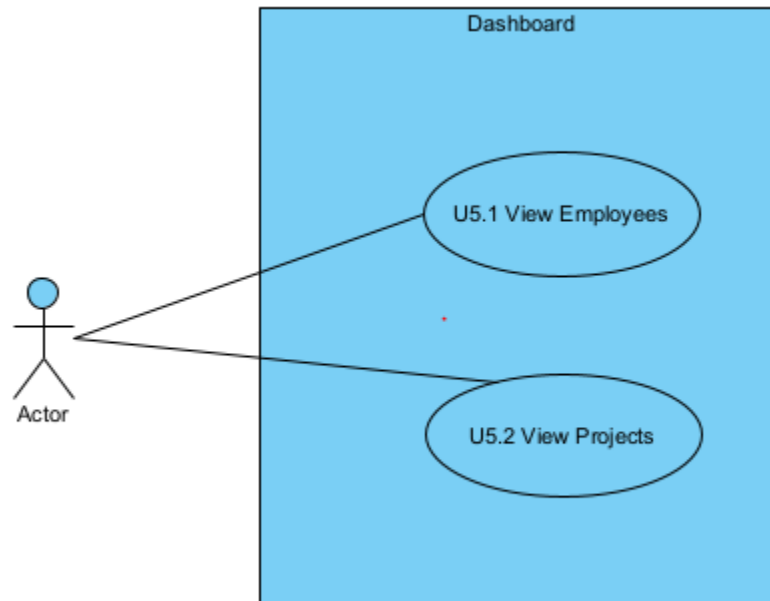
- Admin Creating Company (U4.1)
- Admin Creating Project (U4.2)
- Admin Creating Team (U4.3)



- U4.1 Create Company: Allows an Admin to register a company on the system
- U4.2 Create Project: Allows an Admin to create a project for their company on the system
- U4.3 Creating Team: Allows an Admin to create a team from a company's employees to work on a project

5.1.5. Admin View Dashboard

- Admin Viewing Employees (U5.1)
- Admin Viewing Project (U5.2)



- U5.1 View Employees: Allows an Admin view overall individual performance for all employees of a company
- U5.2 View Projects: Allows an Admin to view added projects for their company on the system

5.2. Requirements

The requirements of the system models the functionality that the Team Utilisation Monitor system offers. These requirements are necessary in order to successfully meet all the criteria needed for the system.

- FR1: The system should provide team or individual utilization measured in comparison to the expected project being worked on.
- FR2: The system should use metrics such as time taken to complete a project, Number of Resources used to complete the project and the amount of external help required to complete the project to provide an effective analysis on individuals and the teams. (team analysis and individual analysis)
- FR3: The system should be able to generate teams based on past data- gathered from the data analysis.
- FR4: The system should provide a dashboard for the admin. It must contain this information, in graphical format:
 - Number of members(active/non-active)
 - Number of teams
 - Number of projects
 - Overall utilization
 - Average utilization over time
- FR5: The system should be able to present the following data to individual users (individual page) in graph form or text form:
 - Utilization
 - Skills
 - Contact details
 - Company

- Project
- Availability (e.g if utilization is at 50%, then the person is available)
- FR6: The system should be able to provide a report based on the data.
 - The system should provide a report based on the admin dashboard
 - The system should provide a report based on the individual's data.
- FR7: Provide an interactive web client that is fully mobile compatible(responsive web application)
- FR8: The system should have a user management framework
 - The system should be able to register/login an individual or admin
 - Admins register directly
 - Regular users must use an invite code sent to their emails
- FR9: The system should allow the Admin to do the following functions:
 - Create and register a company (this is done at the registration of the admin)
 - Add users to that company
 - Remove users from that company
 - Create project and assign workers to it
 - Create teams and assign members to it.
 - Assign positions to members

6. Quality Requirements

6.1. Performance

The system should be designed to continually monitor users and their skills sets as well as detect new trends in field

6.2. Reliability

The system should reliably capture all progress and completed tasks by the user to determine resource consumption.

- The system implements micro-services to ensure reliability.
- The system should implement two DBs. One is the live database and the second one is the redundancy database.

6.3. Security

The system should require proper authentication in order to gain access to the user's personal information from the database.

- Passwords are encrypted with salt and hash algorithms
- Only Admins can register a company and they are responsible for sending out invites therefore there is accountability for every action.
- (Optional) Encrypt emails
- Passwords are masked with dots when being entered on the user password form.
- The forms have pattern matching to avoid the injection of malicious code. E.g passwords should be at least 8 digits and shouldn't have special characters.

6.4. Usability

The systems should be designed to be easy to use and for a user to quickly understand.

- Should provide graphical resources(graphs, charts) to present data to the end user.
- The application should be web responsive.

- The application should be user friendly by using simple but aesthetically pleasing colors and components.

6.5. Scalability

The system should be usable by large industries with hundreds of employees that make up teams. The system should be designed to handle more and more uses as the need for the system grows.

6.6. Maintainability

The system is designed for long term use and continually monitors the users. The system should be modular enough to allow the maintenance and adding of any future features or updates

6.7. Consistency

The software system experience should be consistent across the different interfaces (Web and Mobile). The user should have the same functionality across both systems.

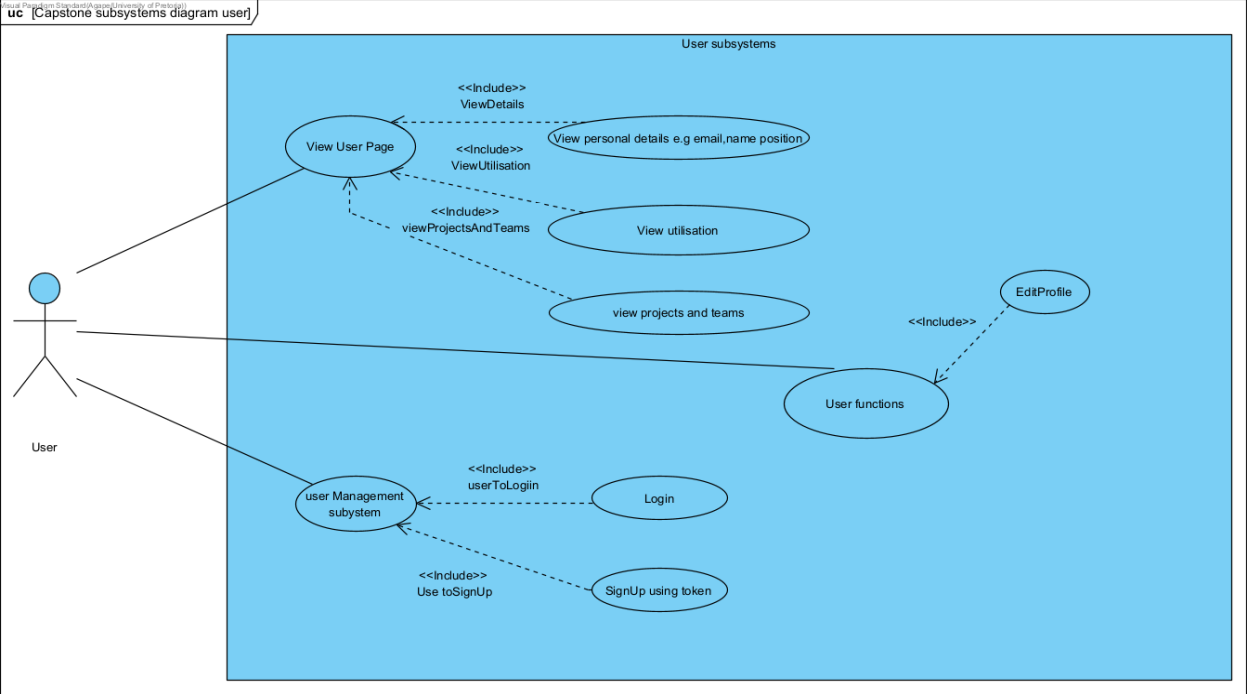
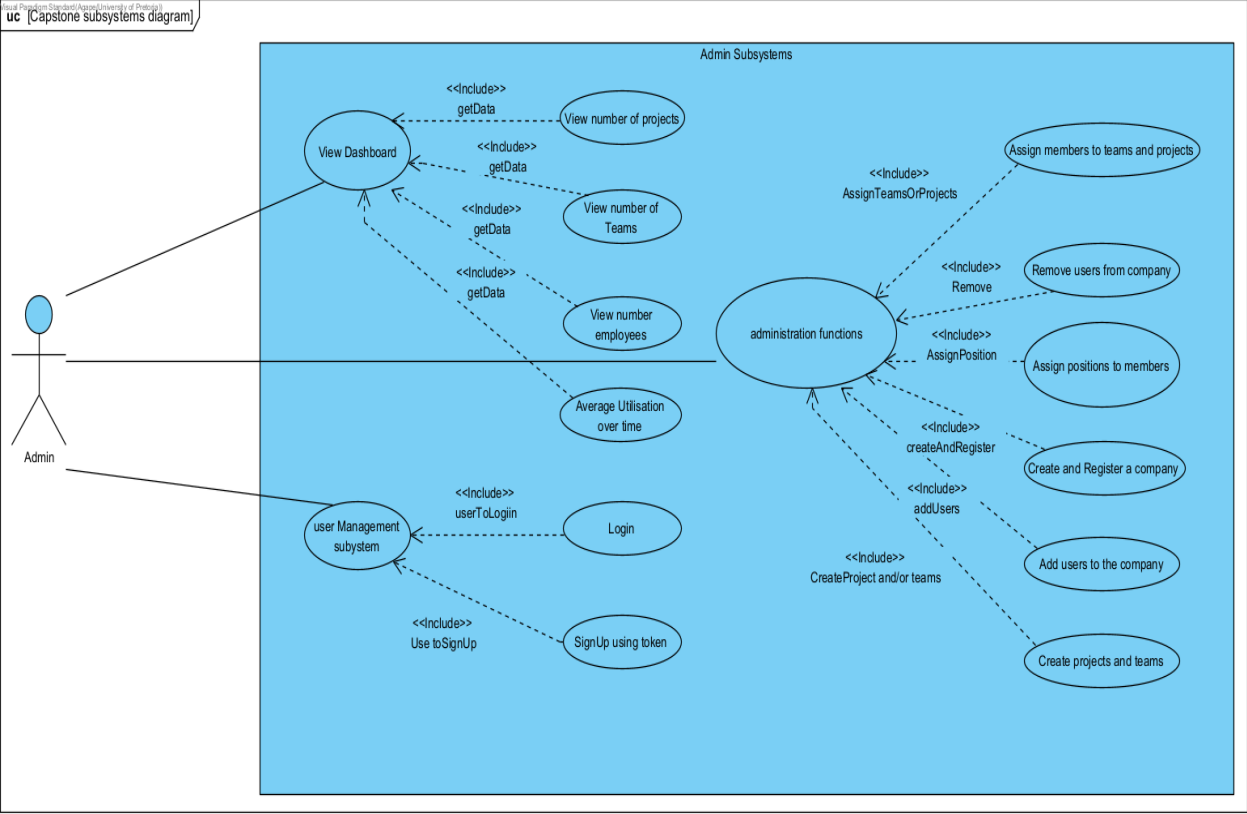
6.8. Availability:

The system should provide some form availability in case of one component going down

7. Trac-ability Matrix

		Sub System							
		Login	Allocation	Performance	Admin U4.1	Admin U4.2	Admin U4.3	Admin U5.1	Admin U5.2
Requirements	FR1			X				X	
	FR2			X					
	FR3		X			X	X		
	FR4							X	X
	FR5			X				X	X
	FR6			X					
	FR7	X							
	FR8	X			X	X	X	X	X
	FR9		X		X	X	X		
	Q1			X				X	
	Q2			X					
	Q3	X			X	X	X		
	Q4	X	X	X	X	X	X	X	X
	Q5	X	X	X		X	X		
	Q6	X	X	X					
	Q7	X	X	X	X	X	X	X	X
Q8			X						

8. Subsystems diagram



9. Architectural structure

