



# MAYA

## Your Ideation Tool System

PROJECT TITLE	MAYA; Your Ideation Tool
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GROUP NAME	MAYA

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# 1.0 Abstract

MAYA system is an ideation tool that is created to help the HILTI employees working remotely. It is a reliable and flexible system that facilitates the HILTI employee to share their ideas, thoughts, and projects. This system helps in improving work efficiency and productivity even though the employees cannot communicate face to face. It is developed using java language and Service-Oriented Architecture(SOA). The system integrates with the third-party application to help employees to organize their work in one application which is the MAYA system.

## 2.0 Introduction

Remote collaborative work has been redefined and becomes the ideal way of working after the world has been shocked with the Covid-19 storm. While this style of working was not very common in most industries before early of the year 2020, the occurrence of the pandemic has placed remote working as a significant option compared to the traditional style of working in the office that everyone is familiar and comfortable with. It is during this time of the year, the issues of remote collaborative work start to appear and be taken more seriously as it affects both the organization and the employees.

## 2.1 Problem statement

### **I. Inefficient communication between workers in a team involved in developing new or current projects remotely**

Communication is key in enabling any information to be delivered precisely. This is especially crucial when involving a group of people working on the same project remotely as everyone needs to be clear not only in their task but also the progress and each change happen in the project. Failure to fulfil this will affect work performance and productivity and result in not being able to deliver a product that meets customers' expected standard.

Ineffective communication due to remote working environments would also cause the workers in a team that are developing new or current projects to be facing difficulties in coping with iterative changes and processes that occur for products or services. Since iterative processes encourage flexibility of change as their prime feature, the inability to communicate efficiently about the changes made for a product among team members would not be able to cater the iterative changes effectively. On top of that, having workers working remotely from all around the world with different time zones would also

complicate the process of communication and even forces some workers to follow the company's timezone to work and communicate effectively with the majority of the workers.

## **II. The difficulty of interaction between different mediums**

Not all interactions that happen online are seamless and smooth. Different ways of interaction are required to communicate certain information effectively. One of the issues can be the different medium involved which makes communicating work or changes that cater to the work employees do to be challenging. Due to this, employees might be unable to cope with iterative changes or processes.

Different mediums used by workers to work on the same content would lead to disorganized work as there would not be a systematic way to interact and communicate properly with each other regarding the content. The non-existent standardised collaboration tool to be used by every worker working on the same content would lead to improper management of storing files and various ways of sending or retrieving information from other team members that might lead to the difficulty in locating the file or information needed in the long run. This would also increase the possibility of losing important data or files that might affect not only the projects but also the company significantly.

## **2.2 Purpose**

For a multinational company like HILTI having workers from all around the globe, this system is designed to allow the possibility to collaborate with other experts of HILTI from across the country despite the differences of background, knowledge or even time zone.

Another purpose of this system is to allow workers who work remotely to be able to follow and keep updated with the workflow. The system is designed to encourage the continuity of work and support changes made for the work despite working remotely such as being able to work on the same content with other team members together through only one platform. This eliminates the compromise on productivity as the system caters effective communication among team members despite having to communicate and interact with each other online at different places.

It is believed that this system increases flexibility among HILTI workers to work at their own pace and time by using one standardized platform. Even if they work in multiple locations worldwide, HILTI workers would be able to use this system

anytime they want to complete their work at their own pace before delivery date as all of the activities occurring inside the system would be recorded as proof of work. As such, this does not only enhance creativity, as workers would not feel immense pressure to work only at respective office hours despite different time zones, but at the same time speed up the working process in an efficient manner.

## 2.3 Scope

Based on the problem statement and purpose discussed, the solution designed to fall under these topics:

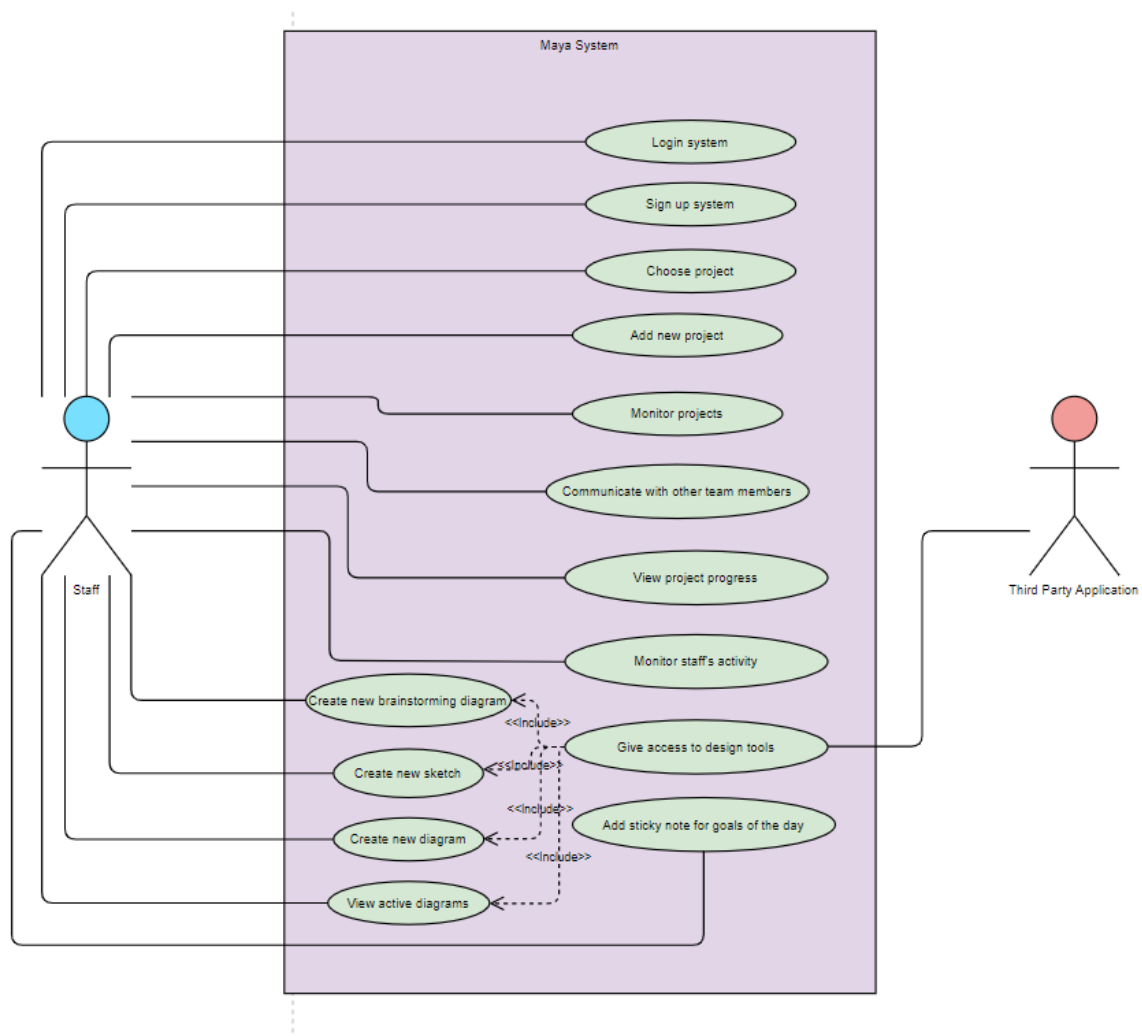
- I. Developing new and secure remote work and collaboration solutions
- II. Overcoming the problems of remote work and collaboration

## 3.0 Solution deliverables

This section will cover detailed information on the proposed solution in terms of the design and the architecture, functionalities, user interface and implementation technology innovation that suits the nature of this system.

### 3.1 Design and architecture

#### 3.1.1 Functional requirement: Use case diagram

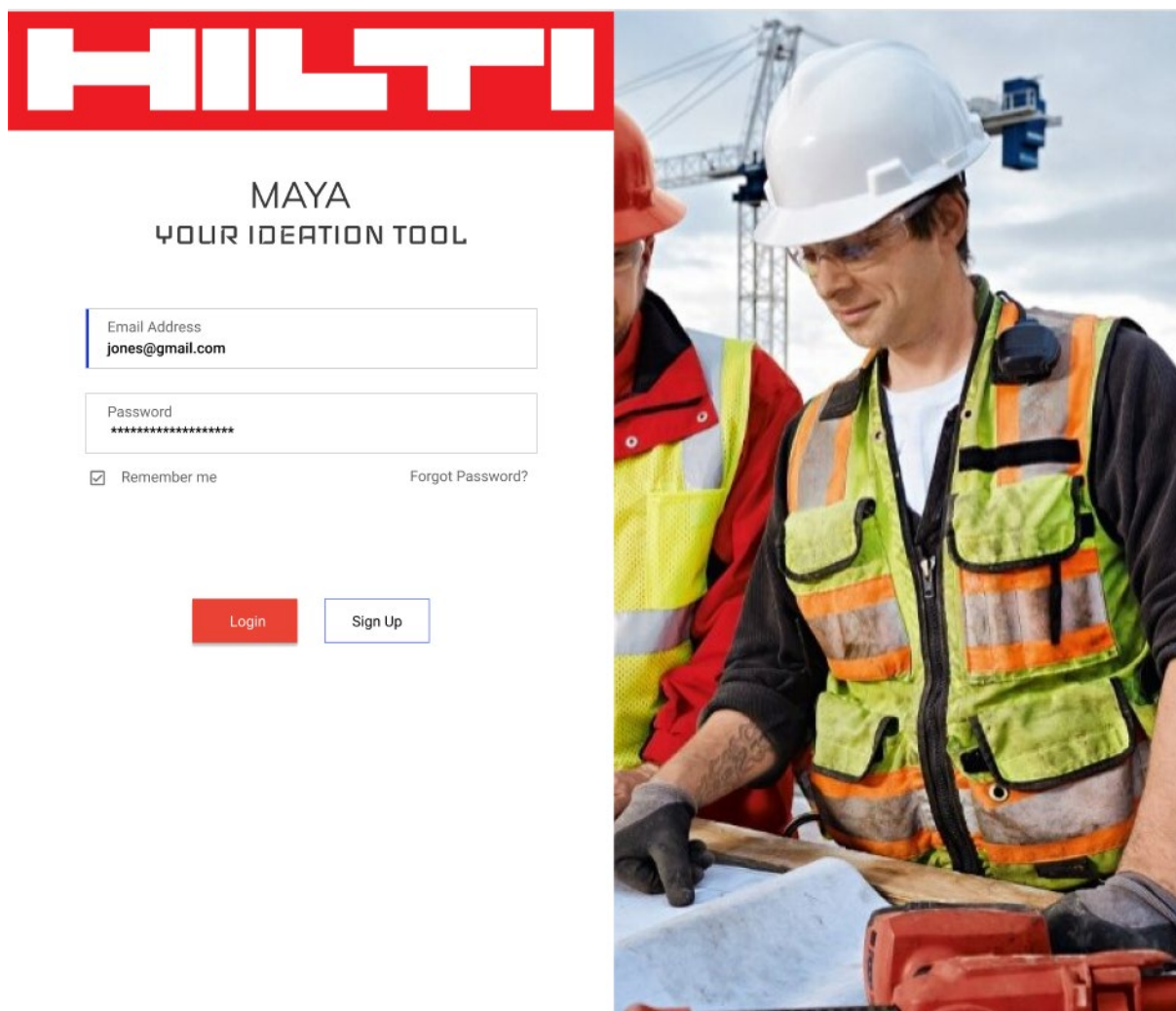


**Diagram 3.1.1.1 - Use case diagram**

The above diagram shows the use case diagram for the Maya system where there are a total of 14 use cases representing the total number of functional requirements. There are two actors involved: staff and the third-party application. Each actor carries out different responsibilities. Staff who are the users of this system have the accessibility to sign up system, login system, choose a project, add a new project,


monitor projects, communicate with other team members, view project progress, monitor staff's activity, create new brainstorming diagram, create a new sketch, create a new diagram, view active diagrams and add a sticky note for goals of the day. For third-party applications, the design tool and activity either creating new brainstorming diagrams, creating new sketches, creating new diagrams or viewing active diagrams being selected by the staff shall be given access to the design tool application.

### 3.1.2 User interface design



**Diagram 3.1.2.1 - Sign In page**

When staff firstly enters the MAYA system, a Sign In page will be displayed. The staff that already has an account or has registered with the system may proceed by filling in email address and password to sign in. For staff that is new to the system, they may proceed by clicking the Sign-Up button to sign up first.




MAYA  
YOUR IDEATION TOOL

Employee ID  
HILTI123456789

Email Address  
jones@gmail.com

Password  
\*\*\*\*\*

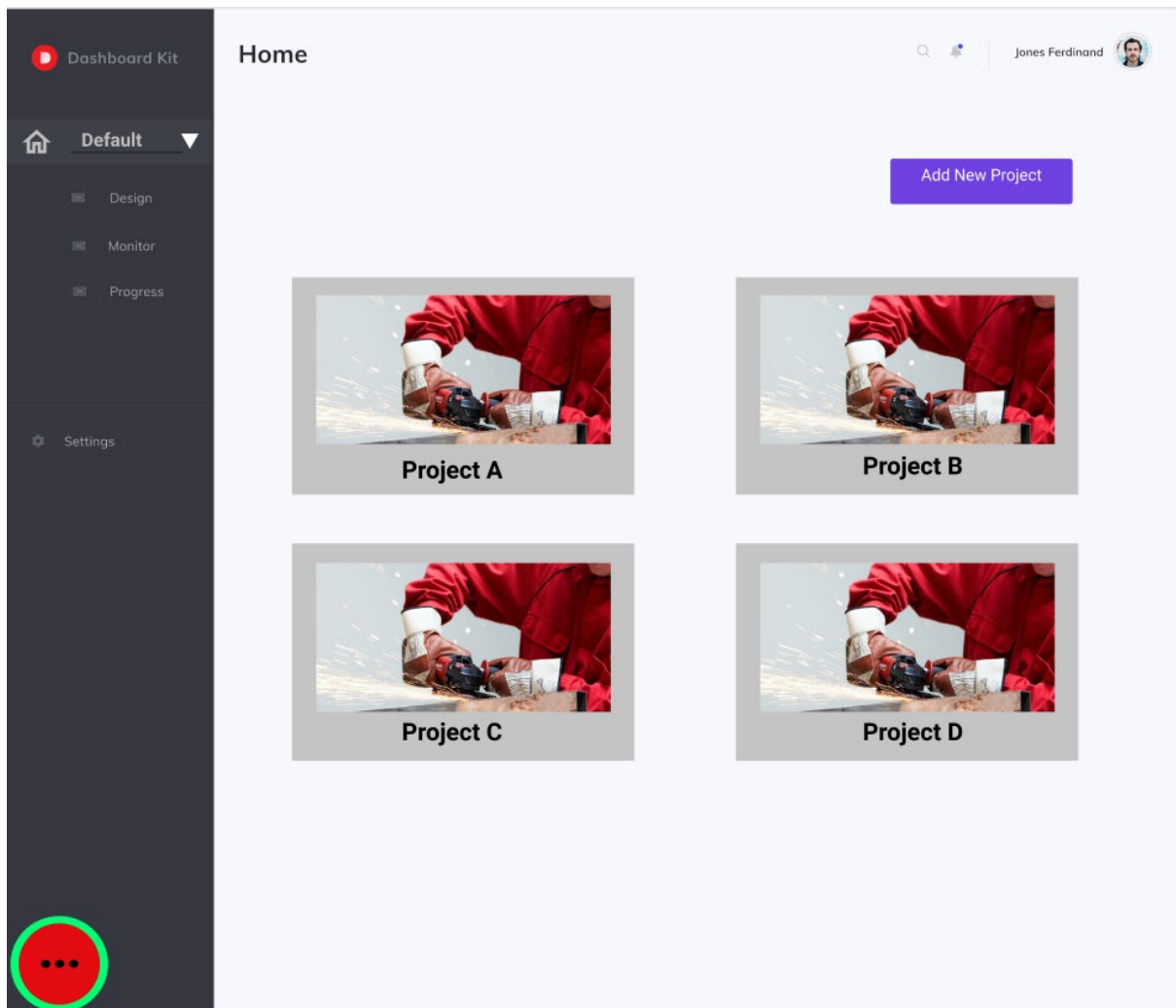
Sign Up Cancel



**Diagram 3.1.2.2 - Signup page**

After staff clicks on the Sign-Up button on the login page, a Signup page will be displayed. Staff needs to fill in a signup form consisting of employee ID, email address and password to register.





**Diagram 3.1.2.3 - Home page**

After staff has successfully signed in to the system, a Home page will be displayed. Inside the Home page, a list of projects that the staff is involved in is displayed. Staff can click on the desired project to see or create designs, monitor activities or view progress of the project. If the staff wants to create a new project, the staff can click on the Add New Project button to add a new project.

Dashboard Kit

Create New ▼

- Design
- Monitor
- Progress
- Settings

Create new project

Project name

Enter email to add team member +

Choose Start date

Select Finish date

Create new Task +

Select Task status +

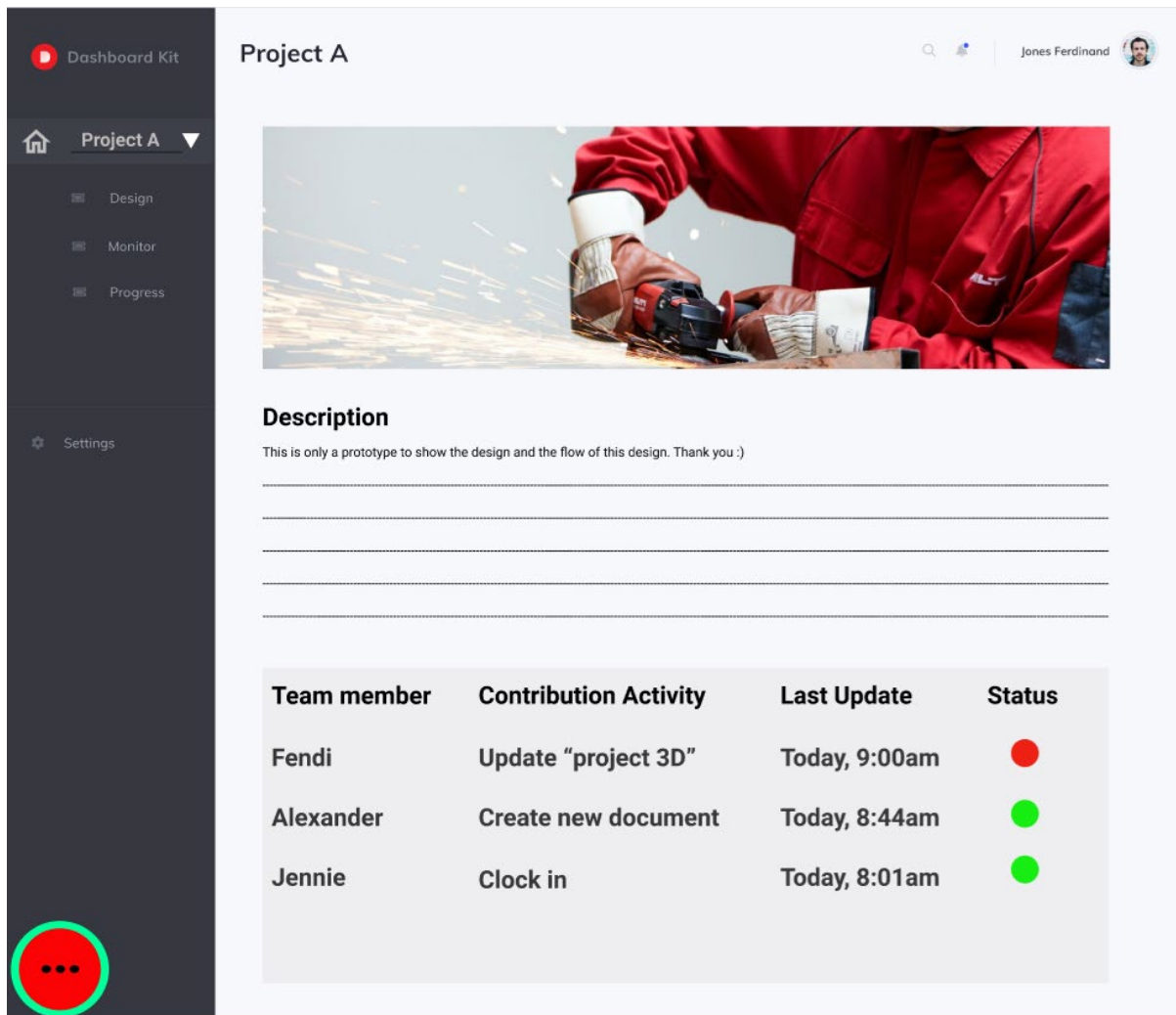
Task Start +

Task due date +

Cancel Submit

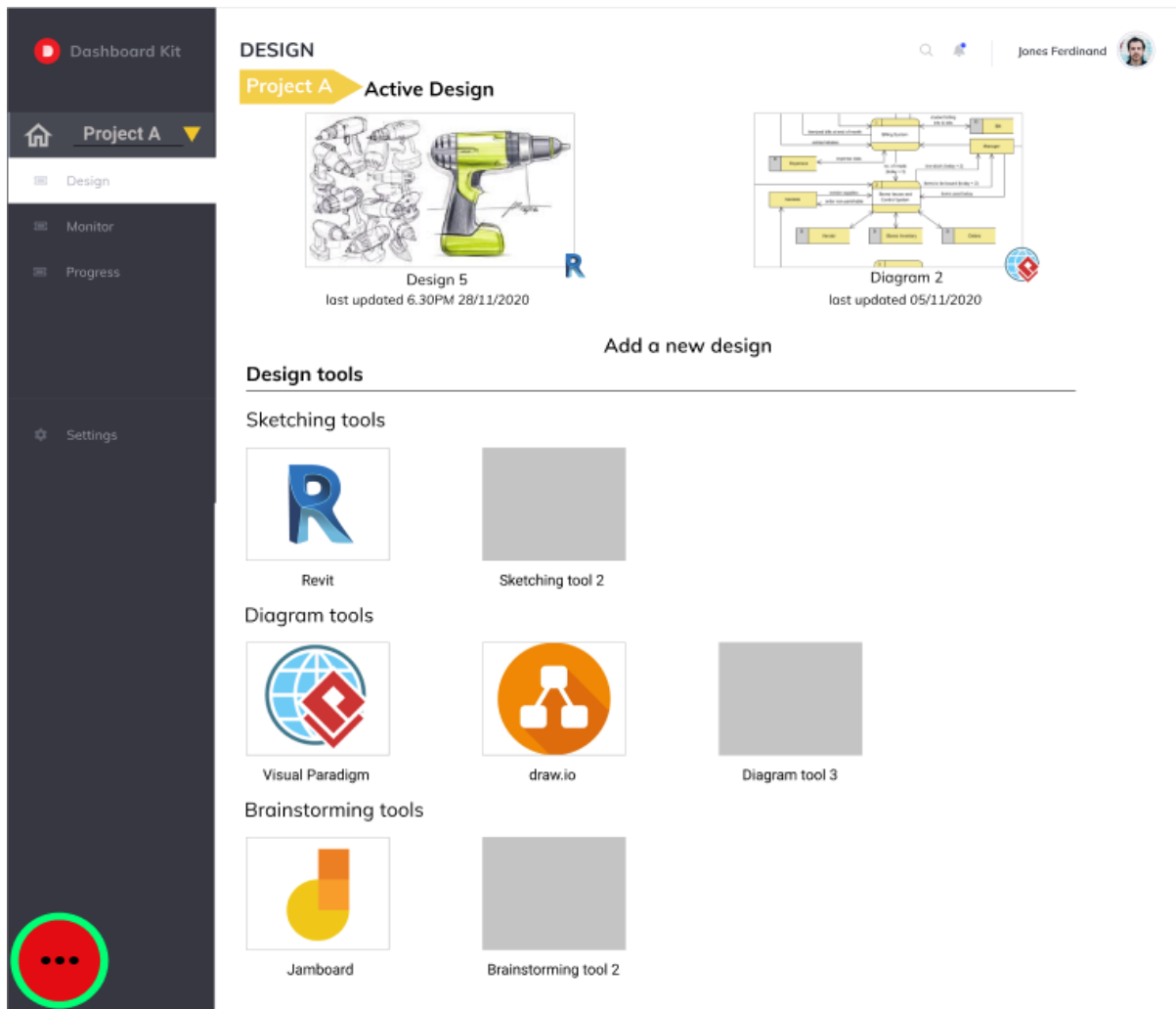
**Diagram 3.1.2.4 - Create New Project page**

Once the staff has clicked on the Add New Project button on Project Home page, a Create New Project page will be displayed consisting of a form to be filled in. The staff needs to enter the Project Name, email address of each team member of the project to automatically add them into the project, the starting date and finish date of the project and also the name, status, starting and due date of tasks under the project. Once the staff clicks on the Submit button, the new project will be created.



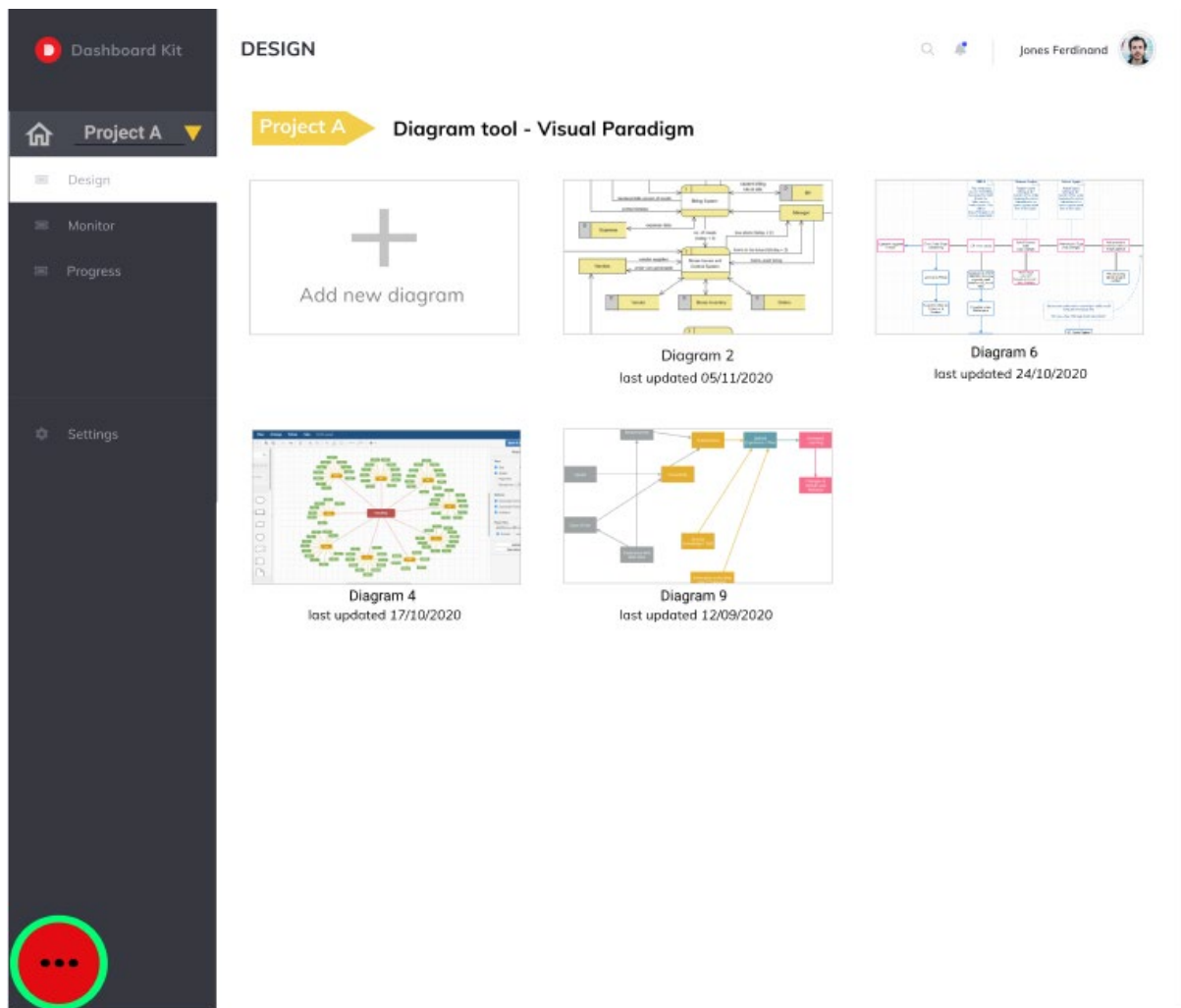
**Diagram 3.1.2.5 - Project Home page**

If the staff clicks on a project for example Project A inside the Home page, the Project Home page for Project A will be displayed. In the Project Home page, a description of Project A and a table containing the current status of team members that are currently making changes or performing activities are displayed.



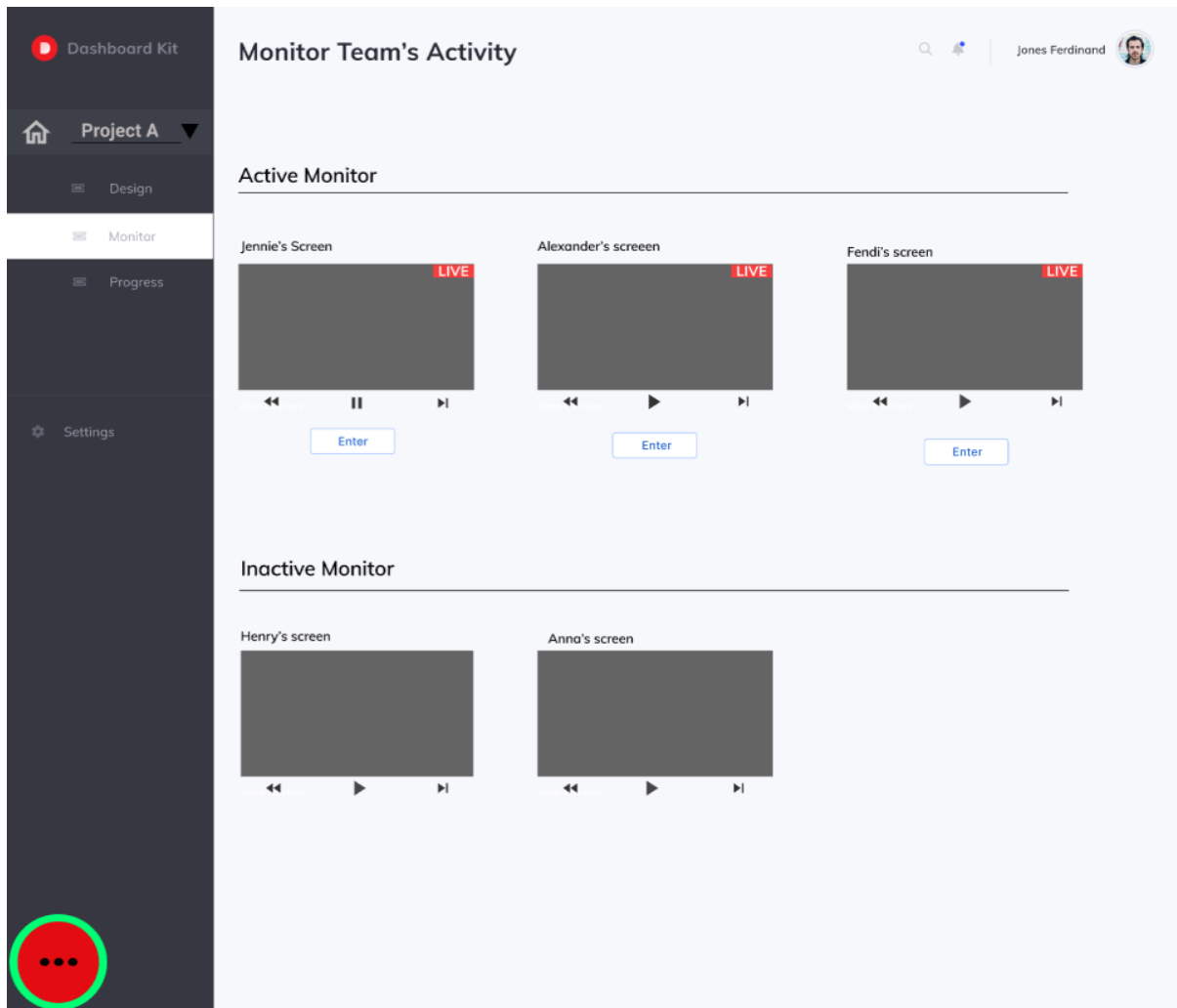
**Diagram 3.1.2.6 - Design page**

When staff clicks on Design in the Dashboard Kit, a Design page will be displayed. The Design page consisted of a list of available designs under the project selected and design tools to add a new design. If the staff clicks on one of the active designs, the page will automatically redirect to the design tool where the design has been created and the design tool will display the latest version of the design. If the staff wants to create a new design, the staff will click on the design tools listed based on their functions which are sketching tools, diagram tools and brainstorming tools.



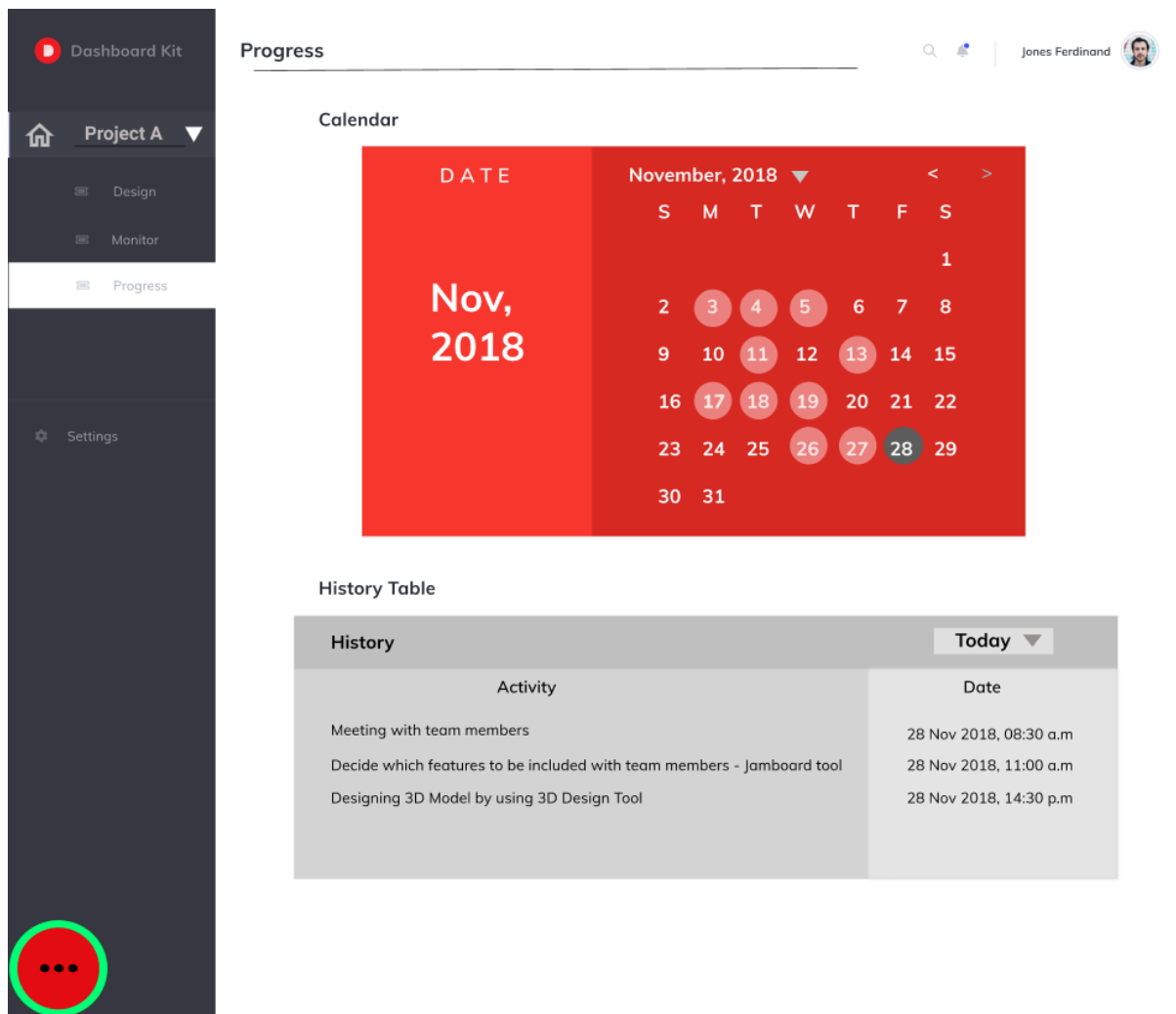
**Diagram 3.1.2.7 - Design page with a list of designs under the selected tool**

If the staff clicks on the design tool in the Design page, a list of designs under the selected tool will be displayed. The staff may decide to either proceed with the existing design for the project under the design tool or to create a new diagram by clicking Add new diagram.



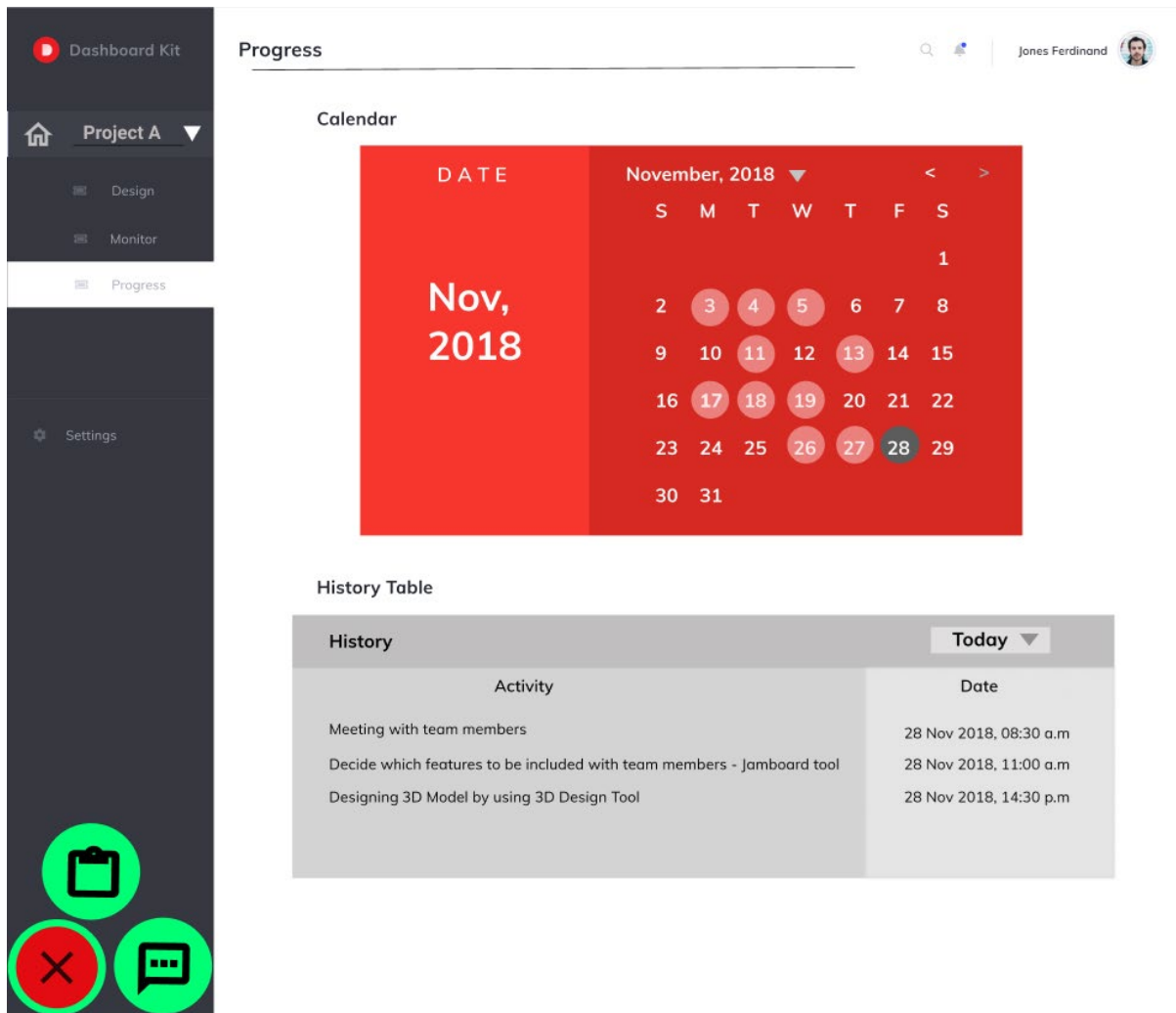
**Diagram 3.1.2.8 - Monitor page**

If the staff clicks on Monitor inside the Dashboard Kit, the Monitor page will be displayed. In the Monitor page, the staff can monitor the team's activity and see their progress by viewing the team members' active or inactive screens. The staff gets to view live activities that occur inside every team member's screen or even view the past activities that occur inside every team member's screen.



**Diagram 3.1.2.9 - Progress page**

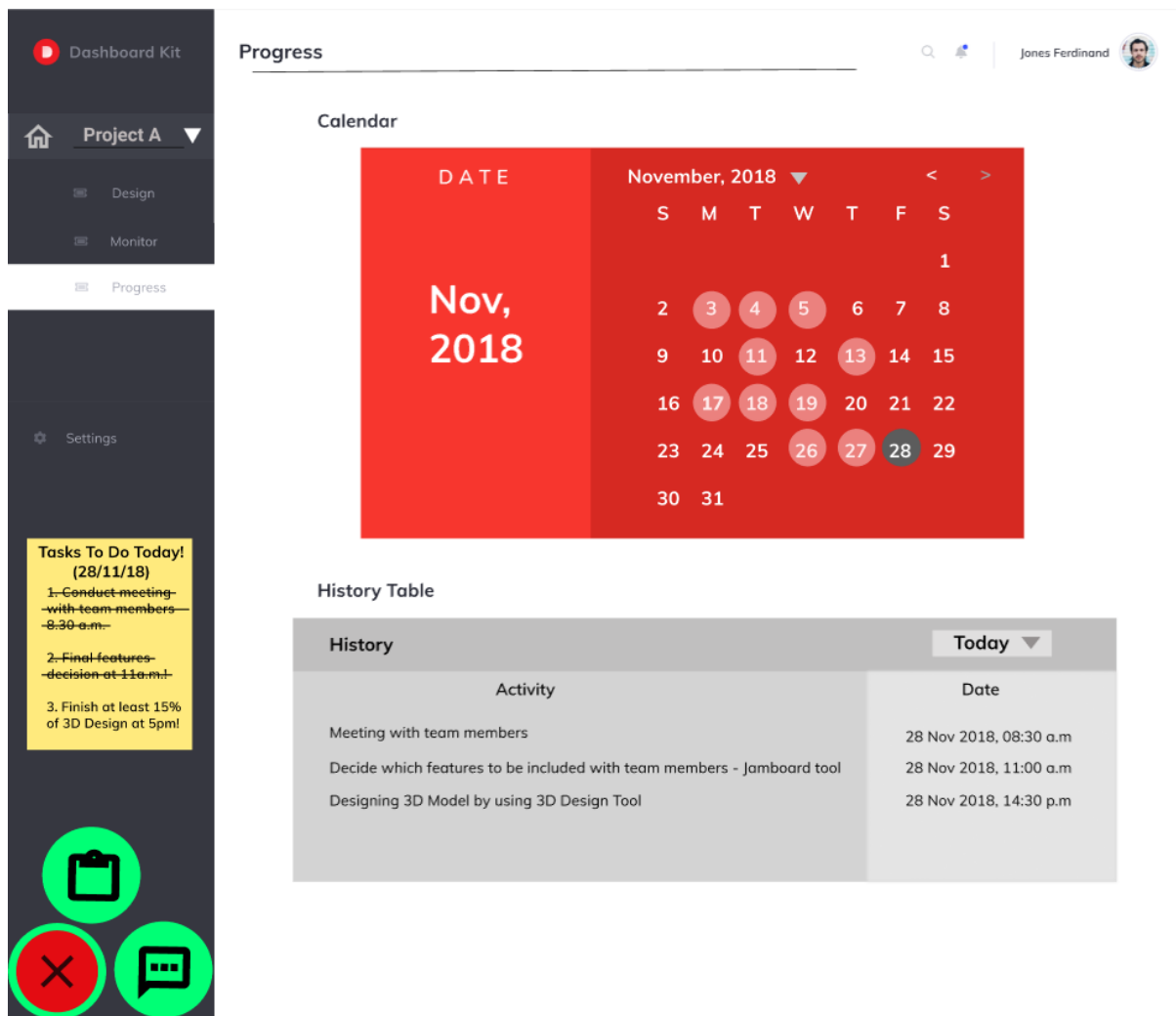
If the staff clicks on Progress inside the Dashboard Kit, the Progress page will be displayed. In the Progress page, a calendar and a history table consisting of a history of the staff's activity with the date and time each activity occurred are displayed. The calendar will display the days of the month that have activities performed in it indicated by a lighter shade of colour encircling the dates involved. If staff wants to check on his/her progress of the day for example on the 28th November 2018, the staff will click on the date inside the Calendar. The selected date will be encircled in a black shade of colour. The history table will then update and display all the activities with the date and time that has been performed on that particular date by the staff.



**Diagram 3.1.2.10 - Floating button with 2 sub-floating buttons: Note and Chat button**

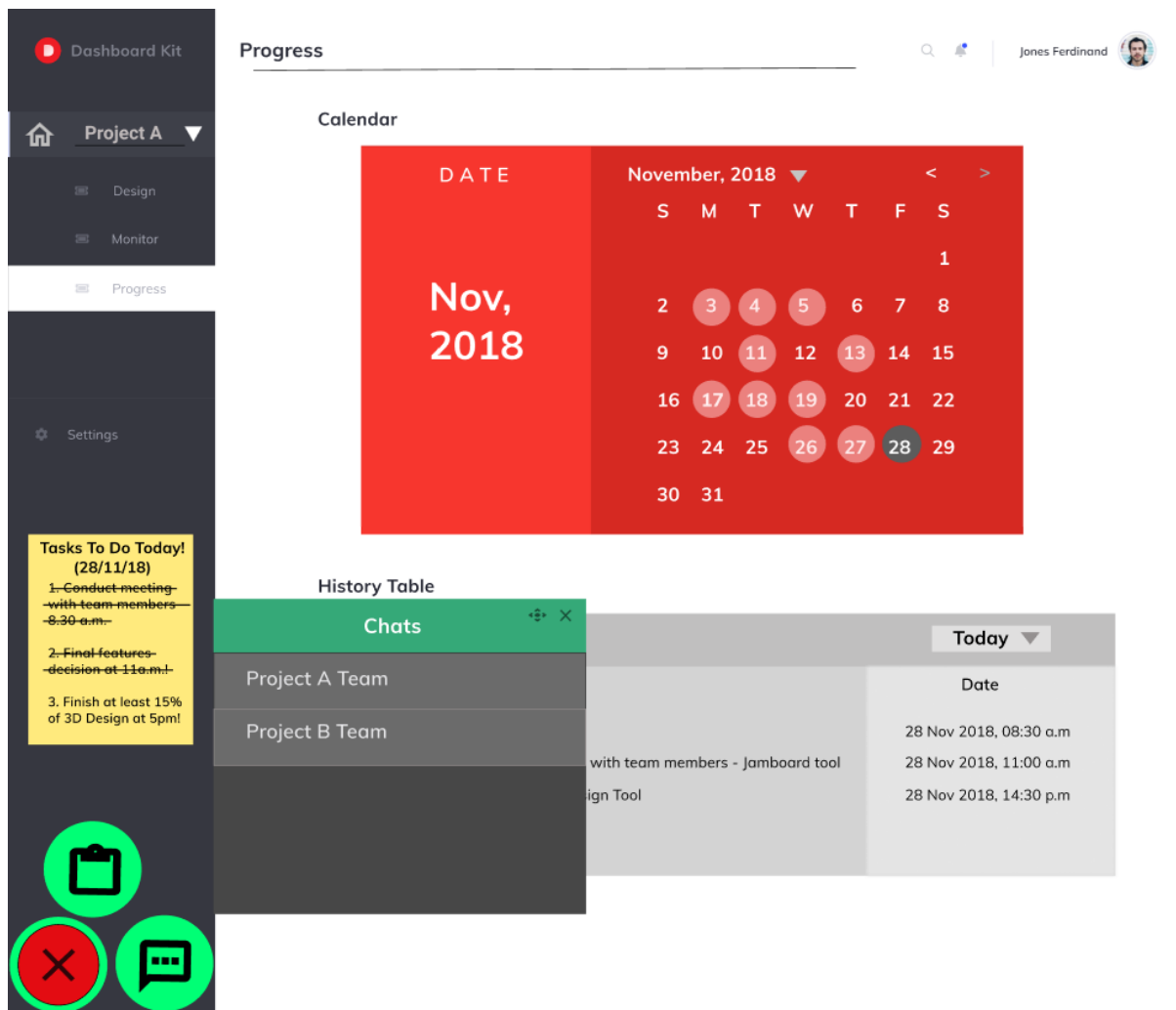
Inside every page, there will be a floating button on the bottom left side of the page containing 2 sub-floating buttons, which are Note and Chat button. Whenever the staff clicks on the floating button, the 2 sub-floating buttons will be displayed. The staff can also drag and place the floating button elsewhere inside the page.





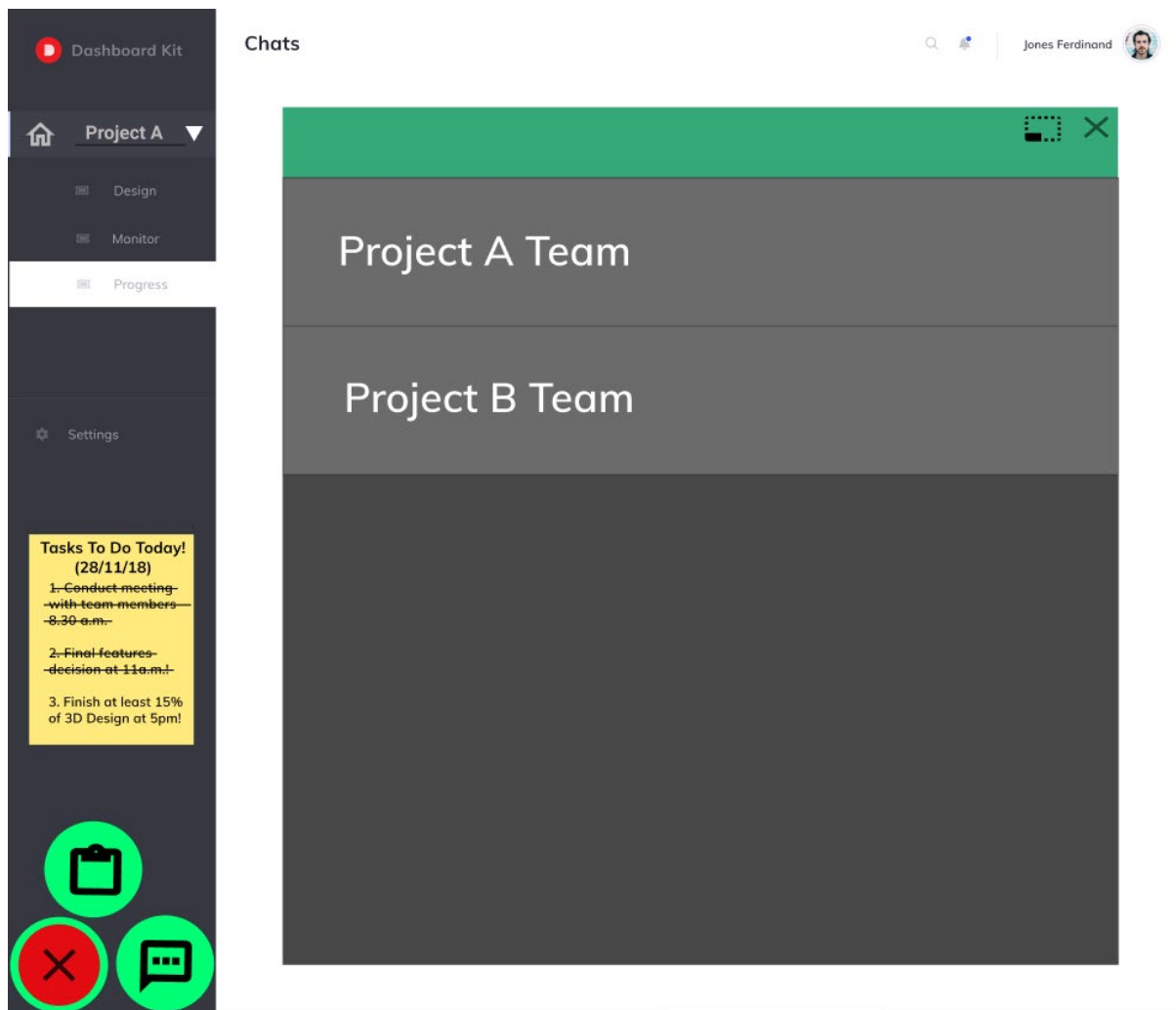
**Diagram 3.1.2.11 - Note popup**

If the staff wants to make a note, for example, to write about the tasks or goals to do for the day, the staff may click on the first sub-floating button inside the floating button which is the Note button. After clicking the Note button, a note resembling a sticky note will appear inside the Dashboard Kit. The staff may write or list down the tasks to be accomplished for the day inside the note.



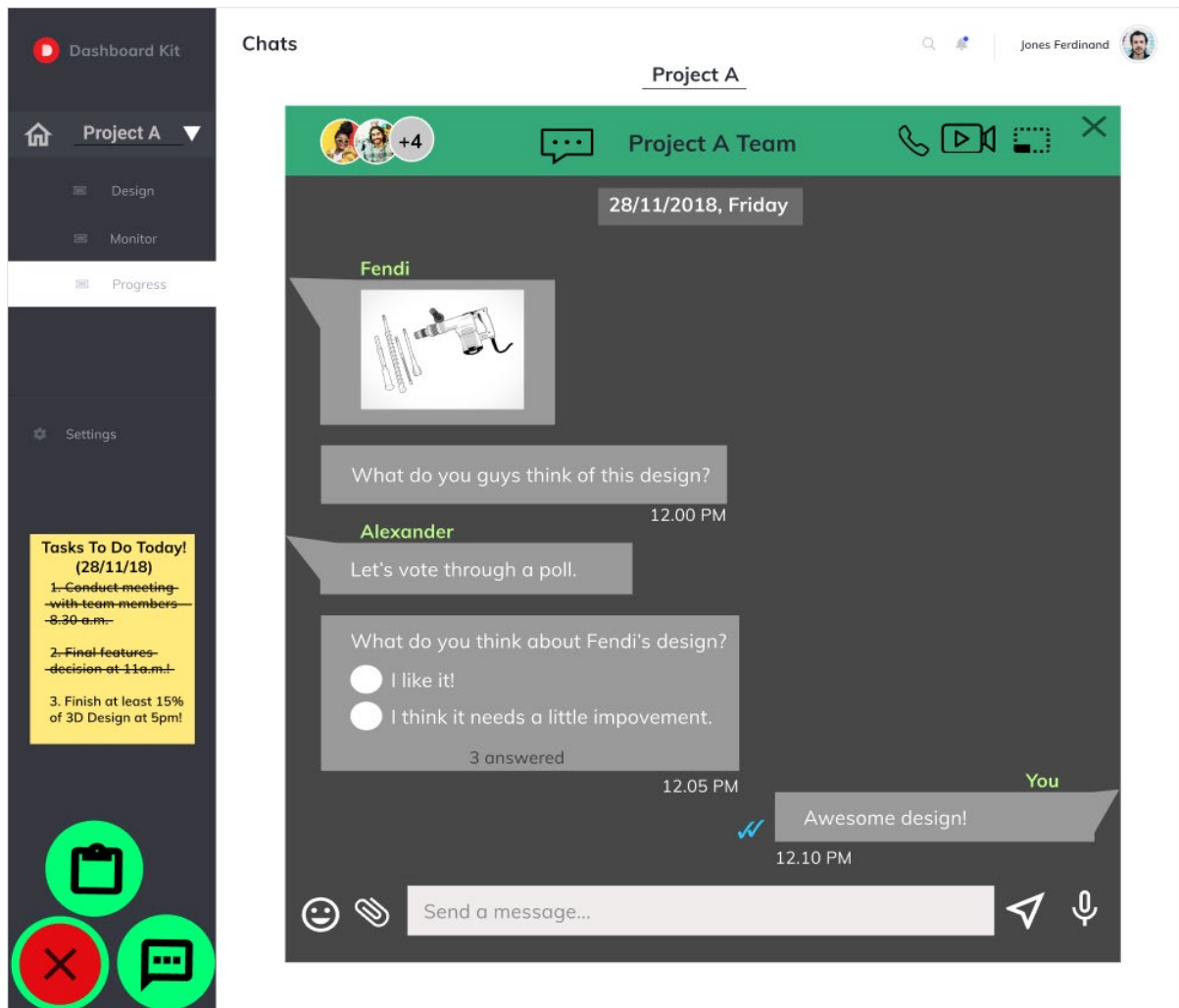
**Diagram 3.1.2.12 - Chat popup**

If staff clicks on the second sub-floating button which is the Chat button, a chat popup will appear. Inside the chat popup, there will be a list of chats for each project team that the staff is involved in for example Project A Team and Project B Team. The chat may also be enlarged by clicking on the enlarged icon at the top right of the popup and be closed by clicking the close button.



**Diagram 3.1.2.13 - Enlarged chat page**

If staff clicks on the enlarge icon inside the chat popup, the chat will be enlarged to be inside a chat page. If the staff wants the chat to be in its previous size, the staff can click on the icon at the top right of the chat.



**Diagram 3.1.2.14 - Enlarged chat page of the selected project**

If the staff has selected a project team inside the list of the chat for example Project A Team, the chat for Project Team A will be displayed. Inside the chat, the staff can send messages to the project team chat or each of the individual team members of the project by clicking at the button list of members at the top left of the chat. The staff may send documents, videos and photos and make polls by clicking on the paper clip icon. The staff may also send emoji, GIFs or stickers by clicking on the smiley icon and send voice messages by clicking on the microphone icon. If the team wants to conduct a video conference meeting or just a regular call, they may do so by clicking on the video call or call icon.

### 3.1.3 System Architecture

#### **Language: Java**

The MAYA system is a web-based system that will be implemented by using the Java programming language. Java programming language has been chosen as it has Object-Oriented Programming, which is a programming paradigm to design a system by using objects. In Object-Oriented Programming(OOP), codes can be written with objects that contain data in the form of variables or data fields and methods for the functionality of the code. The object-Oriented approach has 4 main features which are encapsulation, abstraction, inheritance and polymorphism. The advantages that can be gained from implementing OOP are as below:

1. Encapsulation of data

In OOP, data is encapsulated with methods inside the class. This would ensure the security of data and protect the data from modification by other external non-member methods.

2. Reduce code redundancy by reusability

Inheritance feature in OOP helps for reusability of features of an existing class in a new class without having to repeat the existing code. This would not only save a lot of time for developers but also increases the rate of productivity of the system.

3. Easy to be upgraded

By implementing OOP into the system, the system will be easier to be upgraded to a larger system as OOP uses a bottom-up approach.

Besides that, Java programming language can also be incorporated into Service Oriented Architecture that is also known as object-oriented architecture for Web platforms which will be proposed for the MAYA system.

#### **Architecture: Service Oriented Architecture(SOA)**

Service-Oriented Architecture(SOA) is a software development model based on a contract between a consumer, which is the client and a provider, which is the server through a communication protocol over a network. SOA has been chosen as the architecture of MAYA system as the system acts as a service consumer that calls the service provider, which is a third party application in this case sketching tools, diagram tools and design tools to deliver the services that the user, in this case, staff requests inside the MAYA system. In SOA, it is typically implemented with web services that make functional building blocks accessible over standard internet

protocols such as Simple Object Access Protocol(SOAP). The benefits of SOA are as follows:

1. Promotes reusability of codes  
SOA allows the usage of multiple coding languages as everything runs through a central interface. This would fasten up the development process of the system and prevent reinvention of code every time a new service or process is created.
2. Supports maintainability  
SOA supports maintainability as it provides loose coupling across application services. Application services do not depend and get affected by each other.
3. Reduces Cost  
SOA reduces hardware acquisition costs as the architecture does not require multiple hardware usage.

The SOA can be integrated with cloud computing that will be introduced as the technology for the MAYA system.

#### **Technology:** Cloud computing

Cloud computing is the delivery of computing services including networks, servers, storage systems, applications, and services over the cloud or Internet to offer faster innovation, flexible resources, and economies of scale. One of the concepts of cloud computing is Software-as-a-Service (SaaS). For SaaS, it is a Web-based software services model that provides underlying and infrastructure support for various applications including the completion of service initialization and the maintenance of the operating environment for instance data backup services. The advantages of SaaS are as follows:

1. Support for accessibility  
For any SaaS application, it will have the ability to run through an internet browser regardless of the operating system used. There would be no operating system or other software compatibility problems with SaaS applications.
2. Reliable data backups  
Data of the system is saved routinely in the cloud. This would not only reduce redundancy in data, but the employees may also switch between devices without losing work or the data.

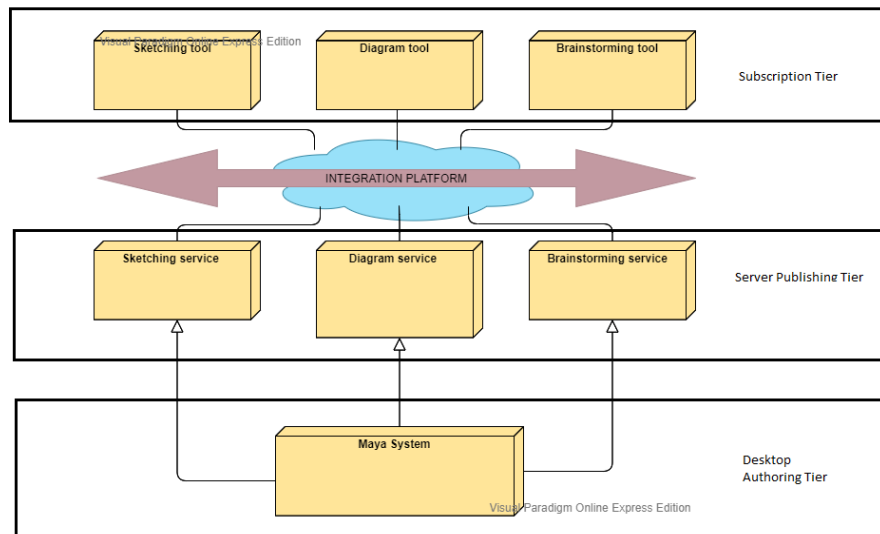
### 3. Reduce cost for the company

With SaaS, companies do not need to recruit IT, staff, construct computer rooms and purchase hardware and software. This way, companies can save the cost of IT products, technologies and maintenance operations.

By integrating SOA and SaaS, the rapid development of enterprise information can be achieved inside the system as both SOA and SaaS's features are combined. SOS will be focusing on platform architecture, while SaaS will be focusing on operational and delivery. SOA will integrate the technology platform, sharing resources and making full use of hardware while SaaS through mode innovation of the software delivery meets the enterprise information and reduces the operating costs.

### 3.1.4 Physical view:

#### 3.1.4.1 Deployment diagram

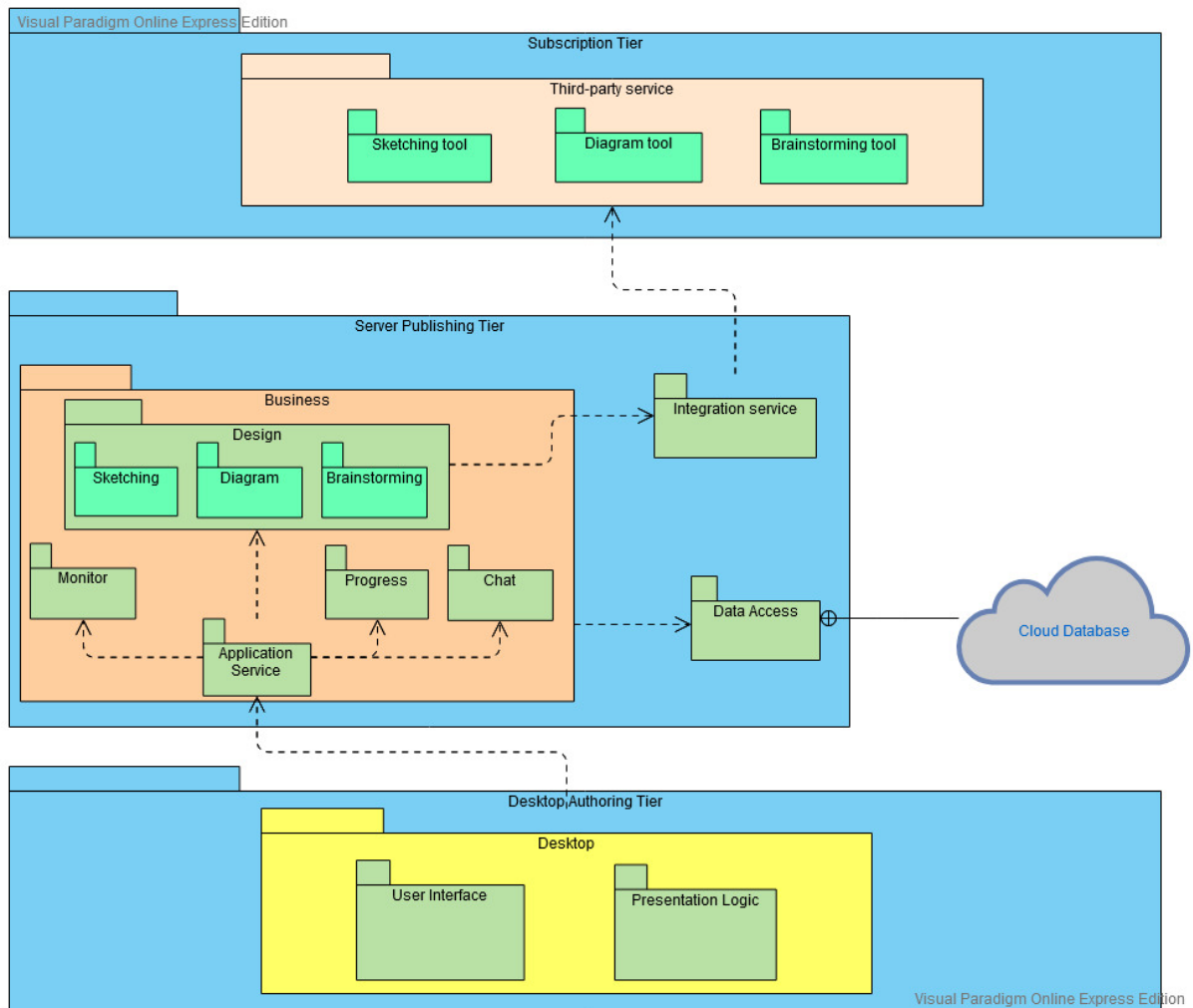


**Diagram 3.1.4.1.1: Deployment diagram**

The deployment diagram above is based on SOA architecture. SOA architecture allows making a complex application by combining services picked from different sources and consists of independent platforms. The architecture is divided into three tiers which are desktop authoring tier, server publishing tier and subscription tier. The desktop authoring tier locates the MAYA system since the system will be used on a desktop. The server publishing tier locates the services that the MAYA system provides. Since the MAYA system is created for HILTI companies, the services should be all the services used by HILTI companies to start proposing a new project. Sketching service, diagram service and brainstorming service showed in the diagram are only examples. The services on the server publishing tier will integrate with the third-party applications that are located on the subscription tier through the integration platform. The integration platform is a cloud platform and helps the server publishing tier and subscription tier to connect to make sure the services can be used on the MAYA system.



### 3.1.4.2 Package diagram



**Diagram 3.1.4.1.2: Package diagram**

The diagram above shows the package diagram structure for MAYA system. It consists of three different tiers that are based on the deployment diagram in **diagram 3.1.4.1.1**.

The first package is the Desktop Authoring Tier package. The interaction between the user and the system happen in this tier. The Desktop Authoring Tier package has a Desktop package and the Desktop package comprises of User Interface package and Presentation Logic package. The Desktop Authoring Tier package will interact with the Application Service package in the Server Publishing Tier package to exchange data and display the get data on the system interface.

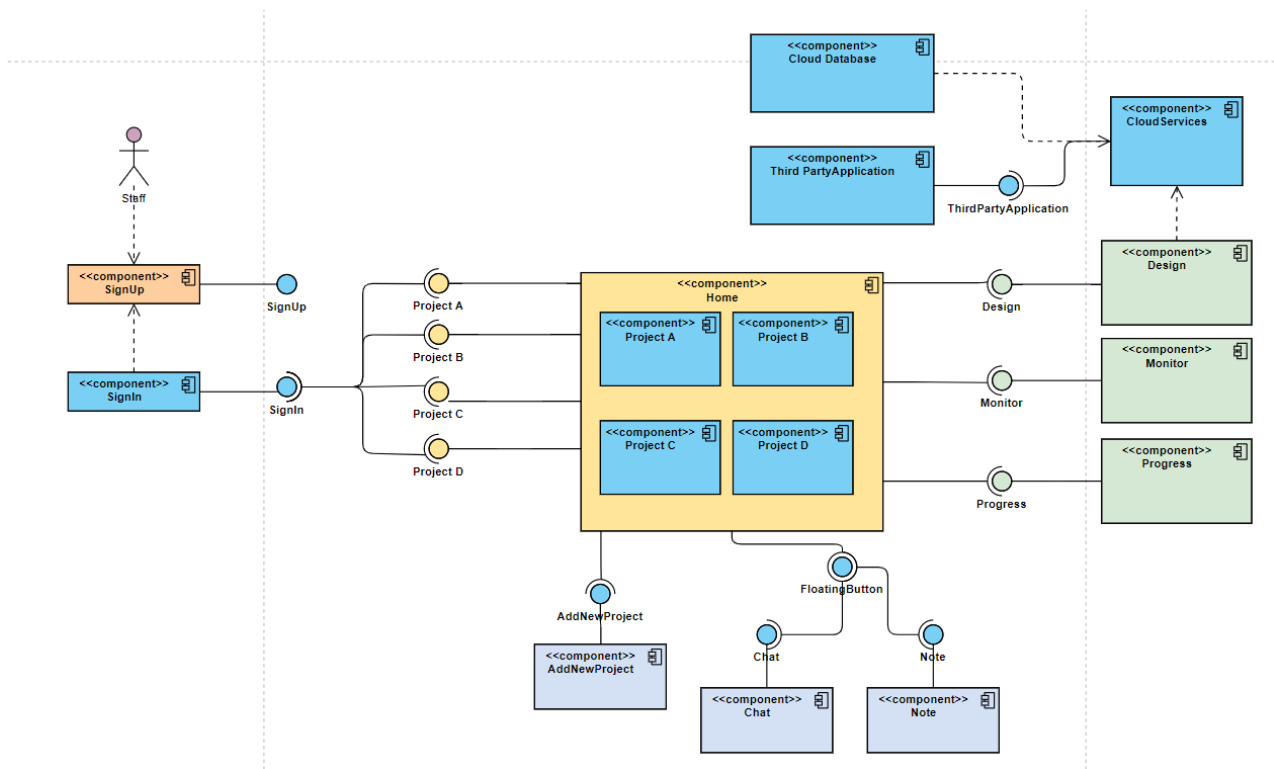
The Application Service package control the other four package which are Monitor package, Design package, Progress package and Chat package. Design package consists of the design services that are provided by the MAYA system which are Sketching package, Diagram package and Brainstorming package. The Application Service package and the other package connected to it is combined in one big

package called Business. It means that they are under the system business logic of MAYA system.

The Business package will interact with the Data Access package to get and store data. Then, the Data Access package will get the database information from the Cloud Database. Any data exchange between the Business package and Cloud Database will pass through the Data Access package.

Next, the Design package that is under Business package will interact with the Integration package to integrate with the Third-party application to provide design services. The Third-party Service package is created in the Subscription Tier package. It comprises of the related services that the MAYA system wants to integrate. For this instance, it contains Sketching tool package, Diagram Tool package and Brainstorming Tool package.

### 3.1.4.3 Component diagram



**Diagram 3.1.4.1.3: Component diagram**

The diagram above shows the component diagram of MAYA system. MAYA system consists of several components which are SignUp, SignIn, Home, AddNewProject, Chat, Note, Design, Monitor, Progress, CloudServices, CloudDatabase and ThirdPartyApplication. Each of the components contains respective interfaces. For SignUp component, it provides SignUp interface that the staffs would view when they first enter the system. The staff depends on the SignUp component as the requirement to access the system for the staff is through a successful sign-up. For the SignIn component, it provides a SignIn interface for the staff who has a successful sign up to sign in to the system. SignIn component depends on the SignUp component as a successful sign up is required for the staff to have a successful sign in.

For Home component, it has several sub-components which consisted of the projects that the staff is involved in for instance Project A, Project B, Project C and Project D. It provides provided interfaces for each of the projects that use the details in the required interface of SignIn. It also has 2 required interfaces, which are AddNewProject and FloatingButton. AddNewProject acts as the provided interface for

AddNewProject component for the staff to add a new project into the system. FloatingButton acts as the provided interface for 2 interfaces, which are Chat and Note. For Chat interface, it acts as the provided interface for Chat component whereas, for Note interface, it acts as the provided interface for Note component. The staff can click on the floating button to choose either Chat or Note sub-floating button.

For Progress, Monitor and Design interfaces, they act as the required interfaces for Home component and as the provided interfaces for Progress, Monitor and Design components. For Progress interface, it provides a page displaying a calendar and a history table of the staff's activities inside the system. For the Monitor interface, it provides a page displaying active and inactive screens of every team members of the project chosen. For Design interface, it provides a page displaying all the active designs available for the project chosen and also sketching, diagram and brainstorming tools if the staff wants to add a new design for the project. Design component depends on CloudServices component as it needs the cloud services inside CloudServices component to integrate with third-party applications in the ThirdPartyApplication component. ThirdPartyApplication component depends on the CloudServices component as through the cloud services, it can provide its provided interface of ThirdPartyApplication for the staff to use. The CloudServices component also helps to integrate data of the system from CloudDatabase component to retrieve the data from the database or to save new data inside the database.

## 4.0 Internal user perspective

We proposed the idea of MAYA system centralized around internal users' needs which are the HILTI staffs to work remotely with efficient communication, the flexibility of working time and pace and to allow the possibility to collaborate with other experts or workers of HILTI from across the country despite the differences of background, knowledge or even time zone. The HILTI staffs and the company will be tremendously benefitted from the system as it helps the work management in the organization to be more organised and have a continuous flow without being affected by its surroundings, for instance, having to work from home. The vision of the system towards the HILTI staffs are as below:

1. The system acts as a standardised platform or hub for all HILTI staffs to generate creative ideas, communicate ideas and changes, perform design activities for HILTI tools and services, monitor progress of other team members and track history of the progress of the staff.
2. The system shall increase the productivity between HILTI staffs as it allows staff to work at their own pace anywhere and everywhere with easier access to communicate efficiently. It promotes working flexibility that would further encourage the staff to be more motivated, less stressful and create a happier working environment despite having to work from home.
3. The system shall demolish the perception of working for HILTI staffs that the company should be based solely inside the office and promote Work-From-Anywhere(WFA) instead to further evolve according to the everchanging Industrial Revolution (IR) 4.0.
4. The system will help to cut the cost of the HILTI company in the long run as it provides multiple services, promotes effective communication and increases collaboration among staffs under just one standardised platform, which is the MAYA system.

## 5.0 Conclusion

MAYA system is a versatile system that is created to cater to the needs of HILTI staffs to accomplish a successful remote working environment with an effective collaboration among the staffs. MAYA system delivers all the functionalities needed by the HILTI staffs to work remotely by providing an effective medium for communication, ideation and collaboration with a reliable SOA architecture that integrates with cloud computing SaaS to produce a faster and compatible data and process integration with the third-party applications. MAYA system would be a great addition to the HILTI company and can be further developed into a greater system that brings benefits to HILTI in heterogeneous ways.