Design and Build a Web Service Based Customer Service Dashboard for Decision Making on CV. IT Pro Solutions

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Abstract— The increasingly advanced development of information technology has influenced overall business development, including the management of distribution company sales teams. Sales Force Automation (SFA) is a system or application designed to increase efficiency in managing sales activities. SalesMania which is one of the products from CV. IT Pro Solutions which provides a sales team management platform to assist managers in managing sales teams starting from scheduling visits and monitoring daily activities. However, as SalesMania grew, the administration experienced problems in monitoring business developments. In this research, a web service-based customer service dashboard will be created with a focus on good UI/UX display, API service access, and building dashboards with Retool. The research methods used in developing this system are the Rapid Application Development method and the black box testing method and interviews. The results of the dashboard development show effective collaboration between UI/UX display design and web services through proper function declaration and API service integration proving its importance in developing web applications that are not only functional but also visually appealing.

Keywords— sales force automation (SFA), dashboard, UI/UX, web service, API

I. INTRODUCTION

The rapid development of information technology has had a significant impact on business competition, especially in the management of company sales teams [1]. Sales Force Automation is a system or application designed to simplify and increase efficiency in managing sales activities [2]. Sales Force Automation helps maximize sales effectiveness in real time and the sales tracking process is used for future sales analysis [3].

CV. IT Pro Solutions presents SalesMania, a sales team management platform that supports enterprises. SalesMania's growth created administrative challenges in recording company data and active users, as well as billing errors due to the unclear amount of users and client trial periods. Another challenge involved SalesMania's lack of data visualization features, hindering market analysis by the marketing division. This research aims to create a web service-based dashboard and use Retool software.

The interaction between the user and the web is separated into three stages: request, processing, and response [4]. A dashboard is a visual display that presents important information in a way that is easy to understand [5]. The presentation of information is designed to be fast and precise according to its intended meaning [6], generally through graphs, tables or other visual elements, tailored to the user's needs [7].

Monitoring or what is known as monitoring activity is an important process in an organization to obtain feedback regarding ongoing programs by understanding the needs for program implementation so that they can be prepared immediately [8].

Retool was founded by David Hsu in 2017 [9]. Retool is a software development platform that allows developers to quickly build and manage user interfaces (UI) to create internal enterprise applications. Retool supports connections to relational databases such as MySQL, PostgreSQL, Microsoft SQL Server, and others, and supports various API types such as REST, GraphQL, and gRPC, providing flexibility for a variety of integration needs [10].

Web services are client-server applications that allow multiple applications to connect over a network. There are two types of web services. The first is REST, and the second is SOAP. REST web services are protocol independent, although practically every REST service uses HTTP verbs to control resource activity [11].

PostgreSQL is an Object Relational Database Management System which is open source, meaning that the source code from PostgreSQL can be used freely [12]. PostgreSQL supports Structured Query Language (SQL) with very complete features such as complex queries, foreign keys, triggers, views, transaction integrity, and multiversion concurrency control, etc [13].

Postman is a powerful tool for querying and testing APIs, with a sophisticated graphical user interface (GUI) and command line and cURL features. The postman GUI allows users to change any important information, including request content, headers, and type, in addition to basic functions such as performing requests and comparing answers [14].

II. METHOD

1. Research Objects and Locations

This research was conducted on staff from CV. IT Pro Solutions which is located on Jl. Jeruk I No.22, Lamper Lor, Kec. Semarang Sel., Semarang City, Central Java 50249.

2. Data Source

a. Primary Source

The primary data source obtained in this research was through interviews with staff CV. IT Pro Solutions is the user of the customer service dashboard that will be built in this research.

b. Secondary Sources

Secondary data sources used in this research come from scientific journals which discuss customer service dashboards for decision making and making it easier for users to monitor.

3. Population and Sample

a. Population

The population of this study consisted of all employees from CV. IT Pro Solutions.

b. Sample

The sample used in this research consisted of director, administrator, and project manager CV. IT Pro Solutions.

4. Data Collection Methods

The data collection technique used in the research is qualitative with the following method:

a. Observation

This method is carried out by asking questions related to information which is necessary for decision making and customer monitoring, so that accurate information can be obtained regarding data for decision making and a list of SalesMania customers at CV. IT Pro Solutions.

b. Interview

This method is carried out by studying directly the points needed by staff CV. IT Pro Solutions in decision making and how the SalesMania

customer data monitoring process is implemented by CV. IT Pro Solutions.

5. Application Development Methods

Method for developing customer service dashboard design on CV. IT Pro Solutions uses the Rapid Application Development (RAD) method. The RAD method is a linear sequential software development method that emphasizes a very short development cycle. The RAD method uses an iterative approach in developing a system where the system working model is built at the beginning of the development stage with the aim of identifying and determining user needs [15].

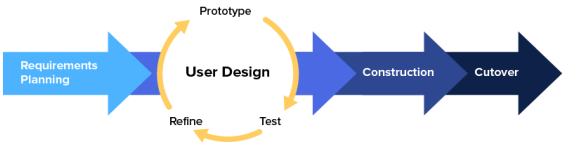


Figure 1. RAD Flowchart

III. RESULTS AND DISCUSSION

A. RESULT

In the representation in Figure 2, two main actors can be identified, namely the user and the system (authentication). The first actor, namely the system (authentication), operates to validate the user account before allowing access to system functions. Meanwhile, the second actor, namely the user, has the authority to access the dashboard which includes information regarding the business

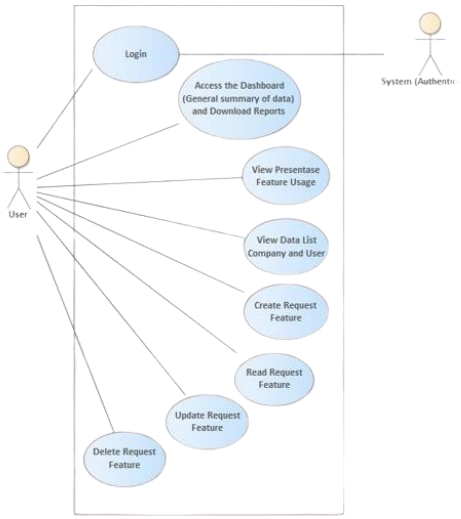


Figure 2. Use Case of web dashboard application

development of SalesMania products. Users have access to view an overview of the business in the form of data summaries, tables and bar graphs. In addition, users can see the percentage of use of a feature and perform CRUD operations (Create, Read, Update, and Delete) for feature request data. The illustration in Figure 3 shows the process flow of using the SalesMania dashboard web application used by users. The initial process begins with the user logging in using Google sign in. After successfully logging in, users can enter the main dashboard page which presents a data summary, perform CRUD (Create, Read, Update and Delete) operations on the

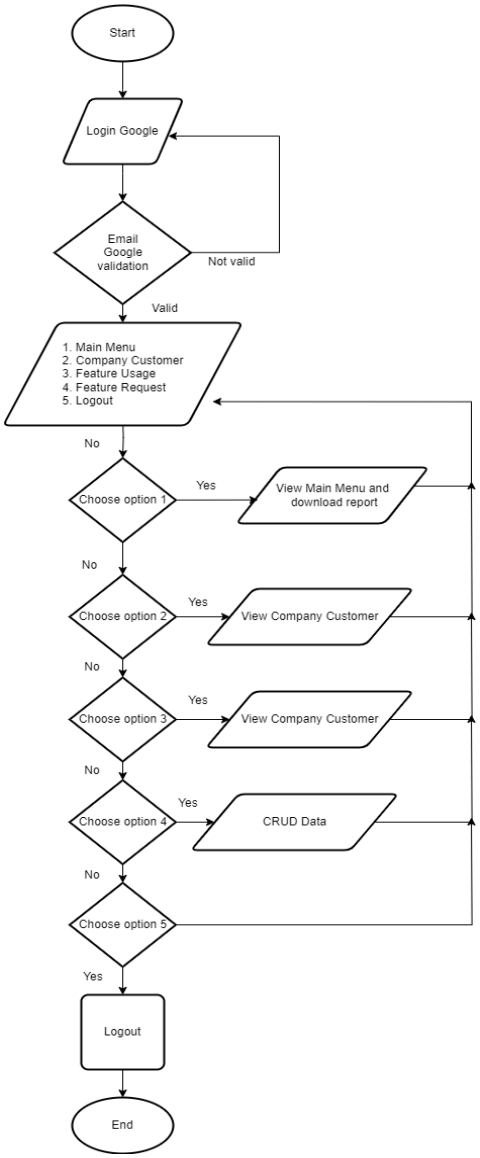


Figure 3. Flowchart of web dashboard application

dashboard and access other features such as viewing company and user data lists using the SalesMania application and carrying out the logout process. The flow of using the dashboard website application describes the initial process of the user logging in, accessing data, carrying out CRUD operations, up to logging out which is the final process of using the dashboard website application.

Entity Relationship Diagram is a graphical representation of the data

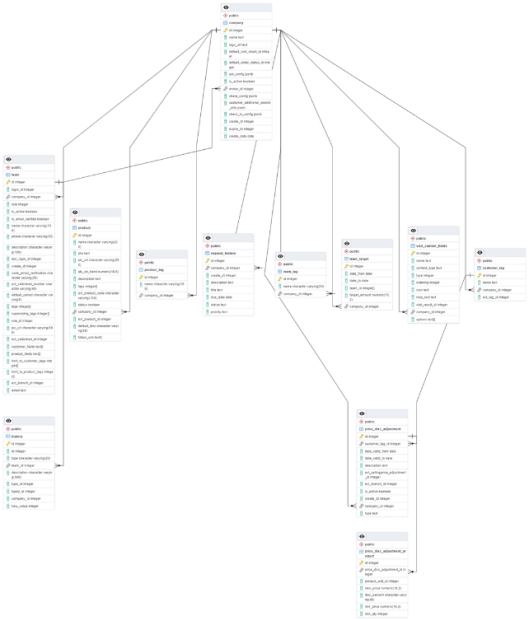


Figure 4. ERD SalesMania Dashboard Website Application

structure of an information system that uses the concepts of entities, relationships and attributes. There are 3 types of entity relationships, namely many to many, one to one, one to man. Figure 4 is the ERD of the SalesMania dashboard website application.

B. DISCUSSION

API connection to Retool is done by creating a new resource in Retool and selecting REST API integration as can be seen in figure 5. In the configuration, you can fill in the resource name and base URL to access the intended API. Base URL is the base address of the API that you want to connect to Retool. By providing a base URL, Retool can understand where the desired API endpoint is located so that it can direct the application to the desired API.

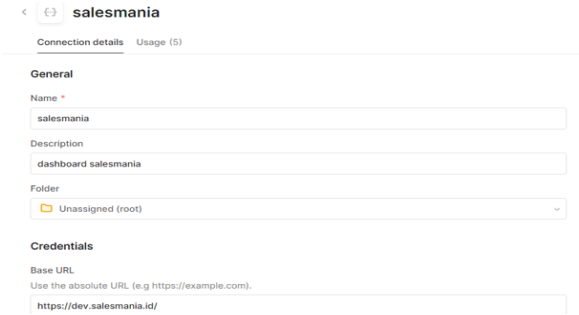


Figure 5. Configure API Connection to Retool

To carry out the login process, users can enter the application URL (itpro.retool.com) which will be directed to the login page as in Figure 6 and enter the login credentials that have been registered using Auth0 as the authentication system. Retool will communicate with Auth0 to verify the credentials and manage the authentication process. If the credentials are valid, the user will be directed to the appropriate Retool dashboard or application page with the specified access rights.

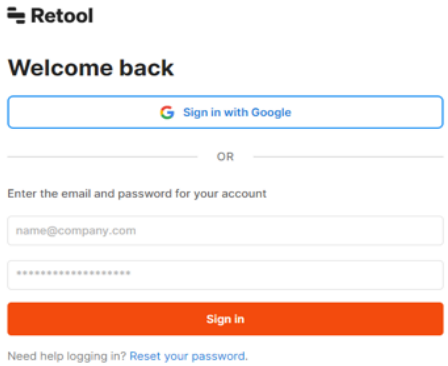


Figure 6. Retool Application Login Page

The web application will be directed to the dashboard page, namely the main page of the dashboard web application, when the user successfully logs in. As seen in Figure 7, this page provides an overview of SalesMania in the form of data summaries, graphs and other important information. The data displayed is information about revenue, users and company data taken

through the execution of several API functions.

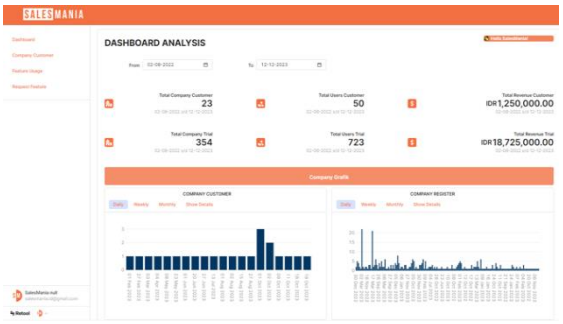


Figure 7. Main Dashboard Page

On the main dashboard page, users can see a growth graph for the list of companies, users and revenue as in Figure 8. The data displayed on the graph can be seen on a daily, weekly and monthly basis which makes it easier for users to analyze their business development.

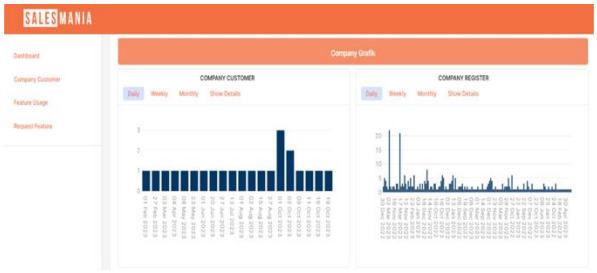


Figure 8. Bar Chart

The show details section as in Figure 9 displays a summary of data from graphs into a table so that users can more easily find out their business growth figures. The data is grouped by month and can be downloaded in excel form.

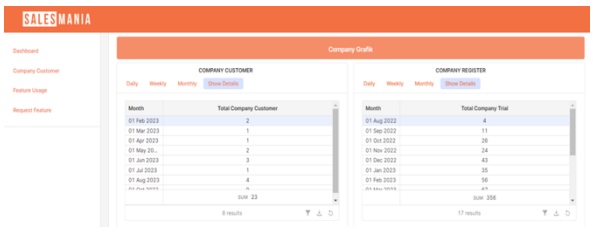


Figure 9. Data Summary Table

In Figure 10, users can see the data contained in the database for data processing. This data can be displayed as information in various data visualizations that suit the user's needs to appear on the web dashboard application. Users can carry out more analysis of the data presented so they are able to make decisions or policies through the information displayed on the dashboard.

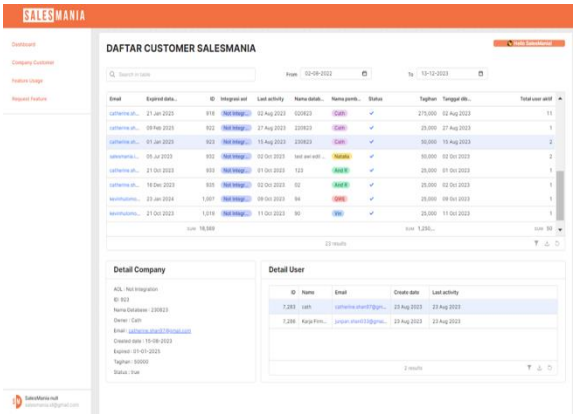


Figure 10. Company Customer List Pages

On the feature usage page as shown in Figure 11, users can monitor the usage percentage of each feature available in the SalesMania application. The visual representation of information is displayed in the form of a pie chart, which makes it easier for users to quickly identify which features are most used and which may be less popular.

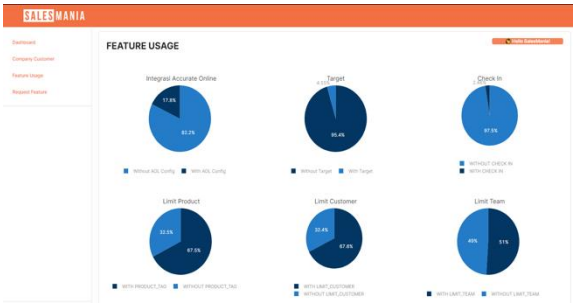


Figure 11. Feature Usage Pages

Through the form as seen in Figure 12, users can input data into the system by filling in the required information. Once successfully input, the data will be stored in the database and then processed according to system requirements. The results of the data processing are then used as information that can be displayed on the dashboard.

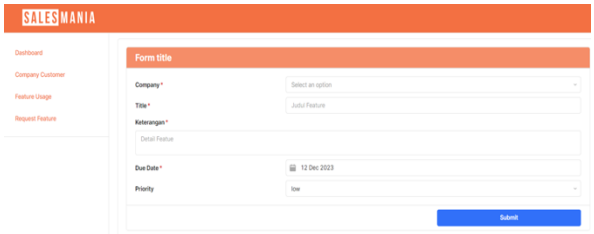


Figure 12. Add Data Form

After the data has been successfully input and stored in the system, the information can be displayed in a dashboard as can be seen in Figure 13. Users can display existing data in various graphical representations that visualize information in a representative manner, making it easier to understand. The results of appropriate data processing on the dashboard help users to carry out analysis and make decisions.

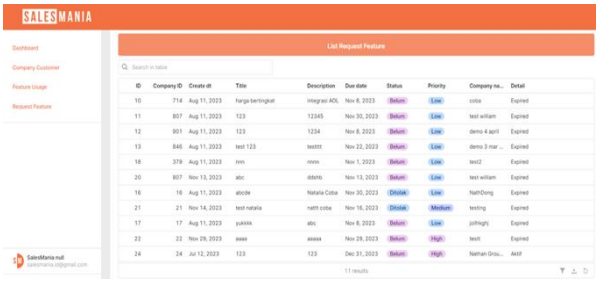


Figure 13. Data Table View Page

In the form display in Figure 14, users can see detailed information that has been input into the database system. By presenting a display of existing information, users can make changes or additions to data directly into the database. Apart from making changes to data, users can also delete data. This process involves user interaction with the data they have previously input.

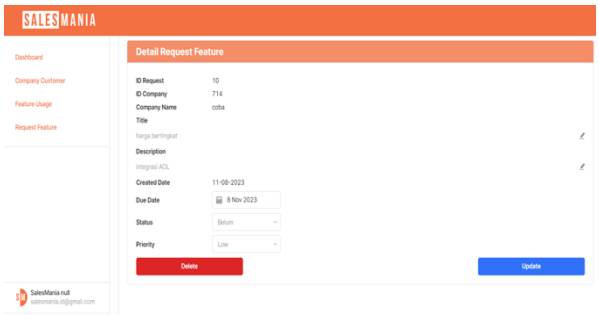


Figure 14. Edit Data Form and Delete Data

The system that has been developed is tested using the black box testing method which shows that the application functionality can operate in accordance with expectations and interviews with staff involved in monitoring SalesMania customers as can be seen in table 1. From the interview results, it can be concluded that the system can meet the specific needs of users and provide significant added value in supporting daily activities and monitoring the company's business development.

Tabel 1. Interview Results with Project Manager

No	Question	Answer
1.	Does the information on the dashboard provide an overview of business development?	Very, especially because lots of graphs and comparative data are displayed, making it easy for me to see developments that occur in accordance with the desired period
2.	Is the information visualization displayed on the dashboard easy to understand?	It's easy, it looks quite modern and easy to digest
3.	Are the displays and menus available easy to understand to use?	For me, it's easy, and the menus are clear so they can be used straight away without having to ask a lot of questions or references
4.	Do you feel that this dashboard meets your specific needs in carrying out daily tasks?	Very, especially because every day I need to monitor the development of this product's business, its appearance and function really make my job easier
5.	What is your level of satisfaction with visual elements such as graphs and tables on the dashboard?	I really like it, it looks modern and pleasing to the eye
6.	Do you feel this dashboard provides relevant and needed information?	The information required is of course very suitable for my daily monitoring needs. If it is relevant from a user perspective, I am quite confident in the data displayed.
7.	Does this system meet the company's needs?	Fulfill the need for assistance from the team and me to monitor progress and retrieve data quickly and effectively
8.	Will you use this dashboard in the future to help with your daily work?	Of course yes, being more efficient and effective will certainly be very helpful for me to continue using

IV. CONCLUSION

Based on research into the design of the SalesMania dashboard web application using web services, it can be concluded that the main focus must be given to user comfort in using the dashboard by designing an optimal UI/UX display. In designing the UI/UX appearance, collaboration is required with access to web services through function declaration and appropriate API service integration. This

aims to create an appropriate interface that suits user needs.

Interface design involves the stage of creating an attractive UI/UX that suits application needs by arranging components based on the planned display design. Next, the logic and functions needed to process the data represented through various visualizations, such as pie charts, bar graphs and tables, are implemented which produce informative and easy-to-read visualizations according to the needs of the data to be presented in the dashboard.

The SalesMania dashboard website application has been tested using the black box testing method and user responses in using this system are considered to meet the company's needs in helping monitor business developments quickly and effectively, so they plan to continue using the dashboard to help with their daily work.

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