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TITLE OF THE PROJECT

DCL CRM-360

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APPROVAL

This Project titled “**DCL CRM-360**”, Submitted by **SHEIKH SHAHINUR RAHMAN SHAWON**, ID No: **181-16-238** to the Department of Computing & Information Systems, Daffodil International University has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computing & Information Systems and approved as to its style and contents. The presentation has been held on- 13-02-2022.

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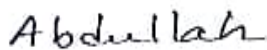
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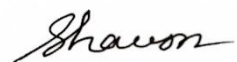
I hereby declare that; this project has been done by me under supervision of **Ms. Nayeema Rahman, Senior Lecturer**, department of Computing and Information System (CIS) of Daffodil International University. I am also declaring that this project or any part of there has never been submitted anywhere else for the award of any educational degree like, B.Sc., M.Sc., Diploma or other qualifications.

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Abstract

DCL CRM-360 is a web-based application that will use to maintain the relationship between the customers and the organization. DCL CRM-360 system will help a company to improve the connection with current customers. This system is able to attract new consumers and regain lost clients. This system is connected to a software system that makes it easier to gather, organize, and manage information about the consumer. Without proper tracking of the relationship with the customer, it will be a little hard process to expand the business or company. This system will help organizations understand more about their consumers, such as who they are and why they purchase your products, as well as buying patterns. This system may potentially give a competitive advantage if it is used effectively.

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Chapter 1 – Introduction

1.1 Introduction

To keep track of a company's connections and maintain the interaction with their customer and the upcoming customers will be able by customer relationship management solution. The concept is simple: establish business relationships to grow your company. The customer relationship management (CRM) solution enables organizations to stay in touch with customers, streamline processes, and boost earnings. Although people start talking of customer relationship management (CRM), people usually mean a CRM system, which is a tool that helps with agent productivity, product management, messaging systems, and many other tasks. (Taylor, 2014) CRM solutions will indeed be used to handle customer relationships across the entire customer journey, including electronic marketing, customer service, sales, and marketing interactions, among other activities. The CRM software enables you to focus on your company's interactions with specific individuals, such as suppliers, colleagues, users who get service, or consumers — by gaining their business, providing support, throughout the course of your relationship with them, and including finding new customers and additional services throughout the lifecycle of the relationship. (Salesforce.com, inc., 2021)

This customer relationship management system (DCL CRM-360) will assist your company in improving the connection with current customers, attracting new consumers, and regaining lost clients. This system is connected to a software system that makes it easier to gather, organize, and manage information about the consumer. This customer relationship management system (DCL CRM-360) may be advantageous to both small and big size enterprises, provided that it is implemented properly. This DCL CRM-360 data will ensure marketing campaign coordination. It's feasible to filter the data so that promotions don't target previous buyers. Businesses may also utilize the data to develop consumer loyalty programs.

1.2 Document Contents

The following chapters will be covered in this document to describe the activities in the project.

Chapter 1: Introduction

The following is a preliminary summary of the DCL CRM-360 system and project.

Chapter 2: Initial Study

In the initial study, the background of a CRM system, a new system need to developed due to which problem and what is the solution of this specific problem I will explain.

Chapter 3: Literature Review

In the literature review chapter, I will explain details about the problem domain that is occurred and the solution for this specific problem. I will also make a comparison between the leading solution that exists for the same problem. I will recommend some approaches for the specific DCL CRM-360 system.

Chapter 4: Methodology

In this section, I will discuss some methodologies that can be used for DCL CRM-360. Then I will recommend a methodology that suits DCL CRM-360 and explain how will I implement it in this project.

Chapter 5: Planning

In the planning section, I will explain the project plan including work breakdown structure, allocation of the resources, create a Gantt chart for this project and create a time boxing.

Chapter 6: Feasibility

The detailed feasibility study of the DCL CRM-360 project and create a cost-benefit analysis for this project will be done in this section

Chapter 7: Foundation

The problem area identification through some data gathering techniques, requirements, and selection of the technology that will be implemented will be covered in this section.

Chapter 8: Exploration

This section will contain the use case and activity diagram of the project and the requirement catalog and also the new system prototype.

Chapter 9: Engineering

In the engineering chapter, the recommended diagram will be included, and the new systems interface design will be added.

Chapter 10: Deployment

Core module development coding sample, the problem breakdown of DCL CRM-360, and the creation of a priority list for this project development will be added in this section.

Chapter 11: Testing

DCL CRM-360 system testing including unit testing, integration testing, and module testing will be done in this section.

Chapter 12: Implementation

All kinds of implementation techniques will be covered in this chapter and the training session will be covered also.

Chapter 13: Critical Appraisal and Evaluation

All appraisal and critical evaluation will be covered in this section.

Chapter 14: Lessons Learned

Which problems I have faced and what I have learned during the project development will be covered.

Chapter 15: Conclusion

In this section, the project summary will be added and the experience will be explained.

Chapter 2 – Initial Study

2.1 Background of the project

Customer relationship management (CRM) term is sometimes misunderstood as a relatively recent idea. While the phrase is new, the practice is as ancient as commerce and money. CRM has become one of those wonderful ideas that ruled the corporate world in the nineties, offering to revolutionize the way businesses of all kinds interact with their consumers forever. It was a long-term process that was better in theory than actuality for a number of reasons. The first was the difficulty and expense of correctly tracking and updating the large number of documents required. Newer software systems and enhanced tracking tools have greatly increased CRM capabilities, allowing the true promise of CRM to be realized. As newer, more customized Internet options reach the market, competition has brought down pricing, allowing even small firms to profit from certain bespoke CRM packages. (Sevak, 2009) Consider what it takes to be a great trader and establish a firm today and you'll see that nothing has changed. 3 things to know about the customer are:

- Your sellers and customers are in the supply chain
- What they intended to purchase or sell
- Finally, what is the location of your buyers and sellers

Accounting has been used for thousands of years to keep track of who owned what and who owed what to whom. Accounting records naturally included names and addresses, the oldest form of a customer database. Early segmentation would have been based on personal wealth and capacity to pay. The notion of CRM has been around for a long time; it's how successful organizations, governments, and nations came to be. (Salesforce.com, inc., 2022)

DCL CRM-360 system will help a company to improve the connection with current customers, attract new consumers, and regain lost clients. This system is connected to a software system that makes it easier to gather, organize, and manage information about the consumer because, without proper tracking of the relationship with the customer, it will be a little hard process to expand the business or company.

2.2 Problem Area

Since I did the internship program, I heard many business problems and made a solution at this time. One day a client says he is facing some problems in his business. He has not been able to properly store his customer information, which has made him unable to distinguish between old and new customers. As a result, he has begun to lose his customers. Also, he is not able to do all the work of his business in an organized way. As a result, he is not getting the expected profit of his business. After hearing these problems of our client, we define those problems as:

- Lack of learning about the customer.
- Unable to organize and automate the business efficiently.
- Lack of optimization of the customer interaction.

Lack of learning about the customer: One of the basic needs to run a business is learning about the customers, such as who they are and why they purchase your products, as well as buying patterns. As a result, organizations are better able to anticipate and meet the demands of their consumers. But lacking to learn about the customer may turn the business into a non-profitable business.

Unable to organize and automate the business efficiently: To run a business properly, it is very important to organize and maintain certain aspects efficiently. Also automating the business aspects is really important to make business more efficient. Any firm may benefit from a wide range of data, ranging from the sales process to marketing campaigns and business analytics. Without proper organizing, maintaining, and automating it's a tough process to move forward the business.

Lack of optimization of the customer interaction: The main motive of a business is customer satisfaction. If the owner cannot make the customer satisfied, it is a threat to the business. To make the customer satisfied, the easiest way is to optimize the interaction of the customer. Without the proper process of customer interaction through simplifying and streamlining, it's quite tough to run the business.

2.3 Possible Solution

After defining the problem, we decide to make a customer relationship management system. We recommend that the client include customer relationship management (CRM) into their strategy before the number of customers necessitates the use of a CRM platform. Customer relationship management solutions may help small businesses and even freelancers.

This customer relationship management (DCL CRM-360) solution will support businesses in learning more as regards their customers, such as who the customer is and why the customer is purchasing your products, while also buying patterns. If Customer relationship management is deployed successfully, it has the potential to provide a competitive advantage. Customer data that has been properly categorized allows businesses to identify the most appropriate receivers for promotions and new goods. Customer relationship management allows for the organization and automation of various aspects of a business.

DCL CRM-360 streamlines and manages a broad range of company processes, from sales to marketing strategies and marketing statistics, along with customer data management. In turn, this enables firms to structure their operations into data that is simpler and easier to interpret. DCL CRM-360 software enables firms to maximize the effectiveness of their client relationships. Customer relationship management improves by automating and modernizing one of the most difficult customer engagement activities. This can lead to an increase in the satisfaction of the customer.

Accessible 24 hours a day and 7 days a week, your websites should have product information, use instructions, and technical support. Create a service plan for each client based on their specific needs and expectations, and then figure out how to meet those needs and expectations. Make follow-up sales calls to analyze cognitional variance after the purchase, as well as the likelihood of repurchases, repurchase timeframes, and buyback frequencies. (Kulpa, 2017)

Chapter 3 – Literature Review

Research papers, books, and other materials related to a certain topic or field of study are all included in a literature review, which serves as a summary and critical assessment of the sources examined. When writing a literature review, it is important to show your readers how your research fits into the greater context of the subject matter you are writing about. It's a good way to see how different pieces of work fit into the bigger picture of the research question under consideration. It's a term used to express how one piece of art compares to the others being discussed. Essentially, it finds fresh angles through which to view previous work. (Fink, 2014) A literature review provides a broad overview of a particular subject for system development purposes. A project's literature study aids in the discovery of issues and potential solutions. With the aid of this part, researchers may discuss their findings and draw comparisons in the same field, which is essential to a successful system.

3.1 Discussion on problem domain

When it comes to running a successful company, it's essential to understand as much as you can about your consumers, including their demographics and why they buy your items. As a consequence, organizations are better able to anticipate and meet the demands of their consumers. Inadequate customer knowledge may, however, result in a loss of revenue. In order to manage a firm effectively, some components must be organized and maintained correctly. In addition, automating corporate processes is critical to boosting productivity. There is a vast spectrum of data that may be used by every company, from sales to marketing to business analytics. It's difficult to go ahead with a firm if it lacks sufficient organization, maintenance, and automation. The primary goal of every firm is to keep its customers happy. Customers who aren't content with their service are a danger to the firm. Optimizing customer contact is the quickest and most effective strategy to ensure client satisfaction. It's difficult to manage a firm without refining and simplifying the client engagement process. To find out if key customer information is missing from a data file when it is opened by an owner. There are gaps in the data. His customers cannot be reached due to the fact that he does not have an authentic email address or phone number through which to

contact them. You get a lot of hard bounces when he sends out a corporate newsletter to the email addresses (bad email addresses). Old data from many years ago show up in your system, indicating the existence of firms that have since closed or changed their name. Stale data is clogging up your company's database. Because you're targeting the same group of customers, revenues at your firm have remained flat. There aren't enough fresh leads coming in for the business. (Salihi, 2021)

- Keeping consumers satisfied is the number one priority of any business enterprise. Customers that are dissatisfied with their service pose a threat to the company. When it comes to ensuring customer happiness, optimizing customer interaction is the most efficient and successful technique. Maintaining control of a company while improving and streamlining the client interaction process is challenging work. Expectations for client service are quite high. Sadly, it's all too common for a small business to neglect the necessity of providing excellent customer service to both new and current clients. Offering several ways to get in touch with a company isn't enough; a successful company treats each customer and client with respect and individuality while also responding promptly and courteously.
- Using a general strategy will fail miserably, but if you don't have quick access to prior contacts with consumers, you run the risk of alienating them. Employees in the sales department may stumble and customer service representatives may appear dumb if a customer calls or emails about a previously stated problem only to discover that there is no record of this. Clients will believe that they are being treated as an afterthought if your follow-up message and marketing materials aren't tailored to meet their specific requirements or interests.
- Messy, poorly managed data may be a major problem for organizations. When you need to find critical sales data but must go through hundreds of different papers, charts, and spreadsheets, this may become a major problem. You should be able to phone, text, or email all of your clients, leads, and future customers from one central spot. Logs of prior contacts with that contact may be accessed easily, and customers' purchase histories can be used to answer any questions or issues they may have. You should be able to build bespoke reports with graphs, visual aids, and other charts based on your sales and marketing data in real-time. (Turner, 2019)

3.2 Discussion on problem solutions

To get rid of the above problems, customer relationship management is the best solution. CRM solutions allow you to standardize the processes of different jobs and assignments. When everyone in the company is known about how to do certain work and input specific data into the system, there is less percentage for error and more percentage for productivity. Work will go more smoothly if staff know what to relate to one another and from the CRM.

- With the DCL CRM-360 system, you'll be able to access all of your data in one place and discover it when you need it. Without client-focused tools and features, it might be difficult to deliver excellent customer service. As a result, the DCL CRM-360 systems will provide a wide range of service options. It's simple to locate the DCL CRM-360s with a strong emphasis on customer service since they've been built for certain sectors or purposes. Consolidating customer data from a variety of sources and using it to estimate future sales is one of the DCL CRM-360's biggest business solutions.
- The DCL CRM-360 may help your organization prepare for future development by analyzing historical sales patterns and habits, as well as predicting sales income. This is a must-have feature for every enterprise-level company.
- As a company, social media presence and awareness are critical. If you've been looking for the right tools to keep tabs on the social media landscape, look no further. For social media administration and marketing, the DCL CRM-360 systems will provide a wide range of options to choose from. Schedule posts, track rivals, and more are all at your fingertips. You may be able to discover a solution that places a greater emphasis on social skills than on sales or customer service, depending on your specific requirements.
- The DCL CRM-360 is a terrific tool for keeping in touch with current and future clients and prospects. From a single spot, you can reach out to all of your contacts via phone, text message, or email. Any prior correspondence with that contact or a customer's previous purchases may be accessed quickly to answer any queries or issues they may have. Responding through social media message platforms is a common feature of many CRMs. (Turner, 2019)
- Customers are better understood through the use of a customer relationship management system, which helps businesses learn more about their customers, including who they are

and why they buy your products, as well as patterns in their purchasing histories. Customer relationship management (DCL CRM-360) has the potential to provide a competitive advantage if it is implemented properly. Customer data that has been properly classified enables businesses to identify the most appropriate recipients for promotional offers and new product introductions.

- A company's ability to organize and automate certain aspects of its operations is made possible through the use of customer relationship management software. The DCL CRM-360 simplifies and automates a wide range of corporate activities, from sales procedures to marketing campaigns and business analytics, as well as the management of customer information. CRM is becoming increasingly popular among businesses of all sizes. Companies can then organize their operations into data that is simpler to understand and interpret as a result of these advancements.
- The use of customer relationship management software allows businesses to maximize the effectiveness of their client relationships. By streamlining and simplifying many of the more complicated customer engagement activities, customer relationship management (CRM) helps businesses increase their customer satisfaction scores. You should make your websites available seven days a week and twenty-four hours a day, seven days a week. Your websites should include product information, use instructions, and technical support information.
- Identify and develop a service plan for each client that is tailored to their specific requirements and expectations, and then determine how to meet those requirements and expectations. After the sale, make follow-up sales calls to assess cognitional variance, the likelihood of re-purchases, the timeline for re-purchases, and the frequency with which customers buy back their products. (Kulpa, 2017)

3.3 Comparison among the leading solutions

The process of comparing two or more items involves identifying the important, comparable features of each and then deciding which characteristics of one are similar to the other, which characteristics are different, and to what degree they vary. It may therefore be determined which

item is better suited for a certain function by looking at the variations in attributes between them. (Wikipedia, 2021)

Comparison is mandatory to create a software solution suitable for a problem because comparing a software solution that is already ready for that particular problem is effective or not or needs to consider its pros and cons so that a solution can create with the previous pros and can reduce the cons.

Note: Since I did the internship program under DCL (Daffodil Computers Limited), our tech leader do this comparison, and he didn't tell me anything about this comparison.

3.4 Recommended Approach

In fact, nothing is perfect, some imperfection remains. I or my system is not exceptional. So, here are some recommended things to make the system more user friendly and reliable:

- Improve the lead management so that it can determine the high-quality leads.
- Make the process of the dashboard's data chart and graph more user-friendly.
- The report generation process makes it easier.
- Sales forecasting should be more dynamic.
- Files sync and share function should be added.
- Call service integration takes the system to another level
- Added more security in role-based views
- More customization settings should be added.

Chapter 4 – Methodology

The term "software development methodology" refers to the systematic methods that must be followed while working on a project in software development. Combining design theory with practical realities has been done since the creation of computers. The creation of software should be addressed in a systematic manner. The use of a software development process is now widely accepted by IT businesses. When it comes to getting the most out of a team, structure, standards, and objectives are all factors to consider. Various software development approaches might be used for different tasks. I can't emphasize this enough: picking and sticking to a software development process is critical. When you take the software development process for granted, you're incurring a number of risks. Customers' ever-changing demands, compounded by omissions or misunderstandings, maybe a source of frustration for engineers without clear direction. As a result, the software is subjected to repeated revisions without enough consideration of the project's long-term effects. (Nikolaieva, 2018)

4.1 What to use

It is important to note that software development approaches play a significant influence in the software development process. Software development methodologies that are well-known to every software developer are joint application development model (JAD), an agile software development model, prototype model, dynamic systems development model (DSDM), waterfall model, rapid application development model (RAD), etc. Now it's time to know the advantages and disadvantages of the above models and I will explain 3 of them.

Waterfall Model

One of the software development methodologies, the waterfall model is that follows a sequential or linear process. Phases are the highest-level grouping of jobs that make up the project's breakdown. For a waterfall model to work, stages must be completed sequentially and with clear exit conditions, such as the agreement of all project participants. With the waterfall model, each phase comprises a list of activities with associated documents and exit criteria for each stage. When

working on large-scale IT projects, bigger organizations often necessitate the implementation of SDLC methodology products. As a result, Software Information Company's use a similar strategy while developing IT applications for their clients, as the resources, scope, budget, and outputs of the project must all be carefully handled. (Sherman, 2015)

The several phases of the Waterfall Model are shown in the following diagram:

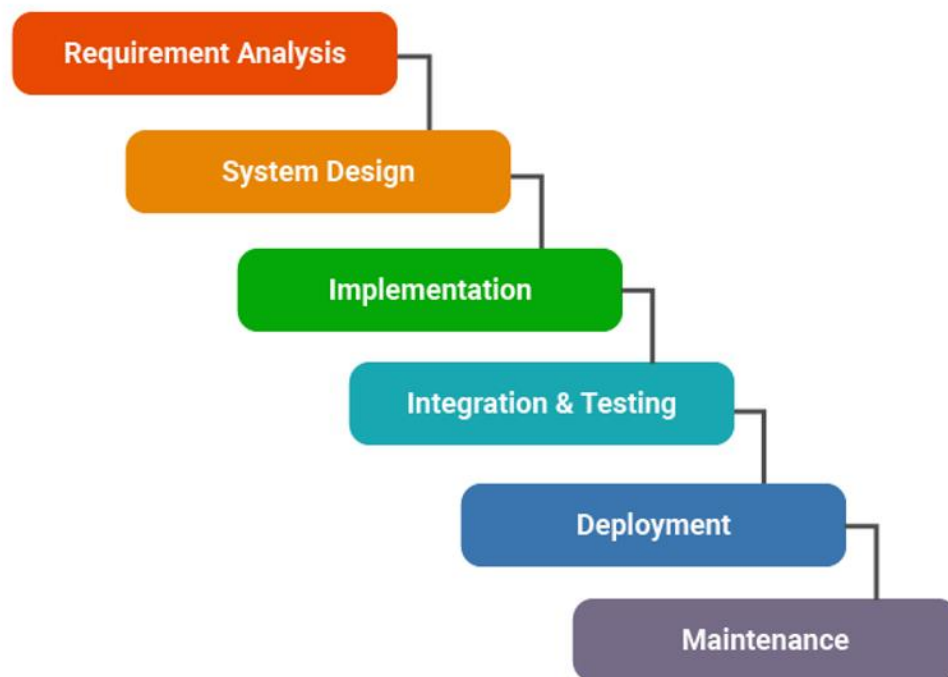


Figure 1: Waterfall Model

Advantages of Waterfall Model

- In order to properly describe the overall scope of the project, construct a comprehensive timeline, and design the overall application, the team must first finish all of the project's requirements.
- Because activities may be divided into many groups to be worked on simultaneously or grouped together to maximize the use of resources, it optimizes resource utilization.

- Having a thorough grasp of all the requirements and objectives results in a more effective application design.
- Having a detailed timetable and resource allocation makes it easier to assess the current state of a project. (Sherman, 2015)

Disadvantages of Waterfall Model

- It is generally difficult, especially in Business Implementation, as comprehensive business requirements need to gather early in a project, since company owners have not thoroughly considered what they require, and business requirements may change over the project of the owner.
- A precise explanation of the business integration application's duties and deliverables is necessary, and this may be beyond the project team's capabilities or expertise at its inception.
- As a result of the "big bang" strategy, waterfall projects are sometimes spread across many months or quarters, even though this isn't a need fundamentally associated with waterfall projects. Project delays, overspending, and failure to fulfill objectives are more likely as the timeline for an IT project dramatically expands. (Sherman, 2015)

Dynamic System Development Method (DSDM)

A paradigm for iterative Agile software development known as the Dynamic Systems Development Methodology (DSDM) has developed. All projects are evaluated in terms of how well they are in line with the company's strategic objectives and how quickly they can offer value to its members and other stakeholders. It's an iterative, evolving process that's heavily influenced by the Rapid Application Development (RAD) paradigm. (Indeed Editorial Team, 2021)

The several phases of the DSDM methodology are shown in the following diagram:

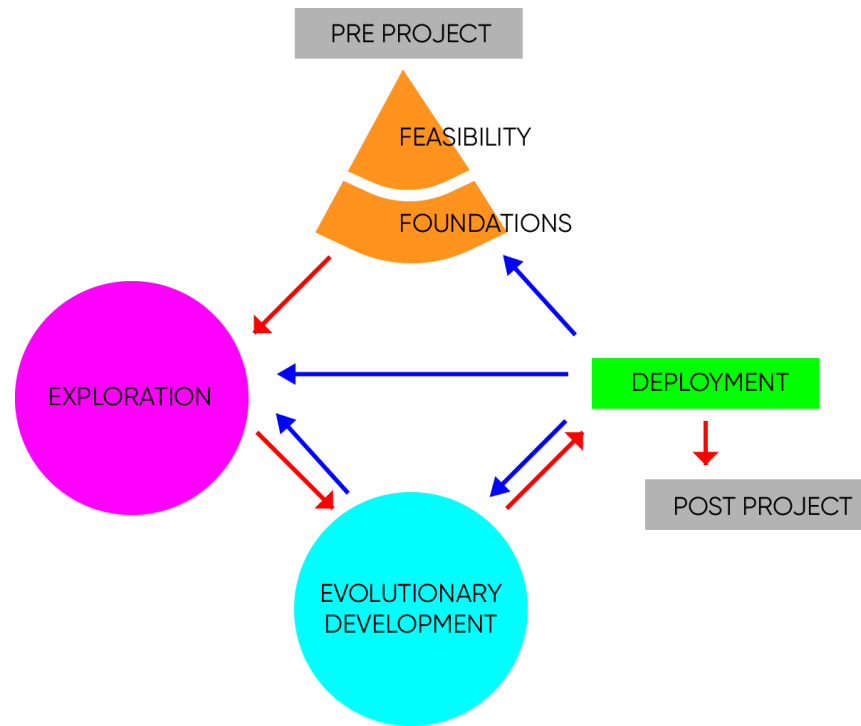


Figure 2: DSDM Methodology

Advantages of DSDM Methodology

- With a flexible process, you can meet project deadlines while still maintaining quality.
- Everyone in the company may see where the project is at any given time.
- Prioritizing business cases in the DSDM model ensures that any initiatives delivered by DSDM are vital to the company.
- You have the ability to provide proper product functionality quickly.
- Access to end-users is a breeze for developers.
- Costs are more easily controlled, allowing the project to go swiftly and efficiently. (Indeed Editorial Team, 2021)

Disadvantages of DSDM Methodology

- Management costs might be rather high at times.
- Small businesses may not be able to afford the installation costs.
- DSDM discourages developers from expressing their own originality.

- Even if more advanced alternatives are available, projects adhere to a set standard. (Indeed Editorial Team, 2021)

Rapid Application Development Methodology

In respect of a following precise plan, rapid application development is much better because of its emphasis technique on the current solution and the input of the user. This methodology is mainly an agile software development method. That's why this methodology prioritizes fast prototyping more than time-consuming planning. Most of the time many people think that it is an individual method but it's not. The idea gained by treating software projects more like clay than steel, which is how traditional development methodologies now manage them is known as rapid application development. (Idesis, 2020)

The several phases of the RAD methodology are shown in the following diagram:

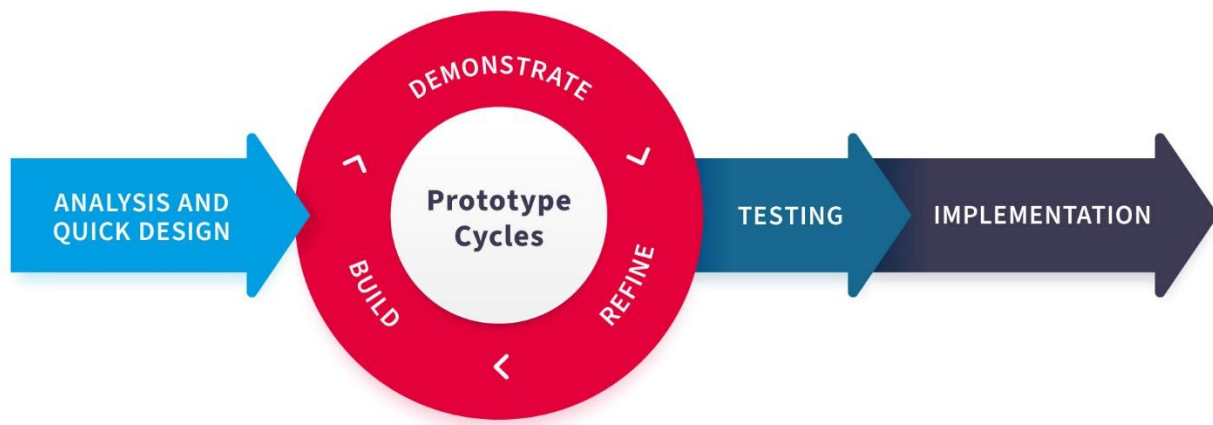


Figure 3: RAD Methodology

Advantages of RAD Methodology

- Requirements are always subject to change.
- The company values and encourages customers to provide comments.

- Reaction times for reviews are lightning-fast.
- The time it takes to create a new feature is reduced by half.
- More output with a smaller workforce. (Kissflow Inc., 2021)

Disadvantages of RAD Methodology

- Requires great teamwork.
- Unable to work in huge groups.
- Requires a team of highly qualified programmers.
- Throughout the product's lifespan, it is necessary to consider the needs of its users.
- It's only appropriate for short-term tasks. (Kissflow Inc., 2021)

Choosing Methodology

I've opted to use the DSDM approach for the Customer Relationship Management project because of the aforementioned considerations. For the Customer Relationship Management project, DSDM will be the best and most appropriate alternative since The DSDM technique constantly delivers high-quality products and delivers those products on time. The DSDM technique is incredibly adaptable for use in any company or business organization. During the development of a project, the client or customer might adjust their requirements if they believe they are necessary.

4.2 Why to use

If the system is going to achieve the deadline and budget, it must adhere to a set of procedures. By following a set of tried-and-true methods, a methodology aids in the accomplishment of a project's primary objectives. Despite the fact that selecting the ideal approach for an academic project of this kind is quite difficult, it will significantly aid in the completion of the project and the delivery of its results.

4.3 Sections of Methodology

Because of DSDM's iterative structure, business representatives can see the solution as it progresses, offer feedback, then ask for modifications during the solution's development. One of the DSDM lifecycle concepts is "Focus on the Business Requirement," which begins in the pre-project phase and ensures that projects are associated with organizational goals. DSDM stages are described below, along with how they relate to one another. The three steps of the DSDM approach are as follows:

Pre-Project Phase: During the Pre-Project Phase, a number of projects are considered, and one is ultimately selected. Also at this phase, an estimate of the project's funding requirements is produced and it is determined whether or not the project will be implemented.

Project lifecycle Phase: The management of the project outlined in the Pre-Project phase is the goal of this phase. The sub-phases has been broken down from this phase:

- **Feasibility study:** The purpose of these sessions is to come up with concepts related to project management, rather than the actual project. To produce a feasibility report, the answers to these questions will be used to guide the project's development, evaluate its expenses, and adapt it to the DSDM model.
- **Study of the business:** There are two parts to the analysis of the business: First, there is a document that examines the business's flexibility, which can only be achieved if the project is designed using DSDM. Here, we will strive to identify the project's characteristics and user expectations. At the conclusion of the research, a list of criteria will be compiled, and these requirements will be ranked in order of importance for the creation of the others.
- **Iteration of the functional model:** Requirements defined in earlier rounds are gathered and translated into Functional Models throughout this iteration of the functional model. So that the user may see how an application will operate, functional prototypes of the requirements are built. This fulfills principle number one. The effectiveness of functional prototypes is evaluated and validated by different groups of end-users.
- **Iteration of design and development (Design & Build Iteration):** As part of the Design & Build Iteration phase, the goal is to turn the functional models created in the preceding

phase into complete, user-satisfying products. To achieve this, we'll construct design prototypes, and we'll test them out with users like in the prior step.

- **Implementation:** Lastly, in the implementation phase, when the prototypes have been tested by the intended users, the implementation and training of the future users are carried out.

Post-Project Phase: In the post-project phase, it's checked to see sure everything functions as it should. During this time, maintenance and software upgrades are necessary. This stage usually takes place six months after the project has been delivered to the customer. (Sixsigma, 2021)

4.4 Implementation Plans

The project's final stage, in which the finished application is made available for public use. Once a problem with the new system is discovered and fixed, the new system should be made available for use. In this section, the release criteria, configurations, and strategies are decided. After this, if all goes well, the new system is put into place and tested.

Chapter 5 – Planning

5.1 Project Plan

The project's execution and control stages are defined by a set of formal documents which is known as a project plan. Risk management, resource management, and communication are all part of the strategy, which also addresses the project's overall scope, cost, and timeline. To ensure that your project runs well and that risks and difficulties are minimized, it is essential to go through the project planning process before you begin any work on the actual implementation of the project. Each and every aspect of your project is covered in great depth in these project management papers. (Project Manager, 2015) Project planning will help everyone who is participating in the project including the project manager and his team. Setting goals, reducing risks, avoiding missed deadlines, and delivering the accepted product, technical support, or solution, among other things, all required things will be completed through planning. In general, project plans, including work breakdown structure, time boxing, and a Gantt chart, will be discussed in this section. The following are some of them:

5.1.1 Management Plan / Work Breakdown Structure (WBS)

A project's activities are organized in a hierarchical structure is known as WBS (Work Breakdown Structure). The WBS "breaks down" a project's structure into smaller, more manageable components. If the project requires it, tasks may be split down further into subtasks for each delivery. A component of project lifecycle management that divides large, complex projects into small pieces, quite manageable parts that may be outsourced to specific persons or teams is known as work breakdown structure (WBS). (Mong, 2020) As a result, the DCL CRM-360 system has been divided into categories and subcategories in the work breakdown structure (WBS) as shown in the chart below:

	Task Name	Duration	Start	End
1	Introduction	7 days	8-Sep-2021	15-Sep-2021
2	Initial Study	4 days	16-Sep-2021	20-Sep-2021
3	Literature Review	6 days	21-Sep-2021	27-Sep-2021
4	Methodology	6 days	28-Sep-2021	4-Oct-2021
5	Planning	7 days	5-Oct-2021	12-Oct-2021
6	Feasibility	8 days	13-Oct-2021	21-Oct-2021
7	Foundation	4 days	22-Oct-2021	26-Oct-2021
8	Exploration	14 days	27-Oct-2021	10-Nov-2021
9	Engineering	35 days	11-Nov-2021	16-Dec-2021
10	Deployment	16 days	17-Dec-2021	2-Jan-2022
11	Testing	7 days	3-Jan-2022	10-Jan-2022
12	Implementation	5 days	11-Jan-2022	16-Jan-2022
13	Critical Appraisal and Evaluation	4 days	17-Jan-2022	21-Jan-2022
14	Lessons Learned	4 days	22-Jan-2022	26-Jan-2022
15	Conclusion	1 days	27-Jan-2022	28-Jan-2022
	Total	128 Days		

Table 1: Work Breakdown Structure of CRM

5.1.2 Resource Allocation

When a process of allocating the best available resources to tasks and projects is called as resource allocation. In order to prevent under or overuse, it monitors workloads. People are then reallocated, if necessary, in accordance with the present availability of resources and the timescales of the project. Resources in the company will be helped to make the most of their potential via this initiative. That's because when done correctly, it may increase both consumer and staff happiness. (Dopson, 2020) The DCL CRM-360 project's resource allocation is as follows in order to satisfy the pre-scheduled project delivery schedule:

	Task	Duration	Resource
1	Introduction	7 days	Analyst, User
2	Initial Study	4 days	Analyst
3	Literature Review	6 days	Analyst, Team Leader
4	Methodology	6 days	Analyst, Developer
5	Planning	7 days	Analyst, Developer, Team Leader, Designer
6	Feasibility	8 days	Analyst, Team Leader
7	Foundation	4 days	Analyst, Designer, Developer
8	Exploration	14 days	Analyst, Designer, Developer
9	Engineering	35 days	Designer, Developer
10	Deployment	16 days	Analyst, Developer
11	Testing	7 days	Developer, Designer, User, Tester
12	Implementation	5 days	Developer, Analyst, User
13	Critical Appraisal and Evaluation	4 days	Analyst, Developer, Tester
14	Lessons Learned	4 days	User, Analyst, Developer
15	Conclusion	1 days	Analyst

Table 2: Resource Allocation List

5.1.3 Time Boxing

When a well-defined deliverable must be delivered within the allocated time and resources, the term "timebox" is used. Deliverables have a specified timeframe and cannot be extended. A timebox differs from conventional progress control in that the scope of the deliverable is one of the variables in project management when a timebox is used. Quality, on the other hand, is always constant. It is essential that the project manager constantly evaluates the trade-offs between the scope and quality of deliverables and the deadline for completion of the task. The timebox cannot be reached if the deliverable's scope and/or quality cannot be further decreased.

Timebox	Task	Resource
TB1	Introduction	Analyst, User
	Initial Study	Analyst
	Literature Review	Analyst, Team Leader
TB2	Methodology	Analyst, Developer
	Planning	Analyst, Developer, Team Leader, Designer
	Feasibility	Analyst, Team Leader
TB3	Foundation	Analyst, Designer, Developer
TB4	Exploration	Analyst, Designer, Developer
	Engineering	Designer, Developer
TB5	Deployment	Analyst, Developer
	Testing	Developer, Designer, User, Tester
TB6	Implementation	Developer, Analyst, User
TB7	Critical Appraisal and Evaluation	Analyst, Developer, Tester
	Lessons Learned	User, Analyst, Developer
TB8	Conclusion	Analyst

Table 3: List of the Time Boxes

5.1.4 Gantt Chart

In project management, if it is a complicated project then the Gantt chart will be the beneficiary for completing the project. All the projects with different sizes can be completed easily with the Gantt chart because it will help by scheduling and planning. All kinds of scheduling and dependencies along with the deadlines for every step of the system and the start dates and end dates of each task indicate that in every stage how much the work will be accomplished will be shown through a horizontal bar. At the time of scope changes of a project will be tracked by the Gantt chart, when it's time to work with various stakeholders or a big team. The Gantt Chart for this DCL CRM-360 is given below:

DCL CRM-360 Gantt Chart

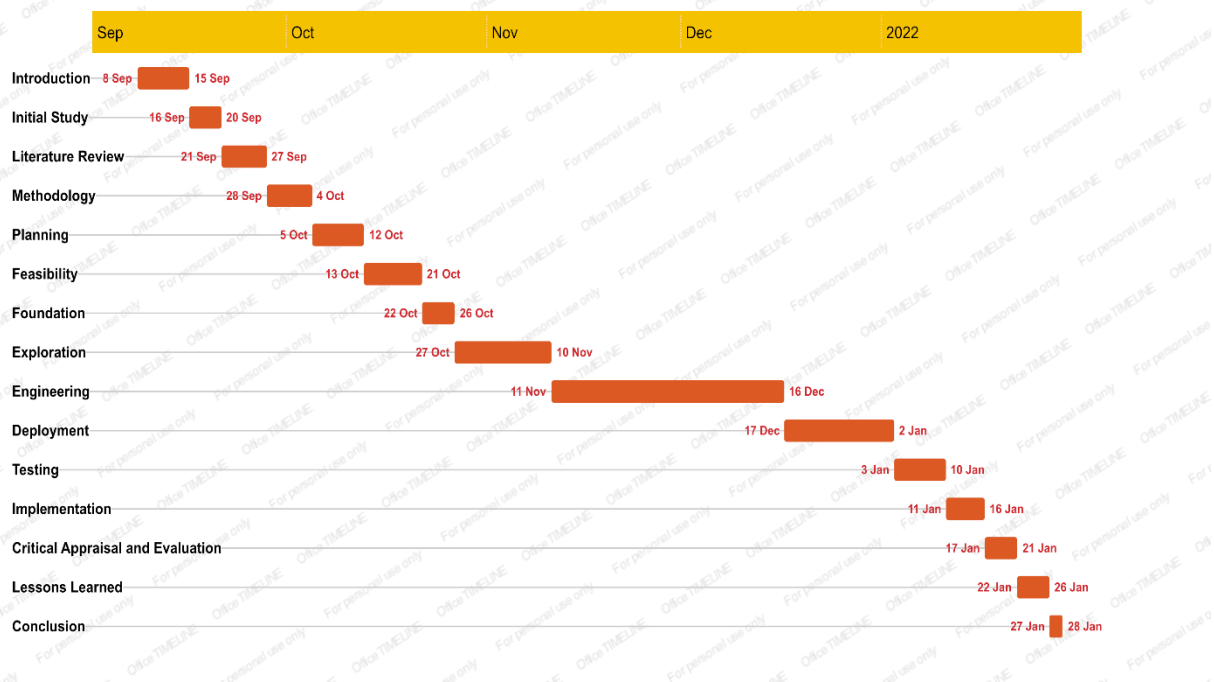


Figure 4: Gantt Chart

Chapter 6 – Feasibility

All the relevant aspects of a project including technical, scheduling issues, legal, and economics are taken into consideration for the completion of the project successfully and the feasibility study measures the possibility of this successful completion. One of the many criteria including the return of investment (ROI) and cost determine the viability of a project that measures the project either earned sufficient income from the customers or it will fail to sell the product to customers. Project financial advantages and initiatives to quantify are not only concerning matters for a feasibility study. To put it another way, the definition of "feasible" differs by industry and the final purpose of the project. (THE INVESTOPEDIA TEAM, 2021)

6.1 All Possible Types of Feasibility

6.1.1 Operational Feasibility

How successfully a suggested system handles issues, fits the needs identified during the systems project scope statement, and exploits opportunities determines by the proposed system's operational feasibility. The willingness of the organization to employ the recommended system is assessed. This is perhaps the most difficult to assess. To assess the project's viability, management must commit to it. If management requested it, it is likely to be approved and utilized. But it is also vital that the employee base accepts the change. (ogbebor, 2011) Because operational feasibility is always concerned about the DCL CRM-360's required functionalities, the proper verification, and validation of DCL CRM-360's user inputs, make them ease-of-use along with navigation system need to make easy and smooth, request option should be easier and increase the usability of DCL CRM-360 and location-based searching for the proposed system will make the DCL CRM-360 system effortless and easier to use.

6.1.2 Technical Feasibility

A significant portion of identifying resources involves determining technical feasibility. It calculates the technological requirements of the proposed project. The organization's technical capabilities are then compared to the technical requirements. The systems project is considered technically feasible if the existing technological competence is sufficient to meet the project requirements. If current technology resources may be updated or enhanced to satisfy the needs of the application under consideration, the analyst must do so. This is where system analysts' experience and relationships with suppliers come in helpful, as they can respond to the technical feasibility question based on previous experiences and contacts with vendors. (ogbebor, 2011)

Technical feasibility testing demonstrates that users of CRM can manage their activities more readily than they could with the old manual procedure. The system is built and developed utilizing cutting-edge web technologies, ensuring that it is compatible with any web browser that supports a connection to the internet at a low level. To guarantee that application data is accessible safely, the system implements a strong authentication architecture. The web-based application is an acceptable and cost-effective software platform and resources, ensuring that it is technically acceptable and more importantly this application is independent in concerning the platform. Therefore, in the context of this DCL CRM-360 project, the technological aspects are as follows:

1. Hardware:

- ❖ Wi-fi Router
- ❖ HP laptop

2. Software:

- Xampp
- MS Word
- Google Sheets
- Google Chrome Browser
- Mozilla Firefox
- Windows 10 OS
- PHP Strom

3. Database:

 MySQL

4. Technology:

4.1 Client Side:

- HTML
- CSS
- Bootstrap
- JavaScript
- Ajax
- jQuery

4.2 Server Side:

❖ PHP

6.1.3 Economic Feasibility

A project's economic feasibility is determined by doing a cost-benefit analysis of the plan under consideration. This word refers to a systematic and impartial evaluation of a project's SWOT (Strength, weakness, opportunity, and threat) analysis including the resources required to execute the project and a prediction of the project's success. Technical and strategic analysis are all included in this process. (Krzewińska, 2017)

Cost of a Web-based Application

It is possible to access a web-based application through an HTTP network connection rather than directly from the device's memory. A web browser is widely used to execute web-based software. In a web-based application, also identified as a client-based application, a small amount of the program is loaded to a user's computer and performed on an external server.

Equipment	Cost Per Unit	Cost
Internet	2,000(Per month)	2,000
Desktop/ Laptop (core i7, 1.60 GHz up to 3.40 GHz, 16GB DDR4 RAM, HDD, SSD)	1,57,000	1,57,000
Domain, Hosting and email service	13,500(Per month)	13,500
Total	1,72,500	1,72,500

Table 4: Cost of a Web-based Application

Cost of a Desktop Application

A desktop application is a piece of software that a person may use to do certain activities on their own personal computer. A word processor and a music player are examples of multi-purpose desktop programs, whereas gaming apps exist just to provide entertainment.

Equipment	Cost Per Unit	Cost
Desktop/ Laptop (core i7, 1.60 GHz up to 3.40 GHz, 16GB DDR4 RAM, HDD, SSD)	1,57,000	1,57,000
File, Web and Email servers	13,500(Per month)	13,500
Total	1,70,500	1,70,500

Table 5: Cost of a Desktop Application

Cost of a Mobile Application

A mobile application is a computer program that runs on a mobile device like a smartwatch, tablet, or phone is called a mobile application. Many applications need the Internet. Digital distribution systems allow users to download apps from app stores.

Equipment	Cost Per Unit	Cost
Mobile (6 GB RAM, 64 GB ROM)	30,000	30,000
File, Web and Email servers	13,500(Per month)	13,500
Total	43,500	43,500

Table 6: Cost of a Mobile Application

6.2 Cost-Benefit Analysis

The method or functionality for companies to choose which actions need to take and which to avoid is called cost-benefit analysis. The cost-benefit analyst adds up all the possible benefits of a condition and then subtracts all the costs of taking that action. These models are also used by consultants and analysts to put a dollar value on things that can't be seen, like the costs and benefits of living in a certain city or town. (HAYES, 2021) The estimated income and costs for the next five years are shown below:

Cost in total

Serial No.	Equipment Cost	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	Cost in total
1	Web-based Application	₹1,17,000					₹1,17,000
2	Email, Domain & Hosting	₹18,000	₹18,000	₹18,000	₹18,000	₹18,000	₹90,000
3	Mobile-based Application	₹1,02,000					₹1,02,000
4	Desktop-based Application	₹1,25,000					₹1,25,000
5	Maintenance	₹50,000	₹50,000	₹50,000	₹50,000	₹50,000	₹1,50,000
6	Staff Expenses	₹30,000	₹30,000	₹30,000	₹30,000	₹30,000	₹1,40,000
Total		₹4,42,000	₹98,000	₹98,000	₹98,000	₹98,000	₹9,34,000

Table 7: Total Cost Estimation for the project**Earnings in total**

Serial No.	Sector of earning	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	Earning in total
1	Software Selling	₹2,20,000	₹2,90,000	₹3,60,000	₹4,30,000	₹5,00,000	₹18,05,000
	Total	₹2,20,000	₹2,90,000	₹3,60,000	₹4,30,000	₹5,00,000	₹18,05,000

Table 8: Earning estimation for the project

Revenue in total

Serial No.	Revenue sector	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	Revenue in total
1	Earning	₳2,20,000	₳2,90,000	₳3,60,000	₳4,30,000	₳5,00,000	₳18,05,000
2	Cost	₳4,42,000	₳95,000	₳95,000	₳95,000	₳95,000	₳9,34,000
	Total Revenue	- ₳2,22,000	₳1,95,000	₳2,65,000	₳3,35,000	₳4,05,000	8,71,000tk

Table 9: Estimated Revenue on a Five-year scale

As a result, it is apparent that by promoting this method, the organization would be able to collect a large number of taka in income each year. Each year, the revenue will be raised. As a result, this initiative makes beneficial the organization.

Market Research Based on CRM Software

There is an incorporated version of this market research in the CRM system, which is based on customer data. All of this information is available to the whole business, regardless of whatever department it comes from. Validation ensures that no one outside of the department with access privileges may view the secret data. Customers' late payment notices, for example, should only be available to the finance department and not to the customer service departments. The CRM system has all of the data, but it's connected and personalized in a manner that's both efficient and effective. Customer Relationship Management in the United States At the end of 2020, the market was valued at USD 8,871.71 million, and by 2027, it is predicted to have grown to USD 10,066.57 million, with a CAGR of 10.39 percent. The research includes market size and forecasts for USD, EUR, GBP, JPY, and AUD in five main currencies. When money exchange data is easily accessible, business executives may make better judgments. The years 2018 and 2019 are used as baselines, 2020 is used as an estimated year, and the forecast period spans the years 2022 through 2027. (Market Researcher, 2022)

6.3 Is DSDM Good or Bad for this Project

The DCL CRM (Customer Relationship Management)-360 is a client-oriented solution along with an academic project that must be completed in a short period of time with all fundamental functions. Because it's such a large undertaking, the requirements for this project may change from time to time. As a result, any approach used must be flexible enough to adapt to new circumstances. As a result, it should be refined over a series of iterations. In order to keep the development process iterative, DSDM implements a set of rigid rules and guidelines. DSDM will assist in meeting corporate objectives and bringing tangible advantages to the organization. The characteristics and quality of the project are generally fixed in the conventional approach of project management. It will thus resolve the deadlines, quality criteria, and costs, and instead, emphasize the features of the product. Since it's a big project, DSDM has the ability to work with a wide range of problem-solving activities appropriately. DSDM gives developers access to the end-user. So, it is clear that for the DCL CRM-360 system, DSDM methodology is the best approach.

Chapter 7 – Foundation

7.1 The Problem Area Identification

Maximum software is built depending on a problem. So, it is necessary to identify the actual problem to build usable software. Without knowing the actual problem, it's won't possible to make an accurate solution. That's why problem area identification is a major thing to build a system. In this area, users help the software company by giving information. Since the user will use a solution and he knows for which problem they need this specific solution, his information will be more appropriate for building up the solution. There are many options to identify the problem. Two of them is given which is used to make this solution:

7.1.1 Interview

The interview is a process where two-person or more talk face-to-face about a specific problem or a solution. It's one of the best problem identification techniques.

7.1.2 Questionnaires

The questionnaire is another data-gathering technique. It's a kind of interview called a written interview. In this process, interviewers have a set of questions to get the information from the user.

Note: This problem area identification portion has been completed by the analyst of DCL and the user. Since I did the internship program under DCL (Daffodil Computers Limited), I am informed just about the used technique.

7.2 Overall Requirement List

The requirement's list is mainly divided into two parts:

- I. Functional Requirements
- II. Non-Functional Requirements

7.2.1 Functional Requirements

The Functional Requirement (FR) describes the service that a piece of software must provide. A software system or a piece of it is described in this way. The software system's behavior and outputs are all that a function is. Expressed in different words, it makes no difference what sort of function a system does as long as it can perform computing, process data, or communicate with humans. In software engineering, the functional specification is another form of functional requirement. (Martin, What is a Functional Requirement in Software Engineering? Specification, Types, Examples, 2021)

- Admin can add the customer.
- Admin must have the ability to log in and log out. Also, the admin can change his password.
- Admin information and customer information can be seen and changed anytime.
- Contact management should be added
- Lead management must-have in the system.
- Sales pipelines and forecasting is essential
- Sales performance management must be added.
- Admin can be added the task
- Admin can manage the campaign
- Admin will be able to track client interaction
- Marketing automation is a major function
- Admin will be able to work with email management
- The event marketing function will be verified by the admin
- Create report and analytics automatically

- Integrate advanced communication system
- Customers can be called through phone calls from the system
- Customer service and support tools should be integrated
- Customer regression analysis function should be added
- Admin can manage service level agreement.
- Ticket status should be customizable

7.2.2 Non-Functional Requirements

Specification of a software system's quality is defined by the Non-Functional Requirement (NFR). These non-functional criteria are important to the achievement of the software system and are judged on their responsiveness, usability, security, and portability. How quickly does the page load? is an example of a nonfunctional demand. Systems that don't fulfill non-functional criteria might fail to meet the demands of their users. (Martin, What is Non-Functional Requirement in Software Engineering? Types and Examples, 2021)

- General Data Protection Regulation (GDPR) function will take the system to another level.
- Integrate the API to synchronize the system data and use them with multiple devices.
- The system should be available 99.9% uptime.
- The system should be scalable to many customers and also huge records list
- The system should have a backup option so that the admin can download all information daily.
- All data and information must be secured.
- The system should be hosted with private hosting so that the data can't be lost.
- Restrict the access through authentication and authorization
- Maintainability should be easier.
- The user interface should be designed easy to understand.
- System validation and verification.
- Authentication should be maintained strictly.

7.3 Technology to Be Implemented

The DCL CRM-360 system can be implemented using a variety of technological alternatives. It is critical to select the appropriate technology in order to achieve success. The technology that will be implemented is web technology or web application technology, which is a server-based system that will be accessible to everyone who has access to the internet to access it. Web technology is incredibly advantageous today since it can be accessed from any location on the planet without the need to download or install any additional software. One component of the online system is dedicated to the administrator, while the other is dedicated to the client. In both cases, the information is adequate, and the interface design is appropriate.

Client-server Application

In the context of an application, the term "client-server" refers to a connection between collaborating programs that are both clients and servers. An application framework that distributes work among servers and clients by allowing them to interact across a computer network or the Internet is known as the client-server paradigm, or simply "client-server architecture". When a server offers a service to the client, the client sends a request to another software to access it. One or more applications on the server distribute and share resources with clients. (Omni SCI, 2020)

Benefits of client-server application

- With a single server housing all of the necessary data, it is easier to protect and manage user access and authentication.
- The addition of computers, servers, and network segments to a client-server network does not cause any significant disruptions.
- Customers and the server need not be close to access data efficiently.
- It's easy to upgrade, replace, or relocate nodes in a client-server system because they are all completely independent and only communicate with the server to get data. (Omni SCI, 2020)

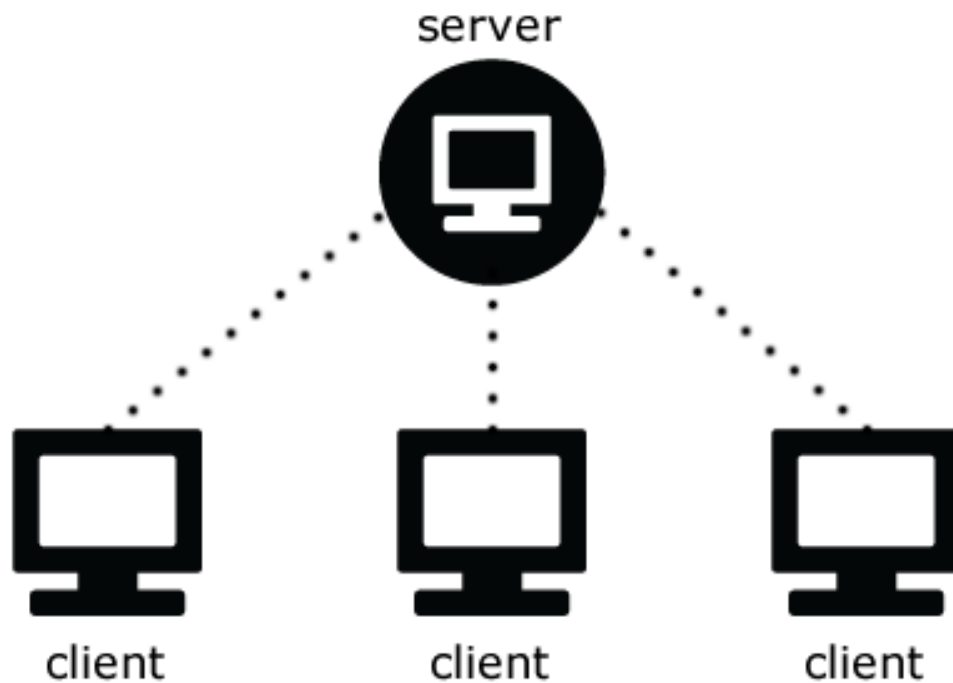


Figure 5: Client-Server Application

The Web-based Application

According to computer science, computer software that uses web browsers and the internet to perform certain tasks is called a web-based application. Server-side language (PHP and ASP) and client-side languages (JavaScript and HTML) are used to store and retrieve information, respectively, in web applications. In this way, customers may communicate with the business by filling out forms online, managing content, making purchases, and so on. As an added benefit, the software enables workers to produce, share, and collaborate on documents from a variety of locations and devices. (Gibb, 2021)

Benefits of the Web application:

- As long as the browser is suitable, web apps may be used on a variety of devices and operating systems.

- There are no incompatibilities since everyone has access to the same version.
- They don't take up space on the hard disk, thus there are no restrictions.
- There is a decrease in the use of pirated software in subscription-based online apps because of their implementation.
- Both the company and the end-user save money since there is less support and maintenance needed by the business and lesser needs for the end user's PC. (Gibb, 2021)



Figure 6: Web Application

Chapter 8 – Exploration

8.1 Activity Diagram

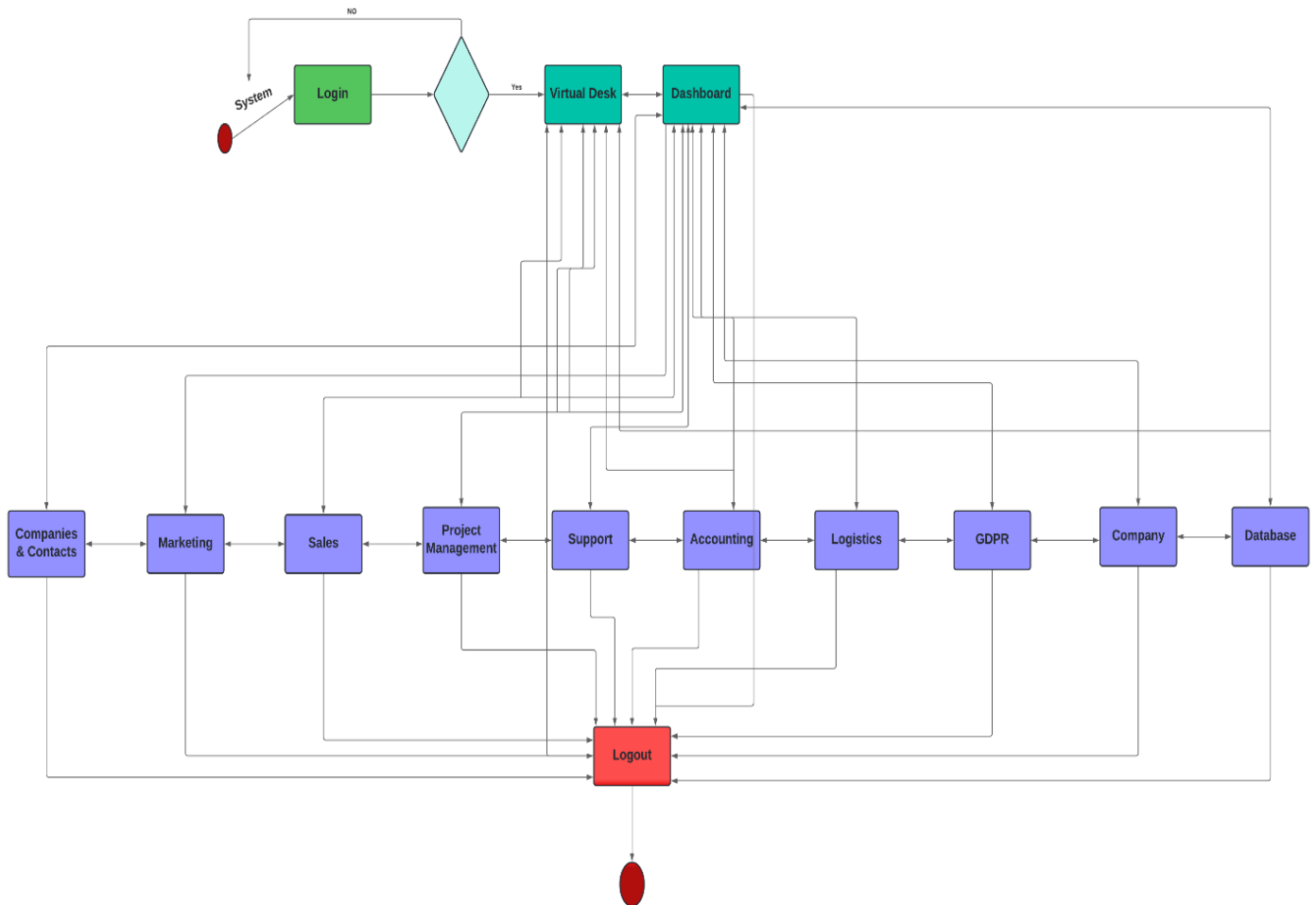


Figure 7: Activity Diagram

8.2 Full System Use Case

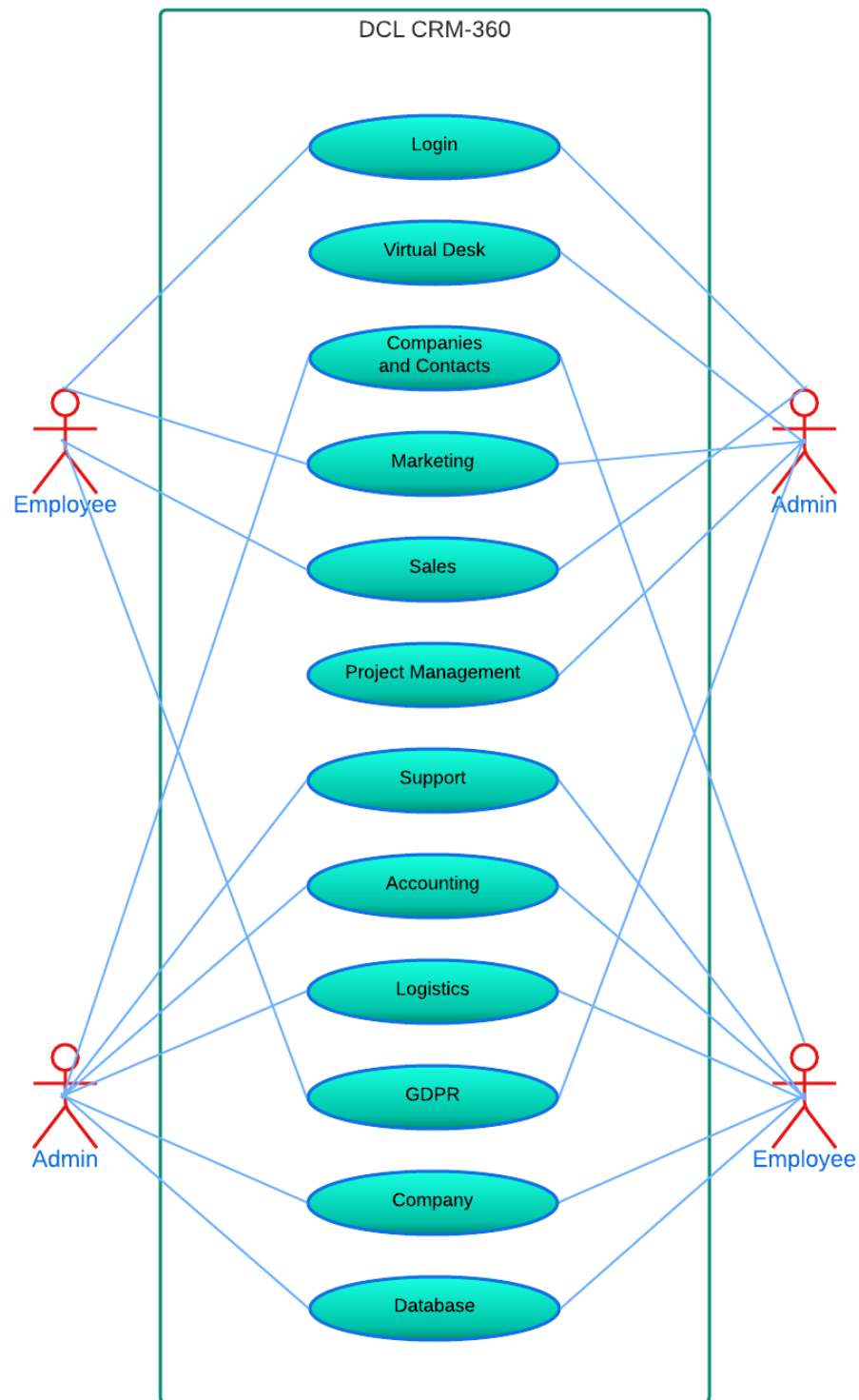


Figure 8: Full System Use Case

8.2.1 Breakdown of Use Case diagram according to the functions of DCL CRM-360

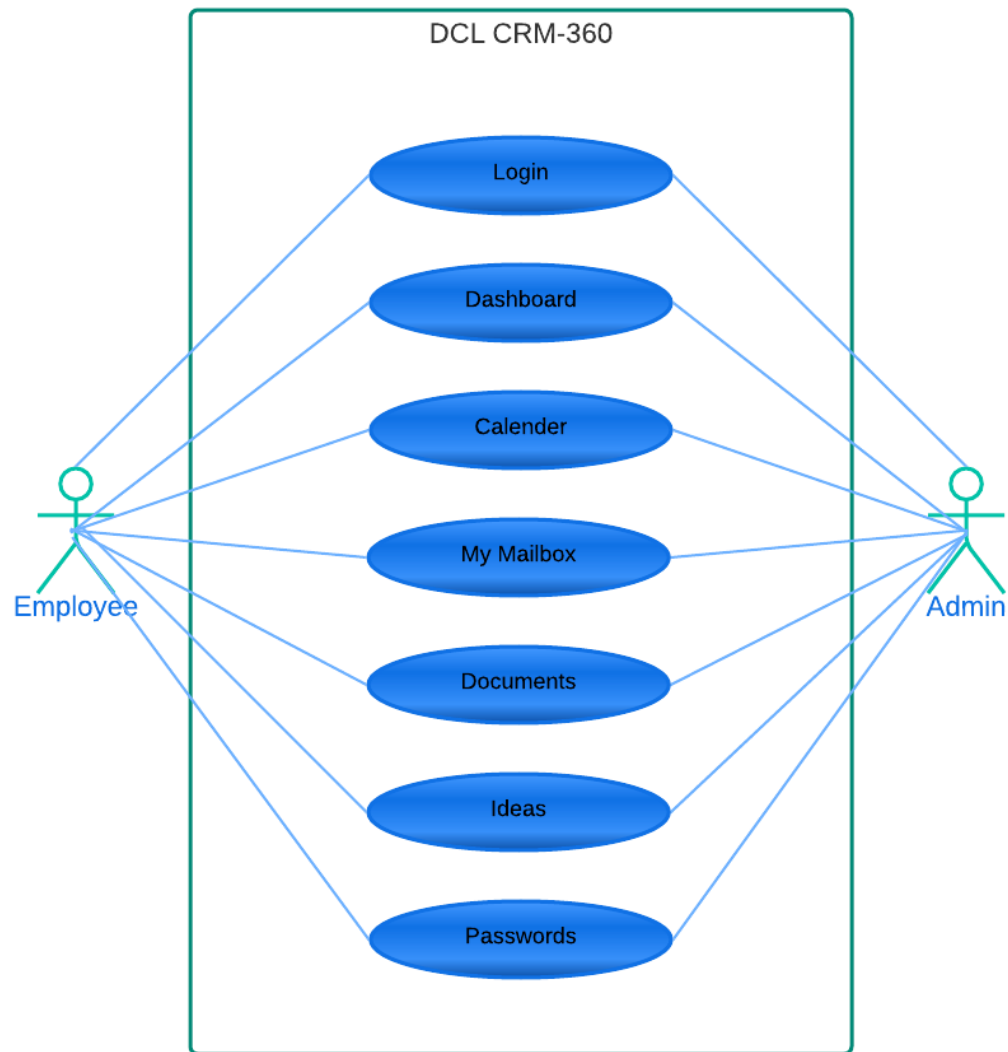


Figure 9: Use Case for Virtual Desk

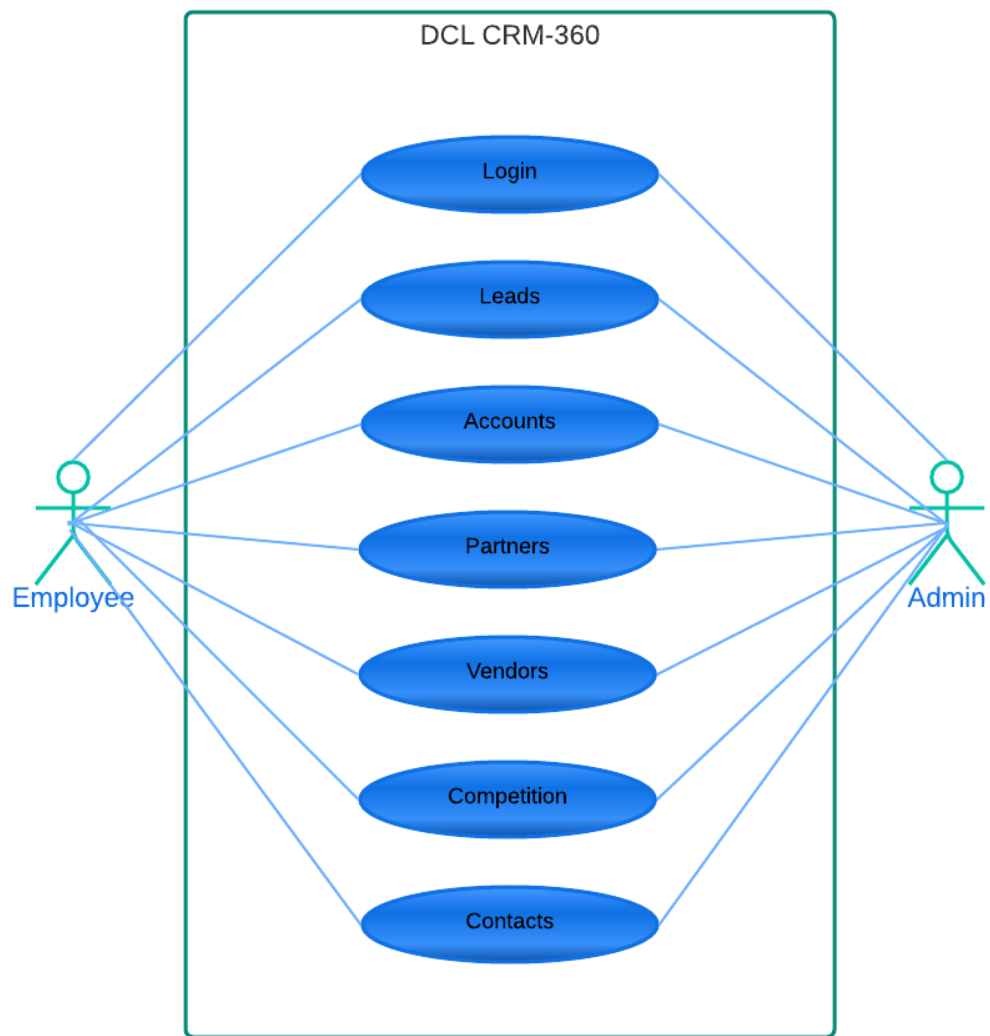


Figure 10: Use Case for Companies and Contacts

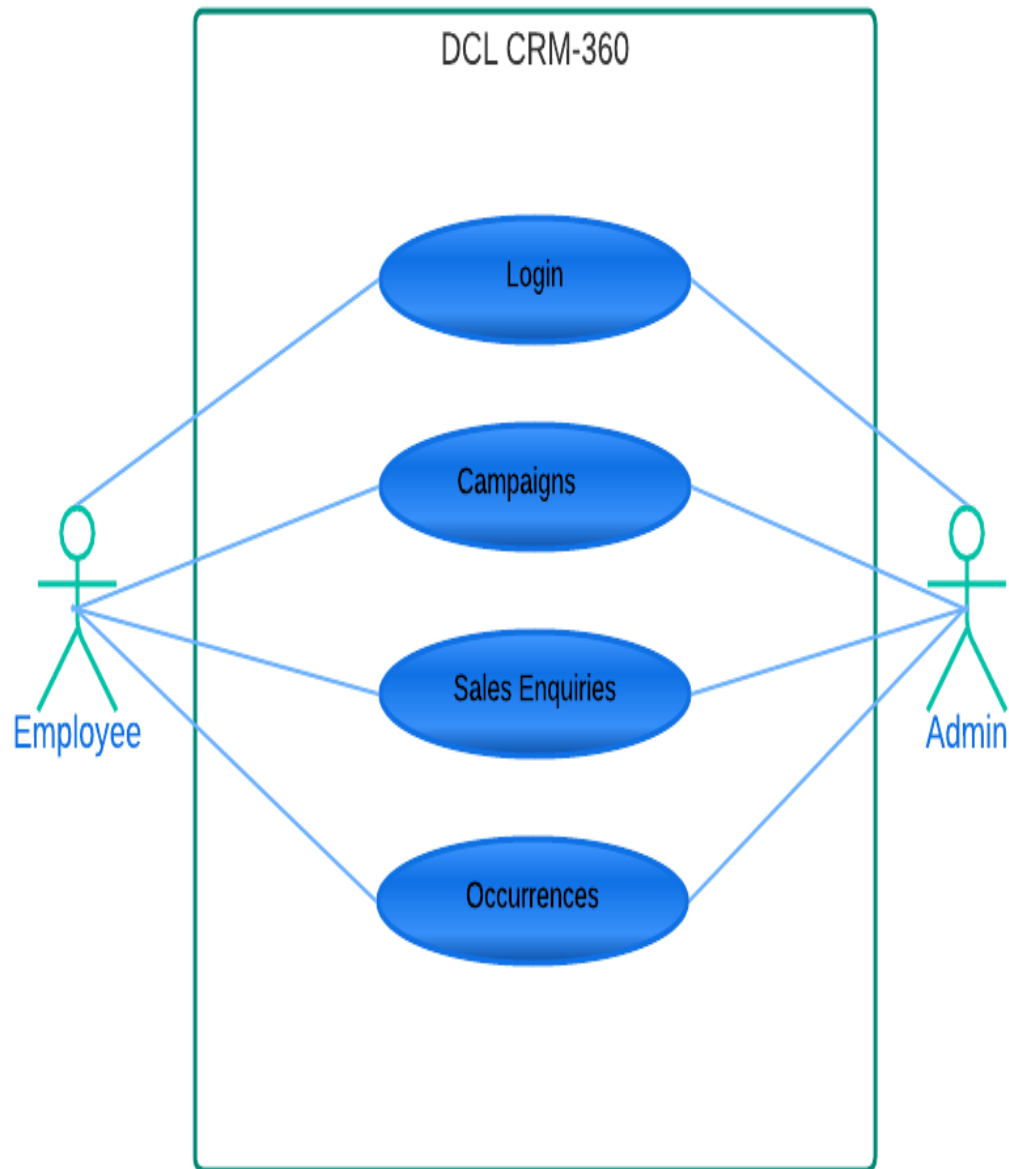


Figure 11: Use Case for Marketing

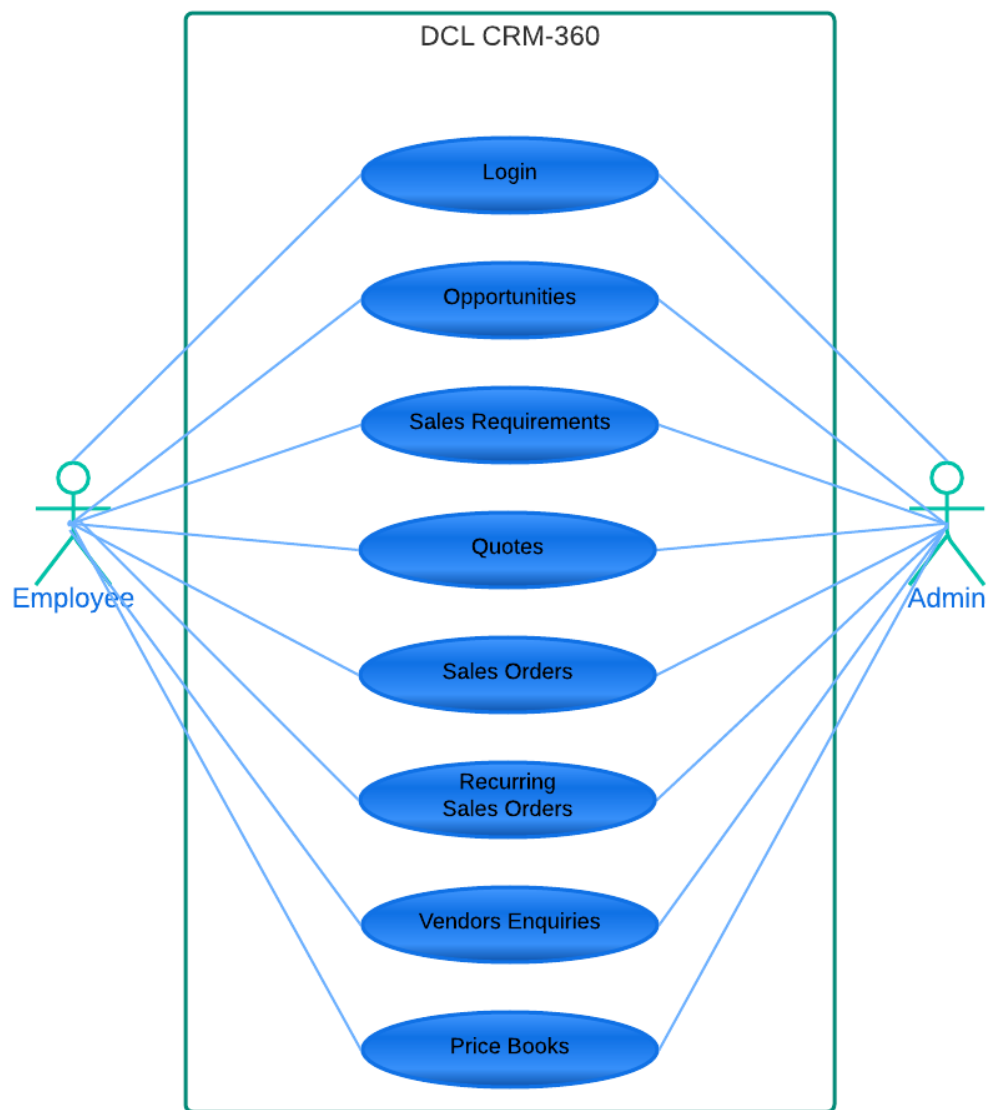


Figure 12: Use Case for Sales

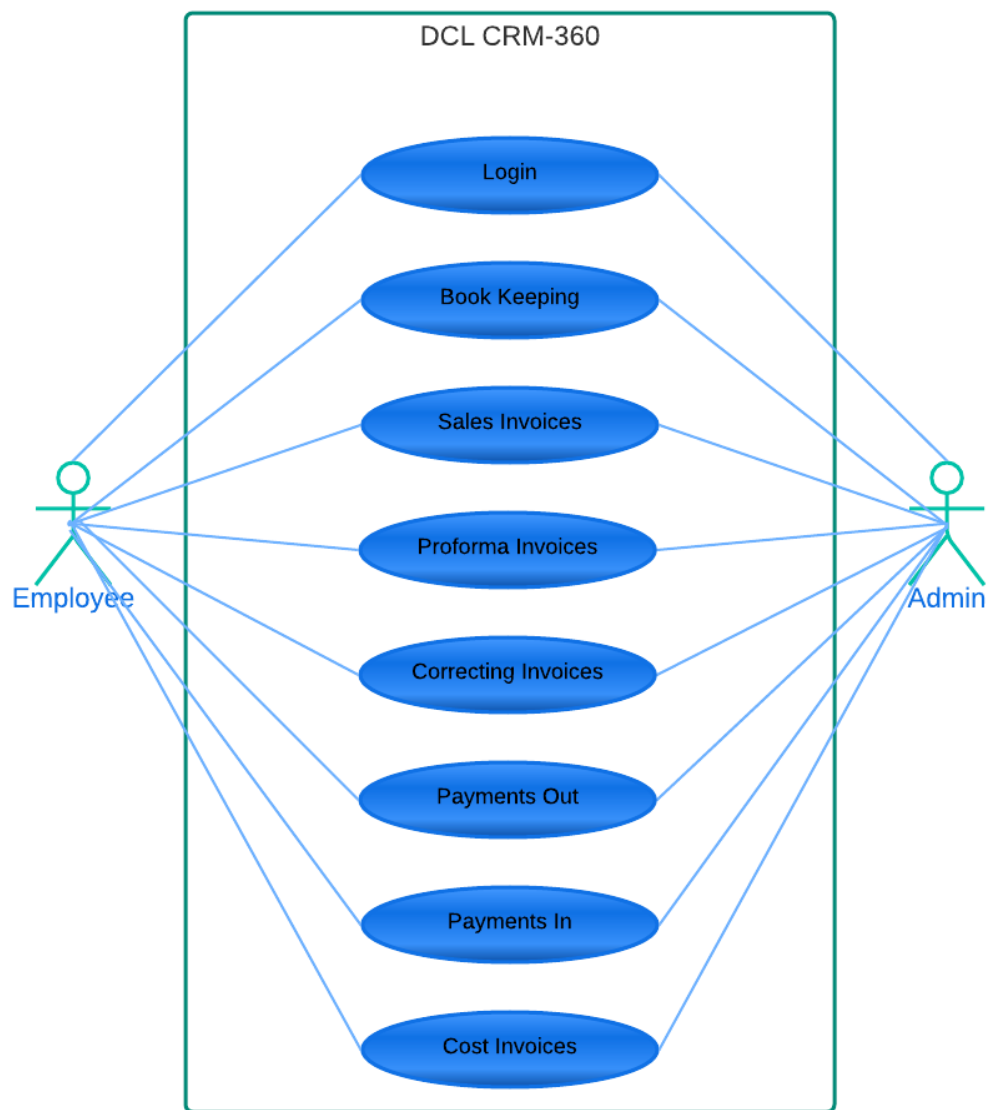


Figure 13: Use Case for Accounting

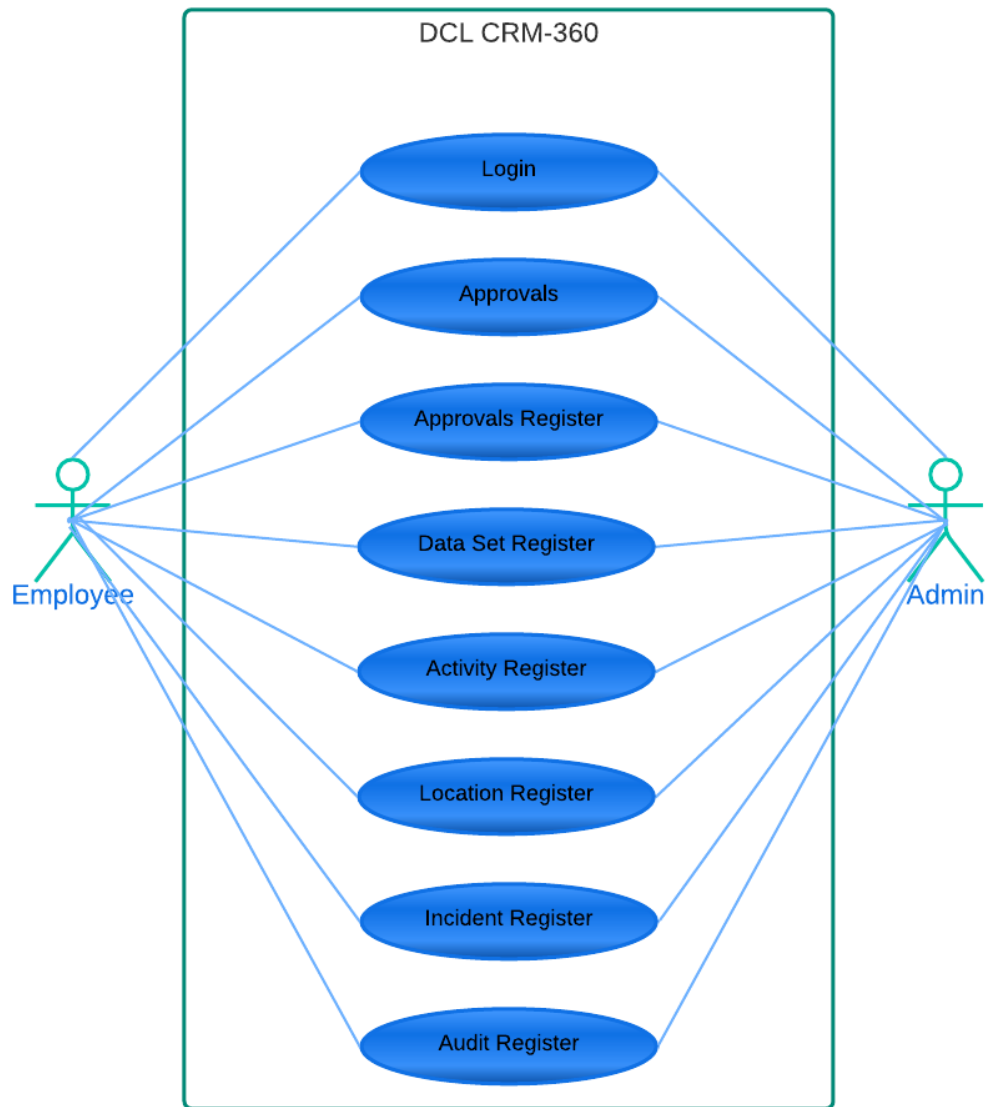


Figure 14: Use Case for GDPR

8.3 Full System Activity Diagram

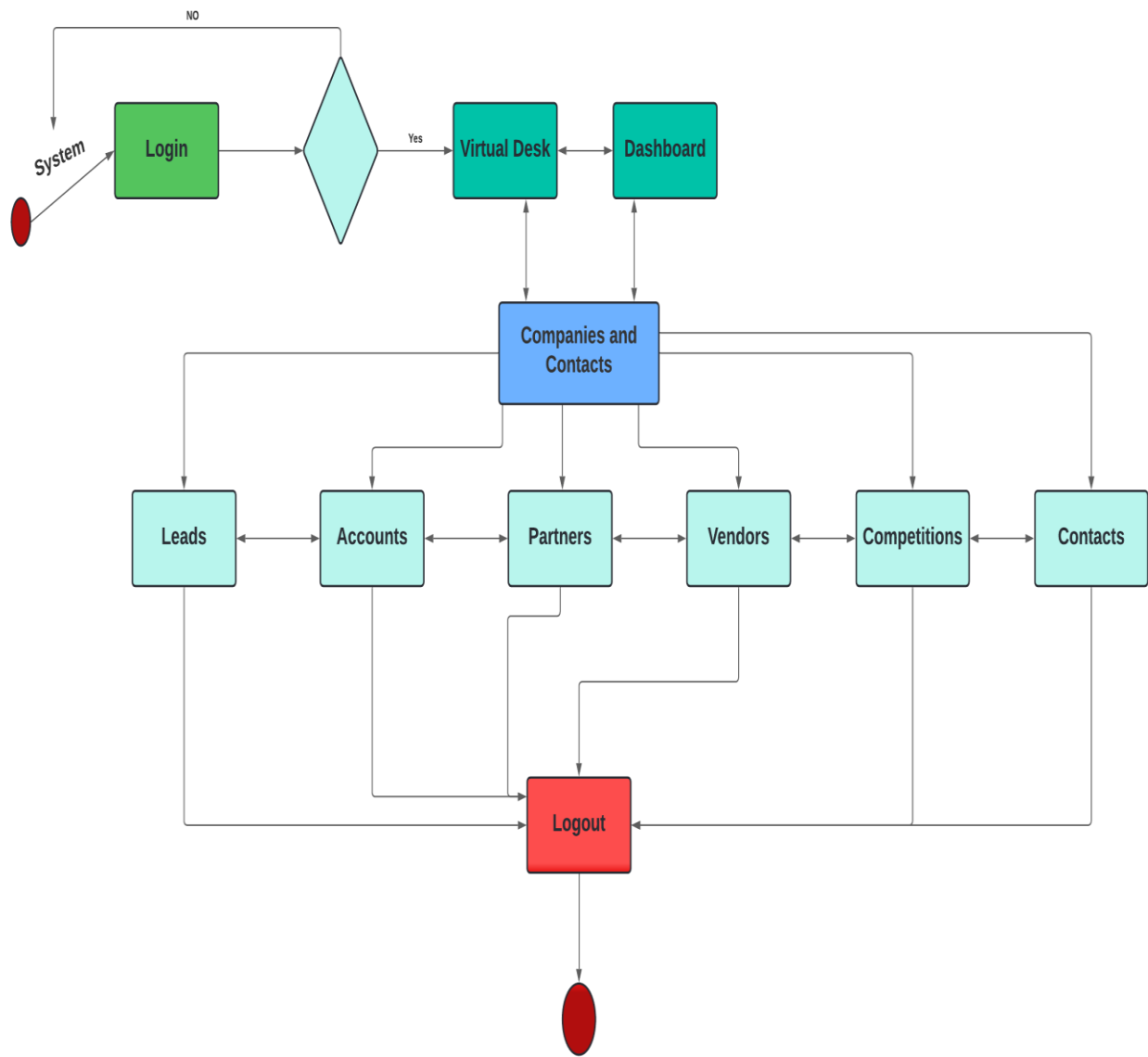


Figure 15: Companies and Contacts activity Diagram

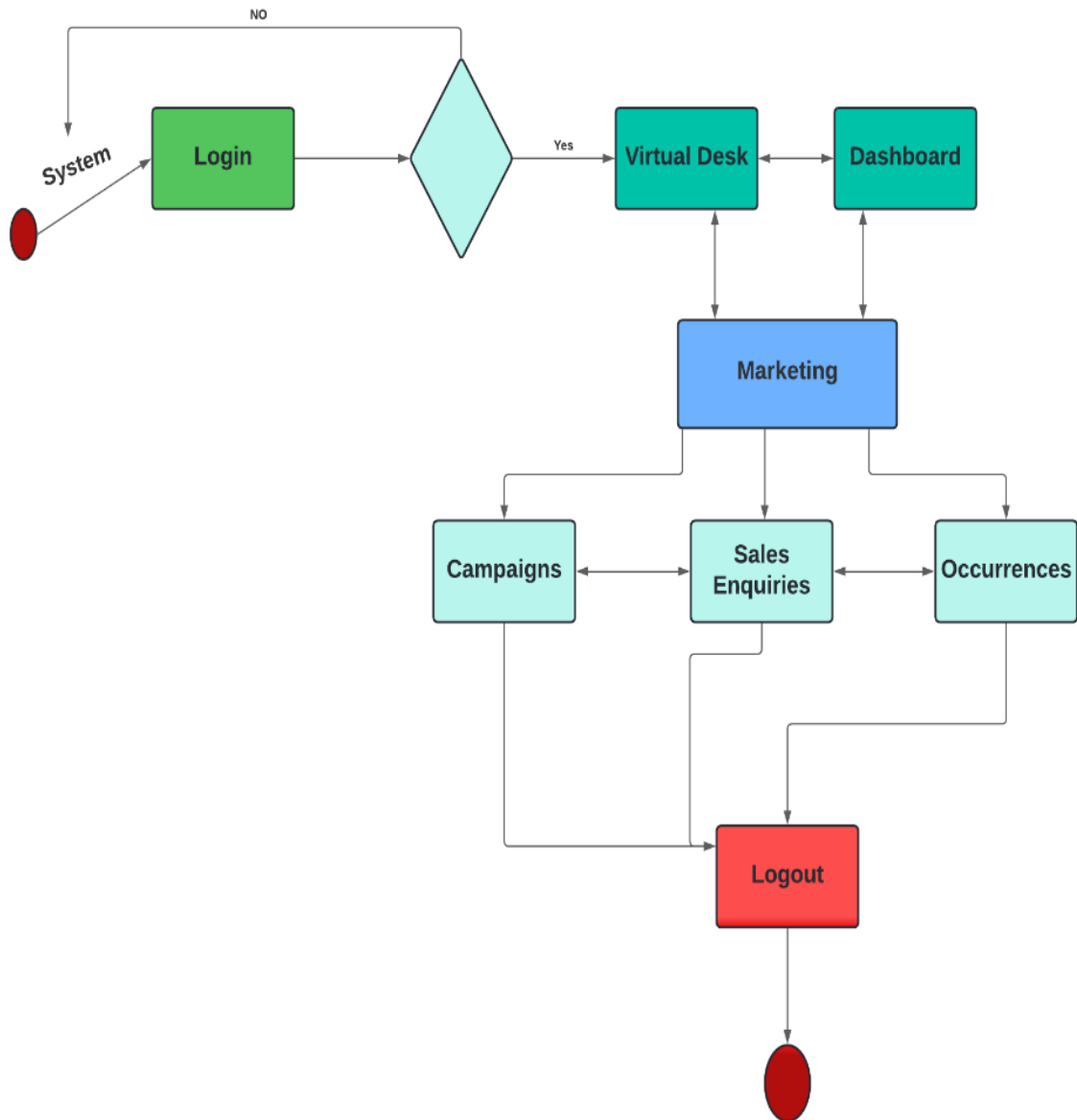


Figure 16: Marketing activity diagram

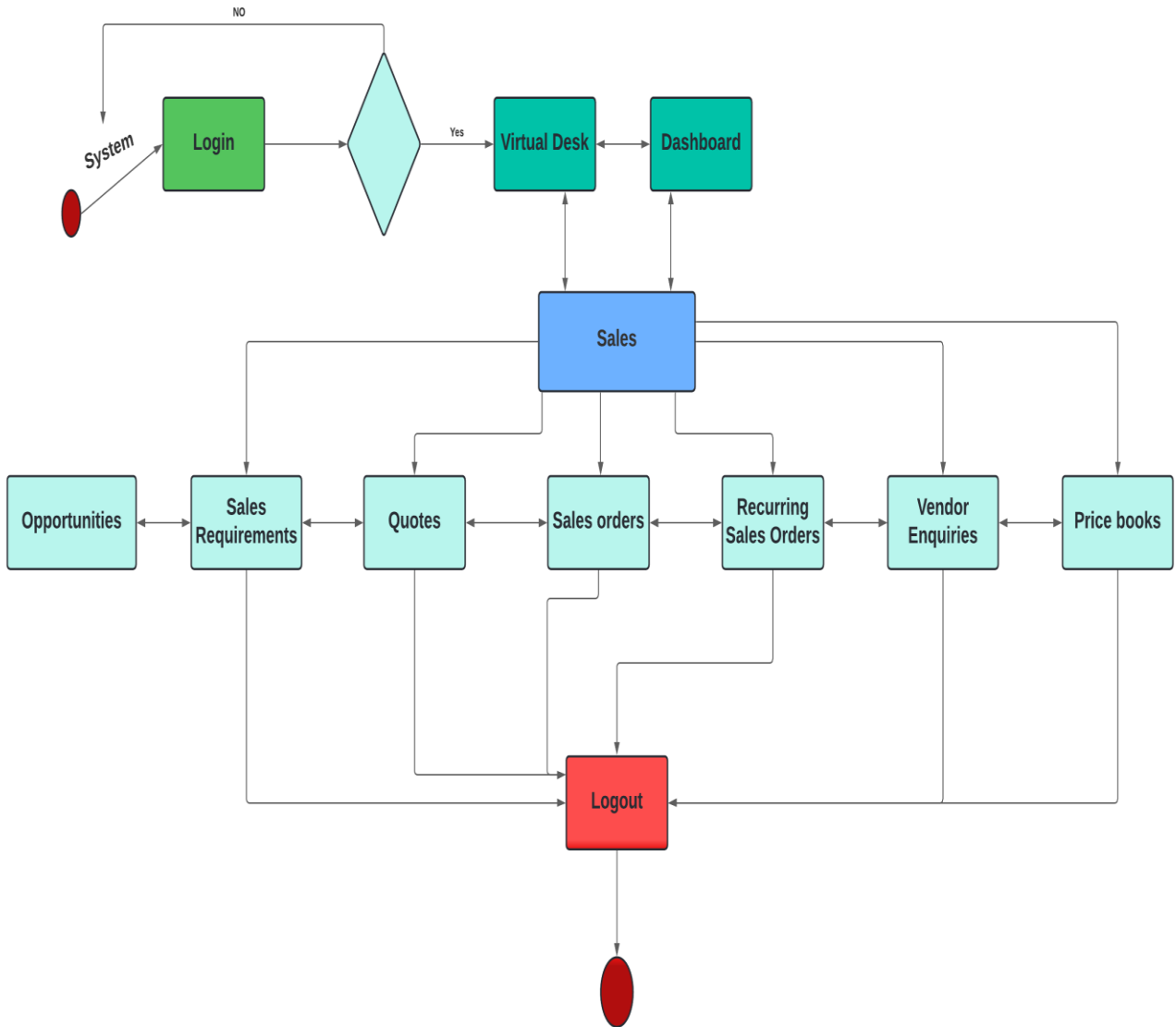


Figure 17: Sales activity diagram

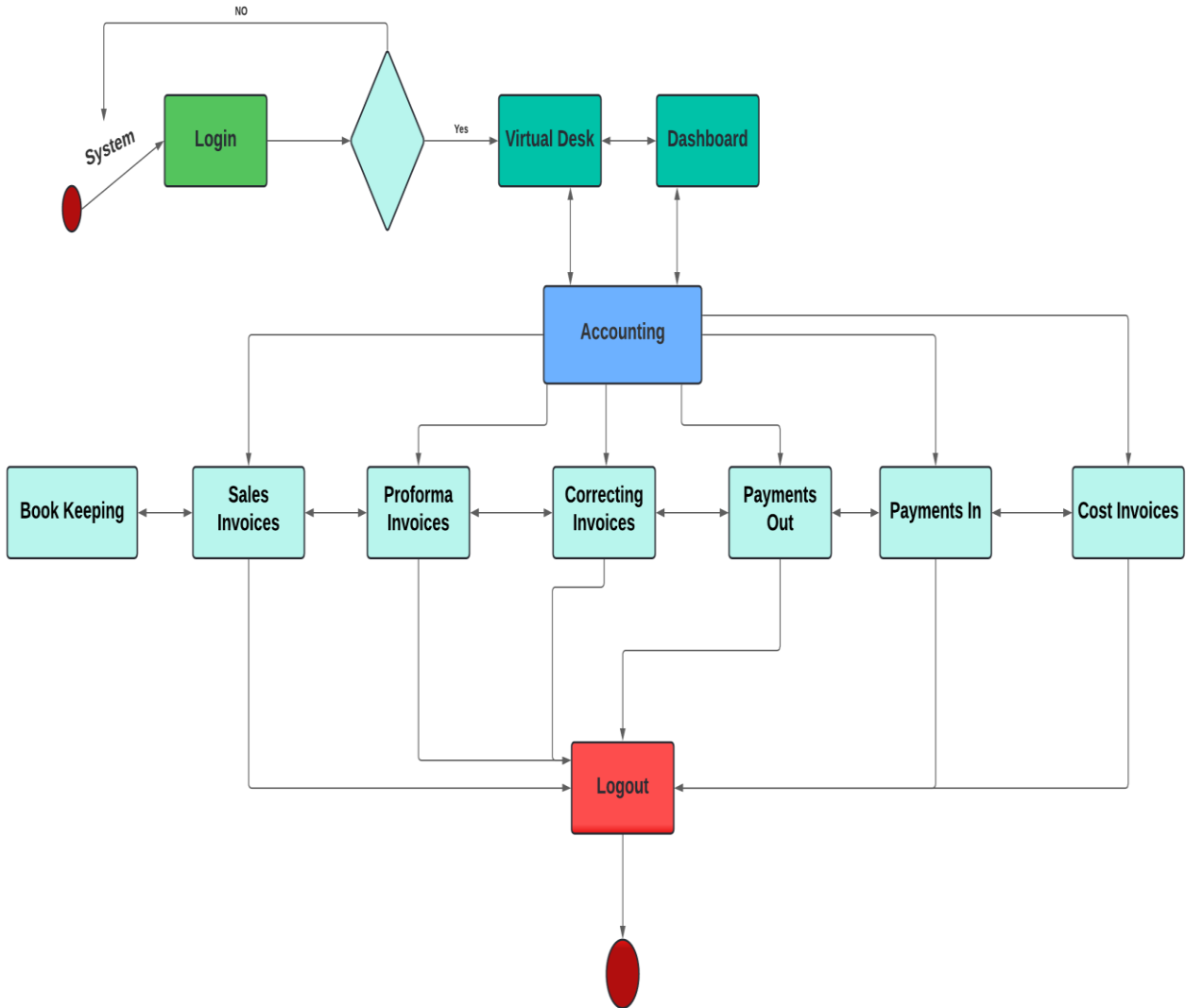


Figure 18: Accounting activity diagram

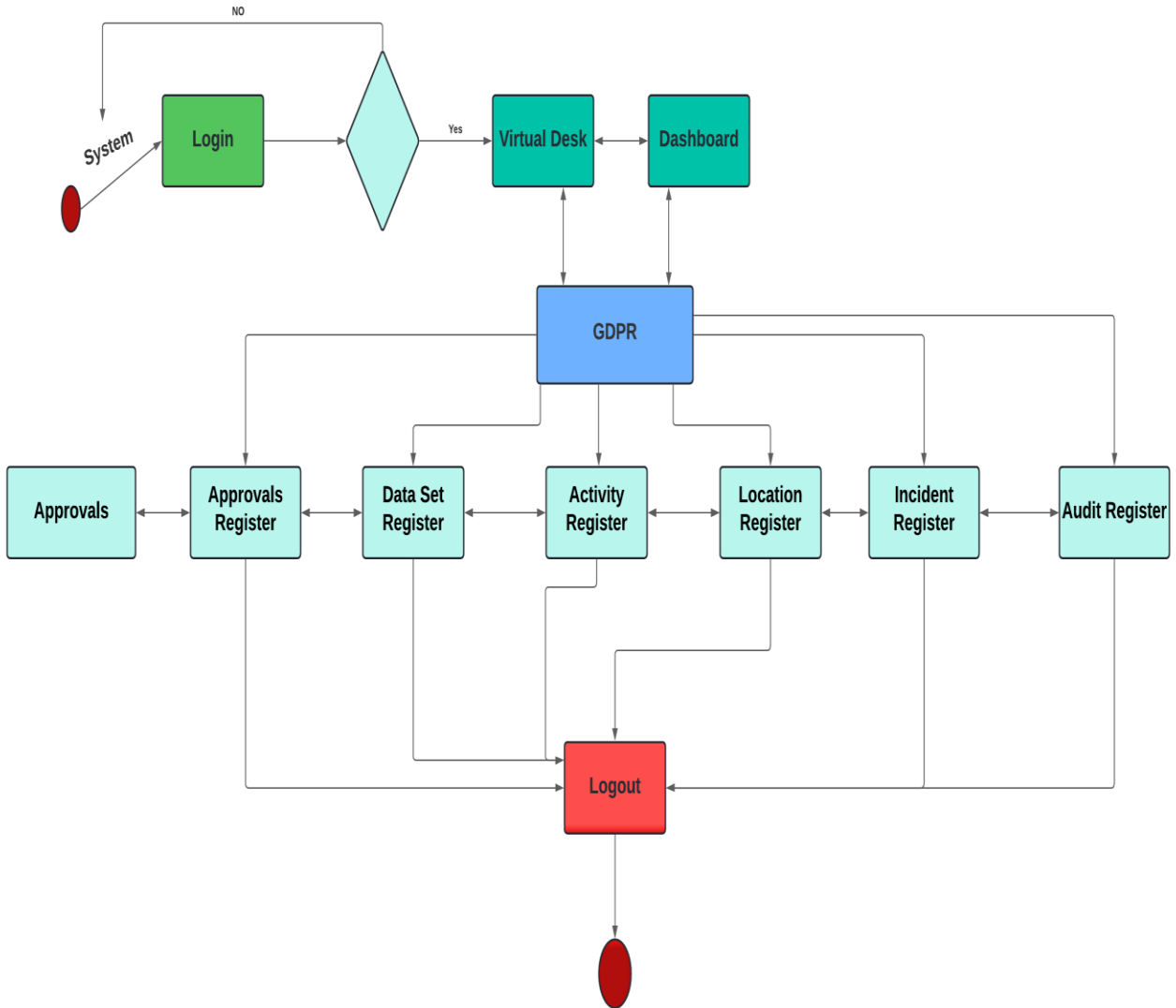


Figure 19: GDPR activity diagram

8.4 Requirements Catalogue

For doing a project it is necessary to identify the requirement. Those requirements should be stored in a list called requirement catalog. According to the standard format of the requirement catalog, all identified requirements will be added to the list:

Requirement catalog for the login system

Requirement Type	Functional Requirement		
Requirement Name	Login and registration system for the admin		
Requirement Description	The person who will be the admin of this system should be registered at the time of the software installation. When the admin will be registered no one will be able to access the system except the admin with proper authentication.		
Requirement ID	Date Source	Priority	Sign off
M-01	Admin	Must	Admin
Requirement Type	Non-Functional Requirement		
Requirement Name	The attempt of login per day		
Description	Target Value	Acceptance Value	Comment
	1500	1000	Only the admin can log in.

Table 10: Requirement catalog for the login system

Requirement catalog for creating companies and contacts

Requirement Type	Functional Requirement		
Requirement Name	Admin will create companies and contacts info.		
Requirement Description	Companies and contacts contain lots of functionalities including leads, accounts, partners, vendors, competition, and contacts. Admin must have the opportunities to create them.		
Requirement ID	Date Source	Priority	Sign off
M-02	Admin	Must	Admin
Requirement Type	Non-Functional Requirement		
Requirement Name	Companies and contacts added per day		
Description	Target Value	Acceptance Value	Comment
	1000	800	Admin can add them

Table 11: Requirement catalog for creating companies and contacts

Requirement catalog for creating Marketing

Requirement Type	Functional Requirement		
Requirement Name	Admin will create marketing instruction.		
Requirement Description	Marketing options contain some functionalities including campaigns, sales inquiries, and occurrences. Admin must have the opportunities to create them.		
Requirement ID	Date Source	Priority	Sign off
M-03	Admin	Must	Admin
Requirement Type	Non-Functional Requirement		
Requirement Name	Marketing functions added per day		
Description	Target Value	Acceptance Value	Comment
	1000	800	Admin can add them

Table 12: Requirement catalog for creating Marketing

Requirement catalog for creating sales

Requirement Type	Functional Requirement		
Requirement Name	Admin will create sales info.		
Requirement Description	Sales options contain lots of functionalities. Admin must have the opportunities to create them.		
Requirement ID	Date Source	Priority	Sign off
M-04	Admin	Must	Admin
Requirement Type	Non-Functional Requirement		
Requirement Name	Sales info added per day		
Description	Target Value	Acceptance Value	Comment
	750	600	Admin can add them

Table 13: Requirement catalog for creating sales

Requirement catalog for creating inventory named database

Requirement Type	Functional Requirement		
Requirement Name	Admin will create inventory details named database.		
Requirement Description	Database options contain lots of functionalities about inventory. Admin must have the opportunities to create them.		
Requirement ID	Date Source	Priority	Sign off
C-01	Admin	Could	Admin
Requirement Type	Non-Functional Requirement		
Requirement Name	Inventory info added per day		
Description	Target Value	Acceptance Value	Comment
	100	100	Admin can add them

Table 14: Requirement catalog for creating inventory named database

8.5 Prioritized Requirement List (PRL)

The MoSCow priority technique is the best way to create a priority list of a project. So, I am going used to this technique to make the priority list of all identified requirements of the DCL CRM-360 system. The list is given below:

Priority Type	Must-Have
Serial No.	Requirement Name
1.	Admin registration at the time of installation and login to the system.
2.	All functions of companies and contacts including leads, accounting, partners, etc. added by the admin.
3.	Marketing functions like campaigns, sales inquiries, and occurrences must-have in the system, and the admin will be able to manage them.
4.	Most manageable sales function.

Table 15: Must-have requirement list


Priority Type	Should-Have
Serial No.	Requirement Name
1.	Manageable logistic functionalities
2.	Project management functionalities should be easier.
3.	The General Data Protection Regulation (GDPR) function should be added to the system.

Table 16: Should-have requirement list

Priority Type	Could-Have
Serial No.	Requirement Name
1.	Company details and all functionalities about the company could be added to the system.
2.	Inventory could be added to the system to maintain the company's product easily.

Table 17: Could-have requirement list

8.6 Prototype of the new system

 Add chart from filter ×

Widget name

Leads

*Select chart

Horizontal bar chart ▼

*Select module

Leads ▼

*Filter

× My Leads

*Value type

Number of records ▼

*Group by field

Lead name ▼

Value dividing field

Select an option ▼

Colors from value dividing field

☒

Combine graph elements

☐

Figure 20: Add Chart from filter prototype

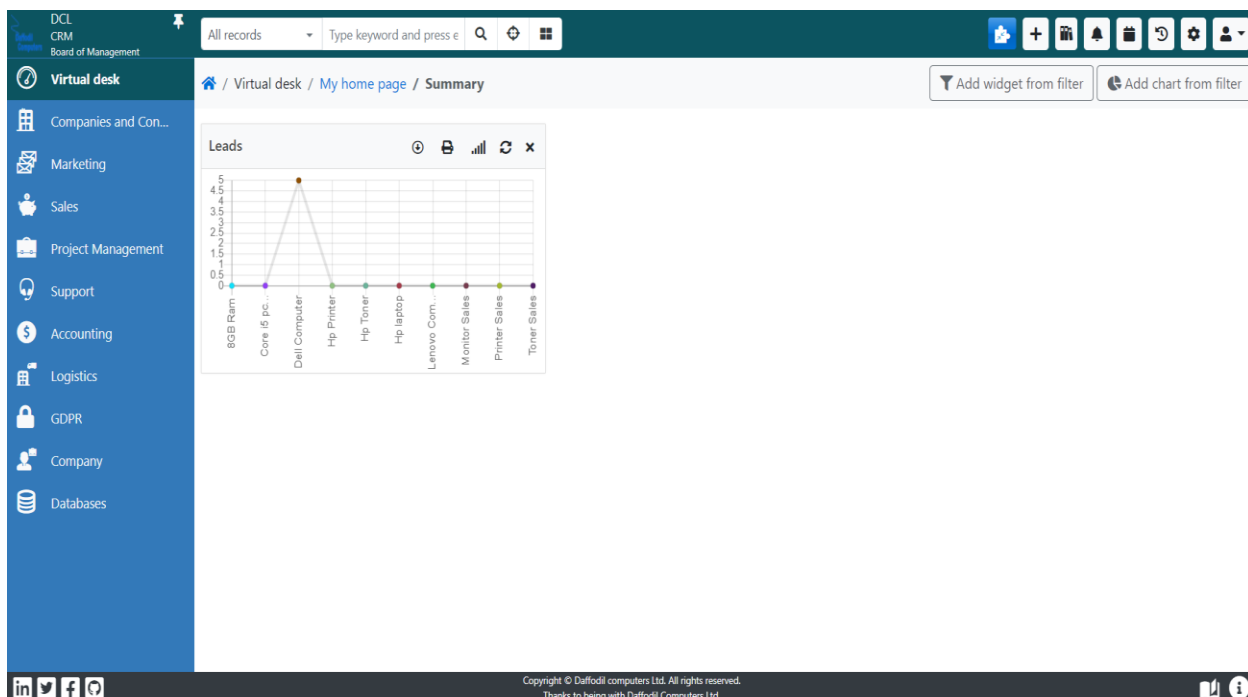


Figure 21: Dashboard prototype

/ Companies and Contacts / Leads / Create

Lead details

*Lead name	<input type="text" value="a"/>	*Lead status	<input type="text" value="Select an option"/>
*Assigned To	<input type="text" value="DCL CRM (Board of Management)"/>	Share with users:	<input type="text" value="Select some values"/>
Industry	<input type="text" value="Select an option"/>	Sub-branch	<input type="text" value="Select an option"/>
Number of Employees	<input type="text" value="0"/>	*Relation	<input type="text" value="B2C"/>
Active	<input type="checkbox"/>	Private	<input type="checkbox"/>

Contact information

Primary phone	<input type="text" value="Bangladesh"/>	Primary phone	<input type="text" value="Additional inform"/>	Primary email	<input type="text"/>
Mobile phone	<input type="text" value="Bangladesh"/>	Mobile phone	<input type="text" value="Additional inform"/>	Secondary email	<input type="text"/>
Fax	<input type="text" value="Bangladesh"/>	Fax	<input type="text" value="Additional inform"/>	Website	<input type="text"/>
Permission to call	<input type="checkbox"/>	Permission to send emails	<input type="checkbox"/>		

Registration details

Figure 22: Create leads prototype

[Home](#) / [Companies and Contacts](#) / [Leads](#) / [List](#)

Records list ▾ Actions ▾ + Add record

Filter: All ▾

First « 1 » 1 to 20 ↺

<input type="checkbox"/>		Lead name	Lead status	Industry	Primary phone	Website	Primary email	Assigned To
<input type="checkbox"/>		Dell Computer	For processing	Trade				DCL CRM
<input type="checkbox"/>		Hp laptop	Pending	Trade				DCL CRM
<input type="checkbox"/>		Lenovo Computer sales	Contact in the future	Trade				DCL CRM
<input type="checkbox"/>		Core i5 pc sales	Pending	Trade				DCL CRM
<input type="checkbox"/>		Hp Toner	For processing	Trade				DCL CRM
<input type="checkbox"/>		8GB Ram	Pending	Trade				DCL CRM
<input type="checkbox"/>		Toner Sales	Pending	Trade				DCL CRM
<input type="checkbox"/>		Monitor Sales	Pending	Trade				DCL CRM
<input type="checkbox"/>		Printer Sales	Pending	Trade				DCL CRM
<input type="checkbox"/>		Hp Printer	Pending	Trade				DCL CRM
<input type="checkbox"/>		Dell Computer	For processing	Trade				DCL CRM

Figure 23: Leads record prototype

Create new filter ×

Basic details ▾

* View name:

* Choose columns and order

Add more columns

View color:

Description details >

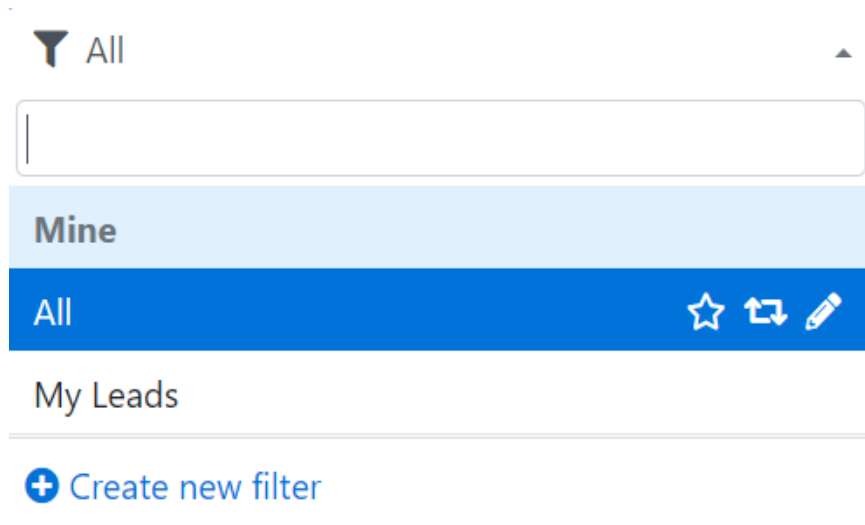
Find duplicates >

Relationship as a custom column ⓘ >

Conditions for filtering related records ⓘ >

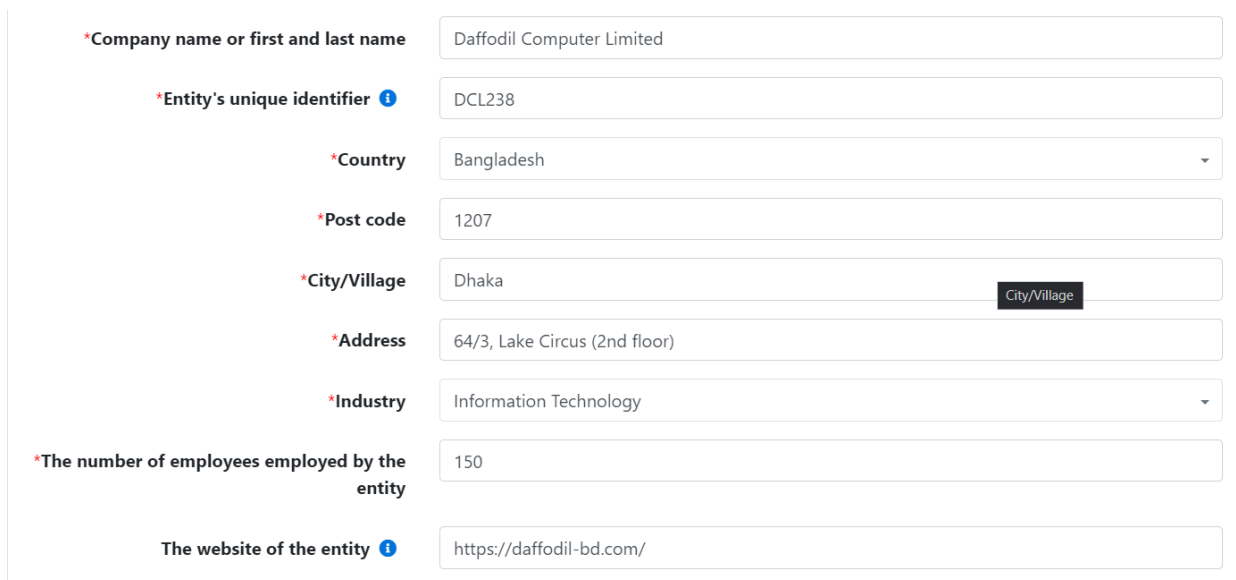
Choose filter conditions: ▾

Figure 24: Create a new filter prototype



The image shows a filter prototype interface. At the top, there is a funnel icon followed by the text "All". Below this is a search bar. A horizontal bar with a light blue background contains the word "Mine". Below that is a blue bar with the word "All" on the left and three icons (a star, a refresh arrow, and a pencil) on the right. Underneath is the text "My Leads". At the bottom, there is a link that says "+ Create new filter" with a plus icon in a circle.

Figure 25: Created filter prototype



The image shows a company details form. It consists of several rows, each with a label on the left and an input field on the right. The labels are: "*Company name or first and last name", "*Entity's unique identifier" (with an information icon), "*Country", "*Post code", "*City/Village", "*Address", "*Industry", "*The number of employees employed by the entity", and "The website of the entity" (with an information icon). The input fields contain the following values: "Daffodil Computer Limited", "DCL238", "Bangladesh", "1207", "Dhaka", "64/3, Lake Circus (2nd floor)", "Information Technology", "150", and "https://daffodil-bd.com/". A small tooltip with the text "City/Village" is visible next to the "Dhaka" input field.

Figure 26: Company details prototype

Home / Databases / Products / List

Records list Actions Add record All First 1 1 to 3

	Product name	Product category	Unit price	Available product quantity	Product active	Sales start date
<input type="checkbox"/>	DCL Laptop		0	0	No	
<input type="checkbox"/>	McAfee Total Protection	Antivirus	34	0	No	20-01-2022
<input type="checkbox"/>	SSD	Hardware	2100	0	Yes	22-01-2022

Product name Product category Unit price Available product quantity Product active Sales start date

Search filters: [Search icon] [X] [A] [Type to search] [Search icon] [Select an option]

Figure 27: Company's product list prototype

Chapter 9 – Engineering

9.1 Modules of the new system

The DCL CRM-360 system is full of new modules since it is a complete system of customer relationship management. So, there will be so many modules to explain. Here I am going to show and explain some of the core modules:

Note: Here I will show if a user takes an action then how the system interacts with the system.

Module for the login system

Serial of Action	The action of User	The interaction of System
1.	After completion of registration, the admin will navigate the URL.	The system will get the user to the login page and it will show a login form if the admin doesn't log in already or it will go to the dashboard.
2.	After being visible the login form, the admin will provide the necessary credential.	After getting the credentials from the user, the system will evaluate whether the user has given valid format data or not.
3.	Now, it's time to log in. The admin will press the sign-in or login button.	After getting the credentials from the user, the system will match the credential with the data of the database. If the credentials are correct then it will send the user to the dashboard or it will show an error message.

Table 18: Module for the login system

Module for Companies and Contacts

Serial of Action	The action of User	The interaction of System
1	The admin will click the companies and contacts option from the sidebar.	The system will open the companies and contacts option and will show its included function to the user.
2	The admin will click the function according to his needs.	The system will take the user to a specific page according to the request.
3	The admin will request to add, edit or delete the information according to his needs.	The system will follow the instruction of the user and will respond according to the user's request.

Table 19: Module for Companies and Contacts

Module for Marketing

Serial of Action	The action of User	The interaction of System
1	From the sidebar, the admin will select the marketing option.	The system will show the user the marketing choice and its integrated function.
2	The administrator will select the function that best suits his demands.	According to the request, the system will direct the visitor to a certain page.
3	According to his requirements, the administrator will request that information be added, edited, or deleted.	The system will reply to the user's request and will follow the user's instructions.

Table 20: Module for marketing

Module for Sales

Serial of Action	The action of User	The interaction of System
1	The admin will click the sales option from the sidebar.	The system will open the sales option and will show its included function to the user.
2	The admin will click the function according to his needs.	The system will take the user to a specific page according to the request.
3	The admin will request to add, edit or delete the information according to his needs.	The system will follow the instruction of the user and will respond according to the user's request.

Table 21: Module for sales

9.2 Use Case for DCL CRM-360

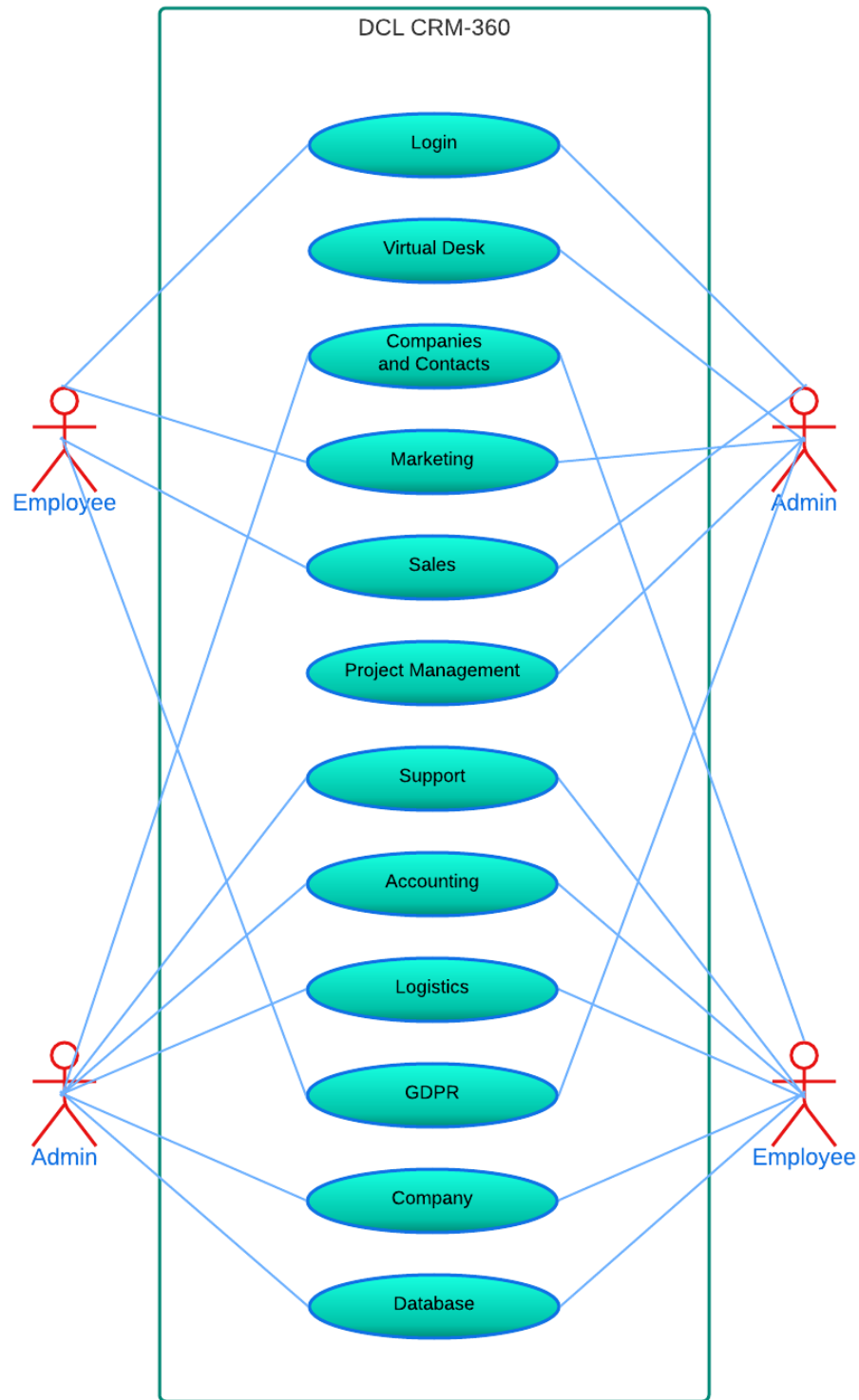


Figure 28: Use Case for DCL CRM-360

9.3 Class diagram for DCL CRM-360

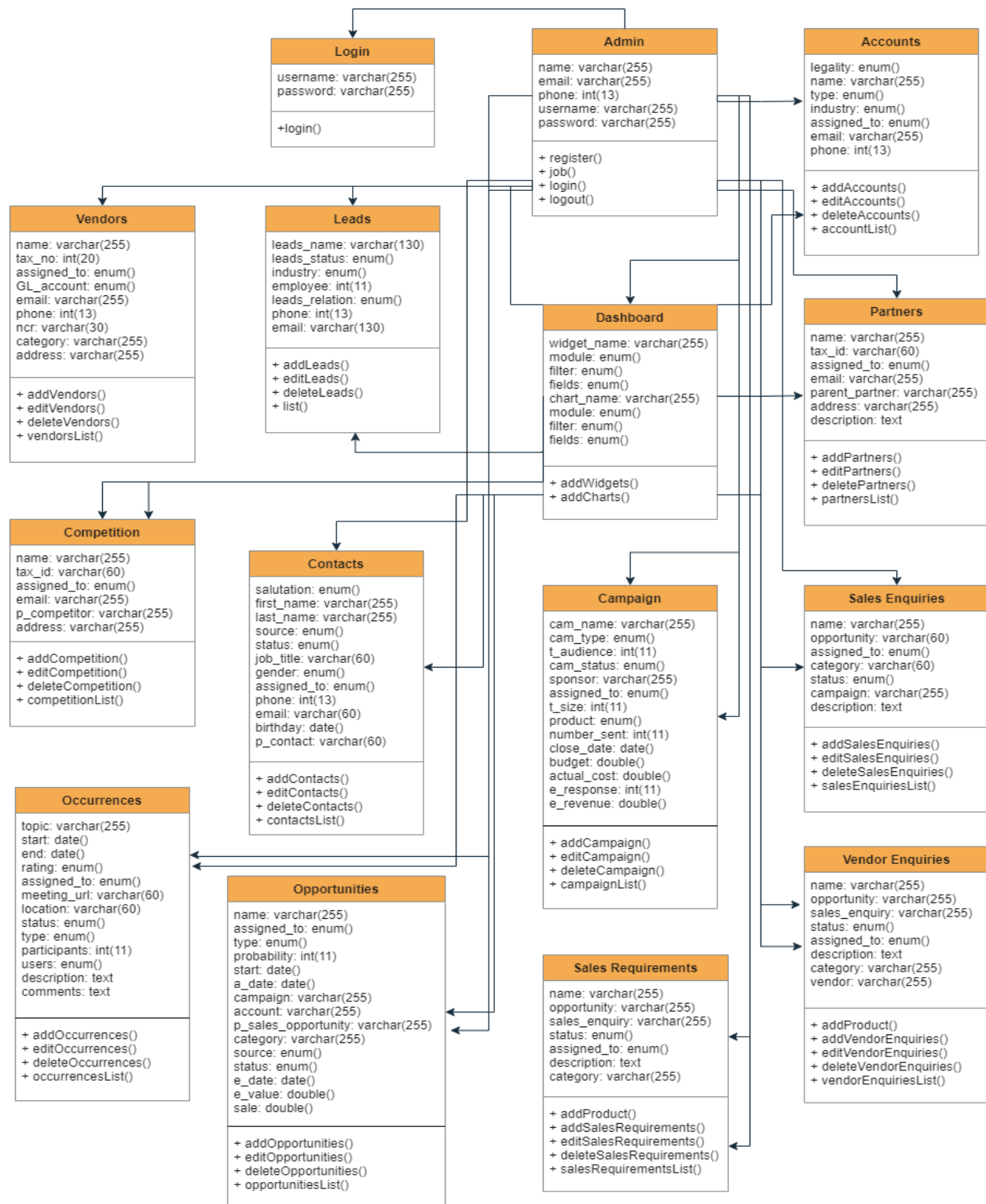


Figure 29: Class diagram for DCL CRM-360

9.4 ERD for DCL CRM-360

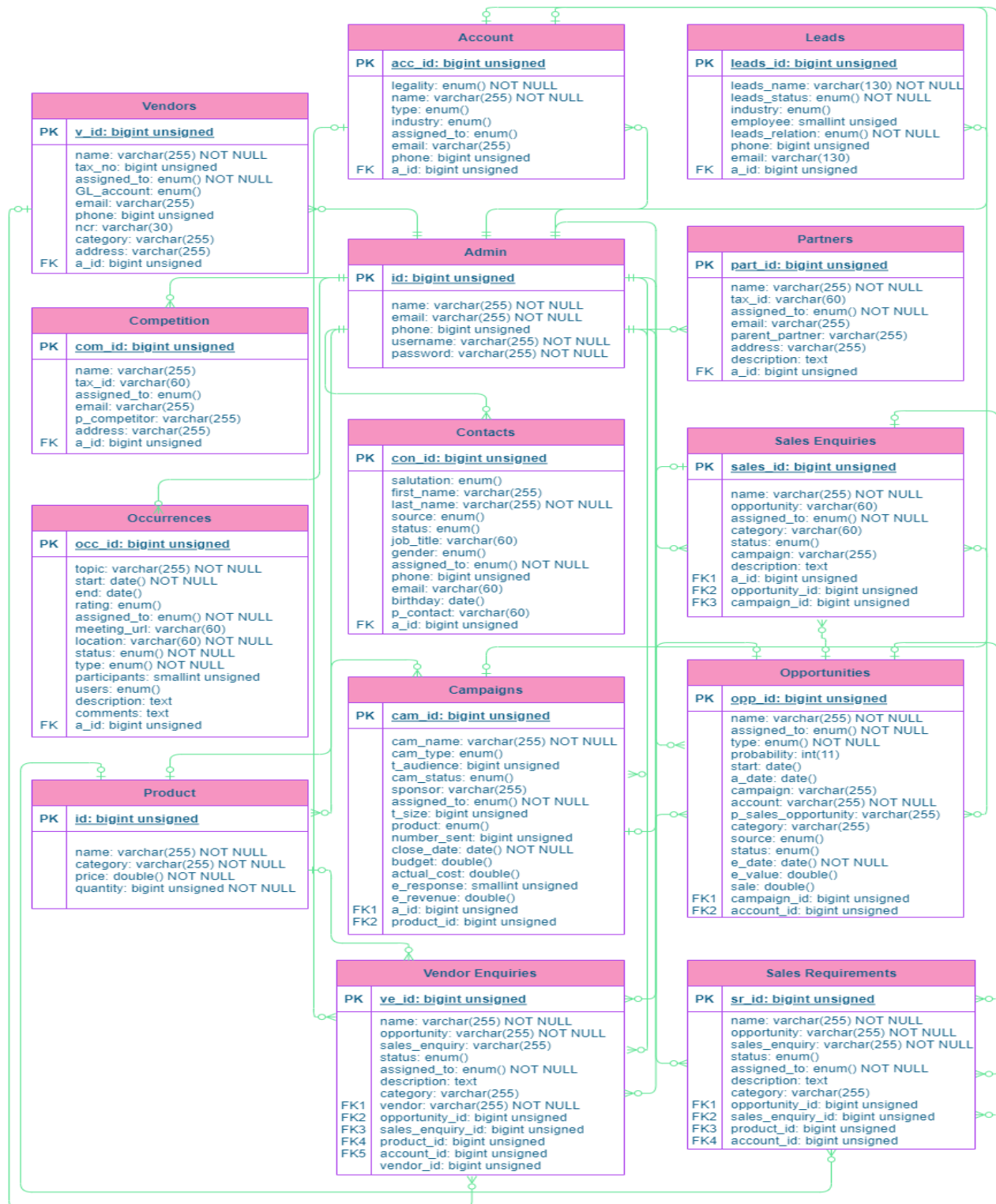


Figure 30: Entity Relationship Diagram for DCL CRM-360

9.5 Sequence diagram for DCL CRM-360

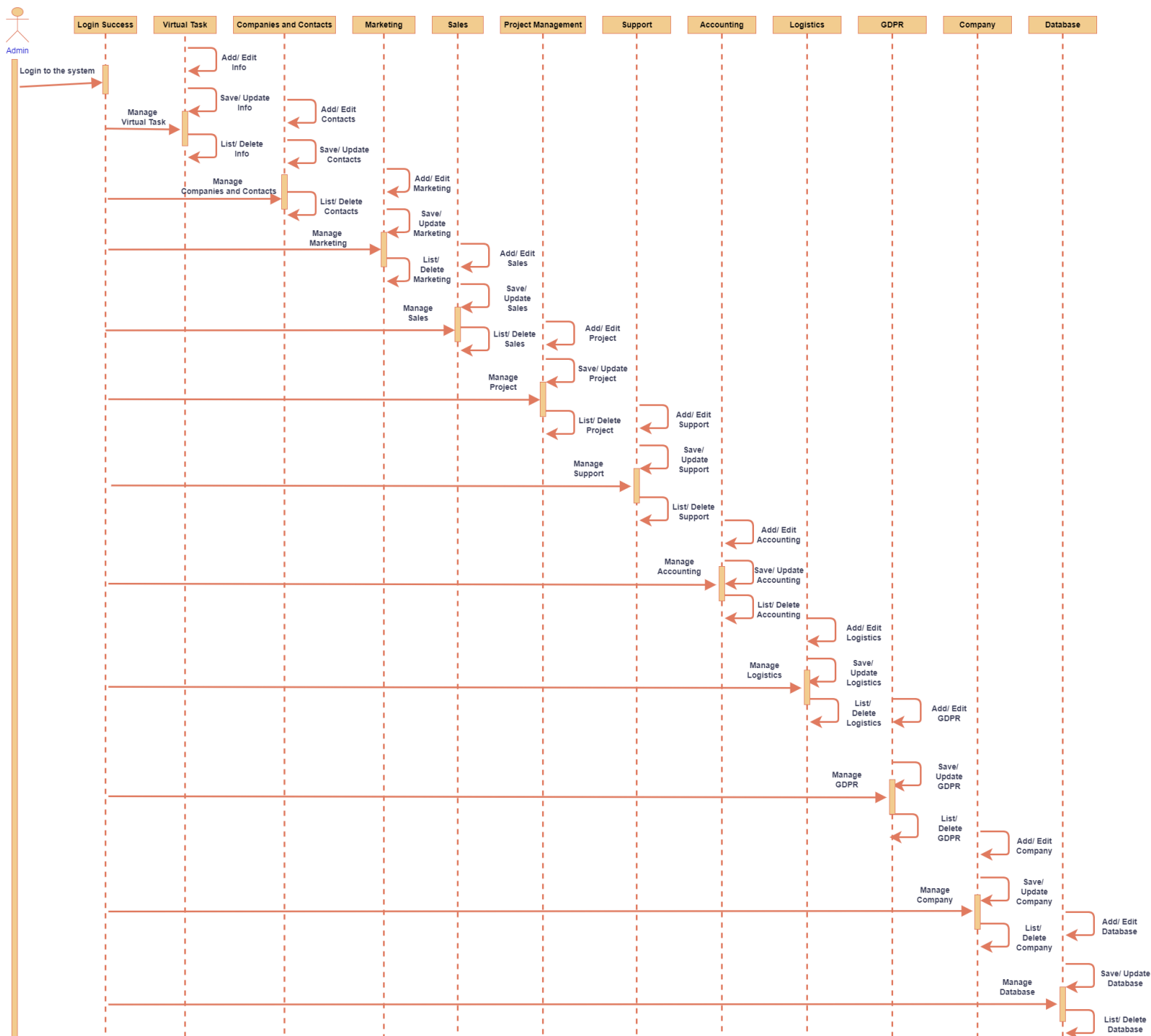


Figure 31: Sequence diagram for DCL CRM-360

9.6 Component diagram for DCL CRM-360

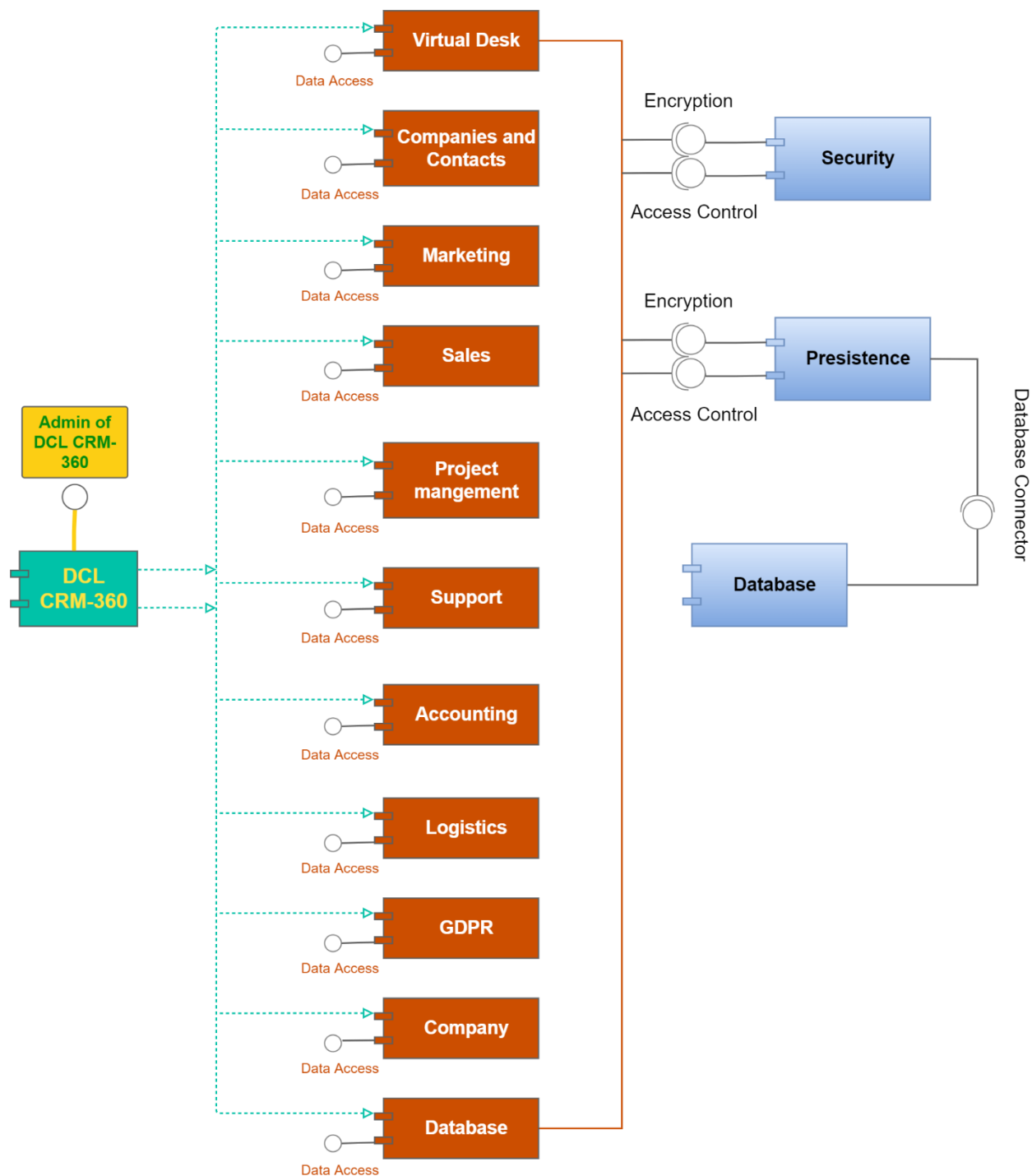


Figure 32: Component diagram for DCL CRM-360

9.7 Deployment diagram for DCL CRM-360

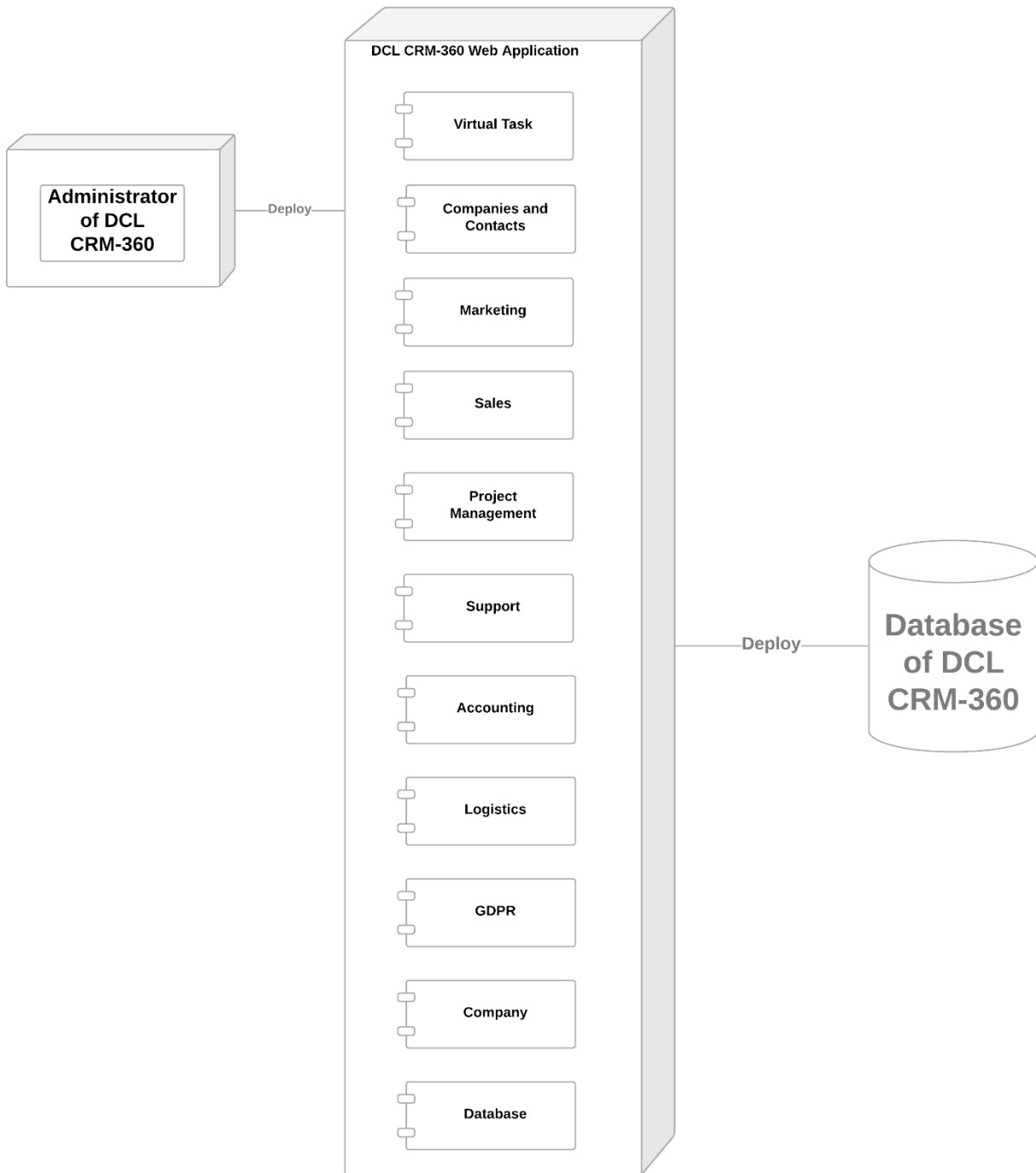


Figure 33: Deployment diagram for DCL CRM-360

9.8 System Interface Design / Prototype

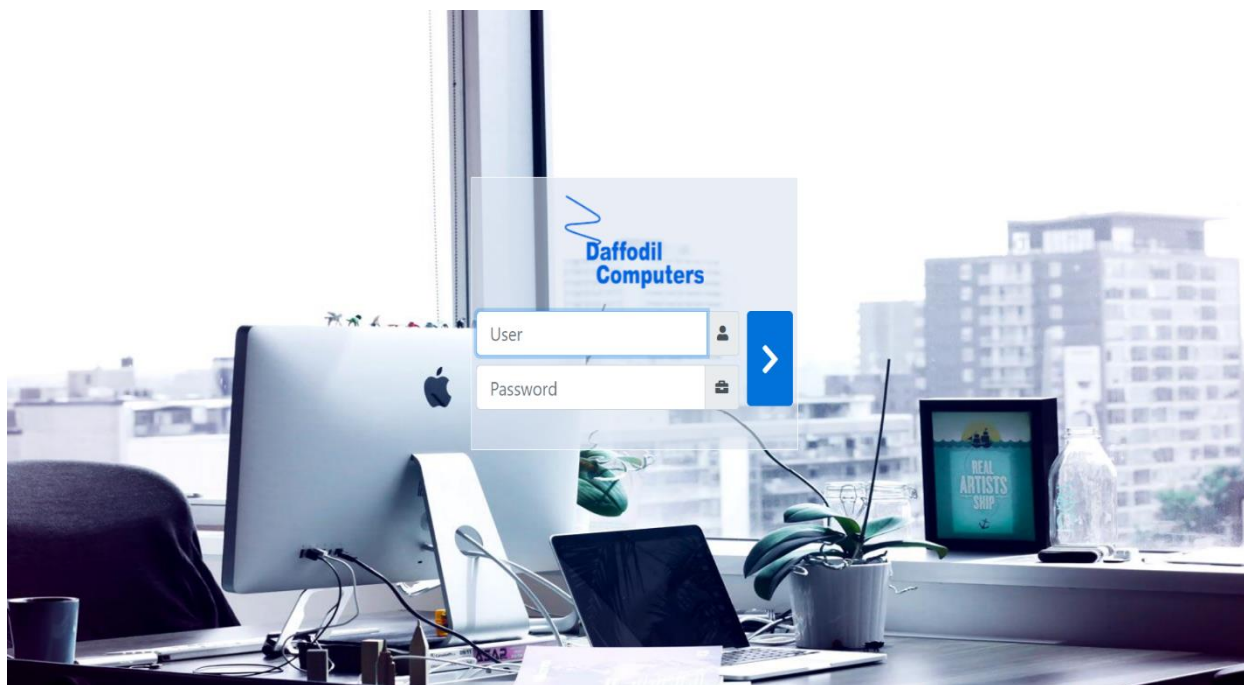


Figure 34: Login UI of DCL CRM-360


History of access activity to your account - DCL CRM ×

The history shows only the last 30 entries, the full list is available in the admin panel.


Date time	Status	User IP address	Browser
2022-02-07 21:16:20	Signed in	45.118.247.22	Google Chrome 97
2022-02-07 14:16:11	Signed in	45.118.247.22	Google Chrome 97
2022-02-06 20:07:35	Signed in	45.118.247.22	Google Chrome 97
2022-02-06 18:09:12	Signed in	103.121.76.33	Google Chrome 98
2022-02-06 15:23:46	Signed in	103.121.76.33	Google Chrome 97
2022-02-06 12:52:32	Signed in	45.118.247.22	Google Chrome 97
2022-02-06 12:43:43	Signed in	103.121.76.33	Google Chrome 98
2022-02-06 11:44:01	Signed in	103.121.76.33	Google Chrome 97
2022-02-06 11:12:50	Signed off	103.121.76.33	Google Chrome 97
2022-02-06 10:41:42	Signed off	103.121.76.33	Google Chrome 97

× Close



Figure 35: Activity history

 **Change password - DCL CRM**
×


Old password



New password

Confirm password




The new password must meet the following criteria:

- Minimum password length: 8
- Maximum password length: 32
- Uppercase letters from A to Z
- Lowercase letters a to z
- Password should contain numbers

↻ Change password
✕ Cancel

Figure 36: Password change interface

Databases
PRODUCT DATABASE
Products
Product category
Outsourced Products
Assets
SERVICE DATABASE
Services
Outsourced Services
Sold Services
LISTS
Email history
Text messages
Call history
RSS

 / Databases / Products / List

Records list ▾ Actions ▾ + Add record

All
First « 1 » 1 to 3




	Product name	Product category	Unit price	Available product quantity	Product active	Sales start date
<input type="checkbox"/> 	DCL Laptop		0	0	No	
<input type="checkbox"/> 	McAfee Total Protection	Antivirus	34 £	0	No	20-01-2022
<input type="checkbox"/> 	SSD	Hardware	2100 £	0	Yes	22-01-2022

Figure 37: Inventory interface

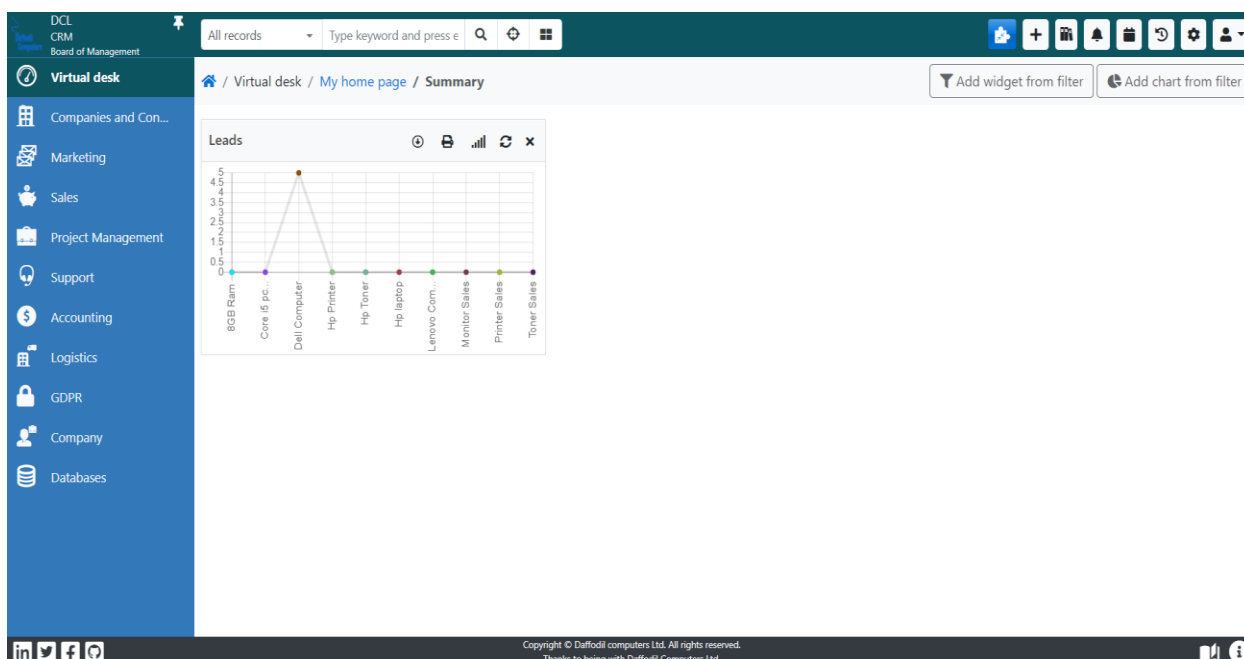


Figure 38: Dashboard interface

My preferences
Viewing user details "DCL CRM"

[Change password](#) [Reset password](#) [Edit](#) [More](#)

Basic information

User name	DCL_CRM	Admin	Yes
First name	CRM	Last name	DCL
Role	Board of Management	Status	Active
Super user	Yes		

Contact information

Primary email	shahinurshawon35@gmail.com	Secondary email	shahinurshawon3@gmail.com
Primary phone	+880 1954-154357	CRM phone extension	+880 1954-154357
Permission to send emails	Yes		

Figure 39: My preferences interface-1

Calendar configuration	
Date format	dd-mm-yyyy
Time zone	(UTC+06:00) Dhaka
Default Calendar view	This month
Default Event status	Planned
Popup reminder interval	15 minutes
Calendar hour format	24
Starting day of the week	Monday
Default activity type	Meeting
Preview date format	Time elapsed
Other event duration (mins)	Call - 60, Meeting - 60, To Do - 60

Configuration of currency and numeric fields	
Currency	Taka
Symbol placement	1.0\$
Digit grouping pattern	123456789
Number of currency decimals	2
Decimal separator	.
Truncate trailing zeros	Yes
Digit grouping separator	Space

Working Time Configuration	
Day starts at	08:00
Day ends at	23:00

Figure 40: My preferences interface-2

Chapter 10 – Deployment/Development

10.1 Core Module Coding Sample

```

1  <?php|
2  namespace Config;
3
4  /**
5   * Configuration file: Config\Db.
6   */
7  class Db
8  {
9      /** Gets the database server */
10     public static $db_server = 'localhost';
11
12     /** Gets the database port */
13     public static $db_port = '3306';
14
15     /** Gets the database user name */
16     public static $db_username = 'demodclcrm';
17
18     /** Gets the database password */
19     public static $db_password = 'demodclcomcrm';
20
21     /** Gets the database name */
22     public static $db_name = 'demodclcrm';
23
24     /** Gets the database type */
25     public static $db_type = 'mysql';
26
27
28     /**
29      * Gets host name.
30      */
31     public static function db_hostname()
32     {
33         return self::$db_server . ':' . self::$db_port;
34     }
35
36
37     /**
38      * Basic database configuration.
39      */
40     public static function base()
41     {
42         return [
43             'dsn' => self::$db_type . ':host=' . self::$db_server . ';dbname=' .
                self::$db_name . ';port=' . self::$db_port,
44             'host' => self::$db_server,
45             'port' => self::$db_port,
46             'username' => self::$db_username,
47             'password' => self::$db_password,
48             'dbName' => self::$db_name,
49             'tablePrefix' => 'yf_',
50             'charset' => 'utf8',
51         ];
52     }
53 }

```

Figure 41: Database Connection

```

1 {strip}
2 {if App\Config::security('CHANGE_LOGIN_PASSWORD')}
3 {assign var=ICON value=Vtiger_Menu_Model::getMenuIcon($MENU, $MENU['name'])}
4 <li class="tpl-menu-Profile c-menu_item js-menu_item nav-item menuLabel {if !$HASCHILDS}hasParentMenu
  {/if}" data-id="{ $MENU['id']}" data-js="mouseenter mouseleave">
5     <a class="nav-link collapsed{if $ICON} hasIcon{/if} js-submenu-toggler is-submenu-toggler"
6       data-toggle="collapse" data-target="#submenu-{ $MENU['id']}" role="button" href="#"
7       aria-haspopup="true" aria-expanded="false" aria-controls="submenu-{ $MENU['id']}">
8         { $ICON}
9         <span class="c-menu_item_text js-menu_item_text" title="{ $MENU['name']}" data-js="class:
10          u-white-space-n">{ $MENU['name']}</span>
11         <!--<span class="toggler" aria-hidden="true"><span class="fas fa-plus-circle"></span><span
12          class="fas fa-minus-circle"></span></span>-->
13     </a>
14     <div class="tpl-menu-Profile_submenu js-submenu collapse" id="submenu-{ $MENU['id']}"
15       data-js="bootstrap:collapse" data-parent="#submenu-{ $MENU['id']}">
16       <ul class="nav flex-column">
17         <li class="menuPanel nav-item">
18           <button name="changePass" data-url="index.php?module=Users&view=PasswordModal&
19             mode=change&record={ $USER_MODEL->getRealId()}"
20             class=" btn btn-block btn-light showModal" type="button" title="
21             {Vtiger_Menu_Model::vtranslateMenu('LBL_CHANGE_LOGIN_PASSWORD', $MENU_MODULE)}">
22             {Vtiger_Menu_Model::vtranslateMenu('LBL_CHANGE_LOGIN_PASSWORD', $MENU_MODULE)}
23           </button>
24         </li>
25       </ul>
26     </div>
27   </li>
28 {/if}
29 {/strip}

```

Figure 42: Admin profile code sample

```

1  {strip}
2      {if count($NEW_ACCOUNTS) > 0}
3          {if $PAGING_MODEL->getCurrentPage() eq 1}
4              <div class="row">
5                  <div class="col-4">
6                      <h6><b>{\App\Language::translate('Account Name' , $MODULE_NAME)}</b></h6>
7                  </div>
8                  <div class="col-4">
9                      <h6><b>{\App\Language::translate('LBL_ASSIGNED_TO' , $MODULE_NAME)}</b></h6>
10                 </div>
11                 <div class="col-4">
12                     <h6><b>{\App\Language::translate('Created Time' , $MODULE_NAME)}</b></h6>
13                 </div>
14             </div>
15             <hr>
16         {/if}
17         {foreach from=$NEW_ACCOUNTS key=RECORD_ID item=ACCOUNTS_MODEL}
18             <div class="row paddingLRZero">
19                 <div class="col-4">
20                     {if \App\Privilege::isPermitted($MODULE_NAME, 'DetailView', $RECORD_ID)}
21                         <a href="index.php?module=Accounts&view=Detail&record={$RECORD_ID}">
22                             <b>{\App\Purifier::encodeHtml($ACCOUNTS_MODEL['accountname'])}</b>
23                         </a>
24                     {else}
25                         {\App\Purifier::encodeHtml($ACCOUNTS_MODEL['accountname'])}
26                     {/if}
27                 </div>
28                 <div class="col-4">
29                     {$ACCOUNTS_MODEL['userModel']->getName()}
30                 </div>
31                 <div class="col-4">
32                     <span>
33                         {\App\Fields\DateTime::formatToViewDate($ACCOUNTS_MODEL['createdtime'])}
34                     </span>
35                 </div>
36             </div>
37         {/foreach}
38         {if count($NEW_ACCOUNTS) eq $PAGING_MODEL->getPageLimit()}
39             <div class="float-right padding5">
40                 <button type="button" class="btn btn-sm btn-primary showMoreHistory" data-url="{ $WIDGET->getUrl1
41                     ()}&page={$PAGING_MODEL->getNextPage()}">{\App\Language::translate('LBL_MORE' , $MODULE_NAME)}</
42                 button>
43             </div>
44         {/if}
45     {else}
46         {if $PAGING_MODEL->getCurrentPage() eq 1}
47             <span class="noDataMsg">
48                 {\App\Language::translate('LBL_NO_RECORDS_MATCHED_THIS_CRITERIA')}
49             </span>
50         {/if}
51     {/if}
52 {/strip}

```

Figure 43: Account create sample code

```

public function getAccountHierarchy($id, $listColumns = false)
{
    \App\Log::trace('Entering getAccountHierarchy(' . $id . ') method ...');

    $listViewHeader = [];
    $listViewEntries = [];
    $listColumns = $listColumns ?: App\Config::module('Accounts', 'COLUMNS_IN_HIERARCHY');
    if (empty($listColumns)) {
        $listColumns = $this->list_fields_name;
    }

    $hierarchyFields = [];
    foreach ($listColumns as $fieldLabel => $fieldName) {
        if (\App\Field::getFieldPermission('Accounts', $fieldName)) {
            $listViewHeader[] = $fieldLabel;
        }
        $field = \App\Field::getFieldInfo($fieldName, 'Accounts');
        $hierarchyFields[] = $field;
    }
    $this->hierarchyFields = $hierarchyFields;
    $accountsList = [];
    $encounteredAccounts = [$id];
    $accountsList = $this->__getParentAccounts($id, $accountsList, $encounteredAccounts);
    $baseId = current(array_keys($accountsList));
    $accountsList[$baseId] = $this->__getChildAccounts($baseId, $accountsList[$baseId], $accountsList[$baseId]['depth']);
    $this->getHierarchyData($id, $accountsList[$baseId], $baseId, $listViewEntries);
    \App\Log::trace('Exiting getAccountHierarchy method ...');
    return ['header' => $listViewHeader, 'entries' => $listViewEntries];
}

```

Figure 44: Account controller sample code

```

1  <?php
2  |
3  class Campaigns extends CRMEntity
4  {
5      public $table_name = 'vtiger_campaign';
6      public $table_index = 'campaignid';
7      public $tab_name = ['vtiger_crmentity', 'vtiger_campaign', 'vtiger_campaignscf', 'vtiger_entity_stats'];
8      public $tab_name_index = ['vtiger_crmentity' => 'crmid', 'vtiger_campaign' => 'campaignid', 'vtiger_campaignscf' => 'campaignid', 'vtiger_entity_stats' => 'crmid'];
9
10     /**
11      * Mandatory table for supporting custom fields.
12      */
13     public $customFieldTable = ['vtiger_campaignscf', 'campaignid'];
14     public $column_fields = [];
15
16     public $list_fields_name = [
17         'Campaign Name' => 'campaignname',
18         'Campaign Type' => 'campaigntype',
19         'Campaign Status' => 'campaignstatus',
20         'Expected Revenue' => 'expectedrevenue',
21         'Expected Close Date' => 'closingdate',
22         'Assigned To' => 'assigned_user_id',
23     ];
24
25     /**
26      * @var string[] List of fields in the RelationListView
27      */
28     public $relationFields = [];
29     //Added these variables which are used as default order by and sortorder in ListView
30     public $default_order_by = '';
31     public $default_sort_order = 'DESC';
32     public $search_fields = [
33         'Campaign Name' => ['vtiger_campaign' => 'campaignname'],

```

```

34     'Campaign Type' => ['vtiger_campaign' => 'campaigntype'],
35 ];
36 public $search_fields_name = [];
37 // Used when enabling/disabling the mandatory fields for the module.
38 // Refers to vtiger_field.fieldname values.
39 public $mandatory_fields = ['campaignname', 'createdtime', 'modifiedtime', 'assigned_user_id'];
40 // For Alphabetical search
41 public $def_basicsearch_col = 'campaignname';
42
43 /**
44  * Function to get the relation tables for related modules.
45  *
46  * @param bool|string $secModule secondary module name
47  *
48  * @return array with table names and fieldnames storing relations between module and this module
49  */
50 public function setRelationTables($secModule = false)
51 {
52     $relTables = [
53         'Contacts' => ['vtiger_campaign_records' => ['campaignid', 'crmid'], 'vtiger_campaign' => 'campaignid'],
54         'Leads' => ['vtiger_campaign_records' => ['campaignid', 'crmid'], 'vtiger_campaign' => 'campaignid'],
55         'Accounts' => ['vtiger_campaign_records' => ['campaignid', 'crmid'], 'vtiger_campaign' => 'campaignid'],
56         'Vendors' => ['vtiger_campaign_records' => ['campaignid', 'crmid'], 'vtiger_campaign' => 'campaignid'],
57         'Partners' => ['vtiger_campaign_records' => ['campaignid', 'crmid'], 'vtiger_campaign' => 'campaignid'],
58         'Competition' => ['vtiger_campaign_records' => ['campaignid', 'crmid'], 'vtiger_campaign' => 'campaignid'],
59         'OSSMailView' => ['vtiger_ossmailview_relation' => ['crmid', 'ossmailviewid'], 'vtiger_campaign' => 'campaignid'],
60         'Products' => ['vtiger_campaign' => ['campaignid', 'product_id']],
61     ];
62     if (false === $secModule) {
63         return $relTables;
64     }
65     return $relTables[$secModule];
66 }
67 }

```

Figure 45: Campaign controller sample code

```

public function moduleHandler($moduleName, $eventType)
{
    if ('module.postinstall' === $eventType) {
        \App\Fields\RecordNumber::getInstance($moduleName)->set('prefix', 'S-RC')->set('cur_id', 1)->save();
        \App\Db::getInstance()->createCommand()->update('vtiger_tab', ['customized' => 0], ['name' => $moduleName])->execute();
        $modcommentsModuleInstance = \vtlib\Module::getInstance('ModComments');
        if ($modcommentsModuleInstance && file_exists('modules/ModComments/ModComments.php')) {
            include_once 'modules/ModComments/ModComments.php';
            if (class_exists('ModComments')) {
                ModComments::addWidgetTo(['SRequirementsCards']);
            }
        }
        CRMEntity::getInstance('ModTracker')->enableTrackingForModule(\App\Module::getModuleId($moduleName));
    }
}
}

```

Figure 46: Sales requirement card sample code

```

public $list_fields_name = [
    'Company' => 'company',
    'Phone' => 'phone',
    'Website' => 'website',
    'Email' => 'email',
    'Assigned To' => 'assigned_user_id',
];
public $relationFields = [];
public $search_fields = [
    'Company' => ['leaddetails' => 'company'],
];
public $search_fields_name = [];
public $mandatory_fields = ['assigned_user_id', 'createdtime', 'modifiedtime'];
public $emailTemplate_defaultFields = ['leadsource', 'leadstatus', 'rating', 'industry', 'secondaryemail', 'email', 'annualrevenue'];
public $default_order_by = '';
public $default_sort_order = 'DESC';
public $def_basicsearch_col = 'company';
public function setRelationTables($secModule = false)
{
    $relTables = [
        'Products' => ['vtiger_seproductsrel' => ['crmid', 'productid'], 'vtiger_leaddetails' => 'leadid'],
        'Campaigns' => ['vtiger_campaign_records' => ['crmid', 'campaignid'], 'vtiger_leaddetails' => 'leadid'],
        'Documents' => ['vtiger_senotesrel' => ['crmid', 'notesid'], 'vtiger_leaddetails' => 'leadid'],
        'Services' => ['vtiger_crmentityrel' => ['crmid', 'relcrmid'], 'vtiger_leaddetails' => 'leadid'],
        'OSSMailView' => ['vtiger_ossmailview_relation' => ['crmid', 'ossmailviewid'], 'vtiger_leaddetails' => 'leadid'],
    ];
    if (false === $secModule) {
        return $relTables;
    }
}

```

Figure 47: Leads module sample code

```

<?php
class Partners_Hierarchy_View extends \App\Controller\View\Page
{
    use App\Controller\ClearProcess;
    public function checkPermission(App\Request $request)
    {
        if ($request->isEmpty('record')) {
            throw new \App\Exceptions\NoPermittedToRecord('ERR_NO_PERMISSIONS_FOR_THE_RECORD', 406);
        }
        if (!\App\Privilege::isPermitted($request->getModule(), 'DetailView', $request->getInteger('record'))) {
            throw new \App\Exceptions\NoPermittedToRecord('ERR_NO_PERMISSIONS_FOR_THE_RECORD', 406);
        }
    }

    public function process(App\Request $request)
    {
        $viewer = $this->getViewer($request);
        $moduleName = $request->getModule();
        $recordModel = \Vtiger_Record_Model::getInstanceById($request->getInteger('record'), $moduleName);
        $hierarchy = $recordModel->getHierarchy();

        $viewer->assign('MODULE', $moduleName);
        $viewer->assign('HIERARCHY', $hierarchy);
        $viewer->view('Hierarchy.tpl', $moduleName);
    }
}

```

Figure 48: Partner module view sample code

```

<?php
class Users_Login_View extends \App\Controller\View\Base
{
    public $csrfActive = false;
    public function __construct()
    {
        parent::__construct();
        if ($nonce = \App\Session::get('CSP_TOKEN')) {
            $this->headers->csp['script-src'] .= " 'nonce-{$nonce}'";
        }
        $this->headers->csp['default-src'] = '\self\';
        $this->headers->csp['script-src'] = str_replace([
            '\unsafe-inline\'', ' blob:'
        ], '', $this->headers->csp['script-src']);
        $this->headers->csp['form-action'] = '\self\';
        $this->headers->csp['style-src'] = '\self\';
        $this->headers->csp['base-uri'] = '\self\';
        $this->headers->csp['object-src'] = '\none\';
    }
    public function loginRequired()
    {
        return false;
    }
    public function checkPermission(App\Request $request)
    {
        return true;
    }

    public function preProcess(App\Request $request, $display = true)
    {
        parent::preProcess($request, false);
        $viewer = $this->getViewer($request);
        $viewer->assign('QUALIFIED_MODULE', $request->getModule());
        $viewer->assign('SHOW_FOOTER_BAR', false);
        if ($display) {
            $this->preProcessDisplay($request);
        }
    }

    public function postProcess(App\Request $request, $display = true)
    {
    }

    public function process(App\Request $request)
    {
        $viewer = $this->getViewer($request);
        $viewer->assign('IS_BLOCKED_IP', Settings_BruteForce_Module_Model::getCleanInstance()->isBlockedIp());
        if (\App\Session::has('UserLoginMessage')) {
            $viewer->assign('MESSAGE', \App\Session::get('UserLoginMessage'));
            $viewer->assign('MESSAGE_TYPE', \App\Session::get('UserLoginMessageType'));
            \App\Session::delete('UserLoginMessage');
            \App\Session::delete('UserLoginMessageType');
        }
        if ('2fa' === \App\Session::get('LoginAuthyMethod')) {
            $viewer->view('Login2faTotp.tpl', 'Users');
        } else {
            $viewer->assign('LANGUAGE_SELECTION', App\Config::main('langInLoginView'));
            $viewer->assign('LAYOUT_SELECTION', App\Config::main('layoutInLoginView'));
            $viewer->view('Login.tpl', 'Users');
        }
    }
}

```

```

    }
}
public function getHeaderCss(App\Request $request)
{
    return array_merge(parent::getHeaderCss($request), $this->checkAndConvertCssStyles([
        'modules.Users.Login'
    ]));
}
public function getHeaderScripts(App\Request $request)
{
    return array_merge(parent::getHeaderScripts($request), $this->checkAndConvertJsScripts([
        '~libraries/device-uuid/lib/device-uuid.js',
        'modules.Users.resources.Login'
    ]));
}
}

```

Figure 49: Login controller sample code

```

1 {assign var="_DefaultLoginTemplate" value=\App\Layout::getTemplatePath('Login.Default.tpl', 'Users')}
2 {assign var="_CustomLoginTemplate" value=\App\Layout::getTemplatePath('Login.Custom.tpl', 'Users')}
3 {assign var="_CustomLoginTemplateFullPath" value="layouts/basic/$_CustomLoginTemplate"}
4
5 {if file_exists($_CustomLoginTemplateFullPath)}
6     {include file=$_CustomLoginTemplate}
7 {else}
8     {include file=$_DefaultLoginTemplate}
9 {/if}
10

```

Figure 50: Login first view sample code

```

<div class="" id="loginDiv">
    {if !$IS_BLOCKED_IP}
        <form class="login-form row" action="index.php?module=Users&action=Login" method="POST"
            {if !App\Config::security('LOGIN_PAGE_REMEMBER_CREDENTIALS')}autocomplete="off"{/if}>
            <div class='fieldContainer mx-0 form-row col-md-12'>
                <div class='mx-0 col-sm-10'>
                    <label for="username" class="sr-only">{\App\Language::translate('LBL_USER',$MODULE)}</label>
                    <div class="input-group form-group first-group">
                        <input name="username" type="text" id="username" class="form-control form-control-lg" placeholder="
                            {\App\Language::translate('LBL_USER',$MODULE)}"
                            {if \App\Config::main('systemMode') === 'demo'}value="demo"{/if}
                            required="" {if !App\Config::security('LOGIN_PAGE_REMEMBER_CREDENTIALS')}autocomplete="off"{/if}>
                        <div class="input-group-append">
                            <div class="input-group-text"><i class="fas fa-user"></i></div>
                        </div>
                    </div>
                    <label for="password" class="sr-only">{\App\Language::translate('Password',$MODULE)}</label>
                    <div class="input-group form-group {if $LANGUAGE_SELECTION || $LAYOUT_SELECTION}first-group {/if}">
                        <input name="password" type="password" class="form-control form-control-lg" title="
                            {\App\Language::translate('Password',$MODULE)}" id="password"
                            {if \App\Config::main('systemMode') === 'demo'}value="demo"{/if} {if !App\Config::security(
                                'LOGIN_PAGE_REMEMBER_CREDENTIALS')}autocomplete="off"{/if}
                            placeholder="{\App\Language::translate('Password',$MODULE)}">
                        <div class="input-group-append">
                            <div class="input-group-text"><i class="fas fa-briefcase"></i></div>
                        </div>
                    </div>
                </div>

                {assign var=COUNTERFIELDS value=2}
                {if $LANGUAGE_SELECTION}
                    {assign var=COUNTERFIELDS value=$COUNTERFIELDS+1}
                    {assign var=DEFAULT_LANGUAGE value=App\Config::main('default_language')}
                    <div class="input-group input-group-lg form-group mb-0 {if $LAYOUT_SELECTION}first-group {/if}">
                        <select name="loginLanguage" class="form-control-lg form-control" title="{\App\Language::translate(
                            'LBL_CHOOSE_LANGUAGE',$MODULE)}">
                            {foreach item=VALUE key=KEY from=\App\Language::getAll()}
                                <option {if $KEY eq $DEFAULT_LANGUAGE} selected {/if} value="{\App\Purifier::encodeHtml($KEY)}"
                                    ">{$VALUE}</option>
                            {/foreach}
                        </select>
                        <div class="input-group-append">
                            <div class="input-group-text"><i class="fas fa-language"></i></div>
                        </div>
                    </div>
                {/if}
                {if $LAYOUT_SELECTION}
                    {assign var=COUNTERFIELDS value=$COUNTERFIELDS+1}
                    <div class="form-group mb-0">
                        <select name="layout" class="form-control-lg form-control" title="{\App\Language::translate(
                            'LBL_SELECT_LAYOUT',$MODULE)}">
                            {foreach item=VALUE key=KEY from=\App\Layout::getAllLayouts()}
                                <option value="{\App\Purifier::encodeHtml($KEY)}">{$VALUE}</option>
                            {/foreach}
                        </select>
                    </div>
                {/if}
            </div>
        </div>
    </div>

```

```

        <div class="col-sm-2">
            <button type="submit" class="btn btn-lg btn-primary btn-block heightButtonPhone heightDiv_{$COUNTERFIELDS}"
                title="{\App\Language::translate('LBL_SIGN_IN', $MODULE_NAME)}">
                <strong><span class="fas fa-chevron-right"></span></strong>
            </button>
        </div>
    </div>
    <input name="fingerprint" type="hidden" id="fingerPrint" value="">
</form>
{if App\Config::security('RESET_LOGIN_PASSWORD') && App\Mail::getDefaultSmtp()}
    <div class="form-group">
        <div class="">
            <a href="#" id="forgotpass">{\App\Language::translate('ForgotPassword', $MODULE)}?</a>
        </div>
    </div>
{if}
{/if}

```

Figure 51: Login form sample code

10.2 Possible problem breakdown

It is quite tough to do big work at a time and complete the work properly. Also, it will take a lot of time. But if the work can be broken into small steps, it will be easy to do and it will take less time than the previous time. The work will be completed properly and efficiently. So, the possible problem breakdown for DCL CRM-360 is given below:

- ✚ Database analysis and design
- ✚ Dashboard design and development
- ✚ Companies and contacts design and development
- ✚ Marketing design and development
- ✚ Sales design and development

Database analysis and design:

- ❖ Identify the system requirement and finalize them
- ❖ Gather all the required information
- ❖ All gathered information should be normalized
- ❖ Create ERD and data dictionary according to the information
- ❖ Create the database schema according to the data dictionary

Dashboard design and development:

- ❖ Design the dashboard
- ❖ Design for all charts and graphs section
- ❖ Develop the dashboard
- ❖ Create a function for retrieving data for charts and graphs

Companies and contacts design and development

- ❖ Identify all functionalities that should be in this section
- ❖ Design the specific section one by one
- ❖ Develop all the sections according to the requirement

Marketing design and development

- ❖ Identify marketing section's functionalities

- ❖ Front-end design for all functionalities
- ❖ Create a function to develop the functionalities one by one

Sales design and development

- ❖ Understand all sales perspectives
- ❖ Design the front-end of the sales option
- ❖ Develop them with the specific requirement.

10.3 Prioritization while developing

It is essential to prioritize the requirement during the development of a system. I have already prioritized the requirement list according to the MoSCoW standard. Now I am showing the list of the prioritized requirements that I will follow during the development of DCL CRM-360.

Priority Serial	Requirement
1	Admin registration at the time of installation and login to the system.
2	All functions of companies and contacts including leads, accounting, partners, etc. added by the admin.
3	Marketing functions like campaigns, sales inquiries, and occurrences must-have in the system, and the admin will be able to manage them.
4	Most manageable sales function.
5	Manageable logistic functionalities
6	Project management functionalities should be easier.

7	The General Data Protection Regulation (GDPR) function should be added to the system.
8	Company details and all functionalities about the company could be added to the system.
9	Inventory could be added to the system to maintain the company's product easily.

Table 22: Priority list while developing

Chapter 11 – Testing

11.1 Test Plan Acceptance

Documentation of the test strategy, goals, timetable, estimates, and deadlines as well as resources needed to complete the project is included in a Test Plan. If you think about it as a template for testing, you'll understand what we're talking about here. They assist those who are not part of the QA department (such as business managers, engineers, and customer-facing teams) by explaining the testing process in detail. They serve as a roadmap for quality assurance engineers as they carry out their testing duties. They go into great depth on things like the scope of the exam, the estimate of the test, and the overall approach. To make it simpler for management people to evaluate and reuse this information, we've compiled it all into one document. (Bose, Test Planning: A Detailed Guide, 2020). There are mainly two types of testing.

➤ **Functional Testing:**

The method that is used by quality assurance specialists to determine if a piece of software meets its specified requirements is called functional testing. Black-box testing methodologies are used for functional testing because about the system's underlying logic, the tester is fully unfamiliar with them. Functional testing is only concerned with assessing whether or not a system works properly. (Bose, Functional Testing : A Detailed Guide, 2021). There are three kinds of functional testing is given below:

❖ **Unit Testing:**

- Input fields validation.
- Selected types filtering.
- For processing, pending, in realization, contact in the future, incorrect, unobtained, for conversion filtering in the list.

❖ **Module Testing:**

- Submit login form without login credentials.
- Registration data or log-in credential is invalid.
- Submit a form with actual or proper data.

❖ **Integration Testing:**

- Login with a proper login credential.
- Personal information was added and updated successfully.

➤ **Non-Functional Testing:**

Non-functional testing examines the software's functionality and performance. As opposed to this, functional testing seeks to confirm the functionality of a piece of software as a whole. Functional and non-functional testing is equally essential in software development. Both help to make sure your product is functioning properly. Testing that isn't part of the functional process is known as non-functional testing. (Kruger, 2021) Non-functional testing can be divided into many types

- ❖ **Security Testing**
- ❖ **Usability Testing**
- ❖ **Acceptance Testing**
- ❖ **Accessibility Testing**

11.2 Test Case

As used in software engineering, a system test is a single test that is run to fulfill a particular software testing goal, such as testing a particular program route or ensuring that a certain requirement is satisfied. A test case is composed of input parameters, programs, and procedures, trying to test procedure, and expected results. Test cases are the foundation of deliberate testing rather than random testing. It is possible to create a collection of test cases that will provide the appropriate coverage of the program under test. Using test cases that have been formally described, it is possible to run the same tests again against consecutive versions of the program, allowing for more efficient and effective regression testing. The test cases that I have used for testing this system is given below:

Unit test – test case:

Test Case Name	Unit Test		
Test Class			
Test Description			
Source of Data	Test Steps	Expected Result	Actual Result

Table 23: Unit test – test case**Module test – test case:**

Test Case Name	Module Test		
Test Class			
Test Description			
Source of Data	Test Steps	Expected Result	Actual Result

Table 24: Module test – test case

Integration test – test case:

Test Case Name	Integration Test		
Test Class			
Test Description			
Source of Data	Test Steps	Expected Result	Actual Result

Table 25: Integration test – test case**11.3 Unit Testing****Unit Test - 1 - Test Case:**

Test Case Name	Unit Test		
Test Class	Contacts create controller		
Test Description	Validation of a contact's last name while creating a contact		
Source of Data	Test Steps	Expected Result	Actual Result
Admin	1. Complete all fields on the form except the required contact the last name. 2. Fill out the form and submit it.	This field is required error message will appear while trying to create a contact.	A message appears that the field is required for creating the contacts.

Table 26: Unit test - 1 - test case

Home / Companies and Contacts / Contacts / Create

Basic information

Salutation * This field is required x v
*Last name
Lead source Self generated x v
Status Active x v
Job title Student
Gender Man x v

First name
Member of Accounts Type to search + -
*Assigned To DCL CRM (Board of Management)
Share with users: x DCL CRM (Board of Management)
Private ☒

Contact information

Office phone Bangladesh +880 1954-15435 Additional inform
Mobile phone Bangladesh +880 1954-15435 Additional inform
Permission to call ☐ Additional information Permission to send emails ☐

Figure 52: Unit test - 1

Unit Test - 2 - Test Case:

Test Case Name	Unit Test		
Test Class	The controller of Contacts creation.		
Test Description	Contacts add and check.		
Source of Data	Test Steps	Expected Result	Actual Result
Admin	1. Filled the form with all information. 2. Submit the form.	After entering all information and after saving the info it will go to this specific contacts details page.	After entering all information and after saving the info it will go to this specific contacts details page.

Table 27: Unit test - 2 - test case

Home / Companies and Contacts / Contacts / Detail / Sheikh Shahinur Rahman Shawon

Mr. Sheikh Shahinur Rahman Shawon
Assigned To: DCL CRM
Share with users: DCL CRM

Active Inactive

Summary Details Comments Updates Map Chat Activities Documents Email history Tickets Tickets (M:M) More

Summary

First name Sheikh Shahinur Rahman

Last name Shawon

Member of

Assigned To DCL CRM

Status Active

Job title Student

Office phone +880 1954-154357

Primary email shahinurshawon35@gmail.com

Description

Calendar

No pending activities

Comments

Add your comment here...

No comments

Emails

No emails

Figure 53: Unit test - 2

Unit Test - 3 - Test Case:

Test Case Name	Unit Test		
Test Class	Contacts		
Test Description	Validation of contacts lists		
Source of Data	Test Steps	Expected Result	Actual Result
Admin	1. Log in to the admin panel. 2. Go to the contacts page and check the all-contacts list.	Contacts that are created should be shown on the contacts list on the contact page.	Contacts that are created should be shown on the contacts list on the contact page.

Table 28: Unit test - 3 - test case

[Home](#) / [Companies and Contacts](#) / [Contacts](#) / [List](#)

Records list ▾ Actions ▾ + Add record

Filter: All ▾

First « 1 » 0 to 1 ↺

	First name	Last name	Member of	Primary email	Office phone	Assigned To
<input type="checkbox"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>			A			Select an option
<input type="checkbox"/> <input type="text"/>	Sheikh Shahinur Rahman	Shawon		shahinurshawon35@gmail.com	+880 1954-154357	DCL CRM

Figure 54: Unit test - 3.1

Summary Details Comments Updates Map Chat

Activities Documents Email history Tickets Tickets (M:M) More ▾

Summary

First name Sheikh Shahinur Rahman
 Last name Shawon
 Member of
 Assigned To [DCL CRM](#)
 Status Active
 Job title Student
 Office phone [+880 1954-154357](#)
 Primary email [shahinurshawon35@gmail.com](#)
 Description

Calendar

Current History +

No pending activities

Comments

Search

Add your comment here...

No comments

Emails

No emails

Figure 55: Unit test - 3.2

11.4 Module Testing

Module Test - 1 - Test Case:

Test Case Name	Module Test		
Test Class	The controller of Contact creation.		
Test Description	Make a contact attempt without entering any information.		
Source of Data	Test Steps	Expected Result	Actual Result
Admin	1. Log in to the system 2. Go to the contact page and click add record. 3. Click the save button without giving any data.	This field is required message will be appeared for the required field.	This field is required message will be appeared for the required field.

Table 29: Module test - 1 - test case

[Home](#) / [Companies and Contacts](#) / [Contacts](#) / [Create](#)

Basic information

Salutation

* This field is required

*Last name

Lead source

Select an option

Status

Select an option

Job title

Gender

Select an option

Figure 56: Module test - 1

Module Test - 2 - Test Case:

Test Case Name	Module Test		
Test Class	The controller of Contact creation.		
Test Description	Make a contact attempt using a data format that isn't valid.		
Source of Data	Test Steps	Expected Result	Actual Result
Admin	1. Log in to the system 2. Go to the contact page and click add record. 3. Click the save button with giving invalid data format.	Please enter a valid email address message that will be appeared for the invalid data.	Please enter a valid email address message that will be appeared for the invalid data.

Table 30: Module test - 2 - test case

Contact information

Please enter a valid email address

Office phone

Bangladesh

Office phone

Additional inform

Primary email

shahinurshawon3

Mobile phone

Bangladesh

+880 1954-15435

Additional inform

Secondary email

Permission to call

☐

Permission to send emails

☐

Figure 57: Module test - 2

11.5 Integration Testing

Integration Test - 1 - Test Case:

Test Case Name	Integration Test		
Test Class	The controller of Authentication.		
Test Description	Login with valid credentials and redirect to dashboard.		
Source of Data	Test Steps	Expected Result	Actual Result
Admin	1. Just go to the URL 2. Enter all of your correct usernames and password. 3. Click on the right-side arrow button.	If the credential is correct it will redirect to the dashboard.	If the credential is correct it will redirect to the dashboard.

Table 31: Integration test - 1 - test case

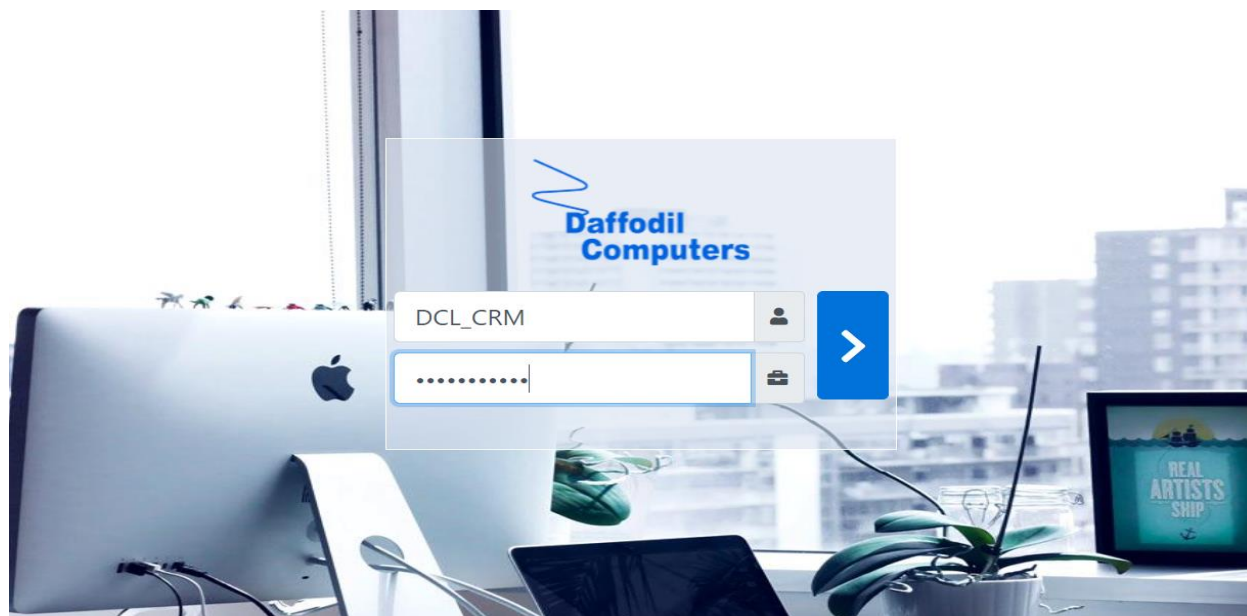


Figure 58: Integration test – 1.1

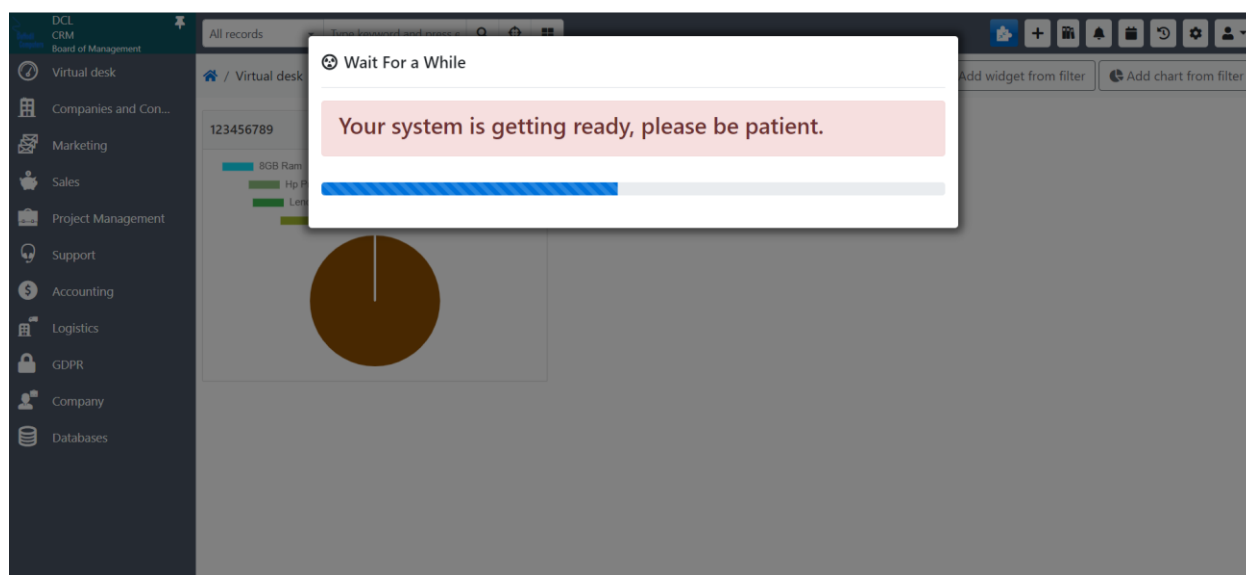


Figure 59: Integration test – 1.2

Integration Test - 2 - Test Case:

Test Case Name	Integration Test		
Test Class	Personal info controller		
Test Description	Personal information adds and edits the information.		
Source of Data	Test Steps	Expected Result	Actual Result
Admin	1. Navigate to the page called My Preferences. 2. Click on the edit option. 3. Change the required information	All information was updated successfully.	All information was updated successfully.

Table 32: Integration test - 2 - test case

[Home](#) / [Users](#) / [Edit](#)

Basic information

*User name

First name

*Last name

*Role

Board of Management

Super user

☒

Contact information

*Primary email

Secondary email

Primary phone

Bangladesh

+880 1954-154357

CRM phone extension

Bangladesh

+880 1954-154357

Permission to send emails

☒

Figure 60: Integration test – 2.1

My preferences

Viewing user details "DCL CRM"

Change password

Reset password

Edit

More

Basic information

User name	DCL_CRM	Admin	Yes
First name	CRM	Last name	DCL
Role	Board of Management	Status	Active
Super user	Yes		

Contact information

Primary email	shahinurshawon35@gmail.com	Secondary email	shahinurshawon3@gmail.com
Primary phone	+880 1954-154357	CRM phone extension	+880 1954-154357
Permission to send emails	Yes		

Figure 61: Integration test – 2.2

Chapter 12 – Implementation

12.1 Training

Training is particularly important when software is introduced since users need to be trained on how to utilize the program. The need for training following software deployment is important to ensure optimal productivity, reduce associate turnover, and boost satisfaction level and spirit from the very earliest stages. There are numerous techniques to send the training modules to the user of the computer system and other ways in which the program may be maintained once it has been installed. When establishing a strategy for effective implementation, one must examine the crucial factors of the company. Keeping managed services lines clear from small problem calls can assist keep support employees accessible for severe situations. After the program is built training and assistance are needed since infrastructure may not be strong enough to support certain software settings such as port allocations and print capabilities. A table that describes the training procedures of DCL CRM - 360 is given below:

SN.	User	Training Scope	Time Period	Comment
1	Admin	Create leads, accounts, partners, vendors, competitions, customers, campaigns, sales enquire, and occurrences successfully. And how to create a database to store those pieces of information. How can the admin modify the above information properly? Admin will be able to change the information that he added while he registered into the system. Admin will be trained about the required field which is essential for creating the above function.	3.5 hours	Admin easily understands all the functions and operators.

Table 33: Admin training

12.2 Big Bang

The major approaches of implementing a new system in a company can be divided into three pieces: the first one is big bang adoption, the second one is gradual adoption and the last one is linear adoption. All old and new systems operate in parallel in linear adoption, enabling all users to become compatible with the latest system while constantly working on the previous system. The term "phased adoption" refers to how the solution will be implemented in phases, with each phase bringing the system closer to full adoption. The transfer from using the previous system to utilizing the new system, known as big bang adoption, occurs on a proper date, the so-called "instant system changeover". The new system will be implemented on that day for everyone, and the old system will just be phased away after that. A big bang acceptance will be used to explain this preparation in the systematic approach. Big bang acts by quickly turning off the previous system and activating the current one. This method is much quicker than the others because it uses the new system right as the test is finished.

The suggested software does not need to be consistent with or attached to any current systems is the main advantage of big bang acceptance. This considerably simplifies the overall architecture of the proposed system, especially in a company with several incompatible systems. Compared among the acquisition types, the big bang is more expensive, despite the fact that it has fewer learning chances built into it, needing more planning. The systematic approach of such big bang acceptance will be used to explain this preparation. Big bang acts by quickly turning off the previous system and activating the current one. This method is much quicker than the others because it uses the new system right as the test is finished. The data transfer from the previous system may cause damage and instability since data may indeed be destroyed and the proposed program may crash. It is implemented on a single location using a single site's human resources.

12.3 Scaling

The scaling of this project has been done by the team leader of DCL. As an intern trainee, I did not get any information about this scaling acceptance.

12.4 Load balancing

The load balancing refers to the optimization of a system against the effect of its users. The number of users struck indicates how many people have used the system at the same time and how long it has lasted. Load balancing and load equalization are terms used to describe this. It distributes the demand over several servers, allowing the system to keep running smoothly. There is only one user who is an admin but the number of hits per day is huge because it's a big system and maintains thousands of customers' information, as a result, an ideal load balancing approach should originate.

Chapter 13 – Critical Appraisal and Evaluation

13.1 Objective Could be Met

The following is a list of the goals that were initially announced:

- ✚ Registration and login system for users (Admin)
- ✚ Companies and contacts management.
- ✚ Marketing and sales record management.

Objective/goals – 1

Achievement rate and others:

Only the administrator has access to the login and registration function of the system. Throughout the program installation, admin information needs to give along with the login credentials. Once the system is installed in the local pc or shared server, the admin can log in to the system with the credential that he provided during installing the software. If the credentials are accurate, then the admin will redirect to the dashboard. It will take a few seconds to ready the system and after that admin needs to give the visiting purpose so that he can remember why he logged in to the system. Then the admin will redirect to the dashboard and he will get permission to access the whole system. So, the achievement rate for this objective is 100 percent.

Objective/goals – 2

Achievement rate and others:

Companies and contacts management include leads, accounts, partners, vendors, competition, vendors, and contacts. Admin can create the information for the above function. He is also able to modify them according to the requirement and can see the list of this information of particular functions.

Companies and contacts options contain the major functionality of DCL CRM-360 and those functions work perfectly. So, the achievement rate for this objective is 100 percent.

Objective/goals – 3

Achievement rate and others:

Marketing and sales record management include campaigns, sales inquiries, occurrences, opportunities, sales requirements, and vendor inquiries. Admin can create the information for the above function. He is also able to modify them according to the requirement and can see the list of this information of particular functions. Marketing and sales options are sometimes used in ERP systems, but we include them in the DCL CRM-360 system because the functionality that is contained by the marketing and sales option is necessary for the CRM system.

The marketing and sales record option contain the major functionality of DCL CRM-360 and those functions work perfectly. So, the achievement rate for this objective is 100 percent.

13.2 How much better could have been done

This DCL CRM-360 is a complete CRM system for an organization. But nothing can be fully accurate, it can be better more and more. This DCL CRM-360 system also can be better than the current system. This current system covers all requirements of a CRM system but this system is not fully optimized. It takes too much time to load. When the admin login into the system, it redirects to the dashboard. But it takes much time to load the dashboard, so it can be optimized so that the system can load in a short time. Without loading problem, this has no major problem that can be better in this system.

13.3 How better is the features of the solution

- **Companies and contacts manage:** With this DCL CRM-360 an organization will be able to keep records of all leads, accounts, partners, vendors, competition, and contacts of customers.

- **Marketing manages:** Through marketing, an organization will be to track market campaigns, sales inquiries, and market occurrences.
- **Sales management:** Sales options will help the organization to create opportunities, make sales requirements, and track vendors inquiries.

13.4 Which features could not be touched

The DCL CRM-360 solution is solely for administrators. Without admin, no one will be able to access the system. Employee or customers access features were not touched totally because one person can control the total system.

Chapter 14 – Lesson Learned

14.1 Pre Project – Review – Closing

DCL CRM-360 is mainly a web-based CRM system. To build up this system my company has followed a predefined structure like collecting the requirement from the client, creating a plan to build the system, selecting an architecture for this system, and selecting a name for this project. Then I have developed this system with PHP and wrote documentation according to the project. This DCL CRM-360 system is concerned about customer tracking, maintaining the relationship with customers, and so on.

14.2 What I have learned

DCL CRM-360 is a web-based application for DCL (Daffodil Computers Limited). I have worked as a designer and developer for this project since I am an intern trainee of DCL. I learned a lot of things that can really be beneficial for me in the future while working on this project. First of all, I have learned how to work with others' created software architecture. While I had started the design, I have learned some new design techniques that were unfamiliar to me. For designing this system, I have learned them and implemented them into the system. Such as creating a design by templating and how to make the design more user-friendly. After completing the design, I have planned for the development of the system. For developing any system, it is essential to design a database first. Without designing a proper database, a system cannot be completed. I have worked with some small databases before that were needed for the small project. But in this system, I have learned how to work with a huge database and more data tables. After database design, then comes coding for developing the system. It was a big challenge for me to develop such a big project. Because I had to write a clean code, more readable, and easy code so that further development can be easier for the developer. But I had to maintain all functionalities and all requirements with easier logic. After completing the project, I was assigned to deploy the system on the live server. It was my first time deploying a system on a shared server. So, I can say it was a great journey because I have learned too many things during this project.

14.3 The Problems I Have Faced

I was working as a designer and developer both in this DCL CRM-360 project. Throughout the project lifespan, I've encountered several difficulties and issues. The major challenge for me was working with team leader's created project architecture. Because it is quite tough to work with other person's created architecture. It takes much time to understand the architecture. I have to face and resolve challenges iteratively since I used the Agile DSDM process, which assures iterative development. This means that issues that come in one timebox are solved in this other timebox and task. While I have started the design for the system, I was instructed to do the design by templating. But I didn't know how to do the templating for the design that's why it took some time to complete the design. Also, I had to learn user-friendly design in a new way. When I started working on the system's database, I realized I'd have to develop a large database with a lot of data tables. But I didn't work with this type of huge database before. It was tough for me to create connections among the data tables. The biggest challenge for me to develop such a big project was because it was the first time for me to work with a huge project. Writing a thousand lines of code was not an easier thing for the first time. Therein are many new things I had to learn for developing the system properly that take more time than normal developing time. Since the DCL CRM-360 system is a completely web-based application, I had to deploy the system on a shared server. But I had no experience working on a live server that's it gave me some pain to deploy on a live server.

14.4 What Solution Occurred

For every problem, there is a solution to get rid of the problem. For the problems that I mentioned above, I have made a solution for each problem and completed the system. First and foremost, I made a solution on how to work with software architecture established by others. While working on the design, I discovered several new design approaches that were unexpected to me. I learned them and included them in the system when building this system. For example, how to create a design using templating and how to make the design more user-friendly. I have planned for the system's evolution after completing the design. A database must be designed before any system can be developed. A system cannot be finished until a good database is designed. I've previously worked with a few minor databases that were required for the little project. However, with this

system, I found a solution on how to work with a large database and several data tables. Following database design, coding for system development follows. Creating such a large project was a significant challenge for me. Because I needed to build clear, legible code that would make future development easier for the developer. However, I had to keep all functions and needs with simpler logic. After finishing the project, I was tasked with deploying the system to the live server. It was my first-time installing software on a shared server and I found the easiest way to deploy the system on the shared server.

Chapter 15 – Conclusion

15.1 Summary of the project

DCL CRM (Customer Relationship Management)-360 is a web-based application that will help the organization to keep the relationship with customers. This system is able to create and keep records of companies and contacts. Within the companies and contacts function, the organization will be able to create records of leads information, accounts details, partners information, vendors details, competition details, and contacts of a customer. When the organization will go the marketing function, it will be able to create the marketing campaign and record them. Sales inquiries is a major thing in an industry, so the organization will be able to inquire about the sales through this marketing function and it will be able to track record of occurrences. Sales-related problems can be solved with this DCL CRM-360 system. It is a complete customer relationship management system that covers all features of a CRM system. This system is designed with HTML, CSS, Bootstrap, JavaScript. PHP programming language has been used to develop this DCL CRM-360 system. All kinds of tables, charts, figures, and diagrams have been provided with the documents.

15.2 Goal of the project

Since I did an internship program in DCL, my project goal has been set by my organization. In the software industry, a system's goal is set according to the customer or client's requirement. This DCL CRM-360 system's goal has been also set according to the client's requirement. The goal of the DCL CRM-360:

- ❖ Have to create the opportunity to learn more about the customer through a system.
- ❖ Have to create a system that will help the organization to organize the business more efficiently.
- ❖ To automate the business needs an efficient software system.
- ❖ Make a usable way to track customer interaction easily.

15.3 Success of the project

When a thing meets its goals, then we can say the thing is successful because it has fulfilled the targets. DCL CRM-360 system has met its all goals according to the client's requirements.

- ❖ This DCL CRM-360 system has the capability to help the organization learn more about their customer.
- ❖ A system has been created that will help the organization to organize its business more efficiently.
- ❖ DCL CRM-360 is a perfect software to automate any business.
- ❖ DCL CRM-360 has all functionalities to track customer interaction.

Therefore, it is clear that the DCL CRM-360 has been completed successfully.

15.4 What I have done in the documentation

Since it is academic documentation so first, I had to follow the academic documentation structure for doing this documentation. I have explained everything in this documentation that I have done during the project. First of all, I have written an introduction of the system in the documentation then I started the initial study for this project and simultaneously did all required steps for this system gradually. All kinds of tables of this documentation have been created with MS word and all figures or diagrams have been created with some third-party application.

15.5 Value of the project

It is more difficult to do any work completely manually. If all that work can be done automatically then time and trouble can be saved. Technology makes it possible to do the same amount of work easily with less time and less effort. It is very difficult and time-consuming to manually keep all the customer details of an organization. But for an organization, it is very important to keep all the retail of its customers with it. If this task can be done easily in less time and with less effort then it will be a timely decision. DCL CRM-360 does this job with less effort and less time to store all kinds of business details. So, the value of DCL CRM-360 is much higher in this technical age.

Because the DCL CRM 360 will help an organization with all kinds of customer details in addition to their contacts as well as Sales Increase, Opportunities, Campaign, etc.

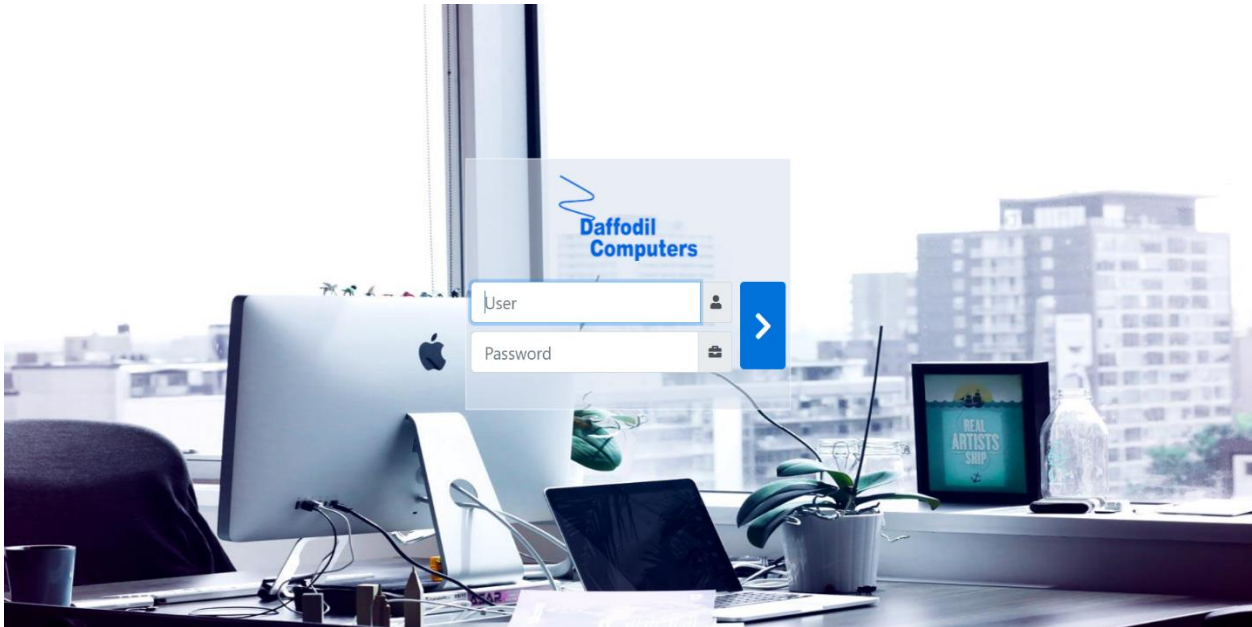
15.6 My Experience

Because I was unfamiliar with all of the technologies required for this project, I gained a lot of knowledge during working on it. I learned these things anew and learned how to implement and complete the project completely. I have learned how to work with others' created software architecture. While I had started the design, I have learned some new design techniques that were unfamiliar to me. For designing this system, I have learned them and implemented them into the system. Such as creating a design by templating and how to make the design more user-friendly. After completing the design, I have planned for the development of the system. For developing any system, it is essential to design a database first. Without designing a proper database, a system cannot be completed. I have worked with some small databases before that were needed for the small project. But in this system, I have learned how to work with a huge database and more data tables. After database design, then comes coding for developing the system. It was a big challenge for me to develop such a big project. Because I had to write a clean code, more readable, and easy code so that further development can be easier for the developer. So, that was a great journey for me because it taught me many things that will help me in the future.

Appendix

User guide

Login Page

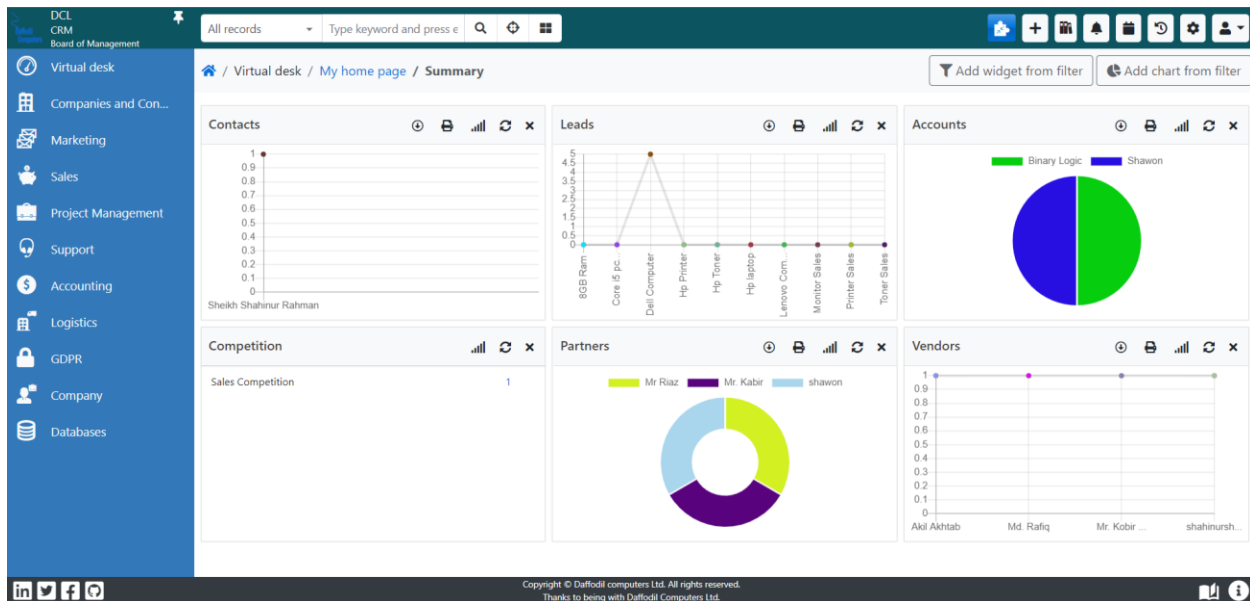


Provide login credentials to log in to the system.

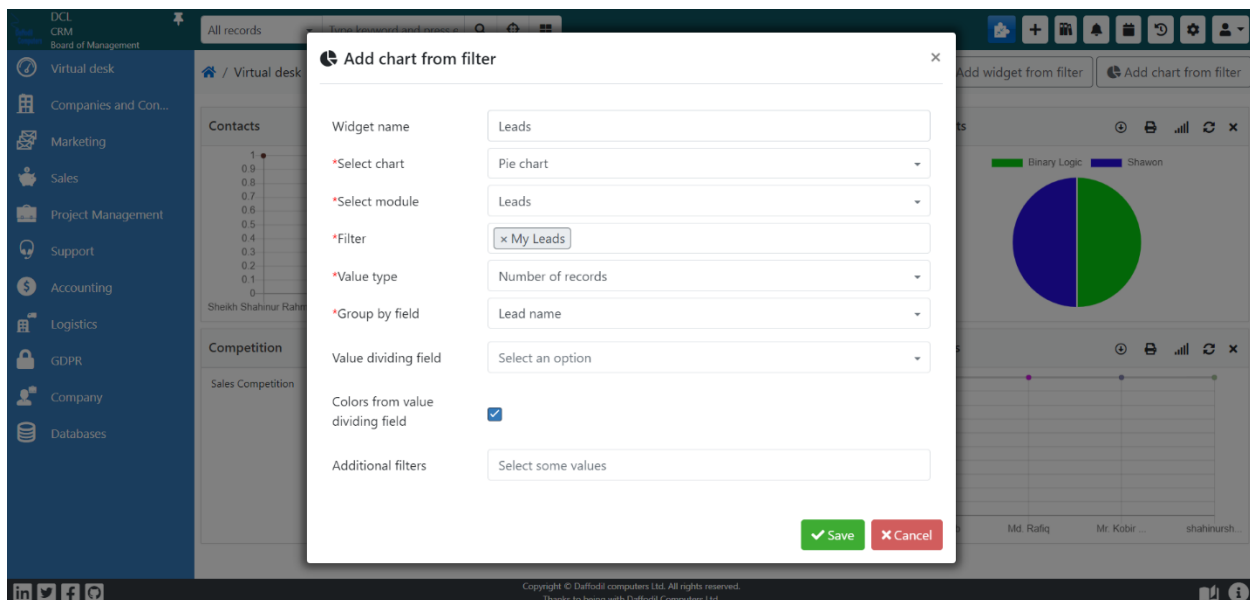
 Enter visit purpose

 Save

Provide the purpose of the visit to the system.



After login and providing the visit purpose the dashboard will be visible to you.



To add any type of chart of a specific option, click on the add chart from the filter function and provide all data this is required to create the chart.

	Lead name	Lead status	Industry	Primary phone	Website	Primary email	Assigned To
<input type="checkbox"/>	Dell Computer	For processing	Trade				DCL CRM
<input type="checkbox"/>	Hp laptop	Pending	Trade				DCL CRM
<input type="checkbox"/>	Lenovo Computer sales	Contact in the future	Trade				DCL CRM
<input type="checkbox"/>	Core i5 pc sales	Pending	Trade				DCL CRM
<input type="checkbox"/>	Hp Toner	For processing	Trade				DCL CRM
<input type="checkbox"/>	8GB Ram	Pending	Trade				DCL CRM
<input type="checkbox"/>	Toner Sales	Pending	Trade				DCL CRM
<input type="checkbox"/>	Monitor Sales	Pending	Trade				DCL CRM
<input type="checkbox"/>	Printer Sales	Pending	Trade				DCL CRM
<input type="checkbox"/>	Hp Printer	Pending	Trade				DCL CRM
<input type="checkbox"/>	Dell Computer	For processing	Trade				DCL CRM

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Click on the leads option to see the leads.

Lead details

*Lead name: Laptop

*Lead status: Pending

*Assigned To: DCL CRM (Board of Management)

Industry: Select an option

Number of Employees: 1

Share with users: Select some values

Sub-branch: Select an option

*Relation: B2C

Active: ☐ Private: ☐

Contact information

Registration details

Custom information












































Primary address

Description details

Save Cancel

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Click on add record option to create leads.

	Lead name	Lead status	Industry	Primary phone	Website	Primary email	Assigned To
	<input type="text"/>	<input type="text" value="Select some value"/>	<input type="text" value="Select some"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text" value="Select an of"/>
<input type="checkbox"/>	                                          						

Lead CRM

Board of Management

Virtual desk

Companies and Contacts

Leads

Accounts

Partners

Vendors

Competition

Contacts

Marketing

Sales

Project Management

Support

Accounting

Logistics

GDPR

Quick edit: **Lead**

Go to full form

Lead details

*Lead name

Dell Computer

*Assigned To

DCL CRM (Board of Management)

*Lead status

For processing

*Relation

B2B

Contact information

Primary email

Primary phone

Bangladesh

Primary phone

Registration details

VAT

<input type="checkbox"/>		8GB Ram	Pending Trade
<input type="checkbox"/>		Toner Sales	Pending Trade
<input type="checkbox"/>		Monitor Sales	Pending Trade
<input type="checkbox"/>		Printer Sales	Pending Trade
<input type="checkbox"/>		Hp Printer	Pending Trade
<input type="checkbox"/>		Dell Computer	For processing Trade

1

>

1 to 20

▼

Assigned To

Select an option

DCL CRM

DCL CRM

DCL CRM

DCL CRM

DCL CRM

DCL CRM

DCL CRM

DCL CRM

DCL CRM

DCL CRM

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Facebook

Twitter

Instagram

WhatsApp

Click on the quick edit option to edit the leads quickly.

Sales enquiries

Virtual desk
Companies and Con...
Marketing
Campaigns
Sales enquiries
Occurrences
Sales
Project Management
Support
Accounting
Logistics
GDPR
Company
Databases

Sales enquiries CRM Board of Management

/ Marketing / Sales enquiries / List

Records list Actions Add record All First « 1 » 1 to 2

	Subject	Status	Category	Assigned To	Created time
<input type="checkbox"/>	Laptop Sell	Draft	DCL CRM	09-02-2022 22:09	
<input type="checkbox"/>	discount	Draft	DCL CRM	09-02-2022 22:16	

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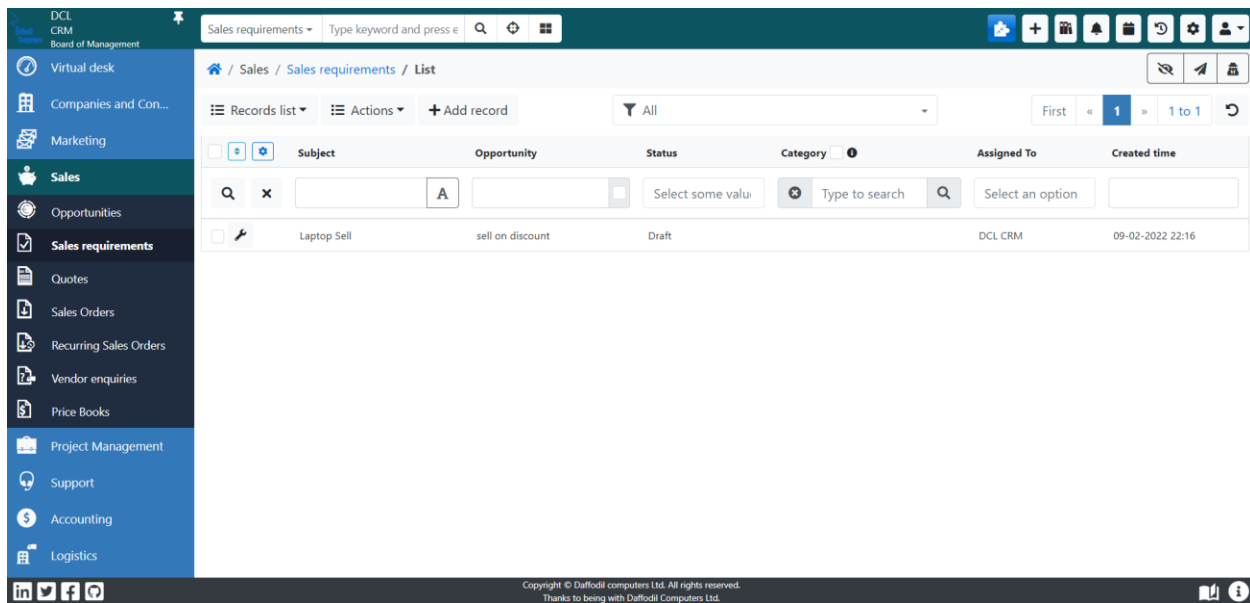
Click on the sales inquiries option to see the records.

The screenshot shows the 'Create' form for a Sales enquiry in the DCL CRM. The left sidebar contains navigation links: Virtual desk, Companies and Con..., Marketing, Sales, Project Management, Support, Accounting, Logistics, GDPR, Company, and Databases. The main content area is titled 'Marketing / Sales enquiries / Create'. It features a 'Basic information' section with fields for Subject (with a red asterisk), Opportunity, Status (set to Draft), Share with users, and Campaign. To the right, there are fields for Category, Accounts, Assigned To (set to DCL CRM (Board of Management)), and a Private checkbox. Below this is a 'Description details' section with a rich text editor. At the bottom right, there are 'Save' and 'Cancel' buttons. The footer includes social media icons and copyright information for Daffodil computers Ltd.

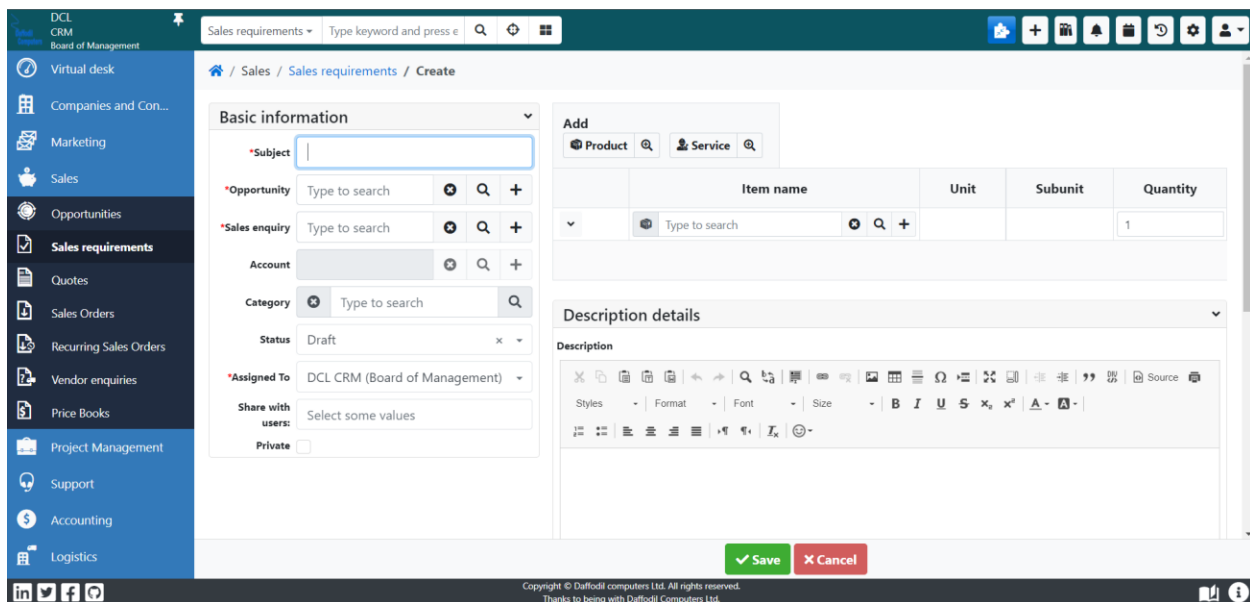
Add the required information and click the save button.

The screenshot shows the 'Detail' page for a Sales enquiry in the DCL CRM. The left sidebar is the same as in the previous image. The main content area is titled 'Marketing / Sales enquiries / Detail / Desktop'. It shows a 'Desktop' enquiry assigned to 'DCL CRM'. Below the title bar, there are tabs for Summary, Details, Comments, Updates, Chat, Documents, Email history, Activities, Contacts, and Time Control. The 'Summary' tab is active, displaying fields for Subject (Desktop), Category, Opportunity, Status (In realization), and Assigned To (DCL CRM). To the right, there are sections for Comments, Documents, Contacts, and Emails, all showing 'No records found'. Below the Summary section, there is an 'Updates' section showing a recent update: 'DCL CRM created' with details about the enquiry's status and creation. At the bottom right, there are 'Save' and 'Cancel' buttons. The footer includes social media icons and copyright information for Daffodil computers Ltd.

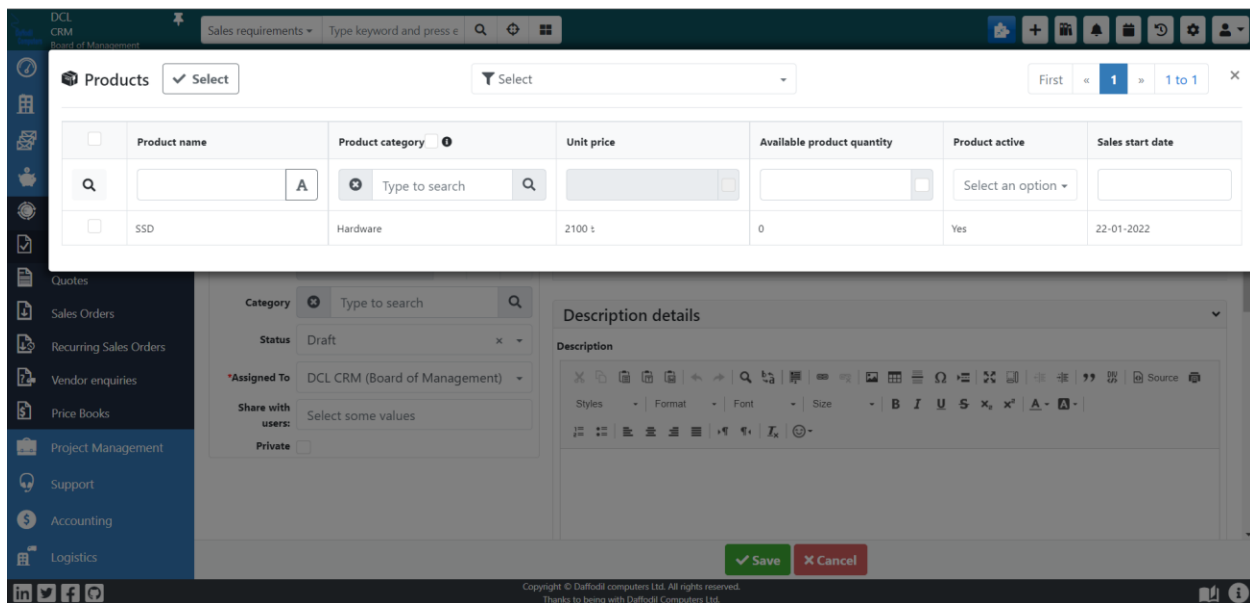
After saving the information, it will go to the detail page and show a summary of the saved information. You can delete or edit the information from this page.



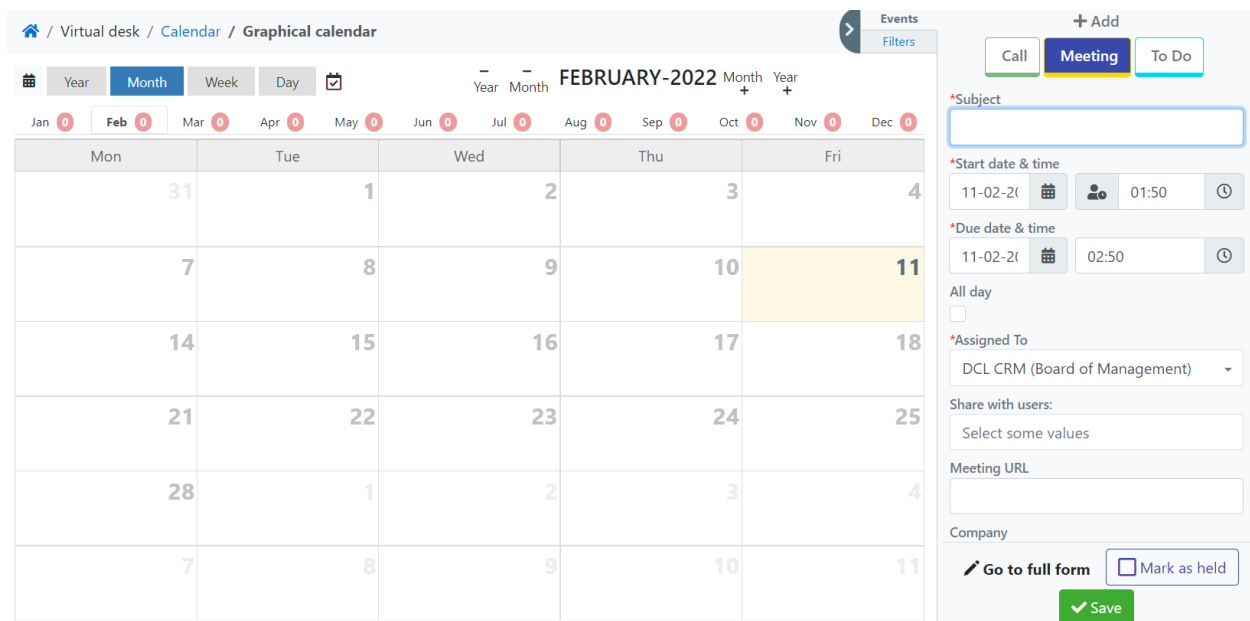
Click on the sales requirements option to see records.



To add a record click on the add record option.



To add a product go to add product section and a pop-up box will be shown.



You can add a to-do list or make a reminder from the calendar function.

My preferences
Viewing user details "DCL CRM"

Change password Reset password Edit More

Basic information

User name	DCL_CRM	Admin	Yes
First name	CRM	Last name	DCL
Role	Board of Management	Status	Active
Super user	Yes		

Contact information

Primary email	shahinurshawon35@gmail.com	Secondary email	shahinurshawon3@gmail.com
Primary phone	+880 1954-154357	CRM phone extension	+880 1954-154357
Permission to send emails	Yes		

Calendar configuration

Date format	dd-mm-yyyy	Calendar hour format	24
Time zone	(UTC+06:00) Dhaka	Starting day of the week	Monday
Default Calendar view	This month	Default activity type	Meeting

You can see your personal information from my preferences pages and also edit them.

Change password - DCL CRM

Old password

New password

Confirm password

The new password must meet the following criteria:

- Minimum password length: 8
- Maximum password length: 32
- Uppercase letters from A to Z
- Lowercase letters a to z
- Password should contain numbers

Change password Cancel

For changing the password, you will have to click the change password function.

Home / Users / Edit

Basic information

*User name: DCL_CRM First name: CRM

*Last name: DCL *Role: Board of Management

Super user ☒

Contact information

*Primary email: shahinurshawon35@gmail.com Secondary email: shahinurshawon3@gmail.com

Primary phone: Bangladesh +880 1954-154357 CRM phone extension: Bangladesh +880 1954-154357

Permission to send emails ☒

Calendar configuration

*Date format: dd-mm-yyyy *Calendar hour format: 24

*Time zone: (UTC+06:00) Dhaka *Starting day of the week: Monday

*Default Calendar view: This month Default activity type: Meeting

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To edit the user information, you will have to click the edit button.

History of access activity to your account - DCL CRM

The history shows only the last 30 entries, the full list is available in the admin panel.

Date time	Status	User IP address	Browser
2022-02-11 01:17:52	Signed in	36.255.189.110	Google Chrome 98
2022-02-09 21:47:19	Signed off	36.255.189.110	Google Chrome 97
2022-02-09 12:51:59	Signed in	36.255.189.110	Google Chrome 97
2022-02-09 12:51:44	Wrong 2FA/TOPO code	36.255.189.110	Google Chrome 97
2022-02-09 00:38:29	Signed in	36.255.189.110	Google Chrome 97
2022-02-07 21:16:20	Signed off	45.118.247.22	Google Chrome 97
2022-02-07 14:16:11	Signed in	45.118.247.22	Google Chrome 97
2022-02-06 20:07:35	Signed in	45.118.247.22	Google Chrome 97
2022-02-06 18:09:12	Signed in	103.121.76.33	Google Chrome 98
2022-02-06 15:23:46	Signed in	103.121.76.33	Google Chrome 97

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You can see the activity list from the activity function.

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