



SUDAN UNIVERSITY OF SCIENCE AND TECHNOLOGY
COLLEGE OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY
INFORMATION SYSTEM DEPARTMENT

CRM and Sales system For B-on

**A graduation project is submitted to the information
system Department in partial fulfilment of the
requirements for the degree of Bachelor (honor) of Science
in Computer and information system**

بسم الله الرحمن الرحيم

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الآية

قال تعالى في محكم تنزيله :

﴿بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ﴾

{ أَفْرَأُ بِاسْمِ رَبِّكَ الَّذِي خَلَقَ ﴿١﴾ خَلَقَ
الْإِنْسَانَ مِنْ عَلَقٍ ﴿٢﴾ أَفْرَأُ وَرَبُّكَ الْأَكْرَمُ
﴿٣﴾ الَّذِي عَلَّمَ بِالْقَلَمِ ﴿٤﴾ عَلَّمَ الْإِنْسَانَ
مَا لَمْ يَعْلَمْ ﴿٥﴾ } سورة العلق.

صدق الله العظيم

DEDICATION

Honorable our fathers, precious our mothers... We will say thank you when you proud of our achievement. Then we will tell you that you “gave birth to us, take Care for us, you learn us and we did it”... Let us we lead, the journey for us now, take rest.

To our brothers dear, the source of optimism and fulfilling... Companions, friends and relatives. You are the most beautiful thing in the world... We mean that you are the world

Our professors Venerable...” professors, Teachers and Teaching assistants”... you are the source of our pride, because you are cradle us and lighting our way for science and knowledge...

From all of us many thanks, and this research is our gift to you

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Thanks first and foremost Allah Almighty which by His will the works completed, and then extend our sincere thanks And appreciation to all who gave us a helping hand to the completion of this research and all who stood by our side with advice, guidance and encouragement to complete this work for them and all our gratitude, And specially thank those who have had the great merit after Allah and they are:

Our Supervisor

MR. AYMAN OSMAN, who did not miserly us his advice and guidance and bright ideas that were so useful to us. Became beacon bringing to light the way for us

Distinguished Teachers:

Thanks to all the teachers valued at Sudan University of Science and Technology for their efforts for us to get an education and knowledge.

Our thanks go to those who helped us in the completion of the output of this modest effort and most notably:

MR.AYMAN MOHAMMED ADAM, MS.HIND KHALID and MS.NAFISA OSMAN

ABSTRACT

The aim of this study is to apply the concept of the integrated systems on B-on multi-companies to manage customer relations and sales at subsidiaries which saves time and effort of subsidiary companies manage independently.

To study the problem and provide a proposed solution we used descriptive and analytical approach, in term of description we used previous studies related to domain to analyze the problem and develop a solution, and in the application terms we use OpenERP (Odoo) in the development of the proposed system.

After applying the system on the B-on company been able to follow the progress of work in its subsidiaries effectively, also subsidiaries increase its profit after improving its relationship with its customers through the distribution of salespeople within regions to facilitate dealing with them, the reliability of customers also increased by credibility of the company through the messages relating to the status and details of their subscriptions that will send to them automatically all the time by the system, It has also been providing synthesis reports for customers and sales representatives explaining the most profitable customers and most active salespeople to put them in mind for future plans.

المستخلص

الهدف من هذه الدراسة هو تطبيق مفهوم الانظمة المتكاملة على شركة B-on المتعددة الشركات بحيث تتمكن الشركة من متابعة وإدارة علاقات العملاء وإدارة المبيعات في الشركات الفرعية مما يوفر الجهد والوقت من إدارة الشركات الفرعية بصورة مستقلة.

لدراسة المشكلة وتقديم الحل المقترح تم إستخدام المنهج الوصفي التحليلي, حيث تم الإستعانة بالدراسات السابقة المرتبطة بالمجال لتحليل المشكلة وتطوير الحل ومن حيث التطبيق تم استخدام OpenERP(Odoo) في تطوير النظام المقترح .

بعد تطبيق النظام على B-on تمكنت الشركة من متابعة سير العمل في شركاتها الفرعية بفعالية كما تمكنت الشركات الفرعية من زيادة ارباحها بعد تحسين علاقتها بعملائها من خلال توزيع مندوبي المبيعات داخل المحليات لتسهيل التعامل مع العملاء, كما ازدادت موثوقية العملاء بمصداقية الشركة عن طريق الرسائل المتعلقة بحالة وتفاصيل اشتراكهم والتي يقوم النظام بإرسالها لهم في كل فترة, كما تم توفير تقارير تجميعية عن العملاء و مندوبي المبيعات توضح اكثر العملاء ربحا واكثر مندوبي المبيعات نشاطا لوضعهم في الاعتبار للخطط المستقبلية.

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LIST OF ACRONYMS/ABBREVIATIONS

ACRONY M	Definition of Acronym
APS	advanced planning and scheduling
BI	Business Intelligence
CEO	Chief Executive Officer
CRM	Customer Relationship Management
CMS	Content Management System
DBMS	Database Management System
ERP	Enterprise Resource Planning
HR	Human Resources
IC	Inventory Control
MRP	Material Requirements Planning
MRP-II	Manufacturing Resource Planning
MVC	Model View Control
OFBiz	Open For Business
ORM	Object Relation Mapping
PoS	Point of Sale
ROI	Return on Investment
SaaS	Software-as-a-Service
SCM	Supply Chain Management
SFA	Sales Force Automation
SME	Small and Medium-sized Enterprises

SOA	Service-Oriented Architectures
SSH	Secure Shell
TCO	Total Cost of Ownership
UML	Unified Modeling Language
VNC	Virtual Network Computing
XML	Extensible Markup Language
WSGI	Web Server Gateway Interface

Chapter One

1 INTRODUCTION

1.1 INTRODUCTION

Clients or customers one of the most important asset of any company, as they are the key to further success and growth, on the tangible level of increasing sales and profits and intangible, such as the good reputation that contribute to increasing its capabilities in the market and in order to be more competitive.

Therefore, many of the small and medium-sized enterprise “SME” are planning for greater opportunities for growth through the assistance of the customer relationships management “CRM”. Note that a large segment of these companies overlook the importance of changing business and technology environment required to accommodate this trend.

In addition, they also need to connect all the sectors that have a relationship with the company and consolidation of information for everyone and it becomes even more important when the company has more than one activity, "in addition to multiple customer support channels. Then the company can find investment opportunities that it was closed and build a large segment of loyal customers.

For these reasons, we use ERP to create CRM and sales system for **B-on ltd** company which is offering its services and products in digital form on the Internet and convert them to new markets. Aim to seize the largest possible share of consumer spending online in these markets.

B-on ltd consists of several companies:

- **Jirtig.com**: An electronic market aims to provide the latest and the best deals and products and services pertaining to the Sudanese bride and Sudanese women, such as accessories,

booking weddings, halls, jewelry stores, etc.... in one place so that the shopping easier and more fun.

- **Sudahomes:** Which is a network specialized in the field of real estate provides information on the Sudanese real estate (rent - sell - replacement) and services cover all parts of Sudan.
- **Sudaclass:** Sudanese gate is specialized in publication of free classifieds, was launched in 2015.
- **Sufsif:** It is a site that offers services to the owners of restaurants, and this site provides products and services for restaurants on a large base of visitors, which increases the restaurants customers, and provides customers with a way to compare prices and find out places restaurants

1.2 STATEMENT OF THE PROBLEM

The fundamental problem is that B-on Company was a multi-company, each sub-company offer services differ from others.so B-on company need a mechanism to be capable of follow-up CRM and sales departments in each subsidiaries at the same time.

Each of these sub-companies lose many customers who wish to participate in the services of the lack of means of communication is perfect to contact.

1.3 RESEARCH QUESTIONS

- How CRM and sales management department works, and what role they play in companies?
- What are the advantages offered by ERP system to companies and how to apply these systems?

- How to enable B-on Company to monitor and manage customer relationships and sales in its subsidiaries.

1.4 RESEARCH OBJECTIVES

- To identify the CRM and sales management systems and find out the importance and the role it plays in the organization.
- Use lead and opportunity to attracting as many as possible of customers that interest in B-on Company services due to increase revenue.
- Make long term relationships between B-on Company and its customers.
- To find out how works multiple companies and how to manage them.

1.5 IMPORTANCE OF RESEARCH

This study highlights the important issue for institutions and business in general and B-on in particular, Due to the services provided by CRM systems to help manage and establish good relationships with customers, Which leads to increased sales, and earn a good reputation helps to grow and flourish and give it a competitive advantage.

1.6 SCOPE OF THE STUDY

- Linguistic boundaries: English
- Objective limits: This study focuses on the role and applying CRM and sales management system in B-on multiple branches.
- Spatial boundaries: The study is limited to the seat of B-on management in the state of Khartoum and subsidiaries.

1.7 THESIS LAYOUT

Research is divided into five chapters, Where chapter two clarify general background about ERP systems, and chapter three describe odoo framework as famous openerp system, then chapter four demonstration CRM and Sales concepts, chapter five contain system design and implementation, chapter six contains the conclusions and recommendations.

Chapter Two

**2 BACKGROUND AND PREVIOUS
STUDIES**

2.1 INTRODUCTION

This chapter explained ERP system and description of section from ERPs system as its components, also discuss concepts of CRM and Sales and Odoo. Then highlight the previous studies in this domain, especially which concerned with Customer Relationship Management and Sales Management.

2.2 ERP SYSTEM

2.2.1 What is ERP System

Enterprise resource planning (ERP) is a category of business-[management](#) software typically a suite of integrated [applications](#) that an organization can use to collect, store, manage and interpret data from many [business](#) activities, ERP provides an integrated view of core business processes, often in real-time, using common [databases](#) maintained by a [database management system](#) (DBMS).

The applications that make up the system share data across various departments (manufacturing, purchasing, sales, [accounting](#), etc.) that provide the data. [\[1\]](#) ERP facilitates information flow between all business functions, and manages connections to outside [stakeholders](#). [\[2\]](#)

Enterprise system software is a multibillion-dollar industry that produces components that support a variety of business functions. IT investments have become the largest category of capital expenditure in United States-based businesses over the past decade. Though early ERP systems focused on large enterprises, smaller enterprises increasingly use ERP systems.[\[3\]](#)

The ERP system is considered a vital organizational tool because it integrates varied organizational systems and facilitates error-free transactions and production. However, developing an ERP system differs from traditional system development.[4] ERP systems run on a variety of [computer hardware](#) and [network](#) configurations, typically using a [database](#) as an [information repository](#). [5]

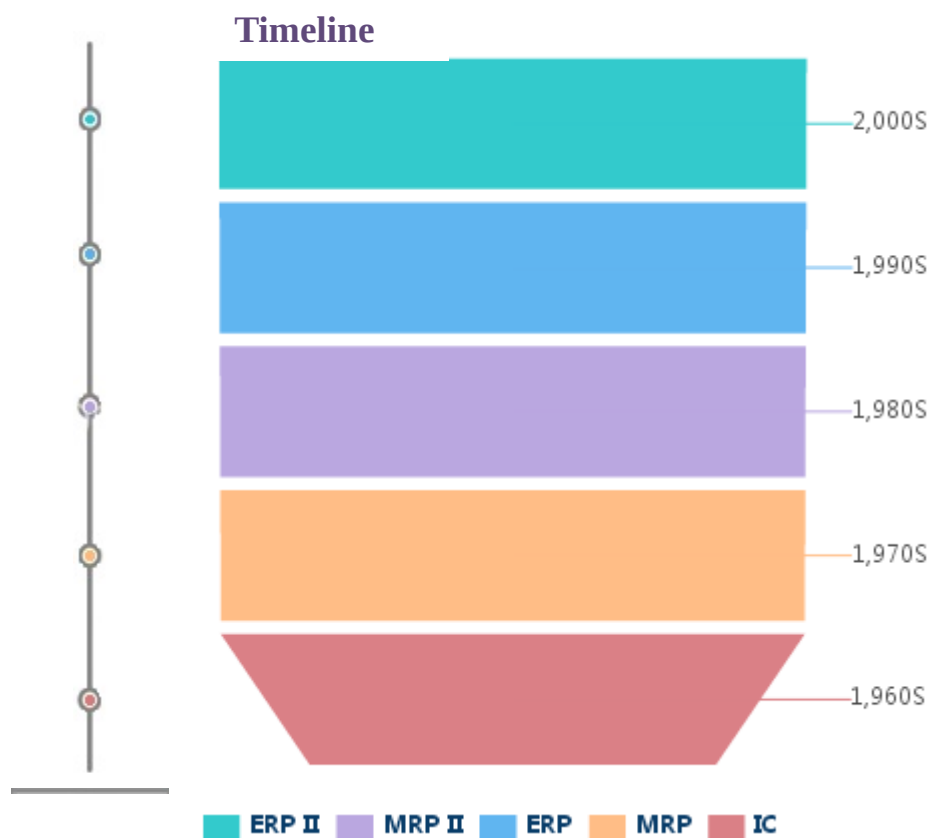


Figure 21: ERP evolution.

2.2.2 ERP Components

The five major component parts of most ERP systems are summarized below. Becoming familiar with these core sections of this all-

encompassing solution is essential for any company wishing to compete in the modern world.

1. Financial Accounting

This core component of ERP software takes care of all the revenue and out goings of your business. It covers any accounts and a variety of taxation levels with a view to integrating and analyzing the figures to produce valuable business critical reports and information.

2. manufacture and Distribution

This component of [ERP software](#) provides firms with a streamlined view of its business's supply and demand levels. By gathering this crucial detail you are able to instantly see if you are achieving your targets. Included in these reports are summaries of stock and insights into trend patterns.

3. Customer Relationship Management

This equally important tool focuses on tracking positive and negative responses from your customer base and managing marketing and sales pipeline activities. These are analyzed to highlight areas that are working and those that may require improvement.

This invaluable information lets you keep on top of client needs and wants helping customer satisfaction ratings. Analysis can also provide information on where marketing spend has been most successful amongst other crucial data such as effectively of the sales process.

4. Human Resources with Payroll features

Loading your ERP software with employee records allows their easy access when needed for the computation of statistics or the implementation of changes. Its added benefit of incorporating

payroll facilities minimizes the possibility of unrecorded errors of under or over payment.

Many business owners use this facility for the planning of working hours and holiday arrangements

5. Stock and Sales Figures

Effective materials planning and stock control software is a crucial part of any ERP system and will grant you a great view of stock or sale numbers. Automatic update of all your available resources gives you an immediate answer in case you wish to guarantee an order.



Figure2-1: ERP system concept

2.2.3 Advantages of ERP systems

The fundamental advantage of ERP is that integrated myriad business processes saves time and expense. Management can make decisions

faster and with fewer errors. Data becomes visible across the organization. Tasks that benefit from this integration include:

Table 2: List of main Advantages.

What benefit	How
Reliable information access	Common DBMS, consistent and accurate data, improved reports.
Avoid data and operations redundancy	Modules access same data from the central database, avoids multiple data input and update operations.
Delivery and cycle time reduction	Minimizes retrieving and reporting delays.
Cost reduction	Time savings, improved control by enterprise-wide analysis of organizational decisions.
Easy adaptability	Changes in business processes easy to adapt and restructure.
Improved scalability	Structured and modular design with "addons."
Improved maintenance	Vendor-supported long-term contract as part of the system procurement.
Global outreach	Extended modules such as CRM and SCM.
E-Commerce, e-business	Internet commerce, collaborative culture.

2.2.4 Disadvantages of ERP systems

Table 22: List of main disadvantages.

Disadvantage	How to overcome
Development Time-consuming	Minimize sensitive issues, internal politics and raise general consensus.
Expensive	Cost may vary from thousands of dollars to millions. Business process reengineering cost may be extremely high.
Conformity of the modules	The architecture and components of the selected system should conform to the business processes, culture and strategic goals of the organization.

Vendor dependence	Single vendor vs. multi-vendor consideration, options for “best of breeds,” long-term committed support.
Features and complexity	ERP system may have too many features and modules so the user needs to consider carefully and implement the needful only.
Scalability and global outreach	Look for vendor investment in R&D, long term commitment to product and services, consider Internet-enabled systems.
Extended ERP capability	Consider middle-ware “add-on” facilities and extended modules such as CRM and SCM

2.2.5 Selecting the right erp system

Selecting the right business management solution is one of the most important business decisions you can make. Making the right decision can propel your company forward while the wrong decision may potentially be catastrophic. Therefore, you must choose the right ERP software system for your company needs and with the appropriate cost

There are two types of reliable [ERP software](#):

- Closed Source ERP
- Open Source ERP

The major difference between the two is, Open Source software is open to developers and can be customized according to the creative bends of the software developer. On the other hand, Closed Source software doesn't allow this privilege and strictly sticks to what the company wants its software to be - untouched. [6]

Comparatively, it is arguably accepted that most closed source ERP systems are mature than their counterparts. We can deduce that because in most cases, closed source ERP software have better

functionality and fewer loopholes to cover than the ones that are open sourced.

On the other hand, open source ERP system allows greater flexibility to modify and develop code for programmers. Also, the commercial version of which is considered cheaper than closed source ERP systems.

Below is a list showing the Top recommended ERP vendors for both today:

1.1.1.1 Closed Source ERP

1. **Epicor** - Started in 1984, working with DOS and later converted its products to Windows, followed a merger and acquisition path to acquire companies selling ERP products and then to offer their solutions as a comprehensive package. . Epicor has a presence in over 150 countries and has more than 20,000 Tier II / III customers.
2. **Infor** - Infor Global Solutions is a privately held company that has grown rapidly in the Tier II vendor space since 2002, now with its acquisition of ENXSUITE in 2011. It has a global presence to match the footprint of the top 2 and has clients in 194 countries, and it has solutions in as many as in 14 different domains.
3. **Microsoft** - Microsoft Dynamics is mostly focused on Tier II clients in the ERP space. It provides solutions in a number of different business domains including in the Customer Relationship Management domain. A great advantage of Microsoft products is its great ease of use.
4. **Oracle** - While Oracle was formerly best known for its relational database, it was for many years the database of choice for SAP ERP applications. Sometime around 2004, Oracle began to look

at building its own ERP solutions and at the same time SAP began to offer its ERP solutions on the Microsoft SQL Server database platform as well. The first Oracle ERP product was Oracle Financials which was released into the market as early as in 1989. However, post 2004, Oracle began to become a serious player in the ERP market and is now a well-established number 2 in the Tier I market.

5. **SAP** – Founded in 1972 by five former IBM engineers, SAP is the undisputed market leader in the ERP space and is the third largest software company in the world. Its current version has more than 30,000 relational database tables that allow it to handle extremely complex business situations. While it is an undisputed number one in the Tier I ERP space, SAP has been criticized at times for being too complex and difficult to handle.
6. **Sage** – is a UK based company and had its beginnings in a 1981 summer job when the first version of a type of accounting software was written. In 1984, Sage Software was launched as a company and achieved a fair amount of success. Like many other companies in the ERP space. A cross hybrid acquisitions present it very successful given the rate of growth Sage has been seeing.
7. **NetSuite** Inc. is an American software company based in [San Mateo, California](#), that sells an eponymous group of software services used to manage a business's operations and customer relations. [7] Customers access these services over the internet paying a periodic subscription fee. NetSuite's services are primarily aimed at medium- to enterprise-sized businesses.[8] NetSuite was founded in 1998 by Evan Goldberg as NetLedger, web-hosted accounting software. NetLedger was later renamed to Oracle Small Business Suite and finally NetSuite.[9] Goldberg is current chairman and chief technology officer.[10] In January 4, 2007, NetSuite named [Moneyball](#) General Manager [Billy Beane](#)

of [Major League Baseball's Oakland A's](#) to its board of directors. NetSuite had 2,550 employees as of March 31, 2014, a 31% increase over March 31, 2013, when it had 1,953.

1.1.1.2 Open source ERP

Define abbreviations and acronyms the first time they are used in the text, even after they have already been defined in the abstract. Abbreviations such as SI, ac, and dc do not have to be defined. Abbreviations that incorporate periods should not have spaces: write "C.N.R.S.," not "C. N. R. S." Do not use abbreviations in the title unless they are unavoidable.

1. **ADempiere** ERP Business Suite. (Java) [iDempiere](#) is a comprehensive multi-platform open source ERP platform that was forked from another ERP project called Compiere back in 2006.
2. **Apache OFBiz**. Multi-platform (Java) [OFBiz](#) (which stands for Open for Business) is the Apache Foundation's enterprise business package. Released under the Apache License 2.0, it is [free to download](#) from Apache.
3. **xTuple** (Qt and Postgres) claims to be the world's number one open source ERP suite and has been around in one form or another since 2000. It offers a free open source edition called PostBooks which is [available from Sourceforge](#), and is also available as a licensed product with maintenance, support and the option to use it as a service offered from the cloud. As well as these two editions, which are aimed at small and medium sized companies, xTuple offers three commercial editions for larger organizations - one aimed at distributors, one targeted at manufacturers and a more general enterprise edition. The open source edition includes functionality for accounting, sales, CRM, purchasing, product definition, inventory and distribution, light manufacturing and the OpenRPT open source report writer.
4. **Odoo** (Python, JavaScript, PostgreSQL) is the new name for an open source ERP suite previously known as OpenERP. The product is aimed at companies of all sizes, and is used by businesses including Danone, Canonical, Singer and the

French postal service La Poste. The community edition of Odoo is [available to download](#) for free, and this includes all modules - ERP ones as well as CRM, marketing and others. The hosted version is available free for two users. A more comprehensive package that includes customization assistance and training materials is also available for Euros 111 per user (\$138 U.S.) per month for each app.

5. [OpenBravo](#) (Java) is an open source ERP system which is available to download on Sourceforge. Aimed at small and medium sized businesses. Openbravo also offers two commercial editions -- a professional edition for smaller companies with up to five concurrent users and an enterprise edition for larger companies with substantial numbers of users.
6. [Opentaps](#) is an integrated open source ERP and CRM suite sponsored by Open Source Strategies, Inc. and used by organizations including Toyota and Honeywell. The name "opentaps" was originally an acronym for "Open Source Enterprise Applications Suite." The opentaps Professional Edition is offered under a commercial license with a support package provided by Open Strategies that includes updates for opentaps releases, access to opentaps support issue tracker, guaranteed response time of four hours during support hours and remote assistance via VNC and SSH for \$600 per user per year.
7. [Dolibarr](#) is an open source business suite designed for small companies and individual traders that includes ERP and CRM functionality. It can be installed on a local machine or accessed from a server, and is also offered as a software-as-a-service (SaaS) solution with a free trial period by Dolibarr-preferred partners including [DoliCloud](#) and [ATM Consulting](#). The open source ERP software is highly modular, and main modules include sales and purchase management, stock management, bank account management, orders management and shipping management. Additional paid-for modules are also available from the official [DoliStore](#).

2.3 OPENERP (ODOO)

Odoo is a suite of open-source enterprise management applications that provided an accomplished, integrated ERP solution. Odoo is used by large companies, small businesses, associations and many different types of organizations to help them manage, automate measure and optimize their operations, finances and projects.

It also provides an open source CMS (content management system), a fully-functional eCommerce and a Business Intelligence engine. It gathered all business needs from sales and accounting to manufacturing and recruitment in one place. No other software product has such a level of integration out-of-the-box[17].

Odoo features an application server which uses PostgreSQL as database back-end, with a web-based client. Odoo is written in Python, with a highly modular design which allows rapid development of new modules through Open Object RAD. Odoo developers have a strong commitment to free software [18].

2.3.1 Why we use Odoo

Being fully open source plays an important role. But at the end, buyers do not care about the license. They just compare products and select the one that better fits their need: quality, functional coverage, TCO...

As product, Odoo is going way beyond traditional ERP. What's usually interfaced with third party apps is fully native with Odoo: CMS, a eCommerce, Point of Sale, and a Business Intelligence engine. Integrating your sales floor with inventory, accounting and manufacturing plant is one thing. But Odoo goes one step further. It's the only software in the world that integrates all sales channels: point of sale, eCommerce, inbound sales. Odoo has 4000+ apps for stuff that usually don't exist in traditional ERP like inbound marketing apps [19].

There are also some special reasons that led to choose Odoo including:

- The first reason is that the Sudan is one of countries that the US economic embargo applied by the state, which prevents access to many things, including

native applications, so the open source applications represent the best solution to the Sudanese companies

- The second reason that Sudan implement policies on some departments such as human resources differs from the rest countries, making applying proprietary or closed source ERP systems, is causing some problems for companies.

2.4 CRM & SALES

2.4.1 What is CRM

Customer relationship management (CRM) is a concept that has developed from marketing theory, [14] and it is an approach to managing a company's interaction with current and future [customers](#). The CRM approach tries to [analyze data](#) about customers' history with a company, to improve business relationships with customers, specifically focusing on customer retention, and ultimately to drive sales [growth](#). [15]

The primary goal of CRM systems is to integrate and automate sales, marketing, and customer support. Therefore, these systems typically have a dashboard that gives an overall view of the three functions on a single page for each customer that a company may have. The dashboard may provide client information, past sales, previous marketing efforts, and more, summarizing all of the relationships between the customer and the firm. Operational CRM is made up of 3 main components: sales force automation (SFA), marketing automation, and service automation. [16]

2.4.2 Sales management

Sales management is a [business](#) discipline which is focused on the practical application of [sales](#) techniques and the management of a firm's [sales operations](#). It is an important business function as [net sales](#) through the sale of [products](#) and [services](#) and resulting [profit](#) drive most commercial business. These are also typically the goals and [performance indicators](#) of sales management to maximize the benefits and its customers receive from its sales force.

Earlier the sales management was concerned with the direction of the sales force personnel. However, at present the term “sales management” has a broader significance and includes all such marketing activities as advertising, sales promotion, marketing research, physical distribution, pricing and product merchandising.

Sales manager is the typical title of someone whose role is sales management. The role typically involves [talent development](#) and [leadership](#).

2.4.3 CRM and Sales Terminologies

- **Lead:** Someone who becomes aware of your company or someone who you decide to pursue for a sale, even if they don't know about your company yet.
- **Opportunity :** A lead that has shown an interest in knowing more about your products/services and therefore has been handed over to a sales representative
- **Customer or prospect:** In Odoo CRM, a customer refers to any contact within your database, whether it is a lead, an opportunity, a client or a company.
- **Quotation:** are documents sent to customers to offer an estimated cost for a particular set of goods or services. The customer can accept the quotation, in which case the seller will have to issue a sales order, or refuse it.
- **Contract:** a contract is an agreement between two parties customer and B-on company, used to save B-on and customers right

2.5 PREVIOUS STUDIES

2.5.1 CRM Service Centre (GIAD MOTOR Case Study) Sudan

Presented in October 2015, by students Sara Khalid *et al*, to obtain a bachelor degree in Computer Science from University of Sudan for Science and Technology. Objective of this study is to provide GIAD company services to which it can maintain its customers and enable them to make decisions quickly and collecting of all systems which the company operates in a single system and to integrate this system with call center for support customer management services and this is done through the use of OpenERP system in the development of this company and to integrate it with asterisk make BI reports for decision-making.

The study defined the concept of Customer Relationship Management and benefit of CRM and Usability of this Module.

The result of this study were quick response to customer demands and save time by showing customer information automatically to agent screen and provide after sales services of the GIAD company and help decision markers in the creation of new business case [16].

2.5.2 Sale management using android

Presented in October 2015, by students Samar Mahgoub *et al*, to obtain a bachelor degree in Computer Science from University of Sudan for Science and Technology.

This study aim to make connection between sales representative and company database, Where the system allow the sales representative to monitor reports and stored in the company database and find out orders that must be delivered, quantity and prices via mobile

The results of this study is facilitate the process of sales representatives management, And to facilitate the work of the sales representative to solve their problems, Since the changes that take place on the products after the sale will be reflected automatically on the company's database.[21]

2.5.3 Impact of Customer Relationship Management Approach on Customer Satisfaction

This study was presented in July 2015 by student Mohamed elfatih, submitted for M.Sc. Degree in management of Quality and Excellence from Sudan University of Science & Technology College of Graduate Studies, and it aim to investigate the effect of applying the concept of Customer Relationship Management (CRM) on the Customer satisfaction and decreasing the rate of customer's loss in Agricultural Bank of Sudan.

The result of this study found that adopting CRM Concept was signification with in positive direction with reaching customer Satisfaction [18].

2.5.4 The Impact of Enterprise Systems on Corporate Performance :(Study of ERP, SCM and CRM System Implementation)

Presented in October 2005 by Kevin B. Hendricks *et al*, from University of Western Ontario.

The study was documented the effect of investment in Enterprise Resource Planning(ERP) , Supply Chain Management (SCM) and Customer Relationship Management(CRM) System on firm's long-term stock price performance and Profitability .

The results are based on sample of 186 announcement of ERP Implementation and 80 CRM Implementation ,After analysis of this sample In the case of ERP system they observe some evidence of improvement in profitability but not in stock returns and are no

evidence of improvement in stock returns or profitability for firms that have invested in CRM [23].

2.5.5 Summary

Through the survey previous studies process, we find that establishing ERP system is very important for companies and provides integrated solutions for companies whether big or small or medium-size because it has several advantages, including the complementary process between units and data that in a single database.

We also find that the application of CRM and Sales system, companies can achieve customer satisfaction and provide them with the best service and fast response to their requirements. It also ensures corporate profit over the long term.

In light of above mentioned studies, we concentrate on customizing and integration of CRM and sales management using ERP system for helping the organizations to provide more benefit and better performance.

Chapter Three

3 ANALYSIS AND TECHNIQUE

3.1 INTRODUCTION

This chapter describes specification of devices, operating system, programming language, functional requirement, non-functional requirement and techniques used to build the system

3.2 SYSTEM REQUIREMENT

3.2.1 Operating Environment

The minimum requirement that can run odoo is simple, it's can run on:

- HDD: 40 GB.
- CPU: 1.5 GHz.
- RAM: 1GB.
- OS: win 7/ Linux.
- Connected to network.

3.2.2 Functional Requirements

The functional requirements are organized in two section first requirements of the B-on and second requirements of the subsidiaries.

1- Requirement of the B-on company

- B-on company have full authority to access all subsidiaries resources such as service, employees "salespersons", customers. Also, the process of appointing "Add" or firing "Delete" an employee to/from the B-on or its subsidiary and give them Permissions to access are within its own borders

- Salesperson can record leads offered to any subsidiaries and assigned to any salesperson within that subsidiary and who is belong to the list of salespersons responsible for that region where lead is offered.
- Director of B-on Company can view reports for any subsidiary companies in aggregate or separately and can choose between subsidiaries and present their reports together

2- **Requirement of the Subsidiaries company**

- All employees of the subsidiary companies can access to all resources "services, employees, customers" of that company only, and cannot reach to the other subsidiary companies or B-on resources
- Managers of subsidiaries can view all the reports that belong to them subsidiary company, also they can distribute salespersons to region within different states to facilitate deal with customers
- Salesperson can record leads within any region and assigned to any other Salesperson from the list of salespersons responsible for that region.
- Managers of Subsidiaries Company can take leads from any salesperson and assigning to another within the same region. and salesperson cannot takes lead from any other salesperson.
- Sales rep can control on the customer's subscription start date and the end of the customer's subscription at customer's request.
- if end date of contract is pass without renew the system automatically suspend the contract

3.2.3 Non-Functional Requirements

- When more than a week after the lead has not been transferred to the customer, sales rep that responsible for it will be notified by an email in his account within the system to deal with it.

- When recording contract must be the start date of the service is greater than or equal to today's date and the end date is greater than the start date. if there is error when data is entered an error message appears describe the type and location of the error.
- When activating the contract the customer is notified about the beginning and end of the service by email.
- Before one week from expiration of the contract the customer is notified to renew the subscription, and sales rep that responsible is notified in a day before end date, to renew contract with this customer

3.3 TECHNIQUES

3.3.1 Odoo Framework

Odoo uses the well-known client-server paradigm: the client is running as a JavaScript application in your browser, connecting to the server using the JSON-RPC protocol over HTTP(S). Ad-hoc clients can also be easily written and connect to the server using XML-RPC or JSON-RPC [1].

Server and client-web components are written in python. Both server and client extensions are packaged as modules which are optionally loaded in a database [2]. Odoo modules can either add brand new business logic to an Odoo system, or alter and extend existing business logic [3].

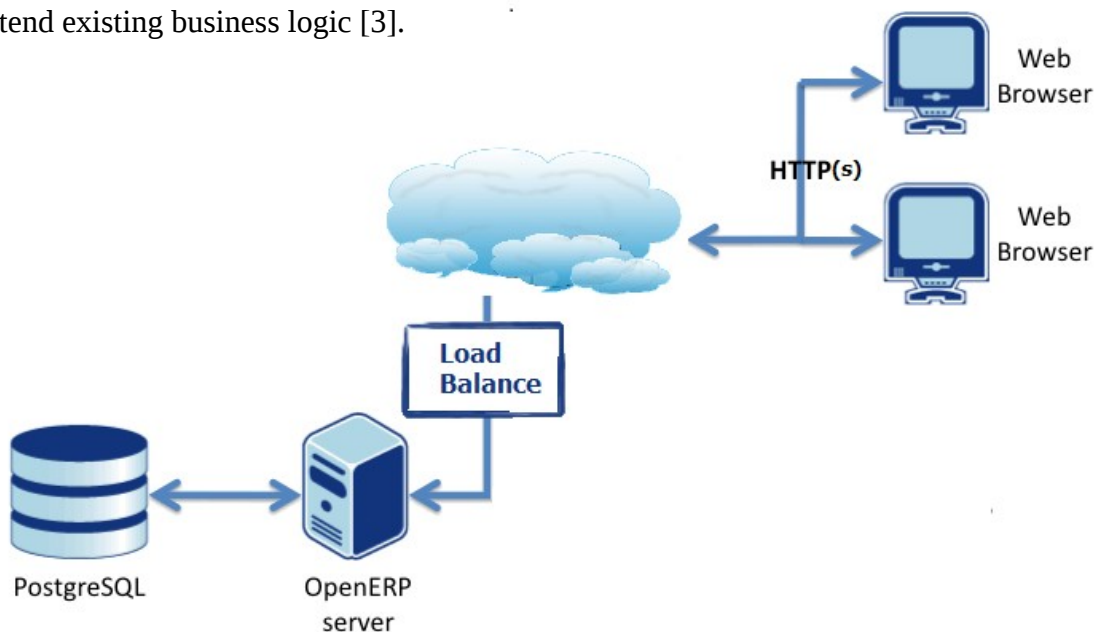


Figure 31: Deploying Odoo Diagram

3.3.2 OpenERP (Odoo) server

Odoo provides an application server on which specific business applications can be built. It is also a complete development framework, offering a range of features to write those applications. Among those features, the Odoo ORM provides functionalities and an interface on top of the PostgreSQL server. The OpenERP server also features a specific layer designed to communicate with the web browser-based client. This layer connects users using standard browsers to the server [4].

From a developer perspective, the server acts both as a library which brings the above benefits while hiding the low-level details, and as a simple way to install, configure and run the written applications. The server also contains other services, such as extensible data models and view, workflow engine or reports engine. However, those are OpenERP services not specifically related to security, and are therefore not discussed in details in this document.

3.3.3 Server-Web

The web layer offers an interface to communicate with standard browsers. Odoo version 8, the web-client has been rewritten and integrated into the OpenERP server tier. This web layer is a Web Server Gateway Interface (WSGI) [5] compatible application based on werkzeug. It handles regular http queries to server static file or dynamic content and JSON-RPC queries for the RPC made from the browser [4].

3.3.4 Python

Python as programming language is highly productive and can create flexible and robust software for any aim or project.

We use Python because it is considered a simple and minimalistic language compared with other programming languages such as Java or C++, easy to learn as it has an extraordinarily simple syntax and most importantly, due to its open-source nature, it is considered portable, which means all your Python programs can work on any platform.

3.3.5 XML

XML is a file extension for an Extensible Markup Language (XML) file format used to create common information formats and share both the format and the data on the World Wide Web, intranets, and elsewhere using standard ASCII text.

We use it because the main way to define data in Odoo is via XML data files. It is also used to describe and exchange of data between different systems.

3.3.6 PostgreSQL Database

The data tier of Odoo is provided by a PostgreSQL relational database. While direct SQL queries can be executed from Odoo modules, most accesses to the relational database are done through the server Object Relational Mapping (ORM) layer [4].

Databases contain all application data, and also most of the Odoo system configuration elements. Note that this server can possibly be deployed using clustered databases.

3.3.7 Qweb Report

Reports are written in HTML/QWeb, like all regular views in Odoo. You can use the usual [QWeb control flow tools](#) [7]. The PDF rendering itself is performed by [wkhtmltopdf](#)[6].1

If you want to create a report on a certain model, you will need to define this [Report](#) and the [Report template](#) it will use. If you wish, you can also specify a specific [Paper Format](#) for this report. Finally, if you need access to more than your model, you can define a [Custom Reports](#) class that gives you access to more models and records in the template.

Chapter Four

4 IMPLEMENTATION

4.1 INTRODUCTION

In this chapter, we will describe the new system design by using UML "Unified Modeling Language" diagram tool, and the construction of the new system and the delivery of that system into production.

4.2 SYSTEM DESIGN

4.2.1 Use Case Diagram

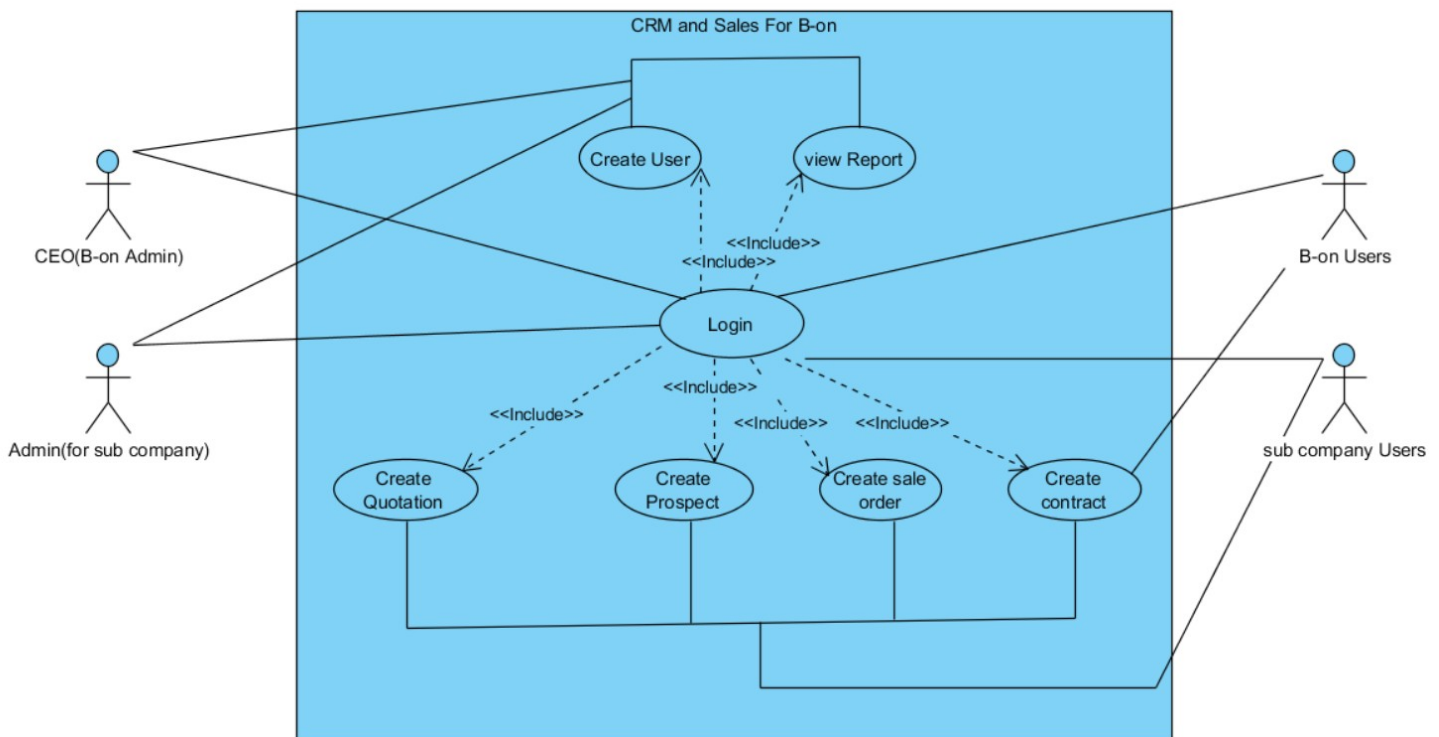


Figure 51: system use case diagram

- System Users (Actors)

1. CEO (B-on Admin)

It is the general manager of B-on so that it has authority over all subsidiaries being able to create users and give them different Permissions.

2. Sub admin

A director of a subsidiary company has all the powers of such subsidiary, where he can create users within that sub-company and validity generate reports.

3. Sub user

Sales rep in a subsidiary company owned limited and restricted Permissions within the company where he can deal with all clients or the company's customers and products "services" and even create customers and deal with them. For seeking to contract with them to increase the company's profits.

4. B-on user

User within B-on handles all the resources of sub-companies and can create customers and hand them over to the salesperson within the subsidiaries based on the services provided by the subsidiaries company and required by the customer, the customer region that salesperson responsible of region.

- System Operations

1. Create user

This process enables the manager to create user "salesperson" and give it Permissions within the company system and this process available to the company manager (B-on) and directors of subsidiary companies are limited. The manager of B-on by using this process could create a new user and give it Permissions within one of the sub-companies and similarly enable this process, sub-company director to create a user "salesperson" and make it accountable for customers in several areas within a particular state.

2. Prospect

This process enables the user to record customer data based on the areas of their presence to the salesperson responsible from that region to negotiate with them to increase the opportunities and the possibility of making a contract with the company.

3. Quotation

Using this process, the sales rep create preliminary bills for requested service and sent to the customer for approval and the creation of the contract and the final bill.

4. Contract

This process is used to create and manage customer contracts and invoices associated with those contracts.

5. Report

This process enables the extraction of periodic reports on customer subscriptions and salesperson to assess their performance and improve business.

4.2.2 Sequence Diagram

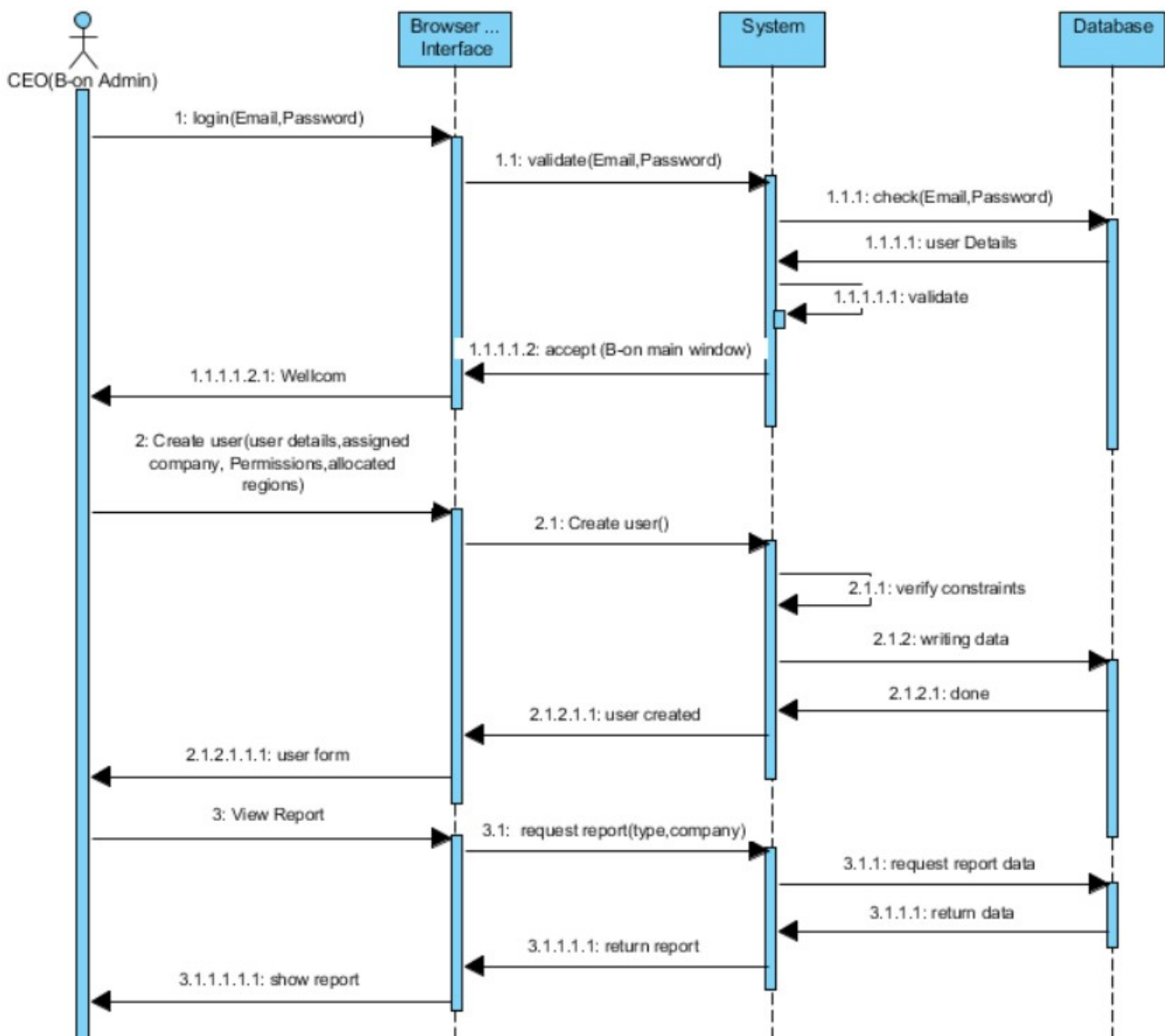


Figure 52: CEO main Task case diagram

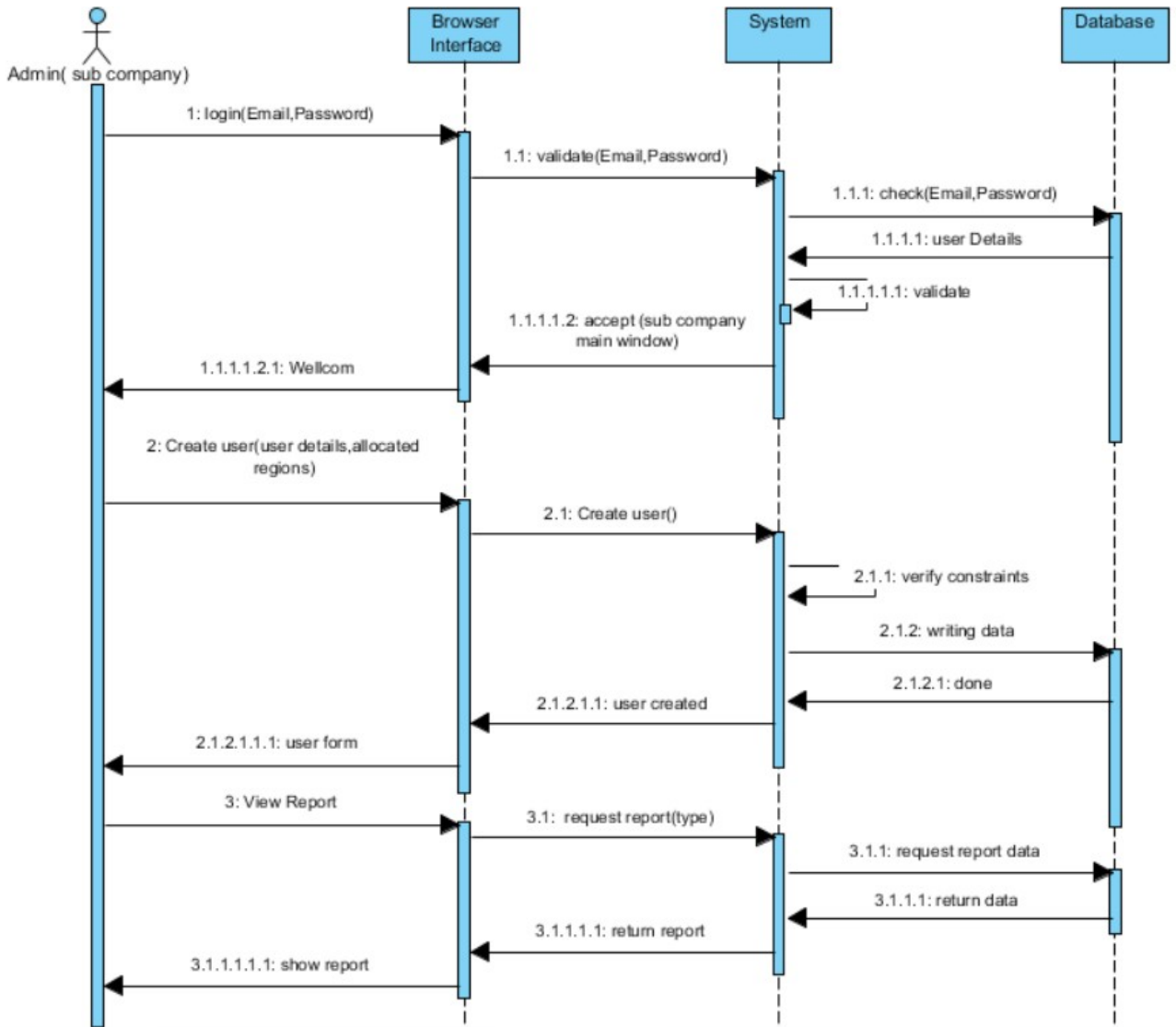


Figure 53: Admin (for Sub Company) main Task

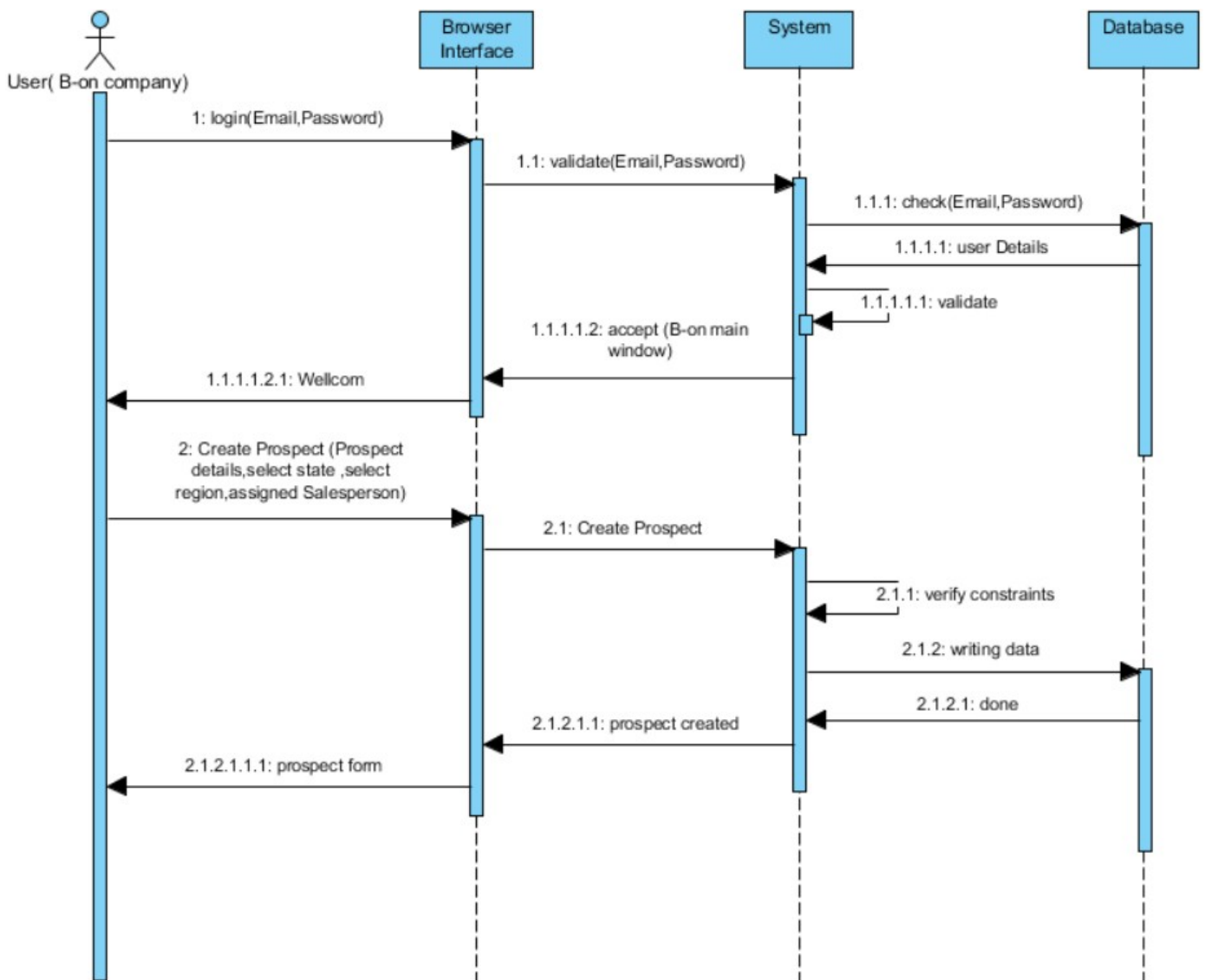


Figure 54: User (for B-on Company) main Task

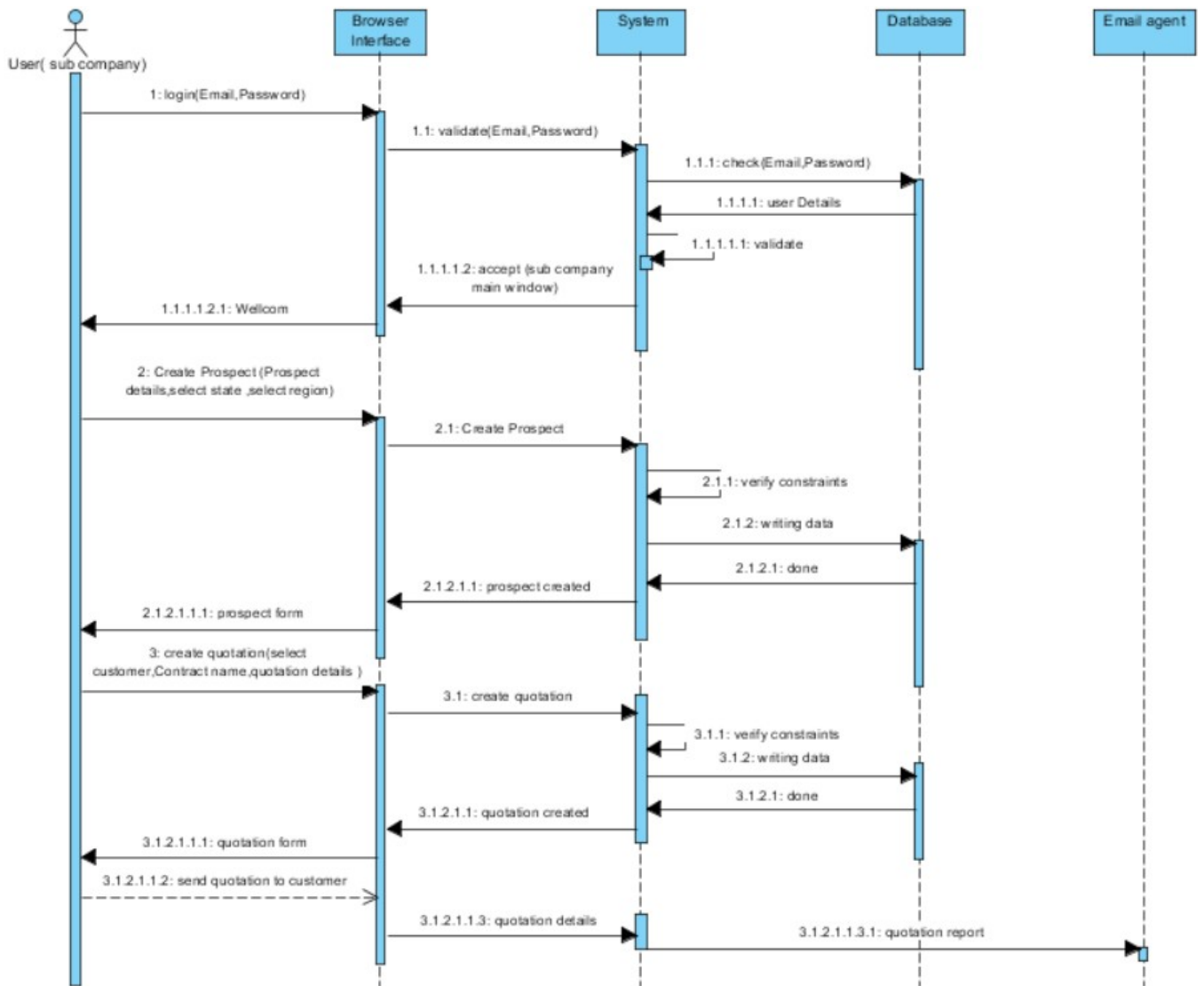


Figure 55: User (for Sub Company) main Task

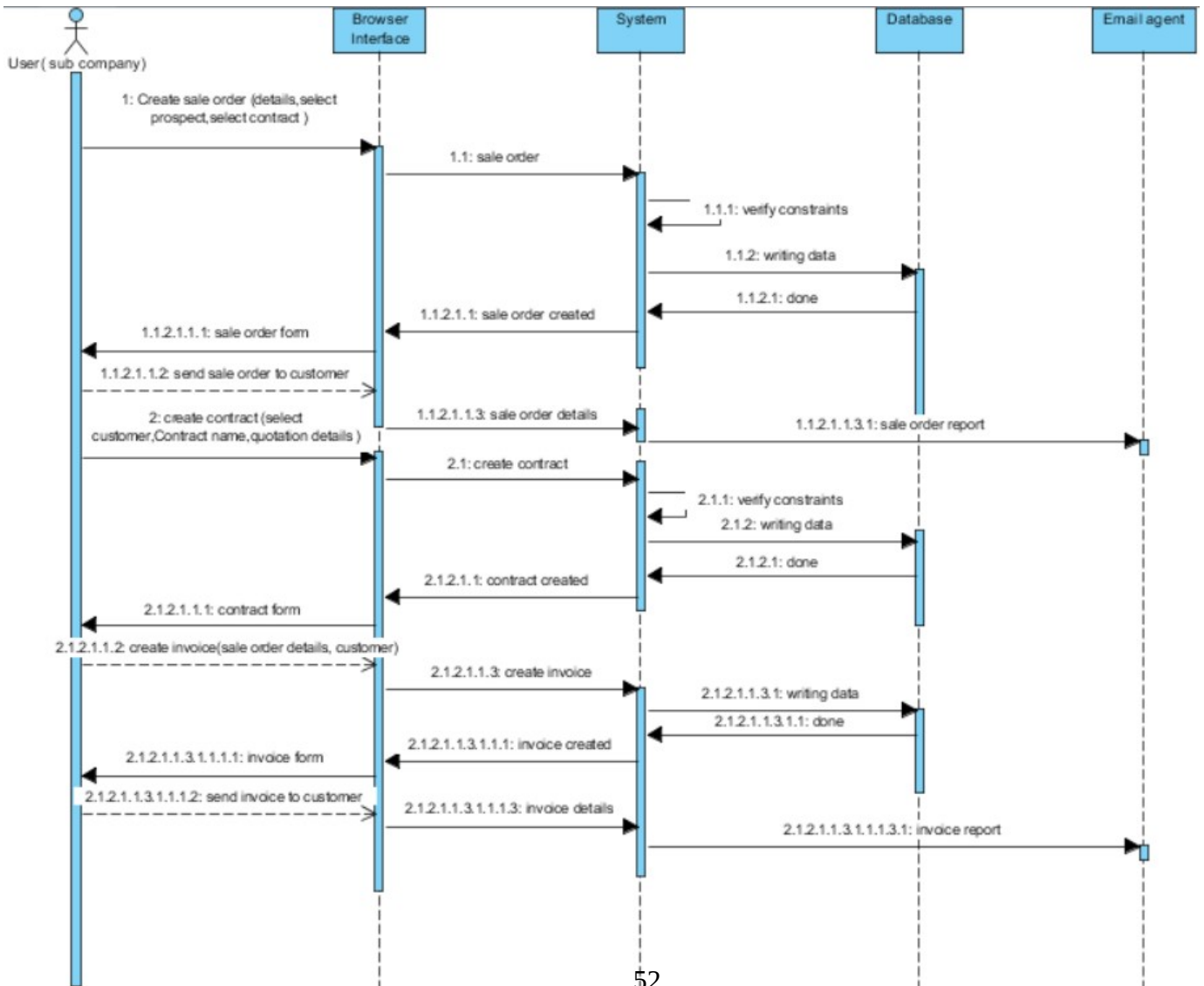


Figure 56: User (for Sub Company) create contract

4.2.3 Activity Diagram

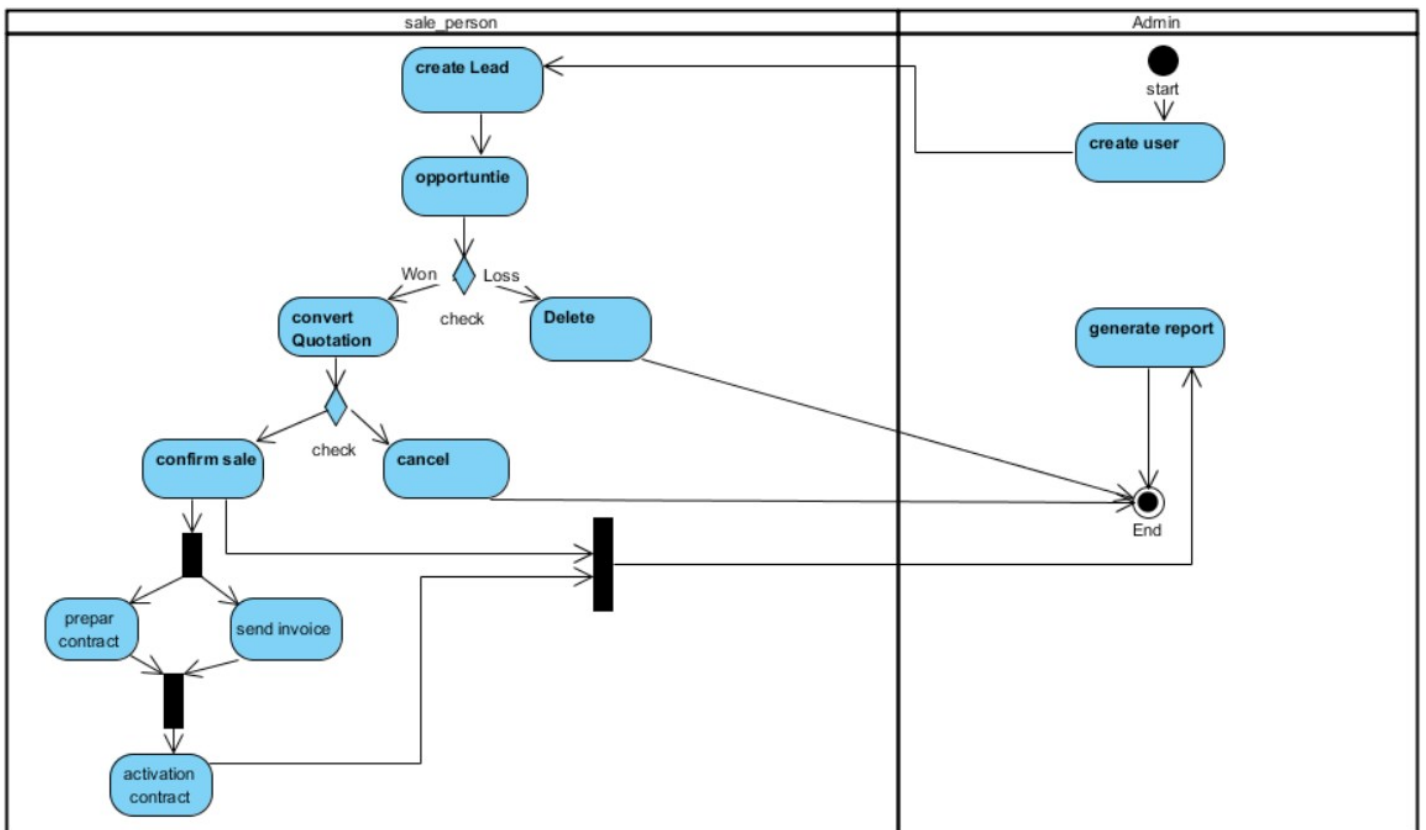


Figure 57: User activity diagram for the system

4.3 SYSTEM IMPLEMENTATION

4.3.1 Administrators Screens

This screen is used by administrators to monitor the performance of sales representatives

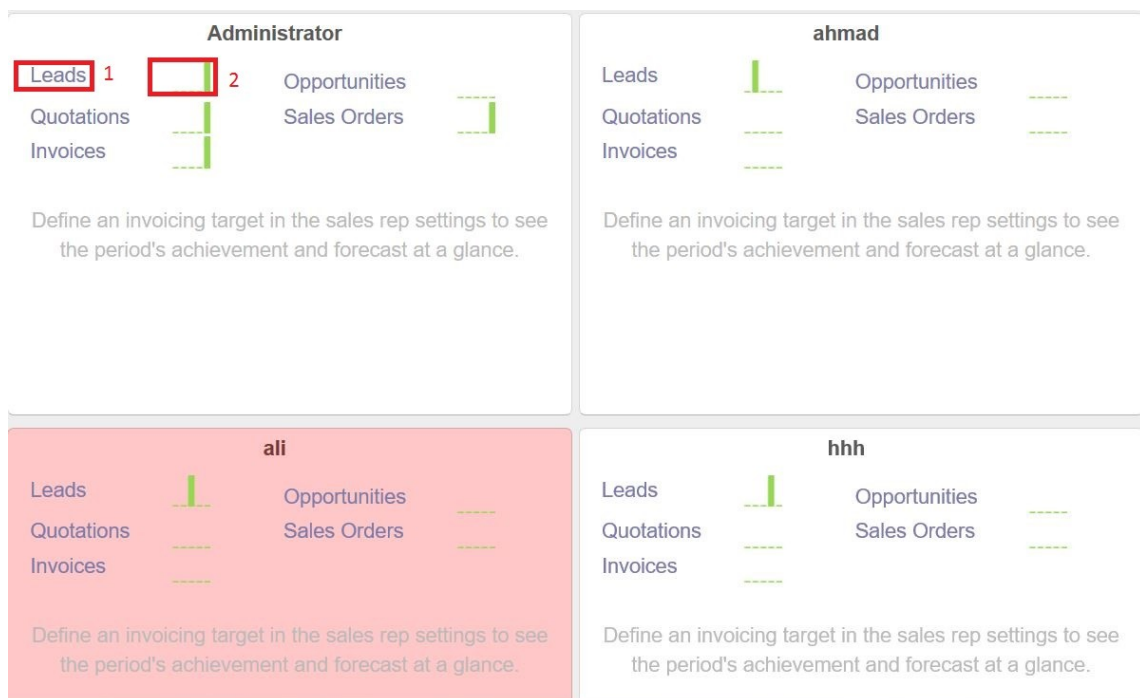


Figure 58: Sales representatives Form

- 1- By clicking on leads all leads related to this sales rep are displayed together. Similarly, as the same way when pressing others they display all information belong to same sales rep.
- 2- These columns are used to view and analyze events relating to leads for this sales representative. These columns display the events of the last five months

Sales Rep / Leads Salesperson Administrator x

Create or Import

<input type="checkbox"/>	Creation Date	Subject	Contact Name	Region	Email	Phone
<input type="checkbox"/>	10/19/2016 22:32:14	giad motor	jabir	al-Khartoum Locality (Khartoum)		
<input type="checkbox"/>	10/17/2016 23:18:31	gcnn		al-Khartoum Locality (Khartoum)		

Figure 59: display all leads belong to sales rep

Sales Rep / Invoices Analysis Salesperson Administrator x Period x

★ Favorites By Country By Product By Product Category By Refund
 🎯 Filters This Year To Invoice Pro-forma Invoiced Customer Supplier Invoice Refund
 📊 Group By Partner Salesperson Sales Team **Category of Product** Status Company Period Due Month

▶ Save current filter
 ▶ Advanced Search
 ▶ Add to Dashboard

📅 📊 📄 🕒 📑 📁 📌 🔄 📄 📄 Measures

Total	08/2016	09/2016	10/2016	Total Without Tax
Total	156.12	165.31	55.10	376.53
All	156.12	165.31	55.10	376.53

Figure 510: invoices analysis form for specific sales rep

Name 1

Quotations Leads Opportunities

Active 2

Invoice Target

Invoice Forecast 3

Access Rights Stages Notes

The basic information for this Salesrep

Login **Phone**

Company 4 **Mobile**

Regions 5 **Fax**

Figure 511: Form for creating sales rep

- 1- Which it used to control the display and hide information from sales representative's screen.
- 2- Make user information visible or hide in sales representative screen.
- 3- To identify target revenue for sales rep to be achieved in month.
- 4- The company, which employed this delegate.
- 5- Assign regions which to be responsible for.

4.3.2 Sales Rep (Users) Screens

This screens is used by system users or company employees to perform tasks

The screenshot shows a web form titled "Quotation /". It contains several input fields: "Customer" (a dropdown menu), "Contract Name" (a dropdown menu with a red box around it and a "1" next to it), "Date" (a date-time picker showing "10/19/2016 22:39:33"), "Reference/Description" (a text input field), "Warehouse" (a dropdown menu showing "B-on"), and "Pricelist" (a dropdown menu showing "Public Pricelist (SDD)"). Below these fields are two tabs: "Order Lines" and "Other Information". Under the "Order Lines" tab, there is a table with columns: "Product", "Description", "Quantity", "Unit Price", "Taxes", and "Subtotal". The first row of the table has a red box around the text "Add an item" and a "2" next to it. Below the table are three empty rows.

Figure 512: create quotation form

- 1- To select or create contract that related to this customer
- 2- To select service package to this contract

<input type="checkbox"/>	Full Name	Customer	Reference	Last Invoice Date	Total to Invoice	Remaining days	Start Date	Expiration Date	Salesperson
<input type="checkbox"/>	3 month hosting	jh	AA001		0.00	0	08/06/2016	08/14/2016	Administrator
<input type="checkbox"/>	Contract: dgd / Contract: dgd	dgd	AA008		0.00	318	09/03/2016	09/02/2017	Administrator
<input type="checkbox"/>	jh	jh	AA017		0.00	0	09/10/2016	09/20/2016	ali
<input type="checkbox"/>	Contract: jh	jh	AA018		0.00	30	09/10/2016	11/18/2016	ali
<input type="checkbox"/>	Contract: jh	jh	AA019		0.00	0	10/05/2016	10/11/2016	ali
<input type="checkbox"/>	Contract: sdsd	Jirtig, sdsd	AA020		0.00	114	09/11/2016	02/10/2017	Administrator
<input type="checkbox"/>	Contract: ss	ss	AA022		0.00	5	10/04/2016	10/24/2016	Administrator
<input type="checkbox"/>	Contract: ss	ss	AA023		0.00	0	09/11/2016	10/03/2016	Administrator
<input type="checkbox"/>	giad add	jh	AA025		0.00	0	09/12/2016	09/22/2016	ali
<input type="checkbox"/>	LJLJ	jh	AA031		0.00	0	10/03/2016	10/17/2016	ali
<input type="checkbox"/>	mazin	mazin	AA033		0.00	0	10/09/2016	10/18/2016	ali

Figure 513: contract details

The screenshot shows a contract management interface. At the top, there is a status bar with buttons: 'Close Contract', 'Set In Progress', 'Cancel Contract', and a status indicator '1'. To the right, there is a status bar with 'In Progress', 'To Renew', and 'Closed' buttons, with a '2' callout. The main form area includes:

- Contract Name:** 'jh' (with a '3' callout pointing to a '\$ Cost/Revenue' field).
- Customer:** 'jh' (dropdown menu).
- Company:** 'Jirtig' (dropdown menu).
- Salesperson:** 'ali' (dropdown menu).
- Contract Information:** A section header.
- Renewal:** A section with explanatory text: 'Once the end date of the contract is passed, the Salesperson is notified by email to renew the contract with the customer.'
- Start Date:** '09/10/2016' (calendar icon, with a '4' callout).
- End Date:** '09/20/2016' (calendar icon, with a '4' callout).
- Remaining days:** '0' (input field, with a '5' callout).

Figure 513: contract form

- 1- Buttons to change contract status.
- 2- Contract status bar.
- 3- To view payment information.
- 4- To identify begin and end date contract.
- 5- Countdown days to suspend contract.

<input type="checkbox"/>	Date	Ref.	Description	User	Analytic Journal	Amount	Quantity	Contract Name
<input type="checkbox"/>								
▼ Sales (1)						15000.00	1.00	
▼ August 2016 (1)						15000.00	1.00	
<input type="checkbox"/>	08/07/2016	SAJ/2016/0006	gold	Administrator	Sales	15000.00	1.00	3 month hosting
						2	15000.00	1.00

Figure 514: Cost/Revenue form

- 1- Grouping sales invoices by month.
- 2- Total revenue for the specific contract

4.4 SYSTEM REPORTS

Subscription Report

Sale Person : ali

Customer	Subscription	Start date	End date
Hala	package 1	2016-05-09	2016-10-25
Asma	package 1	2016-08-15	2017-08-15
Awadia	package 1		

Sale Person Report

Sale Person : Sara

Number of Contracts	Regions	Expected Revenue	Actual Revenue
2	Omdurman	5200.0	5000.0
2	Al-manshia	5200.0	5000.0
2	AL-hajusif	5200.0	5000.0
2	khartuom2	5200.0	5000.0

Sale Person : ali

Number of Contracts	Regions	Expected Revenue	Actual Revenue
2	khartuom2	2000.0	5000.0
2	khartuom2	2000.0	5000.0
2	Arkuil	2000.0	5000.0
2	Omdurman	2000.0	5000.0

Sale Person : jirtig manager

Number of Contracts	Regions	Expected Revenue	Actual Revenue
1	Al-manshia	10200.0	5000.0
1	khartuom2	10200.0	5000.0

Figure 515: Subscriptions Report

Figure 515: Sales rep Report

Chapter Five

5 RESULT

5.1 INTRODUCTION

This chapter discusses the most important results of the System.

5.2 CONCLUSION

We have successfully accomplished this research, asking Allah Almighty that we have made a new addition to the field of information technology and to be helpful for subsequent research, especially in the field of enterprise resource planning to increase the development and progress sections CRM and sales organizations in Sudan.

5.3 RESULTS

- Integrated system unifies all the companies which saves time and effort to become easier to manage
- common database allow to extraction of aggregate reports accurately, to assist in making administrative decisions
- B-on subsidiaries companies distribute salespeople across different regions to be responsible of customers in that regions to improve communication with them and increase revenue

5.4 RECOMMENDATIONS

- We recommend the B-on company to train staff to use the new system and creating new policies.
- We recommend improving the system in order to suit service companies and companies that deal with long-term customers such as insurance companies.

REFERENCES

- 2.1 Rouse, Margaret. "ERP (enterprise resource planning)". TechTarget. Retrieved on July 14, 2016.
- 2.2 Bidgoli, Hossein, (2004). The Internet Encyclopedia, Volume 1, John Wiley & Sons, Inc. p. 707.
- 2.3 Rubina Adam, Paula Kotze, Alta van der Merwe. 2011. "Acceptance of enterprise resource planning systems by small manufacturing Enterprises".
- 2.4 Shaul, L. and Tauber, D. 2012. CSFs along ERP life-cycle in SMEs: a field study. *Industrial Management & Data Systems*, 112(3), 360-384.
- 2.5 Khosrow-Puor, Mehdi. (2006). *Emerging Trends and Challenges in Information Technology Management*. Idea Group, Inc. p. 865.
- 2.6 <http://www.ebuild.co.in/why-a-closed-source-erp-is-preferred-over-an-open-source-erp/> .Retrieved May 14, 2016.
- 2.7 Hardy, Quentin (15 May 2012). "NetSuite Moves to 'Commerce as a Service'". *The New York Times*. Retrieved on May 29, 2016.
- 2.8 Hardy, Quentin (13 May 2014). "NetSuite: Enterprise Software Still Follows a Manufacturing Model". *The New York Times*. Retrieved on May 29, 2016.
- 2.9 "ERPsoftware360". Retrieved on May 29, 2016..
- 2.10 "<https://www.everipedia.com/NetSuite/>". Retrieved on May 29, 2016.
- 2.11 Thomas H. Davenport, "Putting the Enterprise into the Enterprise system" *Harvard Business Review*, 121 -131(1998).
- 2.12 Wincel, J.P "Lean Supply Chain Management", R.M. Donovan Inc. & Co.2010.
- 2.13 Leon, A., "Enterprise Resource Planning", Tata McGraw-Hill, INDIA, 2009.
- 2.14 A Robson "www.perfect-image.co.uk/upload/downloads/white-papers-container/CRM.pdf". Retrieved Jun 27, 2016.

2.15 "[Management Tools - Customer Relationship Management - Bain & Company](#)". www.bain.com. Retrieved Jun 27, 2016.

2.16 "[Types of CRM and Examples | CRM Software](#)". www.crmssoftware.com. Retrieved Jun 27, 2016.

2.17 "<http://quintagroup.com/cms/python/odoo>" Retrieved on May 23, 2016.

2.18

2.19 "<https://wiki.archlinux.org/index.php/Odoo>" Retrieved on May 23, 20

2.20 [Fabien Pinckaers](#)" <https://www.quora.com/Why-does-the-Odoo-OpenERP-software-company-have-so-much-success>" Retrieved May 23, 2016.

2.21 "<http://repository.sustech.edu/handle/123456789/12159>" Retrieved in July 20,2016.

2.22 "<http://repository.sustech.edu/handle/123456789/12817>" Retrieved in July 20,2016.

2.23 "<http://repository.sustech.edu/handle/123456789/11451>" Retrieved in July 20, 2016.

3.1 *OpenERP_Technical_Memento_v0.7.4.pdf*.

3.2 "<https://www.odoo.com/documentation/8.0/howtos/backend.html>" Retrieved May 29, 2016.

3.3 [stéphane teyssier](#) "<http://blog.octo.com/en/first-steps-with-openerp/>" Retrieved May 29, 2016.

3.4 "http://openerp-server-v7.readthedocs.io/en/latest/02_architecture.html" Retrieved May 30, 2016.

3.5 "https://en.wikipedia.org/wiki/Web_Server_Gateway_Interface" Retrieved May 30, 2016.

3.6



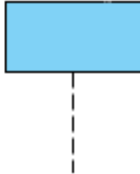
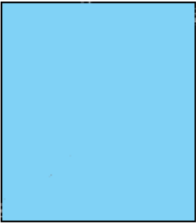


"<https://www.odoo.com/documentation/8.0/reference/reports.html>" Retrieved Jun 3, 2016.



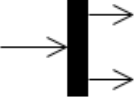
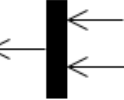
3.7 "<https://www.odoo.com/documentation/8.0/reference/qweb.html#reference-qweb>" Retrieved Jun 3, 2016.

APPENDICES

A First appendix






Table 91: Explanation for UML Forms.

Explain Figure	Name Figure	Figure
Represents an external person or entity that interacts with the system to complete a task.	Actor	
Each use case on the diagram represents a single task that the system needs to carry out.	use case	
Represents an object in the system or one of its components.	Object	
It is usual to display use cases as being inside the system and actors as being outside the system.	System Boundary	
Indicates the first activity/action state on an activity diagram. Is shown using a small black circle.	Initial Node	
Indicates the last activity/action state on an activity diagram. Is shown using a black circle in white circle.	Final Node	

<p>Rectangle with rounded corners and a meaningful name. Also known as an activity state, represents the invocation of an operation, a step in a business process, or an entire business process.</p>	<p>Activity/Action Node</p>	
<p>Is shown as a diamond shape with incoming transition and outgoing transitions where each outgoing transition is labeled with a guard condition in square brackets indicating the condition that must be satisfied for the transition to occur.</p>	<p>Decision Node</p>	
<p>A fork may have one incoming transitions and two or more outgoing transitions, denotes the beginning of parallel activity.</p>	<p>Fork</p>	
<p>A join may have two or more incoming transitions and one outgoing transition, denotes the end of parallel processing</p>	<p>Join</p>	

B Second appendix

Table 92: Explanation for UML Relationship.

Explain Figure	Name Figure	Figure
The association is the link that is drawn between actor and a use case. It indicates which actors interact with the system to complete the various tasks.	Association	
Use the includes link to show that one use case includes the task described by another use case	Include	
A self message can represent a recursive call of an operation or one method calling another method belong to the same object.	Self Message	
Synchronous messages are useful to represent procedure calls	Synchronous Message	
Results of procedure calls.	Return Message	
Solid line from the source activity towards the end activity and represent the order in which activities happen.	Transition(Control Flow/Edge)	