



**SUDAN UNIVERSITY OF SCIENCE AND
TECHNOLOGY**

**COLLEGE OF COMPUTER SCIENCE AND
INFORMATION TECHNOLOGY**

**DEPARTMENT OF SOFTWARE
ENGINEERING**

**UNIFIED EMERGENCY SERVICES
CENTER**

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**THESIS SUBMITTED AS A PARTIAL REQUIREMENTS OF B.Sc.
(HONOR) DEGREE IN SOFTWARE ENGINEERING**

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الحمد لله

الحمد لله رب العالمين.. خلق اللوح والقلم.. وخلق الخلق من عدم.. ودبر الأرزاق والآجال بالمقادير والحكم.. وجمل الليل بالنجوم في الظلم.

الحمد لله رب العالمين.. الذي علا فقهر.. وملك فقدر.. وعفا فغفر.. وعلم وستر.. وهزم ونصر.. وخلق ونشر.

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وأشهد أن محمداً عبده ورسوله , وصفيهُ من خلقه وخليلهُ.

خير البرية أقصاها وأدناها
وهو أبر بني الدنيا وأفهاها
أتى به الله مبعوثاً وأتمه على
شفأ جُرفِ هارٍ فأنجاها
وأبدل الخلق رشداً من ضلالتهم
وقل بالسيف لما عزَّ عزاها

دعانا إلى الإسلام , وسئمنا ذرورة عز لا ترام , ونثر يافوخ الشرك نثراً ليس مثله من بعده نظام , فصلوات الله وسلامه عليه , وآله وصحبه ومن إستن بسنته وأهتدى بهديه ما دار نجم في فلك.

الأية

بسم الله الرحمن الرحيم

قال تعالى:

(وَعَلَّمَ آدَمَ الْأَسْمَاءَ كُلَّهَا ثُمَّ عَرَضَهُمْ عَلَى الْمَلَائِكَةِ فَقَالَ أَنْبِئُونِي بِأَسْمَاءِ هَؤُلَاءِ إِنْ كُنْتُمْ صَادِقِينَ
* قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا إِلَّا مَا عَلَّمْتَنَا إِنَّكَ أَنْتَ الْعَلِيمُ الْحَكِيمُ)

صدق الله العظيم

(سورة البقرة الآيات 31-32)

الإهداء

إلهي لا يطيب الليل إلا بشكرك .. ولا يطيب النهار إلا بطاعتك .. ولا تطيب اللحظات إلا بذكرك ..

ولا تطيب الآخرة إلا بعفوك .. ولا تطيب الجنة إلا برويتك جل جلالك ..

إلى من بلغ الرسالة وأدى الأمانة .. ونصح الأمة .. إلى نبي الرحمة ونور العالمين ..

سيدنا محمد صلى الله عليه وسلم ..

إلى من كلله الله بالهيبة والوقار .. إلى من علمني العطاء بدون إنتظار .. إلى من أحمل اسمه

بكل إفتخار .. ستبقى كلماتك نجوم أهتدي بها اليوم وفي الغد وإلى الأبد ..

والذي العزيز ...

إلى ملاكي في الحياة .. إلى معنى الحنان والتفاني .. إلى بسمه الحياة وسر الوجود ..

إلى من كان دعائها سر نجاحي .. وحنانها بلسم جراحي .. إلى أعلى الحبايب ..

أمي الحبيبة ...

إلى القلوب الطاهرة الرقيقة والنفوس البريئة إلى رياحين حياتي ..

إخوتي ...

بالإخاء والوفاء والعطاء تميزوا ... إلى ينابيع الصدق الصافي .. إلى من معهم سعدت , وبرفقتهم في دروب

الحياة الحلوة والحزينة سرت .. إلى من كانوا معي على طريق النجاح والخير .. إلى من عرفت كيف أجدهم

وعلموني أن لا أضيعهم ..

أصدقائي

شكر و عرفان

الشكر أولاً وأخيراً لله رب العالمين ،

لابد لنا ونحن نخطو خطواتنا الأخيرة في الحياة الجامعية من وقفة ، تعود إلى أعوام قضيناها في رحاب الجامعة مع أساتذتنا الكرام الذين قدموا لنا الكثير، بأذلين بذلك جهوداً كبيرة في بناء جيل الغد لتبث الأمة من جديد...

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...

إلى الذين مهدوا لنا طريق العلم والمعرفة...

إلى جميع أساتذتنا الأفاضل.....

"كن عالماً ... فإن لم تستطع فكن متعلماً ، فإن لم تستطع فأحب العلماء ، فإن لم تستطع فلا تبغضهم"

ونخص بالتقدير والشكر:

الأستاذ: الشريف هجو المقدم يوسف.

الذي نقول له بشراك قول رسول الله صلى الله عليه وسلم:

"إن الحوت في البحر ، والطير في السماء ، ليصلون على معلم الناس الخير"

كما نتقدم بالشكر الجزيل لأسرنا الذين كانوا لنا في هذا الطريق النور والدليل ، نهددهم بعضاً

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Abstract

Information technology plays an important role in organizations that rely on information technology, which is based on the support of various departments in the organization depending on the different foundations and criteria specify to each department. The study addressed the problems faced the emergency systems in Sudan, a multiplicity of emergency numbers, the system is unite all emergency numbers in Sudan (ambulance, police and fire) in one number, by using the PBX device and the open source enterprise resource planning (OpenERP) to provides the integration of the emergency systems with each other.

The study found a number of results: the unification of all emergency numbers in one number, register state information, the exchange of information between emergency departments, extract of the reports become accurate and easy.

The study recommends to apply of the unified system of emergency in Sudan to help to deal with emergency situations better and increasing awareness of enterprise resource planning system.

المستخلص

تلعب تكنولوجيا المعلومات دوراً مهماً في المنظمات التي تعتمد على تكنولوجيا المعلومات ، حيث تقوم على دعم الادارات المختلفة في المنظمة تبعاً لاسس ومعايير مختلفة تخص كل إدارة. تطرقت الدراسة الى المشاكل التي تواجه أنظمة الطوارئ في السودان وهي تعددية ارقام الطوارئ، فالنظام هو توحيد جميع ارقام الطوارئ في السودان (الإسعاف، الشرطة و المطافئ) في رقم واحد، وذلك عن طريق استخدام جهاز PBX ونظام تخطيط موارد المؤسسات المفتوح المصدر (OpenERP) ليوفر تكامل أنظمة الطوارئ مع بعضها البعض.

توصلت الدراسة الى عدد من النتائج وهي: توحيد جميع ارقام الطوارئ في رقم واحد، تسجيل معلومات الحالة، تبادل المعلومات بين اقسام الطوارئ، إستخراج التقارير بصورة دقيقة و سهلة. توصى الدراسة بتطبيق نظام الطوارئ الموحد في السودان ليساعد على التعامل مع الحالات الطارئة بصورة افضل وزيادة الوعي بنظام تخطيط موارد المؤسسات.

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List of Terms

| Terms | Description |
|-------------------|--|
| ERP | Enterprise Resource Planning |
| OpenERP | Open Enterprise Resource Planning |
| PBX | Private Branch Exchange |
| VOIP | Voice Over Internet Protocol |
| XML | Extensible Markup Language |
| UML | Unified Modeling Language |
| HTML | Hyper Text Markup Language |
| SIP | Session Initiation Protocol |
| PSTN | Public Switched Telephone Network |
| RTP | Real-time Transport Protocol |
| AGPL | Affero General Public License |
| OOP | Object Oriented Programming |
| PostgreSQL | Postgres Structure Query Language |

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CHAPTER ONE

INTRODUCTION

1.1 INTRODUCTION:

Information systems have played an increasingly visible role in recent years in improving the competitiveness of business, they are not just tools used to treat repetitive tasks, but are used to guide the development of all the daily activities of the institution. The management of integrated software today has become a major source of competitive advantage for these institutions.

Before the advent of ERP management program (Enterprise Resource Planning (ERP)) these departments has special computer system for each department and separately from other departmental systems. ERP system is a comprehensive system integrates between the enterprise departments sections and activities in the system one software to serve all the needs of different institutions and supports most of the systems that are managed in a single database for a variety of operational work as tasks manufacturing and supply management, financial management, projects, human resources and customer relationship management.

The most important objectives of the ERP system organizations can multi-management of their resources efficiently and easy to access the information to use for make a decision.

1.2 RESEARCH PROBLEM:

The idea of research based on the problems and difficulties facing the emergency of systems in Sudan that contain many figures which makes it difficult for the person who wants service to know the service number required and there is a problem in the different emergency management systems are good, so there has been a tendency to find a system it manages these various systems such as the emergency ambulance, police and fire brigade.

1.3 RESEARCH OBJECTIVES:

The primary objective is to build a unified emergency system for all emergency cases, by using the concept of computerization (ERP), and the resulting application:

- Unite all the different emergency numbers in one number
- Recording information for emergency cases
- Send information to the competent authority to the situation of emergency.
- Achieve greater speed of receiving call, add state information and send it to competent authority.
- Easy extraction of reports.
- Create a database for state information and customer information.
- Provide any data needed by any department of emergency departments.
- Upgrade the performance of emergency service systems, enabling it to predict the future.

1.4 RESEARCH QUESTIONS:

- How to unite all the different emergency numbers in one number?
- How to Recording information for emergency cases?
- How to send information to the competent authority to the situation of emergency?
- How to achieve greater speed?
- How to Easy extraction of reports?
- How to create a single database?
- How to provide any data needed by any department of emergency departments?
- How to upgrade the performance of emergency service systems, enabling it to predict the future?

1.5 PROPOSED SOLUTION:

The importance of research in the framework of an integrated work of building a unified emergency system through the enterprise resource planning software (ERP) and which is a unification of different emergency systems into a single system. The possibility of requesting any service from the emergency services in one number.

1.6 RESEARCH HYPOTHESES:

There are a number of hypotheses expected upon completion of this study, namely:

- Provide rapid response to emergency events.
- Enable emergency departments underdeveloped to save and retrieve data easily.
- Facilitate the exchange of information between various departments of emergency.
- Enable Managers to extract the required report.

1.7 RESEARCH SCOPE:

This research deals with the design of enterprise resource planning (ERP) for different Emergency System and will be building a unified system for all emergency cases in one number.

1.8 THESIS LAYOUT:

The Research Contain six chapters: chapter two includes introduction, background of civil defense emergency in Sudan, ERP System, call center, PBX and Related Studies. Chapter three include introduction to OpenERP, tools and techniques, current system and proposed system. Chapter four includes system analysis using UML. Chapter Five includes system implementations and interfaces. Chapter Six includes the results and recommendations.

CHAPTER TWO

BACKGROUND TO ERP SYSTEM

&

LITERATURE REVIEW

2.1 INTRODUCTION:

This Chapter is divided into five sections: the first section about the civil defense, the second section about ERP system, the third section about call center, the fourth section about PBX device and the fifth section includes literature review.

2.1.1 THE CIVIL DEFENSE EMERGENCY IN SUDAN:

Civil Defense services began in Sudan in 1907 and became a firefighter team for each of the river transport and the Gezira Scheme, civil aviation and maritime ports, these teams for firefighter and with only limited abilities. In 1991 Civil Defense Act is issued, which regulates the work of the civil defense and coordinate efforts to deal with disasters and defines a prevention and safety, which were issued for the prevention and safety regulations. In 1992 it was annexed to the police forces. Civil Defense Department is responsible to protect life and property from fire hazards by providing prevention, fire, rescue and ambulance services. Civil Defense act issued in 2005 and make civil defense a key organ in disaster prevention and responsible for the application, review and evaluation of the means and methods of prevention and safety. ^[1]

2.2 ERP SYSTEM:

ERP term given to a management information system that links data and internal and external entity such as accounting, manufacturing, sales and service, customer relationship management, and so on, all of these activities are automatically connected by mediated software application. The goal of the application resource planning system is to facilitate the transmission of information established between the activities of the various departments and the delivery of relevant information to beneficiaries outside the facility.

Resource planning system can be defined as the following specifications:

- An integrated system that works automatically and keep pace with established real-time activities.
- Uses a unified database to follow up on all of the organization's activities and link them to each base.
- A unified interface for all applications and activities.

Any ERP system in general consists of the following parts:

- Database.
- Control gate to manage the system.
- Producing reports can be customized.
- Extrapolation of business information.
- Search.
- Document Management.
- The conduct of operations management. ^[2]

2.3 CALL CENTER:

An office receive for incoming and outgoing calls in the institution and a lot of institutions have support and customer service that employs many of the staff in customer service and support functions. Contact centers rely on receiving incoming calls and contain a large number of employees for the purpose of providing the service 24 hours a day in order to help meet the needs of the client at any time required, such as emergency services call centers in order to help customer's need in the request for the emergency service that is need it. ^[3]

2.4 PRIVATE BRANCH EXCHANGE

(PBX):

Is a phone system within an organization that converts calls between users in the form of local lines at the same time allows a certain number of external lines for some users. The main purpose of the PBX is to provide a cost per user request line of the main office of the telephone company.

2.4.1 THE PBX INCLUDES:

- Multiple phones lines end at the PBX.
- A computer with a memory for the management transfer calls within the PBX and control the entry and exit calls.
- Network of lines within the PBX.
- The existence of a control panel for the operation. ^[4]

2.5 LITERATURE REVIEW:

2.5.1 GEOGRAPHIC ROUTING OF EMERGENCY SERVICE CALL CENTER EMERGENCY CALLS (PATTI L. MCCALMONT, ROBERT A. SHERRY, RONALD W. MALHLSI, PETER R. SCHMLDT) AUGUST 3, 2004:

The present invention is related to the delivery of requests for emergency service initially handled by an emergency service call center to a public safety answering point. The invention additionally allows for enhancement information to be provided to a public safety answering point operator visually in connection with call routed to that public safety answering point. This information may include caller identification, and additional information, such as information regarding the location of the caller and the nature of the emergency. ^[5]

2.5.2 CAPACITY PLANNING OF EMERGENCY CALL (R. P. DWARS) AUGUST 27, 2013:

Emergency Call centers serve as the first point of contact between the caller and the emergency services there for, it is vital that these call centers operate quickly while providing good quality of services. The main process within an emergency call center consists of two consecutive stages: first triage, followed by dispatching. Triage is about determining the location of the caller and assessing the severity of the accident. Dispatching is the process of coordinating ambulances in the region and assigning them to an accident. Sometimes a call may also lead to one more follow-up calls, in which call center employees have to coordinate with ambulances and hospitals. ^[6]

2.5.3 SUMMARY OF PREVIOUS STUDIES:

According to these studies, it was noted that many countries seek to unify the various emergency regulations on the one number through call centers. These studies also showed convincing and excellent results which helps emergency entities to take the necessary measures to deal with emergency situations are accurate and easy access to emergency service through the unified call number. These excellent results motivate to apply this system in Sudan on emergency departments to deal with emergency cases.

2.5.4 THE SIMILARITIES:

Pervious study unified the all emergency number in one number.

2.5.5 THE DIFFERENCES:

The previous study use routing the call from call centers with caller information to the public safety answering point.

The current research unified all emergency number in one using openERP and PBX device.

CHAPTER THREE

TOOLS AND TECHNIQUES

3.1 INTRODUCTION:

This chapter include Introduction to OpenERP, tools and techniques, the current system and the proposed system.

3.2 OPENERP:

An integrated software system for enterprise resource planning (ERP) is available for free as a ready-to-use and an applet source are adjustable according to the open source software license AGPL.

System consists of a basic platform and a set of software modules that provide the functionality of the program to the user, such as accounting, sales, procurement, warehousing, manufacturing, customer relations, human resources, and other points of sale. This design provides several benefits, including:

- The user can activate the software modules that provide functions that only needed, making the system more accessible and less crowded.
- The ability to add new functionality to the system or modify functions are readily available through the activation of additional software modules or create new software modules.
- The possibility of dissemination and exchange of additional software modules between system users additional functionality not available in basic system.^[2]

3.2.1 THE STRUCTURE OF OPENERP:

“To access OpenERP you can use a web browser pointed at the OpenERP client-web server, or use an application client (the GTK client) installed on each computer.

Using the web browser is preferred in the case if the remote server (in another country), because the web browser with the most suitable time delay that occurs between the network client (Client Web) and server (Server). In the case of a local server (in the same building), the client application (GTK Client) to be more responsive and easier to use”.^[7]

3.2.2 OPENERP COMPONENT:

“An OpenERP system is formed from three main components:

- The PostgreSQL database server, which contains all of the databases, each of which contains all data and most elements of the OpenERP system configuration.
- The OpenERP application server, which contains all of the enterprise logic and ensures that OpenERP runs optimally.
- The web server, a separate application called the Open Object client-web, which enables you to connect to OpenERP from standard web browsers and is not needed when you connect using a GTK client.”^[7]

3.2.3 OPENERP FEATURE:

- “It satisfies all company specifications. You can side away the undesirable functions of this program, if you don't want them in your company procedure.
- Custom ERP Application is a least servicing application.
- It is less costly than packed resources.
- Custom application can be quickly applied in flip structure within a company.
- It reduces the possibilities of danger relevant to cut over of big projects.
- This program is based on your company techniques, so that you should not pattern your company procedures to fit in the ERP program.
- For those company procedures, which are fixed, Custom ERP remedy is best. For example, bookkeeping journal is a fixed procedure that does not significantly modify with time. For these company projects, this ERP is perfect.
- This application is backed by experienced designers. If you experience any specialized problems in applying or performance, the designers are prepared with alternatives.”^[13]

3.3 LANGUAGES USED IN THE OPENERP:

3.3.1 PYTHON:

“Python is an easy to learn, powerful programming language. It has efficient high-level data structures and a simple but effective approach to object-oriented programming. Python’s elegant syntax and dynamic typing, together with its interpreted nature, make it an ideal language for scripting and rapid application development in many areas on most platforms.” [9]

3.3.1.1 USES OF PYTHON LANGUAGE:

Python language was used for programming in many applications, packages and are frequently used in design three dimensional applications. It is also used in various operating systems and is also used as:

- Scripting language.
- Program of geographical maps.
- Package Office open source software.

3.3.1.2 FEATURE OF PYTHON:

- Simple.
- Easy to learn.
- Free and open source.
- High-level programming language.
- Portable.
- Supports most operating systems.
- OOP language.
- Extensible.
- Extensive Libraries. [9]

3.3.2 XML:

Extensible Markup Language symbolized by the abbreviation xml used to describe and store and organize data other than HTML which is used to display the data on the browser. It is noted that XML is not a language in the original, they describe a range of expressions that used to describe any language.

3.3.2.1 USES OF EXTENSIBLE MARKUP LANGUAGE:

- Simplify the process of data involved.
- Simplify the process of changing the working platform.
- Separate HTML data.
- Used to create new Internet languages.

3.3.2.2 XML FEATURE:

- Data storage.
- Exchange and sharing of data.
- The ability to display data more than one way.
- Easy to read.
- Clear. ^[10]

3.3.3 POSTGRESQL:

The PostgreSQL is one of the most open source projects online and operates large numbers of applications, sites and even parts of the Internet infrastructure. In fact, some large and well-known organizations in the world are using the PostgreSQL frequently. PostgreSQL do not own to the company and not limit the development path as it evolves by volunteers from within the free source community.

Invented by expert in databases technology Prof. Michael Stonebraker. In 1995 was known under the name of PostgreSQL95, the developer community as the launch of the database PostgreSQL 6.0 to reflect the origin of the project and new

features that added to it. [8]

3.3.3.1 FEATURE OF POSTGRESQL:

- Integrity of the data.
- More Extendable.
- Characteristics completion.
- Extension.
- Support Platforms.
- License free of trouble.[14]

3.4 ASTERISK:

A telephone System open source that integrated to convert any computer to a telephone exchange (Private Branch Exchange). This system inoperable systems on Linux and UNIX and Mac and provides all the services necessary to build an integrated PBX phone. This system is created by Mark Spencer of Digium company claims to have Asterisk name came from the symbol (*).

3.4.1 FEATURES OF ASTERISK SYSTEM:

- System provides a text interface, showing all the events that occur in the system now, and so it provides an excellent interface helps to detect system errors, and facilitates maintenance and follow-up process.
- Allowing the connection of several different telephone exchanges with each other.
- Works on several protocols SIP, IAX2.
- The ability to communicate with the public telephone network PSTN.
- Store call information such as date, time, duration and number of the caller.
- Allows recording calls between people and leave a voice message in the absence of the person or the line is busy (Voice mail).
- Allows implementation of conference calls and provide chat rooms.

3.4.2 HOW ASTERISK WORKS:

Asterisk use a set of protocols to open voice communication between users, such as protocols IAX2, RTP, SIP, where being uses SIP to initiate contact and management protocol, and uses the protocol RTP to transmit audio and video between the ends of the connection after that starts, it uses the protocol IAX2 for communication between Asterisk servers.^[11]

3.5 UNIFIED MODELING LANGUAGE (UML):

The Unified Modeling Language (UML) is a general-purpose visual modeling language that is used to specify, visualize, construct, and document the artifacts of a software system. It captures decisions and understanding about systems that must be constructed. It is used to understand, design, browse, configure, maintain, and control information about such systems.

3.5.1 UML GOALS:

Reduce the cost, increase reliability, speed up the work, ease of modification and maintenance. UML diagrams help developers to understand the system easily and quickly, the language of communication between developers and designers, and has nothing to do with how the programming of these function.

3.5.2 UML FEATURE:

Designed to give different points of view and abstraction, supports of high-level development concepts, give a complete picture of the program to be designed making it easier to visualize the full program, facilitates the maintenance process and get rid of the defects.

3.5.3 UML DIAGRAMS:

- **Use Case Diagram:** It shows the relationship between actors and use cases.
- **Sequence Diagram:** Show the chronology of objects participating in the interaction.
- **Activity Diagram:** It describes the workflow of the system behavior.^[12]

3.6 THE CURRENT SYSTEM AND THE PROPOSED SYSTEM:

3.6.1 THE CURRENT SYSTEM:

3.6.1.1 DESCRIBE THE CURRENT SYSTEM:

The current system is a system that each department of the emergency departments manage it in a different way depending on the work which contact with each departments on their own number and the registration of emergency case done manually.

With the increase in the number of emergency problems and the multiplicity of emergency numbers. The service request is difficult to the person who wants service process as well as difficulty access to the site case for lack of details of the situation.

3.6.1.2 THE CURRENT SYSTEM PROBLEMS:

- Method of application service take time.
- Lack of follow-up of the service.
- Failure to provide sufficient flexibility in the system.
- Lack of a mechanism to validate the caller ID.
- Difficulty keeping multiple emergency numbers.
- Emergency departments that are managed in a different way.

3.6.1.3 THE CURRENT SYSTEM PROCEDURES:

- The emergency service request according to the emergency department and each section has its own number.
- The state is receiving and recording data.
- Complete the procedure to send the emergency unit to state location.

3.6.2 THE PROPOSED SYSTEM:

3.6.2.1 THE DESCRIPTION OF PROPOSED SYSTEM:

Build a system based on receiving the emergency call by (PBX), record the caller data, determine the status of emergency, also discernible information on the location situation and send this data to the emergency departments And also extract the necessary reports on the number of cases that are dealt with.

3.6.2.2 THE PROPOSED SYSTEM COMPONENT:

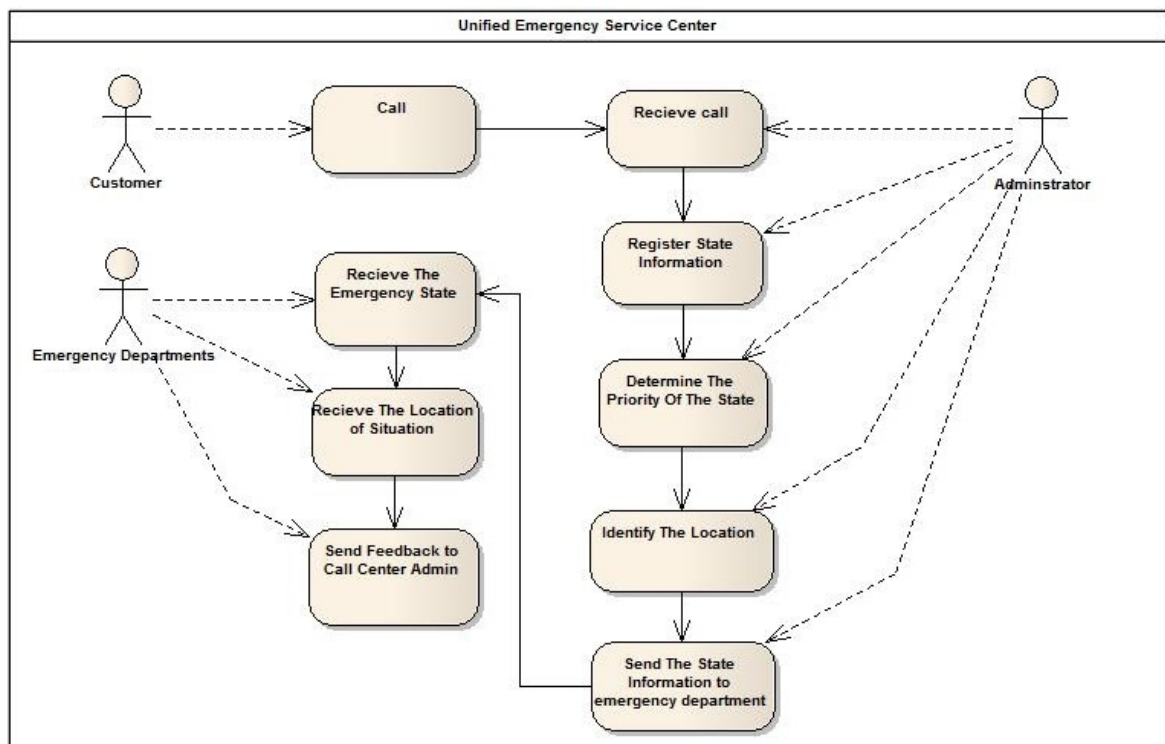


Figure (3-1) Unified emergency service center component and users

DESCRIPTION:

A customer who make a call for an emergency situation, the system administrator receive the call from customer, register emergency case information, determine the priority of the case which if it dangerous case will be in the top of list to deal with, identify the location of the situation then send the information to an emergency department. The emergency department receive the message include the information of situation, receive the map of location and deal with situation then send feedback to call center administrator about the case.

3.6.2.3 THE PROPOSED SYSTEM USERS:

- **SYSTEM ADMINISTRATOR:**

The administrator has a privilege to modify or delete customer information.

- **CUSTOMER:**

The person who make the call.

- **USER(EMERGENCY DEPARTMENT):**

The user just receive the message of emergency situation, location of the situation and he there has no privilege to modify the message.

3.6.2.4 THE PROPOSED SYSTEM REPORT:

The proposed system report help to analysis the system by matching with old report from current system, which if the system help to deal with emergency cases in better way.

- **REPORT TYPES:**

1. Extract the report by the location of situation.
2. Extract the report by type of situation (new, in progress, require to execute....etc).
3. Extract the report by emergency departments that deal with emergency situations.
4. Extract the report by number of cases per (day, month and year).

3.6.2.5 PROPOSED SYSTEM PROCEDURES:

- Receive emergency call.
- Register the caller case.
- Take the location information from the caller.
- Send the data to the competent authority of emergency situation.
- Extract the Report.

CHAPTER FOUR

SYSTEM ANALYSIS

4.1 INTRODUCTION:

This chapter include system requirements and system analysis using UML diagram.

4.2 SYSTEM REQUIREMENTS:

4.2.1 FUNCTIONAL REQUIREMENTS:

- Login to the system via the log Screen that connect to Database (postgresql).
- System Administrator has the authority to change the system and to monitor the system.
- The system will save the caller information, modify them, add and modify emergency departments.
- System works on linking emergency systems with each other.

4.2.2 NON-FUNCTIONAL REQUIREMENT:

It is features and characteristics which should be available in the system:

1. **Usability:** The level of Software ability to enable users to easy system operation and control. Where we find that the program is easy to use in terms of management and control procedures and follow-up the work in simple and clear way.
2. **Integrity:** The level of software product's ability to ensure the validity of the data is completed during the treatment process and transmission. The data transmission are safe, this feature is provided by the database.
3. **Accountability:** The level of software product's ability to keep track of all actions carried out by any user in the system separately.
4. **Performance efficiency:** The level of software product's ability to provide adequate performance for the resources used in the framework of agreed conditions. Means the resources available here Software - Hardware - Paper, printing and others, are sub-characteristics of effective performance in the following:

- **Time behavior:** The product's ability to provide a programmatic response time, productivity and address the appropriate rate acceptable when performing any task according to pre-defined conditions.
- **Resource utilization:** Product programmatic level of consumption or application of resources at the quantity and quality at the level of implementation of any task within the framework of the conditions laid down.

4.3 SYSTEM ANALYSIS USING UML:

4.3.1 USE CASE DIAGRAMS:

Figure (4-1) shows use case diagrams of unified emergency service center

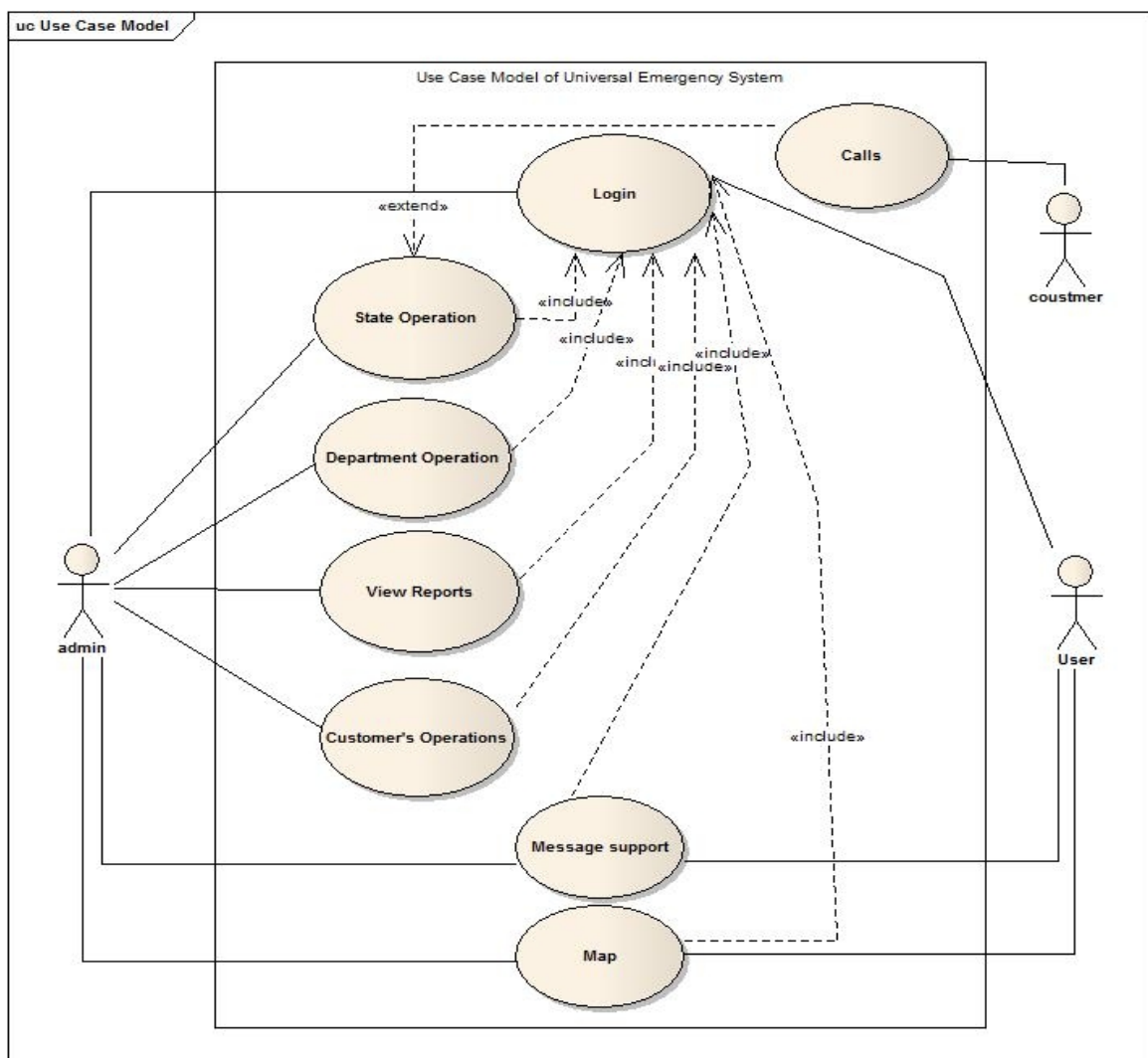


Figure (4-1) Use case for Unified Emergency Service Center

DESCRIPTION:

Admin: The person who receive call, control state operation, control department operation, control customer's operation, extract reports, exchange message with user (emergency departments) and view map to mark the location.

Customer: The person who make the call.

User: The emergency departments receive the state message from administrator, map for state location and exchange the message with administrator.

4.3.2 SEQUENCE DIAGRAM:

Figure (4-2) Show the login for Administrator System.

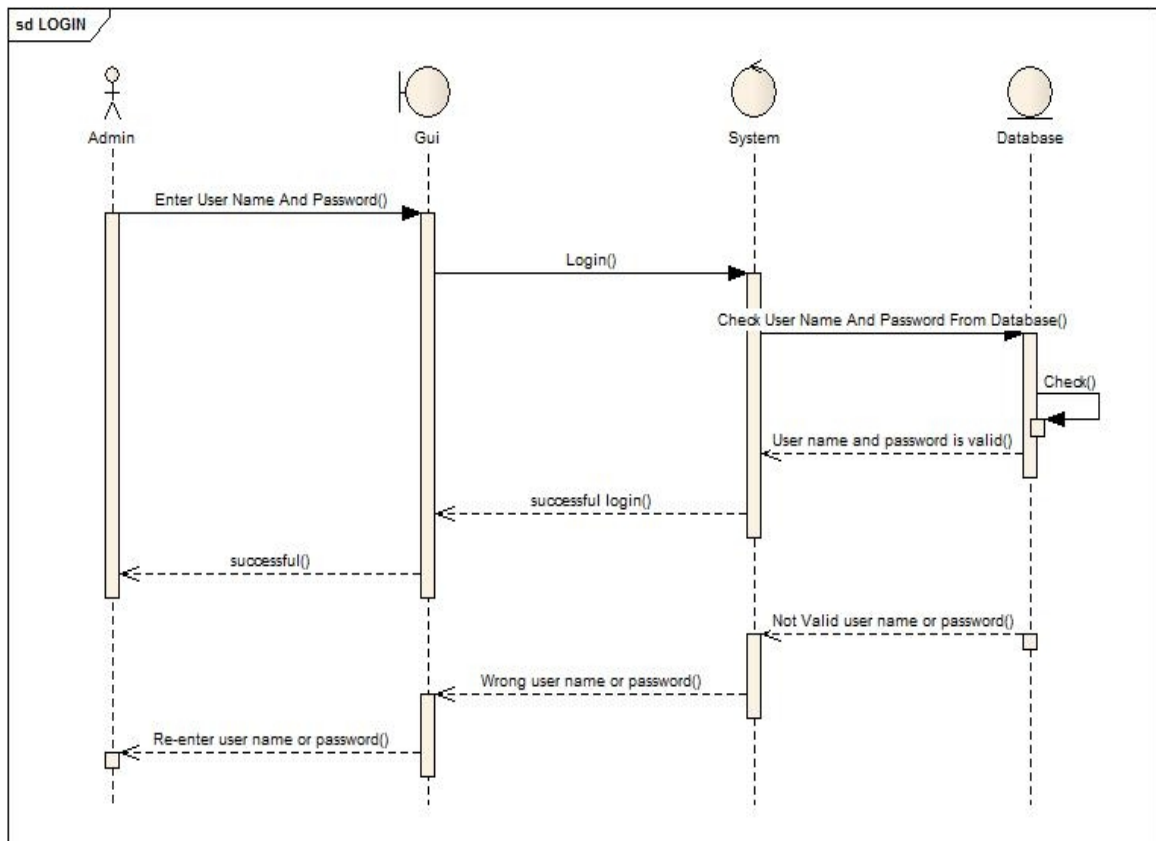


Figure (4-2) Sequence Diagram to login the system

Figure (4-3) show the add state operation to the system

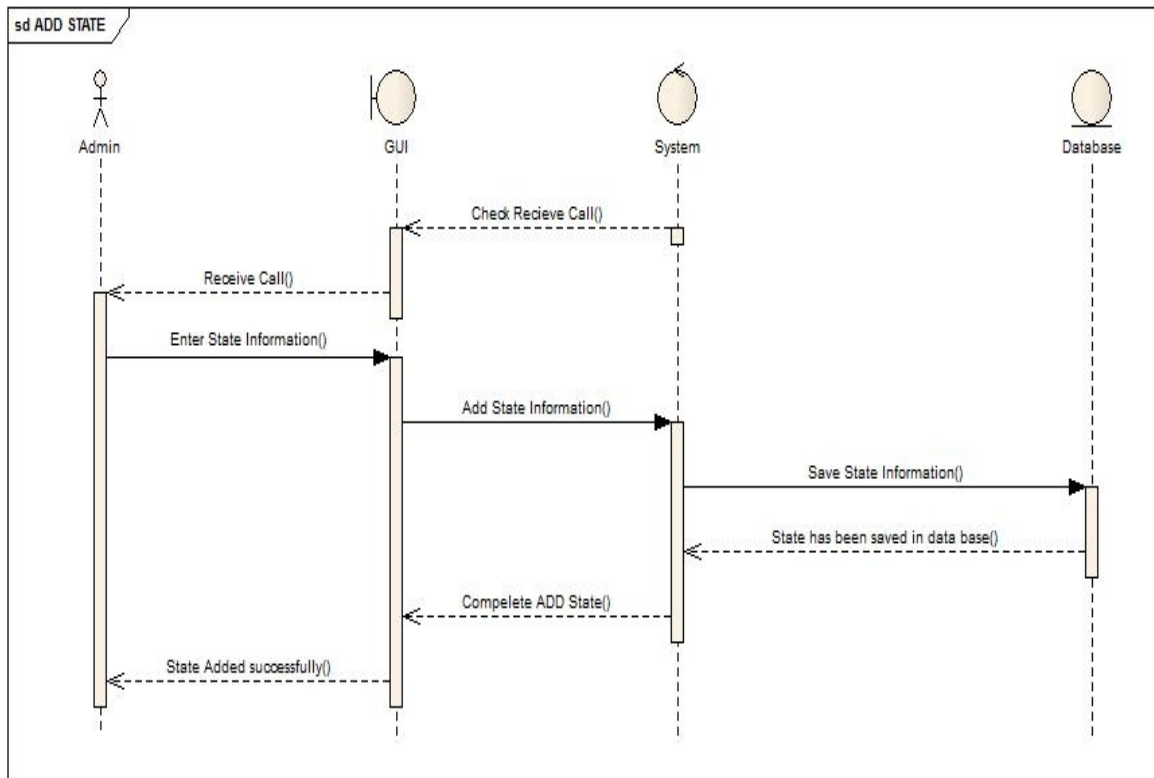


Figure (4-3) Sequence Diagram for Add state operation

Figure (4-4) Show the modify state (Edit and Delete) by system Administrator.

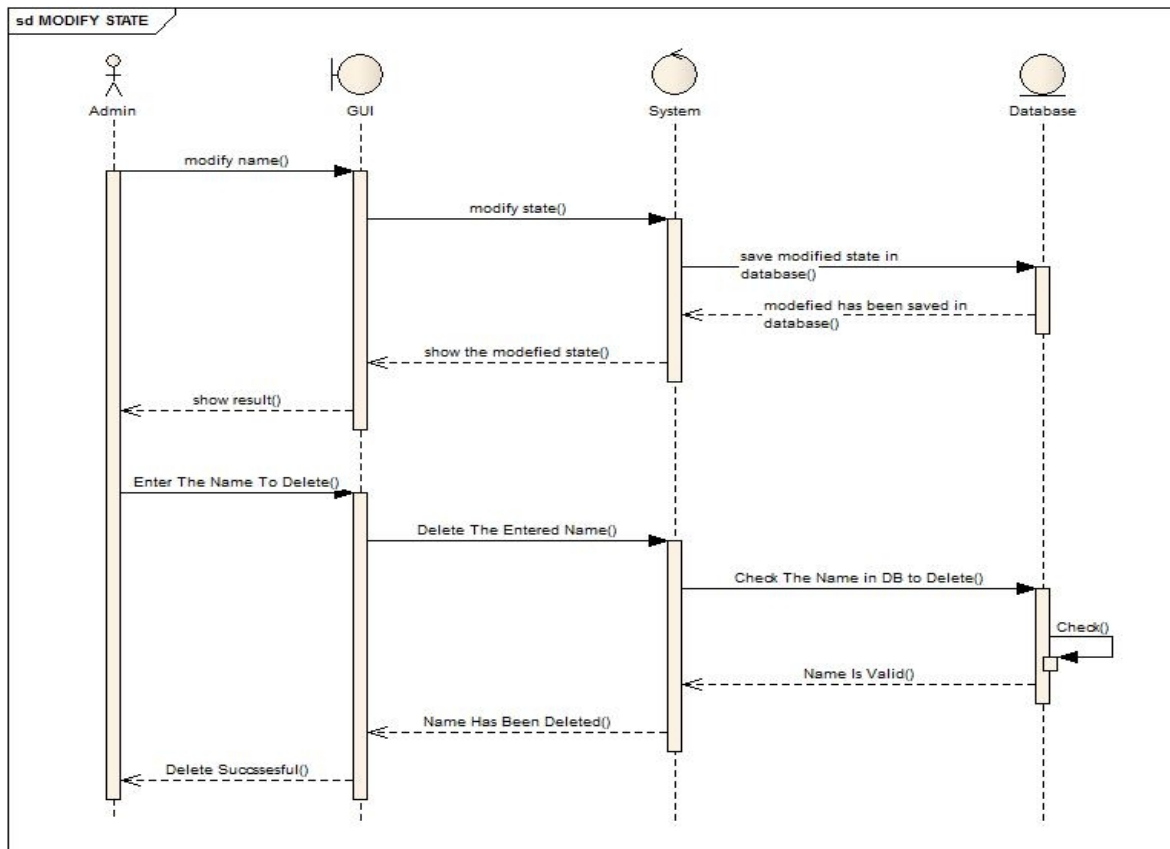


Figure (4-4) Sequence Diagram For Modify State Operation

Figure (4-5) show the search state operation using by administrator.

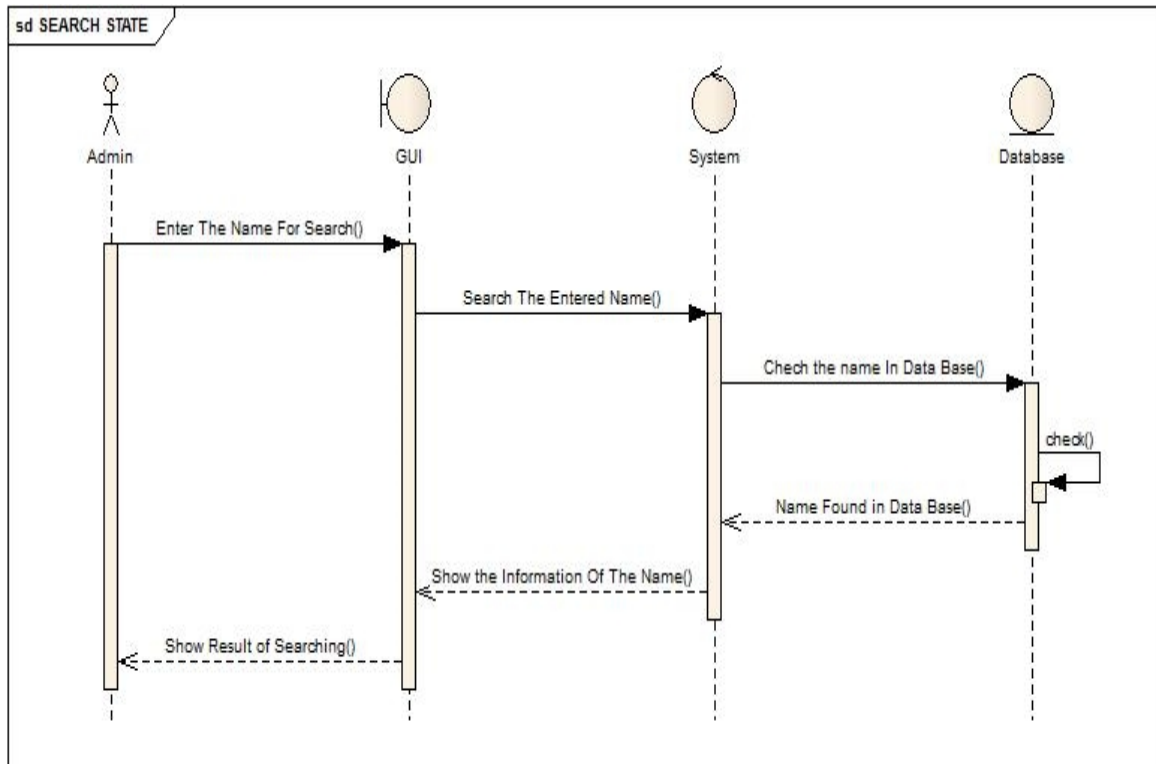


Figure (4-5) Sequence Diagram for Search State Operation

Figure (4-6) show the send state operation the state is send by system admin to the competent authority.

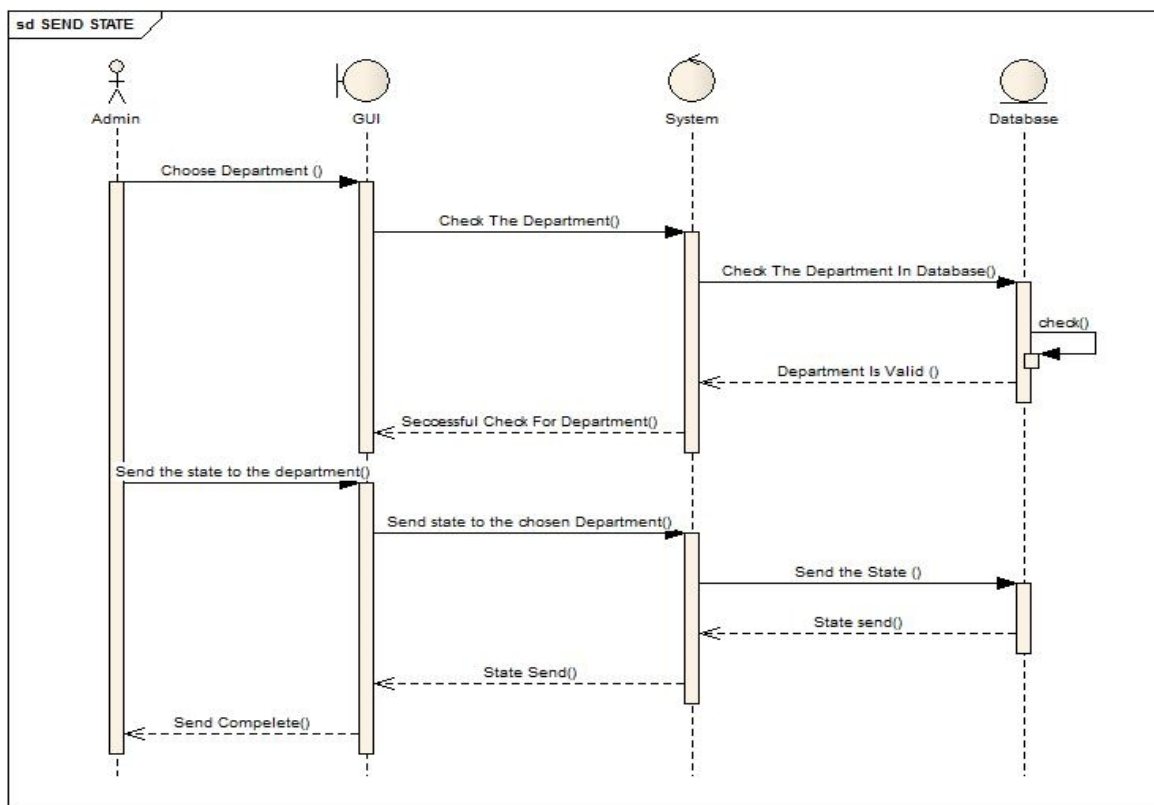


Figure (4-6) Sequence Diagram for Send State Operation

Figure (4-7) show the add department operation to the system by the administrator.

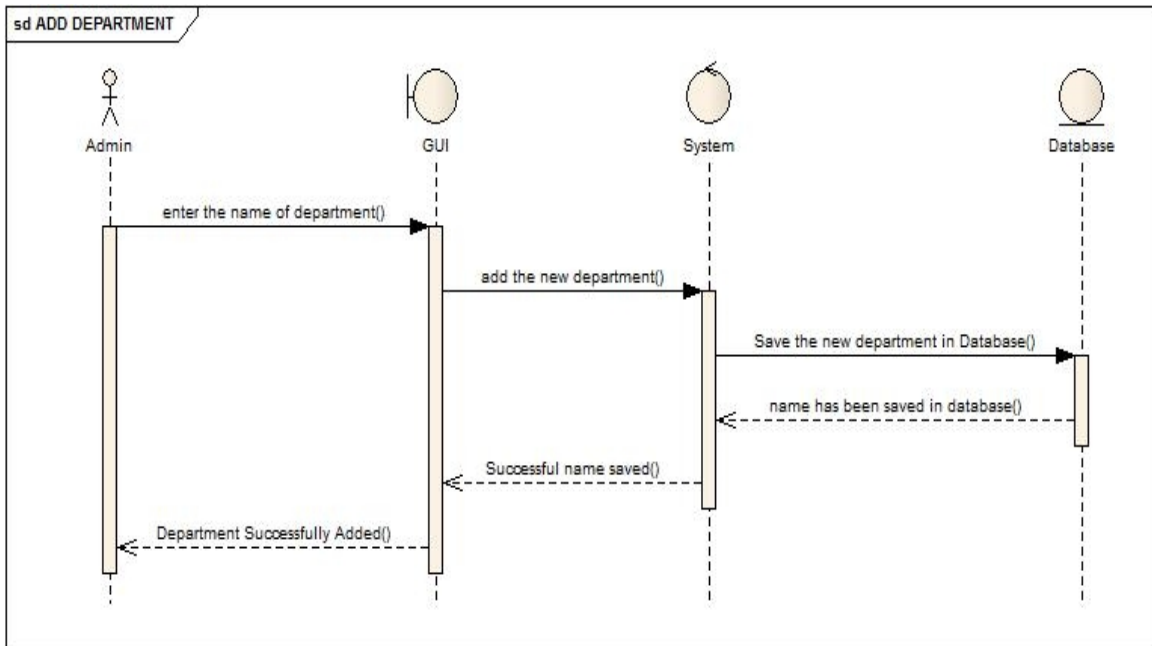


Figure (4-7) Sequence Diagram for Add Department Operation

Figure (3-8) show the modify (edit and delete) to the department by the system administrator.

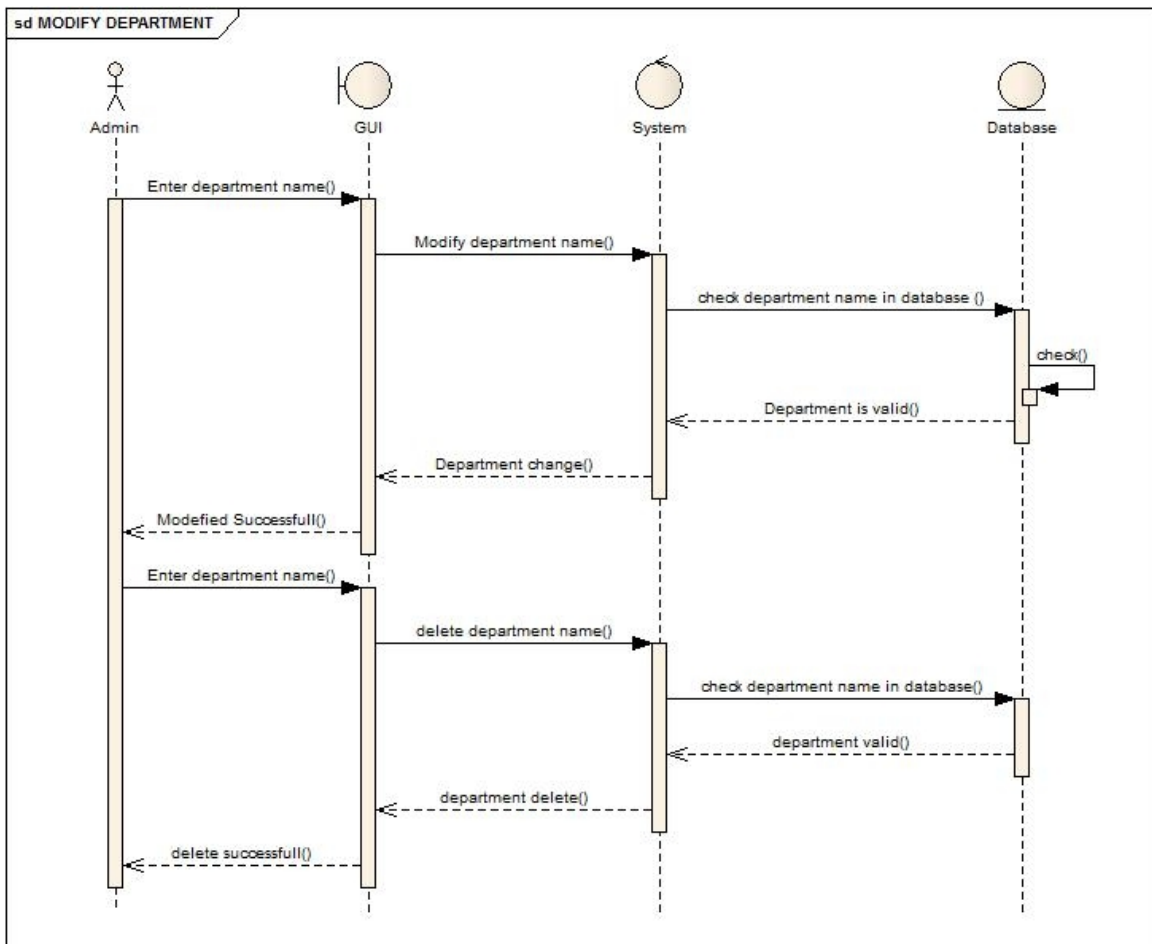


Figure (4-8) Sequence Diagram for Modify Department Operation

Figure (4-9) show the sequence of adding customer to the system by system administrator.

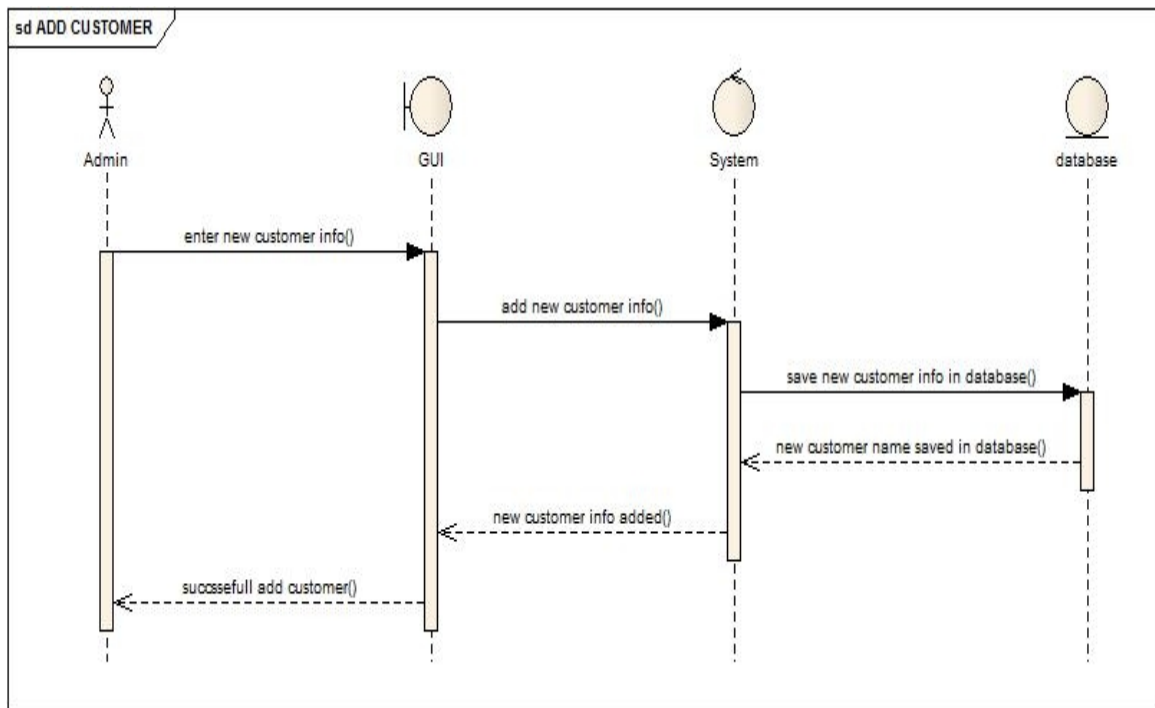


Figure (4-9) Sequence Diagram for Add Customer Operation

Figure (4-10) show the sequence of modifying (edit and delete) customer by system administrator.

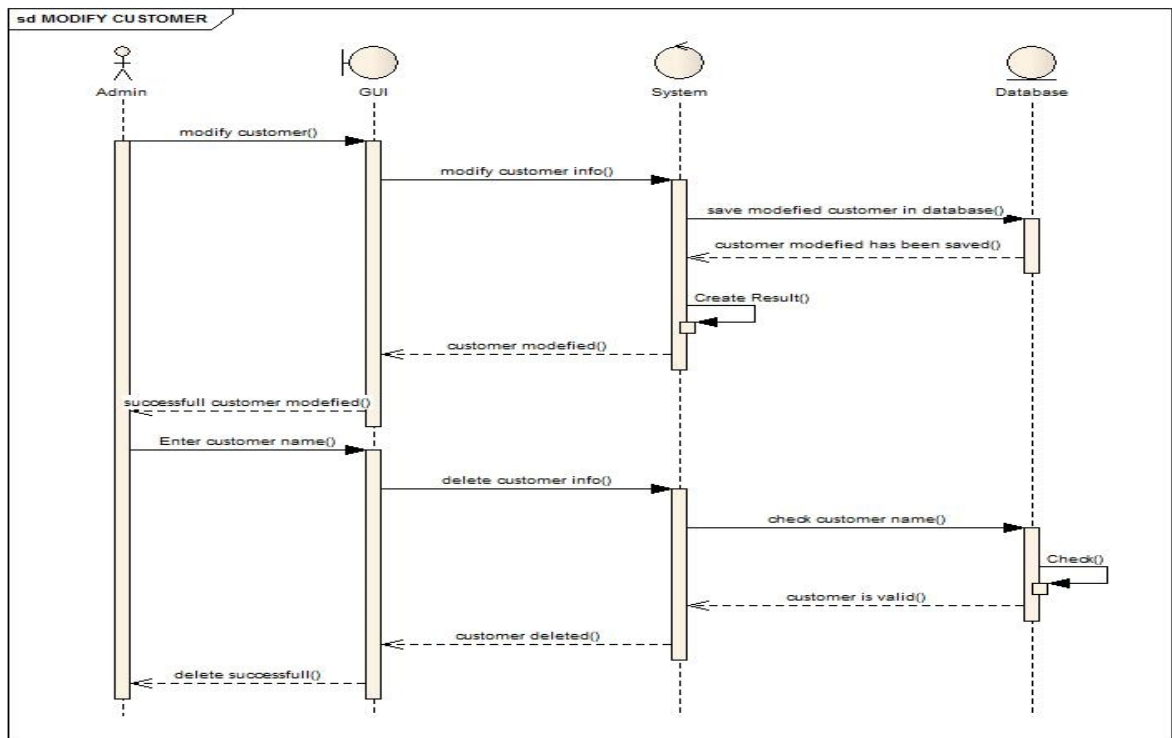


Figure (4-10) Sequence Diagram for Modify Customer Operation

Figure (4-11) show the sequence of the search customer operation by administrator.

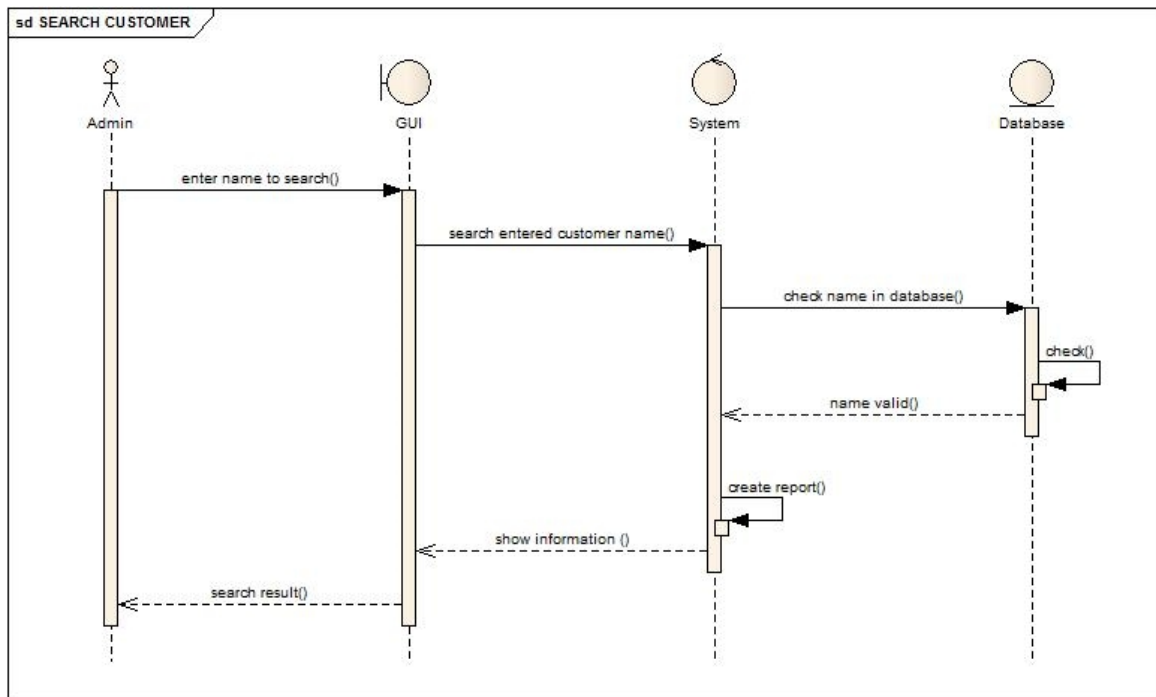


Figure (4-11) Sequence Diagrams for Search Customer Operation

Figure (4-12) show the sequence of selecting the report type by system administrator.

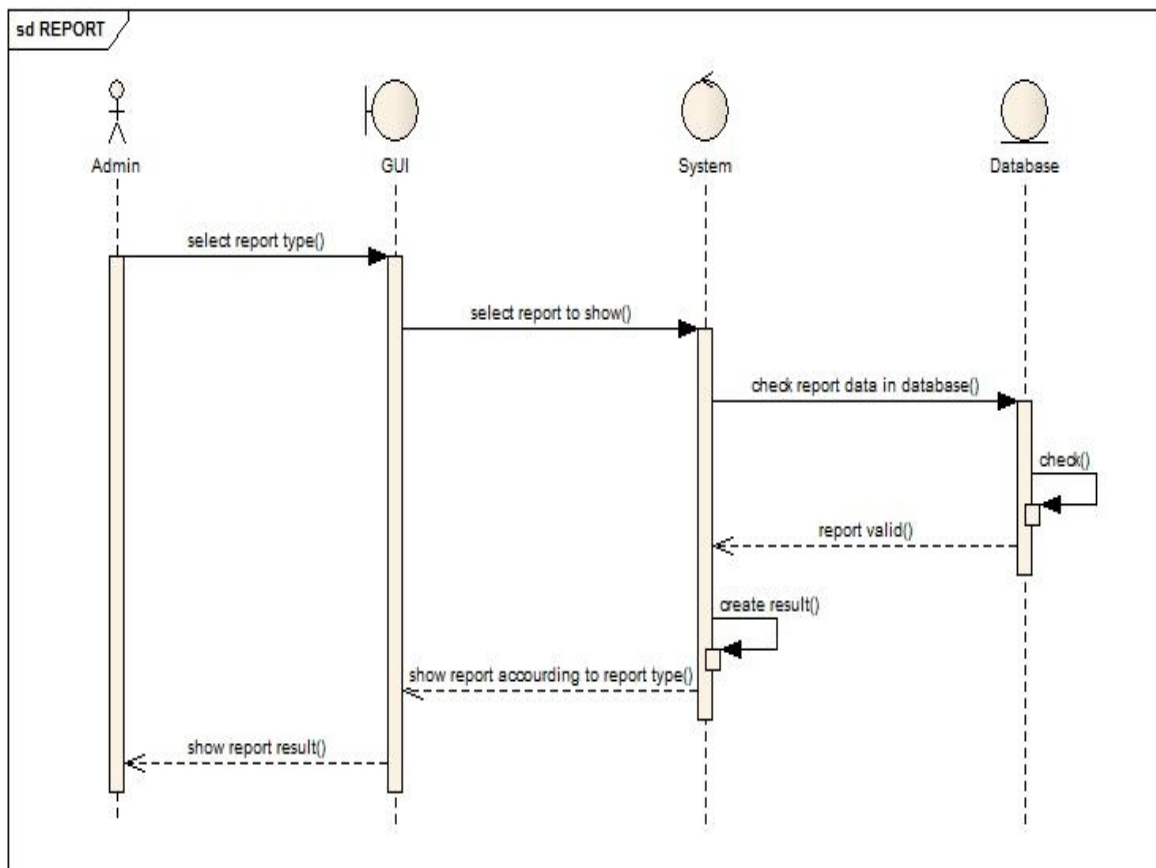


Figure (4-12) Sequence Diagrams of Selecting Reports Operation

Figure (4-13) show the message support between system administrator and the competent authority.

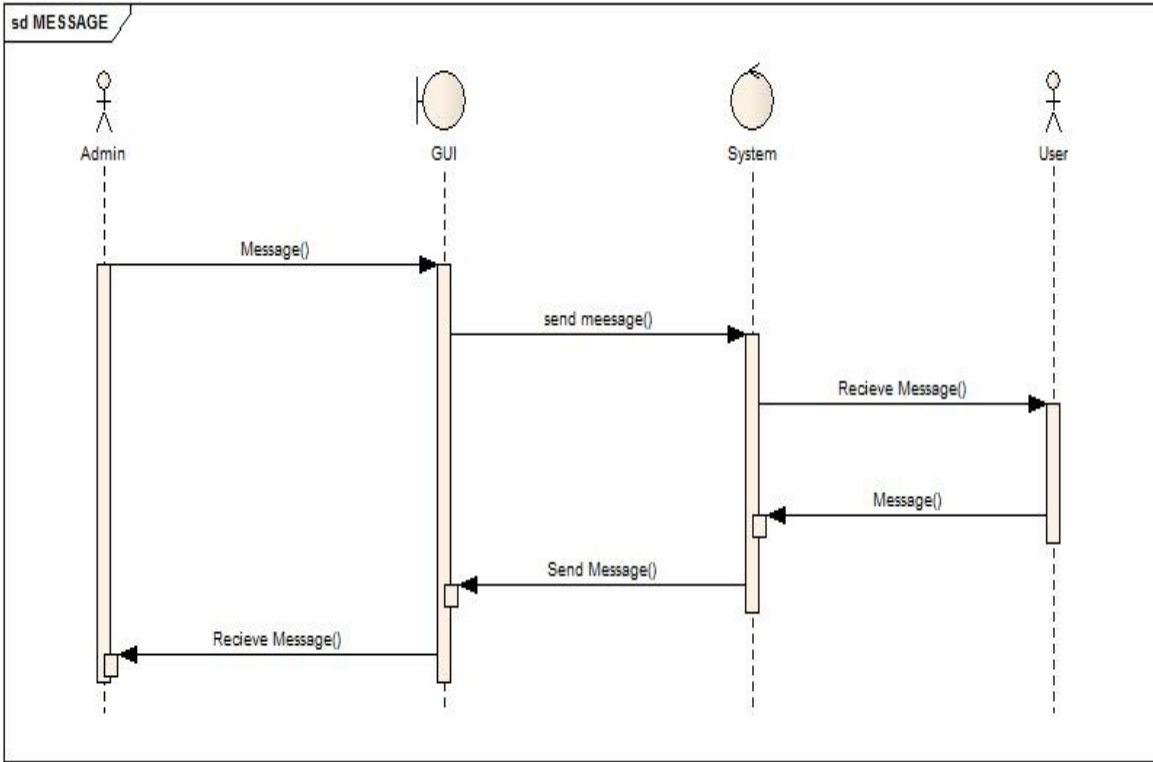


Figure (4-13) Sequence Diagram of Message Support Operation

4.3.3 ACTIVITY DIAGRAMS:

Figure (4-14) show the activity diagram of the system which include activity of System Administrator and activity of competent authority.

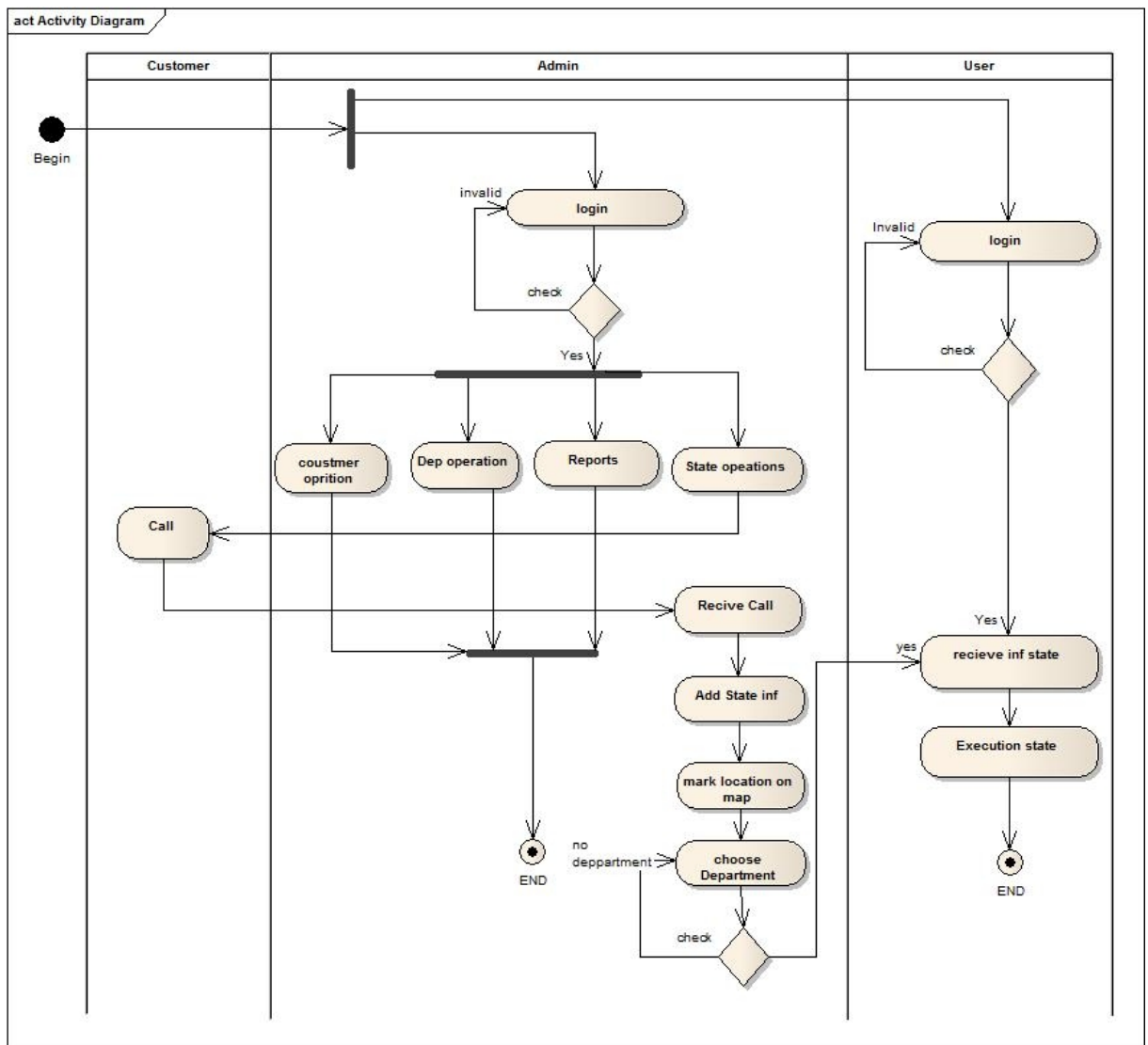


Figure (4-14) Activity Diagram for the System

4.4 CONCLUSION:

The conclusion of the chapter show the type of user in the system with their task and the sequence of how system works.

CHAPTER FIVE

THE PROPOSED SYSTEM INTERFACES

5.1 INTRODUCTION:

This Chapter include the proposed System interfaces.

5.2 THE PROPOSED SYSTEM INTERFACES:

Figure (5-1) System Login Screen for unified emergency service center.

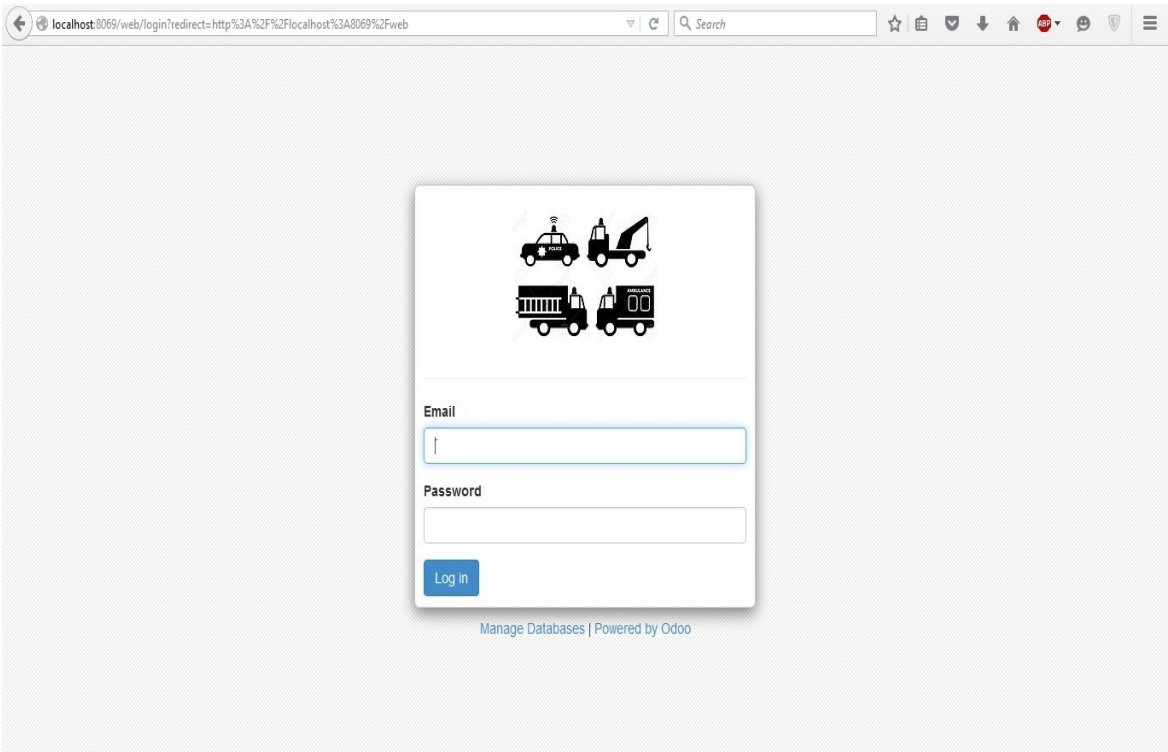


Figure (5-1) System Login Screen

DESCRIPTION:

The login interface require correct username and password for login to system.

Figure (5-2) System main interface for unified emergency service center

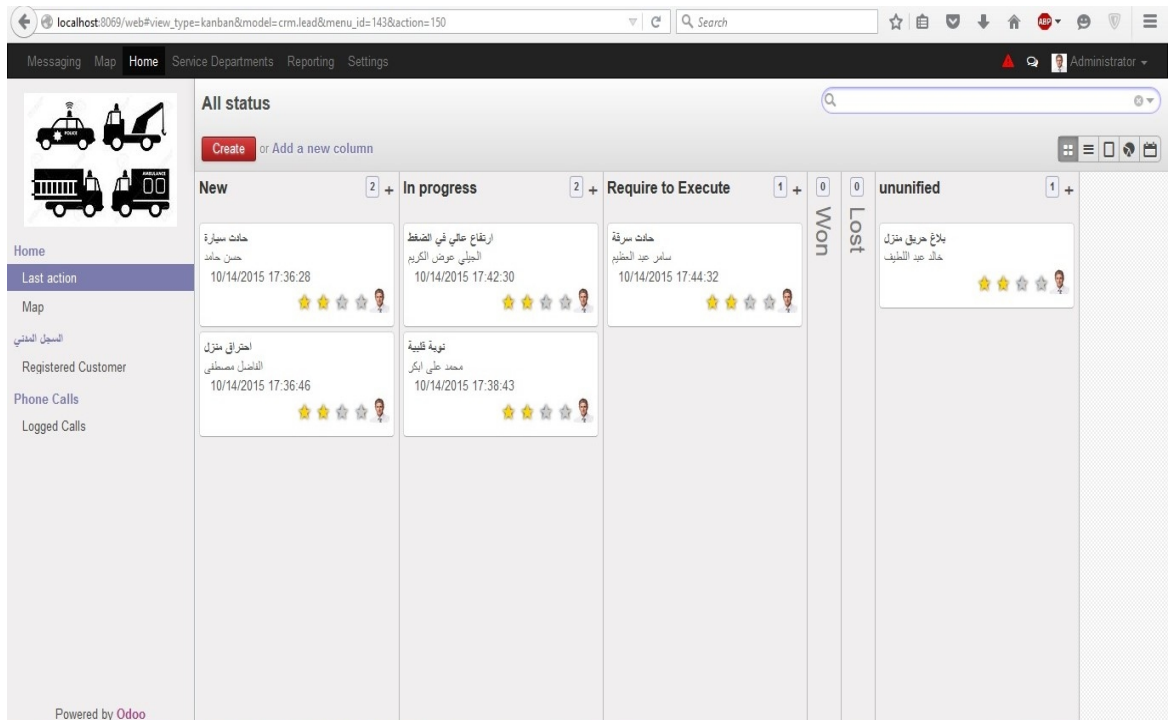


Figure (5-2) System Main Interface

DESCRIPTION:

The main interface include:

1. Status of state which if the state is new or in progress of require to execute or unidentified.
2. The priority of the state will be in the top of the list.
3. Create new state which lead to state detail interface.

Figure (5-3) State detail interface for unified emergency service center.

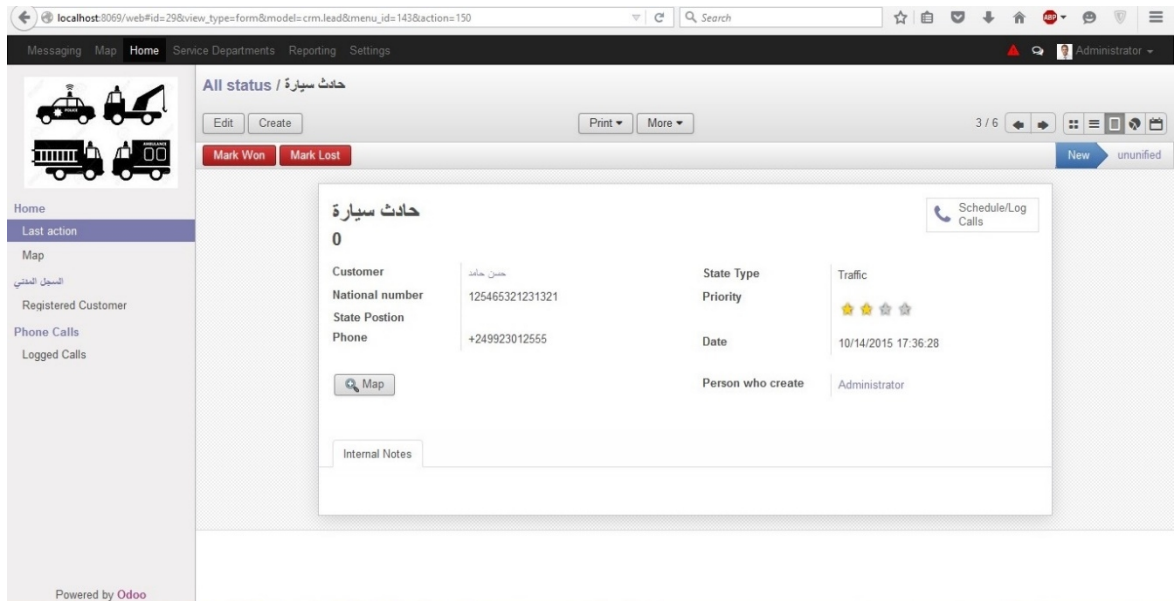


Figure (5-3) State detail interface

DESCRIPTION:

The state detail interface include all information of the situation.

Input: Customer name, national number, state position, phone, state type and priority.

Process: all information saved in database.

Figure (5-4) Send Message interface for unified emergency service center.

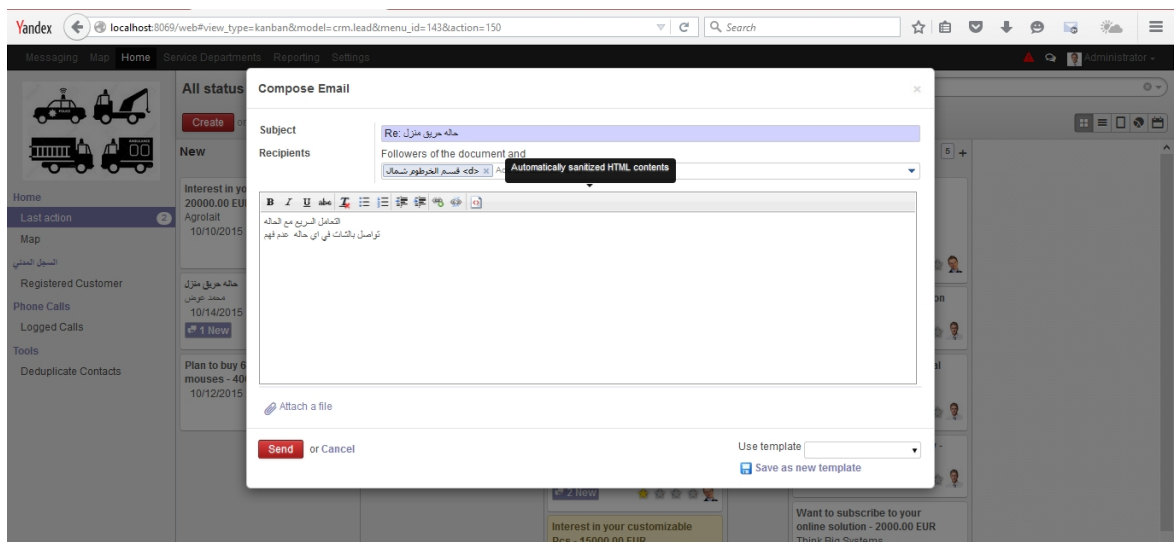


Figure (5-4) Send Message interface.

DESCRIPTION:

The send message interface show how to send state message to an emergency department.

Input: State name, choose emergency department.

Process: Send the message to chosen emergency department.

Figure (5-5) Receive message interface for unified emergency service center.

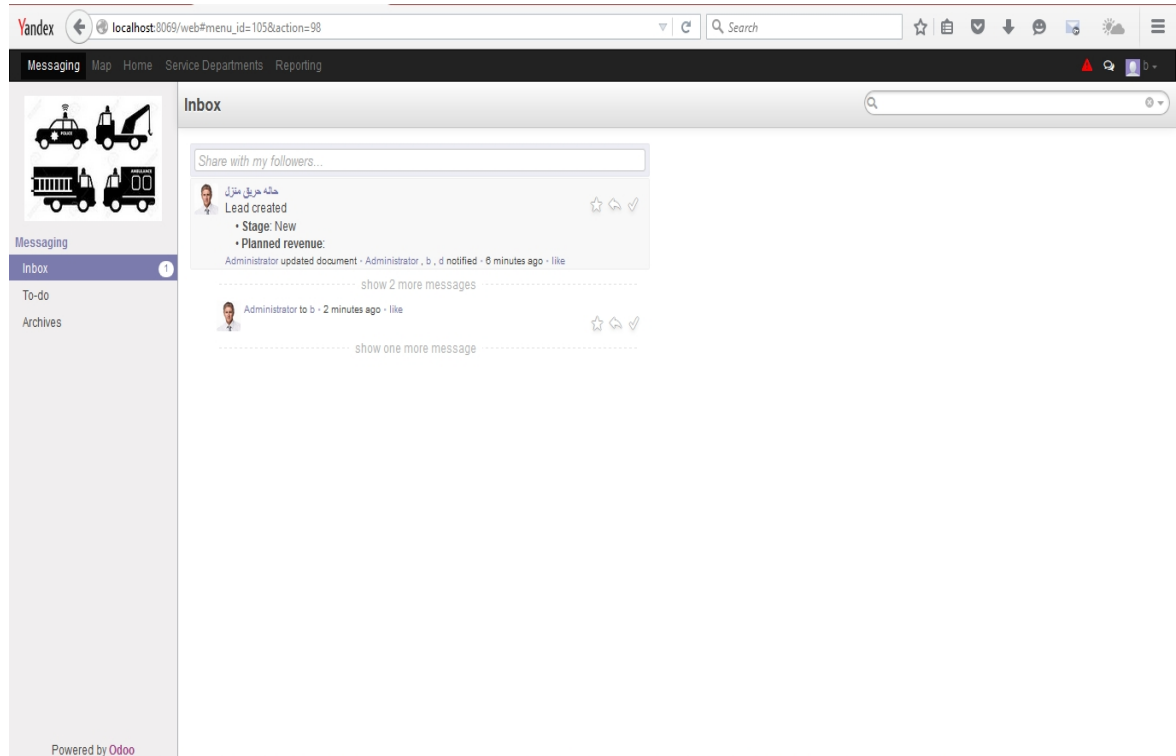


Figure (5-5) Receive Message interface

DESCRIPTION:

The receive message interface show the emergency departments receive the emergency state message.

Figure (5-6) Respond to Receive Message interface for unified emergency service center.

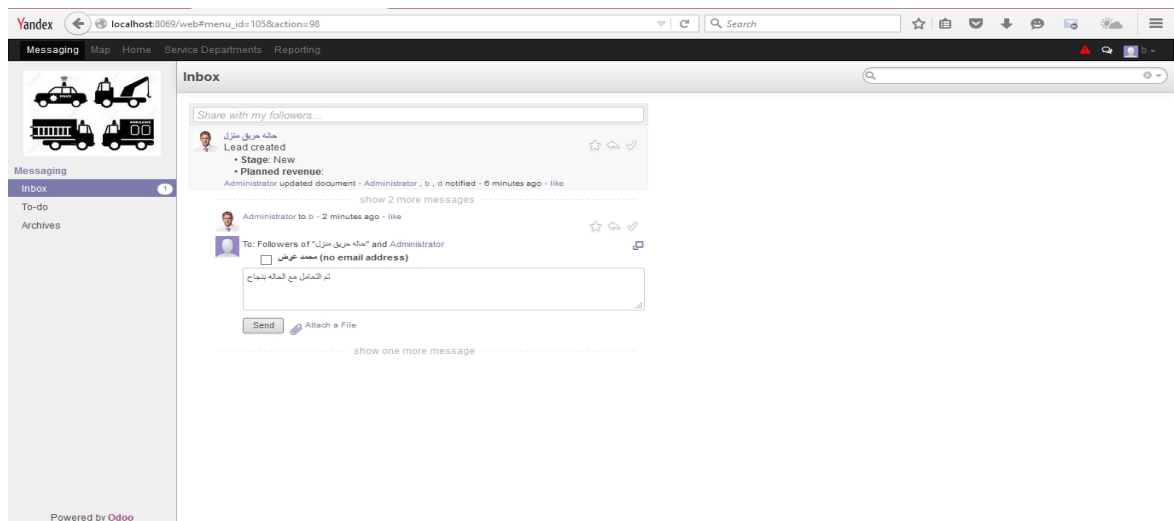


Figure (5-6) Respond to Receive Message interface.

DESCRIPTION:

The respond message interface show how the emergency departments respond to the message from call center.

Figure (5-7) Chat Screen interface between administrators of the system.

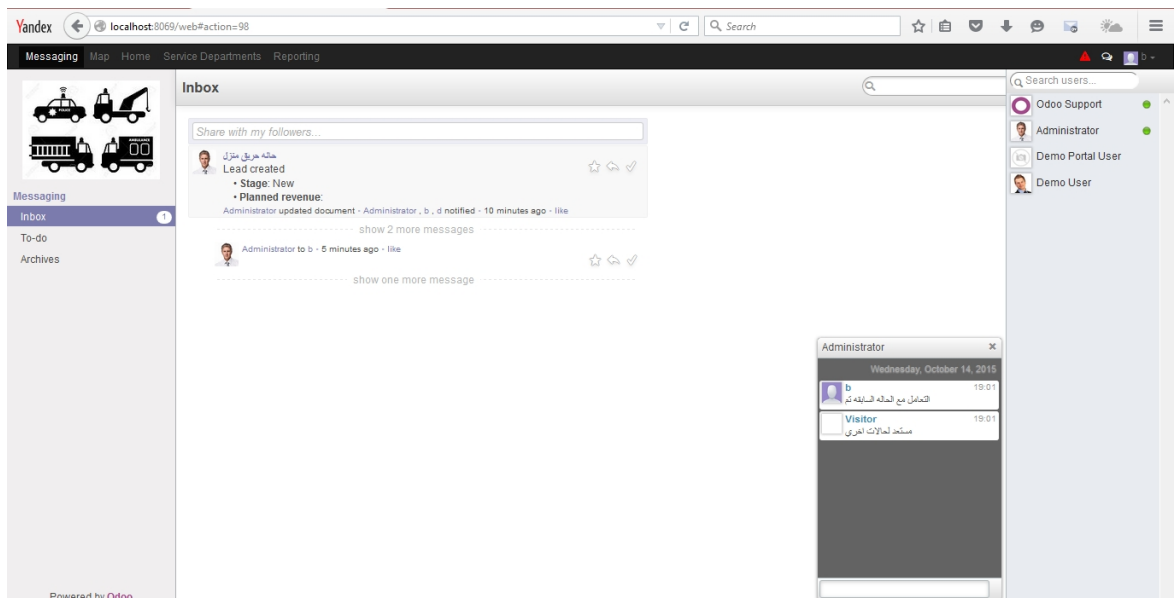


Figure (5-7) Chat interface.

DESCRIPTION:

The chat interface allow to send a quick message between administrator and users in the system.

Figure (5-8) Registered Customer interface in unified emergency service center.

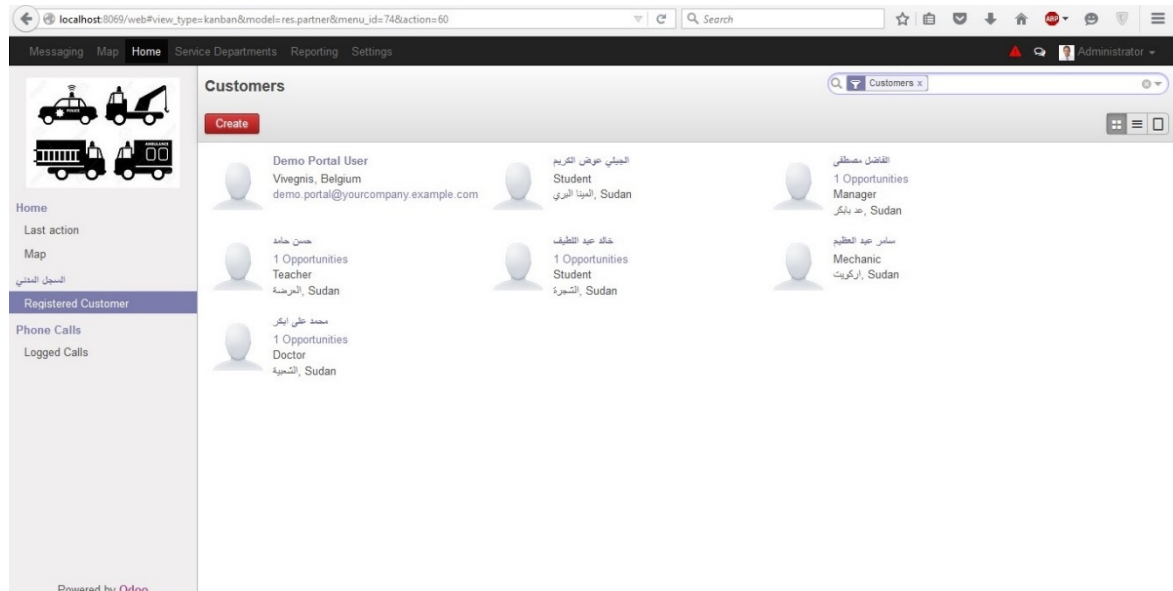


Figure (5-8) Registered Customer interface.

DESCRIPTION:

The customers interface show all registered customers in the system.

After click on create button will lead to customer information screen.

Figure (5-9) Customer information interface for unified emergency service center.

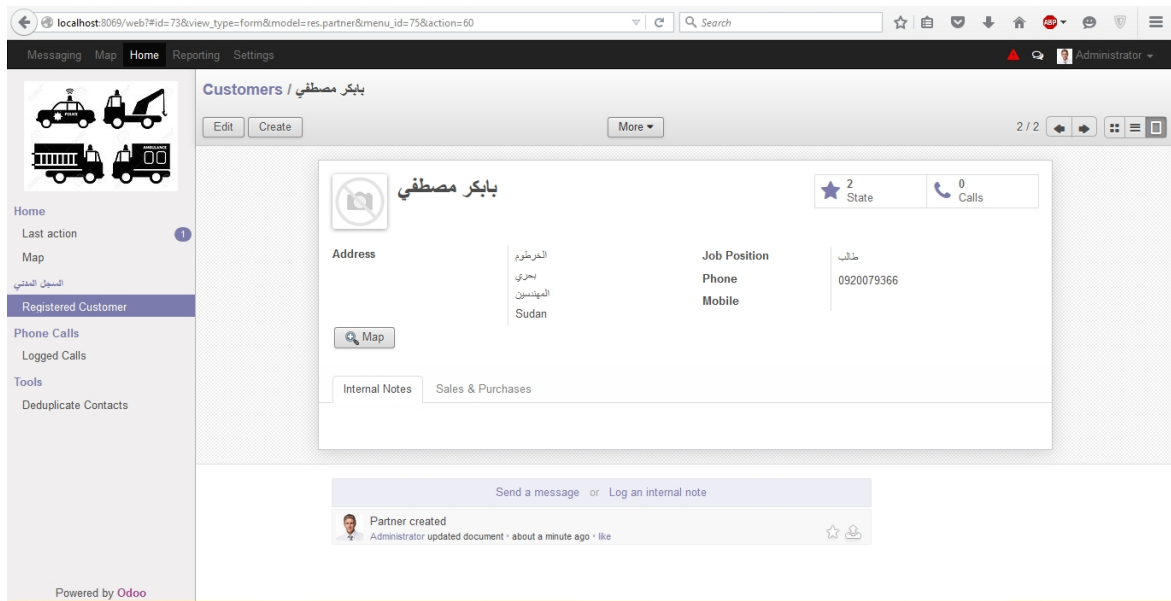


Figure (5-9) Caller Information Screen

DESCRIPTION:

Input: Address, job position and phone number.

Process: all information save in database.

Figure (5-10) Display state in calendar view in unified emergency service center.

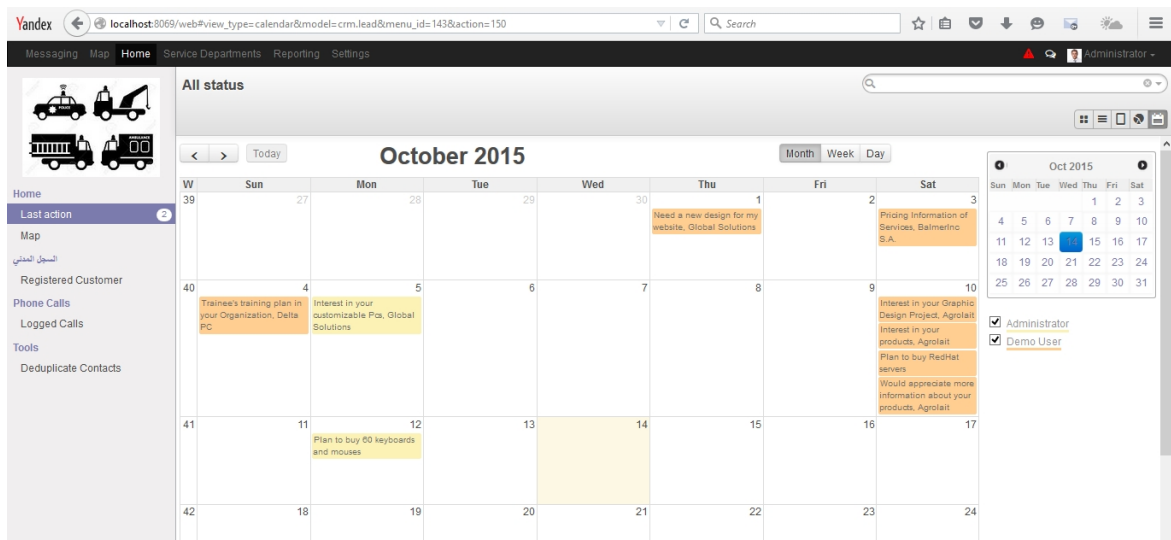


Figure (5-10) Display state in calendar view interface

DESCRIPTION:

The calendar view show number of state per day in calendar view.

Figure (5-11) Map interface for unified emergency service center.

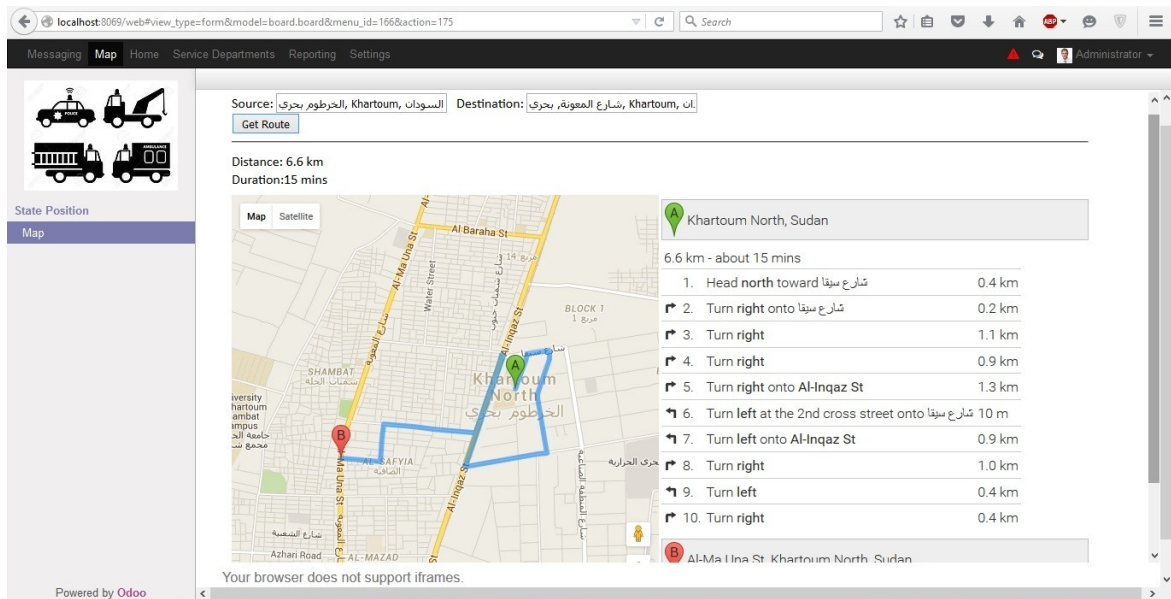


Figure (5-11) Map interface

DESCRIPTION:

Input: Destination location.

Output: Time for emergency vehicle arrive to location for situation.

Figure (5-12) Call Information interface for unified emergency service center.

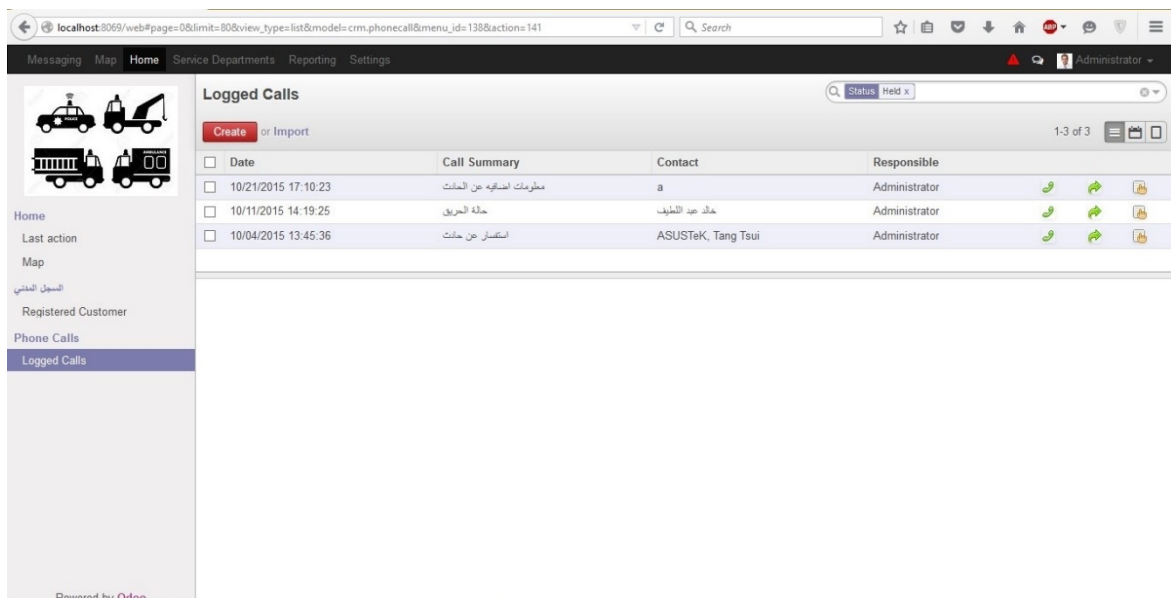


Figure (5-12) Call Information interface

DESCRIPTION:

The call information interface show the summary of all calls received in the system which show the date of call, the reason of call, the person made the call and person who received the call.

Figure (5-13) Report interface for unified emergency service center.

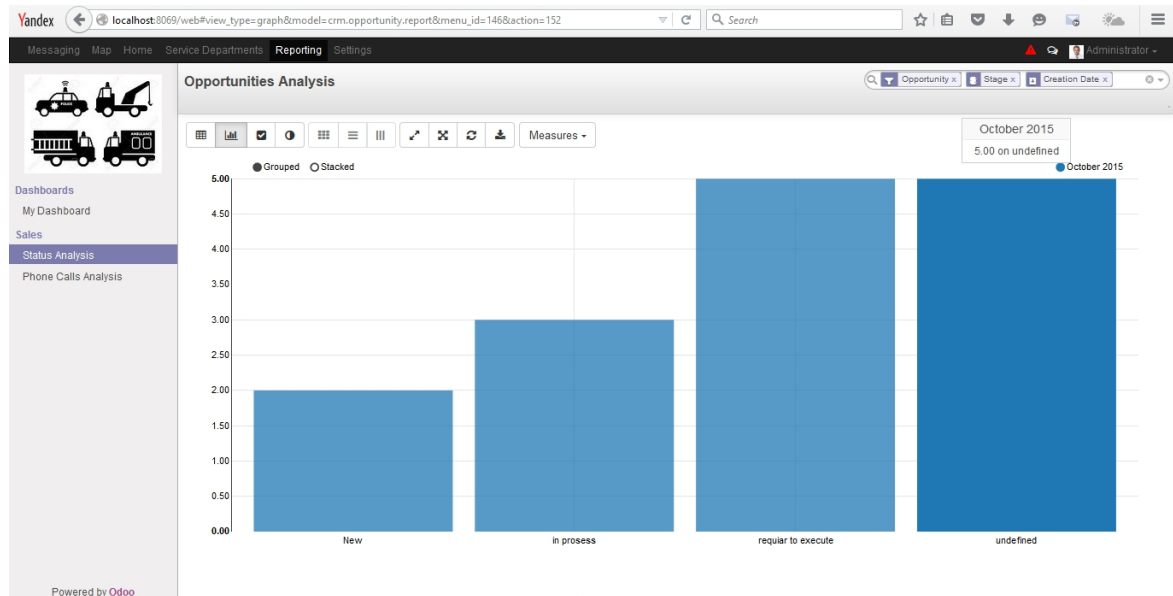


Figure (4-13) Report interface.

DESCRIPTION:

The report interface the description of all emergency situation in all state.

Figure (5-14) Asterisk Configuration interface in unified service center.

The screenshot shows the Asterisk Configuration interface for "Akretion Asterisk IPBX". The server name is "Akretion Asterisk IPBX" and it is active. The configuration includes the following fields:

| Field | Value |
|----------------------------|-------------------------------------|
| Server Name | Akretion Asterisk IPBX |
| Active | <input checked="" type="checkbox"/> |
| Asterisk Manager Interface | |
| Asterisk IP address or DNS | 194.188.5.13 |
| Port | 5038 |
| AMI Login | click2dial |
| AMI Password | ***** |
| Dialplan Parameters | |
| Dialplan Context | from-internal |
| Extension Priority | 1 |
| Out Prefix | |
| Alert-Info SIP Header | info=<Bellcore-dr5> |
| Wait Time (sec) | 15 |

The interface includes a "Save" button and a "Test Connection to Asterisk" button.

Figure (5-14) Asterisk Configuration interface.

DESCRIPTION:

The asterisk configuration interface show the configuration using PBX device in the system.

CHAPTER SIX

RESULTS & RECOMMENDATIONS

6.1 INTRODUCTION:

This chapter include the result of the research, recommendation and conclusion.

6.2 RESULT:

- Request the service on a unified number.
- Record Information about any emergency state.
- The Exchange of Information between the different emergency departments.
- Access to the system through the user's authority.
- Reports have become more accurate and easier.

5.3 RECOMMENDATION:

- Apply the unified emergency service center in Sudan in order to deal with emergency situations precisely.
- Train teams who receives the call in order to optimize the use of system.
- Raise awareness of enterprise resource planning system in the organization as a whole to its importance in the enterprise resource management.

6.4 CONCLUSION:

A system had been developed to integrate different emergency departments with each other in one system (Traffic, Ambulance and Police) by using OpenERP System. The main idea in this research is solving the problem of the different emergency numbers. The system has been done to receive any emergency call, record information of the state, specify state location, then after that the emergency state send to competent authority and communicate with competent authority to follow up the case. The report helps to analyze emergency state. Execute the system helps to easy the service request and save information of any emergency situation.

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[12] “James Rumbaugh, Ivar Jacobson, Grady Booch, the Unified Modeling Language Reference Manual.” Copyright © 1999 by Addison Wesley Longman, Inc ISBN 0-201-30998-X.

[13] [Online] OpenERP Feature:

<http://openerp-development.blogspot.com/> 15/9/2015 6:23PM.

[14] [Online] PostgreSQL Feature:

<http://itwadi.com/what-is-PostgreSQL> 15/9/2015 8:20PM.

APPENDICES

APPENDICES A:

Figure (A-1) Use Case Diagram Table Component:

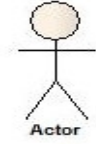

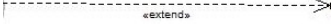
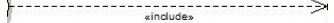
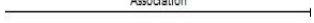
| Figure | Name | Definition |
|--|--------------------------|---|
|  <p>A stick figure with a circular head and a triangular body, labeled "Actor" below it.</p> | Actor | An Actor models a type of role played by an entity that interacts with the subject |
|  <p>An oval shape labeled "Use Case" inside.</p> | Use Case | A use case is the specification of a set of actions performed by a system, which produces an observable result that is, typically, of value for one or more actors or other stakeholders of the system. |
|  <p>A horizontal dashed arrow pointing right, labeled "«extends»" in the middle.</p> | Extend Relationship | This relationship specifies that the behavior of a use case may be extended by the behavior of another (usually supplementary) use case |
|  <p>A horizontal dashed arrow pointing right, labeled "«includes»" in the middle.</p> | Include Relationship | Include is a Directed Relationship between two use cases, implying that the behavior of the included use case is inserted into the behavior of the including use case. |
|  <p>A horizontal solid line with an arrowhead pointing right, labeled "Association" above it.</p> | Association Relationship | An association specifies a semantic relationship that can occur between typed instances. |

Figure (A-1) Use Case Diagram Table Component

Figure (A-2) Sequence Diagram Table Component:


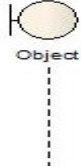





| Figure | Name | Definition |
|---|-------------------|---|
|  | Actor | An Actor models a type of role played by an entity that interacts with the subject. |
|  | Boundary | A lifeline represents an individual participant in the Interaction. |
|  | Entity | A lifeline represents an individual participant in the Interaction. |
|  | Control | A lifeline represents an individual participant in the Interaction. |
|  | Message | A message defines a particular communication between Lifelines of an Interaction. |
|  | Return Message | A message defines a particular communication between Lifelines of an Interaction. |
|  | Recursive Message | A message defines a particular communication between Lifelines of an Interaction. |

Figure (A-2) Sequence Diagram Table Component

Figure (A-3) Activity Diagram Table Component:


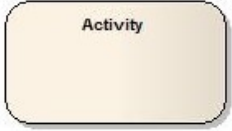

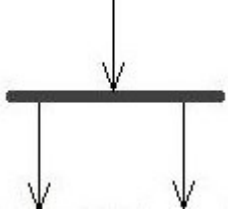
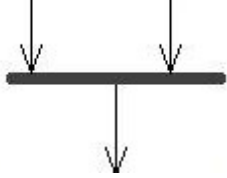

| Figure | Name | Definition |
|---|--------------|---|
|  | Initial Node | An initial node is a control node at which flow starts when the activity is invoked. An activity may have more than one initial node. |
|  | Activity | An activity specifies the coordination of executions of subordinate behaviors, using a control and data flow mode. |
|  | Decision | A decision node accepts tokens on an incoming edge and presents them to multiple outgoing edges. |
|  | Fork Node | A fork node is a control node that splits a flow into multiple concurrent flows. A fork node has one incoming edge and multiple outgoing edges. |
|  | Join Node | A join node is a control node that synchronizes multiple flows. A join node has multiple incoming edges and one outgoing edge. |
|  | Final Node | An activity may have more than one activity final node. The first one reached stops all flows in the activity. |

Figure (A-3) Activity Diagram Table Component

APPENDICES B:

Figure (B-1) Report:

| State type | Priority | Person Who create state |
|------------|----------|-------------------------|
| | Normal | Administrator |

Emergency State Your Company Tagline

Discription:
حاله سرقة

| | |
|-----------------|-------------------------------------|
| Customer Name | بكر مصطفى |
| State Postion | امزمن المهندسين مربع 29 منزل رقم 98 |
| National number | 1233554564 |
| Phone | 0915548487 |
| Date/Time | 11/02/2015 07:55:37 |

Authorized signature

Figure (B-1) Print State as PDF.