

Libyan Academy Tripoli Libya



School of Applied Science and Engineering

Department of Electrical and Computer Engineering

PROPOSED VALUE-ADDED SERVICES INTERFACE SYSTEM FOR LIBYANA COMPANY

Case study: Integration System To Libyana Company

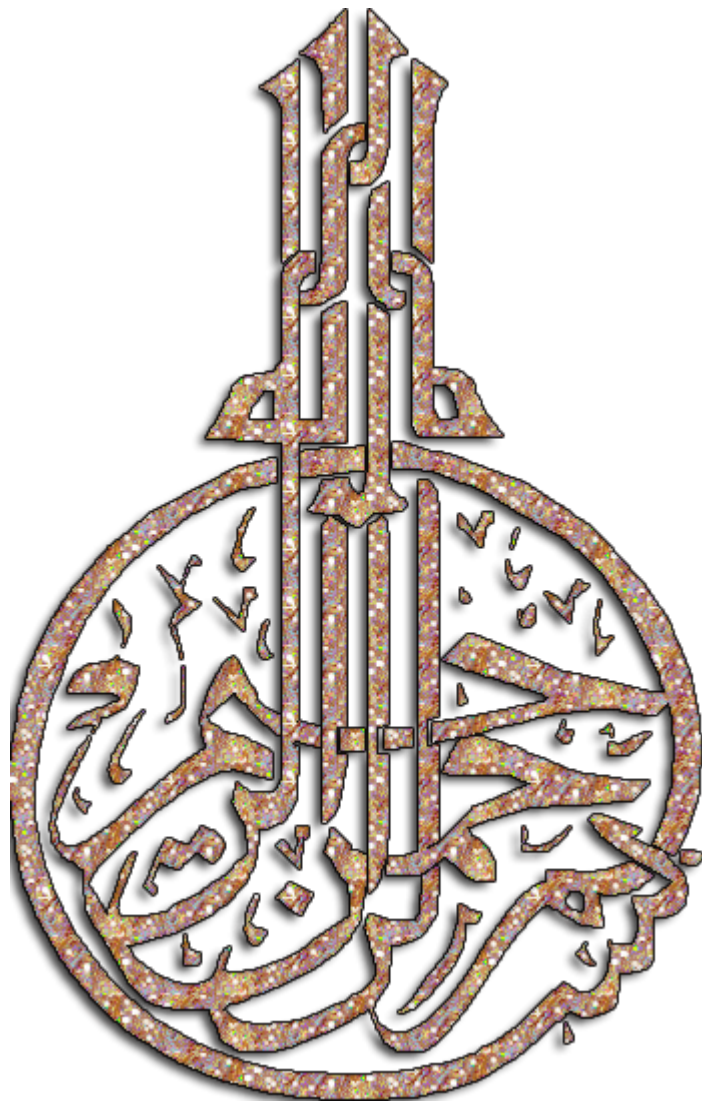
*A dissertation submitted to the department of electrical &
computer engineering in conformity with the department
requirements as partial fulfillment for the degree of Master*

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يقول الله تعالى:

((نَرْفَعُ دَرَجَاتٍ مِّنْ نَّشَأٍ وَفَوْقَ كُلِّ ذِي عِلْمٍ عَلِيمٌ))

الآية 76 من سورة يوسف

((يَرْفَعُ اللَّهُ الَّذِينَ آمَنُوا مِنْكُمْ وَالَّذِينَ أُوتُوا الْعِلْمَ دَرَجَاتٍ وَاللَّهُ بِمَا تَعْمَلُونَ خَبِيرٌ))

الآية 11 من سورة المجادلة

صَدَقَ اللَّهُ الْعَظِيمُ

Dedication

I present this research to my mother and all those who help and lend a helping hand in my life.

It is also dedicated to whoever supported me during my study, in particular, my aunties, my brother Anis, and my friends.

Acknowledgments

O Allah, send peace and blessings upon our master Muhammad and His Family, Companions and those that followed them.

In the first I want to thank God for everything that He has given me.

I don't forget my advisers, who lead and gave me encouragement in this phase, they helped me to understand, and solve mysteries in many sides of life.

Dr. El-Bahlul Fgee & Dr. Aboubaker Elhouni.

ABSTRACT

Utilization of systems integration and central databases in the fields of industry is a modern scientific methodology, enabling the organization to gather all information in one place to be reviewed by decision makers.

In this thesis study, the problem lies in the lack of automated systems, the separate databases in every department, and each department using a different database software, although most of the databases are similar. The solution is to upgrade the manual system to be an automatic integrated system with one central database sharing all data and information where every department can access its data by authentication, and use all the IT tools that are enabled in the organization ASP.NET, SQL 8, intranet, servers, etc.

The thesis analyzes the old system to determine all the departmental processes that need to be integrated into the database by using ER diagram, determine the relationships between the tables in database, design the interface and authority access to every employee and department, and build the new automated integrated system.

Through analyzing the processes and databases in the old system the results were:

- 1- Redundant data entered due to multiple databases.
- 2- Processes are repeated in every department like insertion, deletion, and updates.
- 3- There is a LACE to use the IT tools like servers, intranet, web applications, etc.
- 4- Old database doesn't do any queries or reports.
- 5- The initial intake reports are hard copy paper reports. This costs money through paper, ink and time, whereas a single, integrated electronic system would negate all of those costs.

- 6- Transferring data is impossible due to the systemic differences, despite the fact that the information is all the same.
- 7- Therefore, this thesis proposes a new system designed with integrated databases containing all departmental data, interfaces to access the database by authorized accounts, and prepare reports with time and cost efficiency.

Good results will be achieved if this system implemented.

Contents

Dedication	14
Acknowledgments.....	15
ABSTRACT.....	16
Chapter 1 Introduction	17
1.1 Overview	18
1.2 Location of Study Area	18
1.2.1 Libyana Company structure	19
1.3 Problem Statement	24
1.4 Objectives of the study.....	25
1.5 The scope of the study	25
1.6 Importance of the study.....	26
1.6.1 Scientific importance	26
1.6.2 Practical importance.....	26
1.6.3 Economic importance	27
1.6.4 Management importance.....	27
1.7 Methodology used in this research.....	27
Chapter 2 Web-application review	30
2.1 Overview	31
2.2 Intranet and Security	31
2.2.1 The internet	31
2.2.2 The intranet	32
2.2.2.1 Need For Intranet	33
2.2.2.2 Benefits	34
2.2.2.3 Similarities between the Internet and Intranet	35
2.2.2.4 Differences between intranet & internet	36
2.2.3 Web services and applications	36
2.2.3.1 A Web Page	37
2.2.3.2 A web application	37
2.2.3.3 Business use	39
2.2.3.4 Benefits	39

2.2.3.5	Static web page	40
2.2.3.6	Dynamic web page.....	41
2.2.3.7	Client-side scripting	41
2.2.3.8	Server-side scripting	42
2.2.4	ASP.NET definition	43
2.2.4.1	ASP.NET still renders HTML	43
2.2.4.2	OOP on the Internet	43
2.2.4.3	Web Services	44
2.2.4.4	Great XML Support	44
2.2.4.5	Complete Compatibility	45
2.2.4.6	feature of ASP.NET	46
2.2.4.7	Ajax.....	49
2.2.4.8	Connecting to Databases in ASP.NET.....	49
2.2.5	Data base.....	49
2.2.5.1	SQL Server Compact	50
2.2.5.2	SQL Server 2008.....	50
2.2.5.3	SQL Server Stored Procedure	52
2.2.5.4	Implementation	53
2.2.5.5	Comparison with dynamic SQL.....	53
2.2.5.6	Disadvantages	55
Chapter 3	The Integration system	56
3.1	Overview.....	57
3.2	System definition	58
3.2.1	System components	59
3.3	Information technology definition	59
3.4	Systems integration.....	59
3.4.1	Why Systems Need To be Integrated.....	60
3.4.2	Life-cycle activities.....	62
3.4.3	Primary uses.....	62
3.4.4	The benefit of integration system.....	62
3.4.4.1	The quantitative benefits.....	62
3.4.4.2	The qualitative benefits.....	63

3.4.5	Survey results.....	64
3.4.6	The correlation	66
3.4.6.1	Advantages.....	66
Chapter 4 Practical Framework For The Study		68
4.1	Overview.....	69
4.2	Planning phase	70
4.2.1	Proposed system.....	70
4.2.2	Used tools.....	70
4.3	System analysis.....	70
4.3.1	Facts finding.....	71
4.3.2	Technology and system feasibility.....	71
4.3.2.1	Operational Feasibility	72
4.3.2.2	Economic Feasibility	73
4.3.2.3	Technical Feasibility	73
4.3.3	Functional requirements:.....	74
4.3.4	Nonfunctional requirements:.....	74
4.3.5	Subsystem for registration:	74
4.3.6	Controlling Subsystem:.....	74
4.3.7	Processes modeling (DFD)	75
4.3.8	Data modeling (ERD)	77
4.3.8.1	Relationship	77
4.3.8.2	Normalization	77
4.3.9	Output analyses documentation	81
4.4	system design.....	81
4.4.1	Logical design.....	81
4.4.2	Physical design.....	81
4.4.3	User Interface Design.....	82
4.4.4	Process Design	101
4.5	implementation phase	105
4.5.1	Code writing.....	105
4.5.2	User interfaces implementation	105
4.5.3	Input practical data.....	105

4.5.4	Program package deployment.....	106
4.6	Test and Maintenance	110
4.6.1	Test steps.....	110
4.6.1.1	Black box test.....	110
4.6.1.2	White box test.	110
4.6.1.3	Alpha Version Test	111
4.6.1.4	Beta Version Test.....	111
4.6.1.5	Maintenance process steps	111
	Chapter 5 Conclusion.....	112
5.1	Conclusion	112
5.2	Results.....	113
5.3	Futures work	115
	Attachment A.....	116
	Reference	133

Figures

Figure 1.1 Page 1 of Libyana Company's structure (Corporate Divisions).....	14
Figure 1.2 Page 2 of Libyana Company's structure (Corporate Divisions).....	15
Figure 1.3 Page 3 of Libyana Company's structure (Corporate Divisions).....	16
Figure 2.1 Static web page is delivered to the user exactly as stored	34
Figure 2.2 Dynamic web page example of server-side scripting (ASP.NETand SQL)	35
Figure 2.3 ASP.Net Page	41
Figure 3.1 Business process before systems integration.....	60
Figure 3.2 Business process after systems integration.....	60
Figure 4.1 DFD Diagram Context level 0 for VAS interface system.....	76
Figure 4.2 ER Diagram.....	72
Figure 4.2 ER Diagram.....	73
Figure 4.3 User Interface Design	75
Figure 4.4 User type level1.....	76
Figure 4.5 User type level 2.....	77
Figure 4.6 User type level 3.....	78
Figure 4.7 User type level 4.....	79
Figure 4.8 User type level 5.....	80
Figure 4.9 Add or remove user interface	81
Figure 4.10 Searching interface	82
Figure 4.11 Search by period of time.....	83
Figure 4.12 Add or remove CP and CP employee interface	84
Figure 4.13 Add or remove testing data interface.....	85
Figure 4.14 Add or remove services data interface Data Design.....	86
Figure 4.15 Relationship diagram.....	92
Figure 4.16 The helping table diagram	93
Figure 4.17 Login flowchart	94
Figure 4.18 Search flowchart.....	95
Figure 4.19 ADD New User flowchart.....	95
Figure 4.20 Delete User flowchart.....	96
Figure 4.21 Update User flowchart.....	96
Figure 4.22 Add new Employee CP flowchart	97
Figure 4.23 Add new CP flowchart	97
Figure 4.24 C# Code in ASP.Net.....	100
Figure 4.25 SQL Code "Store procedure	101
Figure 4.26 How to use Store Procedure in the c# code in the ASP.net	102

Tables

Table 3.1 Paired sample test between benefits of systems integration	63
Table 3.2 The best measurement of the benefits of systems integration.....	58
Table 4.1 Category of services table	87
Table 4.2 Content provider table.....	87
Table 4.3 Content provider employee table	87
Table 4.4 Content provider File table	88
Table 4.5 Content provider test number table	88
Table 4.6 Service number Type table	88
Table 4.7 Service numbers table	88
Table 4.8 Service numbers state table.....	89
Table 4.9 States list table	89
Table 4.10 Service type list table	89
Table 4.11 Test telephone no list table	89
Table 4.12 Test numbers state table	89
Table 4.13 Test data table	90
Table 4.14 User level table	90
Table 4.15 Search table.....	90
Table 4.16 Year table	91
Table 4.17 Months table	91
Table 4.18 Days table	91
Table .A1The weight of Likert scale.	110
TableA .2 The survey table	111

Dedication

Acknowledgments

ABSTRACT

Chapter 1 Introduction

1.1 Overview

The difference between the past and the future is the technology invented to make life easier than before, such as camera, DVD, TV, radio, receiver, decoder, computer, etc.

For a while, the computer was like any other device; it's only job was to calculate in a short time. Then the computer was improved to be a multi-processor and became number one on the list of priorities, and then it was used everywhere to facilitate our life.

Many generations of computers lead to many kinds of languages from machine languages, assembly languages to advanced programming languages like C, C++, C#, Visual Basic, Java, and many others; some of them extinct and some of them no longer in use.

Users were provided with interfaces to deal with the variegated data as easy as possible by Java and VB; that's one of the primary reasons that made it in the top of list of programming languages.

Any documentation work in Libyana used a large amount of papers, file archives, and official letters but it was never easy to find any letter or a service number or when this service changed its price and many other questions. We needed to find things in due time but sometimes would wait hours to get it.

This motivation lead to use a programming language to make a user interface to facilitate searching by using a central database, that made finding needed data as quickly as a computer can run and with only one click.

This research consists of 4 chapters; the first chapter is introductory and provides a basic background for the coming chapters, while the three following chapters focus on explaining the steps to make automated value-added services system. The last chapter provides the research results, conclusion and the future work.

1.2 Location of Study Area

The Libyana mobile phone company (Tripoli, Libya) was established in (7/9/2004) to provide mobile communication services to subscribers in Libya; The company improves its services in a short time and achieved the target. It has five corporate divisions: network, finance,

human resource, service and commercial. In 2005 a new department was born in the commercial division called product management & development; it consists of four units. One of them is the portal & content management unit (CPP); this unit is in charge of value-added services (VAS). The subject of this research, the VAS, is short codes that Libyana gives to the content providers (CP) to present services like SMS, MMS, WAP push, IVR, subscription, and USSD code.

1.2.1 Libyana Company structure

The company had 5 divisions Finance, Services, Commercial, IT, Network, and 24 departments, and 77 Units or groups.

The departments and the units that related to this project is like the following:

In the financial division:

- 1- Revenue & collection department.
 - 1.1- Settlements & collection unit.

In the commercial division:

- 1- Product management & development department.
 - 1.1- Portal & Content management unit.
- 2- Market segment management department.
 - 1.1- Consumer & SME management unit.
 - 1.2- Corporate Accounts management unit.
- 3- Customer services department.
 - 1.1- Customer support unit.

In the IT division :

- 1- It development department.
 - 1.1 service platforms development unit.

In the network division:

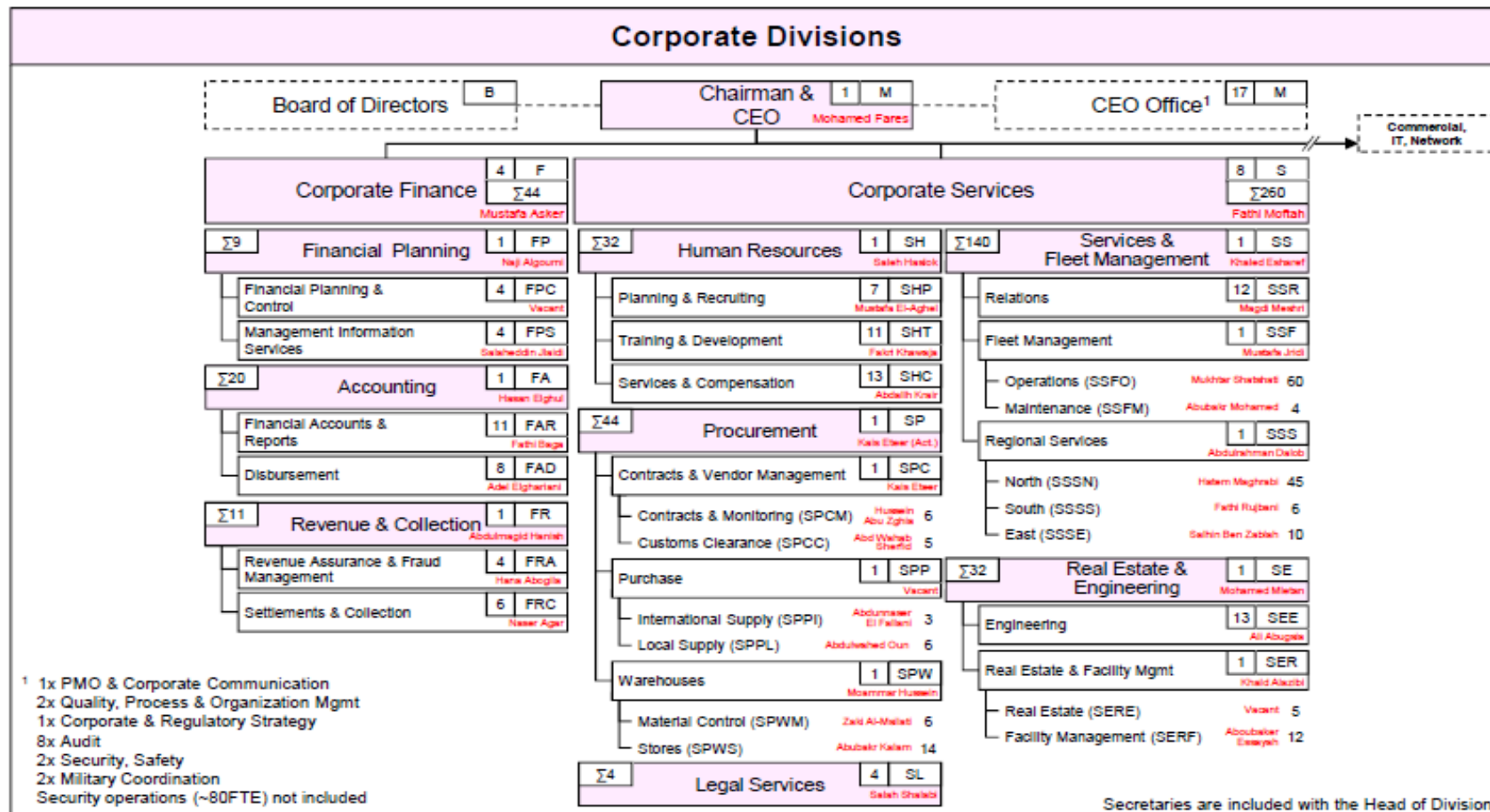
- 1- Network services department.
 - 1.1- Messaging Services unit.

- 1.2- Voice & video services unit.
- 1.3- Portal & 3rd party services unit.

All these departments and units management by the Portal & Content management unit (CPP) , this unit gives all the data and information need to every departments and units that related to added value services (VAS).

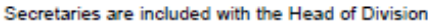
In the following figures the details structure to Libyana Company that clarify the division, the department, and units.

Detailed Structure.

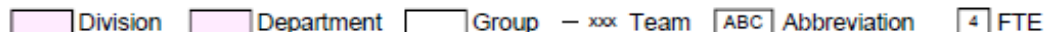


Note: "Act." indicates temporary allocation to fill vacancy. Headcount figures include head.

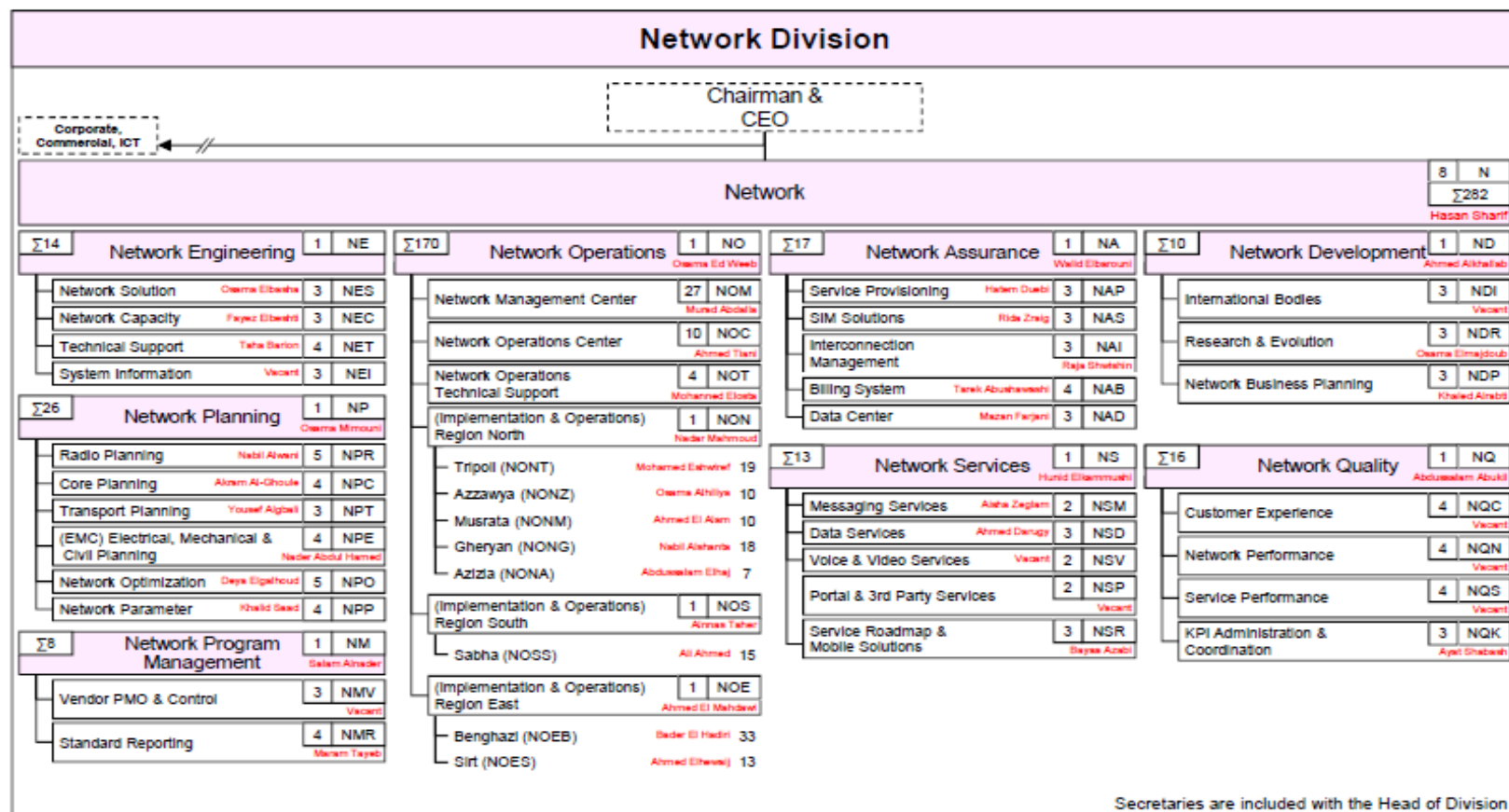
Division Department Group — xxx Team ABC Abbreviation 4 FTE



Note: "Act." indicates temporary allocation to fill vacancy. Headcount figures include head.



Detailed Structure.



Note: "Act." indicates temporary allocation to fill vacancy. Headcount figures include head.

Division Department Group — xxx Team ABC Abbreviation 4 FTE

1-Nov-10

www.libyana.ly

1.3 Problem Statement

The portal & content management unit in Libyana began in 2005 and the work began documented manually and started accumulating gradually since the services is rapidly grow. Therefore the reports was very difficult to prepare when the other departments have a different database.

Thus, such this problem appears when the reports about VAS requested by any department, here are some of these problems:-

1. Missing of computer information system lead to :
 - a. Delayed information.
 - b. Much more work with manual documentation systems.
 - c. Higher rates of error in transferred information.
 - d. Control and security of manual documentation systems is difficult.
 - e. Higher pressure on the employee to make reports manually.
 - f. Employing more people to deal with huge amounts of data.
 - g. Excessive time and money spent to print the reports, to search among services numbers, and to share reports with other departments.
2. There isn't a central database, and that leads to:
 - a. Every department uses a different type of database from the others.
 - b. Redundancy in database.
 - c. When any VAS has an update, deletion or insertion, there must be an update, deletion or insertion in all the databases. If any department forgets any service it creates conflict in the reports.
 - d. Duplicate the process in every department to update, delete, and insert any VAS to the database.

From here appears the importance to make a new integrated automated system to organize the work in the unit, connect the other departments, share the information and facilitate work, control content, prepare reports, and store data in the same place.

1.4 Objectives of the study

This study aims to achieve objectives, such as:

1. Unification of the source data and easier work facilitation.
2. Facilitate the procedures between departments.
3. Facilitate staff research in one unified location.
4. Work time reduction.
5. Transferring of the hardcopy, paper systems to automatic systems and electronic archives.
6. Determine the role of information technology in organized paperwork.
7. Investment by information technology to link databases and build a centralized database.
8. Investment existing intranet network and servers that exist in the company.
9. Study the process and database in the entire department to design a central database and an integrated system including all the processes and procedures used previously in the manual systems in all departments.
10. Working to implement an integrated information system containing all the data to eliminate redundancy and achieve optimal benefit.
11. Save time, effort, and money to Libyana Company.

1.5 The scope of the study

The project is enable the following:

1. Usage from the commercial, finance, and network corporate sections and the ability to use the central database.
2. Everyone can access with user ID.
3. To prepare the needed reports.
4. Control the numbers.
5. Save research and retrieve data easily.
6. Save contracts and other documents to share it without printing.

1.6 Importance of the study

This study solves the problem by integrating an automatic interface system with a central database to control these services. The system is web interface, working in an intranet to share the data between departments and a universally shared database which results in an integrated system that offers services to the entirety of Libyana.

The importance of this integrated system appears from many perspectives in this study like following:

1.6.1 Scientific importance

The following are scientific achievements:

- a- Improve corporate performance and increase the effectiveness of the concerned party to invest all the available information technology tools.
- b- Reduction of redundant data and updating is done only once.
- c- Using a central database increases the performance to the maximum limit.
- d- From using information technology changes from hardcopy paperwork to automatic, digital systems that facilitate the work and make integrated systems for use in the corporate departments.

1.6.2 Practical importance

The following are the achievement when the model is implemented:

- a- Fast data handling, analyses, study and retrieval.
- b- Control the workflow faster and easier than before.
- c- Working on registration data or information and display it in an organized and simplified way.
- d- Preparing good and accurate reports in short time as needed.
- e- Extracting the data easily.
- f- Control the content of all services with ease of use.

1.6.3 Economic importance

- a- Save money and decrease time that was spend to make hard copies, and the work manually take a lot of time to add or delete or update any information the many of recourses was used before (paper, printer ink, time, employee effort, overtime money).
- b- Prior to using the integrated system, we used 3 packets of paper per month, and changed printer ink 5 times in year but after we used 3 packets of paper per every four month, and changed printer ink twice in year.
Compared to the manual documentation the new integrated system uses up to 70% leas paper as well as 85% leas ink.
- c- Employees are working overtime 6 hours per month, at least 72 hours a year, costing the company at least $72 \text{ hour} * 50 \text{ Ld} / \text{hour} = 3600 \text{ LD}$ per employee every month.

1.6.4 Management importance

- a- Control all data by authorized persons who are able to change, add, delete, or modify the database.
- b- Saving time and employee effort.
- c- Share all the data between departments and provide authentication to everyone connected to the system, by easy and quick means.
- d- Enhance the procedures and work by using automatic, integrated systems.
- e- Decrease the routine work.
- f- Protect data.

1.7 Methodology used in this research

The methodology includes:

1. Planning phase:

It is the first stage of system development. This is a brief investigation of the system under consideration and gives a clear picture of what is the physical system itself. In

practice, the initial system study involves the preparation of a 'System Proposal' which lists the Problem Definition, Objectives of the Study, Terms of reference for Study, Constraints, and Expected benefits of the new system, etc., in the light of the user requirements. In summary, the system planning phase passes through the following steps:

1. Defining proposed solutions.
2. Defining the used tools.
3. Limiting Schedule time.

2. Analysis phase :

Systems analysis is a process of collecting factual data, understanding the processes involved, identifying problems and recommending feasible suggestions for improving the system's functioning. Assimilate in the following steps:

1. Facts finding.
2. Feasibility.
3. Requirements documentation.
4. Processes modeling (DFD).
5. Data modeling (ERD).
6. Output analyses documentation.

3. Design phase :

This phase depends mainly on accuracy of the analysis of the output of analysis phase and the steps of design phase as the following:

1. The input of the design phase is the output of analysis phase.
2. The output of the design phase will result it in the following:
 - 1.1 Database Design.
 - 1.2 User interfaces Design.
4. Implementation & test phase:

This phase is divided into the following:

1. Code writing.
2. User interface implementation.
3. Input practical data.
4. Program package deployment.

Testing steps:

1. Black box test.
2. White box test.
3. Alpha Version Test.
4. Beta Version Test.

5. Maintenance phase:

Maintenance is necessary to eliminate errors in the system during its working life and to tune the system to any variations in its working environments. It has been seen that there are always some errors found in the systems that must be noted and corrected. It all means the review of the system from time to time. The review of the system must be capable of the following:

1. Knowing the full capabilities of the system.
2. Knowing the required changes or the additional requirements.
3. Studying the performance of the system.

Chapter 2 Web-application review

2.1 Overview

The traditional way in the manual systems to access, retrieve, delete, and update takes time and cost. That's why new information technology has been invented, to make the research, retrieval, deletion and updating of data easier than the traditional way. Information Technology (IT) refers to anything related to computing technology, such as networking, hardware, software, the Internet, or even the people that work with these technologies. Many companies now have IT departments doing jobs relating to computer programming, network administration, computer engineering, web development, technical support, and many other related occupations. Information technology has become a part of everyday life.

2.2 Intranet and Security

A computer network is a telecommunications network that connects a collection of computers to allow communication and data exchange between systems, software applications, and users. The computers that are involved in the network that originate, route and terminate the data are called nodes. Two devices are said to be networked when a process in one device is able to exchange information with a process in another device. Networks may be classified by various characteristics, such as the media used to transmit signals, the communications protocols used to organize network traffic, network scale, network topology and organizational scope. All of these lead to the best-known computer network: the Internet.

2.2.1 The internet

The internet is a global system of interconnected computer networks that use the standard Internet protocol suite (TCP/IP) to serve billions of users worldwide. It is a network of networks that consists of millions of private, public, academic, business, and government networks, of local to global scope, that are linked by a broad array of electronic, wireless and optical networking technologies. The Internet carries an extensive range of information resources and services, such as the inter-linked hypertext documents of the World Wide Web (WWW) and the infrastructure to support email.

Most traditional communications media including telephone, music, film, and television are being reshaped or redefined by the Internet, giving birth to new services such as voice over Internet Protocol (VoIP) and Internet Protocol television (IPTV). Newspaper, book and other print publishing are adapting to Web site technology, or are reshaped into blogging and web feeds. The Internet has enabled and accelerated new forms of human interactions through instant messaging, Internet forums, and social networking. Online shopping has boomed both for major retail outlets and small artisans and traders. Business-to-business and financial services on the Internet affect supply chains across entire industries.

The Internet has no centralized governance in either technological implementation or policies for access and usage; each constituent network sets its own policies. Only the overreaching definitions of the two principal name spaces in the Internet, the Internet Protocol address space and the Domain Name System, are directed by a maintainer organization, the Internet Corporation for Assigned Names and Numbers (ICANN). The technical underpinning and standardization of the core protocols (IPv4 and IPv6) is an activity of the Internet Engineering Task Force (IETF), a non-profit organization of loosely affiliated international participants that anyone may associate with by contributing technical expertise.

2.2.2 The intranet

The Internet today is not a simple hierarchy structure. It is made up of many wide and local area networks joined by connecting devices and switching station. It is difficult to give an accurate representation of Internet because it is continuously changing – new networks are being added, existing networks need more addresses, and networks of defunct companies need to be removed. Today most end users who want Internet connection use the services of Internet service providers (ISPs). There are international Internet service providers, national Internet service providers, regional Internet service providers and local Internet service providers. The Internet today is run by private companies, not the governments.

An intranet is a computer network that uses Internet Protocol technology to share information, operational systems, or computing services within an organization. The term is used in contrast to internet, a network between organizations, and instead refers to a network within an organization. Sometimes, the term refers only to the organization's internal website, but may be a more extensive part of the organization's information technology infrastructure, and may be composed of multiple local area networks. The objective is to organize each individual's desktop with minimal cost, time and effort to be more productive, cost efficient, timely, and competitive.

An intranet may host multiple private websites and constitute an important component and focal point of internal communication and collaboration. Any of the well known Internet protocols may be found in an intranet, such as HTTP (web services), SMTP (e-mail), and FTP (file transfer protocol). Internet technologies are often deployed to provide modern interfaces to legacy information systems hosting corporate data.

An intranet can be understood as a private analog of the Internet, or as a private extension of the Internet confined to an organization.

Intranets are sometimes contrasted to extranets. While intranets are generally restricted to employees of the organization, extranets may also be accessed by customers, suppliers, or other approved parties.[1] Extranets extend a private network onto the Internet with special provisions for authentication, authorization and accounting (AAA protocol).

In many organizations, intranets are protected from unauthorized external access by means of a network gateway and firewall.

2.2.2.1 Need For Intranet

Increasingly, intranets are being used to deliver tools, As an organization grows in terms of data and services, integration of all departments is highly desired here Intranets used as corporate culture-change platforms. Collaboration (to facilitate working in groups and teleconferencing) or sophisticated corporate directories, sales and customer relationship management tools, project management etc., to advance productivity.

For example, large numbers of employees discussing key issues in an intranet forum application could lead to new ideas in management, productivity, quality, and other corporate issues.

Even a little glitch in communication can cause big problems in data processing and fiscal matters. Install a separate division that keeps the hard copies of all company services is quite lumber some and is difficult to maintain. When the data storage and access is turned into the software way allowing only a selective number of people to access it, it not only becomes easier to access data but is also very cost effective as lesser amount of hardware is required by the organization then. Moreover, accessing data and calculating it becomes very easy. This functionality of easy employee access with significant security measures is provided by intranet.

In large intranets, website traffic is often similar to public website traffic and can be better understood by using web metrics software to track overall activity. User surveys also improve intranet website effectiveness. Larger businesses allow users within their intranet to access public internet through firewall servers. They have the ability to screen messages coming and going keeping security intact.

It is use special encryption/decryption and other security safeguards to connect one part of their intranet to another.

Because of the scope and variety of content and the number of system interfaces, intranets of many organizations are much more complex than their respective public websites. That makes it more secure than internet websites.

2.2.2.2 Benefits

- Workforce productivity.
- Time.
- Communication.
- Web publishing.

- Business operations and management.
- Cost-effective.
- Enhance collaboration.
- Cross-platform capability.
- Built for one audience.
- Promote common corporate culture.
- Immediate updates.
- Supports a distributed computing architecture.

2.2.2.3 Similarities between the Internet and Intranet

In the current times, intranet can be considered more of a business tool which keeps an organization connected in a structured manner. It is, however, to be always remembered that intranet is a part of internet. Thereby, intranet does share some very basic features with the internet. Some of them are listed as under[2]:

- Intranet uses the internet protocols including TCP/IP and FTP.
- Though the access is limited, intranet can work on any of the web browsers. Some organizations do have a customized web browsing environment as per their requirement.
- Organizations that have intranet services often have their own instant messengers or communicators. These can be compared to Yahoo Messenger or Gtalk applications.

Security features like firewall and encryption-decryption policies are applied using same or similar features that internet has. A number of organizations have different encryption

techniques so that any undesirable breach of data is not possible because of patterned studies.

2.2.2.4 Differences between intranet & internet

Dynamic key change is one of the most advanced and is the one that makes intranet safer from internet. Under this security policy, the user's login password gets changed at a specified regular interval. User, then, inputs a new password provided after that specified time interval. This minimizes the chances of any breach or data attack on the intranet services. This is one of the reasons that intranet is regarded as a safer network connection than the internet.

The commercial potential of internet is far more than that of intranet. The revenues that any company collects through internet advertisement and paid services of entertainment and news are far more than what can harness through intranet usage. As a matter of fact, the websites on the internet are a very fine source of income for their owner while intranet services are established on company's own expense and are not revenue or income focused.

2.2.3 Web services and applications

The World Wide Web, or simply Web, is a way of accessing information over the medium of the Internet. It is an information-sharing model that is built on top of the Internet. The Web uses the HTTP protocol, only one of the languages spoken over the Internet, to transmit data. Web services, which use HTTP to allow applications to communicate in order to exchange business logic, use the Web to share information. The Web also utilizes browsers, such as Internet Explorer or Firefox, to access Web documents called Web pages that are linked to each other via hyperlinks. Web documents also contain graphics, sounds, text and video.

- 2 The Web is just one of the ways that information can be disseminated over the Internet. The Internet, not the Web, is also used for e-mail, which relies on SMTP, Usenet news groups, instant messaging and FTP. So the Web is just a portion of the Internet, albeit a large portion, but the two terms are not synonymous and should not be confused.

2.2.3.1 A Web Page

Web Pages are one of the 3 programming models for creating ASP.NET web sites and web applications.

The other two programming models are Web Forms and MVC (Model, View, and Controller).

Web Pages are the simplest programming model for developing ASP.NET web pages. It provides an easy way to combine HTML, CSS, JavaScript, and server code:

- Easy to learn, understand, and use.
- Built around single web pages.
- Similar to PHP and Classic ASP.
- Server scripting with Visual Basic or C#.
- Full HTML, CSS, and JavaScript control.

Web Pages is easy extendable with programmable Web Helpers, including database, video, graphics, social networking and much more [2].

2.2.3.2 A web application

It is an application that is accessed by users over a network such as the Internet or an intranet. The term may also mean a computer software application that is coded in a browser-supported programming language (such as JavaScript, combined with a browser-rendered markup language like HTML) and reliant on a common web browser to render the application executable.

In the early days of the Web each individual web page was delivered to the client as a static document, but the sequence of pages could provide an interactive experience, as user input is returned through web form elements embedded in the page markup.

In 1995 Netscape introduced a client-side scripting language called JavaScript allowing programmers to add some dynamic elements to the user interface that ran on the client side. So instead of sending data to the server in order to generate an entire web page, the embedded scripts of the downloaded page can perform various tasks such as input validation or showing/hiding parts of the page.

Languages to program interactions on the client side with no need to communicate with the server.

In 1999, the "web application" concept was introduced in the Java language. In 1996, Macromedia introduced Flash, a vector animation player that could be added to browsers as a plug-in to embed animations on the web pages. It allowed the use of a scripting in the Servlet Specification version 2.2. [2.1]. At that time both JavaScript and XML had already been developed, but Ajax had still not yet been coined and the XMLHttpRequest object had only been recently introduced on Internet Explorer 5 as an ActiveX object.

In 2005, the term Ajax was coined, and applications like Gmail started to make their client sides more and more interactive. A web page script is able to contact the server for storing/retrieving data without downloading an entire web page.

In 2011, HTML5 was finalized, which provides graphic and multimedia capabilities without the need of client side plug-in. HTML5 also enriched the semantic content of documents. The APIs and document object model (DOM) are no longer afterthoughts, but are fundamental parts of the HTML5 specification. WebGL API paved the way for advanced 3D graphics based on HTML5 canvas and JavaScript language. These have significant importance in creating truly platform and browser independent rich web applications.

In contrast web applications use web documents written in a standard format such as HTML and JavaScript, which are supported by a variety of web browsers.

Through Java, JavaScript, DHTML, Flash, Silverlight and other technologies, application-specific methods such as drawing on the screen, playing audio, and access to the keyboard and mouse are all possible. Many services have worked to combine all of these into a more

familiar interface that adopts the appearance of an operating system. General purpose techniques such as drag and drop are also supported by these technologies.

2.2.3.3 Business use

An emerging strategy for application software companies is to provide web access to software previously distributed as local applications. Depending on the type of application, it may require the development of an entirely different browser-based interface, or merely adapting an existing application to use different presentation technology. These programs allow the user to pay a monthly or yearly fee for use of a software application without having to install it on a local hard drive. A company which follows this strategy is known as an application service provider (ASP), and ASPs are currently receiving much attention in the software industry.

Security breaches on these kinds of applications are a major concern because it can involve both enterprise information and private customer data. Protecting these assets is an important part of any web application and there are some key operational areas that must be included in the development process. This includes processes for authentication, authorization, asset handling, input, and logging and auditing. Building security into the applications from the beginning can be more effective and less disruptive in the long run.

2.2.3.4 Benefits

- Web applications do not require any complex "roll out" procedure to deploy in large organizations. A compatible web browser is all that is needed.
- Browser applications typically require little or no disk space on the client.
- They require no upgrade procedure since all new features are implemented on the server and automatically delivered to the users.
- Web applications integrate easily into other server-side web procedures, such as email and searching.

- They also provide cross-platform compatibility in most cases (i.e., Windows, Mac, Linux, etc.) because they operate within a web browser window.
- With the advent of HTML5, programmers can create richly interactive environments natively within browsers. Included in the list of new features are native audio, video and animations, as well as improved error handling.

As known, there are two kinds of web pages:

2.2.3.5 Static web page

A static web page sometimes called a flat page or stationary page; it is a web page that is delivered to the user exactly as stored, in contrast to dynamic web pages which are generated by a web application.

Consequently a static web page displays the same information for all users, from all contexts, subject to modern capabilities of a web server to negotiate content-type or language of the document where such versions are available and the server is configured to do so.

Static web pages are often HTML documents stored as files in the file system and made available by the web server over HTTP. However, loose interpretations of the term could include web pages stored in a database, and could even include pages formatted using a template and served through an application server, as long as the page served is unchanging and presented essentially as stored.

Disadvantages

- Any personalization or interactivity has to run client-side, which is restricting.
- Maintaining large numbers of static pages as files can be impractical without automated tools.

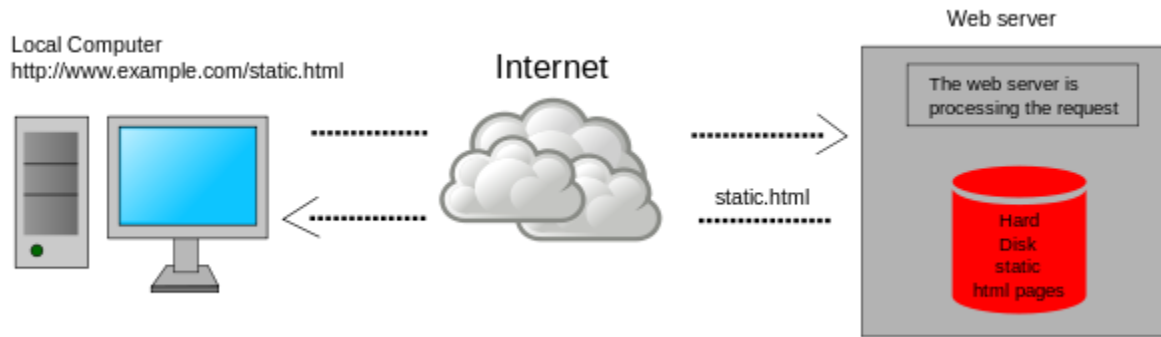


Figure 2.1 Static web page is delivered to the user exactly as stored[3]

2.2.3.6 Dynamic web page

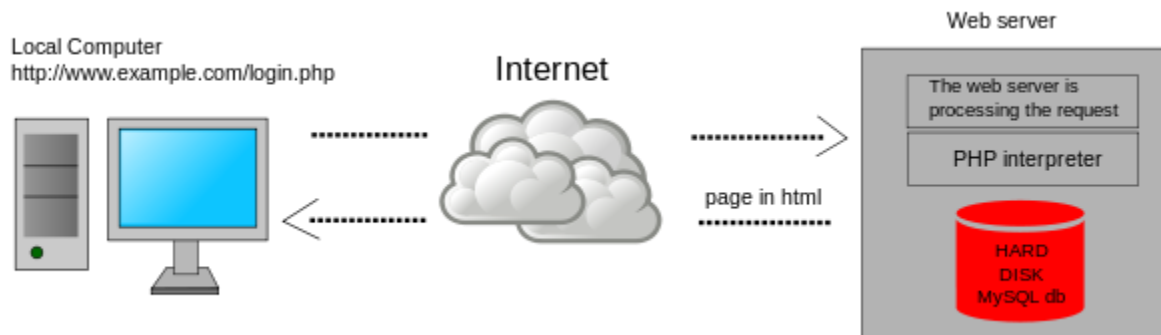


Figure 2.2 Dynamic web page example of server-side scripting (ASP.NET and SQL)[4]

A dynamic web page is a web page with web content that varies based on parameters provided by a user or a computer program.

2.2.3.7 Client-side scripting

Is changing interface behaviors within a specific web page in response to mouse or keyboard actions, or at specified timing events. In this case, the dynamic behavior occurs within the presentation. The Client-side content is generated on the user's local computer system.

Such web pages use presentation technology called rich interfaced pages. Client-side scripting languages like JavaScript or Action Script, used for Dynamic HTML (DHTML) and Flash technologies respectively, are frequently used to orchestrate media types (sound, animations, changing text, etc.) of the presentation. The scripting also allows use of remote scripting, a technique by which the DHTML page requests additional information from a server, using a hidden Frame XML Http Requests, or a Web service.

2.2.3.8 Server-side scripting

A program running on a web server (server-side scripting) is used to change the web content on various web pages, or to adjust the sequence of or reload of the web pages. Server responses may be determined by such conditions as data in a posted HTML form, parameters in the URL, the type of browser being used, the passage of time, or a database or server state.

Such web pages are often created with the help of server-side languages such as ASP, ColdFusion, Perl, PHP, Ruby, Web DNA and other languages. These server-side languages often use the Common Gateway Interface (CGI) to produce dynamic web pages. Three notable exceptions are ASP.NET, JSP, and LSP, which reuse CGI concepts in their APIs but actually dispatch all web requests into a shared virtual machine.

Dynamic web pages are often cached when there are few or no changes expected and the page is anticipated to receive considerable amount of web traffic that would create slow load times for the server if it had to generate the pages on the fly for each request.

ASP.NET is a server-side Web application framework designed for Web development to produce dynamic Web pages. It was developed by Microsoft to allow programmers to build dynamic web sites, web applications and web services.

ASP.NET is a technology for developing web applications. A web application is just a fancy name for a dynamic web site. Web applications usually (but not always) store information in a database, and allow visitors to the site to access and change that information.

ASP.NET is built on the Common Language Runtime (CLR), allowing programmers to write ASP.NET code using any supported .NET language. ASP.NET allows you to use a full featured programming language such as C# (pronounced C-Sharp) or VB.NET to build web applications easily.

The ASP.NETSOAP extension framework allows ASP.NET components to process SOAP messages. [5]

2.2.4 ASP.NET definition

You've probably heard the word ASP.NET fairly often these days, especially on developer sites and news. ASP.NET is not just the next version of ASP; it is the next era of web development. ASP.NET allows you to use a full featured programming language such as C# (pronounced C-Sharp) or VB.NET to build web applications easily.

2.2.4.1 ASP.NET still renders HTML

Unfortunately, the Internet still has bandwidth limitations and not every person is running the same web browser. These issues make it necessary to stick with HTML as our mark-up language of choice. This means that web pages won't look quite as amazing as a fully fledged application running under Windows, but with a bit of skill and creative flair, you can make some rather amazing web applications with ASP.NET. ASP.NET processes all code on the server (in a similar way to a normal application). When the ASP.NET code has been processed, the server returns the resultant HTML to the client. To use ASP.NET hosting you should have installed .NET Framework on the server. If the client supports JavaScript, then the server will use it to make the clients browser experience quicker and easier. Even with HTML being the limiting factor here, ASP.NET still manages to bring true OOP (Object Oriented Programming) to the Internet.

2.2.4.2 OOP on the Internet

Object Oriented Programming makes it possible to build extremely large applications, while still keeping your code clean and structured. Now with ASP.NET, we can do the same on the web. Traditional ASP uses HTML and VBScript (or Jscript) to

process and render pages, but because VBScript is a scripting language, you were forced to write spaghetti code (VBScript was entwined in the HTML and ended up rather messy in larger applications). ASP.NET separates code from display, and you can even have pages with no ASP.NET code in them at all. By adding references in your HTML (called controls), you can tell ASP.NET that you want a button here, some text there, and then in your code, you can manipulate what these controls look like, what they display, how big they are, etc. Controls can do more than just display information. You can add events to controls, so that when a visitor clicks on a button, for example, ASP.NET executes a function of your choice.

2.2.4.3 Web Services

One great feature of ASP.NET is Web Services. Web services mean that you can literally have several pieces of your application on different servers all around the world and the entire application will work perfectly and seamlessly. Web services can even work with normal .NET Windows applications. For example: A lot of people would like to have a stock ticker on their web site, but not many people want to manually type in all changes to the prices. If one company (a stock broker) creates a web service and updates the stock prices periodically, then all of those people wanting the prices can use this web service to log in, run a function which grabs the current price for a chosen company, and return it. Web services can be used for so many things: news, currency exchange, login verification.. the ways in which they can be used are limited to your imagination!

2.2.4.4 Great XML Support

ASP.NET makes it simple to use XML for data storage, configuration and manipulation. The tools which are built into ASP.NET for working with XML are very easy to use. XML is excellent for storing information that rarely changes, because you can just cache that information in the computer's memory after it has been initially extracted.

In ASP.NET, you don't write any code to display the data: you just write the code to bind the data to an object called a Data Grid (which can be done in just a couple of lines). Then, you just have to create a reference on your page to where that Data Grid should go.

The Data Grid will be rendered as a table, and will contain all of the data extracted from the database.

Microsoft has created an amazingly well designed MSDN library for ASP.NET and all of the other .NET languages. It includes a full class library containing information and examples on every class, function, method, and property accessible through ASP.NET. The MSDN library also includes some tutorials and examples to get you started. It may take you a while to get used to the format and layout of the MSDN ASP.NET library, however, once you do, you will find it's an invaluable resource to aid you throughout your ASP.NET learning experience. The .NET MSDN library can be found at <http://msdn.microsoft.com/net/>.

2.2.4.5 Complete Compatibility

One of the most important goals of .NET was to allow developers to write an ASP.NET application using multiple programming languages. As long as each.

ASP.NET page contains only one programming language, you can mix and match different pages using different languages and they will work together seamlessly. This means you can now have a team of developers with half programming in C#, and the other half in VB.NET, with no need to worry about language incompatibilities, etc. A cool little side-effect of all this is that all the programming languages look very similar, and differ only by their language syntax. Take the following code snippets for example. They both do exactly the same thing but the first is written in C#, and the second in VB.NET.

The C# version:

```
void Page_Load(Object S, EventArgs E) { myLabel.Text = "Hello world!!";  
</script>
```

The VB.NET version:

```
Sub Page_Load(S As Object, E As EventArgs) myLabel.Text = "Hello world!!"  
End Sub  
</script>
```

If you take either of the code examples shown above and add the following HTML to them, then they would both run perfectly inside of an ASP.NET page:

```
<head>

<title>"Hello World" example!</title>

</head>

<body>

<asp:Label id="myLabel" runat="server" />

</body>

</html>
```

2.2.4.6 feature of ASP.NET

- Web Services.
- Great XML Support.
- Class Library.
- Complete Compatibility.

Microsoft has released some extension frameworks that plug into ASP.NET and extend its functionality. Some of them the AJAX An extension with both client-sides as well as server-side components for writing ASP.NET pages that incorporate AJAX functionality.

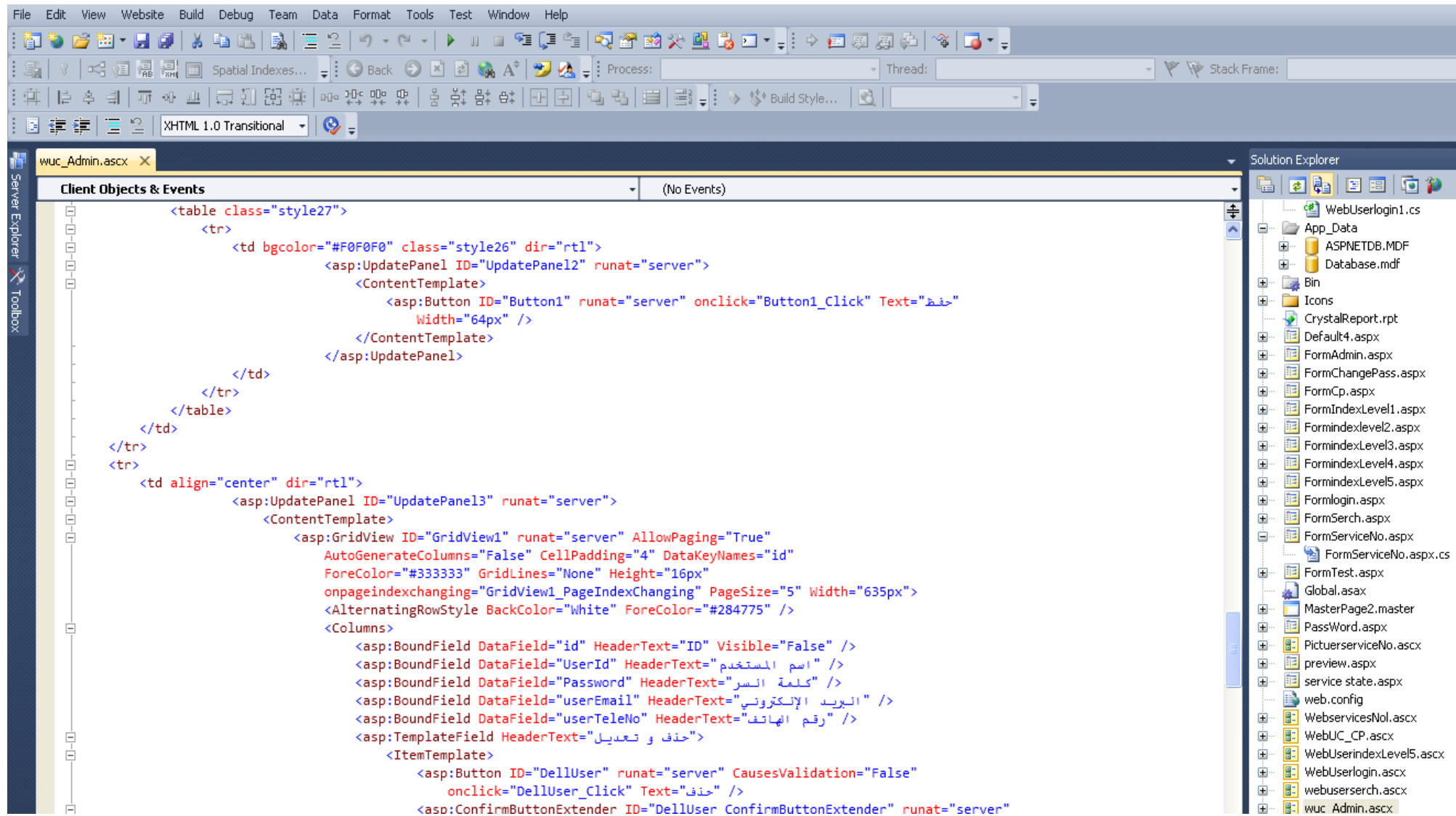


Figure 2.3 ASP.Net Page

2.2.4.7 Ajax

It is a web development technique for dynamically interchanging content which sends a request to the server for data. The server returns the requested data which is then formatted by a client side script. This technique reduces server load time because the client does not request the entire webpage to be regenerated by the server's language parser; only the content that will change is transmitted. Google Maps is an example of a web application that uses Ajax techniques.

2.2.4.8 Connecting to Databases in ASP.NET

ASP.NET gives you flexibility in how you connect to databases. A simple way is to use data source controls, which let you encapsulate data access in a control that you can configure with connection and query information. Alternatively, you can write code to perform data access yourself using ADO.NET classes or LINQ queries.

2.2.5 Data base

A centralized database is a collection of information at a single location accessible from numerous points, in contrast with a distributed database where the information is spread out across multiple sites. There are advantages and disadvantages to this setup that can become considerations when people make decisions about how to configure databases. This is important to think about when setting up a new database or retrofitting a database to meet new needs.

There are a number of ways to set up the centralized database. Multiple programming languages are well suited to database building and companies can also purchase data basing software rather than developing their own. Users may have a number of ways to access material, and the database can be set up with varying security levels to allow for more access controls. Information technology staff maintains the database with various operations to keep it orderly and address early signs of problems like viral infections. They can also change access levels on request and administer the security system.

One advantage of the centralized database is the ability to access all the information in one location. Searches of the database can be fast because the search engine does not need to

check multiple locations to return results. Information may also be easier to organize in a single location. In a database upgrade to handle more information, servers can be added to the database site easily, and the company will not have to balance the needs of a distributed database.

A centralized database can also be easier to physically secure. It can be enclosed in a variety of ways to protect it from theft, sabotage, fire, and other issues. It is also possible to set up an extremely robust computer security system to prevent unauthorized access. For extremely sensitive databases, the computers may not be connected to a network, and users will have to physically enter the database location to pull information. This may be used with some government computers that contain high-security information.

There can also be disadvantages. A centralized database tends to create bottlenecks if multiple users need to access it and their needs are substantial. It can also be very vulnerable if something happens to it and a backup has not been performed or the existing backup is outdated. One advantage of distributed databases is the redundancy factor, which can allow the system to function even if an individual database is down.

2.2.5.1 SQL Server Compact

It is a database engine that facilitates ASP.NET web development and deployment. It does not require a database server or service. Instead, you copy the program files into the Bin directory of your ASP.NET application. The database files are stored in the AppData folder of ASP.NET applications as .sdf files. SQL Server Compact does not require an administrator account and migrates easily to SQL Server.

Microsoft SQL Server is a relational database management system developed by Microsoft. As a database, it is a software product whose primary function is to store and retrieve data as requested by other software applications, be it those on the same computer or those running on another computer across a network (including the Internet).

2.2.5.2 SQL Server 2008

SQL Server 2008 (formerly codenamed "Katmai") was released on August 6, 2008 and aims to make data management self-tuning, self organizing, and self maintaining with

the development of SQL Server Always On technologies, to provide near-zero downtime. SQL Server 2008 also includes support for structured and semi-structured data, including digital media formats for pictures, audio, video and other multimedia data. In current versions, such multimedia data can be stored as BLOBs (binary large objects), but they are generic bit streams. Intrinsic awareness of multimedia data will allow specialized functions to be performed on them. According to Paul Flessner, senior Vice President, Server Applications, Microsoft Corp., SQL Server 2008 can be a data storage backend for different varieties of data: XML, email, time/calendar, file, document, spatial, etc as well as perform search, query, analysis, sharing, and synchronization across all data types.

Other new data types include specialized date and time types and a Spatial data type for location-dependent data. Better support for unstructured and semi-structured data is provided using the new FILESTREAM data type, which can be used to reference any file stored on the file system. Structured data and metadata about the file is stored in SQL Server database, whereas the unstructured component is stored in the file system. Such files can be accessed both via Win32 file handling APIs as well as via SQL Server using T-SQL; doing the latter accesses the file data as a BLOB. Backing up and restoring the database backs up or restores the referenced files as well. SQL Server 2008 also natively supports hierarchical data, and includes T-SQL constructs to directly deal with them, without using recursive queries.

The Full-text search functionality has been integrated with the database engine. According to a Microsoft technical article, this simplifies management and improves performance.

Spatial data will be stored in two types. A "Flat Earth" (GEOMETRY or planar) data type represents geospatial data which has been projected from its native, spherical, coordinate system into a plane. A "Round Earth" data type (GEOGRAPHY) uses an ellipsoidal model in which the Earth is defined as a single continuous entity which does not suffer from the singularities such as the international dateline, poles, or map projection zone "edges". Approximately 70 methods are available to represent spatial operations for the Open Geospatial Consortium Simple Features for SQL, Version 1.1.

SQL Server includes better compression features, which also helps in improving scalability. It enhanced the indexing algorithms and introduced the notion of filtered indexes. It also includes Resource Governor that allows reserving resources for certain

users or workflows. It also includes capabilities for transparent encryption of data (TDE) as well as compression of backups. SQL Server 2008 supports the ADO.NET Entity Framework and the reporting tools, replication, and data definition will be built around the Entity Data Model. SQL Server Reporting Services will gain charting capabilities from the integration of the data visualization products from Dundas Data Visualization, Inc., which was acquired by Microsoft. On the management side, SQL Server 2008 includes the Declarative Management Framework which allows configuring policies and constraints, on the entire database or certain tables, declaratively. The version of SQL Server Management Studio included with SQL Server 2008 supports IntelliSense for SQL queries against a SQL Server 2008 Database Engine. SQL Server 2008 also makes the databases available via Windows Power Shell providers and management functionality available as Cmdlets, so that the server and all the running instances can be managed from Windows Power Shell.

2.2.5.3 SQL Server Stored Procedure

A stored procedure is nothing more than prepared SQL code that you save so you can reuse the code over and over again. So if you think about a query that you write over and over again, instead of having to write that query each time you would save it as a stored procedure and then just call the stored procedure to execute the SQL code that you saved as part of the stored procedure.

In addition to running the same SQL code over and over again you also have the ability to pass parameters to the stored procedure, so depending on what the need is the stored procedure can act accordingly based on the parameter values that were passed.

Then we can define the stored procedure as a subroutine available to applications that access a relational database system. A stored procedure (sometimes called a proc, sproc, StoPro, StoredProc, sp or SP) is actually stored in the database data dictionary.

Typical use for stored procedures include data validation (integrated into the database) or access control mechanisms. Furthermore, stored procedures can consolidate and centralize logic that was originally implemented in applications. Extensive or complex processing that requires execution of several SQL statements is moved into stored procedures, and all

applications call the procedures. One can use nested stored procedures by executing one stored procedure from within another.

Stored procedures are similar to user-defined functions (UDFs). The major difference is that UDFs can be used like any other expression within SQL statements, whereas stored procedures must be invoked using the CALL statement.

CALL procedure (...)

Or

EXECUTE procedure (...)

Stored procedures may return result sets, i.e. the results of a SELECT statement. Such result sets can be processed using cursors, by other stored procedures, by associating a result set locator, or by applications. Stored procedures may also contain declared variables for processing data and cursors that allow it to loop through multiple rows in a table. Stored procedure flow control statements typically include IF, WHILE, LOOP, REPEAT, and CASE statements, and more. Stored procedures can receive variables, return results or modify variables and return them, depending on how and where the variable is declared.

2.2.5.4 Implementation

The exact and correct implementation of stored procedures varies from one database system to another. Most major database vendors support them in some form. Depending on the database system, stored procedures can be implemented in a variety of programming languages, for example SQL, Java, C, or C++. Stored procedures written in non-SQL programming languages may or may not execute SQL statements themselves.

2.2.5.5 Comparison with dynamic SQL

Overhead: Because stored procedure statements are stored directly in the database, they may remove all or part of the compilation overhead that is typically required in situations where software applications send inline (dynamic) SQL queries to a database. (However, most database systems implement "statement caches" and other mechanisms to

avoid repetitive compilation of dynamic SQL statements.) In addition, while they avoid some overhead, pre-compiled SQL statements add to the complexity of creating an optimal execution plan because not all arguments of the SQL statement are supplied at compile time. Depending on the specific database implementation and configuration, mixed performance results will be seen from stored procedures versus generic queries or user defined functions.

- Avoidance of network traffic:

A major advantage with stored procedures is that they can run directly within the database engine. In a production system, this typically means that the procedures run entirely on a specialized database server, which has direct access to the data being accessed. The benefit here is that network communication costs can be avoided completely. This becomes particularly important for complex series of SQL statements.

- Encapsulation of business logic:

Stored procedures allow programmers to embed business logic as an API in the database, which can simplify data management and reduce the need to encode the logic elsewhere in client programs. This can result in a lesser likelihood of data corruption by faulty client programs. The database system can ensure data integrity and consistency with the help of stored procedures.

- Delegation of access-rights:

In many systems, stored procedures can be granted access rights to the database that users who execute those procedures do not directly have.

- Some protection from SQL injection attacks:

Stored procedures can be used to protect against injection attacks. Stored procedure parameters will be treated as data even if an attacker inserts SQL commands. Also, some DBMSs will check the parameter's type. A stored procedure that in turn generates dynamic

SQL using the input is however still vulnerable to SQL injections unless proper precautions are taken.

2.2.5.6 Disadvantages

- Stored procedure languages are quite often vendor-specific. Switching to another vendor's database most likely requires rewriting any existing stored procedures.
- Stored procedure languages from different vendors have different levels of sophistication.
- Tool support for writing and debugging stored procedures is often not as good as for other programming languages, but this differs between vendors and languages.

Chapter 3 The Integration system

3.1 Overview

Systems integration is a process whereby a cohesive system is created from components that were not specifically designed to work together. Components of an integrated system are often systems in their own right.

An integrated system requires that there be two or more computers connected to pass information. Like an example is an entire manufacturing plant with hundreds of workstations connected to a central database. The database is used to distribute work instructions, job routing data and to store quality control test results. In all cases the major issue is connecting devices for the purposes of transmitting data.

Systems integration is a complex topic with many factors to consider. Execution of a successful integration will require knowledge and understanding of the requirements weighed against a careful balance of compromises.

A systems integrator (SI) is an individual or business that builds computing systems for clients by combining hardware and software products from multiple vendors. Using a systems integrator, a company can align cheaper, pre-configured components and off-the-shelf software to meet key business goals, as opposed to more expensive, customized implementations that may require original programming or manufacture of unique components. Creation of these information systems may include designing or building a customized architecture or application, integrating it with new or existing hardware, packaged and custom software, and communications infrastructure. Some systems integrators working in specialized areas, like SAP installations or upgrades, may offer more customization for specific applications.

Systems integration has traditionally been a crucial specialty in the defense contracting industry. Proprietary, closed systems needs to be upgraded or, as is often the case, legacy hardware or software must be preserved within modern computing networks, graphical user interfaces (GUIs) or hardware connection standards.

3.2 System definition

A set of detailed methods, procedures and routines created to carry out a specific activity, perform a duty, or solve a problem.[6], and it's an organized, purposeful structure that consists of interrelated and interdependent elements (components, entities, factors, members, parts, etc.). These elements continually influence one another (directly or indirectly) to maintain their activity and the existence of the system, in order to achieve the goal of the system.

All systems have

1. Inputs, outputs and feedback mechanisms.
2. Maintain an internal steady-state (called homeostasis) despite a changing external environment.
3. Display properties that are different than the whole (called emergent properties) but are not possessed by any of the individual elements.
4. Have boundaries that are usually defined by the system observer.

Systems underlie every phenomenon and all are part of a larger system. Systems stop functioning when an element is removed or changed significantly. Together, they allow understanding and interpretation of the universe as a meta-system of interlinked wholes, and organize our thoughts about the world.

Although different types of systems (from a cell to the human body, soap bubbles to galaxies, ant colonies to nations) look very different on the surface, they have remarkable similarities. At the most basic level, systems are divided into two categories:

1. Closed systems: theoretical systems that do not interact with the environment and are not influenced by its surroundings. Only the components within the system are significant. Example: a sealed jar--nothing enters or exits the jar, but whatever is inside can interact.

2. Open systems: real-world systems whose boundaries allow exchanges of energy, material and information with the larger external environment or system in which they exist. Example: a company--even if there are separate departments in one organization, the workers share data and interact with each other on a daily basis.
3. Different systems methodologies (such as systems dynamics and systems thinking) classify systems differently.

3.2.1 System components

1. System Unit: the box that contains the CPU, Main Memory Drives, and power Supply.
2. Input Devices: Devices that allow the user to enter data into the computer.
3. Output Devices: Devices that translate information after being processed into a form the user can understand.
4. Peripherals: any hardware that is connected to a computer.

It's a collection of subsystems that connect with each other in an organized environment to do special aims.

3.3 Information technology definition

The set of tools used to: receive, process, store, retrieve, print, and transmit information in an electronic form. Information can be: text, sound, picture, or video.

3.4 Systems integration

A discipline that combines processes and procedures from systems engineering, systems management, and product development for the purpose of developing large-scale complex systems that involve hardware and software and may be based on existing or legacy systems coupled with totally new requirements to add significant functionality. Systems integration generally involves combining products of several contractors to

produce the working system. Systems integration applications range from creation of complex inventory tracking systems to designing flight simulation models and reengineering large logistics systems.

Systems integration has been on the forefront of the IT sector in the past years. Researchers and practitioners differ in their definition of systems integration; they generally agree that systems integration is difficult and complicated, yet, not impossible. System integration means different things to different category of people. Khun in [7] defines systems integration as the practice of joining the functions of a set of subsystems, software or hardware, to result in a single unified system that supports the requirements of an organization. Another definition of systems integration is given as: “the assembling of various hardware (such as computers and telecommunication systems), software (such as accounting, desktop publishing and personnel management) and human interfaces to accomplish a specific goal”. [8] However a simpler definition is given as: “A service to make user’s isolated computers link each other and make them much easier and more useful” [9].

To researchers and practitioners, systems integration is a term that has been used and interpreted to mean different things. It is often confused and used interchangeably with terms like client-server and Electronic Data Interchange (EDI). EDI is the direct computer-to-computer communication of information between organizations in a standard format that permits the receiver to perform specific business functions [10]. Client-server is one of the two models for organizing resources of a local area network (LAN). A client-server involves a server, which is actually a dedicated computer that controls all the programs and the peripherals in a network and offers access to all PCs or workstations that have a client program [11].

3.4.1 Why Systems Need To be Integrated

Today there is a rich and diverse choice of software selection available for almost every business domain. These software(s) have a huge amount of processing capabilities. However, these software applications are like ‘islands of processing systems’ even within an organization and across business boundaries. In order to meet the challenges presented

by today's competitive atmosphere, organizations need the ability to solve problems that cannot be solved on its own [12]. Businesses today need a global, an open and distributed computational capability. In other words, the demand is for a large scale, complex and integrated systems.

Developing large and complex systems is no trivial task. One way of looking at the challenges faced by the current software development industry is by viewing the problems encountered, from the engineering, management and technological aspects. One of the challenges of modern software development is that the current methods are no longer able to fulfill the requirements for the development of compound systems with multiple and unstable system requirements. When there is more than one system, additional efforts are needed to integrate the systems. When there is more than one group of developers involved, the overall view of the system is bound to be neglected. More than one customer will lead to multiple requirements and the presence of a heterogeneous environment will inevitably require engineering solutions to bridge the technology gap. Lastly, systems that possess long life cycle will inevitably produce unstable requirements. All these problems can be grouped together as the problems of software development today, viewed from the engineering aspect. From the management aspect, the problem faced is that there is no clear distinction between general and long-term objectives and also between local and temporal objectives. When there are multiple systems, the general objectives of the systems are easily overlooked. More than one system developer will lead to coordination problems on a large scale. The many end-users will contribute to the difference in priorities. The presence of heterogeneous environment will mean that there is no standardization of tools. A long system life cycle will lead to the negligence of long-term objectives. Finally, from the technological aspect, there is a need to bridge the various technologies and efficiently incorporate new emerging technologies as a unique solution. Multiple systems lead to the creation of a heterogeneous environment. More than one developer will make each development group struggle independently with heterogeneity and dynamic environments. When there are more than one user the situation will require customization of an application to the users' environments. A long system life cycle will necessitate the incorporation of new technologies[13].

3.4.2 Life-cycle activities

Application of systems integration processes and procedures generally follows the life cycle for systems engineering. Minimally, these systems engineering life-cycle phases are requirements definition, design and development, and operations and maintenance. For systems integration, these three phases are usually expanded to include feasibility analysis, program and project plans, logical and physical design, design compatibility and interoperability tests, reviews and evaluations, and graceful system retirement.

3.4.3 Primary uses

Systems integration is essential to the design and development of information systems that automate key operations for business and government. It is required for major procurements for the military services and for private businesses.

3.4.4 The benefit of integration system

To understand the benefits of integration some of studies and surveys most doing. one of study to some of the students showed the results of a questionnaire for systems integration of quantitative and qualitative [14] the results of this study like the following:

3.4.4.1 The quantitative benefits

1. Shorter/reduced steps in business processes
2. Time taken to process one application/record
3. Less complaints from members of the public
4. No. of applications/records processed over a period
5. Less complaints from end- users
6. Reduced number of errors
7. Reduced software development time/effort

8. Reduced maintenance

9. Reduced no. of IT personnel.

3.4.4.2 The qualitative benefits

1. Improved working procedures

2. Better communication with other related organizations

3. Job satisfaction

4. Redefine job specification

5. Improved data accessibility

6. One-stop service

7. More friendly public service

On the average, qualitative benefits received higher rankings than the quantitative benefits group. However, it is not statistically significant as proven by the t-test that the benefits of systems integration are more qualitative than quantitative.

Pair	Total Mean	Mean of group	Mean Difference	t	Sig. (2-tailed)
Quantitative	33.5588	3.7287	Quantitative - Qualitative	-.206	.838
Qualitative	30.9091	4.4155	-0.6869		

Table 3.1 Paired sample test between benefits of systems integration

The survey showed that respondents could think of more quantitative benefits of systems integration than its qualitative benefits. Even though the quantitative benefits of systems integration are numerous, they are not easily measured. For an organization to get actual figures of improvement benefits, comparative studies need to be carried. These studies are time consuming and dependent on many variables. The qualitative benefits of systems

integration can be categorized into two aspects. The first category affects the employees of an organization and the second is the members of the public that it serves. The services rendered by public agencies are mostly essential services and cannot be measured by demand. This further makes it difficult to quantify public satisfaction. The qualitative benefits of systems integration to an organization again are difficult to measure and the choice indicators of measurement are very subjective. Qualitative benefits of systems integration, though non-measurable, seem to have a bigger impact on an organization and are more important than the quantitative benefits. Comparing the benefits of systems integration to the Malaysian public sector, it is concluded that the benefits of systems integration are more qualitative than quantitative. Hence, the findings of the survey support the hypothesis: HI Benefits of systems integration are more qualitative than quantitative.

The survey was designed to prove that all the benefits mentioned previously about systems integration was true and existing in the new integration automated system.

The survey that doing for the new integration automated system for Libyana company shown the same results about the benefit of using system integration as the following :

3.4.5 Survey results

After apply the system of this thesis and try it from the employees who outraised to login to the system, the employee answered the survey, and the results processed by the statistic program SPSS, the table 4.19 shown the percentage of the features to the integration automated system interface that proposed to solve the problem that Caused by the manual system in organization.

No.	Measurements	Mean	Std. Dev.	Median
1	The new integration automatic system contain all the requirement of employee	4.5250	0.59861	5
2	Flexibility of the new integration automatic system	4.4500	0.55238	4
3	Reduce documentation work	4.4250	0.50064	4
4	Reduce routine work	4.5250	0.50574	5
5	Employee satisfaction on the functioning of the new integration automatic system	4.6750	0.47434	5
6	Take all the advantage of IT tools that available in Libyana company	4.4750	0.64001	5
7	The quality of program language that used in the new integration automatic system	4.5000	0.64051	5
8	New database tools that used in the new integration automatic system	4.5250	0.64001	5
9	Reduce work time	4.5250	0.59861	5
10	Save the information	4.4500	0.50383	4
11	Save and retrieve data with easy and qualification way	4.5250	0.50574	5
12	Delivered the information directly to user	4.6000	0.49614	5
13	The central database in the new integration automatic system contain all the data that users needed	4.5500	0.50383	5
14	Provide the users with accurate information with quick and easy way	4.6000	0.49614	5
15	The new integration automatic system gives authentication to users	4.3500	0.69982	4
16	The new integration automatic system provide users with Comprehensive data and information	4.6250	0.49029	5
17	The new integration automatic system fits the requirement of the management	4.4750	0.50574	4

Table 3.2 The best measurement of the benefits of systems integration

the benefits of systems integration is in terms of:

1. The new integration automatic system contain all the requirement of employee.
2. Flexibility of the new integration automatic system.
3. Reduce documentation work.
4. Reduce routine work.
5. Employee satisfaction on the functioning of the new integration automatic system.
6. Take all the advantage of IT tools that available in Libyana company.
7. The quality of program language that used in the new integration automatic system.
8. New database tools that used in the new integration automatic system.
9. Reduce work time.
10. Save the information.
11. Save and retrieve data with easy and qualification way.
12. Deliver the information directly to user.
13. The central database in the new integration automatic system contain all the data that users needed.
14. Provide the users with accurate information in quick and easy way.
15. The new integration automatic system gives authentication to users.
16. The new integration automatic system provide users with Comprehensive data and information.
17. The new integration automatic system fits the requirement of the management.

More details shown in the Chapter 5 about the results of survey.

3.4.6 The correlation

After analyzing the data by SPSS program was proof that the correlation between the system and the expertise of employees, up more than their understanding of technology and the availability of any of these techniques is directly proportional to the relations with each like the following:

1. there's a correlation between employees skills and the new integration automatic system.

$$\rho = 0.308$$

That's mean if the employee skills is very good it's pest to use the new automatic integration system.

2. There's a correlation between the internet and local network availability and the new integration automatic system

$$\rho = 0.458$$

That's mean if the internet and the local network is available it's pest to use the new integration automatic system.

3. The degree of positive new system is much better than the degree of positive old manual system.

3.4.6.1 Advantages

- Systems integration approaches enable early capture of design and implementation needs.
- The interactions and interfaces across existing system fragments and new requirements are especially critical.
- It is necessary that interface and intermodal interactions and relationships across components and subsystems that bring together new and existing equipment and software be articulated.
- The systems integration approach supports this through application of both a top-down and a bottom-up design philosophy; full compliance with audit trail needs,

system-level quality assurance, and risk assessment and evaluation; and definition and documentation of all aspects of the program.

- It also provides a framework that incorporates appropriate systems management application to all program aspects.
- A principal advantage of this approach is that it disaggregates large and complex issues and problems into well-defined sequences of simpler problems and issues that are easier to understand, manage, and build.

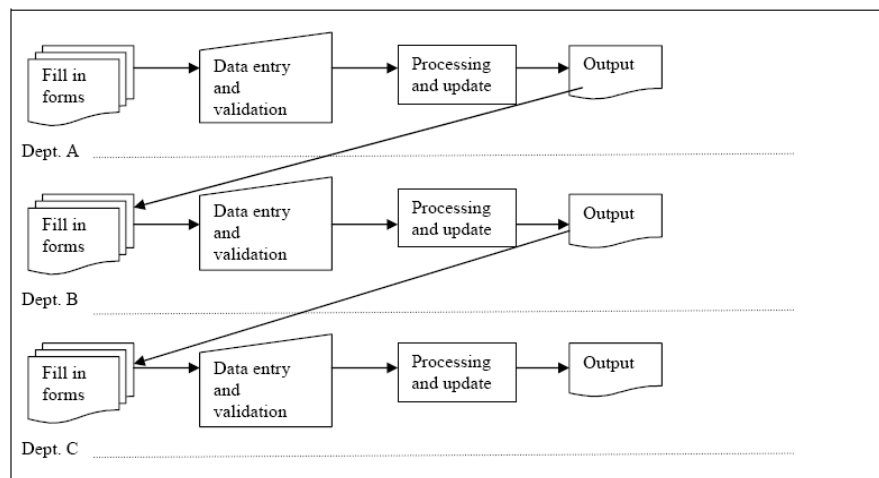


Figure 3.1 Business process before systems integration

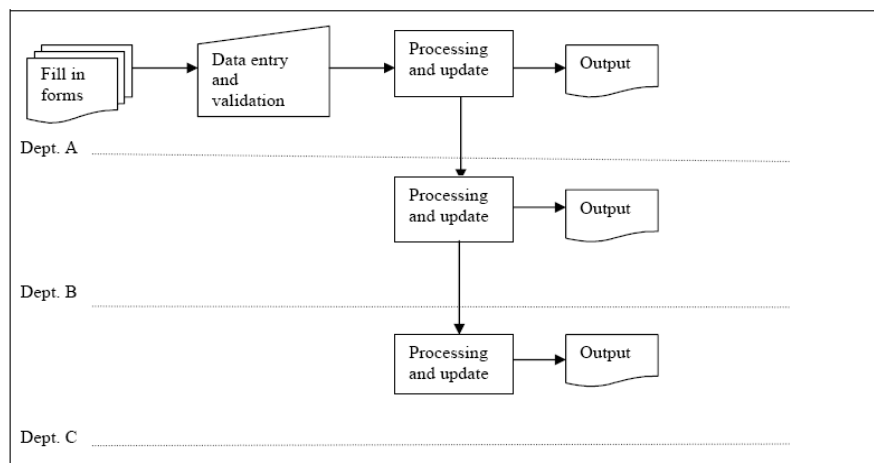


Figure 3.2 Business process after systems integration

Chapter 4 Practical Framework For The Study

4.1 Overview

The development of a computer-based information system includes a systems analysis phase which produces or enhances the data model which itself is a precursor to creating or enhancing a database. There are a number of different approaches to system analysis.[15] When a computer-based information system is developed, systems analysis (according to the Waterfall model) would constitute the following steps:

- The development of a feasibility study, involving determining whether a project is economically, socially, technologically and organizationally feasible.
- Conducting fact-finding measures, designed to ascertain the requirements of the system's end-users. These typically span interviews, questionnaires, or visual observations of work on the existing system.
- Gauging how the end-users would operate the system (in terms of general experience in using computer hardware or software), what the system would be used for and soon.

Another view outlines a phased approach to the process. This approach breaks systems analysis into 5 phases, this chapter displays all these phases.

4.2 Planning phase

Planning phase is the stage which defines and studies the problem and finds solutions in the shortest way. By using scheduled time the problem and proposed solution were described as the following:

4.2.1 Proposed system

To solve this problem we need to do the following:

1. Design a central database containing all the data needed from all departments.
2. Design an automatic integrated system that shares the database with all departments.
3. Design a web user interface and loaded it in the organization intranet to facilitate the work.
4. Achieve secure data access by allowing authorized users only.
5. Design reports and queries in the interface to reduce the time and effort for all departments.

4.2.2 Used tools

The following tools are used:

1. ASP.NET C# language is used to design the system.
2. SQL server is used to design the database.
3. Libyana server is used as a share point.
4. Other tools to connect all departments with the system.

4.3 System analysis

Systems analysis is a process of collecting factual data, understanding the processes involved, identifying problems and recommending feasible suggestions for improving the system functioning. This involves studying the business processes, gathering operational data, understanding the information flow, finding out bottlenecks and evolving solutions

for overcoming the weaknesses of the system so as to achieve the organizational goals. System analysis also includes subdividing of complex processes involving the entire system, identification of data store and manual processes.

4.3.1 Facts finding

From the notes about the manual system the process like the following:

1. Add, remove, modify data that contain services numbers information.
2. Add, remove, modify data that contain service providers information and their employee contacts.
3. Add, remove, modify data of contracts and service models.
4. Prepare monthly, quarter, and yearly reports about the services and their state.
5. Acquire all data.

But they do that by manually handling in every departments, the new system will do the same procedures but by automated system.

4.3.2 Technology and system feasibility

The assessment is based on an outline design of system requirements, to determine whether the company has the technical expertise to handle completion of the project. When writing a feasibility report, the following should be taken to consideration:

A brief description of the business to assess more possible factor/s which could affect the study

The part of the business being examined

The human and economic factor

The possible solutions to the problems

At this level, the concern is whether the proposal is both technically and legally feasible (assuming moderate cost).

4.3.2.1 Operational Feasibility

Operational feasibility is a measure of how well a proposed system solves the problems, and takes advantage of the opportunities identified during scope definition and how it satisfies the requirements identified in the requirements analysis phase of system development.

The operational feasibility assessment focuses on the degree to which the proposed development projects fits in with the existing business environment and objectives with regard to development schedule, delivery date, corporate culture, and existing business processes.

To ensure success, desired operational outcomes must be imparted during design and development. These include such design-dependent parameters such as reliability, maintainability, supportability, usability, reducibility, disposability, sustainability, affordability and others. These parameters are required to be considered at the early stages of design if desired operational behaviors are to be realized. A system design and development requires appropriate and timely application of engineering and management efforts to meet the previously mentioned parameters. A system may serve its intended purpose most effectively when its technical and operating characteristics are engineered into the design. Therefore operational feasibility is a critical aspect of systems engineering that needs to be an integral part of the early design phases.

The Operational feasibility is:

- All the requirements needed are included in the company system and the intranet uses in the company gives the wanted security.
- The new integrated system links all the departments with one database that mean all the department share the same data and update it in the same time.
- The employee can work with the interface easily they just entered the new data and they can check the errors and maintain it easily.
- They can print all the information from the interface reports not like before when they must know how function and sort works in excel.

- All authorized department can access to the database easily.

4.3.2.2 Economic Feasibility

The purpose of the economic feasibility assessment is to determine the positive economic benefits to the organization that the proposed system will provide. It includes quantification and identification of all the benefits expected. This assessment typically involves a cost/ benefits analysis.

Activate green technology in the organization one of the economic feasibility it leads to the following:

- Preserve the environment decrees the paper that used for printing the information to the other department or how wants to know anything about VAS.
- Decries the time that wanted to analysis and sort the data to make reports.

4.3.2.3 Technical Feasibility

The technical feasibility assessment is focused on gaining an understanding of the present technical resources of the organization and their applicability to the expected needs of the proposed system. It is an evaluation of the hardware and software and how it meets the need of the proposed system.

The organization has all the technical tools that this research uses like the following:

- SQL2008 server.
- Web servers.
- Intranet.
- Software's ASP.NET.

All these technical tools make the VAS interface system do all operations easier and more secure than before.

4.3.3 Functional requirements:

- a. Add services numbers, providers, and contracts.
- b. Delete services number, provider, and contract.
- c. Modify services number, provider, and contract.
- d. Edit services number, provider, and contract.
- e. Research by service number, provider name, price, service name, date of activate, date of state, state of number.
- f. Prepare reports monthly, quarter, and yearly reports.

4.3.4 Nonfunctional requirements:

1. The intranet.
2. Web services and applications.
3. Dynamic web page.
4. ASP.NET.
5. Ajax.
6. Data base.
7. SQL Server 2008.
8. SQL Server Stored Procedure.

4.3.5 Subsystem for registration:

- a. Add new user.
- b. Add new administrators.

4.3.6 Controlling Subsystem:

- b. Control the content.

c. Counting the revenue.

These are necessary requirements for the system. The authorized users have all rights in this case. All other users may only search.

4.3.7 Processes modeling (DFD)

A data flow diagram (DFD) graphically describes the flow of data within an organization. It is used to:

- Document existing systems.
- Plan and design new systems.

Subdividing the DFD:

- Few systems can be fully diagrammed on one sheet of paper, and users have needs for differing levels of detail.
- Consequently, DFDs are subdivided into successively lower levels to provide increasing amounts of detail.
- Some data inputs and outputs will not appear on the higher levels of the DFD but appear as the processes are exploded into greater levels of detail.

The highest level of DFD is called a context diagram.

- It provides a summary-level view of the system.
- It depicts a data processing system and the external entities that are:
 - Sources of its input
 - Destinations of its output
- The process symbol is numbered with a “0”

DFD Diagram “Context Level 0”:

This figure shows the system without details. After level 0, it will be more detailed.

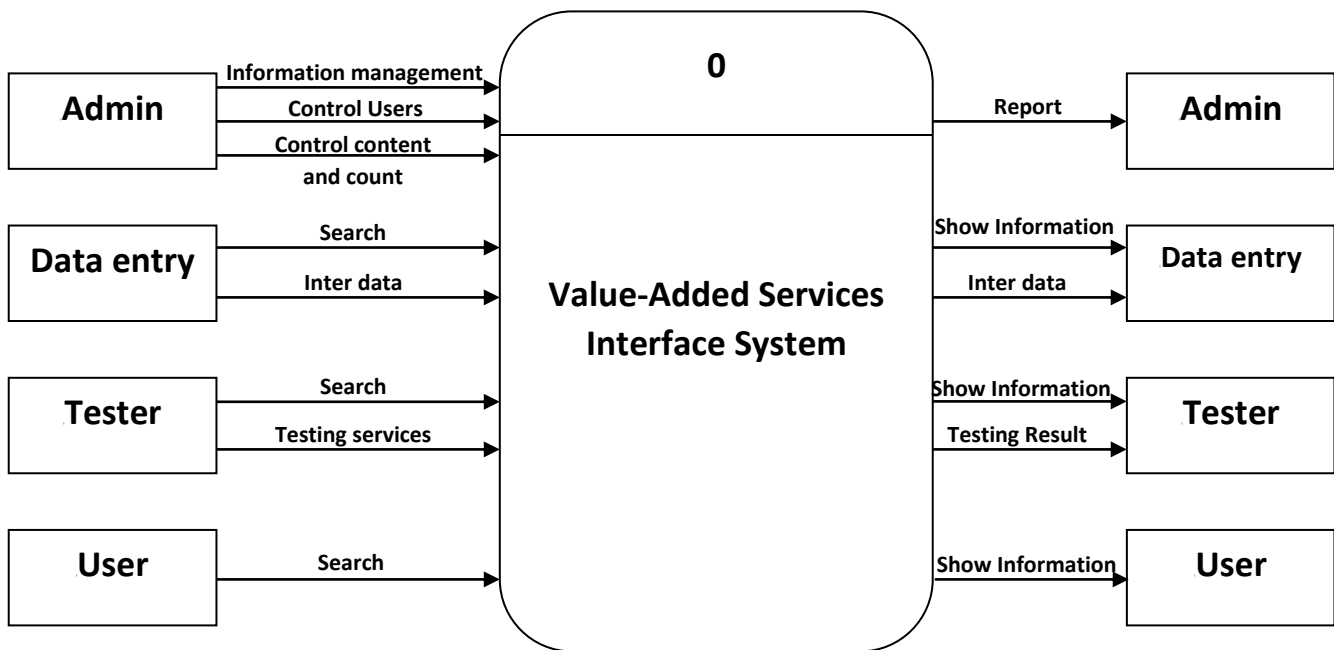


Figure 4.1 DFD Diagram Context level 0 for VAS interface system

4.3.8 Data modeling (ERD)

Entity-Relationship (E-R) Diagram is a detailed, logical representation of the entities, associations and data elements for an organization or business.

It consists of:

- Entity: it's a person, place, object, event or concept in the user environment about which the organization wishes to maintain data Represented by a rectangle in E-R diagrams
- Entity Type: it's a collection of entities that share common properties or characteristics
- Attribute: it's a named property or characteristic of an entity that is of interest to an organization

Each entity type must have an attribute or set of attributes that distinguishes one instance from other instances of the same type.

The Attribute (or combination of attributes) that uniquely identifies each instance of an entity type is called candidate key.

4.3.8.1 Relationship

An association: between the instances of one or more entity types that is of interest to the organization. Association indicates that an event has occurred or that there is a natural link between entity types. Relationships are always labeled with verb phrases.

4.3.8.2 Normalization

A systematic way of ensuring that a database structure is suitable for general-purpose querying and free of certain undesirable characteristics—insertion, update, and deletion anomalies—that could lead to a loss of data integrity.

First normal form (1NF) sets the very basic rules for an organized database:

- Eliminate duplicative columns from the same table.
- Create separate tables for each group of related data and identify each row with a unique column or set of columns (the primary key).

Second normal form (2NF) further addresses the concept of removing duplicative data:

- Meet all the requirements of the first normal form.
- Remove subsets of data that apply to multiple rows of a table and place them in separate tables.
- Create relationships between these new tables and their predecessors through the use of foreign keys.

Third normal form (3NF) goes one large step further:

- Meet all the requirements of the second normal form.
- Remove columns that are not dependent upon the primary key.
- All columns depend directly on the primary key.

Fourth normal form (4NF) has one additional requirement:

- Meet all the requirements of the third normal form.
- A relation is in 4NF if it has no multi-valued dependencies.

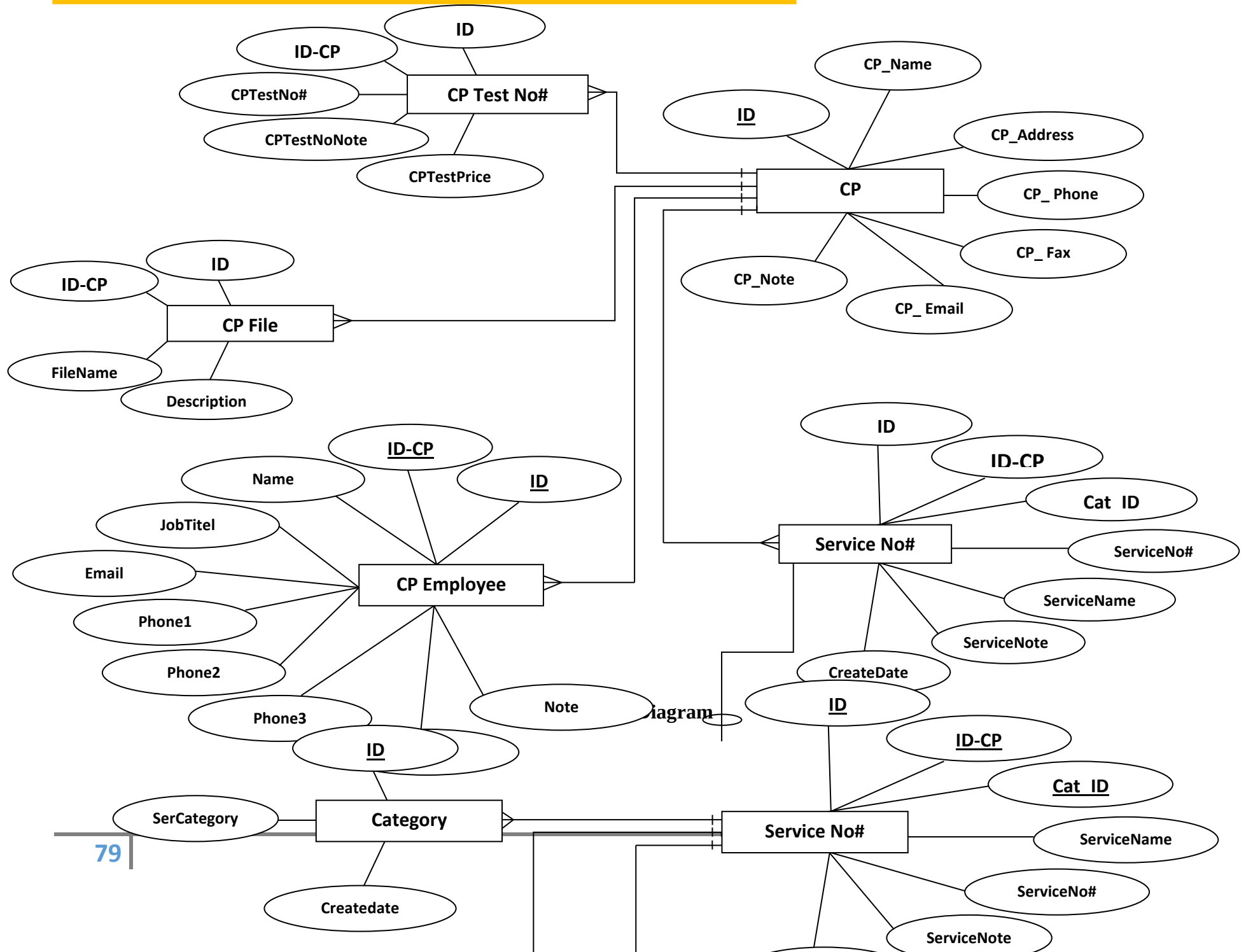


Figure 4.3.2 ER Diagram

4.3.9 Output analyses documentation

All these results and diagrams are the output documentation which are used like input to the next phase to design the new system.

4.4 system design

Based on the user requirements and the detailed analysis of the existing system, the new system must be designed. This is the phase of system designing. It is the most crucial phase in the developments of a system. The logical system design arrived at as a result of systems analysis is converted into physical system design.

4.4.1 Logical design

The logical design of a system pertains to an abstract representation of the data flows, inputs and outputs of the system. This is often conducted via modeling, using an over-abstract (and sometimes graphical) model of the actual system. In the context of systems design are included. Logical design includes ER Diagrams i.e. Entity Relationship Diagrams.

4.4.2 Physical design

The physical design relates to the actual input and output processes of the system. This is laid down in terms of how data is input into a system, how it is verified/authenticated, how it is processed, and how it is displayed as In Physical design, following requirements about the system are decided.

1. Input requirement,
2. Output requirements,
3. Storage requirements,
4. Processing Requirements,
5. System control and backup or recovery.

Put another way, the physical portion of systems design can generally be broken down into three sub-tasks:

4.4.3 User Interface Design

User Interface Design is concerned with how users add information to the system and with how the system presents information back to them.

Login interface:

Every person authorized to login to the VAS system from this inter face:



Figure 4.3 User Interface Design

User type level1:

The person who is authorized to search about something and do nothing else.



Figure 4.4 User type level1

User type level 2:

The person who is authorized to make a report and search about something.



Figure 4.5 User type level 2

User type level 3:

The person who is authorized to enter testing data and search about something.



Figure 4.6 User type level 3

User type level 4:

The person who is authorized to enter CP and Services data and search about something or make reports.



Figure 4.7 User type level 4

User type level 5:

The person is an administrator who is authorized to enter testing, CP, service data and search about something or make reports and give an account to the other users and control everything in the system.



Figure 4.8 User type level 5

Add or remove user interface:

منظومة الخدمات المضافة



ليبانا للهاتف المحمول
LIBYANA MOBILE PHONE





بيانات المستخدم

اسم المستخدم

رقم الهاتف

البريد الإلكتروني

☐ مدير المنظومة
☐ مدخل بيانات
☐ مختبر خدمات
☐ تقارير
☒ بحث



صلاحيات المستخدم



حفظ

اسم المستخدم	كلمة السر	البريد الإلكتروني	رقم الهاتف	حذف و تعديل
soso	Lvas	a.benamer@libyana.ly	925550093	تعديل حذف
mais	2222	mais@yahoo.com	92555555	تعديل حذف
hazem	hazem	h.Libyana.ly	925551324	تعديل حذف
rdwan	2222	r@libyana.ly	925551298	تعديل حذف

تغيير كلمة السر الخاصة بك



لتغيير كلمة السر الخاصة بك اضغط هنا:

هاتفنا... بيتنا... بلدنا... ليبانا
Our phone...Our home...Our libya...Libyana

www.libyana.ly

Figure 4.9 Add or remove user interface

Searching interface:

منظومة الخدمات المضافة

ليبانا للهاتف المحمول
LIBYANA MOBILE PHONE

🏠

بحث بكلمة أو رقم الخدمة

بحث بالتاريخ

اليوم

الشهر

السنة

نوع البحث اسم الخدمة

من: 1 1 2004

إلى: 1 1 2004

كلمات البحث

بحث

بحث

هاتفنا... بيتنا... بلدنا... ليبانا
Our phone...Our home...Our libya...Libyana

www.libyana.ly

Figure 4.10 Searching interface

Search by period of time:

منظومة الخدمات المضافة

ليبانا للهاتف المحمول
LIBYANA MOBILE PHONE

بحث بكلمة او رقم الخدمة

بحث بالتاريخ

السنة الشهر اليوم

نوع البحث اسم الخدمة

كلمات البحث

بحث

اسم الشركة	العنوان	اسم الخدمة	رقم الخدمة	السعر	نوع الخدمة	حالة الخدمة	تاريخ الحلة	تصنيف الخدمة
ليباني	سوق الجامعة	الاستعلام عن الرقم الوطني	11111	0.111	MMS	مقترح	2007/07/07 12:00:00 ص	خدمة إخبارية
ليباني	سوق الجامعة	الاستعلام عن الرقم الوطني	11111	0.111	MMS	تعمل	2007/08/08 12:00:00 ص	خدمة إخبارية
ليباني	سوق الجامعة	الاستعلام عن الرقم الوطني	11111	0.111	MMS	مقترح	2004/02/03 12:00:00 ص	خدمة إخبارية
ليباني	سوق الجامعة	الاستعلام عن الرقم الوطني	11111	0.111	MMS	تعمل	2008.03/23 12:00:00 ص	خدمة إخبارية
ليباني	سوق الجامعة	الاستعلام عن الرقم الوطني	11111	0.111	MMS	إنهاء	2009/09/09 12:00:00 ص	خدمة إخبارية

87654321

هاتفنا... بيتنا... بلدنا... ليبيا
Our phone...Our home...Our libya...Libyana

www.libyana.ly

Figure 4.11 Search by period of time

Add or remove CP and CP employee interface:

Figure 4.12 Add or remove CP and CP employee interface

منظومة الخدمات المضافة 



ليبانا للمحافظات
LIBYANA MOBILE PHONE



اسم الموظف

الصفة

رقم ليبانا

رقم المدار

البريد الإلكتروني

ملاحظات

اسم الشركة

العنوان

رقم الهاتف

الفاكس

البريد الإلكتروني

ملاحظات

اسم الموظف	الصفة	رقم ليبانا	رقم المدار	البريد الإلكتروني	ملاحظات	حذف وتعديل
أسماء نوري بن عامر	مديرة الخدمات المضافة	9876	987	as@lkjhg.ljhg	kdhvkdkv	حذف تعديل
حازم يوسف العوفي	مدير القسم	98765	98765	h@lks.ju	nkcbjgjk	حذف تعديل

اسم الشركة	العنوان	رقم الهاتف	الفاكس	البريد الإلكتروني	ملاحظات	حذف وتعديل
ليباني	سوق الجمعة	92555555	92982882	as@yahoo.com	sdhfhdskfklf	حذف تعديل

hshsjgg info@masarat.ly 213333333 923333333

مسارات للاتصالات والتقنية بن عاتور جامع البدري

Add or remove testing data interface:

منظومة الخدمات المضافة

LIBYANA MOBILE PHONE

اسم الشركة ليبيانا
رقم الاختبار: 44
اسم الخدمة
تصنيف الخدمة إسلامية
نوع الخدمة SMS
السعر
رقم هاتف الاختبار 925550093

رصيد رقم الخدمة
الرصيد المخصص
الرصيد المتبقي
البيانات المرسلة
توافق البيانات
وقت الإرسال
وقت الإستجابة
ملاحظات

وقت
وقت

إرسال البيانات

رقم الخدمة

بحث

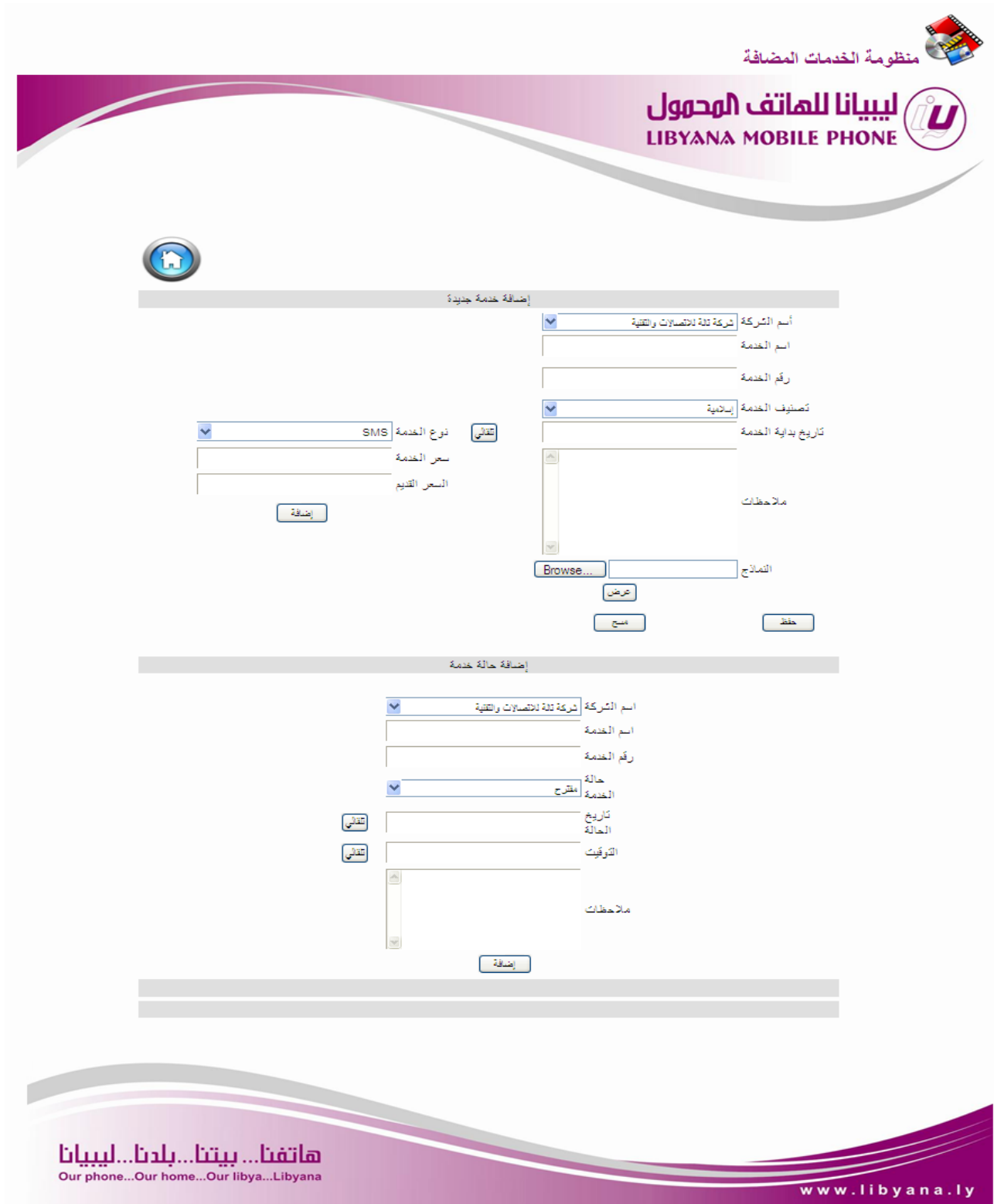
اسم الخدمة	تصنيف الخدمة	نوع الخدمة	السعر	رقم هاتف الاختبار	رصيد رقم الخدمة	الرصيد المخصص	الرصيد المتبقي	البيانات المرسلة	توافق البيانات	وقت الإرسال	وقت الإستجابة
bnm b	SMS	إسلامية	0.1	925550093	10	0.1	9.9	saasas	asasas	12:44:26	12:44:24
تريسيق	SMS	إسلامية	0.1	925552000	10	0	10	تتباركنا	متوافقة	12:46:21	12:46:20

هاتفنا... بيتنا... بلدنا... ليبيانا
Our phone...Our home...Our libya...Libyana

www.libyana.ly

Figure 4.13 Add or remove testing data interface

Add or remove services data interface:



متنوعة الخدمات المضافة

ليبانا للهاتف المحمول
LIBYANA MOBILE PHONE

إضافة خدمة جديدة

اسم الشركة
اسم الخدمة
رقم الخدمة
تصنيف الخدمة
تاريخ بداية الخدمة
ملاحظات

نوع الخدمة: SMS
سعر الخدمة
السعر القديم

إضافة

Browse... عرض مسح حفظ

إضافة حالة خدمة

اسم الشركة
اسم الخدمة
رقم الخدمة
حالة الخدمة
تاريخ
الحالة
التوقيت
ملاحظات

إضافة

هاتفنا... بيتنا... بلدنا... ليبانا
Our phone...Our home...Our libya...Libyana

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Figure 4.14 Add or remove services data interface Data Design

Data Design is concerned with how the data is represented and stored within the system.

From the ERD we can start to build the data base tables like the following:

COM-ASMA-BEN...o.Catservices			
	Column Name	Data Type	Allow Nulls
	Id	int	☐
	Catservices	nvarchar(50)	☒
	Createddate	date	☒
			☐

Table 4.1 Category of services table

COM-ASMA-BENA...Base - dbo.CP			
	Column Name	Data Type	Allow Nulls
	Id	int	☐
	CpName	nvarchar(50)	☐
	Address	nvarchar(50)	☒
	CP_Phone	int	☒
	CP_Fax	int	☒
	CP_Email	nvarchar(50)	☒
	CP_Note	nvarchar(MAX)	☒
			☐

Table 4.2 Content provider table

COM-ASMA-BEN...e - dbo.CPEm			
	Column Name	Data Type	Allow Nulls
	Id	int	☐
	Id_cp	int	☐
	EmployeeName	nvarchar(50)	☐
	Em_JobTitle	nvarchar(50)	☐
	Em_Phone1	int	☐
	Em_Phone2	int	☒
	Em_Email	nvarchar(50)	☒
	Em_Note	nvarchar(MAX)	☒
			☐

Table 4.3Content provider employee table

COM-ASMA-BENA... - dbo.CPFile*			
	Column Name	Data Type	Allow Nulls
▶ ?	id	int	☐
	Id_cp	int	☐
	FileName	nvarchar(MAX)	☒
	pic	varbinary(MAX)	☒
	Description	nvarchar(MAX)	☒

Table 4.4 Content provider File table

COM-ASMA-BEN...dbo.CpTestNo			
	Column Name	Data Type	Allow Nulls
▶ ?	id	int	☐
	id_cp	int	☐
	CP_TestNo	int	☐
	CP_TestPrice	float	☐
	CP_TestNoNote	nvarchar(MAX)	☒
			☐

Table 4.5 Content provider test number table

COM-ASMA-BEN...o.SerNo_Type			
	Column Name	Data Type	Allow Nulls
▶ ?	id	int	☐
	Id_SN	int	☐
	Id_ST	int	☐
	price	float	☐
	old_price	float	☒
	creatdate	date	☒
	updateprice	date	☒
			☐

Table 4.6 Service number Type table

COM-ASMA-BEN...dbo.ServiceNo			
	Column Name	Data Type	Allow Nulls
▶ ?	id	int	☐
	ServiceName	nvarchar(50)	☐
	ServiceNo	int	☐
	createdate	date	☐
	SNote	nvarchar(MAX)	☒
	id_cp	int	☒
	cat_id	int	☒
			☐

Table 4.7 Service numbers table

COM-ASMA-BENA....ServiceState			
	Column Name	Data Type	Allow Nulls
▶	id	int	☐
	Id_SN	int	☐
	Id_state	int	☐
	statedate	datetime	☐
	notes	nvarchar(MAX)	☒
			☐

Table 4.8 Service numbers state table

COM-ASMA-BENA... - dbo.States			
	Column Name	Data Type	Allow Nulls
▶	id	int	☐
	SerState	nvarchar(50)	☐
			☐

Table 4.9 States list table

COM-ASMA-BEN...e - dbo.SType			
	Column Name	Data Type	Allow Nulls
▶	id	int	☐
	ServiceType	nvarchar(50)	☐
	createdate	datetime	☒
	Note	nvarchar(MAX)	☒
			☐

Table 4.10 Service type list table

COM-ASMA-BEN...test_telephon			
	Column Name	Data Type	Allow Nulls
▶	id	int	☐
	test_tele	int	☐
			☐

Table 4.11 Test telephone no list table

COM-ASMA-BEN...o.TestNoState			
	Column Name	Data Type	Allow Nulls
▶	id	int	☐
	Id_Tn	int	☐
	Id_state	int	☐
	stateDate	date	☐
	TNoNote	nvarchar(MAX)	☒
			☐

Table 4.12 Test numbers state table

COM-ASMA-BENA... dbo.testdata			
	Column Name	Data Type	Allow Nulls
	Id	int	☐
	Id_Tn	int	☐
	Id_ST	int	☐
	cat_id	int	☐
	id_Tele	int	☐
	TestSername	nvarchar(50)	☐
	mainPalance	float	☒
	takenPalance	float	☒
	stayPalance	float	☒
	sendinfo	nvarchar(MAX)	☐
	compData	nvarchar(MAX)	☐
	Datesent	date	☒
	timeSend	nvarchar(50)	☐
	timerescive	nvarchar(50)	☐
	TestNote	nvarchar(MAX)	☒
	PalanceNote	nvarchar(MAX)	☒
			☐

Table 4.13 Test data table

COM-ASMA-BEN...dbo.UserTable			
	Column Name	Data Type	Allow Nulls
	Id	int	☐
	UserId	nvarchar(50)	☐
	Password	nvarchar(50)	☐
	ULevel	int	☐
	userTeleNo	int	☐
	userEmail	nvarchar(50)	☒
			☐

Table 4.14 User level table

COM-ASMA-BEN...o.SerchTable*			
	Column Name	Data Type	Allow Nulls
	id	int	☐
	SerchTypeWord	nvarchar(50)	☐
			☐

Table 4.15 Search table

COM-ASMA-BEN...o.YearsTable*			
	Column Name	Data Type	Allow Nulls
	id	int	☐
	years	int	☐
			☐

Table 4.16 Year table

COM-ASMA-BEN...monthstable*			
	Column Name	Data Type	Allow Nulls
	id	int	☐
	months	int	☐
			☐

Table 4.17 Months table

COM-ASMA-BEN...o.DaysTable*			
	Column Name	Data Type	Allow Nulls
	id	int	☐
	days	int	☐
			☐

Table 4.18 Days table

n

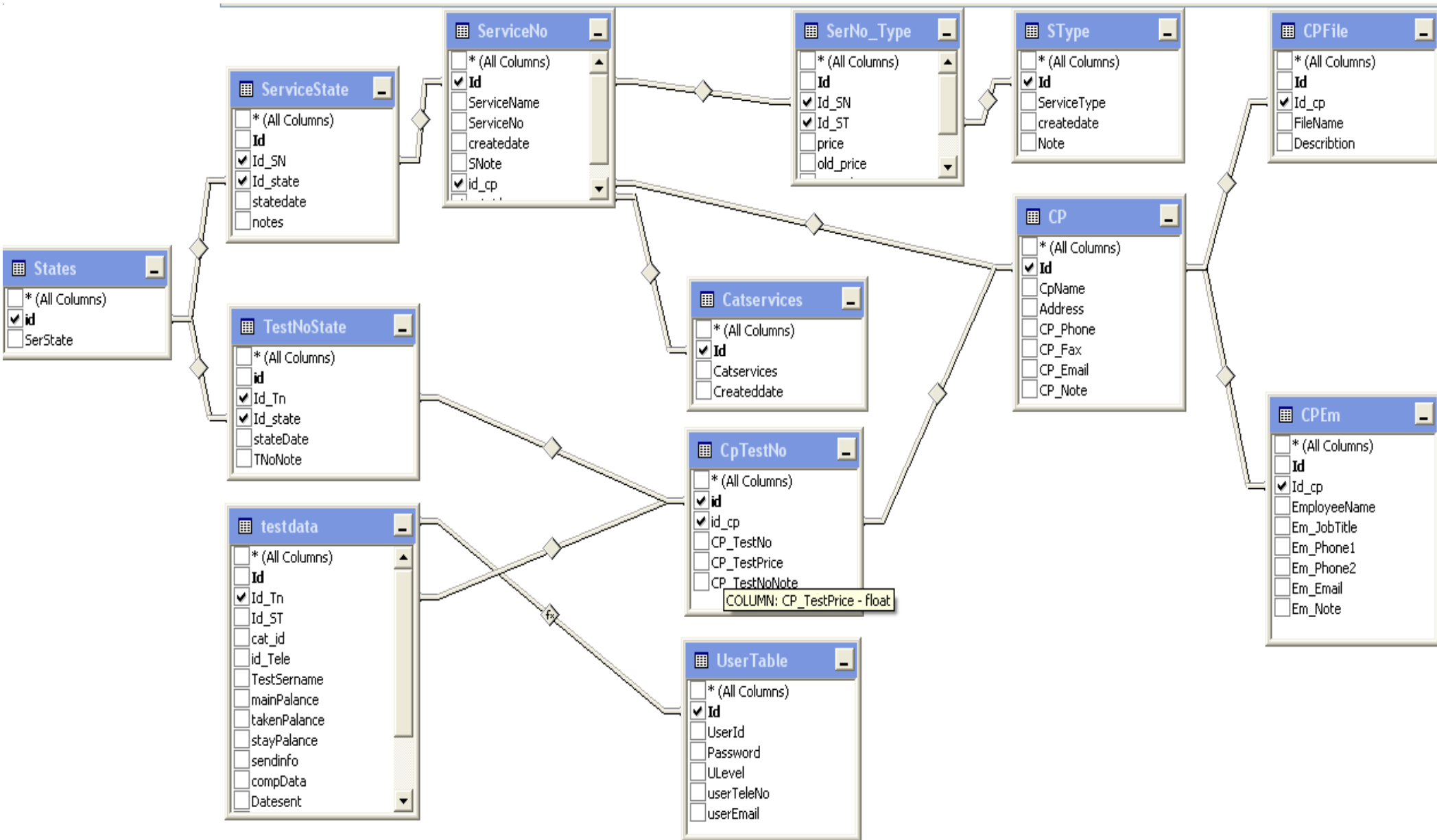




Figure 4.16 The helping table diagram

4.4.4 Process Design

Finally, Process Design is concerned with how data moves through the system, and with how and where it is validated, secured and/or transformed as it flows into, through and out of the system.

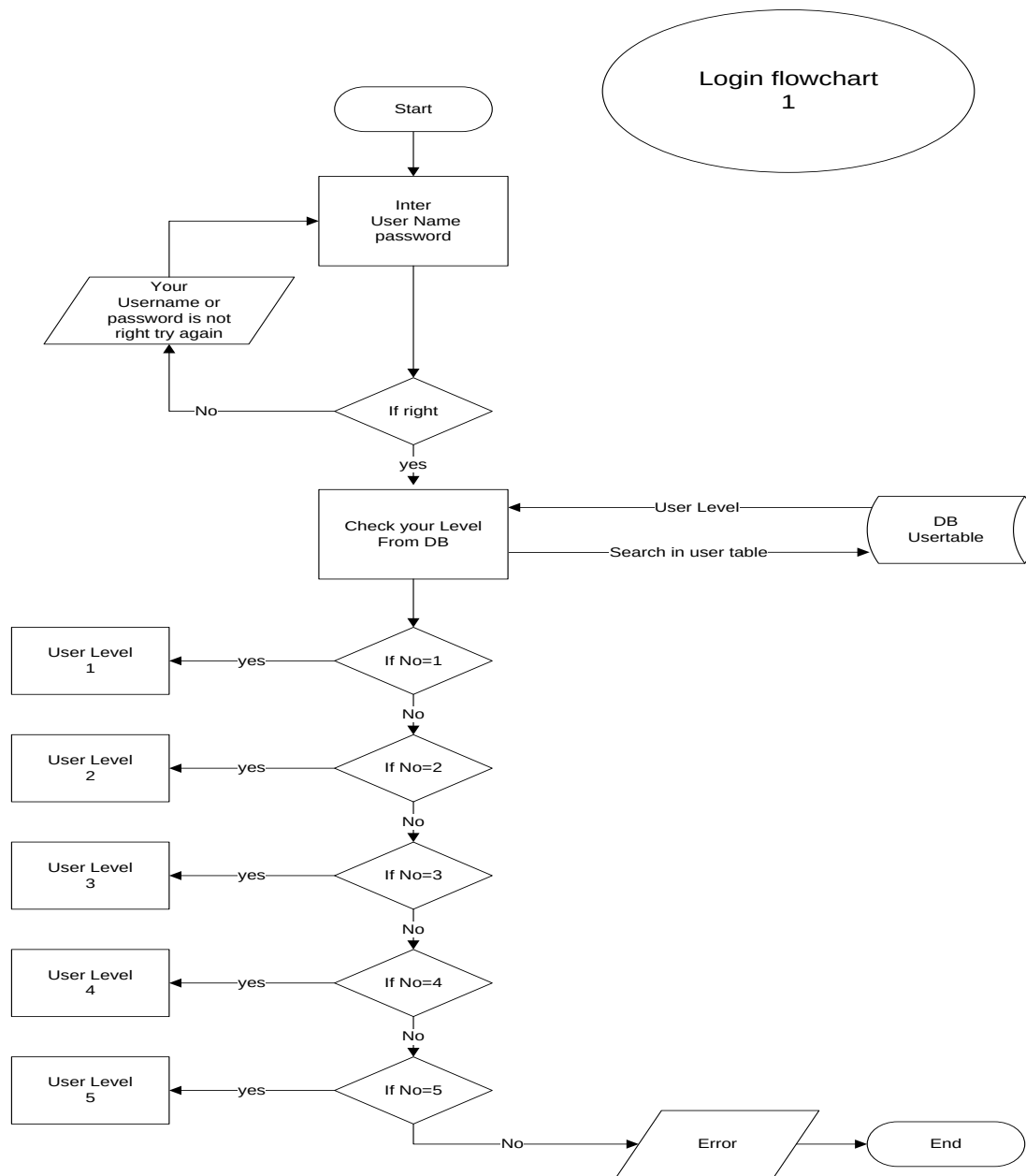


Figure 4.17 Login flowchart

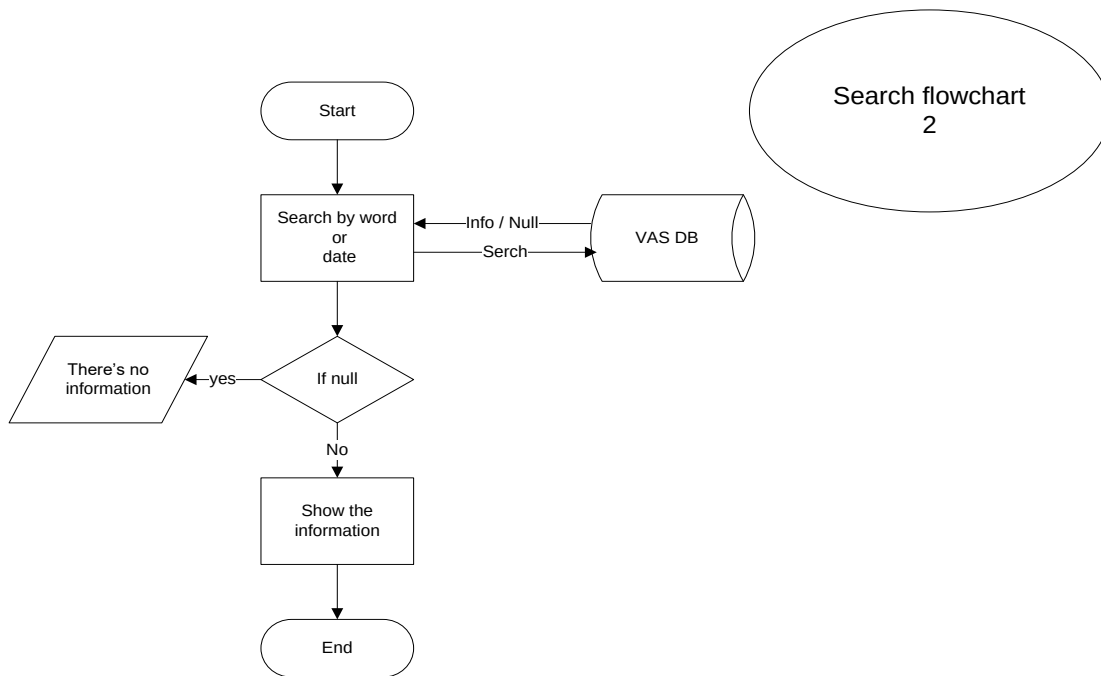


Figure 4.18 Search flowchart

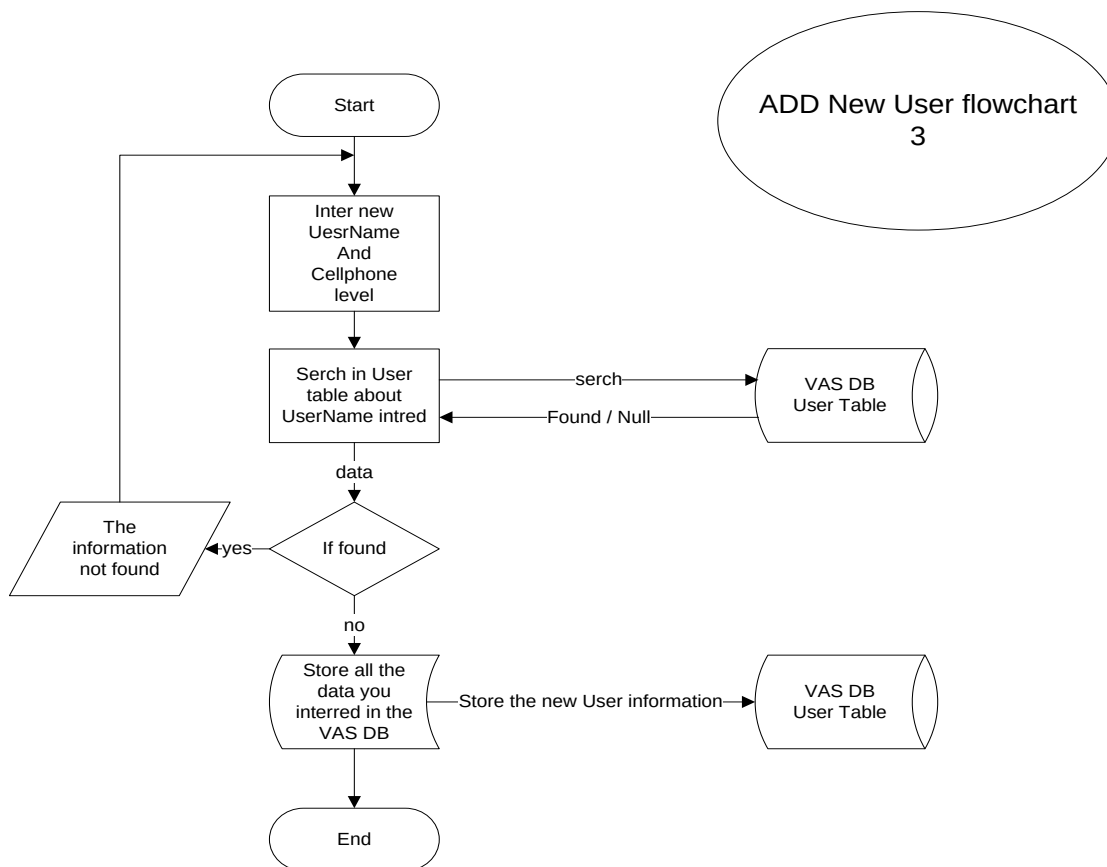


Figure 4.19 ADD New User flowchart

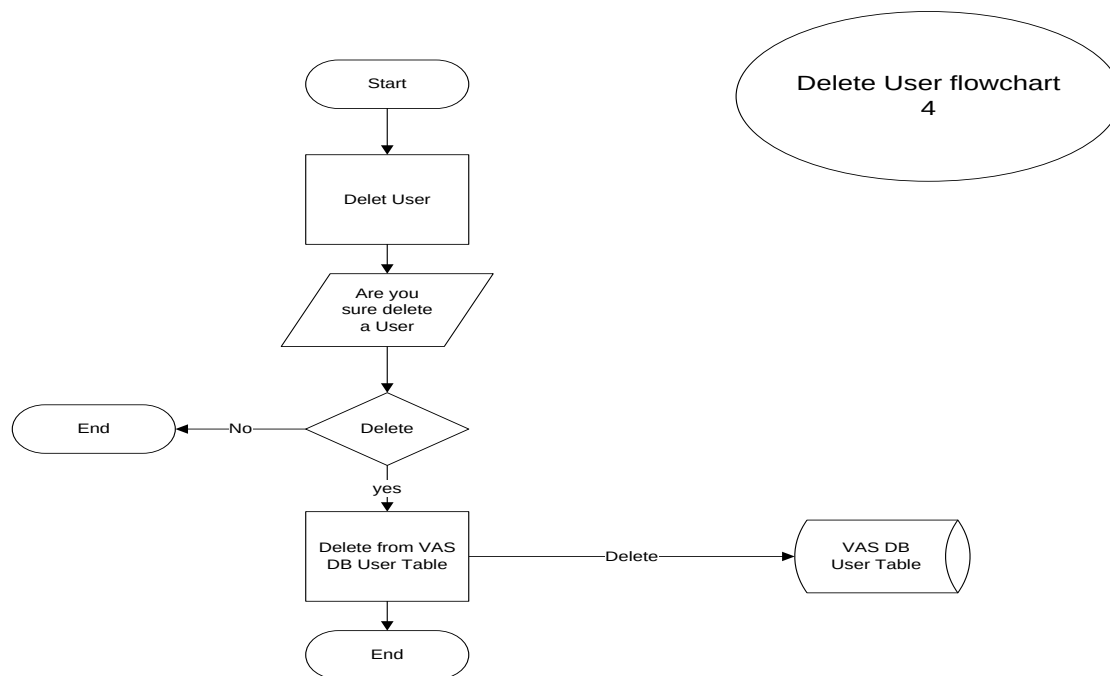


Figure 4.20 Delete User flowchart

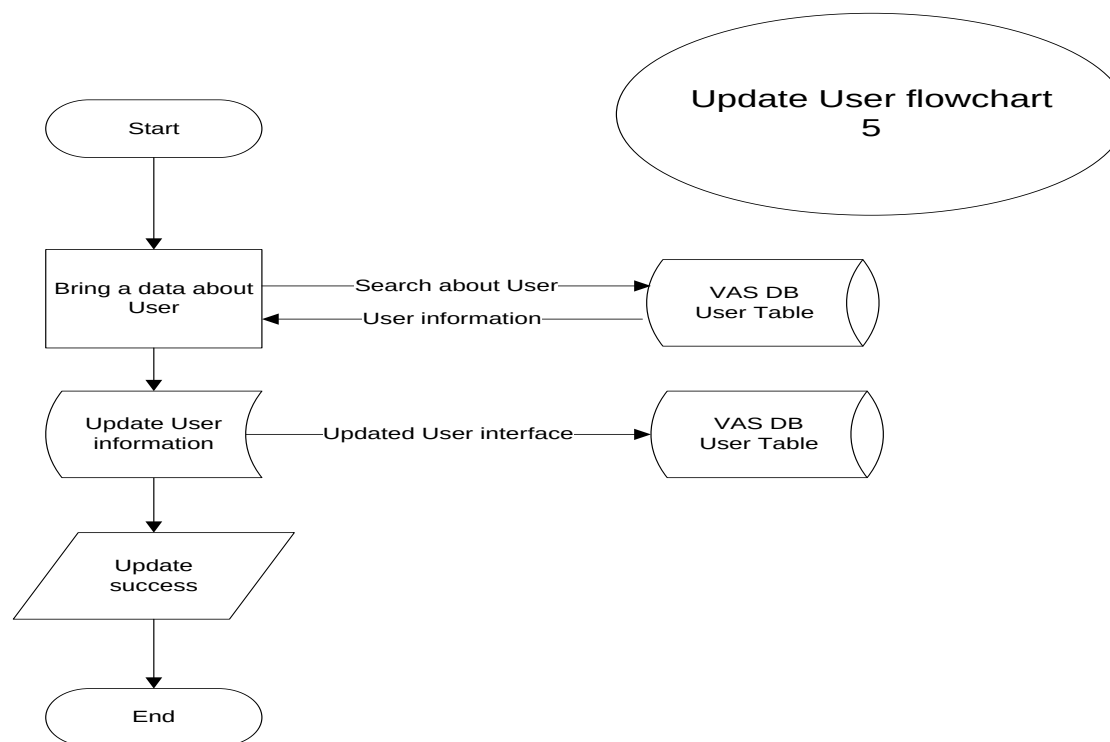


Figure 4.21 Update User flowchart

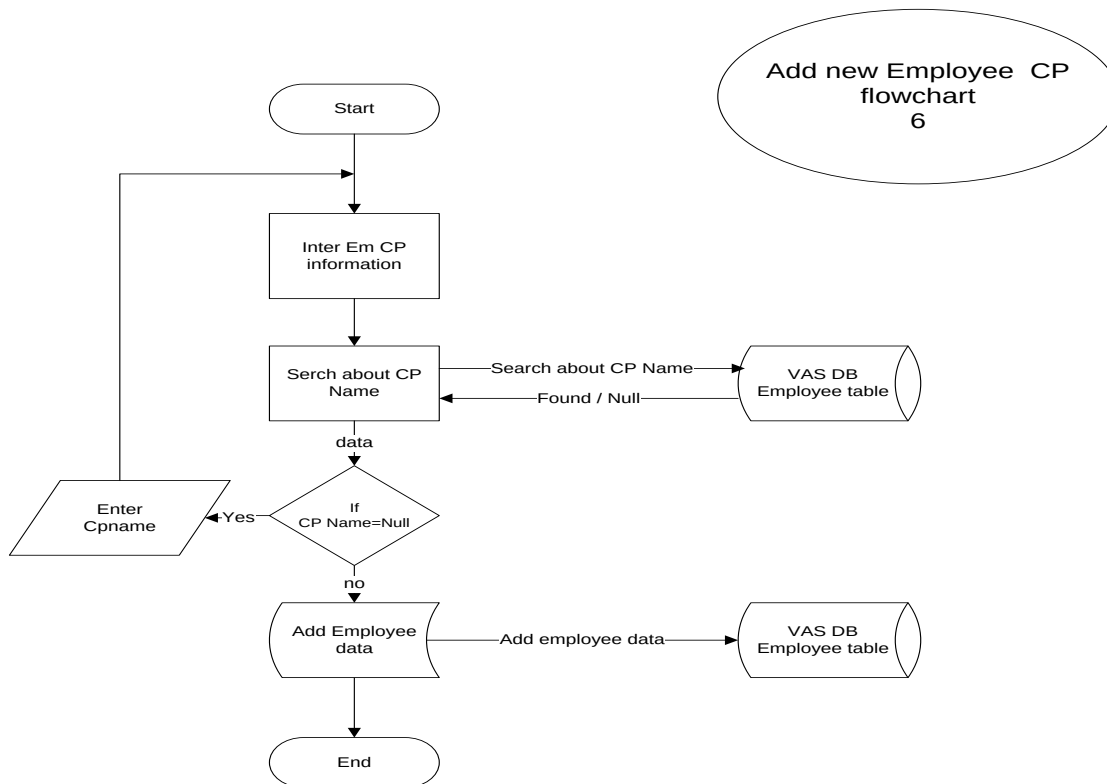


Figure 4.22 Add new Employee CP flowchart

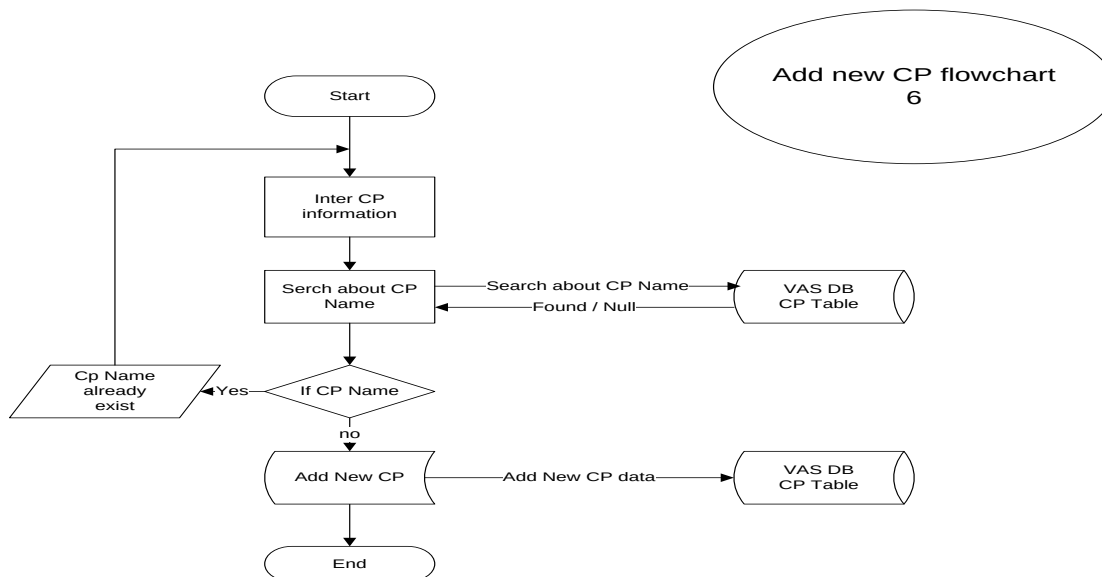


Figure 4.23 Add new CP flowchart

At the end of the systems design phase, documentation describing the three sub-tasks is produced and made available for use in the next phase.

4.5 implementation phase

Implementing the system means that you convert the hardware, software and files into a new system and also train the users.

Before any converting can be done, it has to be tested, to ensure that it could work properly. After the new system is tested, they can then start to transfer their information to the new one. Converting to the new system breaks down into direct implementation, parallel implementation, phased implementation and pilot implementation. Pilot conversion means that the new system is used at only one location with the organization and nowhere else. To train the users, there is usually a head trainer who will lead the users and direct them on how to use the system by explaining them how to operate it. Sometimes it can be done online, in which they will not need an instructor because it can come with a robot or chatterbox.[16]

The implementation phase consists of the following:

4.5.1 Code writing

It's the stage that connects logical database with the source code to make a real database.

4.5.2 User interfaces implementation

Implement the user interfaces that were made previously in the design phase to connect with the real physical database and source code to make it work, integrated together.

4.5.3 Input practical data

To make sure the system will work effectively it must input practical data then, in the test phase comes the result of the new system that can be compared with the data from the old system.

4.5.4 Program package deployment

To be ready to install programs or web app to user.

The screenshot displays the Visual Studio IDE with the file `webuserserch.ascx.cs` open. The code is as follows:

```

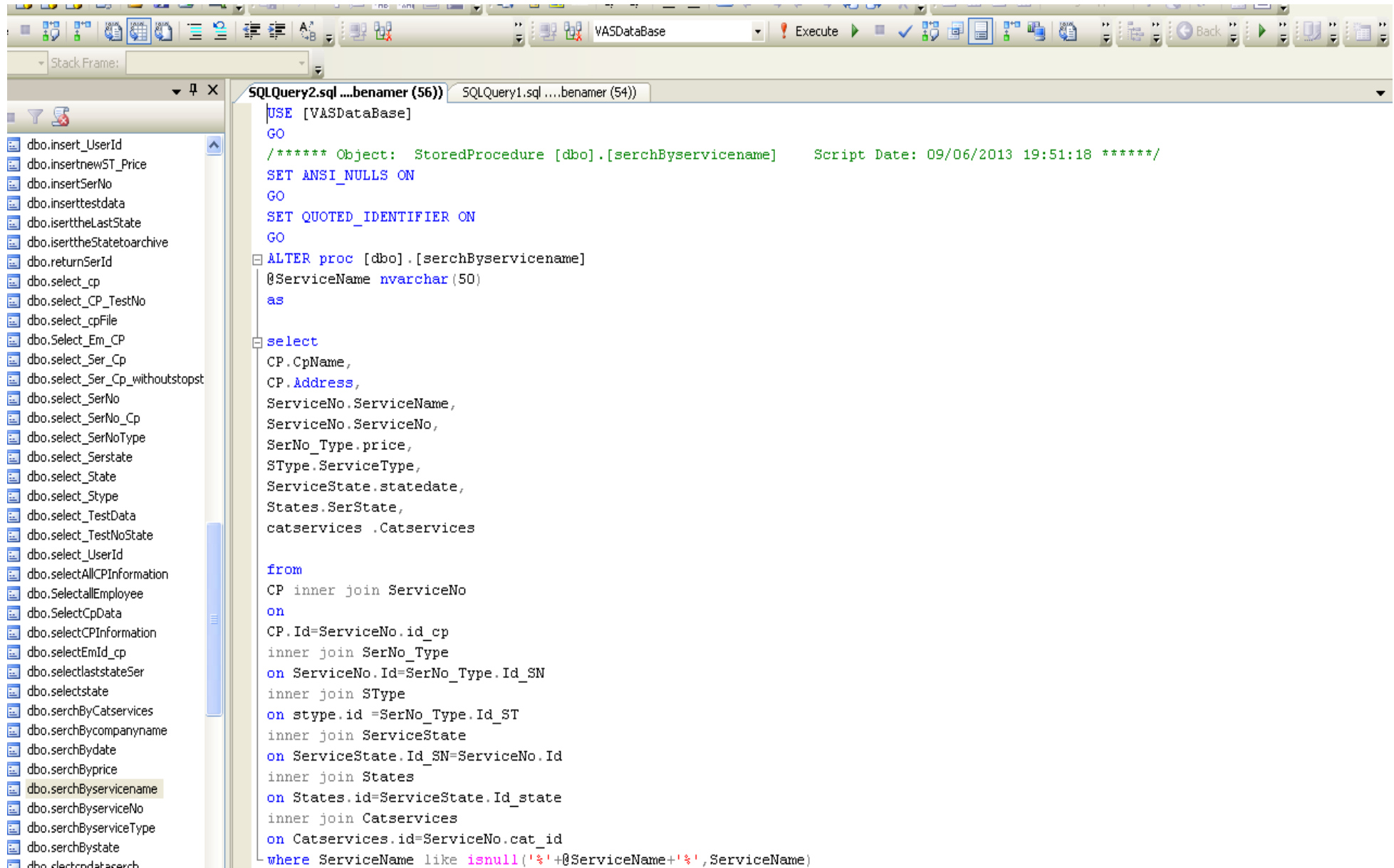
webuserserch.ascx.cs  wuc_Admin.ascx
webuserserch
SerchByWord_Click(object sender, EventArgs e)

    DDLYear2.DataValueField = "years";
    DDLYear2.DataBind();
}
}
void getSercheddata(string x,string y)
{
    ds.Tables.Clear();
    sda.SelectCommand = new SqlCommand(x, con);
    sda.SelectCommand.CommandType = CommandType.StoredProcedure;
    //input parameter
    //-----
    sda.SelectCommand.Parameters.AddWithValue(y,txt_serchword.Text);
    sda.SelectCommand.Connection.Open();
    sda.SelectCommand.ExecuteNonQuery();
    sda.SelectCommand.Connection.Close();
    // put the data from query in the GV1
    //-----
    sda.Fill(ds,"T2");
    GridView1.DataSource = ds.Tables[0];
    GridView1.DataBind();
}
protected void SerchByWord_Click(object sender, EventArgs e)
{
    try
    {
        Session["z"] = "1";
        serchWord = Convert.ToInt32(DDL_TypeOfSerch.Text.ToString());
        switch (serchWord)
        {
            // "البحث باسم الخدمة"
            //-----
            case 1: ;
                x = "serchByserchname";
                y = "@ServiceName";
                getSercheddata(x, y);
                break;
            // "البحث برقم الخدمة"
            //-----
            case 2: ;
                x = "serchByserchNo";
                y = "@ServiceNo";
                getSercheddata(x, y);
                break;
        }
    }
}

```

The Solution Explorer on the right shows the project structure:

- WebUserlogin1
 - App_Data
 - ASPNETDB.MDF
 - Database.mdf
 - Bin
 - Icons
 - CrystalReport.rpt
 - Default4.aspx
 - FormAdmin.aspx
 - FormChangePass.a
 - FormCp.aspx
 - FormIndexLevel1.a
 - Formindexlevel2.as
 - FormindexLevel3.a:
 - FormindexLevel4.a:
 - FormindexLevel5.a:
 - Formlogin.aspx
 - FormSerch.aspx
 - FormServiceNo.asp
 - FormServiceNo
 - FormTest.aspx
 - Global.asax
 - MasterPage2.mastx
 - PassWord.aspx
 - PictuerserviceNo.a:
 - preview.aspx
 - service state.aspx
 - web.config
 - WebServicesNol.asi
 - WebUC_CP.ascx
 - WebUserindexLeve
 - WebUserlogin.ascx
 - webuserserch.ascx
 - wuc_Admin.ascx
 - wuc_test.ascx
 - WUCChangePass.a
 - wucUserindexlevel4.
 - wucUserindexLevel
 - wucuserindexlevel2



```

webuserserch.ascx.cs  wuc_Admin.ascx
webuserserch
SerchByWord_Click(object sender, EventArgs e)

public partial class webuserserch : System.Web.UI.UserControl
{
    public string x, y;
    public int z;
    public int serchWord;
    DataSet ds = new DataSet();
    SqlConnection con = new SqlConnection(ConfigurationManager.ConnectionStrings["VASDataBaseConnectionString"].ConnectionString);
    SqlDataAdapter sda = new SqlDataAdapter();
    void settabledata()
    {
        ds.Tables.Clear();
        sda.SelectCommand = new SqlCommand();
        sda.SelectCommand.Connection = con;
    }
    protected void Page_Load(object sender, EventArgs e)
    {
        if (Session["Uname"].ToString() == "") Response.Redirect("Formlogin.aspx");
        if (!IsPostBack)
        {
            settabledata();
            sda.SelectCommand.CommandText = "select id,SerchTypeWord from SerchTable ";
            sda.Fill(ds,"T1");
            DDL_TypeOfSerch.DataSource = ds;
            DDL_TypeOfSerch.DataTextField = "SerchTypeWord";
            DDL_TypeOfSerch.DataValueField = "id";
            DDL_TypeOfSerch.DataBind();

            settabledata();
            sda.SelectCommand.CommandText = "select id,days from DaysTable";
            sda.Fill(ds,"T9");
            DDLDay1.DataSource = ds;
            DDLDay1.DataTextField = "days";
            DDLDay1.DataValueField = "days";
            DDLDay1.DataBind();

            settabledata();
            sda.SelectCommand.CommandText = "select id,days from DaysTable";
            sda.Fill(ds, "T10");
        }
    }
}

```

Solution Explorer

- WebUserlogin
- App_Data
- ASPNETDB.MC
- Database.mdf
- Bin
- Icons
- CrystalReport.rpt
- Default4.aspx
- FormAdmin.aspx
- FormChangePass.
- FormCp.aspx
- FormIndexLevel1.
- FormindexLevel2.a
- FormindexLevel3..
- FormindexLevel4..
- FormindexLevel5..
- Formlogin.aspx
- FormSerch.aspx
- FormServiceNo.as
- FormServiceNo
- FormTest.aspx
- Global.asax
- MasterPage2.mas
- PassWord.aspx
- PictuerserviceNo.i
- preview.aspx
- service state.asp>
- web.config
- WebServicesNol.a
- WebUC_CP.ascx
- WebUserindexLev
- WebUserlogin.asc
- webuserserch.asc
- wuc_Admin.ascx
- wuc_test.ascx
- WUCChangePass.
- wucUserindexlevel4
- wucUserindexLeve
- wucuserindexleve

4.6 Test and Maintenance

In this phase, systems and products are in place and operating, enhancements and/or modifications to the system are developed and tested, and hardware and software components are added or replaced. The organization should continuously monitor performance of the system to ensure that it is consistent with pre-established user and security requirements, and that needed system modifications are incorporated.

Configuration management (CM) and control activities should be conducted to document any proposed or actual changes in the security plan of the system. Information systems are in a constant state of evolution with upgrades to hardware, software, firmware, and possible modifications in the surrounding environment. Documenting information system changes and assessing the potential impact of these changes on the security of a system are essential activities to assure continuous monitoring, and prevent lapses in the system security accreditation.

Maintenance operations stage of life cycle. Correct errors as discovered, update as needed, monitor activities and output. Be aware of gap between organization's needs and system's performance.

4.6.1 Test steps

Comes after the implementation phase to test your system input, output, efficiency and effectively.

To test the new system there's a lot of technique one of these testes:

4.6.1.1 Black box test

In this test the consideration is the input and the output from the system and the details of the process doesn't matter.

4.6.1.2 White box test.

In this test the programmer analyst or designer do a detailed tracing to the all processes in the system, without focusing into the output.

4.6.1.3 Alpha Version Test

In this test the programmer analyst or designer allows the user to implement and test the system from execution site with him to discover almost the errors in the system before the installation.

4.6.1.4 Beta Version Test

In this test the programmer analyst or designer gives a copy from the system to the user to test it in the real environment and gives his notes and his feedback about the system.

4.6.1.5 Maintenance process steps

1. Obtain maintenance request.
2. Transform requests into changes.
3. Design changes.
4. Implement changes.

Chapter 5 Conclusion

5.1 Conclusion

Integration implies that all relevant data for a particular bounded and closed set of business processes is processed in the same software application. Updates in one application module or component are reflected throughout the business process logic, with no complex external

interfacing. Data are stored once, and it is instantaneously shared by all business processes that are enabled by the software application.

This is definitely the goal of management, especially for mundane business processes. This implies “one source of truth” for those business processes that are enabled by core ERP solutions. [17]

In this thesis, the old system was manual and every department had a database, containing the information about the value added services, every department did the same process in the database and the data are roughly the same with few differences. We examined the advantage of systems integration by converting the old manual system to an integrated automated system, with one database, to save all information in the same place along with authentication software, with different permitted entry to all employees in every department.

Surveys were distributed to employees to verify the benefits of systems integration with a forty employee sample, the results were identical to some of the studies that have been presented in this thesis.

5.2 Results

After studying the current manual system documentation and the survey data analysis the results were as follows:

1. There is weakness in using information technology tools: the information technology used in the company but there is no real benefit from it, because the old system not automatic; in the survey most the employees have good background to use information technology

tools with an average of “4.225” , and all of them answer the part of the availability of information technology tools by average “4.3375”; meaning all the technology that needed to convert the system from manual to automatic integration system are available.

From the statistic analysis, the survey states there’s no correlation between the employees skills and the manual system. But there is a correlation between the employees skills and the automated integration system, when the employee’s skills increase the usage of automatic program increase look to the attachment [A].

2. The manual system (paperwork) doesn’t contribute to reducing paperwork that leads to increasing in budget and must provision a place to save documentation and official letters.
3. The manual work needs to a lot of employees to manage the work.
4. The redundancy from entering the same data makes mistakes and increase time, work and effort to do it.
5. Multi-database that is used doesn’t do any process like, query and report.
6. The reports that printed for other departments used to compare the data are wastes of time and money (paper, ink, printers, effort, and time).
7. Transferring the data between databases isn’t possible because the properties of the tables are in different database metrics.
8. This system isn’t secure and doesn’t keep privacy.
9. The employees aren’t satisfied with this system because they are under pressure.
10. There’s a direct correlation between the information technology that is used to exchange data and the effectiveness of the system so the effectiveness of the system increases when the information technology used to exchange data improves.

All the survey results is in the Attached A page 110.

5.3 Futures work

Because the study must have a limited scope and timeline the new system that is proposed shouldn't be overly complex, it could be a proposal to other theses containing the following:

1. Preparing the financial report and prepare electronic invoice processing.
2. Detailed report for every number to study all number cases from feasibility and the benefits from all numbers, to improve the good one and terminate the bad.

Attachment A

This part is survey data analysis and displays the results that processed in the sample of study by statistic program SPSS.

Study tools:

Prepare survey about the (advantage and disadvantage between old and new system and the information technology that used in the Libyana company) contains fifty questions distributed by five groups:

Group one: the skills of employee.

Group tow: properties of old system.

Group three: properties of new system.

Group four: information technology that is used in the company.

Group five: the local internet and the connection features.

Fifth Likert used to answer the survey like the following table:

Opinion	Weight
Very good	5
Good	4

Medium	3
Weak	2
Very weak	1

Table A.1 The weight of Likert scale.

The samples are from forty employed and other people who had a relationship with the VAS system.

#	السؤال	جيد جدا	جيد	متوسط	ضعيف	ضعيف جدا
1	ما مدى إجادتك للغة الإنجليزية					
2	ما مدى إجادتك لاستخدام الحاسوب					
3	ما مدى إلمامك باستخدام الشبكات WAN & LAN					
4	ما مدى إجادتك لاستخدام الشبكة العالمية Internet والشبكة المحلية Intranet					
5	ما مدى تحقيق النظام الحالي متطلباتك في الحصول على المعلومات					
6	ما مدى تحقيق النظام قيد الدراسة متطلباتك في الحصول على المعلومات					
7	ما مدى مرونة النظام الحالي					
8	ما مدى مرونة النظام قيد الدراسة					
9	ما مدى مساهمة النظام الحالي في تقليص من الأعمال الورقية					
10	ما مدى مساهمة النظام قيد الدراسة في التقليص من الأعمال الورقية					
11	ما مدى تقليص النظام الحالي للأعمال الروتينية					
12	ما مدى تقليص النظام قيد الدراسة للأعمال الروتينية					
13	ما مدى رضاك على النظام الحالي للمعلومات					
14	ما مدى رضاك على النظام قيد الدراسة للمعلومات					
15	ما مدى استخدام تكنولوجيا المعلومات في النظام الحالي					
16	ما مدى استخدام تكنولوجيا المعلومات في النظام قيد الدراسة					
17	ما مدى كفاءة البرامج المستخدمة وشمولييتها في النظام الحالي					
18	ما مدى كفاءة البرامج المستخدمة وشمولييتها في النظام قيد الدراسة					
19	ما مدى حداثة برامج قواعد البيانات المستخدمة بالنظام الحالي					
20	ما مدى حداثة برامج قواعد البيانات المستخدمة بالنظام قيد الدراسة					
21	ما مدى توفر العمالة والخبرات اللازمة في مجال نظم المعلومات					
22	ما مدى محافظة النظام الحالي على وقت العمل					
23	ما مدى محافظة النظام قيد الدراسة على وقت العمل					
24	ما مدى كفاءة النظام الحالي في الحفاظ على سرية المعلومات					
25	ما مدى كفاءة النظام قيد الدراسة في الحفاظ على سرية المعلومات					

26	ما مدى كفاءة النظام الحالي في تخزين واسترجاع المعلومات				
27	ما مدى كفاءة النظام قيد الدراسة في تخزين واسترجاع المعلومات				
28	ما مدى كفاءة النظام الحالي في توصيل المعلومات مباشرة للمستخدم				
29	ما مدى كفاءة النظام قيد الدراسة في توصيل المعلومات مباشرة للمستخدم				
30	ما مدى كفاءة أجهزة الحاسوب وملحقاتها بالموقع				
31	ما مدى كفاءة أجهزة الحاسوب وملحقاتها المستخدمة				
32	ما مدى ملائمة أجهزة الحاسوب وملحقاتها لطبيعة العمل				
33	ما مدى حداثة الأجهزة الحاسوبية وملحقاتها				
34	ما مدى استخدام البريد الإلكتروني في النظام الحالي				
35	ما مدى استخدام البريد الإلكتروني في النظام قيد الدراسة				
36	ما مدى توفر قواعد بيانات متخصصة موضوعيا في النظام الحالي				
37	ما مدى توفر قواعد بيانات متخصصة موضوعيا في النظام قيد الدراسة				
38	ما مدى دقة وسرعة وصول المعلومات في النظام الحالي				
39	ما مدى دقة وسرعة وصول المعلومات في النظام قيد الدراسة				
40	ما مدى محافظة النظام الحالي على خصوصية المعلومات				
41	ما مدى محافظة النظام قيد الدراسة على خصوصية المعلومات				
42	ما مدى اكتمال المعلومات المسترجعة التي يوفرها النظام الحالي				
43	ما مدى اكتمال المعلومات المسترجعة التي يوفرها النظام قيد الدراسة				
44	ما مدى ملائمة النظام الحالي لمتطلبات الإدارة				
45	ما مدى ملائمة النظام قيد الدراسة لمتطلبات الإدارة				
46	ما مدى كفاءة مزودات الخدمة				
47	ما مدى وضوح الاتصال عبر الشبكة المحلية				
48	ما مدى استمرارية الاتصال بالشبكة المحلية				
49	ما مدى سرعة الاتصال بالشبكة المحلية				
50	ما مدى توفر الاتصال عبر الشبكة المحلية				

Table A.2 The survey table

The percentage to every question:

ما مدى إجادتكم اللغة الإنجليزية

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
متوسط	9	22.5	22.5	22.5
جيد	16	40.0	40.0	62.5
جيد جدا	15	37.5	37.5	100.0
Total	40	100.0	100.0	

ما مدى إجادتك لاستخدام الحاسوب

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
متوسط	2	5.0	5.0	5.0
جيد	20	50.0	50.0	55.0
جيد جدا	18	45.0	45.0	100.0
Total	40	100.0	100.0	

ما مدى إلمامك باستخدام الشبكات LAN & WAN

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
متوسط	6	15.0	15.0	15.0
جيد	26	65.0	65.0	80.0
جيد جدا	8	20.0	20.0	100.0
Total	40	100.0	100.0	

ما مدى إجادتك لاستخدام الشبكة العالمية Internet والشبكة المحلية Intranet

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
متوسط	4	10.0	10.0	10.0
جيد	18	45.0	45.0	55.0
جيد جدا	18	45.0	45.0	100.0
Total	40	100.0	100.0	

ما مدى توفر العمالة والخبرات اللازمة في مجال نظم المعلومات

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
متوسط	10	25.0	25.0	25.0
جيد	13	32.5	32.5	57.5
جيد جدا	17	42.5	42.5	100.0
Total	40	100.0	100.0	

ما مدى تحقيق النظام الحالي متطلباتك في الحصول على المعلومات

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
ضعيف جدا	17	42.5	42.5	42.5
ضعيف	14	35.0	35.0	77.5
متوسط	8	20.0	20.0	97.5
جيد	1	2.5	2.5	100.0
Total	40	100.0	100.0	

ما مدى مرونة النظام الحالي

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
ضعيف جدا	10	25.0	25.0	25.0
ضعيف	21	52.5	52.5	77.5
متوسط	9	22.5	22.5	100.0
Total	40	100.0	100.0	

ما مدى كفاءة النظام الحالي في تخزين واسترجاع المعلومات

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
ضعيف جدا	17	42.5	42.5	42.5
ضعيف	18	45.0	45.0	87.5
متوسط	5	12.5	12.5	100.0
Total	40	100.0	100.0	

ما مدى رضاك على النظام الحالي للمعلومات

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
ضعيف جدا	14	35.0	35.0	35.0
ضعيف	20	50.0	50.0	85.0
متوسط	6	15.0	15.0	100.0
Total	40	100.0	100.0	

ما مدى مساهمة النظام الحالي في التقليل من الأعمال الورقية

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
ضعيف جدا	15	37.5	37.5	37.5
ضعيف	22	55.0	55.0	92.5
متوسط	3	7.5	7.5	100.0
Total	40	100.0	100.0	

ما مدى تقليص النظام الحالي للأعمال الروتينية

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
ضعيف جدا	14	35.0	35.0	35.0
ضعيف	17	42.5	42.5	77.5
متوسط	9	22.5	22.5	100.0
Total	40	100.0	100.0	

ما مدى استخدام تكنولوجيا المعلومات في النظام الحالي

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
ضعيف جدا	6	15.0	15.0	15.0
ضعيف	24	60.0	60.0	75.0
متوسط	10	25.0	25.0	100.0
Total	40	100.0	100.0	

ما مدى كفاءة البرامج المستخدمة وشموليتها في النظام الحالي

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
ضعيف جدا	8	20.0	20.0	20.0
ضعيف	23	57.5	57.5	77.5
متوسط	9	22.5	22.5	100.0
Total	40	100.0	100.0	

ما مدى حداثة برامج قواعد البيانات المستخدمة بالنظام الحالي

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
ضعيف جدا	18	45.0	45.0	45.0
ضعيف	18	45.0	45.0	90.0
متوسط	4	10.0	10.0	100.0
Total	40	100.0	100.0	

ما مدى محافظة النظام الحالي على وقت العمل

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
ضعيف جدا	15	37.5	37.5	37.5
ضعيف	18	45.0	45.0	82.5
متوسط	7	17.5	17.5	100.0
Total	40	100.0	100.0	

ما مدى كفاءة النظام الحالي في الحفاظ على سرية المعلومات

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
ضعيف جدا	10	25.0	25.0	25.0
ضعيف	29	72.5	72.5	97.5
جيد	1	2.5	2.5	100.0
Total	40	100.0	100.0	

ما مدى كفاءة النظام الحالي في توصيل المعلومات مباشرة للمستفيد

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
ضعيف جدا	17	42.5	42.5	42.5
ضعيف	20	50.0	50.0	92.5
متوسط	2	5.0	5.0	97.5
جيد	1	2.5	2.5	100.0
Total	40	100.0	100.0	

ما مدى استخدام البريد الإلكتروني في النظام الحالي

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
ضعيف جدا	18	45.0	45.0	45.0
ضعيف	17	42.5	42.5	87.5
متوسط	4	10.0	10.0	97.5
جيد	1	2.5	2.5	100.0
Total	40	100.0	100.0	

ما مدى توفر قواعد بيانات متخصصة موضوعيا في النظام الحالي

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
ضعيف جدا	14	35.0	35.0	35.0
ضعيف	20	50.0	50.0	85.0
متوسط	6	15.0	15.0	100.0
Total	40	100.0	100.0	

ما مدى دقة وسرعة وصول المعلومات في النظام قيد الدراسة

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
جيد	16	40.0	40.0	40.0
جيد جدا	24	60.0	60.0	100.0
Total	40	100.0	100.0	

ما مدى محافظة النظام قيد الدراسة على خصوصية المعلومات

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
متوسط	5	12.5	12.5	12.5
جيد	16	40.0	40.0	52.5
جيد جدا	19	47.5	47.5	100.0
Total	40	100.0	100.0	

ما مدى اكتمال المعلومات المسترجعة التي يوفرها النظام قيد الدراسة

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
جيد	15	37.5	37.5	37.5
جيد جدا	25	62.5	62.5	100.0
Total	40	100.0	100.0	

ما مدى ملائمة النظام قيد الدراسة لمتطلبات الإدارة

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
جيد	21	52.5	52.5	52.5
جيد جدا	19	47.5	47.5	100.0
Total	40	100.0	100.0	

ما مدى كفاءة أجهزة الحاسوب وملحقاتها بالموقع

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
متوسط	3	7.5	7.5	7.5
جيد	23	57.5	57.5	65.0
جيد جدا	14	35.0	35.0	100.0
Total	40	100.0	100.0	

ما مدى كفاءة أجهزة الحاسوب وملحقاتها المستخدمة

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
متوسط	2	5.0	5.0	5.0
جيد	22	55.0	55.0	60.0
جيد جدا	16	40.0	40.0	100.0
Total	40	100.0	100.0	

ما مدى ملائمة أجهزة الحاسوب وملحقاتها لطبيعة العمل

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
متوسط	2	5.0	5.0	5.0
جيد	16	40.0	40.0	45.0
جيد جدا	22	55.0	55.0	100.0
Total	40	100.0	100.0	

ما مدى حداثة الأجهزة الحاسوبية وملحقاتها

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
متوسط	5	12.5	12.5	12.5
جيد	21	52.5	52.5	65.0
جيد جدا	14	35.0	35.0	100.0
Total	40	100.0	100.0	

ما مدى كفاءة مزودات الخدمة

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
متوسط	4	10.0	10.0	10.0
جيد	20	50.0	50.0	60.0
جيد جدا	16	40.0	40.0	100.0
Total	40	100.0	100.0	

ما مدى وضوح الاتصال عبر الشبكة المحلية

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
ضعيف	1	2.5	2.5	2.5
متوسط	7	17.5	17.5	20.0
جيد	18	45.0	45.0	65.0
جيد جدا	14	35.0	35.0	100.0
Total	40	100.0	100.0	

ما مدى استمرارية الاتصال بالشبكة المحلية

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
ضعيف	1	2.5	2.5	2.5
متوسط	6	15.0	15.0	17.5
جيد	19	47.5	47.5	65.0
جيد جدا	14	35.0	35.0	100.0
Total	40	100.0	100.0	

ما مدى سرعة الاتصال بالشبكة المحلية

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
ضعيف	1	2.5	2.5	2.5
متوسط	15	37.5	37.5	40.0
جيد	13	32.5	32.5	72.5
جيد جدا	11	27.5	27.5	100.0
Total	40	100.0	100.0	

ما مدى توفر الاتصال عبر الشبكة المحلية

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
ضعيف	1	2.5	2.5	2.5
متوسط	4	10.0	10.0	12.5
جيد	22	55.0	55.0	67.5
جيد جدا	13	32.5	32.5	100.0
Total	40	100.0	100.0	

The correlation between the Groups

Correlations

		مهارات المهندسين	النظام الحالي
مهارات المهندسين	Pearson Correlation	1	-.079
	Sig. (2-tailed)		.627
	N	40	40
النظام الحالي	Pearson Correlation	-.079	1
	Sig. (2-tailed)	.627	
	N	40	40

Correlations

		مهارات المهندسين	النظام الجديد
مهارات المهندسين	Pearson Correlation	1	.308
	Sig. (2-tailed)		.053
	N	40	40
النظام الجديد	Pearson Correlation	.308	1
	Sig. (2-tailed)	.053	
	N	40	40

Correlations

		مهارات المهندسين	أدوات تقنية المعلومات الموجودة
مهارات المهندسين	Pearson Correlation	1	.043
	Sig. (2-tailed)		.791
	N	40	40
أدوات تقنية المعلومات الموجودة	Pearson Correlation	.043	1
	Sig. (2-tailed)	.791	
	N	40	40

Correlations

		مهارات المهندسين	أدوات تقنية المعلومات الموجودة
مهارات المهندسين	Pearson Correlation	1	.043
	Sig. (2-tailed)		.791
	N	40	40
أدوات تقنية المعلومات الموجودة	Pearson Correlation	.043	1
	Sig. (2-tailed)	.791	
	N	40	40

Correlations

		مهارات المهندسين	الشبكة المحلية وتوافر الاتصال
مهارات المهندسين	Pearson Correlation	1	.223
	Sig. (2-tailed)		.167
	N	40	40
الشبكة المحلية وتوافر الاتصال	Pearson Correlation	.223	1
	Sig. (2-tailed)	.167	
	N	40	40

Correlations

		النظام الجديد	أدوات تقنية المعلومات الموجودة
النظام الجديد	Pearson Correlation	1	.288
	Sig. (2-tailed)		.072
	N	40	40
أدوات تقنية المعلومات الموجودة	Pearson Correlation	.288	1
	Sig. (2-tailed)	.072	
	N	40	40

Correlations

		النظام الجديد	الشبكة المحلية وتوافر الاتصال
النظام الجديد	Pearson Correlation	1	.458**
	Sig. (2-tailed)		.003
	N	40	40
الشبكة المحلية وتوافر الاتصال	Pearson Correlation	.458**	1
	Sig. (2-tailed)	.003	
	N	40	40

Paired Samples Statistics

Pair 1	Mean	N	Std. Deviation	Std. Error Mean
النظام الجديد	4.4583	40	.24224	.03830
النظام الحالي	1.8083	40	.37447	.05921

Paired Samples Correlations

Pair 1	N	Correlation	Sig.
النظام الجديد & النظام الحالي	40	-.157	.335

Paired Samples Test

Pair 1	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
النظام الجديد - النظام الحالي	2.65000	.47678	.07539	2.49752	2.80248	35.153	39	.000

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