Centralized Database for Laboratory Test: A Case Study Of Oil Refinery

Nahla Fadel Alwan   Ammar Mohammed Ali   Jamal Hilal Assi

chemical Engineering Dep., University of Technology, Computer Science Dep.

80115@uotechnology.edu.iq   ammar2006ma@yahoo.com   jamalabomohammed@yahoo.com

Abstract

The data management can be considered as an important subject in information management. The correct and relevant data can be used as a source of valuable information in organization like factories and refineries, and by good management of this data the right decision can be take. The database system is considered as the best choice to manage data efficiently. In oil refinery the laboratories will support the operational processing and provide the employees with knowledge to control the operational condition of unit operation. These laboratories results can be considered as a resource of information in oil refinery and stored in centralized database of client-server system installed on intranet. Using intranet as a private network with central database in oil refinery will provide secure and speed sharing of information within oil refinery, improve employee's productivity, time management, reduce many of the administrative expenses, it can be designed according to the needs of refinery and is subject to internal policies, at last it is cheap to be implemented and run. The authorized employees can access central database and see these laboratories results by using their clients' computers; this will save time and give them the ability to take required right decision quickly in the operation unit and lead to improve quality control on the operational process in oil refinery.

Key words: Data management, Oil refinery, Centralized database, Client-server, Intranet.

الخلاصة

أن إدارة البيانات موضوع مهم في إدارة المعلومات و يمكن أعتمادها كمصدر من المصادر المعتمدة في المصانع والمصافي ، حيث يمكن استخدام البيانات الصحيحة وذات الصلة كمصدر للمعلومات القيمة فيها و أتخاذ القرارت السليمة في العمل بناء عليها.و يعتبر نظام قاعدة البيانات الخيار الأفضل لأدارة البيانات بشكل كفوء.في مصافي النفط يكون للمختبرات دور مساند للعملية التشغيلية و يوفر للعاملين المعرفة المطلوبة لضمان السيطرة على الظروف التشغيلية للوحدات التشغيلية. . يمكن النظر الى النتائج المختبرية التي تجرى على نماذج النفط الخام الداخل لوحدة تكرير النفط الخام و المشتقات النفطية الوسطية و النهائية للوحدات التشغيلية في مصفى النفط كمصدر معتمد من ضمن المصادر فيه ، و يتم ذلك بتخزينها كبيانات في قاعدة بيانات مركزية منصبة على شبكة إنترانت ذات نظام عميل –خادم. و بذلك تتم أدارة هذه البيانات بشكل كفوء بأستخدام الأنترانيت كشبكة خاصة مع قاعدة بيانات مركزية في مصفاة للنفط . و هذا سوف يوفر تبادل آمن وسريع للمعلومات داخل مصفاة النفط، ويؤدي الى تحسين إنتاجية الموظفين، وإدارة الوقت، والحد من العديد من المصروفات الإدارية، ويمكن أن تصمم شبكة الأنترانيت وفقا لاحتياجات المصفاة وان تخضع إلى السياسات الداخلية للمصفاة ، ثم أنها رخيصة التنفيذ والتشغيل. كذلك يتمكن العاملين في المصفى المرخصين العملاء من الوصول إلى قاعدة البيانات المركزية والأطلاع على هذه البيانات (النتائج المختبرية) باستخدام أجهزة الكمبيوتر الخاصة بهم في أماكن عملهم ، وهذا سيوفر لهم الوقت ويمنحهم القدرة على اتخاذ القرار الصحيح المطلوب بسرعة لحل المشاكل التشغيلية الخطرة في الوحدة التشغيلية ويؤدي إلى تحسين السيطرة النوعية و مراقبة الجودة في العملية التشغيلية في مصفاة النفط.

الكلمات المفتاحية :أدارة البيانات، مصفى النفط ، قاعدة البيانات المركزية ، زبون–خادم ، أنترانيت .

1. Introduction

Obviously the success of any business depends not only on the possession of all resources, but it also depends on the efficient use of these resources. At present the data and information are among the strategic sourcing and tactical and operational companies and projects. Managers will take decisions. The information is defined as" the processed data on which to base decisions". this information must be correct and relevant, then it will be considered as a valuable resources and it must be managed effectively and correctly, it is managed as a source when it relationship for achieving the stated objectives of the business can be shown clearly, This will contribute to the success of the business and increases the competition factor with the rest of the companies and organizations. The information must be organized effectively and

correctly by storing it in database system which is the best choice to efficient data management and this valuable resource to make a relational database system .It is required to save data in a software or database management system which is installed on hardware where the data reside on it. The DBMS controls the storage and retrieval of data. In this way the data stored regularly in a database system. The database system can be defined as: " a collection of data where by the data is organized through a structured conversion process in order to produce the required output". The advantage of using database includes : data redundancy , data inconsistency , data sharing ,enforced standards ,security applied , integrity maintained , and balanced conflictions requirement. When the organization use database, this will give it the ability of storing information carefully that the managers and employees can access this information easily and use it over all organizational levels. Also it must be emphasized on the importance of using database system in a right way. The database is very useful in storing a huge amount of data and this is based on the benefit of the relations between records and tables which enable data archive safely and easily achieve database purpose prevent DR, remove the rare used data store the useful relevant data and take the advantage of them and finally extract results from it. The database model built for certain organization should reflects how it works as well their main business processes and requirements of the decision-making; this will lead to achieving organizational goals successfully (Maritz, 2003;Karen Collins, 2016). The adoption of modern directions like the modern use of computer network in work places like telecommunication and internet will enhance data sharing in work place(Musaria and Fawzi , 2011).

1.1. A case study of oil refineries

Using intranet (the internal network) in working places will enable managers and employee in a company, manufacture or refinery of satisfying employees needs to know and display lowest specifications of some products .The employees can access the centralized bank of information of the manufacture or refinery and searching to display the required specification of certain products and other relevant information instead of calling the engineer who resides in another part of country. This search will give them the required information without using telephone or asking for interview with the engineer and losing time dedicated for work. This will enable them to know required information directly. This system is called the intranet, it will provide employees the information they need by using the intranet which is the internal network of organization, to which all computers of the organization or the company will connect, firewall can be used for protection (Ross and Bajwa, 2001).

In oil refinery there is a routine laboratory tests which is a supporting process to the continuous operating process, many laboratory tests must be done on the input feed, the crude oil and the mid oil products and on the final oil products to know their operating specifications and compare them with the standard specifications . This routine laboratory tests results are used to control the operating process in oil refineries and these tests can be done for two hours period especially in the initial operating case of oil refinery. These laboratory tests results are important for the employee to know the operating specifications of input and output flow of unit operation and to control the operating condition of the unit operations .The laboratories in oil refiners make many and different laboratory tests on crude oil feeding distillation unit and mid oil products between operation unit and the final oil products is sent to be stored in tanks or is sent to external pipe line. These laboratories are provided with various devices to make these tests like crude oil Assessment, then these results will be sent to operation unit employees to see it. This will give them the

required knowledge to control the operating conditions of oil refinery operating units. This important laboratory tests are: API gravity @15.6, Specific gravity, Density, Salt content, Water and Sediment, Kinematic Viscosity, Sulfur Content, Pour point, and Vanadium. Also there is another Laboratory tests like testing Sulfur ,Viscosity , API applied on the petroleum products like gasoline, diesel fuel, asphalt to check their specifications and compare them with standard specification of these petroleum products (James and Glenn, 2001; Juki, 2013).

In this paper the results of laboratories tests is considered as a data and it is used as a resource of information in oil refinery and stored in a centralized relational database system and enable the authorized workers and those closely associated with system to access to these laboratory results and to use the computers connected to the intranet. This gives authorized employees at various levels from managers and down to the workers in the operational units the advantage of decision-making required in the operational units and leads to improve the level of quality control on the operational process at the refinery .As well as they have the opportunity to see the reports and analyze input data.

2. Related Work

In this section, we discuss related work to our study. (Ji Li *et.al.,* 2006) developed a DBMS based on internet , the suggested system compose from many components like interface for users and input , edit data , also for evaluation, reporting and other. the purpose of this system to control activities of contractors in a three –tier client –server database system to keep track of projects progress by breaking the project into activities and work tasks in a real time manner , they use Microsoft Access 200 to develop database and JavaScript ,Visual Basic program , and Hypertext Markup Language HTML to design web pages . (Brian, 1994) describe the efficient selection way to choose the suitable DBMS which meet organizations work needs have electronically managed data and develop the criteria of DBMS selection according to complexity of data and the available organization resources like Spreadsheets, word processors, DBMS tools. (Zehra , 2004) developed a DBMS for the Faculty of Open Education course Books based on sharing data and operations by database. The researcher suggested a database system to support manipulation and retrievals the distributed data in different department in college. This system enables users from access books data in various departments. (Robert ,2013) studying the development of Knowledge Management KM in big oil and gas companies to learn from their experience and making a guidance for using KM especially in oil industry. this study explain that Knowledge Management Tacit and Explicit knowledge is the most important terms , where the first refers to the knowledge of expertise in oil companies , while the second is the Explicit written knowledge in manuals and documents .the researcher classify the necessary systems and tools for knowledge management to base upon technology and people , the first one about database and software tools , while the second about gain the accumulated knowledge of the old workers in the oil companies and published it .these oil companies are working towards the establishment of interactive groups that are working to share knowledge effectively and continuously in the community of the company . (İnci *et.al.,* 2007) in this paper developed a DBMS to track the performance of quality management in the companies and measure their deviation from ideal and calculate the deviations cost .the suggested DBMS system is a client server system. There is a database in the server to handle received data and stored it, after that returned to the end user in client side. Java was the programming language used. (Musaria and Fawzi,2011) develop a

distributed Control three tier client-application- Database tiers, client server system base internet to control real time data by web browser. The case study is in North Oil Refineries of Baiji (NORB) in Iraq, where Local Database Server DOHS of Distributed Control System DCS collect local data and send it via internet to the application web server and stored in the Database server. The application web server connects to users which is the clients' side by using the ordinary web browser. The client use browsers to monitor all field sensors data for the chosen DCS in real time. The DCS use Windows NT and SQL server 2000X as DBMS.SQL used for build system database server, the control system use C#.Net as a programming language. (Musaria and Fawzi, 2014) study network design intranet approaches in manufacture to interconnect DCS and evaluate the factors of real time intranet which used to monitor and control industrial process. The case study in this research is about design intranet network in NORB in north of Iraq. The problem called topological design problem to design intranet network in NORB in north of Iraq with high reliability and low cost. The DCSs in each refinery in NORB will be connected by an Ethernet to one local database, which is located at node of communication.

3. Theoretical principles
3.1. Database
It is preferable to store industrial data in database whereas the effective management of data in the factory or refinery requires the use of database, as collecting and organization data in a database is useful to serve multiple applications efficiently by centralizing data and reducing redundant data. The database can be defined as " a shared, integrated computer structure that stores a collection of: • End-user data—that is, raw facts of interest to the end user. • Metadata, or data about data, through which the end-user data are integrated and managed."(Rob *et.al.,* 2013).The database system is defined as: "the collection of data whereby the data is organized through a structured conversion process in order to produce required outputs." (Maritz, 2003) . Database system components consist of the data itself, the hardware where data is stabilized , the software, or DBMS, which controls the storage and retrieval of data and users, they (Maritz,2003). The benefits of database system can be summarized by: avoiding DR, avoiding data inconsistency, sharing data, enforcing standard, applying security restriction, maintaining data integrity, balancing conflicting requirement (Maritz,2003).

3.2. DBMS
The definition of DBMS:"A database management system (DBMS) is a collection of programs that manages the database structure and controls access to the data stored in the database. In a sense, a database resembles a very well-organized electronic Filing cabinet in which powerful software (the DBMS) helps manage the cabinet's contents". (Rob *et.al.,* 2013).

The DBMS is strong software that helps manage the contents of the database. It works as the interface between applications data programs and the actual data files relieves the programmer or prevents from the task of understanding where and how to store the data actually, it serve as an intermediary between the user and the database. The database structure stored as a set of files and the only way to get to the data in these files is through the DBMS, it handles the end user request with a single integrated data view in the database. The DBMS hides most of the internal complexities of the database of the application programs and user, it receive and translate all application requests in the complex processes required to address these requests. The application program can be written by a programmer using a

programming language such as visual basic, NT or Java or C # or may be created through a program DBMS utility program. The presence of DBMS between end-user applications and the database provides some important advantages: First, the DBMS share data in the database can be shared on multiple applications or users. Second, the DBMS integrates several visions of different users of the data in a one includes all data repository. The DBMS helps make more efficient and effective database (Rob *et.al.,* 2013), (Adrienne Watt , Nelson Eng).The benefits and positives of DBMS are:

-Improves data sharing: The DBMS helps create environment that provides a better access for the end user to manage data.

-Improve data security: the greater the number of users accessing the data the greater the security risk of data breach.Is DBMS gives the framework for better control of data privacy and security policies.

-Better integration of data: wider Access to the well-managed data will develop an integrated vision of the operations of organization and a clearer vision for a greater image also the effect of acts in one section of the company will appear clearly on the other sections.

-Reduce data inconsistency: this feature is recognized when the different versions of the same data appear in different places.

-Improve data access: the DBMS can direct quick answers to the requests of the queries.

-Improved decision: the Managed Data and improving the access of data will generate better quality of data and upon which to build better decisions.

-Increase end-user productivity: The combination of data presence and data availability with the tools that transform data into useful information will strengthen the end-user to work more quickly and take decisions that determine the difference between success and failure in the global economy. (Maritz,2003; Rob *et.al.,* 2013).

3.2.1. The importance of database management systems

This importance lies in several points: As the data is important then we must have a good way to manage them, the DBMS helps make data management more efficient and effective. DBMS contain the query language that makes it possible to produce the quick answers on the ad hoc queries. Wide access to ranke well data will promote an integrated vision of the operations of the workplace. The DBMS is necessary to manage data effectively as a source because it stores the data from which the raw material of information is derived (Maritz,2003; Rob *et.al.,* 2013).The database is useful in data archiving and This is useful in the fight against the quantum and the significant growth of data .All these helpful in using and understanding of relational databases and relationships between tables and records and enable them to archive , remove utilization of scarce data , store useful data , draw conclusions from them and perform data analysis without losing referential data integration. (Maritz , 2003).

3.3. Intranet

" A privately maintained computer network that only authorized persons can access"(Karen, 2016).Intranet is a private network for company where the information are available only for authorized users in the company and they must have their user account and password, the information published on intranet is shielded from the public. The dissemination of information on intranet will delete additional costs of printing, the video cassette work published and distributed it.The main purpose of the intranet is the exchange of information and computing resources

in the company between staff, also it can be used to facilitate working in groups and conferences. Intranet uses Transmission Control Protocol TCP / Internet Protocol IP, Hypertext Transfer Protocol HTTP, and other protocols and generally looks like a private version of the Internet. Many companies and institutions, communicate with employees or members of the company or among themselves through the use of private internal network. The difference between the Internet and intranet is that Internet is a public network and all the information is available for everyone but the intranet is a private company network is available only to employees and access to information through a controlled program. (Karen,2016 ; Rouse, 2016; "Dictionary.com," , 2016).

3.4. Central data processing network

Companies and major organizations establish central data processing network at the beginning of the emergence and spread of networks consists of a central single host computer and all the data processing is in the central location also there are computers for data entry and retrieval of information connected to the host computer Central Portal. Many companies and organizations heading for build its own networks of computers for the purpose of sharing information and techniques as well carry out own software and handle data independently. These companies ask from employees share databases, printers, and software applications that apply special types of business documents such as word documents, Excel and other by using its own network. (Karen, 2016 ; Uday and Michael Groomer, 2001). Figure 1 displays Centralized database draw.
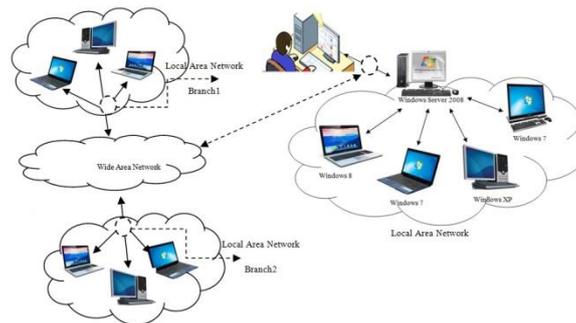

Figure 1 Centralized database

3.5. Client - Server

Client-server is an architecture that distributes processing in a networked environment between clients and one or more servers. Client- server system is a system that includes a client's machine computers which are end-user computers used for data entry and data retrieval, the client's computer has the user interface and all required logic to connect to server. The database and software used for data processing are installed on the server machine, the DBMS job on server will be performed and will hide the complex tasks on the required data and managed it .In client-server system network any node in the network requesting data or client service is the client and any node or device provided service requests is a server .In the client server network, the client computer can perform a specific processing tasks such as handling the user interface while the servers perform data intensive data tasks such as search and retrieve data from databases. This major processing functions tasks will be shared across the client's server network. Not all tasks are addressed by the clients alone or server alone. Such a system installation will save time and money and circulate data more accurately. Client server system is reliable system architecture, dependable and frequently used; it is also not subject to change what occurs in network topological change. In this architecture it can build a client server using a

two-tier model where the first one is the client and the second is the server (Figure 2 shows that). The database management system (DBMS) will be installed on the server which manages all the clients connections in the network, and there will be a cooperation between the server and clients for the implementation of the application.(Musaria and Fawzi , 2011; Karen, 2016; Uday and Michael, 2001).
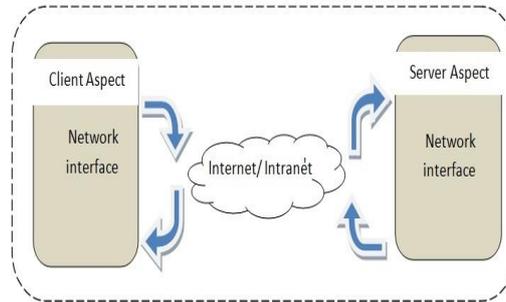

Figure 2 Two-Tier Client – Server system

3.6. Network operating systems

The most very common network operating systems NOS for networks are windows server 2003 and Windows server 2008, windows server 2012. All can provide a scalable operating environment and have high performance. These NOS can equip good reliable processing services such as file and print sharing. Windows server 2008 has built in features like Internet and Intranet, and communication services built in. Therefore, NOS Server 2008 and Windows make it easy to integrate the Web directly to the private network, (Karen, 2016;Uday and Michael, 2001).

3.7. Network topology

There are three types of network topology the Bus, Ring and Star. Star type is the star configuration LAN where one computer is working as a host computer to which all the rest of the computers and devices are connected. All messages will be directed and routed navigate through the host. Network switching is route Messages by the host to the destination node. The star network uses an important amount of the cables because each node must have a direct contact with the central host computer and is the most difficult connection. In the star network connecting all devices associated with the central host computer, as well as Networking switching all messages must pass through the host computer.,(Uday and Michael, 2001).Figure3 show star configuration.
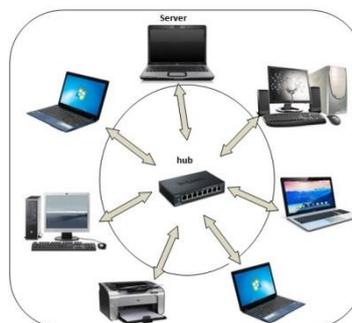

Figure 3 Star configuration

4. The existing problem

There is a standard specification certified for input crude oil to the Czech unit, as well as light petroleum products resulting from refining crude oil. If the operational specifications either for crude oil or petroleum products changed from the standards imposed on them, the employees in operational unit must notify to adjust the

operating conditions and process it, and that must be reported as quickly as possible. Usually the daily laboratory tests done for three shifts and checks are made to emergency situations in addition to the monthly performance tests, So based on these laboratories tests results the operating conditions of operational units are adjusted and the operational processes in the oil refineries should be governed, controlled to get it to the correct production conditions to produce those products in specifications as close as possible to the standard specifications.

The speed informing of appointees employees and director in the operational units is of a great importance in the direct control of the operating conditions. So the time factor is important in improving operational performance of the work of concerned operational unit. Crude oil to be refined in the Czech unit is a highly flammable material and can cause explosions and devastating fires, and this applies to petroleum products derived from this crude, also for the purpose of refining the crude oil must be heated and boiled where the operational processes in the oil operational units require the use of high operational conditions of temperature and pressure and that depends on the required operational process. The working in the operational units requires control and imposes considerations of industrial safety. So it is preferable accelerate knowledge of the laboratory test results and compare them to standard specifications and therefore time is important factor.

5. The proposed system and Software used in development environment

The proposed system and software of addressing the problem consists of the following components see Figure 4:

- Computer server with operating system window server NT 2008 is used as operating system for managing computer server and connected by Intranet network with client server system. A central database installed on it to store the results of laboratory tests.
- the intranet (Internal network) is a star configuration.
- The hub switch is used to connect the computer server and client's computers.
- Computers clients, the number of computers 5 with a different specification, icon installed on each client interface shows: user name and password to access the database for the authorized users. These computers have been linked to a computer server as clients on the Intranet in server – client system.
-Database: Microsoft access is used to build a central data base to store the results of laboratory tests visual basic 6 program is used to build interfaces for the database.
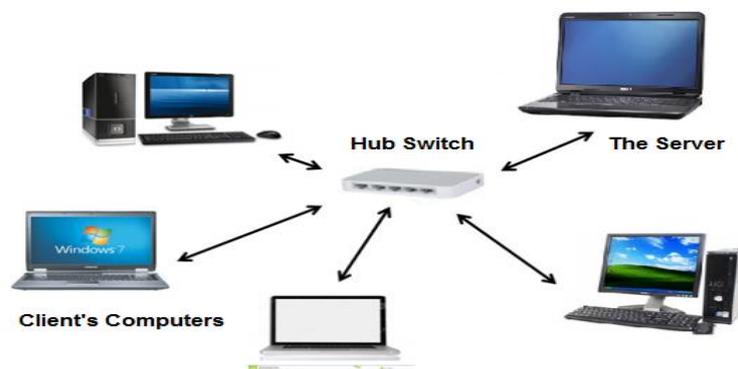

Figure 4 the proposed system

6. System Description
6.1. Database Description
Database system is used to store the results of various laboratories tests for samples sent from Czech unit for oil refinery in Daura. It's also used to display data and produce reports and finally data analysis. The proposed central database system is a system with a graphical user interface for data entry to laboratories tests results. It is an application installed on intranet network server.

The database consists of following tables designed in Microsoft Access program:

Table of standard crude oil specifications (see Figure5 a) , table of crude oil daily tests see Figure5 b , table of monthly crude oil tests, table of oil derivatives tests, and table of standard specifications for petroleum products.

The interfaces designed in Visual Basic 6 program, see Figure6 the interface buttons:

- Data entry interface see Figure 7 Tables interface .

- reports interfaces see Figure 8 Reports interface .

- analysis interfaces.

6.2. Description of the intranet
Intranet the internal network is designed in a star configuration and used hub switch, which linked the computers clients with computer serve as server-client system.

a

b

Figure5 a- Table Specification of Kirkuk Crude oil b- Table daily Crude oil test
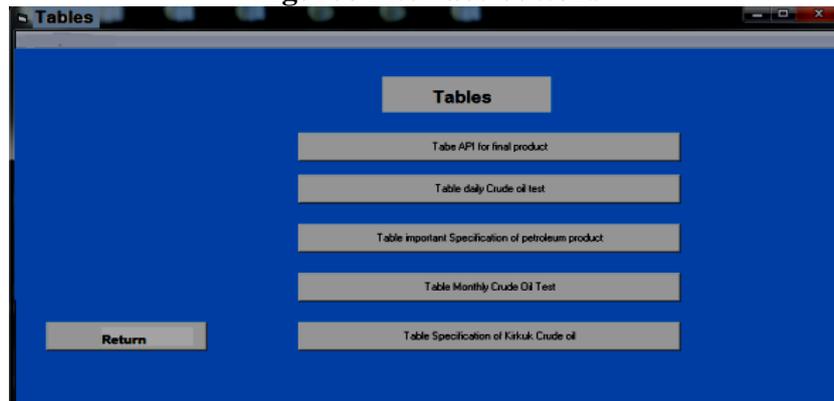
Figure6 interface buttons
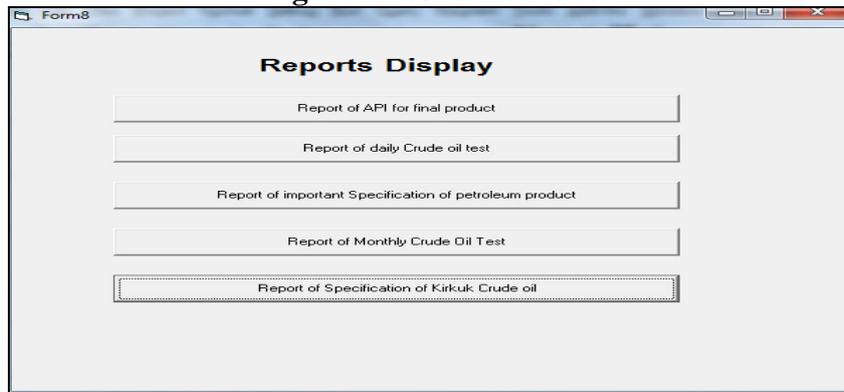

Figure7 Tables interface

Figure 8 Reports interface

6.3. Description Computer server

The administrators control the computer server, see Figure 9andwill be responsible for the computer server work the intranet network, and control on the whole system. The operating system position on the computer server is the window server 2008which is one of the Microsoft operating systems series launched by Microsoft for computers servers and used for networks. The central database that has been designed in the Access Program and Visual Basic6 will be installed on the Computer server.

This operating system windows server2008 allows control of the administrator on the computer server and giving authorities of different levels to computing clients. Authorities vary from network client to another. Administrator will install icon on the desktop of the desktop client, which shows login window when clicked included username and password. So the administrator is the one who knows the clients and give them authorities to gain access to the database and controls the internal network also monitors the work of computing clients and introduces them to intranet network.

6.4. Description client's computers

They are different specifications computers linked to a computer server through the intranet network, there is an icon on desktop of every computer client in the intranet network It allows the end user to access the central database positioned on the computer server after they've clicked and full of information of username and password in the login interface, see Figure 10 then the authorized end user can review what he need according to his authority which supplied by the administrator.
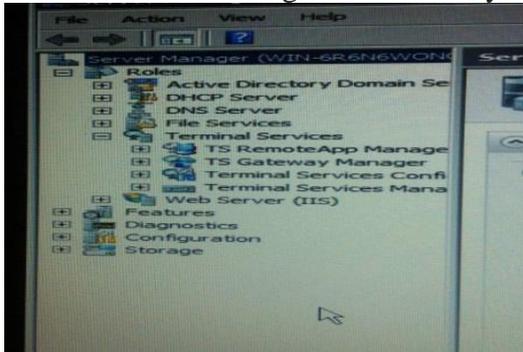

| **Figure9 administrators in server** | **Figure10 login interface** |

7. Results and Discussion

-Storing the results of lab tests will be stored electronically by specialists authorized to enter data through the data entry interface for each table in the database, as well as issuing reports and the analysis data process.

-The administrator controls the number of associate authorized members and their authorities.

-The authorized users can access data at the same time when they click the enter icon into their clients computers despite the spacing between their functional places from computer server of intranet network and from each other because their participation in intranet network which will eliminate the distance factor.
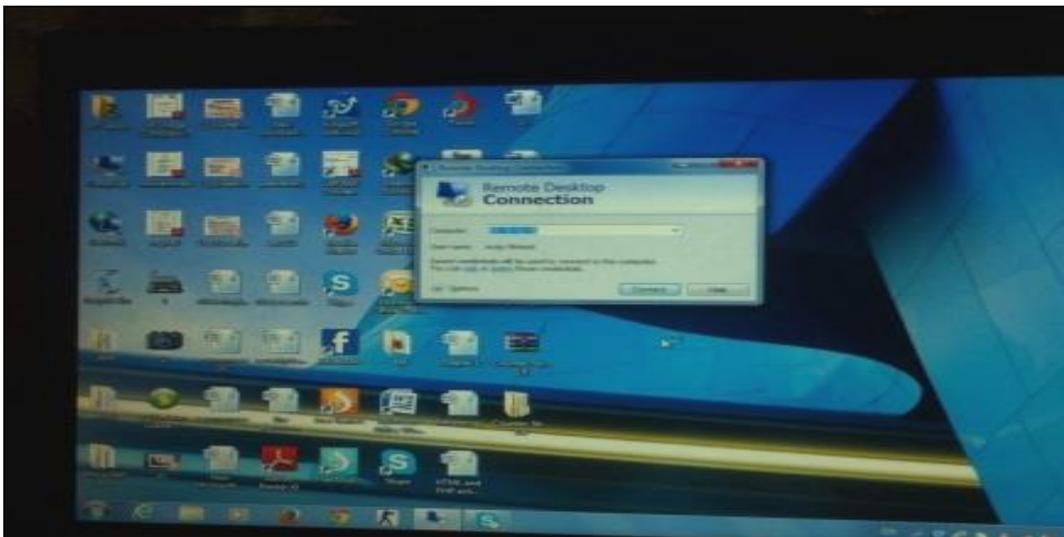

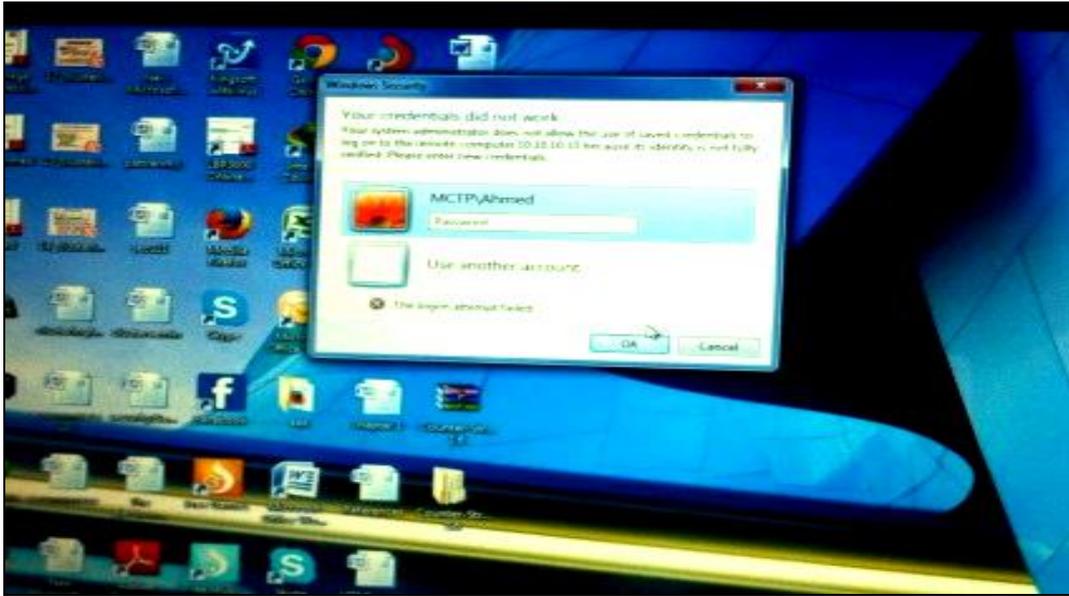**Figure 11 authorized end user connect**

Figure 12 prevent unauthorized person

- The authorized users at various levels of operational unit's operators even directors each one under his own authority can access on the latest electronic laboratory results first hand from their job location without the need to call or send sample man to the laboratory about the desired results, which eliminates the time factor and time delay.

- The database allows the authorized users according to their authorities the possibility of printing the required results hardcopy, review and printer ports and as well analysis data. See Figure 11.

- Data which is the results of lab tests remains and declared within the Intranet internal network of refinery only.

- The administrator provides the authorized end users only with the necessary security to access the central database through the interface user login which includes username and password of the authorized end user.

- Authorized users can access on the cumulative electronic laboratory results and thereby build an idea of the path of laboratory results, giving them an idea of the operational track operational unit and this help the operators and managers making decisions in short and long range.

- The Intranet network provides the necessary security to keep unauthorized people away from accessing database. See Figure 12.

-Fast knowledge of the laboratory results gives operators and managers in the operational unit the possibility of taking right operational decisions to ensure the smooth functioning of the operational process properly correctly and control emergency situations quickly.

8.Conclusions

-As a result of building central database for storing the data represented by the results of laboratory tests of crude oil and its products, and use Intranet network this information(the processed data) is considered as resource within the resources used in the refinery.

- The Intranet provides a secure sharing of information between workers inside the refinery and the end user will have limited access to specific information related to his work according to his authority.

- The information will enable operators and managers taking direct decisions or long-term decisions in solving problems of the operational units.
- Data is stored and collected in central database and therefore all authorized end-users (the managers and operators) can gain access to the data electronically, wherever they are, at any time, simultaneously, quickly and accurately.
- The Intranet will managed time and cancel delay time, where the results of laboratory test will be received at real-time and this will save time, which leads to save money.
- Data storage is subject to the internal policies and systems of refinery and the database will be tailored specifically for the refinery and provides a centralized control to save the data and publish it, also the database will has with a regular appearance which is easy to use.
- Improve productivity of employees as a result to time saving and quick access to data so they can focus on other business.
- Use of the central database and Intranet provides end user with the ability to sifting data quickly and Data integration, and at last non-recurrence of data.
- Central database provides advantages for the end user, such as backup and maintain data from damage, the ability to print the required data, the data will be available electronically and database have unified interface for end-users.
- By using the Intranet: different types of computers can be linked to the network, using the client-server system.
- Discarded old files management systems: the disposal of the paper and its maintenance, Data integration storage, lack of accumulation of files, the difficulty of access to data, save expenses and administrative expenses, reduce the loss of data, the provision of a number of hard copies and protected data electronically.
- Cost: the Intranet are inexpensive in installation and operation, also can use the available computers and connected to intranet network, the used software are cheap price as well, needs a few number of programmers, finally it will cancel the money required for printing, the environment, maintenance, and duplication of paper.
- Security: the Intranet can be separated entirely from the Internet, allowing the entry of authorized users only, best to be owned by the refinery, defining the authorities of different end users, setting Antivirus, then displaying data has reliability.
- By using the operating system windows NT2008 in computer server which have the Active Directory , the administrator to add new end users , give them new authority, set a password and account for the new end-users, protect the network from the unsafe clients computers, and confirms or rejects the user according to their authorization.

References

Adrienne Watt and Nelson Eng,2016," Database Design" , 2nd Edition. Retrieved May 11, from: http://solr.bccampus.ca:8001/bcc/file/5b6f010a-0563-44d4-94c5-67caa515d2c5/1/Database-Design-2nd-Edition-1414110676.pdf.

Ante Juki, 2013,"Petroleum Refining and Petrochemical Processes.ppt , Crude oil: main properties", Faculty of Chemical Engineering and Technology , University of Zagreb, Zagreb. Retrieved May 11, 2016, from: https://www.fkit.unizg.hr/_download/repository/PRPP_2013_Crude_oil_composition.pdf.

Brian westrich, 1994," Selection of Database Management Software", 19th National Nutrient Databank Conference Nutrient Data Bases--Responding to Trends and New Technologies, Retrieved May 11, 2016, from:

Dictionary.com ,2016," © 2016 Dictionary.com", LLC, Retrieved May 11, 2016, from : http://dictionary.reference.com/browse/intranet.

http://www.actacommercii.co.za/index.php/acta/article/view/44.

http://www.nutrientdataconf.org/pastconf/ndbc19/7-1_westrich.pdf.

http://www.tojet.net/articles/v3i1/313.pdf.

https://www.researchgate.net/publication/273735359_Design_of_Reliable_Network_Topology_for_the_North_Refinery_of_Baiiji_with_Minimum_Cost.

İnci Şentarlı, Adnan Erdursun and Deha aman, 2007," Development of a Database Management System Design Involving Quality Related Costs ", retrieved May 11, 2016, from: http://www.ep.liu.se/ecp/026/098/ecp0726098.pdf.

James H. Gary and Glenn E. Handwerk, 2001," Petroleum Refining Technology and Economics", 18-50, Marcel Dekker, NC, NewYork.Basel, Retrieved May 11, 2016,from:http://libgen.io/ads.php?key=5B08FSTWFP0203NH&md5=A99F28126D26251802D24187BB2BDE79.

Ji Li, Osama Moselhi and Sabah Alkass, 2006, "Internet-based database management system for project control ", Engineering, Construction and Architectural Management, 13, Issue: 3 , 242-253, Retrieved May 11, 2016, from : https://www.researchgate.net/publication/228628507_Internet-based_database_management_system_for_project_control.

Karen Collins, 2016 ,"Managing Information and Technology", "An Introduction to Business," chapter 15, Flat World Education, Inc , Available:http://catalog.flatworldknowledge.com/bookhub/5227?e=collins-ch15

Margaret Rouse, 2016, "WhatIs.com", TechTarget, Retrieved May 11, 2016, from: http://searchwindevelopment.techtarget.com/definition/intranet.

Maritz S.G., 2003, "Data Management:managing data as an organisational resource", Acta Commercii, 3, 75-84, Retrieved May 11, 2016, from:

Musaria K. Mahmood and Fawzi M. Al-Naima, 2011," An Internet Based Distributed Control Systems: A Case Study of Oil Refineries ", Energy and Power Engineering, 3 (3), 310-316 , Retrieved May 11, 2016, from : http://www.scirp.org/journal/PaperInformation.aspx?PaperID=6434.

Musaria K. Mahmood and Fawzi M. Al-Naima, 2014, " Design of Reliable Network Topology for the North Refinery of Baiiji with Minimum Cost", Conference: 2nd Iraqi Oil and Gaz Conference, At Iraq Baghdad ,Retrieved May 11, 2016, from :

Rob, Carlos Coronel , Steven Morris and Peter,2013, "Database Systems design ,implementation and management", Cengage Learning, United States of America,1-800-354-9706, Retrieved May 11, 2016, from: https://www.cengagebrain.com.au/content/9781133925286.pdf.

Robert M. Grant, 2013,"The Development of Knowledge Management in the Oil and Gas Industry", UNIVERSIA BUSINESS REVIEW, ISSN: 1698-5117, Retrieved May 11, 2016, from: https://ubr.universia.net/article/viewFile/895/1021.

Steven C. Ross and Deepinder S. Bajwa, 2001," Intranet Adoption and Implementation: A Development Framework", Issues in Information Systems,2, 404-410, Retrieved May 11, 2016, from : http://iacis.org/iis/2001/Ross404.PDF.

Uday S.Murthy and S. Michael Groomer, 2001, CPA, CISA," Accounting Information Systems: A Database Approach"," Data Communications and Networking ",chapter 4, Copyright©1996-2000,CyberText Publishing, Retrieved May 11 , 2016 , from: https://www.cybertext.com/books/primerprev/chapters/ch2.htm.

Zehra KAMIŞLI, 2004, "Database Management Systems: A Case Study of Faculty of Open Education", the Turkish Online Journal of Educational Technology, ISSN: 1303-6521, 3, Issue 1, Article 3, Retrieved May 11, 2016, from: