An Optimal Proposed Model to Build Enterprise Portals for Education Case Study: The Libyan Ministry of Education

Saleh Hussein Awami

salehawami@yahoo.co.uk

Academy of Postgraduate Studies Benghazi Branch, Department of Computer Science – Libya

Abstract: *A holistic view of an organization is a very important factor to build successful enterprise portals. In this paper, a proposed model is presented to build and develop an enterprise content management strategy framework. The proposed model is presented as an optimal solution to the Libyan Ministry of Education (LMOE) to manage the organization using enterprise portals. The proposed model consists of Enterprise Pre-packaged Software Kit (EPSK) and computer hardware. A single secured unified access point is used through a web-based interface to get information and services from organization's entire enterprise system which is represented as enterprise portals. The proposed model can be applied to both the Ministry of General Education (MOGE) and the Ministry of Higher Education (MOHE). This technical work aims at clearly presenting the proposed infrastructure of the Libyan Ministry of Education and its network expansion in their different locations. In the mean time, it aims at investigating and covering the issues of network security level, LMOE interconnection in various locations, and secured voice and video conferencing to make the work effective in various LMOE locations. The LMOE hardware, software, and network devices are listed as LMOE essential requirements for building a wide network infrastructure in Libya. The main objective of developing the proposed model is to provide the main core three services as LMOE WEB site, LMOE official e-mails, and LMOE portal share point service including Document Tracking (DT) system. These services will be accessed by both authorized end users with controlled access security levels and unauthorized end users with restricted access security levels to just LMOE web site. There are so many software package products that can be used to build the enterprise portals because of their ability in testing phase which can be implemented easily by using virtual machines without installing all hardware and software packages before installing in real, production, environment.*

Keywords: *Enterprise Portals; The Ministry of Education; Web Portals; An Optimal Model for the Libyan Ministry of Education; Monitoring and control service office of the Libyan Ministry of Education.*

1. Introduction

Content Addressable Memories It is approved that communication plays an important major role in managing big organizations especially those of wide geographic locations. An enterprise portal refers to a web-based interface that offers enterprise resources, services and information such as e-mails, organization's databases, documents and entire enterprise system. Enterprise portals consist of Enterprise Pre-packaged Software Kit (EPSK) and computer hardware to integrate its services and processes.

Distributed services, through EPSK, and information in a number of different computers are aggregated to build secure, fast, and reliable enterprise portals for organization's processes.

Web portals are being used successfully in many different organizations with some limitation of using internet bandwidth because of cost. Nowadays, technologies are changing quickly and the uses of wide internet bandwidth connections come quite handy for end users with reasonable cost. The only major problem in this case is the size of the organization. Mid-sized organizations and Big-sized organizations might have internet bandwidth limitations in using web portals because of the number of end users. Increasing concurrent end users of web connections will lead to consume the internet bandwidth at the centre of organization's infrastructure. This will lead to slow communications for organization's services. There is another problem which will face the organization when implementing enterprise portals is how to configure the network balance of access to organization's infrastructure. So, qualified power users are highly required in order to implement enterprise portals in a professional way. In this paper, an optimal solution is presented to manage the Libyan Ministry of Education in an effective professional way. Hereafter, some previous works are presented which use web portals to manage the educational environment. Jaka, Jurij, and Mojca (2003) [1] present higher education institutions as just like companies forced to adapt to the ever faster changing environment. They divided them into technology-based and culturally based. Their paperwork addressed the topic of using internet as a

medium to achieve the primary goal of higher educational institutions to become better, and more competitive. Authors presented an e-learning environment at the Faculty of Economics of the University of Ljubljana. Their presented model of personalized portals has been tested in practice. Authors achieved the reduction of opportunity costs by giving the right information to the right user at the right time. Authors concluded the use of a portal in a highly heterogeneous environment proved not only to be sensible but also necessary. Jaydip , Kai, Lai , and Chun (2002 and 2003) [2][3] evaluated the functions and features in enterprise portal products that are offering corporate portal solution. Their study develops a simplified model that can be used for identifying and classifying the functions and features in corporate portal software. Jakob (2003) [4] presented intranet portals aiming at replacing the wild Web model with a tool metaphor, where a company's content and services work together instead of undermining each other. Jakob stated that most of the intranet problems are solved by portals by presenting a single gateway to all corporate information and services. Also, by integrating services and presenting personalized snippets on the initial screen. Jakob (2008) [5] concluded that A usability analysis of 23 intranet portals finds strong growth, increasing collaboration features, and cross-functional governance. Jakob (2011) [6] recommended portal design based on 67 case studies of intranet portals. He stated that the best intranet portals would provide true integration of enterprise information, resources, and tools in a unified user experience not just about access. There are many case studies in the field of building web portals for the Ministry of Education. Some of these organizations have been studied and reviewed in depth as they have successful experiences. All of these web portals [7][8][9][10][11][12][13][14] features are taken into consideration to build an optimal solution for the Libyan Ministry of Education. In this paper, an optimal model is presented to make the intranet portals more promising, personalized, and secured by implementing enterprise solution. The paper is organized as follows: Section '2' presents the model considerations. Section '3' present designing of the model. Section '4' present features of the model. Conclusion and future works are discussed in section '5'.

2. Model Considerations

The Ministry of Education (organization) will have many portions of information. Each portion will have specific information assignment to specific task. All of these portions (web portals) must be controlled through channels. On the other hand, the individual for each portion of the organization will have information only about specific related information that belongs to that specific portion. This ensures the personalized use of enterprise portals.

Monitoring and Control Service Office of the Ministry of Education will have information about schools, location maps, employees, teachers, students, statistical information about both students and teachers, and any other related information belonging to the Ministry of Education.

Authorized users will have access level to their customized information relating to the portion that they have been granted access level with assigned locations according to schools, universities, or cities. Authorized users should have only one credential to identify themselves only once in order to access different channels, web portals, to accomplish their assigned tasks.

Different channels, web portals, might have different appearance which reflects its purposes and usages. In other words, the information available in a web portal is personalized for each authorized user. The authorized users can then view, print, or keep their information to suit their purpose.

The proposed model, enterprise portals, can be accessed globally so there is no need to configure e-mail programs or any other configuration. The service to be used for this purpose is called Outlook Web Access (OWA).

Some characteristics and functions, goals, of the proposed model are as follows:

- More to ensure the confidentiality of information.
- Remember to ensure correspondence and documents.
- Linking databases of universities and institutes of higher and medium-sized institution to the LMOE.
- Create and link databases, including all stages of education.
- Use of telephone communication on services in the e-mail link to the ministry.
- Specific powers granted to employees in the ministry to access information pages of the ministry.
- View statistics the number of employees in the ministry and appointed bodies and their specialties.
- View statistics the number of teachers in the ministry and appointed bodies and their specialties.
- Archive retention decision and correspondence.
- Conservation to ensure correspondence and documents within the Ministry

3. Model Design

In order to meet the development of business and improving the work effect, LMOE must build a perfect data network in their different offices locations. Each of independent office shall configure as a data center location. A major portion of this expansion stems from web-based applications in both Document Tracking System (DT System) and Personal System that are

using SQL database including reporting service and integrity service, data housing, and satellite offices placing great strains on LMOE network. The proposal focuses on the LMOE network expansion, improve LMOE network security level, and LMOE internal/external secured calls communications (Voice and video conferencing services). LMOE shall connect their different geographic locations to build a wide area network (WAN) in order to allow businesses to lease very vast and dedicated lines between facilities in different locations. These locations should be chosen according to network traffics, network load balancing and number of distributed end users including students, teachers, and employees. In this section, the technical proposal will cover interconnecting different geographic locations using the next generation of enterprise portals.

The main objective of developing the proposed model is to provide the main core four services as LMOE WEB site, LMOE official e-mails, LMOE portal share point service, and LMOE Document Tracking (DT) System. These services are developed for end users as follows:

3.1 LMOE WEB Site.

The LMOE web site should be developed to use for general information only. LMOE presents their information like news, events, history and its secured enterprise portals for authorized and personalized access to its infrastructure. Unauthorized end users must redirect to LMOE web site. This web site can be hosted by the Libyan Telecommunications and Technology (LTT). LTT is Internet Service Provider (ISP) Company established in Libya. A duplicated web site shall be implemented in each different geographic location for internal access of organization's end users.

3.2 LMOE Official E-Mails

An official email can be implemented by using Microsoft exchange server 2010 product which offers Outlook Web Access (OWA) service. This will raise the security level of using e-mails system inside the organization. This need to build a reliable network infrastructure to grant access levels to authorized end users. In order to release the network traffic, the network load balance must be implemented in different geographic locations of the LMOE. Also the published OWA service must be implemented by using internet Security and Acceleration (ISA) Server to improve the security access levels. Other technologies can be implemented in order to raise the security levels. Margining both software and hardware will be best solution to protect the organization against intruders.

3.3 LMOE Portal Share Point Services

SharePoint is a family of Microsoft technologies that provides a server infrastructure to support collaboration, document storage, and time/task management needs. This platform connects employees, groups, and departments together with vital search and connection features, enabling everyone to stay informed and in touch. The portal should be implemented with the F5 Web-Accelerator. F5 Networks solution is a good solution for LMOE to secure, fast, and optimize LMOE applications (Enterprise Portals, OWA, SQL 2008) on WAN. Also, the benefit of using these products is that we can implement it in virtual servers without implementing the service in the real environment [14]. The document Tracking System is developed for both employees' end users and for students and teachers end users with granted access levels for each personalized access to organization's portion of information.

3.4 LMOE Document Tracking (DT) System

Document Control System is developed to achieve a list of tasks and functions which enable LMOE control office to save and retrieve messages submitted by authorized end users. The submitted document number can be recognized by classifying the authorized end user by assign a dynamic unique number to employees, teachers, and students. DT System is the important core service in LMOE organization which enables employees, teachers, and students to keep tracking of their history documents like previous school, copy of students' certificates, and their sub-organization charts and more.

The dynamic unique number that assigned to end user is shown in Table 1. Suppose the number is 02-012-0001-2367. The first part contains of two digits which determine the Geographic Location of the end user for instance Benghazi location is coding as 02. The second part contains of three digits which determine the occupation and the gender respectively of the end user for instance Employee is coding as 01 and female is coding as 2. The third part contains of four digits which determine the sub-organization of the end user for instance the ministry is coding as 0001. The last part contains of four digits which determine the unique sequence number of the end user for instance the sequence number is coding according to number of employees in the specific organization and specific department and specific geographic location. By applying this type of coding the network load balancing will be designed in effective and in professional way.

Table 1: Assigning the unique number to the end users.

Part	Unique Number Part	Description
1	xx	Determine the Geographic Location of the end user.
2	xx-x	Determine the occupation and the gender respectively of the end user.
3	xxxx	Determine the sub-organization of the end user.
4	xxxx	Determine the unique sequence number of the end user.

In addition, the document tracking system will be archived by using another coding number for letters between the authorized end users the designed coding for this propose is shown in Table 2.

Table 2: Assigning the unique number to the corresponding letters.

Part	Unique Number Part	Description
1	xx-xx	Determine the document destination. The first two digits are for the sender and the second two digits are for the receiver.
2	xx-xx	Determine the geographic location. The first two digits are for the sender and the second two digits are for the receiver.
3	xxx-xx	Determine the speech domain. It represents the department name and sections using the coding system. The first three digits are for the departments and the last two digits are for the sections.
4	xxxx	Determine the unique number to distinguish the submitted letters.

4. Model Essential Requirements

There are some important factors in order to build successful and reliable enterprise portals. One of these factors is network topology of the organization, hardware server specifications, and software for both server operating systems and enterprise software solution. Hereafter, the list of LMOE essential requirements for building a wide network infrastructure in Libya is as follows:

- 1Gbps Premium-Line CAT 7 Cable Installation.
- 3COM Switch 8800G.
- 3COM Switch 5500G 16-Ports.
- 3COM Switch 4500G 12-Ports.
- 3COM Router 6000 including Module.
- 3COM VCX 7000 system that offers end-to-end voice and data solution with license.

- Microsoft Windows Enterprise Edition 2008 R2 as server operating system.
- Microsoft Windows Enterprise Edition 2008 CALs.
- F5 Networks BIG-IP Local Traffic Manager 6900 with Web-Accelerator appliances.
- HP ProLiant DL380/DL850 G6.
- Microsoft SQL Database Server 2008 enterprise edition.

LMOE shall subscribe with LTT Company using the data transfer service through the leased line at least up to 1mbps to ensure the quality of service.
NAS Device for storage LMOE data.

Figure 1 shows the proposed model for LMOE organization.

5. conclusion and future works

In this paper, we have developed a new model to build the Libyan Ministry of Education by using the enterprise portals concepts. This solution is the best solution for building and testing the system functions and features in virtual machines before implementing the system in the real environment. Building homogeneous system will increase security level in LMOE organization. Using both OWA service and reporting service will reduce time consuming of building the web-based applications.

The suggested future works are as follows:

- The model should be improved by configuring a traditional perimeter network for enterprise portals by applying Microsoft Dynamics AX 2012.
- Document Tracking (DT) system shall be explained in more detail with database structure.
- LMOE shall implement voice and conferencing services in their offices by using 3COM VCX 7000 system (reliable system).
- LMOE shall implement Portal SharePoint Service (MOSS 2007) to keep all LMOE staff in various locations in touch with each other.
- LMOE shall implement F5 Networks BIG-IP Local Traffic Manager with Web-Accelerator appliances ensuring applications (OWA, VOIP ...) is always secure, fast, and available.

References

[1] Jaka Lindic , Jurij Jaklic , Mojca Indihar temberger, (2003), "IMPROVING QUALITY OF EDUCATION THROUGH THE USE OF INTANET". Proceedings of the IADIS International Conference on WWW/Internet. Algarve, Portugal, 5-8 November 2003. ISBN (Book): 972-98947-1-X.

[2] Jaydip M. Raol, Kai S. Koong, Lai C. Liu, Chun S. Yu (2003): "An identification and classification of enterprise portal functions and features". Industrial Management and Data Systems 103(9): 693-702.

[3] Jaydip M. Raol, Kai S. Koong, Lai C. Liu, Chun S. Yu, (2002): "An identification and classification of enterprise portal functions and features". Industrial Management and Data Systems 102(7): 390-399.

[4] Jakob Nielsen.(2003). Jakob Nielsen's Alertbox."Intranet Portals: A Tool Metaphor for Corporate Information". [URL: http://www.useit.com/alertbox/intranet-portals-study-1.html]. March 31, 2003.

[5] Jakob Nielsen.(2008). Jakob Nielsen's Alertbox."Enterprise Portals Are Popping". [URL: http://www.useit.com/alertbox/intranet-portals-study-3.html]. July 14, 2008.

[6] Jakob Nielsen.(2011). Jakob Nielsen's Alertbox."Intranet Portals: Personalization Hot, Mobile Weak, Governace Essential". [URL: http://www.useit.com/alertbox/portals.html]. July 18, 2011.

[7] WEB PORTALS, the Egyptian Ministry of Education. [URL: http://www.moe.gov.eg].

[8] WEB PORTALS, the Hashemite Kingdom of Jordan Ministry of Education. [URL: http://www.moe.gov.jo].

[9] WEB PORTALS, Goverment of the Republic of Trinidad and Tabago Ministry of Education. [URL: http://www.moe.gov.tt].

[10] WEB PORTALS, the United Arab Emirates Ministry of Education. [URL: http://www.moe.gov.ae].

[11] WEB PORTALS, Ministry of Education, Jamaica . [URL: http://www.moe.gov.jm].

[12] WEB PORTALS, Ministry of Education, United Kingdom. [URL: http://www.moe.gov.jm].

[13] WEB PORTALS, Ministry of Education, Saudi Arabia. [URL: http://www.moe.gov.sa].

[14] Web Site/Internet:[URL: http://www.f5.com/solutions/deployment/pdfs/sharepoint_bigip9_dg.pdf].

Saleh H. Awami received the B.S. from the Department of Computer Sciences; University of Benghazi formally named Garyounis University, Benghazi-Libya, in 1996. He received his M.S. degrees from the Computer Sciences Department, The Academy of Postgraduate Studies Benghazi Branch, Libya, in April 2010. Since 2000, he has been with the Al Nahr Engineering Limited (ANE) formally named Brown and Root North Africa Limited (BRNA), Department of Management Information System (MIS). His research interests include computer networks analysis and design, network security, Artificial Neural Networks (ANN), and Soft Computing. **Mr. Awami** has certificated from Microsoft and novel corporate in network computers. He has trained in computer networks and e-mail system courses in United Kingdom (UK), Egypt, and Libya. His practical experience in computer networks was growing since he was responsible to upgrade BRNA/ANE infrastructures in various locations in Libya.
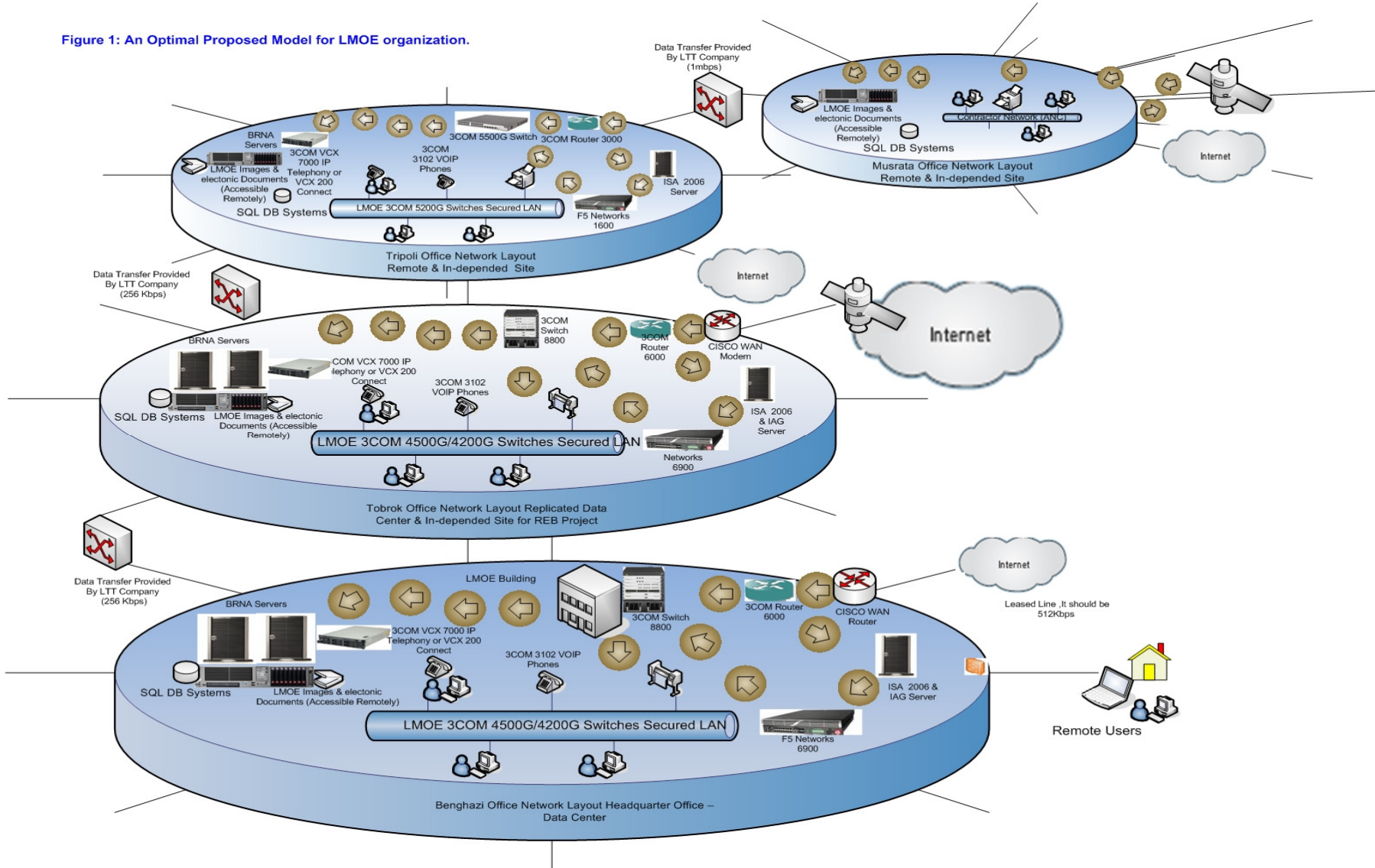
Figure 1: An Optimal Proposed Model for LMOE organization.

Figure 1: An Optimal Proposed Model for LMOE organization.