COMMUNICATION LINES MANAGEMENT SYSTEM

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ABSTRACT

The purpose of this project is to develop a RBDMS DSS with OLAP capabilities that will assist management in making decision concerning MAF communications assets. The DSS is to perform general database functions; generate assets and users reports and summaries. The ROLAP model was implemented to provide the DSS with OLAP functionality assisting the system in database queries and analysis. The methodology adopted for the project development is SDLC and model used is Waterfall. Analyzing and development of design requirements are done with the Unified Modeling Language 2.0; the industry standard graphical notation modeling language for object-oriented systems. The system is implemented as a 3 tier web application using an Apache Tomcat Server/JSP container implementing Java Servlet/JSP in a client-server environment running on the organization intranet. The RDBMS were implemented using MySQL 5.0 Community Server and OLAP functionality using Mondrian Server supported by JPivot and WCF. The system prototype were successfully implemented within the project timeframe by setting achievable objectives; adopting the right development methodology; using the appropriate software technologies and close cooperation with organization staff. It is found that the initial documentation of the SRS and SDD greatly assisted the software developed at the later stage. The implementation of the ROLAP model to support the DSS is found to be suitable for organization with existing database structures. It is also found that all the Open Source software's utilized are capable of developing the required system besides freeing organization resource for other avenues as there are offered under the GNU GPL license. There are also freely available and their usages supported by the Malaysia Open Source IT initiatives.

ABSTRAK

Projek ini bertujuan untuk membangunkan sebuah RDMBS DSS dengan keupayaan OLAP yang akan membantu pengurusan membuat keputusan berkaitan asset-aset komunikasi ATM. DSS ini berupaya melakukan fungsi pangkalan data; menyana laporan dan ringkasan; dan melakukan *query* serta analisa pangkalan data. Metodologi yang diguna untuk pembangunan sistem adalah *SDLC* dan model yang diguna adalah *Waterfall*. Analisa dan pembangunan keperluan sistem di lakukan dengan *Unified Modeling Language 2.0*; bahasa notasi grafik model untuk sistem berorientasikan objek kepiawaian industri. Sistem ini berbentuk aplikasi web 3 tier yang menggunakan server *Apache Tomcat/JSP container* yang implentasikan *Java Servlet/JSP* dalam suasana *client-server* dan berfungsi didalam intranet organisasi. RDBMS dibangunkan dengan *MySQL 5.0 Community Server* dan keupayaan OLAP dibangunkan dengan *Mondrian Server* disokong dengan *JPivot and WCF*. *Ptototype* sistem berjaya diimplimentasi dalam jangkamasa projek dengan menggunakan objektif yang boleh dicapai; metodologi pembangunan yang padan; teknologi perisian yang sesuai dan kerjasama yang erat dengan staf organisasi. Didapati bahawa dokumentasi SRS dan SDD diperingkat awal telah banyak membantu peringkat pembangunkan perisian yang kemudian. Implentasi model ROLAP untuk menyokong sistem DSS juga didapati sesuai untuk orgnisasi yang telah mempunyai struktuk pangkalan data awal. Juga didapati bahawa perisian Open Source berjaya membangunkan sistem yang dihendaki. Ini membolehkan kemudahan organisasi diguna untuk tujuan yang lain kerana perisian *Open Source* diedarkan dibawah lesen *GNU GPL*. Perisian-perisian ini senang didapati dan penggunaan mereka juga disokong oleh usaha-usaha *Malaysia Open Source IT*.

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CHAPTER 1

INTRODUCTION

1.1   Project Background

The ability to communicate is a vital factor in ensuring the success of the numerous daily functions performed by Malaysia Armed Forces (MAF) staffs. MAF bases and facilities exists in all the 11 states and 2 federal territory within the country. The basic facilities provided within these premises are telephone and facsimile communication lines which are used for MAF internal bases to bases communications besides communications with external governmental and private agencies. Additional communication facilities are internet access lines and satellite access link primarily making email and weather information retrieval abilities available. All these facilities are use daily through out the MAF and as in any other corporate office, their usage often seems routine and taken granted for. In reality there are not and for the record, there are actually very important and encompassing. Try imagining for a moment that your office phone and facsimile are out of order and there are also no internet access as well, and all you can do is to work from your cell phone.

To ensure that their staffs do not suffer these fate daily, the Ministry of Defense (MINDEF) spend up to RM 5 million in a fiscal year to provide for all these facilities. Providing the facilities for use is the right direction but without prudent management, the facilities usage will soon be out of control. Within this context, the management of such a large amount of assets should be precise but also prudent at the same time as their mismanagement could lead to wastage of government and subsequently taxpayer funds. The management requirement should involve from the onset a minimal of information

regarding asset users and their where about; the asset billings by type and location; reports and analysis to inform managers and assists them in making decisions in the management and deployment of the assets.

The management of MAF communication lines is the responsibilities of Sel Khidmat Talipon which is a unit placed within Bahagian Komunikasi dan Elektronik (KOMLEK), MAF Headquarters, MINDEF. These include assets within the MAF Headquarters and the 3 major services which are Tentera Darat Malaysia (TDM); Tentera Laut DiRaja Malaysia (TLDM); and Tentera Udara DiRaja Malaysia (TUDM). Overall, the communication lines services under the jurisdiction of the unit are as follows:

1.1.1 Direct Line/Facsimile Line/PABX Extension.

- International Direct Dialing (IDD).
- Category A – Out of State (STD).
- Category B – Within State (STD).

1.1.2 Mobile Line.
- International.
- Regional.
- Local.

1.1.3 Internet.
- Line access.
- Wireless access.

1.1.4 Satellite Access.
- Land based uplink.
- Maritime.

1.2   Sel Khidmat Talipon Organization

Within Bahagian KOMLEK, Sel Khidmat Talipon is placed under Cawangan Bantuan Komunikasi which is basically responsible for providing communication assistance to MAF Headquarters. Sel Khidmat Talipon is headed by a military officer with the rank of Major designated as Staff Officer Grade 2.   He is assisted by a grade N27 civilian staff designated as his Staff Officer Grade 3. Together with them are 3 other service personnel and 2 other civilian staff. The unit is divided into the account administration and the telecommunication services section. The earlier is headed by a grade N32 civilian officer responsible for all communication services bill payment and the later consists of service personnel clerks assisting the unit in facilitating communication lines applications and their usage managements. The unit organization structure is as below:

```
                    ┌──────────────────┐
                    │    Bahagian      │
                    │    KOMLEK        │
                    └──────────────────┘
              ┌────────────┴────────────┐
    ┌──────────────────┐      ┌──────────────────┐
    │ Cawangan Rancang │      │ Cawangan Bantuan │
    │   Komunikasi     │      │   Komunikasi     │
    └──────────────────┘      └──────────────────┘
                                       │
                             ┌──────────────────────┐
                             │ Sel Khidmat Telepon  │
                             │ SO 2 Tel - 1 X Mej   │
                             │ SO 3 Tel – 1 X Civ   │
                             │        (N27)         │
                             └──────────────────────┘
                          ┌──────────────┴───────────────┐
              ┌──────────────────────┐      ┌──────────────────────┐
              │ Pentadbiran Akaun    │      │ Perkhidmatan         │
              │ SO 2 Pay – 1 X Civ   │      │ Telekomunikasi       │
              │      (N32)           │      │ Clerk – 3 X Kpl      │
              │ SO 3 Pay – 1 X Civ   │      └──────────────────────┘
              │      (W27)           │
              └──────────────────────┘
```
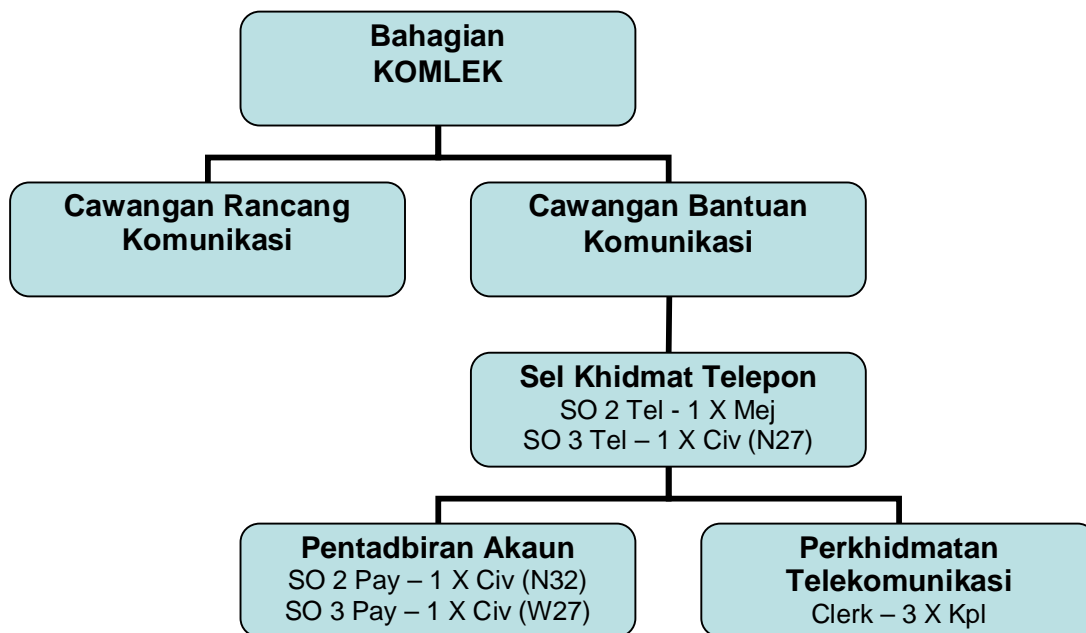
Figure 1.2   Sel Khidmat Telefon Organisation

1.3   Sel Khidmat Talipon Responsibilities

Beside the main function of managing and administering all communication lines within MINDEF, the unit also has to undertake other responsibilities such as planning necessary budgetary functions for billings payment, controlling allocated communication lines budget, planning for required location line installation and maintenance of location lines exchanges.   Its detail responsibilities are listed at **Appendix A**.

1.4   Problem Statement

The unit has 3 standalone computers which are used for daily office functions and 1 user terminal link up to eSPKB (*Sistem Pengurusan Kewangan Bersepadu*) which is a government online ordering and payment system.   The unit currently practices the traditional manual file system in its record keeping in the course of performing its daily functions. Typically, necessary office files are divided according to organization internal and external information sources. There includes areas of communication assets, assets users, communication providers, assets billings, assets requisition and related managements activities.   Records are kept in physical files format; labeled by topics and kept in cabinets where classified information is often under lock. The unit does not have a separate filing room and filing cabinets are placed within the same office premises. An index file assists in the location search for each file within the cabinets.

Even though workable, this manual file record keeping method have a lot of weakness when compare to information management system that utilizes databases Some of the discrepancies observed from this practice are inherent data repetition where records regarding the same subject are duplicated and kept in different topics, data isolation where information are often represented by themselves and not being supported or collaborated by other information, indifference data format where no standardizing of format are practice leading to compability problem when records need to be merge. All these weakness indicate that the current files system practiced by the

unit *could not effectively represent the require organization data.* Information provide by this files system could not effectively assists management in making decision as they contain error and are not reflective of the current state of affairs,

The unit does not have any information management system to assists in managing its responsibilities. The backup of the files systems are records kept in separate Microsoft Excel files but not representative of all office files. Among the problems identifies within the unit are as follows:

- No asset users and billings database.

- User application of communication lines are done manually.

- Monthly inspection of various asset bills is done manually.

- No information systems to record and monitor the current communication asset within the MAF premises.

- No information systems to record and monitor current communication assets rentals and billings.

- Difficulty in producing status report and summary report on billings and assets users required by higher management.

- No information system tools to perform billings or assets queries and analysis.

- The current usage of manual file system exhibits all the disadvantages of data repetition and data isolation.

1.5   **Project Objective**

The objective of this project is to design a relational database *decision support system* (DSS) that will assist Sel Khidmat Talipon in improving its current situation in the best possible means. The designated system should be able to enhance the unit daily operational tasks concentrating on its 2 major functions; which are to manage MAF communication assets and assisting the management in making decision concerning those assets. In order to achieve these, the designated relational database *decision support system* shall have the following capabilities:

- Database function for keeping records of MAF communication users and assets.

- Generation of reports and summaries as require by the management as to assists them in making assets management decision.
- Online analytical processing (OLAP) capabilities to allow the management to perform records queries and analysis.

1.6   **Project Assumption and Limitation**

This project will involve the design and development of a database *decision support system* with OLAP capabilities that will meet the objectives as set forth above. It is a continual project from the current course Professional Attachment I module with the same name. The prototype system designated to be put forward at the end of the project duration will be a 3-tier web based system implemented within the unit and its headquarters intranet. The system will consist of the following modules:

- Module to enable the system to verify users via a login panel.
- Module to enable system administrator to manage system users.
- Module to enable system administrator to view users login.
- Module to enable data operators to input and update assets records.
- Module to enable managers to generate and view data reports and summaries.
- Module to enable managers to perform data queries and analysis.

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