

REQUIREMENT ENGINEERING EVALUATION OF REAL TIME INSTANT
MESSAGING USING ISO 9126 METRICS (INTEGRATED RMN SIGNAL
READER/DRAFTER)

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Special dedication to

The most understanding and caring person,

My beloved wife Zarina Bt Fuad.....

And Bonda Saminah Bt Satiman...

Lovely daughters and sons ...

My entire course mate.....

And to my late father,

Yasin Bin Mohayat

al-fatihah..

“THANK YOU FOR YOUR SACRIFICE AND CONTRIBUTIONS”

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ABSTRACT

Software development that does not have documentation, poses difficulties in modification and maintenance processes. Therefore, the maintenance activity system depends so much on a highly skilled software engineer. As a consequence, project management becomes imbalance especially in workload and responsibility. Moreover, clients are often unaware of the structure development of each software. Client tends to give full trust to the capability of software developer especially when there is no standard communication procedure lined out by developer. Indirectly, it causes the value of activity cost unclear to the customer. Besides, a systematic evaluation upon every system is difficult since software development structure is not concrete and abstract. The DoD-2167A standard was chosen to guide in forming standard documentation in analysis, design and testing. *Unified Modeling Language* (UML) technique was used to model requirement and software architecture. Object oriented programming was applied in developing the software in easing the maintenance activities. ISO 9126 quality metric is used to evaluate the software system. A signal reader system known as “Virtual Signal Reader/Drafter (VirSiRD)” system has been selected as a foundation to the software development in practicing software engineering tasks.

ABSTRAK

Membangunkan perisian yang tidak mempunyai dokumentasi, menyukarkan proses untuk pengubahsuaian dan penyenggaraan. Faktor ini menyebabkan aktiviti penyenggaraan sistem tersebut amat memerlukan seorang jurutera perisian yang berkemahiran tinggi. Natiyahnya, pengurusan projek menjadi tidak seimbang terutama dari segi beban kerja dan tanggungjawab. Tambahan pula, pengguna kebiasaannya tidak terdedah kepada aktiviti-aktiviti pembinaan struktur suatu perisian. Ini menyebabkan pengguna meletakkan sepenuh kepercayaan kepada kebolehan pembangun perisian apatah lagi tiada prosidur komunikasi piawai yang dijelaskan oleh pihak pembangun perisian. Secara tak langsung ini menyebabkan nilai kos aktiviti tidak begitu jelas pada pandangan pengguna. Manakala penilaian sistematik ke atas sesebuah sistem juga sukar dijalankan memandangkan struktur senibina perisian tidak konkrit dan abstrak. Piawaian DoD-2167A digunapakai sebagai satu langkah cepat dan mudah untuk menyenggara proses dan aktiviti sesuatu pembangunan perisian terutama dalam dokumentasi. Teknik *Unified Modeling Language* (UML) digunakan untuk menggambarkan keperluan dan struktur senibina perisian. Pengaturcaraan berorientasikan objek juga digunakan sebagai langkah penyelenggaraan yang lebih mudah. Metrik kualiti ISO 9126 pula digunakan untuk menilai perisian. Perisian Pembaca Kawat yang dinamakan “Virtual Signal Reader/Drafter (VirSiRD)”, dipilih sebagai projek asas pembangunan perisian dalam mempraktikkan kerja-kerja kejuruteraan perisian.

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LIST OF ACRONYMS

ACP123	Allied Communications Publication number 123
ACP127	Allied Communications Publication number 127
ACP	Availability Capacity Payment
AES	Advanced Encryption Standard
CASE	Centre for Advance Software Engineering
CD	Compact Disc
CSC	Computer Software Configuration
CSU	Computer Software Unit
DES	Data Encryption Standard
I/O	Input output
IDE	Integrated Development Environment
IPX	Internetwork Packet Exchange
IRS	Interface Requirement Specification
ISO	International Standard Organization
JPS	Jabatan Pengairan Selangor
LAN	Local Area Network
MS	Microsoft
NIST	National Institute of Standards and Technology
PCR	Problem Change Request
PCSB	Petronas Carigali Sdn Bhd
PPA	Power Purchase Agreement
PPSB	Prai Power Sdn Bhd
RMN	Royal Malaysian Navy
RTU	Remote Transmission Unit
SCADA	Supervisory Control And Data Acquisition
SDD	Software Design Document
SDP	Software Development Plan

SRS	Software Requirement Specification
STD	Software Test Document
TCP/IP	Internet Protocol Suite
TNB	Tenaga Nasional Berhad
TJSB	Teknik Janakuasa Sdn Bhd
TLDMNet	Tentera Laut Diraja Malaysia Networking
UML	Unified Modeling Language
VCL	Visual Component Language
VABS	Virtual Auto Billing System
VAMPS	Virtual Automatic Message Processing System
VirSiRD	Virtual Signal Reader/Drafter
VirQMS	Virtual Quotation Management System
VSS	Virtual Softnet Solutions Sdn Bhd
WAN	Wide Area Network

CHAPTER 1

INTRODUCTION

1.1 Company Background

Virtual Softnet Solutions Sdn. Bhd. was founded by Mr. Abu Bakar Hj Hassan in April 1998. This company was formerly known as Virtual Software & Networks Enterprise. For the first three months, this company started its business in Sg. Petani, Kedah. Thinking about business opportunity, this company shifted to Sitiawan, Perak for expansion strategies and to seek more business opportunities especially for Royal Malaysian Navy (RMN). In December 2000, Virtual Software & Networks Enterprise changed its name to Virtual Softnet Solutions Sdn. Bhd. (VSS) upgraded its status from Enterprise to Sdn. Bhd. (Private Limited) to cope with the requirement of the Royal Malaysian Navy. After about five years of operation in Sitiawan, VSS again moved to its own building in Manjung Business Centre.

Today, the company has taken one step ahead as one of local capable software house in Information Technology (IT) consultation, software development and system integrator. This company has been involved not only in local market but also international market. This happened in Oct 2002, when Rohde & Schwarz Co. GmbH, Bremen, Germany, purchased ship communication system software known as Automatic Signal Switching And Distribution System (ASADS). ASADS was purchased for the used of RMN ships which were built in Germany. With this purchase, shown that the international company recognized this company.

1.2 Company Structure

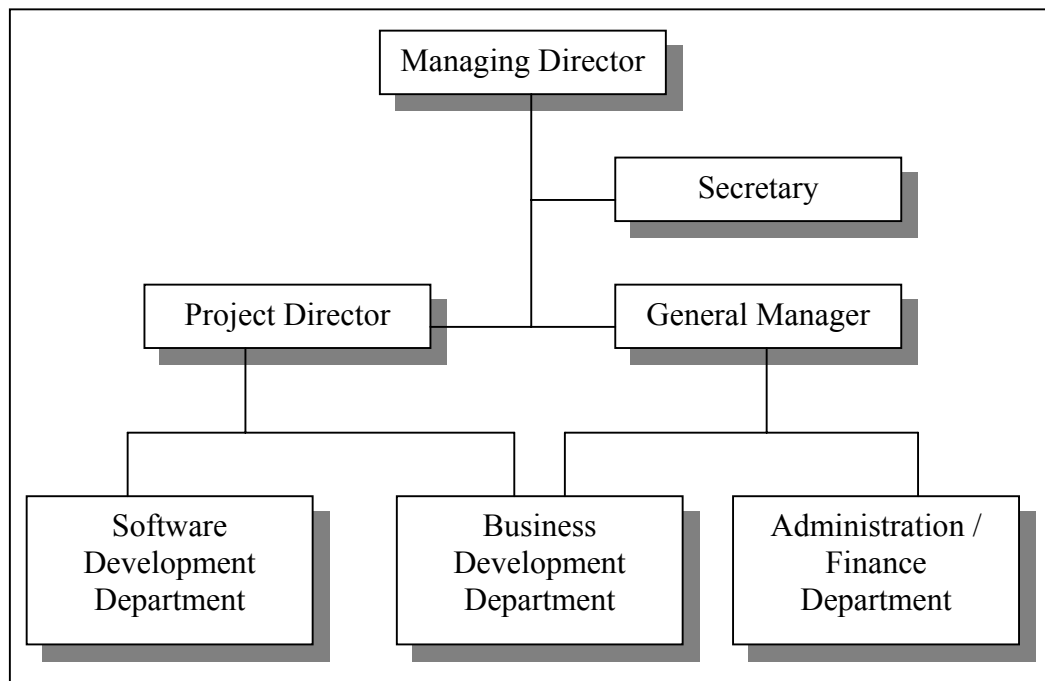


Figure 1.0: Management Structure

The structure of the company is separated into 2 sections, which are the management and software development. General Manager heads the Management Department and Project Director heads the Software Development Department. This structure enables VSS people to work independently and focusing into their relevant expertise and facilitates the development skills among themselves. VSS also created in-between department, which called Business Development Department as the very dynamic and progressive department to fulfill the company needs in marketing, maintenance and support. The uniqueness of this department was that they might occupy their people from both department of Software Development Department and Administration/Finance Department to form a special team to tackle any specific project.

1.3 Company Involvement

Besides other agencies, VSS was involved in software development mostly for the RMN. This company used Borland C++ Builder to develop software for their clients. They have expertise that exposed with Navy signal protocol ACP127 and ACP123, as they are the main software provider for signal communication in RMN. The product that comply with the Navy messaging protocol known as Virtual Automatic Message Processing System (VAMPS) for the RMN and Virtual Signal Reader/Drafter (VirSiRD). Most of RMN ships and bases currently used these applications.

The advantage of this company is that the expertise varies from electrical to software background. With this advantage, many products involve with real-time hardware communication especially in Supervisory Control And Data Acquisition (SCADA) system were successfully delivered. The software developed has the capabilities in communicating to Remote Transmission Unit (RTU), modem, and other equipment that support RS232 or TCP/IP protocol. Examples of the products are: -

- a. Virtual Performance Test System for Lumut Power Plant.
- b. SCADA system for Lembaga Air Perak.
- c. SCADA system for Kulim Hitech Water Treatment Plant.
- d. Pump House Control System for JPS Negeri Selangor.
- e. Tidal Gate Control System for JPS Negeri Selangor.

With the wide use of internet technology to become part of industry business style, this company also doesn't restrict the opportunity in developing system using web based. Support with the C++ Builder expertise, all the limitation of web application were solved such as in providing real time monitoring and control system and integration with other system. Some examples of the products developed by this company under this web-based category are: -

- a. Metocean PCSB Intranet Website for Petronas Carigali Sdn. Bhd.

- b. 13e2Blading Web Based System for Teknik Janakuasa Sdn. Bhd.
- c. Kasturi-Net for KD Kasturi, TLDM.
- d. QueSystem for Majlis Perbandaran Manjung.
- e. FSD E-Purchase System

1.4 Problem Statement

Tentera Laut Diraja Malaysia Networking (TLDMNet) is an application platform used in the RMN as one of means for communication and electronic administration via intranet. RMN officer now can send and receive signals through TLDMNet. This scenario happens when VirSiRD, a signal's software was integrated with TLDMNet. VirSiRD was developed according to ACP 127 protocol. Prior to this, RMN officers have to wait for the distribution signal in the form of printed papers. In addition, there are also e-mail and office automation or electronic administration facilities had been provided.

However, these types of administration and communication's tools are not a real-time communication because of the delay factor. Delay can caused late of decision making, implementation and will produced inefficiency result. To date, there is a real-time communication tools available in the market called Instant Messenger (IM). Bantu, a secure IM was given a chance by the US government to be applied in US Armed Forces. Inline with the government policy "buy local product", today we have local IM known as Virtual Messenger (VM). Therefore VM should be introduced in the RMN service as a complement to provide the real time electronic communication. Since VirSiRD is already become one of the TLDMNet tool, this project will integrate VirSiRD with VM to make TLDMNet more sophisticated.

VirSiRD that is currently used in the RMN is mainly for sending official messages. Normally, before something official come up, there are a few things need to be clarified. So far, using fax or telephone has done it. Using fax and telephone

are limited only for text and voice. Sometime, information might be in the form of graph, photo or even need to transfer files. All these kind of information sending will be eased if instant messaging is introduced.

Another problem is that there was no software documents ever produced for the existing system. In the long term, this can contribute to the difficulties if product needs to be upgraded or maintained. System quality also became issues since no specific procedures or evaluations to claim the level of the system achievement.

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