

INTERNET DATA UPLOADING AND PROCESSING

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To my beloved
mama (Che Hamidah binti Che Ros),
abah (Hamzah bin Abdul Hamid),
and family
(Hamthiar Irwan bin Hamzah),
(Mohd Hamdi Irwan bin Hamzah),
(Muhammad Hamsani Irwan bin Hamzah).

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ABSTRACT

Forecasting Technology and Network Simulation (FTNS) unit in Telekom Research and Development (TMR&D) has produced several forecasting/planning tools to replace the ones currently used and imported by Telekom Malaysia Berhad (TM). The tools are used by TM's to formulate business and network planning and thus helping TM to save time, money and resources on other software. The industrial attachment project is to build a Computer Software Configuration Item (CSCI) called Internet Data Uploading and Processing (IDUP). This CSCI is a part of the forecasting technology system project. The purpose of IDUP is to upload the Internet data file into the database server. IDUP also has the capability of processing data in order to display monthly report summaries. The information stored in the database is mainly used by the user in the website. From the web, users can view all monthly report summaries, print the selected summary report, and also can export the data into other software. This file format will then be used for forecasting purposes. The development of IDUP is divided into three categories. IDUP is built using Microsoft Visual Basic 6. The database for IDUP is built using Oracle 9i. The development to display and print out the information from the database is using Active Server Page (ASP). System modeling and design for Object-Oriented Analysis and Design (OOAD) is done using Unified Modeling Language (UML). This industrial attachment project uses the PROPS model for its development methodology. This model is used throughout the entire project in TMR&D. The standard and guideline to be used for the documentation purposes of this industrial attachment project follows the IEEE standard and guideline for software development.

ABSTRAK

FTNS unit di TMR&D telah menghasilkan peralatan ramalan/perancangan untuk menggantikan peralatan yang digunakan dan diimport oleh TM. Peralatan-peralatan ini digunakan di semua bahagian di TM bagi memformulasikan perancangan perniagaan dan rangkaian untuk membantu TM menjimatkan masa, perbelanjaan, dan sumber, daripada menggunakan perisian lain. Projek Latihan Industri yang ditugaskan ialah untuk membangunkan sebuah CSCI iaitu, IDUP. CSCI ini ialah sebahagian daripada projek *forecasting technology system*. Tujuan IDUP ialah untuk memuat naik fail Internet data ke dalam pangkalan data server. IDUP juga mempunyai keupayaan untuk memproses data bertujuan memaparkan rumusan laporan bulanan. Maklumat yang disimpan di dalam pangkalan data ini akan digunakan oleh pengguna melalui halaman web. Daripada web, pengguna dapat melihat, mencetak, dan mengeksport semua rumusan laporan bulanan data ke dalam perisian lain. Format fail ini kemudiannya akan digunakan untuk tujuan ramalan. Pembangunan IDUP dibahagikan kepada tiga kategori. IDUP dibangunkan menggunakan *Microsoft Visual Basic 6*. Pangkalan data untuk IDUP dibina menggunakan *Oracle 9i*. Pembangunan untuk memaparkan dan mencetak maklumat daripada pangkalan data dibina menggunakan ASP. Permodelan dan rekebentuk sistem untuk OOAD dibuat menggunakan UML. Latihan industri ini menggunakan model *PROPS* untuk metodologi pembangunannya. Model ini digunakan pada seluruh projek yang dijalankan di TMR&D. Standard dan garis panduan yang akan digunakan untuk tujuan dokumentasi bagi latihan industri ini pula adalah mengikut standard IEEE dan garis panduan untuk pembangunan perisian.

TABLE OF CONTENTS

CHAPTER	TITLE	PAGE
	DECLARATION	ii
	DEDICATION	iii
	ACKNOWLEDGEMENT	iv
	ABSTRACT	v
	ABSTRAK	vi
	TABLE OF CONTENTS	vii
	LIST OF TABLES	x
	LIST OF FIGURES	xi
	LIST OF ABBREVIATIONS	xii
	LIST OF APPENDICES	xiii
1.0	INTRODUCTION	1
1.1	Introduction	1
1.2	Company Background	2
1.2.1	Telekom Research and Development (TMR&D)	2
1.2.2	Forecasting Technology and Network Simulation Unit (FTNS)	4
1.3	Project Background	9
1.4	Project Objectives	10
1.5	Project Scopes	11
1.6	Project Planning	12
1.7	Project Deliverables	12
1.8	Project Team Structure	13

2.0	LITERATURE STUDY	14
2.1	Introduction	14
2.2	Existing System – Mobile Data Uploading and Processing	15
2.2.1	Comparison Between the Existing System and the IDUP	16
2.3	PROPS Model – Software Development Methodology Applied	17
2.3.1	Introduction to PROPS	18
2.3.2	The Knowledge Areas	22
2.3.3	Why PROPS?	23
2.3.4	Comparison Between PROPS and Other Model	26
2.4	Standard and Guideline for Documentation	28
2.5	Microsoft Visual Basic 6	30
2.6	Oracle 9i – Oracle Enterprise Manager.	32
2.6.1	Key Concept	34
2.6.2	How the Pieces Work Together	34
2.6.3	New 9i Console Features	35
2.7	Introduction to SQL	36
2.8	Unified Modeling Language	37
3.0	PROJECT METHODOLOGY	38
3.1	Software Development Methodology	38
3.2	Software Development Process	42
3.3	Software Development Standard and Guideline for Documentation	45
3.4	Software Development Tools and Techniques	46
4.0	PROJECT DISSCUSION	47
4.1	Introduction	47
4.2	Software Development Methodology	48
4.3	Software Development Process	48
4.4	Software Development Standard and Guideline for Documentation	52
4.5	Software Development Tools and Techniques	52
4.6	Requirement Analysis, Specification and Design of IDUP	53

4.7	File Data	56
4.7.1	File Data vs. File Type Detection	56
4.7.2	File Data Type vs. Table in Database	57
4.8	Uploading Process Needs	58
4.8.1	SQL*Loader File	60
4.8.2	Control File	61
4.9	IDUP System Requirement	63
4.10	Database	63
4.10.1	Tables	64
4.10.2	Stored Procedure	67
5.0	CONCLUSION	70
5.1	Lessons Learnt	70
5.2	Problems During Development	72
5.3	Constraints and Restrictions	72
5.4	Expectations and Assumptions	73
5.5	Suggestions for Improvement	74
5.6	Conclusion	74
	REFERENCES	75
	APPENDIX	80

LIST OF TABLES

TABLE NO.	TITLE	PAGE
2.1	TMR&D Documentation Templates	29
3.1	Processes in PROPS Application for Applied Research (Software) Model	43
4.1	Field Columns for Internet and TTMc	56
4.2	Corresponding Table for Internet and TTMc Data Type in Database	58
4.3	The Files Used in the Uploading Process	58
4.4	The Files Name Which Involved in Uploading Process	59
4.5	The Example of Control File Format for Internet and TTMc File Data	60
4.6	The Example of SQL*Loader format for Internet and TTMc Data	61
4.7	The Description and Information of Available Table in IDUP Database	64
4.8	Store Procedure Description Which Used in Uploading Program	67

LIST OF FIGURES

FIGURE NO.	TITLE	PAGE
1.1	Organization Structure in FTNS unit	6
1.2	Structure of IDUP Development Team	13
2.1	The location of Uploading Program in System Flow	15
2.2	The PROPS	18
2.3	Four Perspectives in PROPS	19
2.4	The PROPS Color Scheme	20
2.5	The Iterative Process of Project Planning	23
2.6	PROPS Project Document Flow	24
2.7	PROPS Document Guide: Project Specification	24
2.8	Project Management by Facts	25
2.9	Management by Project	25
2.10	The PROPS Consultant Network	26
2.11	The Waterfall Model	27
3.1	PROPS Project Flow	39
3.2	The PROPS Color Scheme	41
3.3	PROPS Application for Applied Research (Software) Model	42
4.1	The Use Case Diagram of IDUP	53
4.2	Sequence Diagram: Basic flow for IDUP	54
4.3	IDUP Architectural Design	55

LIST OF ABBREVIATIONS

CSCI	- Computer Sytem Configuration Item
FTNS	- Forecasting Technology and Network Simulation
IDUP	- Internet Data Uploading and Processing
IEEE	- International Council of System Engineering
TM	- Telekom Malaysia Berhad
TMR&D	- Telekom Research and Development
IFSv2	- Internet Forecasting System version 2.0
ASP	- Active Server Page
OOAD	- Object-Oriented Analysis and Design
UML	- Unified Modeling Language
CASE	- Centre for Advanced Software Engineering
RUP	- Rational Unified Process
OMT	- Object Modeling Technique
OMG	- Object Management Group

LIST OF APPENDICES

APPENDIX	TITLE	PAGE
A	Gantt Chart – Project Planning	80
B	Ericson Success Story	81

CHAPTER 1

INTRODUCTION

1.1 Introduction

The project is an outcome of the industrial attachment Program. The program is part of academic module for Master Degree program organized by Centre for Advanced Software Engineering (CASE), Universiti Teknologi Malaysia. Students are required to complete this module for the eligibility of being awarded with Master of Science (Computer Science in Real Time Software Engineering). The duration of the program is five months. The objectives of this program are to provide practical exposure in real working environment particularly in Software Engineering industry, to orient the students to adopt software engineering theories and eventually improvised their skills and knowledge for future placement, to nurture quality Software Engineering graduates well versed in software engineering technology, versatile, competitive, innovative and resourceful, to provide guideline on what to expect in the pool of working environment and to improvised the existence projects and systems via knowledge sharing between the students and expertise from industry. This technical report will report the task that author has done at Forecasting Technology and Network Simulation (FTNS) Unit at Telekom Research and Development (TMR&D). The caption of the task is Internet Data Uploading and Processing System. This project is not supposed to be a development project at first

but as a research and development project. The main idea is to research the best practice that available in market today to produce the first working application.

1.2 Company Background

This section will delineate the company background that is TMR&D, and one of its units, which is FTNS unit, where author has been placed for the industrial attachment Program with CASE, Universiti Teknologi Malaysia.

1.2.1 Telekom Research and Development (TMR&D)

Telekom Malaysia Research and Development (TMR&D), formally a division of Telekom Malaysia Berhad (TM) has been incorporated as a subsidiary company on 1st October 2000 and operated on 1st January 2001. It is a wholly owned subsidiary company of TM. TMR&D is the forefront for research and development activities in TM and play a leading role for new network and leading edge technologies through designing, fabrication and calibration for telecommunication industries.

Apart from TM as the main clientele, the customer database range from local and multinational company, corporate organization to universities, and other players in the information and communication technology industry locally and abroad. The main activities carried out are:

- i. To identify and undertake research and development activities in Information and Communication Technology.
- ii. To develop, enhance and upgrade all aspects of the related technology of new and/or existing product, system and services.
- iii. To conduct studies, consultations, advisory, testing, calibration and management services in its area of expertise.
- iv. To use the knowledge and understanding gained from research towards production of useful materials, devices, systems and method including design and development of prototypes and process.

TMR&D supports the Operations and Network Groups in TM in modifying and enhancement of current equipment installed in the network for better performance and reliability through innovative ideas from researchers and operation groups. TMR&D team is involved during the planning, designing, manufacturing, assembling, installation, and commissioning of specific projects as well as promotion of products and consultations with potential customers. TMR&D also provides calibration services for optical and electrical telecommunications equipments. These equipments are calibrated according to specification. The calibration lab has accredited with ISO/IEC 17025 as electrical calibration laboratory under Lab Accreditation Scheme SAMM scheme.

TMR&D is committed to continuously provide leading edge products and services in information and communication technology for customer's satisfaction. Core business is to conduct researches in the areas of communication technology.

1.2.2 Forecasting Technology and Network Simulation Unit (FTNS)

TM with its vision to become a world class telecommunication has been spending a considerable amount of time, money and resources on engaging new technologies (e.g. Internet or Intranet and Broadband or Multimedia Communication technology); as well as purchasing statistical and planning tools (e.g. STEM, SAS and SPSS) for business and network planning of above technologies.

TMR&D, in particular Forecasting Technology and Network Simulation (FTNS) unit, has managed to produce several forecasting and planning tools in its effort to replace the ones currently used and imported by TM. The tools are used by TM's divisions in their day-to-day activities especially in formulating business/network planning for existing as well as new technologies thus helping TM to save time, money and resources on "imported" software.

FTNS unit (in particular Network Simulation Group) also plan to help TM in delivering high performance and high reliability networks that support even the most stringent Quality of Service requirements.

Scope and function of FTNS unit are as follows:

- i. To carry out research activities with respect to forecasting and network simulation. This research work will support other application development project undertaken by the other research body.
- ii. To carry out consultant work for internal as well as external (that is outside TM) customers.

Vision of FTNS unit is:

- i. To be the leading (and world-class) research team this is in line with the vision of the company and nation.

Mission of FTNS unit is:

- i. To deliver (effectively) the best possible support and solution with respect to forecasting and network simulation.

The FTNS unit has the following goals to achieve:

- i. To ensure the researchers in the unit are expert in their chosen field.
- ii. To ensure that FTNS unit becomes the reference point for internal as well as external (that is outside TM) customers with respect to research work in the field of forecasting and network simulation.

FTNS unit is divided into two (research) groups namely Forecasting Technology Group and Network Simulation Group.

- i. Forecasting Technology Group will provide forecasting related products/services to internal as well as external (outside TM) customers.
- ii. Network Simulation Group will focus on network modeling and simulation of ATM/B-ISDN (local and wide area networks) and enterprise networks (+ Internet/Intranet). The group will provide consultant service to COINS, SNS and other divisions in TM; and the main simulation software used by the group is OPTNet.

Staff members of the FTNS unit mainly are researchers. The names of researchers are given below in figure 1.1:

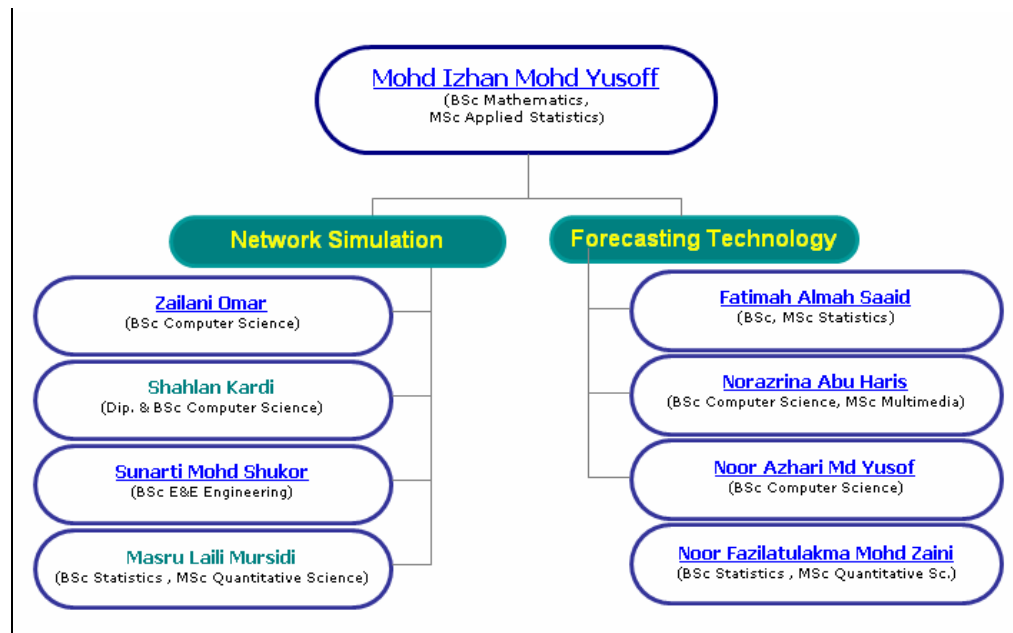


Figure 1.1: Organization Structure in FTNS unit

FTNS is planning to intake more researches with the following capabilities for the next five years to achieve the target of 16 researchers (i.e. 8 researchers for each group). This is part and parcel of FTNS Vision, Mission and Business Strategy.

Members of this unit are also encouraged:

- i. To do Masters or PhD in local as well as overseas university. At the moment two researchers are doing Masters degree and one researcher is doing PhD. Number of researchers with Masters degree in FTNS is two while the rest, Bachelor degrees.
- ii. To produce research papers for local as well as international journals.
- iii. To produce research papers for local as well as international seminars or conferences.

Basically FTNS unit has two roles to fulfill. First and foremost, this unit is the support agent for the following entities:

- i. Other research units (plus administrative and support units) in TMR&D.
- ii. Other divisions (and business entity) in TM.

The secondary role of FTNS unit is to act as technology consultants to other organizations in Malaysia. These organizations shall encompass all the different industries and service sectors.

Having clearly defined the roles of FTNS unit, its responsibilities can now be defined based on the different "customer" profiles. These are listed as follows:

- i. As support agent to TMR&D.
- ii. As support agent to other divisions.
- iii. As technical consultant to other organizations.

Like any other units in TMR&D, FTNS unit will focus mainly on applied research; and Basic research will be done via Masters or PhD. programs. As for Applied research, the unit will collaborate with other research institutions both local and international to develop expertise with the assistance of experts in these institutions. By adopting the above approach, FTNS unit hopes to "secure" a considerable number of projects for this year as well as many years to come.

FTNS unit business strategy is to deliver services to internal as well external (outside TM) customers. This will be the main target for the next two years. As the confidence and know-how developed, the unit will be targeting other industries in Malaysia that require the expert services the unit has to offer.

Up until now, FTNS unit has managed to provide services and expertise to three (internal) customers namely Telco Strategy; (Network Forecasting Division) CPPM and TMM; and will continue serving these customers by upgrading the products and services developed or rendered by this unit. FTNS unit will extend its products and services to other divisions in TM; and it will form and establish a smart partnership with IT companies that are interested to sell the units products and services to external (outside TM) customers.

FTNS unit believes that it has the right component to package reliable and quality products and services with respect to forecasting and network simulation.

Over the years, TMR&D (in particular FTNS) has managed to develop more than ten tools and modules for SMSS (Telco), Telekom Multimedia, Network Forecasting Unit (CPPM, Telco) and Corporate Strategy and Planning (CSP) Division, namely:

- i. Forecasting Software – ForeSoft.
- ii. COMPASSTM for Forecasting Modules.
- iii. Internet Forecasting Software version 2 - IFSv2.
- iv. Missing Values Problem (MVP) analysis module in IFSv2.
- v. Internet Forecasting Software version 1 - IFSv1.
- vi. International Network Forecasting Software – InNeF.
- vii. Mobile Forecasting Software version 1 - MFSv1.
- viii. Broadband Forecasting Software – BFS.
- ix. Forecasting Data Analysis – FDAS.
- x. Forecasting Tool for Telekom Malaysia version 3 - ForTeLv3.
- xi. Network Simulation Tool for UMTS (NeST-UMTS).
- xii. Network Simulation Tool version 1 (NSTV1).

Apart from developing software or tools for customers, FTNS members also actively involve in tasks like conducting workshops and performing consultancy works. FTNS unit also involve in giving consultancy for other company.

1.3 Project Background

For this industrial attachment, the project is to develop a Computer Software Configuration Item (CSCI) called Internet Data Uploading and Processing System. This CSCI is a part of the forecasting technology system project. The purpose of this system is to upload the Internet data file into the database server. This program also has the capability of processing data in order to display monthly report summaries.

The information stored in the database is mainly used by the user in the website. From the web, users can view all monthly report summaries, print the selected summary report and also can export the data into other software.

This file format will then be used for forecasting purposes. The development of the software is divided into three categories. The details are as follows:

- i. Internet Data Uploading Software builds using Microsoft Visual Basic 6.
- ii. The database for this industrial attachment project builds using Oracle 9i.
- iii. The development of the software to display and print out the information from the database is using Active Server Page.

This industrial attachment project uses the PROPS model for its development methodology. This model is used throughout the entire project in TMR&D. The standard and guideline to be used for the documentation purposes of this industrial attachment project adhere to the IEEE standard and guideline for software development.

1.4 Project Objectives

The objectives of this industrial attachment project are:

- i. To develop software that can upload Internet data from text file, process the data to be an informational output, store the information into the database, display and print the result of the information onto the website.
- ii. To understand and implement the PROPS model for the software development methodology.
- iii. To understand and implement the IEEE standard and guideline for the documentation purpose of this software development.

1.5 Project Scopes

The scopes of this industrial attachment project are:

- i. To do literature survey on database management application using Microsoft Visual Basic 6 and Oracle 9i.
- ii. To do literature survey on web application using Active Server Page.
- iii. To do literature survey on existing system.
- iv. Analyze requirements for the software.
- v. Develop SRS documentation using IEEE standard and guideline.
- vi. Design software architecture based on software requirements.
- vii. Design database architecture based on software requirements.
- viii. Develop SDD documentation using IEEE standard and guideline.
- ix. Develop software using Microsoft Visual Basic 6.
- x. Develop database using Oracle 9i.
- xi. To do integration with web application using Active Server Page on existing website.
- xii. Develop STD documentation using IEEE standard and guideline.
- xiii. To do testing and quality control for this industrial attachment project.
- xiv. Write up technical manual and user manual.

1.6 Project Planning

This industrial attachment project will be done within 5 months from 6th of April 2005 until 2nd of September 2005. The project will be done by a developer which is of course the author itself and is supervised by a staff. The details of the task for this industrial attachment project are mentioned in the Gantt chart on Appendix A.

1.7 Project Deliverables

The deliverables from this industrial attachment project are:

- i. Internet Data Uploading and Processing System (IDUP)
- ii. Software Requirements Specifications.
- iii. Software Design Descriptions.
- iv. Software Test Documentation.
- v. Software Technical Manual.
- vi. Software User Manual.

1.8 Project Team Structure

The Development Team Structure is presented as Figure 1.2. The forecasting technology group in FTNS is led by En. Mohd Izhan bin Mohd Yusoff as the Head of Unit. Meanwhile, Pn. Fatimah Almah Saaid, as the team leader, is responsible in defining and detailing the project requirement. Project Supervisor, Pn. Norazrina binti Abu Haris, which is the Industrial Mentor, is responsible in supervising the project development progress and throwing some advice and opinion. The responsibility to develop the project has been given to author as the project developer.

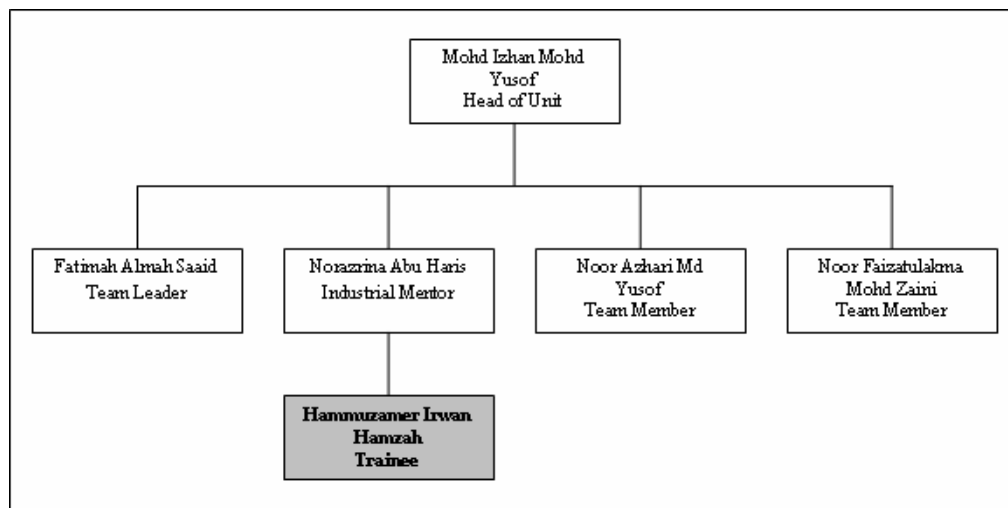


Figure 1.2: Structure of IDUP Development Team

5.5 Suggestions for Improvement

For the future improvement, author has outlined a number of suggestions such as below:

- i. Cater the planning of the project.
- ii. More resource on the major part of this project, like peer programming approach to solve programming problem.
- iii. More resource on the quality part and configuration part of the project.

5.6 Conclusion

Internet Data Uploading and Processing system specially made for Telekom Research and Development (TMR&D). It is indeed a simple project but it gives the author experience on how to handle a project. The project follows the software life cycle phases which are the software requirement and specification analysis phase and also the design and implementation phases. This software development methodology followed the PROPS model. Author also produced software documentation such as the software requirement and specification documentation and the software design documentation which follows the IEEE standard. Not many issues arose in throughout the project; sincerely author admitted that maybe just the lack of experience and knowledge working in the industry plus author was only an armature in the programming skill. There is also other problem occurred while author develop the system which is the technical part whereby the workstation was broken and had not been worked so well. This slowed the progress of the development. It is understood that thing may happen, sometime the project need to be postponed or delayed. This is a nightmare, since it will affect the development schedule to be longer to finish.

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