

**THE UPGRADING OF
MYKID INITIALIZATION SYSTEM
FOR IRIS CORPORATION BERHAD (IRIS)**

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THE UPGRADING OF
MYKID INITIALIZATION SYSTEM
FOR IRIS CORPORATION BERHAD (IRIS)

SARIMAH BINTI SAMSUDIN

This technical writing is submitted in partial fulfillment of the requirements for the
award of
Masters of Science
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Centre for Advanced Software Engineering
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University Technology Malaysia

MAY 2006

DECLARATION

“I declare that this technical writing entitled ‘The Upgrading MyKid Initialization System’ for IRIS Corporation Bhd. (IRIS) is the result of my own research except for citations that have been dully acknowledged”.

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To my inspiration; Hazli and Hazim

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ABSTRACT

The usage of smart card has dramatically expands over the centuries. This is due to the needs in various areas such as healthcare, communication, self identification, banking, and many more that smart card contributes. Malaysia is one of the countries that are implementing smart card as self identification for the citizens. Malaysia has started with MyKad and recently, the government introduces MyKid as identification card for kids below 12 years old. MyKid Initialization System is a system that links two ‘firmware’, which is ‘mechanical firmware’ and ‘reader firmware’ with the mechanical parts of machine that operates the smart card operating machine. The system ran on physical machine named MRR300E. Due to several upgrading to the mechanical part of the machine, the mechanical firmware has to change. Changing the mechanical firmware caused the Machine Automation Department, hereinafter called as MAD, at IRIS need to review back the previous version of the software to enable the new firmware and hardware functioning and delivered the same task as before. Also, the upgrading involved several enhancements to the software. With this new software, security features are added that enable only the maintainer can access the maintainer page. Also, the system will be auto lock from being run after certain times. This is to enable the maintainer team to trace the condition of the machine, and how the machine operated at certain period of time. The methodology used to deliver the project is V shape methodology as this is the simpler methodology compared to others. As MAD have not implement software engineering practices before, choosing V shape is a wise move to introduce software engineering documents and practices. As a result, after competing this project, the author have produced Interface Requirement (IRS), Software Requirement Specification (SRS), Software Design Description (SDD) for the upgraded software. The upgraded software is now known as MyKid version 1.6.2. Hence, this technical report provides experienced-based discussions of software development process of upgrading Mykid Initialization System.

ABSTRAK

Dewasa ini penggunaan kad pintar semakin hebat diperkatakan. Kad pintar digunakan dengan meluas dalam bidang kesihatan, perbankan, komunikasi, alat pengenalan diri dan pelbagai kegunaan global yang lain. Malaysia merupakan salah satu negara yang memperkenalkan kad pintar sebagai alat pengenalan diri untuk warganegaranya. Bermula dengan kad pintar yang dikenali sebagai MyKad, sekarang, ia melangkah setapak lagi dengan memperkenalkan kad pengenalan untuk kanak-kanak berumur 12 tahun ke bawah yang dikenali sebagai MyKid. Penulisan teknikal ini membincangkan tentang penambahbaikan sebuah sistem yang dinamakan MyKid Initialization System. MyKid Initialization System merupakan sistem pengantaraan yang menjadi perantara di antara dua 'firmware', iaitu 'mechanical firmware' dan 'reader firmware' dengan bahagian mekanikal mesin yang membolehkan mesin pengoperasian kad pintar yang dikenali sebagai MRR 300E berfungsi. Disebabkan kepada perubahan yang dibuat ke atas beberapa bahagian mekanikal kepada MRR300E, perubahan ke atas 'mechanical firmware' juga harus dilakukan. Ini menyebabkan Machine Automation Department, dikenali sebagai MAD di IRIS, terpaksa mengubah perisian yang sebelumnya kerana perubahan yang besar ke atas 'mechanical firmware' akan menyebabkan mesin tidak beroperasi sekiranya tiada perubahan di buat kepada struktur arahan di perisian MyKid. Beberapa ciri tambahan juga dimasukkan ke dalam system ini di mana hanya penyelenggara sahaja yang boleh memasuki halaman penyelenggara. Metodologi yang digunakan dalam projek ini ialah *V shape* kerana ia merupakan metodologi yang paling mudah difahami terutama bagi pasukan yang baru ingin melaksanakan praktis kejuruteraan perisian. Selepas menamatkan projek ini, penulis telah menghasilkan Interface Requirement (IRS), Software Requirement Specification (SRS), Software Design Description (SDD) untuk perisian yang kini dikenali sebagai MyKid version 1.6.2.

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LIST OF ACRONYMS

CASE	:	Centre for Advanced Software Engineering
DCM	:	Data Control Module
DES	:	Data Encryption Standard
GUI	:	Graphical User Interface
MSC	:	Malaysia Super Corridor
OMG	:	Object Management Group
RFID	:	Radio Frequency Identification
RUP	:	Rational Unified Process
STD	:	Standard
STD	:	Software Test Description
STD	:	Software Test Description
STP	:	Software Test Plan
STR	:	Software Test Report
STR	:	Software Test Report
UML	:	Unified Modeling Language
UTM	:	Universiti Teknologi Malaysia
UTM	:	Universiti Teknologi Malaysia

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CHAPTER 1

INTRODUCTION

This chapter gives an overview of IRIS Corporation Bhd. (IRIS), which the said project has been done.

1.1 Purpose

This technical writing is prepared for Center for Advanced Software Engineering (CASE), University Technology Malaysia (UTM). Contents of this thesis will give an overview of the tasks that had been done by the author at IRIS. The author was assigned to a project called The Upgrading MyKid Initialization System.

This technical writing emphasizes on the software engineering processes and the development went through during the development of the project. It also describes the experiences gained from the industry.

1.2 Company Background

IRIS Corporation Berhad is a global security solution provider with core expertise in the area of securing government security documents i.e. National ID and Passport. Incorporated in 1994, IRIS is the first company in Asia to set up fully integrated manufacturing facilities for Contact and Contactless Smart Cards, Contactless Document Inserts and assembled Module in Tapes and Reels.

IRIS pioneered the world's first electronic passport and national multiplication smart card with the implementation of the Malaysian Electronic Passport in March 1998 and MyKAD - the Malaysian Government Multi Purpose Card in April 2001. These technologies are deployed in many countries across the Asia, Middle East and Africa regions.

1.2.1 Corporate Overview

IRIS Corporation Berhad is an MSC Status company and is listed on the Kuala Lumpur Stock Exchange.

Beside of smart card manufacturer, IRIS also provides a full range of smart cards readers, integrated terminals, card personalization equipment and biometrics scanner to complement the application of its smart card solutions.

Other IRIS products include the Digital Conferencing System and Immigration Autogate.

1.2.2 Company Profile

The Company (IRIS), is an MSC status company operating from the Technology Park in Bukit Jalil, Kuala Lumpur. It is principally involved in information technology consulting, implementation and research and development. The main focus is the provision of smart card based security solutions. The solutions

are based on a unique identification technology named the Image Retrieval Identification System (I.R.I.S.). The I.R.I.S. technology is the underlining technology for all smart card-security applications developed by the Group as it provides a secure method for identification that is difficult to forge. Depending on the application, innovative technologies such as Biometric Verification, Radio Frequency Identification, Ferroelectric Random Access Memory (FRAM), etc. are integrated with the I.R.I.S. technology to provide customised security solutions.

The Group's initial achievement was designing and implementing the electronic passport. The existing product range includes: Malaysian Electronic Passport (MEP), Smart Sentry, MyKad, Contactless Cards and Electronics, I.R.I.S. Integrated Passenger and Tags, Baggage Security System, Contact Cards, Digital Conferencing System, Smart Card Readers, Smart Lock and Immigration Autogate System.

R&D is an on-going process, especially on technology integration to develop unique smart card solutions and emerging technologies. Current programmes are for smart card technology to incorporate FRAM technology into I.R.I.S. technology and for I.R.I.S. technology: to develop and adapt Facial Biometrics and Voice Pattern Recognition processing. The above development work is targeted to ensure the I.R.I.S. products are applicable for a wider spectrum of the market usage and that it can be accepted globally.

In addition, current development projects cover the proprietary manufacturing process in the production of contactless substrates which are being used in the MEP project, Electronic Visas for use by Immigration Departments and Foreign Embassies, Paperised Baggage Tags using FRAM for airport baggage security, and Battery and Display Technologies for wearable PCs. Under Smart Card Product Designs, the current project is to develop I.R.I.S. proprietary contactless hybrid cards, which are contact as well as contactless cards.

The Group has made seven patent applications to the US Patent and Copyright Office, of which three have been approved. One other patent application to the South Africa Patent Office has been approved, while another to the EU Patent

Office, is still pending. These patents cover the I.R.I.S. Chip Operating System, proprietary techniques and applications commercialised by the Group.

The main customers of the Group are Jabatan Imigresen Malaysia, Percetakan Keselamatan Nasional Sdn Bhd and GMPC Corporation Sdn Bhd, accounting for more than 85% of turnover.

1.2.3 Company Status

The Multimedia Super Corridor (MSC) offers a unique opportunity for companies to participate actively in the development of information technology and to contribute to its use globally.

This initiative is designed to prepare Malaysia to achieve the goals set in Vision 2020 (including attaining the developed nation status), and to leapfrog Malaysia into leadership in the Information Age. IRIS obtained the MSC status in October 1997.

Located in the heart of TPM, IRIS is able to enjoy the full advantage of the infrastructure provided by the MSC.

1.3 Company Projects and Achievement

IRIS has been involved in various projects related to smart card technology. The subparagraphs below explain in general several projects handled by IRIS and the company achievement.

1.3.1 The APICTA 2001 Awards

IRIS is the winner for the Inaugural Asia Pacific ICT (APICTA) 2001 Awards in the E-Government & Services category.

The APICTA 2001 Awards night was held on 7th September, 2001 in Kuala Lumpur with participation from ten countries, namely Australia, Brunei, Hong kong, Indonesia, Korea, Myanmar, the Philippines, Vietnam, Thailand as well as Malaysia. There were 76 nominations for the ten categories of the awards.

It was organized by Multimedia Development Corporation (MDC). The objective was for the entrepreneurs in the information and Communication Technologies (ICT) Sectors in the region to establish a network and benchmark their products with each other. It is also aimed at providing the stimulus to garner global recognition of the information and communications technology (ICT) industry in the Asia Pacific Region.

1.3.2 Turkey E-passport Project

The company has secured a contract to supply e-passports to Turkey. The contract worth Euro 18 million was signed between IRIS Technologies (M) Sdn Bhd, a wholly-owned subsidiary of IRIS and Darphane ve Damga Matbaasi Genel Mudurlugu (Darphane), the General Directorate of the State Mint and Printing Plant of Turkey.

This tender award, which involves the supply of ICAO compliant e-passport inlays being embedded into Turkish passports, marks an important milestone for IRIS. By defeating international bidders who are major players in the smart card solutions industry, IRIS has affirmed its position as a strong global contender and is poised to enter the strategic EU market for smart card security solutions.

The Board is confident that the success in Turkey is expected to create more opportunities for IRIS in 2006 as the US visa waiver dateline beckons and with more countries needing to adopt the e-passport system.

1.3.3 Contract by Syarikat Prasarana Negara Bhd (SPNB)

IRIS has been awarded a RM15.9 million contract by Syarikat Prasarana Negara Bhd (SPNB), to install the ticketing system for SPNB's Rapid KL buses. The contract involves the supply, installation and commissioning of the on-bus-system consisting of electronic ticket machine-driver console, cash vault, coin box, Touch'n Go Reader together with the interfaces for the hardware and software for 1,020 buses. IRIS Corp is expected to complete the project before August 21.

1.4 Project Background

MyKid Initialization System is an application designed for a machine named MRR 300E. The principle of the application is to change the smart card serial number set up by the manufacturer to another serial number means for end user usage. To makes sure that the serial number is safe and unique, all new serial number will be encrypted.

Currently, the system has been used for almost 3 years. Due to some mechanical problem that occurred recently, some upgrading should be carried out to overcome the problem.

The upgrading of machine, several mechanical parts such as coding head, motors and dispenser are changed. Changing the parts also means that we should change the firmware. Thus, the whole application should be revised and upgrade to enable the new firmware and the new part to work together.

In order to come out with the upgraded software, the author has to do some requirement analysis to the machine and application. Since there are no documentation being developed by the previous developer, the author will developed all the documentation based on software engineering practices.

1.4.1 Mykid Initialization System Principle

Figure 1.1 below describe the communication principle of MyKid Initialization System. Basically, when the machine is switch on, it will activate DCM and reader firmware. The DCM firmware will wait for machine status and respond to the machine by giving command based on the status. The command given by the DCM firmware is used to enable the mechanical part to operate, such as to enable the dispenser to dispense card o the lane.

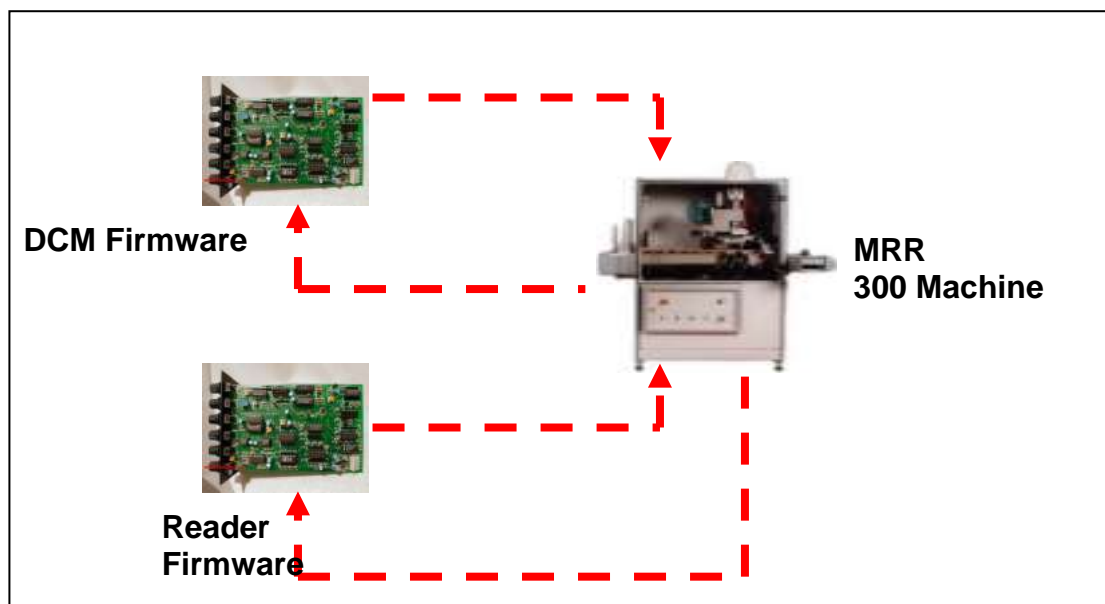


Figure 1.1: MyKid Initialization Communication Principle

Once the DCM firmware detects that the card is at the coding head area, it will give command to coding head to go down to chip area of the smart card. Hence, DCM firmware will pass the operation to reader firmware. The reader firmware will execute all the reader command given by the application. After reader process is finished, reader firmware will check the status of the card. Once again, the DCM

firmware will take the operation responsibility. Based on the status of the card, DMC firmware will give command to the hardware either to execute the fail or pass mechanism. The cycle will continue until all cards is being processed.

Due to the mechanical and firmware changes, the flow of command given and received is changed. Thus, this project is responsible to makes sure that all the upgraded flow is implemented. As there are no documentation is developed before, this project is also aimed to introduce all software engineering documentation practices.

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