IT and Help Desk Support System for Excel Transport Int'l Co., Ltd.

by

Mr. Apiruk Vatcharasevee

A Final Report of the Three-Credit Course
CS 6998 System Development Project

Submitted in Partial Fulfillment
of the Requirements for the Degree of
Master of Science
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Project Title	IT and Help Desk Support System for Excel Transport Int'l Co. Ltd.
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Academic Year	March 2004

The Graduate School of Assumption University has approved this final report of the three-credit course, CS 6998 System Development Project, submitted in partial fulfillment of the requirements for the degree of Master of Science in Computer Information Systems.

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ABSTRACT

Excel Transport International Co., Ltd. (EXC) applied a quality system for Multi Modal Transport Operator (MTO) and International Freight Forwarders. For the early year, dbase was the main application for doing tasks. Many problems occurred during operation such as data accessing deny, data overlapping, and data redundancy. The human error is one reason why the proposed system will be developed. The existing system cannot support the increasing of transaction and concurrent transactions.

The new proposed system will be developed to solve all the problems and revolution from the old fashion to new design. The Master Main System is designed for overall function in the organization such as sale department, reservation booking and accounting. IT and Help Desk Support System is a subsystem in the Master Main system for Information Technology Department. To complete the certification of ISO version 9001:2000, there is audition in Information Technology that has never been before in the last version (2002). IT and Help Desk Support System is added in the main system for ISO purpose.

The proposed system is developed in accordance with the System Analysis and System Design technique. This project covers the user requirements, system design, hardware and software requirements, cost and benefit analysis, security and control and also includes the design of the input and output screen. This system gives benefit by recording help desk activities and having maintenance report for ISO purpose. Moreover, it also evaluates the job performance and reference for help desk responsibility.

ACKNOWLEDGEMENTS

This system development project cannot be completed without kindly advice of many people. The writer would like to convey special thanks to his advisor, Dr. Settapong Malisuwan who has generously spent time advising him accomplish the project. And the writer would also like to express thanks to the Project Committee, Members of the Graduate School for their advice, special thanks to his manager, Mr. Sutin Nikornpongsin and Managing Director's secretary, Mrs. Sakara Wisedkul for their help and support during the entire course of this project. Finally, he is grateful to all the instructors who taught him in the Computer Information Systems Course so that he can apply this knowledge to the system development project.

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1.1 Background of the Project

For early years of operation, the dbase application was the main application doing every task in the company such as booking reservation space, billing and voucher. It worked well for a time but with the increasing of customers and jobs, some errors happened in the application. Dbase was not supported for many users to sharing the database at the same time and when data was over limit, the application can not run. It stuck on the time and other users can't access it. It always damaged index file, the administrator has to monitor time and time. These are reasons why EXC (Excel Transport Int'l Co., Ltd.) should step forward to the new system.

Master Main System is programmed to resolve the entire problem, and the vital reason why we change is because of certified ISO9001:2000. Our partners are concerned highly about the certification. IT and Help Desk Support System is a subsystem in the Master Main system for Information Technology Department purpose. To complete the certification of ISO version 9001:2000, there is an audition in Information Technology Department that has never been before in the last version (2002). The main purpose of this system is recording the computer detail in company and having help desk transaction to present the auditor.

1.2 Objectives of the Project

The objective of this project is to design, implement and evaluate IT and Help Desk Support System that provides the better work performance for system users and to reach ISO9001:2000 standard certification in the Information Technology section.

1.3 Scopes of the Project

The project will cover the basic requirement of IT and Help Desk Support System which is summarized as follows:

(1) Master File in Information Technology

(a) Create type of Computer, CPU, other hardware and etc.

(2) Menu for Application

(b) Computer detail entry, group of computer list and help desk entry

(3) Help Desk Add-in

(c) Request for Help Desk Entry and Hot line Staff list

(4) Reporting

(d) Generate the report when the request by ISO auditor

1.4 Project Plan

The project plan is represented in form of Gantt chart shown in Figure 1.1

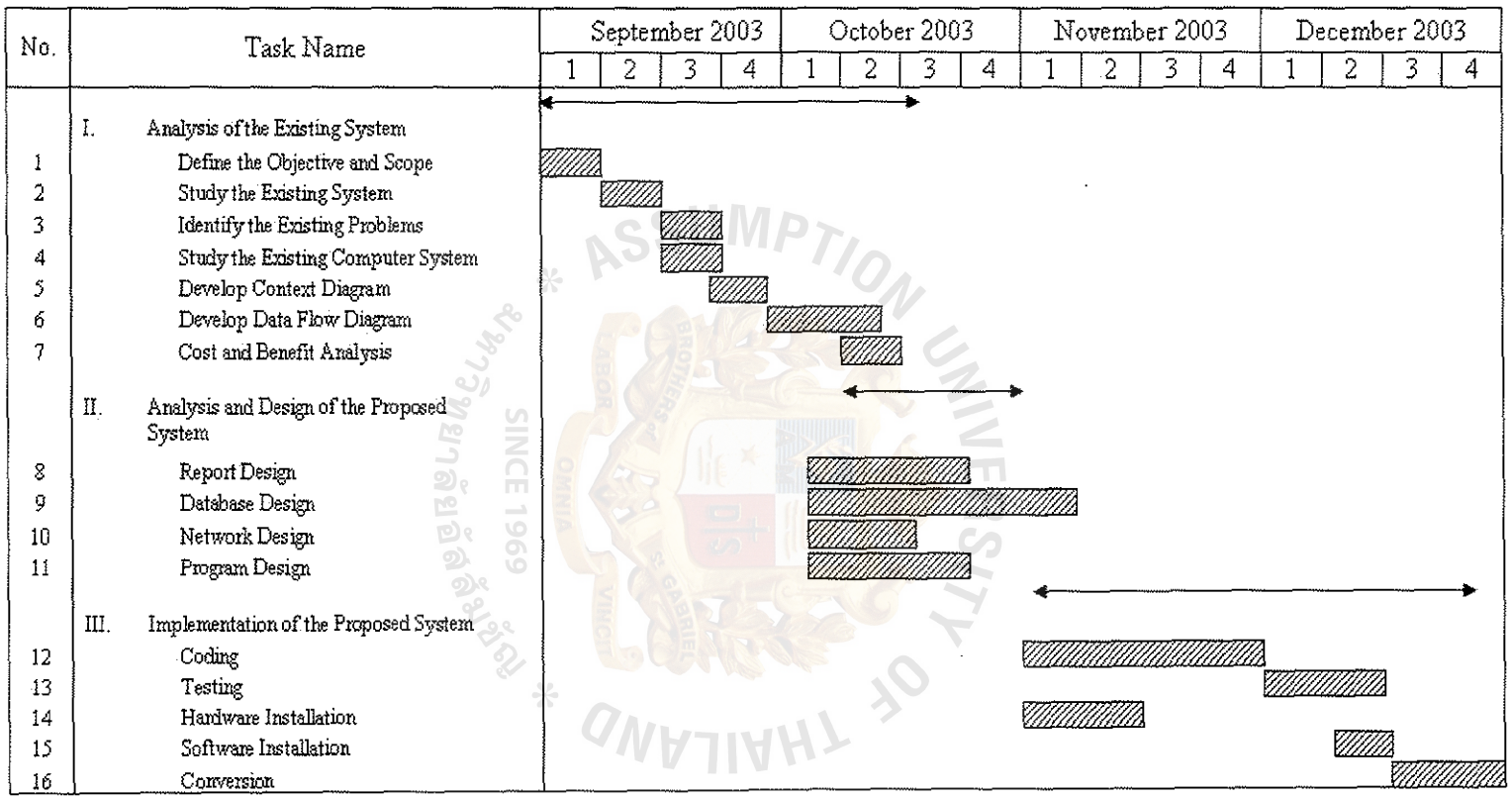


Figure1.1. Project Plan IT and Help Desk Support System.

II. THE EXISITING SYSTEM

2.1 Background of the Company

Excel Transport International Co., Ltd. (EXC) was established since February 15, 1985; and applies a quality system for Multi Modal Transport Operator (MTO) and International Freight Forwarders. It serves for Airfreight/Sea freight, Documentation & Customs Broker, Packing, Warehousing & Distribution, and Domestic door-to-door delivery nationwide. Excel is an associate membership of IATA, TAFA and TIFFA. Excel is also associated with the Hellmann group partner world integrated network of 116 countries worldwide with a computerized systems link network.

Since the first day of establishment of the company, manual system was used in the early stage. When the company reached the growth stage, the computerized system was brought to implement the business. In early years, Dbase was the main application for doing every task in the company such as booking reservation, billing and voucher. It worked well for a time but with the increasing of customers and jobs, some errors happened in the application.

Master Main System is programmed to solve the entire problem and the vital reason why we change is because of certified ISO9001:2000. Our partners are concerned highly about the certification. In the new ISO version 9001:2000, they also audit part of Information Technology that never has it before in the past version (9002). Instead of overall view of the system; IT and Help Desk Support System (Computer Department) is selected for emphasize.

The main objective of new system is to keep record & information of Computer and help desk transaction to present to the ISO auditor.

Excel Transport International Co.,Ltd.

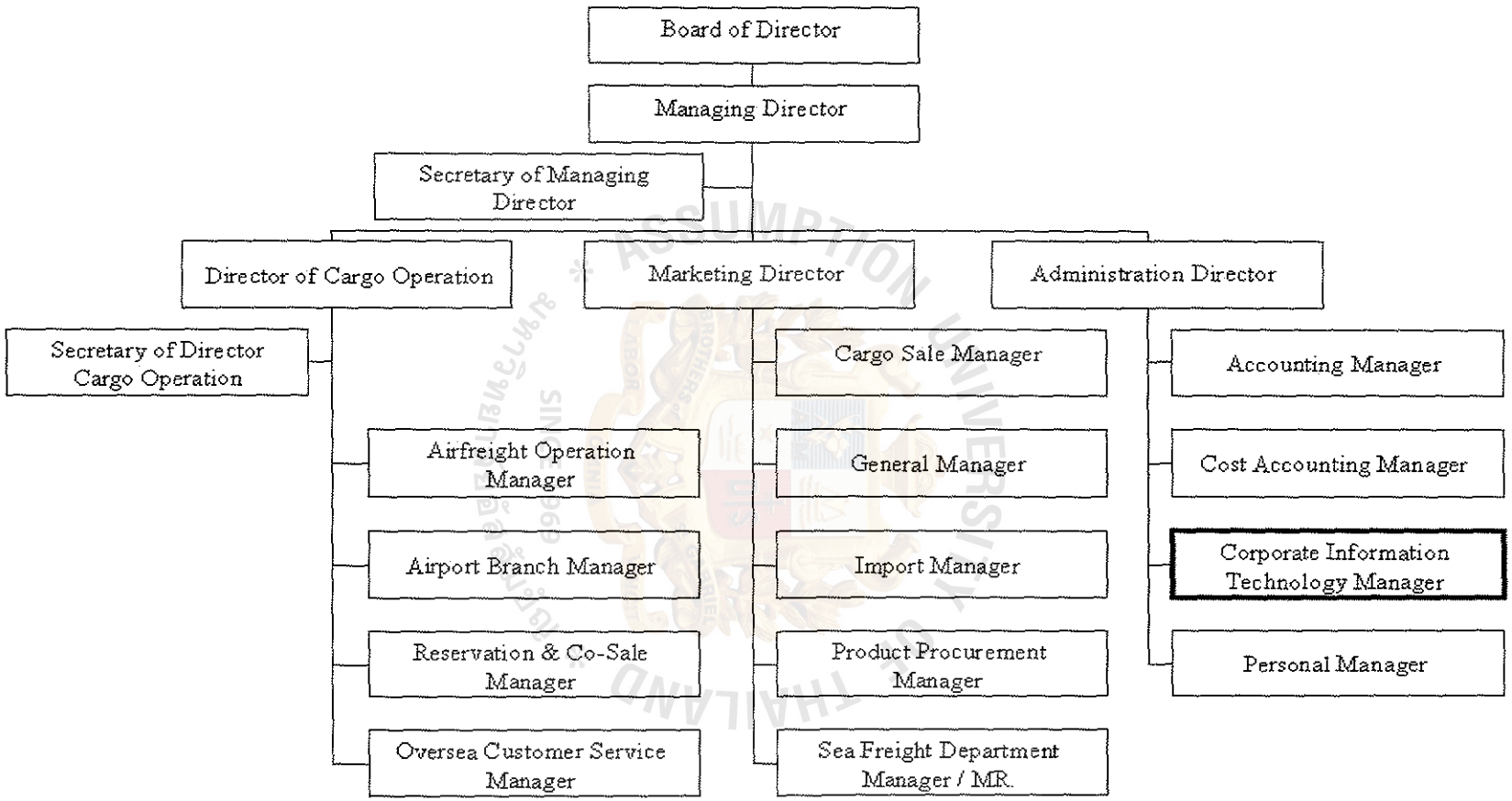


Figure2.1. Excel Transport International Co., Ltd. Organization Chart.

Information Technology Department

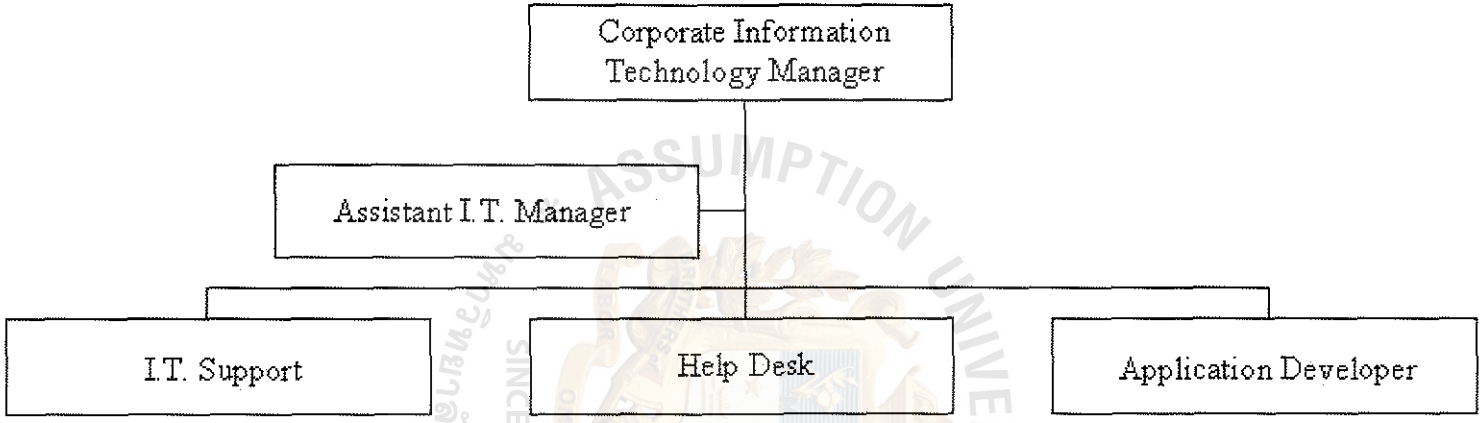


Figure2.2. Information Technology Department Organization Chart.

2.2 Existing Business Function

Since the existing business function of Excel Transport are manual and Dbase applications, all I.T. staffs handle all problem log and problem status as shown in Figure 2.3 and 2.4.

The current work procedure is as follows:

(1) Users send the request by telephone or email to help desk staff.

(2) Help desk staff checks the request and categorize in the following types.

(a) Application problem

(b) Hardware and General problem

(c) Network problem

Then the request will be forwarded to the support team according to the problem.

(3) Support team will contact the users to get more information and find out the solution for each problem.

(4) If the result is accepted, the job is closed.

(5) If the cause of problem is hardware problem and I.T. support cannot fix or change that part, I.T. support will contact the vendor to buy or claim that hardware. When the claimed hardware was returned, it will be reinstalled for user's computer.

(6) No recording anything in the database system.

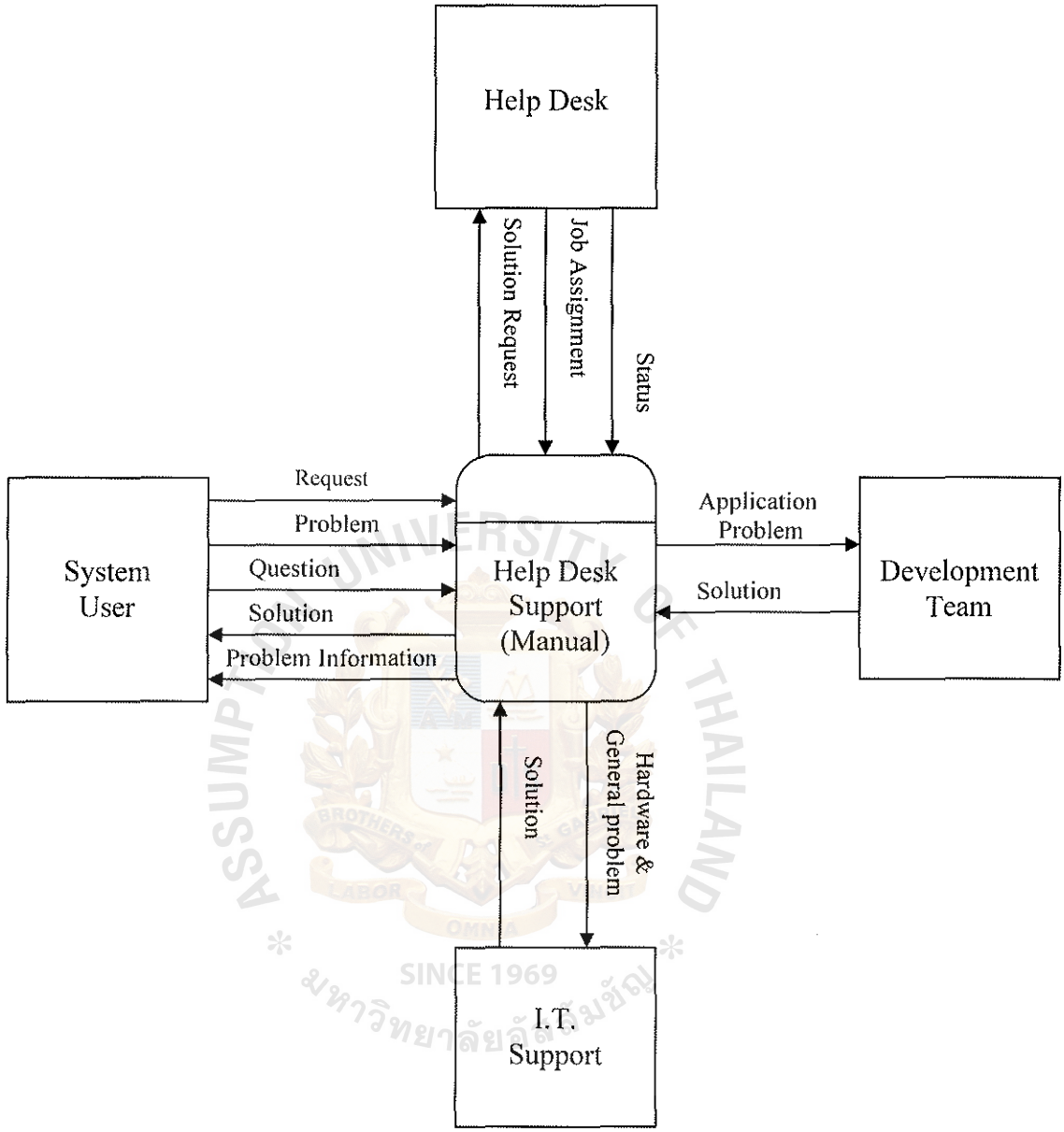


Figure 2.3. Context Diagram of Existing System (Manual).

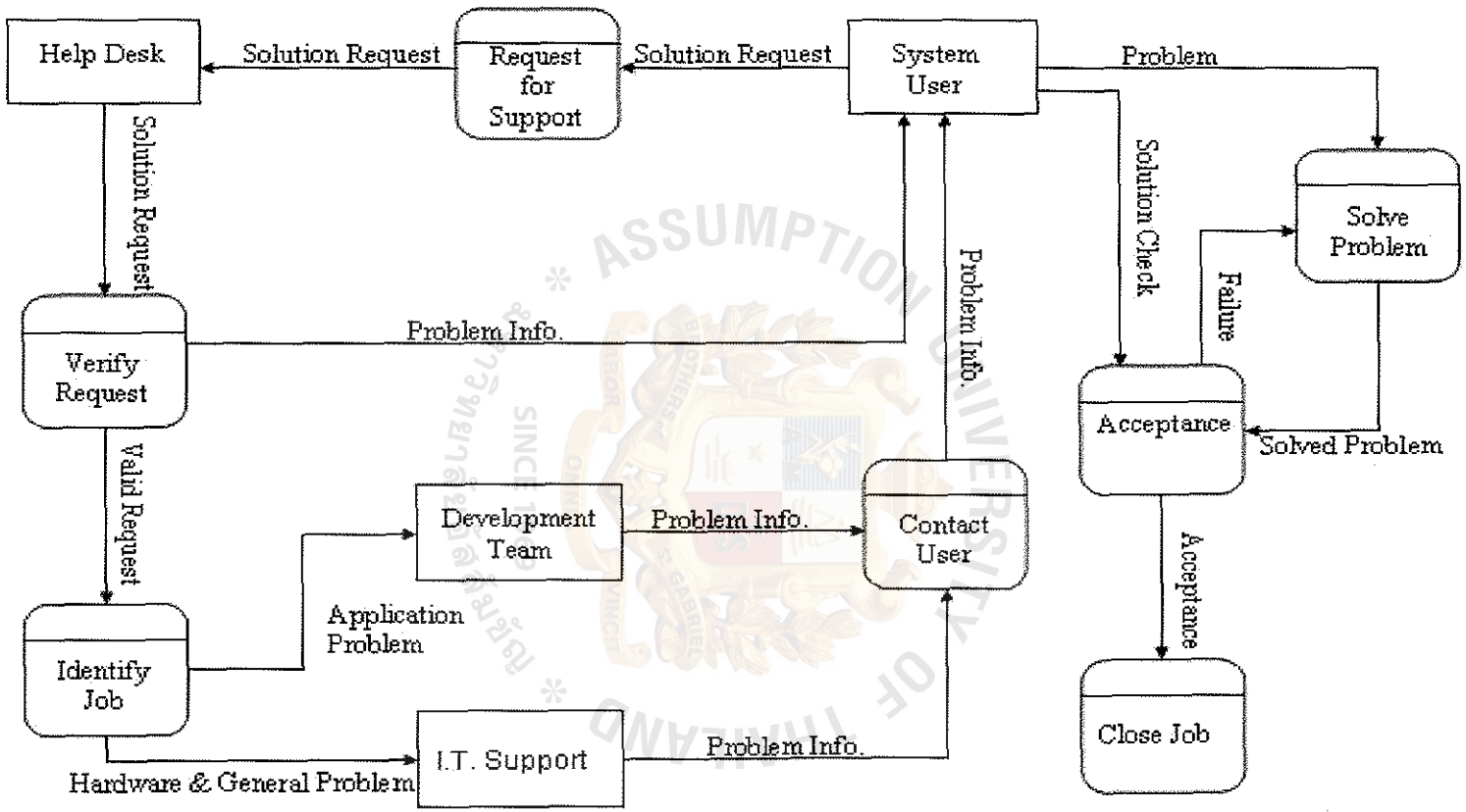


Figure 2.4. Data Flow Diagram of Existing System (Manual).

2.3 Current Problems and Areas for Improvement

2.3.1 Current Problems

The existing system is a manual system. There are many problems that occur in the I.T. services as follows:

(1) No recording information in the system.

(2) Difficult in tracking the status of the current problem. If we want to check the current status, there is no referential record.

(3) Each of the staff members has to organize their own time for each problem. It cannot measure job performance for each I.T. staff.

(4) No information about how many computers and users in the system, who used this information to report MR and ISO auditor.

(5) It cannot measure the computer literacy of system user because there is no problem recording in the system.

2.3.2 Areas for Improvement

For this section, IT department tries to understand the existing problem and to find out the way to improve the current situation and to solve the problems.

The following are the criteria that need to be developed.

(1) Provide system for recording information of these problems.

(2) Provide system for users to tracking the problem solving status.

(3) Recording date & time of each problem solving.

(4) Controlling the job to be accomplished within a desirable time.

(5) Making more effective communication between I.T. department and the system users.

(6) Having information about computer detail to present the Management Review Team (ISO purpose).

III. PROPOSED SYSTEM

3.1 User Requirements

The following are the user requirements of the proposed system that were learnt form I.T. department during in-depth interviews, and from the experience of I.T. manager and staff.

(1) The proposed system must be easy to use.

(2) The proposed system allows multiple users to access the database at the same time.

(3) The proposed system must have security.

(4) The proposed system can generate reports.

(5) I.T. support can add comments or solution detail in each problem solving.

3.1.1 Input Requirement

The following indicates the information required by users to be included in the system.

(1) For Help desk function: User Name, problem, contact person

(2) For Computer Entry: Computer detail, Hardware and Software.

3.1.2 Output Requirement

(1) For Help desk function: Status of request, Comment of solving problem

(2) For Computer Entry: Computer detail of each user.

(3) Reports: Activity report, Summary the number of computer asset in organization.

3.2 System Design

3.2.1 Input Design

The major objective of the input design is to provide the convenience for staff, and to input the data into the standard format. The input design should keep the screen simple with good layout and ensure the forms can keep all the necessary information.

The input screens of the proposed system are represented in Appendix F.

3.2.2 Output Design

The output will show the information into the screen output and paper output. The output screen should be easy to read and show all the required information. The output reports are represented in Appendix F.

3.2.3 Context Diagram and Data Flow Diagram

Proposed system is presented by using data flow diagram as a tool for structural analysis and design. The context diagram depicts the relationship between the proposed system and the external entity.

The context diagram and data flow diagram, which show the whole picture of the process are represented in the Figure 3.1 and Figure 3.2 respectively. The rest of data flow diagrams are represented in the Appendix A.

The new system design divides the whole system into process as follows:

For Computer Entry Function;

Process 1: I.T. support log on in IT and Help Desk Support System to record the computer detail of the overall system such as computer name, user name, hardware and software.

Process 2: In case of audit season, I.T. support must print outstanding report for audition purpose.

For Help Desk Entry Function;

Process 1: The user calls help desk to log the problem into the system. Help desk staff will ask for user information such as user name, computer name and problem detail.

Process 2: Help desk staff will verify the request whether it is a problem or not. If it is not a problem or it is an over I.T. area problems, help desk staff will reject that request and inform users.

Process 3: The valid request is categorized into two types of problems.

(1) Application Problem. This problem type will be assigned to development team to investigate and fix the application problem that has been developed in-house.

(2) General & Network Problem. This problem type will be assigned to I.T. support. General problem may be hardware & software problems. About network problem, it will be the problem related to LAN and WAN. For the problem about the Internet Link and mail server in case of status down, I.T. support will cooperate with ISP' staff to find out the solution and try to finish in preferred time.

Process 4: Support team (I.T. support & Development team) will analyze the problem and they will find the solution for the problem. When they have the solution, they will test before giving the solution to the user.

Process 5: User will perform the solution acceptance. The result will be confirmed to the support team that each solution works or not.

Process 6: If the solution can solve the problem, user confirms to close the job and system will automatically update the status.

Process 7: Report printed for user purpose if user requests for the report.

The functional decomposition diagram is created to show the top-down functional decomposition and structure of the system. This diagram also serves as an outline for drawing the data flow diagram for better understanding of the system. The functional decomposition diagram of proposed system is shown in Figure 3.1.

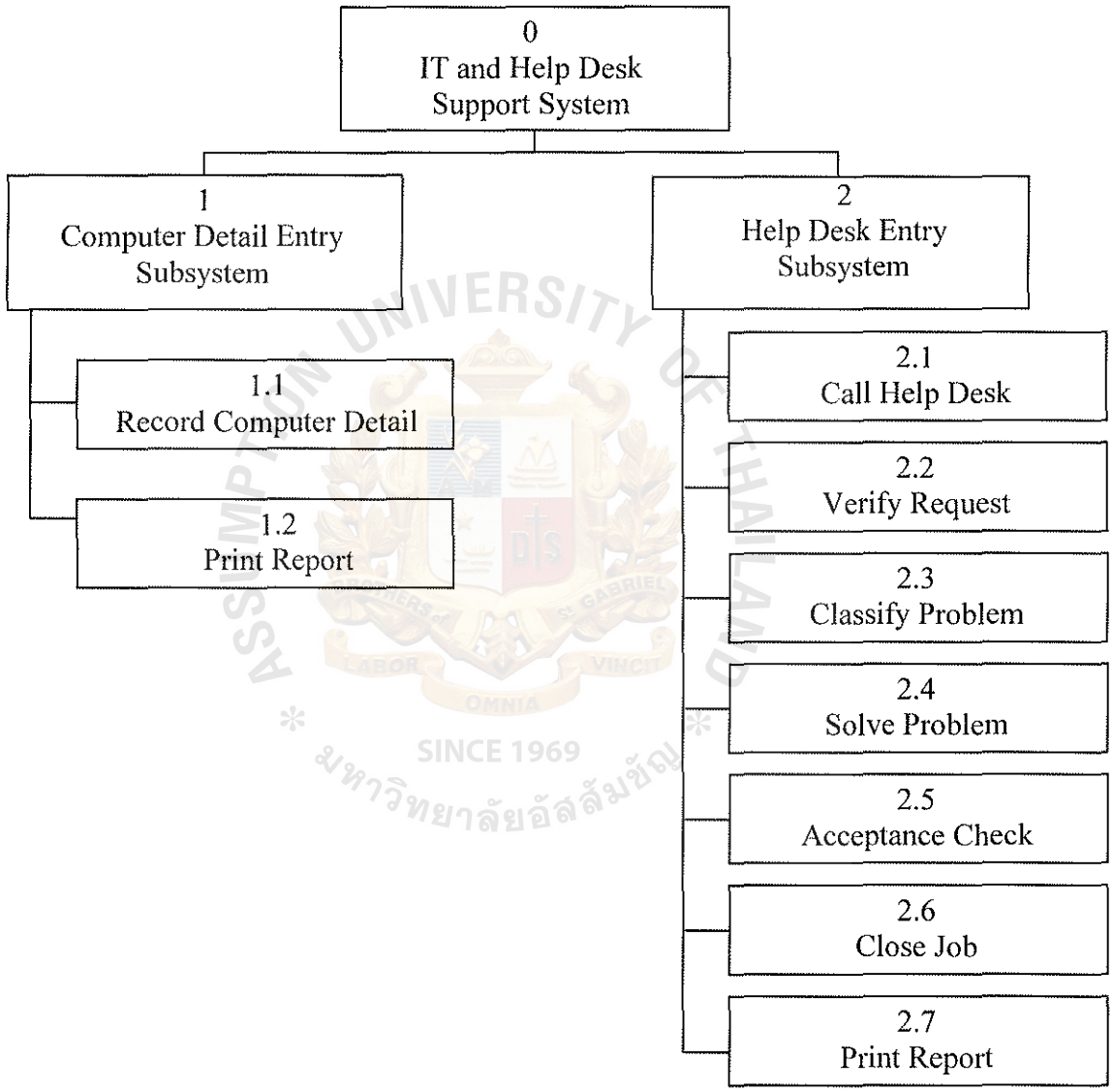


Figure 3.1. Functional Decomposition Diagram of the Proposed System.

3.2.4 Structure Chart

Structure Chart is represented in Appendix E.

3.2.5 Others System Design

(1) Data Dictionary

The data dictionary of the proposed system contains information about data and procedures, information about data maintained by the system including data flows, data structures, data elements, and data stores. Data dictionary is represented in Appendix B.

(2) Process Specification is represented in Appendix D.

(3) Entity Relationship Diagram is represented in Appendix E.

3.3 Candidate Solutions

After knowing the system specification established in the previous section, the alternative candidate solutions can be identified from the idea and opinion of the development team and user. Along with reviewing the system specification, the three candidate solutions can be defined for the proposed system.

Candidate 1: Two Tiers Client/Server Computing – Web Database

Active Server Page (ASP) and Microsoft SQL Server 2000 are used in this solution to develop the web-based application as intranet. The database server serves not only as the system database but as it also serves as the web server for developed program. This kind of architecture is called corporate intranet.

This candidate can be implemented quickly because it requires only a web browser to run the developed application. No additional software is installed in the client computers. However, the development team does not have an experience in the web base development. Training course is required for our development team.

Candidate 2: Resources Sharing with Local Area Network – File Server

Microsoft Visual FoxPro is picked to be both our DBMS and development tool at the same time. We are concerned with the expertise of our development team who don't waste time to start the new tool. The amount of data in the system is the vital factor for us to make decision not using the SQL server. Our database does not exceed 1 TB, which is why we don't waste the money to use SQL server. For network architecture, we mention every system user as client for this system.

Implementing this candidate is quite easier than other candidates because our development team has experience in programming by Visual Fox Pro tool. This solution provides the best way of developing and managing the system by introducing the effective development tool.

Candidate 3: Client/Server Computing – Database server

Microsoft Visual Basic is a very popular development tool. The existing programmer can use it without any technical assistance. As a visual style of Microsoft product, it facilitates the programmer to develop the new application quickly. The database software is Microsoft SQL Server 2000, relational database management system as database server. This solution supports the multi-user environment and relational database technology. Database server is used to follow the concept of two-tier client/server computing

The development team has no experience in visual basic and SQL server 2000. This solution provides unsure developing and managing system.

The candidate systems matrix of proposed system is illustrated in Table 3.1, which explores the characteristics of each candidate in more details.

Table 3.1. Candidate System Matrix.

Characteristics	Candidate 1	Candidate 2	Candidate 3
Portion of System Computerized Brief description of that portion of the system that would be computerized in this candidate.	Help Desk Support System, it receive the requesting help from the system user.	IT and Help Desk Support System is one part of Master main program included computer Entry and Help Desk Entry.	Same as Candidate2.
Benefits Brief description of the business benefits that would be realized for this candidate.	This solution can be implemented quickly because it is just stand alone application not relate to the Master Main System.	Fully supports users request computer hardware and software problem, including directly to ISO standard requirement.	Same as Candidate2.
Servers and Workstations A description of the servers and workstations needed to support this candidate.	IBM x335 Rack; Xeon 3.06 GHz, MS. Windows Server 2003. Pentium 4 2.66GHz for workstation with Windows XP Pro.	Xeon 2.8 GHz, MS. Windows Server 2003. Pentium 4, 2.6 GHz HT for workstations with Windows XP Pro.	Old hardware server from current system just adding new local brand desktop Pentium 4, 2.6 GHz with Windows XP Pro.
Software Tools Needed Software tools needed to design and build the candidate (e. g., database management system, emulators, operating systems, languages, etc.). Not generally applicable if applications software packages are to be purchased.	Internet Information System (IIS) 5.0, Internet Explorer and SQL Server 2000.	MS. Visual Fox Pro 8.0, MS. Office XP Standard	MS. Visual Basic 7.0 and MS. SQL Server 2000.

Table 3.2. Candidate System Matrix (Continued).

Characteristics	Candidate 1	Candidate 2	Candidate 3
Application Software A description of the software to be purchased, built, accessed, or some combination of these techniques.	Custom Solution	Custom Solution	Same as 1 and 2
Method of Data Processing Generally some combination of: on-line, batch, deferred batch, remote batch, and real-time.	Client / Server, Web Database.	Client / Server, File Server.	Client / Server, Database Server.
Output Devices and Implications A description of output devices that would be used, special output requirements, (e.g. network, preprinted forms, etc.), and output considerations (e.g., timing constraints).	- HP LaserJet 4050N - Epson LQ-580 - 3Com Super Stack Switch 4400 48 port/Layer 4	- HP LaserJet 2200N - 3 Com Super Stack Switch 4226T	- HP LaserJet 2200N - 3Com Switch 4924 - Linksys Wireless G Access Point - Linksys Wireless Notebook Adapter - Linksys Instant PCI Card.
Input Devices and Implications A description of Input methods to be used, input devices (e.g., keyboard, mouse, etc.), special input requirements, (e.g. new or revised forms from which data would be input), and input considerations (e.g., timing of actual inputs).	Keyboard & Mouse	Same as Candidate1.	Same as Candidate1.

Table 3.3. Candidate System Matrix (Continued).

Characteristics	Candidate 1	Candidate 2	Candidate 3
Storage Devices and Implications Brief description of what data would be stored, what data would be accessed from existing stores, what storage media would be used, how much storage capacity would be needed, and how data would be organized.	MS. SQL Server 2000	File Server with MS. Fox Pro 8.0	MS. SQL Server 2000

Feasibility Analysis

After the candidate solutions are identified, the feasibility analysis can be done for each candidate. The following feasibility criteria should take into consideration when development team wants to select the best solution to implement the production environment.

Operational feasibility:

It is a measure of how well the solution of problems or a specific solution will work in the organization. It is also a measure how people feel about the system. All candidates fully support the current business process but candidate 2 is the most feasible because it can be implemented easily and managed tasks more efficiently and effectively.

Technical feasibility:

It is a measure of the practicality of a specific technical solution and the availability of technical resources and expertise. Our development team has no experience in Visual Basic programming and IIS; candidate 1 and 3 are not suitable for

this project. Candidate 2 is the most suitable because our development team has experience in Visual Fox Pro.

Economic feasibility:

It is a measure of the cost-effectiveness of a project or solution. All the candidates require hardware and system analyst to implement and operate the developed system as equilibrium.

Schedule feasibility:

It is a measure how reasonable the project timetable is. Both candidate 1 and candidate 3 take more time to implement the developed system because of experience that our development team has to train or maybe hire the new expertise. Candidate 2 consumes the less time in interface design and implement because our development team has some experience in Fox Pro tool.

Up to this point, all four feasibility criteria assessments are provided for each candidate solution. The score is then assigned to each feasibility criteria for each candidate, and multiplied by the weight, which is expressed in percentage, distributed from the total 100% to all four-feasibility criteria according to their degree of importance. The weight scores of each feasibility criteria are summed up for each candidate to rank the candidate solution of the proposed system.

The feasibility analysis result reveals that candidate 2 has the highest scores in operational, technical, economic, and schedule feasibility. Thus, candidate 2 has the highest total score, and ranks the best solution for the proposed system.

The completed feasibility analysis matrix for each candidate is illustrated in Table 3.2. In additional, the full details of cost-benefit calculations (Economic feasibility) are showed in Appendix C, which are all candidate cost tables, payback tables and graphs, and net present value (NPV) tables.

Table 3.4. Feasibility Analysis Matrix.

Feasibility Criteria	Wt.	Candidate 1	Candidate 2	Candidate 3
Operational Feasibility: **Functionality**. A description of to what degree the candidate would benefit the organization and how well the system would work. **Political**. A description of how well received this solution would be by user management, user, and organization perspective.	40%	It cannot record the computer information and cannot identify the user name of each computer set. Score: 80	Fully supports user required functionality and also direct to ISO standard requirement audition. Score: 95	Same as candidate2 Score: 95
Technical Feasibility: **Technology**. An assessment of the maturity, availability (or ability to acquire), and desirability of the computer technology needed to support this candidate. **Expertise**. An assessment to the technical expertise needed to develop, operate, and maintain the candidate system.	30%	SQL2000 will optimize the database management system with the large amount of data. Required to hire ASP expertise to perform modifications for integration requirements. So it will take a long time to start the application. Score: 80	With standard technology like other, not necessary to install SQL server because our database is not large. Having own in-house development team who has expertise in the VFP tool. It is easy to develop the application. Score: 90	Upgrade from NT to 2000 Server is quite solution included Wireless solution to plug in every place seem to be interesting choice. It is necessary to hire VB expertise to develop the application. But it will take a long time to start and costly. Score: 80

Table 3.5. Feasibility Analysis Matrix (Continued).

Feasibility Criteria	**Wt.**	**Candidate 1**	**Candidate 2**	**Candidate 3**
Economic Feasibility: Cost to develop: Payback period (discounted): Net present value: Detailed calculations:	20%	 Approximately 661,200 Baht Approximately 3.4 years Approximately 646,858 Baht See Appendix Score: 80	 Approximately 431,700 Baht Approximately 2.15 years Approximately 975,148 Baht See Appendix Score: 95	 Approximately 527,050 Baht Approximately 2.94 years Approximately 908,971 Baht See Appendix Score: 90
Schedule Feasibility: An assessment of how long the solution will take to design and implement	10%	 Approximately 6 months Score: 80	 4-6 months Score: 90	 Approximately 6 months Score:80
Ranking:	**100**	**78**	**91**	**88**

3.4 Hardware and Software Requirements

3.4.1 Hardware Requirements

(1) File Server.

(a) Intel Xeon 2.8 GHz (Dual Processors Upgradeable)

(b) 1 GB DDR RAM, Integrated Dual Channel Wide Ultra3 SCSI

(c) HD 36 GB x 2 U320 10k/Hot plug, Smart Array

(d) 8 MB Video Memory, CD-ROM48x, 4PCI (64bit/33MHz), 1PCI32bit

(e) LCD Monitor 15", Keyboard & Mouse

(f) Integrate Gigabit 10/100/1000 NIC

(g) 3 yrs on-site service (Windows Server 2003 OEM+5CALs)

(2) Workstation.

(a) Pentium IV 2.6 GHz

(b) 512 MB DDR RAM

(c) Hard Disk 40 GB, 72 RPM

(d) CD-ROM 56x, Keyboard & Mouse Microsoft

(e) Monitor LCD 15"

(f) NIC Allied Telesyn 10/100 Mbps

(3) Printer & Network Peripheral

(a) 3Com Super stack Switch 4226T

(b) APC Back RS Pro UPS1000VA

(c) HP LaserJet 2200N

3.4.2 Software Requirements

(1) Operating System – Microsoft Windows XP Professional OEM

(2) Network Operating Systems – Microsoft Windows Server 2003 OEM

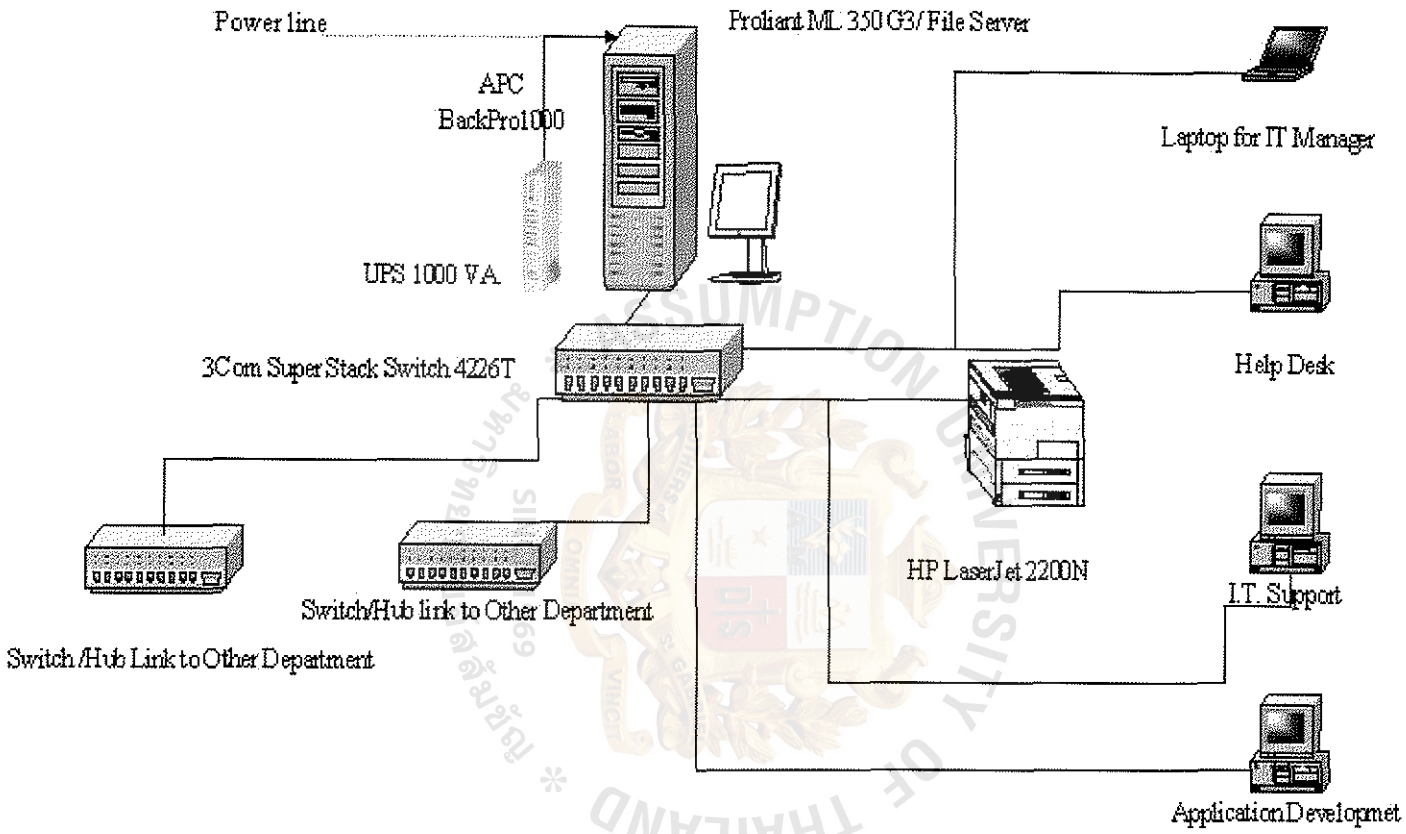
(3) MS. Visual FoxPro Professional 8.0

(4) Symantec Norton Antivirus Enterprise Edition 8.6

(5) Microsoft Office XP Standard OEM

3.5 Data Communication and Network

The proposed system will be connected to the existing Local Area Network. The network diagram of the proposed system is shown in Figure 3.2



Excel Transport Int'l Co, Ltd Context Hardware Configuration of I.T. Department and link to the other deparments in the organization.

Figure3.2. Hardware Configuration of the Proposed System.

3.6 Security and Control

For Information Technology Department, computer information and help desk record were not recorded and managed in the previous system. The proposed system concentrates data in computer files that can potentially be accessed more easily by a large number of people. Consequently, automated data are more vulnerable to destruction, error and misuse. Security and control are very important when a computer-based information system is involved. Security controls attempt to prevent or detect unauthorized access to the data.

There are many advantages to information system when they are properly safeguarded. But when large amount of data are stored in electronic form, they are more vulnerable to many kinds of threats than when existing in manual form. Therefore we setup the security and controls to minimize errors, disaster and computer crime.

The security and controls should include:

(1) Protection of data from unauthorized person access.

(a) Use log in username and password

(b) User can change password by himself after log in the system

(c) Exit the program after the third time wrong log in password.

(d) If any user don't have attendant, no right to log in the system.

(2) Protection and prevention of loss of data or errors from any accident that may destroy the files. Back up policy should be properly setup:

(a) Data in the system should be backed up daily.

(b) Data in the system should be done monthly.

(3) Assuring data completeness and accuracy starting from input to output.

(a) Summary Report

(b) Report should print the date for easy reference.

(c) Data entry must be verified.

(4) Assuring right function for each level user.

Setting level of users and their authentication to log into the system depend on department, task and relate functions. For example, I.T. support cannot modify problem details but they can add comments and solution detail.

3.7 System Cost Analysis

3.7.1 Cost of Manual System

For Information Technology Department, the manual system is for recording computer information, day-to-day help and maintenance of the system. Cost of manual system of each organization consist of labor cost, office equipment and office supplies. To be easily calculated, the extraordinary cost is uncounted.

Table 3.6. Manual System Cost Analysis, Baht.

Cost items	Years				
	1	2	3	4	5
Operating Cost					
IT. Manager (30,000@1)	360,000	396,000	435,600	479,160	527,076
IT. Support & Help desk (9,000@3)	324,000	356,400	392,040	431,244	474,368
Develop Team (12,000@3)	432,000	475,200	522,720	574,992	632,491
Total Operating Cost	*1,116,000*	*1,227,600*	*1,350,360*	*1,485,396*	*1,633,936*
Remark: Skipped Assistant IT. Because doing the same task					
Office Supplies & Miscellaneous Cost					
Stationary (8,000 per month)	96,000	105,600	116,160	127,776	140,554
Paper (7,000 per month)	84,000	92,400	101,640	111,804	122,984
Miscellaneous (6,000 per month)	72,000	79,200	87,120	95,832	105,415
Utilities (8,000 per month)	96,000	105,600	116,160	127,776	140,554
Total Office Supplies & Miscellaneous Cost	348,000	382,800	421,080	463,188	509,507
Total Cost of existing system	*1,464,000*	*1,610,400*	*1,771,440*	*1,948,584*	*2,143,442*

Table 3.7. Accumulated Manual System Cost, Baht.

Year	Total Manual Cost	Accumulated Cost
1	1,464,000	1,464,000
2	1,610,400	3,074,400
3	1,771,440	4,845,840
4	1,948,584	6,794,424
5	2,143,442	8,937,866
Total	8,937,866	

3.7.2 Cost of Proposed System.

The Proposed System introduces the facility in the system; the number of tasks can be managed with a few I.T. supports. So the number of human power is reduced and instead of high competency hardware and software computer.

Table 3.8. The Proposed System Cost Analysis, Baht.

Cost Items	Years				
	1	2	3	4	5
Operating Cost					
I.T. Manager/ Developer (40,000@1)	480,000	528,000	580,800	638,880	702,768
IT.Support (15,000 @1)	180,000	198,000	217,800	239,580	263,538
Help desk (10,000 @1)	120,000	132,000	145,200	159,720	175,692
Total Operating Cost	780,000	858,000	943,800	1,038,180	1,141,998
Office Supplies & Miscellaneous Cost					
Stationary (8000 per month)(5%growth)	96,000	100,800	105,840	111,132	116,689
Paper (7000 per month)(5%growth)	84,000	88,200	92,610	97,241	102,103
Miscellaneous (6000 per month)(5%growth)	72,000	75,600	79,380	83,349	87,516
Utilities (8000 per month)(5%growth)	96,000	100,800	105,840	111,132	116,689
Total Office Supplies & Miscellaneous Cost	348,000	365,400	383,670	402,854	422,996
Training Cost	50,000	-	-	-	-
Computer Cost					
Hardware Cost:					
Server-HP Proliant Server ML350 G3	121,000	-	-	-	-
Workstation (27,000 @3)	81,000	-	-	-	-
3Com Superstack Switches 4226T	21,500	-	-	-	-
APC Back RS Pro UPS1000VA	9,200	-	-	-	-
HP Laserjet 2200N	40,000	-	-	-	-
Total Hardware Cost	272,700	-	-	-	-
Software Cost:					
MS. Windows Server 2003 + CD Set	32,000	Additional 10%			
MS. Windows XP Professional OEM (3@7400)	22,200	Additional 10%			
MS. Visual FoxPro Professional 8.0	15,000	Additional 10%			
Symantec Antivirus Enterprise Edition 8.6	1,700	Additional 10%			
MS. Office XP Standard OEM (3@12700)	38,100	Additional 10%			
Total Software Cost	109,000	10,900	11,990	13,189	14,508
Total Computer Cost	381,700	10,900	11,990	13,189	14,508
Maintenance Cost:					
Maintenance Cost (10%for 2&3yrs 20 %for 4&5)	27,270	29,997	32,997	39,596	47,515
Implementation Cost	50,000				
Total Cost of proposed system	2,018,670	1,264,297	1,372,457	1,493,819	1,627,017

Table 3.9. Accumulated Proposed System Cost, Baht.

Year	Total Proposed System Cost	Accumulated Cost
1	2,018,670	2,018,670
2	1,264,297	3,282,967
3	1,372,457	4,655,424
4	1,493,819	6,149,242
5	1,627,017	7,776,260
Total	7,776,260	

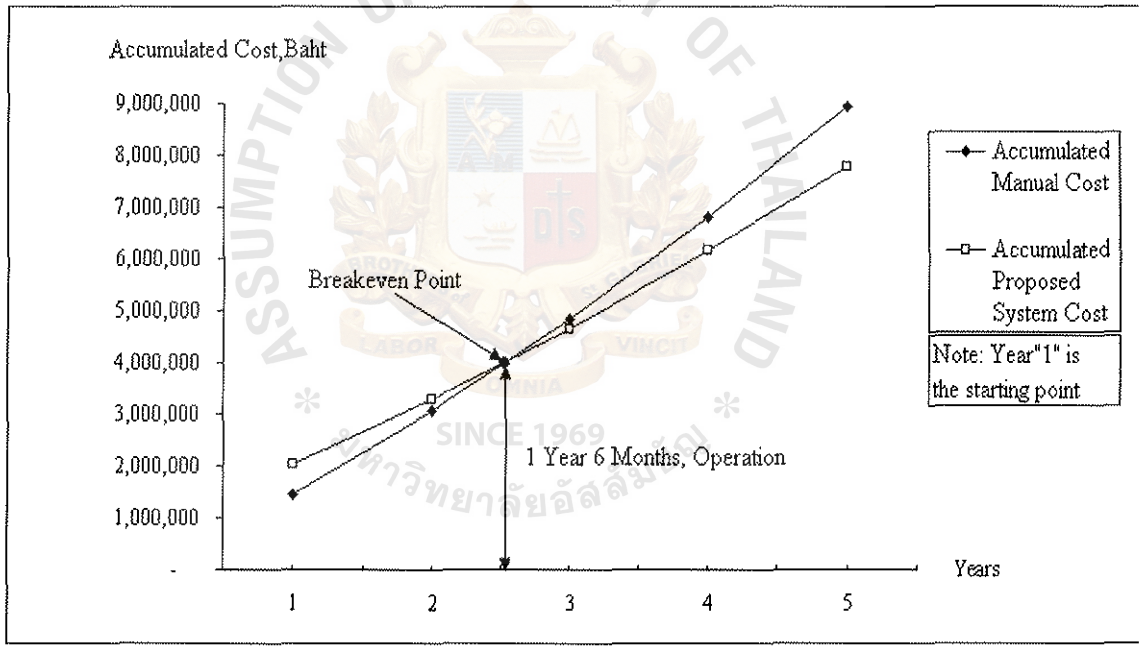


Figure 3.3. System Cost Comparison between Existing System and Proposed System.

3.7.3 Benefit Analysis

(1) Tangible Benefit

Reduction of stationary and paper cost (382,800 – 365,400)	17,400
Reduction of human cost (1,116,000 – 780,000)	336,000
Total Tangible Benefit	353,400

(2) Intangible Benefit

(a) Better User Satisfaction

(b) Convenience to conclude the problem

(c) Faster information retrieval

(d) Reduce paper work

(e) Reduce the human error

(f) Increase in productivity

(g) Easy follow up of the task

(h) Provide better information

3.7.4 Payback Analysis

The payback analysis technique is a simple and popular method for determining if and when an investment will pay for itself, because systems development costs are incurred long before benefits to overtake the costs. Payback analysis determines how much time lapse before accrued benefits will overtake accrued and continuing costs.

The payback period formula is shown as follows:

$$P = \frac{I}{(1-T)R}$$

Where P = Payback Period

I = Initial or Capital Expenditure

T = Corporate tax rate in percent (30%)

R = Average annual return or investment

I = 381,700 + 50,000

= 431,700

R = 1,464,000 – 1,178,000

= 286,000

$$P = \frac{431,700}{(1.0-0.3)(286,000)}$$

= 2.15 Years

The payback period of the proposed system is 2.15 Years.

In Table 3.10 we see an information system that will be developed at a cost of 431,700 Baht. The estimated net operating costs of each of the next five years are also recorded in the table. The estimated net benefits over the same five operating years are also shown. It can be estimated that the benefit will cover the cost in 2.15 years after the proposed system begins.

Net Present Value

Present Value analysis adjusts the value of future costs and benefits costs to account for the time value of money. By measuring all future costs and benefits in current Baht, we can compare systems more accurately and consistently. Table 3.11 shows net present value of the proposed system.

Table 3.10. Payback Analysis for the Proposed System, Baht.

Cost Items	Years					
	0	1	2	3	4	5
Development Cost	-431,700					
Operation & Maintenance Cost		-27,270	-29,997	-32,997	-39,596	-47,515
Discount Factor for 12%*	1.000	0.893	0.797	0.712	0.636	0.567
Time-adjusted cost	-431,700	-24,352	-23,908	-23,494	-25,183	-26,941
Cummulative Time-adjusted costs over lifetime	-431,700	-456,052	-479,960	-503,453	-528,636	-555,578
Benefit derived from operation of new system	0	286,000	387,000	443,970	507,551	578,448
Discount Factor for 12%*	1.000	0.893	0.797	0.712	0.636	0.567
Time-adjusted cost	0	255,398	308,439	316,107	322,802	327,980
Cummulative Time-adjusted costs over lifetime	0	255,398	563,837	879,944	1,202,746	1,530,726
Cummulative lifetime time-adjusted cost+benefit	-431,700	-200,654	83,877	376,490	674,109	975,148

* Remark: 12% discount reference from Corporate Tax Rate.

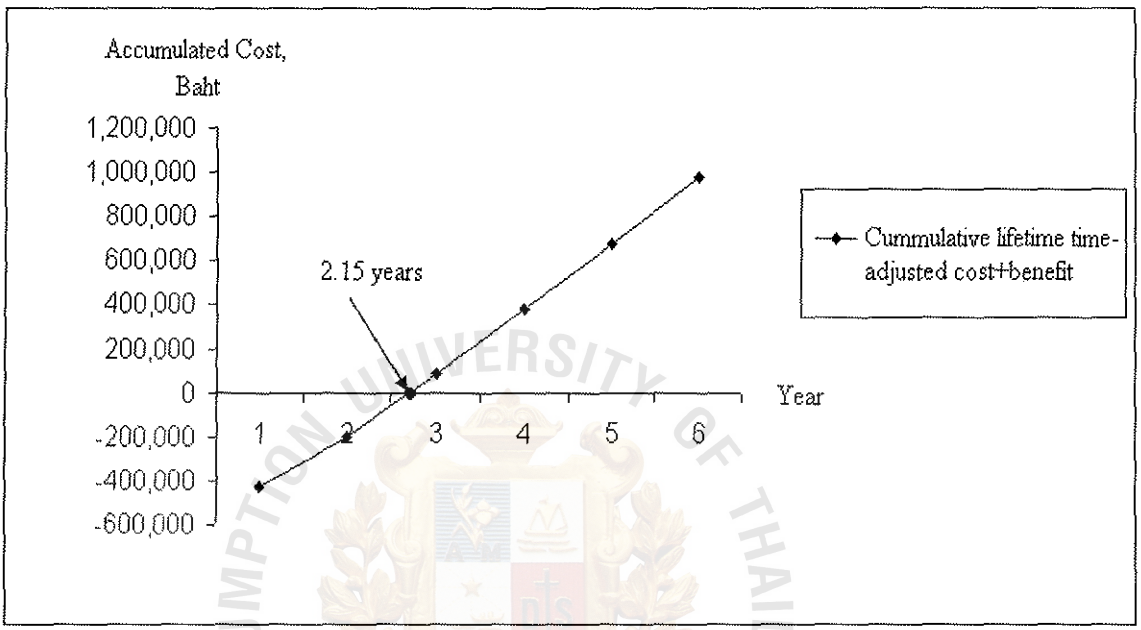


Figure 3.4. Payback Analysis for the Proposed System.

Table 3.11. Net Present Value for the Proposed System, Baht.

Cost	Year						Total
	0	1	2	3	4	5	
Development Cost	-431,700						
Operation & Maintenance Cost		-27,270	-29,997	-32,997	-39,596	-47,515	
Discount Factor for 12%*	1.000	0.893	0.797	0.712	0.636	0.567	
Present value of annual costs	-431,700	-24,352	-23,908	-23,494	-25,183	-26,941	
Total Present value of lifetime costs							-555,578
Benefit derived from operation of new system	0	286,000	387,000	443,970	507,551	578,448	
Discount Factor for 12%*	1.000	0.893	0.797	0.712	0.636	0.567	
Present value of annual costs	0	255,398	308,439	316,107	322,802	327,980	
Total Present value of lifetime costs							1,530,726
Net Present value of proposed system							975,148

* Remark: 12% discount reference for Corporate Tax Rate.

IV. PROJECT IMPLEMENTATION

4.1 Overview of System Implementation

The final step in the system development translates the solution specifications established during systems analysis and design into a fully operational information system. It consists of programming, testing, conversion and production. The proposed system developed by using Microsoft Visual FoxPro and is shown in Appendix F.

4.2 Testing

After coding, a programmer must test the program to be sure that it functions correctly. Later, programs are tested in groups, and finally the entire system must be tested in a procedure as follows:

(1) Stub Testing.

This testing is performed on individual modules, whether they are main programs, sub routing and subprograms.

(2) Unit Testing

Finally, programmers test the program. The testing of an individual program or module is called unit testing. The objective is to identify and eliminate execution errors that cause the program to terminate abnormally and logic errors that might have been missed during stub test. Unit testing uses the test data created during the design phase.

(3) System Testing

A system test includes a typical processing situation. During a system test, users enter data, including samples of actual data, perform queries, and print reports to simulate actual operating condition. All processing options

and outputs are verified by users and the system development team to ensure that the system functions correctly.

4.3 Training

The entire system implementation effort can depend on whether users understand the system and know how to use it effectively. The main purpose of this training is to help the user be able to operate and be familiar with the proposed system. They also understand the new process when using the proposed system.

To suit the different function of each user, training will be divided into two groups:

(1) I.T. support Team: using computer & help desk entry functions.

(2) System user: using help desk entry function.

4.4 Conversion

Conversion is the task of translating the existing files, input forms and database to the new format designed in the new system. Thus, the conversion plan needs to be developed, preferably as soon as the user implementation model is completed, the following issues must be taken into consideration:

(1) The user prefers using the existing system to be parallel run with the new system to ensure its result before completing conversion to user the new system.

(2) The existing system is manual. Therefore there will be no input of the old problem log record into the new system. Users will input only pending status and new request.

There are four conversion methods that are abrupt cut-over, parallel, location, and staged conversion. We choose parallel conversion for this proposed system to minimize the error and make users more familiar the new system.

V. CONCLUSION AND RECOMMENDATION

5.1 Conclusion

Because of the intense competition in every business section nowadays, that is the important factor to push every organization to improve their abilities to compete with others. The information technology is the core business backbone that can support other organics to move forward in business ways. Replace the existing system with the new system, to support the system we need to have the I.T. support to provide system support to the user. Then we introduce IT and Help Desk Support System for I.T. use to facilitate the daily work and help desk function.

The proposed system provides the online system that is accessible anytime in the office. It will provide the work flow that reduces the paper work and tracks the job status easily. This project will describe the system analysis and design activity to implement the IT and Help Desk Support System, The measurement done for this project is as follows:

(1) Analyze the existing system.

(2) Find out the problem.

(3) Find out user requirement.

(4) Design the new system by using many techniques such as data flow, process specification, and structure chart to solve the problems and meet the user requirements.

(5) Analyze cost and benefit.

(6) Design the database that should be in the proposed system.

(7) Design user interface and output from the system.

(8) Plan to implement the new system including the conversion plan.

The deliverable from the new system is the IT and Help Desk Support System. It reduces the cycle time for processing the job and increases efficiency in working with the new system.

Existing System

(a) New request process

User fills in a paper form or calling, and sends the request to help desk. The help desk staff verify request and response user.

(b) Check status process

Help desk staffs search for a problem log from the filing (book). Sometimes no record in filing to remind staff, that case was ignored by time until request sending from user again.

(c) Assign job process

Help desk staffs forward the job to the staff (Both I.T. support and Develop Team).

(d) Report prepare process

No report for the existing system because it is necessary to report anyone in the system.

Proposed System

Computer Entry Function:

(a) Record computer information process

When there is a new set of computers in the system, I.T. support staffs response to record the information of computer in the Master Main Computer System. The information is about hardware, software and username.

(b) Report prepare process

I.T. support staffs select and print report from IT and Help Desk Support system's menu for ISO audition purpose.

Help Desk Entry Function:

(a) New request process

Users call help desk or log in by themselves into the system and sending the request.

(b) Check status process

Technical support staffs search the problem record from IT and Help Desk Support System.

(c) Assign job process

When the problem is verified, it forwards the respondent, hardware, network and general problem to I.T. support, for application problem to the development team.

(d) Report prepare process

Depending on occasion, I.T. support can select and print out the report from IT and Help Desk Support System's menu.

5.2 Recommendations

Information Technology Department has to contact every department to bring the unity of the organization in the same way. We need strong interpersonal and technical skills plus an understanding of the business for I.T. staffs, because they will interact with users in every department.

IT and Help Desk Support System has been designed to support a group of staff in the head office; other branches don't implement this system. For the future trend, web application will be developed to handle the future extension. Development Team may

develops the whole Master Main System for the intranet and set up a web server for this system. The advantages of the web-base IT and Help Desk Support System are as follows:

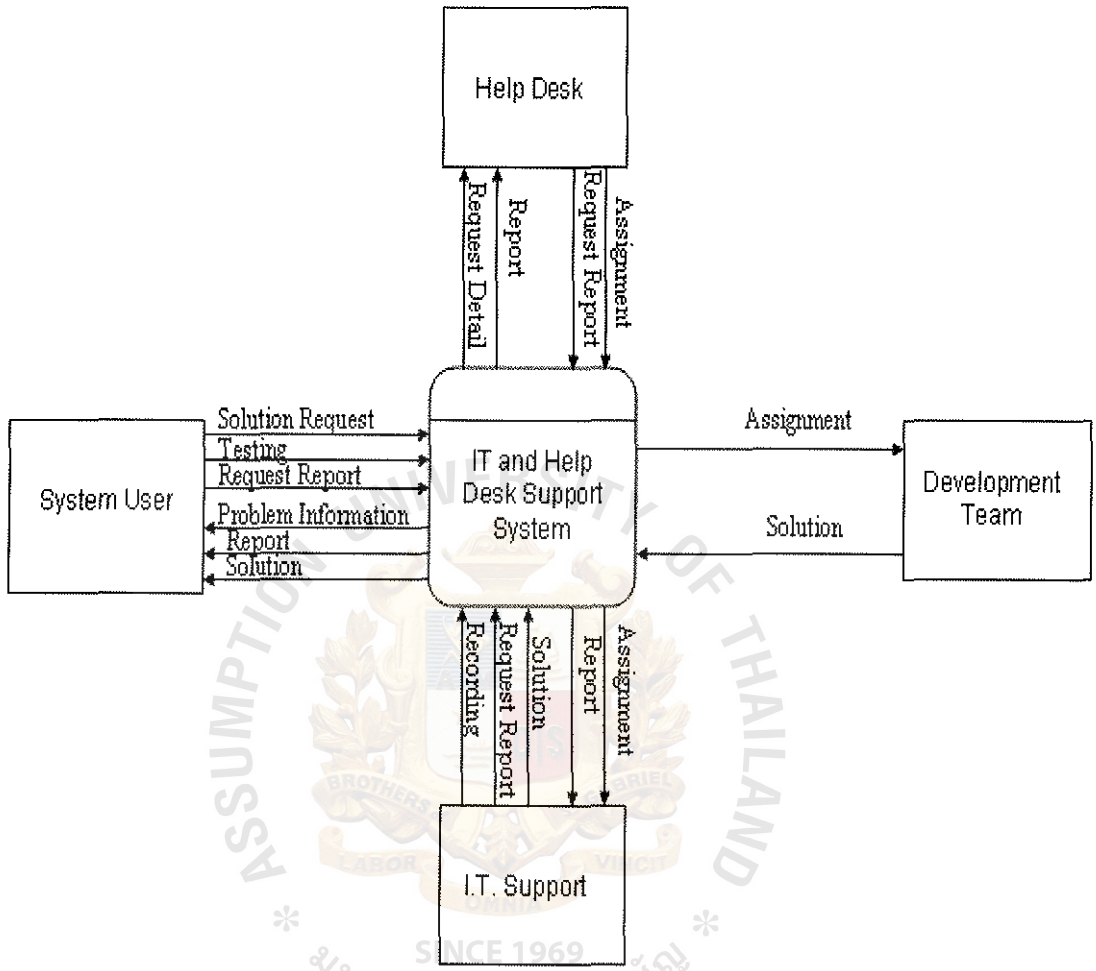
(1) Due to the rapid growth of Information Technology, every computer which uses Microsoft Windows Platform has Internet Explorer (IE) installed. Therefore, there is no requirement of installing any additional program to make web-based IT and Help Desk Support System accessible. We can have access to the system anywhere in the organization.

(2) We can maintain this application system on the server and we do not have to go to each client computer to install or upgrade runtime of the software.

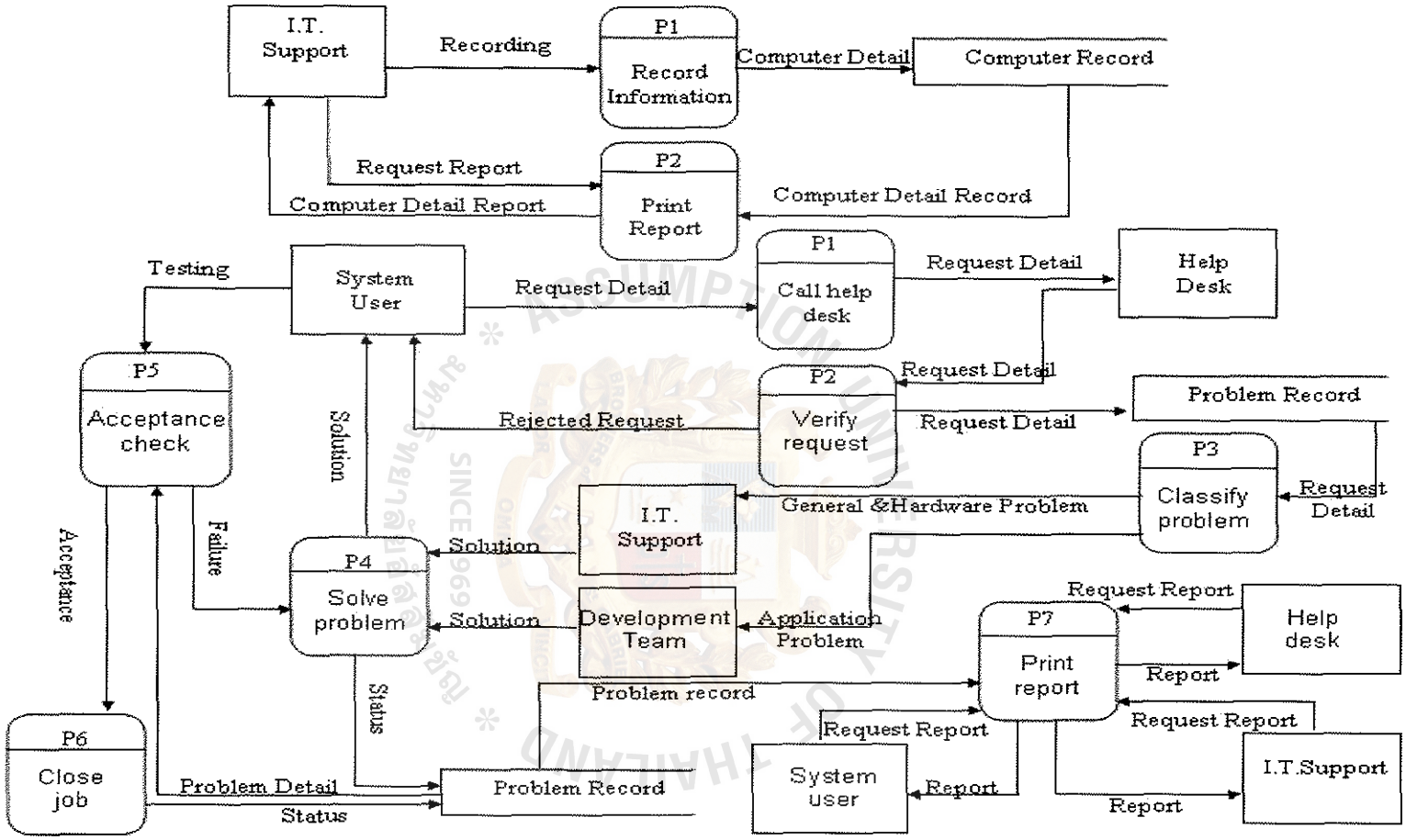
In addition, we can improve the security system by adding encryption module into the system and control and review the accessing of information.

APPENDIX A

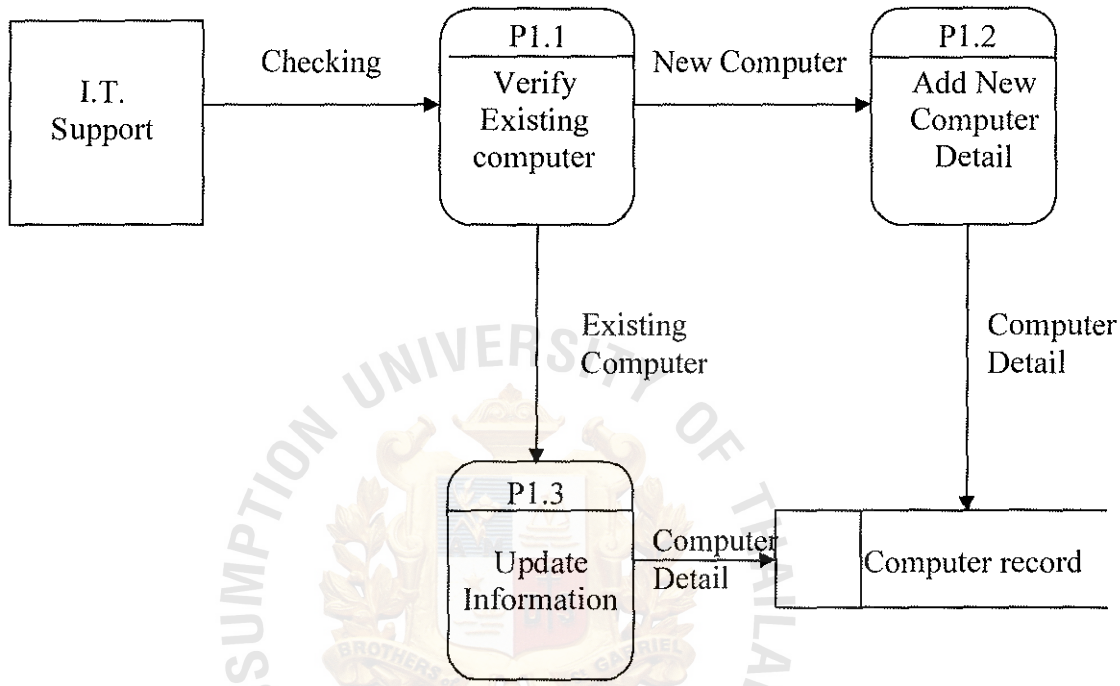
DATA FLOW DIAGRAM



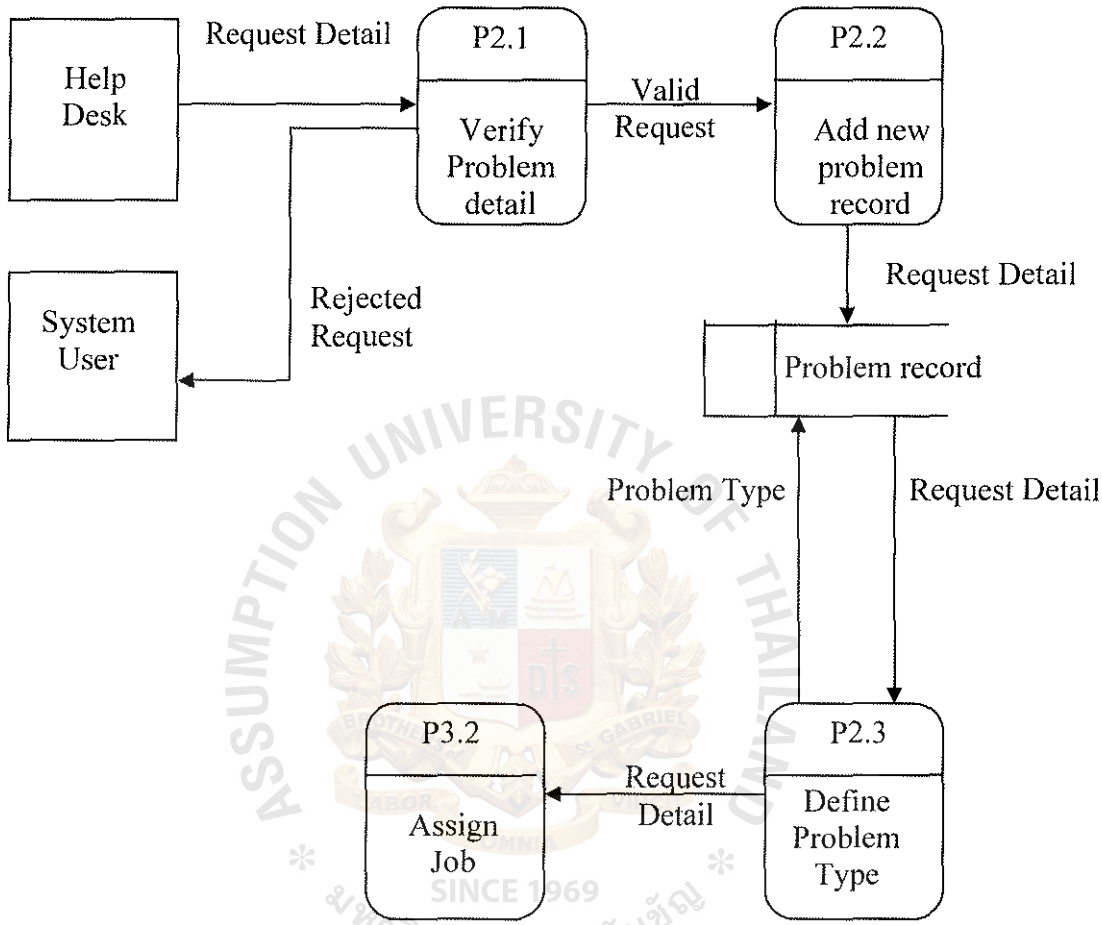
FigureA.1. Context diagram for Proposed System.



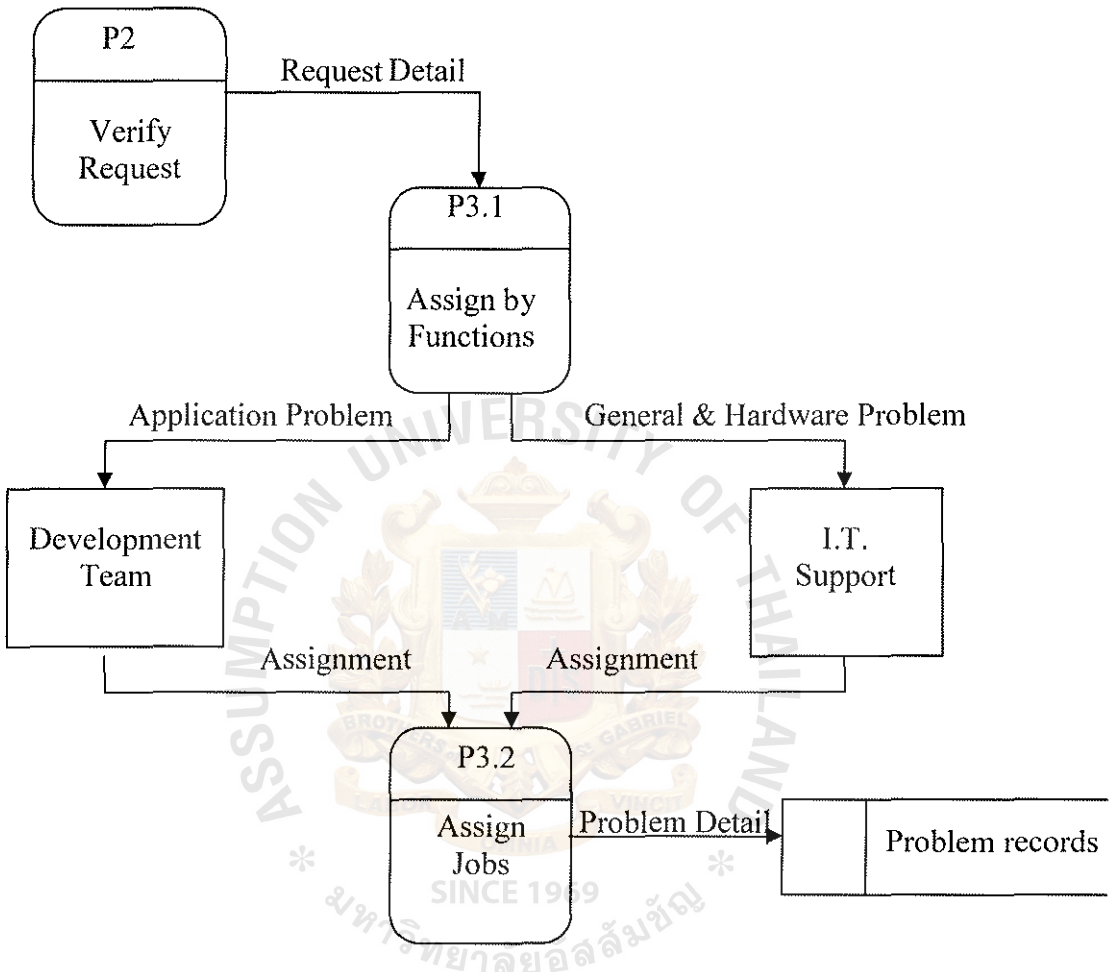
FigureA.2. Data Flow Diagram Level 0 - Proposed System.



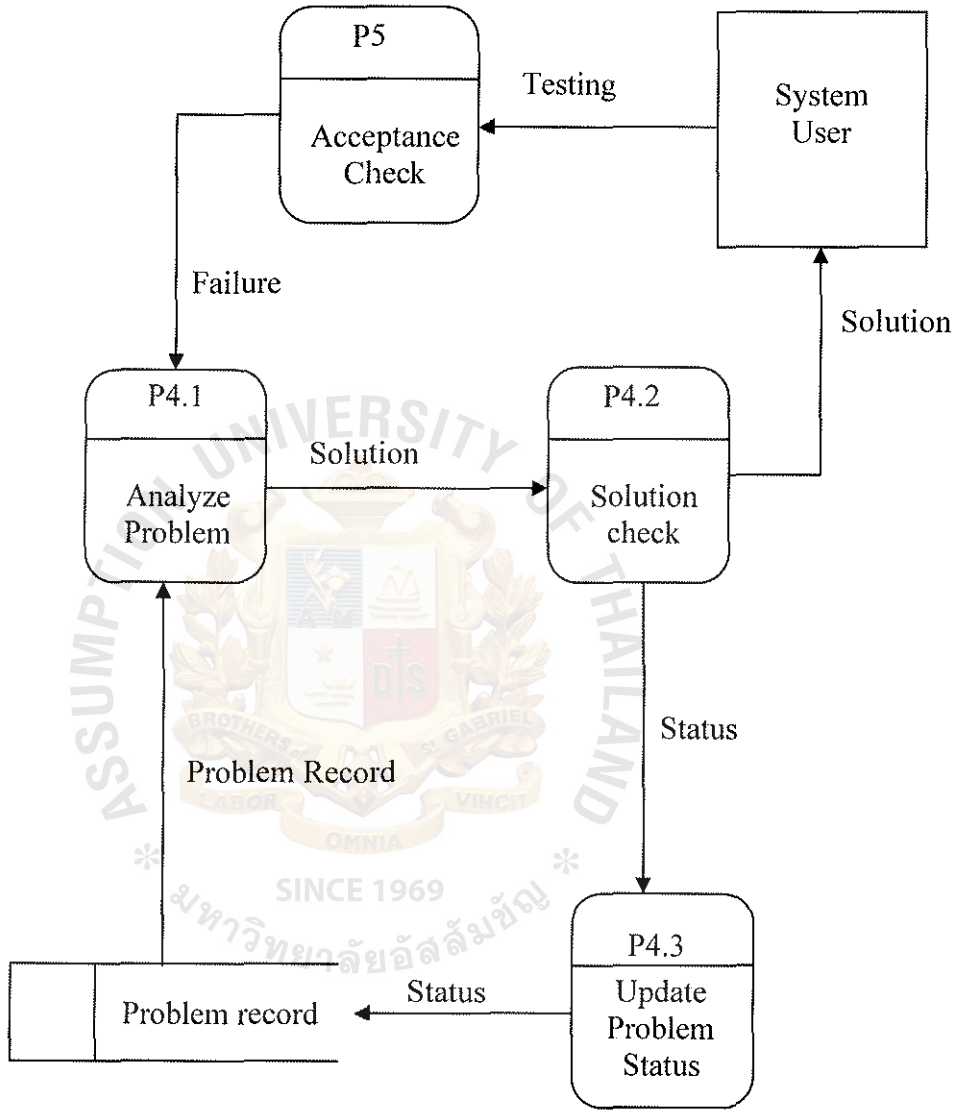
FigureA.3. Data Flow Diagram for the Proposed System-Computer Entry Function Process1.



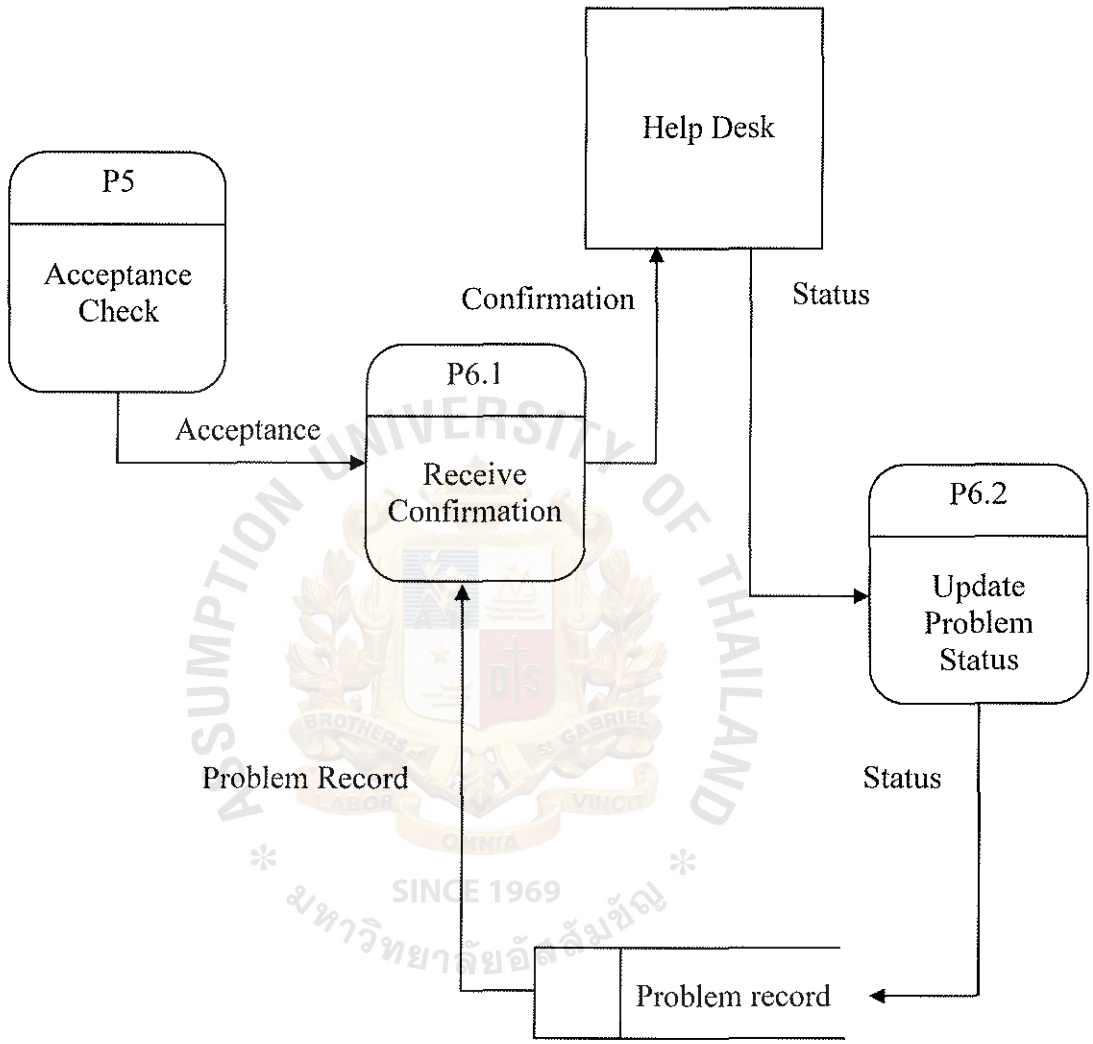
FigureA.4. Data Flow Diagram for the Proposed System – Helpdesk Entry: Process 2.



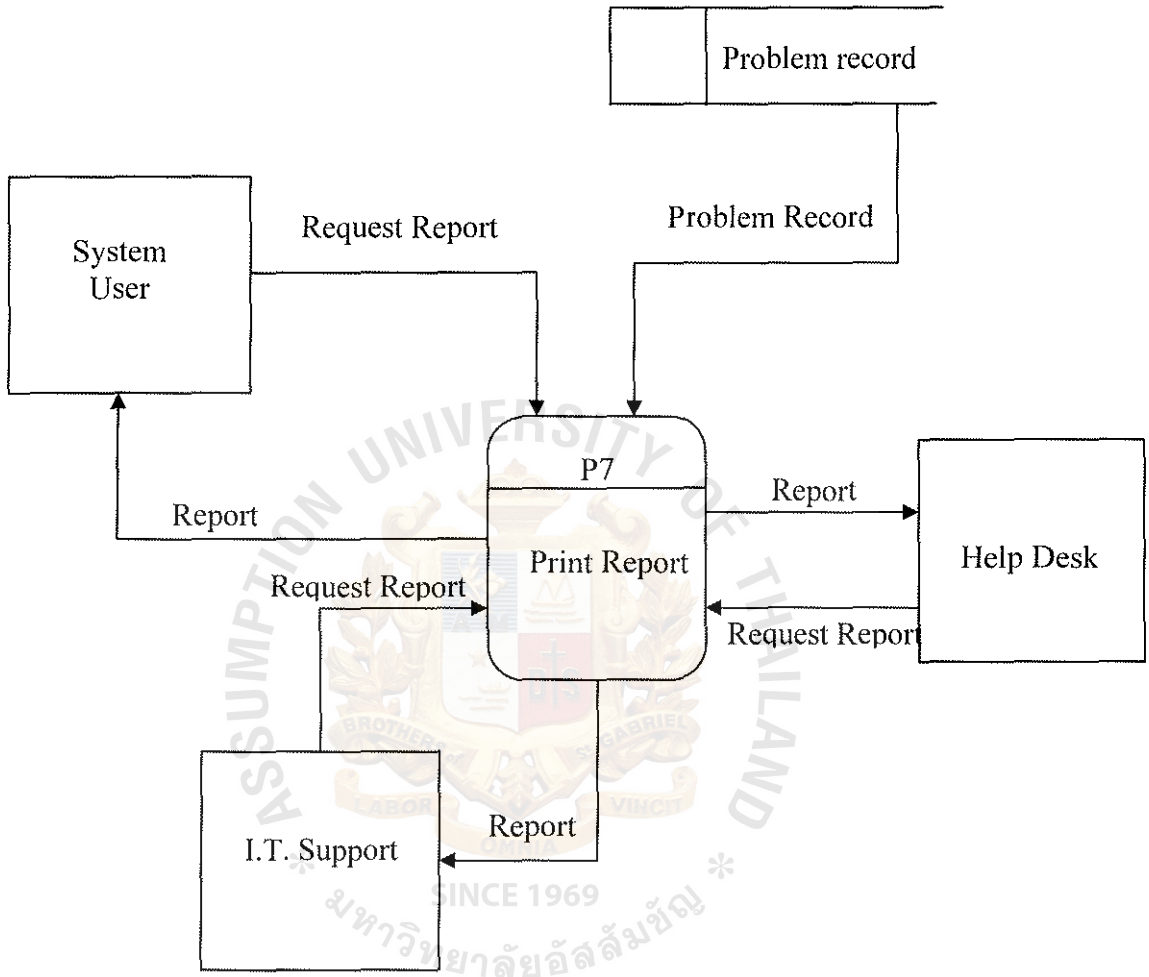
FigureA.5. Data Flow Diagram for the Proposed System – Help desk Entry: Process 3.



FigureA.6. Data Flow Diagram for the Proposed System – Help desk Entry: Process 4.



FigureA.7. Data Flow Diagram for the Proposed System – Help desk Entry Process 6.



FigureA.8. Data Flow Diagram for the Proposed System – Help desk Entry Process 7.

APPENDIX B

DATA DICTIONARY

Table B.1. Data Dictionary.

Name	Description
Acceptance	After perform checking and testing, and the solution can solve the problem. System user has to send the result and sign off.
Acceptance Check	Perform checking and testing to verify the solution.
Add New Computer Detail	Perform adding the new computer detail in the organization.
Analyze Problem	Analyze the cause of the problem.
Application Problem	The problem about various programs in the organization is sent to the Development Team to solve it.
Assign By Function	Perform assign the problem by function. Application problem to Development Team and General and Network problem to I.T. support.
Assign Jobs	The process to assign job followed by different problems.
Assignment	Assign problem request to support team (development team and I.T. support)
Call Help Desk	User calls help desk service to log the problem detail and user information
Checking	Checking the computer is already in the system.
Classify Problem	To classify the type of problems.
Close Job	When the solution is accepted, help desk will update the status.
Computer Detail	It shows computer information.
Computer Detail Record	I.T. support records computer information.
Computer Record	Database to keep computer record and other information.
Confirmation	After accepting the solution, user sends confirmation to the system.
Define Problem Type	Define problem type for each record.
Development Team	Programmer, System Analyst and I.T. manager.
Existing Computer	The existing computer detail in the system.
Failure	User has to report the failed test result to the support.
General & Hardware Problems	The problem about general and hardware.
Help Desk	Call Center for receiving problems from users.
I.T. Support	I.T. staff response for the general and hardware problems.
New Computer	In case of install new computer in the organization.
Print Report	The process to order system to print report.
Record Information	The process to record problem information.

Table B.2. Data Dictionary (Continued).

Name	Description
Problem Detail	Problem information.
Problem Record	Database to keep problem record and other information.
Problem Type	Problem Type ("Application", "General and Network")
Receive Confirmation	Help desk receives confirmation acceptance from the system user.
Rejected Request	The request is rejected because it is just duplication or it is not a problem.
Report	Report generated by the system.
Request Detail	Detail in problem request.
Request Report	Sending the request from system users.
Solution	Method to solve problem
Solution Check	The process to check the solution of each problem.
Solve Problem	The process to bring the solution to solve the problem.
Status	Status of the problem request.
System User	Staff who uses the computer and/or application.
Testing	System user tests the solution.
Update Information	The process to add, delete or edit the computer detail.
Update Problem Status	The process to update status of problem solving.
Valid Request	Verified request and approved.
Verify Existing Computer	Checking the existing computer status in the system.
Verify Problem Detail	Help desk verified and divided problem in group.
Verify Request	Help desk verified the request from system users.

APPENDIX C

CANDIDATE COST ANALYSIS

Table C.1. Estimated Cost of Candidate 1, Baht.

Cost Items	Years				
	1	2	3	4	5
Operating Cost					
I.T. Manager/ Developer (40,000@1)	480,000	528,000	580,800	638,880	702,768
I.T Support (15,000 @1)	180,000	198,000	217,800	239,580	263,538
Help desk (10,000 @1)	120,000	132,000	145,200	159,720	175,692
Total Operating Cost	780,000	858,000	943,800	1,038,180	1,141,998
Remark: Skipped Assistant I.T. because doing the same task					
Office Supplies & Miscellaneous Cost					
Stationary (8000 per month)(5%growth)	96,000	100,800	105,840	111,132	116,689
Paper (7000 per month)(5%growth)	84,000	88,200	92,610	97,241	102,103
Miscellaneous (6000 per month)(5%growth)	72,000	75,600	79,380	83,349	87,516
Utilities (8000 per month)(5%growth)	96,000	100,800	105,840	111,132	116,689
Total Office Supplies & Miscellaneous Cost	348,000	365,400	383,670	402,854	422,996
Training Cost	50,000	-	-	-	-
Computer Cost					
Hardware Cost:					
Server IBM X335 Rack Xeon 3.06 GHz	171,200	-	-	-	-
PC Workstaion Pentium 4 (40,600 @ 3)	121,800	-	-	-	-
3COM SuperStack3 Switch 4400 48Port/Layer4	98,400	-	-	-	-
APC Back RS Pro UPS1000VA	9,200	-	-	-	-
HP LaserJet 4050N+Duplex Unit	74,500	-	-	-	-
Total Hardware Cost	475,100	-	-	-	-
Software Cost:					
MS. Windows Server 2003 + CD Set	32,000	A d d i t i o n a l			1 0 %
MS. Windows XP Professional OEM (3@7400)	22,200	A d d i t i o n a l			1 0 %
MS. SQL Server 2000	27,100	A d d i t i o n a l			1 0 %
Symantec Antivirus Enterprise Edition 8.6	1,700	A d d i t i o n a l			1 0 %
MS. Office XP Standard OEM (3@12700)	38,100	A d d i t i o n a l			1 0 %
Total Software Cost	121,100	12,110	13,321	14,653	16,118
Total Computer Cost	596,200	12,110	13,321	14,653	16,118
Maintenance Cost:					
Maintenance Cost (10%for 2&3yrs 20 %for 4&5)	47,510	52,261	57,487	63,236	69,559
Implementation Cost	70,000				
Total Cost of proposed system	2,440,400	1,287,771	1,398,278	1,518,922	1,650,672

Table C.2. Estimated Cost of Candidate 2, Baht.

Cost Items	Years				
	1	2	3	4	5
Operating Cost					
I.T. Manager/ Developer (40,000@1)	480,000	528,000	580,800	638,880	702,768
I.T.Support (15,000 @1)	180,000	198,000	217,800	239,580	263,538
Help desk (10,000 @1)	120,000	132,000	145,200	159,720	175,692
Total Operating Cost	*780,000*	*858,000*	*943,800*	*1,038,180*	*1,141,998*
Remark: Skipped Assistant I.T. because doing the same task					
Office Supplies & Miscellaneous Cost					
Stationary (8000 per month)(5%growth)	96,000	100,800	105,840	111,132	116,689
Paper (7000 per month)(5%growth)	84,000	88,200	92,610	97,241	102,103
Miscellaneous (6000 per month)(5%growth)	72,000	75,600	79,380	83,349	87,516
Utilities (8000 per month)(5%growth)	96,000	100,800	105,840	111,132	116,689
Total Office Supplies & Miscellaneous Cost	*348,000*	*365,400*	*383,670*	*402,854*	*422,996*
Training Cost	*50,000*	-	-	-	-
Computer Cost					
Hardware Cost:					
Server-HP Proliant Server ML350 G3	121,000	-	-	-	-
Workstation (27,000 @3)	81,000	-	-	-	-
3Com Superstack Switches 4226T	21,500	-	-	-	-
APC Back RS Pro UPS1000VA	9,200	-	-	-	-
HP Laserjet 2200N	40,000	-	-	-	-
Total Hardware Cost	*272,700*	-	-	-	-
Software Cost:					
MS. Windows Server 2003 + CD Set	32,000	Additional 10%			
MS. Windows XP Professional OEM (3@7400)	22,200	Additional 10%			
MS. Visual FoxPro Professional 8.0	15,000	Additional 10%			
Symantec Antivirus Enterprise Edition 8.6	1,700	Additional 10%			
MS. Office XP Standard OEM (3@12700)	38,100	Additional 10%			
Total Software Cost	*109,000*	*10,900*	*11,990*	*13,189*	*14,508*
Total Computer Cost	*381,700*	*10,900*	*11,990*	*13,189*	*14,508*
Maintenance Cost:					
Maintenance Cost (10%for 2&3yrs 20 %for 4&5)	*27,270*	*29,997*	*32,997*	*39,596*	*47,515*
Implementation Cost	*50,000*				
Total Cost of proposed system	*2,018,670*	*1,264,297*	*1,372,457*	*1,493,819*	*1,627,017*

Table C.3. Estimated Cost of Candidate 3, Baht.

Cost Items	Years				
	1	2	3	4	5
Operating Cost					
I.T. Manager/ Developer (40,000@1)	480,000	528,000	580,800	638,880	702,768
I.T Support (15,000 @1)	180,000	198,000	217,800	239,580	263,538
Help desk (10,000 @1)	120,000	132,000	145,200	159,720	175,692
Total Operating Cost	780,000	858,000	943,800	1,038,180	1,141,998
Remark: Skipped Assistant I.T. because doing the same task					
Office Supplies & Miscellaneous Cost					
Stationary (8000 per month)(5%growth)	96,000	100,800	105,840	111,132	116,689
Paper (7000 per month)(5%growth)	84,000	88,200	92,610	97,241	102,103
Miscellaneous (6000 per month)(5%growth)	72,000	75,600	79,380	83,349	87,516
Utilities (8000 per month)(5%growth)	96,000	100,800	105,840	111,132	116,689
Total Office Supplies & Miscellaneous Cost	348,000	365,400	383,670	402,854	422,996
Training Cost	50,000	-	-	-	-
Computer Cost					
Hardware Cost:					
PC Workstaion Pentium 4 (40,600 @ 3)	121,800	-	-	-	-
3COM Switch 4924 24Port/Layer3	168,000	-	-	-	-
APC Back RS Pro UPS1000VA	9,200	-	-	-	-
Linksys Wireless access point + PCI card	13,550				
HP LaserJet 2200DN	43,400	-	-	-	-
Total Hardware Cost	355,950	-	-	-	-
Software Cost:					
MS. Windows Server 2003 + CD Set	32,000	Additional 10 %			
MS. Windows XP Professional OEM (3@7400)	22,200	Additional 10 %			
MS. SQL 2000 Server	27,100	Additional 10 %			
Symantec Antivirus Enterprise Edition 8.6	1,700	Additional 10 %			
MS. Office XP Standard OEM (3@12700)	38,100	Additional 10 %			
Total Software Cost	121,100	12,110	14,532	15,985	17,584
Total Computer Cost	477,050	12,110	14,532	15,985	17,584
Maintenance Cost:					
Maintenance Cost (10%for 2&3yrs 20 %for 4&5)	47,705	52,476	57,723	69,268	83,121
Implement Cost	80,000				
Total Cost of proposed system	2,212,100	1,287,986	1,399,725	1,526,286	1,665,699

Table C.4. Payback Period of Candidate1, Baht.

Cost Items	Years					
	0	1	2	3	4	5
Development Cost	-646,200					
Operation & Maintenance Cost		-47,510	-52,261	-57,487	-63,236	-69,559
Discount Factor for 12%	1.000	0.893	0.797	0.712	0.636	0.567
Time-adjusted cost	-646,200	-42,426	-41,652	-40,931	-40,218	-39,440
Cummulative Time-adjusted costs over lifetime	-646,200	-688,626	-730,278	-771,209	-811,427	-850,867
Benefit derived from operation of new system	0	286,000	387,000	443,970	507,551	578,448
Discount Factor for 12%	1.000	0.893	0.797	0.712	0.636	0.567
Time-adjusted cost	0	255,398	308,439	316,107	322,802	327,980
Cummulative Time-adjusted costs over lifetime	0	255,398	563,837	879,944	1,202,746	1,530,726
Cummulative lifetime time-adjusted cost+benefit	-646,200	-433,228	-166,441	108,734	391,319	679,858

Table C.5. Payback Period of Candidate2, Baht.

Cost Items	Years					
	0	1	2	3	4	5
Development Cost	-431,700					
Operation & Maintenance Cost		-27,270	-29,997	-32,997	-39,596	-47,515
Discount Factor for 12%*	1.000	0.893	0.797	0.712	0.636	0.567
Time-adjusted cost	-431,700	-24,352	-23,908	-23,494	-25,183	-26,941
Cummulative Time-adjusted costs over lifetime	-431,700	-456,052	-479,960	-503,453	-528,636	-555,578
Benefit derived from operation of new system	0	286,000	387,000	443,970	507,551	578,448
Discount Factor for 12%*	1.000	0.893	0.797	0.712	0.636	0.567
Time-adjusted cost	0	255,398	308,439	316,107	322,802	327,980
Cummulative Time-adjusted costs over lifetime	0	255,398	563,837	879,944	1,202,746	1,530,726
Cummulative lifetime time-adjusted cost+benefit	-431,700	-200,654	83,877	376,490	674,109	975,148

Table C.6. Payback Period of Candidate3, Baht.

Cost Items	Years					
	0	1	2	3	4	5
Development Cost	-527,050					
Operation & Maintenance Cost		-47,705	-52,476	-57,723	-69,268	-83,121
Discount Factor for 12%	1.000	0.893	0.797	0.712	0.636	0.567
Time-adjusted cost	-527,050	-42,601	-41,823	-41,099	-44,054	-47,130
Cummulative Time-adjusted costs over lifetime	-527,050	-569,651	-611,474	-652,572	-696,627	-743,756
Benefit derived from operation of new system	0	256,000	387,000	443,970	507,551	578,448
Discount Factor for 12%	1.000	0.893	0.797	0.712	0.636	0.567
Time-adjusted cost	0	228,608	308,439	316,107	322,802	327,980
Cummulative Time-adjusted costs over lifetime	0	228,608	537,047	853,154	1,175,956	1,503,936
Cummulative lifetime time-adjusted cost+benefit	-527,050	-341,043	-74,427	200,581	479,329	760,180

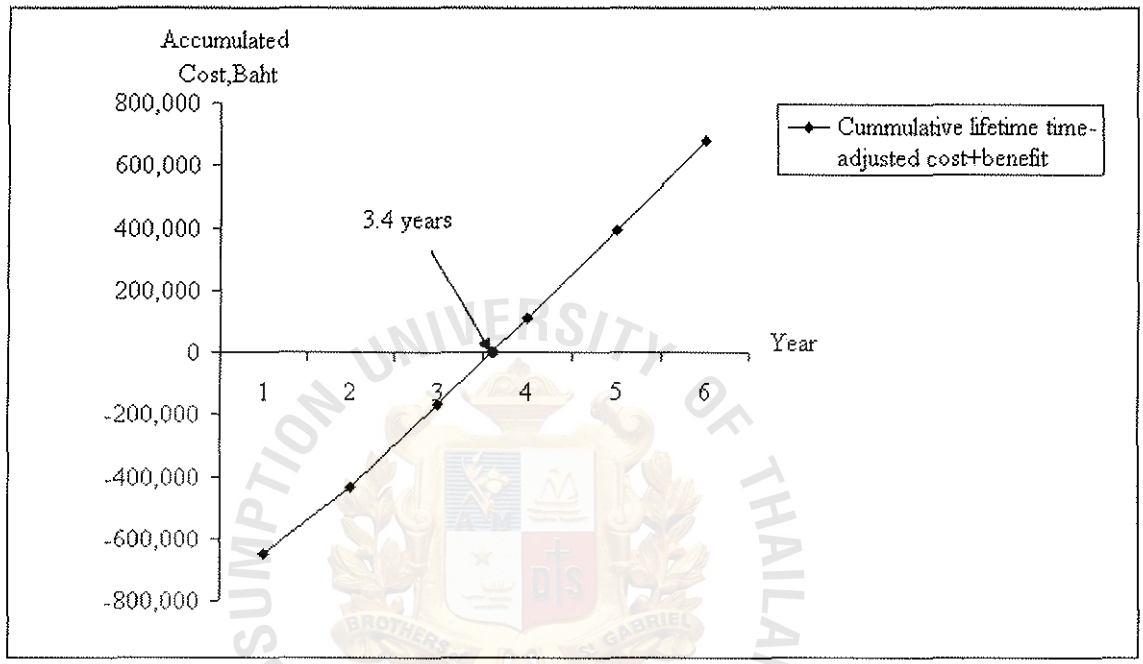


Figure C.1. Payback Period of Candidate 1.

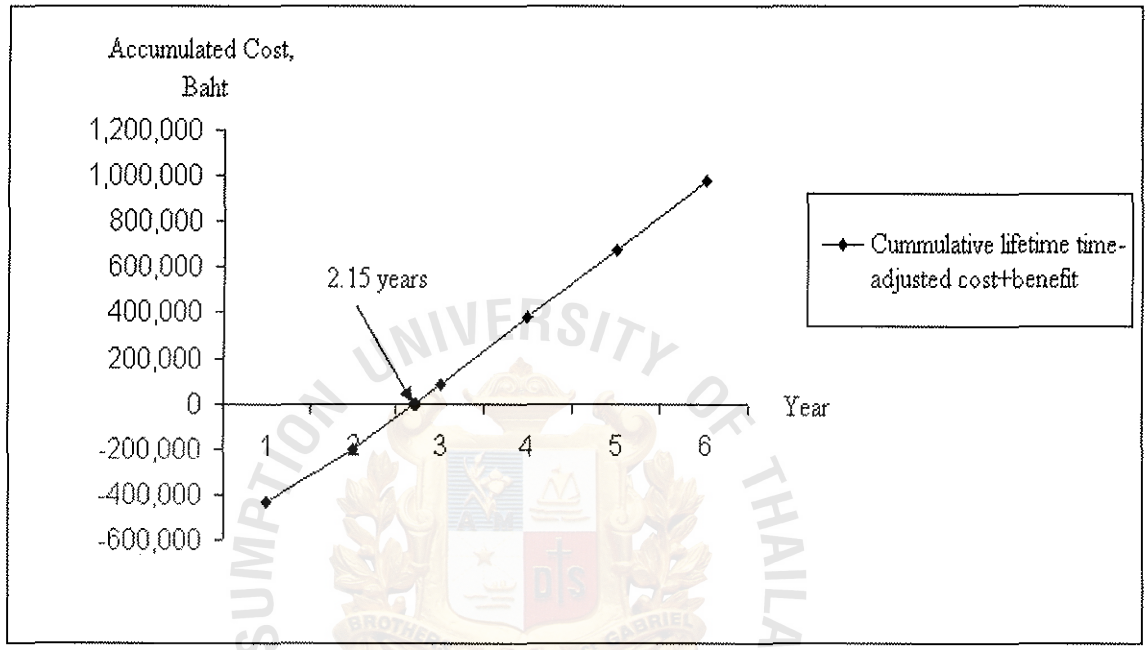


Figure C.2. Payback Period of Candidate 2.

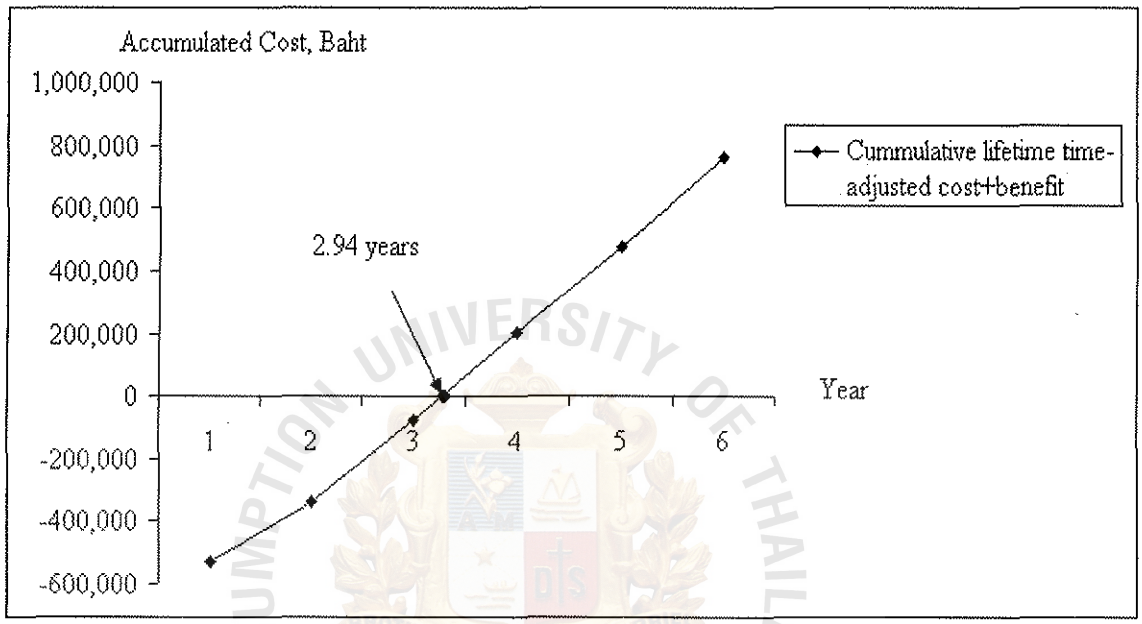


Figure C.3. Payback Period of Candidate 3.

Table C.7. Net Present Value of Candidate 1, Baht.

Cost Items	Years						Total
	0	1	2	3	4	5	
Development Cost	-431,700						
Operation & Maintenance Cost		-27,270	-29,997	-32,997	-39,596	-47,515	
Discount Factor for 12%*	1.000	0.893	0.797	0.712	0.636	0.567	
Present value of annual costs	-431,700	-24,352	-23,908	-23,494	-25,183	-26,941	
Total Present value of lifetime costs							-555,578
Benefit derived from operation of new system	0	286,000	387,000	443,970	507,551	578,448	
Discount Factor for 12%*	1.000	0.893	0.797	0.712	0.636	0.567	
Present value of annual costs	0	255,398	308,439	316,107	322,802	327,980	
Total Present value of lifetime costs							1,530,726
Net Present value of proposed system							975,148

Table C.8. Net Present Value of Candidate 2, Baht.

Cost Items	Years						Total
	0	1	2	3	4	5	
Development Cost	-431,700						
Operation & Maintenance Cost		-27,270	-29,997	-32,997	-39,596	-47,515	
Discount Factor for 12%*	1.000	0.893	0.797	0.712	0.636	0.567	
Present value of annual costs	-431,700	-24,352	-23,908	-23,494	-25,183	-26,941	
Total Present value of lifetime costs							-555,578
Benefit derived from operation of new system	0	286,000	387,000	443,970	507,551	578,448	
Discount Factor for 12%*	1.000	0.893	0.797	0.712	0.636	0.567	
Present value of annual costs	0	255,398	308,439	316,107	322,802	327,980	
Total Present value of lifetime costs							1,530,726
Net Present value of proposed system							975,148

Table C.9. Net Present Value of Candidate 3, Baht.

Cost Items	Years						Total
	0	1	2	3	4	5	
Development Cost	-527,050						
Operation & Maintenance Cost		-47,705	-52,476	-57,723	-69,268	-83,121	
Discount Factor for 12%	1.000	0.893	0.797	0.712	0.636	0.567	
Present value of annual costs	-527,050	-42,601	-41,823	-41,099	-44,054	-47,130	
Total Present value of lifetime costs							-743,756
Benefit derived from operation of new system	0	256,000	387,000	443,970	507,551	578,448	
Discount Factor for 12%	1.000	0.893	0.797	0.712	0.636	0.567	
Present value of annual costs	0	228,608	308,439	316,107	322,802	327,980	
Total Present value of lifetime costs							1,503,936
Net Present value of proposed system							760,180

APPENDIX D

PROCESS SPECIFICATION

PROCESS SPECIFICATION

Process 0 IT and Help Desk Support System

Location:

Context (CONTEXT)

Input Flows:

Solution Request

Recording

Testing

Request Report

Solution

Assignment

Output Flows:

Problem Information

Report

Solution

Request Detail

Assignment

Computer Information Entry

Process 1 Record Information

Location:

DFD Level 0

Input Flows:

Recording

Output Flows:

Computer Detail

Process 1.1 Verify Existing Computer

Location:

Process 1

Input Flows:

Checking

Output Flows:

New Computer

Existing Computer

Process 1.2 Add New Computer Detail

Location:

Process 1

Input Flows:

New Computer

Output Flows:

Computer Detail

Process 1.3 Update Information

Location:

Process 1

Input Flows:

Existing Computer

Output Flows:

Computer Detail

Process 2 Print Report

Location:

DFD Level 0

Input Flows:

Request Report

Computer Detail Record

Output Flows:

Computer Detail Report

Help Desk Entry

Process 1 Call Help Desk

Location:

DFD Level 0

Input Flows:

Request Detail

Output Flows:

Request Detail

Process 2 Verify Request

Location:

DFD Level 0

Input Flows:

Request detail

Output Flows:

Rejected Request

Request etail

Process 2.1 Verify Problem detail

Location:

Process 2

Input Flows:

Request Detail

Output Flows:

Rejected Request

Valid Request

Process 2.2 Add new problem record

Location:

Process 2

Input Flows:

Valid Request

Outlook Flows:

Request Detail

Process 2.3 Define Problem Type

Location:

Process 2

Input Flows:

Request Detail

Output Flows:

Problem Type

Request Detail

Process 3 Classify Problem

Location:

DFD Level 0

Input Flows:

Request Detail

Output Flows:

General & Hardware Problem

Application Problem

Process 3.1 Assign by Function

Location:

Process 3

Input Flows:

Request Detail

Output Flows:

General & Hardware Problem

Application Problem

Process 3.2 Assign Jobs

Location:

Process 3

Input Flows:

Assignment

Output Flows:

Problem Detail

Process 4 Solve Problem

Location:

DFD Level 0

Input Flows:

Solution

Failure

Output Flows:

Status

Solution

Process 4.1 Analyze Problem

Location:

Process 4

Input Flows:

Failure

Problem Record

Output Flows:

Solution

Process 4.2 Solution Check

Location:

Process 4

Input Flows:

Solution

Output Flows:

Solution

Status

Process 4.3 Update Problem Status

Location:

Process 4

Input Flows:

Resolved Status

Output Flows:

Status

Process 5 Acceptance Check

Location:

DFD Level 0

Input Flows:

Testing

Problem detail

Output Flows:

Acceptance

Failure

Process 6 Close Job

Location:

DFD Level0

Input Flows:

Acceptance

Output Flows:

Status

Process 6.1 Receive Confirmation

Location:

Process 6

Input Flows:

Accept

Problem records

Output Flows

Confirm

Process 6.2 Update Problem Status

Location:

Process 6

Input Flows:

Status

Output Flows:

Status

Process 7 Print Report

Location:

DFD Level 0

Input Flows:

Request Report

Problem Record

Output Flows:

Report

APPENDIX E

ENTITY RELATIONSHIP DIAGRAMS

AND STRUTURE CHART DIAGRAMS

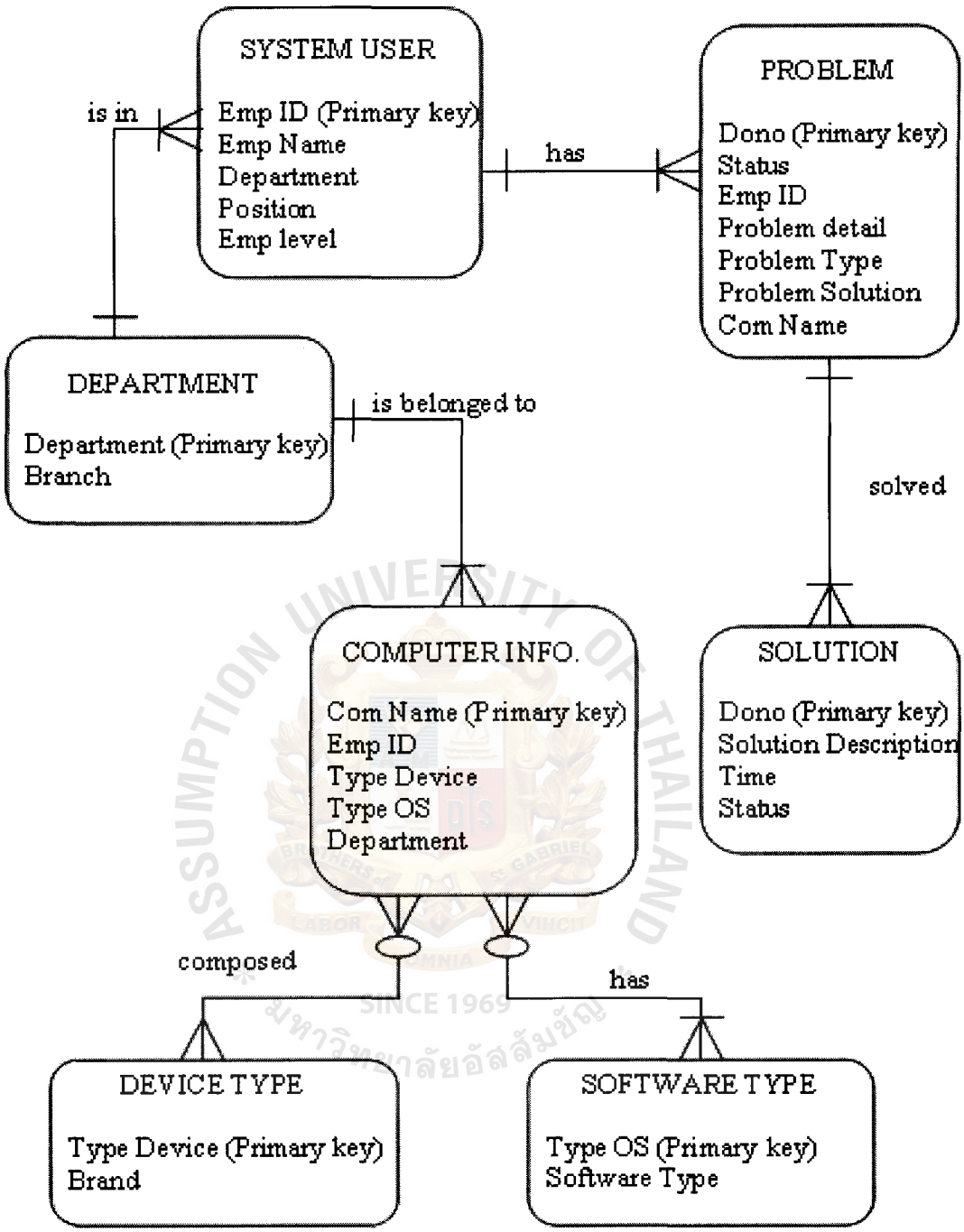


Figure E.1. ER Diagram of Proposed System.

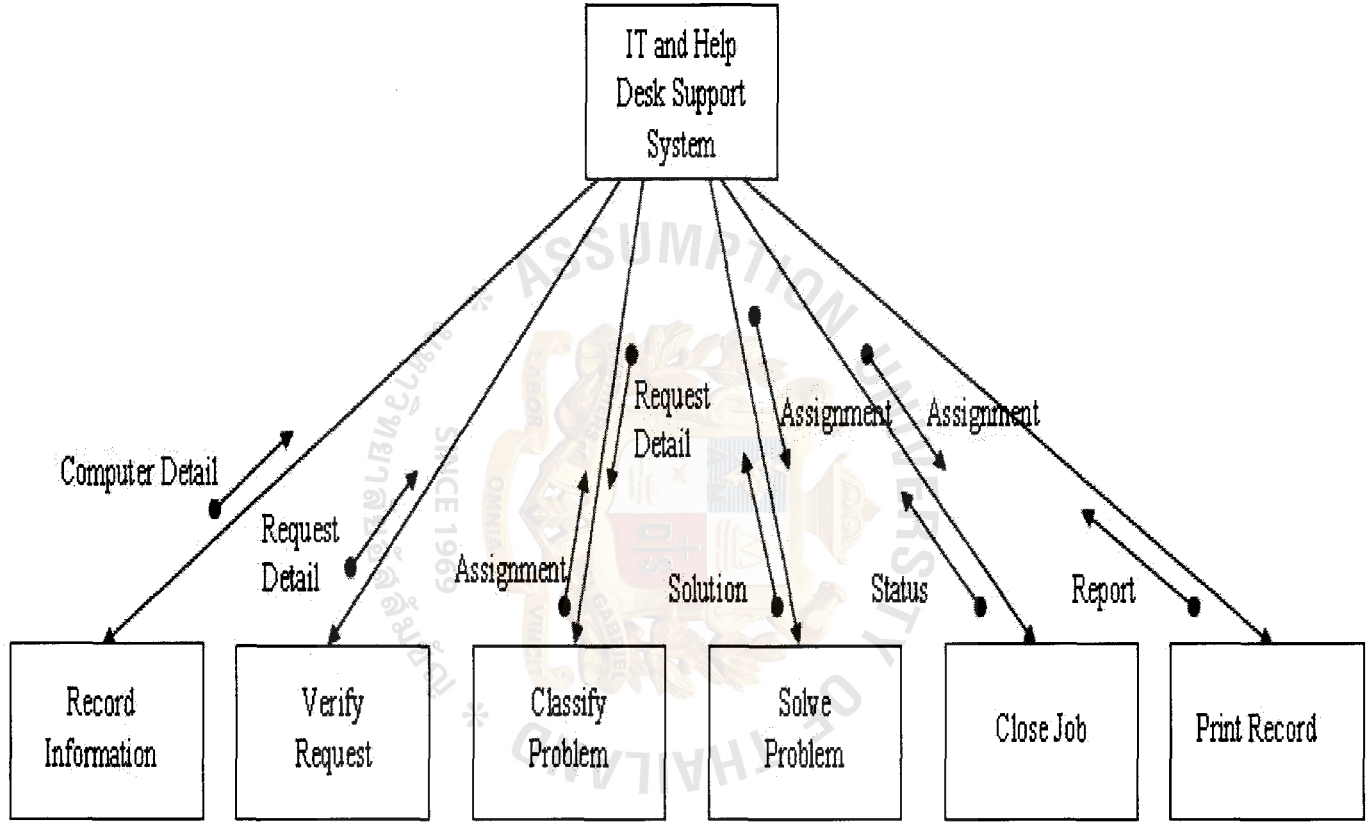


Figure E.2. Structure Chart for the Proposed System.

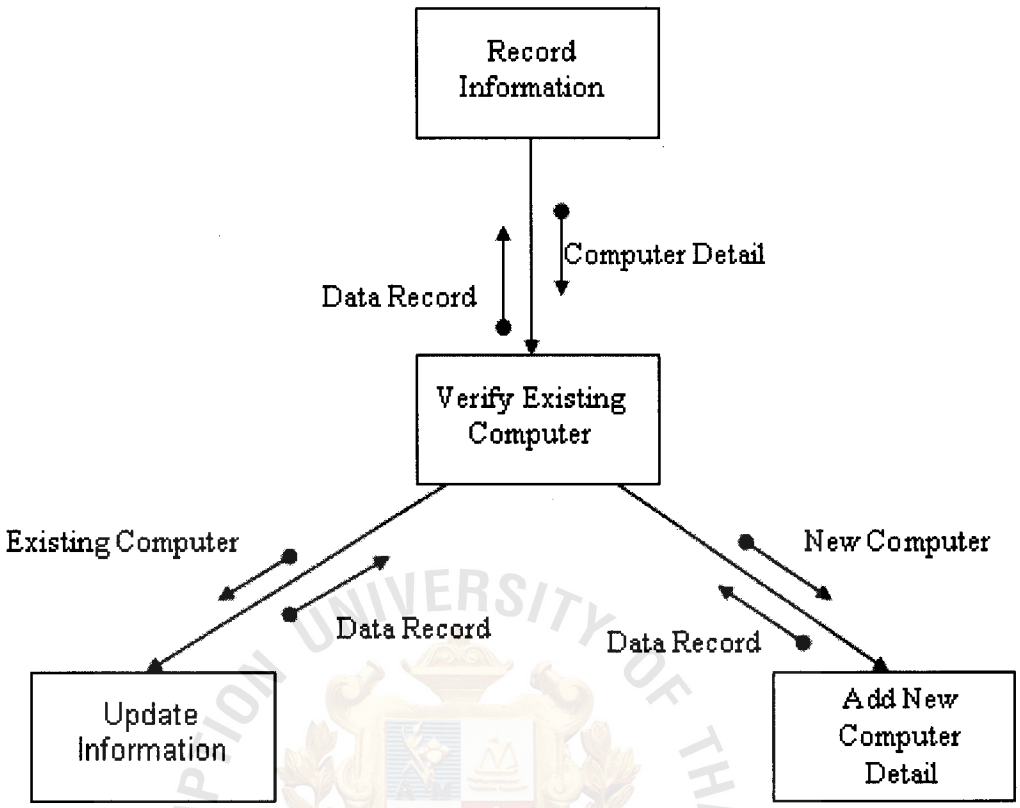


Figure E.3. Structure Chart for the Proposed System – Process1 Computer Entry Function.

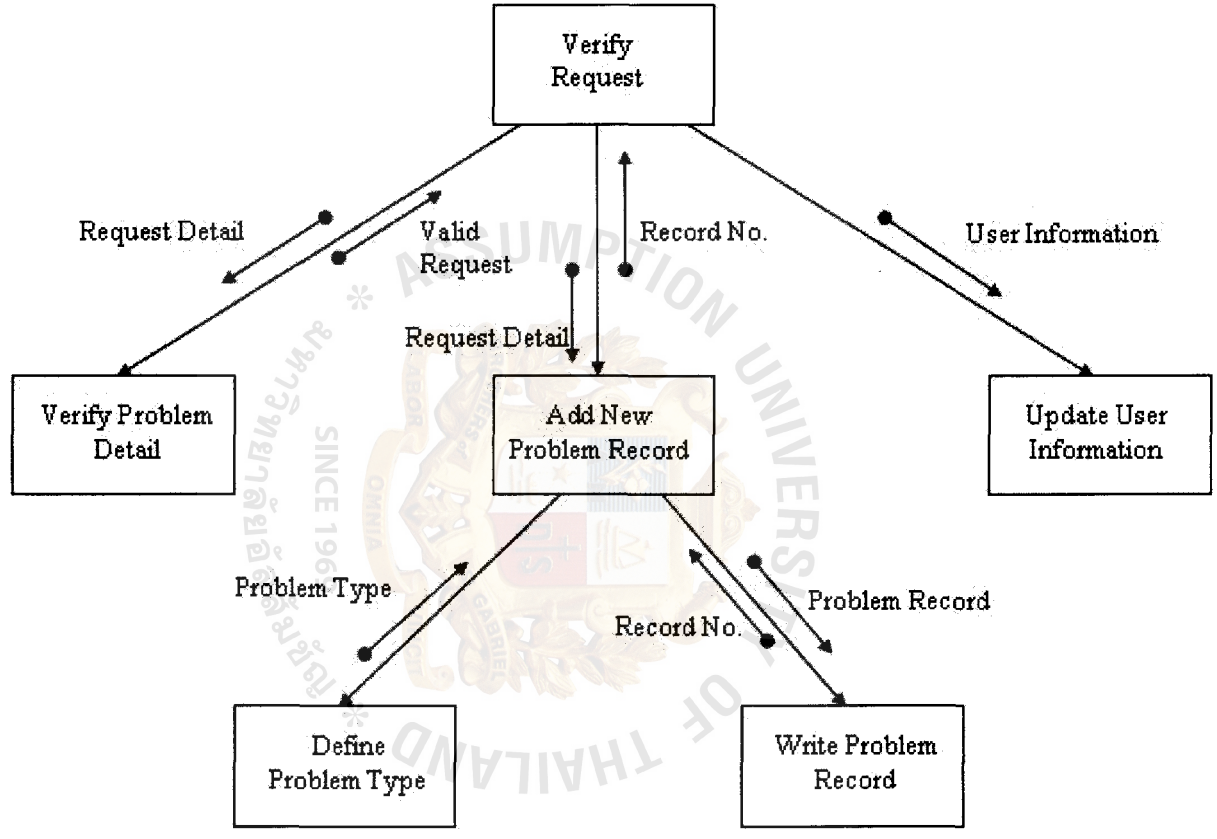


Figure E.4. Structure Chart for the Proposed System – Process2 Help Desk Support Entry.

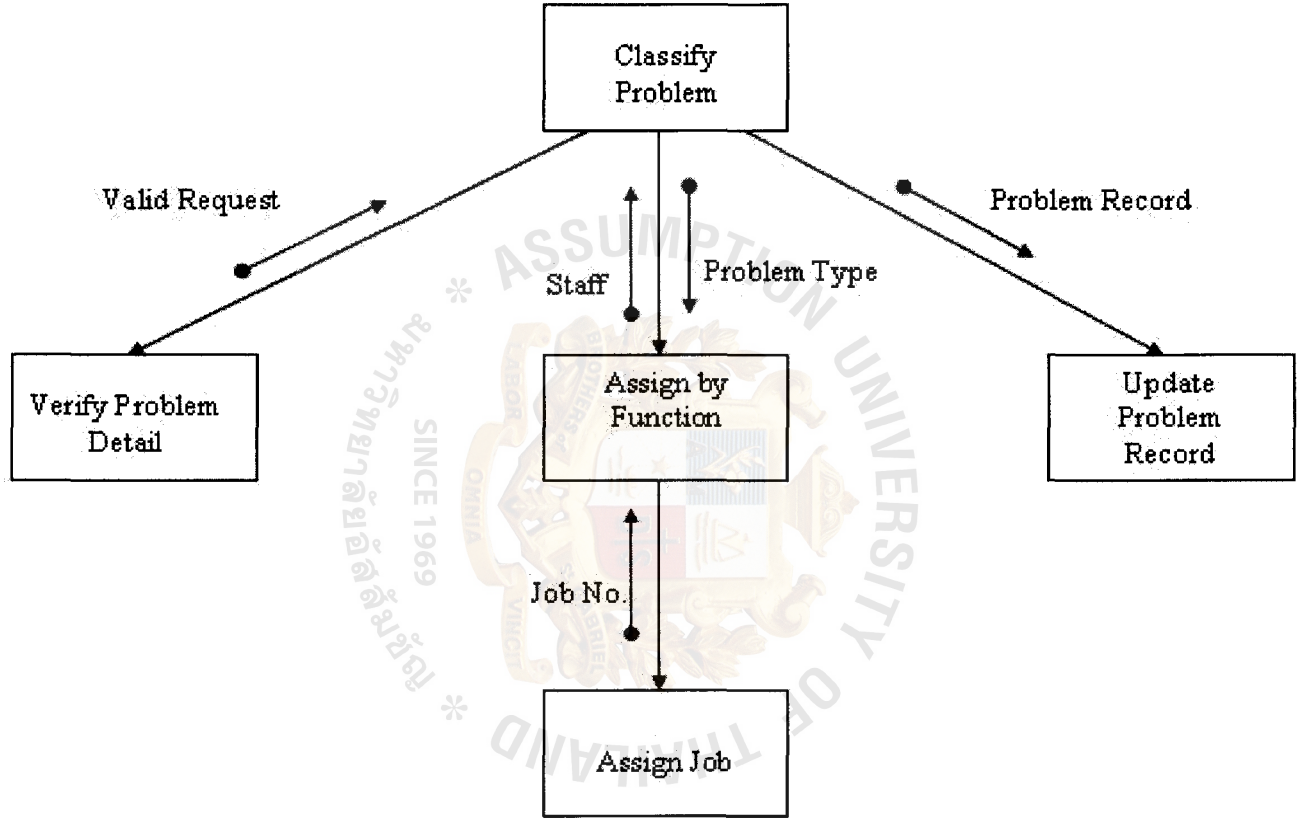


Figure E.5. Structure Chart for the Proposed System – Process3 Help Desk Support Entry.

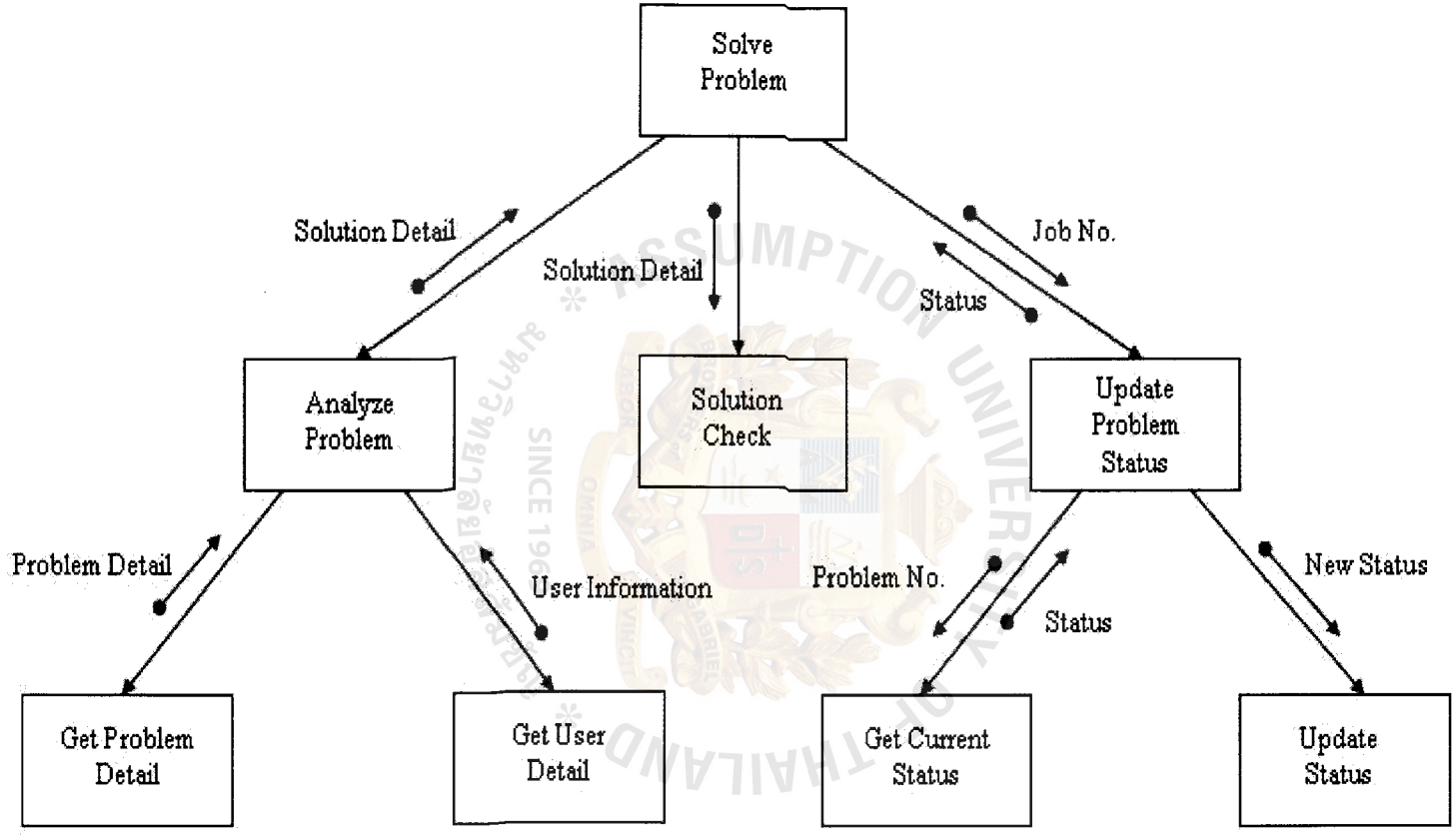


Figure E.6. Structure Chart for the Proposed System – Process4 Help Desk Support Entry.

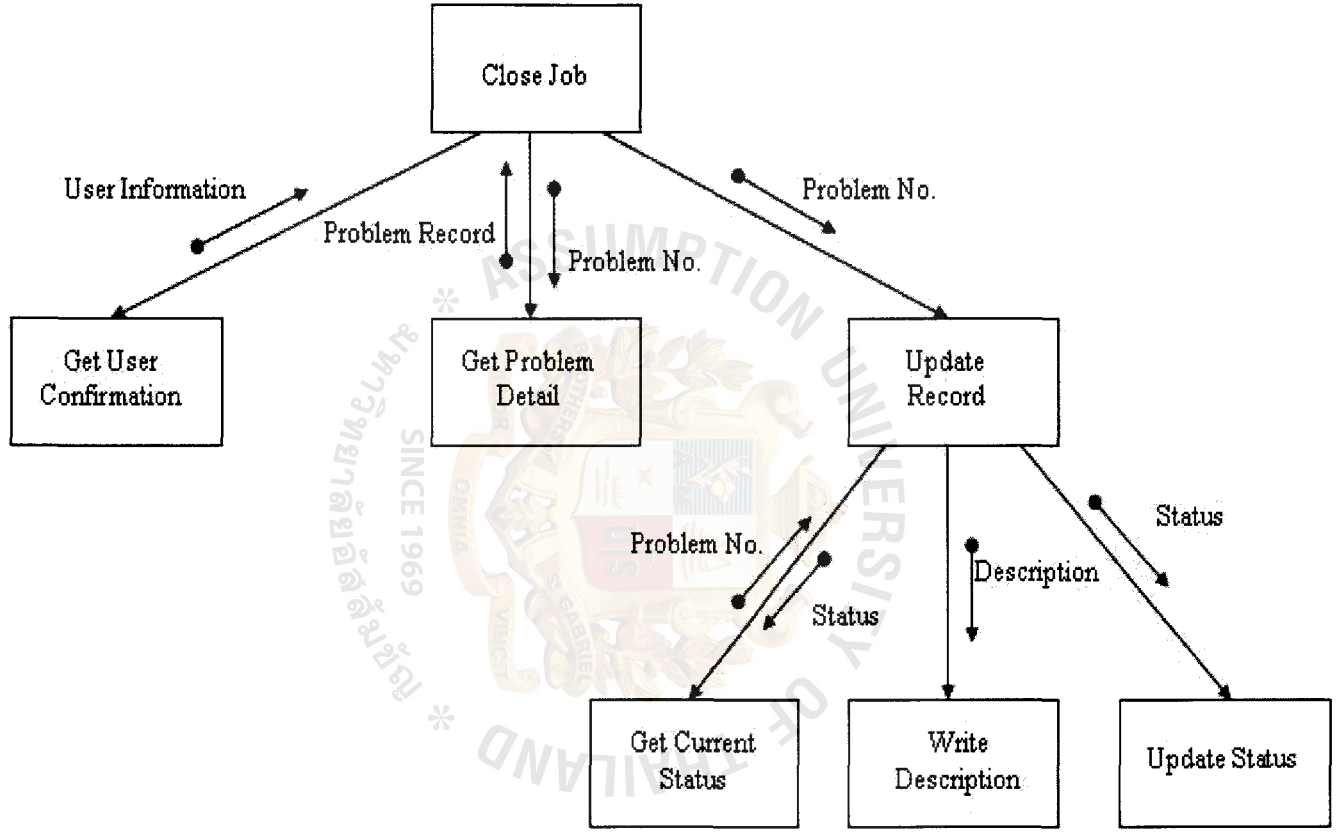


Figure E.7. Structure Chart for the Proposed System – Process6 Help Desk Support Entry.

APPENDIX F

USER INTERFACE DESIGN AND OUTPUT

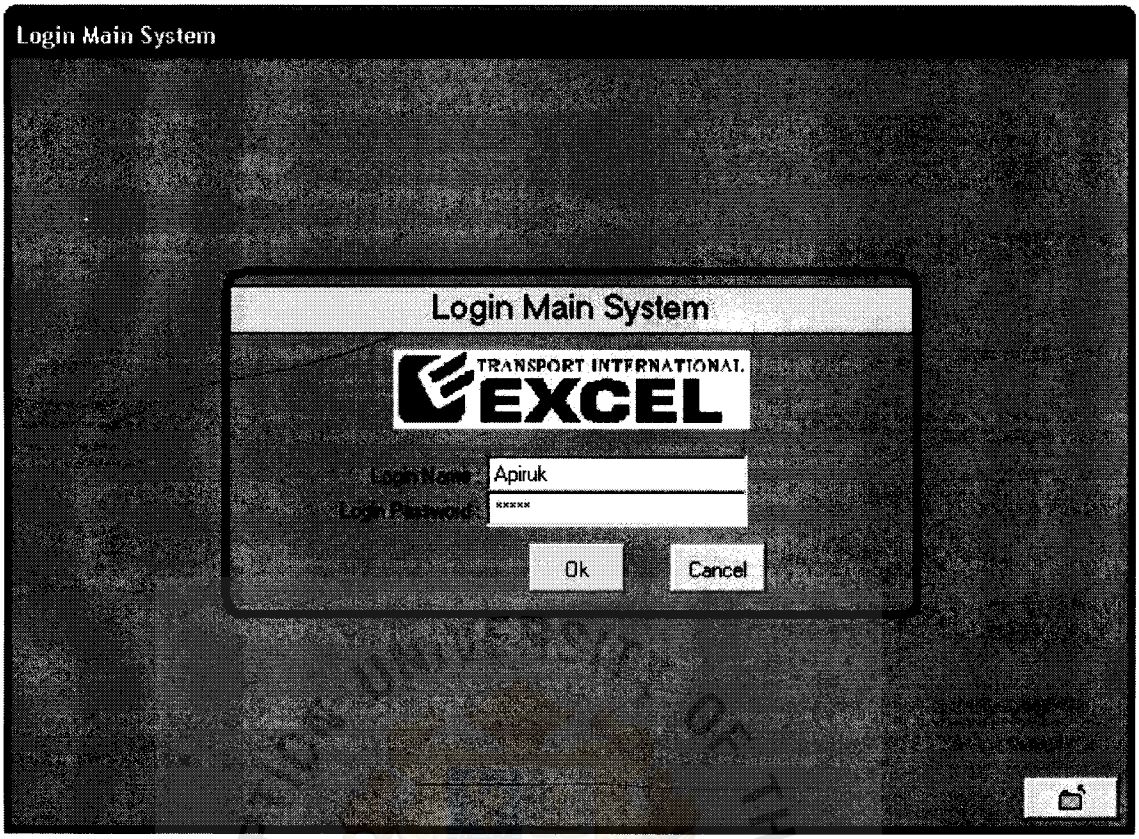


Figure F.1. Login Main System Screen.

Login Screen

Screen Definition

Login Master Main System

Verify User Name and Password

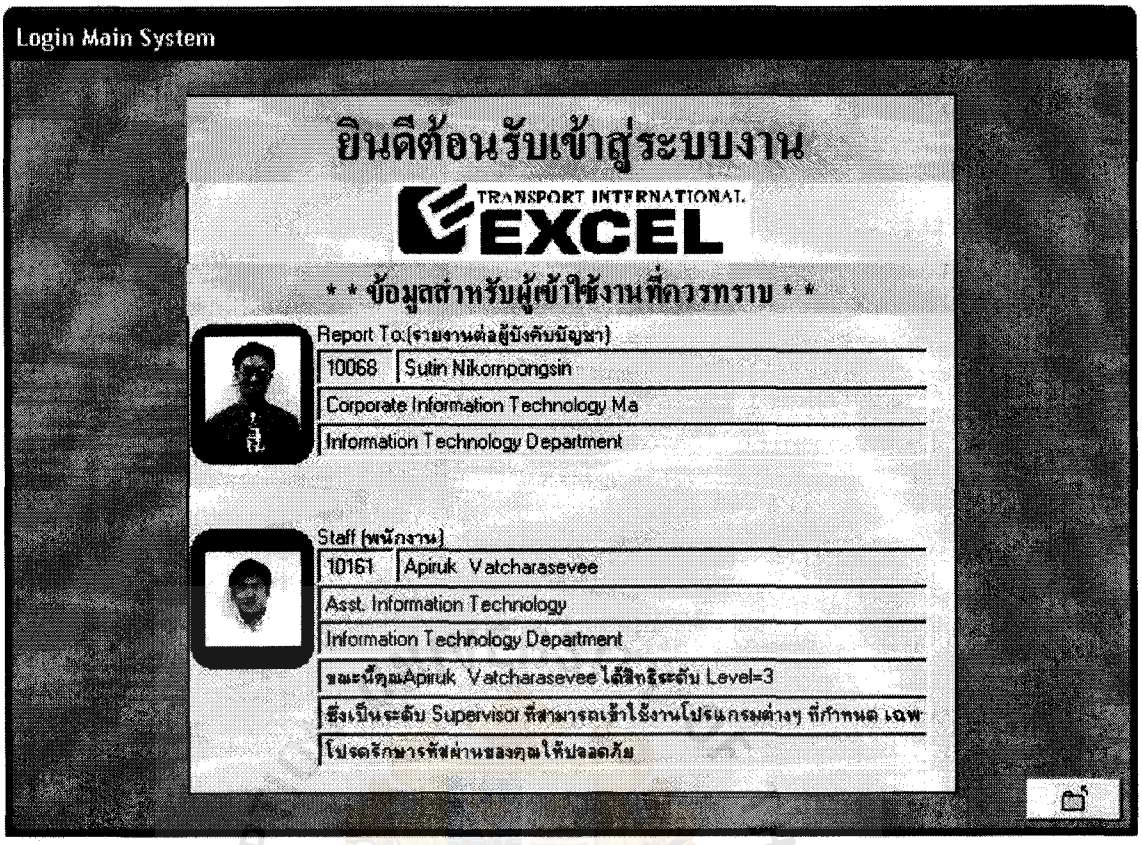


Figure F.2. Display user's information Screen.

Priority Display Screen

Screen Definition

The screen show the priority and some information about the current user and his supervisor or manager who take responsible and report to.

Figure F.3. Main Menu for Master Main System.

Main Menu Screen

Screen Definition

Main Menu of Master Main System includes overall application of every department in Excel Transport Int'l Co., Ltd.

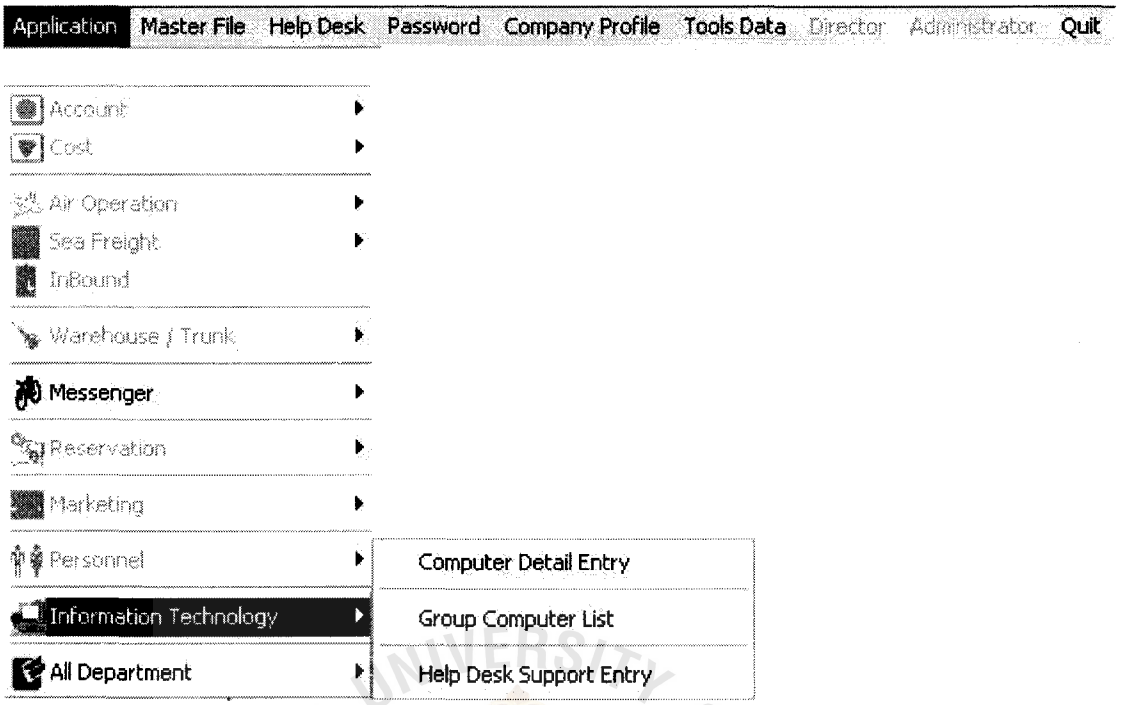


Figure F.4. Application Main Menu.

Application Main Menu Screen

Screen Definition

Show all the departments and their application programs.

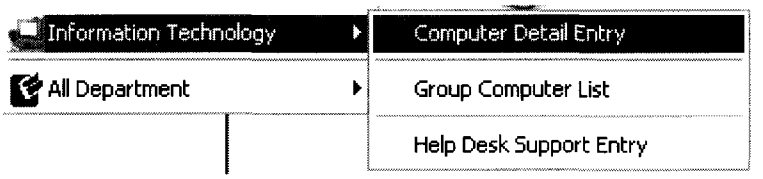


Figure F.5. Information Technology Application Menu.

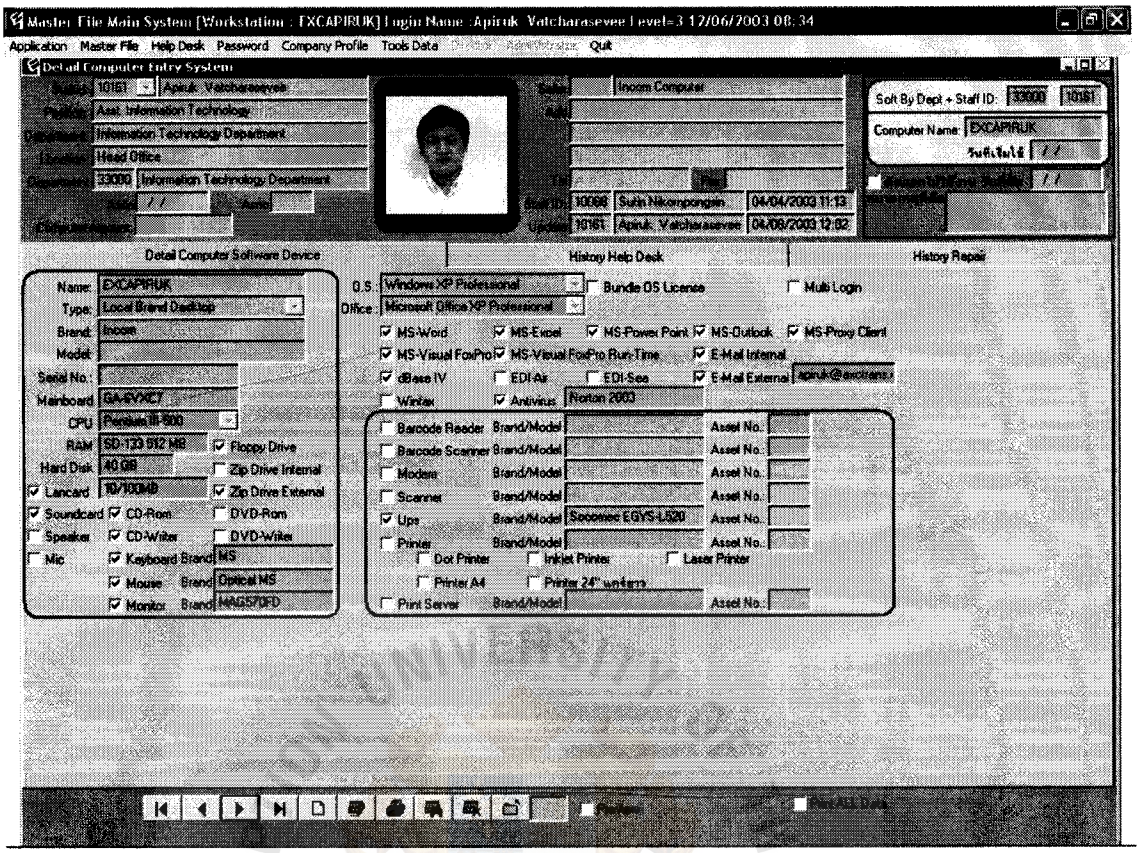


Figure F.6. Competed Computer detail Entry.

Computer Detail Entry Screen

Screen Definition

Show the full detail of one computer set; computer name, user, computer specification, software and hardware, vendor name, price, and start using date. It also has history help desk and history repair sub windows for each computer detail.

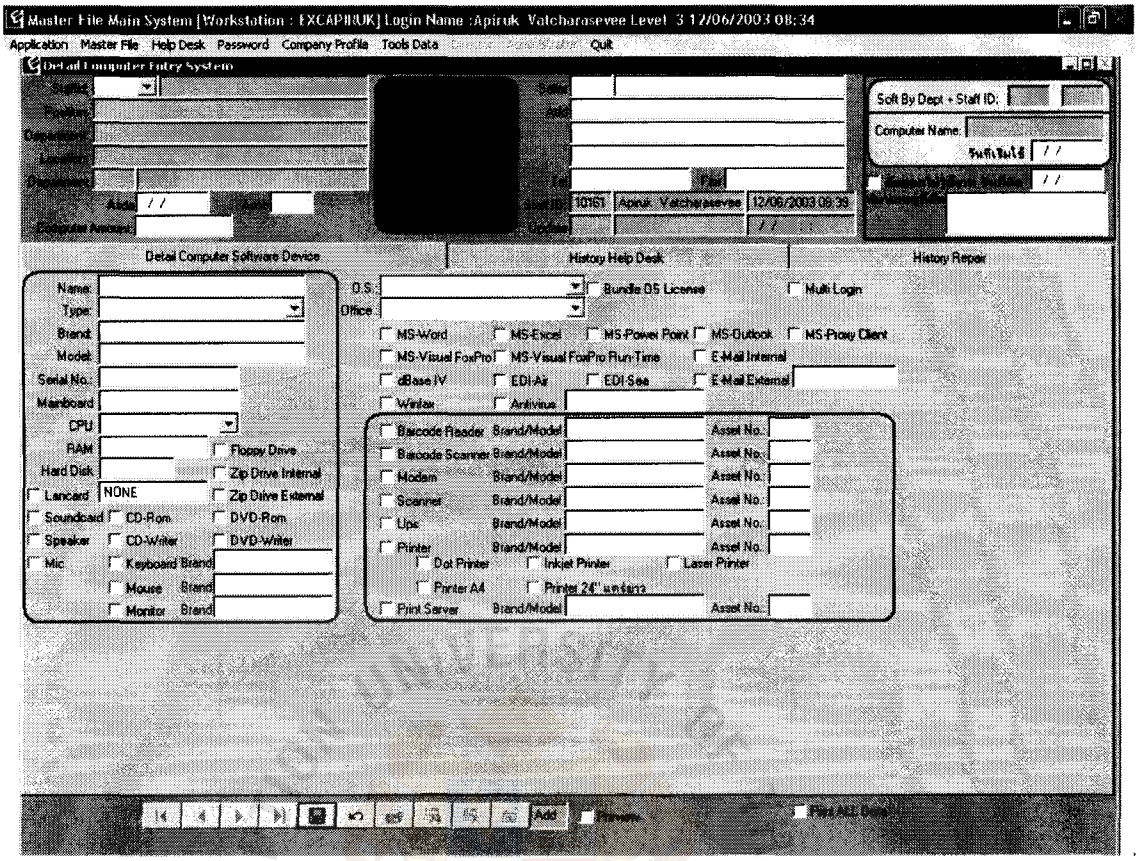


Figure F.7. Adding Computer detail.

Adding Computer Detail Screen

Screen Definition

Click "Add" bottom, the screen will show blank fields to add in necessary detail for each computer. Same as the "Edit" bottom, I.T. support can edit the computer detail by using this screen.

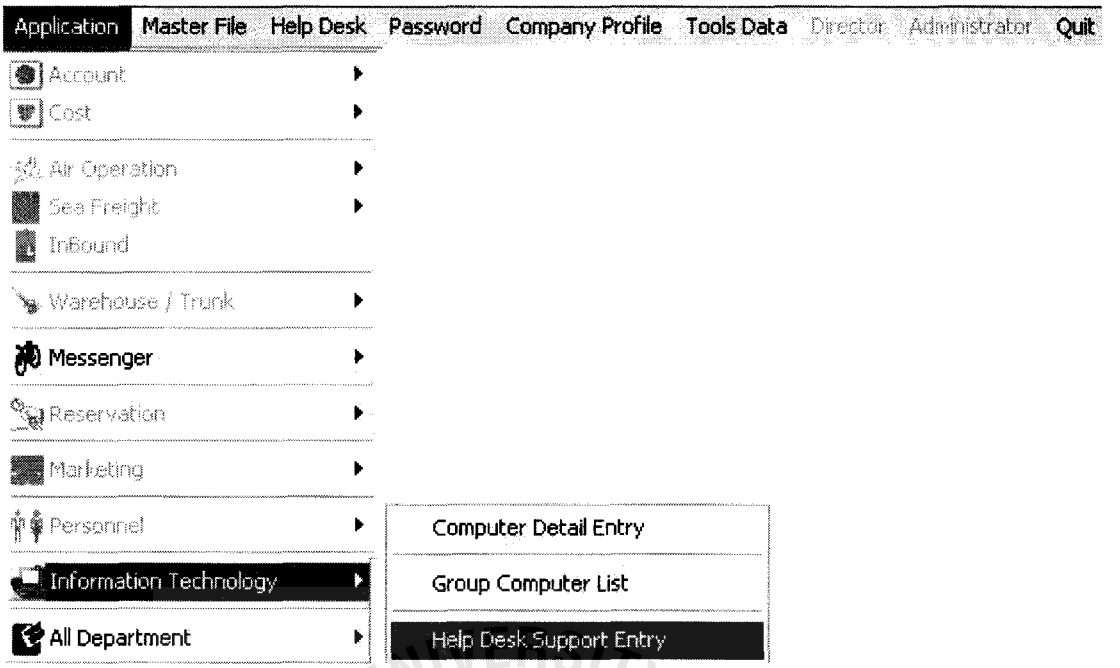


Figure F.8. Information Technology Application menu – Help Desk Support Entry.

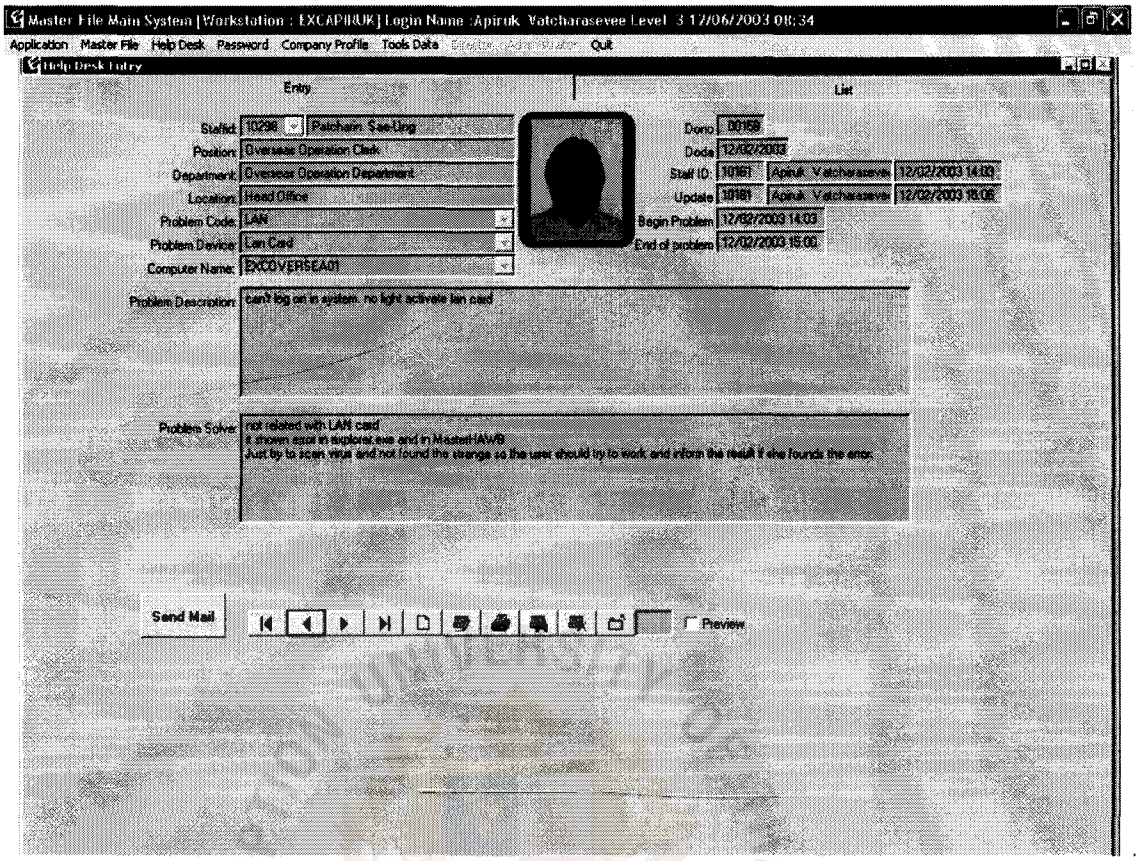


Figure F.9. Help Desk Support Entry.

Help Desk Support Entry Screen

Screen Definition

Show detail about help desk for each job. It contains staff ID, problem code, problem description, problem solution; begin of problem and end of problem. It also records all the help desk record in the system.

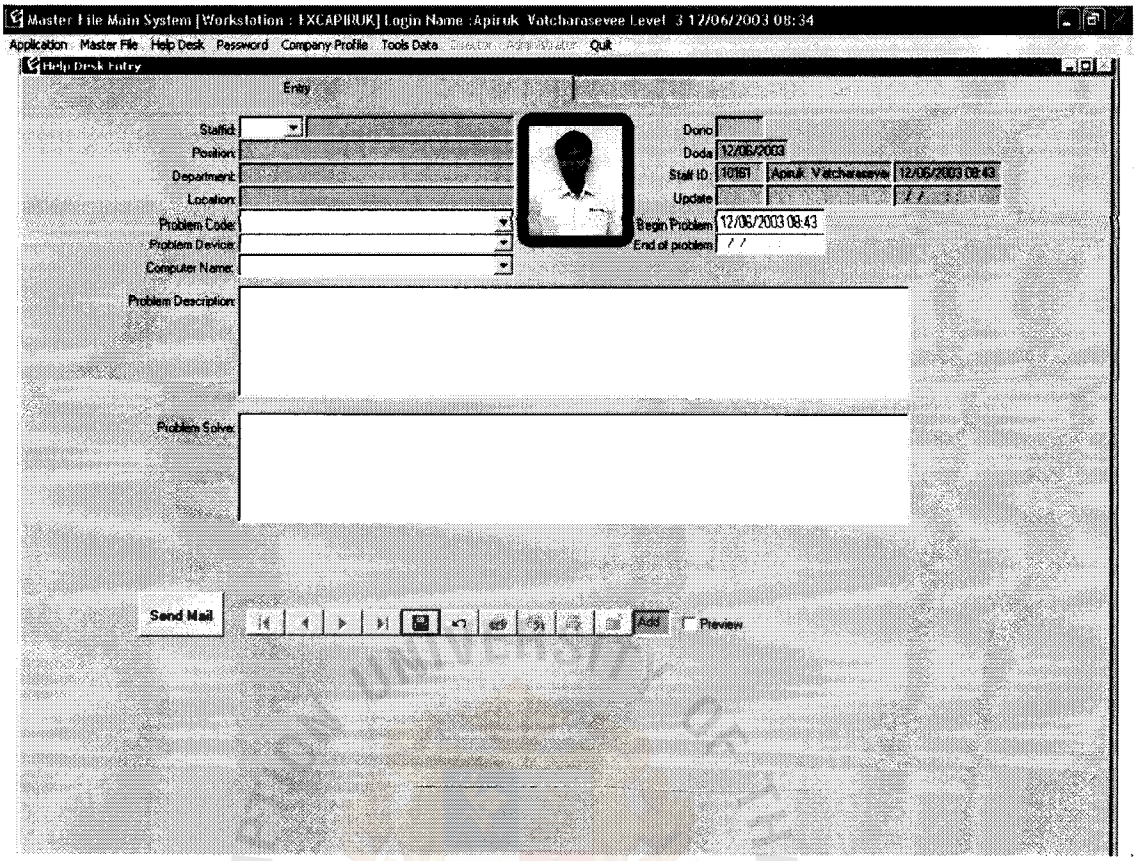


Figure F.10. Add detail Help Desk Entry.

Add Detail Help Desk Entry Screen

Screen Definition

Click "Add" bottom to add detail about request help desk from system user.

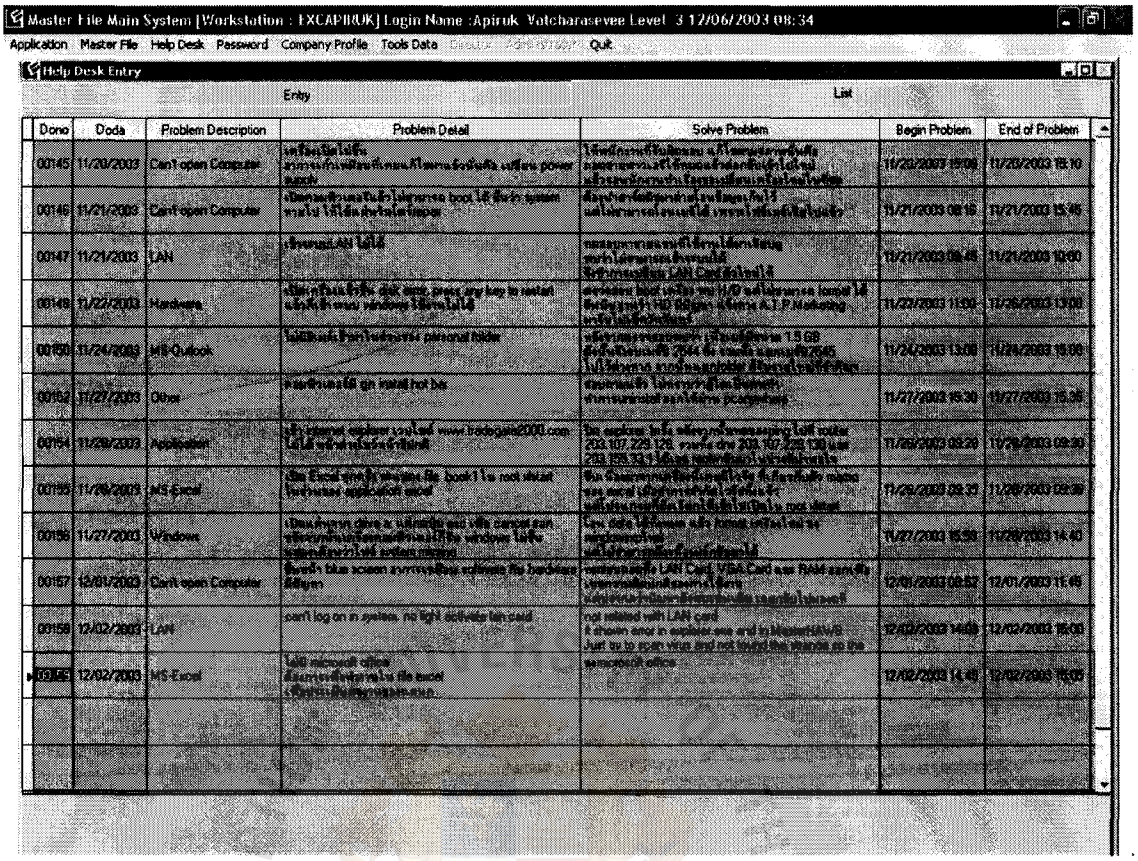


Figure F.11. List Help Desk Entry.

List Help Desk Entry Screen

Screen Definition

Show all the problem and solution from every case in help desk entry.

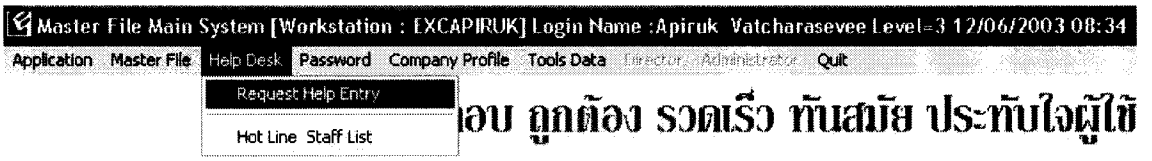


Figure F.12. Request Help Entry Menu.

Request Help Entry Menu Screen

Screen Definition

Help Desk Request from the system user by using Request Help Entry.

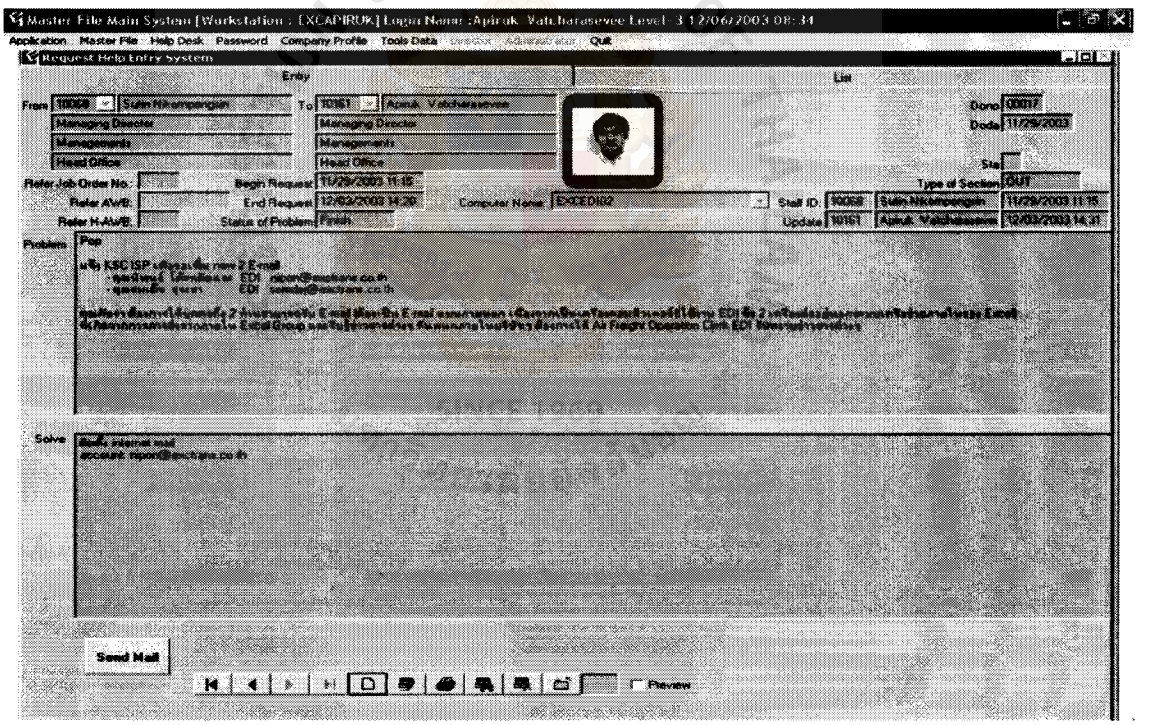


Figure F.13. Help Entry Menu.

Help Entry Menu Screen

Screen Definition

Show in part of Request Sender and Receiver who must take the respond, it also includes problem and solution in the same screen.

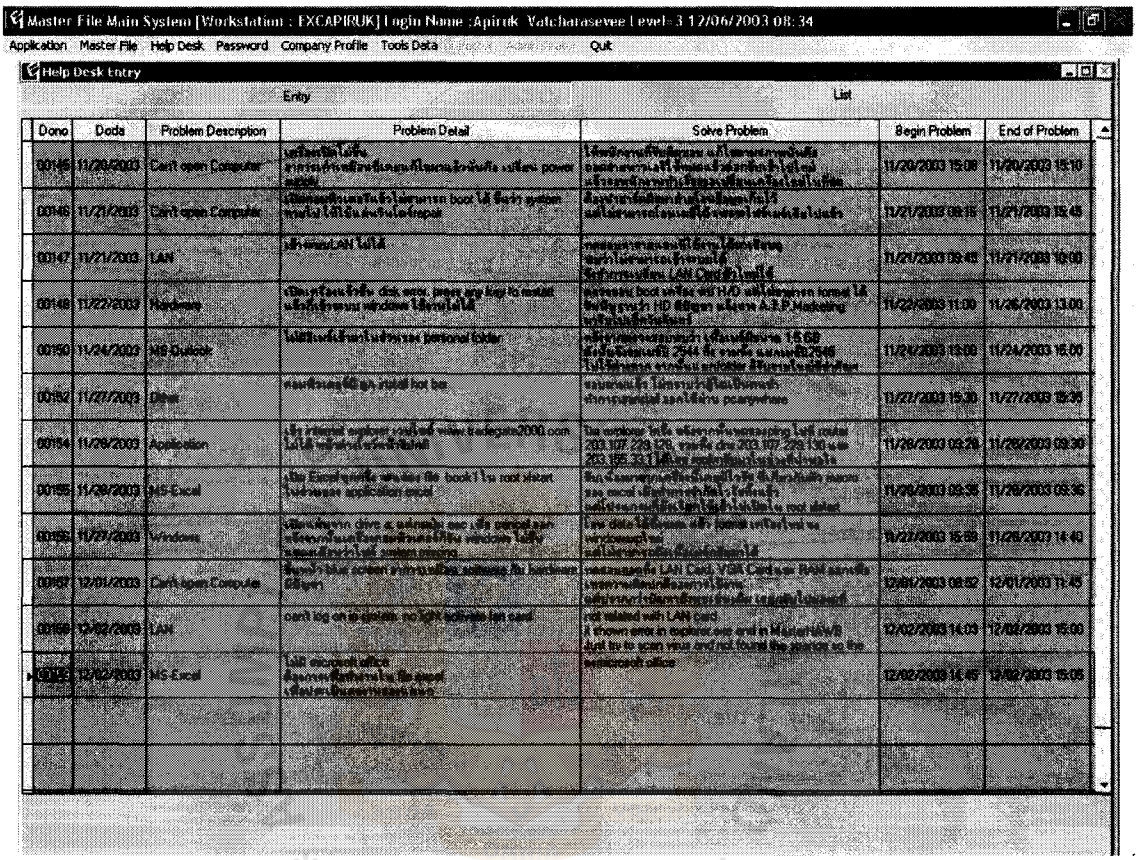


Figure F.14. Help Entry List.

Help Entry List Screen

Screen Definition

Show all the event of Request and take response from the help entry.

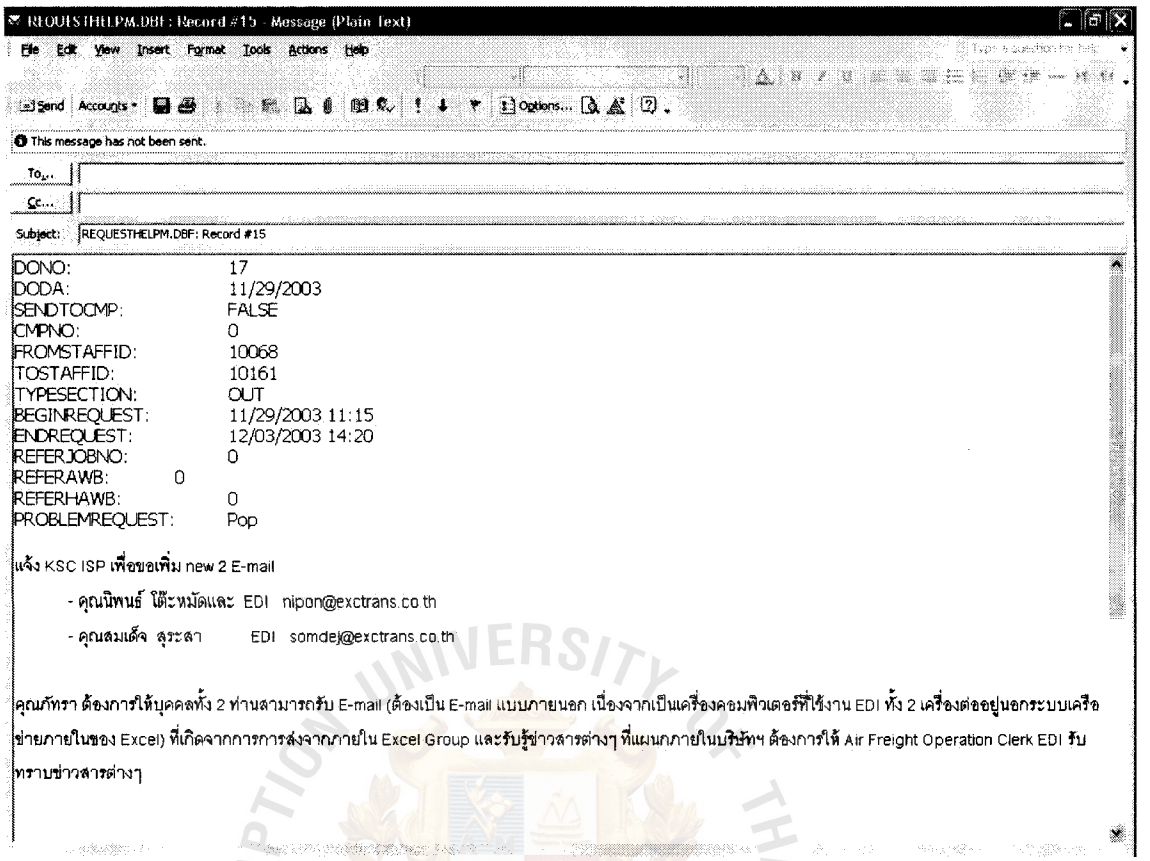
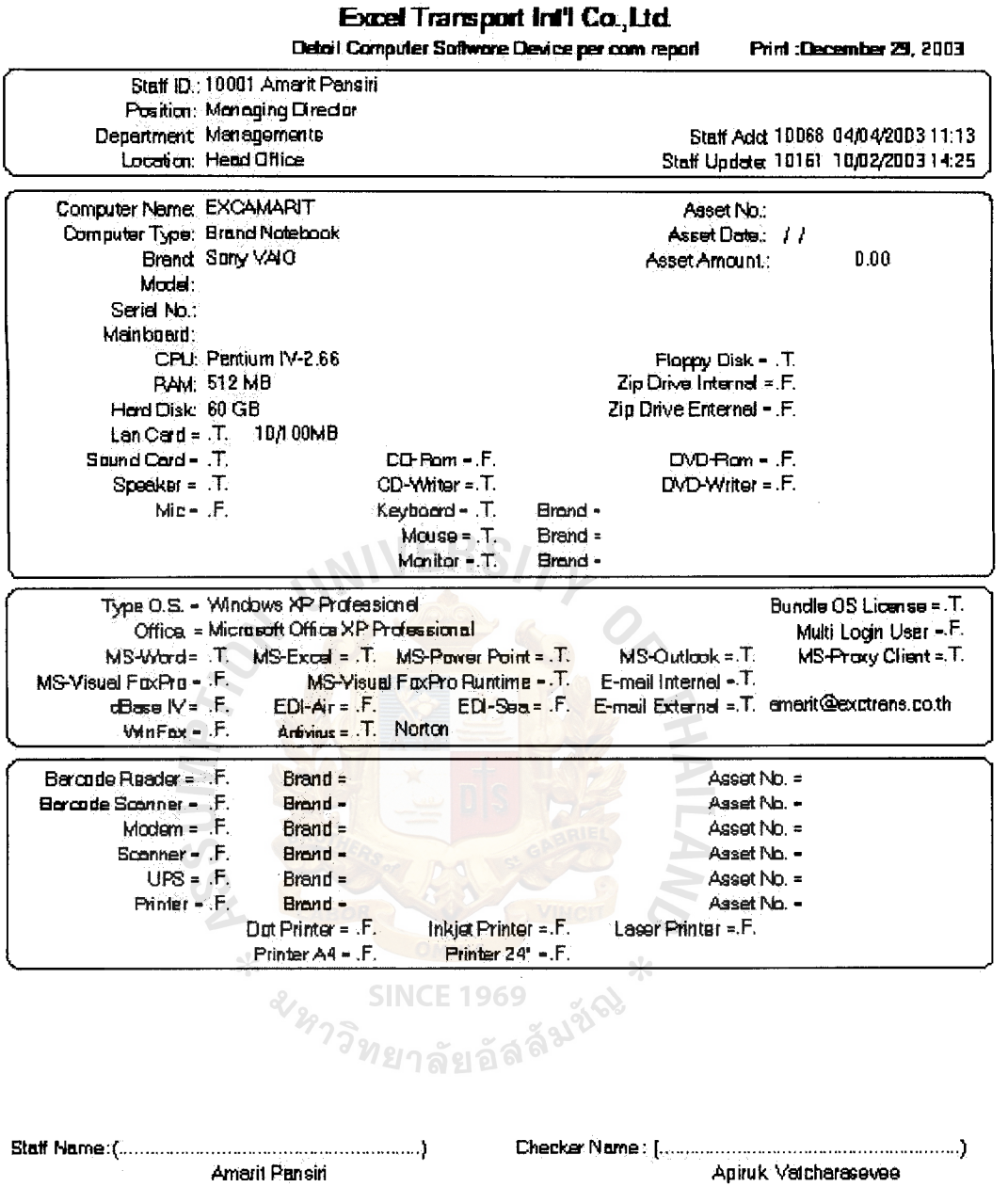


Figure F.15. Sending request.

Sending Request Screen

Screen Definition

System user use Help Entry in Master Main System to request for help and sending the request automatically via exchange server.



Excel Transport Int'l Co.,Ltd.

Detail Computer Software Device per com report Print :December 29, 2003

Staff ID.: 10001 Amarit Pansiri
Position: Managing Director
Department: Managements
Location: Head Office
Staff Add: 10068 04/04/2003 11:13
Staff Update: 10161 10/02/2003 14:25

Computer Name: EXCAMARIT
Computer Type: Brand Notebook
Brand: Sony VAIO
Model:
Serial No.:
Mainboard:
CPU: Pentium IV-2.66
RAM: 512 MB
Hard Disk: 60 GB
Lan Card = .T. 10/100MB
Sound Card = .T.
Speaker = .T.
Mic = .F.
CD-Rom = .F.
CD-Writer = .T.
Keyboard = .T. Brand =
Mouse = .T. Brand =
Monitor = .T. Brand =
Asset No.:
Asset Date: / /
Asset Amount: 0.00
Floppy Disk = .T.
Zip Drive Internal = .F.
Zip Drive External = .F.
DVD-Rom = .F.
DVD-Writer = .F.

Type O.S. = Windows XP Professional
Office = Microsoft Office XP Professional
MS-Word = .T. MS-Excel = .T. MS-Power Point = .T. MS-Outlook = .T.
MS-Visual FoxPro = .F. MS-Visual FoxPro Runtime = .T. E-mail Internal = .T.
dBase IV = .F. EDI-Air = .F. EDI-Sea = .F. E-mail External = .T. emarit@exctrans.co.th
WinFax = .F. Antivirus = .T. Norton
Bundle OS License = .T.
Multi Login User = .F.
MS-Proxy Client = .T.

Barcode Reader = .F. Brand = Asset No. =
Barcode Scanner = .F. Brand = Asset No. =
Modem = .F. Brand = Asset No. =
Scanner = .F. Brand = Asset No. =
UPS = .F. Brand = Asset No. =
Printer = .F. Brand = Asset No. =
Dot Printer = .F. Inkjet Printer = .F. Laser Printer = .F.
Printer A4 = .F. Printer 24" = .F.

Staff Name:(.....) Amarit Pansiri
Checker Name: (.....) Apiruk Vatcharasevee

Figure F.16. Computer Detail Report.

Computer Detail Report Screen

Screen Definition

It's shown all information of each computer set and user's name.

Group Computer Device List System

	Department	Staff	Usedcom	Computer	Notebook	Prn	Prnduty	Printer A4	Printer Width	Dot Printer	Inkjet Printer	Laser Printer	Scanner	Ups
		163	113	94		42		15	10	30	1	6	4	5
Dept	Department	Staff	Usedcom	Computer	Notebook	Prn	Prnduty	Printer A4	Printer Width	Dot Printer	Inkjet Printer	Laser Printer	Scanner	Ups
00001	Managements	3	3	3		1					1		1	1
10000	Cargo Operation	2	2	2		1						1	1	
11000	Airfreight Operation	30	19	15		5		3	2	4				1
11200	Messenger	9	9	2		1				1				
12000	Airport	59	23	6		4		1	1	2		2	1	1
13000	Reservation & Co-Load S	7	7	12		9		3		9				
14000	Overseas Operation	7	7	10		5		1	1	3		2	1	
20000	Marketing	2	2	1										
22000	Sales	4	4	4		1		1		1				
23000	Import Department Seafre	3	3	3		2		2		2				
25000	Seafreight	14	14	11		1			1					
30000	Administration	2												
31000	Accounting	8	8	8		5		4	1	5				
32000	Cost Accounting	7	7	6		5			3	3				
33000	Information Technology	2	2	7		1						1		1
34000	Personnel	2	2	3		1			1					1
36000	Branch Changmai	2	2	2										

Figure F.17. Computer List.

Computer List Screen

Screen Definition

List all computer and hardware devices in each department.

APPENDIX G

STRUCTURE OF TABLE

Table G.1. Structure of System User Table.

Name	Type	Null	Foreign Key to Table	Key Type
Emp ID	Character(5)	Not Null	Problem Table	Primary Key
Emp Name	Character(30)	Not Null	-	Attribute
Department	Character(30)	Not Null	-	Foreign Key
Position	Character(30)	Not Null	-	Attribute
Emp Level	Number (1)	Not Null	-	Attribute

Table G.2. Structure of Problem Table.

Name	Type	Null	Foreign Key to Table	Key Type
Dono	Number(5)	Not Null	-	Primary Key
Status	Character(10)	Not Null	-	Attribute
Emp ID	Character(5)	Not Null	-	Foreign Key
Problem Detail	Character(200)	Not Null	-	Attribute
Problem Type	Character(30)	Not Null	-	Attribute
Com Name	Character(15)	Not Null	-	Foreign Key

Table G.3. Structure of Solution Table.

Name	Type	Null	Foreign Key to Table	Key Type
Dono	Number(5)	Not Null	Problem Table	Primary Key
Solution Description	Character(200)	Not Null	-	Attribute
Time	Date/Time	Not Null	-	Attribute
Status	Character(10)	Not Null	-	Attribute

Table G.4. Structure of Department Table.

Name	Type	Null	Foreign Key to Table	Key Type
Department	Character(30)	Not Null	Computer Info. / System User	Primary Key
Branch	Character(30)	Not Null	-	Attribute

Table G.5. Structure of Computer Info. Table.

Name	Type	Null	Foreign Key to Table	Key Type
Com Name	Character(15)	Not Null	Problem Table	Primary Key
Emp ID	Character(5)	Not Null	-	Foreign Key
Type Device	Character(100)	Null	-	Foreign Key
Type OS	Character(100)	Not Null	-	Foreign Key
Department	Character(30)	Not Null	-	Foreign Key

Table G.6. Structure of Device Type Table.

Name	Type	Null	Foreign Key to Table	Key Type
Type Device	Character(100)	Not Null	Computer Info. Table	Primary Key
Brand	Character(100)	Null	-	Attribute

Table G.7. Structure of Software Type Table.

Name	Type	Null	Foreign Key to Table	Key Type
Type OS	Character(100)	Not Null	Computer Info. Table	Primary Key
Software Type	Character(100)	Null	-	Attribute

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