



THE DEVELOPMENT OF HELP DESK SYSTEM:  
CASE STUDY OF KOAM INTERNATIONAL  
CONSULTING (THAILAND) CO., LTD.

by

Ms. Waralee Hongnoi

A Final Report of the Three-Credit Course  
CE 6998 Project

Submitted in Partial Fulfillment  
of the Requirements for the Degree of  
Master of Science  
in Computer and Engineering Management  
Assumption University

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Name                                Ms. Waralee Hongnoi


Project Advisor                  Rear Admiral Prasart Sribhadung


Academic Year                  November 2001


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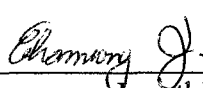
The Graduate School of Assumption University has approved this final report of the three-credit course. CE 6998 – CE 6999 PROJECT, submitted in partial fulfillment of the requirements for the degree of Master of Science in Computer and Engineering Management.

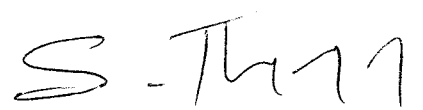
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The seal of Assumption University of Thailand is a large, faint watermark in the background. It features a central shield with a cross and the letters 'DS', surrounded by a circular border with the text 'ASSUMPTION UNIVERSITY OF THAILAND'. Below the shield is a banner with 'BROTHERS of' and 'SI GABRIEL'. At the bottom, it says 'OMNIA SINCE 1969' and 'มหาวิทยาลัยอัสสัมชัญ'.

  
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Advisor

  
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November 2001

## ABSTRACT

KOAM International Consulting (Thailand) Co., Ltd. provides various IT solutions such as ERP, KM, ITS, etc. Moreover, it also provides network equipment such as switch, hub, and router. Technical Support Department has been established to give support to the employees who have difficulties in dealing with different products. This department serves as a Help Desk. Whenever the employees have problems about the products they are in charge, they will call Technical Support staff for help.

The current Help Desk system is performed manually. When Help Desk staff receive calls, they will take note on a small piece of paper, and then give it to the specialist in each area. There is no exact procedure in storing the data. Most of the data are stored on paper. Searching of historical data can be done very slowly, and it takes time to generate reports. Reports are done by using Microsoft Word or Excel as a tool. To increase the speed and the productivity of this system, this project is developed.

The new proposed system is developed to replace the existing manual system. Data will be stored in database server, and it can be easily retrieved. Searching repeated problems and solutions can be done in a minute. Service tracking will not be difficult anymore. Reports can be printed out whenever the manager asks for. Furthermore, the solutions provided by specialists can be used as a knowledge base for the organization.

## ACKNOWLEDGEMENTS

The Help Desk system project would never be accomplished without the help of several people.

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## I. INTRODUCTION

### 1.1 Background of the Project

KOAM International Consulting (Thailand) was established in 1998. KOAM's mission is to help building an information system based society by innovative thinking, internationalism, investment, research, and a consistent drive to be the best. KOAM has networking specialists for other areas such as installing accounting systems, customizing financial reports, developing specialized spreadsheets, setting up electronic billing systems, or managing human resources.

Examples of the professional services provided by KOAM International Consulting are as follows:

- (1) Information system architecture construction
- (2) Information system development, construction and maintenance
- (3) MIS, EIS development and construction
- (4) ERP package development and selling
- (5) Hardware and Software provision, network design, construction and maintenance
- (6) Information resource management solutions
- (7) Multimedia solutions
- (8) Web design and construction
- (9) Internet Security, Firewall
- (10) Intelligent Transportation System (ITS)

Moreover, KOAM also sells networking equipment such as hub, switch, router and Digital Video Recorder.

Because the company provides so many solutions, it is necessary to have specialists who are experts in each solution. Whenever employees face some problems during constructing, customizing, or installing any software, they will call for help from these specialists.

The company has 6 departments, which are Management and Administration Department, Financial and Accounting Department, Government Project Department, System Integration Department, Hardware Department, and Technical Support Department. The organization chart is shown in Figure 1.1.

Actually, Technical Support Department does not have its own Help Desk system. When the specialists receive calls from employees about their problems on computers, the specialists often take notes on small pieces of paper that are often lost and they run around from one problem to the next. They forget to follow up an employee's problem. Sometimes they get complaints due to problems not being resolved or because it took too long to get a response.

Therefore, Technical Support Department needs to develop Help Desk system to effectively deal with the problems mentioned above.

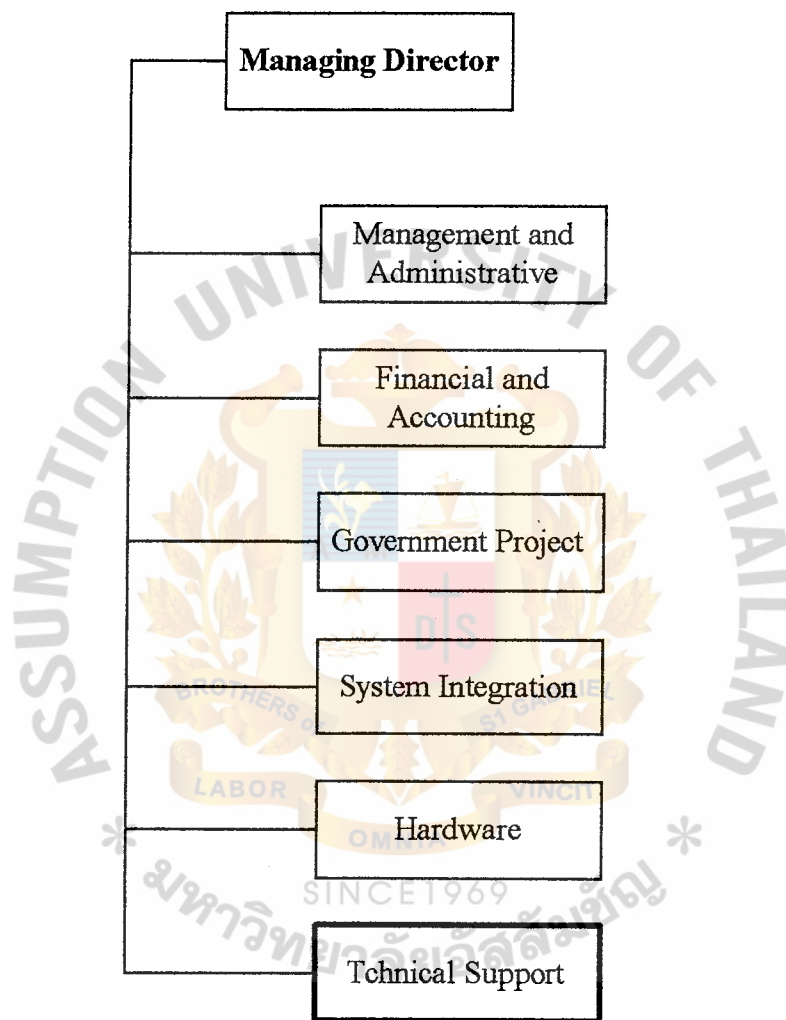


Figure 1.1. Organization Chart.



## 1.2 Objectives of the Project

The main objectives of this project are to develop a Help Desk System to be used within the company so that the current problems of the specialists who have to support employees in constructing, customizing, or implementing of any software can be solved in both efficient and effective manners, and to construct a central database to eliminate data redundancy, and to keep call records and the solutions information for technicians who may encounter the same issue in the future.

The results expected from the developing of Help Desk System are the following:

- (1) Provide all users with a single, helpful, first point of contact with the Information Systems services.
- (2) Reduce user support costs. A search facility gives support specialists instant access to past problems and how they were solved.
- (3) Increase user satisfaction.
- (4) Users are presented with support staff who are knowledgeable about their details and problems.
- (5) Eliminate the possibility of lost requests or forgotten calls.
- (6) Tracking of all referred problems (hardware and software) and a serious problem is escalated.
- (7) The reports on historical performance of help desk are produced. The management can track resource usage by clients or departments, staffing requirements and support specialist effectiveness.
- (8) Build a corporate knowledge base.
- (9) The substantial amount of knowledge that builds up in the database will stay with the company even when support specialists leave. The company does not have to rely on the knowledge each specialist has.

### 1.3 Scope of the Project

The scope of this project will be the development of Help Desk System and its database so that call records can be kept and query can be made for future use.

This project will involve the major parts of Help Desk System, which are as follows:

- (1) Service Management – allows help desk officers to create a call report for each call received at the help desk. Depending on the nature of the call, the call report can be used in other applications to create a problem ticket, change record, or an order.
- (2) Problem Management – allows help desk officers to report and track problems. Problem tickets are routed to the personnel who can resolve the issue.
- (3) Inventory/Configuration Management – allows help desk officers to keep track of hardware and software in the network.
- (4) Request Management – automates the ordering of equipment and services and allows help desk officers to track that process.
- (5) Database Manager - allows help desk officers to add, delete, manipulate, and query entries in the Service Center database.

Microsoft Access 2000 will be used as a tool in developing a database for this project.

#### 1.4 Project Plan

The duration of Help Desk system development is approximately 4 months. This project uses Gantt chart for project planning as illustrated in Figure 1.2. The system analyst has broken the project into three major phases, which are: analysis, design, and implementation. Then the analysis phase is further broken down into data gathering, and feasibility studying. Design phase is broken down into data entry design, input and output design, and data organization. The implementation phase is divided into implementation and training.





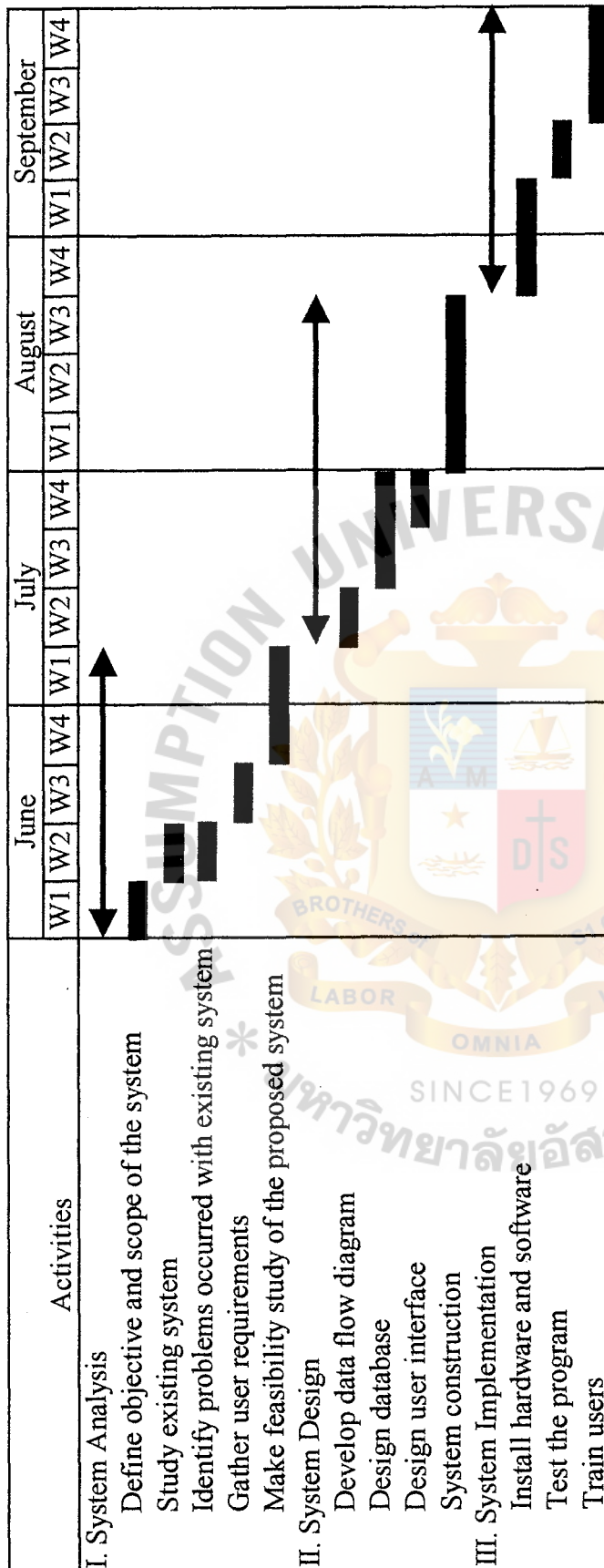


Figure 1.2. Project Plan.

## II. THE EXISTING SYSTEM

### 2.1 Background of the Existing System

At present, KOAM has Technical Support Department to be responsible for solving the problems in using, customizing, or installing of computer hardware and software in the company. Whenever users encounter the problems occurred with both hardware and software such as application malfunction, user's errors, the difficulties in communication or problems in system configuration, they will call Technical Support Department for help. When the officer in Technical Support Department receives a call about problem or request from a user, he will write it down in a small paper, and send it to the specialist who is an expert in the software or hardware that the user has problem with. The specialist will define the solution and send it back to support officer. After that, support officer will send the solution back to the user who requested for assistance.

For hardware problems, after help desk office receives a call, he will check the warrantee period of that hardware. If the warrantee is still valid, the help desk officer will call the vendor of that hardware to repair it.

The records of problems and solutions are kept manually in Microsoft Word 2000. The search for historical data is difficult to do. Because of this, they keep getting the same problems over and over again which cause redundancy. Most of the time, when they receive more calls from employees, the previous problems are often left behind. It often takes long time to get a response or sometimes the problems are not even resolved. The process of the existing system is illustrated in Figure 2.1.

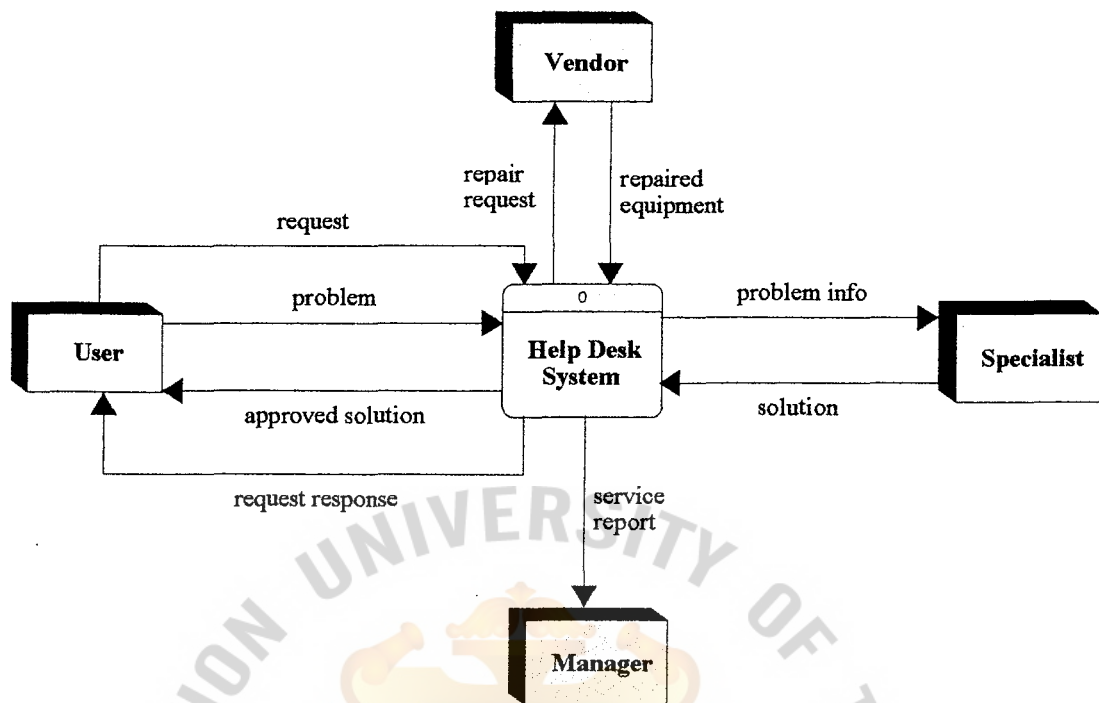


Figure 2.1. Context Diagram of Existing Help Desk System.

## 2.2 Existing Business Functions

The business functions of Technical Support Department are performed manually and with the use of Microsoft Office 2000 such as Microsoft Word. The main functions of Technical Support Department are as follows:

- (1) Receive a call from users about the problems or requests.
- (2) Solve the problems by sending them to knowledgeable persons in each area.
- (3) Send solutions back to the users who requested for help by using telephone or e-mail.
- (4) Contact vendor if the problems concern with hardware that needs to be repaired.



- (5) Keep records of both call and the solutions of each problem and user's requests by using Microsoft Word 2000.
- (6) Generate the reports of calls and solutions records for each month by using Microsoft Word 2000.

The details of the above processes are shown in Figure 2.2.

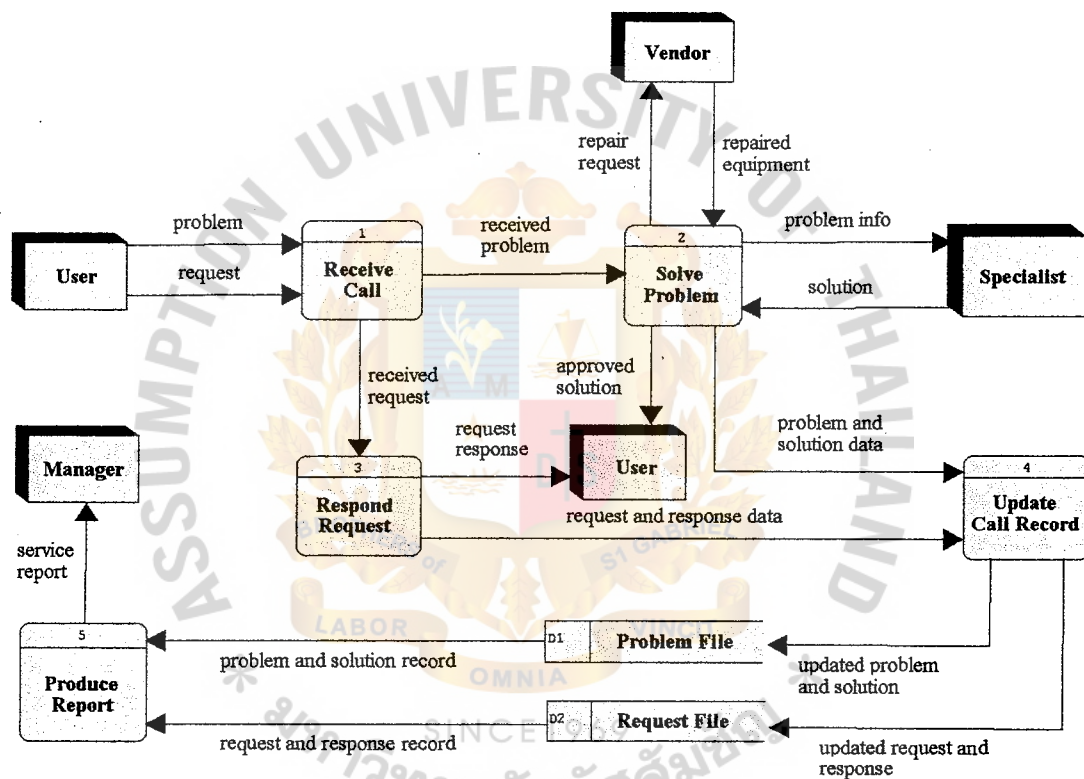


Figure 2.2. Level 0 Data Flow Diagram of the Existing Help Desk System.

## 2.3 Current Problems and Areas for Improvement

### 2.3.1 Current Problems

After conducting an interview with the officers in Technical Support Department, the current problems found are that the support officers are not able to answer user whether the problem has been resolved or it is still in process. They cannot report the

progress to users. Sometimes the solutions provided by a specialist cannot completely solve user's problem because what a specialist understands may not be exactly the same as what user tries to explain about his problem.

Most of the time, the records of calls and solutions are not kept, or query of historical data is difficult to make, when an officer gets the same problem as he has got before, he cannot solve that problem right away. He has to take note and go to see a specialist to solve it again. This wastes time and resources. Currently, the company does not have knowledge base. When a specialist cannot show up, the problem must be held until that specialist comes to work. It is impossible for the users to get quick response.

#### 2.3.2 Areas for Improvement

To enhance the efficiency and effectiveness in solving user's problem, database should be constructed so that it can serve as a knowledge base for Technical Support Officers. This can increase the accuracy and the speed in solving problems. It can eliminate the redundancy by categorizing problems and solutions according to product groups and collecting them into the database. With the use of database, repeated problems can be solved promptly, and solutions for the new problems can be kept for future use as well.

Problems and solutions record will no longer be kept in the Microsoft Word files. Instead, it will be kept in the database, which will have the same format. The format will be easy to understand, and it will not cause problems when new staff comes to work. Moreover, reports are easy to be generated and have the same standard. This makes the management team able to review them easily and take action promptly when problems occurred within this department.

### III. THE PROPOSED SYSTEM

#### 3.1 User Requirements

During requirements determination, the analysts gather information on what the system should do from the existing Help Desk system. This is the list of requirements for the proposed Help Desk System to be used in the troubleshooting function of Technical Support staff.

- (1) The system must provide front line support in order to register, classify and submit the problems to appropriate experts.
- (2) Regarding the front line interface the system must provide a simple way to classify problems according to their areas, and submit them to the specialists in those areas.
- (3) It should be possible and easy for help desk staff to register a “directly solved” problem, in order to (1) have these problems registered for statistical analysis, and (2) keep trace of the problem in the database and be able to retrieve it if the same problem occurs afterwards.
- (4) The system must provide an immediate and efficient search mechanism in order to easily retrieve similar problems afterwards. The efficiency of the database and this search mechanism is essential. It should “refine” the search (e.g. by adding new keywords) in case the number of answers proposed by the system is too large.
- (5) It should be possible and easy for help desk staff to resubmit a problem which was found in the database to another user who has encountered the same problem.

- (6) The notification messages, which are automatically generated by the system, for instance, to send back to a user the solution to his problem must be clear and precise.
- (7) The system should contain standard reports which will meet most standard requirements, and flexibility should also be available in providing ad-hoc report to meet all needs.
- (8) The system should be able to run 24 hours per day, 7 days per week.

## **3.2 System Design**

### **3.2.1 Data Flow Diagram**

From the business functions obtained from the existing system, and the study of user's requirements defined above, at this phase, the analysts will design the proposed system. The context-level data flow diagram is used to represent an overview of the entire proposed system, and level 0 data flow diagram depicts the major activities for Help Desk System. Context diagram of the proposed system is illustrated in Appendix A, Figure A.1, and level 0 data flow diagram is illustrated in Figure A.2. There is one process for each major function. Each process is analyzed to determine the data required and the output produced.

Process 1 – This process corresponds with the first function of the existing system. Help Desk staff receives a call from user about his problem or request. The staff will keep user's information in the call record, and then he will analyze the call whether it is a problem or a request call. Then, he will check whether that problem/request is new or existing problem/request. If it is new, he will assign new problem ticket. If it is the existing problem, and that problem has not been solved yet, he will assign old problem ticket. If that existing problem has been solved already, he will inform user about the solution. Level 1 data flow diagram of this process is illustrated in Figure A.3.

Process 2 – After problem ticket is generated, it will be sent to appropriate expert in each area such as system integration or software, network, and hardware. After the expert solves the problem, the solution will be kept in the record. If the problem is about broken hardware, the equipment warrantee will be checked. If it is in warrantee period, help desk staff will contact vendor of that hardware. This process corresponds with the second and the forth function of the existing system, which are to solve the problems by sending them to the appropriate specialists, and to contact vendor if the problems concern with hardware that needs to be repaired. Level 1 data flow diagram of this process is illustrated in Figure A.4.

Process 3 – Solutions or request response will be sent to user together with confirmation form. This process is the same as the third function of the existing system, which is send solutions back to the users who requested for help by using telephone or e-mail. Level 1 data flow diagram of this process is illustrated in Figure A.5.

Process 4 – User sends confirmation form back to inform help desk officer that he has received the solution. After the officer gets that form, he will update that call record to be close job. It corresponds with the fifth function of the existing system, which is keeping records of both call and the solutions of each problem and user's requests. Level 1 data flow diagram of this process is illustrated in Figure A.6.

Process 5 – Problem report, request report, and call report will be generated and sent to the manager of the department. This process is the same as the sixth function of the existing system, which is generating the reports of calls and solutions records for each month. Level 1 data flow diagram of this process is illustrated in Figure A.7.

After successive levels of data flow diagrams are complete, system analysts use them to help catalog the data processes, flows, stores, structures, and elements in a data dictionary. Data dictionary is illustrated in Appendix B.



Process specifications are created for primitive processes on a data flow diagram as well as for some higher-level processes that explode to a child diagram. These specifications explain the decision-making logic and formulae that will transform process input data into output. Process specifications are shown in Appendix C.

### 3.2.2 Database Design

Database is not merely a collection of files. Instead, a database is a central source of data meant to be shared by many users for a variety of applications. The heart of a database is the DBMS (database management system), which allows the creations, modifications, and updating of the database, the retrieval of data, and the generation of reports. Here, entity-relationship diagram is used to help model the file or database. The entity-relationship diagram and the structure chart are illustrated in Appendix D.

### 3.2.3 Input Design

The quality of system input determines the quality of system output. Therefore, well-designed input forms or input screens should meet the objectives of effectiveness, accuracy, ease of use, consistency, simplicity, and attractiveness since they will be tools to interface with users. Screens and forms are illustrated in Appendix E.

### 3.2.4 Output Design

Output is information delivered to users. Output can take many forms: the traditional hard copy of printed reports, and soft copy such as computer screens. Output screens and reports are illustrated in Appendix F

### **3.3 Hardware and Software Requirements**

Actually, Technical Support Department has already had LAN in its own department. Staff in this department have adequate computers, so it is not necessary to buy new computers, printer, or any other network equipments because they can be shared from the current LAN system. The operating system of the existing hardware is Microsoft Windows Professional 2000. Therefore, the only thing needs to be added to the network is the database server and software used to manage this server. The requirements for this server and software are shown below:

#### **3.3.1 Hardware Requirements**

(1)	Database Server	1 unit
	Processor	Intel Pentium 4 1.5 GHz
	RAM	512 MB
	Harddisk	20 GB
	NIC	10/100 Mbps LAN Card for server
	CD-ROM	48x
	Floppy Disk Drive	1.44 MB
	Monitor	15"
	Standard keyboard and mouse	

(2)	UPS	1 unit
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#### **3.3.2 Software Requirements**

Microsoft Windows Server 2000 for server	1 license
Microsoft Office 2000	1 license

The network configuration of the proposed system is illustrated in Figure 3.1.

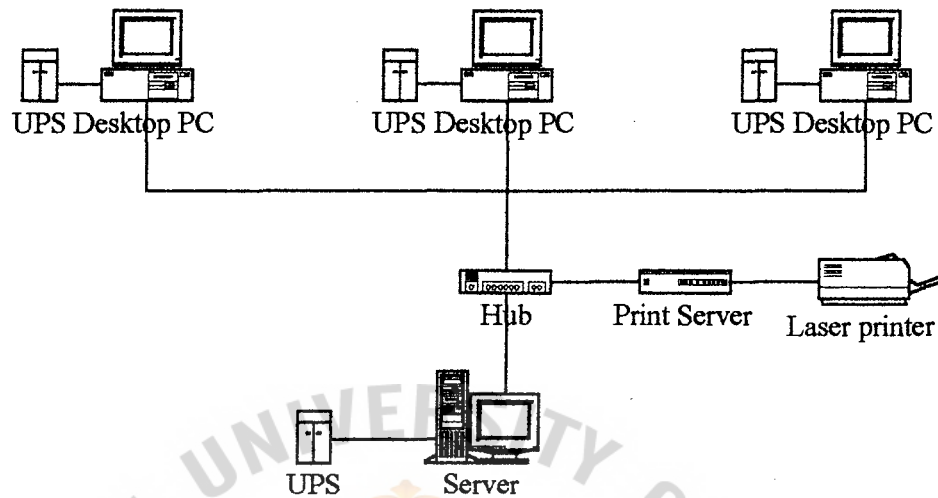


Figure 3.1. Network Configuration of the Proposed System.

### 3.4 Security and Control

A security breach is often referred to as an incident. An incident is any breach that is the result of an external intruder attack, unintentional damage, an employee testing some new program and inadvertently exploiting a software vulnerability, or a disgruntled employee causing intentional damage. To prevent this, the analyst chooses these, the following methods are used for this system.

#### 3.4.1 Physical Security

##### (1) Physical Location

The physical location of network resources is extremely important. All network infrastructure equipments, in this case server and hub, will be physically located in restricted access area to eliminate the possibility of unauthorized access by physical proximity.

Another area of concern is that when printing confidential configuration files, there is the possibility that the printouts from printer might fall into the wrong hands. Therefore, the sensitive printers on a LAN will be located in a room with controlled access so that only authorized persons can enter into this room.

(2) Physical Access

It is necessary to restrict physical access to wiring closets and location of critical network infrastructure equipment. Access to these areas should not be permitted unless the person is specifically authorized or requires access to perform his or her job.

(3) Environmental Safeguards

The building must have network closets built in accordance with relevant fire and safety standards.

All network infrastructure equipments must be connected to backup power supplies to prevent the loss of data due to electricity cut off.

The data will be daily backed up to prevent the loss of data both intentionally or unintentionally. The backups will be kept in a separate location from the originals.

### 3.4.2 Logical Security Controls

(1) Password

Password can be changed whenever user wants to change. Besides, the password will be forced to change on a monthly basis.

(2) Audit Trail

The log of traffic pattern will be kept so that any deviation from normal behavior can be traced easily.

### 3.5 Costs and Benefits Analysis

Costs and benefits of the proposed system must always be considered together, since they are interrelated and often interdependent. Although the system analyst is trying to propose a system that fulfills various information requirements, decisions to continue with the proposed system will be based on a costs and benefits analysis.

#### 3.5.1 Identifying Benefits and Costs

Benefits and costs can be thought of as either tangible or intangible. Both tangible and intangible benefits and costs must be taken into account when systems are considered.

##### Tangible Benefits

Tangible benefits are advantages measurable in term of baht, resources, or times saved that accrue to the organization through the use of the information system.

Tangible benefits for the proposed system are as follows:

- (1) Decreases in the amount of employees (2 persons, 12,000 bahts per month for each person)
- (2) The reduction of volume of office supply needed about 1000 bahts per month

Table 3.1. Benefits Derived from the Proposed System (Baht).

Items	Year				
	1	2	3	4	5
Salary	288,000	316,800	348,480	383,328	421,661
Office Supply	12,000	12,600	13,230	13,892	14,586
Total Benefits	300,000	329,400	361,710	397,220	436,247
Cumulative Benefits	300,000	629,400	991,110	1,388,330	1,824,576



### Intangible Benefits

Some benefits that accrue to the organization from the use of the information system are difficult to measure but are important. These are known as intangible benefits. Intangible benefits derived from this proposed system are as follows:

- (1) The improvement of decision-making process
- (2) The enhancement of accuracy
- (3) An increase in job satisfaction for employees by eliminating tedious task
- (4) Becoming more competitive in customer service

### Cost Analysis

Table 3.2 shows the estimated costs of current system for 5 years operation. Table 3.3 shows the development costs of proposed system, which include the costs of hardware, license software, and personnel who develop new system. Table 3.4 shows the operation costs of the proposed system for 5 years. Training and maintenance are also included.

Table 3.2. Cost of Current System (Baht).

Items	Year				
	1	2	3	4	5
Salary	960,000	1,056,000	1,161,600	1,277,760	1,405,536
Utility	30,000	31,500	33,075	34,729	36,465
Office Supply	54,000	56,700	59,535	62,512	65,637
Total Costs	1,044,000	1,144,200	1,254,210	1,375,001	1,507,639
Cumulative Costs	1,044,000	2,188,200	3,442,410	4,817,411	6,325,049

Table 3.3. Development Cost of the Proposed System (Baht).

Items	Amount	Price/Unit	Total Price
Server	1	164,969	164,969
UPS	1	2,930	2,930
Software (Win Server 2000+Office 2000)	1	6,900	6,900
System Analyst	1*4	20,000	80,000
Programmer	2*4	15,000	120,000
Grand Total			374,799

Table 3.4. Cost of Proposed System (Baht).

Items	Year					
	0	1	2	3	4	5
Development Cost	374,799	-	-	-	-	-
Salary	-	672,000	739,200	813,120	894,432	983,875
Utility	-	35,000	36,750	38,588	40,517	42,543
Office Supply	-	42,000	44,100	46,305	48,620	51,051
Training	12,000	-	-	-	-	-
Maintenance	-	25,185	25,185	25,185	25,185	25,185
Total Costs	386,799	774,185	845,235	898,013	983,569	1,102,654
Cumulative Costs	386,799	1,160,984	2,006,219	2,904,232	3,887,801	4,990,455

### 3.5.2 Comparing Costs and Benefits

There are many well-known techniques for comparing the costs and benefits of the proposed system. Techniques used in this project will include break-even analysis, payback, and present value analysis. All of these techniques provide straightforward

ways of yielding information to decision makers about the worthiness of the proposed system.

### Break-Even Analysis

The point at which the total costs of the current system and of the proposed system intersect represents the break-even point where it becomes profitable for the business to get the new information system. Figure 3.2 illustrates the break-even point for the proposed system which is about 1 year and 5 months.

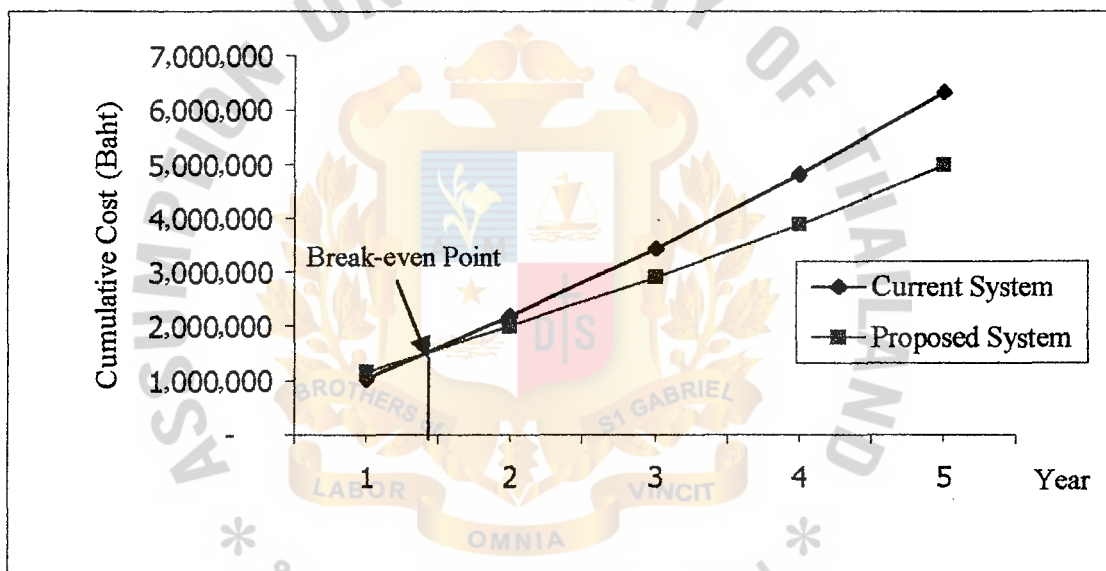


Figure 3.2. Break-Even Analysis.

### Payback

Payback is a simple way to assess whether a business should invest in a proposed information system, one that is based on how long it will take for the benefits of the system to pay back the costs of developing it. The payback analysis is shown in Figure

3.3, and Table 3.5. The discount rate is assumed to be 12%. Formula used to calculate payback period is shown below:

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

Where P = Payback Period

I = Investment Cost

T = Corporate Tax Rate (30%)

R = Annual Return on Investment

$$P = \frac{386,799}{(1 - 0.3) 300,000}$$

$$P = 1.84 \text{ years}$$

#### Present Value

Present value is a way to assess all of the economic outlays and revenues of the information system over its economic life and to compare costs today with future costs and today's benefits with future benefits. Table 3.6 shows the present value of the proposed system. The discount rate is assumed to be 12%.

Table 3.5. Payback Analysis of the Proposed System.

Items	Year				
	0	1	2	3	4
Development cost	-386,799	0	0	0	0
Operating and maintenance costs	0	-25,185	-25,185	-25,185	-25,185
Discount rate (12%)	1.0000	0.8929	0.7972	0.7118	0.6355
Time-adjusted costs	-386,799	-22,488	-20,077	-17,927	-16,005
Cumulative time-adjusted costs over lifetime	-386,799	-409,287	-429,364	-447,291	-463,296
Benefits derived from operation of new system	0	300,000	329,400	361,710	397,220
Discount rate (12%)	1.0000	0.8929	0.7972	0.7118	0.6355
Time-adjusted benefits	0	267,870	262,598	257,465	252,433
Cumulative time-adjusted benefits over lifetime	0	267,870	530,468	787,933	1,040,366
Cumulative lifetime time-adjusted cost and benefits	-386,799	-141,417	101,104	340,642	577,070
					810,306



Table 3.6. The Present Value of the Proposed System.

Items	Year					
	0	1	2	3	4	5
Cumulative Costs	-386,799	-25,185	-25,185	-25,185	-25,185	-25,185
Discount rate (12%)	1.0000	0.8929	0.7972	0.7118	0.6355	0.5674
Present value of costs	-386,799	-22,488	-20,077	-17,927	-16,005	-14,290
Benefits	0	300,000	329,400	361,710	397,220	436,247
Discount rate (12%)	1.0000	0.8929	0.7972	0.7118	0.6355	0.5674
Present value of benefits	0	267,870	262,598	257,465	252,433	247,526
						1,287,892

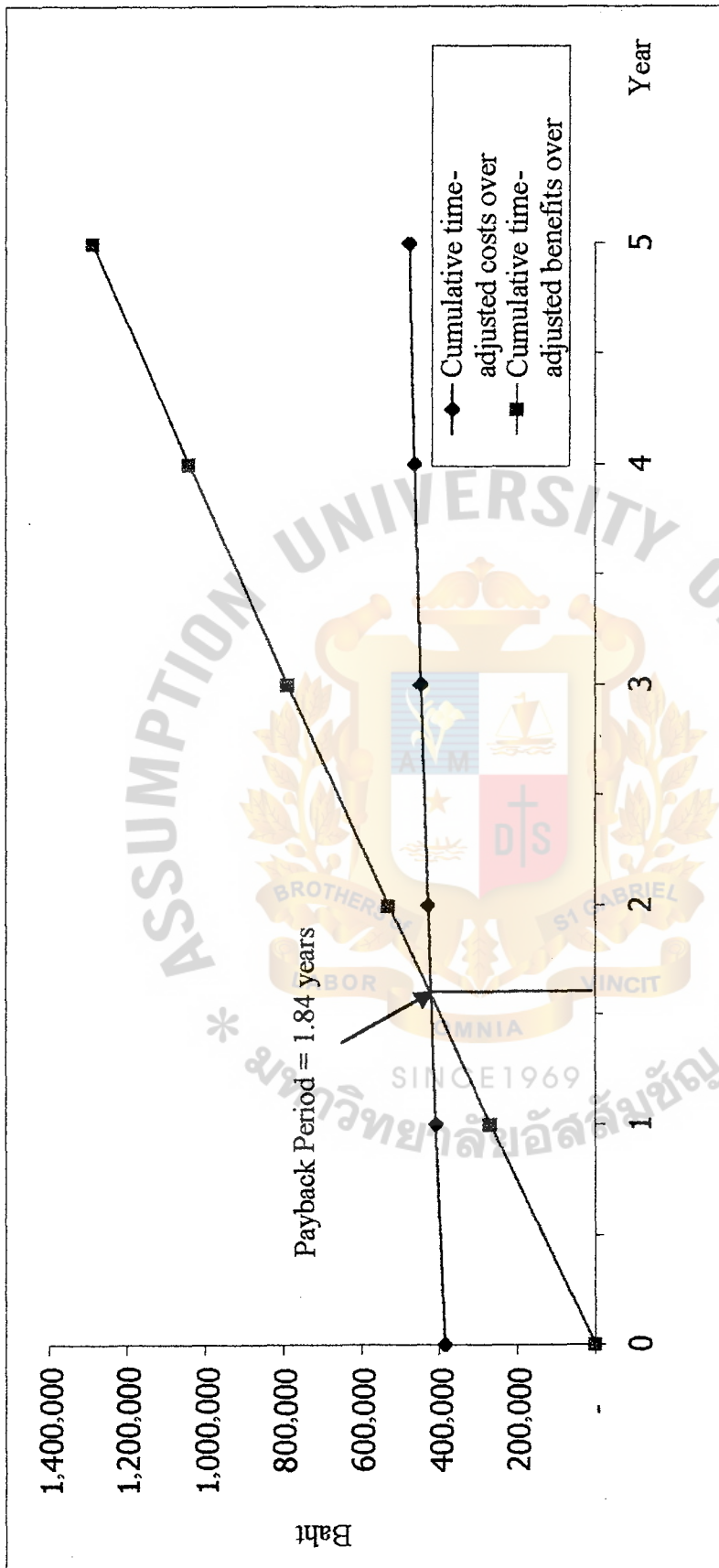


Figure 3.3. Payback Period of the Proposed System.

## **IV. PROJECT IMPLEMENTATION**

Implementation is the process of assuring that the system is operational and then allowing users to take over its operation for use and evaluation. After coding, the process where the physical design specifications are turned into computer code by the programmers, the new system must be tested and converted. Then, the users will be trained. The details of these activities are explained in the following section.

### **4.1 System Coding**

Coding is the process of putting ambiguous or cumbersome data into short, easily entered digits or letters. Coding aids the systems analyst in reaching the objective of efficiency since data that are coded require less time to enter and this reduces the number of items entered. Coding can also help in the sorting of data in the data transformation process.

This Help Desk system is developed by using Microsoft Access 2000 as a tool because it is a tool for rapid application development. Access is a relational database designed for Windows environment, and it also includes most of the functions of Visual Basic. The database support can easily handle 10 to 20 concurrent users, which is suitable for a small company like KOAM.

### **4.2 System Testing**

After finish coding, the system now is ready to be tested. System testing is necessary to check the completeness of the system and to determine whether the user requirements are met. This includes testing the interfaces between subsystems, the correctness of output, and the usefulness and understandability of system output. Programmers, analysts, and users all play different roles in the testing.

Testing of hardware is typically provided as a service by vendors who will run their own tests on equipment when it is delivered to the company.

### **4.3 System Conversion**

After the system has been tested extensively to ensure that it works best, the old way of Help Desk operation is converted to the new Help Desk system. There are many approaches of conversion, for example:

#### **4.3.1 Direct Changeover**

Conversion by direct changeover method means that on a specified date, the old system is dropped, and the new system is started to run. The drawback of this approach is that if errors occur, there will be no alternative way to accomplish processing the jobs. This may cause the delay in operation. The good point for this approach is that it is the least expensive method.

#### **4.3.2 Parallel Conversion**

Using this approach, the old system and the new system are running at the same time. After running for some period of time, outputs are compared to determine whether the new system performs as well as the old system. When the new system produces satisfactory result, the new system is put into use, and the old one is stopped. If errors occur with the new system, it will not affect the operation much because it can be supported by the old system. The disadvantage of this approach is that it is expensive since two systems run simultaneously.

#### **4.3.3 Gradual Conversion**

The old system is gradually converted to the new system from phase to phase. The advantages of this approach include allowing users to get involved with the new system gradually, and the possibility of detecting and recovering from errors without a lot of

down time. The disadvantage is that it takes too long to replace the old system with the new system, and it is not appropriate for a small system.

After considering the good and bad points of each approach, the analyst chooses the parallel conversion approach because since the old system that is going to be replaced is manual, the cost of running two systems might not differ too much.

#### **4.4 Training Users**

When the system is complete, it is necessary to train Help Desk staff how to use the system so that they can use the system effectively. Staff need to be trained about how the system works, what the system can do, and what the functions of the system are. They will know how to use the new tools to solve problems, as well as how and when to escalate a problem or issue that requires additional support. The users in staff level and the users in management level also have different level of accessibility. Therefore, management level and staff level have to be trained in differently based on their objectives of using the system. System training can tell the system analyst whether the system meets user's requirements as well.



## V. CONCLUSIONS AND RECOMMENDATIONS

### 5.1 Conclusions

The Help Desk plays a vital role in providing support for the IT needs of computing systems users. After implementation, the new Help Desk system will have the tools and knowledge to resolve client problems and issues in a timely manner. Help Desk staff will be positioned to provide timely and effective responses to the support needs of the entire computing community.

The benefits obviously derived from the implementation of new Help Desk system are as follows:

- (1) Details of users, their requests and problems are kept in the database.
- (2) Help Desk staff are able to track change and installation requests.
- (3) Problems can be solved faster.
- (4) Manager is able to view the operational status of services in real time.
- (5) Resolutions of problems become the searchable knowledge base.
- (6) What has been changed to solve future problems is recorded.
- (7) The system is able to produce statistics, and reports in short period of time.

To show the achievement of the new system, which is more satisfactory than the old system, the performance comparison of these two systems is shown in Table 5.1.

Table 5.1. The Performance Comparison.

Activities	Existing System	Proposed System
Problem/Request Registration	10 minutes	5 minutes
Solution Inquiry	15 minutes	1 minute
Problem/Request Forward	10 minutes	1 minute
Service Tracking	30 minutes	1 minute
Report Generation	60 minutes	5 minutes

Not only the performance of the new system is satisfactory, the cost of system development is as well. From the costs and benefits analysis that we have done, the system has very quick payback period, which is approximately 1.84 years. For the present value analysis, we can see that the benefits the organization gains are more than the costs. The new system will have lifetime benefits for 1,287,892 bahts, but it will cost the company only 477,586 bahts. This means 810,306 bahts difference.

Thus, implementation of the proposed system is worthwhile because it yields many advantages to the organization as discussed earlier.

## 5.2 Recommendations

The new Help Desk system is designed to fit only the current operation of Technical Support Department of KOAM International Consulting (Thailand) Co., Ltd. As time passes by, the size and the operation procedures of the department may change, and the system will not be up-to-date. Therefore, in the future, the system will need to be upgraded. The system may be expanded to be a more complete one which has more functions.

Moreover, many companies go on-line in the Internet. KOAM may be as well like that in the future. Therefore, the next step of Help Desk system development should be a web-based system. This will facilitate employees to submit their problems or requests;

for example, the engineers who go out to customer sites may be able to submit the problems or requests on-line. They do not have to call Help Desk staff to report problems or requests.





## **APPENDIX A**

### **CONTEXT DIAGRAM AND DATA FLOW DIAGRAMS OF THE PROPOSED SYSTEM**

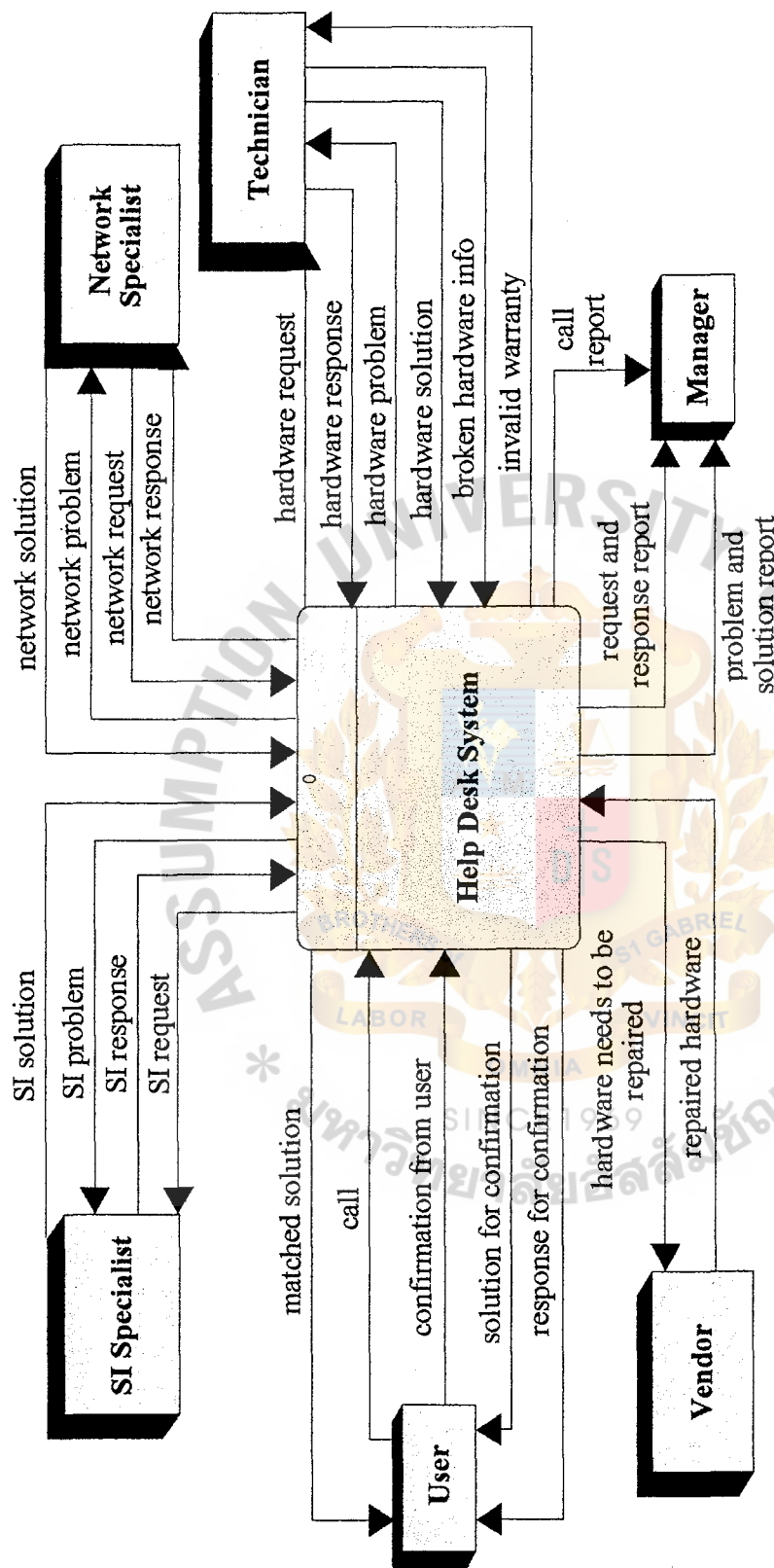
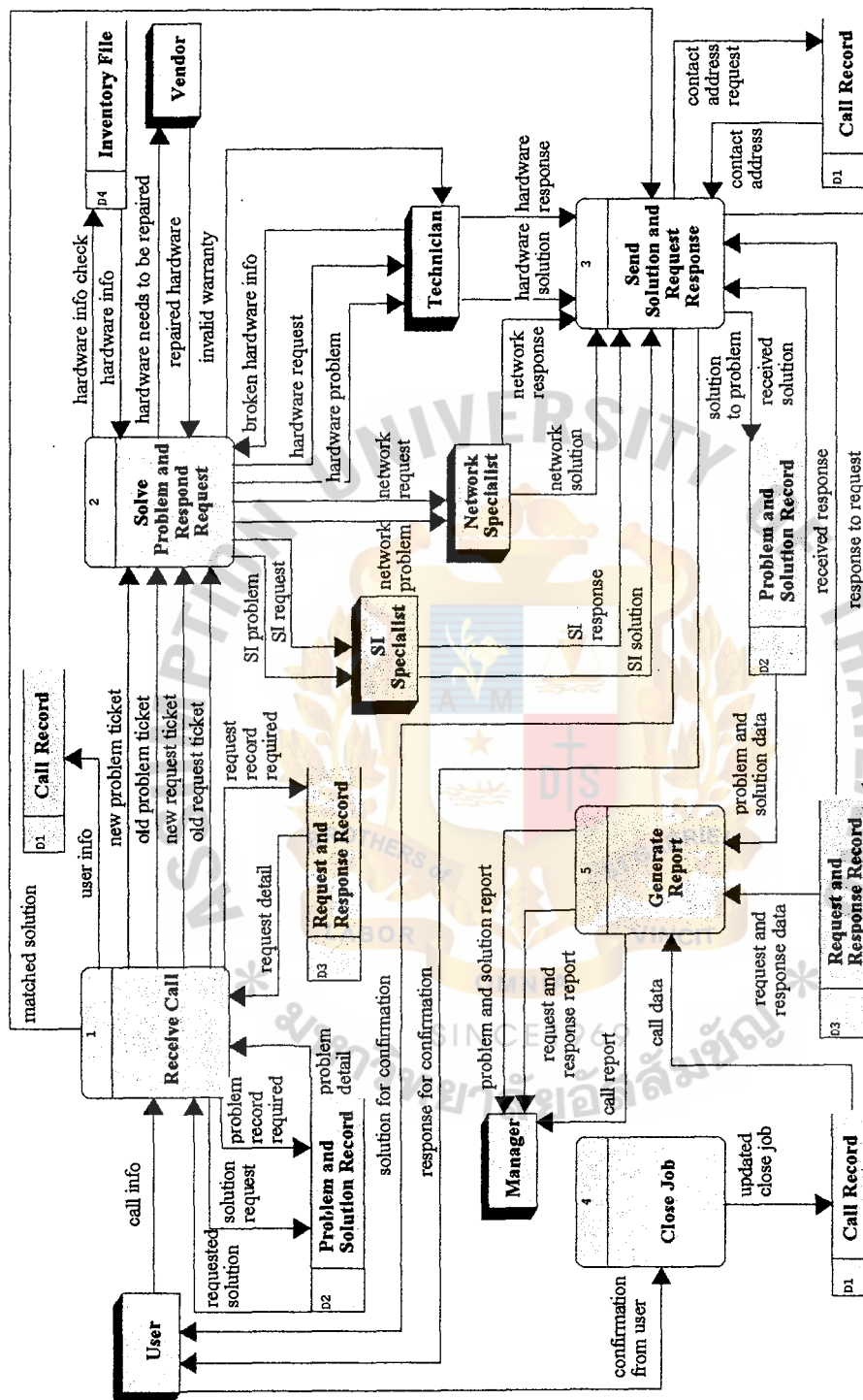


Figure A.1. Context Diagram of the Proposed System.





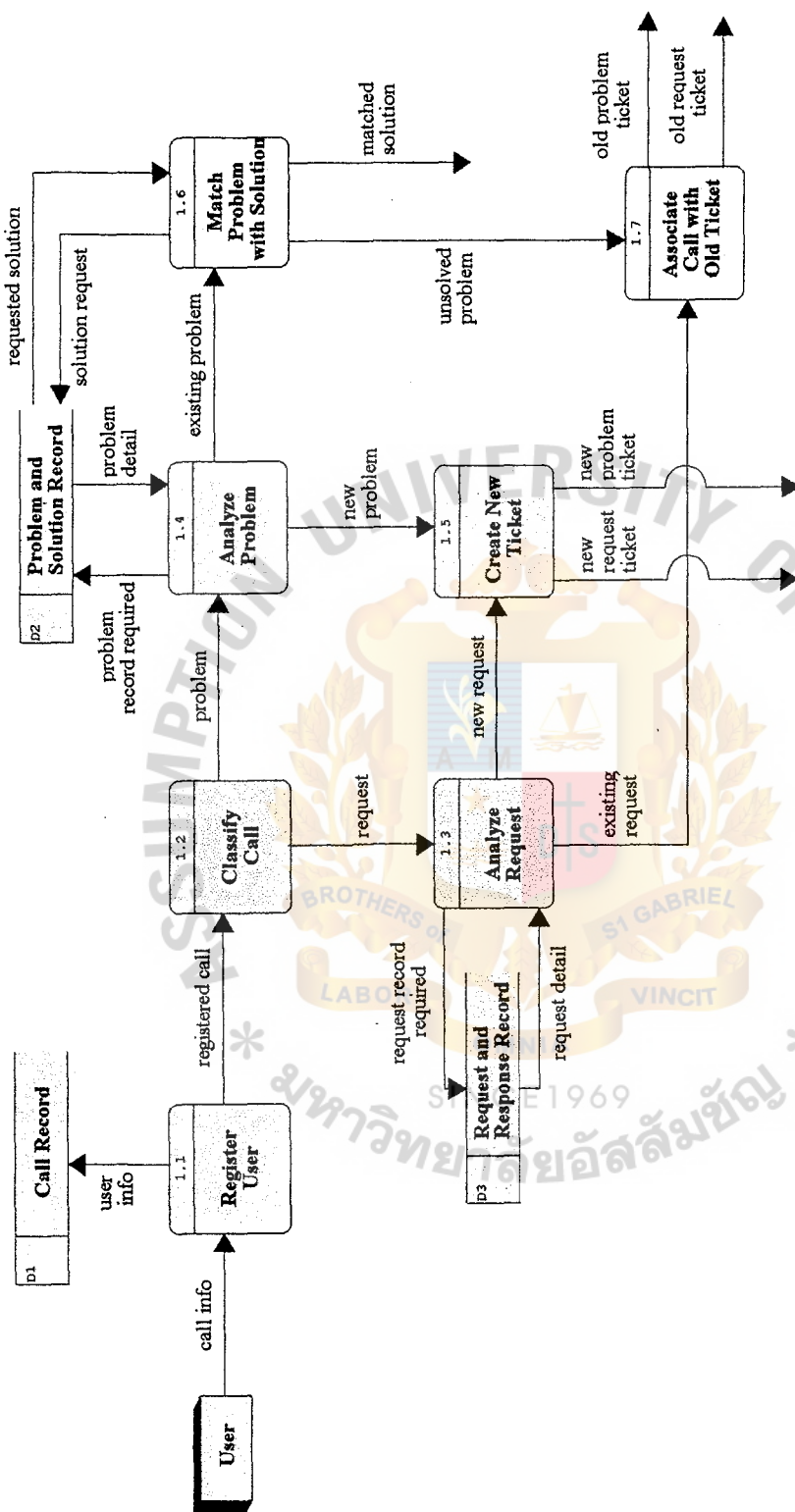


Figure A.3. Data Flow Diagram Level 1.1 - Receive Call Process.

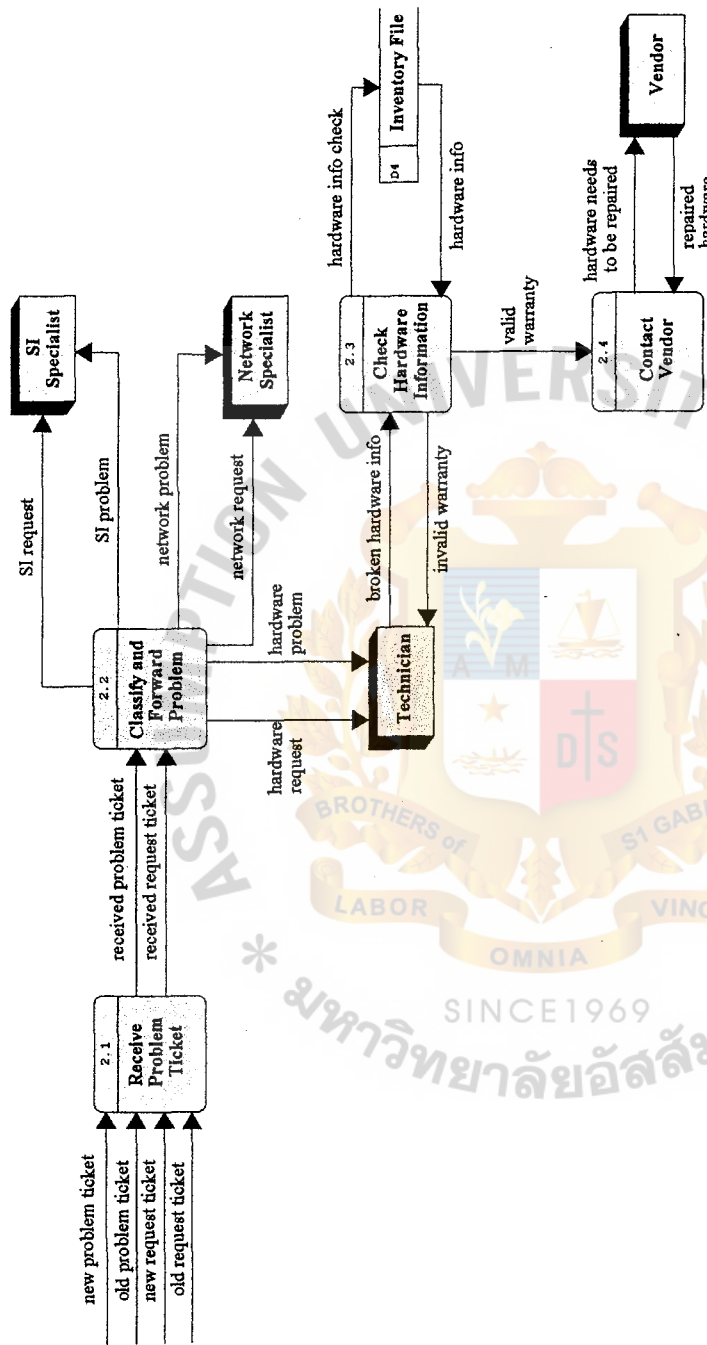


Figure A.4. Data Flow Diagram Level 1.2 - Solve Problem and Respond Request Process.

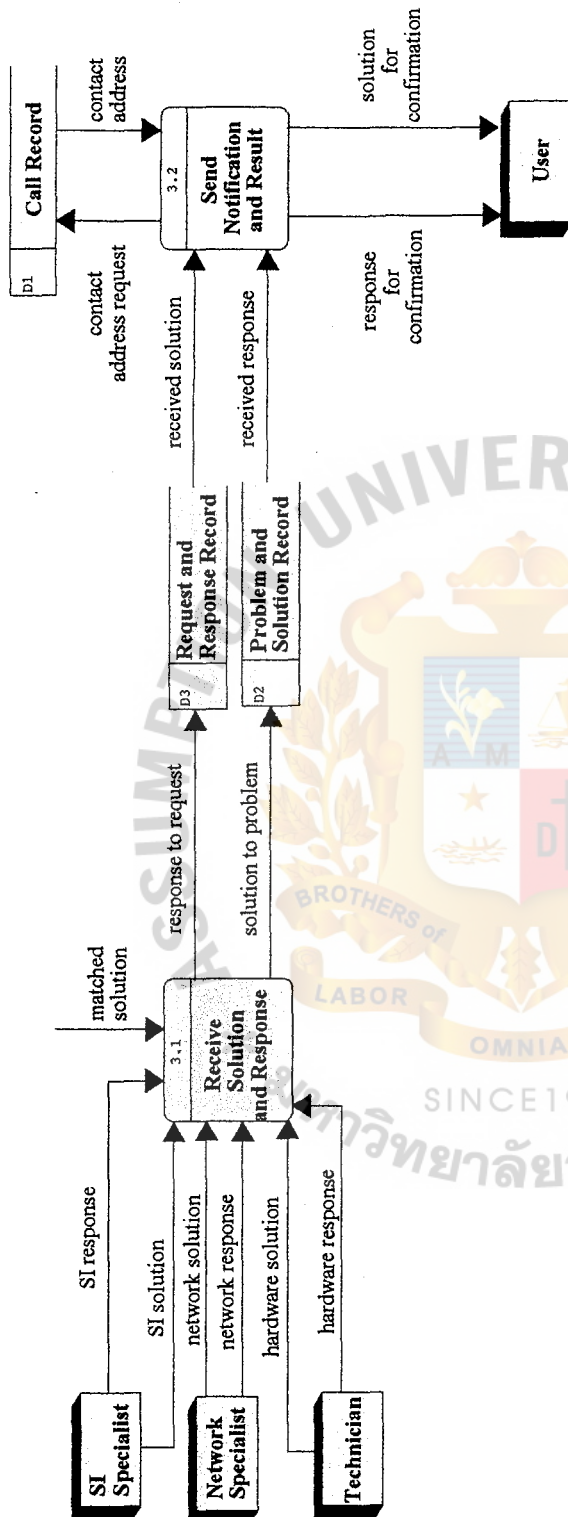


Figure A.5. Data Flow Diagram Level 1.3 - Send Solution and Request Response Process.



Figure A.6. Data Flow Diagram Level 1.4 - Close Job Process.



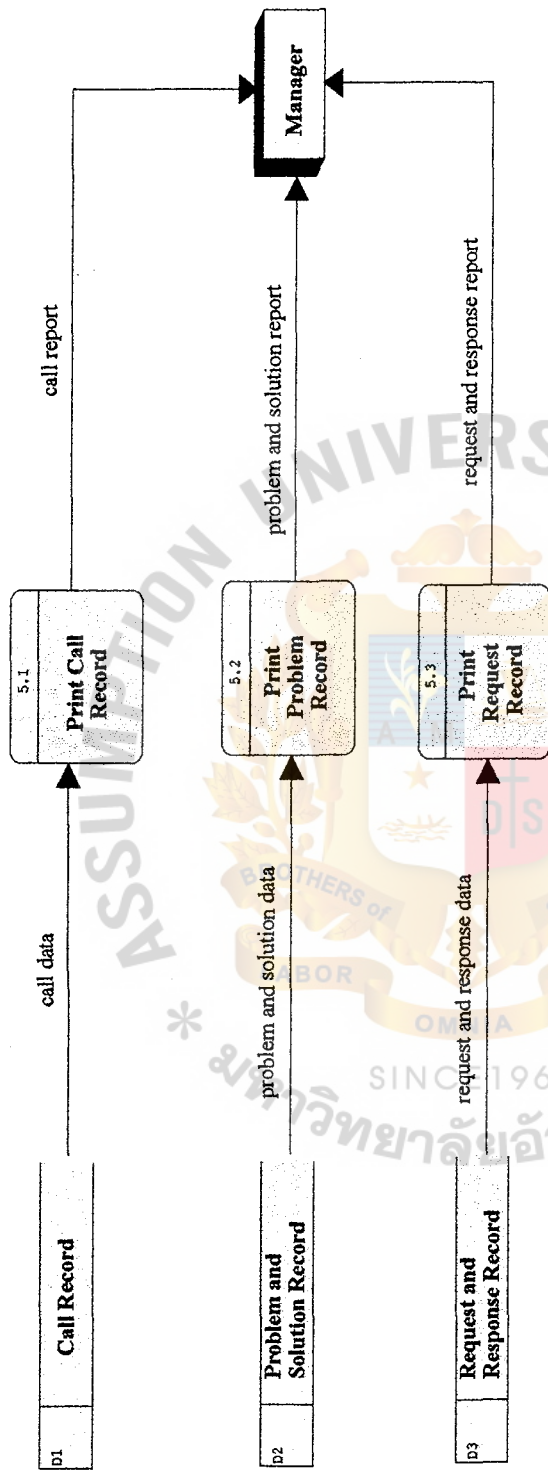


Figure A.7. Data Flow Diagram Level 1.5 - Generate Report Process.



Table B.1. Data Dictionary.

Object Name	Object Type	Description
Acceptance check		[Yes   No]
Address		Address of vendor *Address1 + District + Province + Zip code
Address1		*Character[30]*
Asset ID		Identification number assigned to asset *Digit[5]*
Broken hardware info	Data Flow	Information about vendor and warranty period of the broken hardware *Hardware info*
Call data	Data Flow	Data of calls received by help desk officer and closed jobs *Call Record*
Call info	Data Flow	User's call information *User info + (Problem) + (Request) + Severity*
Call date		Date of call received *Date*
Call ID		Identification number of call *Digit[4]*
Call info	Data Flow	*Character[255]*
Call Record	Data Store	*Call ID + Call date + Call time + Call info + Call status + Severity + (Reply date) + (Reply time) + Staff ID + Specialist ID*

Table B.1. Data Dictionary. (Continued)

Object Name	Object Type	Description
Call report	Data Flow	Report about the calls received by help desk officer, and the jobs that have already been closed *Call Record*
Call status		Status of the call [Open   Closed]
Call time		Time of call received *Time*
Character		[A-Z   a-z   0-9   /   .   &   %   @ ]
Confirmation from user	Data Flow	Confirmation sent by user that he has already received the solution or response *Confirmation sheet*
Confirmation sheet		The confirmation of the acceptance of solution or response *User info + Acceptance check + Staff ID + (Staff contact no) + (Staff e-mail)*
Contact address	Data Flow	User's contact address *User info*
Contact address request	Data Flow	Request for user's contact no or e-mail *Call ID*
Contact no		Contact number *Digit[3]*
Date		[dd/mm/yy]
Digit		[0-9]

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Table B.1. Data Dictionary. (Continued)

Object Name	Object Type	Description
District		*Character[20]*
E-mail		E-mail address *Character[25]*
Existing Problem	Data Flow	Problem that has been solved or that is still in process *Problem ID + Problem*
Existing request	Data Flow	Request that has not been responded *Request ID +Request*
First name		*Character[20]*
Floor		Floor on which the device is located
Hardware info		Information of hardware *Asset ID + Type + Model +Hardware status + Location + Purchase date +Warranty expired date + Serial no + Vendor info*
Hardware info check	Data Flow	The request to check hardware information
Hardware needs to be repaired	Data Flow	Hardware that needs to be repaired by vendor
Hardware problem	Data Flow	Problem concerned with hardware *Problem ID + Problem*



Table B.1. Data Dictionary. (Continued)

Object Name	Object Type	Description
Hardware request	Data Flow	Request concerned with hardware *Request ID + Request*
Hardware response	Data Flow	Response to hardware request *Request ID + + Response*
Hardware solution	Data Flow	Solution to the problem concerned with hardware *Problem ID + Problem + Solution*
Hardware request	Data Flow	Request concerned with hardware *Request ID + Request*
Hardware response	Data Flow	Response to hardware request *Request ID + Request + Response*
Hardware solution	Data Flow	Solution to the problem concerned with hardware *Problem ID + Problem + Solution*
Hardware status		Availability of the device [Installed   Available   Warehouse]
Invalid warranty	Data Flow	Expired warranty *Hardware info*
Inventory file	Data Store	Record of devices *Hardware info*
Location		The physical location of the device *Floor + *Problem ID + Room*

Table B.1. Data Dictionary. (Continued)

Object Name	Object Type	Description
Matched solution	Data Flow	Solution matched with the problem Problem + Solution*
Model		Model of asset *Character[10]*
Network problem	Data Flow	Problem concerned with network *Problem ID + Problem*
Network request	Data Flow	Request concerned with network *Request ID + Request*
Network response	Data Flow	Response to network request *Request ID + Request + Response*
Network solution	Data Flow	Solution to the problem concerned with network *Problem ID + Problem + Solution*
New problem	Data Flow	*Problem*
New problem ticket	Data Flow	Ticket of new problem *Problem ID + Problem*
New request	Data Flow	*Request*
New request ticket	Data Flow	Ticket of new request *Request ID + Request*
Old problem ticket	Data Flow	Ticket of old or existing problem *Problem ID + Problem + Staff ID*

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Table B.1. Data Dictionary. (Continued)

Object Name	Object Type	Description
Old request ticket	Data Flow	Ticket of old or existing request *Request ID + Request + Staff ID*
Problem	Data Flow	User's problem *Character[255]*
Problem and solution data	Data Flow	Data of problems and solutions to be printed out *Problem and Solution Record*
Problem and Solution Record	Data Store	Record of user's problem and its solution *Problem ID + Problem + Solution + Staff ID + Call Status + Specialist ID*
Problem and solution report	Data Flow	Report about the user's problem and its solution *Problem and Solution Record*
Problem detail	Data Flow	Detail of previous problem *Call record + Problem ID + Problem + (Solution) + Staff ID
Problem ID		Identification number of problem *Digit[4]*
Problem record required	Data Flow	Problem record required by help desk staff *problem*
Province		*Character[20]*
Purchase date		Date of hardware purchase *Date*

Table B.1. Data Dictionary. (Continued)

Object Name	Object Type	Description
Received problem ticket	Data Flow	User's problem ticket received by help desk officer *Problem ID + Problem*
Received request ticket	Data Flow	User's request ticket received by help desk officer *Request ID + Request*
Received response	Data Flow	Response to user request received from specialist or technician *Request ID + Request + Response + Call ID*
Received solution	Data Flow	Solution to user's problem received from specialist or technician *Problem ID + Problem + Solution + Call ID*
Registered call	Data Flow	Call that has already been registered *Call ID + Call date + Call time + Call*
Repaired hardware	Data Flow	Hardware that has already been repaired
Reply date		Date of call replied *Date*
Reply time		Time of call replied *Time*
Request	Data Flow	User's request *Character[255]*
Request and response data	Data Flow	Data about request and its response *Request and Response Record*

Table B.1. Data Dictionary. (Continued)

Object Name	Object Type	Description
Request and Response Record	Date Store	Record of user's request and its response *Request ID + Request + Response + Staff ID + Call Status + Specialist ID*
Request and response report	Data Flow	Report printed for manager about the request and its response *Request and Response Record*
Request detail	Data Flow	Detail of previous request *Call record + Request ID + Request + (Response) + Staff ID
Request ID		Identification number of request *Digit[4]*
Request record required	Data Flow	Request record required by help desk staff *Request*
Requested solution	Data Flow	Solution to the requested problem *Solution*
Response		Request's response *Character[255]*
Response for confirmation	Data Flow	Response that is sent to user and needs user to confirm whether he got it *Request ID + Request + Response + Staff ID + Confirmation sheet*
Response to request	Data Flow	Response to user's request *Request ID + Response*



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Table B.1. Data Dictionary. (Continued)

Object Name	Object Type	Description
Room		Room in which the device is located
Severity		[Low   Moderate   High]
SI problem	Data Flow	Problem about software or system integration *Problem ID + Problem*
SI request	Data Flow	Request concerned with SI *Request ID + Request*
SI response	Data Flow	Response to SI request *Request ID + Request + Response + Specialist ID*
SI solution	Data Flow	Solution of problem concerned with software or system integration *Problem ID + Problem + Solution + Specialist ID*
Solution		Solution to user's problem *Character[255]*
Solution for confirmation	Data Flow	Solution that is sent to user and needs user to confirm whether he got it *Problem ID + Problem + Solution + Staff ID + Confirmation sheet*
Solution request	Data Flow	Request for previous problem's solution *Problem ID*
Solution to problem	Data Flow	Solution of problem *Problem ID + Solution*

Table B.1. Data Dictionary. (Continued)

Object Name	Object Type	Description
Specialist ID		Unique identification assigned to the specialist *character[8]*
Specialist info		Information of specialist *Specialist name + Specialist ID + Specialist no + Specialist e-mail*
Specialist name		Name of specialist *First name + Surname*
Staff contact no		Staff's telephone number *Digit[3]*
Staff e-mail		Staff's E-mail address *Character[25]*
Staff ID		Unique identification of help desk staff *Character[8]*
Staff info		Information of each staff *Staff name + Staff ID + Staff contact no + (Staff e-mail)*
Staff name		Name of Help Desk staff *First name + Surname*
Surname		*Character[20]*
Tel no		Telephone number of vendor *Digit[9]*
Time		[##:##]
Type		Classification for the device *Character[20]*

Table B.1. Data Dictionary. (Continued)

Object Name	Object Type	Description
Unsolved problem	Data Flow	Problem that has not been solved *Problem ID + Problem + Staff ID*
Updated close job	Data Flow	Finished job that has already been updated *Call ID + Call status*
User dept		User's department *Character[30]*
User ID		Identification number of employee *Digit[5]*
User info	Data Flow	Information of user *User ID + User name + User dept + Contact no + (E-mail)*
User name		Name of user *First name + Surname*
Valid warranty	Data Flow	Warranty that is still valid *Hardware info*
Vendor ID		Identification number assigned to the vendor *Digit[4]*
Vendor info		Information of vendor *Vendor ID + Vendor name + Address + Tel no*
Vendor name		Vendor who is contacted for service on the device *Charanter[50]*

Table B.1. Data Dictionary. (Continued)

Object Name	Object Type	Description
Warranty expired date		Date that the warranty of device is expired *Date*
Zip code		*Digit[5]*





Table C.1. Process 1.1 - Register User.

<p>Number: 1.1</p> <p>Name: Register User</p> <p>Description: Help Desk staff key call information received from users. If the entries are correct, Call Record is updated.</p>
<p>Input Data Flow:</p> <p>Call info</p>
<p>Output Data Flow:</p> <p>User info</p> <p>Registered call</p>
<p>Type of Process: Online</p>
<p>Process Logic:</p> <p>DO Get Help Desk Home Menu</p> <p>DO Get <u>Call Info</u></p> <p>IF Valid Entries</p> <p>    THEN Write <u>Call Record</u></p> <p>ELSE Correct the Entries</p> <p>ENDIF</p>



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Table C.2. Process 1.2 – Classify Call.

Number: 1.2
Name: Classify Call
Description: Determine if a call is a problem call or request call.
Input Data Flow:  Registered call
Output Data Flow:  Problem  Request
Type of Process: Manual
Process Logic:  IF the <u>Registered Call</u> is Problem Call THEN Move <u>Registered Call</u> to <u>Analyze Problem</u> ELSE Move <u>Registered Call</u> to <u>Analyze Request</u> ENDIF

Table C.3. Process 1.3 – Analyze Request.

<p>Number: 1.3</p> <p>Name: Analyze Request</p> <p>Description: Determine if a request is a new request or an existing request.</p>
<p>Input Data Flow:</p> <p>Request</p> <p>Request detail</p>
<p>Output Data Flow:</p> <p>Request record required</p> <p>New request</p> <p>Existing request</p>
<p>Type of Process: Online</p>
<p>Process Logic:</p> <p>DO Get <u>Request</u></p> <p>DO Read <u>Request and Response Record</u></p> <p>IF the <u>Request</u> is equal to <u>Request and Response Record</u></p> <p>    THEN Write <u>Existing Request</u></p> <p>        Move <u>Existing Request</u> to Associate Call with Old Ticket</p> <p>ELSE DO Write <u>New Request</u></p> <p>    Move <u>New Request</u> to Create New Ticket</p> <p>ENDIF</p>

Table C.4. Process 1.4 - Analyze Problem.

<p>Number: 1.4</p> <p>Name: Analyze Problem</p> <p>Description: Determine if a problem is a new problem or an existing problem.</p>
<p>Input Data Flow:</p> <p>Problem</p> <p>Problem detail</p>
<p>Output Data Flow:</p> <p>Problem record required</p> <p>New problem</p> <p>Existing problem</p>
<p>Type of Process: Online</p>
<p>Process Logic:</p> <p>DO Get <u>Problem</u></p> <p>DO Read <u>Problem</u> and Solution Record</p> <p>IF the Problem is equal to Problem and Solution Record</p> <p>    THEN Write <u>Existing Problem</u></p> <p>        Move <u>Existing Problem</u> to Match Solution with Problem</p> <p>ELSE DO Write <u>New Problem</u></p> <p>    Move <u>New Problem</u> to <u>Create New Ticket</u></p> <p>ENDIF</p>

Table C.5. Process 1.5 – Create New Ticket.

<p>Number: 1.5</p> <p>Name: Create New Ticket</p> <p>Description: Assign new ticket to the new problem or the new request.</p>
<p>Input Data Flow:</p> <p>New request</p> <p>New problem</p>
<p>Output Data Flow:</p> <p>New request ticket</p> <p>New problem ticket</p>
<p>Type of Process: Online</p>
<p>Process Logic:</p> <p>DO Get <u>New Request</u></p> <p>DO Assign <u>New Request Ticket</u></p> <p>DO Get <u>New Problem</u></p> <p>DO Assign <u>New Problem Ticket</u></p>

Table C.6 Process 1.6 – Match Solution with Problem.

<p>Number: 1.6</p> <p>Name: Match Solution with Problem</p> <p>Description: Determine if the received existing problem has appropriate solution.</p>
<p>Input Data Flow:</p> <p>Existing problem</p> <p>Requested solution</p>
<p>Output Data Flow:</p> <p>Solution request</p> <p>Matched solution</p> <p>Unsolved problem</p>
<p>Type of Process: Online</p>
<p>Process Logic:</p> <p>DO Get <u>Existing Problem</u></p> <p>DO Read Problem and Solution Record</p> <p>IF the <u>Existing Problem</u> is equal to Problem and Solution Record</p> <p>    THEN Get <u>Requested Solution</u></p> <p>        Move <u>Requested Solution</u> to Receive Solution and Response</p> <p>ELSE Move <u>Unsolved Problem</u> to Associate Call with Old Ticket</p> <p>ENDIF</p>

Table C.7. Process 1.7 – Associate Call with Old Ticket.

Number: 1.7
Name: Associate Call with Old Ticket
Description: Assign old ticket to the existing request or the existing unsolved problem.
Input Data Flow: <ul style="list-style-type: none"> <li>Existing request</li> <li>Unsolved problem</li> </ul>
Output Data Flow: <ul style="list-style-type: none"> <li>Old request ticket</li> <li>Old problem ticket</li> </ul>
Type of Process: Online
Process Logic: <ul style="list-style-type: none"> <li>DO Get <u>Existing Request</u></li> <li>DO Assign <u>Old Request Ticket</u></li> <li>DO Get <u>Unsolved Problem</u></li> <li>DO Assign <u>Old Problem Ticket</u></li> </ul>



Table C.8. Process 2.1 – Receive Problem Ticket.

<p>Number: 2.1</p> <p>Name: Receive Problem Ticket</p> <p>Description: Receive new and old problem and request ticket.</p>
<p>Input Data Flow:</p> <p>New problem ticket</p> <p>New request ticket</p> <p>Old problem ticket</p> <p>Old request ticket</p>
<p>Output Data Flow:</p> <p>Received problem ticket</p> <p>Received request ticket</p>
<p>Type of Process: Online</p>
<p>Process Logic:</p> <p>DO Get <u>New Problem Ticket</u></p> <p>DO Move <u>New Problem Ticket</u> to Classify and Forward Problem</p> <p>DO Get <u>Old Problem Ticket</u></p> <p>DO Move <u>Old Problem Ticket</u> to Classify and Forward Problem</p> <p>DO Get <u>New Request Ticket</u></p> <p>DO Move <u>New Request Ticket</u> to Classify and Forward Problem</p> <p>DO Get <u>Old Request Ticket</u></p> <p>DO Move <u>Old Request Ticket</u> to Classify and Forward Problem</p>

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Table C.9. Process 2.2 – Classify and Forward Problem.

<p>Number: 2.2</p> <p>Name: Classify and Forward Problem</p> <p>Description: Classify problem and request ticket if they are concerned with SI, network, or hardware, then forward them to the appropriate specialist.</p>
<p>Input Data Flow:</p> <p style="padding-left: 40px;">Received problem ticket</p> <p style="padding-left: 40px;">Received request ticket</p>
<p>Output Data Flow:</p> <p style="padding-left: 40px;">SI problem</p> <p style="padding-left: 40px;">SI request</p> <p style="padding-left: 40px;">Network problem</p> <p style="padding-left: 40px;">Network request</p> <p style="padding-left: 40px;">Hardware problem</p> <p style="padding-left: 40px;">Hardware request</p>
<p>Type of Process: Manual and Online</p>
<p>Process Logic:</p> <p style="padding-left: 40px;">DO Get the <u>Received Problem Ticket</u></p> <p style="padding-left: 40px;">BEGIN CASE</p> <p style="padding-left: 40px;">IF the <u>Received Problem Ticket</u> is SI type</p> <p style="padding-left: 80px;">THEN Move the <u>Received Problem Ticket</u> to <u>SI Specialist</u></p> <p style="padding-left: 40px;">ELSE IF the <u>Received Problem Ticket</u> is network type</p> <p style="padding-left: 80px;">THEN Move the <u>Received Problem Ticket</u> to <u>Network Specialist</u></p> <p style="padding-left: 40px;">ELSE IF the <u>Received Problem Ticket</u> is hardware type</p>

Table C.10. Process 2.3 – Check Hardware Information.

<p>Number: 2.3</p> <p>Name: Check Hardware Information</p> <p>Description: After receiving broken hardware information from the Technician, Help Desk staff searches for hardware information in the Inventory File.</p>
<p>Input Data Flow:</p> <p>Broken hardware info</p> <p>Hardware info</p>
<p>Output Data Flow:</p> <p>Hardware info check</p> <p>Invalid warranty</p> <p>Valid warranty</p>
<p>Type of Process: Online</p>
<p>Process Logic:</p> <p>DO Get the <u>Broken Hardware Information</u></p> <p>DO Read <u>Inventory File</u></p> <p>DO Get <u>Hardware Info</u> from the <u>Inventory File</u></p> <p>IF <u>Invalid Warranty</u></p> <p>    THEN Move Hardware to <u>Technician</u></p> <p>ELSE Contact Vendor</p> <p>ENDIF</p>

Table C.11. Process 2.4 – Contact Vendor.

<p>Number: 2.4</p> <p>Name: Contact Vendor</p> <p>Description: Contact vendor of the broken hardware.</p>
<p>Input Data Flow:</p> <p>Valid warranty</p> <p>Repaired hardware</p>
<p>Output Data Flow:</p> <p>Hardware needs to be repaired</p>
<p>Type of Process: Manual</p>
<p>Process Logic:</p> <p>DO Get <u>Valid Warranty Hardware</u></p> <p>DO Contact Vendor</p> <p>DO Move <u>Hardware Needs to Be Repaired to Vendor</u></p> <p>DO Get <u>Repaired Hardware from Vendor</u></p>

Table C.12. Process 3.1 – Receive Solution and Response.

<p>Number: 3.1</p> <p>Name: Receive Solution and Response</p> <p>Description: Help Desk staff receives solutions and responses from the specialist and updates Problem and Solution Record and Request and Response Record.</p>
<p>Input Data Flow:</p> <p>SI solution</p> <p>SI response</p> <p>Network solution</p> <p>Network response</p> <p>Hardware solution</p> <p>Hardware response</p> <p>Matched Solution</p>
<p>Output Data Flow:</p> <p>Solution to problem</p> <p>Response to request</p>
<p>Type of Process: Online</p>
<p>Process Logic:</p> <p>DO Get <u>SI Solution</u> from <u>SI Specialist</u></p> <p>DO Update <u>Problem and Solution Record</u></p> <p>DO Get <u>Network Solution</u> from <u>Network Specialist</u></p> <p>DO Update <u>Problem and Solution Record</u></p> <p>DO Get <u>Hardware Solution</u> from <u>Technician</u></p> <p>DO Update <u>Problem and Solution Record</u></p>

DO Get SI Response from SI Specialist

DO Update Request and Response Record

DO Get Network Response from Network Specialist

DO Update Request and Response Record

DO Get Hardware Request from Technician

DO Update Request and Response Record





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Table C.13. Process 3.2 – Send Notification and Result.

<p>Number: 3.2</p> <p>Name: Send Notification and Result</p> <p>Description: Help Desk staff receives solution and response from Problem and Solution Record and Request and Response Record, then matches problem ID or request ID to Call ID and sends the solution or request back to users together with confirmation sheet.</p>
<p>Input Data Flow:</p> <p>Received solution</p> <p>Received response</p> <p>Contact address</p>
<p>Output Data Flow:</p> <p>Solution for confirmation</p> <p>Response for confirmation</p> <p>Contact address request</p>
<p>Type of Process: Online</p>
<p>Process Logic:</p> <p>DO Get <u>Received Solution</u> form <u>Problem and Solution Record</u></p> <p>DO Read <u>Call Record</u></p> <p>DO Get <u>Contact Address</u> of User</p> <p>DO Send <u>Received Solution</u> and <u>Solution for Confirmation</u> to User</p> <p>DO Get <u>Received Response</u> form <u>Request and Response Record</u></p> <p>DO Read <u>Call Record</u></p> <p>DO Get <u>Contact Address</u> of User</p>

DO Send Received Response and Response for Confirmation to User

Table C.14. Process 4.1 – Receive Confirmation.

Number: 4.1
Name: Receive Confirmation
Description: Help Desk staff receives confirmation from user.
Input Data Flow: Confirmation from user
Output Data Flow: Received user confirmation
Type of Process: Manual
Process Logic: DO Get <u>Confirmation from User</u> DO Move <u>Confirmation from User</u> to Update Call Record

Table C.15. Process 4.2 – Update Call Record.

Number: 4.2
Name: Update Call Record
Description: After Help Desk staff receives user's confirmation, they will update call record to close the job.
Input Data Flow:  Received user confirmation
Output Data Flow:  Updated close job
Type of Process: Online
Process Logic:  DO Get the <u>Received User Confirmation</u>  DO Update <u>Call Record</u>

Table C.16 Process 5.1 – Print Call Record.

Number: 5.1
Name: Print Call Record
Description: Help Desk staff prints call report for Technical Support Manager daily and monthly.
Input Data Flow:  Call data
Output Data Flow:  Call report
Type of Process: Batch
Process Logic:  DO Get <u>Call Data</u> from <u>Call Record</u>  Do Print <u>Call Record</u>  DO Send <u>Call Report</u> to Manager

Table C.17. Process 5.2 – Print Problem Record.

Number: 5.2
Name: Print Problem Record
Description: Help Desk staff prints problem and solution report for Technical Support Manager daily and monthly.
Input Data Flow:  Problem and solution data
Output Data Flow:  Problem and solution report
Type of Process: Batch
Process Logic:  DO Get <u>Problem and Solution Data</u> from <u>Problem and Solution Record</u>  Do Print <u>Problem and Solution Record</u>  DO Send <u>Problem and Solution Report</u> to Manager

Table C.18. Process 5.3 – Print Request Record.

Number: 5.3
Name: Print Request Record
Description: Help Desk staff prints request and response report for Technical Support Manager daily and monthly.
Input Data Flow:  Request and response data
Output Data Flow:  Request and response report
Type of Process: Batch
Process Logic:  DO Get <u>Request and Response Data</u> from <u>Request and Response Record</u>  Do Print <u>Request and Response Record</u>  DO Send <u>Request and Response Report</u> to Manager





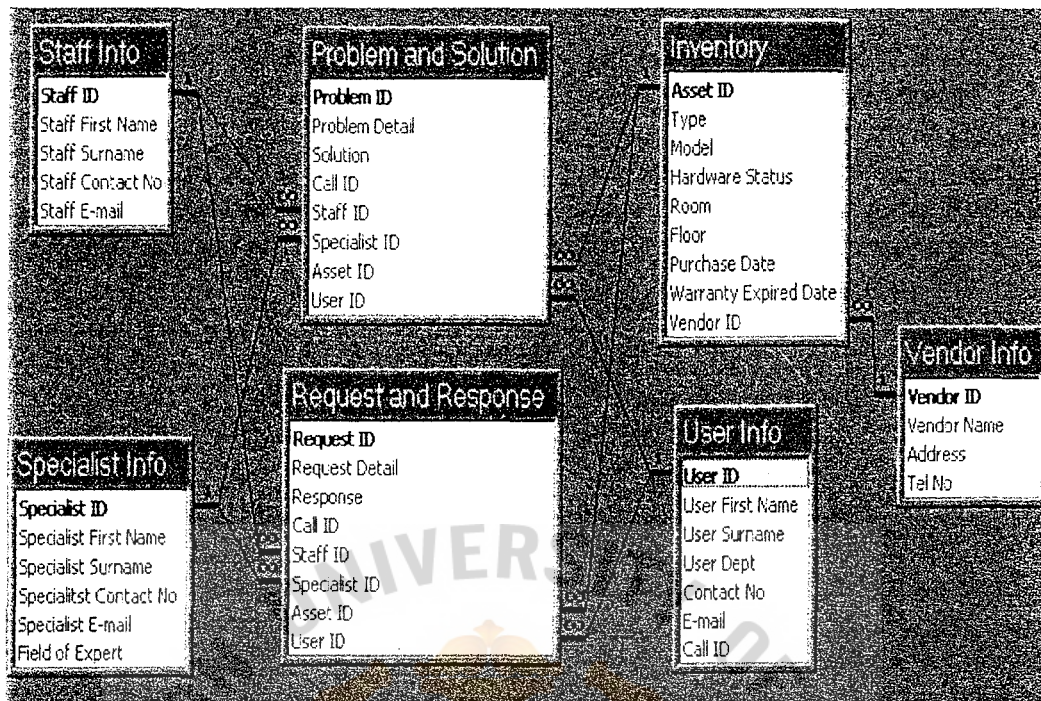


Figure D.1. Entity Relationship Diagram of the Proposed System.



## APPENDIX E

### USER INTERFACE DESIGN

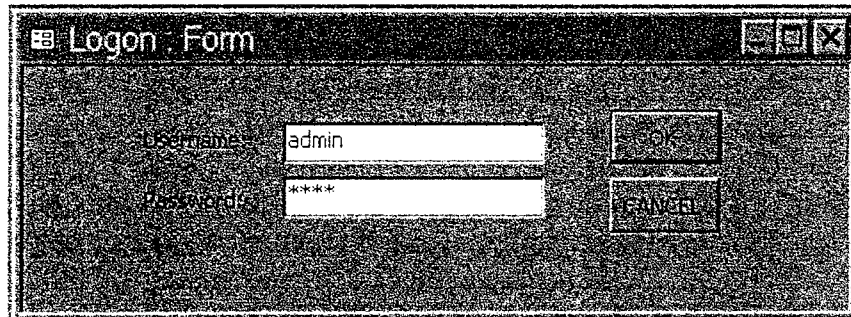


Figure E.1. Login Screen and Error Message.

User must enter his user name and password in order to login to the system.

Error message box will appear when user enters incorrect user name or password.



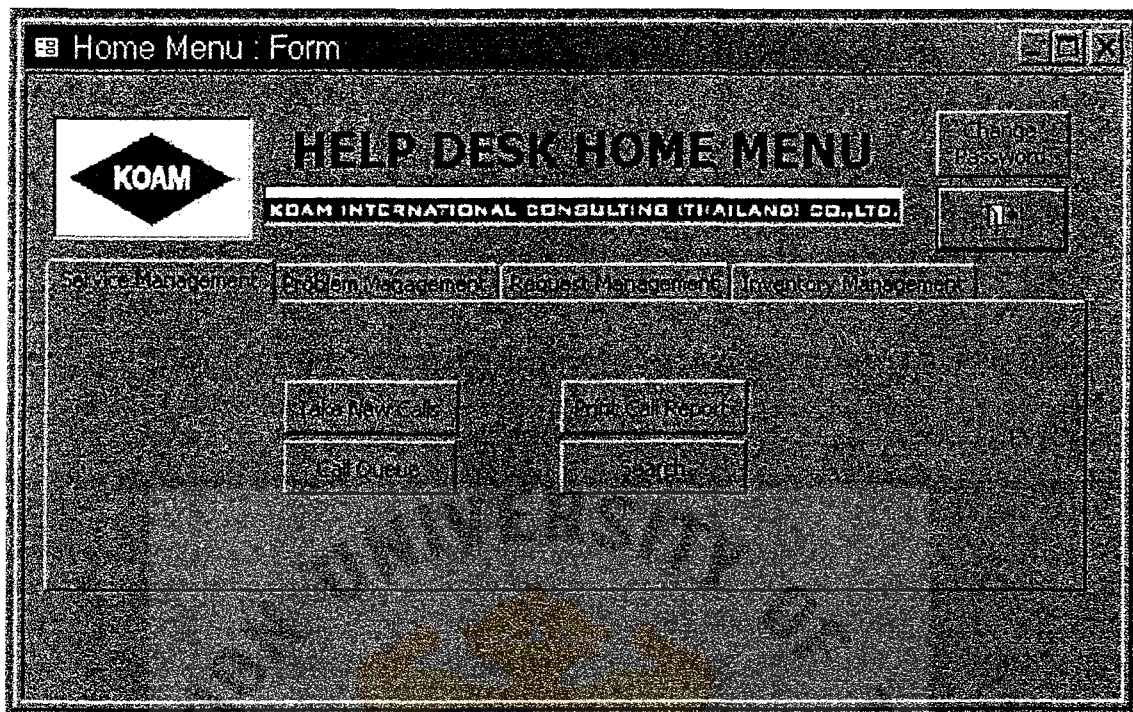


Figure E.2. Main Menu – Service Management.

Service Management allows Help Desk staff to track the calls that he receives. Take New Calls button accesses a blank call report form to enter information from a call, check for related call reports, and add call information to other Help Desk records such as problem ticket.

Call Queue button allows Help Desk staff to check the list of call report of all Help Desk staff.

Search button accesses directly to the search menu. Print call report button allows Help Desk staff to print a call report.

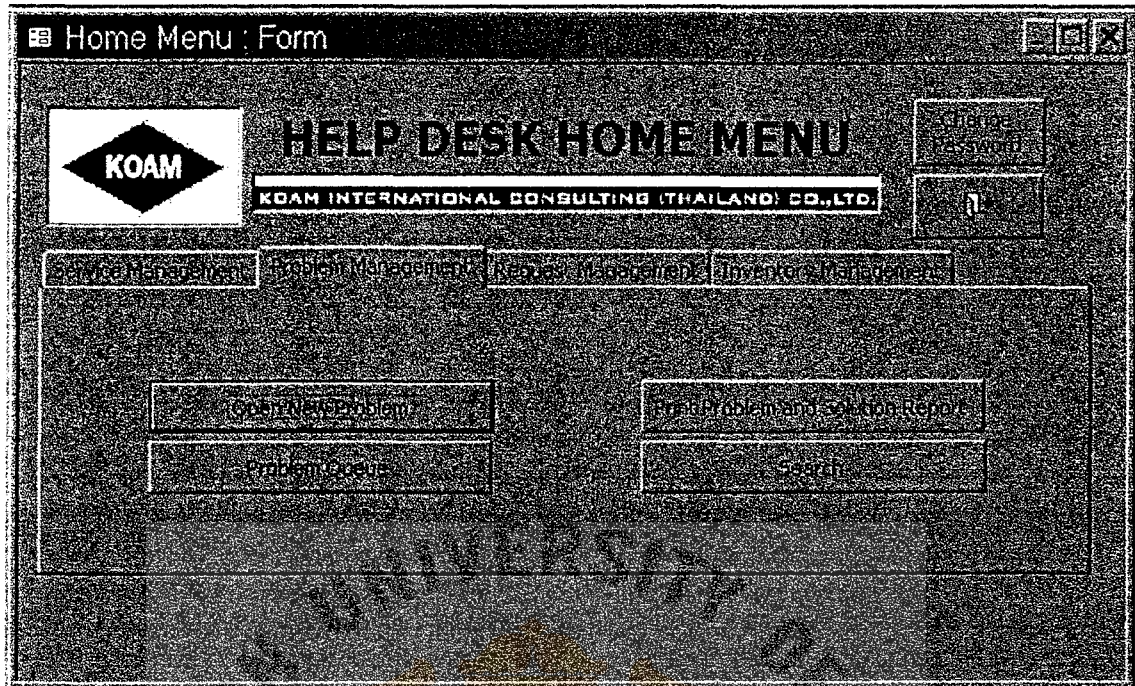


Figure E.3. Main Menu – Problem Management.

Help Desk Home Menu allows Help Desk staff to keep track of calls by opening a call report. If a reported problem requires further action, Help Desk staff can use Problem Management to open a problem ticket to track the problem.



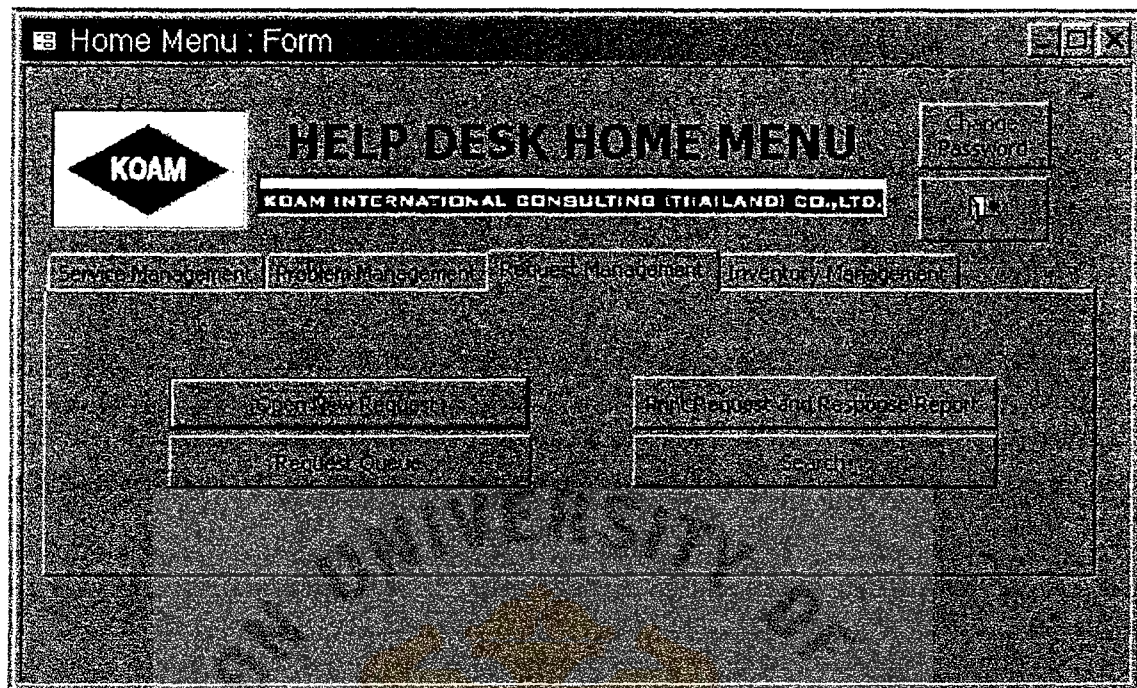


Figure E.4. Main Menu – Request Management.

Request Management allows Help Desk staff to report various types of requests, such as software, hardware, or network requests.

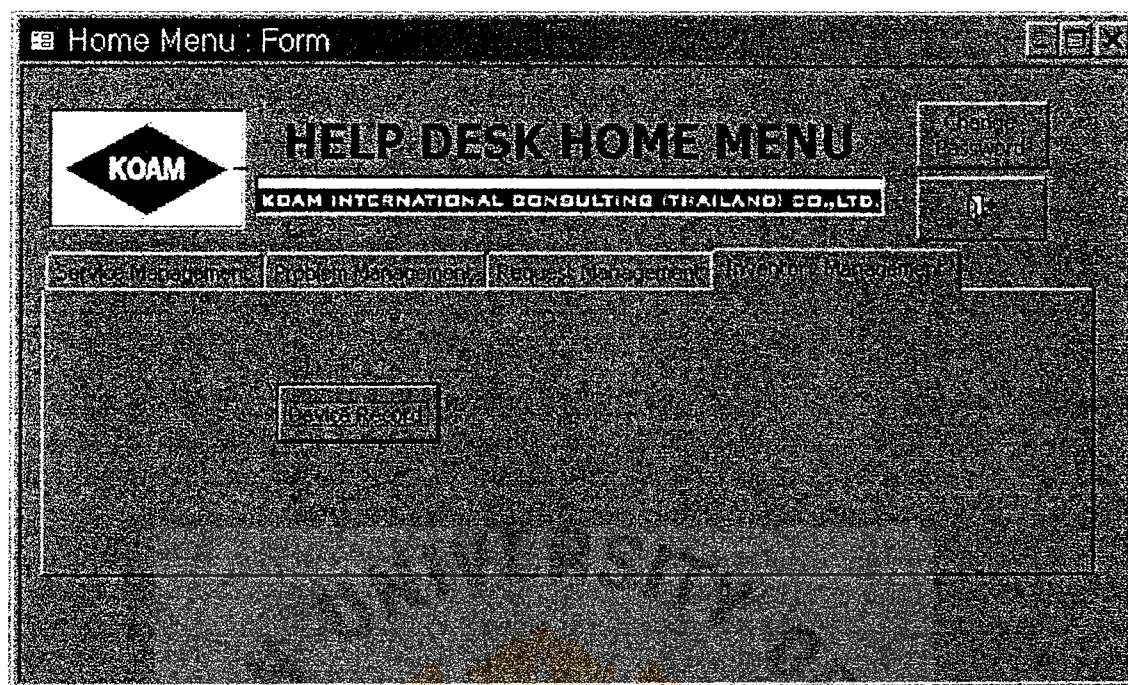


Figure E.5. Main Menu – Inventory Management.

Help Desk Inventory Management helps Help Desk staff keep track of the hardware and software in his network.



**New Call**

Call ID: 0001

Call No.: 41001

User Name: NARUMOL AROMDEE

Contract No.: 219

Email: narumol@koam.co.th

User Dept: FINANCIAL AND ACCOUNT

Priority: 1

Status: CLOSED

Call Description: Cannot read disk drive

Open Time: 1/11/01 11:36:05

Access ID: D001

Type: PC

Model: PRESARIO 4

Status: URAIWAN

Assignment: HARDWARE

Severity: MODERATE

Notify By: PHONE

Figure E.6. New Call Form.

The form for opening a new call report allows Help Desk staff to quickly log calls and create reports.





The screenshot shows a software window titled "Call Report Search : Form". Inside, there are two tabs: "Basic Search" (selected) and "Advanced Search". The "Basic Search" tab contains a list of search criteria on the left and corresponding input fields on the right:

Field	Input Field
Call ID	[Text Field]
Reported By	[Text Field]
Department	[Text Field]
Status	[Text Field]
Assigned	[Text Field]
Affected Item	[Text Field]
Severity	[Text Field]
Call Status	[Text Field]

Figure E.8. Call Report Basic Search Tab.



Call Report Search : Form

CALL REPORT SEARCH

Basic Search | Advanced Search

Inventor

And before

Staff ID

Last Updated Date

And before

Staff ID



Call Report Record : Form

CALL REPORT RECORD

Call ID	C001	Call ID	URAIWAN
Call Status	CLOSED	Call Type	PHONE
Caller Name	NARUMOL AROMDEE	Severity	MODERATE
Caller No.	219	Assignment Group	HARDWARE
User Data	FINANCIAL AND ACCOUNT	Open Time	1/11/01 11:36:05
Email	narumol@koam.co.th	Log On/Off Time	1/11/01 11:36:10
Asset ID	D001	Call Log	Cannot read disk drive
Type	PC		
Model	PRESARIO 4		

Figure E.10. Call Report Record.

This Call Report Record can be accessed by Call List Inbox or Search Menu.

Problem Ticket Open : Form

PROBLEM TICKET OPEN

Problem ID	P001	Category	TAVITP
System	HARDWARE	Severity	MODERATE
Location	URAIWAN	Status	CLOSED
Code	C001	Asset ID	D001
User ID	41001	Serial No	470020-240
Report Name	NARUMOL AROMDEE	Model	PRESARIO 4
Contact No	219	Access Code	D001
Email	narumol@koam.co.th	Problem Desc	Cannot read disk drive
Department	FINANCIAL AND ACCOUNTI		
Resolution	Send engineer to fix it.		

Figure E.11. Problem Ticket Open Form.

Opening a problem ticket for a reported problem creates a record that can be used to track the progress of the problem resolution.



Microsoft Access - [Problem List : Form]

Description: Arial 10

### PROBLEM LIST

Problem ID	Open Time	Call Status	Assignee	Description
<input checked="" type="checkbox"/> P103	23/08/01 13:52	Closed	Hardware	Cannot read disk drive
<input checked="" type="checkbox"/> P104				

Page 1 of 1

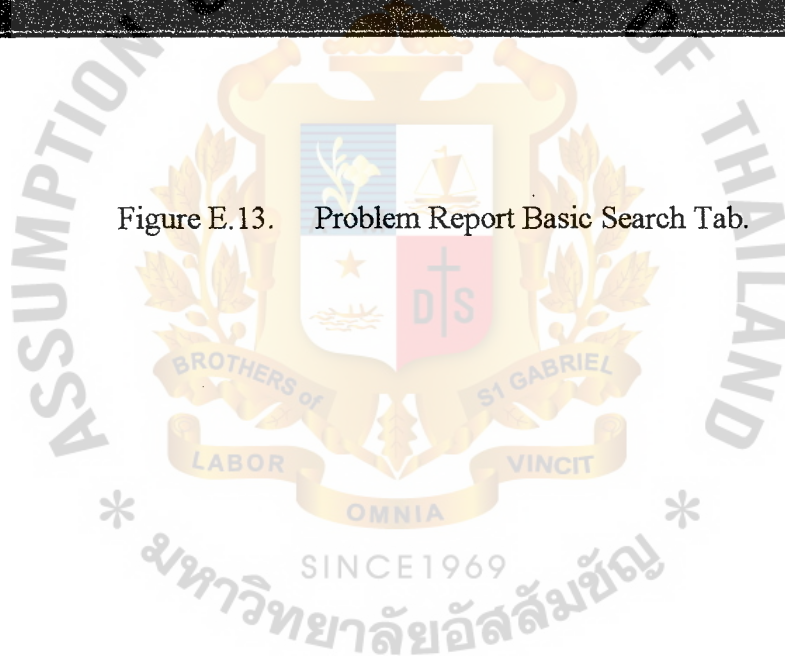
Figure E.12. Problem List Inbox.

To access Problem List inbox, click the Problem Queue at Problem Management Home Menu.

Problem Report Search Form

1	Problem Report Search Form
---	----------------------------


Figure E.13. Problem Report Basic Search Tab.







Hep Desk System - [Problem Ticket Record : Form]

Tahoma 8

1

P001	1/11/01 11:36:05
C001	1/11/01 11:36:10
NARUMOL AROMDEE	CLOSED
219	HARDWARE
narumol@koam.co.th	URAIWAN
FINANCIAL AND ACCOUNT	TAVITP
Cannot read disk drive	D001
	MODERATE
Send engineer to fix it.	D001
	470020-240
	SALES ROOM

Figure E.15. Problem Ticket Record Form.

This Problem Ticket Record can be accessed by using Problem List inbox or Request Search menu.



Request Ticket Open Form

C004	SOMSAKK
R001	high
SI	OPEN
44003	NONE
NAKORN	CHERDRUM
228	
nakorn@koam.co.th	Need SI staff to collect user requirements on immigration project
GOVERNMENT PROJECT	
rattapong	

Figure E.16. Request Ticket Open Form.

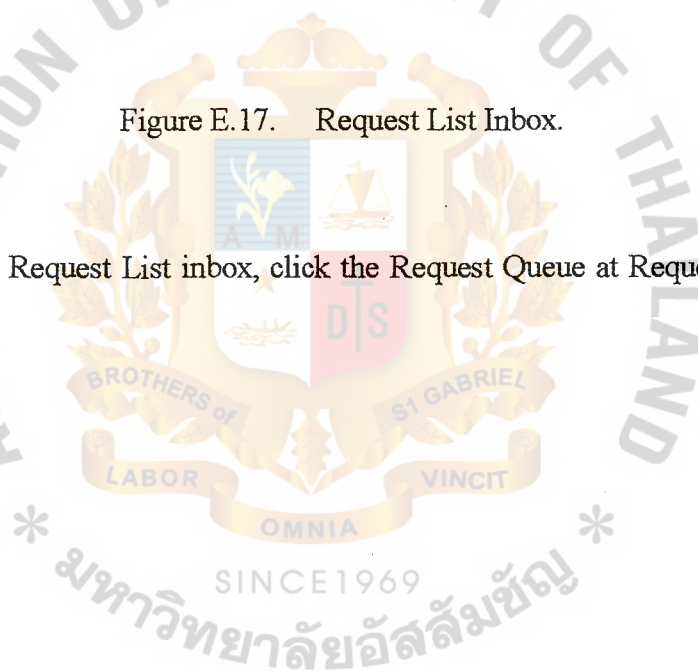
Opening a request ticket for a request creates a record that can be used to track the progress of the request response.

Request List by Request ID : Form

R001	C004	22/11/01 21:30:04	OPEN	SI	Need SI staff to d
------	------	-------------------	------	----	--------------------

Figure E.17. Request List Inbox.

To access Request List inbox, click the Request Queue at Request Management Home Menu.



Problem Report Search : Form

1	
---	--

Figure E.18. Request Report Basic Search Tab.



[illegible]

Figure E.19. Request Report Advanced Search Tab.



Request Ticket Record : Form

<div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div> </div>		<div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div> </div>	
R001		22/11/01 21:30:04	
C004		22/11/01 21:30:04	
NAKORN	CHERDRUM	OPEN	
228		SI	
nakorn@koam.co.th		RATTAPOP	
GOVERNMENT PROJECT		SOMSACK	
Need SI staff to collect user requirements on immigration project		HIGH	
		NONE	

Figure E.20. Request Ticket Record Form.

This Request Ticket Record can be accessed by using Request List inbox or Request search menu.



Inventory Management : Form

470020-240

PRESARIO 4

COMPAQ

18/11/98

18/11/99

D001

PC

Figure E.21. Inventory Management Form.

Inventory Management helps Help Desk staff keep track of the hardware and software in the network. Help Desk staff can also create inventory records with Inventory Management. This allows him to add new devices or software to the inventory database.

Help Desk staff can also search for a specific record or a set of records by entering Asset ID, or a type of hardware.



CONFIRMATION SHEET		
User Name:	Department:	
Contact No.:	Fax:	E-mail:
Staff Name:		
Contact No.:	Fax:	E-mail:
Problem:		
Solution:		
Problem <input type="checkbox"/> Solved <input type="checkbox"/> Unsolved		
Request:		
Response:		
Request <input type="checkbox"/> Complete <input type="checkbox"/> Incomplete		
Please check in the box below and fax or mail this form back to Help Desk staff at the e-mail address or fax number shown above. Thank you.		

Figure E.22. Confirmation Sheet.



Call Report  
Ranked by Call ID

For the Month Ending August 31, 2001

Page 1 of 1

Call ID	Open Date	Open Time	Reported By	Staff ID	Current Status	Severity	Assignment
C001	1/8/01	0:00	xxxxxxxxxx	xxxxxxxxxx	Closed	Low	SI
C002	1/8/01	0:00	xxxxxxxxxx	xxxxxxxxxx	Open	Moderate	Network
C003	1/8/01	0:00	xxxxxxxxxx	xxxxxxxxxx	Open	High	Hardware
C004	2/8/01	0:00	xxxxxxxxxx	xxxxxxxxxx	Closed	Low	Network
C005	3/8/01	0:00	xxxxxxxxxx	xxxxxxxxxx	Open	High	SI
C006	4/8/01	0:00	xxxxxxxxxx	xxxxxxxxxx	Closed	Low	Hardware
xxxxx	xxxxxx	xxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx	xxx	xxxxx
xxxxx	xxxxxx	xxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx	xxx	xxxxx
xxxxx	xxxxxx	xxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx	xxx	xxxxx
Currently Open					9,999 Calls		
Closed					9,999 Calls		
Total					9,999 Calls		

Figure F.1. Call Report.

# Problem and Solution Report Ranked by Problem ID

For the Month Ending August 31, 2001

Page 1 of 1

Problem ID	Problem	Solution	Assignment	Specialist ID	Call Status
P001	xxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxx	SI	xxxxxx	Open
P002	xxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxx	Network	xxxxxx	Closed
P003	xxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxx	Hardware	xxxxxx	Open
P004	xxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxx	xxxxxx	xxxxxx
P005	xxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxx	xxxxxx	xxxxxx
P006	xxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxx	xxxxxx	xxxxxx
xxxxxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxx	xxxxxx	xxxxxx
xxxxxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxx	xxxxxx	xxxxxx
xxxxxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxx	xxxxxx	xxxxxx
Currently Open			9,999	Problems	
Closed			9,999	Problems	
Total			9,999	Problems	

Figure F.2. Problem and Solution Report.

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THAILAND

Figure F.3. Request and Response Report.



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3. อำไพ พรประเสริฐสกุล. การวิเคราะห์และออกแบบระบบ. กรุงเทพมหานคร: ศูนย์เทคโนโลยีอิเล็กทรอนิกส์และคอมพิวเตอร์แห่งชาติ, 2540.



**KOAM International Consulting (Thailand) Co.,Ltd.**

16 July 2001

To Whom It May Concern :

This letter is to certify that KOAM International Consulting (Thailand) Co.,Ltd. Has no objection that Miss Waralee Hongnoi is developing a KOAM Help Desk System for her project at Assumption University.

Sincerely yours,

Bang Oh Won  
President



**St. Gabriel Library, Au**