Technical Support Information System for Internet Service Provider

By

Ms. On-amon Taksavanitcha

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
Assumption University

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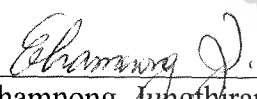Assumption University

November, 1998

Project Title	:	Technical Support Information System For Internet Service Provider

*The tittle has been changed according to the final approval the committees

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Project Advisor	:	Dr.Sming Chungviwatanant
Academic Year	:	1998

The Graduate School of Assumption University has approved this 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.

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ABSTRACT

The most important department in the service company is the customer service department. The Internet Service Provider which is one of the service companies will provide their excellent service to support their customer. Asia Infonet separated the customer service division into two departments. First, the Customer Relation is mainly concerned with subscription process and second the Technical Support which is responsible for solving all kinds of technical problems for members. The organization found that the technical support department has a lot of problems regarding work flows, the redundant work and spend a lot of time making manual reports.

The proposed system is designed to solve the problems found in existing system. Actually, the department has almost enough hardware and staff but the resources of the department are not productivity. The system need some software to produce input data and output report faster and some staff may transfer to work in other section for more productivity. The cost of investment is not much and the break even point will be within one year. The implementation phase will be run parallel with the manual system. This phase is the most difficult step of developing, simulation run established, the management will select the staffs to be the representatives in all functions in the system. The input and output will be designed by using Microsoft Access 97. The user will try to input data and make output report. They will identify that the designed screen and output report cover all their needs or not.

The achievement quite meets the user requirements. Actually, the proposed system is suitable to use in short term. In the future, if the organization grows continually, the management will consider for a more effective and higher performance system.

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1.1 Background of the Project.

Internet came into use in the 1980s to describe the global, interconnected, heterogeneous network that continues to grow in size and geographic coverage. It all began in 1969 with a project of the U.S. Department of Defense called ARPAnet which linked computers at universities and within the U.S. to facilitate research. Today the Internet is a "top level" network, linking together many smaller networks worldwide.

To access the Internet, every user must have an account (user-ID) on a host computer.' So there are many Internet Service Providers (ISP) serving you to access the Internet by subscribing with them. Then you can get an account to use the Internet.

Asia Infonet Co.,Ltd., is also an ISP in Thailand which is the subsidiary company of TelecomAsia Group. It is a joint venture between the Communications Authority of Thailand and Telecom Holding Co.,Ltd. Asia Infonet is responsible for rendering Internet service (Internet Service Provider), linking users' computers to Internet networks with Full Graphic i.e. to access information through Internet in the forms of text, graphics, and sound simultaneously.

Asia Infonet Co.,Ltd., as an Internet Service Provider recognizes the importance of customer service and technical support as the key elements of the organization. The technical quality and service quality bring impact to our product, services and image of the whole group. Mainly, the technical support department provides services for both direct contact and incoming calls by the customers. So, quality that satisfies customers will achieve company's goal of being one of the best ISP in Thailand.

To fully support customer service and technical support, the company has to review the flow of serving customers and the sufficient technique to support in solving customers' problems as soon as possible. The after sale-service job function is responsible by Customer Service Department which can be separated into two work sections.

1. Customer Relations : mainly obliging for subscription process and providing details of organization and promotions.

2. Technical Support : solving all kinds of technical problems for members either via incoming calls or direct contact.

However, the customer service (especially the technical support section) doesn't seem to perform its job properly and sufficient as to the company is getting more and more complaints from the customers everyday. The reproaches come up with many reasons and the company has to solve the crisis immediately.

This project will help design and simplify the information flow in the organization, reduce paper work by utilizing Client/Server computing model with graphical user interface (GUI) to collect the problems and complaints which also synthesize data to report. Then, the management team will find the easier way to solve the company's problems.

Asia Infonet Co.,Ltd. has a plan to leverage its services to provide premium service quality and reasonable expense as business strategy, so the company has planned new strategies of technical support as under :

- To provide customer quick services.

- To improve existing services procedure

- To ensure customer satisfaction

- To increase revenue from customer direct contact

So, management has designed and set up the technical support section to perform a proper job as soon as possible which are :

- Organize customer database for verifying and recording

- Support all customers' problems

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- Keep track of problem status
- Reduce technicians' paper workload
- Produce required statistical report for management

1.2 Objectives of the Project :

Objectives of the project on Technical Support Information System are as follows :

1. To design and simplify information flow in organization that will not only develop work flows of technical support itself, but also process of assisting customers.

2. To search for more computers which are substantive in working process of Technical Support.

3. To organize database by applying Microsoft Access in order to verify and record the company's customers.

4. To utilize Client/Server computing model with graphical user interface (GUI) to collect daily incoming problems and complaints which can also be synthesized data for monthly report.

1.3 Scope of the Project :

The project on Technical Support Information System will cover all major functions of technical support department which includes :

1. Record the daily problems and system defections and summarize the valid customer's problems and the system defections.

2. Record and advise customer's problems which will help management to plan for the better system and software to support customers in the future.

3. Record system defections from network development and summarize to propose to management for planning for the new ways of network developing.

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4. Customer charges memo to Finance department which the Finance Department will bill to customers and summarize the revenues that comes from customer.

1.4 Project Plan

Since there are many parts to develop, this system development project took time to complete as represented in Gantt Chart as follows : -

ID	Task Name	Duration
1	**Preliminary Investigation**	**14 days**
2	-Study existing system	5 days
3	-Investigation Users Requirement	5 days
4	-Define the objectives and scope	4 days
5	**System Analysis and Design**	**28 days**
6	-Design the proposed system	7 days
7	-Develop a context diagram	2 days
8	-Develop data flow diagrams	5 days
9	-Develop data dictionary	3 days
10	-Design the process specification	4 days
11	-Design input screen	4 days
12	-Design output report	3 days
13	**Identify system platform**	**14 days**
14	-Identify Hardware requirement	7 days
15	-Identify Software requirement	7 days
16	Cost and benefit analysis of the proposed system	7 days

Timeline months: May, June, July, August, September, October, Novem
Week columns: 27 | 4 | 11 | 18 | 25 | 1 | 8 | 15 | 22 | 29 | 6 | 13 | 20 | 27 | 3 | 10 | 17 | 24 | 31 | 7 | 14 | 21 | 28 | 5 | 12 | 19 | 26 | 2 | 9

Project: On-Amon
Date: Wed 3/8/98

Legend:
- Task
- Split
- Progress
- Milestone
- Summary
- Rolled Up Task
- Rolled Up Split
- Rolled Up Milestone
- Rolled Up Progress
- External Tasks
- Project Summary

Figure 1.1 Gantt Chart

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ID	Task Name	Duration	May 27 4 11 18 25	June 1 8 15 22 29	July 6 13 20 27	August 3 10 17 24 31	September 7 14 21 28	October 5 12 19 26	Novem 2 9
17	System Implementation	10 days							

Task

Split

Progress

Milestone ◆

Summary

Rolled Up Task

Rolled Up Split

Rolled Up Milestone ◇

Rolled Up Progress

External Tasks

Project Summary

Figure 1.1 Gantt Chart

Project: On-Amon
Date: Wed 3/8/98

II.   EXISTING SYSTEM

2.1   Background of the Organization

Asia Infonet Co.,Ltd., is an Internet Service Provider in Thailand linking users' computers to access information through Internet . The company tries to serve and satisfy all users by providing many kinds of internet services and solutions.

Since Asia Infonet has provided Internet access to individual subscribers, they can select the appropriate package which is divided into 3 types :-

1. Monthly member
2. Debit hours service
3. Instance package

In addition to providing Internet access to individual subscribers, Asia Infonet also provides corporate links for companies that need to connect to the Internet through Leased Line. The Leased Line connection will allow a company to connect to the Internet according to customer's needs. Virtual Domain is our new service for organization or corporation which requires internet service in searching business related information or E-Mail at lowest cost. It is a service allowing customers to access Internet through an equipment called WebRamp (Dial up via WebRamp), by using WebRamp, modem and direct telephone line. The other service is providing advertisement space to let with both Homepage and Banner for publicity purposes.

Asia Infonet Co.,Ltd., is a company of medium size which is divided into departments as follows : -

1. Board of Directors.
    - Attain the Board of Directors Meeting
    - Acknowledge the company's proceedings
    - Give suggestions in company business proceeding
2. President
    - Set up Company's policy
    - Plan the company's proceedings with management team.

3. General Manager

   - Set up Company's policy

   - Plan the company's proceeding with management team.

   - Evaluate and inspect all employees' operations.

4. Channel Marketing

   - Analyze the competitors' situations, market change and economic crisis.

   - Set the company's objectives and awareness of the organization.

   - Create new channels to expand the company's products and services.

   - Holding exhibitions and activities.

   - Initiate promotions increasing the selling numbers of services and products.

5. Corporate Sales Division

   - Increase numbers of corporate users

   - Take care of corporate subscribers.

6. Business and content development.

   - Creating and updating company homepage.

   - Developing business content and database to serve our customers.

7. Customers Services

   - Customer relations - mainly obliging for subscription processes.

   - Technical Support - solving all kinds of technical problems for members.

8. Technical and Network Operation

   - Develop and maintain the system and network.

9. Finance and Accounting

   - All the accounting concerned.

10. Human Resources and General Affairs.

    - Take care of employees' affairs.

Asia Infonet Co.,Ltd.

Jan. 1, 1998
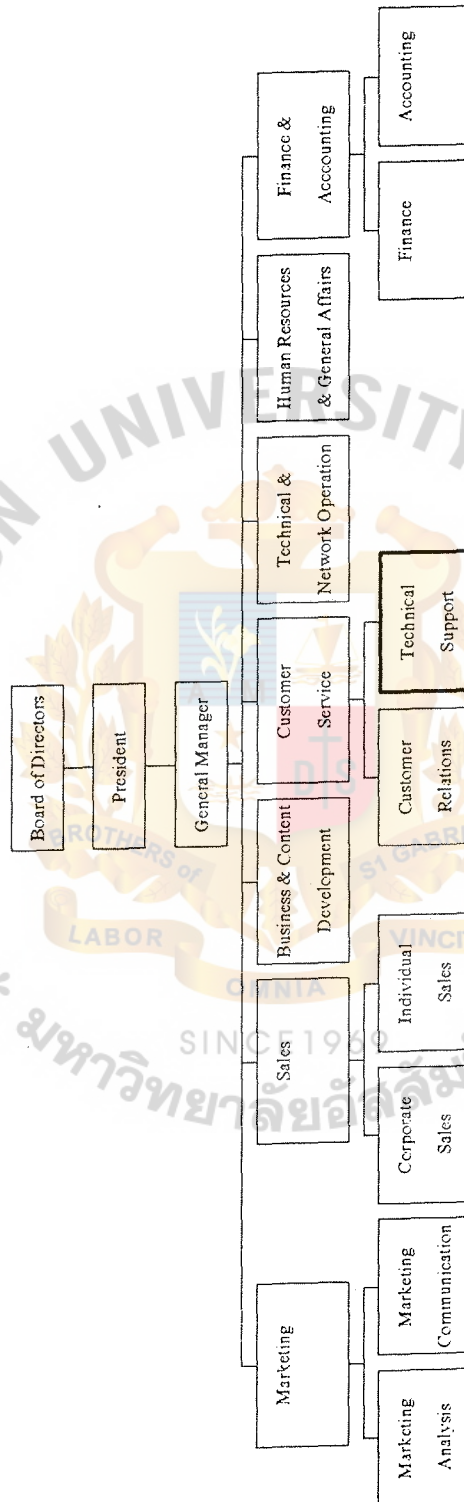
Figure 2.1. Organization Chart

2.2   Existing Business Function

Since Internet is a new communication technology in Thailand, most Thai customers have little background. They sometimes need help from ISP to support them for installing Internet program.   So the expert technical staffs and proper services are needed.

The technical support section of Asia Infonet is one of the sections in Customer Service Department. Technical Support is responsible for solving all kinds of technical problems for customers either via incoming call and direct contact. The technical support is composed as follows :-
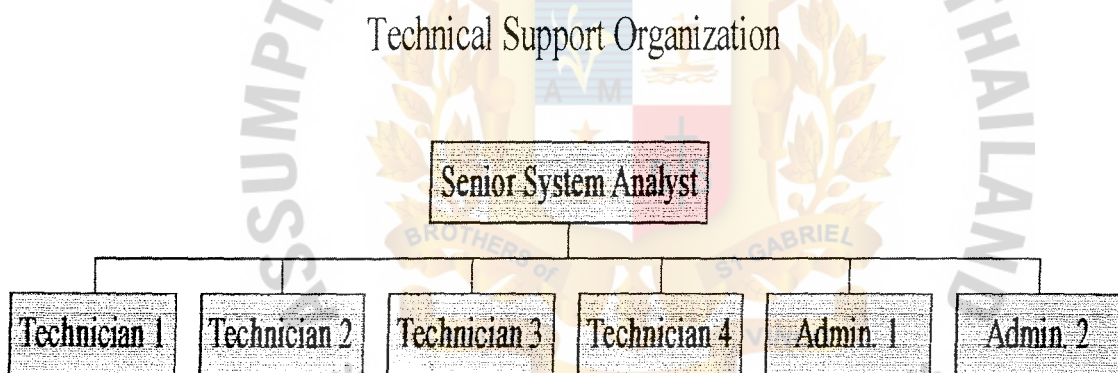
Figure 2.2.   Technical Support Organization

The current system of technical support staff is waiting for incoming calls and direct contact. The staff will ask about the problems that occur to the users and try to solve their problems. If sometimes they cannot solve the problem, they will take a note and promise to call back. After the shift of the working day, they have to summarize the problems into a paper and send to senior system analyst.

In case that the customers bring their PC's to the counter, the technicians check and set some required programs until the PC's are ready to use. The company serves this for free of charge.

The technicians have to do their daily report, and send to the senior SA to summarize in weekly reports and monthly reports to propose to management. These are all manual work.

2.3   Current Problems and Areas of Improvement

The technical support section is one of the important sections in customer service department. The main job is solving all kinds of technical problems for members either via incoming calls or direct contact.

However, the technicians do not seem to perform its job properly and sufficiently. The company has been getting more and more complaints from members and customers everyday. The reproaches come up with these following issues.

1. Internal Miscommunication : technician can not solve customer's problems accurately due to slow information flow in the company - For example the problem with the telephone lines for connection. Sometimes, the lines are busy and customers cannot connect. The customers call and complain. The staff find out that the cause is due to the testing of PCT system which TelecomAsia should inform before the test. This will effect to our network also, so TA have to inform to our technical and network operations and then send some messages to technical support section.

2. Not enough computers and technical staffs - one third of computers use for doing reports and one third of staffs are administration staff. So technical staff will be assisted more effectively, if technical staffs have more computers to go step by step with customers.

3. Do not have any program to support writing reports - as too many reports are written each day, the company should create some GUI to help technicians to write the reports. Nowadays, staffs take much time to keep data of customers' complaints by writing in daily report forms, weekly report forms, and summarize in monthly reports for the management team.

4. Customer Database Access - databases of callers help the staffs verify the customers and find out solutions for customers easier, faster, and more specificly assisting only Asianet's customers which will be save time.

5. No feedback to caller - often the staffs cannot solve customer's problem, they take note and promise to call back but they forgot. This should be recorded on the system so they can check the pending question and find the way to solve and call back.

6. Some Unconsidered Customers - there are increasing numbers of subscribers that bring in their computers to install games and unnecessary programs, or even, want to learn how to surf the net, without any consideration of other customers who are waiting to fix their computers.

7. Retroactive Management - if management notices how serious these problems are and starts to gather complaints and information, then find out causes, solutions, and group systematic problems, the service of the company will be better to keep its current customers.

With the new system analysis, the company can solve the crisis described above immediately, their repercussion problems that surrounds the company will also be resolved correctly from the causes such as customer's satisfaction problems, problem of low and decreasing number of new and current subscribers, or technical supports and system problems.

2.4 Existing Computer Information System

The technical support department has six computers that connect to the LANs with IP Address assignment, four computers are also connect to 28.8, 33.6 and 56 kbps. modems and telephone lines for each one. The computers have Microsoft Windows 95 with Microsoft Office 95, Internet Explorer version 4.0 and Netscape Navigator, installed.
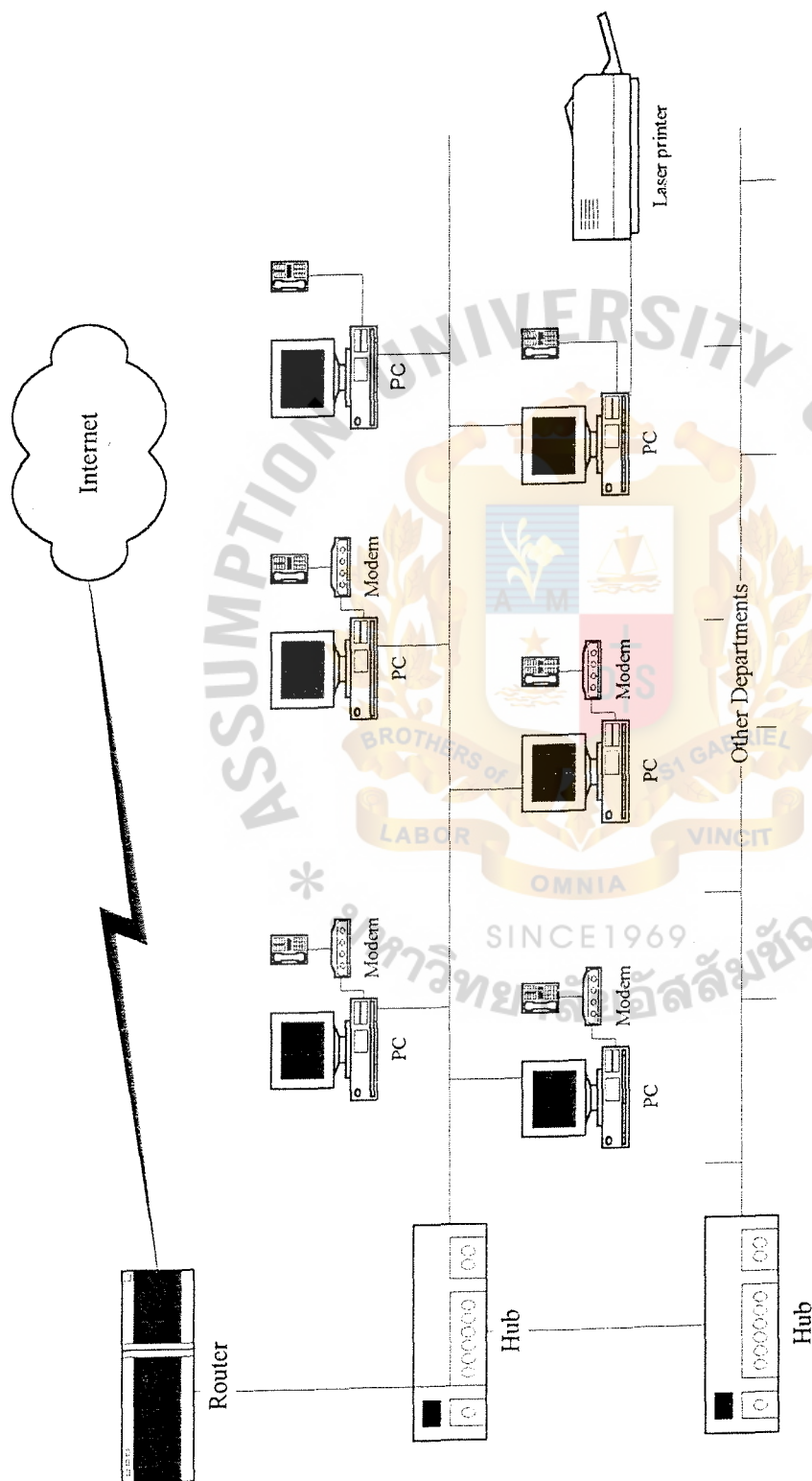
Figure 2.3.   Technical Support Existing Network Configuration

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III. PROPOSED SYSTEM

3.1 User Requirements

Conceptual requirement of the new system

The objective definition of the new system requirements is to assemble an overall picture of inputs, outputs, operations, and resources required by the system to meet the present and future needs of the organization. There are activities and improvements that new system will provide. After analyzing existing system, the new system requirements or objectives are defined as follows:

1. To improve customers' satisfaction.
2. To provide customer service training and technical support knowledge.
3. To set up internal message flow.
4. To reduce overall operating cost of administrative staffs such as paper/ documentation, redundant work, etc.
5. To be able to produce management reports for better decision making.
6. To provide customer database for technical support staffs to find out solutions easier, faster, and more specificly assisting only Asianet's customers.
7. To reduce human errors which may occur and lead to waste of time and money.

Information required from users

1. Internal early informed message. Technical Operations should informed our network or system defection to all departments especially customer service and technical support. Since customer service and technical support are the first departments that face the customers directly, they should get the information before customers. The technical operations will transfer system defections to technical support by e-mail. The senior system analyst will be responsible for checking e-mail and answering Internet problems via e-mail. After getting system defection problem from technical operation this

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senior system analyst will update information into system defection file and input the occurance date, the date of improvement and the solutions. If the system defection is about Internet link down, the technical operation has to informed the data of improvement to technical support and customer service for answering to the customers.

2. There are six computers that are used in this department and divided into two main jobs. Four of the computers are used for technical support for answering problems and help in solving step by step with customers and demonstrate log on for testing speed of the Internet. The last two computers are used by administrative staff for making reports to senior system analyst and then he/she will summarize and propose to management team. Actually, the computers and the staffs are enough and correspond to the number of current subscribers but the job function is redundant. The technical support staff can do reports by themselves if they have suitable system to support them and the administrative staff also can do the technical support jobs, if he/she got some training. If we do recognize this technical support department, there will be development cost of new software or program only. The number of disconnection of existing subscribers will decrease and the number of new subscribers will increase because they will get better service. The new organization of the proposed system is shown as follows :-
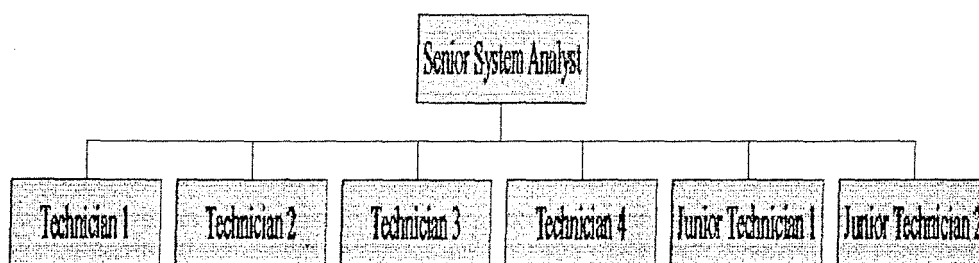
Figure 3.1. Technical Support Proposed Organization Chart

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3. To eliminate redundancy and reduce paper work, the system will develop the client/sever computing model by applying Microsoft Access to collect daily incoming problems and complaints which can also be synthesized data for and urgent report and monthly report.

4. The new system will be organized in Microsoft Access in order to verify and record the company's customers. The system will verify the customer's name matching with the login name. This is an advantage for the staff to save time to assist only Asianet's customers. The record will be transfered to a report for management team.

5. Technicians will get pending assisting customers' list at the end of the day and call back one by one to clarify the customers' problems. This will reduce dissatisfactions among our customers.

6. Some customers who bring their computers for fixing at our technical support service counter, normally, request to install some necessary and unnecessary programs, or even, want to learn how to surf the Internet. These services are free of charge. According to the proposed system development project, the accounting will charge the customer for installing unnecessary program which will increase income for the company. Customers will also considered that the program are costly. The other customers who are waiting for their turn will not waste their time also.

7. The management who would like to get the report, will get them as soon as they want. The system will gather all complaints and information for management and they will notice how serious these problems are and will find out the solutions urgently for keeping its current customers.

3.2   System Design

The new system is designed by studying user requirements. It is considered that the old system is not capable enough for the organization. A summary of the business activities obtained from user requirements and management team and overview of the entire system is represented by context – level data flow diagram in figure 2. Since the system have to keep track the numbers of problems, all details and all kinds of system defection, the external entity customer and technical and network operation have many data flow to and from them. The system has to inform service charge to customers so the designed system propose to add financial department entity to collect payment from customers. The management also requires report from the system, so the system is designed for generating reports to propose to management as soon as they need it.

Data flow diagram level 0 depicts the major activities for the technical support information system. Each process is analyzed to determine the data required and the output produced. Process 1, VERIFY CUSTOMER PROBLEM; the CUSTOMER entity is represented for calling for technical help which the input information needed is customer login ID which would be matched with the real name in the database. Then PROBLEM file is used to store problem information until it is summarized into a report. Process 2, ADVISE CUSTOMER, this process needs the entity, TECHNICAL & NETWORK OPERATION, to inform system defection information for an advised reference. If any new system defection occurs, the technical support will inform back to technical and network operation for further process. In case that customer contact at our front office counter and any extra software has been installed or set up, customer charge needed will be informed to FINANCIAL DEPARTMENT entity. The unsolved problem will be kept in problem file and gather all kinds of problems for, PRODUCED SUMMARY REPORT to process and to propose to MANAGEMENT. Then gather unsolved problems to CALL BACK, and this process needs information from entity TECHNICAL AND NETWORK OPERATION, that will inform solved problems to be information in advising customers in call back process.

Data flow diagram level 1 of process 1 depicts the sub-activities of data flow of level 0 of process 1. The first process represent to VERIFY CUSTOMER'S LOGIN ID, which needs entity CUSTOMER to inform his/her login ID, for matching with the CUSTOMER RECORD file. If the told name matches with the database, the next process is CHECK CUSTOMER STATEMENT. This process requires the information statement data file for checking customer statements, then inform the customer. Process 1.3 is represented as RECORD CUSTOMER'S PROBLEM. This process has entity CUSTOMER to inform the problem. The system record customer's problem after the customer has verified the statement and inform the customer if any statement is overdue, then do the next process. The system record the customer if any statement is overdue, then do the next process.

Data flow diagram level 1 of process 2 depicts the sub-activities of data flow diagram level 0 of process 2. The first process is RECORD SYSTEM DEFECTION. This process needs TECHNICAL & NETWORK OPERATION entity to inform system defection to record in Process 2.1 RECORD SYSTEM DEFECTION into SYSTEM DEFECTION file. The next process 2.1 ADVISE CUSTOMER, this process needs data store file name, SYSTEM DEFECTION for retrieving information and solution to advise customers. The data store file PROBLEM has been retrieved for considering the way to solve that problem and advise information will be kept in the ADVISE RECORD file for being history. If it cannot advise customers, then inform the problem that might be system defection problem to TECHNICAL & NETWORK OPERATION for finding the solutions. The next process is SET UP SOFTWARE, this will be done in case that customers contact directly to our customer service counter. The technical support staff will check customers' PC and if any program needed to be installed, technical support staff will inform the customer. Technical support staff request the customer to fill in set up software form, then install for customer. After set up, the staff will record software set up in SET UP SOFTWARE file to be in customer's history. Technical support will inform software set up charge to FINANCIAL DEPARTMENT for issuing invoice to customers.

Data flow diagram level 2 of process 2 depicts the activities in lower level of process 2. Process 2.2.1, CHECK SYSTEM DEFECTION requires data file, PROBLEM

file, and SYSTEM DEFECTION file for checking whether the problem is related to our network system or not. Then advise to entity CUSTOMER and record advice evidence into the ADVISE RECORD file. If the technical support staff is not sure whether the problem is about system defection or not, inform TECHNICAL & NETWORK OPERATION for further verification. If the technical staff check that it is not a system problem then do the process, CHECK CUSTOMER CONFIGURATION. This process, technical staff check the configuration in customer PC and advise customer to correct, then record advisory into the ADVISE RECORD file. If the problem is not related to the mis-configuration problem then do the process, CHECK CUSTOMER APPLICATION. This process, technical staff has to check application in customer's PC and advise customer to correct them, then record in the ADVISE RECORD file. If the problem is not the application problem, then the problem will be an unsolved problem and kept into PROBLEM file and follow with the process, CALL BACK.

Data flow diagram level 1 of process 3, shown in figure 12 depicts the activities in the process CALL BACK of data flow diagram level 0. First, the process 3.1 LIST CUSTOMER HAVING SYSTEM PROBLEM will list the pending unsolved problem from file PROBLEM and require external entity TECHNICAL & NETWORK OPERATION to inform solved problems and solutions for advising. The next process is ADVISE which requires list of customer's login ID, customer's problem and advise information from ADVISE RECORD file. The process also requires phone number in CUSTOMER RECORD file and a call to the customer who had pending problems, then advise them and record in ADVISE RECORD file.
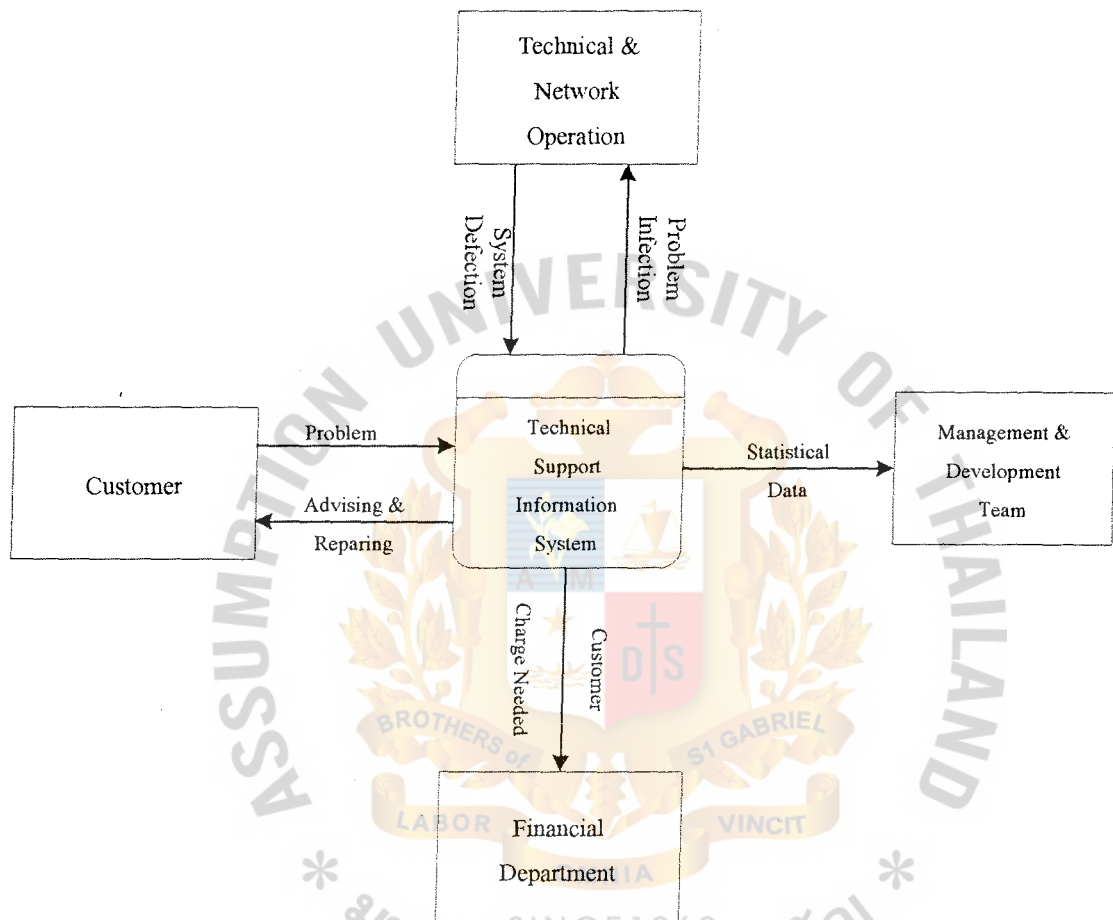
Figure 3.2.   Context Diagram of Proposed System
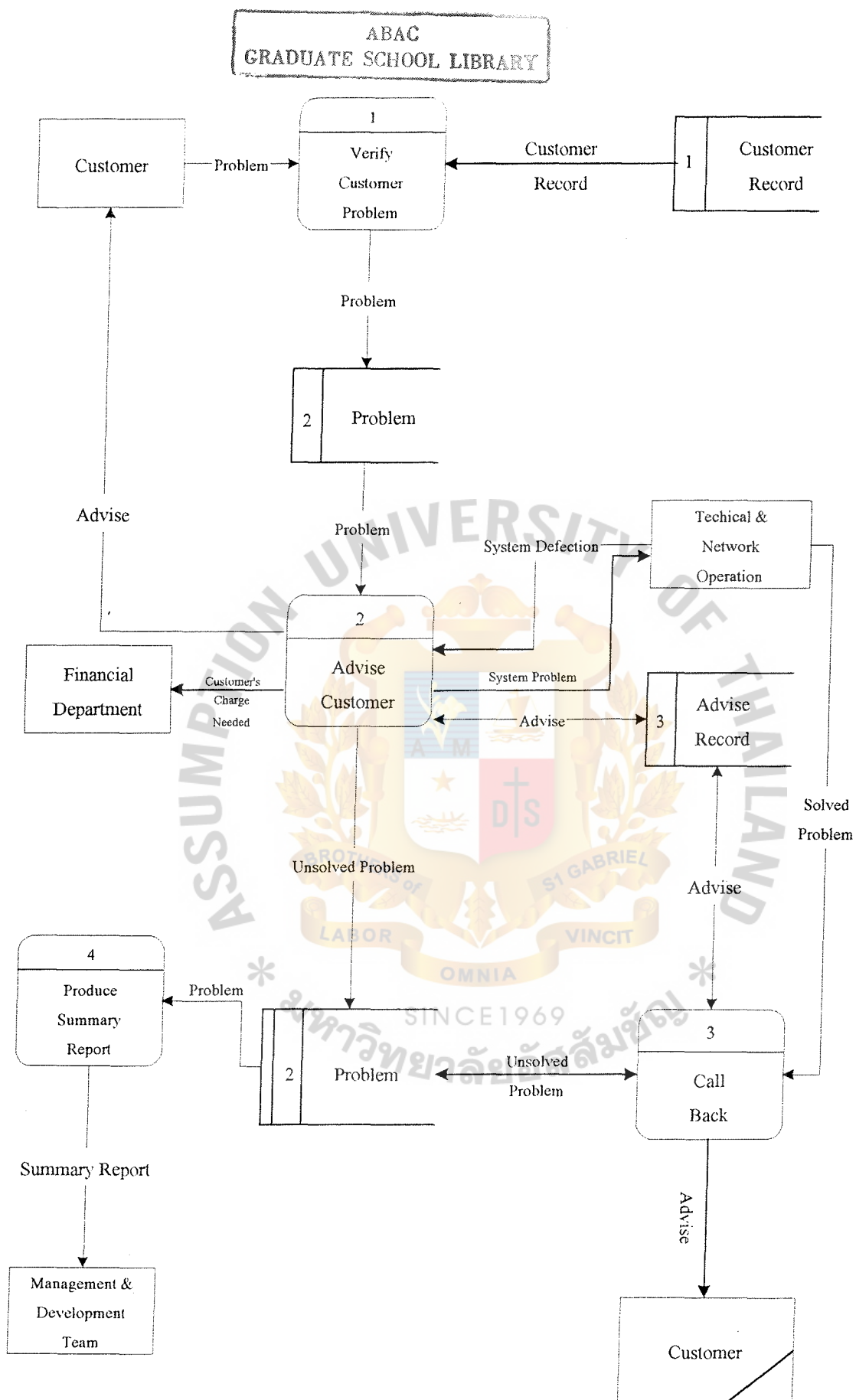
Figure 3.3. **Data Flow Diagram Level 0**
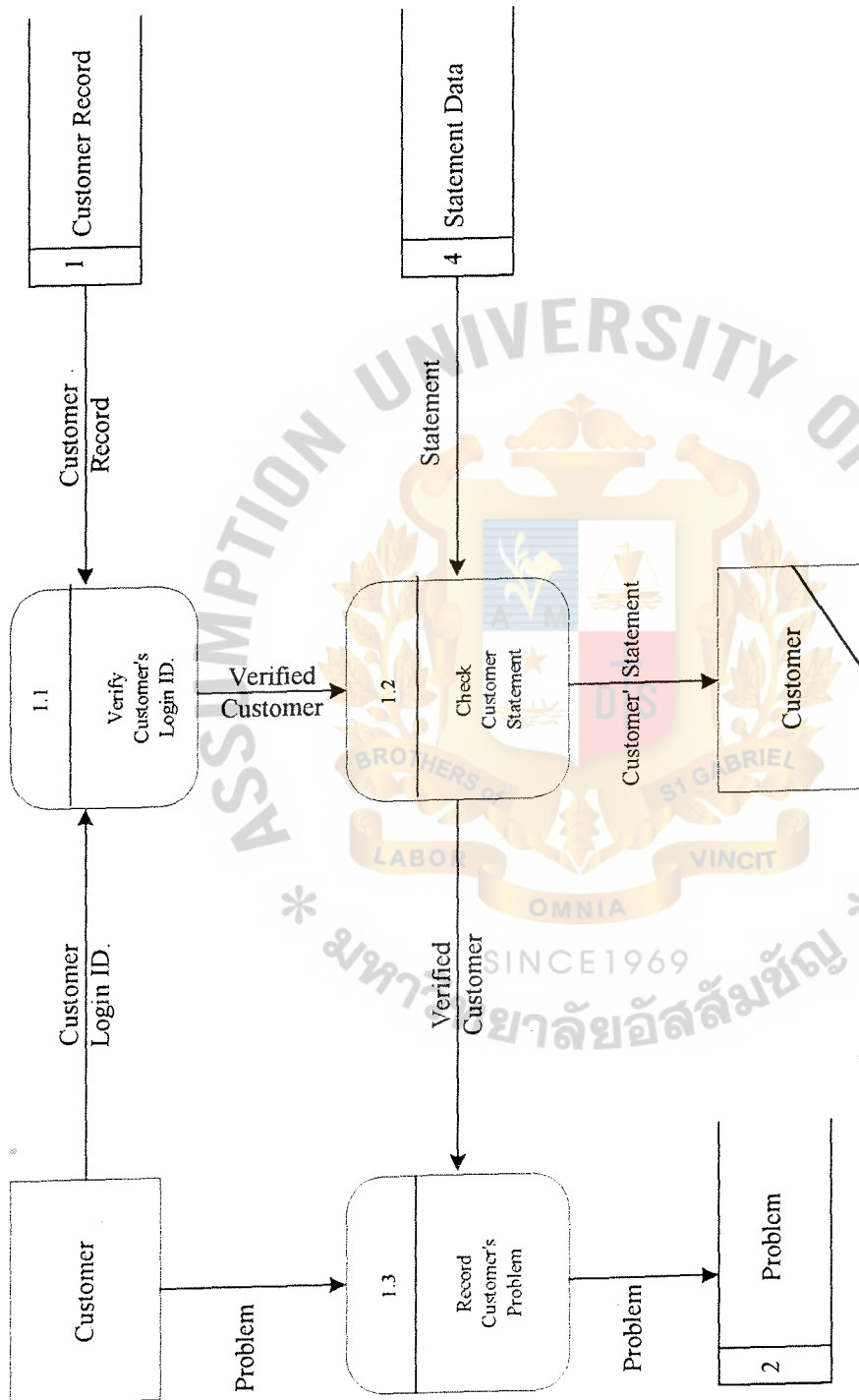
Figure3.4. Data Flow Diagram Level 1 of Process 1

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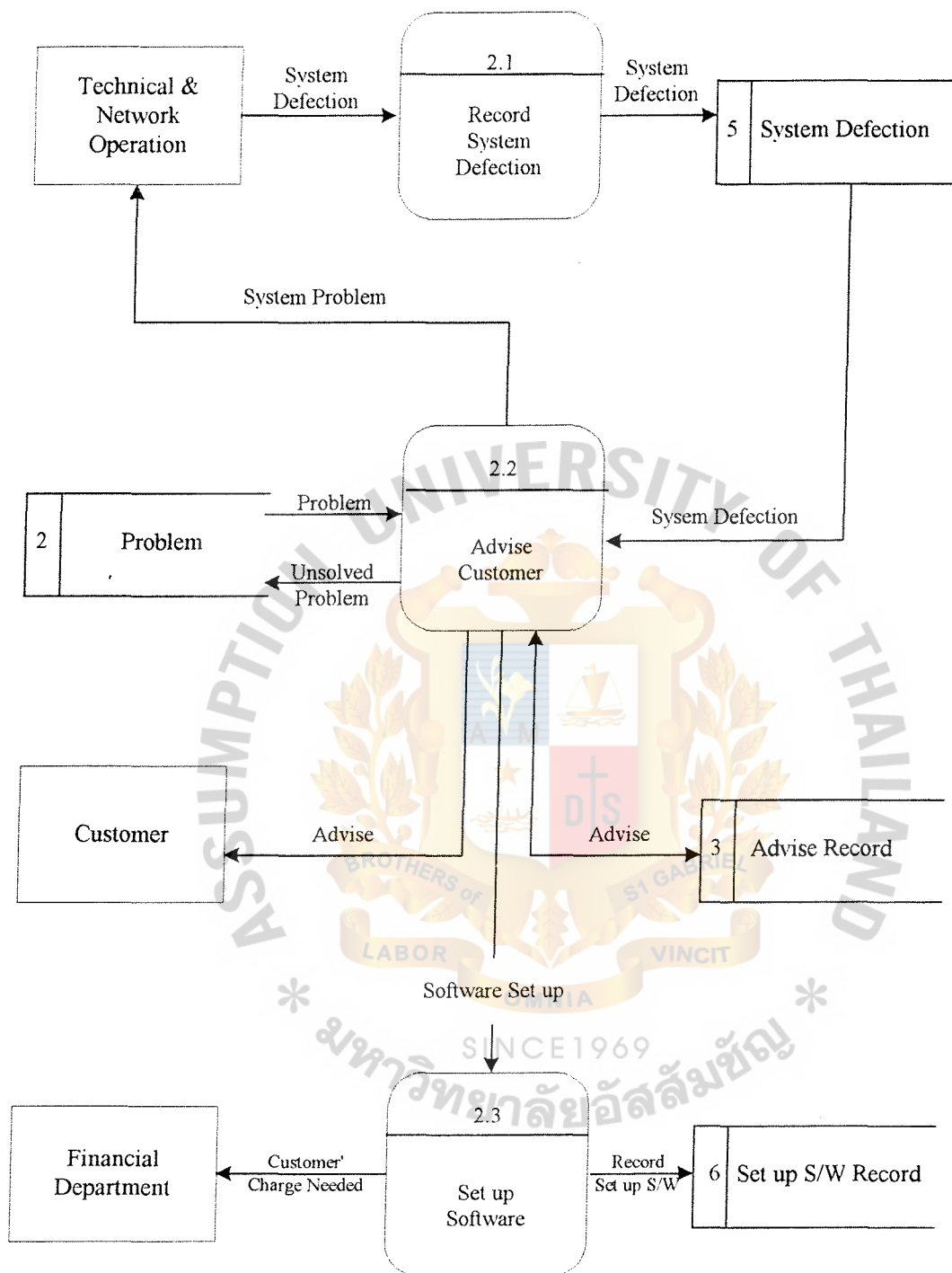
Figure 3.5.   Data Flow Diagram Level 1 of Process 2
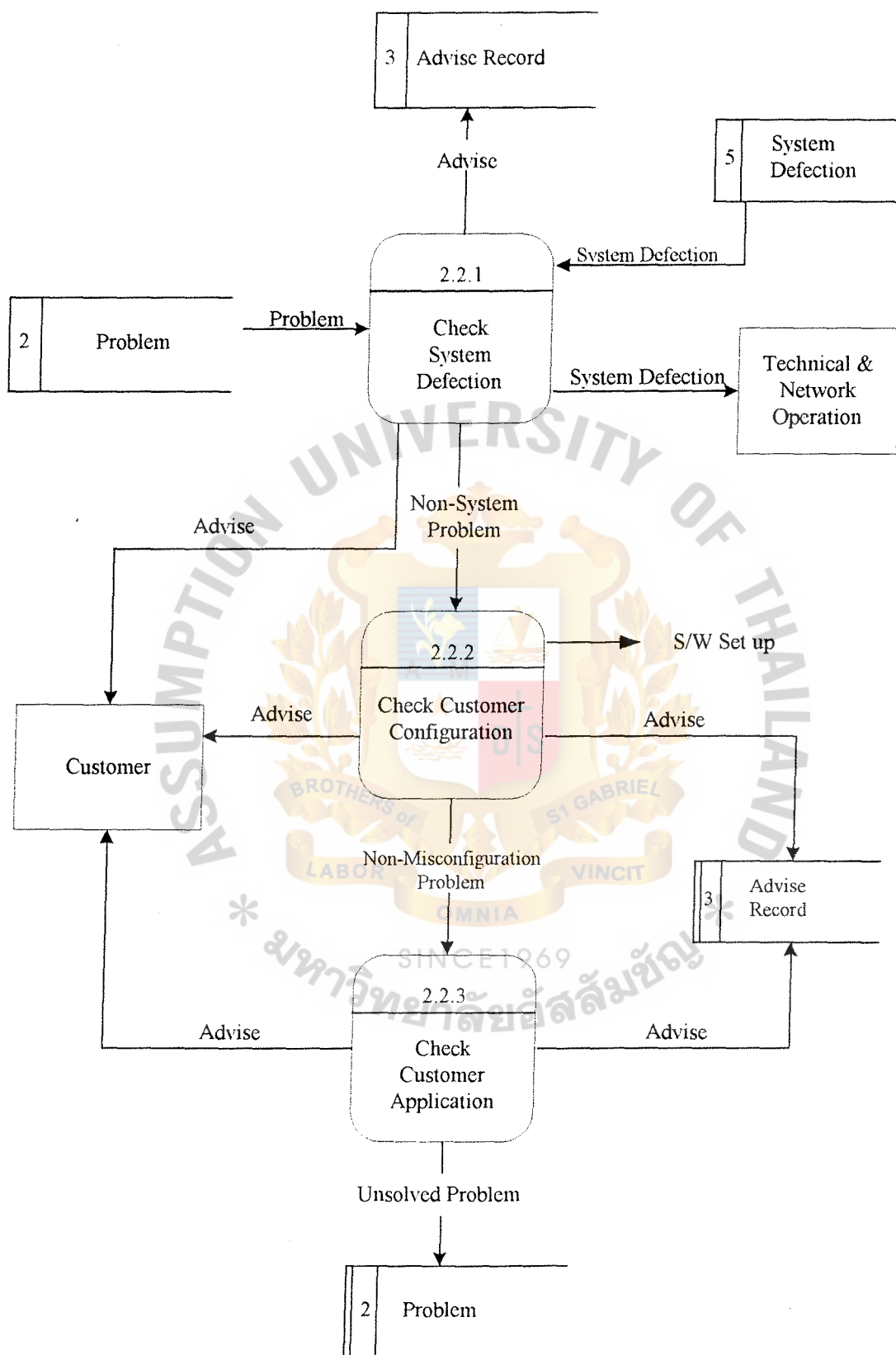
Figure 3.6. Data Flow Diagram Level 2 of Process 2
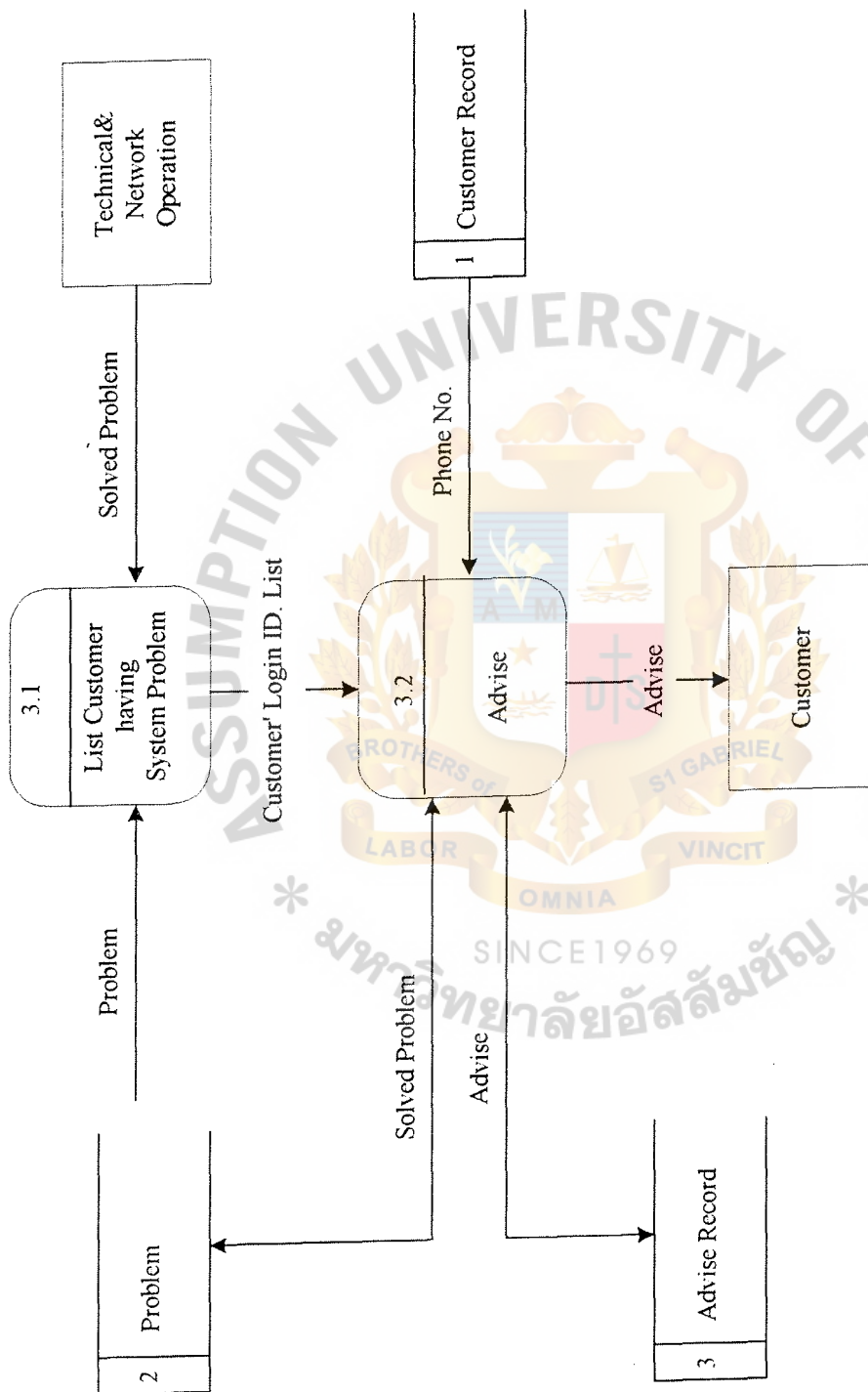
Figure 3.7. Data Flow Diagram Level 1 of Process 3

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3.3 Hardware and Software Requirements

The existing technical support department has six PCs that are already connected to the LAN system with IP Addresses. All of the PCs are sufficient to utilize in the proposed system. The PC's memory is enough to add new software and it does not need to upgrade or add any hardware. Additional hardwares are modems for administrative staff who will be junior technical support staff after training for the technical course. The requirement of software is Microsoft Access.

Hardware requirement :

    External Modem :   56 Kbps.   2   sets

Software requirement :

    System Development Software :   Microsoft Access 97   6   licenses
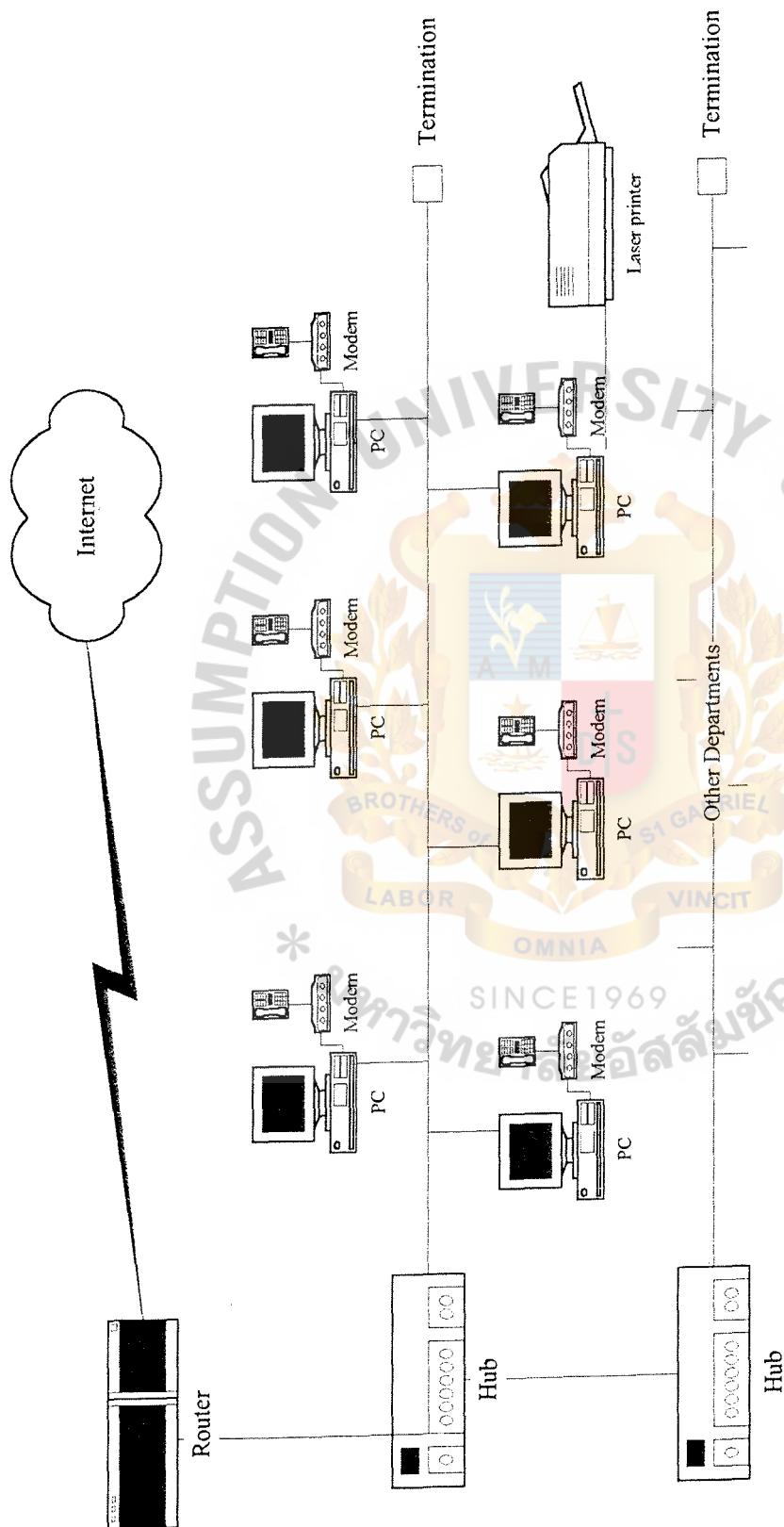
Figure 3.8. Technical Support Proposed System Network Configuration

3.4 Security and Control

In terms of security, computing is very close to the wild west days. At some installations, computer and their data have been recognized as a valuable and vulnerable resource, and appropriate protection has been applied.

The computing system is a collection of hardware, software, storage media, data and persons that an organization uses to do computing tasks. Insecurity, an exposure is a form of possible loss or harm in a computing system; examples of exposures are unauthorized disclosure of data, modification of data, or denial of legitimate access to computing. A vulnerability is a weakness in the security system that might be exploited to causes loss or harm. A human who exploits a vulnerability perpetrates an attack on the system. Threats to computing systems are circumstances that have the potential to cause loss or harm; human attacks are examples of threats, as are natural disasters, inadvertant human errors, and internal hardware or software flaws. Finally, control is a protective measure – an action, a device, a procedure, or a technique – that reduces a vulnerability.

As mentioned above, we can consider that security and control are important parts of the proposed system. The system has been designed for software and data security by providing password protection to prevent unauthorized users and allow only authorized users to access or modify the program. The program has also classified users into two levels :-

- Senior System Analyst is user who has accessibility to the database and to security of the system. The job is to maintain the system running properly at all the time. Only this user is allowed to alter the database or maintain data in the master file.
- Technicians and Junior technicians are the ones who are allowed to key in the data and run report. They are not allowed to enter database, to change, or delete the main database.

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For the computers the department use only for technical support staff, passwords will be changed every month. There will be back up copies of the system software.

The scan virus policy is done weekly on Friday. There are existing virus protection software provided by Norton AntiVirus and MCAfee Anti-Virus. UPS (Uninterrupted Power Supply) is an existing hardware used to prevent electronic shock and shortage.

3.5 Systems Cost Evaluation and Comparison

The system cost evaluation and comparison of the Technical support Information system are divided into 3 main categories, which are :

1. Investment Cost

   The existing computer system of technical support department has hardware and software that almost fit to the requirements of the proposed information system. The users require additional hardware of modem and software which is Microsoft Access 97.

   The investment cost is a fixed cost, which occurs only one time at the implementation phase of proposed information system.

2. Development Cost

   The proposed technical support information system is developed by in house programmer. The salary of the staff is also produce cost.

   However, the development cost is a fixed cost, which occurs only one time at the implementation phase of proposed information system.

3. Operation Cost

   The operation cost comes from salary of the administrative and office supplies.

   The operation cost is variable cost, which occurs continuously until the system has already been changed.

   According to the existing business situations, the company has increased the number of individual subscribers for 200, monthly. Unfortunately, the current subscribers also discontinue service about 100 subscribers a month. So the net increase in number of subscribers is around 100 per month. The company has surveyed for the reason of discontinue service, and they discover the reasons divided into 3 main types which can be found in appendix G. The reasons that caused by system and service is around 30% which is responsible by technical support department.

   The discontinuing service of the subscribers is costly and cause the company not being able to meet their target. The discontinuing service cause by technical support department is around 30% of total discontinue service. The proposed system's target is auxiliary increase in number of re-continuing service as the table on the next page.

All costs of the proposed technical support information system are shown as follows : -

Table 3.1.   Costs of proposed Technical Support Information System

Cost	Amount (Baht)
Investment Cost	
Hardware	12,000
* Modem 56 K US Robotics @6,000 Baht	
(6,000 * 2 set)	
Software	84,000
* Microsoft Access 97 @14,000 Baht	
(14,000 * 6 licences)	
Development Cost	
Programmer Salary	24,000
(A programmer salary is 12,000 Baht a month,	
so 1 programmer for 2 months = 12,000*1*2)	
Total fixed cost :	**120,000**
Operation Cost	
Administrative staff salary	32,000
(An administrative staff salary is 8,000 Baht a month,	
so 2 admin.staffs for 2 mths. = 8,000*2*2)	
A4 Paper 5 ream (@80 Baht)	400
Printer Toners	500
Micellaneos Cost	500
Total variable cost : (Baht/Month)	**33,400**

All costs of the existing technical support department are shown as follows : -

Table 3.2.   Costs of existing Technical Support department

Cost	Amount (Baht)
Operation Cost	
Administrative staff salary	32,000
(An administrative staff salary is 8,000 Baht a month,	
so 2 admin. staffs for 2 mths. = 8,000*2*2)	
A4 Paper 8 ream (@80 Baht)	640
Printer Toners	1,500
Micellaneos Cost	1,000
Total variable cost : (Baht/Month)	**35,140**

The proposed system make recontinuing service, expect increasing around 5 subscribers per month.

So, the income of recontinue service is auxiliary increased as the following table:

Table 3.3. Proposed System of Recontinued service

Month	Month1	Month2	Month3	Month4	Month5	Month6	Month7	Month8	Month9
Recontinue service (subscribers)	5	10	15	20	25	30	30	30	30
(*B700/sub)	3,500	7,000	10,500	14,000	17,500	21,000	21,000	21,000	21,000

3.5.1 Benefit Expected

- Tangible benefit
    1. Profit on re-continuing service for

first month	3,500	Baht
second month	7,000	Baht
third month	10,500	Baht
forth month	14,000	Baht
fifth month	17,500	Baht
sixth month	21,000	Baht

    2. Reduce operation cost per month   1,740 Baht

- Intangible benefit
    1. Reduce redundant work and paper work.
    2. Improve quality and service performance
    3. Improve in decision making process by providing on time accessibility to information.
    4. Generate flexibility in providing ad hoc report to management.
    5. Ability to meet the competitors.

3.5.2 Payback Period

A payback period is the exact amount of time required for the firm to recover its initial investment as calculated from cash inflows. The after taxes payback period is

$$P = I/(1-T) * R$$

Where P = Payback period

     I = Initial investment or capital expenditure

     R = Annual saving realized by investment

     T = Corporate tax rate in percent (30%)

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The payback period of the proposed system can be calculated as follows :-

$$P \quad = \quad 120{,}000/(0.7*199{,}500+20880)$$

$$= \quad 0.75 \text{ years}$$

$$= \quad 8.9 \text{ months}$$
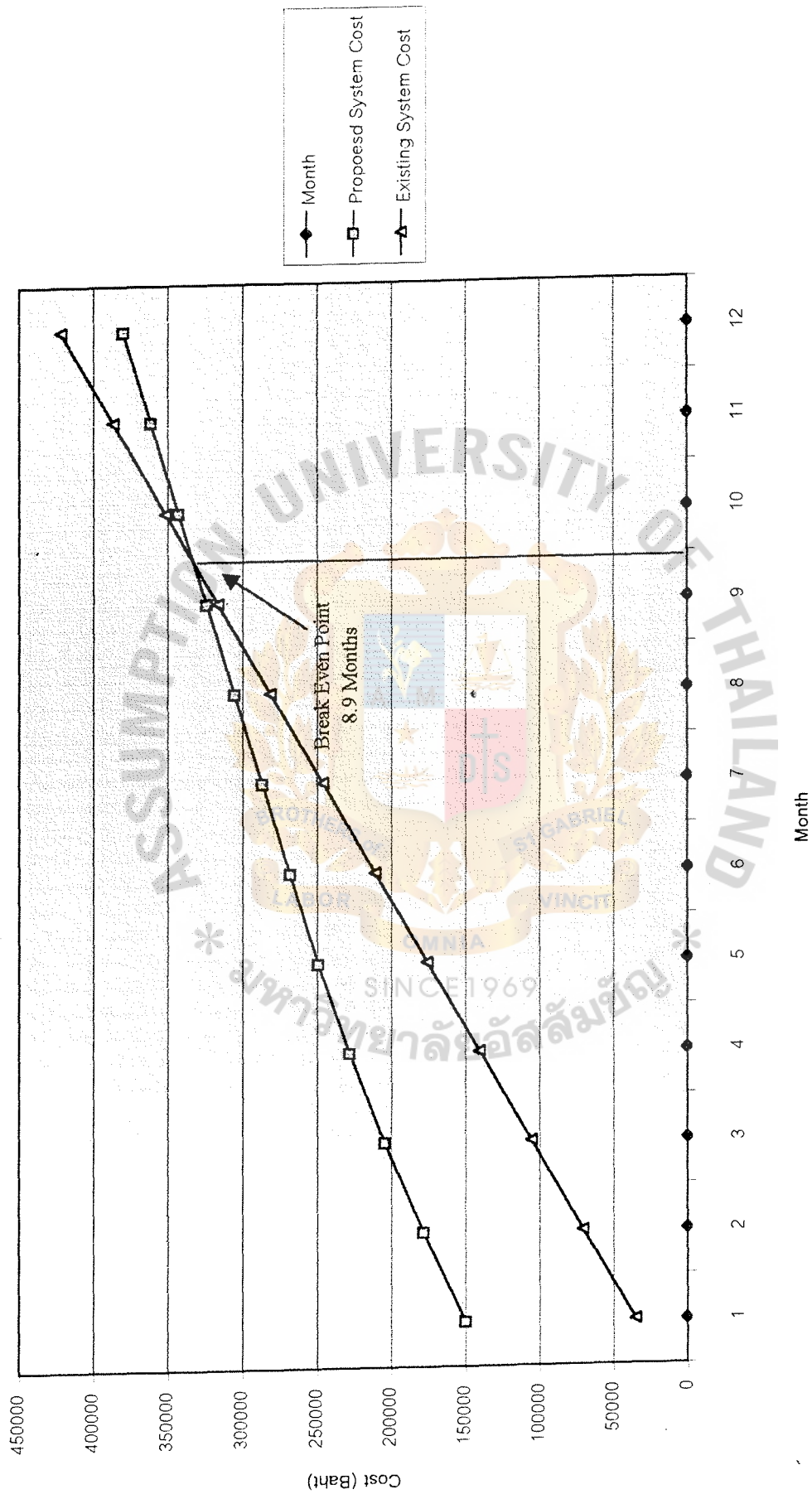
Figure 3.9.   The Comparison of Existing System Cost and Proposed System Cost

Table 3.4.   The Monthly Cost Comparison of Existing System and Proposed System

Proposed System

Month	Investment Cost	Oper.Cost	Invest+Oper.	Recontinue	Net Recontinue	Cost Per Month	Accum Cost
1	120.000	33,400	153,400	3,500	2,450	150,950	149,900
2		33,400	33,400	7,000	4,900	28,500	178,400
3		33,400	33,400	10,500	7,350	26,050	204,450
4		33,400	33,400	14,000	9,800	23,600	228,050
5		33,400	33,400	17,500	12,250	21,150	249,200
6		33,400	33,400	21,000	14,700	18,700	267,900
7		33,400	33,400	21,000	14,700	18,700	286,600
8		33,400	33,400	21,000	14,700	18,700	305,300
9		33,400	33,400	21,000	14,700	18,700	324,000
10		33,400	33,400	21,000	14,700	18,700	342,700
11		33,400	33,400	21,000	14,700	18,700	361,400
12		33,400	33,400	21,000	14,700	18,700	380,100

Total 199,500

Existing System

Oper.Cost	Cost Per Month	Accum
35140	35140	35140
35140	35140	70280
35140	35140	105420
35140	35140	140560
35140	35140	175700
35140	35140	210840
35140	35140	245980
35140	35140	281120
35140	35140	316260
35140	35140	351400
35140	35140	386540
35140	35140	421680

4. PROJECT IMPLEMENTATION

4.1 Project Implementation Schedule

The implementation of Technical Support Information System will be developed after management has proposed the system. They will take time to make decision and there are some factors that must be taken into consideration. The most significant factor is some of administrative staff will be transfered to junior technical support staff. They must be trained and it takes time to be a Technical professional. Anyway, the proposed system will help organization to maintain current subscribers and increase number of new subscribers. The proposed system consists of installation of new software and during the implementation, two staff is needed to input data into the system. The implementation will run parallel with the manual system and need another two staffs to check error of the reports, verify data input and coordinate with the manual system.

4.2 Test Plan and Results

All of the system's newly written or modified application programs, as well as new procedural manual, new hardware and all system interface, must be tested thoroughly. Haphazard trial-and-error testing will not suffice.

Testing of specific programs, subsystems, and total systems is essential for quality assurance. Testing is done to turn up any existing problems with the programs and their interfaces before the system is actually used. Typically, testing is done in a bottom-up fashion with program codes being desk checked first. Following several intermediate test steps, testing of the full system with level data is accomplished. This provides an opportunity to work out any problems that arise before the system is put into production.

The most difficult task in this project life cycle is the implementation of the proposed system. Using of the new software changes a lot in procedures of work.

So as the result, simulation run established. Management in each department involved has to select their staffs to be representatives involved in all functions in the system, not only the changes in their functions, but also the movement throughout the system, from one function to another. Also from this simulation, they identify additional requirements and report modification.

Following are work packages in this simulation task : -

- Simulation planning
- Review with users
- User training (system overview and changes)
- Simulation preparation
    - Input documents
    - Hardware and software
    - Simulation run
    - Identify modifications and conclusion

5. CONCLUSION AND RECOMMENDATION

5.1 Conclusion

The company recognizes the importance of technical support as a key element of a good service business.

The proposal of this system development project is to analyze, design, collect data and implement Technical Support Information System of the company that is an Internet Service Provider. The entire process of the existing system is gathered by interviewing the technicians and their senior system analyst.

This system is a part of the attempt to improve overall technical support' productivity, efficiency, and effectiveness. The system has been designed for information flow in organization that develop work flows of technical support itself and process of assisting customers would be effective. The re-organization of technical support department will be resource utilization of numbers of computers and providing training course to the administrative staffs to be technical staffs. All of these would take time but the employees will improve their performance. To organize database by applying software in order to verify and record customer's problem would save time and also can create reports by computerized technology which is better and faster than manual process. Number of redundant work and paper work are expected to tremendously reduce through the implementation of the system.

By using this system, senior system analyst will be allowed to closely monitor service job and the response of every problem from customers to make sure that all problems and services requested are responded with careful attention by his/her staffs. At the same time, work load of each technician will be reduced.

5.2 Recommendation

This proposed system, technical support information system, is developed for using by not more than 20 users as mentioned in Microsoft Access 97 manual. In the future, when the company continually gain an increase in number of customers, the management team may consider to enhance the internet system or develop the system to be standard and get lesser problem and affect to the customers. The development method is according to company' requirements. The company is able to think about other interesting areas for further system development.

The company expects that in the future our customers may complain less. So, management should plan for better technology to serve the customers. The company will get less call by setting the Frequently Asked Question (FAQ) in the company homepage and add some trouble shooting into the company internet users' manual. The next recommendation is online service, customers can send e-mail instead of calling. The company may create the Bulletin Board System (BBS) which is a service that enables users to enter information for others to read and that can store and retrieve files. The technician will answer the questions back and stores then any user can retrieve to read the files. The company may set the objectives for telling their customers that before they call they can find the solutions by themselves. The company may print some trouble- shooting manual as mentioned above and add into company's products. The others method, they may set the training course for increase Internet knowledge to public and they can get some profit also.

Finally, the company need neither increase technician staff nor hardware and software to support because they always improve their technology by using the report form this proposed system and there is also less complaint and calling from the customers.

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APPENDIX A

Entity Relationship Diagram
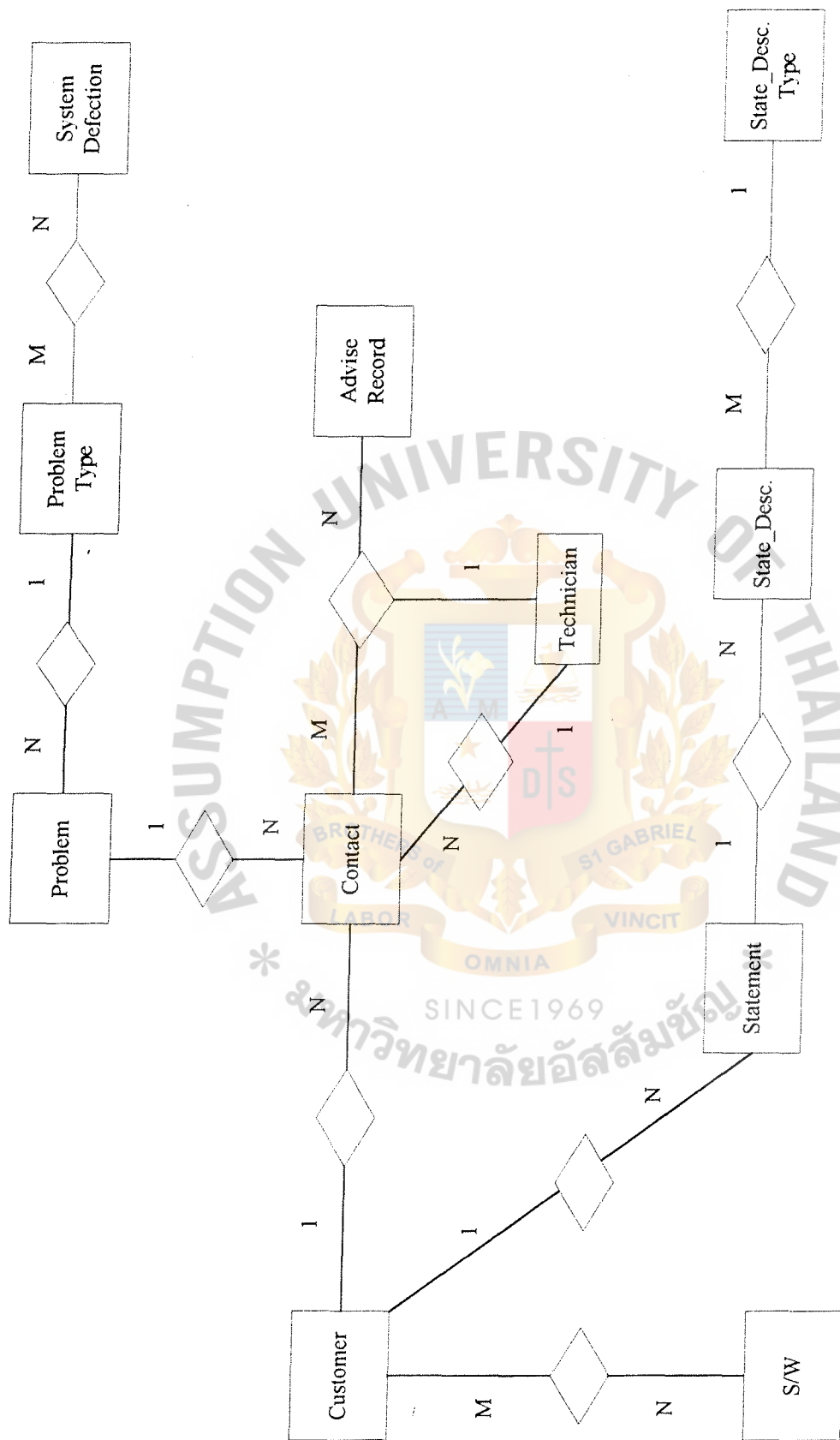
Figure A.1.   Entity Relationship Diagram of the Proposed System 1
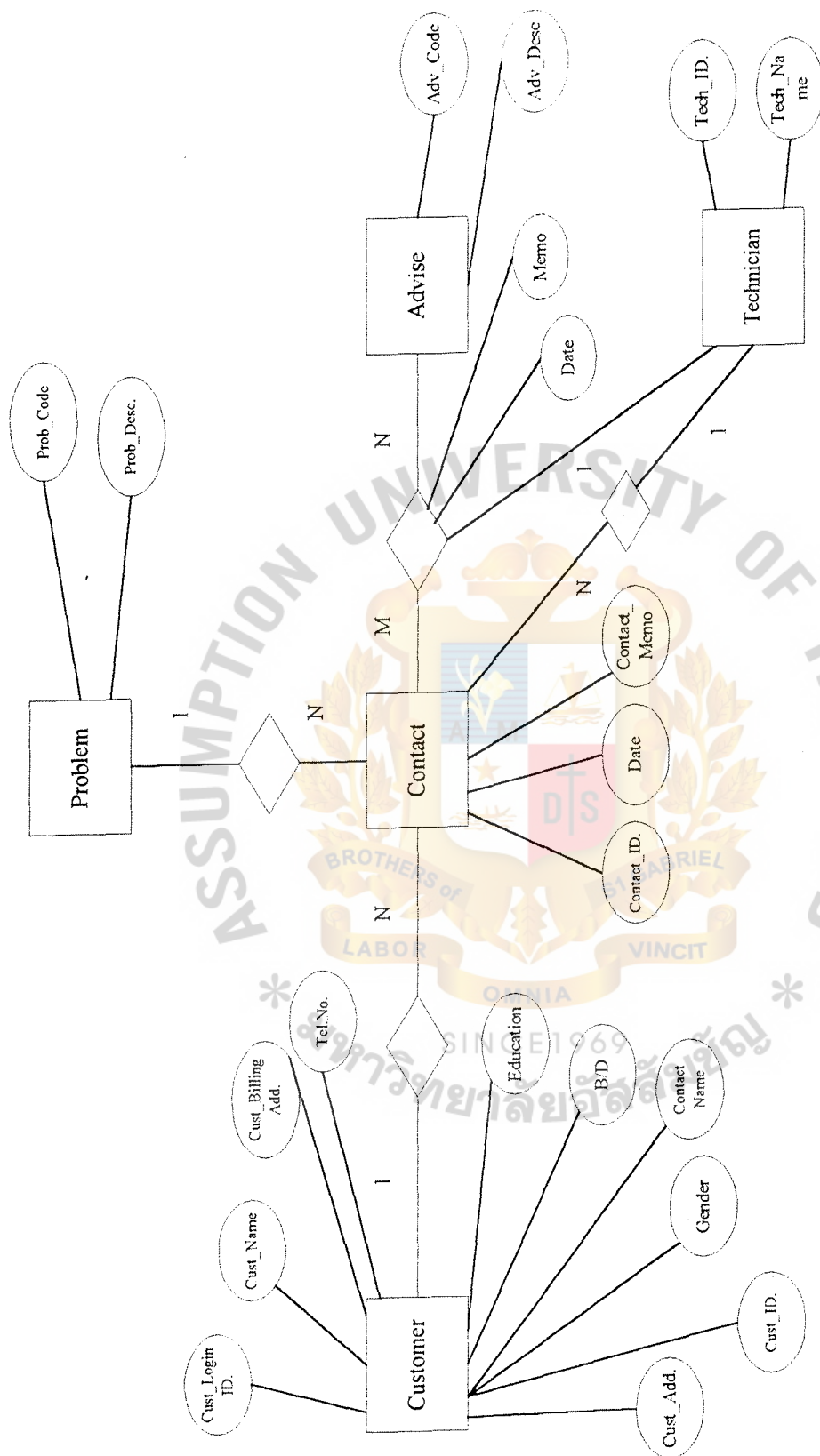
Figure A.2.   Entity Relationship Diagram of Proposed System 2
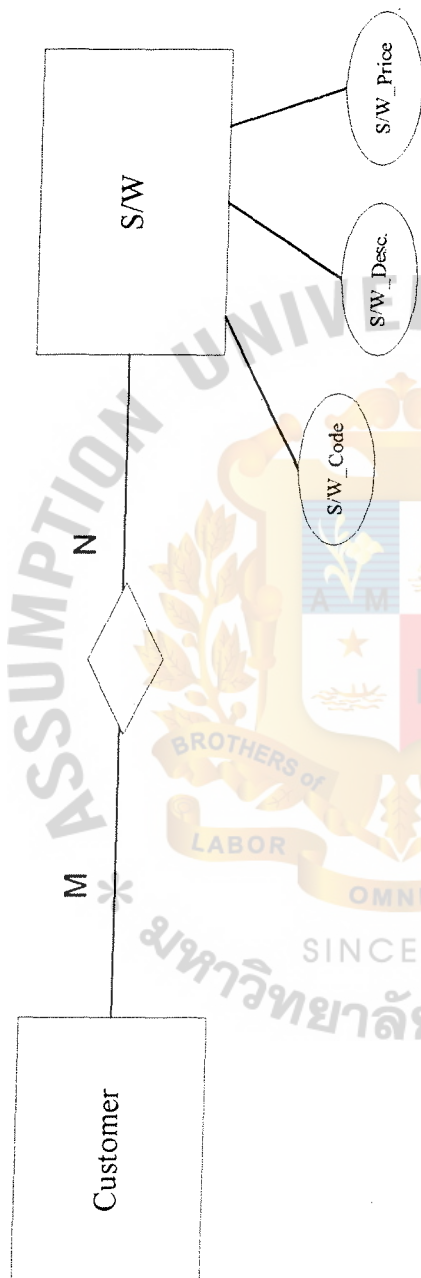
Figure A.3. Entity Relationship Diagram 3
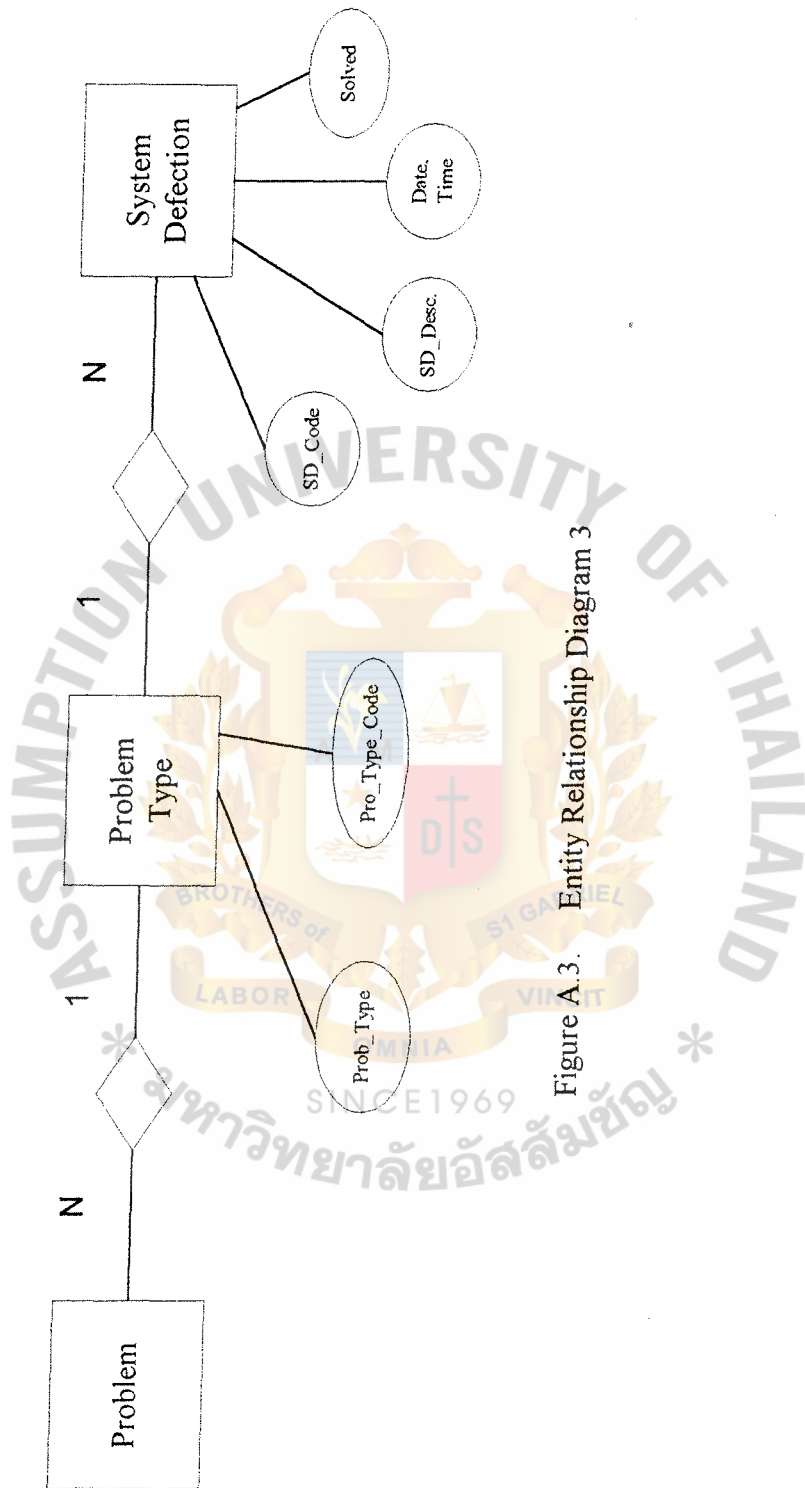
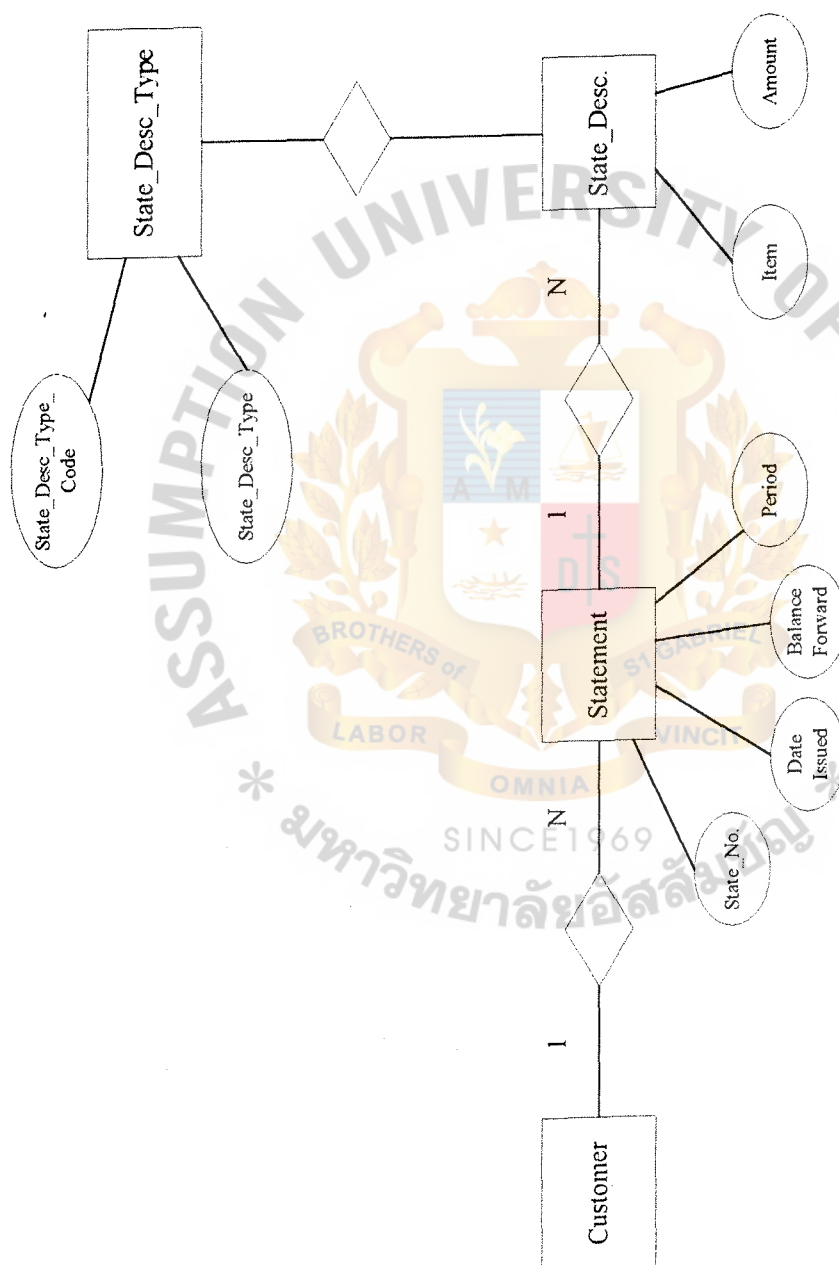Figure A.4. Entity Relationship Diagram of the Proposed System 4

Figure A.5. Entity Relationship Diagram of the Proposed System

APPENDIX B

File Layout

Table B.1.   Customer

Field Name	Description	Key Type	Size	Property
Cust_Login ID.	Customer' Login ID.	Primary	8	Character
Cust_Name	Customer' Name	Attribute	30	Character
Cust_Add.	Customer' Address	Attribute	80	Character
Cust_Billing_Add.	Customer' Billing Address	Attribute	120	Character
Gender	Gender	Attribute	1	Character
B/D	Birthday	Attribute	10	Character
Tel. No.	Telephone Number	Attribute	10	Number
Cust_ID.	Customer ID. No.	Attribute	10	Character
Contact Name	Customer contact name	Attribute	20	Character
Edu.	Education	Attribute	10	Character

Table B.2.   Contact

Field Name	Description	Key Type	Size	Property
Contact_ID.	Contact Identification No.	Attribute	2	Number
Date	Contact date	Attribute	10	Date
Contact_Memo	Contact memo	Attribute	100	Character
Cust_Login ID.	Customer' Login ID.	Primary	8	Character
Prob_Code	Problem Code	Primary	4	Character

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Table B.3. Problem

Field Name	Description	Key Type	Size	Property
Prob_Code	Problem Code	Primary	4	Character
Prob_Desc.	Problem Description	Attribute	20	Character
Prob_Type_Code	Problem Type Code	Primary	4	Character

Table B.4. Contact Advise

Field Name	Description	Key Type	Size	Property
Contact ID.	Contact Identification No.	Primary	4	Character
Advise Code	Advise Code	Primary	4	Character
Date	Advise Date	Attribute	10	Date
Memo	Advise Memo	Attribute	200	Character

Table B.5. Problem Type

Field Name	Description	Key Type	Size	Property
Prob_Type	Problem Type	Attribute	4	Character
Prob_Type_Code	Problem Type Code	Primary	4	Character

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Table B.6.   System Defection

Field Name	Description	Key Type	Size	Property
SD_Code	System Defection Code	Attribute	8	Character
SD_Desc.	System Defection Description	Attribute	150	Character
Date_Time	Date and time of System Defection occurred	Attribute	10	Date
Solved	Problem Solved or not	Attribute	5	Time
Prob_Type_Code	Problem Type Code	Primary	4	Character

Table B.7.   Software

Field Name	Description	Key Type	Size	Property
S/W_Code	Software Code	Primary	5	Character
S/W_Desc.	Software Description	Attribute	50	Character
S/W_Price	Software Price List	Attribute	5	Number

Table B.8.   Customer Software

Field Name	Description	Key Type	Size	Property
Cust_Login ID.	Customer' Login ID.	Primary	8	Character
S/W_Code	Software Code	Primary	5	Character

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Table B.9. Statement

Field Name	Description	Key Type	Size	Property
Cust_Login ID.	Customer' Login ID.	Attribute	8	Character
State_No.	Statement Running No.	Primary	10	Number
Date Issued	Date of isuance invoce	Attribute	10	Date
Balance Forward	Balance Forward	Attribute	15	Number
Period	Period	Attribute	20	Character

Table B.10. State_Desc.

Field Name	Description	Key Type	Size	Property
State_No.	Statement Number	Primary	10	Number
Item	Item of Statement	Primary	2	Number
Amount	Amount	Attribute	15	Number
State_Desc._Type_Code	Statement Description Type Code	Attribute	4	Number

Table B.11. State_Desc._Type

Field Name	Description	Key Type	Size	Property
State_Desc._Type_Code	Statement Description Type Code	Primary	4	Number
State_Desc._Type	Statement Description Type	Attribute	4	Number

Table B.12.   Technician

Field Name	Description	Key Type	Size	Property
Tech_ID.	Technician Identification Numbe	Primary	4	Number
Tech_Name	Technician Name	Attribute	10	Character

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APPENDIX C

Process Specification

Table C.1.   Verify Customer's Login ID. process specification

Process Specification
Process No. :   1.1
Process Name :   Verify Customer's Login ID.
Description :   Check the customer Login ID. whether he/she is our real customer or not.

INPUT :	- Customer' Login ID. 4-8 digits and real name
	- Customer Record
OUTPUT :	- Verified Customer
PROCESS :	1. Display input Login ID. Screen
	2. Key in Login ID. that the customer told.
	3. Display details of record seek.
	4. Check whether Login ID. and real name is matched with the data told by customer or not.
	5. If yes, continue to help customers, otherwise, apologize the customer that he/she does not our real customer and we can't help him/her.

Attachment : Process 1.2

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Table C.2. Check Customer Statement Process Specification

Process Specification
Process No. : 1.2   Process Name : Check Customer Statement   Description : Check the customer statement status whether he/she has payment   overdue or not.
INPUT : - Customer' Login ID. And real name   - Customer Statement data   OUTPUT : - Verified Customer   PROCESS : 1. Display details of statement.   2. Check whether customer' statement is overdue or not.   3. If yes, continue, otherwise tell the customer to settle the bill   within the suitable period.
Attachment : Process 1.1, 1.3

Table C.3.   Record Customer' problem process specification

Process Specification
Process No. :   1.3
Process Name :   Record customer' problem
Description :   Record customer' problem into problem file.

INPUT :   - Customer' problem
- Verified customer
OUTPUT :   - Customer's problem data
PROCESS :   1. Get customer' problems.
2. Record all the problems into the file.
Attachment : Process 1.1, 1.2

Table C.4.   Record System Defection process specification

Process Specification
Process No. : 2.1
Process Name : Record System Defection
Description : Record system defection from the information flow from technical and network operation into system defection file.
INPUT : - System Defection informed - System Problem informed OUTPUT : - System Defection PROCESS : 1. Display input system defection screen. 2. Search for system defection code. 3. Update system Defection into file.
Attachment : Process 2.2

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Table C.5.   Set up Software process specification

Process Specification
Process No. :   2.3 Process Name :   Set up Software Description :   Setting up some needed software in the customer'PC which requested by customer' him/herself.
INPUT :   - Software set up requested OUTPUT :   - Informed Customer's charged needed PROCESS :   1. Setting up the requested program. 2. Record Software that had been set up. 3. Informed customer's charged needed to Financial Department for issuing invoice.
Attachment : Process 2.2

Table C.6. Check System Defection process specification

Process Specification
Process No. : 2.2.1
Process Name : Check System Defection
Description : Check whether customer told problem was our company system defection or not.

INPUT :
- System Defection
- Problem

OUTPUT :
- Advise record
- System defection informed
- Non-System problem

PROCESS :
1. Get customer's problems from file.
2. Check problem with the system defection file.
3. If the problem is our system defection problem, advise customer by following the instruction in the system defection file.
4. If the problem is system defection problem, but does not be informed, inform urgently to the technical and network operation department.
5. Advise customer and record it in the advise file.
6. If the problem is not system defection problem, follow the next process to find out the problem.

Attachment : Process 2.2.2

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Table C.8.   Check Customer Application process specification

Process Specification
Process No. :   2.2.3 Process Name :   Check Customer Application Description :   Check whether customer PC has been set up the complete application or not.
INPUT :   - Non-misconfiguration Problem OUTPUT :   - Advise - Unsolved Problem PROCESS :   1. Get Non-misconfiguration problem. 2. Check whether the user has set up completely application in his/her PC or not. 3. If not, advise and record. 4. If yes, find out other possible mistake. 5. If cannot find any mistake, record in the unsolved file . 6. Send to technical and network operation to search for the recification.
Attachment : Process 2.2.2

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Table C.9.   List Customer having System Problem process specification

Process Specification
Process No. :   3.1 Process Name :   List Customer having System Problem. Description :   List the customer' Login ID. and telephone No. for calling back to solve their pending unsolved problem.
INPUT :   - Problem - Informed Solved Problem OUTPUT :   - Customer' Login ID. List PROCESS :   1. List customer' Login ID. who have pending unsolved problem. 2. List unsolved problem. 3. List informed solved problem from technical and network operation.
Attachment : Process 3.2

Table C.10. Advise process specification

Process Specification
.
Process No. : 3.2
Process Name : Advise
Description : Advise user to solve their internet problem.
INPUT :   - Problem   - Advise   - Phone No.   OUTPUT :   - Advise   PROCESS :   1. Get customer pending list.   2. Get customer phone No.   3. Get problem and advise method.   4. Call back and advise customer.   5. Record in advice file.
Attachment : Process 3.1

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APPENDIX D

Input Screen

Figure D.1.   User Login

Figure D.2.   Main Menu

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Figure D.3. Customer Status Form

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Figure D.4.   System Defection Form

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Figure D.5.   Problem Type Form

Figure D.6.   Advise Form

Figure D.7.   Set up Form

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Figure D.8.   Checking and Repairing Form

Figure D.9. Reset Login Name and Password Form

Figure D.10.   Extra Service form

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APPENDIX E

Output Report

Table E.1. Customer Status Report

Customer Status Report

Thursday, November 05, 1998

Login Name	Name	Surname	Gender	Statement Status : Statement No.	Date issued	Balance Forward	Due date
Cleo	Suphawadee	Sathaporn	F	98/012354	15/11/98	2,400.00	10/12/98
xxxxxxxx	xxxxxxxx	xxxxxxxx	x	xx/xxxxxx	xx/xx/xx	xxxxxxxx	xx/xx/xx
xxxxxxxx	xxxxxxxx	xxxxxxxx	x	xx/xxxxxx	xx/xx/xx	xxxxxxxx	xx/xx/xx
xxxxxxxx	xxxxxxxx	xxxxxxxx	x	xx/xxxxxx	xx/xx/xx	xxxxxxxx	xx/xx/xx
xxxxxxxx	xxxxxxxx	xxxxxxxx	x	xx/xxxxxx	xx/xx/xx	xxxxxxxx	xx/xx/xx
xxxxxxxx	xxxxxxxx	xxxxxxxx	x	xx/xxxxxx	xx/xx/xx	xxxxxxxx	xx/xx/xx
xxxxxxxx	xxxxxxxx	xxxxxxxx	x	xx/xxxxxx	xxx/xx/xx	xxxxxxxx	xx/xx/xx
xxxxxxxx	xxxxxxxx	xxxxxxxx	x	xxxxxx/xx	xx/xx/xx	xxxxxxxx	xx/xx/xx

Table E.2. Problem Type Report

Problem Type Report

Thursday, November 05, 1998

Login Name	Name&Sur.	Problem Code	Description	Advise Code	Description
Cleo	Suphawad S.	C1	Line Busy	AC1	Line Maintenance
xxxxxxxx	xxxxxxxxx	xx	xxxxxxxxxxx	xxxx	xxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxx	xxxxxxxxx	xx	xxxxxxxxxxx	xxxx	xxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxx	xxxxxxxxxx	xx	xxxxxxxxxxx	xxx	xxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxx	xxxxxxxxxx	xx	xxxxxxxxxxx	xxxx	xxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxx	xxxxxxxxxx	xx	xxxxxxxxxxx	xxx	xxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxx	xxxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxx	xxxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxxxxxxxxxxxxxxxxxxx

Total of problem C1   xxxx

Total of problem C2   xxxx

Total of all problem   xxxx

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Table E.3.   System Defection Report

System Defection Report

Thursday, November 05, 1998

SD_Code	Description	Date/Time occurred	Date/Time Solved	Reason	Solution
SDC01	Can't connect through No. 6421441	05/11/98 18:3	5/11/98 19:30	Line busy	Clear customer connect over 12 hrs.
xxxxx	xxxxxxxxxxxxxxxxxxxxx	dd/mm/yy 00:00	dd/mm/yy 00:00	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxx
	xxxxxxxxxxxxxxxxxxxxx			xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxx
xxxx	xxxxxxxxxxxxxxxxxxxxx	dd/mm/yy 00:00	dd/mm/yy 00:00	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxx
	xxxxxxxxxxxxxxxxxxxxx			xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxx
xxxx	xxxxxxxxxxxxxxxxxxxxx	dd/mm/yy 00:00	dd/mm/yy 00:00	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxx
	xxxxxxxxxxxxxxxxxxxx			xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxx

Total Amount of System Defection   xxxxx

System Defection Case that wait for solution SD_Code xxxxx

Table E.4.   Advise Report

Advise Report

Thursday, November 05, 1998

Advise Code	Description	Number of Customer have been advised
C1	Connect – Line Busy	xx
C2	Can't connect	xx
M1	Can't received mail	xx
S1	Set up Internet Explorer	xx
xx	xxxxxxxxxxxxxxxxxxx	xx
xx	xxxxxxxxxxxxxxxxxxx	xx
xx	xxxxxxxxxxxxxxxxxxx	xx
xx	xxxxxxxxxxxxxxxxxxx	xx
xx	xxxxxxxxxxxxxxxxxxx	xx
xx	xxxxxxxxxxxxxxxxxxx	xx
xx	xxxxxxxxxxxxxxxxxxx	xx
xx	xxxxxxxxxxxxxxxxxxx	xx
xx	xxxxxxxxxxxxxxxxxxx	xx
xx	xxxxxxxxxxxxxxxxxxx	xx
xx	xxxxxxxxxxxxxxxxxxx	xx

Total Amount   xxx

Table E.5.   Checking and Repairing Report

Checking and Repairing Report

Thursday, November 05, 1998

Login Name	Computer Type	O/System	Modem Type	Description
cleo	PC	W95	Ex.	W95 was not properly installed
xxxx	xx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxxxxxx
xxxx	xx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxxxxxx
xxxx	xx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxxxxxx
xxxx	xx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxxxxxx
xxxx	xx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxxxxxx
xxxx	xx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxxxxxx
xxxx	xx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxxxxxx
xxxx	xx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxxxxxx

Total Amount of checking and repairing   xxx

Table E.6.　　Set up Software Report

Set up and install Add-on Program Report

Thursday, November 05, 1998

Login Name	SW/Program	Service Charged (Baht)
Cleo	Microsoft Chat	100
XXXXXXX	XXXXXXXXXXXX	XXX
XXXXXXX	XXXXXXXXXXXX	XXX
XXXXXXX	XXXXXXXXXXXX	XXX
XXXXXXX	XXXXXXXXXXXX	XXX
XXXXXXX	XXXXXXXXXXXX	XXX
XXXXXXX	XXXXXXXXXXXX	XXX
XXXXXXX	XXXXXXXXXXXX	XXX
XXXXXXX	XXXXXXXXXXXX	XXX
XXXXXXX	XXXXXXXXXXXX	XXX
XXXXXXX	XXXXXXXXXXXX	XXX

Total number of service	XXX
Total number of Microsoft Chat set up	XXX
Total amount of service charged	XXXXX

Table E.7.   Customer Charged Report

Customer Charged Report

Thursday, November 05, 1998

Login Name	Name&Sur.	Membership	Add On Prog.	Reset	Checking & Repairing	Extra Service
Cleo	Suphawad S.	S01 006	MS Chat	PW	-	M.alias
xxxxxxxx	xxxxxxxxx	xxx xxx	xxxxxxx	xx	xxxxxxxxx	xxxxxxxxxx
xxxxxxxx	xxxxxxxxx	xxx xxx	xxxxxxx	xx	xxxxxxxxx	xxxxxxxxxx
xxxxxxxx	xxxxxxxxx	xxx xxx	xxxxxxx	xx	xxxxxxxxx	xxxxxxxxxx
xxxxxxxx	xxxxxxxxx	xxx xxx	xxxxxxxx	xx	xxxxxxxxx	xxxxxxxxxx
xxxxxxxx	xxxxxxxxx	xxx xxx	xxxxxxxx	xx	xxxxxxxxxx	xxxxxxxxxx

Total Amount of Add On Program   xxxxx

Total Amount of Reset Login Name & Password   xxxxx

Total Amount of Checking and Repairing   xxxxxx

Total Amount of Extra Service   xxxxx

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Table E.8.   Extra Service Report

Extra Service Report

Thursday, November 05, 1998

Type of Extra Service	Service (time)	Amount	%service
Mail Alias	xxxxxx	xxxxxx	xx
Mail Alert	xxxxxx	xxxxxx	xx
International Roaming	xxxxxx	xxxxxx	xx
Banner Ad.	xxxxxx	xxxxxx	xx
Web Link '	xxxxxx	xxxxxx	xx
Others	xxxxxx	xxxxxx	xx
Total Amount	xxxxxx	xxxxxx	xxx

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Table E-9. Pending Advise List Report

Pending Advise List (for Call Back)

Thursday, November 05, 1998

Login Name	Membership	Problem Pending	Pending fr.	Pend.for (days)	Cust_ Tel.	Solution
Cleo	S01 006	Can't connect to	03/11/98	2 days	247-4747	Line not mix w/ modem
		speed 56.6				
xxxxxxxx	xxx xxx	xxxxxxxxxxxxxx	xx/xx/xx	xx days	xxx-xxxx	xxxxxxxxxxxxxxxxxxxxxx
xxxxxxxx	xxx xxx	xxxxxxxxxxx	xx/xx/xx	xx days	xxx-xxxx	xxxxxxxxxxxxxxxxxxxxxx
xxxxxxxx	xxx xxx	xxxxxxxxxxxxxx	xx/xx/xx	xx days	xxx-xxxx	xxxxxxxxxxxxxxxxxxxxxx
xxxxxxxx		xxxxxxxxxxxxxx				xxxxxxxxxxxxxxxxxxxxxx
xxxxxxxx		xxxxxxxxxxxxx				xxxxxxxxxxxxxxxxxxxxxx
xxxxxxxx	xxx xxx	xxxxxxxxxxxxx	xx/xx/xx	xx days	xxx-xxxx	xxxxxxxxxxxxxxxxxxxxxx
		xxxxxxxxxxxx				xxxxxxxxxxxxxxxxxxxxxx

Total Pending Advise List	xx	
Total Pending for 1 days	xx	
Total Pending for 2 days	xx	
Total Pending for 3 days	xx	URGENT !

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Table E.10. Reset Login Name and Password Report

Reset Login Name and Password

Thursday, November 05, 1998

Login Name	Name	Surname	Membership	Reset Login Name	Reset PW	Reason
Cleo	Suphawadee	Sathapo	S01 006	N	Y	Forget Passdword
xxxxxxx	xxxxxxxx	xxxxxxx	xxx xxx	x	x	xxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxx	xxxxxxxx	xxxxxxx	xxx xxx	x	x	xxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxx	xxxxxxxx	xxxxxxx	xxx xxx	x	x	xxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxx	xxxxxxxx	xxxxxxx	xxx xxx	x	x	xxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxx	xxxxxxxx	xxxxxxx	xxx xxx	x	x	xxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxx	xxxxxxxx	xxxxxxx	xxx xxx	x	x	xxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxx	xxxxxxxx	xxxxxxx	xxx xxx	x	x	xxxxxxxxxxxxxxxxxxxxxxxxx

Total Amount of reset login name   xxxx

Total Amount of reset password   xxxx
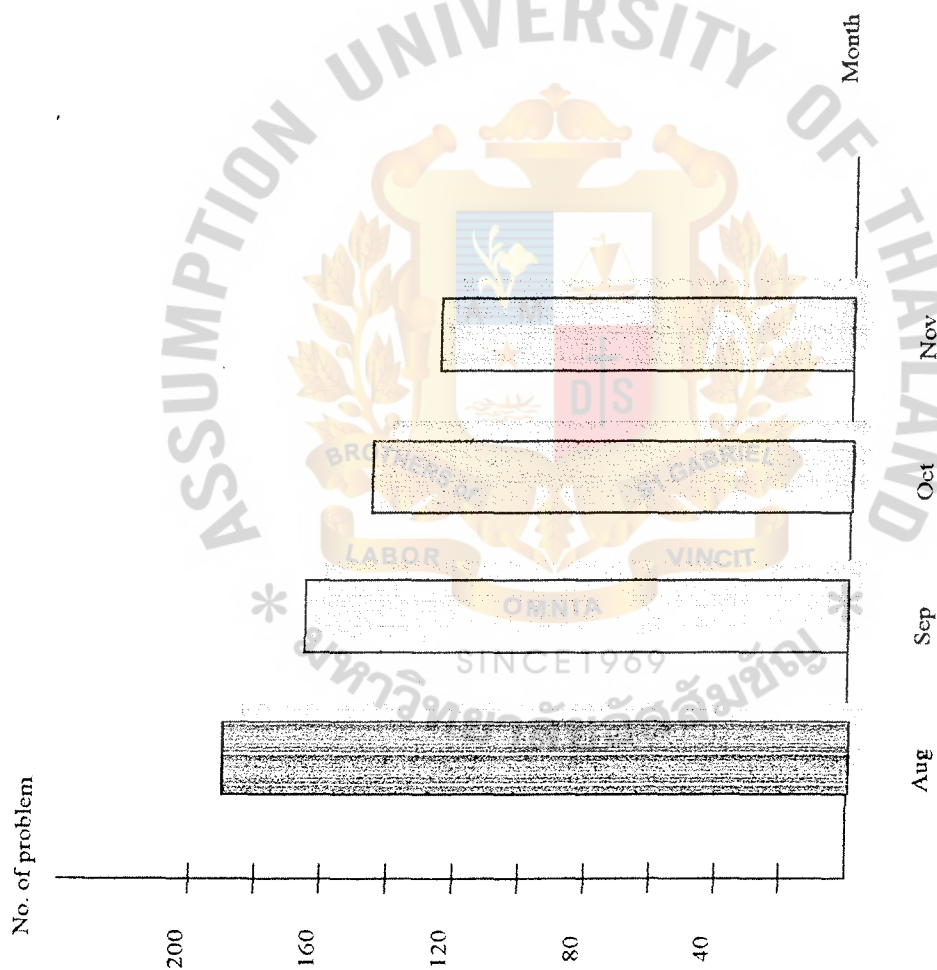
Problem Graph (Connection problem compare)

No. of problem

200
160
120
80
40

Aug   Sep   Oct   Nov   Month

Figure E.1.   Problem Graph

APPENDIX F

Data Dictionary

Advise Code	=	Advise Code
Amount	=	Amount
B/D	=	Birthday
Balance Forward	=	Balance Forward
Contact ID.	=	Contact Identification Number
Contact Name	=	Contact name of the customer
Contact_Memo	=	Contact memo of the customer
Cust ID.	=	Customer Identification No.
Cust_Add.	=	Address of the customer
Cust_Billing_Add.	=	Billing Address of the customer
Cust_Login ID.	=	Login ID. of the customer
Cust_Name	=	Name of the customer
Date	=	Contact date by the customer
Date	=	Advise Date
Date Issued	=	Date of invoice isuance
Date_Time	=	Date and time of System Defection occurred
Edu.	=	Education Level of the customer
Gender	=	Gender
Item	=	Item of Statement
Memo	=	Advise Memo
Period	=	Period
Prob_Code	=	Problem Code

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Prob_Desc.	=	Problem Description
Prob_Type	=	Problem Type
Prob_Type_Code	=	Problem Type Code
S/W_Code	=	Software Code
S/W_Desc.	=	Software Description
S/W_Price	=	Software Price List
SD_Code	=	System Defection Code
SD_Desc.	=	System Defection Description
Solved	=	Problem Solved or not
State_Desc._Type	=	Statement Description Type
State_Desc._Type_Code	=	Statement Description Type Code
State_No.	=	Statement Running No.
State_No.	=	Statement Number
Tech_ID.	=	Technician Identification Number
Tech_Name	=	Technician Name
Tel. No.	=	Contact Telephone number of the customer

APPENDIX G

Report of Discontinuing Service

Table G.1.   Report of Discontinuing Service

Discontinue Service Monthly Report	
1. System/Service	30%
2. Customer ' PC error	10%
3. Service Rate	25%
4. Statement mis-calculation	10%
5. Network system defection	15%
6. Others	10%
Total	**100%**