

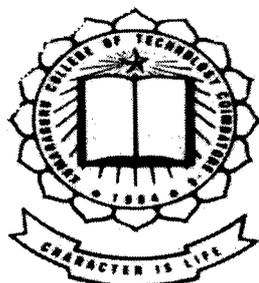
**SERVICES INTEGRATED INFORMATION SYSTEM
[SIIS]**

P-835

PROJECT REPORT

Submitted in partial fulfillment of the requirements
for the award of the degree of

M.Sc (Applied Science) SOFTWARE ENGINEERING
of Bharathiar University, Coimbatore.



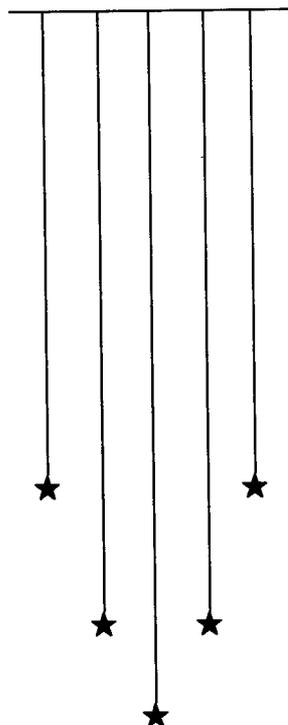
Submitted By

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Under the Guidance of

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
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COIMBATORE - 641 006

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
KUMARAGURU COLLEGE OF TECHNOLOGY

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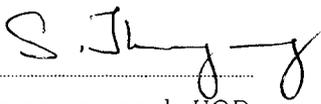
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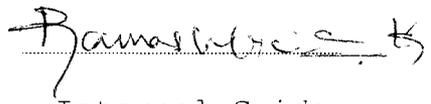
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[SIIS]**

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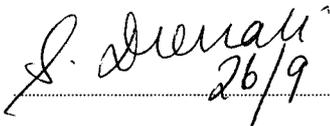
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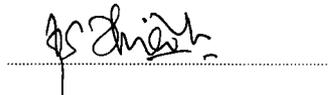
IS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE AWARD OF THE DEGREE OF
M.Sc [Applied Science] SOFTWARE ENGINEERING
OF BHARATHIYAR UNIVERSITY, Coimbatore
during the academic year 2001-2002


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Professor and HOD 26/9/02


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Internal Guide

Submitted to University Examination held on 26.09.02...


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External Examiner



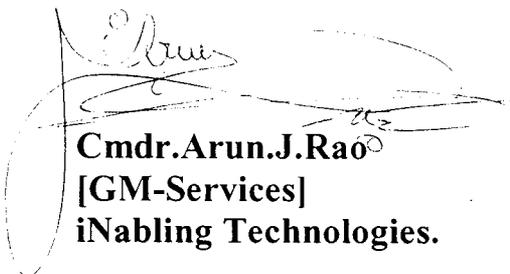
August 24th, 2002

TO WHOMSOEVER IT MAY CONCERN

This is to certify **Mr. Kartik Vaidyanathan (9937S0079)** has completed his project work "**Services Integrated Information System [SIIS]**" as part of his Master of Science (Msc – Software Engineering) curriculum from Bharathiyar University in our company, from May 15th, 2002 to September 1st, 2002 for the Services Group under the guidance of cmdr.Arun.J.Rao - GM Services.

During his project tenure as "Project Trainee" at iNabling Technologies he has been a proactive member of the team and his work was found excellent.

We wish him all success in his future endeavors.


Cmdr.Arun.J.Rao
[GM-Services]
iNabling Technologies.



Acknowledgment



Acknowledgment

At the outset I would like to thank my Principal **Dr.K.K.Padmanaban** Kumaraguru College of Technology, Coimbatore, **Dr.S.Thangasamy** – Head of the Department – Computer Science and Engineering for giving me an opportunity to do this project as a part of my course.

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A project of this size requires a guide who takes pains to spend time and hands out invaluable advice from time to time. Here, I am greatly indebted to **Cmdr Arun J. Rao** (retd) (GM - Services) for his invaluable guidance from start to finish.

I would like to thank **Mr. Narendra** (Member Technical) for his endless support in guiding me through the various stages in the development of the Project.

I also extend my sincere gratitude to **Miss.Nancy** for helping me understand the working of *iConnect* Service and clarifying my day-by-day doubts. I also thank the Services Group comprising of **Mr.Soni**, **Mr.Santosh**, **Mr.Prasad**, **Mr.Subramanya**, **Mr.Pavan** and **Mr.Jayaprakash** who have not only guided me but also motivated me.

And last but not the least I would like to thank **Mr.Harsha** (GM- R&D) and **Mr.Prabhu** (CTO, *iNabling Technologies*) for having given me an opportunity to learn and complete a project at *iNabling Technologies*.

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Organization Profile

1. Organization Profile

iNabling Technologies

iNabling Technologies Pvt Ltd, is a customer-oriented, innovation-driven organization, specializing in information services. Founded in October 1997 and headquartered in Bangalore, the Silicon Valley of India, *iNabling Technologies Pvt. Ltd.* was created with a mission to provide high quality and affordable connectivity solutions to the masses. They are a service-oriented company, dedicated to information enabling people, the world over.

Their strong and abiding commitment to quality and integrity in every sphere of operations helps translate innovations, learning and processes into value for their customers.

Vision

Their vision is to become a world leader in creating universally relevant, affordable communication solutions to bridge the digital divide and thereby 'information enable' people across the globe.

MOTTO - Bringing E-Mail to the Masses

***iNabling Technologies* has unveiled a device designed to offer low-cost e-mail for developing nations.**

E-mail may be almost everywhere in this country, but in many places, it still is a rarity. *iNabling Technologies* hopes to change that with a new device, designed to bring e-mail into developing nations. Called the *iStation*, the \$150 (US) or Rs.7000 (India) e-mail appliance also helps with chores like word processing and spreadsheets. *iNabling Technologies* is bundled the device with its own Internet service designed exclusively for text- based e-mail. Users will be charged \$3 per month for unlimited mail (US) or the cost of a local call in Indian conditions.

1. Organization Profile

The *iStation* is built around a processor from Seoul-based Samsung Semiconductor, using the ARM7TDMI CPU core from Cambridge, U.K.-based ARM. The appliance has an in-house developed graphical user interface and device drivers. Besides 256 KB of SRAM, the *iStation* has 256 KB of storage for user data and 256 KB of storage for application data, implemented in flash memory.

The device, weighing approximately two pounds, also has a built-in modem, and a backlit liquid crystal display for nighttime viewing. It can be shared by up to five users with individual personal e-mail IDs, and can store up to 250 e-mail addresses. Once the user has entered the user name and password, e-mail can be composed offline. Mail can be simultaneously sent and received by the click of a button.

A premium model of the *iStation* has features likely to be useful to corporate users, including a spreadsheet, a text editor, calculator and calendar, a provision for uploading and downloading files from a PC, and text file printing.

MARKET UPBEAT

The company is targeting its new concept at the community use of e-mail through public e-mail offices (PEO) using the lines of public call offices, which were used to popularize telephony in rural India.

The e-mail appliance and the bundled service are also targeted at personal users of e-mail and at the corporate market for use by sales and marketing staff to communicate field reports to corporate offices. INabling Technologies is also looking beyond the Indian market.

Synopsis



2. Synopsis

The Objective of **Services Integrated Information System [SIIS]** is to facilitate the **Services Group** to maintain their Customer Base for *iConnect* Service. SIIS aims at easing the task of keeping track of Customer Details and Customer Complaints and thereby providing the users various ways to extract the necessary information.

SIIS covers available information based on *iConnect* Service, Customer Complaints & *iStation* Repairs. SIIS will be useful in analyzing and verifying various parameters related to quality of service and Customers.

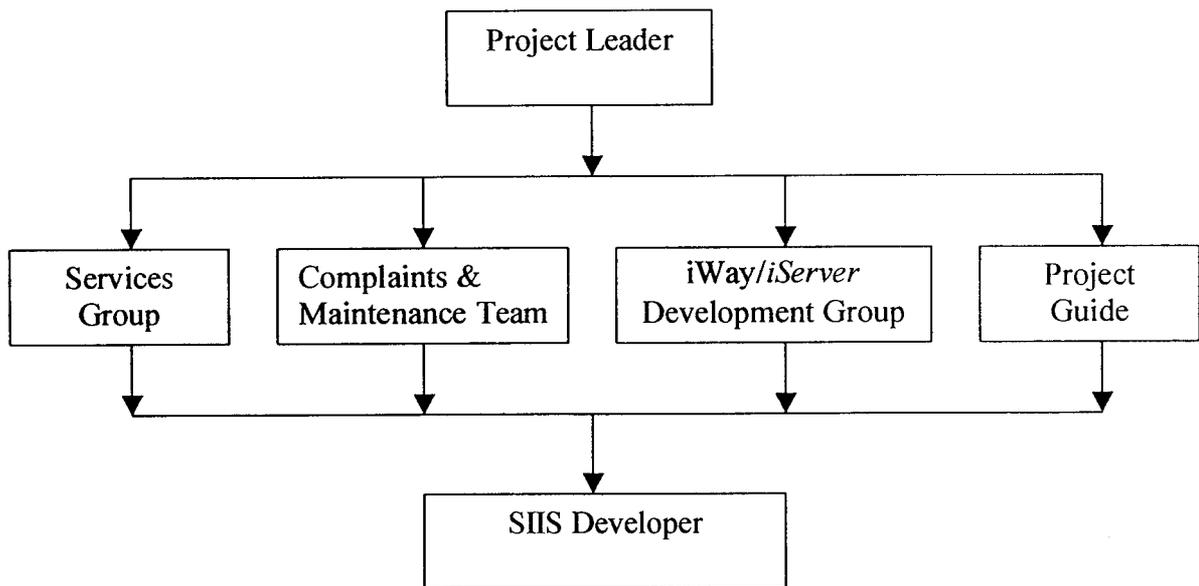
SIIS can be compared to a mini CRM tool that helps the users to draw analysis on the data obtained. SIIS is provided with a friendly GUI and screens to generate various reports. The Reports are customized to user requirements with appropriate headings based on user selection.

SIIS acts as a bridge between procurement of data and analysis of the information. Based on the data gathered, reports are prepared which will form the backbone for intelligent analysis.

Project Plan



3.1 Team Structure



Project Leader	-	Cmdr Arun.J.Rao (retd)
Services Group	-	Mr.Soni Mr.Subramanya Mr.Santosh Mr.Pavan Mr.Prasad
Complaints & Maintenance Team	-	Mr.Jayaprakash
<i>iWay/iServer</i> Development Group	-	Miss Nancy
Project Guide	-	Mr.Narendra
SIIS Developer	-	Kartik Vaidyanathan

3.2 Development Schedule

The various phases in the development of SIIS are as follows:

1. System Study
2. Requirements Gathering
3. Analysis Phase
4. Learning Crystal Reports
5. Design Phase
6. Coding
7. Report Preparation
8. Testing Phase
 - 8.1 Unit Testing
 - 8.2 Performance Testing
9. Implementation Phase

System Study: A detailed system study was performed on the working of the *iWay*, *iServer* and the *iStation*. Study was also done on the type of *iStation* Users such as Home Users, PEO Owners and PEO Users. The Transactions made by each *iStation*, which are stored as log files, was also studied along with the Customer Details stored in LDAP.

Requirements Gathering: The various user requirements were obtained that were necessary for the development of SIIS. Adequate help was taken from the Project Leader. Based on the User Requirements, the System Requirements were also gathered.

Analysis Phase: Based on the System Study and User Requirements gathering the necessary information to be obtained for the development of SIIS was ascertained.

3.2 Development Schedule

Learning Crystal Reports: The mode of displaying required information generated from SIIS must be through an user friendly report generating tool and there could be nothing better than Crystal Reports! [Vendor – Seagate Crystal Reports 6.0]

Design Phase: Based on the System Requirement Specification the Design HLD [High Level Design Document] was prepared. The process on Normalization was applied in the design of the Database. The various Report Templates were also designed.

Coding: This being application software, Microsoft Visual Basic was considered appropriate for development. Visual Basic provides a ready to use GUI and also integrates well with Microsoft SQL. Visual Basic also allows the usage of third party tools, in this case namely Seagate Crystal Reports 6.0. The code consists of comments wherever necessary supported with proper indentation.

Report Preparation: Using Seagate Crystal Reports 6.0 the various Reports Templates were designed along with appropriate Report headings to be generated as per user selection

Testing Phase: The process of testing was done under two phases,

Unit Testing - Considered an adjunct to the coding steps - was done by the developer.

Performance Testing – Run Time performance tests - was done by the Testing Department.

Implementation Phase: The implementation Phase consisted of Packaging and Deploying the SIIS to other systems

3.3 Project Plan

Development Phase	May		June				July				August			
	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4
	System Study													
Working of <i>iConnect</i> Service	■													
Transaction Log format	■													
Customer LDAP Format		■												
Users of SIIS		■	■											
Analysis														
Customer Requirement Specification														
<i>iConnect</i> Requirements		■	■											
Customer Complaint Requirement				■	■									
<i>iStation</i> Repair Requirement				■	■	■								
System Requirement specifications														
Design Document														
Database Design						■								
Data Flow design						■	■							
Screen Design							■	■						
Learning Crystal Reports							■	■						
Coding														
Log File Processing Module								■						
LDAP - Customer Module								■	■					
Customer Details Entry Module									■	■				
Complaint Details Entry Module										■	■			
Report Generation Module										■	■			
Help Details Module											■	■		
Software Testing														
Unit Test								■		■	■	■	■	
Performance Test											■	■	■	■
Implementation														■

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3.4 Programming Languages and Development Tools

Microsoft Visual Basic

Microsoft Visual Basic, a part of the Microsoft Visual Studio, is the most productive tool for creating high-performance enterprise and Web-Based application. It helps in developing sophisticated Windows application in a professional manner. It helps the Developer in creating robust and powerful applications.

Visual Basic provides a graphical environment in which you visually design the forms and controls that become the building blocks of your applications. Visual Basic supports many useful tools such as projects, forms, class objects, templates, custom controls, add-ins and database managers.

The version used in the development of SIIS is Microsoft Visual Basic 6.0. Visual Basic 6.0 is integrating with Visual Database Tools and Data Environment Designer. This allows the usage of databases such as Oracle and Microsoft SQL without leaving the Visual Basic Environment

Microsoft Visual Basic applications are very easy to Package and Deploy thus enabling the making executables and distribution easy and fast.

Microsoft Visual Basic 6.0 introduces ADO as the powerful new standard for data access. The various databases it can access are

- SQL Server 6.5
- Oracle 7 and upwards
- Microsoft Access
- ODBC
- SNA Server

3.4 Programming Languages and Development Tools

MS SQL

MS SQL is not a complete programming language usable to build complex application. It is commonly used with a host language that offers specific features for building complete applications. However, SQL is an industry standard to access database. It enables data definition, manipulation and management, access protection, and transaction control. Its roots are in relational databases, and SQL handles many relational objects, including tables, indexes, keys, rows and columns.

The ANSI 1989 standard defines three programmatic interfaces to SQL:

- ◆ **Modules:** Separate compiled modules may define procedures and then call them from a traditional programming language.
- ◆ **Embedded SQL:** The specification defines embedded statements for a few traditional programming languages. It allows embedded static SQL statements within complete programs.
- ◆ **Direct Invocation:** Access is implementation defined.

SQL language is usable for a variety of purposes

- Querying a database by entering SQL text directly.
- Querying a database within a program
- Defining a database within a program
- Administering Data
- Accessing Multiple Data Services
- Managing Transactions

3.4 Programming Languages and Development Tools

Seagate Crystal Reports

Seagate Crystal Reports 6.0 is the most powerful Windows reporting tool. Seagate Crystal Reports offers new web reporting technology that provides you with advanced dynamic web reporting capabilities and lets you transfer existing reporting skill to the web projects.

It provides a Smart Navigation facility that enables the developer or Report Designer to report information as soon as the Report Design is made. It provides platform independent reporting functionality without having to set up the application on the client. Allows creating Web-deployed database applications, Seagate Crystal Reports gives you the same flexible reporting power you enjoy on the desktop.

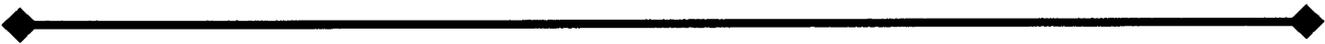
Crystal Report Designer provides support for a wide range of PC and SQL data sources. It connects to any ODBC set up including OLAP data as well. The designer offers functionality to create complicated formulas with the click of a few buttons.

3.5 Documents Prepared

The Various Documents Prepared is as follows: -

1. Customer Requirements Document
2. System Requirements Document
3. High Level Design Document [HLD]
4. Performance Test Case Document

Users of SIIS



4. Users of SIIS

➤ Services Group

- ✓ Customer Support Tracking
- ✓ Quality Report Generation
- ✓ Overseeing Maintenance Department
- ✓ Daily/Weekly/Monthly *iStation* Usage Analysis
- ✓ Enhancing Quality of Service
- ✓ Transaction Analysis
- ✓ Customer *iStation* Fee Collection Plan
- ✓ New User Creation /User Deletion Tracking

➤ Management

- ✓ Macro Analysis
- ✓ Target Maximization

➤ Marketing Group

- ✓ Area Wise Strategy Analysis.
- ✓ Customer User Type Analysis.
- ✓ Marketing Plan - Check List.

➤ Development Group

- ✓ LDAP Maintenance.
- ✓ Network Enhancement.
- ✓ *iWay-iServer* Maintenance

4. Users of SIIS

➤ Repairs and Maintenance Group

- ✓ Customer Complaint Tracking.
- ✓ Pending Customer Complaint Follow up - with Reason
- ✓ AMC Maintenance.
- ✓ Spares Usage in Repairs.
- ✓ Analysis of "Problem Type"
- ✓ Customer Satisfaction- Time taken for Solution

➤ Quality Control Group

- ✓ Spares Replacement
- ✓ Complaint Type Analysis
- ✓ *iStation* Quality Analysis

➤ Network Administrators

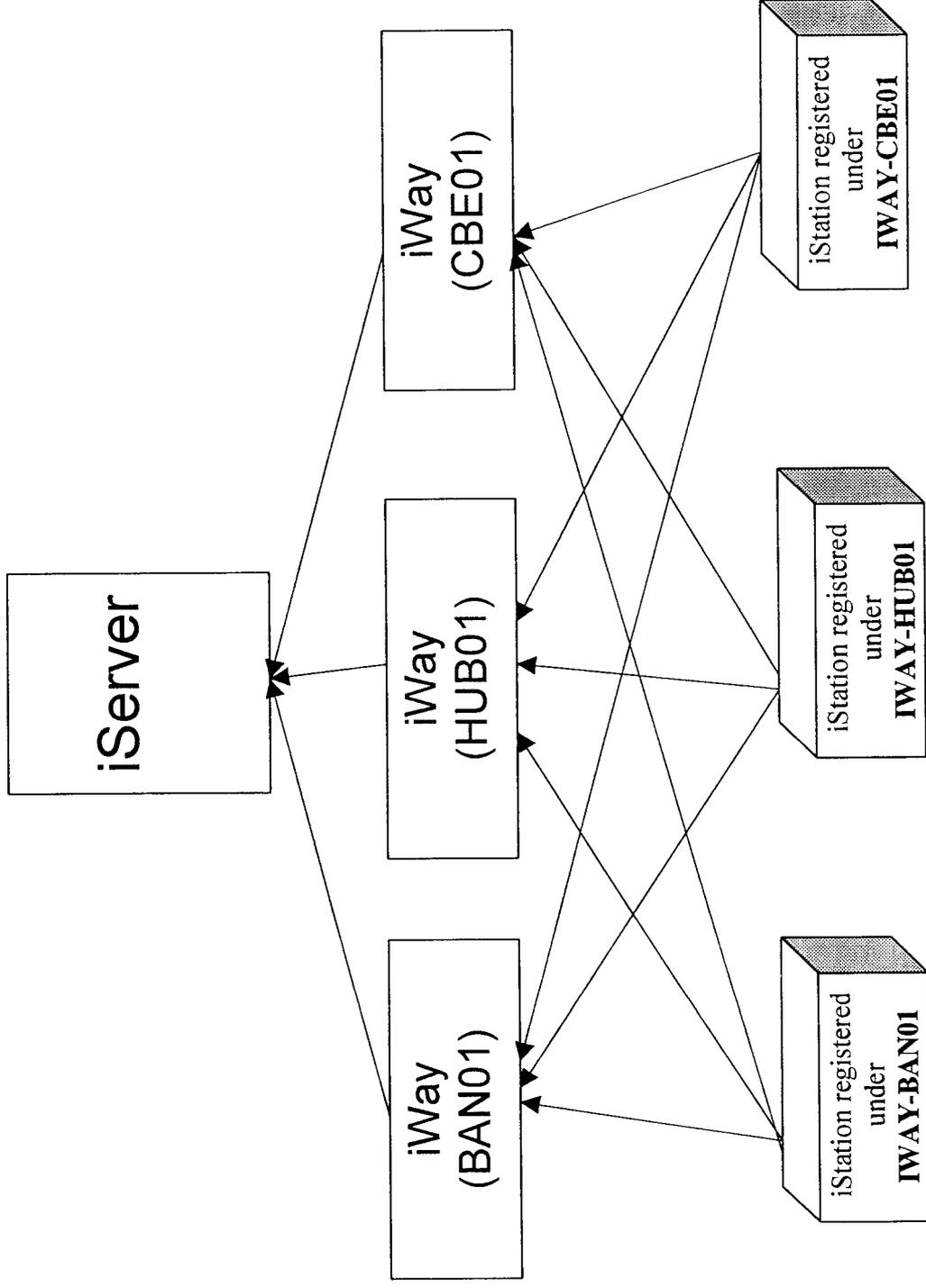
- ✓ Network Monitoring –[*iWay*]
- ✓ *iWay* Uptime and Failure

iConnect Services



5. Working of *iConnect* Services

BLOCK DIAGRAM - iConnect Services



5. Working of *iConnect* Services

iConnect is the Trade Mark service offered by iNabling Technologies. To understand the working of *iConnect* we should understand the working of *iStation*. When a user wants to send mail from the *iStation* calls up the server and deposits the mail. During this time, the *iStation* picks up the mails for the user from the server. The server is connected to the Internet over dial-up/leased lines. *iStation* can communicate with any Internet user and vice-versa. Thus at the cost of a local phone call a user can send as many as 25 emails in a single transaction.

When an *iStation* connects to an *iWay* to which it has been registered then the *iStation* makes transaction termed “**Regular Transactions**”. It is not mandatory that an *iStation* should be connected to an *iWay* to which it has, been registered, since *iConnect* facilitates the usage of *iStation* – “Anywhere Anytime”, and *iStation* can be connected to other *iWays* as well. This form of connectivity allows the user of make transaction deemed “**Roaming Transaction**”.

The *iServer* is a POP Server located in Mumbai, that is the Master server governing the whole of *iConnect*. Similar servers are located (POP3 Servers) at switch points that allow establishing faster connectivity and thereby reducing the time to make transactions. The above block diagram shows *iWays* in Bangalore,, Hubli and Coimbatore.

***Customer
Requirements Document***



6. Customer Requirements Document

6.1 INTRODUCTION

6.1.1. Purpose

The purpose of this document is to lay down Customers Requirements for an Integrated Information System for the Services Group (SIIS). The available information covering *iConnect* Service, Customer Complaints & *iStation* repairs, would be useful for the Services and Development Group for analyzing & verifying various parameters related to Quality of Service and Customers. This System would also be useful to Customer Support & Marketing Groups who are in direct contact with the Customers to analyze their Usage & behavioral patterns.

6.1.2. Scope

The scope of this Document would be to cover all aspects of Customer usage of the *iWays* via their *iStations*. The program requires having a Database back-end, with an effective and easy-to-use front-end. It should be able to handle about a million records. The various operations that the System is expected to do are as follows: -

- (a) **Data Conversion.** Raw data in the form of *iWay* transaction log-files & LDAP Customer information files will be (initially) manually pulled from various *iWays* and *iServer* and given to the System in the form of a flat file. This data needs to be converted from ASCII into Database files in appropriate tables. The formats of these log-files are placed at Annexure-1. This Database creation is the first step for data manipulation.

- (b) **Data Validation.** Data once converted as above needs to be validated with certain parameters that would be generated alongwith the flat files.

6. Customer Requirements Document

- (c) **Manual Data Input.** Some information like *iWay / iServer* status, Customer complaints, Repairs to *iStations*, and certain other information needs to be manually fed-in for which provision needs to be made.
- (d) **Reports.** Various Reports are required to get information from the Database files to cater to various needs. This needs to be built-in.
- (e) **Query.** A query program for getting any desired Report not covered under 2(d) above, based on a simple user query, needs to be created as well.

6.2. REQUIREMENTS

The Requirements of the SIIS have been grouped under three heads as follows :-

- (a) *iConnect* related Requirements
- (b) Customer Complaint related Requirements
- (c) *iStation* repair related Requirements

6.2.1 *iConnect* Related Requirements

Master Reqmt	Child Reqmt No	Reqmt Type	Description	Remarks
SIIS-01	001	Data Conversion	Convert <i>iWay</i> Transaction logfiles to Database files/Tables (Annexure-1)	Log-files are ASCII files
	002		Convert <i>iServer</i> LDAP Customer Info to Database files/Tables	LDAP info given as ASCII files
	003	Data Validation	Validate Converted tables with total transactions, customers, etc as given	Input/ Output comparison
	004		Ensure creation of new Customer on a 'User Creation' transaction in log-file.	-- do --
	005	Data Consistency	Ensure Customer data consistency when LDAP info is updated	

Master Reqmt	Child Reqmt No	Reqmt Type	Description	Remarks
	006	Conversion Execution	Create Front-end to execute the above requirements	Screen file
	007	Data Input	Create Front-end to manually input <i>iWay</i> info (Annexure-2)	Screen file
	008	Report Selection	Create a front-end to select a Report from a list or a Query	Screen file
	009	Report Generation	Make appropriate programs to generate Reports as given below (graphs may be invoked wherever possible)	Programming for Reports
	010	Reports	(1) <i>iConnect / iWay</i> uptime & failures	See Annexure-3 for Report Forms
	011		(2) Transactions/Mails/Volume, <i>iWay</i> -wise as in existence presently	-- do --
	012		(3) Quality of Service- Transactions Successful/ Unsuccessful with reasons	-- do --
	013		(4) Quality of Service- Analysing no. of <i>iStation</i> attempts for connectivity	-- do --
	014		(5) <i>iStation</i> Failure Analysis from above	-- do --
	015		(6) Customer Usage patterns- over days, weeks, months, <i>iWays</i> , etc	-- do --
	016		(7) Customer Usage patterns- during various times of the day	-- do --
	017		(8) Customer non-usage	-- do --
	018		(9) Roaming Customer & Demo Usage	-- do --
	018		(10) Customer Type Pattern	-- do --
	019		(11) S/w version Distribution in field (<i>iStations</i>)	-- do -- #
	020		(12) Subscription Fees Collection Plan	-- do --
	021		(13) Daily, Weekly, Monthly Reports	To be emailed
	022	Query	Query Form for any other conditional Report not covered above	Screen File & Report Form

Note: # - *iStation* s/w version No. is not being entered in the *iWay* log-file presently, though *iStation* is sending the same. This change in the *iWay* s/w is required to be made at the earliest.

6.2.2 Customer Complaint Related Requirements

Master Reqmt	Child Reqmt No	Reqmt Type	Description	Remarks
SIIS-02	001	Data Input	Create Front-end to manually input Customer Complaints info (Annexure-4)	Database integrated with SIIS-01
	002	Report Selection	Create a front-end to select a Report from a list or a Query	Screen file
	003	Report Generation	Make appropriate programs to generate Reports as given below (graphs may be invoked wherever possible)	Programming for Reports

Master Reqmt	Child Reqmt No	Reqmt Type	Description	Remarks
	004	Reports	(1) No. of Customers Complaints	See Annexure-5 for Report Forms
	005		(2) Type of Complaints	-- do --
	006		(3) Customer Satisfaction – Time taken for solution	-- do – (ideally within 24 hrs)
	007		(4) Pending Complaints with reasons	-- do --
	009		(5) Weekly, Monthly Reports	To be emailed
	010	Query	Query Form for any other conditional Report not covered above	Screen File & Report Form

6.2.3 *iStation* Repair Requirements

Master Reqmt	Child Reqmt No	Reqmt Type	Description	Remarks
SIIS-03	001	Data Input	Create Front-end to manually input <i>iStation</i> repair info (Annexure-4)	Screen file
	002	Report Selection	Create a front-end to select a Report from a list or a Query	Screen file
	003	Report Generation	Make appropriate programs to generate Reports as given below (graphs may be invoked wherever possible)	Programming for Reports
	004	Reports	(1) No. of <i>iStation</i> failures (h/w, s/w) & their breakdown	See Annexure-5 for Report Forms
	005		(2) <i>iStation</i> Failure Analysis from above	-- do --
	006		(3) Weekly, Monthly Reports	To be emailed
	007	Query	Query Form for any other conditional Report not covered above	Screen File & Report Form

Enclosures: Annexures-1 to 5 as below: -

- Annexure 1 - Logfile – Flat-file available at the *iWay/iServer*
- Annexure 2 - Manual Data input – Front-end Screen
- Annexure 3 - Reports Forms Format (Refers to para 4 above)
- Annexure 4 - Manual Data input – Customer Complaints & *iStn* Repairs
- Annexure 5 - Reports Forms Format (Refers to para 5 & 6 above)

6. Customer Requirements Document

Annexure –1

6.2.4 Flat Files from iWays & iServer - For Database Conversion

(1) iWay Daily Transaction File Details

- 1 file per *iWay* named as “<*iWayname*>-<date>.log”
Eg: *iWayBAN01-23-jan-2002.log* would be required to be processed every morning.
- All these daily *iWay* transaction files would be required to be kept in one directory named “dailyusage”.
- The log file should start with 5 pieces of Validation data for that file in the first line, viz total transactions, total mails sent, total mails received, total successful transactions, total unsuccessful transactions
Eg: 152, 80, 125, 142, 10
- Only one operation on the above files should be allowed (no duplication)
- User Creation transaction should modify/add records to the Customer Database
- User Deletion should ‘mark’ the concerned UserID as deleted- but should delete the UserID from the database.
- Sample of the “flat file” is as below: -

```
lakshmim~H~r100110000169~ban01a1176~tty C0~0~22:47:27~1023383847~22:47:49~10
23383869~0~1085~0~1~RS~#1 RECV: iStation received mail(s) successfully~0
santhanam~H~r100110000139~ban01a8004~tty C0~0~07:11:44~1024623704~07:12:04~1
024623724~0~625~0~1~RS~#1 RECV: iStation received mail(s)
successfully~2~7.21.41~7.23.9
lakshmim~H~r100110000169~ban01a1176~tty C1~0~23:12:23~1023385343~23:12:44~10
23385364~450~0~1~0~RS~#1 No new mails in inbox~0
ybveena~H~r100110000169~ban01a1176~tty C1~0~23:14:06~1023385446~23:15:19~102
3385519~0~0~0~0~RX~#0 RECV: No ACK for DATA packets~0
```

6. Customer Requirements Document

(2) iServer Customer Information Details (from LDAP)

- The Customer Data file requires to be processed every week with the existing Customer Database for updation.
- There will be 2 flat files given as follows: -
 - One, based on Subscription ID (*iStation* & Subscription details)
 - Second, based on User ID (Customer personnel Details)
- Both files are to be processed and the information updated/ fed into appropriate tables in the Customer Database
- No Validation information is added to these files since data from this will only update the Customer file, not replace. All replacements' History should be recorded and available for future references; it should be possible to delete this History (with password protection)

Sample of the LDAP flat files is as below:

```

ban01a0020
knaveen
Naveen K
6697708
78/41 14TH Cross 11th Main Padmanabhanagar,B'lore -560070
Male

ban01a0023
mamatha
MAMATHA
8600693
23,SRI SAILAM,INDIAN BANK COLONY,RAJA RA
Female
    
```

Sample data of Transaction Log Files:

```

ban00a0018~i190110000017~O~iWay-BAN01~30-08-2002
ban01a0012~r090110000069~H~iWay-BAN01~22-03-2002
ban01a0013~r090110000018~H~iWay-BAN01~23-03-2002
    
```

6. Customer Requirements Document

Annexure – 2

6.2.5 Manual Data input Screen – Customer Information

Customer data needs to be Manually fed-in/modified using a Front-end interface. To this extent, information needs to be presented for data addition / modification. The data to be displayed for this purpose are as follows: -

<u>NOT to be Edited</u>	<u>May be Edited</u>
<ul style="list-style-type: none"> • Subscription No. • <i>iStation</i> No. • User Type • User ID • Home <i>iWay</i> • Registration Date 	<ul style="list-style-type: none"> • Customer Name • Address • Phone No • Sex • Place • Sector of Usage • Termination Date • <i>iStation</i> AMC Details

The Customer data should be indexed in Compound index files to have facilities like advancing/ going back according to Subscription no., *iStation* no., User ID, place & Customer Name, with adequate help/browsing facilities to search the required Customer.

Editing & Deleting facilities may also be provided for whole *iStations* / Subscription nos. All such transactions may be through protected passwords.

6. Customer Requirements Document

Annexure – 3

6.2.6 Format for Report Forms – *iConnect* Service Usage

There are various Reports that are required to see the efficiency of the *iConnect* Service as well as the Customer Usage. These are as follows: -

Sl No	Report Name	Selections	Fields to be Displayed	Remarks
A Transactions Based Reports				
1.	Daily Transactions	UserID, Subscription No (upto 5 IDs) or <i>iStation</i> no. – single, in a Range or All, Place/ <i>iWay</i> -wise, by Name, User Type, Sector of Usage	User ID, <i>iStation</i> no, User Name, 30 Days transactions, Mails Sent & Rxd – Report Title as per Selection	Landscape form; print option reqd
2.	Monthly/ Qtrly Transactions	UserID, Subscription No (upto 5 IDs) or <i>iStation</i> no. – single, in a Range or All, Place/ <i>iWay</i> -wise, by Name, User Type, and Sector of Usage. Months to be selectable (1 or more months, Qtr, half-year or All), User Type, Sector of Usage	User ID, <i>iStation</i> no, User Name, all Monthly transactions, Mails Sent & Rxd –Report Title as per Selection	----- do -----
3.	Transaction Success/Failures Analysis	<i>iWay</i> , place, day/date range, User Type	<i>iWay</i> , Successful/Failed transactions, details of failed transaction, mails sent/rxd, no. of simultaneous hits, UserIDs, <i>iStn</i> no. for failures	Total overall for <i>iConnect</i> Service to be given
4.	<i>iStation</i> time-Usage pattern	Month, period, User Type	Transactions, Mails Sent, Mails Rxd, on hourly basis	Graphs preferable
5.	Daily Report	Option to Select Date or Month and User Type	As per daily Report Format in use presently	Printable; also to be mailed daily
B <i>iWay</i> Health Reports				
6.	<i>iConnect</i> Service status	Day, Month, time, <i>iWay</i>	<i>iWay</i> uptime, total <i>iWay</i> usage time, CPU idle time, etc	Graphs & data required
7.	Telephone line occupancy	<i>iWay</i> , Date, Month, time range for a day	Transactions/tty every 2 hrs for the selected time range	Grapg & data required

Customer based Reports				
8.	<i>iStations & Customers List</i>	Place, <i>iWay</i> , User Type and Sector	Customer details- Name, UserIDs Sex, Tele no, Address, Date of Regn, Sub exp date, total transactions	Yearly transactions total may be given; printable
9.	Usage Pattern of <i>iStations</i>	Place, <i>iWay</i> , Sex-wise, User Type, User Classfn	Place, no. of <i>iStns</i> , nos of Users as per Classfn; each classfn expandable further with Customer details as above – Report Title as per Selection	Print Option; Users- Heavy, daily, wkly, mthly, occsnl, non-users
10.	Details of types of <i>iStation</i> Users	Place, <i>iWay</i> , Sex-wise, User Type, User Classfn	Customer Details with tele nos, addresses & places with no. of & last date of transaction/mails	Print Option; transactions for last month / qtr
11.	Subscription Fees Dues & Collection List	Place, <i>iWay</i> , Day/ Month (upto), Paid/Not-paid <u>Note: (Home-users only)</u>	Customer Details with tele nos, addresses & places with no. of & last date of transaction/mails	Print Option <u>Note: (Home-users only)</u>
12.	LDAP data to be updated	-----	<i>iStn</i> no., Sub no., User ID, all Customer details changed	Print Option

6. Customer Requirements Document

Annexure – 4

6.2.7 Manual Data Screen – Customer Complaints & iStation Repairs

Customer complaints & analysis data needs to be Manually fed-in/modified using a Front-end interface. All relevant information needs to be presented for data addition / modification. The data to be displayed for this purpose are as follows: -

<u>Data to be Entered</u>	<u>Data to be Displayed only</u>
<ul style="list-style-type: none"> • User ID • Date Reported • Problem Description • Problem Type • Engineer's Observation • Action Taken • Engineer's Visit Details • <i>iStation</i> spares replaced • Problem status details • SE assigned the job 	<ul style="list-style-type: none"> • Subscription No. • <i>iStation</i> No. • User Type • Home <i>iWay</i> • Termination Date • Address • Phone No • Place • <i>iStation</i> AMC Details

The Customer Complaints table should be indexed in Compound index files to have facilities like advancing/ retracing according to Subscription no., *iStation* no., User ID, place & Customer Name, with adequate help/browsing facilities to search the required Complaint.

Editing facilities may also be provided for Complaints as specified above. All data entry may be through protected passwords.

6. Customer Requirements Document

Annexure – 5

6.2.8 Format for Report Forms – Customer Complaints

There are various Reports that are required so as to ensure speedy resolution to Customer Complaints. These are as follows: -

Sl No	Report Name	Selections	Fields to be Displayed	Remarks
A Complaints-based Reports				
1.	Complaints List	Period Range, User type	Complaint no, Date Reported, User ID, Sub no/ <i>iStn</i> no, Problem desc, Observns, Action taken, dates, Spares replaced, Status	Landscape form; print option in Register format
2.	Complaints Handled/ Pending	Week/Month/Period range (selectable), <i>iWay</i> -wise, place-wise, Status, User type	Complaint no, Date Reported, User ID, Sub no/ <i>iStn</i> no, Problem desc, Observns, Action taken, dates, Spares replaced, Status	Print option required
3.	Complaint Report Form		As per existing Complaint Form to be taken by SEs.	Complaint no. & details to be entered
4.	Weekly/ Monthly Report	Week/Month/Period range (selectable), User type	Total Complaints handled, solved, pending (with reasons), spares replaced, visits made	<i>iWay</i> -wise; Print option required; Report to be mailed
5.	Complaint Analysis	Week/Month/Period range (selectable), <i>iWay</i> -wise, place-wise or SE-wise	Total Complaints handled, solved, pending (with reasons), spares replaced, visits made, approximate cost incurred	Print option required
B iStation-based Reports				
6.	Defect Analysis	Week/Month/Period range (selectable), <i>iWay</i> -wise, place-wise or spares-wise	Total & percentage of defects, spares utilization details, type of defects	Graphs & data required
7.	Mapping-working to repaired <i>iStations</i> in field	Week/Month/Period range (selectable), <i>iWay</i> -wise, place-wise or spares-wise	Working to repaired <i>iStations</i> , as per selection	Graphs & data required

System Requirement Specification



7. System Requirement Specification

7.1. Introduction

iConnect is a project being developed by iNabling for providing E-mail connectivity to the users without the need to have a computer or an Internet connection. *iConnect* comprises of the various modules and includes hardware and software.

The main purpose of Integrated Information System for the Services Group (SIIS) is to analyze the *iConnect* Customer Base. The **Services Group, Development Group and Network Administration Group** use the available information covering *iConnect* Service, Customer Complaints & *iStation* repairs. This system would also be useful to the above-mentioned groups for analyzing & verifying various parameters related to Quality of Service and Customers. This system would also be useful to **Customer Support & Marketing Groups** who are in direct contact with the Customers to analyze their **behavioral & Usage pattern**.

7.1.1 Purpose

The purpose of this document is to lay down the Software Requirements for an **Integrated Information System for the Services Group (SIIS)**. The document highlights the various requirements from the aspect of software development to satisfy the user requirements. It also lays down the hardware and software requirements for **SIIS**.

7.1.2 Scope

This document shall form the basis for the design and development of **SIIS (Services Integrated Information System)**

7. System Requirement Specification

7.1.3 Definitions, acronyms, abbreviations

Abbreviation	Definition
<i>iServer:</i>	The Main Server located in Mumbai that stores all the customers' mails and transaction details from the <i>iWay</i> permanently.
<i>iWay:</i>	Servers located at various places such as Bangalore, Coimbatore, Hubli, Chennai, and Mangalore that enable <i>iStations</i> to connect and mail faster.
<i>iStation:</i>	An indigenous product from iNabling Technology that enables people send mails without a PC. The device requires a telephone cable. You can send all your mails stored in the Outbox at the cost of just one phone call.
<i>iConnect</i>	The Service Domain provided to the <i>iStation</i> Customers is called <i>iConnect</i> . <i>iConnect</i> Service also provides the transliteration between various languages
S I I S	Services Integrated Information System
Demo Transaction	Users with Subscription No between a pre specified range [ban01a0001 to ban01a1000]
Regular Transaction	Transactions of users who have been registered to a particular <i>iWay</i> and have logged to the same <i>iWay</i>
Roaming Transaction	Transactions of Users who have logged on to an <i>iWay</i> to which they are not a Registered user.
Home Users Type	Individual Users are connected to a particular <i>iStation</i> . A Home <i>iStation</i> has five User ID's bound to a Subscription No
LDAP	Light Weight Directory Access Protocol . This directory is a database optimized for Read Operations mainly. They are basically designed following the "Tree Structure" Principle and enable powerful Browse and Search Capabilities.
PEO Owners Type	Users who own an <i>iStation</i> and are permitted Unlimited User ID and no termination date. Can be compared to the Owner of a STD Booth.
PEO Users Type	Users who do not own any <i>iStation</i> but can access any "PEO Owner <i>iStation</i> ". The PEO Users are not bound to any <i>iStation</i> . Can be compared to any user of the STD Booth.

7. System Requirement Specification

7.1.4 References

1. Customer Requirements Document for SIIS
2. *iWay* Design Document
3. *iServer* Design Document
4. Complaint Form Format
5. *Daily* Report Template
6. *iConnect* Usage Analysis Template

7.2. System Requirements:

The requirements have been classified into Hardware and software requirements. They are discussed in the following sections.

7.2.1 Hardware requirements for the PC

The hardware requirement for SIIS software is standard PC with the following minimum configuration

- 100 MHz Pentium.
- 200 MB RAM
- 2 MB Free Hard Disk Space or more.

7. System Requirement Specification

7.2.2 Software requirements for SIIS

(a) iConnect Related Requirements

Master Reqmt	Child Reqmt No	Reqmt Type	Description	Remarks
SIIS-01	001	Data Conversion	Convert <i>iWay</i> Transaction logfiles to Database files/Tables (Annexure-1)	Log-files are ASCII files
		10	The log files should have the File Name format as follows <i>iWay</i> Name-DD-MMM-YYYY.log E.g.: <i>iWay</i> -BAN01-22-Dec-2000.log	
		20	The Log File Name must be parsed to obtain the <i>iWay</i> Name and the date of transaction	
		30	The various parameters of the Transaction log file must be separated by tilde(~)	
		40	The log file to be processed should be put in a folder "Todays Log File"	
		50	The log file should be accompanied with 5 validation parameters as the first line of the log file namely 1.Total Transaction 2.Total Mail Sent 3.Total Mail Received 4.Total Successful Transactions. 5.Total Unsuccessful Transactions	
	002	LDAP Updation	Convert <i>iServer</i> LDAP Customer Info to Database files/Tables	LDAP info given as ASCII files
		60	Converting the Sub Based Flat file and UserID based flat file into database.	
		70	Mapping Sub based database with UserID based database to generate Master and Customer Details database	
		80	Classification of Roaming, Regular <i>iStation</i> Users.	
		90	Updating Master and Customer Details database for new user details	
		100	Segregation of Changed data with option to view changed data	
	003	Data Validation	Validate Converted tables with total transactions, customers, etc as given	Input/ Output comparison

Master Reqmt	Child Reqmt No.	Reqmt Type	Description	Remarks
		100	Validating the Transaction Log file of each <i>iWay</i> for a) No of Transactions b) Total Mails Sent/ <i>iWay</i> c) Total Mails Received/ <i>iWay</i> d) Successful Transactions e) Unsuccessful Transactions	
		110	If the parameters match with the processed data then the validation is a success else the validation is a failure	
		120	The validated file if successful is to be processed.	
		130	The validated file once processed is to be moved to another folder named "Old Log Files"	
	004		Ensure creation of new Customer on a 'User Creation' transaction in log-file.	-- do --
		140	If the transaction record is a Create Successful 'CS' entry then the Master and the Customer Details table should be updated with the SubscriptionNo, UserID, <i>iWay</i> Name, User Type, <i>iStation</i> No.	
	005	Data Consistency	Ensure Customer data consistency when LDAP info is updated	
			1 Enter new user details by updating Master and Customer Details table with Customer Information	
		160	Check for Inconsistency in LDAP and SIIS – details of these customer to be recorded in inconsistencies table are to be viewed by invoking a report	
		170	Map Subscription No for corresponding UserID	
	006	Conversion Execution	Create Front-end to execute the above requirements	<u>Screen file</u>
		180	The form should provide the user to update the LDAP as a step by step process 1. Convert the Subscription Based Tree to Database 2. Convert the UserID Based Tree to Database 3. Map the Subscription Based database with the UserID based database to give the master and the customer details table	The Customer Details table should be updated for only new user creation. Any inconsistencies should be recorded to facilitate updating of LDAP

Master Reqmt	Child Reqmt No.	Reqmt Type	Description	Remarks
		190	Option to view the Inconsistencies should be provided in the form	
	007	Data Input	Create Front-end to manually input <i>iWay</i> info (Annexure-2)	Screen file
		200	A front end should be provided to update the <i>iWay</i> transaction information to SIIS database.	
		210	The front end should process validate the Log files for the validation parameters provided.	
		220	Information about processing should be provided at regular intervals to the user – before and after process is completed.	
	008	Report Selection	Create a front-end to select a Report from a list or a Query	Screen file
		230	A menu option should be provided in the Main screen from where the user can select the required report	
	009	Report Generation	Make appropriate programs to generate Reports as given below (graphs may be invoked wherever possible)	Programming for Reports
		240	From the Main Screen the reports can be accessed through Transaction Based Reports Menu and Customer Based Reports Menu	
	010	Reports	(1) <i>iConnect</i> / <i>iWay</i> uptime & failures	See Annexure-3 for Report Forms
		250	Input: day, Month, Time, Year Output: <i>iWay</i> Uptime, total <i>iWay</i> Usagetime, and CPU idle time.	
	011		(2) Transactions/Mails/Volume, <i>iWay</i> -wise as in existence presently	-- do --
		260	Input: Date, UserType Output <i>iWay</i> Name, Total No Of Transactions, Successful, Unsuccessful Transaction, No of Mail Sent, No of Mails received, KB Sent, KB Received, No of Users Created, No of Users Deleted, <i>iStation</i> logged in today/ Total <i>iStation</i> Regd, % <i>iStation</i> Used, No of transactions/ <i>iStation</i> Used, No of Emails/ <i>iStation</i> Used.:	
	012		(3) Quality of Service- Transactions Successful/ Unsuccessful with reasons	-- do --
		270	Input: <i>iWay</i> , Place, Date Range Output: <i>iWay</i> Name, Total No Of Transactions, Successful. Unsuccessful	

Master Reqmt	Child Reqmt No.	Reqmt Type	Description	Remarks
			Transaction, No of Mails Sent & Received.	
		280	Sub Classification of Unsuccessful Transaction Types. Transaction types that have their last letter as "X" – say in CX, FX, and DX etc should be classified with their corresponding no of transactions.	
		290	'FS' transaction type is to be considered as failure	
	013		(4) Quality of Service- Analyzing no. of iStation attempts for connectivity	-- do --
		300	Count of the number of tele line attempts made by each iStation used that particular day to the total iStation registered	The count should not be taken for separate user ID
	014		(5) iStation Failure Analysis from above	-- do --
		310	The iStation failed to connect comparative to the iStation connected during that period.	
	015		(6) Customer Usage patterns- over days, weeks, months, iWays, etc	-- do --
		320	Input: Option to select the type of report such as monthly, quarterly, half yearly, yearly should be provided. Further selection should be provided to select the month or quarter or half year and the year.	
		330	Input: User Type, Period, Search based on Subscription No, User ID, iStation No along with the range of search Output: User ID, iStation No, User Name, Total Transactions, Mails Sent & Rcvd for the Period chosen, No of Simultaneous Hits.	If the range of search is 'All' then the process will take a lot of time particularly for monthly transaction analysis as the calculation is for each day.
		340	Report Title should be given as per period selection	
		350	The no of days for a month should be taken care of as for leap year and 30 day months and 31 day months' etc.	
	016		(7) Customer Usage patterns- during various times of the day	-- do --
		360	Input: Period Range (date), User Type Output: iWay Name, Transactions, Mail Sent, Mail Received	The time slot for analysis is in hourly basis starting from 00:00 hrs to 24:00 hrs for the date range
	017		(8) Customer non-usage	-- do --

Master Reqmt	Child Reqmt No.	Reqmt Type	Description	Remarks
		370	Input: <i>iWay</i> Name, Place, Sex, User Type, User Classification, Period Output: <i>iWay</i> Name, Place, No of Non Users	The report is a part of the Usage Pattern of <i>iStation</i> Report
	018		(9) Roaming Customer & Demo Usage	-- do --
		380	Transactions that contain "Message type" as "POP sent Mail" are termed as Roaming Transactions	-- do --
	019		(11) S/w version Distribn in field (<i>iStation</i>	-- do --
		390	Checking for existence of Version No in the transaction log and if exists recording the Version No in the SIIS database	If version no does not exist in the transaction record then the field should be left blank.
	020		(12) Subscription Fees Collection Plan	-- do --
		400	Check for Termination Date, if Current date exceeds Termination date then mark the User for Renewal of Subscription	
	021		(13) Daily, Monthly Reports	To be emailed
		410	Input: Date, User Type Output: <i>iWay</i> Name, Total No Of Transactions, Successful, Unsuccessful Transaction, No of Mail Sent, No of Mails received, KB Sent, KB Received, No of Users Created, No of Users Deleted, <i>iStation</i> logged in today/ Total <i>iStation</i> Regd, % <i>iStation</i> Used, No of transactions/ <i>iStation</i> Used, No of Emails/ <i>iStation</i> Used.	Mailing report option is provided in the Report generation software by default.
	022	Query	Query Form for any other conditional Report not covered above	Screen File & Report Form
		420	Provide Selection Option with Validation	

7. System Requirement Specification

(b) Customer Complaint Related Requirements

Master Reqmt	Child Reqmt No	Reqmt Type	Description	Remarks
SIIS-02	001	Data Input	Create Front-end to manually input Customer Complaints info (Annexure-4)	Database integrated with SIIS-01
		10	Fixed Fields: Customer Details, Complaint Number. Fields to be Entered: User ID, Problem Type, Date Reported, Problem Description, SE Observation, SE assigned, Action Taken, Visit Made, Visit Date, Spares Replaced, Status of complaint, Date of Completion / Reason for Pending, Avail of AMC or not.	
		20	The details entered by the SE can be modified. The option is password protected	
		30	New spares should be allowed to add and must be checked for duplication	
		40	Once the SE enters the User ID his Customer Details should be tracked and should be automatically displayed	
		50	Old Complaints should be traceable- they can be traced using the Complaint No as the Search criteria.	
		60	The option to delete a complaint should be provided and it should be password protected	
		70	Navigation facility should also be provided to Move First, Move Last, Move Next, Move Previous	
	002	Report Selection	Create a front-end to select a Report from a list or a Query	Screen file
		80	A menu option should be provided in the Main screen from where the user can select the required report	
	003	Report Generation	Make appropriate programs to generate Reports as given below (graphs may be invoked wherever possible)	Programming for Reports
		90	From the Main Screen the reports can be accessed through Complaint Based Report	
	004	Reports	(1) No. Of Customers Complaints	See Annexure-5 for Report Form
		100	Input: Period Range, User Type Output: Complaint No, Date Reported, User ID, Subscription No, iStation No, Problem Description, Problem Type, Observation, Action Taken, Spares Replaced, Status, Visit	

			Made, <i>iWay</i>	
	005		(2) Type of Complaints	-- do --
		110	Input: Period Range/Month Selection, <i>iWay</i> Name, Place, Status Output: Complaint No, Date Reported, User ID, Subscription No, <i>iStation</i> No, Problem Description, Problem Type, Observation, Action Taken, Spares Replaced, Status, Visit Made, <i>iWay</i>	
	006		(3) Customer Satisfaction – Time taken for solution	-- do -- (ideally within 24 hrs)
		120	Diff b/w Complaint Date and Date of Completion	
	007		(4) Pending Complaints with reasons	-- do --
		130	Input: Period Range/Month Selection, <i>iWay</i> Name, Place, Status Output: Complaint No, Date Reported, User ID, Subscription No, <i>iStation</i> No, Problem Description, Problem Type, Observation, Action Taken, Spares Replaced, Status, Visit Made, <i>iWay</i>	
	009		(5) Weekly, Monthly Reports	To be emailed
		140	Input: Period Range/ Monthly Selection, <i>iWay</i> Name, Place, SE Name Output: Total Complaints handled, Total Complaints Solved, Total Complaints Pending with Reason for Pending, Spares Replaced, Total Visits Made	Option to mail is provided by default in the Report Generation Software
	010	Query	Query Form for any other conditional Report not covered above	Screen File & Report Form
		150	Provide Selection Option with Validation	

7. System Requirement Specification

(c) *iStation* Repair Requirements

Master Reqmt	Child Reqmt No	Reqmt Type	Description	Remarks
SIIS-03	001	Data Input	Create Front-end to manually input <i>iStation</i> repair info (Annexure-4)	Screen file
		10	Option to enter User Details and <i>iStation</i> Related requirements along with details about AMC.	Refer Complaints Form format
	002	Report Selection	Create a front-end to select a Report from a list or a Query	Screen file
		20	A menu option should be provided in the Main screen from where the user can select the required report	
	003	Report Generation	Make appropriate programs to generate Reports as given below (graphs may be invoked wherever possible)	Programming for Reports
		30	From the Main Screen the reports can be accessed through <i>iStation</i> Based Report	
	004	Reports	(1) No. of <i>iStation</i> failures (h/w, s/w) & their breakdown	See Annexure-5 for Report Forms
		40	Input: Period Range/ Monthly Selection <i>iWay</i> Name, Place, and Spares Name. Output: <i>iWay</i> Name, Place, Total Complaints Handled, Total No of Defects, H/w and S/w Defects, % of defect (H/w & S/w), Spares utilized for the above defects.	
	005		(2) <i>iStation</i> Failure Analysis from above	-- do --
		50	Input: Period Range/Monthly Selection, <i>iWay</i> Name, Place, Spares Name Output: <i>iWay</i> Name, Place, Total <i>iStations</i> , Defective <i>iStations</i>	If a particular spare is chosen the defective <i>iStation</i> for that particular spare is to be given
	006		(3) Weekly, Monthly Reports	To be emailed
		60	Same Reports as SIIS-004	
	007	Query	Query Form for any other conditional Report not covered above	Screen File & Report Form
		70	Should take any type of Input and should generate the necessary report.	Specify Parameters selected.

Design Document



8. Design Document

8.1 Introduction

iConnect is a project being developed by iNabling for providing E-mail connectivity to the users without the need to have a computer or an Internet connection. *iConnect* comprises of the various modules and includes hardware and software.

The main purpose of **Integrated Information System for the Services Group (SIIS)** is to analyze the *iConnect* Customer Base. The **Services Group, Development Group and Network Administration Group** use the available information covering *iConnect* Service, Customer Complaints & *iStation* repairs. This system would also be useful to the above-mentioned groups for analyzing & verifying various **parameters** related to Quality of Service and Customers. This system would also be useful to **Customer Support & Marketing Groups** who are in direct contact with the Customers to analyze their **behavioral & Usage pattern**.

8.1.1 Purpose

The purpose of this document is to lay down the High Level Design for an **Integrated Information System for the Services Group (SIIS)**. The document highlights the various requirements from the aspect of software development to satisfy the design.

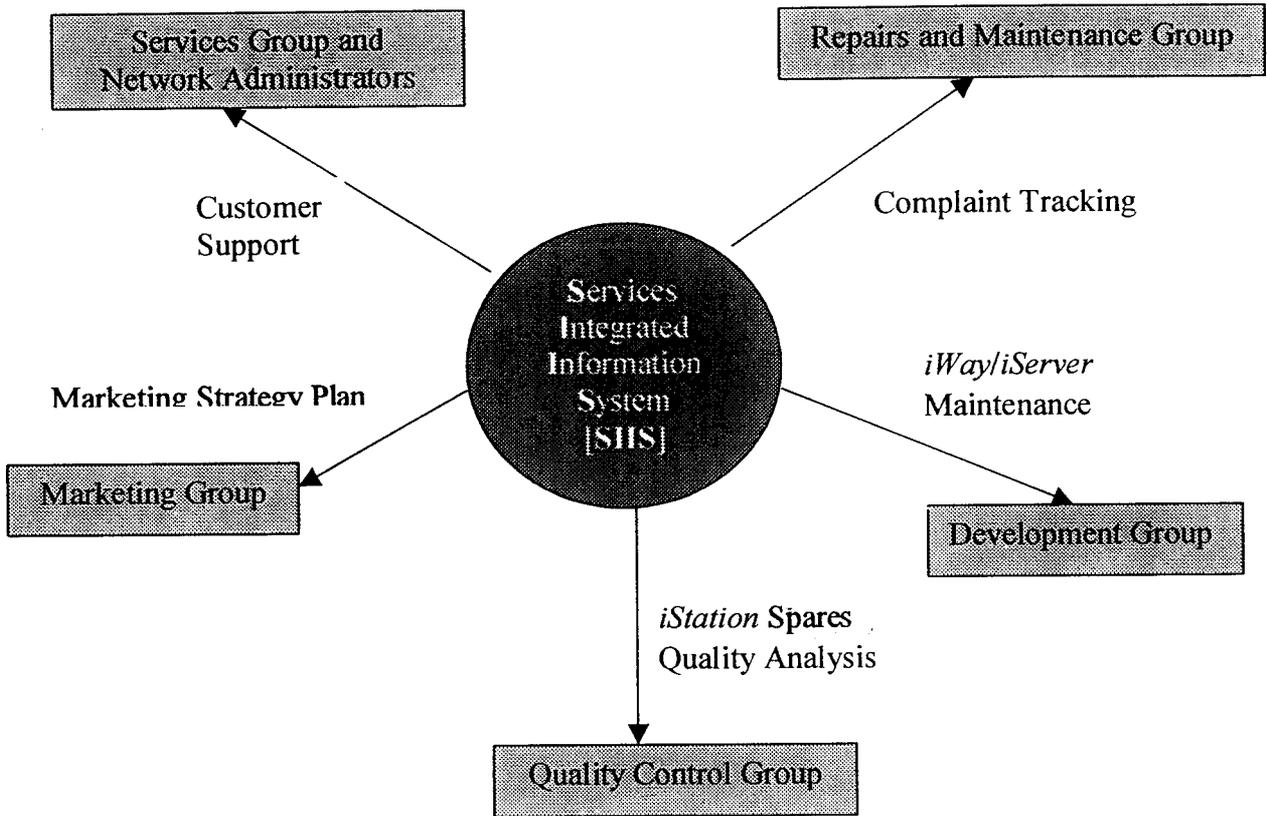
8.1.2 Scope

This document shall form the basis for the Low Level Design and preparation of test cases for **SIIS (Services Integrated Information System)**.

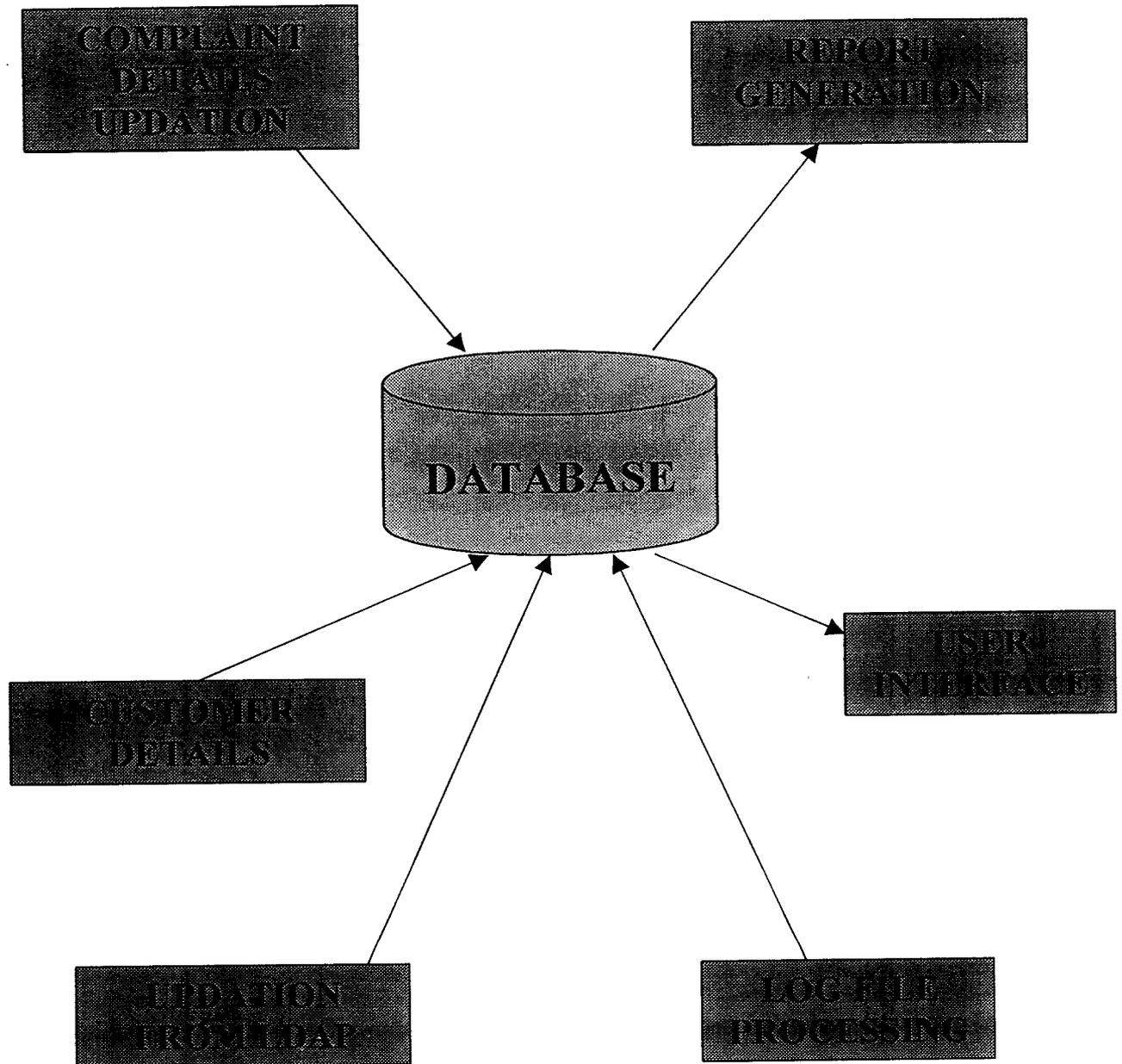
8.1.3 Definitions, Acronyms and Definitions

Refer System Requirement Document.

8.2 Context Diagram for SIIS



8.3 Overview of SIIS



8.4 Subsystem Design

Log File Processing Module

In this Module the various transactions recorded in the form of **flat log files** by the various *iWays* will be given as input. An interface is required to process the flat files and also record the *iWay* Name and the **date** on which the file has been processed automatically from the log file name. **Creation of New User** and **Deletion of any existing user** should be detected from the transaction files and the necessary updates should be made to the Customer Details. Transactions should be appropriately segregated as **Regular, Roaming or Demo** Users.

LDAP - Customer Module

The Customer Details extracted from all *iWays* are obtained as two Trees. One tree based on the **Subscription No** and the other tree based on the **UserID**. It is noted that a Subscription No has five User ID's bound to it. This pertains only to the Home *iStations*. **PEO Owners** have ownership over an *iStation* and allow access to any PEO User.

The **Subscription No** tree should be mapped to the **UserID** tree based on the Subscription No. Any changes in Customer Details, Details of New Users should be updated. Any **Inconsistencies in LDAP and SIIS database** should be reflected in a Report.

Customer Details Entry Module

This Module allows the Services group to view the **Customer Details**, **Browse** according to any chosen index. Help facility in the form of Search should allow them to search for the Customer Detail based on any criteria. **Navigation Facility** should be provided to enable them to move between records. The option to Navigate the order of records should also be provided. **Customer Details Modification** should also be provided and it should be **password** protected. Any changes in Customer Details should be recorded and facility should be provided to view the changes made in a Report. **AMC** details are also to be recorded.

8.4 Subsystem Design

Complaint Details Entry Module

This Form provides an interface to the maintenance Group to view the complaint details. The complaints can be searched according to the Complaint No. The Complaint Form should display all the Customer Details along with each complaint. It keeps track of the spares used, the type of problem, the Service Engineer who attended the complaint, Status of Complaint. The default mode is the view mode only. Provision for modification is also provided, which is password (encrypted) protected.

Report Generation Module

This module deals with mainly providing the Services groups an interface to interact and customize their report generation according to various criteria's and complexities. The Reports are classified into the following types.

- **Transaction Based Reports**
- **Customer Based Reports**
- **Complaint Based Reports**
- ***iStation* Based Reports**
- ***iWay* Health Reports**

Help Details Module

This module deals with an user friendly help system such that even an common man can operate with the SIIS. Details with respect to the various key terms should be provided for and explanation of the working of each form should be explained. Details about the Reports should also provided with such as the inputs needs and the field displayed by the Report along with the usage of each Report.

8.5 Database Design

The design of the database has been very carefully drafted to avoid redundancy. The various principles in database design were applied. The principle of Normalization was applied to eradicate redundancy. The database will have different tables containing information about Customer Details, Complaint Details, Transaction Details and details required for generating Reports.

The tables required are as follows

MASTER: Details about each Subscription No

CUSDET: Details about each User ID

TRAN: Details about each Transaction recorded by individual *iWays*.

ROAMING: Details about each Roaming Transaction recorded by individual *iWays*.

MESSAGES: Contains the list of all the Messages the *iWay/iStation* can generate depending on the transaction

CUSCOMP: Details about the Complaints made by the Customer.

DAILYTRAN: Stores the Daily Transaction Analysis detail for each *iWay*.

INCON: Stores the Inconsistent Customer Records while performing Updation from LDAP.

MONTHTRAN /QTRTRAN/FULLTRAN: Stores the *iConnect* Service Usage Analysis detail that is used to generate Reports.

LOGIN: Stores the Login ID and Passwords

SPARES: Stores the Spare Details for every *iStation* spare replaced.

SUBSCRIPTION: Parses the Sub Based Tress and stores it.

USERID: Parses the Sub Based Tress and stores it.

8.5 Database Design

CHANGEDDETAILS: Records the details of the Customer modified manually by the user.

IWAYCOMPLAINTS: Stores the details of the Complaints *iWay* wise

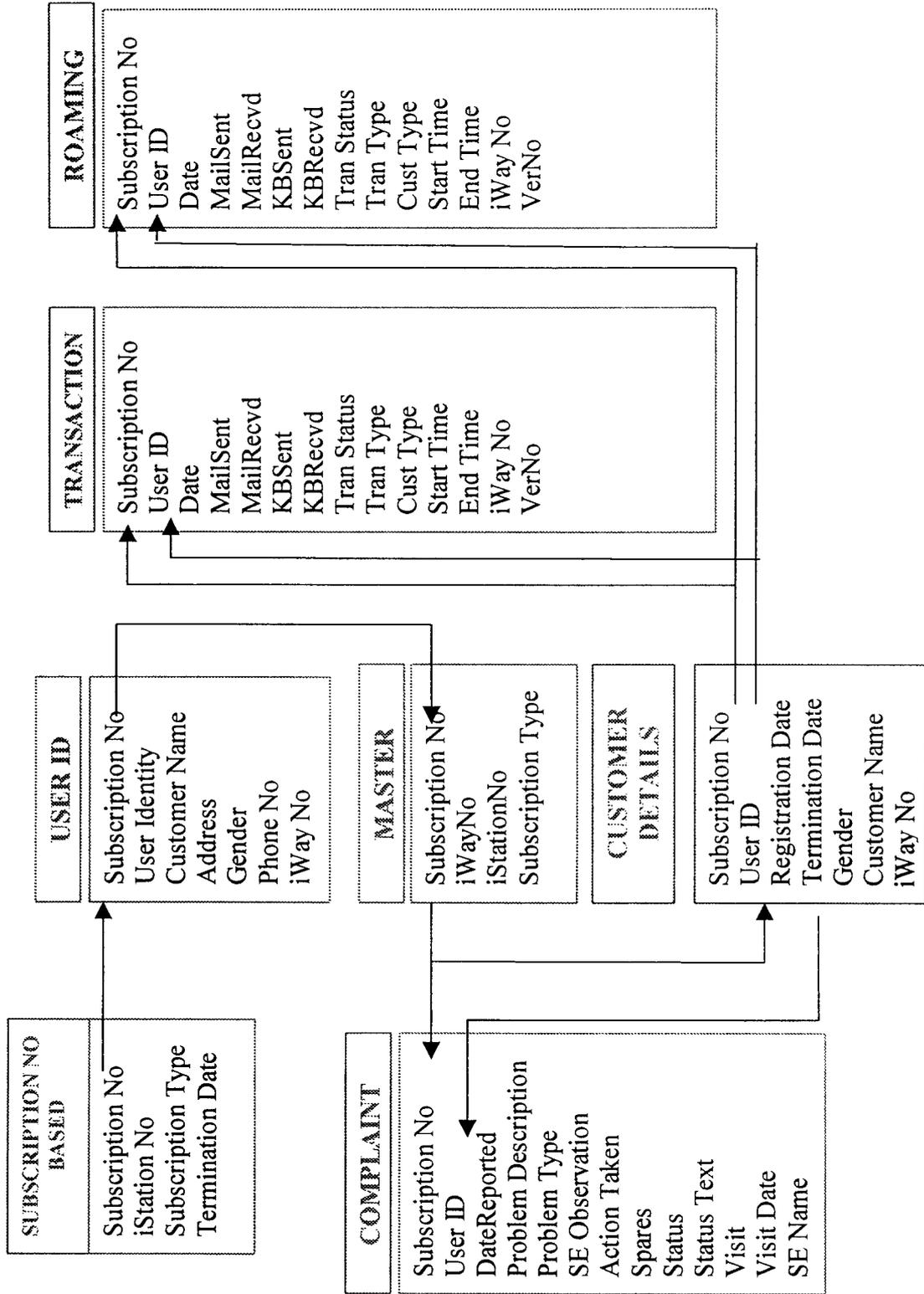
USAGEPATTERN: Stores the details of the Customers based on their usage pattern of *iStations*

TIMEPATTERN: Stores the Telephone Line usage in intervals of 2 hrs.

DEFECTANALYSIS: Stores details about the Customer and the *iStation* that have recorded defects *iWay* wise.

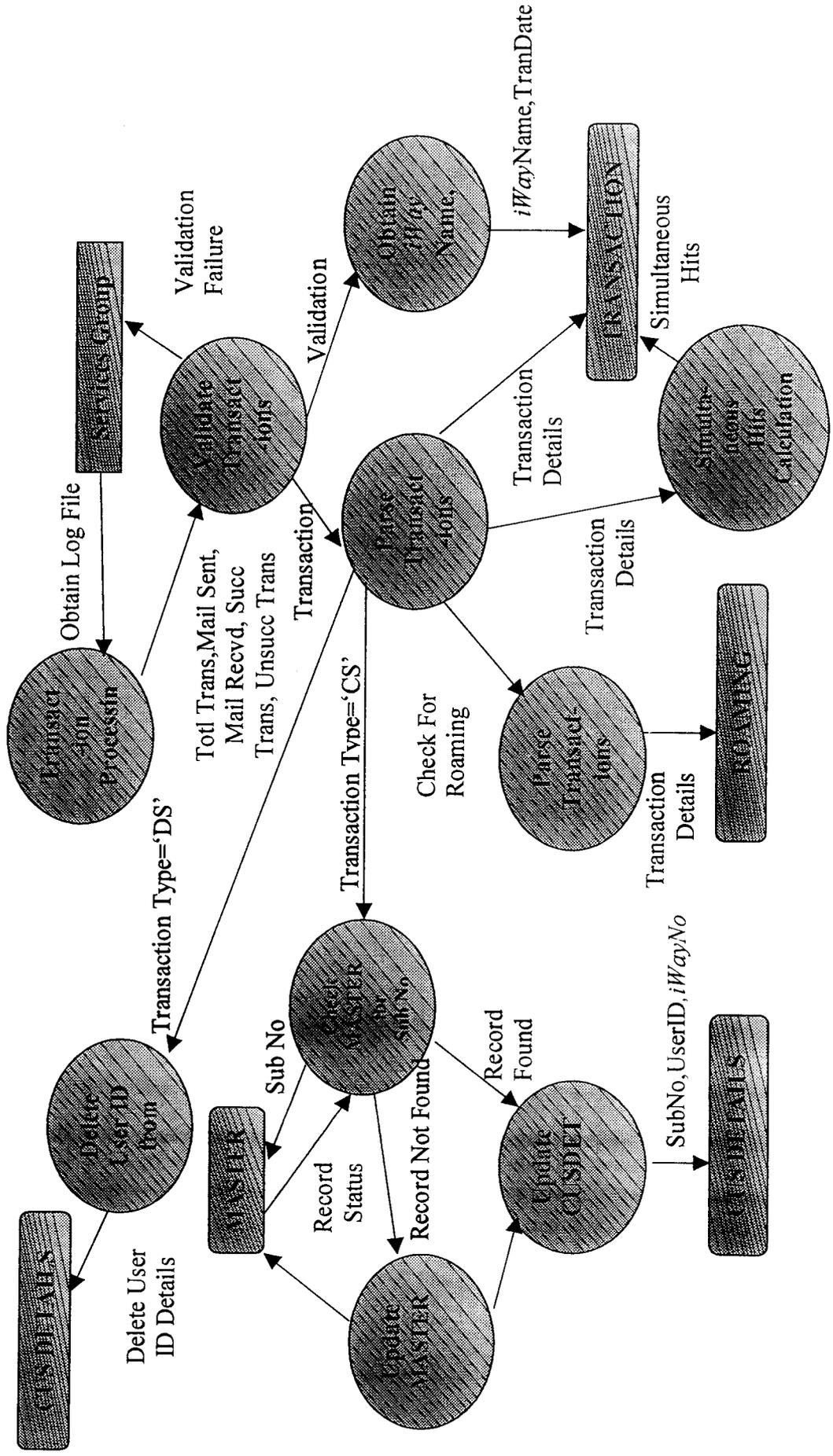
SUCFAILANALYSIS: Stores information about the successful and unsuccessful transactions for each *iWay*.

8.5 Database Design



8.6 Data Flow Diagram (DFD)

Transaction Log File Processing



8.7 Format of Customer Records from LDAP

The Customer Details from LDAP are obtained in a text file in the following format. LDAP stores the Customer Details in two trees namely **Subscription Tree** and **User ID Tree**. These two trees are obtained as text files in the following format

Subscription Based Tree

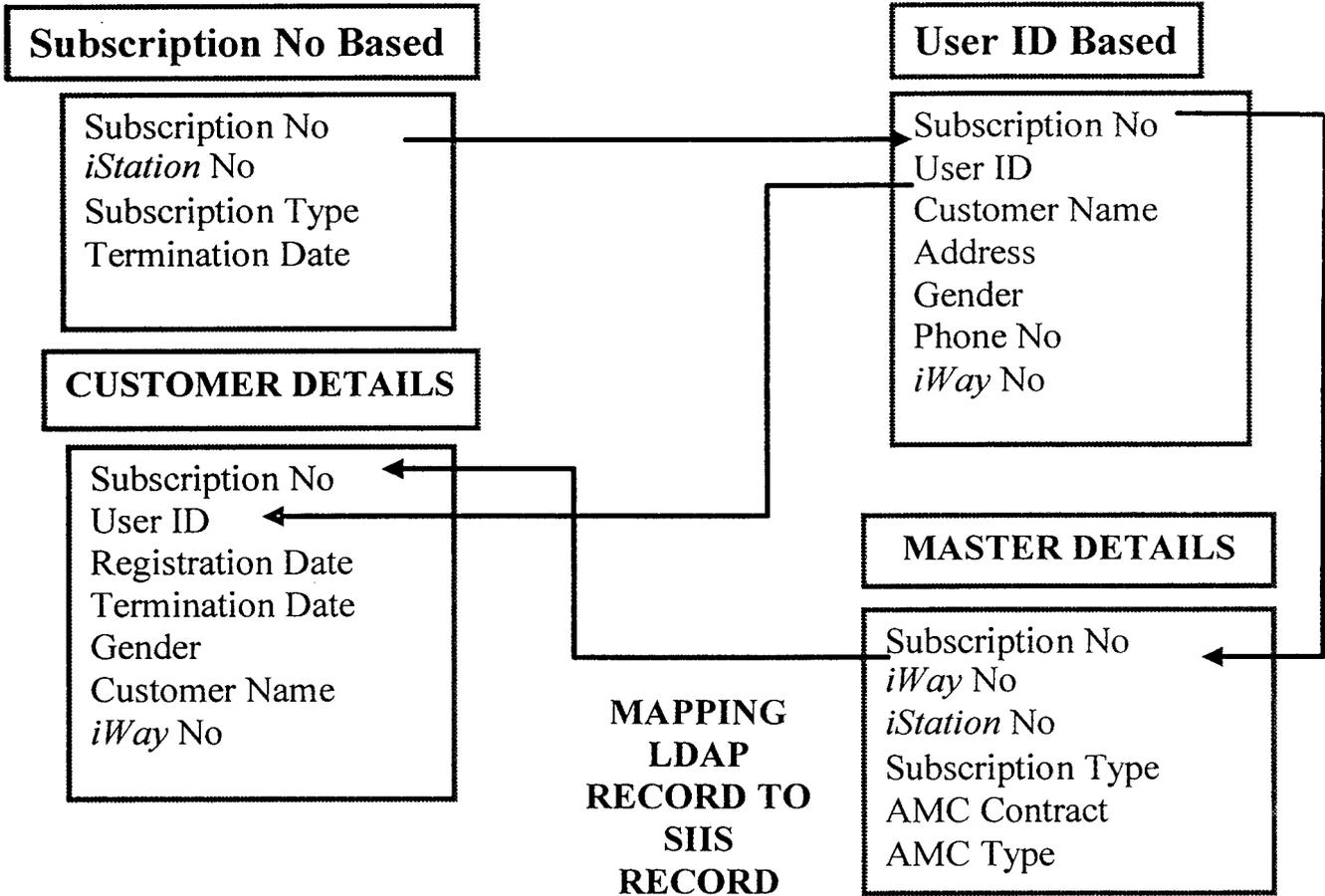
```
subid=ban01a1405,si=subids,o=inablers.com,c=INDIA,u=universe  
subscriptionid=ban01a1405  
usertype=H  
iStationid=r060110000170  
terminationdate=31-12-2002
```

User ID Tree

```
qu=acputtur,id=emailid,o=inablers.com,c=india,u=universe  
uid=acputtur  
realname=Paramesh  
address=No.10,Cinthy Road, New Delhi-90  
gender=Male  
telephonenumber=9393024  
iWayid=iWay-MAN01  
subscriptionid=man01a8216
```

8.8 Mapping LDAP Database to SIIS

BLOCK DIAGRAM – MAPPING LDAP TO SIIS



8.9 Format of Transaction Log Records

The outlined text below is the format in which the transactions made by each *iStation* is recorded by the *iWay*. These transactions are obtained in a flat file from each *iWay* with the extension .log.

**dhiraj~H~r120110000048~ban01a1038~ttyC0~0~06:41:05~1010711465
~06:41:21~1010711481~600~190~9~2~RS~#1 No new mails in inbox~0**

The various parameter of the above transaction record are explained below

Username - diraj

UserType - H

***iStation* No - r120110000048**

Subscription No - ban01a1038

ModemNo - ttyC0

StartTime - 06:41:05

Encrypted Start Time – 1010711465

EndTime - 06:41:21

Encrypted End Time – 1010711481

KBSent - 600

KBRecvd - 190

Mails Sent- 9

Mails Recvd - 2

Transaction Type – RS

Transaction Status and Transaction Message Type - #1 No new mails in inbox

No of Attempts - 0

8.10 Classification of Successful / Unsuccessful Transactions

Unsuccessful Transactions

- XX - No Data Received from *iStation* - None
- FX - Configuration Operation in Progress - (Err in Comm)
- FS - Conf Operation Over
- SX - Mail-Send (Mails Sending from *iStation* Failed) Failed
- RX- Mail Receive Success (Mails sent to *iStation*)
- UX -User Request came
- CX - Creation failed (User Creation)
- MX - Modification of password failed
- DX - Deletion of User ID failed
- WX - Renew Operation Failed
- OX - Download in progress

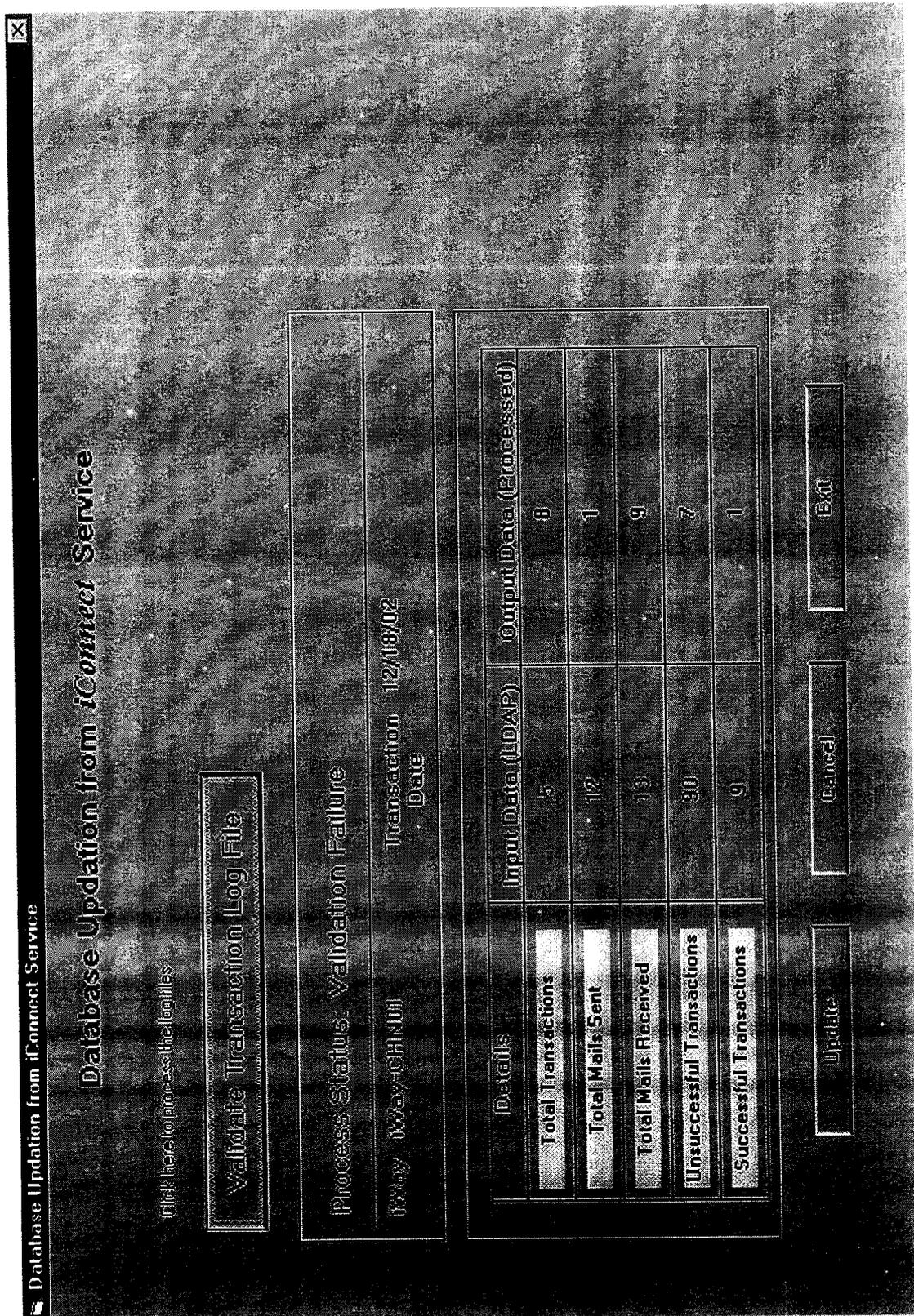
Unsuccessful Transactions

- RS - Mail-Receive success (Mails sent to *iStation*)
- SS - Mail-Send Success (Mails sent from *iStation* Received Successfully)
- OS - Download over
- MS - Modification of password success
- CS - Creation Success (User Creation)
- DS - Deletion of User ID success
- WS - Renew in progress

8.11 Screen Design – Customer Complaints

Customer Complaints	
Complaint Details	Customer Details
Complaint No: 40	Station No: r310101110070
User Id: aditi	Way No: W/ay-BAN01
Problem Description: The LCD was not displaying due to break in plasma.	Subscription No: ban01a7672
Problem Type: <input checked="" type="checkbox"/> Station H/w <input type="checkbox"/> Station S/w <input type="checkbox"/> Connectivity	Place: Bangalore
SE Assigned: JayaPrakash	Sector: Retail
SE Observations: The LCD has been giving fluctuation display.	User Type: H
Action Taken: The LCD was replaced.	Phone No: 08232 2374
Visit Made: Yes	AME: <input checked="" type="radio"/> Yes <input type="radio"/> No
Station Spares Replaced: <input checked="" type="checkbox"/> LCD <input type="checkbox"/> Keyboard <input type="checkbox"/> Cable <input type="checkbox"/> Modem	Date of Termination: 12/31/02
Visited Date: 05/09/2002	Status: Completed
Add New Spare:	Date of Complaint: 05/09/2002
	Buttons: Save, Cancel, Delete

8.11 Screen Design – Database Updation from iConnect Service



8.11 Screen Design – Daily Transaction Report

Daily Transaction Report
X

Daily Transaction Report

User ID:

Report Type: Daily Report Monthly Report

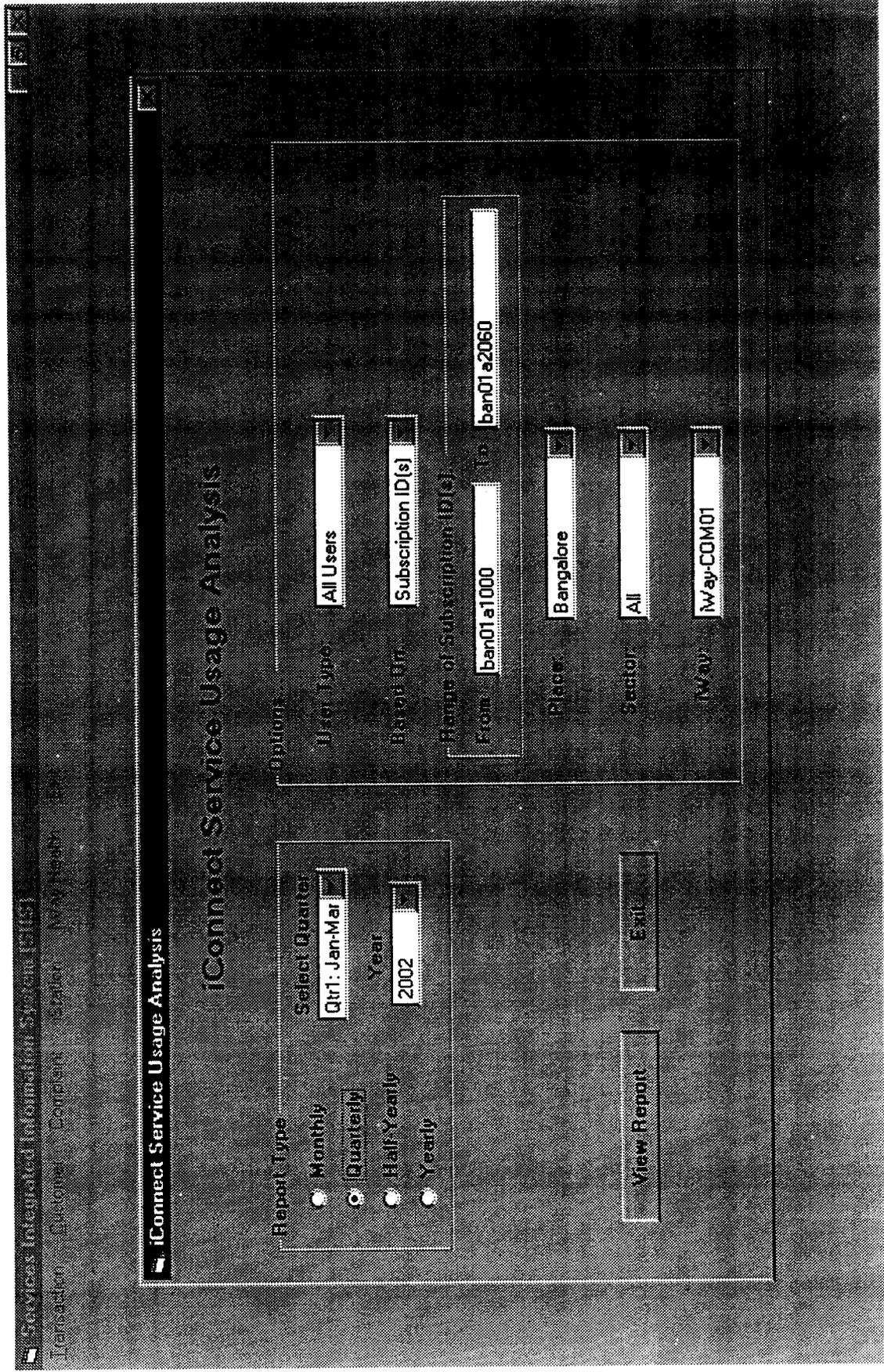
Date:

View Report

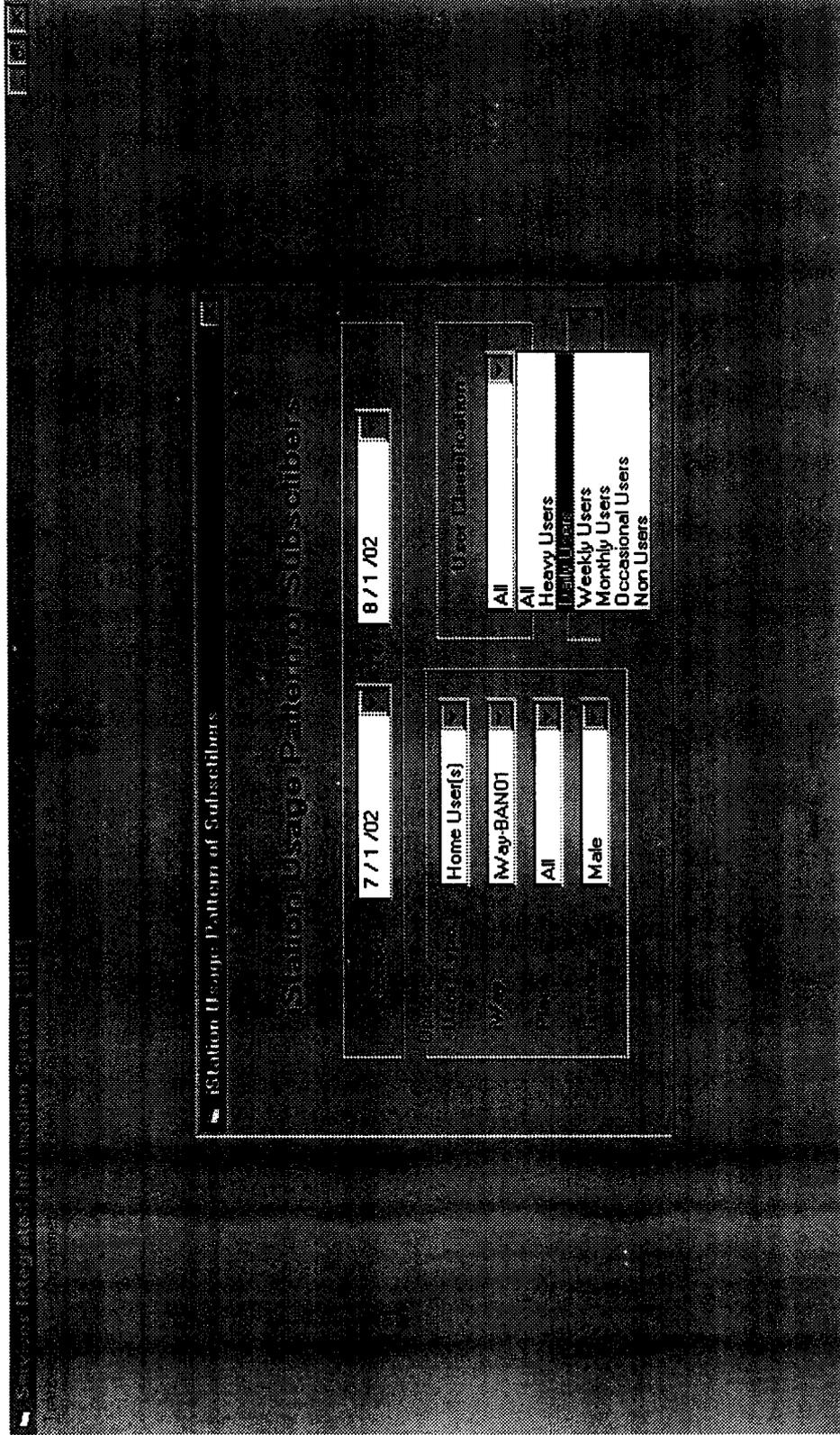
Exit

	GAN	CHN	HYD	COM	HUB	MAN	MAD	MU
Total no of Transactions								
Successful								
Unsuccessful								
Missed Alerts								
Missed Jobs								
No. of Missions								
No. of Alerts Fired								
Missed								
Received								
No. of Users Deleted								
No. of Bars Deleted								

8.11 Screen Design – iConnect Service Usage Analysis



8.11 Screen Design – *iStation* Usage Pattern of Subscribers



Software Testing



9.1 Software Testing - Introduction

9.1 Introduction

Software Testing is a critical element of software quality assurance and represents the ultimate review of specification, design and coding. It is noteworthy to mention my **Project Leader's** stress on the fact that a **minimum of 40%** of total project effort was expended on testing which proved right.

The process of testing is done with the intent of **finding an error** in the system or an **undiscovered bug** in the system. Testing demonstrates that software functions appear to be working according to specification and that performance requirements appear to have been met. Additionally the data collected for testing provides a good indication of **software reliability** and some indication of **software quality**.

A lot of importance was given to the Testing and Maintenance Phase. I was educated on the fact that all tests should be traceable to the **Customer Requirements** and this formed the basis of testing the software. Both Black Box testing and White Box testing was performed.

9.2 White Box Testing

White Box testing, sometimes called glass-box testing is a test design method that uses the control structure of the procedural design to derive test cases. White Box testing mainly included **Control Structure Testing**, which is simple and highly effective.

Condition Testing: Condition testing is a test case design method that exercises the logical conditions contained in a program module. It focuses on testing each condition in the program

Data Flow Testing: Data flow testing method selects paths of a program according to the locations of definitions and uses of variables in the program

Loop Testing: Loops play a major role in the construct of Program Code. Loop Testing technique focuses exclusively on the validity of loop constructs. Three types of loops were accounted for namely simple loops, concatenated loops and nested loops.

9.3 Black Box Testing

Black Box testing focuses on the module in its entirety, as a “black-box”, with no interest shown as to how it has been developed. The intention here is to ‘break’ the system by testing it to possible conditions wherein the software throws up ‘errors’ in its execution. The type of testing chosen in black box testing was “Functional Testing” of the software. Here the test conditions / test cases are based on the functional requirements/ specifications of the application. Though White Box testing has been performed it does not guarantee to test all the functional requirements. Black Box testing is not an alternative but is likely to uncover different types of errors. The duration for performing Black Box Testing on SIIS was 25 hours.

Categorization of Errors using Black Box testing

- 1.incorrect or missing functions
- 2.interface errors
- 3.External Database errors
- 4.Performance Errors
- 5.Initialization and Termination Errors

Boundary Value Analysis: The testing department laid great emphasis on Boundary Value Analysis (BVA) which tests for errors in the input domain. This test case design technique selects test cases at the edges of the class. Test cases were prepared by the testing department and reviewed by the Project Leader.

Testing GUI: Testing was also done on the GUI namely the SIIS screen formats and Report Designs. Tests were done for validation of Windows, Menus, Reports and Data Entry Screens.

9.4 Testing Strategy

1.Verification and Validation

Verification refers to the set of activities that ensure that software correctly implements a specific function. “Are we building the product rightly?”

Validation ensures that the software has been traceable to the Customer Requirements. “Have we built the right product?”

Unit Testing: The developer did Unit testing in order to focus even on the smallest unit of software design. With adequate guidance from the Project Leader and Project Guide insights into this testing methodology was obtained and were classified as follows

- 1.Boundary Condition Testing
- 2.Interface Testing
- 3.Validation Testing
- 4.User Help Testing
- 5.Module Level Data Testing

Integration Testing: Unit Test was performed in order to test for proper working of an each module individually. Integration Test was performed to test for inadvertent loss of data. This test uncovers errors associated with interfacing. The whole software is tested as a one unit. This test was done by the testing department.

Performance Testing: The testing department for the viability of the products real time usage did Performance Testing. This test is done to ascertain the software's runtime performance. Various test cases were prepared to conduct performance test.

Skills Acquired



10. Skills Acquired

The various Skills Acquired learnt during the course of this project are: -

System Study: To perform a detailed and elaborate study on any given system. The working of the system has to be understood to every niche in order to feel comfortable with project.

To draft a Customer Requirement Document: Requirements gathering forms the foundation for further progress in software development. Understanding the client's requirement in his perspective is very important for a Software Engineer. This is a task where communication content is very high and is the pivot of Customer – Developer interaction

Prepare a System Requirement Specification: Playing the role of an Analyst is one of the most important tasks in software development. The initial study has a lot of scope for ambiguities and regular review is necessary. The scope of the problem must be recognized in the perspective of the Customer. This phase was found to be one of the most arduous tasks in the development process since the aftermaths of not freezing the requirements was realized.

Drafting a Project Plan: As a software engineer, Time Schedule is a must not only to be framed but also to be followed. This task was really mind boggling as a beginner like me could not properly decipher time estimates. The various phases of the development were ascertained and were followed accordingly.

Preparing the Design Document: The design document forms the “blueprint” for coding. The document represents a high level of abstraction – i.e. it can be traced to specific data, functional and behavioral requirements. It is worthy to mention that this was the most interesting phase and adequate help was taken from the Project Leader. This phase was carried out on a modular basis.

10. Skills Acquired

Learning Crystal Reports: Since the project had ample scope for Report Generation, it was decided to use Seagate Crystal Reports 6.0 a very powerful windows based reporting tool. How to interface Crystal Reports to Visual Basic was also learnt.

Testing: Various testing methodologies were implemented on the code, ranging from Black Box Testing to White Box Testing. Though the testing department did Black box testing, it was great insight into the preparation of test cases for the testing of the software. The testing phase attributed to 40% of the development time.

Team Work: The success of any project depends on the cohesive working of a team. The importance of co-operation, discussion and critical analyses of various problems was understood by working in a close-knit group.

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