



# **IT Services & Consulting**

## **Project Profiles**

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## 1 Internet Solutions Unit

### 1.1 Europe Direct Access (EDA)

**The Client** Advanced Development Group (ADG), LA [End Customer: European Technology Office]

**The Challenge** Direct Access 7.x (latest version 7.3) is a PC Internet Banking application developed by ADG, LA. Direct Access has 2 parts viz. Global Direct Access (GDA) and Europe Direct Access (EDA). EDA consists of market specific functions i.e. for the bank's branches in European region. EDA shipped with DA 7.3 will be initially deployed in Spain, France, Belgium, Germany and UK. The following functions will go with the EDA (DA7.3):

- Buying and Selling of Mutual Funds
- Sending e-mails to Customer Service Representatives for the various services like Account opening, Ordering Travelers Cheque, etc.
- Giving Notice for Card Savings A/c
- Blocking PIN
- Order/Cancellation of TAN

**i-flex Solution** Direct Access 7.x is based on the New Technology Delivery System (NTDS) developed by ADG, LA. i-flex was responsible for the development of all EDA functions.

i-flex executed this project on Time & Material basis.

i-flex's job was to integrate Europe functions with that of Global Direct Access developed by ADG, LA and do the Product Testing on Windows 95, Windows NT using Internet Explorer and Netscape.

It was developed using VB 5.0, JavaScript, HTML and NTDS. NTDS is a COM based architecture, which provides a development and a runtime environment. It can be described as the middle layer of the three-tier architecture. It supports any kind of browser or devices like ATM etc. It can talk to any kind of host at backend provided the host understands the message protocol, which it uses to talk to

the host. As a development environment it provides a set of COM components representing almost every entity in the business.

The project involved a team strength of 6 people at i-flex and 1 person at ADG, LA. DA 7.2 (EDA without e-mail functions) was successfully installed in Spain and Germany on 2<sup>nd</sup> September 1998. The Development, Documentation and Product Testing were completed in 10 months time.

### **Salient Features**

- Multi-language support
- Euro currency support for Give Notice for Card Savings function
- Online real time update of Customer profile and account balances.
- Secured Sockets Layer (128 bit – SGC) encryption of all data between client and the Web server.
- Cookies are encrypted and stored using PGP (Pretty Good Privacy).

### **Client Benefits**

- Banking services (except for the physical transactions) can be availed through the PC from anywhere
- Banking services (except for the physical transactions) can be availed through the PC from anywhere.
- Transactions can be done in any Currency supported.
- New Account opening, Ordering Travelers Cheque, Transferring of Funds, sending Standing Orders and many more can be done just by selecting the corresponding menus and entering few texts.
- Screens are displayed in any of the languages supported, which in turn depends upon the Country where this Application Server is setup.

## 1.2 Product Warehouse

### The Client

A US based Software Development House for a Leading Multinational Bank.

### The Challenge

The Client is a pioneer in banking technology and has introduced several innovative and path-breaking products and IT solutions for its parent bank. The objective of the system is to provide easy and cost effective access to a database of all product and features inventory offered by all business across regions. Also, the encyclopaedia part will provide a database of all product and features available/unavailable across regions. This will facilitate a pick-and-choose approach of features from the encyclopaedia or standard library of features and help the bank analyze and provide product variations.

The main functionality of the Product Warehouse is to facilitate product rationalization through product features, by implementation of the following:

- Import data regarding the various features of the wide range of products offered in the bank markets across regions in a pre-defined format.
- Process the data according to the pre-defined rationalization procedures.
- Provide views/reports that will facilitate manual decisions to be taken for product rationalization.

### i-flex Software Solution

The initial focus was on the systematic implementation, specifically on the products supported by the technology (checking, savings, time deposits, loans and mortgages). Product information was gathered from the countries in the pilot region and the product warehouse developed to capture and structure the product data.

For each business using this system, the data is organized by region and country, and stored in Standard Template form for each product within a product family. Each template consists of a three level hierarchy:

- Components: The features of the product are categorized into components.
- Features: These are the attributes of each component.

- Parameters: These are the superset of values that the features can take.

The solution is developed using Lotus Notes ver 4.5, Domino Server. To meet the requirement for wide and easy access the product warehouse was designed and built with Internet web access.

### **Salient Features**

This project involves a series of tasks that define the data conversion procedure. Businesses across regions supply data in the form of answers to questions regarding the availability of product features in their respective markets. The features in the Questionnaire have been mapped to a standard library of product features developed by the bank. The features in the standard library are also mapped to the products to which the features are applicable.

- Involves rationalization procedures/rules, which are implemented in the product warehouse as part of data processing.
- Involves views/reports based on the rationalization procedures/rules, which are intended for the users to identify Core or Unique product features, which can be either retained or discontinued by the businesses thus implementing product rationalization.

### **Client Benefits**

In addition to meeting all the system objectives stated above, the warehouse is envisaged to provide the following benefits to the Client Bank:

- Facilitate product innovation and rapid-to-market production with reduced development costs.
- Sustain global branding efforts by promoting consistency worldwide.
- Advance customer relationship growth by offering optimal product options to meet customers' needs while smoothing life cycle transitions.
- Aid in dissemination of relevant marketing strategy and MIS data to promote cross-regional success transfers
- Facilitate global branding efforts for consistency control

### 1.3 PC Internet Banking - Japan

**The Client** A US based Software Development House for a Leading Multinational Bank based in Japan

**The Challenge** The bank provides a range of banking services to its customer via Phone, ATMs and physical branches. The bank required a new channel, “Internet Banking”, to enable it offer anytime, anywhere banking to its customers at reduced costs. The Internet banking solution needed to allow its customers to access their accounts using their own PC and a standard browser to view information and conduct transactions. Specifically, the Phase-1 of the system needed to:

- Provide account information, Yen and MultiMoney fund transfers and opening of time deposits in Yen and other foreign currencies
- Provide timely FX rates and FX trend information, and current Investment News to aid to better investments
- Cater to Japanese as well as English speaking customers
- Allow access to customers using a variety of platforms: Windows 95, Mac OS, Windows NT, MS Internet Explorer and Netscape Communicator
- Solve technical challenges in interfacing with the IBM host computer located at Singapore.

**i-flex Software Solution** The bank decided to deploy PC Internet Banking using Advanced Development Group's (ADG) Global Direct Access 7.1 application based on the New Technology Delivery System (NTDS) architecture. i-flex developed the Japan-specific applications, developed the Host Interface, performed Integration and System Testing, and implemented the solution at Japan.

i-flex executed this project on a turnkey basis. The Global Applications were developed by the Software Development House at Los Angeles while the market-specific applications and the Host Interface component were developed at i-flex in Mumbai. The system was integrated and tested at Mumbai, and implemented at Tokyo, Japan.

The tools and environment for this project were:

- NTDS Architecture: developed using VC++, VB
- ActiveX DLLs developed using Visual Basic 5.0
- SQL Server 6.5
- HTML, JavaScript used for the user interface

The project involved a team of 13 persons at i-flex and 5 persons at ADG, LA. The Functional Specifications, Design, Development and System Testing activities were completed over a period of 7 months.

### **Salient Features**

- Virtual-branch operations
- MultiMoney time deposits and transfers
- Online update of customer profile and transaction activity with transfers and time deposits
- Standalone utilities for effective support by the Help Desk
- Multilevel security mechanisms including Secure Sockets Layer (128-bit SGC), DES encrypted TPIN and PCPIC
- Automatic Rates Update with manual overrides
- Replicated SQL Server database for PCPIC and Rates information
- Load balancing for scalability, event-driven and flexible Security Manager software
- Multi-country development

### **Client Benefits**

- Reduced costs for both the bank and the customer
- Enhanced image in the market—The client bank is the only bank that provides bilingual, Internet banking without charging fees
- Additional emerging medium for customer communication and for value-added services
- Scalable, secure solution meeting the banks stringent global audit standards
- Component-based solution that is being enhanced with additional functionality for increasing customer benefits.



## 2 Turnkey Software Development

### 2.1 Agency System For Mutual Funds

<b>The Client</b>	A Leading Mutual Fund Company in Thailand.
<b>The Challenge</b>	<p>The Client Mutual Fund Company required an agency system for providing a distribution network for its open-ended funds. This system, to be used in the retail branches of its share-holding banks and security houses, specifically needed to:</p> <ul style="list-style-type: none"><li>• Provide efficient and easy-to-use service to the unit holders.</li><li>• Cater to standard agency operations like account opening, subscriptions, redemption, transfer and switches.</li><li>• Allocate units to unit holders at the end of each day, based on the day's NAV.</li><li>• Provide the fund manager with up-to-date information on the holdings in each fund.</li><li>• Provide hand-offs to the registrar system.</li><li>• Utilize, optimally, the existing network infrastructure in the shareholding branches.</li></ul>
<b>i-flex Software Solution</b>	i-flex executed this project on a turnkey basis. The analysis was carried out in Thailand at customer site and the system designed, developed and tested at i-flex's Bangalore office in India. It uses leading edge technology with distributed client/server architecture and has a multilingual Graphical User Interface (GUI) front-end.
<b>Salient Features</b>	<ul style="list-style-type: none"><li>• Modularity and Scalability.</li><li>• Centralized unit holder database.</li><li>• Networked multi-branch operations.</li><li>• User-friendly, multi-lingual Graphical User Interface.</li><li>• Extensive application and data level security.</li></ul>
<b>Client Benefits</b>	<p>In addition to meeting the specified requirements, the System provides the following benefits:</p> <ul style="list-style-type: none"><li>• Increase in investor base and reach.</li><li>• Decrease in turnaround time for all unit holder operations.</li></ul>

- Automated information flow across various entities (agent, fund manager, registrar etc.).
- Provision of a facility for the unit holder to operate from any branch across the country.
- Online balance inquiries serviced instantaneously from any branch.
- Scalable infrastructure backbone for future growth.

## 2.2 Workflow Automation For A Regional Data Processing Center

**The Client** A Singapore-based Regional Data Processing Centre (RDPC) of a Leading Multinational Bank.

**The Challenge** An ISO-9000 certified service provider, the RDPC caters to the Bank's needs across 30 countries, running various banking applications for users in these countries. Whenever a business entity needs a new service or a change calling for significant RDPC resources, it is required to raise a New Service Request (NSR). Given the logistics of the RDPC's user base, a manual paper-based process resulted in major delays and bottlenecks. The RDPC therefore needed an appropriate system which would automate the entire process.

The automated system would be required to:

- Improve service turnaround time by streamlining the business process, thereby ensuring speedy processing of the NSR.
- Provide online information on the status of user requests, thus saving time and effort on follow-up.
- Enable the RDPC to provide accurate and transparent cost estimates and check the feasibility and acceptability of proposed schedules to help users make informed decisions and plan accordingly.
- Provide complex resource statistics reports to aid the RDPC management in scheduling their resources effectively.
- Generate the New Service Agreement automatically, with a facility for electronic signatures.
- Provide a highly interactive, client-server system, which can capture semi-structured data and cater to multi-locational clients.

**i-flex Software Solution** i-flex executed this project on a turnkey basis. After a scoping study, the solution was conceptualised through onsite analysis and prototyping.

The software was designed, developed in Lotus Notes and tested at i-flex's offshore development centre. It was then implemented at Singapore and Hong Kong.

**Salient Features**

The automated system provided:

- Streamlined workflow definition for the NSR process, with flexible workflow model and facility for automatic document routing and structured escalation.
- Graphical user interface.
- High operational security by precise role definition for different roles in the workflow and provision for electronic signatures.

**Client Benefits**

In addition to satisfying the requirements listed above, i-flex's solution provided:

- Predictable service turn-around time.
- Increased ease of operations.

## 2.3 Decision Support Systems For Financial Controls And Investment Placement

<b>The Client</b>	A Leading Investment Bank in Bahrain.
<b>The Challenge</b>	The Client bank has substantial business interests in North America and Europe. It has a state-of-the-art technology infrastructure with Windows NT Advanced Servers and SQL Server databases. The Bank identified a large number of decision support and executive information systems to be developed for various end-users including Financial Controls and Investment Placement.
<b>i-flex Software Solution</b>	In a very short period of time, i-flex designed, developed and implemented the required Windows based systems, the salient features of some of which are listed below.
<b>Salient Features</b>	<p><b>Year End Financial Reporting (YEFR)</b> is a multi-user Microsoft Access database system used by Financial Controls to prepare consolidated reports for the many holding and subsidiary companies in the Group. These reports, based on a multiple-level accounts hierarchy, are used for the preparation of the Client's annual report.</p> <p><b>Furniture Inventory System (FIS)</b> was developed to aid the transfer and refurbishing of hundreds of furniture items, from one Client office in London to another. It enables tracking of individual items by current and future owners, current and future locations, type and class.</p> <p><b>Billing Information &amp; Tracking System (BITS)</b> is an MS Access-based tool that enables the Client's London office to analyse its expenditure on legal services. Given the complexity involved in its activities, the Client takes recourse to a number of top legal counsels in Europe and America. The itemized invoices raised for these run into a few hundreds. A Quick Pick Analyzer in BITS uses this detailed information to answer flexible queries such as: "How many dollars were spent on services provided by senior partners of legal firms based in Italy, on matters pertaining to taxation?"</p>

**Paget-Brown Invoicing System (PagBro)** automates the process of tracking the approval of invoices received by the Client from a paralegal services provider based in Cayman Island. Developed using Visual Basic Professional 3.0, the system has a table-driven parser routine that reads the invoice text file mailed from Cayman Island and extracts relevant data. This is then mailed in the desired format to the approving authority in Financial Controls and mailed back to the Accounts for payment.

**Investment Placement Analysis & Tracking System (InPAT)** is a marketing analysis tool developed using Microsoft products like Visual Basic, Excel and SQL Server database running on WindowsNT Advanced Server. The system helps in maintaining and analyzing information on the various stages of an investment by a prospective investor. By storing and reporting information on the targeted investment of each prospect and the reasons for accepting or declining to invest in a deal, InPat helps the investment placement team of the Client to fine-tune its strategies. It also helps in the varied classification of prospective investors.

#### **Client Benefits**

- State-of-the-art executive information and decision-Support tools.
- Workflow automation resulting in increased responsiveness.

## 2.4 Documentary Collections Tracking System

### The Client

The Product Marketing Group (PMG) of a Leading Multinational Bank in Singapore.

### The Challenge

The PMG provides a range of services, processing export bills to corporate clients and financial institutions. It required a system to enable it offer quality service to its clients in a highly competitive and changing business environment.

Specifically, the system needed to:

- Provide a guaranteed collection cycle to PMG's clientele.
- Provide efficient and cost-effective follow-up service to improve turn-around times.
- Cater to a wide spectrum of instruments including export bills under LCs and export bills under collections.
- Provide trade operations with timely and up-to-date information as an aid to decision-making.
- Provide various customer reports at pre-determined intervals.

### i-flex Software Solution

For this project, i-flex's consultants analysed the requirements through a user-interface prototype. The solution was built around Lotus Notes and Lotus ViP. The software was designed, developed and tested onsite in Singapore.

### Salient Features

i-flex's solution stood out with its following features:

- The Bank's first Notes application in the Asia Pacific Region with external users like DHL.
- Interfaces to the Bank's COSMOS and DHL's SIS systems.
- Multi-branch operations, with multiple follow-up locations.
- Access to the central Notes server in Singapore through dial-up modems, and data synchronization between follow-up locations and Singapore server using Notes Replication.
- Automatic computation of follow-up party and destinations.
- User-definable grid to compute follow-up party and number of days after which to follow-up.

- Past follow-up history on a bill available to all parties, irrespective of destinations.

**Client Benefits**

Maintenance of historical information in archival database. The system equipped the PMG to provide prompt response services to its customers with accurate information. In a competitive market, this would assist the PMG in retaining and increasing its customer base.



## 2.5 Equity Research System For Global Emerging Markets' Equity Research

### The Client

A Securities and Broking Company in the UK.

### The Challenge

An affiliate of a leading international financial institution, the Client has operations in the Indian sub-continent and Europe. To service its clients, it publishes the findings of its equity research conducted across eighteen emerging market countries. In this, it uses country and analyst-specific research methodologies and IT solutions.

With the effects of globalization and the opening up of emerging market economies, the Client experienced the need of a standardized approach and a common research baseline for its worldwide research activity. To bridge the gap in its existing setup, it called in i-flex to develop for it an equity research system (ERS).

Specifically, the system was required to:

- Provide a standard approach for fundamental analysis of companies, with facilities for defining industry models.
- Present the fundamentals data in an international format, for aggregation and comparison across countries.
- Provide unified tools and facilities for generating forecasts using historical data.
- Create a built-in facility to generate research reports in a standard format.
- Include tools to define and modify report templates.
- Incorporate a facility to provide a trigger management system for maintaining the research reports uptodate.
- Provide security control features for storing, freezing and unfreezing of financial information, forecasts and reports, and for recording the same for audit purposes.
- Provide archival features for building the reports repository.

### i-flex Software Solution

Using its experience in developing equity research systems, i-flex conceptualized and designed the ERS, based on its discussions with the Client's users in London and Mumbai.

After preparing the Requirements Specifications document and a Presentation Prototype for the Client, i-flex developed the ERS at its development centre in Mumbai.

i-flex's solution is based on a Visual Basic front-end using an MS-Access database. It seamlessly integrates with MS-Excel and MS-Word through OLE 2.0.

### **Salient Features**

The ERS is characterized by:

- It being an MS-Office solution, globally available across all user countries, thus posing a lower learning curve for users.
- Optimum use of MS-Excel for analysis and MS-Word for report generation.
- Standardized format for company financials.
- Streamlined report generation.
- An application wizard for generation of customized report templates.
- Local Financials and International GAAP Format reporting for London.

### **Client Benefits**

In addition to meeting all the system objectives stated above, the ERS ensures the following benefits for the Client:

- Standardization of the research method across all countries, facilitating institutionalization of research. Consistent system architecture and workflow among the equity research groups in various countries.
- Controlled framework for change. Flexibility with control.
- Building infrastructure for collection of fundamentals data at a central location.
- Uniform research reports, with substantial savings in report turnaround time.
- Pro-active servicing of its customers, with accurate and up-to-date information.

## 2.6 Maintenance Of A Sales And Services Automation System

**The Client** The Regional Processing Facility (RPF) of a Large International Bank in the US.

**The Challenge** The Client Bank's Sales and Services Automation System (SSAS) serves as the front-end system for its AS400 banking application called CORE. This is a GUI front-end developed under WYSIWYG standards. The SSAS provides standardisation of the user interface and better customer service. It eliminates training overheads and the technical specialization required from the end user, enabling focus on the system functionality rather than on its technical aspects.

Originally, Olivetti North America (ONA) was responsible for the Client Bank's RPF at Tampa. There were 5 sites of SSAS installation in the US and 6 sites in Mexico. However, the Bank's RPF was not equipped with any knowledge on the system. To change this situation and with a view to gaining technical, functional and process expertise, the Client Bank sought i-flex's assistance.

**i-flex Software Solution** i-flex used its proven processes and methodologies to established a baseline for the SSAS. Change control management and Release control procedures were established. Subsequently, an internal group was set up to work along with the i-flex team to build technical and functional expertise on the system. This combined team is now making enhancements to the SSAS, besides installing new releases to other SSAS installations.

**Client Benefits** i-flex's handholding, rendered to the RPF, enabled:

- Quicker response to business needs.
- Setting up in-house development for SSAS which will lead to cost reductions.
- Reducing time-to-market for new products.
- Ensuring Quality in software.
- Inducing a performance monitoring capability.
- Introduction of process improvement activities like System test plan, Release test plan, Documenting of System architecture and other technical documentation.
- Minimized dependence on ONA.

## 2.7 Communication and Performance Support System

**The Client:** The Integrated Consumer Banking Systems Group of A Large Multinational Bank.

**The Challenge:** The Client Bank's Integrated Consumer Banking Systems (ICBS) Group develops and maintains system solutions for all of the Bank's banking operations across 12 countries in the Asia-Pacific Region. To enable a seamless work environment serving to facilitate its complex activities, the Group felt the need for an internal system to monitor its project teams, and also serve as a document referencing mechanism.

Specifically, the system required to:

- Facilitate communication within the ICBS Group, in terms of E-mail, notifications, administrative communication.
- Enable document management, e.g. repository for project documents
- Provide a performance support application to manage meetings, action items, etc.
- Allow set-up of an alert mechanism to generate reminders on user dates

**i-flex Software Solution:** i-flex's three-component solution covered an Internal Communications System

A client/server solution, the communication and performance support system comprises a Windows 3.1 or Windows for Workgroups 3.11 and a Lotus Notes 4.01 Desktop client and a Windows NT 3.51 and Lotus Notes 4.01 Server.

**The ICS** provides a mechanism to load and track required mails to the main system. These mails are classified under default categorizations based on electronic mail headers like From, To, CC, Date, Sub. A query engine allows pattern searching and retrieval of documents. Uploaded mails can be recategorized as other document types without loss of the original document.

**The DMS** serves as a repository for project specifications, for the specific use of the project teams. All objects created in this system are listed and cross-referenced to specifications, which would then be stored as attachments. Any external file (.doc, .xls, .mpp, etc.) can be stored as attachments.

Each Notes document is in the form of a Cover Note, with which is associated one or more attachments, like Project Plans, Progress Reports, Schedules, Minutes of Meetings and Action Items. Responses and queries from group members are stored as a Response to the Cover Note. In addition to project-related documents, the DMS allows capture of travel schedules, leave plans and other administrative notifications. Documents can be classified as Private or Public domain, with the initiator of a document granting access rights.

**The AMS** sends notifications and reminders to the appropriate parties about an activity assigned to them, along with a due date by which it should be completed.

**Client Benefits:**

Other than providing an effective document management mechanism, the system provided the users with:

- A single desktop
- A central document repository.

## 2.8 Treasury Information System

**The Client** The Treasury group of a large multinational bank based in London.

**The Challenge** The client, a Treasury group of a large multinational bank based in London having Europe wide Operations approached i-flex to develop a turnkey solution for them. The Treasury support groups involved in funding of the treasury operations wanted an automated system by which information from all the European branches would be available centrally on a timely basis. The Treasury Information System was conceptualised to provide automated centralized funding support with a view to reduce the cost of funding, operations as well as improving the accuracy and efficiency with which funding requirements could be forecast. It would also enable making optimal use of the funds as well as the specific currency expertise within the bank. The primary users of the system will be the European Treasurers and the centralized Treasury Support Group. i-flex was the vendor of choice because of the inherent strengths in Treasury applications.

**i-flex Software Solution** i-flex undertook this project in June '97. The on-shore analysis phase was followed by a detailed design, development and testing phase at the i-flex offshore facility in Bangalore in India. The system was delivered for User Acceptance testing in June '98. The implementation and support activities for the project are currently underway at London. The technology employed was VC++ front end, Sybase 11 backend, and covered the following functionality:

- Automatic Matching and Funding
- Net funding views, Matched / Unmatched funding views, Cut off time management
- Balancing views to reconcile the differences between forecasts and ledger/ correspondent balances
- Funding exceptions
- Netting views, comprising of netting agreements, netting movements and Value dated balances
- Cash Flow views, checking for duplicates in intra-day, reversal processing
- Processing of claims

- Setting up of funding rules, matching criteria and netting agreements
- Access & Security control mechanisms
- Providing hand-offs to other systems

**Salient Features**

The key characteristics of the system were

- Ability to handle large volumes
- Provide high response times
- Parameter driven
- Minimum down-time, i.e. available at least at all business hours of TIS defined currency centers
- Reliable - minimum system crashes, accurate and reliable information at all times
- Flexibility

**Client Benefits**

The TIS System would help the bank:

- Manage the collation, forecasting and validation of the regional currency funding needs in a centralized /standardized manner
- Automate the cash flow prediction process for all currencies
- Facilitate effective management of overnight balance with the local clearing or Central Bank, by accurately predicting the closing balances - country-wise, branch-wise and currency-wise
- Help improve currency cut-off times given to customers
- Facilitate reconciliation of forecast flows with information/data from local clearing processes
- Facilitate enhanced liquidity management and reduced exposure
- Achieve economies of scale, reduce costs.
- Enable total compliance with local regulations.
- Capture of projected cash movements and customer pre-advice.
- Matching projected and actual cash movements
- Arriving at the funding number
- Recoveries

## 2.9 Organization Capability Modeling

### The Client

Emerging Markets Group of a leading multinational bank.

### The Challenge

Organization Capability Modeling System is a system that will generate organization models based on the data provided by the Users, parameters and adjustment factors that will be manipulated at run-time by the User, and pre-defined formulae that will operate on the data using the parameters and adjustment factors for the selected cost centers and countries.

The bank has attempted to evolve an organization model to understand the growth in the organization based on business parameters. This tool helps to compare business groups, identify the inefficiencies to attain the optimum organizational structure. This is part of Strategic Cost Management initiative being undertaken by the Emerging Markets Group of the bank.

There is a need for automating this modeling tool. The system needs to be user-friendly since it will be used by Senior Management and should have the flexibility to accommodate new models and changes to existing models.

The models will be centrally defined by the EM Corporate Office and will be used across all EM countries. Adequate security needs to be provided to prevent the country users from modifying the models by mistake.

### i-flex Solution

The system is developed using MS-EXCEL for the front-end and MS-ACCESS for the back-end. The back-end consists of the data for various countries cost centre-wise and the front end consists of model sheets. The data along with the input parameters and adjustment factors are required to build the organisation model for the various cost centres. The results namely variance, FTE calculated and the actual FTE are collated in the output file. These results can then be analysed in MS-EXCEL and also compared against previously frozen values. This application aims at providing a user-friendly graphical user interface to navigate and automate the process of model generation using existing model templates and the data files, along with security and analysis features. i-flex's terms of reference included analysis of the requirements,



design, development and implementation of the system in the EM Corporate Office. The total project size is around one man-year

### **Salient Features**

- **Client-Server architecture:** The system will have an MS-ACCESS based back-end and an MS-EXCEL based front-end. All master data and driver data for the cost centers and countries will be stored in MS-ACCESS database. The front-end will enable the User to specify the selection of parameters, view the data, view the results, view the impact of change in values of parameters and adjustment factors, analyze the output, freeze the results for future comparison, and compare fresh set of values with previously frozen set of values.
- **Access to the database maintained in the back-end is restricted using the Security layer.** On successful login, a set of options that the User is authorized to use is displayed to the User.
- **Generic Approach to Maintenance:** The design approach adopted in OCM back-end is to have a generic model for Master and Data Maintenance. A Data Dictionary is maintained which contains the data elements for any entity for which data needs to be captured. A generic data entry program picks up the elements corresponding to a given entity and displays the labels on a screen and captures the data. When the User attempts to save the data, the type checking is done by MS-ACCESS. Any error is captured and meaningful messages are displayed on screen.
- **In the front-end, system will enable definition of new models based on generic templates that will be pre-defined.** These generic templates will consist of Parameter Block, Adjustment Factor Blocks, Area for loading the driver data, and area for storing the results.

### **Client Benefits**

The system automates the modeling tool conceptualized by the client. The system provides flexibility to the client to define new models within the pre-defined templates. The database can be modified with ease and new data definitions can be introduced by the User without the need to develop fresh programs. The system enables ‘what-if’ analysis for changes in parameters and adjustment factor values and comparison of results against previously frozen set of values.

## 2.10 Development Of A Consumer Banking Front End System

**The Client** An In-house development centre for a global Multinational bank.

**The Challenge** The client is the solution provider and Software Development centre for its Latin American banking businesses and an International Private Banking business in the US. Currently, the Consumer banking and Cards related development of 3 businesses (Mexico, Venezuela and IPB) is supported by the Client.

The client is heading a regional integration and Standardisation of systems across all Latin American banks. Columbia, Brazil, Puerto Rico and Chile are among the other prospective clients in this regional integration. The purpose of project is to provide a Standard Banking front-end system across different bank businesses in the region. At a strategic level, this will ensure better Customer relationship building, functional convergence among different businesses. The common development platform and integrated development for different businesses will reduce the cost of deployment and provide newer functionality to the customer by leveraging from development across the different businesses. The front-end development quickens the development and deployment cycle and ensures better time to market for new business products / functionality.

The Client depended upon another vendor as the sole development contractor for the front-end system and had no technical / functional expertise in the Front-end development. It had to rely heavily upon the vendor even for supporting the existing businesses. To reduce this dependence and to ensure an internal development centre for the front end system was the primary challenge. Also, the client had to deliver the front-end solution to Venezuela and support existing businesses.

**i-flex Software Solution** This assignment was a co-operative effort between i-flex and the Client Group. i-flex played the pivotal role of

product release and maintenance cycles for the business. i-flex was also involved in Process improvement in Client.

i-flex has been responsible for:

- Understanding and Documenting the existing system functionality and technology
- Development and Implementation of a new release of the front end system for the Venezuela bank.
- Design and Development of enhancement / maintenance releases for the banks in Mexico, Venezuela and the International Private Banking business
- Requirements study and Estimation for the proposed new release to Brazil and Puerto Rico.
- Study on integration of existing country based development to lower individual business' cost and leverage out of any single development
- Training the Client's staff on the functionality and technical training to ensure that they can provide support and maintain existing businesses
- To greatly reduce the dependency on the vendor

The Front-end system is built on a proprietary Olivetti Development language called Pinnacle Plus. In the run time environment the system operates on a Pentium / 486 PC running Windows NT 3.5 as operating system. The system provides an integrated solution to the Teller/Greeter requirements. In the development environment the system uses an Olivetti DNP-20 (Motorola 40820) running a proprietary operating system called D-NIX which is similar to UNIX version SVR3.

In the run time environment the Central Database server (based on a B-Tree storage mechanism) runs on Olivetti UNIX O/S on an Intel Pentium / 486 machine.

### **Salient Features**

Generic Teller / Greeter front end system

- On-line communication to AS400/ mainframe backend systems
- Ability to operate in the absence of the host Back end system and local storage
- Facility to transfer from local storage to the host system (Automated re-entry)
- Resilient configuration by having a backup Database server in the case of a primary server crash

- Receipt printing in pre-printed stationary
- Signature verification
- Multi currency support and foreign exchange conversion capability
- Varied consumer banking functionality support like Deposits, Withdrawals, closure, Foreign exchange, Fund based operations, Credit cards and loans.

### **Client Benefits**

Reduced dependency on existing vendor.

- Development and release for 3 businesses
- Integration of the development effort for the 3 businesses
- Better time to market for new development / releases and for existing businesses
- Better understanding of the Front end system technology and functionality

## 2.11 Account Server GUI

**The Client** The Global Relationship Banking group of a leading Multinational Bank.

**The Challenge** The client has several “servers” to meet their business needs, e.g., the Account Server, the Customer Server, etc. This project was intended to provide a GUI front-end for the Account Server. The front-end application will be used globally to obtain information on accounts. Specifically, the system needed to:

The Account Server GUI entailed integration of several technology components, as the server database is not directly accessible to a client application. Thus, server APIs were to be invoked from the GUI through the Distributed Computing Environment (DCE) layer.

This inherent technological complexity, coupled with the fact that remote servers were to be accessed, made system performance one of the key attributes to be targeted during software design and development.

**i-flex’s Software Solution** Account Server GUI was developed by i-flex to meet the above requirements. The project was executed as an offshore development project on a T&M basis.

The Functional Specifications for the product were finalized onsite at New York and Dallas. This was followed by the development of a quick prototype to further refine user requirements and their understanding by the development team.

The system was designed, developed and tested at Mumbai. The infrastructure at the customer’s Technology Center at Dallas was used in the real-time mode during the development and testing phases.

The technology components used for the development of the system consisted of Oracle 7.1, Power Builder 5.0, Gradient DCE Client 1.0.3b, Sybase Open Client Library 10.0.3, SQL\*Net 2.2.2.1.0, and Microsoft VC++ 4.1.

The User Acceptance Test (UAT) for the system was completed in April 1997. The elapsed time between project start and completion of UAT was about 4 months.

The project was a milestone for i-flex. Its' technological complexity was its' challenge. It was the first time that servers were being accessed from a remote site in the real-time mode.

**Salient Features**

- Online update of remote data repository
- Integration of several technology components
- Remote program calls to the Account Server APIs
- Integration with the customer's security software
- System performance beyond customer's expectations

**Client Benefits**

- The Account Server is a common generic server for Citibank, which provides all the account related functions. It is the book-keeping system for the centralized "our" accounts of the treasury function. The Account Server GUI provides the front-end for a part of the functionality encapsulated in the Account Server. This includes maintenance of accounts, posting of transactions, queries and reports on account balances and transactions.
- The data stored in the Account Server being important financial data, will not be accessed directly by client applications now. Users now have a tool using which they can access Account Server functionality.

## 3 Off Shore Development

### 3.1 Offshore Development / Support Center Service

**The Client** A Leading Investment Bank in Bahrain.

**The Challenge** The Client acts as a principal and an intermediary in international investment transactions. It forms a bridge between those who seek and those who provide investment opportunities in North America and Europe.

The Client firm specializes in corporate investment, real estate investment and proprietary trading. Investments are placed in the Gulf and internationally with institutional and individual clients.

The Client Bank's main functions are:

- Corporate Investment
- Real Estate Investment
- Proprietary Trading
- Investment Placement
- Financial Management and Corporate Administration.

Towards the end of 1995, the Bank took a decision to outsource its application development and support activity with the objective of reducing cost and having a trained pool of resources available for development and support. To meet this requirement, it had to identify a software development company that had a good understanding of the financial application area, was technically strong in its development environment and had an excellent understanding of the offshore development process. In early 1996, the Bank selected i-flex to serve as an offshore development and support centre for it in India.

As part of this project, i-flex's offshore development centre has been providing the following services to the Bank:

- Developing new applications.
- Maintaining existing applications.
- Undertaking on-going R&D and support for upgrades.

**i-flex Software Solution**

As the first step to undertaking this project, a Model for offshore development and support was defined in discussion with the Client. This Model was based on the Client Bank's application development process and i-flex's client/server Application Development methodology. With this approach, i-flex is sharing its detailed Process Maturity capability with the Client.

A detailed approach to Project Management, Standards and Procedures including responsibilities, Configuration Management and Quality Plans were discussed and agreed upon. All standards and procedures including templates and forms, serving as a baseline, are made accessible, online, to all members of the i-flex-Client team at both locations.

An offshore development methodology specifically tailored to the Bank's requirement has been defined and used on the project. The development methodology defines a co-operative effort between the Client and i-flex, both working together as a team to meet the Bank's requirements.

This is an ongoing project in which at the beginning of each year an overall Project Plan for the year is prepared by the Client. This would include the approved scope of work, and the resource loading to meet the development and support requirements. The overall plan for the year is used to monitor ongoing tasks and to initiate new sub-projects during the year.

**Client Benefits**

By outsourcing the application development and support activity, the Client Bank is able to concentrate on the primary task of identifying requirements and delivering systems required by its business functions, and at the same time not spend time on detailed day-to-day project management and administrative tasks.



## 3.2 FXLink - Online Foreign Exchange dealing system

**The Client** A provider of global financial services affiliated to a large multi-national bank.

**The Challenge** The Client provides a range of treasury services to high net worth individuals. The client required a comprehensive, integrated, distributed system to enable it offer quality service to its clients in a highly competitive and volatile business environment. Specifically, the system needed to:

- Provide efficient and global service to its clientele.
- Cater to a wide spectrum of instruments including spot, forward, swap and blocks on a 24hr/365 basis.
- Cater to a variety of special requirements based on the emerging markets and trading regulations
- Provide branch traders with timely and up-to-date information as an aid to decision-making.
- Provide an effective tool to carry out small to medium sized trades automatically without much human intervention.
- Ensure speedy settlement of FX deals.

**i-flex Software Solution** FXLink was designed and developed by the client and i-flex jointly to meet these requirements.

The solution was conceptualised as a co-operative effort of i-flex and the client at New York and India.

The system was designed, developed and tested at Bombay. Currently it is deployed at various locations across the world.

The project was a major milestone for i-flex. It involved 20 person years of effort with a peak team strength of 7 people. The Design, Development and Testing activities were completed over a period of 23 months. The software has Distributed Computing Environment and multi-tiered architecture.

**Salient Features**

- Multi-tiered architecture.
- Multiple regions working simultaneously with 24hr trading.

- Online real time update of rates/credit line.
- Automatic processing of trades that are entered for special trading.
- Interface for settlement(FXMATCH) and back-office processing(Trestel).
- Rate feed captured from FastPrice and Reuters' as automatic update.
- Price making can be shared across branches for round the clock rate making.
- Message delivery across the firewall from Server to Client - made easy.
- Electronic message delivery system.
- Credit calculation using simple as well as PSR algorithms.
- The system is secured using DCE security along with Secured sockets.
- Single sign on for all other clients applications.
- Crystal reports used to make the client thin. The reports used can be modified by client to incorporate regulatory text for the country/bank.
- Reporting feature on each and every screen to keep record of any data that is available through screen on paper for further reference.

### **Client Benefits**

In addition to meeting all the system objectives stated above, FX Link provided the following benefits to the client:

- Induction of new technology.
- Integrated system for Foreign Exchange and Money Market transactions using the CUI
- Consistent system architecture at Bombay and USA.

### 3.3 Centralized Automated Reconciliation Services (CARS)

**The Client** A provider of global financial services affiliated to a large multi-national bank.

**The Challenge** The client saw an opportunity to offer a new service in the market, which will assist Fund Managers and Custodians in the reconciliation of the portfolios of their customers.

The trading, settlement, clearance, and safekeeping of securities involves several individuals and organizations. Some of these are: Fund Managers (or Investment Management Firms), Custodians, Brokers, and Depositories. Fund Managers make investments in securities on behalf of their customers. These trades are normally made through the services of Brokers, who act as agents for the Fund Managers. Brokers, in turn, settle the trade with Custodians who hold the physical/electronic securities.

The presence of several organizations in the investment process, with each maintaining its' own books and records, gives rise to differences and the need for regular or periodic reconciliation of securities and cash balances and transactions among these different books and records.

Whatever the causes of these differences, it is clear that there exists a need for identifying the differences between two sets of records, and initiating steps to resolve them. This process is called Reconciliation.

**i-flex Software Solution** CARS was designed and developed by i-flex to meet these requirements.

The initial Functional Specifications and the initial design of the system was done onsite in New York. Subsequently the detailed design, development and system testing was done offshore in Bombay. The software after system testing was released for final user acceptance. The system is now in production after successful completion of User Acceptance Test..

The project involved around 11 resources during the peak construction phase. The whole project execution took around 12 months.

The system uses three-tier client server architecture with Visual Basic and Crystal Reports as the GUI and SYBASE as the database. The business functionality was handled by a set of 'C' servers on NT while the data access routines were handled by another set of 'C' servers on NT. The communication between the tiers is effected by a DCE software called Entera.

### **Salient Features**

- Transaction reconciliation
- Position reconciliation
- Cash reconciliation
- Importing of Fund Manager and Custodian Files both manually as well as scheduled.
- Matching Process and resultant matched and unmatched data.
- Flexible matching rule setup for each Fund manager
- Summary and Detailed reports for matched / unmatched Transactions/ Positions using Crystal Report writer
- Customisable query outputs
- Archiving and purging – manual as well as automatic
- Interfaces to SWIFT messaging.

### **Client Benefits**

In addition to meeting all the system objectives stated above, RECON provides the following benefits to the client:

- Service bureau kind of operations for many fund managers and custodians.
- Interfaces to SWIFT for receiving Custodian data.
- Cost effectiveness due to offshore development

### 3.4 Reengineering an Investment Software Product

**The Client**

CrossMar, a Citicorp subsidiary

**The Challenge**

The client operated the product, Global Portfolio Services (GPS), as a Service Bureau providing a multi- currency portfolio accounting, valuation, analysis and reporting for Investment Managers. The source code rests with CAD, Computer aided Decisions, who is the vendor of the product. GPS is the record keeping module, which forms the core of the GLOBAL, EPVS System. It is a near real-time system, which accepts trades, prices, corporate actions and other transactions.

The need for re-engineering arose as the system does not cater to multiple firms, thereby making installation numerous and in different locations based on the number of clients. The technology was obsolete and this prevented new customers from buying the product. CrossMar and CAD took this as an opportunity to increase their market presence by re-engineering the product and entrusted i-flex with the project. The key objectives were

- Meet market expectations with respect to technology, namely GUI interface and use of RDBMS.
- Flexibility to allow incorporation of changes to the software both on the business and technological front.
- Making it more robust, stable and provide security features in accordance with Citicorp standards.
- Enable easy definition and implementation of interfaces with third party products like the Trade and Order Management System etc.
- Provide adequate documentation and training so as to develop the capability of CrossMar and CAD to support the product for its own clients in future.

**i-flex solution**

The re-engineering approach and plan were finalized in October '97 and was to be executed out of CrossMar with senior i-flex resources deployed at CrossMar and involved in the execution. CAD and EEA, Enterprise Engineering Associates, a consulting firm carrying expertise in the area of Object Analysis and Design were also involved. After the Proof of Concept, the project was executed in a phased manner with the CAD team in Boston doing the Analysis and test plan preparation, the i-flex team- New York doing the design and i-flex team- Mumbai doing the development and testing. The project involved 450 man months of effort with an elapsed time of 2 years. The software is currently under final UAT.

The salient features are:

- Focus on the Architecture and Technology enhancements to the Product with some additional enhancements to the functionality. The OOAD approach was used for entire software development cycle.
- Three-tiered client-server architecture comprising a presentation layer (GUI), Application Servers (managing core business logic along with Data Database Connectivity) and the Database.
- The GUI functionality has two components- the GUI and the OLE server. The GUI component contains the screen handling and syntactic validation, while the actual communication with the server side (RPC calling) is done by the OLE Server.
- The functionality is logically spread across multiple Servers. These Servers are dedicated to a Firm or a Family of Firms. The Firms are organized into Families to optimize service characteristics, such as Load size and geographic location.
- Servers communicate with each other using the Remote Procedure Call feature provided by the DCE component of the system.

**Client Benefits:**

- Any future computer-to-computer interaction as well as Business functionality/ technology changes that the market would expect is taken care of.
- Product enabled to service multiple firms.

## 4 Data Warehouse Solutions

### 4.1 Integrated Data Warehouse

<b>The Client</b>	Group MIS of a Large Multinational bank based in Singapore
<b>The Challenge</b>	<p>The Asia Pacific, Consumer Banking group felt the need for a sophisticated data management and analysis capability to provide its knowledge workers with analytical tools and information that would allow them to make informed and impact-having decisions on marketing strategies, sales development, credit analysis, etc. This called for building and implementing a common MIS across all the segments of its Banking business and the entire region spanning Turkey in the west to Australia in the east.</p> <p>The Challenge was to build a generic software that could on the basis of a standard Data Model, Standard Metadata, be rapidly implemented across various countries in the region, using a single version of the software.</p>
<b>i-flex Solution</b>	<p>The Integrated Data Warehouse has been developed as a truly client/server, GUI solution, using an industry-standard UNIX and MS-Windows operating environment and ORACLE RDBMS. This solution provided a GUI interface for Metadata definition and maintenance, Business Definitions, Data Loading definitions, Data Transformations Definition, Data Quality Definition, WEB Based Metadata Browsers, Data Model Storage and Views, WEB based Process Views etc. All together provided for a integrated platform for Data Warehouse implementations.</p> <p>The solution conceived is a judicious blend of off-the-shelf data access products and i-flex-developed customized software tools. To enable storage of large volumes of data and to service the dynamic analytical needs of the spectrum of users, ORACLE Express multi-dimensional database is used. To satisfy the ever-increasing MIS needs of the business, tools such as Sales Analyzer for structured queries, Business Objects for on-the-fly queries, and Statistical Analysis System for number crunching and pattern recognition are employed.</p>

#### *Salient Features*

- Generic data warehouse design.
- Metadata Repository Design in RDBMS
- Structured transportation and Loading of OLTP data.
- Cleaning and Validation of Data Loaded
- Storage and access to rich transaction level data.
- Access to atomic data, cumulated data and metadata.

- Automated OLAP aggregation and Loading into MDBMS
- Data quality checks at various levels of MIS build-up.
- Maintenance of a rich repository of rolling-24-months of online historical data.
- Sophisticated user, function and data level security.
- Standard and ad hoc query facility.

i-flex's deliverables included

- Technical Architecture Definition
- Requirement Specification
- Developed and Tested Software
- The delivery of the system as per the signed-off RS
- The User Training

### **The User**

The User community for the IDW system is the MIS department of the bank across the Asia-Pacific region.

### **Benefits**

- A Single software to cater to diverse needs from a Data Warehouse
- Creation of a centralized repository of regional atomic data.
- Current and standardized MIS strategy at all levels of Management.
- Ad hoc query facility for non-standard MIS requirements.
- Availability of online MIS
- Ability to carry out cross-country analysis of information.
- Powerful aid for business decisions, based on analysis of historical data.

### **Time Frame and Resources**

This software was developed in a timeframe of 6 Months. This software is now the standard software being deployed in all locations of the bank, and is now the global standard. It is currently in its release 4.2. The entire development and implementation activities were carried out in i-flex's Data Warehouse Center of Excellence.

### **The Technology**

This Data Warehouse was developed and implemented on a Digital 8200 Machine, operating under Digital UNIX 4.0. The Database used was Oracle, and included the Oracle Application Server, Oracle Express, Oracle Sales Analyzer, Business Objects., Space OLAP server



## 4.2 Development And Rollout Of A Cards Data Warehouse

**The Client** Global Consumer Banking Group of a Large Multinational Bank.

**The Challenge** The Client's GCB-Asia Pacific Group's thriving Consumer Banking Cards business is poised for significant growth in the coming years. The business has a well-established centralized Transaction Delivery capability. Despite this, to ensure a competitive edge, GCB - Asia Pacific felt the need for a sophisticated data management and analysis capability to provide its knowledge workers with information and analytical tools that would allow them to make informed and impact-having decisions. This called for building and implementing a common MIS across all the segments of its Cards business and the entire region spanning Turkey in the west to Australia in the east.

**i-flex Software Solution** This assignment was a co-operative effort between i-flex and the Client's GCB Singapore Group. i-flex has played the pivotal role of System Integrator and has been involved in the project from concept to commissioning.

i-flex has been responsible for:

- Definition of the overall warehouse architecture.
- Specification and selection of hardware and environmental software.
- Definition of network and data architecture.
- Specification and development of warehouse security framework.
- Requirements specification to implementation of warehouse software for Cards business covering: Marketing, Business Planning and Analysis, FinCon, Sales, Service, Credit and Treasury.

The warehouse has been developed as a truly client/server, GUI solution, using an industry-standard UNIX and MS Windows operating environment and ORACLE RDBMS. The solution

conceived is a judicious blend of off-the-shelf data access products and i-flex-developed customized software tools. To enable storage of large volumes of data and to service the dynamic analytical needs of the spectrum of users,

ORACLE Express multi-dimensional database is used. To satisfy the ever-increasing MIS needs of the Cards business, tools such as Sales Analyser for structured queries, Business Objects for on-the-fly queries, and Statistical Analysis System for number crunching and pattern recognition are employed.

The Data Warehouse is built on an high-end Digital Alpha 8400 5/300 machine.

### **Salient Features**

Generic data warehouse design.

- Rollout of the application to 12 countries.
- Structured transportation of OLTP data.
- Storage and access to rich transaction level data.
- Access to atomic data, cumulated data and metadata.
- Data quality checks at various levels of MIS build-up.
- Maintenance of a rich repository of rolling-24-months of online historical data.
- Sophisticated user, function and data level security.
- Drill-down data analysis capability.
- Standard and ad hoc query facility.

### **Client Benefits**

Creation of a centralized repository of regional atomic data.

- Current and standardised MIS strategy at all levels of Management.
- Ad hoc query facility for non-standard MIS requirements.
- Availability of online MIS, specifically for collections, credit and risk monitoring.
- Ability to carry out cross-country analysis of information.
- Powerful aid for business decisions, based on analysis of historical data.

### 4.3 Development Of A Banking Data Warehouse

**The Client** Global Consumer Banking Group of a Large Multinational Bank based in Singapore.

**The Challenge** The Bank's Asia Pacific, Consumer Banking group has been growing steadily and is currently poised for an explosive growth in its banking operations in the next few years, in this region. The business has existing MIS for their individual products. But, to ensure a competitive edge, the bank was looking for a system to do product portfolio analysis across all products, across all regions. They felt the need for a sophisticated data management and analysis capability to provide its knowledge workers with analytical tools and information that would allow them to make informed and impact-having decisions on marketing strategies, sales development, credit analysis, etc. This called for building and implementing a common MIS across all the segments of its Banking business and the entire region spanning Turkey in the west to Australia in the east.

The Bank was also looking at a building separate Mutual Fund Data Warehouse and Financial Data Warehouse for a financial and business analysis of their mutual funds and financial information.

**i-flex Software Solution** This assignment was a co-operative effort between i-flex and the Client's Consumer Banking Group. i-flex has played the pivotal role of System Integrator and has been involved in the project from concept to commissioning.

i-flex has been responsible for:

- Definition of the complete warehouse architecture.
- Specification and selection of hardware and environmental software.
- Definition of network and data architecture.
- Specification and development of warehouse security framework.

- Requirements specification to implementation of the warehouse application software for their Banking business covering: Marketing, Business Planning and Analysis, Financial Control, Sales, Service, Credit, Treasury, Mutual Funds, etc.

The warehouse has been developed using client-server technology with standard GUI front end. The solution has been developed on standard tools like MS Windows operating environment for the front end, and industry-standard UNIX and ORACLE RDBMS at the server end.

To meet the large storage needs and the dynamic analytical requirements of the users Oracle Express multidimensional database has been used for data storage. To do the analysis on this data, Oracle Sales Analyser has been used for structured querying of the database, Business Objects has been used for ad-hoc querying and SAS has been used for the number crunching and pattern recognition.

The Data Warehouse is built on an high-end Digital Alpha 8400 5/300 machine.

### **Salient Features**

Generic data warehouse design.

- Web enablement of the application.
- Provide a Customer Relationship view to the data.
- Structured transportation of OLTP data.
- Storage and access to rich transaction level data.
- Access to atomic data, cumulated data and metadata.
- Data quality checks at various levels of MIS build-up.
- Maintenance of a rich repository of rolling-24-months of online historical data.
- Sophisticated user, function and data level security.
- Drill-down data analysis capability.
- Standard and ad hoc query facility.

### **Client Benefits**

Ability to carry out cross-country analysis of information.

- Successfully converting management time from MIS production to MIS analysis.
- Ability to have a consolidated view of mutual fund performances across the twenty countries.
- Easy and low cost access to the data through the internet.
- Current and standardised MIS strategy at all levels of Management.

- Availability of powerful financial analysis figures like product profitability, budgeting, etc.
- Creation of a centralized repository of regional atomic data.
- Ad hoc query facility for non-standard MIS requirements.
- Availability of online MIS, specifically for collections, credit and risk monitoring.
- Powerful aid for business and financial decisions, based on analysis of historical data.

#### 4.4 Japan local credit MIS – an experiment in success

As part of the DWH implementations for a leading multinational bank in the Asia Pacific Region, the rollout for Japan Local Credit MIS was taken up for implementation. Though the Banking DWH had been implemented in several other countries in the region, this project was understood to be different, as it envisaged data flow and cube builds on a weekly basis. Historically, all DWH solutions for this bank have been on a monthly basis; but the business felt the need to have data and analysis on a weekly basis.

**The Client :** The client for this Project was Group MIS of a large multinational bank based in Singapore. Group MIS has the overall responsibility of implementing DWH solutions in various countries in the region, and they act as facilitators between the solution provider (i-flex) and the End Users – in this case, Credit Department of the Japanese bank. The final DWH solution structure is decided between i-flex and the End Users, with key inputs from Group MIS. In this project, the deliverable was restricted to the credit aspect of the Banking DWH.

The User group in this case was from the Credit Analysis department, fully conversant with the intricacies of the Credit business.

**The Challenge:** i-flex has had a long experience in implementing DWH solutions for this bank. Before this project was finalized, i-flex had already completed the Banking DWH implementations in over five countries. It would be, but obvious, to assume that this implementation would not have been a technical challenge. But, the challenge lay elsewhere – all these DWH solutions were implemented on a monthly basis. This project envisaged implementation on a weekly basis, which had not been attempted before for Group MIS. The challenge was to successfully implement the DWH solution, for weekly cube builds, and set a positive precedent for other projects.

**i-flex Solution:** Given the importance of this project as a first experiment in weekly builds, as also the need to define the project deliverable appropriately, a special emphasis was placed on the Requirements study / gathering process and the development activity. An initiative was also taken to define some dummy cubes on test data, so that, problems, if any, could be identified at an early stage. After several discussions and iterations, and with suitable inputs from the DWH Team, the Requirements were finalized and signed-off.

Then came the development process. At every stage in this activity, the need to have a perfect delivery was stressed. As is the case for any Banking DWH solution, a thorough process of Data Quality verification was finalized and implemented. The development was successfully completed in a very short span of time and the UAT was commenced.

The Users were able to complete the UAT in a perfect manner and they were ably supported by i-flex in this endeavor. **It is to the credit of i-flex that the delivery was found to be totally error-free and the UAT was signed-off in a record time of seven working days.** The Users were extremely pleased with the role of the DWH Team in this project. The project development and the UAT phases clearly demonstrated that i-flex is capable of taking on any challenge in this field.

**Benefits:**

The Banking DWH solution implemented for Japan Local Credit MIS is expected to be particularly useful to the business. The Asia Pacific region has been reeling under a severe economic downturn and most financial institutions have been facing heavy losses. Under such circumstances, the business would like to tightly monitor customer performance, in terms of Product classifications, Delinquency, Branch performance, Insurance, Collaterals and Customer Profile, among others. This project provides all these, on a weekly basis. An important aspect of this project is also that it provides the Users with an opportunity to generate suitable reports from the cubes. This is so as the cube structures were finalized, keeping in view the reporting requirements of the business.

**Technology:**

This Data Warehouse was developed and implemented on a Digital 8200 Machine, operating under Digital UNIX 4.0. The Database used was Oracle, and included the Oracle Application Server, Oracle Express, Oracle Sales Analyzer, Business Objects.

The Data Warehouse Software used was the i-flex developed software for Data Warehouse Metadata Definition, Data Loading, Data Transformation, Data Quality, Accumulation and Batch Process.

## 4.5 Feasibility study & system evaluation for a data warehouse

### The Client

The Delivery Team for Emerging Markets group of a Large Multinational Bank based in London.

### The Challenge

The bank has traditionally catered to Top Tier Local Corporate customers, who have global business operations. As part of a new business initiative, it was decided that the bank should also offer services to small local corporates also. These were termed as Emerging Local Corporates (ELC) in the Emerging Market countries.

The ELC business is expected to start functioning in eight pilot countries. It will generate high volume and low value ticket business. The focus of operations will shift from relationship banking to mass marketing strategy. All the systems to cater to this kind of mass market business are expected to be operational from the first day of business. The data warehouse is one of the key systems that will enable the management to monitor and refine the strategies that have been defined for the market.

Specifically, the system needs to:

- Provide an integrated view of data from various operational systems
- Act as a central repository for all transactional information for query and analysis purposes
- Help in discovering patterns of customer behavior for refining norms of selection, target marketing, and delinquency.
- Provide data for comparing the planned business with the actuals
- Monitor and refine efficiency of the various processes that are followed within the bank

i-flex has been involved as consultants in defining the requirements of the various departments that will be met from the warehouse.

Based on the requirements that have been gathered from four pilot countries for ELC and the ELC Sector management, CITL was involved in identifying vendors who provide various components of the data warehouse solution, requesting for information from them and the vendor selection process.

### i-flex Solution

The Requirements Study was undertaken in four representative countries which would pilot the ELC Business. i-flex's requirement document outlined the requirements that need to be met by the warehouse for the functional groups Sales, Credit Administration, Business Planning and Customer Service. The process also defined the information that needs to be captured by the operational systems to cater to the planning and monitoring needs. A phasing exercise was undertaken to prioritize the requirements based on their criticality to business.

Based on the above study, a comprehensive RFI was created for issue to vendors which covered the specific technology needs for the warehouse like front end OLAP and query tools, databases, middleware, extraction tools, metadata managers etc.



In addition, aspects of implementation like data warehouse on methodologies were also requested. The RFI was circulated to a selected list of vendors who provide solutions in these areas. The RFI was also sent to systems integrators who would undertake integration of the selected tools and to provide end-to-end solution through implementation in the pilot 8 countries.

Responses were received from these vendors and evaluated. A detailed evaluation methodology was drawn up by i-flex to do the same. i-flex's recommendations for an optimum solution for the Client was based on, both, a quantitative and qualitative evaluation of vendor offerings.

A Feasibility Document was generated at the end of the evaluation process, giving recommendations on the following aspects of the project

- The Data Warehouse Architecture
- The Infrastructure needs
- The Project Management aspects
- The Project Cost
- Implementation schedules
- Recommended vendor solutions

**Client Benefits**

- The Requirements study document provided the Client with specific information required for the planning and monitoring the ELC business on an on-going basis.
- i-flex undertook to integrate the enabling of an objective evaluation of the vendor offerings, for selection of an appropriate solution in keeping with the requirements of: functionality, schedules and related-criteria.

## 4.6 Customer profitability

### The Client

The Regional office of a leading multi-national bank operating in more than 80 countries. The bank is an extremely technology-driven enterprise and is one of the leading users of Data Warehouse Technology to meet their growing MIS needs.

### The Challenge

The banking business is an area that is highly customer-oriented and being able to understand your customers better is a key to success. Customer Profitability, is a powerful source of information enabling the business to measure the value of a customer in terms of profitability. Availability of this information spanning across time, across various demographic profiles, across various products, throws open enormous opportunities to analyze patterns, recognize high-value customers, growth patterns etc, all with a specific emphasis on customers.

The existing process to enable Customer Profitability Reporting was lacking in certain aspects that were becoming critical in an environment of constant change and the bank was unable to leverage on the information available to them in their core applications. Some of the issues were

- Profitability statements were available at a product level rather than at a customer level
- Ability to allocate costs at a customer level for e.g. The cost of transacting using an ATM

Also any changes due to organizational changes, introduction of new lines of business or new definitions were not so easy to be incorporated as the existing process was highly reliant on PC-based software. The process of establishing GL integrity was largely a semi-automated process. Also no adequate tool was available to do comprehensive analysis.

Over all, the bank was looking for avenues to obtain this information which was residing in various application systems but needed to be integrated into a common platform to enable a customer-centric view rather than a product-centric view of the business.

Another key requisite was providing for a platform where, the constant changes in business and business priorities may be reflected even in the process of defining customer profitability. The end state was to make all of this information available to all relevant users with suitable tools to enable analysis.

The new process was intended to eliminate all of the above and enable the users to spend more time in effectively analyzing the data rather than spend time in preparing the data for analysis.

### i-flex Solution

The key to the success of this report was the availability of the raw financial and demographics data at customer level. A study was done to analyze the availability of data within the systems

running the various applications that form the core of the bank's business. A gap analysis document was prepared based on the study conducted. This formed the basis of establishing the feasibility and degree of accuracy of the end-deliverable.

### ***Pilot Study***

After establishing that sufficient data was available and that missing data could be alternately sourced, a pilot country was chosen to implement the system first. As the data warehousing platform was already established for other MIS needs of the business, the Customer Profitability Reporting was built on the same foundation. The highlights of the system developed include:

- Data Extraction into Data Warehouse: Automated tools to enable defining extraction rules and templates were used to pool data from the various application systems that run the core of the bank's business.
- Business Rule Definition: The Customer Profitability reporting is largely dependent on changing business needs as well as management direction on definition of profitable/non-profitable customer, in defining allocation of common revenue/costs at a customer level.
- *For example*, the introduction of new products in the business needs to be reflected appropriately in the profitability reporting. Alternately, there may be a management directive that the cost of operations be distributed across all products in proportion to the number of customers serviced by the product as against the number of accounts serviced the product. To facilitate this changing definition, the application was designed to enable the business to setup rule definitions. This maybe re-defined as and when required.
- Data Integrity Customer Profitability largely depends on the financial accuracy of the data received. To establish the integrity of financial information in any business verification with the General Ledger is the established norm. In customer profitability any variances in the financial numbers with the General Ledger are suitably highlighted and the distribution of the variances across customers is again defined based on business rules.

### ***Analysis***

To facilitate the analysis of the customer profitability information, the raw information that was stored in Oracle Database was built into an Oracle Financial Analyzer Multi-Dimensional Database. This database contained the customer information cut by various dimensions such as customer demographics, product, organization and various reporting lines.

*For example*, measuring the net revenue of a product A, versus a product B across a particular demographic profile like customer income is enabled through this multi-dimensional database. The various reporting lines were suitably designed to obtain multi-dimensioned information across key components of the customer profitability statement.

### **Management**

From the client side a senior management person was responsible for the purpose of managing the project. This person was responsible for the end delivery of the project. One additional senior executive from the business with extensive understanding of the bank's business was responsible to facilitate defining requirements and liaising with the user community.

i-flex played the role of consultant and solution provider. i-flex was responsible for the over-all project management and for the delivery at all stages of the project cycle.

### **User and Geographical Spread**

The user community included various business users ranging from marketing personnel to the high-level management that was responsible for making key business decisions. The end-state of the project was to ensure the Customer Profitability Reporting be established within the Asia-Pacific region.

### **The Team**

The team from i-flex for delivering the pilot consisted of one Project Manager, a team leader and two team members. Collectively the team combined the following skills:

- Business knowledge
  - Data warehousing project experience
  - Software Development experience
  - OLAP tools knowledge
- 
- Project Management

The project was approximately 600 person days effort for the pilot and spanned a period of 4 months.

A separate team from the user community was formed for doing the user acceptance testing which was supported by i-flex along with the business representative from the client side.

### **Business Perspective**

From a strategic business benefit perspective, Customer Profitability Reporting is a powerful decision support tool that can be used to better understand their customers and business.

- It can be used to dictate new marketing initiatives that are aimed at new and prospective customers.
- It enables recognition of the banks' high-value customers to target for specific programs.
- This was the first attempt at analyzing marketing and delivery costs at a customer level.
- Overall the Customer profitability Reporting platform provides a means to maximize the use of customer data so that the bank can take better advantage of this to generate more business.

### **The Technology**

This Data Warehouse was developed and implemented on a Digital 8200 Machine, operating under Digital UNIX 4.0. The Database used was Oracle, and included the Oracle Application Server, Oracle Express, Oracle Sales Analyzer, Business Objects.

The Data Warehouse Software used was the i-flex developed software for Data Warehouse Metadata Definition, Data Loading, Data Transformation, Data Quality, Accumulation and Batch Process.

## 4.7 A data warehouse in a stock exchange

### The Client

A Leading Stock Exchange of India

### The Challenge

The Client is a leading stock exchange in India highly geared towards computerisation in order to reduce the cycle time between trade and settlement. This objective brings along with it the risk of defaults on transactions that are guaranteed by the Stock exchange.

To contain the risk the exchange has to continuously monitor the performance of its key entities in order to track any abnormal behavior, which may indicate a risky move by a malicious entity. The risk of having very stringent rules restricting members on trading behavior is loss of business. Hence the Objective/ Challenge for the client was to reduce its risk and at the same time provide its members with better trading facilities in the form of trading/ Margin policies.

### i-flex Solution

The assignment required that the process of data extraction to report creation in the form of Multidimensional Databases be automated and tuned so that the reporting time cycle could be reduced in line with the reducing settlement cycle.

The Solution provided by i-flex Included the following

- Requirement study and Data modeling
- Data inspection and Transformation to conform to the data model
- Implementation of security layer
- Specification of Multidimensional Databases and configuration of the system to make it an automated batch process
- Creation and delivery of the Multidimensional Database
- Web based Metadata viewing

The warehouse has been developed as a truly client/server, GUI solution, using an industry-standard UNIX and MS Windows operating environment and ORACLE RDBMS. The solution conceived is a judicious blend of off-the-shelf data access products and i-flex-developed customized software tools. To enable storage of large volumes of data and to service the dynamic analytical needs of the spectrum of users, ORACLE Express multi-dimensional database is used. Other third party tools such as Sales Analyzer for structured queries, Business Objects for on-the-fly queries were employed.

### Salient Features

- Daily and weekly MIS reporting
- Structured transportation of OLTP data.
- Storage and access to rich transaction level data.
- Access to atomic data, cumulated data and metadata.
- Data quality checks at various levels of MIS build-up.
- Maintenance of a rich repository of rolling-53 weeks of online historical data.
- Sophisticated user, function and data level security.

- Drill-down data analysis capability.
- Standard and ad hoc query facility.

**Client Benefits**

- Creation of a centralized repository of disparate atomic data from across markets to get an overall picture.
- Current and standardized MIS strategy at all levels of Management.
- Ad hoc query facility for non-standard MIS requirements.
- Availability of online MIS for Risk Analysis.
- Powerful aid for business decisions, based on analysis of historical data.

**The Technology**

This Data Warehouse was developed and implemented on a Digital 8200 Machine, operating under Digital UNIX 4.0. The Database used was Oracle, and included the Oracle Application Server, Oracle Express, Oracle Sales Analyzer, Business Objects.

The Data Warehouse Software used was the i-flex developed software for Data Warehouse Metadata Definition, Data Loading, Data Transformation, Data Quality, Accumulation and Batch Process.

## 5 CRM Solutions

### 5.1 Siebel implementation for world's leading bank

#### The Client

Citibank - Emerging Local Corporate (ELC) is one of the new initiatives taken by Citibank to enhance their customer base. Traditionally Citibank was focussing on only high network customers. With this initiative, Citibank wants to expand their business to other customers also.

Given the large number of customers and the volumes that are expected, client has chosen Siebel as the Customer Relationship Management software.

#### Business Drivers

- Improving effectiveness **by** providing the sales team with better targeting, customer context, presentations, product information, sales processes and tools to close deals faster. The salesperson can be more effective in sales situations if they have all information with them on their laptop. Effectively, sales personnel will be able to handle more customers/prospects than a traditional relationship management organization
- Improve **efficiency** by providing the sales force with more time to perform selling tasks. This is achieved by automating and off-loading non-value added and administrative activities, e.g. preparing call Reports.

#### Functionality

**There were four major dimensions to the project**

1. Siebel implementation for customer relationship management
2. Database management system for prospects
3. Development of a credit management system for risk evaluation of the customers
4. Datawarehousing product implementation for analysis of the data from Siebel

#### **The following functionality was implemented:**

- Contact Management
- Opportunity Management
- Account Management
- Activity Management
- Calendar Management
- Integration with custom-developed credit management application
- Remote Synchronization
- Workflow management

#### **Additional functionality built:**

- Customer Planning
- Product structure and definition
- Drawdown application
- Credit related data

### **Interfaces**

- Real-time interface was developed for integration with credit management system. Windows NT services were written for two-way transfer of data between credit application and Siebel. VB COM technology was used for developing this interface.
- Batch Interface was developed for uploading data from Siebel into the datawarehouse product FIC.
- Developed a wrapper program to implement an interface with external Security Management System. This adds one more level of security before logging onto the Siebel Database

### **Deployment**

Application was deployed in 14 countries.

The following activities were carried out as part of deployment:

#### **Software Installation**

Front End installation of customized Siebel software on user's workstation and Testing of successful installation.

#### **Local Administrative Support Training**

Local technology, network support professionals trained on the day-to-day activities to be performed (Siebel-specific).

#### **Data Migration Support**

Support provided during data migration for more than 14 countries. Enterprise Integration Manager (EIM) was used as part of data migration

#### **Hand- Holding during parallel runs post-live period of stabilization**

Assistance was provided by the Implementation group to the help-desk to resolve any queries / problems that were raised post-live. This continued until Help-Desk team took over total support tasks and until the users were used to the new system and felt comfortable with it.



## 5.2 Siebel implementation release for leading investment bank

### The Client

SSB is an investment banking company of the Citigroup family whose operations encompass different regions across the world. Client/Contact management is a crucial business requirement for SSB. Currently, SSB has different client management systems operating in different regions and a need was identified to have the same system operate across the regions and be linked to a central database.

As a part of the above initiative, SSB found that the Siebel Client Management System that is currently in place at Robinson Humphrey Company LLC (RH), a subsidiary of SSB, is a suitable alternative for the proposed project.

### Business Drivers

- To do away with different client management systems in different regions and thereby provide the Users (Employees) with a single window access to data across its operating regions viz. Asia Pacific, Australia/New Zealand, USA, Japan, Emerging Europe and Latin America
- To maintain detail information about each and every client and present it in the same form to all the users and thereby standardize the customer service and increase the efficiency of the users.

### Functionality

#### **The following functionality was implemented:**

- Contact Management
- Account Management
- Activity Management

#### **Additional functionality developed:**

- Each employee could be a member of many teams and each team could be associated with many Institutions and one Institution or Contact can be associated with many Teams. In essence, Institutions and Contacts were related to an employee either through a Team or because of his or her own interest in them. In order to have the employees select their own list of Institutions and Contacts, Siebel VB was used successfully.
- Stock Management

### Deployment

Application in the current phase has been deployed in US

The following activities were carried out as part of deployment:

**Software Installation**

Front End installation of customized Siebel software on user’s workstation and Testing of successful installation

**Data Migration Support**

Support provided during data migration. Enterprise Integration Manager (EIM) was used as part of data migration

### 5.3 Siebel implementation for leading equity research and investment bank

#### The Client

Robinson Humphrey is an equity analysis and investment-banking arm of Salomon Smith Barney operating in USA. The Client was using Siebel Sales Application, originally configured by Siebel Inc, for its client and portfolio management. In the course of usage, the client identified some enhancements required to be incorporated in the application to meet their changing needs.

#### Business Drivers

- Improving coordination in the various client management teams. This was achieved by allowing each individual's activities to be visible to all the members of the teams he is associated with. This led to streamlining of efforts in the team and reducing the number of redundant activities.
- Scheduling and tracking client communication. Each user would be allowed to maintain a calling list of Client Contacts and track the status of his scheduled calls for each Contact. A user would be able to send mails simultaneously to a group of Client Contacts and record the activity for future reference.

#### Functionality

##### **The following functionality was implemented:**

- Call List Management
- Activity Management
- Interface management with a legacy system

##### **Additional functionality developed:**

- If any address of a Contact matches exactly with any of the addresses of its Institution then if the Institution address changes, the Contact address is changed accordingly
- When an Activity is created for a Contact and a Security Interest is associated with the activity then if that Security Interest does not already feature with respect to that particular Contact the system automatically creates the required association.
- When a user sends a mail to multiple Contacts, an Activity would be created automatically for each Contact.

##### **Additional technical aspects:**

Implemented DTS packages, external to Siebel, which eased the System Administrator's task in uploading and downloading data to and from Siebel keeping all integrity constraints intact. In fact, keeping in view System overhead it enabled the Administrator to schedule the sequential tasks in a convenient way.

**Deployment**

The Application was deployed in Atlanta, USA

The following activities were carried out as part of deployment:

**Software Installation**

Front – End installation of customized Siebel software on user’s workstation. Testing of successful installation

**Data Migration Support**

Support provided during data migration.

## 6 Strategic Business & Technology Consulting

### 6.1 Technology Upgradation Consultancy

#### The Client

A Central Bank in the Caribbean.

#### The Challenge

The Client Bank is responsible for the entire gamut of central banking functions, including implementing banking policy, monitoring commercial banks, managing external debt and money supply. The various functional areas of the bank include:

- Foreign exchange management.
- Money market operations.
- Current accounts.
- Teller/Clearing operations.
- NOSTRO accounts.
- External debt servicing and management.
- Currency management.
- Bank inspection and audit.

Faced with tremendous growth in volume and complexity in the various areas of the business and a set of existing antiquated systems, the Bank felt an urgent need for an across-the-board upgradation of the level of automation. The requirements included:

- Requirements specification for various functional areas.
- Identification of automation resource requirements.
- Evaluation and selection of computer hardware.
- Evaluation and selection of software packages.
- Customization and implementation of system.
- Training of users and EDP personnel.
- Implementation of office automation.
- Extensive security control.
- Improved MIS for senior management.

#### i-flex Software Solution

i-flex Software was retained as consultants for the automation process. An initial strategic requirements study was conducted, which included a complete data model for key business areas. This was followed by an

implementation phase, during which i-flex Software provided a comprehensive suite of consulting services, involving approximately 10 person-years of consulting effort. The project culminated in a successful, highly automated environment with immediate payoffs in employee productivity.

The range of professional consulting services provided included requirements analysis, hardware configuration and selection, data centre set up, system tuning, software package selection for banking applications, package customization and enhancement, custom design and development of new systems, implementation of office automation, recruitment of data processing personnel and training for users and EDP staff.

### **Client Benefits**

- Online access to up-to-date information.
- State-of-the-art technology.
- Office automation through electronic mail and workgroup software.
- Quantum leap in employee productivity.
- Enhancement of service quality.
- Improved MIS reporting capabilities.
- Fully trained user community and EDP personnel (160 in number).
- Complete transfer of know-how to in-house personnel, resulting in self-reliant operations.

## 6.2 Technology Strategy Consultancy

### The Client

A Leading Bank in Jamaica.

### The Challenge

The Client Bank, the first commercial bank in independent Jamaica, offers a wide range of retail and corporate banking services to its customers. Faced with an increasingly complex financial environment, growth in business volumes, outdated technology and limited in-house expertise in automation, the Bank required a comprehensive technology upgradation program. Specifically, it needed help to:

- Identify problem areas in existing systems.
- Identify and prioritize potential areas for automation.
- Formulate a long-term strategic technology plan.
- Upgrade current hardware/software environment.
- Move from batch-oriented systems to an online, integrated environment.
- Upgrade in-house technology expertise and skills.
- Identify and implement new financial products/services.

### i-flex Software Solution

i-flex Software was selected as a one-stop strategic provider of consulting services for the Bank against strong local and international competition. The result was the formulation and successful implementation of a comprehensive technology upgradation program for the Bank as a whole, with i-flex Software providing a complete range of business and technology consulting services. The program included preparation of a business strategy-driven technology plan; detailed requirements studies; hardware/software evaluation, selection and implementation; user training; recruitment and training of EDP personnel, etc. Executed over a two-year timeframe, the program saw the Bank move dramatically to a position of technology leadership in the industry, with significant impact on customer service and growth in bottom-line profits.

### Client Benefits

- Introduction of ATMs.
- Quantum leap in automation.
- Improved customer service.

- Improved user skills in all departments.
- Acquisition of in-house technical expertise.
- Industry leadership in technology.
- Implementation of new products.



### 6.3 Requirement Study For Corporate Trust System

**The Client** The Corporate Trust Unit (CTU) of an International Financial Institution.

**The Challenge** The CTU in London is part of the Financial Institutions Group (FIG) of the Client Institution and provides issuer services to corporate clients, including corporate securities services and bond market operations. i-flex Software was involved in the automation of the CTU's operations. The key areas of automation were: database services, product life-cycle processing, related financial processing and settlement. Some specific needs were:

- Provide capability to play various roles under the corporate trust umbrella, such as issuing agency, authentication and exchange agency, paying and destruction agency, agent bank, custodian, and common or special depository.
- Cater to various types of debt instruments.
- Provide for timely and efficient planning.
- Provide for financial and non-financial message generation and processing.

**i-flex Software Solution** i-flex Software was retained to prepare a Requirements Specifications document which would form the basis for system development. Working closely with users, technologists from Corporate Securities Services International and from Bond Agency Operations in London, a comprehensive Requirement Specification and Process Design document was prepared. This project involved 6 person-years of effort.

**Salient Features** The proposed system was envisaged to enable:

- Parameter-driven issue set-up.
- Confirmation and acknowledgement of activities across players.
- Full automation of Authentication and Exchange agency functions.
- Corporate actions processing.
- Product life-cycle functions and diary maintenance.
- Fee processing and billing.

- Advanced formula-linked processing for bonds.
- Full credit functions with analysis of settlement risk.
- Support for a wide range of products including synthetic bonds, collateral bonds, warrants, Euro commercial paper (ECP), synthetic ECP, medium term notes (MTN), synthetic MTN and certificates of deposit (CD).
- Interface to the Euroclear Euclid system.

**Client Benefits**

- Resultant competitive edge over debt issuers and agents who render investor services.
- Total automation of corporate trust business.
- Replacement of disparate PC-based systems with one integrated system.

## 6.4 Requirement Study For Depository Management System

<b>The Client</b>	A Central Securities Depository in Belgium.
<b>The Challenge</b>	<p>The Client is a central depository of securities operating in Belgium. Its main function is the physical management of securities, as well as processing of all corporate actions for the securities held, and the related accounting and settlement. Given the technology innovations sweeping through the securities industry and the dependency of their business operations on systems, the Client asked i-flex Software to draw up a Requirements Specification for a state-of-the-art central Depository Management System. The specification was required to address the following areas:</p> <ul style="list-style-type: none"><li>• Online access to information.</li><li>• Enhanced tracking facilities in inventory processing.</li><li>• Online access to affiliates, for inquiry on their account positions.</li><li>• Integration of depository operations with existing financial accounting system.</li><li>• Collection and analysis of statistics on depository functions.</li><li>• Single source of information for all processing requirements.</li><li>• Corporate actions processing.</li></ul>
<b>i-flex Software Solution</b>	i-flex Software was engaged in this project to draw up a detailed Requirements Specifications document which would form the basis for the development of an automated system. To achieve this, i-flex Software worked closely with the Client's users in Belgium. The assignment involved about one person-year of effort.
<b>Salient Features</b>	<p>The proposed system was envisaged to enable:</p> <ul style="list-style-type: none"><li>• Online transaction processing.</li><li>• Security at user, function and data level.</li><li>• Multilingual support.</li><li>• Backdated reports and queries.</li><li>• Automated inventory control.</li><li>• Packet control as part of the inventory management.</li></ul>
<b>Client Benefits</b>	<ul style="list-style-type: none"><li>• Enhanced system security.</li><li>• Enhanced control mechanisms.</li></ul>

- Reduced manual intervention.
- Improved data integrity.
- Efficient inventory management.

## 6.5 Business Process Re-Engineering For International Banking

**The Client** A Leading Commercial Bank in Jamaica.

**The Challenge** The Client Bank is the third largest commercial bank in Jamaica with assets over J A \$6 billion. About one-fourth of its business is accounted for by foreign exchange operations.

In the liberalized scenario of the foreign exchange market, the Bank needed to move rapidly to take advantage of the emerging opportunities and position itself for leadership in the new environment. The Bank was also on the threshold of automating its international and wholesale banking operations. As a preparatory step to implementing its automation plan, it required a business process re-engineering exercise to ensure a productive and flexible automated environment resulting in high-quality customer service.

The Bank needed:

- To design and implement systems and procedures for all activities in international banking and foreign exchange operations, appropriate to the new liberalized environment.
- To identify and establish controls over risks and exposures, and to introduce checks and balances in the operational work flow.
- To identify and address major operational problems currently existing in business operations.
- To establish a flow of work and supporting documents to ensure entry of complete, accurate and authorized data into its automated systems.
- To design and implement work policies, procedure and flows that would fully leverage the capabilities and features of the automated system.

**i-flex Software Solution** i-flex conducted a comprehensive business process re-engineering study to meet the above objectives. As a result, it delivered a detailed Operations Manual for all activities in the international banking business, along with a detailed implementation plan including activities, milestones, resource requirements and training requirements. The study

also provided recommendations and guidelines designed to enhance the operational effectiveness of the Bank's International Banking department, and position it for competitive advantage.

### **Client Benefits**

The Bank's major benefits came from i-flex's holistic approach and one stop consultancy service for technology and banking operations. The primary benefits were:

- New guidance and assistance in foreign exchange business.
- New, efficient procedures to measure and control risks and exposures.
- Solutions to problems in nostro accounts management.
- Documented accounting procedures.
- Substantially improved and profitable cash management.
- Guidelines for audit and inspection.
- Complete and unambiguous documentation.
- New business opportunities identified for the Bank by i-flex, during the conduct of the study.

## 6.6 Assessment And Implementation Of New Technology

### The Client

A Leading Private Sector Bank in Jamaica.

### The Challenge

The Client bank has a network of 12 branches and 7 sub-branches across the island. Additionally, it provides merchant banking facility through a subsidiary.

Driven by an ambitious growth and expansion program designed to make it one of the significant players in the Jamaican financial market, the Bank felt the need to enhance its current Information Technology infrastructure in order to achieve its strategic business objectives.

It therefore commissioned i-flex as consultants to formulate a strategic Information Technology plan for the 1990s and assist it in selecting and implementing appropriate new systems.

### i-flex Software Solution

As consultants, i-flex was responsible for the following:

- Assessment of: the overall status of the Bank's automation; suitability of the existing hardware and software in view of the future business plans; formulation of a strategic technology plan.
- Preparation of Requirements Specification for its banking applications.
- Preparation of an RFP for h/w and s/w and sending of invitations to vendors, to submit proposals.
- Definition of evaluation criteria and formulation of an objective evaluation methodology.
- Evaluation of proposals and selection of an optimal solution.
- Management of the implementation of the selected solution.

### Client Benefits

This assignment brought to the Client bank some specific benefits:

- A quantum leap in the status of automation of the bank; this was enabled with the establishing of a flexible, comprehensive and growth-oriented technology

platform, which could serve as a critical input to the achievement of ambitious business objectives.

- A one-stop comprehensive solution; in addition to the formulation of a strategic technology plan, selection of an appropriate solution and assistance in implementation, i-flex provided consulting assistance to the Bank in designing a new data center, increasing general awareness on advancement of technology in the areas of office automation facilities, etc.
- The location of the consultant at the Bank's premises for the entire tenure of the project enabled a close interaction with the Bank's people and a better understanding of its needs. This in turn enabled a critical assessment of the Client's technical and functional needs.



## 6.7 Requirements Spec. Study & Package Evaluation For Integrated Treasury System

**The Client** The Treasury Group of an International Bank in the Middle East.

**The Challenge** The Client Bank's Treasury wing deals in a variety of capital market instruments and products like Foreign Exchange, Money Market, Capital Market Securities and Derivatives: Swaps, Options, Swaptions, FRAs, Financial Futures.

A leading market player, the Client required a comprehensive and fully integrated Treasury System to enable it manage the Bank's and its customers' portfolios and risks in an online, real-time manner.

Specifically, the system needed to be capable of:

- Doing a complete and integrated processing of the requirements of the Front-office, Middle-office and Back-office, with respect to: pricing, real time valuations, online credit & risk management, automated messaging and settlement operations.
- Catering to a wide spectrum of instruments including Foreign Exchange, Money Market, Capital Market Securities, and Derivatives.
- Catering to a variety of Derivative instruments including:
- **FX Options:** Plain vanilla to Exotic Options, ETOs and OTCs  
**Interest Rate Options:** Caps, Floors, Collars, Swaptions, Financial Futures, FRAs, Bond Options  
**SWAPS:** Interest Rate Swaps (Coupon Basis), Currency Swaps  
**Financial Futures:** Euro Dollar, T Bills  
**Forward Rate Agreements:** Discounted, Non-discounted, Odd-dated, Regular / Irregular.
- Servicing a variety of Government Bonds, Treasury Bills, Other bonds; Credit Card receivable and other asset backed securities; Collateralised Mortgage Obligations, FRNS, Zero-coupons and Fixed-rate Bonds.

- Providing Desk Heads and Risk Managers with online, real-time information on portfolios in terms of: positions, cash flows, limits etc.; and on risks: credit, price and liquidity risks, for effective and timely decision-making.
- Enabling efficient and speedy processing of: deal entries, enrichments, verifications, messaging and settlements.
- Providing overall superior risk management controls and enabling improved productivity and capacity to handle increased transaction volumes.

### **i-flex Software Solution**

The Bank retained i-flex to prepare a Requirements Specifications (RS) document and to subsequently evaluate software solutions for its integrated treasury requirements, closely working with its Software Technology Department.

The project initiated with an in-depth Business Study, involving discussions and interviews with business area unit heads; review of the current systems and operations; understanding of the specific requirements of the integrated treasury environment and analysis of the overall findings of the study. Subsequently, a detailed RS for the integrated treasury system was prepared for client review and finalization.

With the RS serving as the basis for an in-depth and objective evaluation of the potential solutions, i-flex created a detailed system evaluation matrix and system evaluation framework. Two software packages from leading vendors of Treasury systems were then evaluated and the Evaluation reports presented to and discussed with the Bank's management, along with a set of recommendations.

### **Salient Features**

The systems evaluated had the following features:

- Enabling synthesis of information from all treasury departments and related areas, namely: Front-office (trading room), Middle-office (risk management and credit) and Back-office (operations, control, Treasury, MIS and Fincon).
- Integrated with external vendor systems for market information as well as for making deals (e.g. using Reuters dealing 2000).

- Rule-based, defining product processing rules covering the entire life cycle management (entry, authorization, liquidation / settlement) of products and contracts and their relationships with other objects/entities such as: counterparties, GL and accounting, limits and risks, portfolio, market data, messaging, security and audit, MIS.
- Integrated with internal systems such as current accounts, GL, MIS, electronic banking and message delivery & transmission.
- Enabling updation and managing of limits and risks in an online, real-time environment.
- Enabling pricing of products, and performing a simulation and what-if analysis on dealer's and customer's portfolio.
- Providing online positions and P&L for dealers, portfolio.
- Facilitating definition of warehouse and portfolio structure and viewing of details of: positions, P&L, limits, cash flow, etc. from different perspectives and reporting levels (e.g. MIS perspective, Dealer perspective, Chief dealer perspective, warehouse level, currency level.).
- Enabling query on current and historical information in a user friendly manner.
- Providing a highly user- friendly and intuitive interface.
- Having an open, extensible and industry standard architecture.

### **Client Benefits**

In addition to meeting all the system objectives stated above, the integrated Treasury system is envisaged to provide the following benefits to the Client Bank:

- Ease of transaction processing. Increased transaction volumes.
- More competitive/profitable pricing of products/instruments.
- Improved/controlled risk monitoring. Proactive customer management.
- Effective portfolio management. Improved business management.

## **6.8 Feasibility Study And Software/Hardware Evaluation For Bank Automation**

**The Client** A Leading Bank in the Middle East.

**The Challenge** The Client Bank, running its 11 branches on legacy software and hardware, had plans for replacing these with a state-of-the-art solution. For this, it called in i-flex as Consultants to conduct a Feasibility Study and thereafter assist it in the 2-phases of its Replacement Plan. In the first phase of the assignment, which involved replacement of the Bank's front-end Branch systems, i-flex was required to bring out a comprehensive RFP and conduct a software/hardware evaluation of various vendor solutions. In the second phase, the Bank sought i-flex's help in preparing an RFP for vendors, for the replacement of its back-end Core systems.

**i-flex Software Solution** The Feasibility Study was undertaken in two representative branches of the Bank. i-flex's study outlined the critical features of the existing legacy systems in objective terms, so as to enable decision-making by the Bank on issues of co-existence, customisation of systems and Business Re-engineering. i-flex also carried out a focused review of the phasing options available to the Client and their comparative advantages. An Effort-Benefit-Risk matrix drawn up, duly considered the Bank's expectations of the implementation time-frames and phasing. i-flex's set of recommendations made to the Bank, included several significant suggestions for partitioning its Project for speedier implementation, alongwith the resultant benefits accruable at the different Project phases.

Based on the above study, a revised, comprehensive RFP was created for issue to vendors. Using a detailed evaluation methodology drawn up by i-flex, evaluation for selection of front-end systems was then carried out within a strict time-frame, on the basis of pre-defined quantitative criteria and with the complete involvement of the Users. i-flex's recommendations for an optimum solution for the Client were based on, both, a quantitative and qualitative evaluation of vendor offerings.

In parallel with the evaluation of the front-end system, an RFP for the host system was also created.

**Client Benefits**

- The detailed Feasibility study provided the Client with specific information required for decision-making on the phasing of its planned automation project.
- With its unique blend of banking expertise, technical knowledge and professional skills, i-flex provided the Bank a sound Evaluation Methodology, enabling an objective evaluation of the vendor offerings, for selection of an appropriate solution in keeping with the requirements of: functionality, schedules and related-criteria.

## 6.9 Requirements Specifications Study For An Integrated Treasury System

**The Client** The Treasury Division (TD) of a Leading Multinational Consumer Bank in Singapore.

**The Challenge** The Bank's TD serves the treasury needs of the regional countries including: Hong Kong, Singapore, Malaysia, Thailand, Indonesia, Philippines and Taiwan. Customer transactions done at the country level are consolidated and positions are passed on to the central TD at Singapore. The TD manages the positions and deals in a variety of capital market instruments and products like Foreign Exchange, Money Market and Foreign Exchange Options.

Considering the centralized TD's high transaction and business volumes, generated at customer delivery centres and devices (including ATMS) in various countries, it requires a comprehensive and fully integrated Treasury System to enable it cap

Specifically, the system needs to be capable of:

- Capturing, consolidating and transferring the positions from country treasury to the central TD.
- Doing a complete and integrated processing of the requirements of the Front-office, Middle-office and Back-office, with respect to: pricing, real time valuations, online credit & risk management, automated messaging and settlement operations.
- Catering to a wide spectrum of instruments including Foreign Exchange, Money Market, FX options (and later other derivatives and Capital Market Securities instruments).
- Providing Desk Heads and Risk Managers with online, real-time information on portfolios, in terms of: positions, cash flows, limits etc.; and on risks: credit, price and liquidity risks, for effective and timely decision-making.
- Enabling efficient and speedy processing of: deal entries, enrichments, verifications, messaging and settlements.

- Providing overall superior risk management controls and enabling improved productivity and capacity to handle increased transaction volumes.

**i-flex Software Solution**

The Client Bank's TD retained i-flex to study its current processing environment, information flow and procedures, and prepare a Requirements Specifications (RS) document. Subsequently, i-flex was requested to prepare an RFP and do an evaluation of software solutions for the integrated treasury requirements.

The project was initiated with an in-depth business study, involving discussions and interviews with business area unit heads; review of the current systems and operations; understanding of the specific requirements of the integrated treasury environment and analysis of the overall findings of the study. Subsequently, a detailed RS for the integrated treasury system was prepared for client review and finalization, followed by the preparation of an RFP and its distribution to a select set of vendors.

**Client Benefits**

In addition to meeting all the system objectives stated above, the integrated Treasury system is envisaged to provide the following benefits to the Bank:

- Ease of transaction processing.
- Increased transaction volumes.
- More competitive/profitable pricing of products/instruments.
- Improved/controlled positions management & risk monitoring.
- Improved business management.

## 6.10 Process And Quality Improvement Consulting

**The Client** The Largest Retail Bank in Jakarta.

**The Challenge** The Client Bank has set itself the goal to increase its customer base and the volume of electronic transactions done through the bank, by having a sound technological edge over its competitors, and by providing improved quality service to all its customers. Thus, the Bank aims at establishing a No. 1 technology cell, in comparison with its competition. i-flex, having achieved SEI-CMM Level 4 Process Maturity in Dec 1995, was thus approached by the Bank to provide consultancy and to define a global strategy for achieving Process and Quality Improvement.

**i-flex Software Solution** i-flex offered to provide the Client Bank with Phase I of its PQIP Consultancy. i-flex and the Bank mutually decided that the Software Engineering Institute's Capability Maturity Model (SEI-CMM) would be adopted as the framework for developing the PQIP.

As per the CMM requirements, participants from the Bank's software projects would have to undergo an introductory orientation and training on SEI-CMM concepts, which was conducted by the i-flex Consultants. Presentations and Demos on i-flex Products - *An Online Repository of modern software engineering processes and management practices*, and *A tool for Project Monitoring and Tracking*, were also conducted, to expose the Bank's key project personnel to the i-flex tools for process adherence and improvement. Investigations were held by the i-flex consultants with the Bank's project personnel at various levels, to understand the current processes, documentation and nature of business at the Client Bank.

Finally, based on the investigation, i-flex formally presented a global strategy for process and quality improvement to the Bank, outlining the recommendations and action points. Non-existent groups/functions at the Bank, but required by the CMM, were also highlighted as part of the global action plan.



The Phase I PQIP Consultancy involved a total effort of 20 person-days, half of which were spent at the Bank site and the other half at i-flex's site.

**Client Benefits**

The PQIP Consultancy will aid the Client Bank in the following manner:

- Strengthening of the technology cell, through the improvements in the software development processes.
- Resultant improved in the quality of the software services provided.
- Eventual translation into less effort spent on maintaining systems for customer services, effectively reducing the cost of services (cost per transaction) provided to the customer.
- Improved quality and high-value technology services will result in a much larger volume of transactions and an increased customer base.

In addition to the above, a higher software process maturity as defined by SEI-CMM will play a very important role in establishing for the Bank the No.1 technology cell status, thus arming it with a competitive edge in the banking business.

## 6.11 Consultancy For Merger Of Multiple Banks

**The Client**                      Citizens Bank, Jamaica

**The Challenge**                      Government of Jamaica as part of the restructuring of the Financial Services industry had announced the merger of three loss-making financial entities belonging to a Group, with Citizens Bank group. The challenge was to merge the accounts and operations of the merging institutions into those of Citizens Bank and its associate Banks within the least time, with maximum retention of accounts and without any loss of confidence of the public in Citizens Bank itself.

While Bank initiated the preliminary steps, it commissioned i-flex as its consultant to see through the merger.

The Bank also expects to be in a position to receive more Banks to be merged in itself and to that extent the exercise is not seen a single time exercise but as an ongoing project challenge. i-flex's consultancy was expected to institutionalise the merger process.

**i-flex Software Solution**                      As consultants, i-flex provided assistance in the following areas:

- Drawing up, keeping updated a granular plan for all activities in the merger
- Identifying the task dependencies, staffing requirements, risks and risk mitigation for the various tasks and stages in the merger project
- Identification of the management issues, highlighting the management control points and project monitoring throughout the duration of the project
- Educating the bank staff on the activities they are entrusted with in the merger, and providing the interface for the inter-departmental issues on the merger
- Providing technological and business expertise in the areas of Product Mapping, General Ledger Mapping, Merger accounting, Automated and semi-automated

accounts conversion process, Conversion Verification process and post-merger customer handling

- Providing expert assistance in the legal and commercial negotiations in the merger and adding value in the accounting process of the merging and the merged institutions
- Playing the role of catalyst for the change management in the staff of both the sides in the merger

### **Client Benefits**

The consultancy from i-flex brought to the Client bank some specific benefits:

- Firm clear date-wise plan with effective management control: Result is that the merger went through on the chosen date with no unanticipated problems
- Least disturbance to customer service, and most visible positive impact on the customers and general public to carry forward the policies of the government
- Effective control on efforts, dates, expense on merger related and an effective control on the risks
- Positive impact on the merger capability of the Bank, GoJ already announced one more bank to be taken over by the client even during the project's progress, more are expected later
- Effective transfer of management technology in the aspects of visualising and managing a bank merger project- at all levels of the bank's hierarchy

## 6.12 Feasibility Study And Firewall Software Evaluation For Bank's Web Server

### **The Client**

A Leading Bank in the Middle East.

### **The Challenge**

The client bank running its branches across the globe, using retails banking s/w application, had the plans to open its operations, to all the customer on Internet. For this, it called in i-flex as Consultants to conduct a comprehensive feasibility study and suggest the most suitable firewall for securing the bank web server against any potential data loss and same time not to make any compromise on the performance. i-flex consultant conducted the study and submitted a report with secured architecture, which can be put in place to secure the web server.

### **i-flex Software Solution**

The Feasibility Study was undertaken in banks corporate office i-flex's study outlined the critical features of various firewalls their implementation strategy and maintenance so as to keep the bank's web server available for the business without any down time.

i-flex also carried out a focused review of the firewall options available to the Client and their comparative advantages/disadvantages. An Effort-Benefit-Risk matrix drawn up duly considered the Bank's expectations of the implementation time frames and phasing. i-flex's set of recommendations made to the Bank, included several significant suggestions for partitioning its Project for speedier implementation, along with the resultant benefits accruable at the different Project phases.

Based on the above study, a revised, comprehensive report was created for bank management to come to a concluding decision about selecting a firewall. Using a detailed evaluation methodology drawn up by i-flex, evaluation for selection of front-end systems was then carried out within a strict time frame, on the basis of pre-defined quantitative criteria and with the complete involvement of the Users. i-flex's recommendations for an optimum solution for the Client were based on, both, a quantitative and qualitative evaluation of vendor offerings.

**Client Benefits**

The detailed Feasibility study provided the Client with specific information required for decision-making on selecting a firewall for bank web server

- With its unique blend of banking expertise, technical knowledge and professional skills, i-flex provided the Bank a sound Evaluation Methodology, enabling an objective evaluation of the vendor offerings, for selection of an appropriate solution in keeping with the requirements of: functionality, schedules and related-criteria.

## 6.13 Feasibility Study And System Evaluation For A Data Warehouse Solution

### The Client

The Delivery Team for Emerging Markets group of a Large Multinational Bank based in London.

### The Challenge

The bank has traditionally catered to Top Tier Local Corporates customers, who have global business operations. As part of a new business initiative, it was decided that the bank should also offer services to small local corporates also. These were termed as Emerging Local Corporates (ELC) in the Emerging Market countries.

The ELC business is expected to start functioning in eight pilot countries. It will generate high volume and low value ticket business. The focus of operations will shift from relationship banking to mass marketing strategy. All the systems to cater to this kind of mass market business are expected to be operational from the first day of business. The data warehouse is one of the key systems that will enable the management to monitor and refine the strategies that have been defined for the market.

Specifically, the system needs to:

- Provide an integrated view of data from various operational systems
- Act as a central repository for all transactional information for query and analysis purposes
- Help in discovering patterns of customer behaviour for refining norms of selection, target marketing, delinquency.
- Provide data for comparing the planned business with the actuals
- Monitor and refine efficiency of the various processes that are followed within the bank

i-flex has been involved as consultants in defining the requirements of the various departments that will be met from the warehouse.

Based on the requirements that have been gathered from four pilot countries for ELC and the ELC Sector management, CITL was involved in identifying vendors

who provide various components of the data warehouse solution, requesting for information from them and the vendor selection process.

### **i-flex Software Solution**

The Requirements Study was undertaken in four representative countries which would pilot the ELC Business. i-flex's requirement document outlined the requirements that need to be met by the warehouse for the functional groups Sales, Credit Administration, Business Planning and Customer Service. The process also defined the information that needs to be captured by the operational systems to cater to the planning and monitoring needs. A phasing exercise was undertaken to prioritise the requirements based on their criticality to business.

Based on the above study, a comprehensive RFI was created for issue to vendors which covered the specific technology needs for the warehouse like front end OLAP and query tools, databases, middleware, extraction tools, meta data managers etc.

In addition, aspects of implementation like data warehouse on methodologies were also requested. The RFI was circulated to a selected list of vendors who provide solutions in these areas. The RFI was also sent to systems integrators who would undertake integration of the selected tools and to provide end-to-end solution through implementation in the pilot 8 countries.

Responses were received from these vendors and evaluated. A detailed evaluation methodology was drawn up by i-flex to do the same. i-flex's recommendations for an optimum solution for the Client was based on, both, a quantitative and qualitative evaluation of vendor offerings.

A Feasibility Document was generated at the end of the evaluation process, giving recommendations on the following aspects of the project

- The Data Warehouse Architecture
- The Infrastructural needs
- The Project Management aspects
- The Project Cost
- Implementation schedules
- Recommended vendor solutions

**Client Benefits**

- The Requirements study document provided the Client with specific information required for the planning and monitoring the ELC business on an on-going basis.
- i-flex undertook to integrate the enabling of an objective evaluation of the vendor offerings, for selection of an appropriate solution in keeping with the requirements of: functionality, schedules and related-criteria.