Working Group on Priority Areas in Banking Technology

The Reserve Bank of India, on a recommendation of the Governing Council of IDRBT, set up a Working Group to prioritise major areas of emphasis to be addressed by IDRBT.

This Working Group consisted of five members: Prof P. Rama Rao, Vice Chancellor, University of Hyderabad (Chairman), Dr. K.K.K. Kutty, Chairman, Goldstone Softech Ltd; Shri Ramesh Gelli, Chairman & Managing Director, Global Trust Bank; Shri R. Chandreshekhar, IAS, Secretary to Government, APIIC, Govt. of Andhra Pradesh and Dr V.P. Gulati, Director, IDRBT, (member secretary). Shri K.R Ganapathy, Adviser, Reserve Bank of India, on duty with IDRBT attended all the meetings of the Group as a special invitee.

The Working Group's terms of reference were as follows:

- Identification of Technology Areas that impact customer service in the banking and financial sector and generally improve payment flows.

- Identification of research areas that could be of relevance to banking and financial sector with the ultimate objective of achieving improved house keeping, decision making and customer services.

- Identification of educational programmes and their implementation to meet specialised demand for Information Technology experts in the banking and financial sector.

- To suggest measures to increase the use of electronic media for payment services, thereby reducing the use of paper-based instrument and cash.

- To suggest necessary steps to improve security in IT use, and for this purpose, undertake research with collaboration, if necessary, with other institutions/ entities within and outside the country.

The Working Group had four meetings on April 26, June 12, July 19, and July 29, 2000. In order to identify the areas in banking technology for focus by IDRBT, the Group decided to carry out a gap analysis taking into account the prevailing technology deployment status in the various sections of the Indian banking system. Presentations were called for from some of the reputed banks who have deployed technology as part of their business strategy, banking software vendors and also communication technology providers to get an idea about the existing technology status in the private and foreign banking sector as regards software architecture and to note the emerging trends in the communication technology in the near future.

The gap analysis revealed that the following areas need to be addressed: Research and Development; Making available a Communication Super highway for use by banks and their customers; Security platform for establishing Trust; Scaleable Software Architecture; A big gap in the availability of skilled personnel to operate and manage in an automated environment including Risk

Management; Need for standards as regards messages, security protocols, payment protocols, and data models; education and training.

Keeping the above areas in view, the Working Group evolved its recommendations, and submitted its report to the Governor of RBI on August 4, 2000.

Executive Development Programmes

Information Security and Cyber Crimes

An Executive Development Programme, exclusively for CBI Officials, *on Information Security and Cyber Crimes in the Computerised Environment* was conducted from July 24-29.

Shri R.K. Raghavan, Director, CBI, inaugurated the programme and Dr. V.P. Gulati, Director, IDRBT, delivered the welcome address.

Shri R.K. Raghavan, Director, CBI, (second from left) is all ears as the programme coordinator, Dr. P Radha Krishna briefs the participants at the inaugural session. To his right is Dr. V.P. Gulati, Director, IDRBT, and to his left are Prof. D.B.Pathak, IIT, Mumbai, and Shri K.R. Ganapathy, Adviser, IDRBT.

The programme focussed on the skills and techniques required to handle cyber crimes and provided the participants with an insight into the various aspects like security breaches in computerised environment, detection of cyber crimes, collection of evidence, legalities involved in producing and proving evidence in electronic form, reorientation needed for handling cyber crimes etc.

The chief focus of the programme was exclusively on tackling cyber crimes in the key sectors of Banking and Finance and the participants were DIGs, SPs and DSPs of the Central Bureau of Investigation from all over the country.

Web Based Learning

This programme, held at the Institute from August 7-12, aimed at preparing the Bankers for the emerging system of Web-based Learning and Training. The participants were Trainers and Managers of the training system from Banks.

Participants of the programme on Web Based Learing. In the front row (sixth from left) is Dr. V.P. Gulati, Director, IDRBT with the faculty. He is flanked by Shri K.R. Ganapathy, Adviser, IDRBT (left) and Shri M.V. Sivakumaran, programme co-ordinator (right).

The programme took them through a wide gamut of technology tools and trends, with practical projects for assimilating the fundamentals of web-based curriculum.

This very first programme could break new ground by enabling the participants to create model web courses, on given topics, and present them successfully within a span of three days, using most of the functionalities offered by HTML

The topics covered include Web Design Concepts, HTML, DHTML, XML, ASP, CGI, Perl, Graphics and Animation, apart from Web Hosting and Management.

Special Programme for Bank of Maharashtra

A customised Executive Development programme was organised at the Institute from August 21-26, for the Executives of Bank of Maharashtra.

Shri S.C. Basu, Executive Director, Bank of Maharastra, delivering the inaugural address. To his left are Shri KR Ganapathy, Adviser, IDRBT; Dr. VP Gulati, Director, IDRBT and Shri Visweswar, programme coordinator.

The programme provided exposure to the participants on the emerging trends in banking technology on all fronts like Payment Systems and Security, Risk Management, Data Mining, Data Warehousing, Internet Banking and so on. The INFINET infrastructure, expansion plans and strategies for effective utilisation of this country-

wide communication network through intra-bank and inter-bank applications were also discussed.

E-Commerce for IDBI

A programme on E-Commerce was conducted for the officers of Industrial Development Bank of India from September 25-30. Dr. V.P. Gulati, Director, IDRBT inaugurated it.

The programme aimed at familiarising the participants with the latest trends in Banking and Financial Technology, E-Commerce, Payment Systems & Security. There were 28 participants drawn from different branches of IDBI.

Apart from the faculty of the Institute, a host of guest speakers too shared their expertise with the participants.

Top Management Programme for Vijaya Bank

The participants of the Customised Executive Development Programme for Vijaya Bank. Shri C. Gopalakrishnan, CMD, Vijaya Bank, (fourth from right) is flanked by Shri Michael Bastian, ED, (left) and Dr V.P. Gulati, Director, IDRBT (right).

At the request of Vijaya Bank, a two-day Special Executive Development Programme for their top management was conducted at the institute from October 13–14, 2000. The participants included Shri C. Gopalakrishnan, CMD, and Shri Michael Bastian, ED.

A wide range of topics including Emerging Trends in Banking Technology, INFINET, Intra and Inter Bank Applications, Security and Certification, Multimedia, Corporate E-Mail, Data Warehousing and Data Mining were discussed.

Novell GroupWise

This one-week programme, held at the Institute Campus, from July 17-22, was organised for the benefit of those banks, which have selected Novell GroupWise as their messaging backbone. Various topics including Advanced Features of GroupWise Administration and Remote Access were discussed in detail.

The participants were system administrators, technical supporting staff and trainers from SBI, RBI, Punjab & Sind Bank, Punjab National Bank, and State Bank of Indore.

Messaging Systems

Two programmes on Mail Messaging were conducted from September 4-9, and 11-16. While the first programme was exclusively for Andhra Bank, the second had participants from the RBI, Bharatiya Reserve Bank Note Mudran Limited, Indian Bank, Syndicate Bank, State Bank of Bikaner and Jaipur, and SBI.

The programmes had technical sessions and provided hands-on training to the participants in configuration, maintenance and trouble-shooting of the backbone.

INFINET, Security, Messaging & SFMS Issues

A 3-day Workshop on "INFINET, Security, Structured Financial Messaging Solution, Messaging and other INFINET-related issues" was organized at the Institute from October 4– 6, 2000. The participants were chiefs of CPPD/DIT of the public sector banks.

In his inaugural address, Dr.V.P. Gulati, Director, IDRBT, traced the genesis of the INFINET project. He reiterated that intra – bank applications had to be developed by CUG members themselves and for the inter bank applications IDRBT, RBI, IBA and all CUG members will work together.

During the workshop, SFMS details were given to the participants. Dr. Gulati requested them to form a team of officers, preferably with SWIFT background, who could make this project a success.

The project team from M/s.TCS, made a presentation on SFMS. There was also a session on Security features proposed to be incorporated in the SFMS. (Details of SFMS on Page. 9)

The Workshop on INFINET, Security, Messaging & SFMS in progress.

During the discussions on SFMS, Shri.K.R. Ganapathy, Adviser, IDRBT, said that the number of gateways had to be decided by the banks. Moreover, for building interfaces with TBA software packages and

for straight through processing, banks have to work closely with IDRBT and M/s TCS. Dr. Gulati, informed the participants that the Report of the Message Standards Committee would be circulated to all the banks.

He advised the CUG members to form corporate networks using INFINET connectivity and said that all CUG members should build up LANs at VSAT offices. He mentioned that all efforts will be made to get the restriction regarding interconnectivity of two networks to be waived from TRAI and DoT. He suggested that network monitoring could be done proactively if CUG members specified their sites that were critical in nature. IDRBT would also work to obtain periodical usage and problem reports bank – wise for circulation to the banks. He said that the network usage should be made much better than the present usage. He once again requested banks to offer full cooperation in making SFMS on INFINET a big success.

Other Events

Seminar on Smart Card Key Management.

Our Director, Dr. V.P.Gulati, inaugurated this one-day seminar held on August 8. In his inaugural address, he placed emphasis on the commercialisation of the Smart Rupee Systems (SMARS).

The Smart Card-based payment scheme developed for banks is essentially due to the efforts of the group comprising of RBI, IIT (Mumbai) and IDRBT. Finally, the group was expanded to include 17 partners, each actively involved in developing a smart card-based payment system for banks using open standards and ensuring interoperability among the participating banks.

The need to introduce internationally acclaimed 'best practices' in the Key Management System (KMS) was highlighted so that the essential elements of secure transactions such as message integrity, card authenticity, data confidentiality and non-repudiation of transaction are taken care of.

Presentation on Web Mining

On 17th August 2000, Prof A K Pujari, University of Hyderabad, made a presentation on "Recent Developments in Data Mining". The presentation was an overview of web mining in general and text mining in particular.

Forthcoming Programmes

Enterprise Wide Networking
(Nov 13-18 and Dec 18 –23, 2000)

Two programmes on *Enterprise Wide Networking* will be conducted on the above-mentioned dates.

The complexity of computer devices that supports an ever-increasing number of applications and users gives rise to the need to use automated network integration and management tools.

As network installations become large, more complex and more heterogeneous, the cost of ownership of network spirals. To control costs and provide faster solutions to these problems, network management tools that can be used across a broad spectrum of product types are a must.

Keeping in mind the objective of constant vigilance and preparedness, security has to be provided using a layered approach. The various important measures to be adopted will be covered with special focus on NATs, Proxy Servers and Firewalls.

For further information, please contact the programme coordinators: Shri N Rajendran and Shri Varghese Jacob, Faculty, IDRBT

Email : rajendra@idrbt.ac.in
varghese@idrbt.ac.in

Payment Systems and Information Security Strategies (Nov 20–25, 2000)

This programme enables the participants to understand the : Need for a Strategic Security Architecture, which can deliver business-driven technology solutions for the ever-changing customer requirements; risks associated with the payment systems and their management; technology infrastructure that will be required to implement an efficient payment system integrated with an efficient Information security life cycle policy; legal and statutory framework to define the rights and liabilities of the parties involved; and security technologies and Cryptography system/Trust architecture that must be set for enabling secure payment systems.

For further information, please contact the programme coordinator: Dr. Ashutosh Saxena, Faculty, IDRBT

Email: ashu@idrbt.ac.in

Technology for Risk Management (Nov 27- Dec 2, 2000)

This one-week programme aims at providing an insight into the various models of Forex and Credit Risk Management. An insight into the concepts of Risk Analysis and Management with specific reference to the Indian scenario will be provided.

Concepts of Risk Management in the technology driven Internet-enabled financial and Banking Sector will be discussed and debated at length.

For further information please contact the programme

coordinators: Shri Aditya Gaiha and Shri Supriya Kumar De, Faculty, IDRBT

Email: aditya@idrbt.ac.in
       supriya@idrbt.ac.in

E-Commerce and Payment Technologies (Dec 4 – 9, 2000)

This programme aims at familiarizing the participants with the latest trends in the areas of E-Commerce, Payment Systems and Securities. E-Commerce provides ample opportunities for small and medium companies to reach out to the global customers. Many banks are already on the fast track having introduced Internet–based services.

The programme will provide an overview of the basic concepts of E-commerce, payment systems, security technologies, and legal aspects.

For further information, please contact the programme coordinator: Shri A.R. Dani, Faculty, IDRBT.

Email: ardani@idrbt.ac.in

INFINET News

The INFINET now has 481 VSATs across the country already commissioned. With the allocation of a full transponder (No. 8) on INSAT 3B, the bandwidth availability has enhanced considerably.

Now, the INFINET has 16 in-routes (as against the 8 earlier) and 2 out-routes (as against the single out-route earlier)

Consequent to the shift from INSAT 2B to INSAT 3B, we had to re-orient all the VSATs to point to the new satellite. This elaborate exercise has been successfully completed.

The INFINET is being expanded using leased line technology, wherein 21 cities are being connected by a judicious mix of 2 Mbps and 64 Kbps leased line links. CUG members will be allowed gateways to this leased line based network at each of these 21 cities. The leased line part of the INFINET will be seamlessly integrated with the VSAT portion of the INFINET. The leased line connections between some cities have already been released by the DoT. Orders have already been placed for the networking equipment. The leased line portion would be fully operational within a period of six months.

INFINET can be used for both intra and inter–bank application. Banks can develop and port intra bank applications on their own. Inter bank applications are being developed by the RBI, IDRBT and member banks. INFINET will be the backbone for the National Payment Systems.

Member banks can plan their corporate networks utilizing the INFINET as the backbone and their branches can get connected to the INFINET network at designated locations in 21 major cities in India. For the other cities, the bank can plan their own leased line/ VSAT network, which can also be integrated to the INFINET for nationwide connectivity. Banks can connect their non-INFINET branches using ISDN, PSTN and leased lines to INFINET (either VSAT sites of their banks or Leased line gateways in the 21 cities).

Awareness Series :

INFINET – The National Backbone for Financial Services

Genesis

The need for a nation-wide communication backbone for the Banks and Financial Institutions to improve the payment systems in our country was stressed as early as 1994 by the Committee on Technology Upgradation in the Payment Systems, set up by the Reserve Bank of India. The task of setting up a reliable, country-wide communication backbone for financial messaging was entrusted to IDRBT by RBI. The proposed network, named the Indian Financial Network(INFINET), was based on VSAT Technology, to start with.

IDRBT established the INFINET with its Hub and the Network Managmement System(NMS) located in the Institute Campus in Hyderabad. INFINET was inaugurated on 19th July 1999, by Shri.S.P. Talwar, Deputy Governor, RBI.

Ownership and Control

IDRBT owns the Hub Equipment and manages and operates the Network. The remote VSATs and related equipment like the IDU are owned by the respective participating member banks. IDRBT issues the guidelines

for the Banks on how to configure the various components on the network. Banks can develop their own Enterprise-wide Networks using INFINET infrastructure and link low volume, intra-city and nearby branches with the nearest VSAT communication node. IDRBT is in the process of developing a dedicated website - **infinet.org.in** for providing Online Help, Guidelines, Frequently Asked Questions(FAQ), Certification and a List of Intra-bank Applications that can be deployed on the network. The INFINET Users Group (IUG) is the forum for discussing the common issues related to the network and banking applications.

Membership

Initially, the membership was restricted to the Public Sector Banks, RBI, SBI and its Associates. From October 2000, the membership of the INFINET has been expanded to include Private Banks, Foreign Banks and Cooperative Banks and Financial Institutions as well.

The Technology – Best of Both Worlds

VSATs were the natural choice when the INFINET was conceived as they were economical, affordable and reliable for a sprawling network of this nature, spanning the entire country(leased line costs were prohibitive at that time and, of course, there was the other major problem of the last mile connectivity). The INFINET's VSAT Network; spanning 108 cities/towns with 481 VSATs already installed and commissioned, uses TDM/TDMA for Data traffic and DAMA/SCPC for voice or video traffic.

Now that the communication lines have improved and the leased line costs have become reasonable, IDRBT has chalked out a plan for seamlessly integrating the VSAT Network with a high bandwidth Leased Line Network (LLN) connecting 21 major cities across the country. Each Bank can develop its own intra-city or nearby cities network and come through a single gateway to get linked to the INFINET through the LLN Gateway. A dedicated port would be allocated to each participating bank at the LLN gateway and dedicated bandwidth would also be made available depending upon the requirements of each bank. The DoT approvals have been obtained for this purpose and IDRBT is in the process of procuring the necessary communication equipments and networking components. The LLN is expected to be in place shortly.

With the integration of the LLN with the existing VSAT Network, the users of INFINET will have the option of dynamic routing between VSATs and the Leased Lines depending upon traffic volumes, specific application requirements and other factors like time criticality etc.

Security

The INFINET is the **most secure platform** that technology

can provide for this purpose. The salient points of security implementation on the INFINET are as follows:

- INFINET being a Closed User Group(CUG), it provides a high level of security against intruders. Outsiders cannot enter or penetrate the network.
- In the case of VSAT Network
  a) The IP Addresses for IDUs at the remote VSAT locations are allotted and maintained by the Hub and cannot be changed by the end users. This takes care of the network integrity and security.
  b) In the space segment, the data transmission, even in broadcast mode, is encrypted using proprietary standards and the packets cannot be opened at any VSAT location except the one specified as the destination VSAT.
- In the case of Leased Line Network(LLN) IPSEC 56 will be used to provide state-of-the-art encryption and security.
- Apart from the above layers of network security, there will be a host of in-built security mechanisms in each application that is deployed on the INFINET - like password, access control, encryption, digital signatures and certification and in some applications there will be smart card and/or bio-metric authentication as well.
- IDRBT will be building a complete Public Key Infrastructure and act as the Certification Authority for the Banking and Financial Sector, under the IT Act 2000.

Intranets and VPNs

The INFINET offers a wide variety of intra-city as well as inter-city connectivity options. Banks can connect their low volume branches to VSAT ports through the city-wise gateway of the Leased Line Network(LLN) through PSTN/ISDN/Leased Lines (DoT permission is available for this). Banks can develop their own Virtual Private Networks(VPN) on the INFINET and effectively implement enterprise-wide Intranets.

Banking Applications on the INFINET

Once Banks develop their own enterprise-wide intranet using INFINET infrastructure, they can port a number of their intra-bank applications. However, very few banks have well developed applications which have been ported on the network. This issue has been discussed in various forums including the Conference of CPPD Chiefs at IDRBT and INFINET Users Group meetings. It has been observed that there are some critical factors which come in the way of porting of applications by many banks on the INFINET, like:

a) Either the Banks do not have applications(developed already) or the software is of a standalone nature and does not have networking modules.

b) Banks are yet to develop their own Local Area Networks which can be linked to the Wide Area Network node(VSAT IDU/ISDN/PSTN/Leased Line, Routers)

These problems are being sorted out on a war footing by most of the banks.

In the INFINET Users Group meetings, it was also decided that till proper application solutions are built by individual banks, a Mail Messaging System(MMS) may be implemented which can be used for some Banking Applications and to improve the communication within the organization and possibly with customers also.

Similarly, there was another strong view of the INFINET Users Group about the uniformity and common standards for banking applications and possibility of having software solutions which can be utilised for both intra-bank and inter-bank applications. The Structured Financial Messaging Solution **(SFMS)** emerged from this and IDRBT is in the process of implementing the SFMS. MMS and SFMS can be very useful in the implementation of many banking applications on the banks' own intranets.

Now, the onus is on each and every bank to be ready with the pre-requisites to implement the applications on the network.

Given below is the list of intra-bank application that Banks can look forward to port on the INFINET(Ref: Vasudevan Committee's recommendations):

- Funds transfer and payment messages (Intra-bank)
- Banks owned ATM/credit card, debit card and other applications on the Corporate network
- Inter Branch Reconciliation (IBR)
- Quick disposal of loan / investment proposal
- Forex information from branches to the office dealing in Forex
- Fund information from clearing centers to the fund management office for optimal allocation of funds
- Cash Management Product
- Treasury Management (TM)
- Any Branch Banking
- Asset Liability Management (ALM)
- E-mail (e-mail can replace the telephone / telex / facsimile, etc.), and Collaborative Environment Applications

- Software distribution in the bank
- Organizational bulletin boards may contain the following:
  - Circulars
  - News letters, Phone and address directories
  - Undesirable parties
  - Hot list / warning bulletins
  - Missing security items
  - Confidential circular on attempted frauds
- Human Resources Development and Personnel Administration
- Auditing and Inspecting computerised branches using the network
- Organizational / Customers data base may include:
  - Statutory returns
  - Control returns
  - Standardized returns
  - Ad hoc reports
- Banks: corporate customers connectivity
- Management Information Systems
  - Borrower's profile
  - Branch profile
  - Employees analysis
  - Products / services profile
  - Business profile of branches

Apart from providing efficient service to customers the financial network will also fulfil the following objectives:

- timely information to top management
- helping in development of new products
- speedy communication among branches and to the controlling offices

Mail Messaging System (MMS)

As an enabling mechanism for basic communication between the users of INFINET, IDRBT set up a messaging backbone on the INFINET. **MMS** consists of a set of nine servers which perform Clustering, Load Balancing, Certification, Domain Name Service(DNS) etc. IDRBT uses this cluster of Servers and the Microsoft Exchange environment to provide state-of-the-art services to the Banking Industry.Users have the option to use compatible messaging systems like Novell Groupwise and Lotus Notes at their end to effectively utilize the

messaging backbone. Using this messaging backbone banks can implement highly effective and productive workflow applications on the INFINET.

Corporate E-mail

MMS could be used to provide a unique Corporate E-mail facility to the Banks. This corporate e-mail has interface to Internet E-mail also. Banks can now have a simple short e-mail address for their executives and officers across the country, like designation@bankname.co.in **or** username@bankname.co.in . **The advantage of this facility is that this enables users to have a single, permanent e-mail address which can be used on their Corporate Intranet as well as on the Internet.**

- The designation based official e-mail addresses provide instant access to the new incumbent or ever changing incumbents.
- The username based demi-official e-mail address provides instant access to the particular person, wherever he goes, on multiple transfers and so on, without the need for changing the e-mail address.

The internet e-mails are picked up through a safe firewall by the IDRBT LAN and then handed over to the mail server on the INFINET, through another firewall.

This Corporate E-mail facility is being used already by a few banks. Banks need to get their Domain Names registered for this purpose, as a pre-requisite. Banks may approach IDRBT for the purpose of domain name registration as well as guidelines and configuration requirements at their end for availing the facility of Corporate E-mail.

Banks can also implement security for their messaging and e-mail applications, using digital signatures and certification to take care of authentication, authorization, confidentiality, non-repudiation etc. IDRBT has already developed certification procedures for the MMS.

Structured Financial Messaging System

To provide a reliable platform for domestic financial messaging, the INFINET Users Group decided on a SWIFT like messaging system. A Working Group was constituted for the purpose of designing and implementing the Structured Financial Messaging System(SFMS) on the INFINET. The SFMS Message Formats have been designed and a Vendor has been identified for developing the SFMS Package. (For more details on SFMS please read the Article on page no.9 in this Newsletter)

Inter-bank Applications

There are a number of inter-bank applications which will be ported on the INFINET. Most of these applications will have to go through the systems of the central bank of the country. RBI along with IDRBT, IBA and various Banks is working towards implementing inter-bank applications on the INFINET. The list of inter-bank applications which can be ported on the INFINET are given here(Ref: Vasudevan Committee Recommendations):

- Electronic Funds Transfer (EFT)
  - ❖ Retail EFT (Small value credit transfer) on net settlement basis
  - ❖ Wholesale EFT (Large value credit transfers) on Real Time Gross Settlement (RTGS) basis for time critical payments.
- Clearing and settlement systems for securities – Delivery vs. Payment (DVP): The final delivery of securities will occur if and only if final payment occurs.
- Transferring balances from net settlement systems to RTGS Server at periodic intervals. The net obligations could be from:
  - ❖ Local paper-based clearing
  - ❖ Inter-city paper-based clearing (including TT discounting facilities)
  - ❖ Bulk payments - ECS(Debit, Credit, RAPID) including inter-city
  - ❖ Shared ATM networks
  - ❖ Smart cards and other pre-paid/pre-authorised debit cards
  - ❖ Foreign Exchange market clearing (Rupee leg)
  - ❖ Debt Market clearing including derivatives
- Exchange of Defaulting Borrowers' list among RBI and banks
- EDI services to the extent they pertain to payment cycle of EDI
- Consolidation of current account balances from the existing DAD applications periodically to facilitate balance enquiry by banks on all India/centre-wise basis and if necessary to activate transfer of funds among DADs at different centres.
- Currency chest accounting
- Reporting of government account transactions (Central and State Governments)
- Reporting of BSR, R-Returns etc., to RBI
- Asset Liability Management (for reporting to RBI)
- Intranet in RBI to enable banks to get circulars, press releases etc.
- Reporting of Sec.42 Data to RBI
- Returns to be submitted by the banks to Department of Banking Supervision (DBS) for off-site supervision and monitoring.

Conclusion

IDRBT is fully equipped and eager to provide all assistance to the Banks to help them fully exploit the potential of this unique, secure and nation-wide network. Reserve Bank of India is equally committed to support all efforts in this direction. It is for the Banks to be proactive and to come out with a perspective plan of action for integrating their services and linking their Branches and Offices to take the maximum advantage of this national resource, the INFINET.

Structured Financial Messaging Solution (SFMS)

The primary need to have a common messaging solution that would serve as the basic platform for intra-bank and inter-bank applications was recognised and emphasised by the INFINET Users Group(IUG). The IUG appointed a Subgroup to study this issue. This Subgroup, after due deliberation, recommended a SWIFT-like Messaging System to fulfil the needs of domestic financial messaging, Based on the recommendation of the Subgroup, a Working Group was appointed for design, development and implementation of the SFMS.

The Working Group has grouped the requirements of Message Formats into four categories/volumes:

- Volume I: All Customer Transactions like Fund Transfers, Bills and Cheques etc.
- Volume II: All Government Transactions and Currency Chest Transactions.
- Volume III: All Securities Transactions – Govt. Securities and Investments, PPF, Precious Metals, Travellers' Cheques etc.
- Volume IV: System Messages- Technical information on data types and file systems, message templates, trouble shooting etc.

The work related to the design of message formats for Volume I to III has been completed. Volume IV would be completed shortly.

Another Working Group, appointed for selecting a solution provider, has undertaken an elaborate exercise to identify a Vendor for implementing this Messaging Solution. After evaluating the various applicants of international reputation, their experience, strengths and capabilities and after visiting their reference sites, the working group has selected M/s Tata Consultancy Services for this purpose and they have been awarded the contract for developing and implementing the SFMS on the INFINET. They have already started the work and the Solution is expected to be in place within the next few months.

The Advantage of SFMS

The major advantage of SFMS is that it can be used practically for all purposes of communication within the bank and between banks. **The intra-bank part of SFMS, which is most important, can be straightaway used by the banks to take full advantage of the secure messaging facility it provides.** The inter-bank messaging part would be useful only when we have applications developed for using it. Efforts are being taken by RBI to come out with inter-bank applications like Real Time Gross Settlements System(RTGS), Delivery Versus Payments(DVP), Centralised Funds Management System(CFMS) etc.

The SFMS provides easy to use Application Program Interfaces(APIs) which can be used to integrate all existing and future applications with the SFMS. The banks can develop comprehensive and efficient tools and applications and integrate them easily with SFMS for use on their corporate intranet.

Banks can link all their important, high volume branches, irrespective of their category, to the SFMS through appropriate connectivity like PSTN/ISDN or Leased Lines. Use of SFMS is not restricted to computerised or partially computerised branches or offices.

Key Features of SFMS

- A modularized Web-enabled software enabling financial messaging within and between the participating banks.
- Template Builder to support flexible definition of messages similar to SWIFT like user-to-user and systems messages.
- Flexible architecture that facilitates centralized or distributed deployment.
- Directory services for maintenance of IFSC directory, network configuration.
- Secured messaging and routing based on store and forward principles governed by push technology.
- Messages can be clubbed and exchanged as a batch of files.
- Smart card based user access.
- Messages will be secured via standard encryption and authentication services conforming to ISO/SWIFT standards.
- Complete auditing, logging, time-stamping and warehousing of messages.

- Periodic computation of charges and billing of the services offered to the participating banks.
- Multi-tiered solution covering INFINET HUB, Bank Gateways and Bank sites
- A modularized Web-enabled software to facilitate the participating banks to send and receive financial and non-financial messages through Bank Gateways and INFINET HUB
- Deployment of COMS-Enabler®, object oriented, event-driven asynchronous parallel processing communications software for the implementation of INFINET

Message flow in SFMS

The flow of messages in SFMS is as shown in the diagram below :
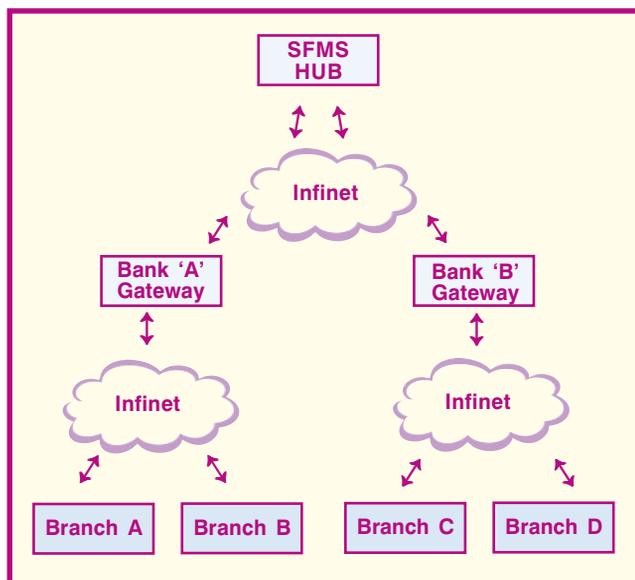
All inter-bank message will have to necessarily go through the Hub. For the intra-bank messages the switching/routing can be done at the Bank itself, provided:

- There is only one Gateway for the Bank concerned and
- The Bank does not require a centralised storage of a copy of all intra-bank messages at the Hub.

Inter-bank messages will have to necessarily go through the Hub and the respective bank gateways.

Deployment Environment

The Hardware configuration will be:

- IBM, RISC CLUSTERS, FT Platforms at the HUB.
- NT and Unix platforms at the Gateways

Benefits of SFMS

Following benefits will be realized with implementation of SFMS

- Well partitioned and layered architecture facilitating pipelining, parallelism and event driven messaging
- Open solution based on SWIFT like messaging, transport control for communication, ISO standards on security and privacy, ISO data dictionary and IFSC code for participant identification.
- Highly secure solution supporting digital signatures, message and network level encryption, Registration/Certification services.
- An interoperable solution that facilitates n-tier deployment and API's for connecting to bank applications.
- Object oriented and component based solution that facilitate maintainability.

Technology behind SFMS

The SFMS is built around COMS-Enabler® object oriented, event-driven asynchronous parallel processing communications software. Its features are:

- Functional Capabilities
  - ☐ Configurable Messages, Queues / API's
  - ☐ Message Repair Facility & Grouping
- File / Message transfer Modes
  - ☐ Event Based Processing
  - ☐ Transaction initiation on change of events
  - ☐ Background processing
  - ☐ Queue Management and Load Balancing
  - ☐ Scalable architecture
- Technological features
  - ☐ DB Independent, Object Oriented, Rule based Engine
  - ☐ n-tier client / server architecture
- Design Features
  - ☐ Message Template Builder
  - ☐ Multiple Version Support
  - ☐ Multiple Language Support
  - ☐ Messaging operations
  - ☐ Registration of branches & gateways
  - ☐ Query Facilities
  - ☐ User Security Profiles
  - ☐ Download Facilities
  - ☐ Pricing Services
  - ☐ Audit, Log & Reports
- Message Structure
  - ☐ Format for all messages follows block structure
  - Messages to have five blocks as
    [{<basic-header>}] - for identification and control
    [{<application-header>}] - for application information

[{<user-header>}] - for user reference
[{<message-text>}] - for actual data
[{<trailer>}] - for additional / security information

- Audit Services
  - ☐ Activity log of messages / Files exchanged
  - ☐ Pre-transaction and Post-transaction images for all user-initiated transactions
- Archival and Retrieval
  - ☐ Rule-based housekeeping
  - ☐ Rules are defined on housekeeping information at Object level and Retention Period
- Housekeeping programs
  - ☐ Archival on separate historical data-warehouse
  - ☐ Selective Retrieval
- Store & Forward and Time stamping
  - ☐ Instructions / Messages / Files are stored locally before being forwarded
  - ☐ Copies are time stamped with proper receipt, digitally signed and dispatched with date and time
  - ☐ Query facility based on these receipts and dispatch date and time

Following APIs will be part of SFMS for Interface with Bank Application

- Login
- Fetch Incoming Instructions
- Update instruction status as Accepted, Rejected or To Repair
- Submit instruction for dispatch
- Query status for dispatched instructions
- Log off

INFINET HUB Operations Center will do following activities:-

- Setup Network Configuration
- Maintenance of INFINET Message templates
- Maintenance of INFINET Directory, Security, User Profiles
- Query of Messages (Incoming and Outgoing)
- Alerter to monitor the load on various queues
- Computation of charges
- BoD, EoD, Housekeeping Operations
- Background processes on
- Session handling
- Store and Forward
- Auditing and Logging

Bank Gateway Manager will do following:-

- Setup Routing Information, User Profiles

- Synchronise INFINET Message templates
- Synchronise INFINET Directory
- Query of Messages (Incoming and Outgoing)
- BoD, EoD, Housekeeping Operations
- Background processes on
  - ☐ Session handling
  - ☐ Store and Forward
  - ☐ Auditing and Logging
  - ☐ Delivery / Warning Notification

Bank Gateway Access Module will do following:-

- Setup Routing Information, User Profiles
- Synchronise INFINET Message templates
- Synchronise INFINET Directory
- Query of Messages (Incoming and Outgoing)
- Message formatting and repair
- BoD, EoD, Housekeeping Operations
- Background processes on
  - ☐ Session handling
  - ☐ Store and Forward
  - ☐ Auditing and Logging

Batch File Handling Support Features include

- File parameter setup for file-names, directories for incoming, outgoing
- File structure (Place holders)
- File Decryption / Encryption
- File Validation
- File dispatch statistics, Log
- Manages the file transfers between nodes

Security Services

- Authorisation
- Confidentiality
- Message Authentication
- Non Repudiation
- Integrity

Reports & MIS

- Undelivered messages, files
- Message history, status
- Billing Statement
- Reconciliation Report
- Security violations
- Rejected messages
- Message Traffic statistics
- Directory listings

Queries & Clarifications

Some of the points which emerged, by way of clarification, during the interaction of the SFMS project team with the participants of the Workshop on SFMS (OCT 4-6, 2000) are:

General Issues

- Messaging part of SWIFT Messaging
  - ➢ Web-enabled interface, java front end.
  - ➢ message template builder supports multiple versions.
  - ➢ centralized or distributed – flexible architecture.
  - ➢ store and forward, push principle.
  - ➢ possible to club messages and send them as batch files.
- APIs for interfacing banking software (at branch level) to SFMS system will be developed and delivered by TCS.
- Same software (by parameterization and configuration) behaves as hub / gateway / router / branch etc. (e.g. periodic billing at hub level)
- Intra-bank messages can be routed at gateway level itself without going to the hub.
- Requirement at branch level – server/ application at branch and database at gateway is possible.
- Interbank Reconciliation – not part of SFMS, but formats can be used for file transfer etc.
- At gateway, decrypting is done for time stamping etc. However, the message part is not opened and nobody at the gateway can see it. It's a part of legal requirement that time stamping has to be done.
- Branch machine being off/down due to holiday or due to technical snag – unless message is delivered, acknowledgement will not come.
- Bank gateway must be *on 24 hours.*

- Difference between SWIFT and SFMS – intra-bank messages need not come to hub.
- Acknowledgement that message is opened (i.e. read at the receiving end by owner of a smart card) is part of the SFMS requirement.
- How can the Bank client be configured : three choices of access - browser based, thick client and integration of the two.
- Tuxedo or MQ series will be the middleware of SFMS.
- Validation takes place at bank gateway.
- Time required for message transfer – Between the Bank Gateways the message transfer is instanteneous. Between the Gateway and Branch, it depends on the connectivity and frequency of access.
- Message Template Builder will be available only at the hub level to ensure uniformity and standards.

On Security in SFMS

- Each message (and not each packet) is digitally signed.
- PIN of smart card is not part of SFMS security solution and it will be taken care of by the smart card application.
- How to use/equip computer at branch level with SSL : a CD will be provided to install 128 bit SSL.
- Digital signature of the same entity differs when different file (data) is sent.
- When digital certificate is revoked, message will not be recognized.
- Revocation preferred in SFMS and not suspension of IDs.

Forthcoming Programmes

Enterprise Wide Networking	(Nov 13-18 and Dec 18 –23, 2000)
Payment Systems and Information Security Strategies	(Nov 20–25, 2000)
Technology for Risk Management	(Nov 27- Dec 2, 2000)
E-Commerce and Payment Technologies	(Dec 4 – 9, 2000)

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