



Institute for Development and Research in Banking Technology

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IDRBT Governing Council

Name	Designation
Dr. Y. V. Reddy	Visitor, IDRBT & Governor, Reserve Bank of India
Shri. V. Leeladhar	Chairman, Governing Council, IDRBT & Deputy Governor, Reserve Bank of India
Shri. A. K. Purwar	Chairman, State Bank of India & Chairman, Indian Banks' Association
Dr. R. B. Barman	Executive Director, Reserve Bank of India
Shri. V. K. Sharma	Executive Director, Reserve Bank of India
Prof. M. Rammohan Rao	Dean, Indian School of Business, Hyderabad
Prof. G. Sivakumar	Professor, Indian Institute of Technology, Mumbai
Prof. Ashok Jhunjunwala	Professor, Indian Institute of Technology, Chennai
Prof. B. H. Jajoo	Professor, Indian Institute of Management, Ahmedabad
Shri. Arvind Sharma	Member Secretary, Governing Council, & Director, IDRBT

Leading from the Front

A revolution is on in the Indian Banking and Financial Sector. Banks and Financial Institutions are moving on to the Technology Bandwagon in a big way and as a result, the sector is going modern. Comfort Banking is in and spearheading this change is the *Institute for Development and Research in Banking Technology* (IDRBT).

Established by the *Reserve Bank of India* (RBI) in 1996, the Institute through its various initiatives has pioneered technology absorption in the Sector. The Institute has taken the lead in every aspect of technologising the sector, right from Creating Technology Infrastructure and Products, engaging in quality Research and Development to moulding the Technology Talent.

The major technology initiatives of the Institute include setting up and managing the nationwide communication backbone for the Industry – the INdian FINancial NETwork (INFINET) with a 99.99% uptime; becoming the Certifying Authority (CA) under the IT Act 2000 and issuing the largest number of Digital Certificates in the country till date; launching the secure, Structured Financial Messaging System (SFMS) for free flow of financial messages across the industry and implementing the Mail Messaging System (MMS) for enabling secure and efficient communication within and among organisations. The Institute has set up the National Financial Switch and Inter-Bank Payment Gateway.

IDRBT is actively engaged in a number of Research Projects, aimed at developing the standards and systems of Banking Technology at the industry and national levels. The Institute also provides Advisory and Consultancy Services to Banks and FIs on various Technology and Management related issues.

The Institute's educational initiatives include the unique M.Tech. course in Information Technology with specialisation in Banking Technology and Information Security and a Doctoral Programme in the areas of Computer Science, Information Technology and Management Studies, focussed on the Banking and Financial Sector. The Institute also offers a bouquet of highly specialised Executive Development Programmes to keep the sector abreast with the latest. ***IDRBT is the only Institute in the country exclusively focused on Banking Technology.***

IDRBT's Mission

The Mission of the Institute for Development and Research in Banking Technology is to Spearhead the Absorption of Technology to improve the Functioning of the Banking and Financial Sector through:

- Development & Adaptation of technologies
- Research and Consultancy in the area of Banking Technology
- Education, Training and E-Learning
- Providing advisory services in Information Management, Knowledge Management & Technology Management

IDRBT's Vision

The Vision of the Institute for Development and Research in Banking Technology is to:

- Be a Globally Reckoned Centre for Research, Development & Advisory Services in Banking Technology.
- Impart Quality Training to the Banking and Financial Industry.
- Create a pool of Banking Technology and Information Security Professionals through innovative educational initiatives.
- Be the Leading Institute of the Financial Community on Technology Issues.

IDRBT's Activities at a Glance

Sl. No.	Activities	Initiatives
1.	INFINET & Services	<ul style="list-style-type: none"> ❖ VSAT & Leased Line Network ❖ Mail Messaging & Web Hosting Services ❖ Certifying Authority Services ❖ Structured Financial Messaging System ❖ National Financial Switch
2.	Research & Development	<ul style="list-style-type: none"> ❖ Several Research Projects aimed at benefiting the Banking and Financial Sector in the focal areas of: <ul style="list-style-type: none"> ➤ Financial Networks and Applications ➤ Electronic Payments and Settlement Systems ➤ Security Technologies for the Financial Sector ➤ Technology Based Education, Training and Development ➤ Financial Information Systems and Business Intelligence ❖ Sponsored Research projects from the Government of India ❖ Development of Products for aiding Technology Absorption in the sector ❖ National & International conferences/seminars, on the focal research areas to promote exchange of knowledge, experiences, and research findings

Sl. No.	Activities	Initiatives
3.	Education and Training	<ul style="list-style-type: none"><li data-bbox="594 241 1440 317">❖ Ph.D. program in collaboration with University of Hyderabad & IIT, Bombay<li data-bbox="594 325 1440 447">❖ M.Tech. in Information Technology with specialisation in Banking Technology & Information Security in collaboration with University of Hyderabad<li data-bbox="594 455 1440 531">❖ Executive Development programmes with focus on achieving a multiplier effect.<li data-bbox="594 539 1440 615">❖ Customised programmes as per the specific requirements of banks and financial institutions

The Journey of IDRBT

PARTICULARS	DATE
The Committee on “ <i>Technology Issues relating to Payment Systems, Cheque Clearing and Securities Settlement in the Banking Industry</i> ,” headed by Shri W. S. Saraf, Executive Director, RBI, recommends that the Reserve Bank of India, set up an Autonomous Institute on Banking Technology	December 1994
The Central Board of Directors of the Reserve Bank of India approves establishment of the Institute for Development and Research in Banking Technology (IDRBT)	October 19, 1995
The IDRBT is registered as a Society under the Andhra Pradesh (Telangana Areas Public Societies Registration Act) 1350 Fasli	March 06, 1996
Shri W. S. Saraf, Executive Director, RBI, takes over as the first Director of the IDRBT	June 10, 1996
IDRBT starts functioning from its premises at Castle Hills, Masab Tank, Hyderabad	July 01, 1996
Dr. C. Rangarajan, Governor, RBI, meets CMDs of all Banks to explain the VSAT Project	July 08, 1996
IDRBT organises the first conference of CPPD Chiefs to explain the VSAT Project	July 18, 1996
The Governing Council of IDRBT holds its first meeting	September 02, 1996
IDRBT conducts its First Executive Development Programme, which is on VSAT Network	December 16-17, 1996
The Staffing Committee of the Governing Council of IDRBT meets to study the Staffing requirements of the Institute	January 20, 1997
Shri Jagdish Kapoor, Deputy Governor, RBI and Shri S. A. Hussain, Executive Director, RBI, inaugurate various infrastructural facilities including a fully-equipped Conference Hall at the Institute	October 28, 2004
Shri W. S Saraf retires and Dr. A. Vasudevan assumes charge as the acting Director of the Institute	October 31, 1997
Dr. V.P. Gulati takes over as the Director of the IDRBT	November 26, 1997

IDRBT signs the agreement on VSAT Network with M/s. HECL	Feb 23, '98.
The Dept. of Telecom, Ministry of Communications, Govt. of India grants License for Installation and Operation of VSAT Network to IDRBT	August 28, 1998
Allotment of 1/8 of (Transponder) Bandwidth on Transponder No.13 on INSAT for the VSAT Network	August 28, 1998
A World Bank Mission consisting of Mr. Robert Keppler, Principal, Payment Systems Specialist, World Bank; Mr. Scott L. Hommel, President and CEO, United Communications International, and Mr. Massion Cirasino, Financial Economist, World Bank, visit the Institute.	September 15, 1998
Dr. Bimal Jalan, Governor, Reserve Bank of India, visits the Institute	October 14, 1998
IDRBT & University of Hyderabad sign a Memorandum of Association for Doctoral Programmes, R&D Activities, and Advanced Courses	February 1, 99
Inauguration of VSAT Network by Dy. Governor Shri S.P.Talwar, Fifth Meeting of the Governing Council, and Video Conferencing of DG (SPT), Director (VPG) and ED (AV) with Governor Dr. Jalan and Deputy Governors Shri Y. V. Reddy and Shri Jagdish Kapoor	June 19, 1999
The Doctoral Programme focused on Banking Technology is launched in collaboration with the University of Hyderabad	August 1999
Sixth Governing Council Meeting and Constitution of Working Group on Priority Areas to zero in on the major areas of emphasis to be addressed by the IDRBT. Prof. P. Rama Rao, Vice Chancellor, University of Hyderabad, is the Chairman of the Working Group.	December 7, 1999
Dr. C. Rangarajan, Governor of Andhra Pradesh and former Governor of the RBI, inaugurates the National Seminar on E-Commerce, jointly organised by IDRBT and CMC Ltd in collaboration with the Ministry of Information Technology, Govt of India.	December 18, 1999
IDRBT launches the Mail Messaging Services for the Closed User Group of the INFINET	January 2000
IDRBT organises the Fourth Bank Educationists Conference in association with the Indian Institute of Bankers. Dr. C.Rangarajan, Governor of A.P (March 6, 2000) and Shri M.Narasimham, Former Governor, RBI and Chairperson, ASCI, visit the Institute	March 6-7, 2000
Submission of the Report of the Working Group on Priority Areas to Dr Bimal Jalan, Governor, RBI and Chairman, IDRBT Governing Council.	March 24, 2000

Visit of Dr. Bimal Jalan, Governor, RBI and Constitution of the Human Resources Committee	April 21, 2000
The Dept of Space, Govt of India, allocates a Full Transponder on INSAT 3B to IDRBT for INFINET Operations	May 8, 2000
Constitution of Standing Technical Evaluation Committee (STEC) on INFINET and Eighth Meeting of the Governing Council	October 23, 2000
IDRBT organizes the National Seminar on Information Technology Laws and Intellectual Property Rights in association with the Ministry of HRD, Copyright Division, Govt of India; Lex Orbis – a firm of Attorneys specialising in IT Laws and the World Intellectual Property Organisation	December 11-12, 2000
Conference of Chiefs of Public Sector Banks and Heads of IT Department on Indian Financial Network and Applications	December 14, 2000
On the recommendations of the Working Group on Priority Areas, IDRBT constitutes Technical Sub-Committees on the following Priority Areas: <ul style="list-style-type: none"> • Communications and Networking • Software Architecture • Security Related Technology • Electronic Presentment and Payment • Business Intelligence 	January 08, 2001
Submission of report by Standing Technical Evaluation Committee on INFINET	January 16, 2001
Launch of the Pilot Project on Structured Financial Messaging System	March 20, 2001
Tenth meeting of the Governing Council and Constitution of Advisory Committee of Governing Council	April 10, 2001
Conference of CPPD Chiefs, focussed on INFINET and Applications	April 17, 2001
Visit of Information Security Task Force from National Security Council Secretariat, New Delhi	May 14, 2001
Bharat Ratna Dr. A. P. J. Abdul Kalam, Principal Scientific Adviser to Government of India and Director, Central Board of RBI, visits IDRBT	June 1, 2001
Dr. R.H. Patil, Chairman, Clearing Corporation of India Limited, inaugurates the International Seminar on Payment & Settlement Systems: Challenges for Emerging Economies organised jointly by the IDRBT, Bank for International Settlements and the Reserve Bank of India. The dignitaries included Marc Hollanders, BIS; Ms Christine Preisig, Swiss National Bank; Nick Roberts,	June 13 – 15, 2001

Reserve Bank of Australia; etc.	
Visit of All India Council of Technical Education Team to the Institute	June 26, 2001
IDRBT is bestowed with the Golden Peacock National Training Award 2001	August 3, 2001
Dr. Y.V.Reddy. Deputy Governor, Reserve Bank of India inaugurates IDRBT's collaborative M.Tech. Programme with the University of Hyderabad	September 05, 2001
Conference of Regional Directors and CGMs-in Charge of Central Office Departments of Reserve Bank of India	September 20-21, 2001
Conference of IT Chiefs of Public Sector Banks	Oct 31 & Nov 01, 2001
Conference of Chiefs of Public Sector Banks and Presentation of First IDRBT Awards for Excellence in Banking Technology by Shri Vepa Kamesam, Chairman, IDRBT's Governing Council and Deputy Governor, Reserve Bank of India	November 2, 2001
Conference of Principals of Staff Training Colleges on Web Based Learning	November 12-13, 2001
IDRBT launches EnDeSign™ - an indigenously developed Encryption, Decryption, Signature Software	November 2001
Visit of Shri N. Vittal, Central Vigilance Commissioner, to IDRBT	January 10, 2002
Mr. Andrew C. Crockett, GM, Bank of International Settlements visits IDRBT	January 28, 2002
Signing of Memorandum of Association with Society for Electronic Transaction and Security (SETS)	May 14, 2002
IDRBT becomes Certifying Authority for the Indian Banking & Financial Sector	August 08, 2002
The Department of Scientific and Industrial Research recognizes IDRBT as a Scientific Research Institute	August 19, 2002
IDRBT organizes four National Seminars on Information Security at Bangalore, Hyderabad, Chennai, and Mumbai	Sep 13, Sep 27, Oct 29, & Nov 28, 2002
IDRBT is bestowed with ISO 9001:2000 Certification	October 15, 2002
Conference of CMD's & ED's of PSBs and Presentation of Second Banking Technology Excellence Awards by Dr. Bimal Jalan, Governor, Reserve Bank of India	October 24, 2002

INDOCRYPT 2002 - The Third International Conference on Cryptology in India organised by IDRBT in association with the Cryptographic Research Society of India. Dr. R. Chidambaram, Principal Scientific Adviser, GoI, inaugurates the conference	December 14 - 18, 2002
IDRBT wins the Computerworld Honors Laureates' Medal 2003 for Innovativeness in Development and Management of INdian FINancial NETwork	April 18, 2003.
Post Graduate Programme in Banking Technology Management is launched	September 01, 2003
HsecNet 2004 – National Conference on Hardware and Software Solutions for Secure Networks is organised in collaboration with the Computer Society of India.	January 23-24, 2004
Banking Technology Awards 2003 is announced	April 02, 2004
IDRBT finalizes the proposal for setting up the National Financial Switch and Inter-Bank Payment Gateway and places an order with M/s Euronet Services India Pvt. Ltd.	April 06, 2004
IDRBT launches Mirror.NET™ - an indigenously developed Corporate Intranet Framework.	May 07, 2004
Second Meeting of the Research Academic Advisory Committee	May 08, 2004
Meeting of CPPD Chiefs on National Financial Switch and INFINET related activities	June 07, 2004
Meeting of members common to both the Governing Council and Research Academic Advisory Committee	June 29, 2004
Dr. Y. V. Reddy, Governor, Reserve Bank of India and Visitor IDRBT; Shri. G. N. Bajpai, Chairman, Securities and Exchange Board of India; and Shri. C. S. Rao, Chairman, Insurance Regulatory and Development Authority inaugurate the IDRBT's National Financial Switch, present the Banking Technology Excellence Awards 2003 & give away the Diplomas to the inaugural batch of the PGPBTM at the IDRBT	August 27, 2004
19th Meeting of IDRBT's Governing Council	October 05, 2004
Shri. S. Sankara Subramanian, Chief General Manager, IDRBT takes over as In-charge Director, IDRBT	November 26, 2004
IDRBT organizes the 7th International Conference on Information Technology (CIT 2004) in association with University of Hyderabad (UoH) and International Institute of Information Technology (IIIT), Hyderabad.	December 20-23, 2004

20th Meeting of IDRBT's Governing Council	December 30, 2004
Shri. V. Leeladhar, Deputy Governor, Reserve Bank of India, takes over as the Chairman of IDRBT's Governing Council	January 01, 2005
Shri V. Leeladhar visits the Institute along with Dr. R. B. Barman, Executive Director, RBI and Member, IDRBT's Governing Council	February 11, 2005
Shri. R. Gandhi, Regional Director for Andhra Pradesh, Reserve Bank of India takes over as In-charge Director, IDRBT	March 29, 2005
21st Meeting of IDRBT's Governing Council	May 12, 2005
Conference of IT Chiefs	July 04, 2005
22nd Meeting of IDRBT's Governing Council	August 06, 2005
Shri. Ajai Chowdhry, Chairman and CEO, HCL Infosystems visits IDRBT	August 25, 2005
Conference of Business Heads on Beyond Core Banking - Data Warehousing and Risk Management	October 04, 2005
Dr. Ishrat Husain, Governor, State Bank of Pakistan visits IDRBT	October 07, 2005

Research and Development Initiatives

The Research and Development activities of the Institute are aimed at providing state-of-the-art services and products for the success of Banking Technology in the country. While addressing the immediate concerns of the Banking Sector, the Research at the Institute is focused towards anticipating the future needs and requirements of the sector and developing technologies to address them.

The Institute is currently concentrating on the following five major areas of Research:

- **Financial Networks and Applications**
- **Electronic Payments and Settlement Systems**
- **Security Technologies for the Financial Sector**
- **Technology Based Education, Training and Development**
- **Financial Information Systems and Business Intelligence**

A galaxy of focused Research Projects, which includes long-term basic, developmental, application-oriented and industry-oriented research projects, forms the crux of our Research activities. The Institute has already completed quite a few Research and Development Projects and the results are being implemented in the Indian Banking and Financial Sector.

IDRBT is also involved in some nationally important Research Projects such as the Protocols and Standards for Electronic Check Clearing and Settlements, Protocols and Standards for SMART Card Based Payment Systems, both in association with the Ministry of Communication and Information Technology, Government of India; Reserve Bank of India; and IITs, etc.

Focal Research & Development Areas

Financial Networks and Applications

Computer Communication has become an essential part of every organisation. Networking is used in just about every aspect of business including planning, production, advertising, shipping, billing and accounting. The Internet reaches millions of people across the world. In India, the Internet is fast becoming the preferred mode of communication and in fact, many corporates have gone in for their own private networks.

Almost all Indian Banks and Financial Institutions are in the process of deploying their Enterprise-wide Networks based on Internet Technologies through which they would be able to provide a large number of IT-enabled services to their customers. They are now implementing Core Banking Solutions with the focus being on creating robust, secure, scalable and reliable

communication networks that would support various innovative Delivery Channels. These communication networks would also take into account the prevailing geography, infrastructure and technologies.

Research in this focal area is aimed at analysing the available network infrastructure, the present technologies and the problems encountered to develop, design and deploy new technologies and applications that can address and meet the emerging requirements of the Banking Sector.

Electronic Payments and Settlement Systems

Competition has gone global and increased manifold with the liberalisation of the economy. These changes have necessitated that the Electronic Payments and Settlement Systems be continually improved to meet the emerging needs of the various sectors of the economy.

The development of a modern Payment System involves huge investments in terms of hardware, software, legal and statutory framework, systems, processes and procedures. None of these can be ignored since a modern Payment System has to guarantee the certainty of payment and finality of settlement. It should provide customers with alternative authentic payment channels and guarantee confidentiality.

In most of the countries, Electronic Payment Systems have evolved over a considerable period of time, absorbing appropriate technology during various stages of development and implementation. This process became more complex as the financial service providers began competing with each other to meet the growing demands of the customers. Moreover, the design and implementation of Electronic Payment Systems impacts the economy of a country in a big way.

The Institute is convinced that the development of efficient Electronic Payments and Settlement Systems is an absolute essentiality for strengthening the E-Commerce environment, which is in turn essential for the success of Banking Technology in the country. We are working on developing the Protocols and Standards for Electronic Check Clearing and Settlements, and SMART Card Based Payment Systems.

Security Technologies for Financial Sector

Banks and Financial Institutions are using Internet Technologies for constructing their Enterprise-wide Networks. However, Internet brings along various inherent weaknesses and so appropriate Security Technologies need to be adopted for smooth working of these networks.

Digital Security discusses the issues related to Confidentiality, Authenticity, Integrity and availability of information. The protection of the resources holding the information, which include critical servers, various services running on them and the network itself, is critically important.

The establishment of the Certifying Authority was achieved through rigorous research on Security Technologies and we are making various applications PKI-enabled, so that transaction of digital data has legal sanctity under IT Act 2000. The Institute is also exploring Smart Card-related Key Management Issues.

The Institute has also carried out extensive research on Security Policies and Framework and we have drawn up the Security Plan and Policy of quite a few banks. We are working towards preparing a long-term strategy for Banks and FIs aimed at providing a strong framework for the Core Technologies i.e., the System Software, the Networking Products etc., deployed in these organisations.

Technology Based Education, Training and Development

Banks and Financial Institutions in general and large ones in particular, find it difficult to meet the growing demands of continuing education and training of employees because of several factors such as insufficient number of training establishments within the organisation, lack of expert Faculty in diverse areas of requirements and fast changing training needs of employees, particularly in Banking Technology. Technology Based Education is a modern approach to meet these challenges by offering maximum flexibility in terms of time, location, independence, self-pacing and just-in-time learning.

Technology Based Education in various forms such as CBT (Computer Based Training), CD, Digital Library, Electronic Documents and WBT (Web Based Training) on LAN (Local Area Network), Corporate Intranet, WAN (Wide Area Network) through INTERNET and INFINET can be implemented in Banks and Financial Institutions even if they are not fully networked. This can help in effectively utilising the available computers at different branches and offices of the organisation for Education and Training of the employees.

The Institute already has in place the infrastructure required for powering Technology Based Education and is now focusing on making the Web Based Post Graduate Programme in Banking Technology Management to happen.

Financial Information Systems and Business Intelligence

Banks and Financial Institutions that have been in the business for a while have accumulated huge amounts of data in various operational databases. These OLTP (Online Transaction Processing) systems work just fine for specific purposes, but the data needs to be "mined" for other purposes, particularly for sales, marketing and strategic planning.

Currently, the Institute is closely working with nationalised banks in the area of Management Information Systems. The Institute has developed a Web Based Management Information System for nationalised banks for effective Information Management. This system integrates all the legacy systems at a centralised location and provides a single view of a bank. We are now in the process of integrating CBS solution with Non-CBS branches' data for arriving at the complete MIS of a bank.

The Institute has also designed and implemented a Data Mining tool, named BD Miner (Business Data Miner) with a few existing algorithms. Developing it further, we have proposed new data mining algorithms and integration of these algorithms with the tool is in progress. Research on designing qualitative cubes and building materialised views using normalisation concepts to support an intelligent data warehouse is being carried out.

Research Projects Accomplished

Applicability to the Banking and Financial Sector is the guiding spirit behind all the research and development activities of the Institute. The Institute's aim is to create state-of-the-art technology infrastructure for the sector through innovative research and developmental activities. Various research projects, aimed to contribute significantly in the field of Information Technology, in general, and Banking Technology, in particular, have been accomplished over the years. The outcome of these activities is various software, applications, systems, services, etc. The details of the completed Research Projects, are hereunder:

Electronic Check

Electronic Check, also known as E-Check, is an Electronic realisation of traditional Paper Checks and these Checks can be used in the same way as Paper Checks.

The Financial Services Technological Consortium (FSTC) has proposed a model for Electronic Checks. In the model, the E-Check will carry the Digital Signature of the holder, which can be automatically verified for authenticity. A holder of E-Check can carry out various transactions like purchase of articles and payments. over Internet using E-Check. The Payment Mechanism of E-check is similar to that of the Paper Checks. However, it is carried out electronically.

This project studied Electronic Check in detail with specific focus on its Working, Features, Financial Services Mark up Language, Digital Signatures, Security Features, E-Check Issue, Verification and Payment, etc.

SMArt Rupee System

The 80s witnessed the introduction of credit cards as a substitute for cash. Since then, the Card Industry has grown by leaps and bounds and has offered various utilities to the cardholders. The Saraf Committee, set up in 1994, by the Reserve Bank of India, to look into the issues related to Payment Systems suggested Smart Card Technology as one of the options meriting close observation.

It was felt that an experimental deployment of Smart Card Technology would provide valuable feedback for future absorption and widespread usage of this technology by the nation. A core group comprising Reserve Bank of India, IDRBT and IIT, Bombay, was formed to frame the modalities for implementing a Smart Card pilot project named "SMARs" (SMARt Rupees System) at IIT, Bombay. From the observations and issues identified during the pilot run, inferences were drawn to formulate the standards.

Technologies for E-Commerce

E-Commerce is the way business is transacted on the Internet enabling the parties that have never met before to do business. The major requirement for e-Commerce is to provide a highly secure and trusted environment over the Internet for conducting commercial transactions. This requires authentication of transacting parties, privacy, message integrity and non-repudiation. Digital Signatures address this requirement of e-Commerce.

For any business organisation, it is important to secure its Intranet from the open network and provide selective access control. Intrusion Detection System addresses this requirement. Many of the above technologies, which provide necessary security are expensive and subject to export controls. Moreover, these security products may have trap doors.

One of the most important components of e-Commerce is e-payment over Internet. The available payment technologies are expensive and are only suitable for the advanced countries. For the Indian market, it's the cheque that is the most widely used payment instrument and hence it needs to be made available on the Internet.

Considering the strategic importance of e-Commerce Technologies, especially in the Indian context, CMC Limited and IDRBT initiated the "Technologies for e-Commerce" project with the Ministry of Information Technology, Govt of India. The focal areas of the Project were

Development of Security Related Products, Development of e-payment methods, and providing Training on Internet Commerce. The Project helped in building a strategic e-Commerce Technology base, from which the Indian consumer community and business organisations could benefit immensely.

Certificate Management by Certifying Authority

Consisting of two parts - Task of Certifying Authority in e-Commerce and Directory Services for Certifying Authority in e-Commerce, this project is an in-depth study of the Certifying Authority, its role and significance, Certifying Authority as Authenticity Provider, Issuing and Renewing of Certificates and related issues. The Project was of significant importance since IDRBT was to become the Certifying Authority for the Indian Banking and Financial Sector. Electronic-Commerce involves very important issues and the second part of the project examined in detail the most critical of them.

Certificate Policy and Practice Statement

This project was conceived keeping in view that IDRBT would be acting as a Certifying Authority for the Indian Banking and Financial Sector. A Certifying Authority takes care of a large number of tasks and one needs to define them before embarking on them. Thus, the Certification Policy and Practice Statement needs to be in place before the start of the Certifying Authority operations.

The main objective of this project was to draw up the framework of the Certificate Policy and Practice Statement in such a way that it meets the specific requirements of the Institute's Certifying Authority. Further, the project also studied the Certification Services over the INFINET and provided the guidelines for it. Consisting of two parts, this project dealt with Certificate Policy and Practice Statement for Banks, and Certification Services over the INFINET.

Intrusion Detection System

It's now a world of networks and the virtual era has arrived. Get connected to the Internet and the whole world becomes accessible right from the comforts of the home. This certainly has its advantages, but at the same time it has also given birth to many problems regarding Computer Security.

As mission critical computers started getting connected to the Internet, they were exposed to attacks from intruders and the security of these systems were under threat. A number of technologies such as Firewalls, Encryption, Authentication Devices and Vulnerability Checking

Tools, being used to defend the network. In spite of these, the systems are susceptible to hackers. Hence, it's necessary to establish a second line of defence in the form of an Intrusion Detection System.

Network Based Intrusion Detection System detects all known port-scans and denial-of-service attacks in a bank's network and Host Based Intrusion Detection System will detect all the attacks on a particular host. This project involved developing a Network Based Intrusion Detection System (NIDS) and a Host Based Intrusion Detection System.

Pattern Discovery and Data Mining in Retail Banking

Retail Banking is now a primary area of focus for the banking sector. Over the last few years, banks across the country have been taking a long, hard look at the retail market and this is precisely why banks are competing against themselves to enter new segments like specialised loans and segmented loans.

New products and schemes might improve the business. But a proper decision support system should exist to overcome the difficulties arising during the operation and to promote these products and schemes. For example, a loan officer must be able to identify potential credit risks during the loan approval cycle to minimise loan defaults.

Data Mining has brought in some new technologies that have the potential to improve the functioning of financial products in retail banking as well as to produce easily interpretable results. Data Mining is also useful in finding interest patterns in the database. The project aimed at developing a suitable Information Mining tool for large-scale Decision Support to Retail Banking.

Data Warehouse for Banks

Banks are being overwhelmed with data, but they lack the tools to understand and use it to maximise profits. They need to tame the data, leverage value from it and capitalise on it. Data Warehousing is the right solution to identify and extract high-value information from data assets for Business Intelligence. This solution can be a key tool for business decision support in Banks and Financial Institutions.

The project on Data Warehouse for Banks involved developing a Data Warehouse System and OLAP tools and configuring the server and clients. The project also involved developing few data marts for banks such as Deposit and Credit to serve the information needs of a bank. An OLAP interface was developed, which would help managers in taking appropriate decisions.

Data Mining for the Analysis of Credit Card Transactions

In order to remain competitive, credit card issuers are turning to Data Mining in a big way to uncover useful information from their massive databases. This project dealt with credit card data of a bank.

The database contained data that represented various types of customers and their profiles. The data also contained the status details specifying the number of months and the amount outstanding, utilisation amount, etc. Mining the credit card data not only helps discover the customer segments but also helps in extracting additional hidden information that may guide the bank in developing models tailored for specific business goals, such as accurately targeting customers or detecting fraud.

From the project analysis, it was observed that the bank's need to improve their customer service cell operations, and other demographical data needs to be captured and used to aid operations effectively. The results obtained by mining the available data, provide deep insight into the spending patterns.

Risk Management

Risk Management is one of the significant tools to be used by the majority of players in the Indian Banking sector for being able to maintain their positions and move onto becoming major players in the international financial markets. With growing globalisation and opening up of the economy, forex risk management becomes a key performance area for Banks and Financial Institutions in India, as they have to cater to the growing need of forex transactions of their customers.

Banks and Financial Institutions in India face various kinds of risks. Various risk analysis models, both statistical and non-statistical are under use in different parts of the world with varying degrees of success. This project was an attempt at finding out the VaR (Value at Risk) of different currencies depending upon the historical values of currencies selected by the user, with Indian currency as the base currency. This project also aimed at calculating the default risk of a firm.

Information Architecture

Organisations today have realised that the investors/shareholders are not the only stakeholders. In today's dynamic world, the strategy of focusing on SBUs too does not guarantee success. Organisations are devising strategies, which focus on their core competencies. They have also realised that for greater success, firm/s must cater to the interests of all the stakeholders involved.

A systematic understanding of the organisation is required to find out the interests of the various stakeholders and how they effect the organisations economically or otherwise. Business Modelling is a method of defining business: its functions, processes and products through the use of easy-to-understand diagrams like entity relationship diagrams. These diagrams focus on Business Functions, Communications, Individual components or entities.

During the process, the informational needs and relationships that exist between each of these three areas are defined. By focusing on the different perspectives, a common way of communication, which enables groups to effectively and efficiently work together is defined. This helps a business office clarify its mission and identify what they do, how they do it, what is needed as input and what produces results. This project focused on developing Business models that are useful for an organisation in streamlining its activities.

Inventory and Analysis of Banking Software Applications

This project aimed at providing information regarding the requirements and availability of software solutions for Banks and Financial Institutions. This was an attempt to provide a common platform to the end-users in the Banking and Financial Sector and the Software Vendors and Developers in this field. This project involved compiling the responses received from various Software Vendors, Banks and FIs.

The responses received from various Software Vendors, Banks and Financial Institutions have been compiled and a comprehensive list with all the requisite information has been made available on the Institute's website: <http://www.idrbt.ac.in> under the link 'Bank IT Products'. The list has been categorised under six broad categories: Packages for Banks, Packages for NBFCs and FIs, Generic Packages, Communication Packages, Networking Packages, and Call Centre Packages.

Centralised Banking Systems – Indian Prospects

Though computer systems were installed as early as the 1960s, their role was primarily limited to accounting. Such systems are woefully inadequate considering the vast array of banking functionalities available today. Therefore, financial institutions need to invest in new core banking systems.

In fact, according to estimates, by the end of 2005, the 100 largest Financial Institutions worldwide are expected to invest more than US\$14 billion on such systems. Several Indian banks are also expected to migrate to Centralised Banking Systems, primarily due to obsolete hardware systems, Software that no longer meets needs, Business model changes, Improved

total cost of ownership, Need for integrated customer records, Flexibility in product development and time-to-market, and Development of new delivery channels, etc.

This Project studied the current position of technology deployment in the Indian Banking Sector; impact of technology at various levels in a Bank; functionalities, features and applications of Core Banking; implementation of Core Banking Solutions in Indian Banks; international scenario vis-à-vis India and assessed the future requirements for Core Banking Solutions.

ATM Financial Switch - Issues and Prospects

This project is of crucial significance with ATMs becoming an integral part of Banking. It studied the issues involved with the expansion of ATMs, its impact on Banking and Financial Services, issues involved in sharing ATM Infrastructure, and also zeroed in on the best options for connecting ATM Switches with other switches. The findings of this report contributed immensely towards the setting up of the National Financial Switch.

Protocols and Standards for e-Pay Clearing and Settlement

New Payment Instruments like the Electronic Check are being introduced for Payments over the Internet. These new Instruments need a well developed Electronic Inter-bank Clearing and Settlement System.

Lack of a suitable Clearing and Settlement System is one of the main bottlenecks for the growth of E-Commerce. Electronic Check offers the advantage of both traditional paper Checks and modern cryptographic techniques – in short the best of both worlds. But to derive the maximum benefit from the deployment of Electronic Checks, a suitable Inter-bank clearing and settlement system for e-checks needs to be developed and integrated with the existing Clearing and Settlement Systems.

This project involved developing the Protocols and Standards for E-Check Clearing Systems, testing the interface with the existing settlement systems, using this system to pay utility bills like the telephone, electricity, taxes and designing a prototype for Check Truncation.

Research Projects in Progress

The Institute considers Research and Developmental work as the driving force for all its activities, and hence engages itself in challenging projects to expand the frontiers of knowledge and to meet the needs of the Banking and Financial Sector. Since Information Technology is developing at an enormous speed, the Research at the Institute strives to make use of the latest

developments in the field, to provide the best to the Banking Sector. The details of the Research Projects, the Institute is currently engaged in, are hereunder:

Projects sponsored by Ministry of Communication and Information Technology, Government of India

Protocols and Standards for E-Check Clearing and Settlement

New Payment Instruments like the Electronic Check are being introduced for Payments over the Internet. These new Instruments need a well-developed Electronic Inter-Bank Clearing and Settlement System.

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The objective of this project is to develop the Protocols and Standards for e-Check Clearing Systems, test the interface with the existing settlement system and design a prototype for Check truncation.

Protocols and Standards for SMART Card Based Payment Systems

Earlier, Smart Cards featured a small amount of memory and little computing power. They were limited to relatively small, single applications and were built on proprietary Smart Card operating systems. Today, Smart Cards with 64K and 128K of memory and a lot of computing power and standard systems (e.g. Java) are emerging. Ample memory and open platform systems now allow Smart Cards to store and process multiple applications, much like today's desktop computer systems.

This holds tremendous promise for both consumers and those involved in marketing. For example, a Financial Institution may offer consumers a Smart Card with credit, debit, e-purse and loyalty capabilities, all on a single card. Because the card offers so much memory and computing power, the Financial Institution can allow other businesses - such as telecommunications and healthcare enterprises - to put their applications on the card as well, thereby significantly reducing the cost of ownership of the system for both parties by sharing the investment in the infrastructure of cards, terminals, hosts and networks. This requires a Multi-application Smart Card infrastructure that makes personalisation and lifecycle management of these cards fast, easy and cost-effective.

The project proposes to study the prevailing standards for payment and customise them to meet the requirements of the nation. It will include pilot implementation of multi-application Smart Cards, which requires end-to-end security, highly productive and cost-effective acceptance infrastructure and vendor independent "open" standards for Smart Card applications, terminals, personalisation, delivery and management. The project proposes to prepare the protocols, and standards and secure operational procedures for the Smart Card based Payment and Multi-application System covering Interoperable online debit, Online and offline credit, ATM cash withdrawal in online/offline mode, Interoperable Preloaded Card/e-Purse, Smart Card Payments over Internet, etc.

Institute's Projects

Enterprise System and Application Integration

Information at the fingertips is the objective of this project, which focuses on developing a role-based Information system, through automation of various activities of a typical organisation.

Design, development and integration of various work processes such as Visitor Management, Programme Management, Hostel Management, Access Control Integration, Pay Roll, Leave Management, Change Management have already been completed. Currently, other work processes such as Reimbursement Management, Asset Management, Tour Management, Income Tax Payment Automation, etc. are being developed as part of this project.

Open Source Technologies

With Open Source Technologies gaining greater momentum all over the world and earning increasing level of acceptance among different segments of users as a viable, reliable and cost-effective option, the Institute has initiated research in Open Source Technologies.

The project involves studying a variety of open source technologies available, exploring their features and functionalities and determining their suitability for deployment in the Indian Banking and Financial Sector. It would also develop LAMP [Linux + Apache + MySQL+ PHP] based applications using Open Source Technologies for meeting the requirements of the Banking and Financial Sector.

EnDeSign Suite

EnDeSign Suite is a software product being developed by the Institute to cater to the various Security needs of the Banks and Financial Institutions. This Suite will consist of the EnDeSign -

the Encryption, Decryption, Signature Software, Smart EnDeSign, EnDeSign Mail and Turbo EnDeSign modules.

The modules can also be customised to the specific needs of Banks and Financial Institutions and can be integrated for Straight Through Processing with existing Legacy Systems.

Contemporary Technology Instruments – Impact on Indian Banks and their Response

Technology isn't all about modern computers and networks. It has developed from Automatic Ledger Posting Machines (ALPM), the quintessential ATMs to the evolving wireless technologies. The objectives of this project include:

- Studying all the technologies relevant to the Banking Sector including business enablers, support tools, facilitators and delivery channels
- Studying the impact of these technologies on Banks and the way the Banks are responding
- Assessing technology trends on a global basis and specifically, the technology deployment in Indian Banks
- Offering structured guidance for banks/ customers to help gain maximum Return on Investment following technology deployment

Data Warehousing & Data Mining Tools

Traditionally, decision support systems are used to obtain information from a limited amount of data to support the decision making process. However, such decision support systems have difficulty dealing with complex, multiple data sources that are typically found in large organisations. While Data Warehousing technology provides the solution for decision support process, Data Mining helps in discovering understandable patterns in data and in extracting business advantage from the vast amount of available enterprise data.

This project involves the study of new approaches to design cubes and materialised views to support an intelligent Data Warehouse. It focuses on improvement and integration of existing data mining algorithms and augmenting more functionality to the mining tool.

Soft Computing Based Intelligent and Control Technologies for Web and Mobile Applications

Banks and Financial Institutions are now-a-days seeking web-enabled solutions for their decisions because they offer them the flexibility of movement, convenience of time, reduction in interference, and bring down the costs and risks.

This project aims at developing a framework to support decision-making in selective problems of important financial systems and explores the soft computing techniques in their application. The project involves: (i) design of a framework for an interactive web based decision support system for financial decision problems, with proper categorisation and role based access (ii) development of a software tool to help the decision support activities for various users of a Bank or Financial Institution to solve specific decision problems in the areas of Technology Management and ALM, Credit Management and Portfolio Management through the web (iii) Development of a prototype financial decision model using soft computing techniques.

Centralised Banking Solutions – Impact Analysis

Implementing Centralised Banking Solutions makes profound business sense for banks in India. Many leading private sector banks have already implemented CBS and the major players in the public sector like Syndicate Bank, Punjab National Bank and State Bank of India have also joined this club.

This project proposes to study the experience of banks, which have either implemented or are in the process of implementing centralised banking solutions (CBS), to gain insights into the effort, money and time that they have invested in this project, which will change the way they have been doing banking business, once and for all and the benefits that accrued/likely to accrue from their repositioning as technology-driven banks. The project would also bring out the benefits accrued to customers by way of improved customer service, innovative products and services.

Network Security and Quality of Service

This project consists of three parts - Security Issues in Mobile Banking; Framework of Quality of Service and Security on INFINET using Multi-protocol Label Switching Technology; and Network Security Framework for INFINET.

With ATMs, Telephone Banking and Internet Banking already in, the next evolutionary step for the Indian Banking Sector is Mobile Banking. The convergence of mobile telecom and Internet would enable the banks to extend their existing online banking services to mobile subscribers. But successfully creating mobile consumer applications require Security and the standardisation of retail and banking hardware systems. Focusing on Wireless LANs, Global System for Mobile Communication, Code Division Multiple Access, General Packet Radio Service, Universal Mobile Telecommunication System and Wireless Application Protocol, the first part of the project aims at developing an Integrated Network Security System for Mobile Communication and also developing a tool to identify Security Vulnerabilities in Mobile Banking.

With more and more Banks and FIs joining the INFINET, there is an increasing pressure on bandwidth, which leads to problems such as speed, scalability, quality of service and limited IP address. Applications using voice and video transmissions get clogged and so a technology that can co-exist with the present technology and solve these problems is needed. The second part of the project aims at developing a framework for deploying MPLS on INFINET in order to achieve scalability, quality of service and security. The final part of the project addresses the Security concerns on the network through a detailed security assessment that identifies both internal and external threats and vulnerabilities to arrive at various steps to eliminate the risk.

SFMS Extended Development

The objective of this project is to develop appropriate software to facilitate smooth migration from the existing decentralised Electronic Fund Transfer (EFT) System to a centralised National EFT using SFMS as a backbone. It involves development of a Gateway Module at the IDRBT Hub, SFMS interfaces, interfaces with National EFT Settlement Server and modifying the current EFT software modules.

Strategic Technology Management for Banks

Since the need for adopting and absorbing technology is urgent, banks need resources like benchmarks, guidelines and frameworks for tackling various key and core issues in implementing technology.

The project is a study of the problems involved in implementing key technologies in core areas like ATMs, Core Banking and Internet Banking, through surveys and interactions with the technology management teams in Banks and with reputed vendors and service providers.

Based on the study, it is proposed to come out with Research Papers, Strategic Frameworks and Benchmark Guidelines. The study proposes to investigate various areas of technology absorption such as Core Banking, ATM Networks, Internet Banking and Multi-Application Smart Cards and bring out a useful reference resource for strategic management of technology in core areas.

Trust, Confidence and Adoption of Electronic Transactions (with special reference to Internet Banking in India)

The Internet promises a revolution in retail banking of monumental proportions providing customers with new levels of convenience and flexibility. It is evolving into a "one-stop service and information unit" that promises greater benefits to both banks and consumers. Internet Banking would help banks present a potentially low-cost alternative to brick and mortar branch Banking. However, customers in India are yet to adopt Internet Banking in a big way, especially

because of the lack of trust in the system. This project attempts to study trust and confidence of consumers in the adoption of Internet Banking (with special reference to India) in its various dimensions and stages.

Technology Initiatives

INdian Financial NETwork (INFINET)

In a major step towards making the Indian Banking and Financial Sector Technology Enabled, the Institute set up the INdian FInancial NETwork [INFINET], the nationwide Closed User Group [CUG] Communication backbone for the Indian Banking and Financial Sector. Shri. S. P. Talwar, Deputy Governor, Reserve Bank of India, inaugurated the INFINET on June 19, 1999. All Banks - Public Sector, Private Sector, Cooperative, etc., and the premier Financial Institutions in the country are eligible to become members of the INFINET.

The INFINET uses a blend of communication technologies including VSATs, Terrestrial Leased Lines and ISDN Lines. Presently, the network consists of over 2,300 VSATs located in 300 cities of the country and utilises transponder No. 13 & 14 on INSAT 3A.

The Network started off with the VSAT operations, which commenced on 1/8th of a transponder on INSAT 2 B. In June 2000, the operations were migrated to a full transponder on INSAT 3B. By December 2002, the Institute had commissioned over 1,000 VSATs. The VSAT Network was then upgraded to Broadband Network, which was commissioned during March-April 2003 with which 256 Kbps inroutes and a 2 Mbps outroute were made available to the CUG members.

Leased Line Network

The Institute implemented the Leased Line Network in 2001, which involved setting up of a backbone WAN connecting 40 RBI offices in 21 cities across the country through 64 Kbps and 2 Mbps Leased Lines in a full mesh configuration. All CUG members were provided gateways to connect to the INFINET backbone in 20 RBI regional offices, RBI Mumbai NCC and IDRBT in Hyderabad. The INFINET Leased Line Network was also seamlessly integrated with the VSAT Network. The Network Management System (NMS) for the Leased Line Network was placed at Hyderabad with a backup NMS at Mumbai for monitoring the network.

In June 2003, the INFINET Leased Line Network, was upgraded with the provision of redundant 2 Mbps (2 Mbps X 4) lines between Hyderabad and Mumbai and Hyderabad and Delhi. Other important centres such as Chennai, Bangalore, Nagpur and Kolkata were provided with 2 Mbps x 2 lines to Hyderabad and Mumbai. All other INFINET nodes were connected to the nearest important INFINET node through a 2 Mbps line and all centres were provided with ISDN as a backup to the Leased Line.

The network was also provided with Router redundancy for providing higher uptime. The Institute is currently in the process of provisioning Fibre termination of circuits and OFC terminals at the INFINET nodes so as to reduce the latency time and provide higher uptime. The network is also manned 24 X 7 from Hyderabad and Mumbai and a resident engineer is placed at all other RBI regional offices during business hours on all working days.

The VSAT Network and the Terrestrial Leased Line Network of the INFINET co-exist by drawing from the strengths of each other. The users now have the facility of a dynamic option to choose between these two networks depending upon the need, urgency, suitability, volume of traffic, availability & accessibility.

Security Solutions

The Institute has also deployed Security Solution at RBI offices, which includes deploying Firewalls, Host & Network IDS and VPN concentrator. This helped in making the INFINET an inherently secure medium of communication for the Banking and Financial Sector of the country.

Applications

Various inter-bank and intra-bank applications ranging from Simple Messaging, MIS, EFT, ECS, Electronic Debit, Online Processing and Trading in Government Securities(PDO-NDS), Centralised Funds querying for Banks and Financial Institutions, Anywhere/Anytime Banking, and Inter-Branch Reconciliation are being implemented using the INFINET.

The latest additions to the inter-bank applications being used or in the process of being used on the INFINET are SFMS, RTGS and CFMS. The Network has maintained 99.9% uptime right since its inception.

Structured Financial Messaging System

Responding to the urgent need for upgrading the country's payment system through a secure and common messaging system that would serve as the basic platform for intra-bank and inter-bank applications, and would fulfill the requirements of domestic financial messaging, the Institute set up the Structured Financial Messaging System.

The SFMS Advantage

The SFMS is built on the lines of SWIFT but has many more utilities to offer. The major advantage of SFMS is that it can be used practically for all purposes of secure communication

within the Bank and between Banks. The intra-bank part of SFMS can be used by Banks to take full advantage of the secure messaging facility provided by it. The inter-bank messaging part would be useful for applications like National Electronic Funds Transfer, Real Time Gross Settlement System, Delivery Versus Payments, Currency Chest Reporting, Government Account Transfers, Forex Confirmation and Settlement, etc.

The SFMS provides easy to use Application Programme Interfaces (APIs), which can be used to integrate all existing and future applications with the SFMS. Banks can develop comprehensive and efficient tools and applications and integrate them easily with the SFMS for use on the 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. Moreover, use of SFMS is not restricted only to fully computerised or partially computerised branches.

Key Features of SFMS

- Template Builder to support flexible definition of messages similar to SWIFT like user-to-user messages
- Directory services for maintenance of IFSC directory, network configuration
- Secured messaging and routing based on store and forward principle
- Messages can be clubbed and exchanged as a batch of files
- Smart Card based user access.
- Use of PKI in securing the Messages via standard encryption and authentication services
- Complete auditing, logging, time-stamping and warehousing of messages
- Gateway available on Windows 2000, Sun Solaris, IBM AIX
- Branch Server available on Windows 2000, Sun Solaris
- Secure File Transfer Facility
- Hindi Language Support for message creation

The Structured Financial Messaging System is now functional in 24 Public Sector Banks, including the Reserve Bank of India. The latest version, SFMS 3.0, which is RTGS-ready on Oracle 9i and MQ Server 5.3, was rolled out on January 19, 2004.

Mail Messaging & Web Hosting Services

IDRBT's Mail Messaging System [IMMS], is another major industry-level initiative that provides the best option for easy and secure communication within the Banks and between Banks with

seamless integration to the Internet with appropriate and adequate security. The IMMS serves as the Mail Gateway for the Indian Banking System. With over 20 banks, including the Reserve Bank of India making use of this backbone, it's one of the largest Messaging Systems in the country.

Since Banks with a wide network of branches in every nook and cranny of the country are making use of this messaging platform, it becomes a mission-critical service and it is absolutely essential that there are no hiccups. An obstruction of even an hour can cause serious disruption to the functioning of critical sections of the banks.

The IMMS acts as a bridge between the INFINET and the Internet, thereby facilitating seamless to and fro transmission of mails both within the INFINET and between the Internet and the INFINET. The IDRBT Mail Messaging System is designed to facilitate these two specific functionalities:

- ❖ Ensure smooth and secure movement of mails within the Closed User Group
- ❖ Ensure smooth and secure movement of mails between the Closed User Group and the Internet.

The IMMS provides a unique corporate e-mail facility to the Banks that enables the users to have a single, permanent e-mail address, like designation@bankname.co.in or username@bankname.co.in. The designation-based official e-mail addresses provide instant access to the new incumbent or the user-name- based demi-official e-mail address provides instant access to particular person, wherever s/he goes, without the need for changing the e-mail address.

The IMMS has developed over a period of time and we have made it more user-friendly. When the Mail Messaging System was first implemented, all mails from and to the outside world were routed through the IDRBT Local Area Network [ILAN]. This system consisted of several servers on the ILAN, which took care of the traffic and the architecture was developed dynamically over a period. The Institute is also hosting websites of a number of Public Sector Banks.

Certifying Authority Services

IDRBT made yet another pioneering effort by becoming the Certifying Authority (CA) for the Indian Banking and Financial Sector, licensed by the Controller of Certifying Authorities (CCA), Government of India, under the IT Act 2000. The formal approval as Certifying Authority was handed over to Dr. V.P. Gulati, Director, IDRBT, by Shri. K. N. Gupta, CCA, on August 08,

2002. The CA Services from the IDRBT are aimed at facilitating speedy, authentic, secure and cost-effective electronic financial transactions, thereby paving the way for improved customer service and satisfaction and also ensuring economic development at a faster pace.

With the Digital Certificates issued by the IDRBT, Banks and FIs are building in full-fledged Security including Digital Signatures and Data Encryption in their electronic communications, intra-bank and inter-bank applications and messaging. These Digital Certificates comply with X.509 Standards to individuals and servers, thereby fulfilling the need for Trusted Third Party services in Electronic Commerce.

The IDRBT Digital Certificates are being used for various applications including CFMS, RTGS, PDONDS, SFMS, RBI NCC EFT, Corporate e-mail, Online Tax Assessment System (OLTAS) NSDL Application, STEPS of State Bank of India, and Collateralised Borrowing & Lending Obligation (CBLO) of the Clearing Corporation of India Ltd.

The IDRBT Certifying Authority has issued over 28,843 Digital Certificates, which is the highest number of certificates issued by any Certifying Authority in the country.

Banking Technology Awards

In order to infuse a spirit of healthy competition and speed up the process of Technology Absorption among the Public Sector Banks of the country, the IDRBT instituted the Banking Technology Awards in the year 2001. These Awards are meant to act as catalysts by recognising and rewarding the efforts of Banks aimed at better use of technology, greater levels of Technology Absorption and improved levels of customer service and satisfaction. The Awards are given away in the following categories:

- ❖ Best Bank Award - Delivery Channels
- ❖ Best Bank Award - Business Computerisation
- ❖ Best Bank Award - Back Office Applications
- ❖ Best Bank Award - Techno-Savvy and Customer-Friendly Services

These Awards, the best indicators of the rate of technology implementation and absorption in the Public Sector Banks, are presented at the Annual Conference of Chairman and Managing Directors (CMDs) and Executive Directors (EDs) of all Public Sector Banks in India, held at IDRBT, Hyderabad. The winners of the IDRBT Banking Technology Awards include:

Winners 2001

- Corporation Bank
- State Bank of India

- Indian Overseas Bank
- Syndicate Bank

Winners 2002

- Punjab National Bank
- Canara Bank
- Corporation Bank
- Andhra Bank

Winners 2002

- Corporation Bank
- State Bank of Patiala
- State Bank of India
- Punjab National Bank
- Syndicate Bank
- Union Bank of India

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National Financial Switch

In a major step towards ushering in convenience-banking for the citizens of the country, the Institute has set up the National Financial Switch (NFS). Dr. Y. V. Reddy, Shri. G. N. Bajpai, and Shri. C. S. Rao dedicated this National Financial Switch to the Nation on August 27, 2004.

Speaking at the inauguration, Dr. Reddy heralded the customer-centric National Switch for ATMs and looked forward to a scenario where access to a large number of ATMs of different banks would become a reality for the citizens of the country.

The NFS comprises a National Switch to facilitate inter-connectivity between the Banks' Switches, and Inter-Bank Payment Gateway for authentication & routing the payment details of various e-commerce transactions, e-government activities, etc. Presently, the banks that are already connected to the NFS include:

Sl. No.	Bank	No. of ATM's
1.	Allahabad Bank	82
2.	Andhra Bank	341
3.	Bank of Baroda	501

4.	Corporation Bank	821
5.	ICICI Bank	1910
6.	IDBI Bank	328
7.	Oriental Bank of Commerce	170
8.	Punjab National Bank	552
9.	Tamilnad Mercantile Bank Ltd.	29
10.	The Dhanalakshmi Bank Ltd.	47
11.	The Jammu and Kashmir Bank Ltd.	152
12.	The Karnataka Bank Ltd.	50
13.	The Karur Vysya Bank Ltd.	162
14.	The South Indian Bank Ltd.	134
15.	The United Western Bank Ltd.	56
16.	YES Bank Ltd.	03

The NFS Network now connects 5338 ATMs, which is the largest number of ATMs under a single network in the country.

The National Financial Switch allows connecting directly to the individual bank's switch or through their shared ATM Network Switches. It is a win-win situation for all the banks and more importantly, for the customers.

The Clearing Corporation of India Limited (CCIL) is the clearing and settlement agency for the switch, which also facilitates the NFS Disaster Recovery Site from its premises at Mumbai.

An NFS User Group has been set up to deliberate various issues related with the procedures, fee, etc., and a Steering Committee consisting of the banks' top management resolves various issues related to the National Financial Switch and policies from time to time.

Academic Initiatives

With the Indian Banking and Financial Sector moving on to the technology bandwagon in a big way, the need of the hour is trained manpower to lead these technology initiatives and make a success of them.

Responding to this huge demand, the Institute has formulated a two-pronged strategy to develop the competencies of the existing manpower through training initiatives and simultaneously develop fresh manpower for Banks and Financial Institutions.

The Institute offers a variety of educational programmes, designed specifically to meet the requirements of the Sector. Currently, the long-term programmes being offered by the Institute include the unique M.Tech. course in Information Technology (M.Tech. IT) with specialisation in Banking Technology and Information Security, a fast-track Post Graduate Programme in Banking Technology Management (PGPBTM) and a Doctoral Programme (Ph.D) in the areas of Computer Science, Information Technology, and Management Studies focussed on the Banking and Financial Sector.

Ph.D. (Research Fellow) Programme

The Institute, in association with reputed Universities/Institutes, offers a Doctoral Programme leading to Ph.D. in the areas of Computer Science, Information Technology and Management. Currently, the Institute has collaborative arrangements with the Indian Institute of Technology, Bombay (IITB) and University of Hyderabad, Hyderabad (UoH), for pursuing Research towards Ph.D.

The Research Fellows work at the Institute in the focal Research areas of the Institute, and simultaneously get registered for the Ph.D Programme of the University/Institute after fulfilling their respective admission requirements. The Institute started this Collaborative Research Fellow Programme from the academic year 1999-2000 and offers Research Fellowship to the candidates joining under this programme.

The monthly Fellowship amount is Rs. 11,000/-, 12,000/- and 13,000/- for the First/Second and Third Years respectively. Candidates with relevant work-experience of three-five years join as Senior Research Fellow (SRF) and the SRF Fellowship is based on the experience and expertise. Currently, the Institute has Research Fellows/ Sr. Research Fellows pursuing research with both the University of Hyderabad and the Indian Institute of Technology, Bombay.

M.Tech. in Information Technology

The Institute offers a unique two-year M.Tech. in Information Technology (with specialisation in Banking Technology and Information Security) in collaboration with the Central University of Hyderabad. The programme, referred to by Dr. Y. V. Reddy, as the "first-of-its-kind in India and perhaps in the world" is aimed at creating a pool of responsible and resourceful Information Technology professionals for the Banking and Financial Sector.

This All-India Council of Technical Education (AICTE) recognised programme is designed to impart in-depth knowledge and expertise to the students through innovative learning, supported by high-calibre research and technology leadership. This multi-disciplinary programme merges the new and emerging Information Technologies with the domain expertise in the evolving field of Banking and Financial Services Sector.

The curriculum, spread over four semesters, consists of courses on Core Computer Science, Banking Technology and Information Security, which provide the right mix of various aspects of Computer and Information Security. Admissions to the programme are open to both Direct and Sponsored Candidates from the Banking and Financial Sector. However, only GATE-qualified candidates are eligible under the Direct Category. Dr. Y. V. Reddy inaugurated the programme on September 05, 2001.

Course Contents

Semester I: Banking Technology – I, Computer Organisation & Operating Systems, Data Structures and Programming, Data Base Management Systems, Computer Networks, Cryptography, Lab-I (Java & Web design)

Semester II: Systems Security, Software Engineering, Electronic Commerce & Payment Systems, Data Warehousing and Data Mining (Elective – I), Computer Crimes and Cyber Law (Elective – II), Information System Audit (Elective – III), Softcomputing in Finance (Elective – IV), Lab – II (Network Programming)

Semester III & IV: Project Work, which is done under the supervision of a Faculty from the Institute/University and also from the respective organisations, if necessary.

Placements

As IDRBT Programmes are specifically designed to meet the requirements of the Banking and Financial Sector and IT Industries focussed on Banking, the demand for our students has always been more than the number of graduating students. Moreover, the quality of our students ensures that reputed Banks, Financial Institutions and IT Industries select them.

The Institute facilitates Campus Placements during the Final Semester of the Programme and all our students are placed with reputed organisations.

IDRBTians are at:

- Reserve Bank of India
- Infosys Technologies Limited
- Bank of India
- Bank of Baroda
- Indian Bank
- Clearing Corporation of India Ltd.
- Export Import Bank of India
- Tata Consultancy Services
- ICICI Infotech etc.

Weekly Seminars

As a step towards promoting the culture of knowledge sharing and bringing to the Institute the best that is being thought and said, the Institute conducts weekly seminars by inviting experienced bankers, renowned personalities, and academicians from various areas relevant to the Institute.

These seminars are open to the Faculty, Research Staff, and students of the Institute and serve as a forum for quality interaction. Here is a select list of speakers, who have addressed the seminars.

Speakers	Topic	Affiliation
Prof. D. B. Pathak	Indian IT Roadmap for 21st Century - IT Professional's Role	Subrao Nilekani Chair Professor, Indian Institute of Technology, Bombay
Prof. Janat Shah	Service Quality	Chairperson, Post Graduate Programme, Indian Institute of Management, Bangalore
Prof. B. K. Mohanty	Fuzzy Logic Systems	Indian Institute of Management, Lucknow
Dr. A. Vasudevan	Adjustment and Growth	Former Executive Director, Reserve Bank of India, Mumbai
Shri. P. K. Biswas	Change Management - The need of the hour for Indian Banking Sector	Executive Director, Reserve Bank of India, Mumbai

Shri. N. V. Deshpande	Information Technology and Right to Privacy	Executive Director & Principal Legal Adviser, RBI, Mumbai
Shri P. Krishnamurthy	Central Bank's Role in Controlling Foreign Exchange, Risk Management	Regional Director, Reserve Bank of India, Hyderabad
Shri. D. R. Mehta	Capital Markets and Bank's Role	Former Chairman, SEBI; Former DG, Reserve Bank of India
Shri. Y. Radha Krishna	Technology Upgradation in Banks	Former Managing Director, State Bank of India
Shri. K. Raghuraman	Banking Management	General Manager, Central Bank of India, Mumbai
Dr. K. Subramanian	Beyond Digital Signatures - Building Trust and Confidence for e-Services	IT Adviser to CAG of India & DDG, National Informatics Centre
Prof. R. Vemuri	Intelligent Information Systems for Information Security	University of California
Prof. R. K. Shyamsundar	Trust Models & PKI	Dean, Tata Institute of Fundamental Research, Mumbai
Prof. S. Kuppuswami	Extreme Programming	Professor & Head, Dept. of Computer Science, Pondicherry University, Pondicherry
Prof. B. Brahmaiah	Emerging Trends in Capital Markets	JNIDB, Hyderabad
Shri. Ashok Dohare	Cyber Crimes & Law	National Police Academy
Shri. Manoj Chugh	Storage Area Networks	President, India & SAARC, EMC Information Systems
Shri. Ramesh Loganathan	Software Engineering for Products	Technical Director, Pramati Technologies, Hyderabad
Shri. Govindaraj Rangan	Next Generation Infrastructure Services	Technology Specialist, Microsoft Corporation
Shri. Srinivasan Namakkal	Team Building Model	Author, Team Dimensions, USA
Dr. P. T. Kulkarni	Optical Communication and Networking	Professor & Head, PES Institute of Technology, Bangalore

Programmes

Programmes of IDRBT form an integral part of the Institute's Initiatives in aiding Technology Absorption in the Banking and Financial Sector. The focus of the programmes, which include Executive Development Programmes, Seminars, Workshops and Conferences, is to prepare the top and middle-level managements of Banks and Financial Institutions for 'Technology Banking'.

These specialised programmes are open to both the Public and Private Sectors. The programmes address various areas of immediate relevance to the Industry such as Payment Systems, Security Technologies, Information System Audit, BCP/DRP, Open Source Technologies, Data Warehousing and Data Mining, Software Engineering, Decision Support Systems, Cyber Crimes, etc. The Institute also conducts training programmes on various services provided by the Institute such as Structured Financial Messaging System and Certifying Authority Services.

The IDRBT Programmes are all about disseminating 'tech-knowledge' and so, providing extensive hands-on experience is an integral part of all the programmes. This helps the participants try out all the concepts learnt in the classroom themselves and sort out the arising issues. The sessions are addressed by a team of dedicated and experienced Faculty, who are well-versed with various practical applications of Technology. In addition, the Faculty accord special importance to analysing the subject with real-life case studies to ensure that the participants get an in-depth understanding of the issues involved. Eminent guest speakers, both from the academia and the industry address and interact with the participants.

The Institute initially started off with around six training programmes and currently the Institute is conducting on an average 35 programmes per year. The number of programmes conducted by the Institute yearwise is:

- 1997 – 1998: 06
- 1998 – 1999: 18
- 1999 – 2000: 24
- 2000 – 2001: 29
- 2001 – 2002: 37
- 2002 – 2003: 49
- 2003 – 2004: 40
- 2004 – 2005: 34

Customised Programmes

Apart from the regular Executive Development Programmes, the Institute conducts Customised Programmes to meet the specific needs of the Banking Industry. The course content of these programmes is developed in consultation with the particular Bank/Financial Institution and it imparts inputs on IT-enabled services of specific relevance to that institution.

Prior to the commencement of the programme, the Institute studies in-depth the various Technology Initiatives of the particular organisation, the stage and pace of Technology implementation, the bottlenecks encountered, challenges faced and the future Technology needs of the Bank/FI. It's on the basis of this specific study and interaction with the top management, that the content for the programme is finalised.

The duration of these programmes is generally a week so as to enable a group of executives from an organisation to take time off from their schedules and get a detailed understanding of the latest offerings of Technology. However, depending on the topics and level of participants, and considering the time constraints, especially in the case of top management, the duration of the customised programmes may be modified accordingly.

The number of participants for a customised programme is generally limited to a maximum of 30. Over 40% of the programmes conducted by the Institute are Customised Programmes and the Institute has conducted Customised Programmes for almost all the PSBs.

International Conferences

The Institute organises International Conferences, at regular intervals, to promote exchange of knowledge, experiences, research findings and technical know-how so as to attain and sustain international standards of excellence in Banking Technology. These Conferences are focused on the SAARC countries, countries from the Southeast Asian region, Europe & the developed countries.

IDRBT has collaborated with the Bank of International Settlements, Switzerland; SAARC Secretariat, Nepal; The Cryptographic Research Society of India (CRSI); Society for Electronic Transactions and Security (SETS); Indian Institute of Technology, Mumbai; Indian Institute of Technology, Chennai; University of Hyderabad, and IPR and Patent Authorities in India and abroad etc., for various International Conferences. The International/National Conferences/Seminars organised by the Institute include:

- International Seminar on E-Commerce: Opportunities and Challenges in India: Oct 29, '99

- National Seminar on E-Commerce: Dec 18, '99
- Bank Educationists Conference: March 6-7, '00
- National Seminar on Intellectual Property Rights: Dec 11-12, '00
- International Seminar on Payment & Settlement Systems: Challenges for Emerging Economies: June 13–15, '01
- Four National Seminars on Information Security: September 13(Bangalore), September 27(Hyderabad), October 29 (Chennai), November 28, '02(Mumbai)
- INDOCRYPT 2002 - Third International Conference on Cryptology in India: December 16-18, '02.
- HsecNET 2004 - National Conference on Hardware and Software Solutions for Secure Networks, January 23-24, 2004, organised in collaboration with Computer Society of India
- CIT 2004 – 7th International Conference on Information Technology, December 20 –23, 2004.
- Indo-US Cyber Security Forum - International Seminar on Cyber Security for Financial Services on Thursday the 15th September 2005 at Centrum Hall, World Trade Centre, Colaba, Mumbai

Counselling the Captains

In order to ensure that the Technology Absorption process is accorded priority, the Institute organises an Annual Conference to focus the personal attention of the CEOs of Banks on the urgent issues in Technology upgradation and innovation in the Sector. This conference, is designed as a forum for the captains of Public Sector Banks, to share their experiences and concerns on various matters relating to Technology Adoption and Absorption.

The Governor, Reserve Bank of India; Secretaries from the Union Ministries of Information Technology, Telecommunications, renowned Academicians and eminent leaders from the Industry address this conference and help in charting out the road ahead for the sector.

IDRBT also conducts workshops, seminars and conferences for the benefit of IT Chiefs of Banks regularly. These meets focus on the entire gamut of economic and managerial issues in implementing technology initiatives in banks. Focussed presentations, debates and deliberations on crucial applications like Core Banking, ATM Services, Messaging Solutions, etc., form the basic agenda for these meets. Leading vendors and thought leaders too participate and contribute towards Technologising the sector.

The meets conducted for the top managements by the Institute include:

Particulars	Date
Conference of CPPD Chiefs on VSAT Project	July 18, 1996
Conference of CPPD Chiefs on VSAT Network	August 17-19, 1998
Conference of CPPD Chiefs on INFINET	June 21-22, 1999
Conference of Chiefs of Public Sector Banks on INFINET and Technology Upgradation	December 07, 1999
Workshop for Regional Directors and Chief General Managers-in-Charge of Reserve Bank of India on INFINET and IT Strategy	April 21-22, 2000
Workshop for CPPD Chiefs on Security Policy and INFINET issues	April 27-29, 2000
Workshop on INFINET, Security, Messaging and SFMS-Related Issues for CPPD Chiefs	October 04-06, 2000
Conference of Chiefs of Public Sector Banks and Heads of IT Department on INdian FINancial NETwork and Applications.	December 14, 2000
Conference of CPPD Chiefs on INFINET and Applications	April 17, 2001
Conference of Regional Directors and CGMs-in-Charge of Central Office Departments of Reserve Bank of India on Technology Implementation	Sep 20-21, 2001
Conference of IT Chiefs of Public Sector Banks on INdian FINancial NETwork & Related Issues	Oct 31-Nov 1, 2001
Conference of Chiefs of Public Sector Banks on Technology Implementation and Upgradation	November 02, 2001
Conference of Principals of Staff Training Colleges on Web Based Learning	Nov 12-13, 2001
Seminar on Banking IT Products for IT Chiefs	October 22, 2002
Workshop for CPPD Chiefs of Public Sector Banks on Technology Issues	October 23, 2002
Conference of Chiefs of CMDs and EDs of Public Sector Banks on Technology Implementation and Road Ahead for Banks	October 24, 2002
Conference of Principals of Staff Training Colleges on Web Based Learning	Nov 18-19, 2002
Workshop for Senior Officers on Technology Initiatives & Challenges for Nationalised Banks, SBI & Associates	June 09-10, 2003
Conference on Technology Initiatives and	June 23-24, 2003

Challenges for Sr. Officers of Reserve Bank of India	
Workshop for Personnel & HRD Chiefs and Principals of Staff Training Colleges on HR Strategies	July 07, 2003
Meeting of CPPD Chiefs of Public Sector Banks on various initiatives of IDRBT	December 30, 2003
Meeting of CPPD Chiefs on National Financial Switch and INFINET related activities	June 07, 2004

IDRBT Products

The Institute has indigenously designed and developed two products - EnDeSign™, an Encryption, Decryption, Signature Software and Mirror.NET™, a Corporate Intranet Framework, to meet the specific needs of the Banking and Financial Sector. While EnDeSign™ ensures secure communication through complete encryption of files and folders and digital signatures, the Mirror.NET™, offers information to the employees at a click, thereby making communicating within an organisation unbelievably easy.

EnDesign

Responding to the demand of the Banking and Financial Sector for a Secure System to conduct business and to ensure secure communication, the Institute launched EnDeSign™, which provides complete encryption of file and folders along with digital signatures. It brings along a host of features, including:

- **Privacy** : keeps the message confidential and prevents eavesdropping
- **Authentication** : digital signatures are used as proof of identity
- **Non-Repudiation** : files are digitally signed, thereby providing proof of origin
- **Integrity** : as files are hashed and signed, integrity is assured

EnDeSign™ is powered with Advanced Encryption Standard (AES) Algorithm (Rijndael) of 128-bit key length (minimum), does not restrict use of any specific mail/client server and is available on a variety of platforms. Symmetric key encryption and signature are carried out using RSA algorithm.

EnDeSign™ Advantage

- **Easy to use:** The Graphic User Interface allows the user to achieve the functionalities desired at the click of a mouse.
- **Encryption:** File Encryption/Folder Encryption using AES algorithm with 128-bit key length.
- **Decryption:** File Decryption/Folder Decryption.
- **Keys:** Key Encryption/Key Decryption using RSA algorithm (512/1024/2048 bit key length).
- **Digital Signature:** Signing and Verification using X.509 v3 Certificates.
- **Smart Card Integration:** Integration of digital signing through Smart Cards (on demand).
- **CRL Verification:** Validation of Revoked Certificates in CRL during key Encryption and Verification.

Banking on EnDeSign™:

- Reserve Bank of India
- State Bank of India
- Corporation Bank

Mirror.Net™

A modern Intranet needs to move over from being a mere static site to a platform that integrates various workflow applications, based on the specific requirements of the organisations. Problems such as Duplication of Work, Sensitive Information falling into wrong hands, and Non-availability of Information when required, not just slow down the pace of work but also adversely impact the business.

The Mirror.NET™, a Corporate Intranet Framework, addresses these problems through a system that is rapid, consistent and automated for accessing as well as updating the information. This Intranet comes along with a set of workflow applications and can be deployed within a matter of minutes.

Mirror.NET Advantage

HR Management: An automated Employee Induction and Relieving Process, the application gathers information about a new recruit, connects him/her to the various departments of the organisation and provides access to the information instantly on a need-to-know basis.

Security Management: This application tracks the attendance, movement of the employees and the entry and exit of visitors, trainees, etc., in the organisation. This application captures the images of the various visitors through web cams and alerts the employee that s/he has got a guest.

Programme Management: Right from Programme Scheduling, Time Table Preparation, Monitoring a Programme's Progress, Obtaining Participant Feedback, and tracking the Fee Payment Status, this application helps automate the entire Programme Management Process.

Hostel Management: This application automates the management of room allocation for Participants/Guest Speakers/Visitors in hostels/boarding houses of the organisation. It tracks the services availed and also ensures correct billing.

More Applications: Mirror.NET™ also brings along a host of other applications including the Tour/Leave Tracking System, the e-Notice Board and the Thought Paradise application, etc.

The Mirror.NET™ is designed to be a perfect vehicle to facilitate the absorption of technology in an organisation. With the workflow happening through it, the Mirror.NET™ becomes a significant step in automating the various activities of an organisation. The Mirror.NET™ is currently being implemented in various Banks and Financial Institutions.

Consultancy & Advisory Services

Apart from investing most of its time and resources in Research and Development, the Institute also offers Consultancy and Advisory Services in Information Technology and Related Areas to Banks and other Financial Institutions.

The Faculty of the Institute are also called upon regularly to contribute to various national committees, working groups, advisory boards, etc. The Faculty are also on the Information Technology panels of many banks.

Security Technologies, Smart Cards, Corporate Network Design, Electronic Payment Systems, Information System Audit, Cyber Crimes, Enterprise Application Integration, Intrusion Detection System, Banking Software Applications, Data Warehousing, Data Mining, and Risk Management are some of the areas in which the Institute is currently offering consultancy and advisory services.

The Institute has already completed quite a few consultancy and advisory projects. The list of reports submitted to the various Banks and Financial Institutions include:

IT Security Policy

- ◆ Punjab & Sind Bank - April 2004
- ◆ Allahabad Bank - Nov. 2003 & Mar. 2004
- ◆ Oriental Bank of Commerce - October 2003
- ◆ Dena Bank - July 2003
- ◆ Central Bank of India - July 2003
- ◆ Canara Bank - October & August 2002
- ◆ Corporation Bank - June 2002
- ◆ Punjab National Bank - June 2002
- ◆ Central Bank of India - March 2002
- ◆ Punjab National Bank - February 2002
- ◆ Corporation Bank - February 2002
- ◆ Canara Bank - January 2002
- ◆ Punjab National Bank - December 2001

Web Enabled Remittances from Abroad through Internet

- ◆ Syndicate Bank - September 2003

Backup Policy and Procedures for Data Center

- ◆ Syndicate Bank - August 2003

Secured Internet Banking Architecture

- ◆ Oriental Bank of Commerce - Oct. 2003
- ◆ Syndicate Bank - November 2002

Information Technology Perspective Plan

- ◆ State Bank of Bikaner and Jaipur - November 2002

Prototype Datamart

- ◆ Bank of Maharashtra - May 2002

Enterprisewide Datawarehouse

- ◆ Bank of Maharashtra - May 2002

Information Technology Strategic Plan

- ◆ Central Bank of India - May 2002

Purchase Policy

- ◆ Central Bank of India - March 2002

Top Management Policy

- ◆ Central Bank of India - March 2002
- ◆ Punjab National Bank - February 2002

Information Systems and Technology Plan

- ◆ Bank of Maharashtra - March 2001

MASD Project

- ◆ Oriental Bank of Commerce - Dec. 2001

Enterprise Wide Networking

- ◆ Oriental Bank of Commerce - Nov. 2000

Enterprise Network Design

- ◆ State Bank of Indore - June 1999

Publications

As a result of the quality research pursued, the Institute has published in national and international journals and conferences. The Faculty Members of the Institute have also regularly been invited to deliver lectures and talks at many national and international forums. The Institute's research publications include:

Research Papers

Year 1999

1.	“INDian FIancial NETwork” , published in IBA Bulletin, Journal by Indian Banks' Association, [March 1999], Vol. XX No.3, pp 127 – 129, by V. P. Gulati, K.R. Ganapathy and Aditya Gaiha
2.	“Data Warehousing and Data Mining Applications in the Banking Industry” , in proceedings of the National Seminar on Data Warehousing in Government, Chennai, [April 21 – 22, 1999], by P. Radha Krishna and S. Sam
3.	“A Modified Algorithm to Compute Pareto-optimal Vectors” , published in the Journal of Optimization Theory and Applications, USA, Vol.103, No.1, pp.241-244, 1999 by V. N. Sastry and Ismail Mohideen
4.	“An Overview of Multi-objective Network Optimization Problems,” in proceedings of the International Conference on O.R in Small and Medium Enterprises, S.V.University, Tirupati, [December 20-22, 1999] by V.N.Sastry and Ismail Mohideen

Year 2000

5.	“IT Security Policy for a Bank” , published in IBA Bulletin, Journal of Indian Banks' Association, [March 2000], Vol.XXI, No.3, pp 54 – 56, by V. P. Gulati, K.R. Ganapathy and Ashutosh Saxena
6.	“A New Algorithm For Multi-Objective Network Optimization Problem” , in proceedings of the International Conference on Number Theory and Discrete Mathematics in Honour of Srinivasa Ramanujan, Punjab University, Chandigarh, [October 2-6, 2000] by V.N.Sastry, V.N. Janakiraman, T.N. & Ismail Mohideen
7.	“E-Authentication via Digital Certificate” , in IBA Bulletin, Journal by Indian Banks' Association, [October 2000], Vol.XXII, No.10, pp 17 – 21, by V.P. Gulati and Ashutosh Saxena
8.	“Modification of Dijkstra's Algorithm for Multi-Objective Network Optimization Problem” , in proceedings of the International Conf. on Recent Advances in Mathematical Sciences, IIT, Kharagpur, [December 20-24,2000] by V.N.Sastry and Ismail Mohideen

Year 2001

9.	“ An Architecture for Electronic Check Based Payment Systems ”, in proceedings of the 4th International Conference on Information Technology – CIT 2001, Gopalpur [2001] pp – 226 – 232 [Pub. by Tata MacGraw Hills], by V. P. Gulati and A. R. Dani.
10.	“ Electronic Check and Payments over Internet ”, in proceedings of the National Conference on E-Commerce, IPE, Hyderabad [2001], pp – 115 – 130, by V. P. Gulati, A. R. Dani and Aditya Gaiha.
11.	“ The Framework for Modeling E-Contracts ”, in proceedings of the 21 st International Conference on ER [2001] (SpringerVerlag Lecture Note Series (LNCS) No. 2224), by A. R. Dani, Kamalakar Karlapelam and P. Radha Krishna
12.	“ e-Learning in banks – Perspectives and Initiatives ”, in proceedings of the National Seminar on E-Learning and E-Learning Technologies, [ELELTECH INDIA 2001, Aug 7-8, 2001], by V. P. Gulati and M. V. Sivakumaran
13.	“ A Time Stamped Multiparty Signature Scheme over Elliptic Curves ”, in proceedings of the National Workshop on Cryptology, [10 th to 12 th October 2001], Indian Statistical Institute, Kolkata, by Ashutosh Saxena, Ravi Sankar Veerubhotla, and V.P.Gulati
14.	“ An Elliptic Curve Public Key Traitor Tracing Scheme ”, in proceedings of the National Workshop on Cryptology, [10 th to 12 th October 2001], Indian Statistical Institute, Kolkata, by V.P.Gulati, Ravi Sankar Veerubhotla, and Ashutosh Saxena
15.	“ A Frame Work for Modelling Electronic Contracts ”, in proceedings of the 20 th International Conference on Conceptual Modelling (ER2001), [November 27-30, 2001], Yokohama, Japan, LNCS, vol. 2224, Springer 2001, by P. Radha Krishna, Kamalakar Karlapalem and A.R. Dani
16.	“ A Fuzzy Approach to Build an Intelligent Data Warehouse ”, Journal of Intelligent & Fuzzy Systems, 10, pp 1-10, 2001, by P. Radha Krishna and S. K. De
17.	“ An E-Check Framework for Electronic Payment Systems in the Web Based Environment ”, in proceedings of the 2 nd International Conference on Electronic Commerce and Web Technologies (EC-Web 2001), Munich, Germany, 4-6 September, LNCS, vol. 2115, pp 91-100, Springer, [2001], by P. Radha Krishna and A.R. Dani.
18.	“ Digital Certificates with Biometrics ”, in proceedings of 4th International Conference on Information Technology – CIT 2001, Gopalpur [2001] pp – 178 – 183, by V. P. Gulati, R.S. Veerubhotla and Ashutosh Saxena
19.	“ World Trade Organisation and the Banking Sector ,” in proceedings of the 13th Annual Management Convention, [2001], by V. P. Gulati and Supriya Kumar De

Year 2002

20.	“IT Framework for the Indian Banking Sector” , ASCI Journal of Management [31(1&2) March 2002], by M. V. Sivakumaran, V. P. Gulati and C. Manogna
21.	“Information Security Governance: A Model for the Banks in India” , published in Prajnan, Journal of Social and Management Sciences, Vol XXXI, No 3, [October – December, 2002] pp 215 - 221, by D. P. Dube and V. P. Gulati
22.	“Neural Networks for Secure Key Generation” , in proceedings of the National Workshop on Cryptology, [3rd to 5th October, 2002], Indian Statistical Institute, Delhi, by Ashutosh Saxena
23.	“Towards Logically and Physically Secure Public-Key Infrastructures” , in proceedings of the 3 rd International Conference on Cryptography in India, INDOCRYPT 2002, [December 2002], Springer-Verlag Lecture Notes in Computer Science, by Kapali Viswanathan and Ashutosh Saxena,
24.	“CRM for Bank in India” , in Proceedings of the seminar on Customer Relationship Management – A key to Corporate Success program, UoH, Hyd [2002], pp63 – 66, by V. P. Gulati and M. V. Sivakumaran
25.	“EREC Business process model for E-Contracts Enactment” , in proceedings of the 12 th Workshop on Information Technology and Systems, WITS02, Barcelona, Spain, [2002], by P. Radhakrishna, Kamalakar Karlapalem and A.R. Dani
26.	“Mining Web Data using Clustering Technique for Web Personalization” , International Journal of Computational Intelligence and Applications (IJCIA), 2 (3), pp. 255-265, [2002], by P. Radha Krishna and S.K. De.
27.	“Web Based Information System for Indian Banking Industry” , in proceedings of the 7 th South Asian Management Forum - AMDISA 2002, by V. P. Gulati, P. Radha Krishna & C. Manogna
28.	“Reed Solomon Codes for Digital Fingerprinting,” in proceedings of the 3 rd International Conference on Cryptography in India, INDOCRYPT 2002, [December 2002], Springer-Verlag Lecture Notes in Computer Science, by Ravi Sankar Veerubhotla, Ashutosh Saxena and V.P.Gulati
29.	“Information Management – Issues and Challenges” , Bank Quest, the Journal of the Indian Institute of Bankers, Platinum Jubilee Special, [October-December 2002], Vol. 73, No.4, pp 38 – 43, by V. P. Gulati.

Year 2003

30.	“Information Security Framework for Banking and Financial Sector” , in Proceedings of National Conference on e-Information Security in Banking & Financial Sector: Issues Challenges – [February 11-12, 2003], by D. P. Dube and V. P. Gulati
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31.	“Risk in Internet Banking” , in IBA Journal, published by the Indian Banks’ Association, [September 2003], Vol XXV, No.9, Page Nos. 24 to 29, by Ashutosh Saxena
32.	“Indian Banking: Global Benchmarks 2003” , in Proceedings of the Conference on FICCI, Mumbai [September 2003], pp. 43-61 “Innovations in IT and Banking”, by V. P. Gulati.
33.	“Technologies for E-Commerce: India Initiatives” , accepted at IEEE TENCON, [14 th to 17 th October 2003], by Ashutosh Saxena and AR Dani,
34.	“Cryptanalysis of Stereotype Message Transmission” , in proceedings of the National Workshop on Cryptology, Chennai, India, [16 th to 18 th October, 2003], by Pankaj Kapoor, Manik Lal Das, Ashutosh Saxena and V. P. Gulati
35.	“Security Analysis of Lal and Awasthi’s Proxy Signature Schemes” , in International Association for Cryptology Research, ePrint Report No. 2003/263, [2003], by Manik Lal Das, Ashutosh Saxena, V P Gulati
36.	“Elliptic Curve -- A new Direction to Future Cryptography” in proceedings of the National Workshop on Cryptology, [2003], by N. Rajendran, Debabrata Nayak, D. B. Phatak and V. P. Gulati
37.	“Security Issues in Mobile Data Networks” , in proceedings of the National Workshop on Cryptology – [2003], by N. Rajendran, Debabrata Nayak, D. B. Phatak and V. P. Gulati
38.	“Security Issues in Wireless Data Networks” , in proceedings of the National Workshop on Cryptology – [2003] by N. Rajendran, Debabrata Nayak, D. B. Phatak and V. P. Gulati
39.	“An Intrusion Detection Scheme based on Frequency and Ordering” accepted for the Information Management and Computer Security Journal, by Sanjay Rawat, V.P. Gulati and Arun K. Pujari
40.	“New Algorithms for Multi-objective Shortest Path Problem” , published in OPSEARCH, Vol.40, No.4, pp.278-298, 2003, by V. N. Sastry, T. N. Janakiraman and Ismail Mohideen
41.	“Preventing Technology Based Bank Frauds” , published in The CID Review, Journal of Crime Branch, CID, Tamil Nadu, March 2003, Vol III, Issue: 3, pp 31-44, by V. P. Gulati and V. Radha
42.	“On Determination of Efficient Key Pair” , published in Journal of IE, Vol. 84, [May 2003] by V. P. Gulati, Ashutosh Saxena and Divya Nalla
43.	“A Key Management Scheme Based on Collision-resistant Hash Function and Polynomial Interpolations” , in proceedings of the International Conference on Number Theory for Secure Communications [December 20-21, 2003], by Manik Lal Das, Ashutosh Saxena, V. P. Gulati and Deepak B Phatak

44.	“IM for Knowledge Management” , in IBA BECON-2003 Volume, 11-12 [December 2003], pp, by Ashutosh Saxena
45.	“Proxy Signatures Using Partial Delegation with Warrant” , in proceedings of the International Conference on Number Theory for Secure Communications, [December 20-21, 2003], by Manik Lal Das, Ashutosh Saxena and V. P. Gulati
46.	“Appcast – A Low Stress and High Stretch Overlay Protocol” , in Proceedings of the 2nd International Workshop on Grid and Cooperative Computing, 2003, Shanghai, China [Dec. 2003], Vol. II, pp. 967 – 978, by V. P. Gulati, V. Radha and Arun K. Pujari.

Year 2004

47.	“Security Issues in Wireless LAN” , in Proceedings of the National Conference on Hardware and Software Solutions for Secure Networks 2004” Hyd. [Jan. 2004], by V. P. Gulati, N. Rajendran, Debabrata Nayak and S. Albert Rabara.
48.	“Optimised Hybrid approach for efficient storage and retrieval of multidimensional data - Using Hilbert Curves” in proceedings of the IASTED International Conference on Databases and Applications (DBA 2004), held from [February 17 to February 19, 2004], in Innsbruck, Austria. (Paper No. 419-103), by T. K. Srivani
49.	“Time Series Mining: Financial Series Case” , in proceedings of the National Conference on Recent Trends in Computational Mathematics, UGC-NCRTCM-2004, [18 - 19 March 2004], Ghandhigram, India, by P. Radha Krishna and Pradeep Kumar
50.	“Efficient Multicast E-Services over Appcast” , in proceedings of the International Conference on Information Technology – ITCC 2004, [April 05-07, 2004], Las Vegas, USA, by V. P. Gulati, V. Radha and A. K. Pujari.
51.	“On Gossip Codes and Traceability Schemes” , in proceedings of the International Conference on Information Technology – ITCC 2004, [April 05 - 07, 2004], Las Vegas, USA Sponsored by IEEE Computer Society, by V. P. Gulati, Ravi S. Veerubhotla, Ashutosh Saxena and Arun K. Pujari.
52.	“Unicast Routing Algorithm with Multiple Quality-of Service Parameters” , in IEEE Proceedings of the ISPAAN-2004 (Seventh International Symposium on Parallel Architectures, Algorithms and Networks), Hong Kong, May 10-12, pp.520-526, 2004, by Amarnath Koundinya.K, Atul Negi and V. N. Sastry
53.	“Maximum possible Number of Pareto Optimum Paths in a Multi Objective Shortest Path Problem” , accepted for publication the Bulletin of Pure & Applied Sciences. Section E. Mathematics and Statistics, Vol.23, No.1, [June 2004], by S. Ismail Mohideen, T. N. Janakiraman and V. N. Sastry
54.	“Evolution of Web Services in SFMS – A Case Study” accepted at the IEEE Third International Conference on Web Services (ICWS; 2004) [July 6 – 9, 2004], by V. P. Gulati, V. Radha and Rajesh T.

55.	“On Demand Distributed Unicast Routing Algorithm with Multiple Quality of Service Parameters” , accepted at the Fourth International Network Conference, Plymouth, U.K., July 6-9, 2004. (To appear in the Proceedings of INC-2004) by Amarnath Koundinya. K, V. N. Sastry and Atul Negi,
56.	“Integrating Classical and ART models for Data Mining” , accepted at the International Conference on Intelligent Sensing and Information Processing (ICISIP)-2004, Chennai, India, by Ashutosh Saxena and P. Radha Krishna
57.	“Straight Through Processing (STP): Challenges and Benefits” , in IBA Bulletin, Journal by Indian Banks’ Association, March 2004, Vol.XXV1, No.3, pp 19 – 22, by Ashutosh Saxena
58.	“Operational Risk In Indian Banking Sector” , presented in the National Conference on Recent Trends in Computational Mathematics (NCRTCM)-2004, sponsored by UGC, at Gandhigram, Deemed University, by D. P. Dube and Yatin
59.	“MPLS Architecture for Service Provider” , Accepted at the “International Conference on E-Business and Telecommunication Networks ICETE 2004”, by [2004], by N. Rajendran, V. P. Gulati, K. Yugandhar, and S. Albert Rabara.
60.	“Security Issues in Wireless Local Area Networks” accepted at the “Canadian Conference on Electrical and Computer Engineering, IEEE Canada, CCECE 2004” by N. Rajendran, Debabrata Nayak, D.B.Phatak and V.P. Gulati
61.	“Analyzing Mining Patterns Using Fuzzy ART and Soft Regression” , International Journal of Artificial Intelligence Tools, Vol. 14, [1-2, 2004], by P. Radha Krishna and J. Sailaja Rani
62.	“Frequency And Ordering Based Similarity Measure For Host Based Intrusion Detection” , accepted in the Journal of Information Management and Computer Security, by Sanjay Rawat, V. P. Gulati and Arun K. Pujari
63.	“New Polynomial Time Algorithms to Compute a Set of Pareto Optimal Paths for Multi- Objective Shortest Path Problem” , accepted in the International Journal of Computer Mathematics, UK, 2004, by V. N. Sastry, T. N. Janakiraman and S. Ismail Mohideen,
64.	“A Balanced Multicast Overlay Protocol” , accepted at the 18 th International Conference on Advanced Information Networking and Applications [AINA 2004] at Fukuoka Institute of Technology [FIT], Fukuoka, Japan, by V. P. Gulati, V. Radha and A. K. Pujari.
65.	“The Application for Stable Marriage Problem to Electronic Negotiation” , in proceedings of the Second International Conference on Artificial Intelligence and Applications, conducted by [IASTED], by V. P. Gulati, A. R. Dani and A. K. Pujari
66.	“Clustering Web Transactions Using Rough Approximation” , Fuzzy Sets and Systems, [In Print], by P. Radha Krishna and S.K. De

67.	“From Contracts to E-Contracts: Modeling and Enactment” , accepted for publication by the Information Technology and Management Journal, by P. Radha Krishna, Kamalakar Karlapalem and A.R. Dani
68.	“Central Data Management System for the Reserve Bank of India - A Data Warehouse proposition” , by Radha Krishna, V. P. Gulati and S. Sam
69.	“Identity Theft – Hindering E-Commerce” in Journal of Banking Laws, (ICFAI Publishers), by V. Radha [In Print]

Working Papers

The Faculty members of the Institute update themselves regularly on the latest trends in Banking Technology and are constantly exploring ways and means of bringing in this technology into the sector. Towards this end, the Working Papers on Developments in Technology and probable Applications are prepared by the Faculty.

Many of these ideas grow into viable projects and models, which are subjected to closer scrutiny by the various sub-committees before being cleared for Research and Development. The Institute has published the following eight working papers.

Working Paper No.	Title	Authors	Published in
1	Technology Based Distance Learning: New Vistas for Banks	V.Radha, V P Gulati & K.R Ganapathy	June 1999
2	Construction of Security Policy for Banks	V P Gulati, K.R. Ganapathy, Ashutosh Saxena & M.V.S. Prasad	April 2000
3	Electronic Commerce and Banks in India	V P Gulati, K.R. Ganapathy, Ashutosh Saxena & M.V.S. Prasad	April 2000
4	An Approach to Establish Data Warehouse for Banks in India	P Radha Krishna	May 2000
5	Technology for Forex Risk Management - Delta Normal Method for Risk Analysis	Aditya Gaiha & Supriya Kumar De	September 2000
6	A Framework for Smart Card Payment Systems	Ashutosh Saxena & Aditya Gaiha	January 2001
7	A Framework on IT Security Policy	Ashutosh Saxena & V.P.Gulati	September 2001
8	Enterprise Network Security	V.P.Gulati & V.Radha	May 2002
9	Y2K38	Ashutosh Saxena & Sanjay Rawat	August 2005

Books Published

- ***Public Key Infrastructure*** by Dr. Ashutosh Saxena, Faculty [Tata Mcgraw Hill, October 2003].
- ***Information Security Audit*** by V. P. Gulati and D. P. Dube [Tata Mcgraw Hill, June 2004].
- ***Human Resource Management*** by P. Jyothi and D. N. Venkatesh [Oxford University Press, October 2005]

Institute Publications

The Institute brings out a variety of Publications to disseminate knowledge on Banking Technology. The Institute's Newsletter, FAST FORWARD, is published quarterly to update the Banking Community, Financial Institutions, the IT Industry and the Academic Community on the various initiatives, activities and achievements of IDRBT. Articles of general interest on specific areas of Banking Technology also find a place in the Awareness Series column of the FAST FORWARD.

The Institute also publishes a variety of informative brochures and booklets such as Programme Brochures, Training Material for Programmes, and Booklets and Brochures on Projects and Thrust Areas of the Institute like INFINET, Certifying Authority, SFMS, M. Tech., PGPBTM, Research, etc.

Web Publishing: The Institute's website <http://www.idrbt.ac.in> serves as the general vehicle for communication with the world at large, carrying information and news about the Institute set up, people, profiles, projects, priorities, and the latest happenings, etc.

For the purpose of meeting the requirements of the INFINET User Group, a separate website <http://.infinet.org.in>, has been made exclusively available to the Closed User Group members. The Certifying Authority Services of the Institute are available @ <http://idrbtca.org.in>

IDRBTNET: The Institute has developed and implemented IDRBTNET, a comprehensive Intranet that provides all the information required, like the rules and regulations, workflow procedures and applications, information on what is happening where, roles and responsibilities of various functionaries, event schedules and practically everything that is required for the smooth day-to-day functioning of the Institute.

The IDRBTNET provides user-based access to all the employees of the Institute, and s/he can apply for leave, access salary statement and all information needed to increase efficiency in the Institute. The programme management system, integrated with the IDRBTNET has automated all the programme-related activities in the Institute. This user-friendly Intranet has also been implemented at the College of Agriculture Banking, Pune.

Awards & Certifications

Golden Peacock National Training Award 2001

In recognition of the Institute's outstanding contribution in the area of conducting training programmes, the IDRBT was bestowed with the "Golden Peacock National Training Award 2001" by the Institute of Directors (IOD), New Delhi.

The Institute, since its inception, has been conducting a range of Executive Development Programmes and Workshops for the top managements and special officers to quicken the pace of Technology Absorption in the Indian Banking and Financial Sector.

Shri Swaraj Paul, Chairman, Caparo Group, presented the award to the Director, IDRBT, on August 03, 2001, at the IOD Foundation Day Ceremony in New Delhi. Shri Suresh Prabhu, the then Hon'ble Minister of Power, Government of India, and Dr. M. B. Athreya were the Chief Guests at the glittering function, which was attended by a large number of CEOs, Managing Directors and corporate leaders from all over the country.

Computerworld Honors Laureates' Medal 2003

The IDRBT won the Computerworld Honors Laureates' Medal 2003 for Innovativeness in Development and Management of the INdian FINancial NETwork [INFINET]. Mr. Daniel S. Morrow, Executive Director, Centre for Innovative Technology, Virginia, USA, presented the award on April 18, 2003.

This award confirms the path-breaking Technology initiatives taken by IDRBT to further the pace of Technology Adoption and Absorption in Banks and Financial Institutions in India.

The Computerworld Honors Program, instituted in 1990 by the Center for Innovative Technology, Herndon, Virginia, recognises and awards organisations, whose use of Information Technology has been especially noteworthy for the originality of its conception, the breadth of its vision, significance of its benefit to the society and are leading the Global Information Technology Revolution.

ISO 9001:2000 Certification

IDRBT has been bestowed with ISO 9001:2000 Certification in recognition of its strictly adhering to and maintaining internationally accepted standards in its work processes.

Shri. Sanjay Kaushik, QMS Australia, handed over the Certificate of Recognition of IDRBT as an ISO 9001:2000 Institution to Dr. V. P. Gulati, Director, IDRBT on October 15, 2002. IDRBT, as an institution, has constantly endeavoured to improve the quality of each and every activity that it is engaged in.

Facilities

The Institute has in place excellent facilities and labs equipped with the most modern infrastructure to aid high quality R & D, and for conducting programmes, seminars and conferences.

While the various Research labs provide the thrust for the Research Activities of the Institute, the Smart Card Enabled Access Control Mechanism, regulates entry, exit and movement within the Institute, and helps provide a conducive atmosphere for Research and Education. The IDRBT campus is also WI-FI enabled.

The IDRBT campus consists of an Academic block, an Executive Facility Centre and an Executive Development Centre. A landscape garden with a wide variety of flower plants and fountains lends a touch of tranquility and natural splendour to the campus.

Research Facilities

The Institute has set up state-of-the-art facilities for aiding and promoting research work. The Labs and Research Centres are being constantly upgraded with the latest systems, devices and tools to keep pace with the ever-changing Technology trends. Presently, the Institute has the following laboratories for focused research, development and training:

Secure Technology Lab

The Secure Technology Lab caters to Security Needs of the Banking Industry. It provides consultancy and solutions, on par with the prevailing standards around the globe, to Banks, Financial Institutions, Corporates and other Business organisations.

The Lab is also engaged in integration of Digital Signature Application with the legacy software system to make it PKI-enabled. Currently, quite a few nationally important applications are in the process of being developed and integrated. The Research and Development Activities of the Secure Technology Lab are focused on the following areas:

- PKI Enablement of Legacy Software
- Digital Certificate Management
- Multi-application Smart Card Based Payment System
- Active Audit Guidelines for Security Policy
- Authentication technologies
- Banking Security Standards

Networking Lab

The Networking Lab focuses on Research towards integrating various networking devices and Technologies. The experiments are on simulated real world scenarios to zero in on better and workable solutions to resolve some of the key issues in networking and traffic optimisation. The lab also evaluates various tools and Network Management Systems on an ongoing basis with a specific focus on the following:

- Support for testing of Network Management policies and protocols
- Vulnerability study of the various systems through simulated environment
- Continuous research on network security and quality of services

The Lab is fully equipped with routers, firewalls, intrusion detection systems, security scanner, network scanner, switches, etc.

Business Intelligence Lab

Business Intelligence drives an Information organisation with Technologies and Techniques that allow the enterprise to glean insight from volumes of data. It gains critical importance from the fact that the Banks and Financial Institutions are increasingly becoming more and more data sensitive.

In the Business Intelligence Lab, we develop tools and algorithms for capturing, extracting, analysing and presenting valuable data from Banks' internal and external data to support high quality data analysis. Currently, the lab is focusing on the development of a suite of tools for Data Warehousing and Data Mining and also working on case studies and prototypes.

Computer Labs

The Institute has two spacious Computer Labs, one each in the Academic Block and the Executive Development Centre (EDC). While the Lab in the Academic Block is equipped with 40 Systems, the Lab in the EDC has 24 Systems. Both these Labs are used to provide hands-on training to the participants of the various programmes conducted by the Institute, and it's also used by the Research Associates for their day-to-day research.

Both the Labs have been designed in such a fashion that the Faculty can easily move across the aisles and rows to pay personal attention to each participant/research associate. The Labs are fully equipped with Multimedia Projection Systems and Public Address Systems.

Participants move from the classroom to the computer lab for sessions requiring hands-on practice and exercises. In cases, where the major portion of a Programme requires intensive hands-on sessions, the entire programme is conducted in the Computer Lab itself.

Library

The totally computerised library of the Institute caters to the academic and research needs of the faculty, staff, research scholars, and students of the Institute. The Library maintains an exhaustive collection of books along with over 300 periodical titles, 120 e-mail based newsletters, and a selective collection of video cassettes, CBTs, CDs, photo albums and other materials (both in print and electronic media).

The collection, which is being continuously augmented and updated, reflects the mandate of the Institute - Research and Development in Banking Technology. The major subject areas include Financial Networks, Application Architecture, Satellite Communications, Electronic Payment Systems, Security Technology, Electronic Commerce, eCRM, Internet Technologies, Data Mining, Data Warehousing, Business Intelligence, Knowledge Management, Technology Management, Risk Management, and Banking Law and Legislation.

Data Centre

Located in the Executive Facility Centre, the state-of-the-art Data Centre houses the Hub of the Structured Financial Messaging System (SFMS), Leased Line Network Management System of the INdian FINancial NETwork, Web Servers, Mail Servers, Certifying Authority Office and other Application Servers for various services provided by the IDRBT.

Banks and Financial Institutions too are allowed to use this Data Centre services to run their own web hosting and application services, at reasonable rates, subject to availability of space and other infrastructural requirements.

Academic Block

The academic block has two floors and it houses the Classrooms, Conference Halls, Auditorium, Library, Computer Labs, Centre for Security Technology, Server Rooms, Director's Office, Faculty Rooms and the Administrative Office.

The Auditorium has a capacity of 160 seats while the Conference Hall can accommodate upto 70 participants. The Classrooms and the Conference Halls are equipped with the latest audio-visual equipment. The Campus has more than 250 personal computers hooked to a campus-wide LAN and Uninterrupted Power Supply is ensured through UPS systems.

Executive Facilities Center

The Executive Facilities Centre is located just behind the Academic Block and has seven floors. The ground floor houses the VSAT Control Centre (VCC) and the dining hall. The Data Centre is located in the second floor of the EFC. The Recreation Centre, Health Clinic and the VIP Lounge are in the first floor. The Recreation centre comprises an ultra-modern gym and fitness centre, a meditation hall, billiards table, table tennis, carrom and chess facilities.

Executive Development Centre

Located in the third floor of the Executive facilities Centre, it's here that a majority of the programmes of the Institute are conducted. The centre has a state-of-the-art Classroom that can accommodate 40 participants and also a Lab equipped with the latest systems to provide hands-on practice to the participants.

Accommodation

There are 56 air-conditioned rooms in the EFC, located on the 5th, 6th and 7th floors. These rooms are fully furnished and carpeted. The rooms are connected with the IDRBT LAN and have a computer, phone, cable TV and hot water. The hostel is meant for participants of the seminars, conferences and executive development programmes.

The hostel also has four VIP suites with ultra modern facilities for accommodating the visiting dignitaries and VIPs. Apart from the accommodation Facility at the EFC, the Institute also has a Guest House meant for visiting faculty and guest speakers who stay for short duration.

The IDRBT Team

DIRECTOR

Arvind Sharma

ASSOCIATE PROFESSORS

P. Radha Krishna
Data Warehousing, Data Mining, Pattern Recognition

Ashutosh Saxena
Security Technologies, Payment Systems, Smart Cards

V.N. Sastry
Software Engineering, E-Learning, Web Based Decision Support Technologies

ASSISTANT PROFESSORS

V. Radha
Computer Applications, Databases, Internet

M.V. Sivakumaran
Banking Technology, E-Learning, Information System Audit

Mahil Carr
E-Commerce, E-Governance, Open Source Technologies

M.V.N.K. Prasad
Digital Image Processing, Security

FACULTY RESEARCH ASSOCIATE

Arijit Laha
Pattern Recognition, Neural Networks, Fuzzy Systems

FACULTY ON DUTY/DEPUTATION FROM BANKS

D. P. Dube
Enterprise Security Framework, Information System Assurance, Benchmarking of
Internet Banking, Operational Risk Management

Sambhavi Chandrasekar
Electronic Payment Systems, Information Security, E-Learning,
Open Source Technologies, Banking Technology

INFINET SERVICES

K. Chandrachoodan

General Manager, INdian FIInancial NETwork & Applications

V. VISWESWAR

Deputy General Manager, Mail Messaging System

N. RAJENDRAN

Deputy General Manager, INdian FIInancial NETwork

N. P. DHAVALÉ

Deputy General Manager, Certifying Authority

R. MANI

Deputy General Manager, Structured Financial Messaging System

V. GUNASEKARAN

Deputy General Manager, National Financial Switch

ADMINISTRATIVE SERVICES

M. R. Das

Deputy General Manager, Administration

P. Ratna Kumar

Assistant General Manager – Library & Information Sciences

Vijay Belurgikar

Assistant General Manager - Accounts

D.N. Venkatesh

Manager - HR & Administration

B. Shekar

Manager - Estate

S. Rashmi Dev

Manager - Publications & Programmes

R. S. Sirisha

Senior Secretary

K. Srinivas

Senior Secretary

P. Balasubramanyam
Senior Secretary

Varsha Shrivastava
Senior Secretary

V. Kishore
Documentation Assistant

Prakash Dhavale
Library Assistant

Former Employees of IDRBT

Name	Designation	Duration
W. S. Saraf	Director	October 7, 1996 to October 31, 1997 (First Director)
V. P. Gulati	Director	November 26, 1997 to November 25, 2004
K. R. Ganapathy	Faculty	September 25, 1996 to January 23, 2001
Supriya Kumar De	Faculty	May 31, 1999 to July 10, 2001
Varghese Jacob	Faculty	April 17, 2000 to April 17, 2003
A. P. Raja	Faculty	July 02, 2001 to June 13, 2003
Aditya Gaiha	Faculty	February 09, 1998 to September 10, 2003
T. K. Srivani	Faculty	June 13, 2001 to June 03, 2004
M.S.Aradhey	Officer	May 31, 1999 to July 10, 2001
A.S.Kulkarni	Officer	July 15, 1996 to July 31, 1998
S.G.Chitnis	Officer	April 22, 1997 to April 30, 1997
A D Hariharan	Officer	April 30, 1997 to April 30, 1999
A.R.Dalvi	Officer	May 21, 1997 to June 9, 1997
P.Damodar	Officer	December 11, 1997 to December 31, 1998
Rushyendra Prasad	Officer	March 2, 1998 to October 8, 1998
Kaza Sudhakar	Officer	March 31, 1999 to July 23, 1999
Nitin Singh Chauhan	Project Executive	June 22, 2002 to September 14, 2005
Aditya Anshuman	Project Executive	March 16, 2004 to October 07, 2005
Shalini Kalyan Raman	Project Executive	February 23, 2004 to October 21, 2005

Former Members of IDRBT Governing Council

Name	Position	Designation
Dr. C. Rangarajan	First Chairman	Governor, RBI [Mar 6, 1996 to Nov 22, 1997]
Dr. Bimal Jalan	Second Chairman	Governor, RBI [Nov 22, 1998 to Apr 10, 2001]
Shri. S. P. Talwar	Third Chairman	Deputy Governor, RBI [Apr 10 to Jun 30, 2001]
Shri. Vepa Kamesam	Fourth Chairman	Chairman, Governing Council, IDRBT, [July 01, 2001 to December 31, 2004]
Shri W. S. Saraf	Member Secretary	Director, IDRBT [Jun 10, 1996 to Oct 31, 1997]
Dr. V. P. Gulati	Member Secretary	Director, IDRBT [Nov 26, 1997 to Nov 25, 2004]
Shri R. V. Gupta	Member	Deputy Governor, RBI
Shri S. A. Hussain	Member	Executive Director, RBI
Shri M. S. Verma	Member	Chairman, State Bank of India [Mar 19 to Nov 30, 1998]
Shri M. P. Radha Krishnan	Member	Chairman, State Bank of India [Dec 1, 1998 to Jan 1, 1999]
Dr. K. K. K.Kutty	Member	Chairman & Managing Director, CMC Ltd [March 6, 1996 to March 5, 1999]
Prof. S. Ramani	Member	Director, NCST, Mumbai [March 6, 1996 to March 5, 1999]
Deepak B. Pathak	Member	Head, Shailesh J. Mehta School of Management, Indian Institute of Technology, Bombay [March 06, 1996 to March 3, 2005]
M. S. Vijayaraghavan	Member	Chief Executive Officer, Society of Integrated Circuit Technology & Applied Research, Bangalore [March 06, 1996 to March 3, 2005]
Shri B. S. Sharma	Member	Executive Director, Reserve Bank of India
Shri. A. T. Pannir Selvam	Member	Chairman, Indian Banks' Association
Dr. A. Vasudevan	Member	Executive Director, Reserve Bank of India [December 1, 1998 to August 31, 2000]
Shri. G. G. Vaidya	Member	Chairman, State Bank of India [Feb 1, 1999 to Oct 31, 2000]
Shri. M. G. Srivastava	Member	Executive Director, Reserve Bank of India [December 1, 1999 to February 15, 2001]
Shri S. S. Ghosh	Member	Chairman & Managing Director, CMC Ltd. [May 15, 1999 to March 4, 2002]

Prof. Arun K. Pujari	Member	Professor, University of Hyderabad [May 15, 1999 to March 4, 2002]
Shri. Janaki Ballabh	Member	Chairman, State Bank of India [Nov 01, 2000 to Oct 31, 2002]
Shri. S. L. Parmar	Member	Executive Director, RBI [Feb 01, 2001 to Jan 31, 2003]
Mohammed Tahir	Member	Executive Director, RBI [Apr 01, 2001 to Mar 31, 2003]
H. Krishnamurthy	Member	Principal Research Scientist, Indian Institute of Science, Bangalore [March 4, 2002 to March 3, 2005]
Smt. K. J. Udeshi	Member	Deputy Governor, Reserve Bank of India [August 01, 2002 to June 11, 2003]
Dr. Dalbir Singh	Member	Chairman & Managing Director, Central Bank of India [August 01, 2002 to June 11, 2003]
Shri V. Leeladhar	Member	Chairman, Indian Banks' Association [Sep 25, 2003 to Sep 24, 2004]
P. S. Shenoy	Member	Chairman, Indian Banks' Association [September 28, 2004 to March 1, 2005]

CONTACT

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