

Banking Technology Awards 2003

The Institute introduced the Annual Banking Technology Awards to instill a competitive spirit in technology adoption and innovation among the member banks (Public Sector Banks, State Bank of India and Associates).

For the Banking Technology Awards 2003, the Banks were evaluated on a range of parameters. A detailed format covering the various facets of technology implementation in Banks such as Computerisation, Networking Infrastructure, Technology Applications, INFINET Applications, Information Security Audit, Training on various IT aspects, In-House Software Development etc., was designed. Banks also submitted two proposals of Best Branches for consideration based on their internal judgement.

The Screening Committee for this year's Awards consisted of the following members:

- Shri. K. K. Jaswal, Secretary, Department of Information Technology, Ministry of Communications & Information Technology, (MCIT), Government of India

- Dr. R. B. Barman, Executive Director, Reserve Bank of India
- Dr. Subir Chowdhury, Chairman, Webel Informatics Limited, and Former Director, Indian Institute of Management, Calcutta

Innovative Technology Enabled Services, Security, and Reduction in staff etc., for the 'Techno-Savvy and Customer-Friendly Services Award'

- Deployment and Growth in terms of Penetration, Volume of Transactions and Card/Customer base of various Delivery Channels such as ATMs, Internet Banking, Telebanking, Mobile Banking etc., for the 'Delivery Channels Award'
- Extent of Branch Computerisation, Business Covered, Application Packages Implemented etc., for the 'Business Computerisation Award'



- Dr. S. Ramani, Former Director, National Institute of Industrial Engineering
- Dr. V. P. Gulati, Director, IDRBT

The parameters the Banks were evaluated on for various awards include:

- Core Banking Initiatives, Customer Service related parameters such as Extended Timings, Single Window Facilities and other amenities, Branch Profit, Productivity, Business Growth,

- Implementation of Application Packages, Security Policy, IS Audit, DRS/BCP Initiatives, IT Education etc., for the 'Back Office Applications Award'

The committee recommended three Branch Awards for the three Best Branches. The committee also made a few recommendations for the 2004 Awards, which include separate Awards for the rural and semi-urban banking category to encourage the absorption of technology in rural and semi-urban areas.

NATIONAL FINANCIAL SWITCH

In a major initiative towards providing an interface between the Corporate Community and the Banking and Financial Sector of the country, the Institute is setting up the National Financial Switch (NFS). The NFS Project envisages the following:

- ◆ An apex switch, which will facilitate switch-to-switch connectivity.
- ◆ An e-Commerce Payment Gateway (Internet and Mobile Commerce) to authenticate and route payment details between banks and various parties, acting as an e-Commerce facilitator.

The NFS became a necessity in the context of the initiatives of some banks for mutual sharing of the ATM resources among them. Currently, a few banks have agreements among themselves to share the ATM resources as per the mutually agreed cost structure. The infrastructure inter-connectivity architecture of the above initiatives was however observed to be adhoc. These initiatives are again limited to only a few banks.

Hence, it was felt more appropriate to utilise the common infrastructure that is available in the form of the INdian FINancial NETwork (INFINET) and set up a National Financial Switch with INFINET as the backbone so as to result in optimum cost and advantage for the entire Banking Community.

Further, there has been a long felt need from Government, its agencies and the Corporate Community for the Internet Interbank Payment Gateway for e-Commerce related transactions. The issue was deliberated at various forums of the Institute such as the Standing Technical Evaluation Committee, Governing Council of IDRBT, IT Chiefs' meeting etc.

Since all the financial institutions are already connected to the INFINET and the countrywide infrastructure is already in place, banks can establish connectivity to the switch without much further spending on infrastructure for this connectivity. The Institute is in discussions with major banks for working out the modalities and an optimum charging policy. The Solution Provider for the Project has also been identified.

This project ultimately has social and economic repercussions as not only does it help prevent infrastructure duplication, but also opens up a range of

electronic possibilities for banks, corporates, consumers, and all the parties concerned. This will help in optimal utilisation of resources and raise the global competitiveness of the Indian Banking and Financial Sector. The National Financial Switch is expected to go live by July 2004.

LEASED LINE NETWORK

The INFINET Leased Line Network now consists of 8 Mbps Links connecting Hyderabad to Mumbai and Delhi. Centres such as Kolkata, Nagpur, Chennai and Bangalore are connected to Mumbai and Hyderabad through 4 Mbps links, and other centres are connected to the nearest major INFINET node through 2 Mbps links with ISDN backup. ISDN-PRI lines have also been installed at all regional offices of the RBI for providing backup to the Leased Lines of CUG members connected to the INFINET.

The implementation of router redundancy and Multi-protocol Label Switching (MPLS) on the INFINET Leased Line Network is in progress to provide high availability and uptime on the Network.

The deployment of Security Solutions (Firewalls, Host IDS and Network IDS) in RBI offices has been completed in 31 locations. At the remaining locations, the deployment is in progress and when completed at all the 38 locations, the INFINET will be inherently secure, thus helping the Banking and Financial Sector in providing secure passage for all Inter and Intrabank transactions.

The INFINET support facilities are now available on a 24 x 7 basis at Hyderabad and Mumbai, and at all other regional offices of the RBI, the support facility is available during business hours.

VSAT NETWORK

The IDRBT VSAT network is now operational on Transponder No. 14 on INSAT 3A. The migration of VSAT operations from INSAT 3B to INSAT 3A has been successfully completed and over 2000 VSATs are now operational on INSAT 3A.

The Institute has also procured an additional 1/8th transponder space on INSAT 3A keeping in view the large No. of VSAT deployments (both TDM/TDMA and SCPC) by banks. The Broadband Network is also operational on the VSAT network, making available an outroute of 2 Mbps for the VSAT users along with an inroute of 256 Kbps.

STRUCTURED FINANCIAL MESSAGING SYSTEM

The Structured Financial Messaging System (SFMS) is a secure and common messaging system provided to serve as a platform for intra-bank and inter-bank applications, mainly to cater to the needs of domestic financial messaging. It can be used practically for all purposes of secure communication within the bank and between banks, and comes with a number of special features. Especially, it is a modularised and web enabled software, providing for a flexible architecture that facilitates centralised or distributed deployment. Besides, the access control is through Smart Card based user access and messages are secured by encryption and authentication services.

The SFMS 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. This version comes with the following advanced and user-friendly features:

- ◆ The New Architecture enables the offline servers to be connected to the Gateway directly
- ◆ The revamped Secure File Transfer facility handles ASCII and non-ASCII files, with no limitation of the file size on the front end, and provides support for uploading and downloading of files from remote sites
- ◆ Supports RTGS messages for RTGS Bank's Participants' Interface (PI) Host Interface
- ◆ Banks' API is improved taking into account the RTGS requirements
- ◆ New Message types for PDO-NDS introduced
- ◆ Hindi language support for creation of messages is provided

A few private sector banks, foreign banks and cooperative banks too have evinced keen interest in implementing the SFMS and the process in these banks will be initiated depending on their readiness.

A meeting of the IT Chiefs of the PSBs was held on December 30, 2003, at the Institute, to discuss the various issues concerning the SFMS. During the meeting, the banks identified various applications that can be integrated

with the SFMS messaging backbone. Meanwhile, the Real Time Gross Settlement (RTGS), being launched by the RBI, is using the SFMS for messaging.

IDRBT continues to conduct customised training of special batches exclusively for various banks on SFMS, the latest beneficiaries being over 400 officers, in 14 batches, from nine banks including the RBI and the State Bank of India.

STEPS FORWARD

A number of new applications that can use the SFMS have been identified and the Institute is working on them. The NEFT Centre Module of the National EFT has been completed and the Branch Gateway Module is being developed. Both the modules are expected to be rolled out by May 2004.

Responding to the request of the banks during the IT Chiefs Meet, the Institute has also taken up the development of the Forex Module. The approach has been finalised and the SRS is being drawn up. This module would facilitate the banks to:

- ◆ Send the forex confirmation to the counterparts in case of \$-Re Deals in India through the SFMS and to their overseas counterparts, through the SWIFT interface, in case of cross-currency deals. The Messages generated at the SFMS terminal would be sent across to SWIFT without any manual intervention.
- ◆ Send a copy of their confirmation to the CCIL by utilising the facility in SFMS for eventual settlement of rupee leg of the transactions.

The Institute has carried out an internal exercise to identify the future usage of the SFMS for broadening the utility of the application, integration of the new technological advances and more importantly enabling the smaller banks to implement the SFMS without much investment. Accordingly, we have taken up the task of development of a Common Gateway Module enabling smaller banks to participate in the SFMS and various other schemes being developed by the RBI.

Provision of the SFMS on Internet is on the cards and in this direction a meeting was held with RBI, SEBI and NSDL representatives to firm up the requirements.

IDRBT CERTIFYING AUTHORITY

The IDRBT Certifying Authority, as on March 31, 2004, has issued 10,000 Digital Certificates (4900 for Class 1, 4500 for Class 2 and 600 for Class 3). The Banks and Financial Institutions are using the Certificates issued by IDRBT CA for Corporate E-mail, SFMS, Webservers used for Internet Banking, and CCIL Settlement Applications.

Digital Certificates were also issued to RTGS individual users in banks and other RTGS members and the process will continue for additional users as per the requirements of the banks. Further, the IDRBT Certification Services are now extended to NSDL's Online Tax Assessment System (OLTAS) application, RBI's Centralised Fund Management System (CFMS) and SBI's Electronic Payment System (STEPS).

Further, till date 100 Registration Authority Offices were created, covering 26 Public Sector Banks, 17 Private Sector Banks and 5 Financial Institutions. These include 16 Registration Authority Offices created for the State

Bank of India. We also created 33 RA Offices for all Regional Offices of the RBI, which are in operation since September 2003.

The Institute organised a series of workshops including customised programmes for banks during which, procedures and processes for Digital Certificate issuance and its management, were explained in detail with the help of presentations and demonstrations. The Institute also imparted training to RBI's and SBI's RA officials through customised workshops at IDRBT.

Studies have been completed on network connectivity and system requirements for setting up of the proposed Disaster Recovery Site (DRS) at the National Informatics Centre Certifying Authority (NIC-CA) site at New Delhi. The specific site at NIC has been finalised, tenders invited and the required hardware and software procured. The testing and loading of CA software is complete and the equipment is ready for transportation and installation.

PGPBTM & M.TECH. IT

The students of the first batch of PGPBTM, our fast-track technology programme with a management focus, are shaping up nicely. They are raring to go, to try their techno-management skills in the Industry. They are now in the third term of instruction which covers advanced, strategic managerial inputs like Technology Management Strategies, IT Project Management, Information Systems Audit, Computer Crimes and Law, Technologies for Marketing Financial Services, Organisational Behaviour etc. To get a good grip on the projects they have to undertake in the next term, they have already started exploring their areas of interest and have had detailed preliminary discussions with the Faculty concerned.

The students have had the unique advantage of listening to and interacting with a galaxy of eminent speakers, industry leaders and academic experts from banking and finance, IT and management during the weekly seminar, which is an integral part of their curriculum.

It is the Placement Season and many leading Banks and IT Companies have evinced keen interest in visiting our

campus and the Placement Programme is scheduled from April 5 onwards. The next batch of PGPBTM is scheduled to start in July 2004. We find from our records that a good majority of students who have applied for the Second Batch have performed very well in CAT/ ATMA. The schedule for Group Discussion and Personal Interviews for selecting the students for the next batch will be announced shortly.

Deadline Extended: The last date for application for Sponsored Students from Banks and Financial Institutions for PGPBTM July 2004 batch is extended upto April 30, 2004.

M. TECH. IT. – The University of Hyderabad will shortly be releasing the advertisement for the M.Tech in Information Technology, with specialisation in Banking Technology and Information Security, being conducted in collaboration with the IDRBT, in various national dailies. Admissions to the course are open to both Direct and Sponsored Candidates from the Banking and Financial Sector. We invite you to visit us at www.idrbt.ac.in for more details.

MEETING OF IT CHIEFS OF PUBLIC SECTOR BANKS

A meeting of the CPPD Chiefs of the Public Sector Banks was held at the Institute on December 30, '03, with a view to discuss the IT Initiatives of IDRBT, review the implementation of the SFMS, and deliberate on the implementation of projects such as the Leased Line and VSAT Network and CA Services etc.

Dr. V.P Gulati, Director, IDRBT, started the proceedings by tracing the developments in these areas since the last meeting held in June 2003. This was followed by presentations on various projects by the respective Coordinators, who also highlighted the issues involved as well as the expectations of the banks. There were open house discussions during and after the presentations, a brief summary of which is presented hereunder:

INdian Financial NETwork

- The Director requested the banks to carefully study their requirements in terms of procurement of VSATs and Leased Lines at their branches and communicate the same to IDRBT. Banks were also requested to identify such locations where bandwidth hungry applications such as data centers, switch sites etc. reside for optimally utilising the broadband capabilities of the VSAT Network.
- Henceforth help-desk facilities would be available at Mumbai and IDRBT on a 24 x 7 basis and at all regional offices of RBI during business hours.
- The banks were advised to explore the possibility of having alternative arrangements with other Service Providers for provisioning of both VSATs and Leased Lines taking into consideration factors such as cost and benefit/ Services provided / BCP-DRS perspective etc.
- The banks were also informed that IDRBT would be in a position to offer bandwidth based on application requirement using Multi-Protocol Label Switching (MPLS). MPLS & Quality of Service would be deployed in the network during Phase – II of the implementation.

Structured Financial Messaging System

- Shri. R. Gandhi, CGM-in-Charge, DIT, RBI, discussed with each bank about the applications they proposed to port on the SFMS. He also impressed upon the banks on the need to finalize the applications at the earliest to make optimal use of the facility.

- The banks were requested to communicate to IDRBT regarding the requirements for implementation of FOREX module as a part of the SFMS so that necessary action in this regard could be initiated by IDRBT.
- The banks requested IDRBT to offer training (both technical and user) to trainers who could in turn train the officials in their banks on the use of SFMS 3.0. The banks also requested IDRBT to look into the possibility of providing Training CD's so as to help bankers deploy and operate the SFMS at their end for training purposes.

Certifying Authority Services

- Banks were requested to explore the possibility of using USB tokens over Smart Cards in view of the costs and the advantages the banks would have with the use of USB tokens.
- Banks were advised to promote the use of secure emails in their corporate network. In this connection, the Director added that IDRBT could look into the possibility of providing free Digital Certificates initially for a period of one year to promote secure email usage in banks as the official means of communication.

National Financial Switch

- Banks were appraised about the proposal of setting up the National Financial Switch by IDRBT to provide switching of transactions between the various ATM switches and also for acting as a payment gateway for e-Commerce related transactions. The Director impressed upon the banks on the need for participation of all banks for the success of the project.
- The Charging Policy to be adopted, considering the investment, expected volume of transactions and also the prevailing rates charged by the service providers, was deliberated upon. The Charging Policies of the various consortiums such as Cashtree, Euronet, Bancs, Mitra etc. were debated.
- IDRBT informed the banks regarding its intention to hold discussions with private sector banks like ICICI, UTI, HDFC, IDBI etc., who are major players in the ATM market and arrive at a rational fee structure.

Shri. S. S. Subramanian, CGM, IDRBT, proposed the vote of thanks.

HsecNet 2004

NATIONAL CONFERENCE ON HARDWARE AND SOFTWARE SOLUTIONS FOR SECURE NETWORKS

Security is fast emerging as a major area of concern in this era of Networks. It's to deliberate on the various issues in the critical area of Secure Networks and also to present the latest research and development findings, that the Institute in collaboration with the Computer Society of India (CSI) organised HsecNet 2004 - the National Conference on Hardware and Software Solutions for Secure Networks. The conference, which brought together renowned speakers from the academia and industry, was held on January 23-24, 2004.

Inaugurating the Conference, Dr. P. Rama Rao, Adviser – Higher Education & Research, Government of Andhra Pradesh, and Former Vice Chancellor, University of Hyderabad and Secretary, Government of India, stressed on the need for securing the resources of the nation. "Research in the area of Security should be all encompassing. It should not limit itself to just securing the IT Resources, but work on protecting the total national wealth." Highlighting the critical importance of Security in every system, he said that "an increasing number of scholars from the growing knowledge bank in the country, must concentrate on issues of Security, for it is essential for making India a developed nation at the earliest".

The conference spread over six technical sessions devoted to contributed papers and invited talks on Hardware Security, Network Security, Software Security, Smart Cards, Security Standards and BCP/DRP.

The specific issues deliberated upon include: Hardware Appliances – SSL VPX to Secure Network Access using 2 Factor Authentication, Crypto-Hardware Implementation Challenges, Secure Automated Network Storage, Broadcast Security, Network Security, Secured Identity Management, Intrusion Detection System, Security Issues in Wireless LAN, Embodying Trustworthy Computing in Global Enterprise, Java Security, Security Policy, High Performance Cryptography Using Elliptic Curves, Routing Algorithms, Smart Card Security, Mobile Money, Best Practices for ISMS, IS Audit, BCP and DRP.

The conference concluded with the Panel Discussion on Digital Security: Challenges and Opportunities. Chaired by Dr. V.P. Gulati, Director, IDRBT, the panel included Dr. R.K. Bagga, CSI; Shri N.N. Murthy, CMC; and Prof. D.V.R. Vithal. The highly interactive discussions brought the following factors into limelight: Need for interdisciplinary research, Constant interaction between the industry and academia, and need to popularise courses such as IDRBT's M.Tech and launch courses focused on Security Technologies.

TUTORIALS: The two-day conference was preceded by a one-day tutorial on January 22, 2004. While G. Sandeep, Area Manager, CMS Computers Limited, explained how to Protect Networks in Hackers Paradise; Dr. Ashutosh Saxena and Dr. N.P. Dhavale, Faculty, IDRBT, offered an in-depth view on Digital Security for Banks. These tutorials

provided a good opportunity to get to know some of the current applied areas of the subjects and set the tone for the conference.

Over 140 delegates including Academicians, Researchers, and Executives from the Government, IT Industries, Private and Public Sectors participated in this conference. The delegates, appreciating the content of conference, opined that the HsecNet should be made an Annual Conference. The conference was coordinated by Dr. Ashutosh Saxena, Faculty, IDRBT.



Dr. P. Rama Rao lighting the lamp to inaugurate the HsecNet 2004

EXECUTIVE DEVELOPMENT 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 our programmes is to prepare the top and middle-level managements of Banks and Financial Institutions for Technology Banking. The Programmes conducted by the Institute recently include:

Internet Banking

Internet Banking has changed the entire paradigm of Banking. In a scenario, where just about all banks, including the traditional banks have gone in for transactional Internet Banking, it's imperative that the sector not just have the systems required, but also have well-trained manpower to tackle the arising issues with immediacy. It's to meet this requirement that the Institute conducted the Programme on Internet Banking from October 13-15, 2003.



Risks and Controls in Internet Banking, Technology and Security Standards, Security Products, Architectural Options for Deployment, IDS Deployment, BCP/DRP, Information System Audit and Delivery Channels were some of the issues deliberated. Shri D.P. Dube coordinated the programme.

Implementing Application Development using LAMP

Developing and deploying various Web Based Applications earlier needed costly hardware and software, but the LAMP (Linux + Apache + My SQL + PHP) Technology using free, open source components enables speedy development and deployment of quality web-based applications without requiring high-end hardware.

This programme, held at the Institute from November

11-13, 03, introduced the Bankers to LAMP Technologies and provided insights into fruitfully deploying the technology in the Banks. The participants gained hands-on experience in developing Dynamic, Database-driven web applications. Shri M.V. Iyer coordinated this programme.

Payment Systems and Security Technology

The liberalisation of the Financial Markets and the consequent globalisation of markets have made it imperative to improve the Payment Systems. A modern Payment System must guarantee certainty of payment and finality of settlement, and this demands secure transactions over the network.

This programme, conducted at the Institute from November 17-24, 2003, deliberated on the issues related to Security Technologies, the evolution of Payment Systems in the country, components of a modern payments system, Control considerations in their design and implementation, future trends in this area, risks associated with the payment systems and their management. Dr. Ashutosh Saxena coordinated the programme.

Certificate Course in Enterprising Networking Technologies and Security

The Certificate Course in Enterprise Network Technologies and Security (CENTS), specifically designed to equip the sector with expertise to counter the Security threats and update it with the new advancements in technology, was held at the Institute from February 02, 2004 to February 13, 2004. This was the third CENTS conducted by the Institute, the first two being in November-December 2002 and April-May 2003 respectively.



Focussing predominantly on providing intensive hands-on experience, the course provided detailed inputs on OSI & TCP/IP, Network Devices, LAN/WAN Design, Routing Protocols – RIP, OSPF, Router ACL and NAT, DHCP & DNS, Steganography, Framing Security Policies, Network Vulnerabilities, and DHCP/DNS using Linux etc. The course was coordinated by Ms V. Radha.

Multi-Application Smart Card Based Payment Systems in India



Smart Cards are fast gaining pre-eminence as the ultimate portable and network personal computers of today. These cards have the potential for being used in many applications related to banking, retail payments, vehicle registration, internet payments, e-governance, health records etc.

The Institute in association with the Indian Institute of Technology, Bombay, is executing a Project sponsored by the Ministry of Communications and Information Technology, Govt. of India, on Multi-Application Smart Cards for Payment Systems.

Drawing from this project, this technical workshop focussed on Smart Card Based Payment System in India and deliberated on both conceptual and implementation issues. The discussions spread over issues such as Interoperable online and offline debit/credit systems, Interoperable E-Purse system, Loyalty and Transit Systems, Security Architectures, and Key Management Issues. Technical Executives and Managers from Banks and Financial Institutions, Industries and Academicians participated in this two-day workshop held from February 19-20, 2004. Dr. Ashutosh Saxena coordinated the workshop.

Information System Audit

With technological advancement, the resources of the

organisations have also been diversified and categorised. We now have data and other IT-related resources, which have to be properly safeguarded. This week-long programme, held from February 23-28, 2004, provided the Bankers, who are associated with the maintenance of IT resources, both at operational and policy levels, inputs on how to ensure that the IT resources of the organisation are secured.

The issues that were discussed include Operational Control Framework & Review, Computer Assisted Audit Tools & Techniques (CAATTS), Business Continuity & Disaster Recovery in a Core Banking Environment, Risk & Controls in ATM, and Management Control Framework & Review etc. The participants were also trained to prepare a Security Policy for their organisations. Shri D. P. Dube coordinated the programme.

SFMS & Digital Certificates

The Institute conducted eight customised workshops on SFMS and Digital Certificates for the Syndicate Bank, Bank of India, Andhra Bank, Corporation Bank, Central Bank of India, United Bank of India, and State Bank of India and Associates. Workshops focused exclusively on Digital Certificates were also conducted for the Punjab National Bank and the Reserve Bank of India.



Providing hands-on experience on various aspects of Certifying Authority Services such as Registration Authority Functions, RA & Subscribers, PKI Enabled e-mail and Structured Financial Messaging System Services such as SFMS & RTGS, SFMS Certificates, SFMS Message Formats, SFMS User Creation & Message Formats and SFMS - SWIFT Solution was the focus of these workshops. Shri R. Mani and Dr. N.P. Dhavale coordinated these workshops.

INFORMATION SYSTEM AUDIT

D.P DUBE, FACULTY, IDRBT

Information System (IS) Audit, formerly called Electronic Data Processing (EDP) Auditing evolved as an extension of Traditional Auditing. The need for IS Audit came from several quarters:

- Auditors realised that computers had impacted their ability to perform the function of attestation.
- The Information Processing Management recognised that computers were key resources for competing in the business environment and had a critical need for Control and Audit.
- With the growing digitisation of Information, the basics of evidence collection, evaluation and the entire process of Traditional Audit needed a paradigm shift.
- Professional associations, organisations, Government Bodies and regulators recognised the need for Information Technology Control and Audit.

Information System Lifecycle

In any legacy organisation, the Information System deployment/absorption follows these three phases:

- **Pervasive Phase:** Here the objective of the organisation is popularisation of Information Technology and hence is characterised by unrestricted use of IT.
- **Consolidation Phase:** This is the second stage where the organisation after getting a reasonable feedback about the widespread use of IT in the organisation tries to consolidate the Information Systems. This involves ascertaining - Who uses what, What technology is popular, Is there any constraint in resources etc.
- **Controlled Phase:** Here the organisation after consolidating the Information System and ascertaining its uses tries to put in place appropriate Control and Security. The organisation tries to design an Information System Framework that includes the necessary Assurance Mechanism.

Information System Audit - Defined

Ron Weber defines Information System Auditing as “the process of collecting and evaluating evidences to

determine whether a computer system safeguards assets, maintains data integrity, allows organisational goals to be achieved effectively and uses resources efficiently.” So, an Information System Auditor is required to provide a reasonable Assurance to the company/auditee that the computer system fulfills the above objectives.

The sequence of the objectives too is very important to appreciate the requirement for an Auditor. Data integrity has no meaning in the organisation if the assets are not safeguarded, effectiveness has no meaning unless there is integrity of data and finally efficiency (doing things right) has no role if it is not effective (doing right things). These four objectives probably constitute what Information System Audit is all about:

Asset Safeguarding

The Information Assets are not necessarily what appear in the right hand side of the balance sheet. In fact, the first and foremost Information Asset of an organisation is the people. The data, software, hardware, facilities, documentation, all constitute Information Assets. The IT Governance Institute (USA) in its Governance model i.e COBIT (Control Objectives for Information and Related Technology) has defined IT Resources which constitute:

- **Data:** Objects in their widest sense (external and internal) structured and non-structured, graphics, sound etc.
- **Application Software:** Sum of manual or programmed procedures
- **Technology:** Hardware, Operating System, Data Base Management System, Network, Multimedia etc.
- **Facilities:** Resources to house and support Information Systems
- **People:** Includes staff skills, awareness and productivity to plan, organise, acquire, deliver, support and monitor Information System and Services.

Data Integrity: Data Integrity is about the purity and completeness of the Data, which is very important from an Assurance point of view, as the decision makers rely

on these data for making strategic decisions. In the event of any inconsistencies, impurity in the data, there is every likelihood of a wrong decision by the management.

Effectiveness: Effectiveness implies knowledge of user needs. To evaluate whether a system reports information in a way that facilitates decision making by its user, Auditors must know the characteristics of the users and the decision-making environment.

Efficiency: Efficiency from an Auditor's perspective is doing an effective job using minimum resources

We can now safely deduce that the knowledge of Information Technology per se will not be sufficient for an Auditor to certify the above objectives. Firstly, the Auditor should have knowledge of Traditional Auditing, which contributes to Internal Control Practices and overall Control philosophy. Another contributor is the Information System Management, which provides methodologies necessary to achieve successful design and implementation of systems.

The field of behavioural science/organisational behaviour provides questions and analysis as to when and why Information Systems are likely to fail because of people problems. Finally, the field of computer science contributes the knowledge about concepts, discipline theory, and the formal models that underline hardware and software design as a basis for maintaining data integrity. To again quote Ron Weber on the knowledge requirement of IS Auditors " Auditors should be better at business than the clients"

Benefits of IS Audit

Information System Auditors are regarded as Control Advocates and the importance of Control in the organisation can never be ignored. In the entire lifecycle of software and hardware, Auditors have to perform very important duties, which result in several benefits to the organisation including:

Mapping Business Control with IT Application

Whether the IS Auditor should be involved at the project stage of the application or not is a matter of debate but from the Control perspective it is always better to involve the Internal Auditor at the project stage. S/he can help in ensuring that necessary controls are built into the system at the development stage itself. However, the same

Auditor should not be allowed to conduct a post implementation review/audit of that application.

Business Process Re-Engineering

The basic difference between automation and computerisation is that in the case of automation, the existing manual process is automated using computers whereas in the case of computerisation, the manual process is reengineered and then automated using computers. In the latter case, while the absorption of IT is better, there is a likelihood of some basic Controls being missed or forgotten, which can have some strategic impact on the organisation. It's for this reason that the IS Auditor should be a part of the BPR exercise to ensure that the basic Controls required for the business exist in the reengineered processes.

The IT Security Policy

As an IS auditor travels the length and breadth of an organisation, s/he is able to see and verify which parts of the Policy are being complied with and offer suggestions on improving compliance or making suitable updates to the Policy. The IS Auditor also comes across systems or situations that are not adequately addressed in the policy and offers guidance. An active IS Audit function can make the difference between an effective, living IT Security Policy and a dormant decorative document.

Security Awareness

An effective IS Auditor increases Security awareness and compliance with Security measures whenever s/he deals with IT users during his/her reviews. This high-level of awareness helps keep mischief-makers at bay. This also provides better motivation to security officers and system administrators to do their jobs effectively. Consequently, business continuity preparedness also remains at a higher level.

Better Return On Investments

The IS Auditors today are concerned not just with Security and Controls, but with IT governance, which includes performance measurement, value for IT investments and alignment of IT and business. An involved IS Auditor realises that IT is often strategic to the business and focuses on the objectives that make a significant difference to the business. When an IS Auditor reaches this stage of his/her work after taking care of Security and Controls, the value added to the organisation can be significant.

Risk Management

The domain of IS Auditing is now getting more aligned towards the domain of Risk Management and as such the role of an internal IS Auditor is perceived as a Risk Management professional more so in the matter of Operational Risk. And there is no denying the fact that the key to an enterprise's success is appropriate Risk Management.

A Changing Role

As business models and technologies continue to change at an incredible pace, so must the role of the Auditor. Technology evolution and new business models based on outsourcing, downsizing and decentralisation have taken businesses and the audit profession through several changes during the last 20 years. The following chart depicts the changing role of an Auditor.

Traditional Approach	New Approach
Detection	Prevention
Policeman	Business Partner
Audit Focus	Business Focus
Cost Focus	Customer Focus
Functional Focus	Process Focus
Career Auditor	Career Risk Manager
Hierarchical	Team
Quill Pen	Technology

The Technology Impact

As technology evolves, the Auditor is required to anticipate the strategic direction of IT and the effects these directions and consequently detailed implementations, may have on business objectives. Perhaps the most critical area here is when the Auditor faces delicate political issues when s/he identifies weaknesses in the highest strategic planning processes. Moreover, the IT Auditor's job is becoming more difficult because the pace of IT deployment has picked up as companies work to roll out Internet projects in Internet time.

As Auditors attempt to deal with these new difficulties, they also are attempting to erase the image of the Auditor as the "IT Police" from the minds of business and IT professionals. The Auditor now has a key role in achieving business objectives as a business partner.

What is COBIT?

A major challenge for the Auditors has been the lack of a common framework to work with. This problem was first addressed with the release of the COBIT (Control Objectives for Information and related Technology) Framework by the IT Governance Institute, USA, sponsored by the Information System Audit and Control Association (ISACA), as an evolving international basis for Audit Planning, Management Requirements, Discussion and Agreement. However, Auditors found that they needed a clear alignment with the institutional or corporate objectives.

IT Governance and Auditors

In order to achieve the business objectives, a common ground of proactive discussion among Auditors, the IT Management and the Board needs to be reached. COBIT (3rd Edition) and the IT Governance Framework, developed by the IT Governance Institute, address these issues through several supporting tools and mechanisms.

These mechanisms have evaluated and defined the role of the Auditor within IT governance. The IT governance activities are mapped with 34 objectives, one for each of the IT Processes. These processes are grouped into four Domains viz., Planning and Organisation, Acquisition and Implementation, Delivery and Support, and Monitoring

COBIT as a standard for IT Security and Control Practices is not only meant for the Auditors but also for the Management, Users etc. In fact, from a tool of Security and Control Practices, it has evolved as an IT Governance Tool and is helpful for the:

- **Management:** To help them balance Risk and Control investments in an often unpredictable IT environment
- **Users:** To obtain assurance on the Security and Control of IT services provided by internal and third parties
- **Information System Auditors:** To substantiate their opinions and/or provide advice to the management on internal Controls

CIT 2004

7TH INTERNATIONAL CONFERENCE ON INFORMATION TECHNOLOGY

CALL FOR PAPERS

CIT 2004, the 7th International Conference on Information Technology, being hosted by the Institute for Development and Research in Banking Technology (IDRBT), University of Hyderabad (UH), and International Institute of Information Technology (IIIT), will be held in Hyderabad, India, from December 20-23, 2004. The Conference aims at providing a high quality forum for scientists and engineers from various disciplines to present their latest research findings on all topics in the area of Information Technology. Although the natural focus will be on Computer Science and Information Technology Issues, we welcome research contributes from Management, Business and other disciplines.

Authors are invited to submit original unpublished manuscripts that demonstrate current research in areas of Information Technology. Topics of interest include but are not limited to:

- Network Computing, Mobile and Wireless Computing
- Internet and WWW-Based Computing
- e-Commerce and Mobile Commerce
- Payment Systems
- Information and Network Security
- Fault-tolerance and Reliability
- Neural Network and Genetic Algorithms
- Fuzzy Logic and Rough Sets
- Intelligent Computing and Knowledge Management
- Bioinformatics and Computational Biology
- Signal and Image Processing and Pattern Recognition
- Parallel and Distributed Systems
- Embedded and Real Time Systems
- Databases and Data Warehousing
- Information Systems

- Impact of Information and Communication Technologies on Education and Society

SUBMISSIONS: Authors are invited to submit full papers in PDF, Postscript or MS-Word RTF electronically to cit2004@idrbt.ac.in with subject header CIT 2004 along with the Abstract, indicating the paper's title, authors, authors' addresses, and topic areas, as well as the e-mail address of the contact author. The papers must be in English and submitted in LNCS Format. (<http://www.springer.de/comp/lncs/authors.html>). Papers should not exceed 10 pages (i.e. 10 LNCS formatted pages).

Papers will be reviewed by the Program Committee and judged according to their originality, technical merit and clarity of presentation. The review will be blind. Papers on similar work may be submitted to another scientific event, but, if selected, authors must choose only one event. All accepted papers are likely to be published in "Lecture Notes in Computer Science" (LNCS) by Springer Verlag.

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Parallel Tutorials will be organized along with CIT 2004. Proposals are solicited for Tutorials to be held at the conference. Interested individuals should submit proposals electronically by May 31, 2004 to cit2004@idrbt.ac.in. The proposal should include a brief description of the intended audience, a lecture outline, and a vita for each lecturer.

Deadlines

May 24, 2004	: Abstract Submission Due
May 31, 2004	: Conference Full Paper Due
May 31, 2004	: Tutorial Proposal Due
July 26, 2004	: Notification of Acceptance
August 30, 2004	: Camera-Ready Paper Due

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