



# JAIIB/DBF

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# MODULE C

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# PAPER-1 PDF

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# MODULE C – BANKING TECHNOLOGY

## JAIIB/DBF Paper 1

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## Unit 1- Essentials of Bank Computerization

### Bank Computerization

The **Concept of Bank Computerisation** Practically stated after 1980-81 and more precisely gained pace in the year 1983-84, after setting up a committee in the year 1983 under the chairmanship of the then Deputy Governor of RBI, **Dr. C. Rangarajan**. This Committee was set up to study the possibilities and stages involved in bank computerisation and to prepare guidelines for the same. The report submitted by the committee in the year 1984 was know as **First Rangarajan Committee Report on bank mechanization**.

Another Committee was constituted in 1988 was know as first Rangarajan Committee Report on bank mechanization.

### **Need for Computerisation**

The four Major objectives of computerization in banking are to improve

- Customer Service

- Housekeeping
- Decision- making
- Productivity and profitability

## **Stand- Alone Computer System**

Using the stand- Alone computer system is normally the initial stage of computerization at a bank. The single user- computer system is a small system, which as its name implies, is used by only one person at a time.

## **Multi- user System**

The Multi-user systems, as their names signify, are computers to which several people can access at the same time. Mini computers, Main Frame Computers, Micro- Computers and the more powerful Super Computers all fall under this category.

## **Network**



### **LAN (Local Area Network)**

A Local Area Network (LAN) is a group of computer and peripheral devices which are connected in a limited area such as school, laboratory, home, and office building. It is a widely useful network for sharing resources like files, printers, games, and other application. The simplest type of LAN network is to connect computers and a printer in someone's home or office. In general, LAN will be used as one type of transmission medium.

It is a network which consists of less than 5000 interconnected devices across several buildings.

### **Characteristics of LAN**

Here are important characteristics of a LAN network:

- It is a private network, so an outside regulatory body never controls it.
- LAN operates at a relatively higher speed compared to other WAN systems.
- There are various kinds of media access control methods like token ring and ethernet.

### **Advantages of LAN**

Here are pros/benefits of using LAN:

- Computer resources like hard-disks, DVD-ROM, and printers can share local area networks. This significantly reduces the cost of hardware purchases.
- You can use the same software over the network instead of purchasing the licensed software for each client in the network.
- Data of all network users can be stored on a single hard disk of the server computer.
- You can easily transfer data and messages over networked computers.
- It will be easy to manage data at only one place, which makes data more secure.
- Local Area Network offers the facility to share a single internet connection among all the LAN users.

### Disadvantages of LAN

Here are the important cons/ drawbacks of LAN:

- LAN will indeed save cost because of shared computer resources, but the initial cost of installing Local Area Networks is quite high.
- The LAN admin can check personal data files of every LAN user, so it does not offer good privacy.
- Unauthorized users can access critical data of an organization in case LAN admin is not able to secure centralized data repository.
- Local Area Network requires a constant LAN administration as there are issues **related to software setup and hardware failures**

### Network Device

There are various network Devices used in a LAN, The basic network devices used in a LAN are

- NICs (Network Interface Cards)
- Hubs
- Switches
- Bridges
- Routers
- Gateways
- Firewalls
- WAPs
- Modems etc.

### WAN (Wide Area Network):

WAN (Wide Area Network) is another important computer network that which is spread across a large geographical area. WAN network system could be a connection of a LAN which connects with other LAN's using telephone lines and radio waves. It is mostly limited to an enterprise or an organization.

### Characteristics of LAN:

- The software files will be shared among all the users; therefore, all can access to the latest files.
- Any organization can form its global integrated network using WAN.

### Advantages of WAN

Here are the benefits/ pros of using WAN:

- WAN helps you to cover a larger geographical area. Therefore business offices situated at longer distances can easily communicate.
- Contains devices like mobile phones, laptop, tablet, computers, gaming consoles, etc.
- WLAN connections work using radio transmitters and receivers built into client devices.

### Disadvantage of WAN

- The initial setup cost of investment is very high.
- It is difficult to maintain the WAN network. You need skilled technicians and network administrators.
- There are more errors and issues because of the wide coverage and the use of different technologies.
- It requires more time to resolve issues because of the involvement of multiple wired and wireless technologies.
- Offers lower security compared to other types of networks.

## Uninterruptible power supply (UPS)

An uninterruptible power supply (UPS) is a device that allows a computer to keep running for at least a short time when the primary power source is lost. UPS devices also provide protection from power surges.

A UPS contains a battery that "kicks in" when the device senses a loss of power from the primary source. If an end user is working on the computer when the UPS notifies of the power loss, they have time to save any data they are working on and exit before the secondary power source (the battery) runs out. When all power runs out, any data in your computer's random access memory (RAM) is erased. When power surges occur, a UPS intercepts the surge so that it does not damage the computer.

## **Core Banking Solution**

### **What is the Core Banking System?**

**Core Banking solutions are vital to the day-to-day functioning of any bank.** It is an integral part of the banking technology which aims to serve **their clients and customer with the best services.** In simple words, core banking solutions are account-management back-end and front-end processes.

Core is short for “Centralized Online Real-time Exchange.” As the name suggests, it is a centralized system or a network created by a bank and its branches. This allows the customers of the bank to access, manage and perform basic transactions from any branch of the bank they hold an account in. Thus, core banking software allows the banks to create a centralized data center.

### **Core banking solutions offer the following advantages to the bank:**

- Improved operations which address customer demands and industry consolidation
- Errors due to multiple entries eradicated
- Easy ability to introduce new financial products and manage changes in existing products
- Seamless merging of back office data and self-service operations.

### **Features of Core Banking Solution:**

- Customer-On Boarding.
- Managing deposits and withdrawals.
- Transactions management
- Interest. Calculation and management.
- Payments processing (cash, cheques /checks, mandates, NEFT, RTGS etc.).
- Customer relationship management (CRM) activities.
- Designing new banking products.
- Loans disbursal and management.
- Accounts management
- Establishing criteria for minimum balances, interest rates, number of withdrawals allowed and so on.

## Unit 2- Payment System and Electronic Banking

### Electronic Payment system

E-payment system is a way of making transactions or paying for goods and services through an electronic medium without the use of check or cash.

### **Automated Teller Machines (ATM)**

The Automated Teller Machine, or ATM, enables people to withdraw and deposit money from their bank accounts using machines.

The **Committee headed by Dr. C. Rangarajan** recommended the setting up of ATM in India.

#### **ATM Models in India:**

- Online
- Offline
- Stand-alone
- Networked

### **HWAK (The Intelligent Auto-teller and Netware Management System)**

Intelligent auto-teller systems are a special breed of auto-teller machines capable of thinking for themselves, that means they are fast, impose less demands on your banking systems and serve the customers more like a personal banker than less sophisticated auto teller systems.

HWAK provides unsurpassed service even without benefit of a reliable communication network.

#### **Benefits of HWAK are:**

- Customer satisfaction.
- High availability
- Online and offline auto-recovery
- Anytime full banking service
- Low cost, shorter queues and less number of tellers with ease of use
- Quick and early implementation

- Enhanced security and audit control
- Network management
- Predictable cost of ownership
- Comprehensive 'One Stop' autobanking.

### **White Label ATMs (WLA)**

Automated Teller Machines (ATMs) set up, owned and operated by non-bank entities are called "White Label ATMs" (WLAs). They provide the banking services to the customers of banks in India, based on the cards (debit/credit/prepaid) issued by banks.

#### **Key facts related:**

- Non-bank entities shall commence setting up and operating WLAs only after it has been authorised to do so by the RBI under the **Payment and Settlement Systems Act, 2007**.
- Taking over of ATMs operated by banks would not be permitted. Entities may ensure to draw a strategic plan for installation of such WLAs based on the criteria set during authorization. White Label ATM Operators (WLAO) may also indicate the value added services it proposes to offer at the WLA while seeking authorisation.
- WLAO is permitted to have more than one Sponsor Bank. All the transactions of WLAs serviced by this Sponsor Bank would be settled through it.
- Cash Management at the WLAs will be the responsibility of the Sponsor Bank, who may if required, make necessary arrangements with other banks for servicing cash requirements at various places.
- WLAO may establish connectivity with any of the authorised ATM Network Operators/ Card Payment Network Operators and ensure that the settlement of all the transactions at the WLAs shall be done only in the books of the Sponsor Bank through the ATM Network Operators/ Card Payment Network Operators with whom the WLAO has established connectivity.
- Maintenance and servicing of the WLAs shall be the sole responsibility of the WLAO.

#### **As per the new guidelines, it has been decided to allow:**

- The WLA Operators to buy wholesale cash, above a threshold of 1 lakh pieces (and in multiples thereof) of any denomination, directly from the Reserve Bank (Issue Offices) and Currency Chests against full payment.
- The operators to source cash from any scheduled bank, including Cooperative Banks and Regional Rural Banks.



- The operators to offer bill payment and Interoperable Cash Deposit services, subject to technical feasibility and certification by National Payments Corporation of India (NPCI).
- The display advertisements pertaining to non-financial products / services anywhere within the WLA premises, including the WLA screen, except the main signboard. However, it shall be ensured that the advertisements running on the screen disappear once the customer commences a transaction.
- Banks to issue co-branded ATM cards in partnership with the authorised WLA Operators and may extend the benefit of 'on-us' transactions to their WLAs as well.
- All guidelines, safeguards, standards and control measures applicable to banks relating to currency handling, and cyber-security framework for ATMs, shall also be applicable to the WLA Operators.

### **National Payment Corporation of India (NPCI)**

National Payments Corporation of India (NPCI), an initiative of the Reserve Bank of India (RBI) and Indian Banks' Association (IBA), is an umbrella organisation for operating retail payments and settlement systems in India.

NPCI has ten core promoter banks—State Bank of India, Punjab National Bank, Bank of Baroda, Canara Bank, Bank of India, HDFC Bank, Citibank, HSBC, and ICICI Bank.

The organisation functions under the provisions of the **Payment and Settlement Systems Act, 2007** in order to create robust payments and settlement infrastructure for India.

It is a non-profit organisation set up **under the provisions of Section 25 of Companies Act, 1956 (now, Section 8 of Companies Act, 2013)**. NPCI aims to provide infrastructure to the whole banking industry, both physical and electronic payment and settlements system.

### **Rupay Card**

**RuPay was introduced in 2012 by NPCI and functions within the domestic boundaries.** RuPay cardholders can use the service for ATM withdrawals, online transactions, and card payments. RuPay card has a comparatively lower processing cost and processing time in comparison to Visa and MasterCard. RuPay cards are available all over the country including urban and rural areas.

### **Benefits of RuPay Card**

A brainchild of RBI, RuPay is exclusively crafted to meet the needs and requirements of Indian customers. Here are some of the benefits that RuPay customers stand to get.

- **Security of Information Related to Indians:** Customer data and transaction details pertaining to RuPay card transactions will not be passed outside India.
- **Safe Transactions:** With SMS alerts and notifications that are sent to the customer's phone number after every transaction, RuPay cardholders can be ensured of a secure transaction.
- **Designed for India:** RuPay cards have been customized keeping in mind the product and service requirements of Indians.
- **Greater Reach in Rural Areas:** When it comes to the RuPay cards transactions, all the processing happens within the country. This results in lower cost of settlement and clearing for the transactions made using RuPay debit card. Banks will profit immensely from this as costs for transaction processing becomes affordable.
- **Greater Reach in Rural Areas:** Consumers in rural areas can easily apply and get a RuPay card.
- **Payment Solutions across Platforms:** RuPay debit card is designed to provide complete interoperability between payment channels including mobile technology, ATMs, cheques etc.

## Types of Plastic Cards

### **Plastic Cards**

#### **Debit Card**

Debit card is linked to the account of the cardholder i.e one who owns the cards. They are usually issued by Banks and financial institutions. When ones use a debit card the money is immediately deducted directly from one's account associated with the card. One can buy things as long as there is money in account. A debit card is a way to "pay now" Say you have Rs 10,000 in your account. The amount you can spend, or withdraw, through your card cannot exceed this limit.

#### **Credit Card**

Credit Card is a small plastic card that is issued by financial institutions such as banks. As the name Credit when one buys using credit card, one is buying by taking loan. One needs to pay back later(there are no free lunches in life!). There is a limit to which one can buy on a credit card. So, even if you have only Rs 10,000 in your account but your credit limit is Rs 50,000, you are free to spend up to Rs 50,000. You could also have Rs 1,00,000 in your account, but your credit limit is only Rs 50,000. You need to repay the amount bought on credit by a due date.

#### **Charge card**

Charge card carries all the features of credit cards. However, after using a charge card you will have to pay off the entire amount billed, by the due date. If you fail to do so, you are likely to be considered a defaulter and will usually have to pay up a steep late payment charge. In case of credit card, one can pay late payment fee if one misses the due date. Popular charge cards are American Express cards also called as Amex cards

### **Smart Card**

It contains an electronic chip that is used to store cash. There is no requirement of any signature, identification and payment authorization. The exact amount is deducted from the smart card during payment and is collected by the smart card reader machines.

### **Member Card**

A small card issued to and held by a member of a club, society or other organisation, verifying the member's membership for a given period.

Membership cards and discount offers are important elements of marketing programs designed to build customer loyalty. Consumers and business customers can apply for membership cards offered by companies that sell products or services that they buy frequently.

## **Electronic Banking**

Electronic banking has many names like e banking, virtual banking, online banking, or internet banking. It is simply the use of electronic and telecommunications network for delivering various banking products and services. Through e-banking, a customer can access his account and conduct many transactions using his computer or mobile phone.

### **Anytime Banking**

ATMs have eliminated the time limitations of customer service and offer a host of banking services, including deposit, withdrawals, requisitions, instructions and transfers.

### **Anywhere Banking**

With the introduction of ATMs and tele-banking, financial details can be accessed from remote locations and basic transactions can be effected even outside the bank.

### **Home Banking (Corporate and Personal)**

Home Banking Versus Online Banking Online banking is generally available for both individuals and small businesses. Additional services, such as certificates of deposit (CDs), and business, personal and mortgage loans, often still occur at physical branch locations.

### **Corporate Banking**

Remote Banking has become very popular among corporate customers especially big business/ industrial house which are already automated. More and More banks are providing customer terminals right in the customer's office, which facilitates the customers to operate the account without physically coming to the bank.

***At present, by utilizing remote banking facility, corporate customers will be able to get the following services:***

Getting their current balance or getting their statement of accounts for any pre-defined period

- Ordering cheque banks
- Ordering/ Transferring intra-bank and inter-bank fund transfers
- Instructing stop payments of cheques
- International remittances
- Opening letter of credits

## **Personal Banking**

Personal banking is a type of banking service and product line offered by banks to retail customers, that is consumers rather than businesses, intermediaries and institutions. Banks worldwide offer personal banking products that typically include savings and transaction facilities such as a bank transaction account, debit cards/EFT, an interest bearing floating account (savings account) and a fixed interest deposit account for a specific agreed period (certificates of deposit / term deposit) which can vary according to the bank. In addition it also includes debt facilities such as loans, mortgages and credit cards.

### **Example:**

The customers of personal banking services and products are commonly the general public that includes adult individuals, retirees, students, children who may be citizens, residents and non-residents depending on the requirements of the country or bank. While affluent individuals may also use personal banking services, they may also be offered private banking services by banks which can include more sophisticated services and investments.

### **Internet banking:**

Most online payments are done via internet banking option. It has become one of the most convenient payment methods for transferring money. Most banks have created their own apps that can be downloaded on the phone and used any time. Through mobile devices, users can make transactions through mobile apps, net banking facilities, or internet fund

transfer services such as IMPS (Immediate Payment Services), NEFT (National Electronic Fund Transfer), and RTGS (Real-time Gross Settlement).

## Mobile Banking

Mobile banking has simplified the lives of many people and given them the option to send money, receive money, check account balance, pay bills, etc. using their mobile phones. And the best part is that banks offer mobile banking services for free.

## Electronic Commerce (E-Commerce)

E-Commerce or Electronic Commerce means buying and selling of goods, products, or services over the internet. E-commerce is also known as electronic commerce or internet commerce. These services provided online over the internet network. Transaction of money, funds, and data are also considered as E-commerce. These business transactions can be done in four ways: **Business to Business (B2B), Business to Customer (B2C), Customer to Customer (C2C), Customer to Business (C2B)**. The standard definition of E-commerce is a commercial transaction which is happened over the internet. Online stores like Amazon, Flipkart, Shopify, Myntra, Ebay, Quikr, Olx are examples of E-commerce websites. By 2020, global retail e-commerce can reach up to \$27 Trillion.



## Cheque Truncation

**Section 6 of the Negotiable Instruments Act, defined cheque as “a bill of exchange drawn on a specified banker and not expressed to be payable otherwise than on demand”.** This section has been amended in September 2002 to include truncations and cheques within the definition of cheque.

## What is Cheque Truncation System?



Cheque Truncation System (CTS) is a cheque clearing system undertaken by the Reserve Bank of India (RBI) for quicker cheque clearance. As the term proposes, truncation is the course of discontinuing the flow of the physical cheque in its way of clearing. Instead of this an electronic image of the cheque is transferred with vital essential data. Cheque Truncation System brings elegance to the whole activity of cheque processing & clearing and offers numerous benefits to banks like time and cost savings, cost effectiveness, including human resource rationalization, business process re-engineering and enhanced customer service.

## Benefits of Cheque Truncation System




- Time, money and manpower expended on physical transfer of cheques from banks to clearing house are eliminated

- Clearing related frauds become less plausible
- Probability of cheques misplaced in transit is eliminated
- CTS is more advanced and more secure.
- It provides quicker clearance of cheques
- Reduces operational risk and risks related to paper clearing
- There are no extra charges levied for the collection of cheques drawn on a bank located within the grid, further providing no geographical restrictions.

## JAIIB Online Mock test with Explanation



JAIIB/DBF Paper I	Mock
<p style="text-align: center;">JAIIB/DBF Paper-I (Principle and Practices of Banking) Online Mock Tests</p> <p style="text-align: center;">Visit- <a href="http://test.ambitiousbaba.com" style="color: red;">test.ambitiousbaba.com</a></p>	<ul style="list-style-type: none"><li>• <b>Unit wise Mock</b>- 450 questions</li><li>• <b>Module Wise Mock</b>- 250 Questions</li><li>• <b>Full length Mock 5</b>- 600 Questions (Each Mock 120 Q)</li><li>• Case Study Mock</li><li>• Memory based Mock</li></ul> <p style="text-align: center;"><b>Total- 1500+ Questions</b></p>

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## Unit 3- Data Communications Networks and EFT Systems

### Data Communication Networks

Data communications helps in drastically cutting and the time involved in transferring data from the point of origin to the computer and information from the computer to the point of use.

## Components of Data Communications Networks

Data communications typically consists of various data communication components. When the components operate together for the sharing of resources, they are said to form a network. It has three basic components.

### Transmission Devices and Interface Equipment

The data is transmitted along the communication path between computer devices using electrical signals and bit sequences to represent number and characters.

**Modem:** A modem is a device or program that enables a computer to transmit data over, for example, telephone or cable lines. Computer information is stored digitally, whereas information transmitted over telephone lines is transmitted in the form of analog waves. A modem converts between these two forms.

### Transmission Medium

For Communications between computers, the data has travel through some medium during its transmission. The prevalent technologies for data communications media are terrestrial, microwave and satellites.

#### (a) Terrestrial Cables (Three types)

- Twisted Pair
- Coaxial Cable
- Optical fibre

**(b) Microwave systems:** A microwave system is a system of gear used for microwave data transmission. The typical microwave system includes radios located high atop microwave towers, which are used for the transmission of microwave communications using line of sight microwave radio technology.

**(c) Communication satellite:** A satellite is a body that moves around another body in a mathematically predictable path called an Orbit. A communication satellite is nothing but a microwave repeater station in space that is helpful in telecommunications, radio, and television along with internet applications.

A repeater is a circuit which increases the strength of the signal it receives and retransmits it. But here this repeater works as a transponder, which changes the frequency band of the transmitted signal, from the received one.

The frequency with which the signal is sent into the space is called Uplink frequency, while the frequency with which it is sent by the transponder is Downlink frequency.

### **Transmission Processors**

The Purpose of communication processors is to enhance is to data communication between two points. Communications processors can be broadly categorized as:

- Message Switches
- Multiplexers
- Front end processors

### **Modes of transmission**

- Simplex
- Half- Duplex
- Full Duplex

## **Network Scenario in India: Major Networks**

The Committees on communication networks for banks, set up in 1987 under the chairmanship of “**T.N Anantharam Lyer**” executive director, RBI, had strongly recommended for the establishment of a cooperative communication network especially for the banking industry.

### **INET**

INET was set up by the department of telephones in the year 1991. It is a fast, reliable, flexible and quite cost effective data communication network.

### **NICNET**

NICNET has been set up by the National Informatics Centre (NIC), a Government of India organization. It is India’s largest Wide Area Network (WAN). The Master Earth station is installed in New Delhi, to provide access to satellites and operates from around 2000 VSAT terminals.

### **INDONET**

It was set up by CMC Ltd. In the 1980 and was among the first countrywide networks in India.

### **RBINet**

After recognising the pressing need to harness information technology for intra-bank and inter-bank communications in the **1980s, RBI commissioned the BANKNET in 1991.**



***RBI Net is also being used by several departments of banks for various applications such as:***

- **Transmission of section 42(2) o the RBI Act, 1934, data** by commercial banks to regional offices of department of banking operations and development (DBOD) and furnishing of consolidated data by the regional offices of DBOD to central DBOD.
- Press relations division daily news summary of important financial matters.
- Department of economic analysis and policy macroeconomic indicators on a weekly basis.

## **Emerging Trends in Communications Networks for Banking**

### **RBI's VSAT Network**

The Indian Financial Network (INFINET) is a Closed User Group (CUG) Network for the exclusive use of Member Banks and Financial Institutions. It was set up by the Reserve Bank in 1999 through the Institute for Development and Research in Banking and Technology (IDRBT) Hyderabad. The Institute explored capability, methods, procedure to expand the network using a blend of communication technologies such as VSATs and Terrestrial Leased Lines. In order to have a careful combination of technologies in the INFINET, a Leased Line Network (LLN), connecting 21 major cities has been seamlessly integrated with it. The LLN is a mix of 2 Mbps and 64 Kbps lines. The LLN provides gateways to banks from each of these 21 cities. The Network Management System (NMS) of the LLN is located at the INFINET Hub at Hyderabad. The Backup NMS is located in the Main Office of RBI in Mumbai

Among various inter-bank and intra-bank applications ranging from simple messaging, MIS, EFT (Retail), Electronic Clearing Service (ECS) for both Credits and Debits, online dealing and trading in Government securities, Centralized Funds Management System (CFMS) for Banks and Financial Institutions, Anywhere banking/Anytime Banking (ATM), Inter-Branch Reconciliation, Structured Financial Messaging System (SFMS) and Electronic Funds transfer (RTGS/NEFT) System, transmission of Inter-city Cheque Realisation advices, government securities trading, and currency chest accounting are done through this service. VSAT technology service can also be used for one-way and/or interactive communications via satellite. Presently, the network consists of over 950 VSATs located in 127 cities of the country. All Banks and financial institutions in the country are eligible to become members of the INFINET.

## Internet

The Internet is a global network of networks. It is a system of computers which allows user computers exchange data, message, files etc.

- The Internet is a global network of networks. It is a system of computers which allows user computers exchange data, message, files etc.
- Serial Line Protocol (SLIP)
- Point to Point Protocol (PPP)

### **Internet Access Service**

- E-mail
- Usenet
- Gopher
- File Transfer Protocol (FTP)
- World Wide Web (WWW)

## **SWIFT (Society for Worldwide Interbank Financial Telecommunication)**

**SWIFT** message types are the format or schema used to send messages to financial institutions on the **SWIFT (Society for Worldwide Interbank Financial Telecommunication) network**. The original message types were developed by **SWIFT and retrospectively made into an ISO standard, ISO 15022**. In many instances, **SWIFT message types between custodians follow the ISO standard. This was later supplemented by a XML based version under ISO 20022**.

SWIFT India Domestic Services Pvt Ltd (“SWIFT India” or “the Company”), founded on similar principles, is a financial messaging services provider formed by SWIFT SCRL and Indian banks, for the domestic Indian financial community and by the community.

Through shared resources and capital, SWIFT India functions with the objective of enabling harmonised exchange of structured financial information between domestic participants in the domestic Indian community, thereby

(a) Reducing costs and risks,

(b) Expanding the reach of automated, standardised and secure exchange of information across the industry,

(c) Enabling new instruments, opportunities and markets for the industry.

### **Message types:**

- Real-time and bulk messages
- File transfer of structured and unstructured information

### **Security:**

- Role-based access control
- Maker-checker controls
- 3 layers of asymmetric encryption to ensure integrity, authenticity and confidentiality
- Hardware security modules
- Support for local Controller of Certifying Authorities (CCA) licensed public key infrastructure (PKI)

### **International and domestic standards:**

- Support for international ISO 15022 (MT) and ISO 20022 (MX) message formats, including domestic to international message transformation
- Support for local market practices and flows
- Support for local addressing schemes such as the Indian Financial System Codes (IFSC)

### **Value added message features:**

- Guaranteed delivery
- Delivery confirmation and non-delivery warning
- Broadcast messages
- Syntax and rule-book message validation
- Non-repudiation proof of message transmission in case of dispute
- Message retrieval for 124 days in case of messages lost or corrupted by either sender or receiver
- Store-and-forward for when counterparties are not online

### **Back-office integration for straight-through-processing**

- Message transformation
- Multiple protocols (including SOAP, MQ, file transfer, etc)
- Custom workflows

### Premium support

- Standard 24/7 online and phone support
- Native support by back-office certified partners and services providers across Core Banking System, Treasury System, Cash Management Systems, Retail and Corporate Banking Systems. Payments Middleware and Enterprise Resource Planning Systems.
- Other premium support features such as onsite support, pro-active network monitoring and health checks, coordinated business continuity exercises, and others. Visit Support & Training for more information.

### JAIIB/DBF Online Mock test with Explanation

JAIIB/DBF Paper	Mock Link
<p><b>JAIIB/DBF Paper-I (Principle and Practices of Banking) Online Mock Tests</b></p> <p><a href="http://test.ambitiousbaba.com">Visit-test.ambitiousbaba.com</a></p>	<ul style="list-style-type: none"> <li>• <b>Unit wise Mock- 450questions</b></li> <li>• <b>Module Wise Mock- 250 Questions</b></li> <li>• <b>Full length Mock 5- 600 Questions (Each Mock 120 Q)</b></li> <li>• <b>Memory based Mock</b></li> <li>• <b>Case Study Mock</b></li> </ul> <p style="text-align: center;"><a href="#">Click here -Mock Link</a></p> <p><b>Total- 1500+ Questions</b></p>
<p><b>JAIIB/DBF Paper-II (Accounting &amp; Financial for Bankers) Online Mock Tests</b></p>	<ul style="list-style-type: none"> <li>• <b>Unit wise Mock- 250+Questions</b></li> <li>• <b>Module Wise Mock- 200 Questions</b></li> </ul>

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### **Unit 4- Role Of Technology Upgradation and Its Impact on Banks**

#### **Trades in Technology Development**

The Advancements in software tools, computer hardware and telecommunications have shifted the focus of the banks towards computerization from data processing to information services.

- Data Warehousing
- Data Mining

#### **Data Warehousing**

##### **What is Data Warehousing?**

Data warehousing is the process of constructing and using a data warehouse. A data warehouse is constructed by integrating data from multiple heterogeneous sources that support analytical reporting, structured and/or ad hoc queries, and decision making. Data warehousing involves data cleaning, data integration, and data consolidations.

##### **Using Data Warehouse Information**

There are decision support technologies that help utilize the data available in a data warehouse. These technologies help executives to use the warehouse quickly and effectively. They can gather data, analyze it, and take decisions based on the information present in the warehouse. The information gathered in a warehouse can be used in any of the following domains –

- **Tuning Production Strategies** – The product strategies can be well tuned by repositioning the products and managing the product portfolios by comparing the sales quarterly or yearly.
- **Customer Analysis** – Customer analysis is done by analyzing the customer's buying preferences, buying time, budget cycles, etc.

- **Operations Analysis** – Data warehousing also helps in customer relationship management, and making environmental corrections. The information also allows us to analyze business operations.

## Integrating Heterogeneous Databases

To integrate heterogeneous databases, we have two approaches –

- Query-driven Approach
- Update-driven Approach

### Query-Driven Approach

This is the traditional approach to integrate heterogeneous databases. This approach was used to build wrappers and integrators on top of multiple heterogeneous databases. These integrators are also known as mediators.

#### Process of Query-Driven Approach

- When a query is issued to a client side, a metadata dictionary translates the query into an appropriate form for individual heterogeneous sites involved.
- Now these queries are mapped and sent to the local query processor.
- The results from heterogeneous sites are integrated into a global answer set.

#### Disadvantages

- Query-driven approach needs complex integration and filtering processes.
- This approach is very inefficient.
- It is very expensive for frequent queries.
- This approach is also very expensive for queries that require aggregations.

### Update-Driven Approach

This is an alternative to the traditional approach. Today's data warehouse systems follow update-driven approach rather than the traditional approach discussed earlier. In update-driven approach, the information from multiple heterogeneous sources are integrated in advance and are stored in a warehouse. This information is available for direct querying and analysis.

#### Advantages

This approach has the following advantages –

- This approach provide high performance.
- The data is copied, processed, integrated, annotated, summarized and restructured in semantic data store in advance.
- Query processing does not require an interface to process data at local sources.

## Functions of Data Warehouse Tools and Utilities

The following are the functions of data warehouse tools and utilities –

- **Data Extraction** – Involves gathering data from multiple heterogeneous sources.
- **Data Cleaning** – Involves finding and correcting the errors in data.
- **Data Transformation** – Involves converting the data from legacy format to warehouse format.
- **Data Loading** – Involves sorting, summarizing, consolidating, checking integrity, and building indices and partitions.
- **Refreshing** – Involves updating from data sources to warehouse.



## What is Data Mining?

Data mining is looking for hidden, valid, and potentially useful patterns in huge data sets. Data Mining is all about discovering unsuspected/ previously unknown relationships amongst the data.

It is a multi-disciplinary skill that uses machine learning, statistics, AI and database technology.

The insights derived via Data Mining can be used for marketing, fraud detection, and scientific discovery, etc

Data mining is also called as Knowledge discovery, Knowledge extraction, data/pattern analysis, information harvesting, etc.

## Business understanding:

In this phase, business and data-mining goals are established.

- First, you need to understand business and client objectives. You need to define what your client wants (which many times even they do not know themselves)
- Take stock of the current data mining scenario. Factor in resources, assumption, constraints, and other significant factors into your assessment.



- Using business objectives and current scenario, define your data mining goals.
- A good data mining plan is very detailed and should be developed to accomplish both business and data mining goals.

### **Data understanding:**

In this phase, sanity check on data is performed to check whether its appropriate for the data mining goals.

- First, data is collected from multiple data sources available in the organization.
- These data sources may include multiple databases, flat file or data cubes. There are issues like object matching and schema integration which can arise during Data Integration process. It is a quite complex and tricky process as data from various sources unlikely to match easily. For example, table A contains an entity named cust\_no whereas another table B contains an entity named cust-id.
- Therefore, it is quite difficult to ensure that both of these given objects refer to the same value or not. Here, Metadata should be used to reduce errors in the data integration process.
- Next, the step is to search for properties of acquired data. A good way to explore the data is to answer the data mining questions (decided in business phase) using the query, reporting, and visualization tools.
- Based on the results of query, the data quality should be ascertained. Missing data if any should be acquired.

### **Benefits of Data Mining:**

- Data mining technique helps companies to get knowledge-based information.
- Data mining helps organizations to make the profitable adjustments in operation and production.
- The data mining is a cost-effective and efficient solution compared to other statistical data applications.
- Data mining helps with the decision-making process.
- Facilitates automated prediction of trends and behaviors as well as automated discovery of hidden patterns.
- It can be implemented in new systems as well as existing platforms
- It is the speedy process which makes it easy for the users to analyze huge amount of data in less time.

### **Disadvantages of Data Mining**

- There are chances of companies may sell useful information of their customers to other companies for money. For example, American Express has sold credit card purchases of their customers to the other companies.

- Many data mining analytics software is difficult to operate and requires advance training to work on.
- Different data mining tools work in different manners due to different algorithms employed in their design. Therefore, the selection of correct data mining tool is a very difficult task.
- The data mining techniques are not accurate, and so it can cause serious consequences in certain conditions.

## **Role and Uses of Technology Upgradation**

Technology has allowed banks to offer much more to their customers like the facilities of card and telephone access, anytime and anywhere banking through 24hrs ATMs, credit card, debit card and POS (Point of sale) access. The technology has made it possible for the customers to have fingertip access to their accounts worldwide.

### **Data and Message Transferring**

- Electronic Data Interchange (EDI): Banks have been using EDI in the form of SWIFT messages.
- Electronic Mail

### **Corporate Websites**

- Dissemination of information
- Financial Advice
- To highlight non-banking activities
- A node for commerce
- Selling financial products
- Gateway to the Internet
- Account services

### **Management Information System (MIS):**

A management information system is an information system used for decision-making, and for the coordination, control, analysis, and visualization of information in an organization. The study of the management information systems testing people, processes and technology in an organizational context.

- Computer- based Information systems
- Decision Support Systems (DSS)

## Impact of 'IT' on Banks

- Changes in Organisational Structure and Orientation
- Impact on Service Quality (Changes In Customer Aspirations)
- Impact on Human Resources (Role Transition, Training Needs)
- Impact on Privacy and Confidentiality of Data

## Unit 5- Security Considerations

### Risk Concern Areas

The Customer Demands have triggered a fierce competition among banks and financial companies for the application of information technology in their operations to help them offer innovative products and services at reduced costs. This also helps those entering new geographical areas.

- **Data and software:** Data is critical resource, necessary for an organisation's continuing operations. Incorrect data can have serious implications in decision making, as well. The increasing availability and use of expert system and the potential impact erroneous data can result in playing havoc with an organisation's business.
- **Infrastructure:** Banks have to invest heavily for implementing technology- based tools and solutions. In addition to software and data, same hardware components are required for operations of the computer and communication systems.
- **Peopleware:** Peopleware refers to the group of persons directly or indirectly involved in managing and running the computerized systems.

### Different types of Threats

The threats to computerized system manifests in the form of business interruptions as under:

- Errors and omissions in data and software
- Unauthorised disclosure of confidential information
- Computer abuse and mis-utilisation of banks assets
- Computer/cyber frauds

**Accidental Damages:** Computers and communications systems have found their applications to be quite extensive in banking and other financial organisations. However, at the same time, these systems are vulnerable to damages caused accidentally, both due human failures and natural calamities.

- Environmental Hazards
- Human Error and Omissions
- Unreliable systems

**Malicious Damages:** Risk of malicious damages to computerized systems can be from disgruntled employees who wish to disrupt the services or from individuals with malafide intentions, using the technology for perpetrating fraud for financial gains.

- Interruptions in Services
- Frauds

## **Control Mechanism**

Implementation of effective control mechanism is required management of risks associated with the use of IT tools.

### **Physical Control**

### **Internal Control**

1. Accounting Control
2. Administrative Control

### **Operational Control**

1. Audit Trails (i) Accounting Audit Trail (ii) Operations Audit Trail
2. Checksum
3. Data Encryption

## **Computer Audit**

Banks can achieve effective, secure and reliable computer systems only through the use of appropriate control techniques discussed above. The control techniques selected, varies

from bank to bank, reflecting the particular risks within each bank and the costs of related security and control procedures.

A regular programme of independent tests of security and control procedures by auditors help in identifying lapses before the banking operations land into serious risk. The generic organizational function aimed at evaluation of the asset safeguarding, data integrity, system effectiveness, and system efficiency in computerized systems is termed as "Computer Audit".

### **Information System Audit (IS Audit)**

An information system (IS) audit or information technology (IT) audit is an examination of the controls within an entity's Information technology infrastructure. These reviews may be performed in conjunction with a financial statement audit, internal audit, or other form of attestation engagement. It is the process of collecting and evaluating evidence of an organization's information systems, practices, and operations. Obtained evidence evaluation can ensure whether the organization's information systems safeguard assets, maintains data integrity, and are operating effectively and efficiently to achieve the organization's goals or objectives.

#### **Information Systems Audit Methodology**

**PHASE 1:** Audit Planning

**PHASE 2 –** Risk Assessment and Business Process Analysis

**PHASE 3 –** Performance of Audit Work

**PHASE 4:** Reporting

#### **Benefit of IS Audit**

It would identify the risks of exposure to an existing computerized environment. On Identification of the risks, remedial measure can be taken to protect the interests of an organisation.

It would deter people/employees/ users from indulging in corruption/ manipulation of data, frauds etc. An undesired activity will be detected through implementation of IS audit.

### **Information System Security (IS Security)**

Information systems security, also known as INFOSEC, is a broad subject within the field of information technology (IT) that focuses on protecting computers, networks, and their users. Almost all modern companies, as well as many families and individuals, have justified concerns about digital risks to their well-being.

#### **Need for IS Security**

- To Comply with law of the land and regulator's guidelines.
- To comply with business policy.
- To comply with business partner's requirements.

## **IS Security in Banking**

Banks must meet their customers requirement for security aspects in special way on many levels, whether it is with their saving, taking advantage of over-the counter services at a branch office, withdrawing money from the teller machines, making deposits via the cash recycling system, online banking etc.

## **Threats to IS Security**

- E-mail Viruses
- Phishing Attacks
- Hackers Attack
- Vishing
- Smishing

## **Evaluation Requirements**

The IT resources continuously undergo changes in the form of development of new applications, acquisition of new hardware, turnover of trained employees etc.

- Computer Hardware
- Computer Software
- Data
- Communication channels
- Disaster Recovery Management
- System Development Process

## **Legal Framework For Electronic Transactions**

At present, many legal provisions recognize the paper-based records and documents that should bear signature. Since, electronic commerce eliminates the need for paper-based transactions. Therefore to facilitate e-commerce, there was a need for enactment/amendment of necessary Law.

Indian Parliament enacted a comprehensive information Technology Bill, which received the Present's assent on 9 June 2000.

***Consequent upon the recognition given to the electronic records, electronic documents and electronic signatures, incidental amendments have also been made in the following Acts:***

- The Indian Penal Code, 1860
- The Indian Evidence Act, 1872
- The Banker's Bank Evidence Act, 1891
- The Reserve Bank of India Act, 1934

The Act purports to include the work "electronic record" along with the word "record"/"document" appearing generally in various sections of these act.






The amendment to Indian Penal Code, 1860, also states that for the purpose of the Section 466 (dealing with forgery of records) a "register" shall include any list, data or record of any entires maintained in the electronic form as defined in the IT Act 2000.

Bankers Books Evidence Act, 1891 redefines banker's books as ledgers, daybooks, cash books and account Books used in the ordinary business of the Bank.

The RBI act, 1934 has been amended by the IT act, 2000, empowering the central board to make regulations for fund transfers through electronic means between the banks or between the banks and other financial institutions.

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