CA INTER

EIS

MRN

(Master Revision Notes)

CA Saket Ghiria

Fully Updated & Revised

Including all Amendments

Comprehensive Revision Book

Exclusive For May 23 & Nov 23

Contents in Brief

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CA Saket Ghiria

Chapter No. 1 Automated Business Processes

Data, Information & Information System

Data

Raw & unorganized pieces of information which *do not convey any message as such.*

Information

It is the *processed form of data* which is meaningful & useful for the entity.

System

Group of *related components or elements* working together to achieve some common goal or objective like traffic system.

Information System

Meaning

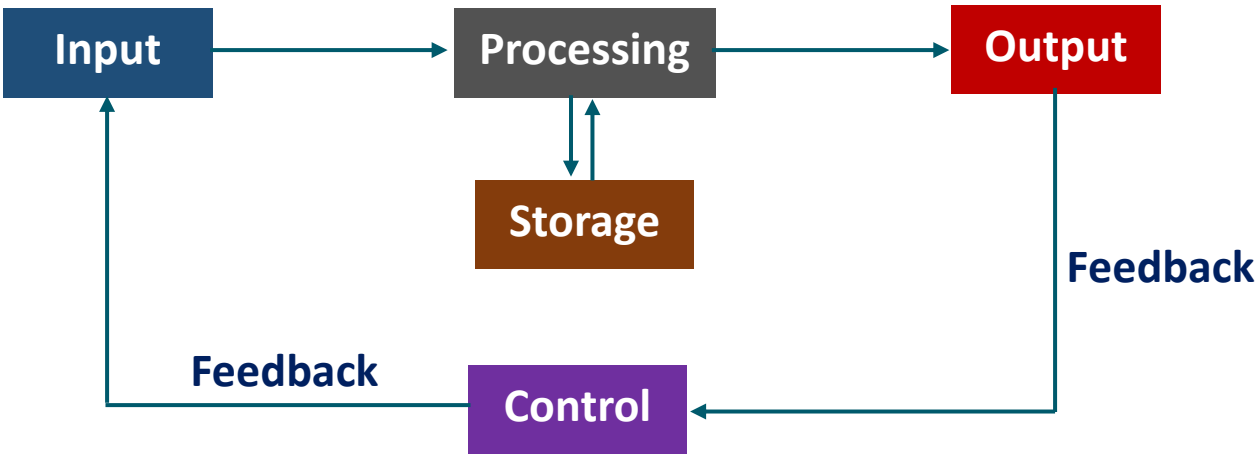
Mechanism which takes input, processes it & converts into output.

Functions/Steps

- Input
- Processing
- Output
- Storage
- Feedback & Control

Components/Resources

- People
- Hardware
- Software
- Data
- Network




Author's Note

To conduct business in this highly competitive environment, Organisation needs proper information regarding various factors. Hence to get these information on timely basis, Organisation should have effective information system

Enterprise Information Systems (EIS)

Meaning

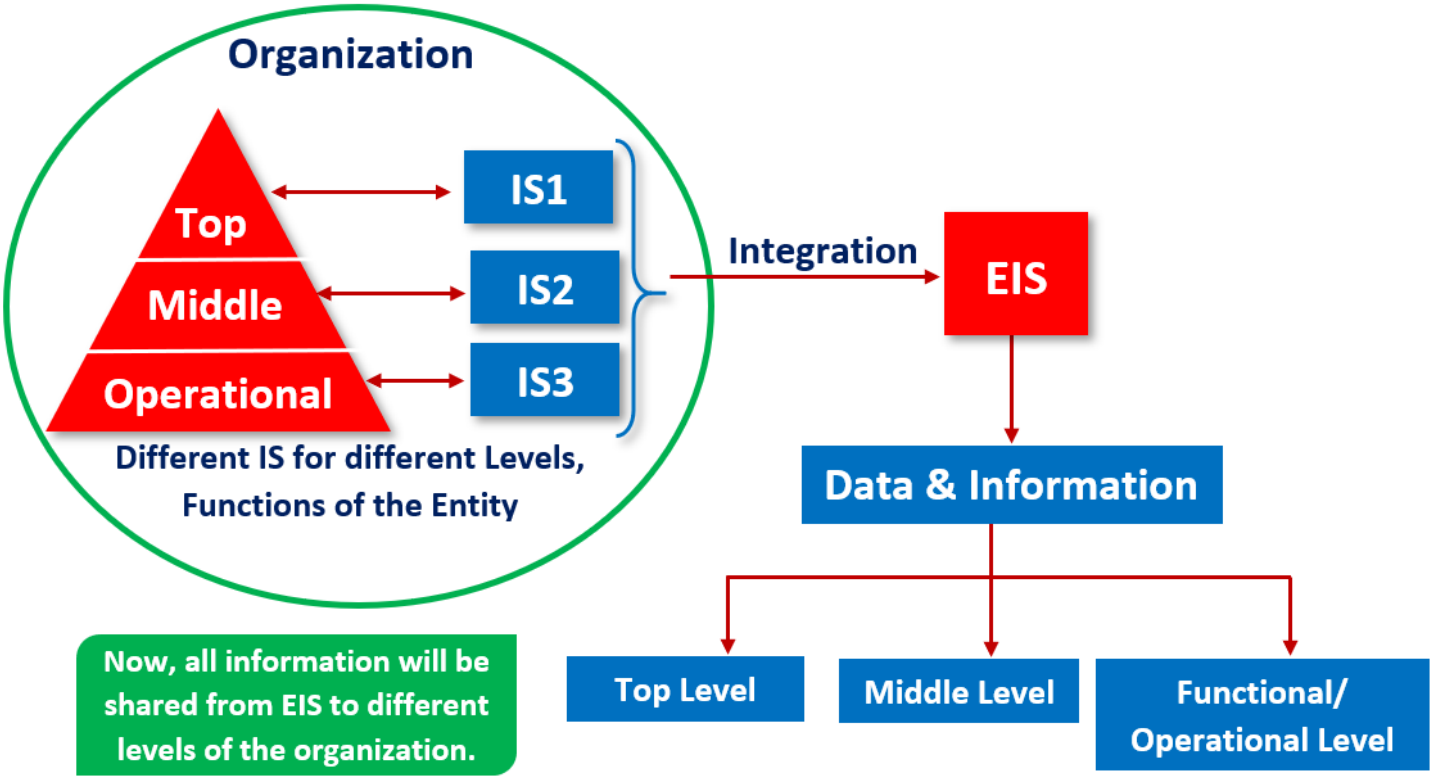
A *kind of information system which improves the functioning & efficiency of the enterprise business processes through integration*.

Scope

EIS is an *information system which is not for a single department or function but for the entire organization*. Through it, data & information will be provided to different departments, divisions, functions etc. of the entity.

Advantages

- Increases business productivity
- Increases operational efficiency
- Cost saving
- Reduces product development cycle time
- Reduces service cycle



With the increased globalization, expanding the size of the businesses and nature of the organisations becoming multi-businesses and multi-product, the emergence of EIS was inevitable (unavoidable).

Process/Business Process

Business process is an activity or set of activities that will accomplish a specific organizational goal. All business processes are *designed as per the vision & mission of the top management*.

Meaning

Co-ordinated & standardized flow of activities performed by people or machine which can traverse department or functional boundaries & achieve some business objective.

Accounting or Book Keeping Process

- Source Document
- Journal
- Ledger
- Trial Balance
- Adjustment
- Adjusted Trail Balance
- Closing Entries
- Financial Statement

Business Process Management (BPM)

Meaning

Systematic approach of improving various business processes of the organization.

3 E's

- Effectiveness
- Efficiency &
- Economy

How to Manage Process

- First define process, its steps & map steps involved.
- Then establish performance measures.
- Finally have organisational set-up for standardization of & adherence to process.

Categories of Business Process

Operational Process

Also called ***primary process***, it helps entity in producing product or rendering services & *represents core business & value chain of the entity.* Like

- O2C
- P2P etc.

Supporting Process

Also called ***secondary process***, it supports primary process & ***do not provide value to the customers directly***. E.g.

- HR Process
- Accounting Process
- Legal Process etc.

Management Process

Measures, monitors & controls activities related to business procedures & systems *but do not provide value to customer directly* but ***has direct impact on the efficiency of entity***. E.g.

- Internal Control
- Planning, Governance
- Decision Making etc.

Vision, Mission & Business Process

- **Vision & Mission** – Becoming No. 1 Auto Company in India for an Automaker.
- **Management Process** – Activities to be done to achieve the vision like entering into new market, launching new products, automation etc,
- **Support Process** – Activities like HR process, accounting system etc.
- **Operational Processes** – Actual implementation activities like production, purchase, marketing etc.

Author's Note

It is very important for the organization to properly manage all of its business processes on continuous basis so to gain competitive edge over the competitors in the marketplace. If the entity fails to evolve its business process regularly, the competitors will eventually outpace the entity in the market.

Automated Business Processes/Business Process Automation (BPA)

Meaning

Mechanism of *automating the business processes of the organisation* using the latest technology.

Success Criteria or Objectives

- Confidentially
- Integrity
- Availability
- Timeliness

Advantages

- Time saving
- Reduce cost
- Reduced Turnaround Time
- Improves operational efficiency
- Quality & consistency
- Visibility

TVQ Company did BPA that increases its IRR

Steps involved in BPA

(i) Define why we plan to implement BPA
(ii) Understand the Rules & Regulations
(iii) Document the process to automate
(iv) Define goals & objectives to be achieved
(v) Engage the Business process consultant
(vi) Calculate the ROI of the project
(vii) Development of BPA
(viii)Testing the BPA

Step-1. Define why we plan to implement BPA *(Generic Reasons)*

- Errors in manual process
- Poor customer services
- Payment process not streamlined
- Poor debt management
- Unable to recruit & train new employees
- Lack of management's understanding of business process

Step-4. Define the Goals to be achieved

- Specific
- Measurable
- Attainable
- Relevant
- Timely

Which Business Processes should be automated?

- Processes involving high-volume or repetitive tasks
- Processes requiring multiple people to execute tasks
- Time-sensitive processes
- Processes involving need for compliance and audit trail
- Processes having significant impact on other processes and systems

Challenges involved in BPA

- Automating Redundant Processes
- Defining Complex Processes
- Staff Resistance
- Implementation Cost

Risk & its Type

Meaning

As per ISO, Risk is *uncertainty in achieving objectives*. Risk is a potential harm caused if a threat exploits a vulnerability of entity. Risk is an event that may result in a significant deviation from a planned objective causing unwanted negative consequences.

Types of Risks

Business Risks

- Strategic Risk
- Financial Risk
- Regulatory Risk
- Operational Risk
- Hazard Risk
- Residual Risk

Technology Risks

- Multiplicity & complexity of system
- Different controls for different technologies
- Frequent changes or obsolescence of technology
- Proper alignment with business & regulatory requirements
- Dependence on vendors due to outsourcing of IT services
- Vendor related concentration risk
- Segregation of Duties (SoD)
- External Threats leading to cyber fraud

DVDPMSFE

Data Related Risks

- Data diddling
- Bomb
- Worm
- Rounding down
- Salami Techniques
- Christmas Card
- Spoofing
- Trap doors
- Asynchronous Attack
  - Data leakage
  - Subversive attacks
  - Wire – Tapping
  - Piggy backing

Risk Management

Meaning

Process of

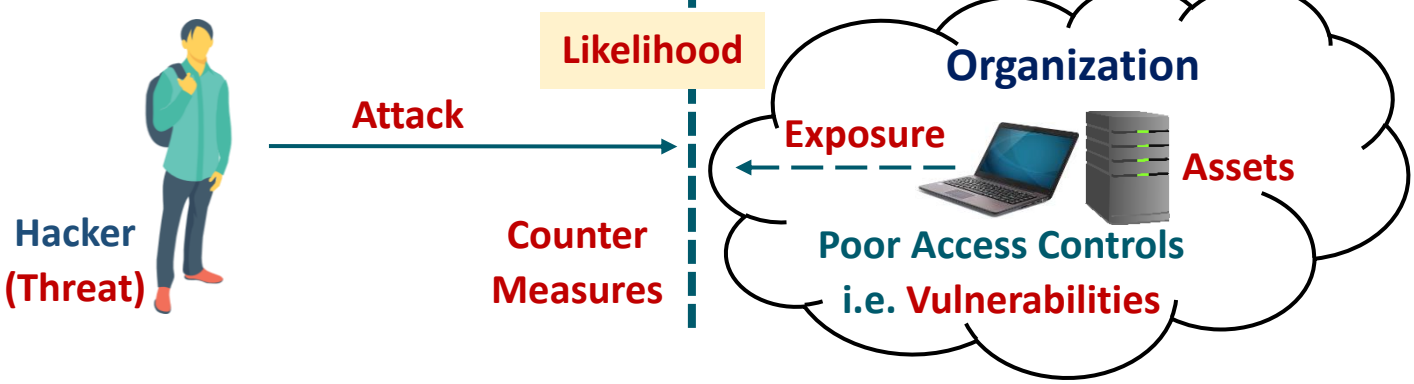
- Assessing risk
- Taking steps to reduce it to acceptable level &
- Maintaining it at that level

Related Terminologies

- Asset
- Vulnerability
- Threat
- Exposure
- Likelihood
- Attack
- Counter Measures

Risk Response Strategies

- Tolerate/Accept
- Terminate/Eliminate
- Transfer/Share
- Threat/Mitigate
- Turnback/Ignore



Asset	Something having value for the organisation like *data, information, hardware, software etc*. **Asset has following characteristics:** • Recognised to be of value for the organisation. • Not easily replaceable. • Forms part of organization's corporate identity. • Data & information asset are classified into proprietary, highly confidential or top secret.
Vulnerability	Refers to the weakness in the system or its safeguards that exposes the system to threats. ***Some of the examples are:*** • Poor physical access controls. • Poor logical access controls. • Weak or short passwords. • Bug or malicious codes in the software etc.
Exposure	Extent of loss entity has to suffer when a risk materializes.
Likelihood	Determines the probability of threat accruing & succeeding in achieving undesirable events.
Attack	Attempt to gain unauthorized access to system & compromise its CIA.
Counter Measure	Actions, devices, Procedure or Technique that reduces the vulnerability of component or system.
Threat	Any entity, circumstances or event having the potential to harm the system or component through unauthorized access, modification, destruction or denial or services etc.

Control & Internal Control

Definition

Policies, Procedures, Practices & Organization Structure *designed to provide reasonable assurance* that business objectives are achieved & undersigned events are prevented or detected & corrected.

Limitations of Internal Controls

- Cost may exceed benefits
- Defeating through collusion with employees etc.
- May not point out unusual transactions
- Person responsible abusing his responsibility
- Manipulations by management

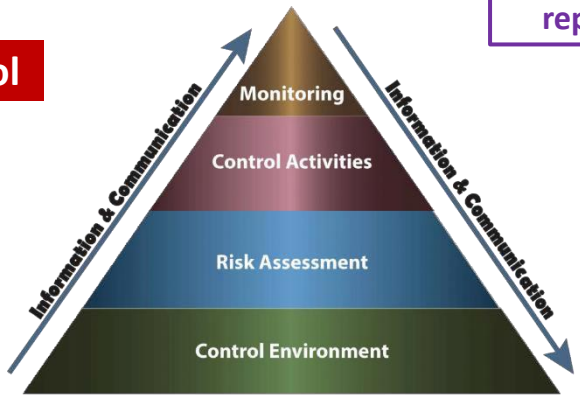
Internal Control as per SA-315

Process designed, implemented & maintained by those charge with Governance, Management & other personnel for:

- Effectiveness & efficiency of operation
- Safeguarding of assets
- Compliance with laws
- Reliability of financial reporting

Components of Internal Control

- Control Environment
- Risk Assessment
- Control Activities
- Information & Communication
- Monitoring of Controls



IT Control

Meaning

Controls implemented to mitigate IT Related Risks.

Its Objectives are:

- Enable entity to achieve goals
- Mitigate IT related Risk

Sample List of IT Controls

- Record of all log-in & log-out
- System access during stipulated hours & days only
- User time-out system
- Once end of the day process over, ledger opening with supervisory level password
- Posting in inoperative a/c, only with supervisory level password
- User access only specified data & file (RBAC)

Classification

General Controls

Also called infrastructure control, it applies in all system, component, process etc. of the organisation.

- *Information security policy*
- *Separation of Key IT Function*
- *CIA of software, data & file*
- *Management of system acquisition, implementation*
- *Change management*
- *Back-up, Recovery & Business Continuity*

Application Controls

Implemented in application software. *Some examples:*

- Data edit only for permissible fields
- Separation of functions
- Balancing of total
- Transaction logging
- Error reporting
- Exception reporting

Key Indicators of Effective IT controls

- Consistent availability and reliability of IT services
- Efficient use of customer support desk
- Ability to protect from threat & vulnerabilities
- Delivery of projects on time & within budget
- Ability to recover from disturbance of IT services
- Ability to allocate resources predictably

Enterprise Risk Management (ERM)

Meaning

Process designed by Entity's BOD, management & other personnel to apply in strategy setting & across the organization.

Benefits/Advantages

- Minimize operational surprise & losses
- Rationalize capital
- Links Growth, Risk & Return
- Align Risk Appetite & strategy
- Provides Integrated Response to Multiple Risk
- Seize Opportunities
- Enhances Risk Response Decisions

MR. LAPSE

ERM Framework

- Internal Environment
- Objective Setting
- Event Identification
- Risk Assessment
- Risk Response
- Control Activities
- Information & Communication
- Monitoring

Companies Act, 2013 Provisions

Directors Responsibility Statement [Section 134(3)]

a) Directors has taken proper & sufficient care for
   - Maintenance of accounting records
   - Safeguarding of assets
   - Prevention & detection of fraud etc.

b) Directors in case of listed companies laid down internal financial controls & they are adequate & operating effectively.

Powers & Duties of Auditors & Auditing Standards [Section 143(3)]

Auditors report shall state whether company has:
- Adequate internal financial controls in place &
- Operating effectiveness of such controls

ICAI'S Guidance Note

Auditor should plan & perform audit in such a way to determine ***whether any material weakness exists***. If yes then Internal financial controls cannot be said as effective.

Corporate Governance

Corporate Governance framework is intended to make sure that *BOD ensures accountability, fairness & transparency in the company's relationship with all its stakeholders*. Good Corporate Governance requires sound internal control practices, risk management & companies with laws & standards.

Corporate Governance framework consists of

- explicit & implicit contracts between the company & its stakeholders for distribution of rights, responsibilities & rewards.
- Procedures for reconciling the conflicting interest of different stakeholders.
- Procedure for proper supervision, control & information flow to serve as a system of checks & balances.

Risks & Control for Specific Business processes

Organization's Major Business Processes (Automation through software)

- Transaction
- Master
- Configuration

Risk & Threats

- General Ledger
- Fixed Assets
- Human Resource
- Procure to Pay
- Order to Cash
- Inventory

Risk impacts all & hence control is needed for all.

Controls/Internal Controls

- **USA & ROW**: ERM (8 Components)
- **INDIA**: Companies Act, 2013 & SA-315 (5 Components)

Levels at which Controls are Placed

Configuration

The way software system is set-up.

- *Password Management*
- *User activation & deactivation*
- *User access & privileges configuration*
- *Creation of customer type, vendor type etc.*
- *Defining access rules*

Master

Called Standing data, it defines how software will process the transaction.

- *Vendor Master*
- *Customer Master*
- *Material Master*
- *Employees Master*
- *Tax Master etc.*

Transaction

Actual Transaction entered into software, its approval & processing.

- *Purchase Transaction*
- *Sales Transaction*
- *Stock Transfer Transaction*
- *Payment Transaction etc.*

Bleeping Computer

Veeam fixes bug that lets hackers breach backup infrastructure

... exploit it to access backup infrastructure hosts after obtaining encrypted credentials stored in the VeeamVBR configuration database.

(I) General Ledger (GL) Process

Meaning

Process of recording the transactions in the system to finally generating the reports.

Steps Involved

- Entering financial transaction in the system
- Reviewing Transaction
- Approving Transaction
- Posting of Transaction
- Generating Financial Reports

GL Configuration – Risks & Controls

- **Accounts Mapping not upto date** – Account Mapping shall be upto date.
- **Adding/Deleting GL A/c not restricted to authorised persons** – It shall be restricted to authorised persons.
- **Unauthorised GL entries can be passed** – Access to GL entries shall be restricted to authorised persons.
- **Out of balance entries not prohibited** – Out of balance entries shall be prohibited.
- **Sources of all entries not known** – Sources of all entries are identifiable.
- **System functionally does not segregate posting & approval functions** – System shall have functionally to segregate posting & approval functions.

GL Masters – Risks & Controls

- GL Master File change report not generated by the system or not reviewed as necessary by the concerned person – Such report should be generated & necessarily reviewed by the concerned person.
- Standard chart of account not approved & not utilized within all entities of the corporation – Standard chart of accounts shall be approved by the management & utilized by all the entities of the corporation.

GL Transactions – Risks & Controls

- **GL balance not reconciled to sub-ledger balances & such reconciliation not reviewed by the concerned person** – Such reconciliation shall be made & reviewed by the concerned person.
- **Interrelated B/S & P&L A/c not reconciled** – They shall be reconciled to check accuracy of such accounts.
- **Account code & transaction amount not accurate & complete** – They shall be accurate & complete.
- **Actual to actual, actual to budget reports not produced** – These reports shall be produced & reviewed by controller & CFO.
- **Closing Entries not complete or accurate** – Closing entries shall be complete & accurate.

(II) Fixed Asset (FA) Process

Meaning

It is a process that ensures ***all the fixed assets of the entity are tracked for the purpose of accounting, maintenance, theft deterrence***.

Steps Involved

- Procuring asset
- Adding asset
- Adjusting asset
- Transferring asset
- Depreciating asset
- Disposing asset

FA Configuration – Risks & Controls

- **System access not restricted to authorised person** – System access shall be restricted to authorised persons only.
- **Depreciation rates, base etc. not specified** – Depreciation rates, base etc. are specified.

FA Masters – Risks & Controls

- **Invalid changes can be made to FA Master** – Only valid changes could be made to FA Master.
- **Changes to FA Master not accurate** – Changes to FA Master are accurate.
- **FA Master is not upto date** – FA Master remains upto date.
- **System access to FA Master not restricted to authorized persons** – System access to FA Master is restricted to authorized persons only.
- **Changes to FA Master not promptly processed** – All valid changes to the FA Master is promptly processed.
- **Valid changes to FA Master not input & processed** – All valid changes to FA Master are input & processed.

FA Transactions – Risks & Controls

- **FA acquisition not recorded accurately** – FA acquisition are accurately recorded.
- **FA acquisition not recorded in appropriate period** – FA acquisition are recorded in appropriate period.
- **All FA acquisition not recorded** – All FA acquisition are recorded.
- **Depreciation charges not accurately calculated & recorded** – Depreciation charges are accurately calculated & recorded.
- **FA disposal not recorded** – All FA disposals are recorded.
- **FA Maintenance activity records not upto date** – FA Maintenance activity records are upto date.

(III) Human Resource (HR) Process

Meaning

HR life cycle refers to HR Management and covers all the stages of employees time in an enterprise & the role HR department plays at each stage.

Steps Involved

- Recruitment & on-boarding
- Orientation & career planning
- Career development
- Termination or transition

HR Configuration – Risks & Controls

- System access to employee in excess to Job requirement – All employees are given system access in accordance to their job requirement (RBAC).
- Employees left the organisation continue to have system access – System access of the employees left the organisation are immediately removed.

HR Masters – Risks & Controls

- System access to Payroll Master not restricted to authorized persons only – System access to Payroll Master restricted to restricted to authorized persons only.
- Invalid changes made to Payroll Master – Only valid changes to be made in Payroll Master.
- Payroll Master is not upto date – Payroll Master is kept upto date.
- Valid changes made to Payroll Master not processed in timely manner – All valid changes made to Payroll Master is processed in timely manner.
- New employees not added to Payroll Master – All new employees added to Payroll Master.
- Addition to Payroll Master do not represent valid employees – Additions to Payroll Master represents only valid employees.

Note: HR – Transaction are not considered separately.

Consultancy.in
https://www.consultancy.in › news › tata-consultancy-...

Tata Consultancy Services hits milestone: 600,000 employees ...

15-Jul-2022 — Global IT services firm Tata Consultancy Services has hit a major company milestone, with headcount exceeded **600,000** for the first time in ...

SAP News Center

Vodafone Builds Its Future-Ready Workforce on Cloud HR Foundations

... using SAP SuccessFactors solutions for employee self-service, ensures that employees can access Vodafone's HR system from anywhere and...

(IV) Procure to Pay (P2P) Risks & Controls

Meaning

P2P process involves obtaining & managing raw material needed for manufacturing a product or providing services.

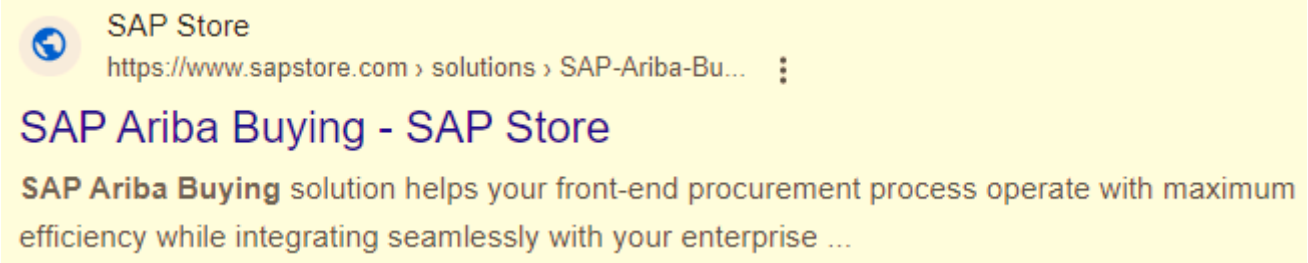
P2P Masters – Risks & Controls

- **System access to maintain vendor masters not restricted to authorized users** – System access to maintain vendor Master restricted to authorized users only.
- **Supplier Master file is not upto date** – Supplier Master file is kept upto date.
- **Unauthorized changes made to Supplier Master** – Only authorized changes made to Supplier Master.
- **Changes made to Supplier Master not correct** – All changes made to Supplier Master are correct.
- **All valid changes to Supplier Master not input & processed** – All valid changes are input and processed.
- **Changes to Supplier Master not processed in timely manner** – All valid changes made to Supplier Master processed in timely manner.

O2C Transactions – Risks & Controls

- **Unauthorized purchase requisitions ordered** – Only authorized purchase requisition are ordered.
- **Purchase orders issued not input & processed** – All valid purchase orders issued are input and processed.
- **All disbursements not recorded** – All disbursements are recorded.
- **Disbursements made for goods & services which are not received** – Disbursements are made only for the goods & services received.
- **System access to process transactions not restricted to authorized persons only** – System access to process transactions are restricted to authorized persons only.
- **Disbursements made to unauthorized suppliers** – Disbursements made only to the authorized suppliers.

Note: P2P Configuration are not considered separately.



(V) Order to Cash (O2C) Process Risks & Controls

Meaning

O2C Process involves receiving & fulfilling customer for goods and services.

Steps Involved

- Customer order
- Order fulfillment
- Delivery Note
- Invoicing
- Collections
- Accounting

O2C Masters – Risks & Controls

- **System access to Customer Master not restricted to authorized users** – System access to Customer Master shall be restricted to authorised users only.
- **Customer Master is not upto date** – Customer Master file data is kept upto date.
- **Invalid changes made to Customer Master** – Only valid changes can be made to Customer Master.
- **Changes made to Customer Master not accurate** – All changes made to Customer Master are accurate.
- **Changes made to Customer Master not processed in timely manner** – All *valid changes made* to Customer Master processed in timely manner.
- **Customer Master is not maintained property** – Customer Master file is maintained properly.

O2C Transactions – Risks & Controls

- **Goods shipped are not invoiced** – All goods shipped are invoiced.
- **Orders not approved by management as to price & terms of sale** – All orders are approved by management as to price & terms of sale.
- **Invalid & unauthorized orders are input & processed** – Only valid & authorized orders are input & processed.
- **Invoice raised for invalid shipments** – Invoices relates to only valid shipments.
- **Invoices not recorded in the system** – All invoices are recorded in the system.
- **Invoices are recorded in wrong period** – All invoices are recorded in the appropriate period.

Note: O2C configuration are not considered separately.

Business Today

Amazon, Flipkart revenues soar in FY21 as e-commerce sees aggressive sales

Flipkart India saw a revenue jump by 25 per cent in FY21 compared to FY20, to stand at Rs 43,357 crore. The company further reported a net loss...

(VI) Inventory Cycle – Risks & Controls

Meaning

Inventory cycle process tracks on-hand inventory level in an enterprise & helps business to ***Understand, Plan & Manage*** inventory level.

Process Involved

- Ordering Phase
- Production Phase
- Finished Goods & Delivery Phase

Inventory Cycle Masters - Risks & Controls

- **System access to maintain Inventory Master not restricted to authorized users –** System access to maintain Inventory Master restricted to authorized users only.
- **Invalid changes made to Inventory Master –** Only valid changes made in inventory Master.
- **Changes to Inventory Master not accurate –** Changes made to Inventory Master are accurate.
- **Inventory Master is not upto date –** Inventory Master are kept upto date.
- **Changes to Inventory Master not timely processed –** All valid changes to Inventory Master are timely processed.

Inventory Cycle Transaction - Risks & Controls

- **System access to process inventory related transactions not restricted to authorized users only –** Such access shall be restricted to authorized users only.
- **Raw material received not recorded accurately –** Raw material received are recorded accurately.
- **Raw material received & accepted without valid purchase order –** It shall be accepted only with a valid purchase order.
- **Shipments not recorded in the system –** All shipments recorded in the system.
- **Shipments not recorded accurately –** All shipments are recorded accurately.
- **Transfer of raw material to production not recorded accurately –** All transfer of raw material to production recorded accurately.

Note: Inventory cycle configuration are not considered separately.

S.N.	Section	Description	Fines & Penalties
1.	43	Damage etc. to Computer, Computer System, Computer Network	Compensation to the person affected
2.	66	Offences given u/s 43	Imprisonment upto 3 years & or Fine upto ₹ 1 lakh
3.	43A	Compensation for failure to protect data	Compensation to the person affected.
4.	65	Tampering with computer source document (Required to be kept under any law)	Imprisonment upto 3 years & or Fine upto ₹ 2 lakh
5.	66B	Dishonestly receiving Stolen Computer Resource or Device	Imprisonment upto 3 years & or Fine upto ₹ 1 lakh
6.	66C	Punishment for identity Theft	Imprisonment upto 3 years & or Fine upto ₹ 1 lakh
7.	66D	Cheating by personation	Imprisonment upto 3 years & or Fine upto ₹ 1 lakh
8.	66E	Violation of privacy	Imprisonment upto 3 years & or Fine upto ₹ 2 lakh
9.	66F	Punishment for cyber terrorism	Imprisonment which may external to lifetime imprisonment
10.	67	Punishment for publishing or transmitting obscene material in electronic form	First Conviction – Fine upto ₹ 5 lakhs & imprisonment upto 3 years Second Conviction – Fine upto ₹ 10 lakhs & imprisonment upto 5 years
11.	67A	Punishment for publishing or transmitting of material containing sexually explicit act,	First Conviction – Fine upto ₹ 10 lakhs & imprisonment upto 5 years Second Conviction – Fine upto ₹ 10 lakhs & imprisonment upto 7 years
12.	67B	Punishment for publishing or transmitting of material depicting children in sexually explicit act, etc. in electronic form	First Conviction – Fine upto ₹ 10 lakhs & imprisonment upto 5 years Second Conviction – Fine upto ₹ 10 lakhs & imprisonment upto 7 years

Non-Applicability of Section 67, 67A & 67B

- **Publication is for public good as it is in the interest of Science, Literature, art or learning or other object of general concern or,**
- **Kept or used for bonafide heritage or religious purpose.**

Privacy & Privacy Rules

Privacy Policy

- For Website
- For Email ID

IT Act, 2000 & Privacy

- Setting up regulatory authorities
- Defining data, information, computer database, e-form etc.
- Declaring any computer, computer system etc. as protected system
- Creating civil liability
- Creating criminal liabilities
- Imposing penalty etc.

Reasonable Security Practices & Procedures & Sensitive Personal Data or Information (SPDI) Rules, 2011

Applicability

Body corporate processing, dealing or handing any SPDI in any computer system *which it owns, operates or controls*.

Sensitive Personal Data or Information (Rue 3)

- Password
- Financial Information
- Physical/Physiological/Menta Health Conditions
- Sexual Orientation
- Medical Record & History
- Biometric Information

Consent to Collect (Rue 5)

Body corporate should, prior to collection, obtain consent in writing regarding the use of that data.

Body Corporate

Any company & includes Firm, Sole Proprietorship or other association of individuals engaged in commercial or professional activity.

Consent to Disclosure (Rue 6)

Discloser of SPDI requires prior approval.

Exceptions:

- Already Agreed
- Legal Obligation

Cyber Fraud & Cyber Laws (IT Act)

Meaning of Cyber Fraud / Crime

Fraud committed with the help of Computer & Technology.

Types of Cyber Fraud/Crime

- Computer Hacking
- Credit Card fraud
- Email A/C Hacking
- Harassment via fake profile on social media
- Online sale of illegal articles
- Theft of confidential information
- Phishing & Email scams
- Introducing Viruses, Trojans, Bugs
- Source Code Theft
- Web defacement
- Cyber terrorism

Advantages of Cyber Laws (IT Act)

- Companies can carry e-commerce
- Act addresses security issues
- Email considered as valid & legal form of communication
- Digital Signature got legal validity
- Concept of secured digital signature arises
- Govt. issue notification on web

Diagrammatic Representation of Business Processes

To control an organization & improve the various processes, it is very important to have a proper understanding of the processes. ***Mapping of business process is done to have a better understanding of such processes.*** Mapping is done to gather extensive information about the process, the various process flows, tasks performed, who is in-change thereof etc. ***Flowchart & Data Flow Diagram*** are two widely used business process mapping tools.

Flowchart

Advantages

- Quicker grasp of relationship
- Effective Analysis
- Efficient Coding
- Program Debugging
- Efficient program maintenance
- Communication

Meaning

A diagram that describes a process or operation of an organization through multiple steps.

Limitations

- Complex Logic
- Difficulties in Modification
- Reproduction is difficult

Data Flow Diagram (DFD) – DFD are used to graphically represent the flow of data in a business information system from one place to another. DFD describes the processes that are involved in a system to transfer data from input to storage & reports generation.

Chapter No. 2 Financial & Accounting System

System, Financial & Accounting System

System

System is *group of inter-related components working together to achieve some common goal or objective*. All system has:

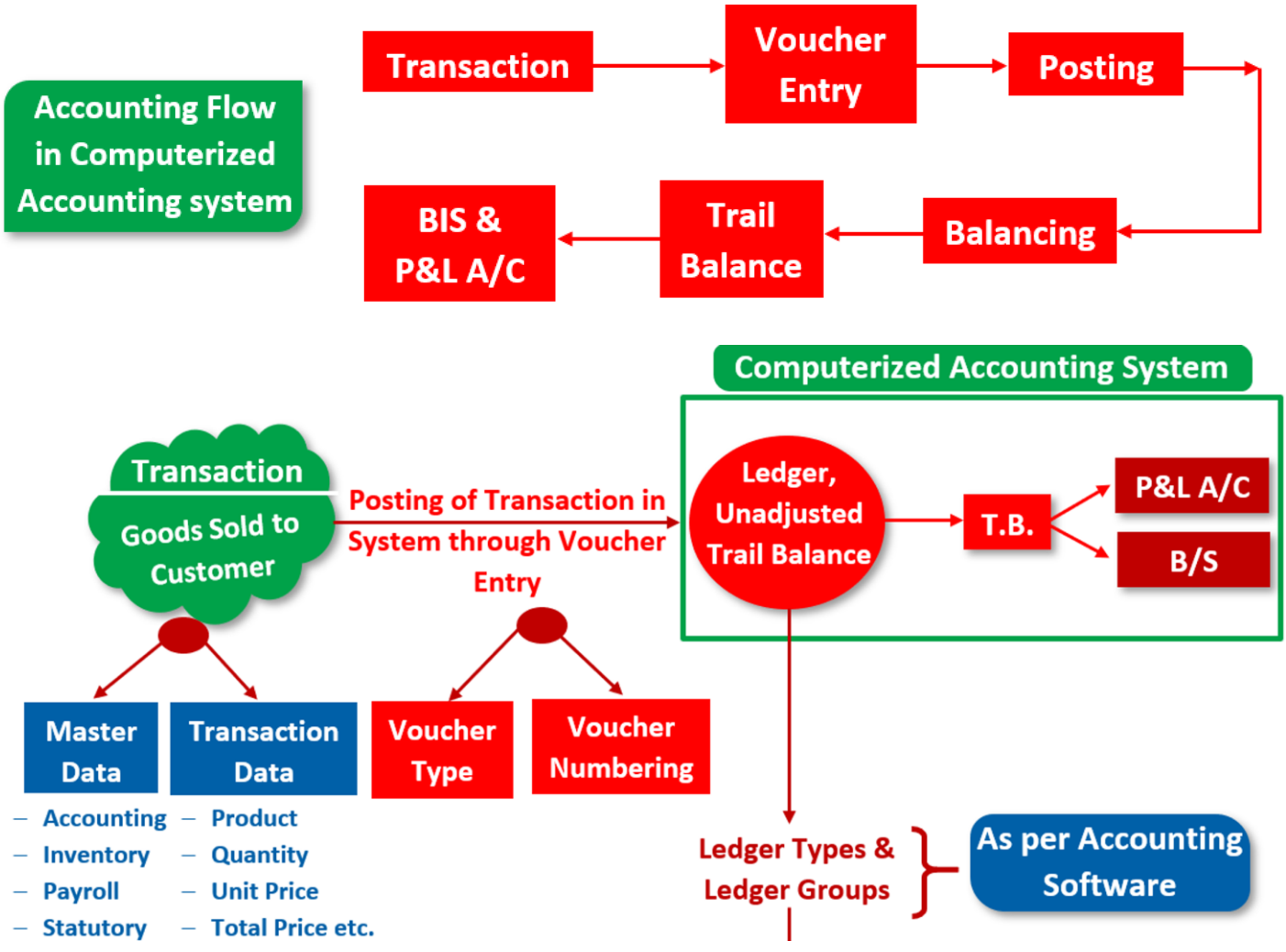
- Input, output & feedback mechanism
- Boundaries defined by system observers
- Mechanism to maintain internal steady state

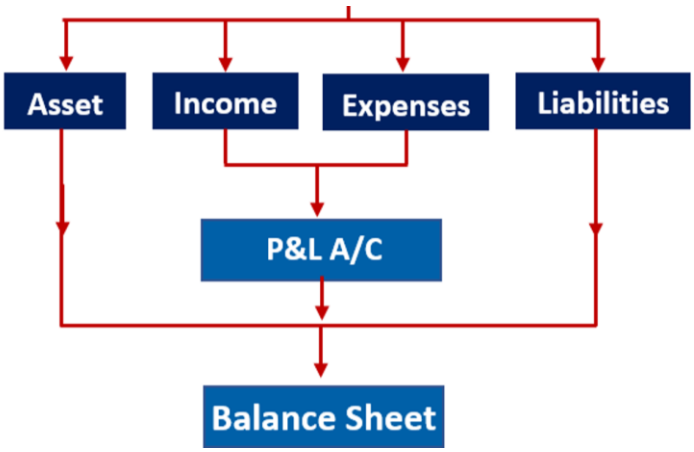
Financial & Accounting System

It is concerned with the financial & accounting aspect of the organization. *Requirements:*

a) Accountant – Preparation of P&C A/C & Balance-sheet with ease.
b) Auditors – Correctness of P&C A/C & Balance sheet.
c) Owners/Managers – Availability of required information at right time.

Concepts in Computerized Accounting System





Types of Data

Master Data

Relatively permanent data not expected to change very frequently. *In accounting system, following Master Data are used:*

- ✓ Accounting
- ✓ Inventory
- ✓ Payroll
- ✓ Statutory

Non-Master Data

Data which changes again & again and ***may be different for each transaction***. Like for a Sales Transaction,

- Product sold
- Units sold
- Unit price etc.

are transaction data.

Important Points

(a) Master data selected from available list & if not already available then first created then used, Non-Master Data is typed for each transaction.

(b) Master data entry done less frequently compared to Non-Master data.

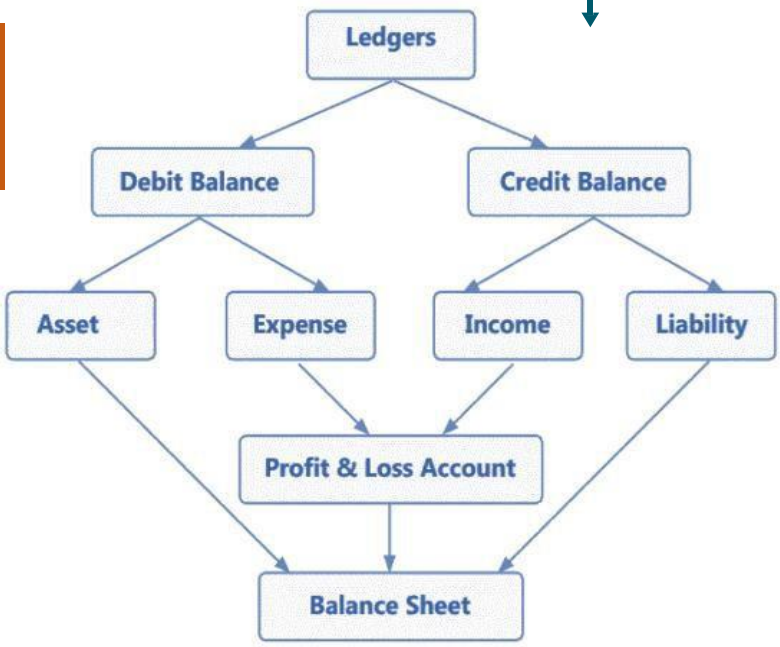
(c) All transactions relating to one master be taken at one place for reporting.

(d) Having proper control over Master & Non-Master data entry.

Ledger & Ledger Group

Introduction - Financial & accounting software does not classify ledger in Real, Personal & Nominal Ledger but as Assets, Liabilities, Income & Expense Ledger.

Classification - It is very important to have proper ledger classification as ***incorrect ledger classification can lead to errors in the financial statements***.



Vouchers

Types

Accounting Module

Voucher	Use
Payment	Payment to outside party
Receipt	Receipt of money
Journal	Non-Nash & Bank Transaction
Sales	Trading sales made
Purchase	Trading purchases made
Contra	Cash deposited or withdrawal from bank, cash transferred from one location to another or one bank A/C to another
Debit/Credit Note	Changes or correction in sale/purchase transaction
Memorandum	Record of transaction but not affecting trail balance

Inventory Module

Voucher	Use
Purchase Order	Purchase order raised
Sales Order	Sales order received
Stock Journal	Physical movement of stock
Physical Stock	Correction after physical stock counting
Delivery Note	Physical delivery of goods sold
Receipt Note	Physical receipt of goods purchased

Payroll Module

Voucher	Use
Attendance	Attendance of employee
Payroll	Salary calculation

Voucher Numbering

- Serially numbered
- Unique
- Separate
- Prefix, suffix or both
- Chronological order

Technical Aspect of Financial & Accounting Software

Introduction

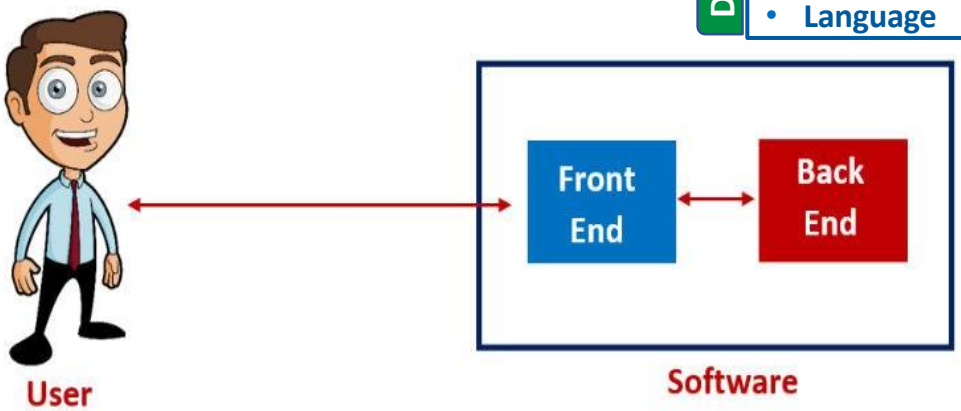
Any software is divided in two parts

- **Front End** – Interacts with user & acts as a link between user & back end.
- **Back End** – Carries out all the processing but do not interact with the users directly.

Reasons

Domain PLUS

- Domain Expertise
- Presentation
- User Experience
- Speed
- Language



Manner of Using Financial & Accounting Software

Installed Applications Approach

Software is installed on each user's device separately.

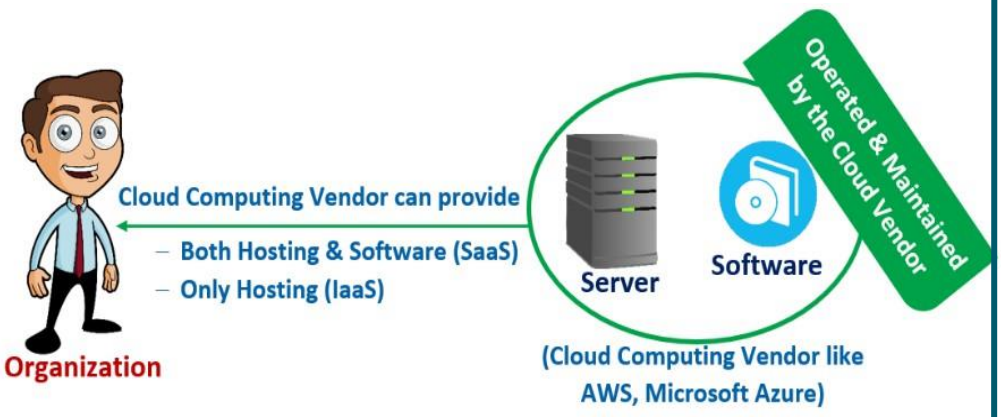
Web Applications Approach

Software is installed on a web server & users access the software through the network & web browser of their device. However, this approach is not widely followed.

Cloud-Based Applications

Cloud computing vendors like AWS, Microsoft Azure, etc.

IaaS – Only software hosting service provided
SaaS – Both software as well as hosting provided.



Difference between Installed & Cloud Based Applications

- Installation, Maintenance & Updation
- Accessibility
- Data Storage
- Data security
- Performance
- Flexibility
- Mobile Application

Non-Integrated System

Meaning

Data is maintained in the decentralized manner where each department will maintain their own data separately.

Issues

– Communication Gaps
– Data Mismatch

brandcritica.com
https://brandcritica.com › where-are-toyota-cars-made

Where are Toyota Cars Made? 31 Countries Revealed (2023)

Toyota cars are made in **31 countries** around the world. These countries include Japan, China, France, the North American and South American states, the United ...

Integrated/ERP System

Meaning

Integrates internal & external management information into a single integrated software application. ERP system is modular (made of different modules) and all modules are linked to central database. E.g. SAP R/3, Oracle 9i etc.

Advantages

- Information integration
- Reduction of lead-time
- On-time shipments
- Improved resource utilization
- Reduction in cycle time
- Increased flexibility
- Better customer satisfaction

Free & Open Source ERP software

- Open Taps
- J Fire
- Web ERP
- Open Bravo
- Post Books

RBAC in ERP System

Policy neutral access control mechanism that advocates that *access rights should be given to the employees based on their job requirements*.

Types of Access can be:

- ✓ Create
- ✓ Alter
- ✓ View
- ✓ Print

Note: RBAC can be implemented in the form of *Mandatory Access Control (MAC) & Discretionary Access Control (DAC).*

- **MAC – In MAC, access criteria are defined by the system administration, enforced by operating system & unable to be altered by the end users. Here a *central authority* regulates access rights based on multiple level of securities.**
- **DAC – It involves physical or digital measures & is *less restrictive than MAC*. It *offers Individual complete control* over the resources they own & they set the policies defining who can access it.**

Regulatory & Compliance Requirements

Meaning & Type

Regulatory compliance means *compliance by the organization with relevant rules, regulations applicable to it*. It is of two Types:

- General Compliance
- Specific Compliance

Regulatory Compliance & Accounting System

Regulatory compliance & Accounting system are closely interlinked. *Now entity has two options*:

- Use same software for both accounting & tax compliances.
- Use different software for accounting & tax compliance.

Basis	Single Software for Both	Exclusive Software for Tax Compliance
Ease of software operation	Less	More
Features & Facilities	Less	More
Time & effort required	Less	More
Cost	More	Less
Accuracy	More	Less

Risk & Controls Related to ERP Implementation

People Aspect

ERP implementation involves many people *like Employees, Management, Implementation Team, Consultants & Vendors*. *Major aspects are:*

- Change Management
- Training
- Top Management support
- Staff Turnover
- Consultants

Process Aspect

ERP are implemented to improve business process so to make it more efficient &, productive. *Major aspects are:*

- Program Management
- BPR

Technology Aspect

Entity implementing ERP should have latest & updated technologies. *Major aspects are:*

- Software functionality
- Technology obsolescence
- Enhancement & upgrades
- Application portfolio management

Other Implementation Aspect

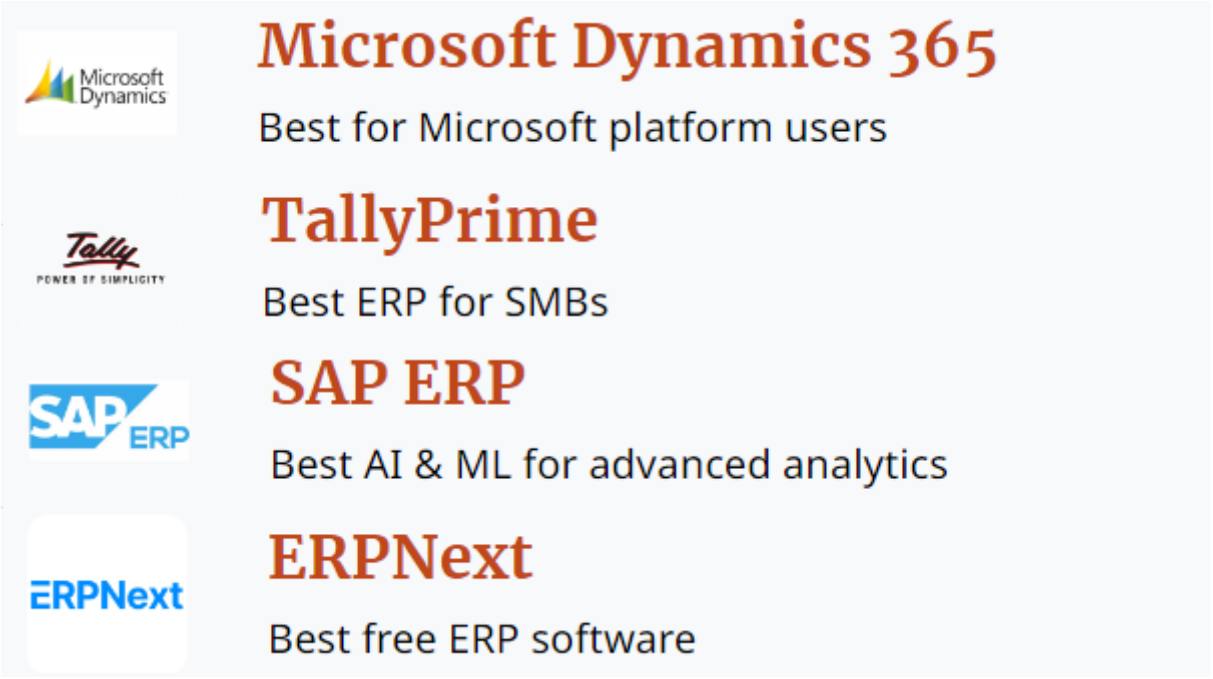
Many times, ERP implementation is affected by many hidden & unexpected factors. *Major aspects are:*

- Insufficient funding
- Lengthy implementation time
- Data safety
- Speed of operation
- Data access
- System failure

Post Implementation Aspect

Smooth running of the ERP system needs a continuous commitment by the management & users. *Major aspects are:*

- Lifelong Commitment



Audit & Control in ERP System

Controls

ERP system should have:

- **General Controls** – Overall controls & includes control over IT infrastructure, software acquisition, management etc. *Two types of general controls are management controls & environmental controls*.
- **Application Controls** – Control over individual business process or application system.

Audit

Auditing of Data

- Physical Safety
- Access Control

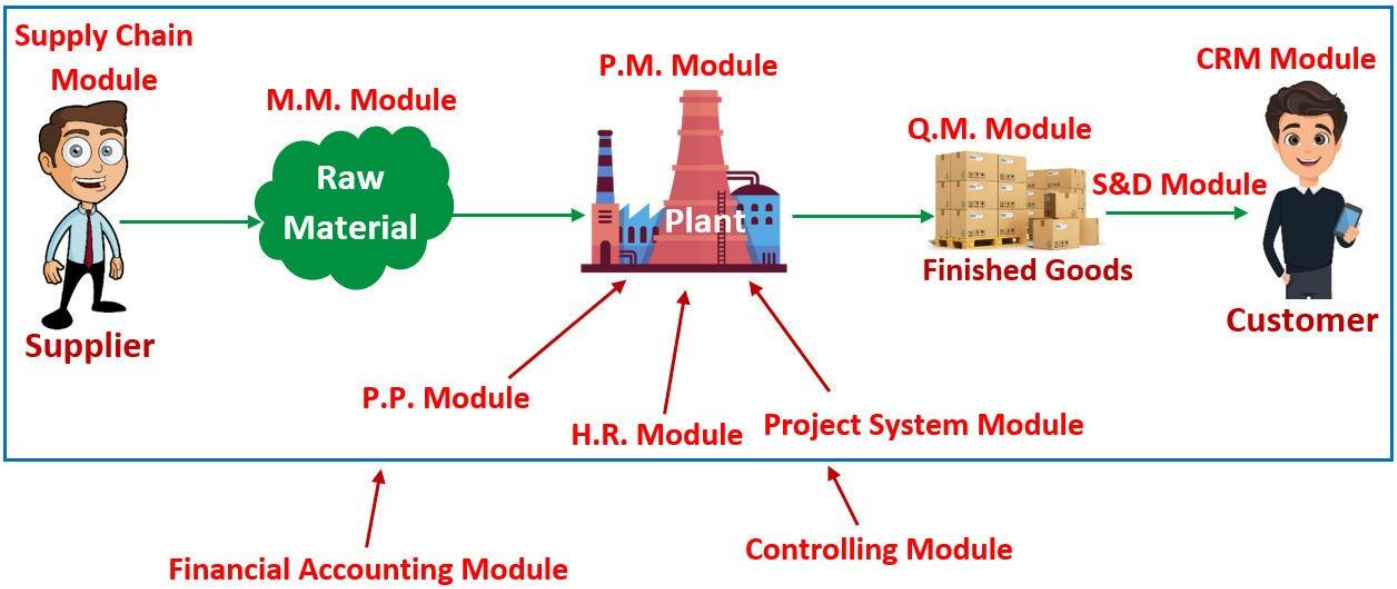
Auditing of Process

- Functional Audit
- Input Validation

Question Auditor Should ask/Check list of ERP Audit

- ERP System Administrator with clearly defined responsibilities
- Role Based Access Control (RBAC)
- Process data as per Indian GAAP & GAAS
- Meet regulatory & business reporting needs
- System protect CIA of Information Asset
- System protects information asset from unauthorized access

Business Process Modules in ERP



(A) Financial Accounting (FA) Module

Introduction

One of the most important module of ERP system which also connects different modules to each other.

Key Features

- Tracks & integrates Financial Accounting Transaction.
- Creation of organisational structure.
- Financial Accounting Global Setting.
- Tax configuration & House of Banks.
- Accounting of assets & liabilities.
- Accounting of accounts payable.
- Accounting of accounts receivable.

(B) Controlling Module (CO)

Introduction

This module *facilitates the coordination, monitoring & optimization*. Here two kinds of elements namely ***Cost Elements & Revenue Elements are managed***.

Key Features

- Cost Element Accounting
- Cost Centre Accounting
- Activity Based Accounting
- Internal order
- Product cost Controlling
- Profit Centre Accounting
- Profitability Analysis

(C) Sales & Distribution Module

Introduction

This module supports sales & distribution activities starting from enquiry to order there finally delivery. ***This module has high level of integrity complexity.***

Process

- Pre-sale Activities
- Sales Order
- Inventory Sourcing
- Material Delivery
- Billing
- Receipt from Customers

Key Features

- Setting organizational structure
- Assigning organizational units
- Defining pricing components
- Setting sales document type, billing type
- Setting customer master & configuration etc.

(D) Human Resource Module (HR)

Introduction

This module contains *master file of every employee & manages all HR related functions*.

Functions

- Recording attendance
- Loans or advances taken
- Leaves taken
- Generating monthly wage sheet
- Handles PF, ESI task.

(E) Production Planning Module (PP)

Introduction

Software designed specifically for production planning activities of the entity.

Contains

- Master Data
- SOP (Sales & Operations Planning)
- DRP (Distribution Resource Planning)
- Production Planning
- MRP (Material Requirement Planning)
- Capacity Planning

Process

- Receipt of raw material
- Conversion into WIP
- Conversion into Finished Goods
- Transfer to Godown

(F) Material Management Module (MM)

Introduction

This module contains software designed specifically to manage the material of the organization.

Process

- Purchase requisition from production department
- Evaluation of requisition
- Asking quotation from vendors
- Evaluation of quotation
- Placing purchase order
- Receipt of material by store
- Issue of material to production
- Receipt of purchase invoice
- Payment to vendor

(G) Quality Management Module (QM)

Introduction

This module is concerned with the management of quality in the different processes in the organization.

Elements

- Quality Planning
- Quality Control
- Quality Assurance
- Quality Improvement.

Process

- Setting master data & standards
- Setting quality targets
- Preparing quality management plans
- Defining how quality targets measured
- Report on overall level of quality achieved
- Quality check at multiple points

(H) Plant Maintenance Module (PM)

Introduction

Provides a comprehensive software solution for all the maintenance activities performed in the organization.

Objectives

- Achieve minimum breakdown
- Keeping plant in good condition
- Keeping machine in condition to have optimum capacity use
- Ensure availability of machines

(I) Project Systems Module

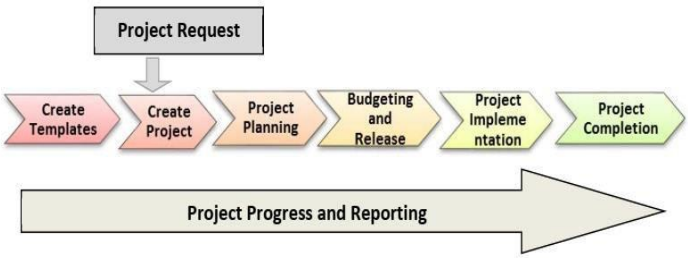
Introduction

This module has several *tools that enables effective project management such as planning, budgeting, scheduling* etc.

Process

- Create templates
- Create projects
- Project planning
- Budgeting & release
- Project implementation
- Project completion

Photo



The Guardian

India opens first stage of $13bn Delhi to Mumbai expressway

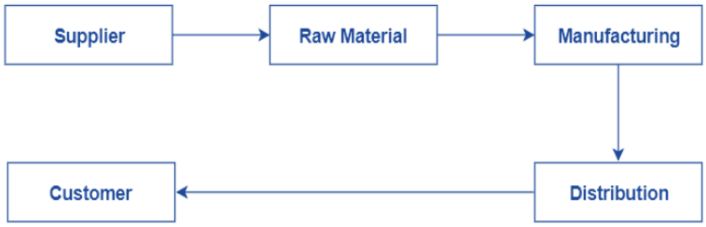
Route linking two cities is part of concerted infrastructure push to catch up with geopolitical rival China.

(J) Supply Chain Module

Introduction

Concerned with the management of the supply chain related activities of the organization.

Photo



(K) Customer Relationship Management Module (CRM)

Introduction

CRM module helps entity in managing & improving the relationship with customers & helps in finding in new customers.

Key Benefits

- Improved Customer Relations
- Better internal communication
- Maximizes upselling & cross-selling
- Optimizes marketing
- Increases revenue

Integration of Modules in ERP System

Important points regarding Integration

- Master data across all modules must be same
- Common transaction data must be shared
- Separate voucher types
- Flow of figures & values

Process

- MM Module & FA Module
- MM Module & PP Module
- MM Module & Sales & Distribution Module
- MM Module & QM Module
- MM Module & PM Module
- HR Module & FA Module etc.

Big Data & Big Data Analytics

Big Data

Massive data sets which traditional DBMS tools do not have enough processing power to process & analyze.

Uses of Big Data Analytics

- Retail Industry
- Hospitality Industry
- Health Industry

Benefits

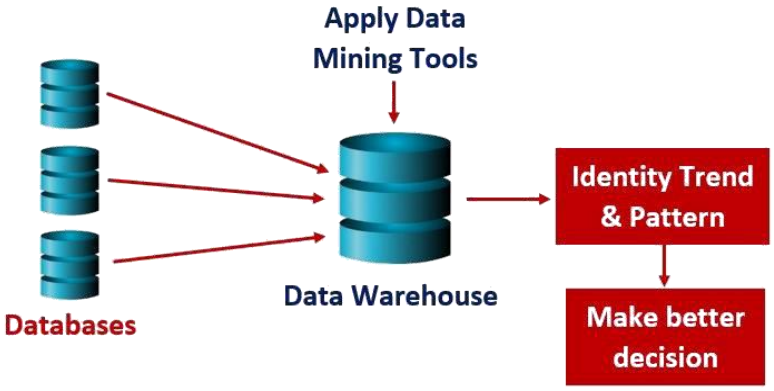
Big Data Analytics has following benefits:

- Better decision making & strategy making
- Improved customer service
- Better operational efficiency

Data Mining

Meaning

Process of *analyzing datasets to find trends & patterns in datasets so to make informed business decision*. Data mining tools are applied in data warehouse.



Steps Involved

- Data Integration
- Data Selection
- Data Cleaning
- Data Transformation
- Data Mining
- Pattern Evaluation & Knowledge Presentation
- Decisions/Use of Discovered Knowledge

Management Information System (MIS)

Meaning

Managers at all the levels needs information to make decisions & evaluate performance. They rely on MIS Reports provides managers information they need to properly carryout their function.

When MIS Report will be useful

To be useful, MIS Report should be:

a) Structured
b) Timely
c) Accurate
d) relevant

MIS Report of a Customer Service Call Department

- No. of calls comes daily
- No. of emails comes daily
- Average time to answer call or email
- No. of calls answered correctly

Data Warehouse

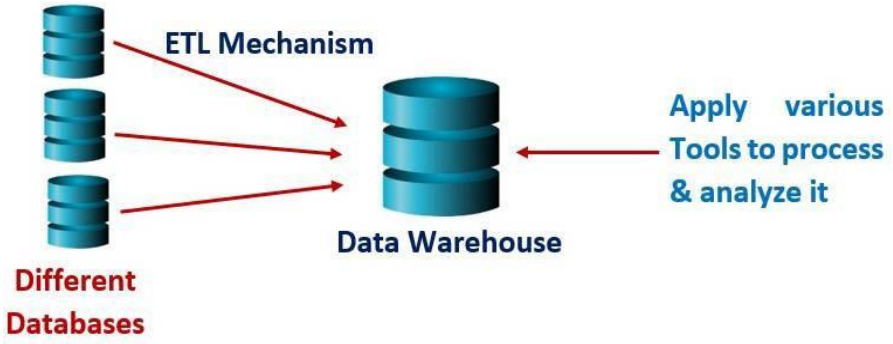
Meaning

A Mechanism of *extracting data* from one or more database of the organization, *loading it* to data warehouse (another database) so to process & analyze it.

Data warehouse Design

Should meet the following criteria:

a) *Use Non-Operational Data*
b) *Data should be Time-Variant*
c) *Data should be standardized (ETL)*



Approaches of Design

Bottom-Up Approach

Small data warehouse called Data-Marts (for different deptt) are created & than combined to create large data warehouse.

Top-Down Approach

A large enterprise wide data warehouse created first & to address specific business needs, data marts are created from that data warehouse.

Databases → Data Marts → Data Warehouse

Databases → Data Warehouse → Data Marts

Advantages

- Provides centralized view of data collected across the organization
- Provides tools to combine data.
- Helps entity to better understand data
- Inconsistent data are identified
- Accurate Reports & statists are generated
- Helps in data comparison & trend analysis

Data Analytics

Meaning

Process of examining data sets of draw conclusions about the information they contain. Proper data analytics process provides information which ultimately leads to knowledge & intelligent decisions for organization.

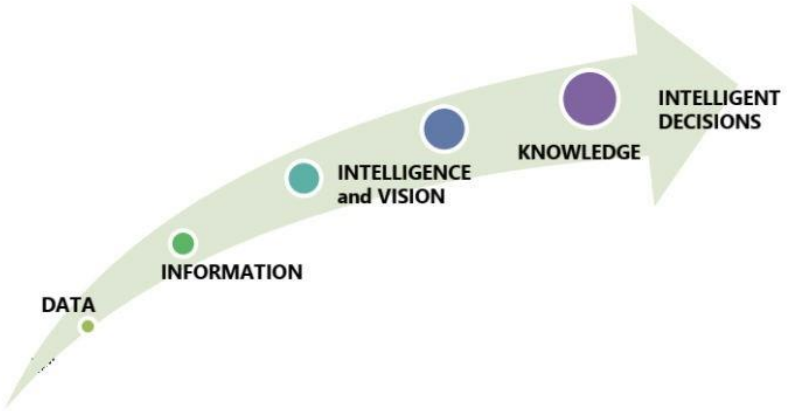
Types of Data Analytics Application

- Exploratory & Confirmatory Data Analysis
- Quantitative & Qualitative Data Analysis
- For Big Data Analysis, entity uses Data Mining, Predictive analysis & machine Learning.

Data Analytics Process

It includes following steps:

a) Data collection from different sources
b) Data integration & transformation
c) Carrying data profiling & data cleansing to remove errors & inconsistent data
d) Building Analytical model & run a partial data set.
e) Improving the data analytical model according
f) Finally running the analytical model on full data set.



Application Areas

- Banks & Credit card companies
- E-commerce companies
- Mobile Network operators
- Health Care Organizations

Advantages

- Better decision making
- Increase Revenue
- Gain competitive edge
- Respond quickly to changing situation
- Improves business performance

Sebi bets on data analytics, new generation tech to address market challenges

The watchdog has been taking strict action against erring entities.

PTI | Last Updated: Sep 01, 2019, 03.34 PM IST

Save

0 Comments

A+

New Delhi: Continuing its efforts to bolster supervision and identify non-compliance, regulator Sebi plans to deploy data analytics and new generation technologies to deal with various challenges in the market.

Business Intelligence (BI)

Meaning

Technology driven *process for analyzing data & presenting actionable information so to help entity in making better decision*.

Reasons

BI helps entity to understand

- Position of entity
- Capabilities of entity
- Changes in customer behaviour
- Market conditions, trends etc.

Advantages

- Better decision making
- Increase Revenue
- Gain competitive edge
- Respond quickly to changing situation
- Improves business performance

BI Tools & Techniques

These are *software used to perform data analysis & report processed data to different users.*

- BI application can be bought from single vendor or different vendors.
- For BI, data are collected, integrated, consolidated & cleansed.
- BI Team includes BI manager, BI architects, BI developers, business analyst etc.
- BI technology includes data visualization software .
- BI is used interchangeable with Business Analytics.

Business Reporting

Meaning

Also called enterprise reporting, it is the reporting of functional & operational data to the different stake holders. Different kinds of Reporting are:

(a) Financial & Regulatory Reporting
(b) ESG Reporting
(c) Sustainability Reporting etc.

Advantages

- Promotes better decision making
- Entity can better engage with stakeholders
- Stakeholders can better judge business performance
- Reduces risk for lenders
- Helps entity in various kinds of reporting

XBRL

Meaning & Purpose

Stands for *eXtensible Business Reporting Language*, it is developed & managed by XBRL International Inc. (XII). It is an international standard language for business reporting used around the world.

XBRL & XML

XBRL is based on XML which stands for extensible mark-up Language. XBRL uses all XML technologies like:

- *XML Schema*
- *X Link*
- *X Path*
- *Name Spaces*

Features

- Clear Definitions/Taxonomies
- Testable Business Rules
- Strong Software Support
- Multi-lingual Support

XBRL Tagging

Tagging is the *process by which any financial data in the XBRL report is tagged with the most appropriate element in the XBRL Taxonomy*.

Users

- Regulators
- Companies
- Accountants
- Analyst & Investors
- Government
- Data Providers

Task Performed

- Publish report with confidence
- Use information given in report with confidence
- Use information in the way that best suit the need like different language currency etc.

Taxonomy – Taxonomy are like dictionaries that are developed by regulators, Government, Accounting Standard Bodies (ICAI) etc. to clearly define certain terms. It provides a common set of meaning of accounting data.

Chapter No. 3 Information Systems & Its Components

Data, Information & System

Data

Raw & unorganized pieces of information which do not convey any message as such. Data can be both qualitive as well as quantitative.

Information

Processed form of data. Organization collects data from both internal & external sources & after processing, it becomes information.

System

Group of inter-related components or elements working together to achieve some common goal or objectives like Traffic System, Government System, Information System etc.

Information System

Meaning

Mechanism which takes input (data), processes it & converts into output (information) & *has a feedback mechanism* to control the entire operation.

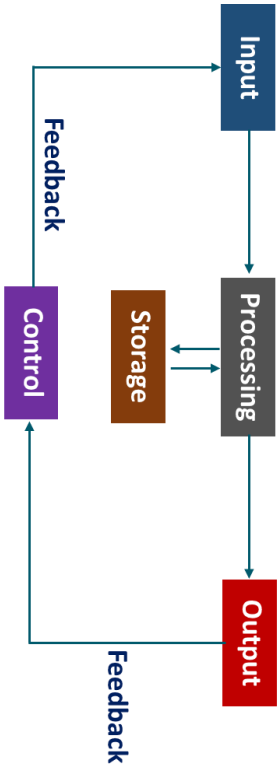
Function

- Input
- Processing
- Output
- Feedback & Control
- Storage

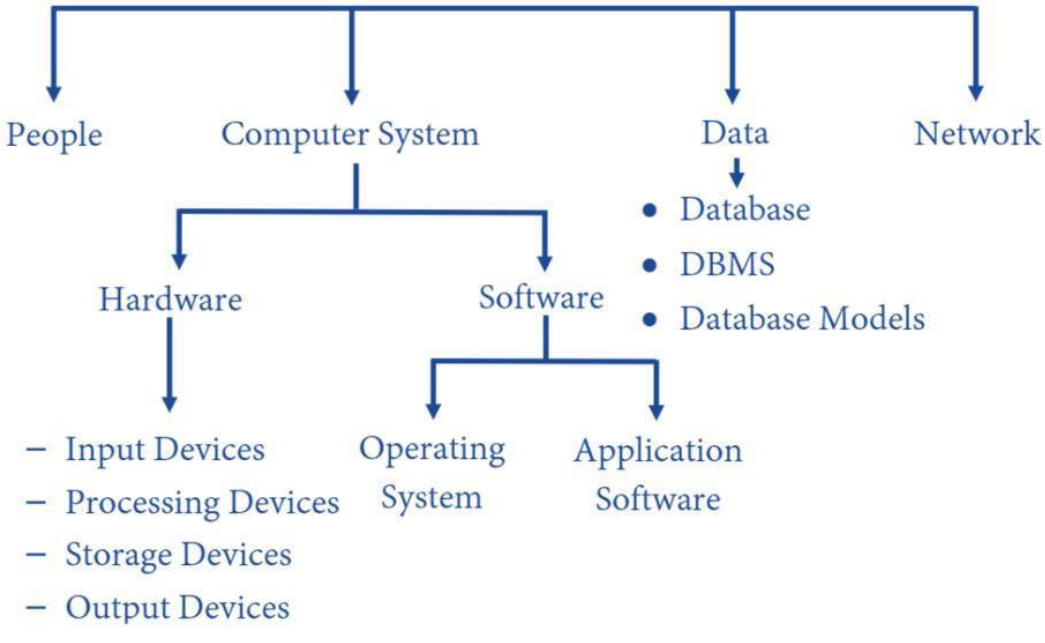
Components / Resources

- People
- Hardware
- Software
- Data
- Network

} Computer System



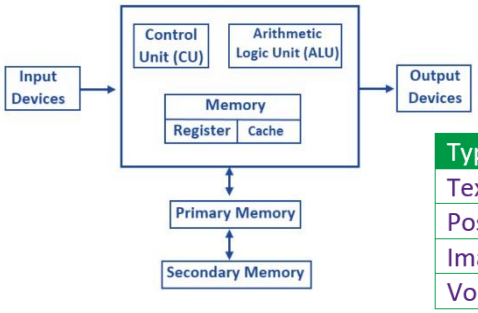
Components of Information Systems



Component - Hardware

Meaning & Architecture

Tangible portion of computer system which can be *seen*, *touched* & have *weight*.



Input Device

Devices used to interact with computer system & through which *instructions are given to the computer system* about the task to be performed.

Types of Input	Device
Text Based	Keyboard
Position Based	Mouse, Touchpad
Image Based	Scanner
Voice Based	Microphone

Processing Device

In computer system, CPU acts as processing device that executes the programs & instructions & co-ordinates the hardware & software. CPU acts like brain of the computer. *It has three functional units:*

- *Control Unit (CU)*
- *Arithmetic Logical Unit (ALU)*
- *Registers*

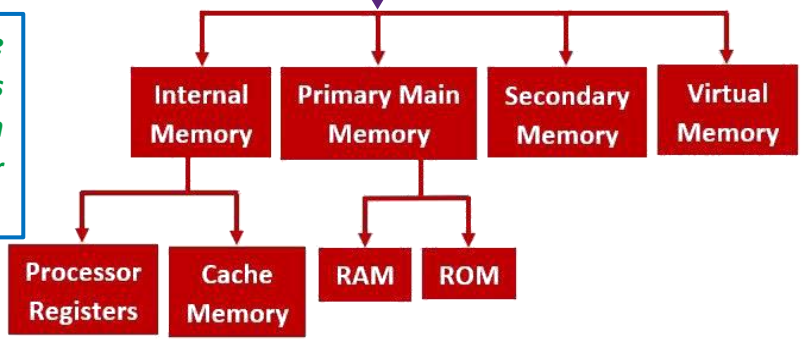
Data Storage Devices

In Next page

Meaning

Memory *where data & programs are stored on temporary basis or permanent basis.*

Types



Output Devices

Devices *through which computer system responds* & shows the result of task given to computer for executions. Like printer, monitor, speaker, projector etc. Output can be:

- Textual Output
- Graphical Output
- Tactile Output
- Audio Output
- Video Output

a) Internal Memory – Memory built within the CPU.
   - Processor Registers – Low capacity (64 Bits) very high-speed memory within CPU & directly involved in the execution of instructions. Volatile in nature.
   - Cache Memory – Smaller, faster & violative memory within CPU that stores most frequently used instructions from primary memory locations.

b) Primary / Main Memory – Memory which are directly & quickly accessed by CPU.
   - Random Access Memory (RAM) – Volatile & stores data, file, program & software currently used by computer.
   - Read Only Memory (ROM) – Non-volatile & storing basic codes & instructions for initial booting of computer.

c) Secondary Memory – Non-volatile high capacity memory that stored data & program on permanent basis. It is slow & cheaper memory. Like CD, DVD, Pen Drive, Hard Disk etc.

d) Virtual Memory – If computer lacks RAM, operating system creates a temporary space called "Paging File" in hard disk to compensate RAM. It is not a physical memory but an imaginary or virtual memory.

Component - Software

Meaning

Set of instructions that tells hardware what to do. without software, hardware will be Non-operational. It is stored in some storage device (hardware).

Application Software

Software that performs the task beyond the running of the computer itself. Through application software, user can perform multiple tasks. Examples:

- MS Office
- Accounting Software
- ERP Software
- CBS Software

Operating System Software

Set of computer programs that manages the hardware & acts as intermediary between the user & the computer. It performs following activities.

- Performs Hardware functions
- Provides user interface
- Provides hardware Independence to APP Developers
- Memory Management
- Task Management
- File Management
- Networking Capabilities
- Logical Access Security

DBMS

Operations Performed

- Adding new file
- Deleting existing file
- Inserting data in existing file
- Modifying data in existing file
- Deleting data from existing file
- Retrieving data from existing file

Data Evolution Hierarchy

- Database
- Files
- Record
- Field
- Character/Byte
- Bits

Types

Enterprise Level

- Oracle Database
- DB2
- SQL etc.

Personal Usages

- Microsoft Access
- Open Office Base

Models

- Hierarchical
- Network
- Relational
- Object Oriented

Advantages

- Permits data sharing
- User friendly
- Improved security
- Minimizes data redundancy
- Achieving program/data independence
- Faster application development

Disadvantage

- Cost
- Security

Component - Data Resource

Introduction

Organization generates & collects huge quantity of different types of data like production related data, HR related data, Marketing Related Data etc. *These data are stored in Databases.*

Database

Meaning

Organized *collection of related data* where all data stored are related to each other. Hence to manage unrelated data, separate databases are created.

DBMS

Database Management System are software that helps entity in *organizing, using & controlling* the data stored in databases.

Database Model

Meaning

It determines the *logical structure* of database & *manner in which data can be stored, organized & retrieved*.

Database Model Types

Hierarchical

Records are logically structured into a hierarchy of relationship that forms an inverted tree like structure. All records are linked as parent-child relationship. Top parent record is called *Root Record*. This model *implements one to one & one to many relationships*. Here search is difficult & time consuming.

Network

It views all records in set where each set is composed of one owner record & one or more-member record. Here a *record can be a member of more than one set at the same time*. This model implements *many to one & many to many relationships also*. Here data search is fast.

Relational

Data is structured in tables which is made of rows & colours.

Three important terms are:

- Relation – Table made of rows & columns.
- Attributes – Named column
- Domain – Set of values attributes can take.

Different tables are linked through key in this database model.

Object Oriented

All data are modeled & created as objects where each object is an independently functioning unit. Objects are organized by grouping them in class & sub-class. This model is mainly used to store complex data like images, audio, video etc.

Component - Network & Telecommunication System

Meaning

- **Telecommunication** refers to exchange of data & information over the computer network.
- **Computer Network** refers to collection of computers, server & other networking devices (router, switch etc.) connected to each other.

Types

- **Connection Oriented** – First connection is established then data are exchanged. Like circuit switching.
- **Connection Less** – No prior connection is established & *data to be exchanged contains the complete information (IP Address) of the sender & recipient*. E.g. pocket switching

Terms Used

- **Routing** – Process of determining how to communicate data from source to destination.
- **Bandwidth** – Quantity of data that can be transmitted in a given time like second. E.g. MBPS, GBPS etc.
- **Resilience** – Ability of the computer network to recover from any kind of error like connection failure, data loss etc.
- **Contention** – Situation where there arises some conflict for some common resource in a network.

Benefits

- Distributed nature of information
- Resource sharing
- User communication
- Computational power
- Reliability

Provides Valves through

- Time compression
- Overcoming geographical dispersion
- Restructuring business relationship

Information System's Auditing

Meaning & Objectives

Process of attesting objectives (external auditor) focused on data integrity, asset safeguarding & management objectives (internal auditor) focused on effectiveness & efficiency. *Four Main Objectives*

- Asset safeguarding
- Data integrity
- System effectiveness
- System efficiency

Need

- Organizational cost of data loss
- Cost of incorrect decision making
- Cost of computer abuse
- High cost of computer error
- Maintenance of privacy
- Value of hardware, software

Today organization produces data on real-time basis & *hence there is a need of continuous auditing tools*. It enables auditors to significantly reduce or eliminate the time between occurrence of event & its auditing.

Tools

Types of Tools

Snapshot

Snapshot software are *embedded* in system *at those points where material processing occurs*. Snapshot software captures image of those processing & such images can be utilized to access the authenticity, accuracy & completeness of processing.

Audit Hooks

There are codes which are *embedded* in the application that enables auditors to flag transactions which he thinks are suspicious are report such transactions to the auditor.

Integrated Test Facility (ITF)

Here a dummy entity (like dummy master file) is created in the application system then submit the test data for processing against the entity *to verify the authenticity, accuracy & completeness of the processing*.

Continuous & Intermittent Simulation (CIS)

It is used to trap the exceptions and report it when the application system uses a DBMS. DBMS passes transaction to CIS & CIS determines whether to examine it or not. If it determines to examine it, CIS will simulate the processing & check the processed data by it with the data processed by application system. Exceptions, if identified, are recorded in an *exception log file*. *The biggest advantage of CIS system is that it does not require any embedment in the application still provides online auditing capability.*

System Control Audit Review File (SCARF)

It involves embedding audit software module in the application system for the continuous monitoring of the system transaction. The information so collected is written in a special audit file called *SCARF Master File*.

Master Chart of Classification of Information System's Controls

- Objectives of Controls
- Nature of IS Resources
- Audit Function

(i) Classification based on Objectives of Controls

Preventive Controls

- Employing Qualified Personnel
- Segregation of Duties (SOD)
- Access Control
- Authorization of transactions
- Validation of transactions
- Edit Checks in applications
- Firewalls, Antivirus Software
- Login ID, Password

Detective Controls

- Internal audit system
- Intrusion Detection system
- Budgeting & Maintaing actual expenditure against budgets
- Bank Reconciliation system
- Check points in production system
- Rechecking of calculations
- Echo control in telecommunication
- Hash Totals

Corrective Controls

- Business continuity plan (BCP)
- Contingency planning
- Backup procedures
- Rerun procedures
- Variance Analysis
- Submitting connective journal entries after discovering errors

Preventive Controls: Controls established to *prevent the error or omission from occurring*.
Detective Controls: Controls established to *detect and report the error or omission* after they occurred.
Corrective Controls: Controls established to correct (eliminate or minimise) the impact of errors and omission after they have been detected.

(ii) Classification Based on Nature of IS Resources

Environmental Controls

- Fire / Explosion Damage
- Power Spike / Electrical Exposure
- Water Damage
- Pollution Damage & Others

Physical Access/Security Controls

Lock on Doors

- Cipher Locks
- Bolting Door Locks
- Electronic Door Locks

Physical Identification Medium

- Plastic Cards
- Personal Identification Number
- Identification Badge

Logging on Facilities

- Manual Logging
- Electronic Logging

Other Means

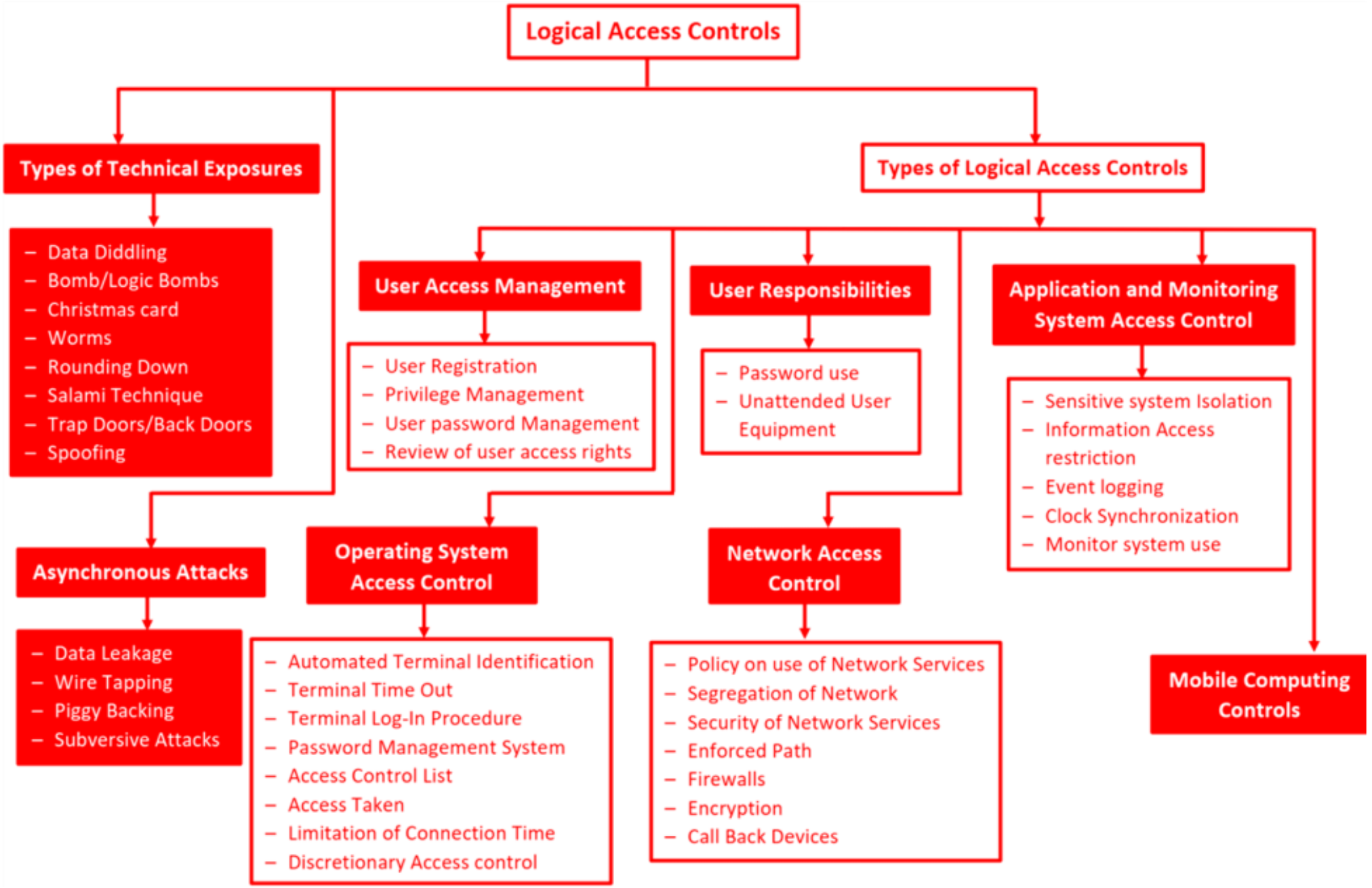
- Video Camera
- Security Guard
- Controlled Visitor Access
- Bonded Personnel
- Dead Man Doors
- Non-Exposure of Sensitive Facilities
- Controlled Single Entry Point
- Computer Technical Lock
- Control of Out of Hours of Employees
- Perimeter Fencing
- Secured Distributor Carts
- Alarm System

Logical Access Controls

(See Next Page)

Environmental Controls: Controls relating to IT environment such as power, air-conditioning, UPS, smoke detectors, fire extinguishers etc.

Physical Access Controls: Controls relating to the physical security of tangible IS resources and intangible resources (data & program) stored on them. These controls saves entity from abuse of IS resources, blackmail, damage etc of IS resources.



Logical Access Controls: Controls established to ensure that access to the system, data and program is restricted to authorized users only so to safeguard them from unauthorized use, modification, damage etc. Weak or ineffective Logical Access Controls gives opportunity to logical access violators and results in technical exposures for the entity.

(iii) Classification Based on Audit Function

Management Control Framework

Controls over managerial functions to ensure that the development, implementation, operation and maintenance of information system should be in the planned and controlled manner.

Application Controls

(See Next Page)

Top Management Controls

- Planning
- Organizing
- Leading
- Controlling

System Development Management Controls

- Problem Definition & Feasibility Assessment
- Analysis of Existing System
- Information Processing System Design
  - Elicitation of detailed requirements
  - Design of data/information flow
  - Design of Database and user interface
  - Physical design
  - Design of the hardware/software platform
- Hardware/Software Acquisition & Procedures Development
- Acceptance Testing & Conversion
- Operation & Maintenance

Programming Management Controls

- Planning
- Control
- Design
- Coding
- Testing
- Operation & Maintenance

Quality Assurance Management Controls

Securities Management Controls

Entity shall have proper DRP & Insurance coverage.

Data Resource Management Controls

- Definition Controls
- Existence/Backup Controls
- Access Controls
- Update Controls
- Concurrency Controls
- Quality Controls

Operations Management Controls

- Computer Operations
- Network Operations
- Data Preparation & Entry
- File Library
- Documentation & Program Library
- Help Desk/Technical Support
- Management of Outsourced Operations

Application Control Framework

There controls ensures that individuals application systems safeguard assets, maintain data integrity & achieve objectives effectively & efficiently. Also, ***auditor should verify two types of audit trail in each sub-system*** –

- **Accounting Audit Trail –** Maintains records of events.
- **Operations Audit Trail –** Maintains records of resources consumed.

Boundary Controls

- Cryptographic Controls
- Access Controls
- PIN
- Digital Signature
- Plastic Cards

Accounting Audit Trails – All material application oriented events occurring in boundary sub-system should be recorded like identify user, authentication information given, resources requested/supplied etc.

Operations Audit Trails – Details of resources usages from log-in to log-out.

Input Controls

- Data Code Controls
- Batch Controls
- Validation Controls

Accounting Audit Trails – This records events like identify of the source, physical device used, time & date when data was captured.

Operations Audit Trails – Details like time to key-in source document, no. of read error made by optical scanning device, no. of keying errors etc.

Communication Controls

- Physical Component Controls
- Line Errors Controls
- Flow Controls
- Link Controls
- Topological Controls
- Channel Access Controls
- Internetworking Controls

Accounting Audit Trails – Source identifier, destination & each node that traverses the message, identification of person or process authorizing dispatch of message.

Operations Audit Trails – No. of messages traversed at each node & link, queue length etc.

Processing Controls

- Processor Controls
- Real Memory Controls
- Virtual Memory Controls
- Application Software Controls

Accounting Audit Trails – Trace & replicate the processing performed & existence of Flowchart & DFD.

Operations Audit Trails – Details of hardware consumption like CUP Time, Memory uses & Software consumption like compilers used, libraries used etc.

Database Controls

- Access Controls
- Integrity Controls
- Application Software Controls
- Concurrency Controls
- Cryptographic Controls
- File Handling Controls

Accounting Audit Trails – Checking whether the application properly accepts, processes & store information. Have Unique time Stamp on all transactions, before image & after image of data items etc.

Operations Audit Trails – Resources used in events that affects database.

Output Controls

- Inference Controls
- Batch Output Production & Distributions Controls
- Batch Report Design Controls
- Online Output Production & Distribution Controls

Accounting Audit Trails – What output presented to users, who receives the output, when the output received etc.

Operations Audit Trails – Recourses used in output subsystem to produce, distribute, use, store & dispose the various output like text graph, image etc.

Auditing of Different Information Systems Controls

- Environmental Controls
- Physical Access Controls
- Logical Access Controls
- Management Control Frameworks
- Auditing Application Control Framework

Environmental Controls

Audit of Environmental Controls is very critical & should form a critical part of IS Audit Plan. The IS Auditor shall conduct physical inspection & observe practices. ***IS Auditors shall focus on following***

- *Power Conditioning*
- *Back-up power*
- *HVAC*
- *Water detection*
- *Fire detection*
- *Cleanliness*

Physical Access Controls

IS Auditor shall review the physical access risk & controls to check the effectiveness of physical access controls. ***For this, IS Auditor shall do***

- Risk Assessment,
- Control Assessment &
- Review of Documents.

Auditing Physical Access Control requires the focus on following

- ✓ Siting & Marking
- ✓ Physical Barriers
- ✓ Surveillance
- ✓ Guards & Dogs
- ✓ Key Card Systems

Logical Access Controls

Logical Access Control audit requires IS Auditor to focus on Network Access Paths & Documentation among others. For Logical Access Control Audit, IS Auditor ***shall consider the following factors:***

User Access Controls

Auditing User Access Controls

- Authentication
- Access Violations
- User account lockout
- Dormant accounts
- Shared accounts
- Intrusion detection & prevention

Auditing Password Management

- Maximum password length
- Use of former password
- Frequency of password change

Auditing User Access Provisioning

- Access request processes
- Access approvals
- New employee provisioning
- SOD
- Access review

Auditing Employee Terminations

- Termination Process
- Access reviews
- Contractor access & terminations

User Access Logs

- Centralized access logs
- Access log protection
- Access log review
- Access log retention

Investigative Procedures

- Investigation Policies & Procedures
- Computer Crime Investigation
- Computer Forensics

Interest Point of Presence

- Search Engine
- Social Networking Sites
- Online Sales Sites
- Domains Names
- Justification of Online Presence

Management Control Frameworks

If Management controls are ineffective, other controls are also not likely to be effective. *While auditing management controls, IS Auditor shall consider the following factors:*

(1) Auditing Top Management Controls – Auditor should audit the
- **planning,**
- **organizing,**
- **leading &**
- **controlling**

tasks performed by the senior management.

(2) Auditing Systems Development Management Controls – Auditor should do
- ***Concurrent Audit,***
- ***Post Implementation Audit &***
- ***General Audit.***

First two audit are done by Internal Auditor while General Audit is performed by External Auditor.

(3) Auditing Programming Management Controls – Auditor should audit all the phases like
- ***Planning,***
- ***Control,***
- ***Design,***
- ***Testing,***
- ***Operation & Maintenance.***

(4) Auditing Data Resources Management Controls – For this, auditor should
- **Determine the controls exercised to maintain data integrity.**
- **Use "test data" to evaluate those controls.**
- **Interview Data Administration (DA) & Database Administration (DBA).**
- **Check how well DA & DBA carry out their functions.**

(5) Auditing Security Management Controls – For this, auditor should
- **Evaluate whether high quality & on-going security reviews are carried or not.**
- **Evaluate performance of BCP controls.**
- **Check whether there are high quality DRP or not.**
- **Check whether there is appropriate insurance coverage or not.**

(6) Auditing Operations Management Controls – Auditor should evaluate whether documentations are maintained securely & issued to authorized persons only.

(7) Auditing Quality Assurance Management Controls – Auditor should
- **conduct interview,**
- **review documents,**
- **have observations**

for the same.

Auditing Application Control Framework

Key areas to be focused here are

1) Auditing Boundary Controls

- Determine how well assets are safeguard and data integrity is preserved.
- Is there any access control mechanism & its effectiveness.
- For cryptographic key management, check how keys are generated, distributed to users & installed in cryptographic facilities.
- Approach (e.g. MAC, DAC) used to implement access controls.

2) Auditing Input Controls

- Checking the source document design.
- Examine the data entry screens.
- Approach of data entry into application & their relative weaknesses & strengths.
- Quality of coding system to check its impact on data integrity, effectiveness & efficiency.
- Checking whether input files are stored securely & back-up are kept properly.

3) Auditing Communication Controls

- Adopt structured approaches to evaluate various communications controls.
- Ensure data transmission between two nodes in WAN is accurate & complete.
- Check the implementation of encryption controls to ensure the protection of privacy of sensitive data.
- Check the topological controls & ensure its effectiveness.
- Check whether adequate network backup & recovery controls like automatic line speed adjustment based on modems speed etc. are implemented properly or not.

4) Auditing Processing Controls

- Check whether common programming errors is taken care of.
- Assess the performance of validation controls.
- Check whether unauthorized activities like gaining access to sensitive data are controlled or not.
- Check whether there are proper check point & restart controls which enables the system to recover itself from the point of failure.

5) Auditing Database Controls

- Check back-up & recovery strategies.
- Check whether damaged or destroyed database can be restored properly.
- Protection of privacy of data during back-up & recovery activities.
- Checking security of public keys & private keys.
- Checking data integrity controls & how integrity violations prevented.

6) Auditing Output Controls

- Check the sensitive report program & who is authorized to access them.
- Ensure that RBAC are followed or not.
- Check the report collection, distribution & printing controls are effective or not.

Segregation of Duties (SOD)

Meaning

Also known as separation of duties, it ensures *single individuals do not possess excess privileges that may result in unauthorized activities like manipulation of sensitive data or fraud.*

SOD Controls

- Transaction Authorization
- Split custody of high-value assets
- Workflow
- Periodic reviews

Mitigating SOD Issue

- Reduce access privileges
- Introduce a new mitigating control
  - Increased logging requirements
  - Improved exception reporting
  - Reconciliations of data sets
  - External reviews

Audit Trail

Logs that can be designed to *record activity at the system, application, and user level*. When properly implemented, audit trails act as an important detective control.

- Accounting Audit Trail shows the source & nature of data and processes that update database.
- Operations Audit Trail maintains a record of resource consumption within a system.

Need

- Fulfil statutory requirements
- Detect causes & consequences of error
- Answer queries
- Overall system monitoring

Objectives

- Detecting Unauthorized Access
- Reconstructing Events
- Personal Accountability

Generating Audit Logs

Information contained in audit logs is useful for accountants in measuring the potential damage & financial loss due to application errors, abuse of authority or unauthorized access.

Organization Structure & Responsibilities

To function properly, organisation needs proper structure to distribute the rights and responsibilities among various users. This is called Organisational Structure or Organisational Chart.

Why Structure Changes

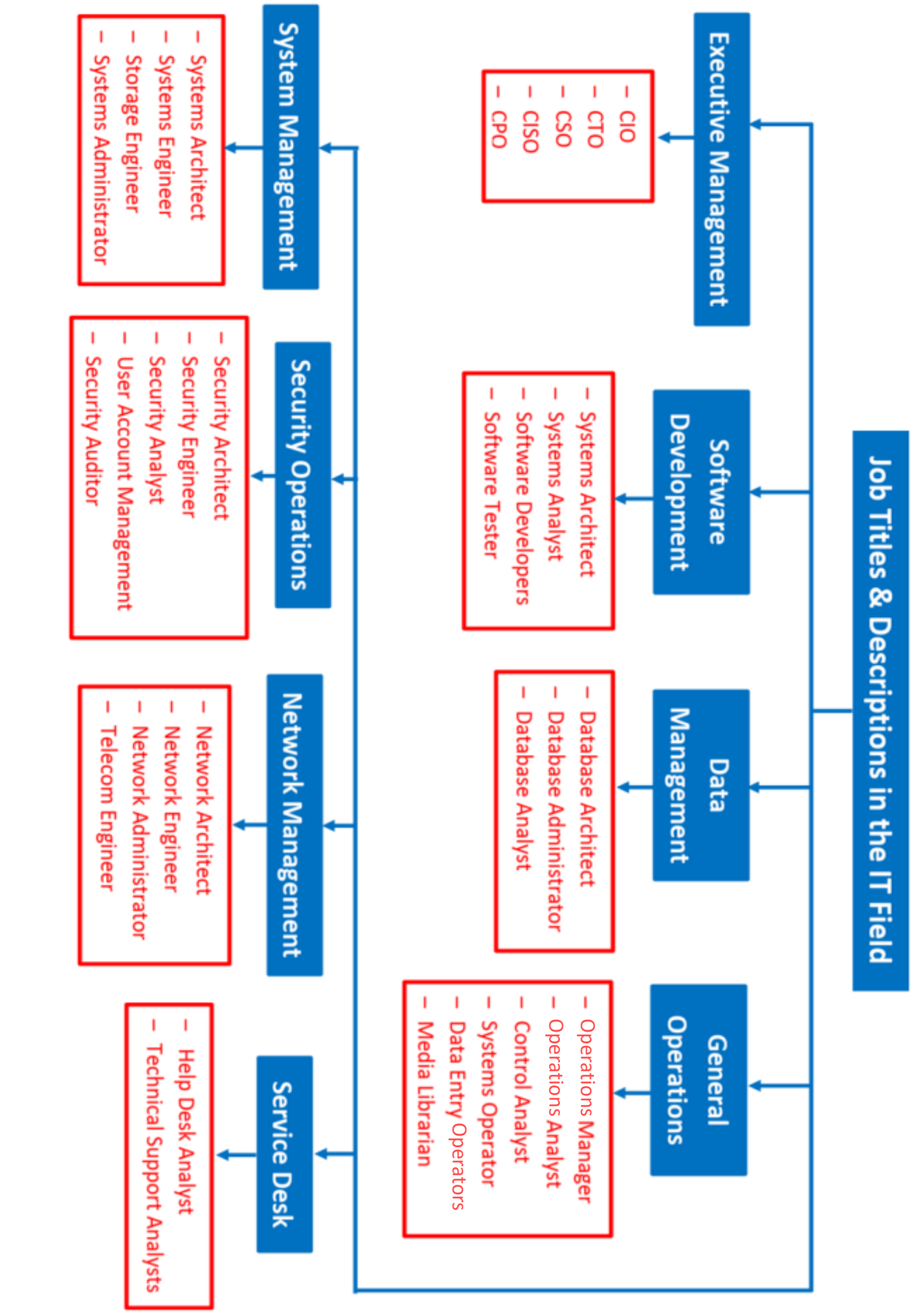
- Short & long-term objectives
- Market conditions
- Regulations
- Available Talent

Individual Roles & Responsibilities

- Owner
- Executive management
- Manager
- User

Standard Job Titles

- Recruiting
- Compensation baselining
- Career advancement


Job Titles & Descriptions in the IT Field
Executive Management
CIO
CTO
CSO
CISO
CPO
Software Development
Systems Architect
Systems Analyst
Software Developers
Software Tester
Data Management
Database Architect
Database Administrator
Database Analyst
General Operations
Operations Manager
Operations Analyst
Control Analyst
Systems Operator
Data Entry Operators
Media Librarian
Service Desk
Help Desk Analyst
Technical Support Analysts
Network Management
Network Architect
Network Engineer
Network Administrator
Telecom Engineer
Security Operations
Security Architect
Security Engineer
Security Analyst
User Account Management
Security Auditor
System Management
Systems Architect
Systems Engineer
Storage Engineer
Systems Administrator

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Chapter No. 4 E/M Commerce & Emerging Technologies

E-Commerce

Meaning

Process of *doing business electronically with customers, business partners etc. Features*:
- Electronic system
- Always available
- Worldwide scope of Business
- No physical inspection
- Many payments options etc.

Advantages

To Customer
- Time saving
- Any time access
- Better deals
- Convenience
- Various options
- Reviews

To Business
- Reduction in cost
- Increased customer base
- Creation of new market
- Instant transaction
- Increased efficiency
- Elimination of time delay

To Government
- Instrument to fight corruption
- Less use of ecologically damaging materials

E-Market Types
- E-Shops
- E-Malls
  - *General Stores*
  - *Specialized Stores*
- E-Auctions
- Portals
- Buyer Aggregators
- Virtual Communities
- E-Procurement
- E-Distribution

Forces behind E-Com Revolution
- Proliferation of Mobile Devices
- Social Network
- Artificial Intelligence
- Convergence of Mobile Network & Internet
- Biometrics
- Predictive Analysis
- Support of IT Governing Laws

Disadvantage of E-Commerce or E-Business
- Internet Connection
- High Start-up Cost
- Legal Issues
- Cultural Impediments
- Security Concern
- Some businesses not suitable

Business Models
- Business to Business (B2B)
- Business to Consumer (B2C)
- Consumer to Consumer (C2C)
- Consumer to Business (C2B)
- Consumer to Government (C2G)
- Government to Consumer (G2C)
- Business to Govt (B2G)

Technology Used in E-Commerce Should be
- Scalable
- Easy to use & convenient
- Implementing responsive design

Flipkart

Components in E-Commerce Environment

User

Web Portal

Network / Internet

Payment Gateway

Technology Infrastructure

- Computer, Server Database
- Mobile Apps
- Digital Library
- Data Interchange

E-commerce Vendors

Components

User

Person using e-com platform to make purchase or other transaction.

Web Portal

Interface through which e-commerce transaction is conducted. Through web portal, user interacts with e-commerce vendor.

Internet Network

It is the critical enabler of e-commerce business & without stable & speedy internet connection, e-commerce is not possible.

Payment Gateway

Through it, e-commerce vendor collects payment from their customers.

Technology Infrastructure

Provides overall support to e-commerce business. It includes:

a) Computers, Servers & Database
b) Mobile Apps
   - Mobile store front module
   - Mobile ticketing module
   - Mobile advertising & marketing module
   - Mobile customer support & information module
   - Mobile Banking/Payment module
c) Digital Libraries
d) Data Interchange

E-commerce Vendor

E-commerce vendors need to ensure:

- Supplier & supply chain management
- Warehouse operations
- Shipping & return
- Catalogue & product display
- Marketing & loyalty programs
- Showrooms & offline purchases
- Guarantee
- Security
- Privacy policy

Security in E-Commerce

E-commerce vendor needs very strong security policy for both the data which is:

- *Transferred online or*
- *Stored in databases*

IT Act, 2000 states that *security of data collected by e-commerce vendor is the responsibility of e-commerce vendor*. Entity should use *Encryption & SSL Tools* to secure the data.

Architecture of Networked systems/E-commerce Network Architecture

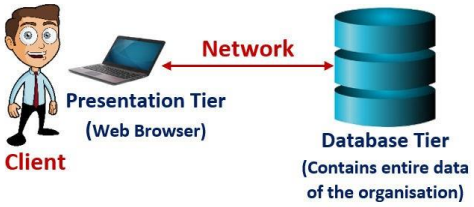
Meaning

Architecture basically means how different systems & components are connected together to execute the e-commerce transaction.

Which Architecture is used?

All E-commerce Entities use Three Tier Network Architecture.

Two-Tier Client Server Architecture



Layers are

- Presentation/Client Tier – Through it, user interacts with the vendor.
- Database/Data Tier – Servers where all data are kept.

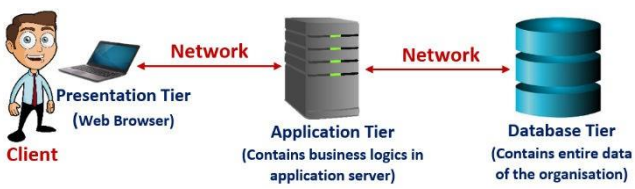
Advantages

- Very simple to set up
- Easy to maintain
- Many users connected simultaneously
- Higher performance

Disadvantages

- Performance decreases as user increases
- Less flexibility

Three-Tier Client Server Architecture



Layers are

- Presentation/Client Tier – Through it, user interacts with vendor.
- Application Tier – Also called Middle or Logic Tier, here all processing & manipulations are carried out.
- Database Tier – Here all data are kept.

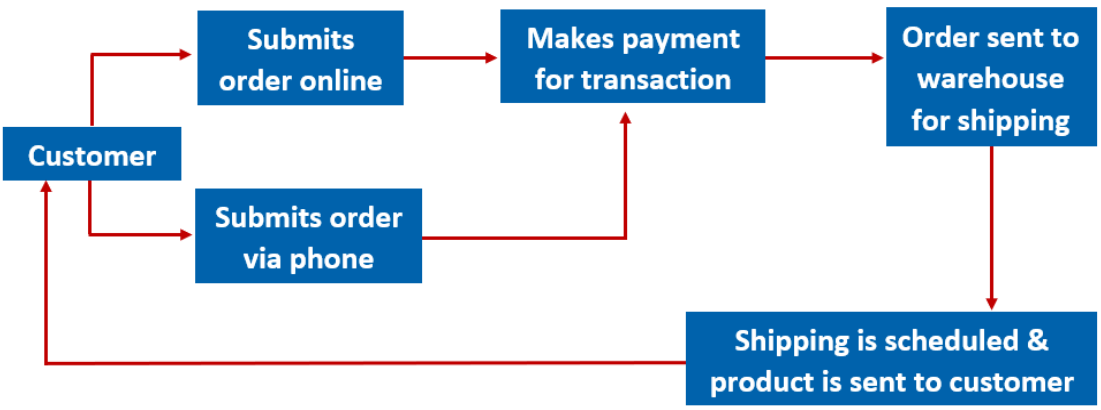
Advantages

- Dynamic load balancing
- Centralized application management
- Easier change management
- Separation of user interface & data presentation from application logic

Disadvantages

- Increased network traffic
- Tools are complex & expansive

Workflow Diagram for E-commerce



Steps Involved

1. Customer Logic
2. Product/Service Selection
3. Customer Places Order
4. Payment Gateway
5. Dispatch & Shipping
6. Delivery Tracking
7. COD Tracking

Risks & Controls in E-commerce Business

Risks

- Quality issues
- Privacy & security
- Hidden costs
- Need of internet connectivity
- Lack of infrastructure
- Non-recognition of e-transaction
- Lack of audit trail

Controls

Controls Needed for

- User
- Vendor
- Network service provider
- Logistics service provider
- Technology service providers
- Payment Gateway
- Government

Types of Controls

a) Educating participants about nature of risk
b) Communication of organizational policies
   - Privacy policies
   - Information security
   - Shipping policies
   - Refund policies
c) Ensure compliance with Industry Body Standards
d) Protect e-commerce business from intrusion
   - Viruses
   - Hackers
   - Regular software update
   - Password
   - Sensitive data

Guidelines & Laws Governing E-Commerce

Guidelines

- Billing
- Guarantee/Warranty
- Shipping
- Delivery
- Return
- Payment

Laws Governing E-commerce

Commercial Laws

- Income Tax Act, 1961
- Goods & Service Tax Act
- Companies Act, 2013
- Customs Act, 1962
- Foreign Exchange Management Act, 1999
- Foreign Trade (Development &Regulation) Act, 1992
- Consumer Protection Act, 1986

Special Laws

- Information Technology Act, 2000
- Reserve Bank of India act, 1932

Digital Payment

Meaning

Transfer of money through digital mode i.e. online. Here no hard cash is involved & *payment is made from or received in bank account or digital wallet*.

Advantages

- Easy & convenient
- Any where anytime payment & receipt
- Rebate & discounts
- Written records
- Less risk
- Competitive advantage
- Environment Friendly

Disadvantages

- Difficult for Non-technical person
- Risk of data theft
- Over spending
- Disputed Transactions
- Increased business cost
- Internet access required

Types of Digital Payments

Traditional Methods

- Cards
  - Credit Cards
  - Debit Cards
  - Smart Cards
- Internet Banking

Modern/New Methods

- **UPI Based Apps –** Developed by NPCI, UPI powers multiple bank accounts of participating banks & provides various services like fund transfer, balance check etc. There are many UPI based Apps like BHIM App, PhonePe etc.
- **BHIM Mobile App –** UPI powered App developed by NPCI & provides services like Fund transfer, Balance checking etc.
- **Immediate Payment Service (IMPS) –** Instant inter-back electronic fund transfer service through mobile phones. It is managed by NPCI.
- **Aadhar Enabled Payment Service (AEPS) –** Aadhar based digital payment service using which customer can make payment through Aadhar Number.
- **Unstructured Supplementary Service Data (USSD) –** User can do banking through normal feature phone without internet & smart phone. Also called *99# Banking.
- **Mobile Wallets –** Digital or virtual wallets that stores payment card details on a mobile device like PayTM, SBI Buddy etc.
- **e-Rupi –** A cashless & contact-less digital payment mode based on UPI system. It is an e-voucher which is delivered to the beneficiary in the form of QR code or SMS string & ensures a leak profit transfer of benefit to the intended beneficiary.

PhonePe

Moneycontrol

UPI transactions on course to reach 1 billion a day by 2025: NPCI chief

Daily transactions on the unified payments interface (UPI) platform can touch 1 billion in the next three years as UPI hits its full...

Cyber Security Risk Considerations

Introduction

Business environment in which entity operates is continuously evolving due to technological advancements.

Cyber security risks leads to:

- Direct Impact: Causing direct financial impact on organization
- Indirect Impact: May put entity in legal trouble & reputational crisis.

Relevant Portion of SA 315

IT poses specific risks to an entity's internal control in the form of:

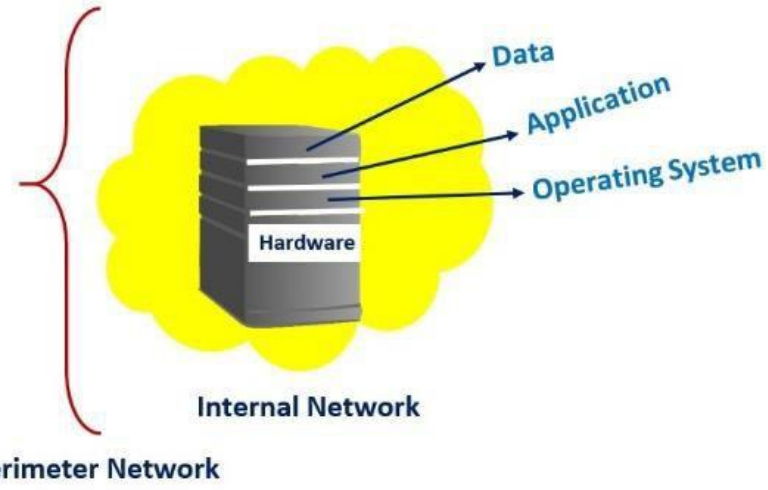
- Unauthorized changes to system or program
- Unauthorized changes to data in master file
- Failure to make necessary changes to system
- In-appropriate manual intervention
- Personnel have access privileges beyond job requirement
- Unauthorized access to data causing its destruction or changes

Controls for Cyber Security Risk

- Proper IT security policy made & circulated
- Network Diagram containing details of servers, database
- List of digital assets, its location, manager responsible
- List of cyber security breach
- Periodic review of access rights
- All remote logins to be configured on two-factor authentication
- Use of firewall or other security tools

Levels of Cyber Security Breach

- Perimeter Network
- Internal Network
- Operating System
- Application
- Data



Mobile Computing

Meaning

Technology that *allows the data transmission from a computing device without having to be connected to a fixed physical link*. It allows computing & connectivity on the go (i.e. Mobile).

Components

- **Mobile Communication** – Allows communication on the go i.e. wireless communication.
- **Mobile Hardware** – Devices uses for mobile computing. It should be light weight, portable etc. & are supported by various server like application server, database server.
- **Mobile Software** – It includes mobile operating system & mobile application (Apps).

Working/Steps Involved

- User enter or access data using application on mobile device.
- Data entered by user are transmitted from mobile device to site's information system.
- Now both user's device & site's information system have same information & are in synchronization .
- The process works in same way starting from other direction.

Advantages

- Workforce access work-order details like location, contact information, completion details etc. on the go.
- Sales personnel can update their work order status in real-time.
- Facilitates access to corporate services anytime from anywhere.
- Provides access to corporate knowledge base at job location.
- Improves management effectiveness.

Disadvantages

- Insufficient bandwidth
- Security standards
- Power consumption
- Transmission interferences
- Potential health hazards
- Human interface with device

Cloud Computing

Meaning

Use of computing resources like storage, software, database & other services over the network (internet).

Drawbacks

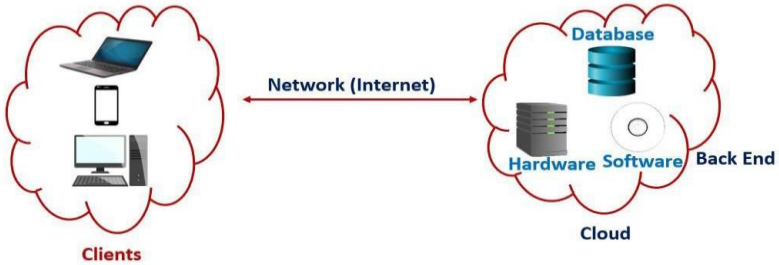
- Internet Connectivity
- Vendor Dependent
- Security
- Control
- Interoperability issues

Characteristics

- Elasticity & Scalability
- Pay per use
- On-Demand
- Resiliency
- Multi-Tenancy
- Work load movement

Advantages

- Improved flexibility
- Streamline business processes
- Pervasive availability
- Minimizes maintenance & software licensing requirement
- Less personnel training requirements
- Reduced spending on technology infrastructure.



Cloud Computing Environment Types

- Private/Internal Cloud
- Public Cloud
- Hybrid Cloud
- Community Cloud

Private/Internal Cloud

Meaning

Cloud computing environment residing within organizational boundaries & in the exclusive use of entity. *Types:*

- On-premises
- Outsourced

Characteristics

- Most secured cloud
- In exclusive control of entity
- Weak Service Level Agreement (SLAS)

Advantages

- High security & privacy
- Improves server utilization level & efficiency
- Controlled & maintained by entity itself

Limitations

Huge investment in IT hardware & software needed.

Public Cloud

Meaning

Cloud computing services offered by third party vendor to the public on pay per use basis like AWS, IBM Cloud, Google Cloud etc.

Drawbacks

- Data security
- Data confidentiality

Characteristics

- Highly scalable
- Affordable
- Less secured
- Highly available
- Stringent SLAS

Advantages

- Strict SLAS
- No limit on no. of users
- No need to acquire & operate IT hardware & software
- Organization can deliver highly scalable & reliable application at affordable cost.

Hybrid Cloud

Meaning

Combination of public cloud & a private cloud where entity runs its core data & application on private cloud & non-core data on the public cloud.

Characteristics

- Scalable
- Partially secured
- Complex cloud management

Limitations

- Less secured than public cloud
- Complex to manage

Advantages

- Highly scalable
- More secured than public cloud

Community Cloud

Meaning

Cloud computing service used exclusively by the members of a specific community or group.

Characteristics

- Collaboration & distribution
- Partially secured
- Cost effective

Disadvantage

- Less secure than private cloud
- Autonomy of entity may be lost
- In case of no collaboration, no community cloud possible

Advantages

- Low cost private type cloud
- Collaboration work on cloud
- More secured than public cloud

Cloud Computing Service Model/Kinds of services offered over Cloud

IaaS | PaaS | SaaS | Others

Infrastructure as a Service (IaaS)

Meaning

Hardware level service that provides basic computing resources like processing power, storage, database etc.

Characteristics

- Online Access
- Centralized Management
- Elastic & scalable
- Shared infrastructure
- Metered services

Major IaaS Model

a) Network as a Service (NaaS) - Service of
   - *Virtual Private Network (VPN)*
   - *Band Width on Demand (BoD)*
   - *Mobile Virtual Network (MVN)*

b) Storage as a Service (STaaS) - Storage infrastructure service to user & data synchronization over multiple devices.

c) Database as a Service (DBaaS) - Service of creation, storage & maintenance of databases over the cloud.

d) Backends as a Service (BaaS) - Web & mobile App developers are provided services like backend cloud storage connectivity, user management, push notification, social network integration.

e) Desktop as a Service (DTaaS) - Desktop virtualization service to user without the need to buy, manage & upgrade their own infrastructure.

Platform as a Service (PaaS)

Meaning

Cloud computing service model where users *provided tools & resources to develop & deploy their business application.*

User

Entity can develop, deploy and manage highly scalable application software through PaaS.

Example

- Google App Engine
- Unity Engine
- Amazon Web Services

Software as a Service (SaaS)

Meaning

In SaaS, complete software are offered over the cloud on pay as uses basis.

Types

- **Testing as a Service (Taas) -** User are provided software testing service.
- **API as a Service (APIaaS) -** Through APIaaS, user are allowed to explore the web functionality like Google Map etc.
- **Email as a Service (EaaS) -** Service of management, emailing, office record automation, spam blocking etc. are provided.

Other Cloud Computing Services

- **Communication as a Service (CaaS) -** Entity outsources all of its enterprise communication requirement to outside vendor on pay as uses basis.
- **Data as a Service (DaaS) -** User are provided data on demand like text data, images, audio, video etc. Highly used in financial services industry.
- **Security as a Service (SECaaS) -** Security services are integrated with the cloud services provided by the vendor.
- **Identify as a Service (IDaaS) -** Authentication infrastructure services like authentication service, single sign-on service, identity management & profile management services are provided.

Pertinent Issues in Cloud Computing

- Threshold Policy
- Interoperability
- Unexpected Behaviour
- Security Issues
- Legal Issues
- Software Development in cloud
- Bugs in large-scale distributed system

Grid Computing

Meaning

Distributed architecture of large no. of computers connected to each other through internet & each computer (Node) share computers resources with each other in the grid.

Benefits

- Making use of underutilized resources
- Parallel CPU capacity
- Resource Balancing
- Reliability
- Virtual resources & organization for collaboration
- Access to additional resources

Resources

- Computation
- Storage
- Software & Licenses
- Communication
- Special equipment, capacities, architecture etc.

Application Areas

- Large scale sciences & engineering projects
- Civil engineering collaborations
- Insurance companies mining data from partner hospitals
- Supports e-business workload
- Application service provider offloads excess work to computer cycle provider.

Security / Constrains to be considered

- Single sign-on
- Protection of credentials
- Interoperability with local security solutions
- Exportability
- Support for secured group communication
- Support for multiple implementations

Green Computing

Meaning

Also known as Green IT, ***it is the study & practice of environmentally sustainable computing***. It is the study and practice of using IT resources in more efficient & environmentally friendly way so that the ***damaging impact on the environment can be minimized***.

Best Practices

Major Steps are

- Develop sustainable green computing plan
- Recycle
- Make environmentally sound purchase decisions
- Reduce paper consumption
- Conserve energy

The Guardian

Google, Facebook and Apple lead on green data centers

The growth of cloud computing. While the Greenpeace report highlights several American companies that have committed to using renewable energy...

Virtualization

Meaning

Act of creating a virtual version of:

- Hardware (Hardware/Platform Virtualization)
- Storage Device (Storage Virtualization)
- Network Resources (Network Virtualization)

Application Areas

- Server Consolidation
- Disaster Recovery
- Testing & Training
- Portable Application
- Portable Workspace

Types

Hardware/Platform Virtualization

Creating a *virtual machine that acts like a real computer having an operating system (OS)* through a software called *hyper visor or virtual machine manager*. A layer of abstraction is added between hardware & OS running on it so that multiple OS can run on same machine. It allows *physical to virtual (P2V) transformation*.

Network Virtualization

Process of combining hardware and software network resources & network functionality into a single software-based entity called Virtual Network & it so created can be spilt-off into channel & assigned to different servers at real time.

Storage Virtualization

Pooling of data from different storage devices or different types of storage devices into a single virtual device that can be managed from a central console. It is also referred as ***abstracting the logical storage from physical storage***.

Bring Your Own Device (BYOD)

Meaning

Business policy where companies ***allows its employees to bring & use their own preferred computing devices*** like smart phone, laptop, tablet etc. ***for business related work***.

Advantages

- Happy Employees
- Increased employee efficiency
- Lower IT Budget
- Reduced IT support requirement
- Early adoption of new technologies

Disadvantages

- Network Risks
- Device Risks
- Application Risks
- Implementation Risks

Web 3.0 & Web 4.0

Meaning

It is *next logical evolution of internet & web technologies*. It is *read-write-execute web* where *user interaction level* is very high. *It uses:*

- Semantic web technologies
- Drag & drop features
- Widget
- Natural language processing
- Machine Learning
- Artificial Intelligence

Component

a) Semantic Web – Technology where data & information the web can be readily intercepted by machine without human intervention.

b) Web Services – Software system supports computer to computer interaction over internet.

Web 4.0

Web with following features:

- Autonomous
- Proactive
- Self-learning capabilities
- Collaborative
- Content generation agents based on AI, matured semantic etc.

Web 5.0

- Called as Telepathic Web or Symbiont Web.
- Highly complex future Web generation.
- To be present after 2030.
- Involves Body implants like brain implants.

Internet of Things (IoT)

Meaning

System of computing devices, machines, animals, people or other objects connected to the network & exchange data & information with each other.

Application areas

- Home Appliances
- Office Devices
- Government uses
- Human implements
- Connected car
- Wearables
- Smart Cities
- Smart grids
- Connected Health
- Smart Retail
- Industrial IoT

Risks

(a) Manufactures
- Unable to bring IoT technology may lead to out of business.
- Data storage is an issue.

(b) Users
- Security
- Privacy Autonomy & control
- Intentional obsolescence of devices

(c) Technology Risk

(d) Environmental Risk

Artificial Intelligence & Machine Learning

Meaning of AI

Research field that focuses on *creating intelligent computing machines having the ability of understanding, imagination & judgement* to solve the problem & adapt to new situations without any human interventions.

Meaning of ML

Type of AI that *provides computers the ability to learn without being explicitly programmed*.

Application Area

- Autonomous vehicles
- Medical & pharmaceutical devices
- Graphic Software
- Search engine
- Online Assistants like Apple Siri.

Risk

- Big security threat for human race
- Incorrect data thus incorrect conclusions
- May kill human skills & thinking

Control

Appropriate controls shall be developed based on the nature of AI tool, purpose etc.

Blockchain

Meaning

Blockchain uses Chain of blocks, also known as *Distributed Ledger Technology (DTL)*, it is a shared, Peer to Peer & decentralized open ledger technology system with no trusted party in between. This ledger database has every entity as permanent as it is an append only database.

Working

Wants to send Bitcoin or Money

A transaction is initiated → Transaction is broadcasted via the network (Internet/Intranet) → Network validates the transaction using cryptography → Transaction is represented online as a block → Block is added to the existing blockchain of those transactions → Transaction is completed

Risks

- Due to humongous data getting updated frequently, it may lead the *situation of information overload*.
- Due to the *absence of any central authority* to enforce & administer protocol amendments, it will affect the overall functioning & maintenance of blockchain.
- Organisation using blockchain shall consider the risk with a wider perspective as *different users could have different level of risk tolerances*.
- If the underlying technology *like consensus mechanism is tampered* with, the financial transactions stored in ledger could be inaccurate or unreliable.

Application Areas

- Financial Services
- Healthcare
- Government
- Travel Industry
- Economic Forecasts

Controls

- Organisation adopting blockchain *engage both internal & external auditor* during the development or identification of blockchain so to understand the auditability issues thereafter suitable controls are established to mitigate those issues.
- Unique aspects of blockchain like *private keys, consensus protocols* etc. shall be managed properly.
- *Computerized continuous monitoring* techniques shall be used to perform ongoing evaluations.
- Suitable *data analytics procedures* shall be developed to identify & obtain relevant data from blockchain.
- Communication methods shall be established to ensure that *operational charges & update related to blockchain* are communicated to right person in the right time.

Chapter No. 5 Core Banking Systems

Banking Industry & Banking Business

Introduction

Banking Industry in any country act as its backbone as without a developed & effective banking industry, economy can't grow. In last few decades, banking industry in India seen massive growth.

Key Features

- Custody of large volume of cash & other monetary items
- Dealing in large no. of transactions
- Operates through wide network of geographically dispersed branches
- High possibility of fraud

Services

- Acceptance of Deposits
- Granting of Advances
- Remittances
- Collection
- Clearing
- Letter of Credit
- Letter of Guarantee
- Credit Card
- Debit Card
- Other Banking Services
  - Retail Banking
  - HNI Banking
  - Risk Management
  - Back Operations
  - Other Services like broking, underwriting, insurance (Life/General).

Remittances

Transfer of fund from one place to another. Several Methods Used:

Traditional

- DD (Instrument handed over to applicant)
- TT/MT (No instrument handed over to applicant)

Modern/EFT

- RTGS
- NEFT
- IMPS

Clearing

Collection of proceeds from the instruments lodged by customer with the bank like Cheque, DD, pay order

ECS Debit

Bank collects fund on behalf of its customer from large no. of people (e.g. Water company, Electricity company)

ECA Credit

Bank pays from the account of its customer to large no. of people like payment of salary, interest etc.

Letter of Credit (LC)

Undertaking given by Bank to the payee (i.e. supplier of goods or service) to pay him on behalf of the buyer (purchaser) upto the amount specified in LC provided the terms & conditions mentioned in LC are complied

Letter of Guarantee

Person needed to submit a bank guarantee to its customer, legal department or government (CBDT or CBIC etc.) *Banks provides those Bank guarantee services for a commission.*

Core Banking Solution (CBS)

Meaning

CORE stands for *Centralized Online Real Time Environment*. CBS refers to the IT solutions where a central shared database supports the entire banking operations.

Characteristics

- Centralized Banking Software with several modules
- Uses Centralized databases
- Modular in nature and can be implemented in stages
- Supported by advance technology
- Can integrate both in-house & third-party vendor software
- Customer becomes customer of bank & not of that branch only.

Popular CBS Software

- Finacle (Infosys)
- FinnOne (Nucleus)
- Flex Cube (Oracle)
- BankMate (IBM)
- BaNCS (TCS)

Task Performed through CBS

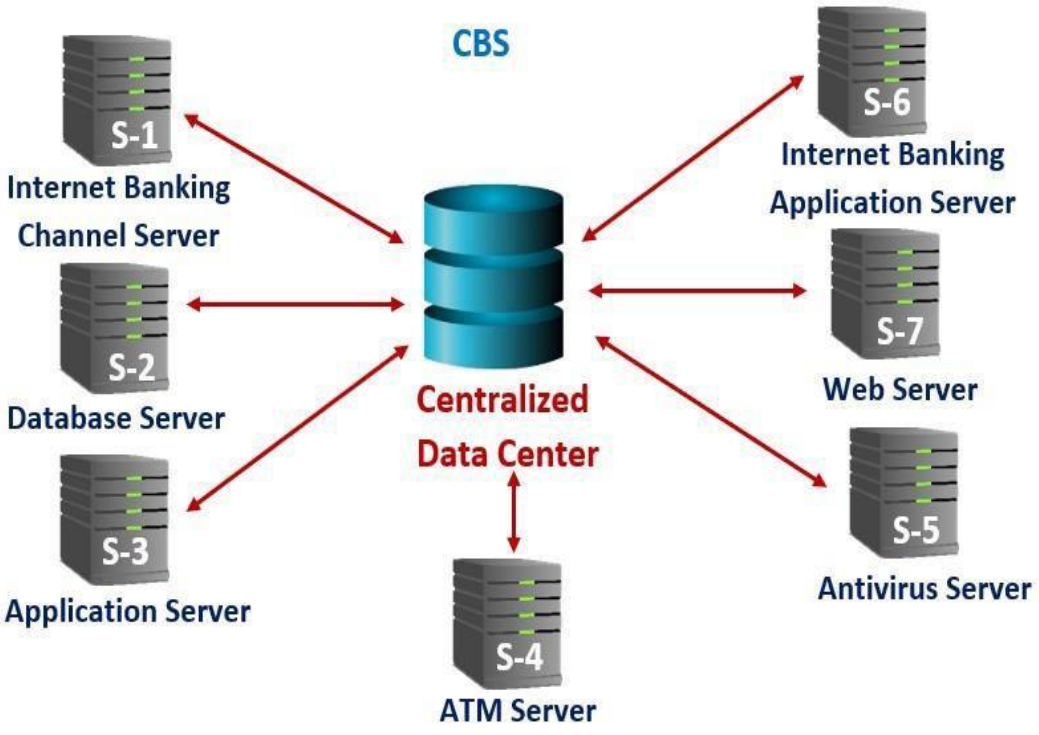
- Opening new account
- Recording of transaction
- Passbook management
- Loan distribution
- Interest calculation
- Cash deposit & withdrawal
- Customer record management

Core/Main Features

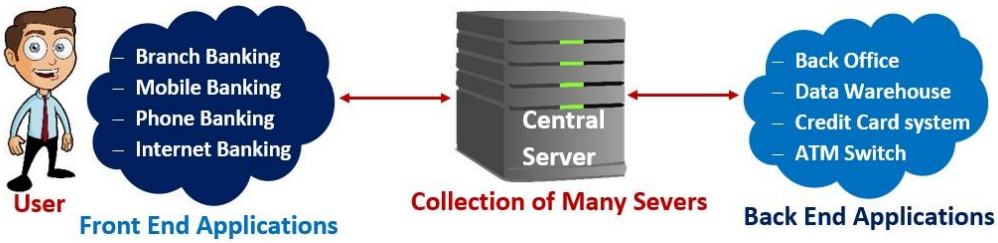
- Centralized databases & servers
- Online real time processing
- Transaction posted immediately
- Anytime, anywhere access
- Remote interaction
- Automatic processing of standing instruction
- Authorization occurs within application

Stages involved in CBS Deployment & Implementation

- Planning
- Approval
- Selection
- Design & Develop or Procure
- Testing
- Implementation
- Maintenance
- Support
- Updation
- Audit



Key Modules of CBS



Front-End Applications

Through it, customer interacts with the Bank. It consists:

- **Branch Banking –** All the member branches are connected to the centralized Data centers & customer can perform banking from any member branch.
- **Mobile Banking –** Customer can access banking services through the mobile App which they need to install from Play Store in their smart-phone.
- **Internet Banking –** Online Banking where banking services are provided through the website of the Bank itself like www.onlinesbi.com
- **Phone Banking –** Customer can avail banking services through the telephonic conversation with the bank's contact center.

Central Server (CDC)

It is the *backbone of the entire CBS mechanism and it made CORE Banking possible*. All the branches of the bank are connected to the central server.

Back-End Applications

It supports the entire Banking operations. It consists of:

- **Back Office –** Consists of administrator & support personnel & performs task like clearance, settlement, accounting, record maintenance etc.
- **Data Warehouse –** Helps Bank to simplify & standardize the data management task.
- **Credit Card System –** Manages all the credit card functions of the Bank like credit card management, customer information management, customer account management etc.
- **ATM Switch –** ATM allows customer to perform banking task like balance checking, fund transfer, cash withdrawal etc. Without ATM switch, ATM will not function.

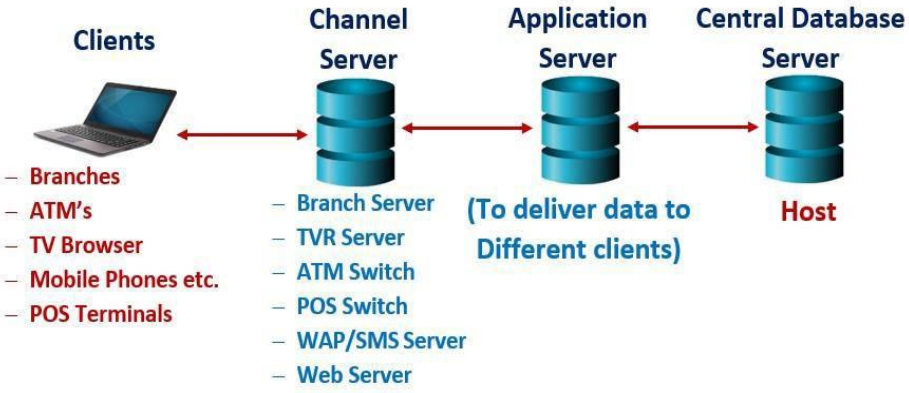
Components & Architecture of CBS

Technology Architecture

It consists of client at top which interacts with channel server which interacts with Application Server & which interacts with Central Database Server.

Key aspects to be built into CBS Architecture

- Information Flow
- Customer Centric
- Regulatory Compliances
- Resource Optimization



Functional Architecture

CBS is modular in nature i.e. made of different modules. *However bank is not required to install all of the modules of CBS* and they can choose to install only those modules which are essential for the bank to carry out their functions.

Technology Components of CBS

The key Technology Components

- Database Environment
- Application Server
- Cyber Security

Key Features of Cyber Security Framework Prescribed by RBI

1) Network Security & secure configuration
2) Application security
3) Data centre & Disaster Recovery centre
4) Online Transaction Monitoring for fraud risk management

Network Security & Secure Configuration

Key measures to be implemented are

- Multi-layered boundary defense through proxy server, IDS, Firewall etc.
- Different LAN segments for in-house / on site ATM & CBS / branch network
- Proper uses of routers, hubs, switches
- Periodic security review of systems
- Identification of risks to ensure that it is within bank's risk appetite.

Application Security

Security Policy to ensure CIA of data & information & *will include the following:*

- Bank Specific email domains
- Have two factor authentication
- Implement password management policy
- Effective change management process
- Robust configuration management process
- Capturing of audit log & an alert mechanism to monitor any changes in log setting
- Proper reporting mechanism

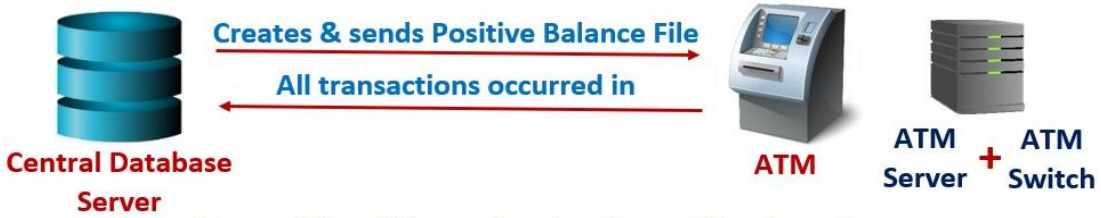
CBS IT Environment / Servers Used in CBS Environment

Meaning

In CBS, all the branches are connected to central data center. All CBS services are managed through servers. Servers are powerful computers that provides services to all the connected devices called clients. *CBS works on client-server architecture*.

Types of Servers Used

- **Database Server –** Contains all data of the bank. Bank needs to ensure database server shall be secured, properly maintained & updated. Bank employ *"Database Administrators"* for this purpose.
- **Application Server –** Stores various application software (business logics) to perform different banking activities. To keep application server updated, changes should not be made directly to application server but a separate server called test server.
- **Web Server –** Hosts web pages & delivers it when a request is made by the browser of the client through HTTP or HTTPS protocol.
- **Internet Banking Channel Server (IBCS) –** Hosts software that stores user name & password of all internet banking customers.
- **ATM Server –** Hosts software that stores the details of the ATM account holders of the bank. When Central Database is busy, it sends a file called *"Positive Balance File (PBF)"* to ATM switch so that ATM services shall continue even when the central Database is unavailable.



- **Anti-Virus Software Server –** Hosts anti-virus software that ensures all data & software are scanned & free from viruses & other malware.
- **Proxy Server –** Allows to make indirect connection to the network service.
- **Internet Banking Application Server (IBAS) –** It hosts software which authenticates the customer with the login details stored in IBCS.

Core Business Processes Flow & Relevant Risks & Controls

(A) Business Process Flow of Current & Saving Accounts (CASA)

It is one of the most common service provided by Banks.

Risk & Key Controls

(a) **Credit line Set-up is unauthorized –** Check financial ratios, net worth & other factors before offering credit line.

(b) **Credit line Set-up in CBS is unauthorized –** Access right to authorize credit line restricted to authorized person.

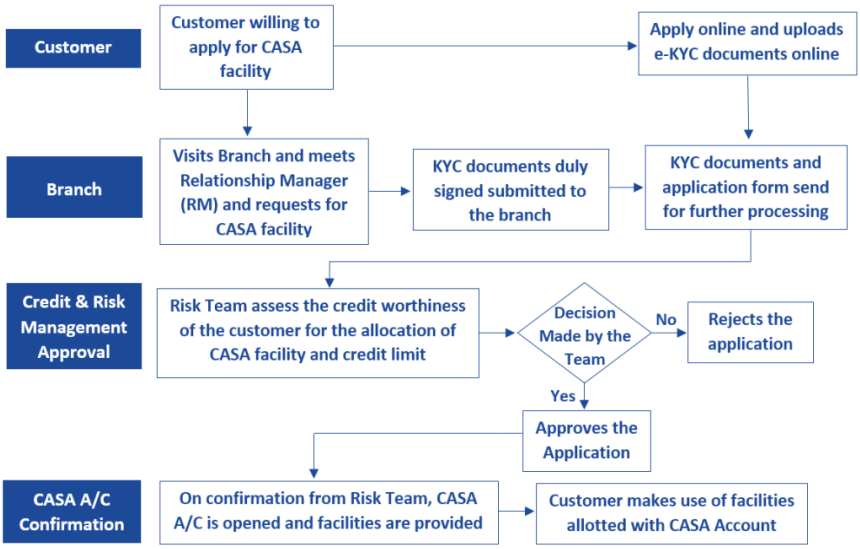
(c) **Inaccurate interest or charges –** Interest or charges be calculated automatically in CBS.

(d) **Customer Master defined in CBS not as per PDC –** Access right to authorize customer master restricted to authorized person.

(e) **Inaccurate accounting entries –** Accounting entries on facilities requested & used.

(f) **Unauthorized person approving CASA transaction –** Proper SOD should exist.

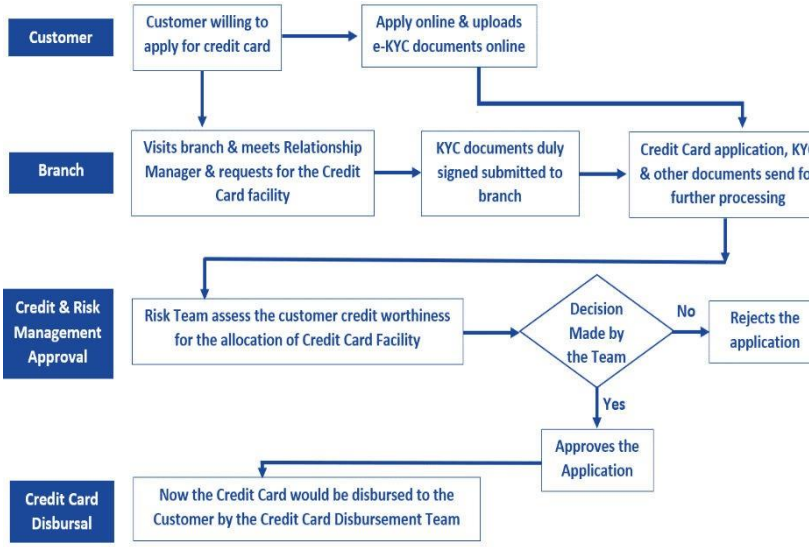
Process Flow



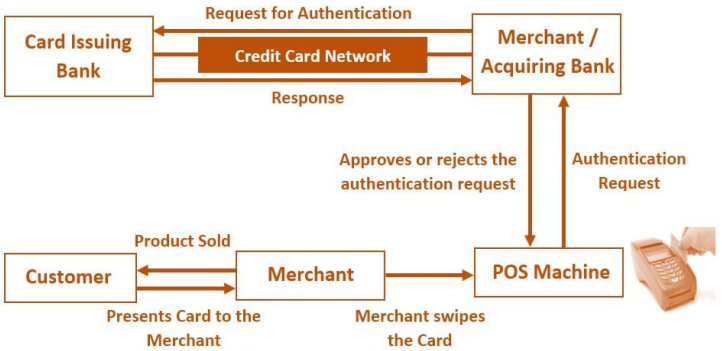
(B) Business Process Flow of Credit Cards

Credit Card process has three steps:

Step - 1: Issuance of Credit-Card Facility



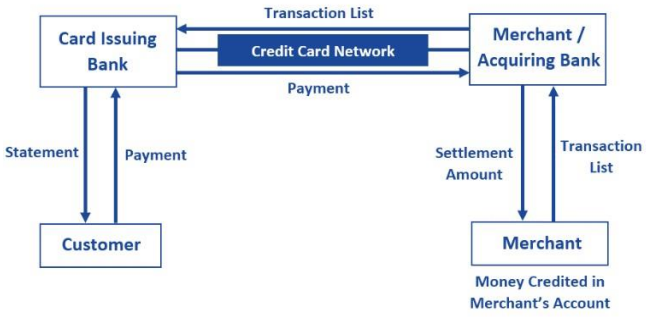
Step - 2: Sale & Authorization Process



Risk & Key Controls

a) Credit line Set-up is unauthorized – Check financial ratios, net worth & other factors before offering credit line.
b) Credit line Set-up in CBS is unauthorized – Access right to authorize credit line in CBS restricted to authorized person.
c) Inaccurate interest or changes – Interest or changes be calculated automatically in CBS.
d) Customer Master defined in CBS not as per PDC – Access right to authorize customer master restricted to authorized person.
e) Breach of Credit line Set-up – Transaction can not made if aggregate limit of outstanding amount exceeds limit assigned.
f) Inaccurate Reconciliation Performed – Daily reconciliation.

Step - 3: Clearing & Settlement



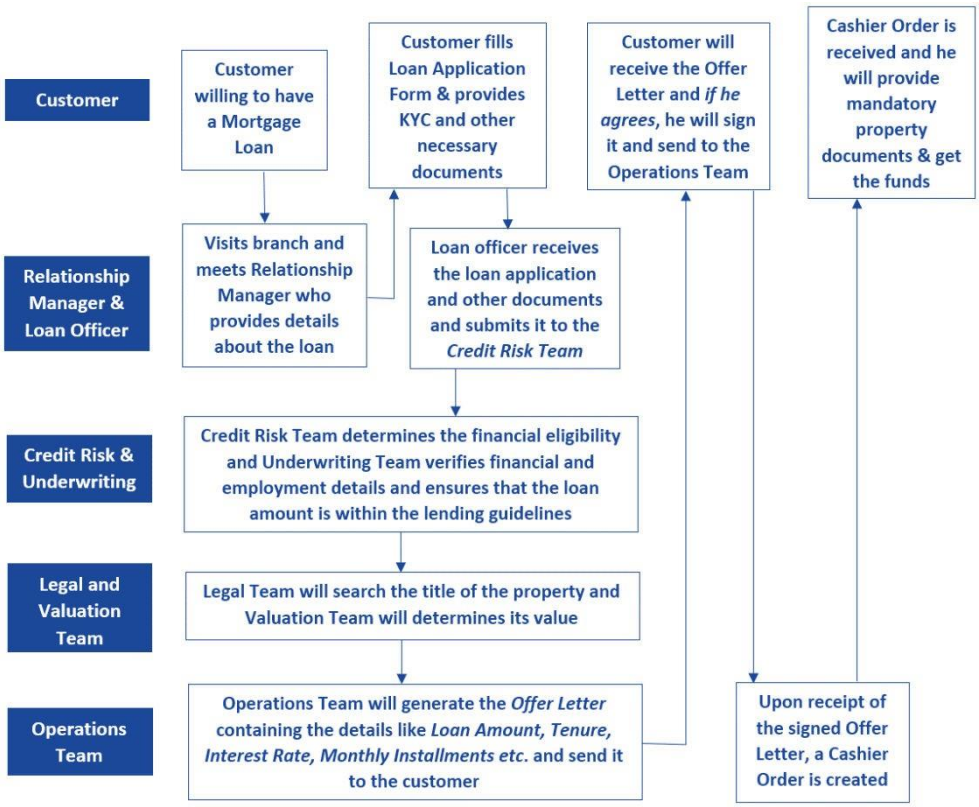
(C) Mortgage Process Flow

Mortgage loan is a *secured loan which is secured by making a lien on the borrower's property*. Mortgage can be fixed rate mortgage or floating rate mortgage.

Types of Mortgage Loan

- House Loan
- Top-Up Loan
- Loan for Under Construction Property

Mortgage Process Flow



Risk & Key Controls

a) Incorrect Customer & Loan details captured – Secondary review by independent team to verify loan details.
b) Incorrect loan amount disbursed – Secondary review by independent tam to verify loan amount.
c) Inaccurate interest calculation – Interest calculated automatically in CBS.
d) Unauthorized changes made to Loan master or customer master – Access right to authorize loan master or customer master restricted to authorized person only.

(D) Treasury Process

Meaning

Banks how have a regular business to deal in investment & security to deal in investment & security products like shares, debentures, bonds, derivatives (options, future, Swap), government securities etc. All these activities are managed by treasury operations department of the Bank. ***It has three parts:***

Process Flow

Front Office Operations

Dealing room where dealer enters into deal with its customers (like big corporates or other banks) for the treasury products through a trading platform or telephonic conversation. In case of derivate transactions, counter party should have valid ISDA Agreement.

Middle Office Operations

It deals with

- Risk Management
- Treasury Accounting
- Documentation
- Budgeting
- Preparing financial result
- Pricing

Back Office Operations

It directly supports trading room (Front Office) through.

- Reconciliation of ISDA Agreement
- Reconciliation of NOSTRO A/c
- FOBO Reconciliation
- Settlement of Trade etc.

Today due to Straight-Through-Processing (STP) transaction processing is very quick & even on real time basis.

Risks & Controls

a) Unauthorized securities set-up in system – Proper SOD & control over securities master.
b) Inaccurate Trade Processed – Appropriate SOD & review controls.
c) Insufficient Security available for settlement – Effective controls on securities & margin.
d) Insufficient fund available for settlement – Effective control over fund availability & margin.
e) Incorrect NOSTRO Payment Processing – Effective controls for NOSTRO reconciliation & payment.
f) Incorrect & Incomplete data flow between system – Inter-system reconciliation & effective batch processing control.

(E) Loan & Trade Finance Process

Meaning

Banks provides varies types of credit facilities to its customers. Loan & advances is one of the major business of the banks. These credit facilities can be:

- Fund Based Credit Facility &
- Non-Fund Based Credit Facility

Income & Accounting

Product	Income for Bank	Accounting
Cash credit/Overdraft	Interest on CC/OD	Interest accrued on a daily basis
Demand Loan/Term Loan	Interest on Loan Income	Interest accrued on a daily basis
Bill Discounting	Discounting Income	Interest accrued on a daily basis
Bank Guarantees	Commission Income	Commission accrued over the tenure of the bank guarantee
Letter of Credit	Commission Income	Commission accrued over the tenure of the letter of credit

Risks & Controls

a) **Credit line Set-up is unauthorized –** Credit team shall check financial ratios, Net-worth etc.

b) **Credit line Set-up in CBS is unauthorized –** Access right to authorize credit line in CBS restricted to authorized person only.

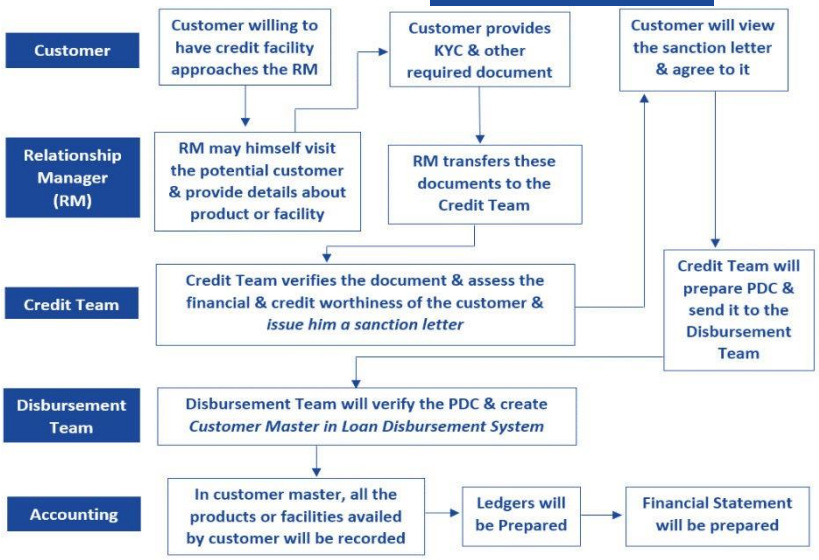
c) **Breach of Credit line Set-up –** Transaction cannot made if outstanding amount exceeds assigned limit.

d) **Customer Master defined in CBS not as per PDC –** Access right to authorize customer master in CBS restricted to authorized person.

e) **Inaccurate interest or changes –** Interest or changes be calculated automatically in CBS.

f) **Lower interest or communication charged –** Facility will be restricted by CBS if interest or commission charged is lower than defined in customer master.

Process Flow



(F) Internet Banking Process

Process

Step-1: Customer with account applies bank for internet banking facility.

Step-2: Customer is issued user ID & password.

Step-3: Customer visit bank website & login with his user ID & password.

Step-4: Web server passes request to IBAS which access IBCS to authenticate the login id and password provided.

Step-5: If authentication details matched, access granted & if not than *"Access Denied"* massage displayed & customer will have to log-in again.

Services Offered

- Balance inquiry
- Fund Transfer
- Cheque book issue request
- Change of password
- Account statement
- Stop payment etc.

CBS Risks, Security Policy & Controls

Risks | Information Security | Internal Control & IT Control | Application Software

Risks

Operational Risk

Risks arises *due to inadequate or failed internal process, people or system.*

Credit Risk

Risk that an asset (loan) will become irrecoverable.

Market Risk

Risk of loses in bank's trading book due to change in equity prices, interest rates, forex rates, credit spread, commodity prices etc.

Strategic Risk

Risk of decline in earnings due to a changing business environment like new competitor.

Compliance Risk

Risk of fine or penalties that organization will face when it fails to comply with law, regulation etc.

IT Risk

Risk associated with:

- Ownership of data
- Authorization process
- Authentication procedure
- Access controls
- Change management
- Maintaining response time
- User identity management

Information Security in Bank

Meaning

Security refers to *ensuring the confidentiality, integrity & availability* (CIA) of data & information. RBI asked banks to obtain ISO 27001:2013 security certificate. *Information security comprises following process:*

- Information security policies, procedures & practices
- User security administration
- Application security
- Database security
- Operating system security
- Network security
- Physical security

Related Risk & Control

a) **IS Resources may be modified or disclosed –** Administrators passwords be adequately protected & periodically changed.

b) **Loss of CIA of Information System –** Proper access controls & change in default vendor password.

c) **Lack of Management Commitment & Direction –** proper information security policy to be established & management should ensure its compliance.

d) **User accountability not established –** All user's accountability to be established & they are given user ID & Password.

e) **Password are easy to guess –** Password should be complex kept confidential & changed frequently.

f) **Inadequate Security from Environment Threats –** Proper environment controls mechanism like smoke detectors, fire extinguishers, humidity control devices.

Internal Controls & IT Controls

Meaning

Controls refers to the *policies, procedures, practices and organisational structure* designed to provide reasonable assurance that business objectives are achieved, and undesired events are prevented or detected and corrected.

Related Risk & Control

- Orderly efficient conduct of business
- Adherence to management polices
- Safeguard of asset
- Prevention & detection of fraud & errors
- Accuracy & completeness of accounting record
- Timely preparation of reliable financial statements

Internal Control Examples

- System of job rotation of staff
- Fraud prone items in the custody of at least two officials
- Work of one staff be verified by another (maker-checker)
- Powers of officials fixed & communicated
- Branch manager to send periodic compliance report
- All books should be periodically balanced

IT Controls

IT risks are becoming a major threat for banking industry & to mitigate IT related threat, entity needs IT controls.

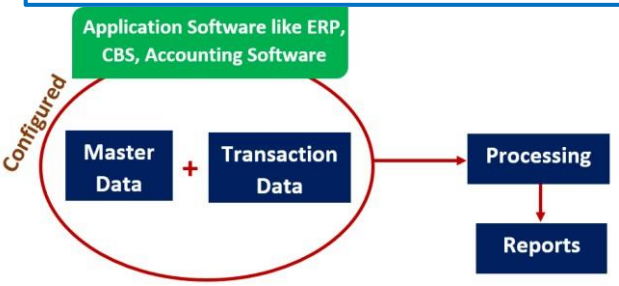
Some of the IT controls are:

(a) System to maintain record of all log-in & log-out
(b) System access available during stipulated hour & days
(c) There should be user time out system
(d) Access rights be given on "need to know" basis (RBAC)
(e) Supervisory level password needed to:
  - Open ledger after end of the day process over
  - Put transaction in dormant account
  - Process all exception situations

Application Software – Configuration, Master, Transaction & Reports

Meaning

Application software (ERP, CBS, Accounting Software etc.) *have primarily four gateways through which entity can control its functioning.*



Configuration

The way software system is set-up.

- *Password Management*
- *User activation & deactivation*
- *User access & privileges configuration*
- *Creation of customer type, vendor type etc.*
- *Defining access rules*

Masters

Also called standing data, it defines how software will process transaction.

- *Vendor Master*
- *Customer Master*
- *Material Master*
- *Employees Master*
- *Tax Master etc.*

Transaction

Actual Transaction performed by the user like:

- Deposit related transaction
- Advances related transaction
- ECS related transaction
- General ledger transaction

Report

CBS software has extensive reporting feature through which it can generate standard & on-demand report like:

- Summary of transaction of day
- Daily general ledger
- MIS Report
- Performance Report
- Compliance Report
- Exceptions Report

Related Risks & Controls

a) Inappropriate set-up of accounts – System Parameter for account set-up be defined as per Bank rule.

b) Inappropriate security over system parameter setting – Authority to make system parameter be restricted to authorized persons only.

c) Inappropriate reversal of charges – System does not permit reversal of changes in excess of original amount charged.

d) Incorrect interest computation – Interest should be computed automatically in CBS.

e) Multiple liens on single asset – System does not permit creation of more than one lien on same asset.

f) Incorrect classification & provisioning of NPA – CBS should perform NPA classification automatically as per RBI guidelines.

Applicable Regulatory & Compliance Requirements

Banking Regulation Act, 1949

It applies to all banking companies. In 1965, the act was amended & Section 56 was inserted through which act extended to co-operative Bank also. Through this act, commercial banking in India is supervised & regulated. ***This Act gives RBI the following power:***

- Regulate banking operation
- Give licenses to banks
- Regulate shareholding & voting rights
- Supervise appointment of board & management
- Lay down instructions for audit
- Issue direction to bank
- Impose penalties

NI Act, 1881

As cheque & other Negotiable instruments are used in banking industry, this Act is very crucial for Banks. As per the Act, cheque includes electronic *image of a truncated cheque & a cheque in the electronic form*. Cheque in the electronic form means a mirror image of a paper check.

RBI Regulations

Banking Industry, FI & NBFC are supervised by RBI. RBI was established on 1st April 1935 through RBI Act, 1934. ***Key Functions of RBI:***

- Monetary Authority
- Regulation & Supervisor
- Issue of Currency

IT Act 2000

Already Covered in Chapter No. 1

Money Laundering & PML Act, 2002

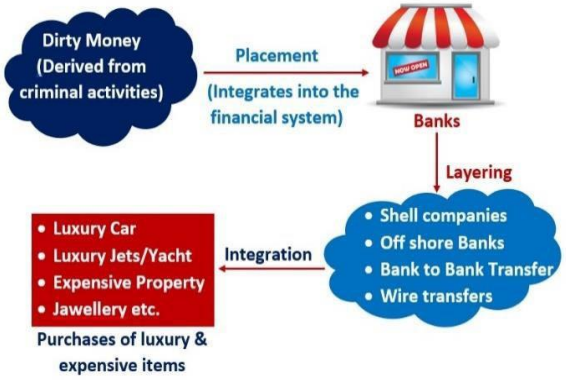
Process by which proceeds of crime & true ownership of the proceeds are concealed to make it appear to come from legitimate sources. It is the process of making dirty money look clear & legitimate. ***It has following steps:***

(a) **Placement** – Placement of the proceeds derived from illegal activities in the banking system.

(b) **Layering** – Mechanism of making it difficult to detect money laundering activity through Shell companies, off-shore banks, countries having loose laws etc.

(c) **Integration** – Mechanism of integrating the laundered money in economy through the banking system like through property dealing, false invoices, false loan etc. Finally person purchase.

To curb the practice of money laundering, Prevention of Money Laundering Act, 2002 has been introduced.



PML Act, 2002

List of Chapters & Sections			
Chapter	**Description of Chapter**	**Section**	**Description of Section**
II	Offence of Money-Laundering	3	Offence of Money-Laundering
IV	Obligations of Banking Companies, Financial Institutions & Intermediaries	12 13	Reporting entity to maintain records Powers of Director to impose fine
X	Miscellaneous	63 70	Punishment for false information or failure to give information, etc. Offences by companies

Offence of Money Laundering (Section 3)

Whosoever directly or indirectly attempts to indulge or knowingly assists or knowingly is a party or is actually involved in the money laundering activity shall be

Reporting entity to maintain records (Section 12)

Every reporting entity shall maintain record of all prescribed transaction for the period of 5 years from the date of transaction & report transaction to Enforcement Director within such time as may be prescribed.

Power of director to impose fine (Section 13)

The director may make inquiry with regard to the obligations of the reporting entity. He may also direct reporting authority to get its audited by a Chartered Accountant. The director, if he finds that reporting entity failed to comply with obligations, may

- Issue warning in writing
- Direct it to comply with instructions
- Direct it to send reports
- Impose monetary penalty which shall not less than ₹ 10,000 but go upto ₹ 10,0,000 for each failure.

Punishment for false information or failure to give information (Section 63)

- Any person giving false information causing arrest or search under this act be liable for imprisonment upto 2 years or ₹50,000 or both.
- If any person legally bound to give true information refuses to give information or, refuses to sign statement made by high or refuses to produce soaks etc. to whom summon issued u/s 50 pay penalty not less than ₹500 upto ₹10,000 for each such failure.

Offences by companies (Section 70)

If any offence committed by a company than every person in charge or responsible to the company shall be deemed to be quality of contravention *until he is able to prove that contravention took place*:

- *Without his knowledge*
- *He exercised all due diligence.*

Company means body corporate & includes firm or other association of individual.

Basel III Norms & AI in Banking Industry

Introduction

Financial crisis of 2008 caused significant concern for the banking industry & exposed the weak financial & risk management system in Bank.

Process

It is a comprehensive set of reform measures developed by Basel committee on Banking supervision which aims to strengthen the regulation, supervision & risk management of banking sector & enhances its ability to absorb financial shocks. It specified capital adequacy norms for banks based on their risk assessment.

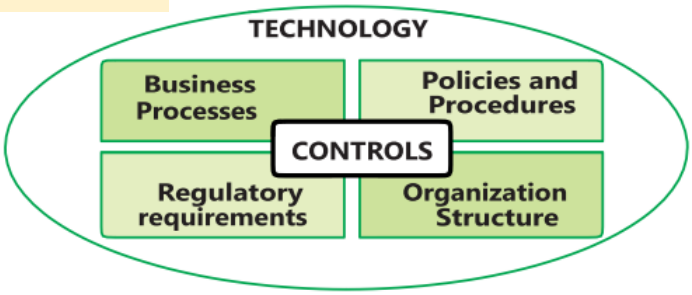
How Bank Specific Risk assessed

As Nature of Banking business & risk involved is quite complex, traditional risk assessment tools do not work & thus AI powered tools are used. For this data from CBS are transferred to Data warehouse & to analyze them AI power tools are used.

Key Components of Banking Business & Technology

Key Components

- Business Processes
- Policies & Procedures
- Organization Structure
- Regulatory Requirements



Impact of Technology

All the key components of the banking business are under the huge influence of technology in the CBS environment. All these four components are *configured as per the requirement of the bank*. If it fails, then none of the processes can be performed. So all these components shall be configured & updated properly & necessary controls shall be established.

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