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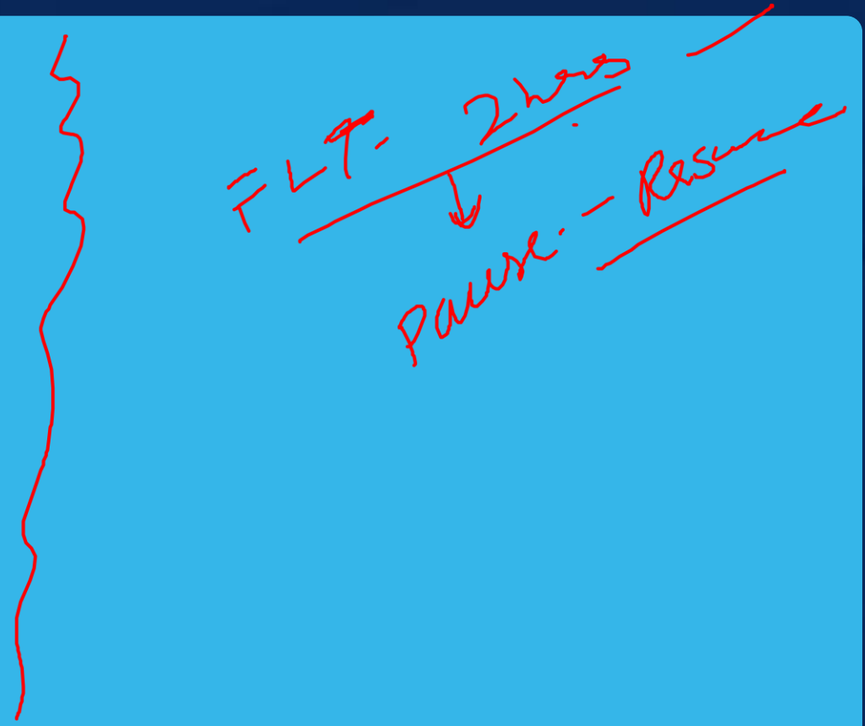
PPB

Crash course

Module- C

Lec-01



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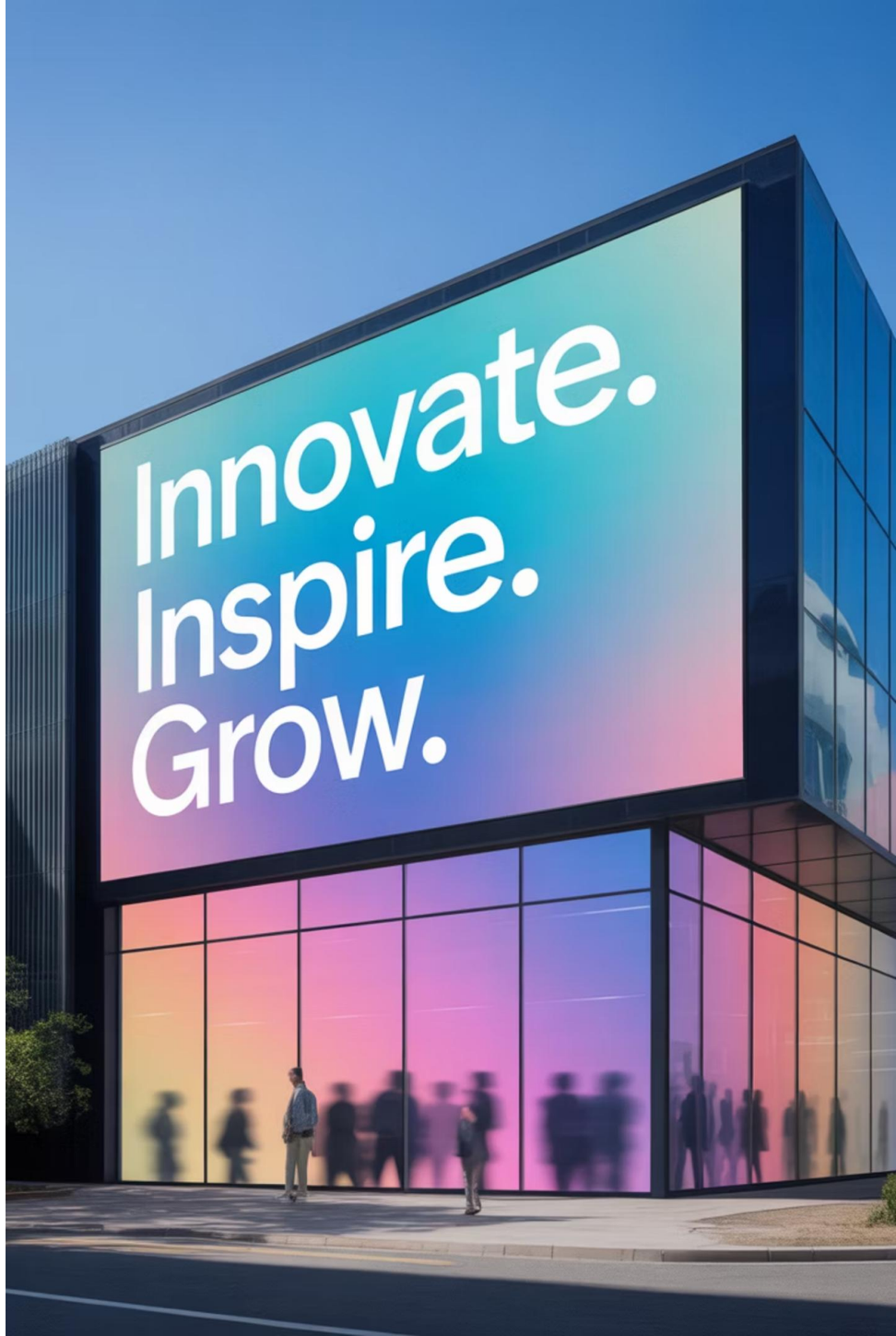
Essentials of Bank Computerisation

1 [Foundation]

Digital Banking Revolution

The transformation of Indian banking from passive computerization to comprehensive digital services, driven by the Rangarajan Committee's 1983 recommendations and liberalization policies.



The Catalyst: 1983 Rangarajan Committee

Before 1983

Banks maintained passive approach to computerization with minimal technological adoption.

After 1983

First Rangarajan Committee Report sparked brisk activities for quick technological changes in banking operations.

Four Pillars of Bank Computerization

Customer Service

Enhanced service delivery and reduced waiting times

Housekeeping

Improved internal operations and data management

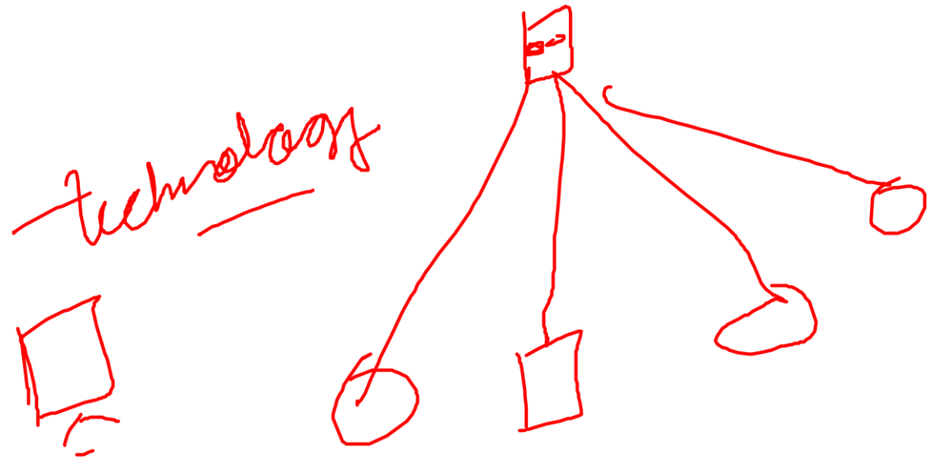
Decision-Making

Better analytical capabilities for strategic choices

Productivity

Increased profitability through operational efficiency

Evolution of Banking Systems



1 Stand-alone Systems

Single-user systems for decision-making processes. Low cost but limited processing speed and storage capacity.

2 Multi-User Systems

Central server supporting multiple terminals through time-sharing, enabling online applications development.

3 Total Branch Automation

Integrated systems enabling single-window concept and Electronic Fund Transfer capabilities.

Centralized Data Processing Benefits

Anywhere, Anytime Banking

Services available across all branches and delivery channels

Resource Optimization

Economical hardware, software, and skilled manpower utilization

Enhanced Security

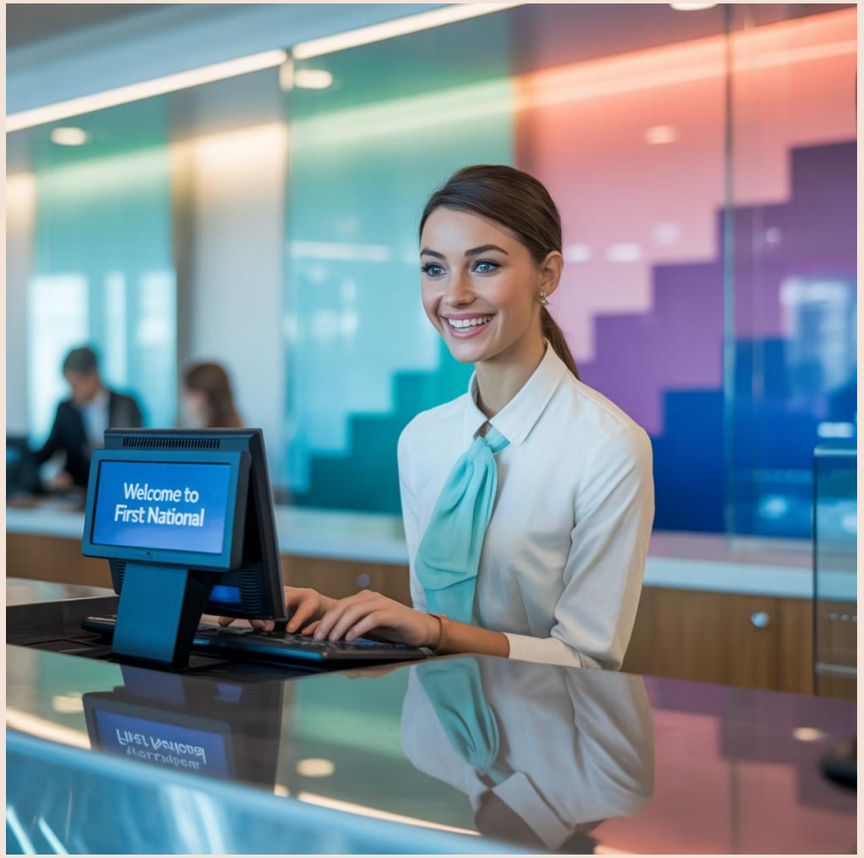
Better data availability and centralized security management

Branch-Level Computerization Impact

Key Advantages

- Better and speedy customer service
- Improved housekeeping operations
- Enhanced branch-level data analysis
- Automated report generation

ALPMs (Automatic Ledger Posting Machines) handled specific products like Savings and Current accounts, though General Ledger remained manual.



Regional Office Functions

Branch Profile Management

Fixed particulars (location, premises) and variable data (performance, income/expenditure statistics)

Credit Monitoring

Decentralized loan supervision with centralized database access for effective control

Personnel Management

Employee database including qualifications, training, transfers, and performance evaluation

Head Office Computerization Areas

HRD & Administrative Support

Payroll processing, PF management, employee loans and advances

Funds Management

Managing RBI balances and government securities within regulatory limits

Investment Portfolio

Mathematical models to maximize returns on approved securities

Credit Information System

Comprehensive borrower data for planning, monitoring, and statutory reporting

Network Infrastructure Foundation

High-performance computer networks form the backbone of financial institutions, requiring security, reliability, scalability, and optimized speed for uninterrupted service delivery.

> "Network infrastructure is essential for maximum speed and efficiency in banking operations."

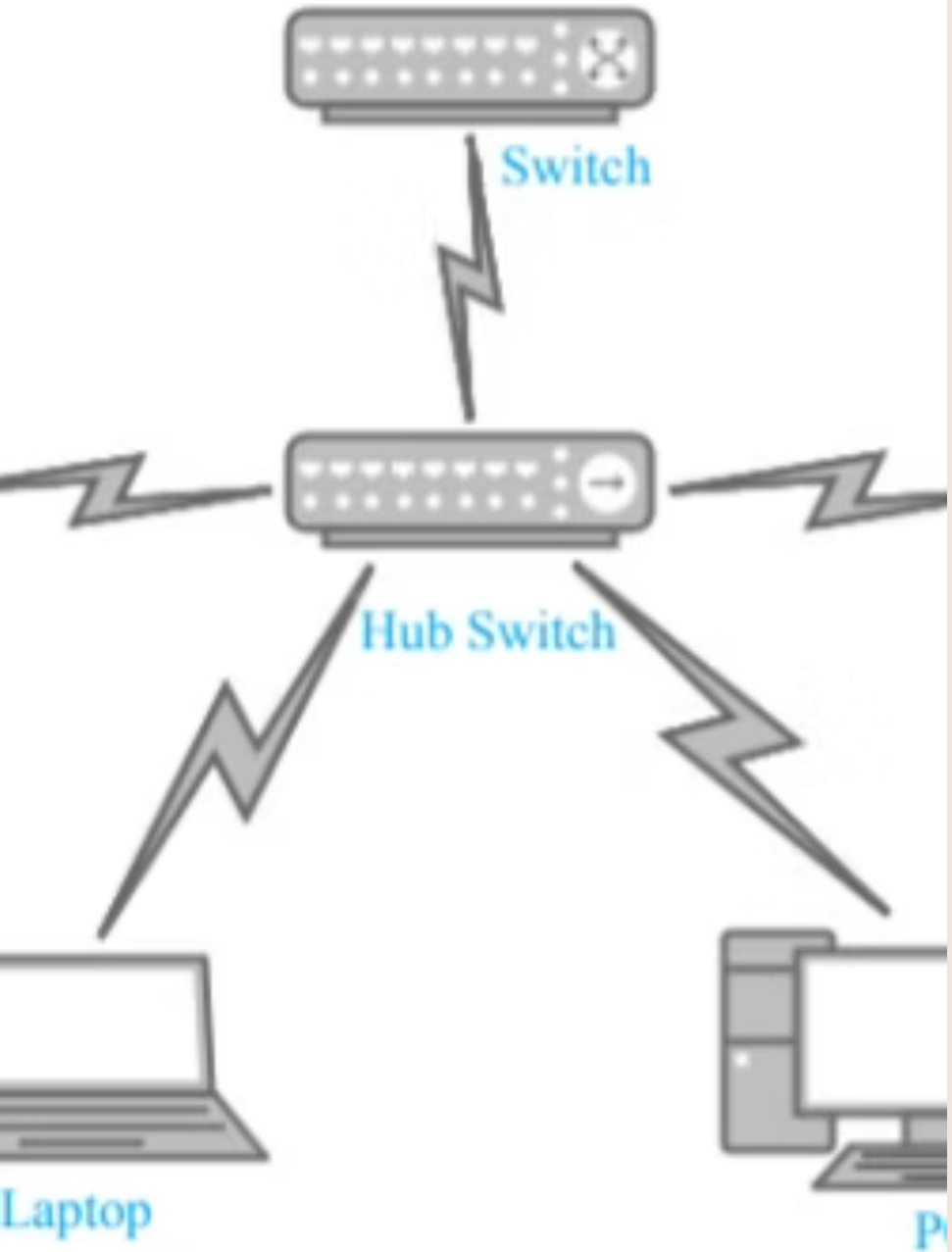


Figure 42.1 Local Area Network

Local Area Network (LAN) Architecture

LANs connect computers and peripherals within localized areas (typically within 100 meters for Cat5e cables). Central server nodes provide network services while client nodes route requests for necessary services.

Network Topologies Comparison

Bus Topology

Single continuous cable, easy setup, limited flexibility

Ring Topology

Closed-loop connection, one-direction data flow, single point failure risk

Star Topology

Central master node, maximum flexibility, traffic bottleneck potential

Tree Topology

Hierarchical structure with root, intermediate, and leaf nodes

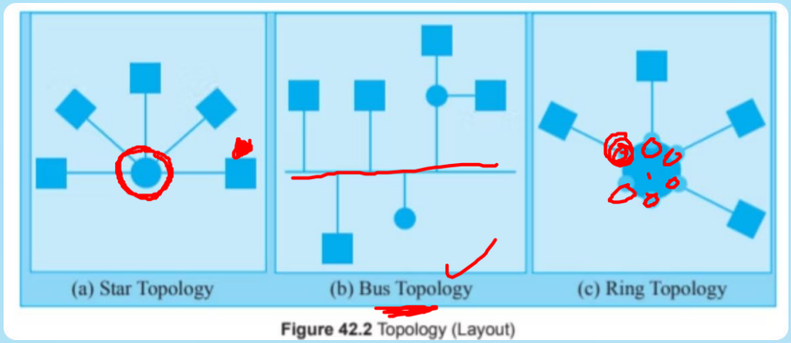


Figure 42.2 Topology (Layout)

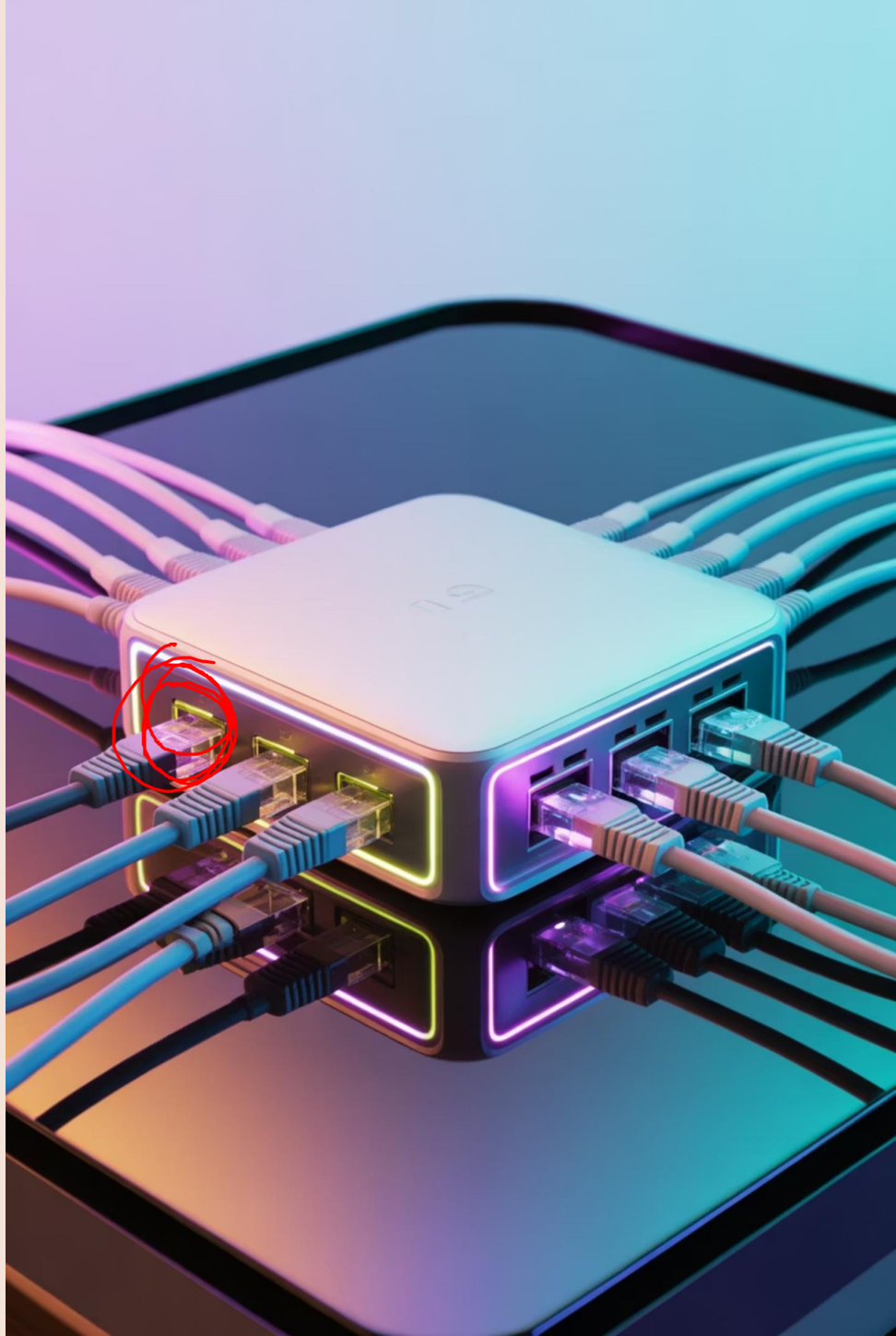
Network Protocols & Communication

Ethernet Technology

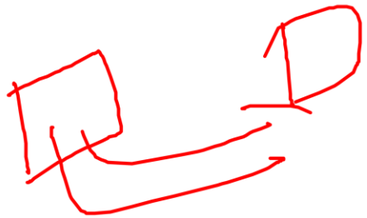
Uses CSMA/CD (Carrier-Sense Multiple Access with Collision Detection) for media sharing. Stations transmit only when channel is clear.

Token-Ring System

Deterministic media-access control using special token frames passed node-to-node for transmission authority.



Essential Network Devices



Network Interface Cards

Hardware components connecting computers to networks

Hubs & Switches

Connect multiple devices, route information intelligently

Routers & Gateways

Forward data packets, connect dissimilar networks

Security Devices

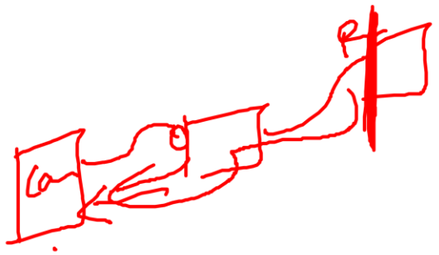
Firewalls, WAP, modems for secure communications

Wide Area Network (WAN) Implementation

WANs interconnect branches with regional offices and head offices across sizeable geographic areas using telecommunications networks including leased lines, dial-up, satellite, and microwave links.

Microwave systems enable broadband transmission up to 40 km with direct line-of-sight between dish antennas.

Uninterrupted Power Systems (UPS)



1

Online UPS

Continuous AC-DC-AC conversion, automatic battery backup during power failures

2

Offline UPS

Separate battery charger and inverter, electronic changeover with millisecond response

UPS systems protect IT assets from blackouts, brownouts, swells, sags, surges, and interference, ensuring business continuity and preventing data loss.

Core Banking System (CBS) Architecture

Centralized branch computerization model connecting branches to central host, incorporating automation modules and online delivery channels under integrated infrastructure using WAN technology.

> "One banking software for all branches operated on the Bank's intranet infrastructure."

CBS Business Components

Customer Banking Modules

Deposits, loans, bills, remittances, lockers, clearing services

Trade Finance & Forex

International business and foreign exchange operations

Government Business

Corporate finance and specialized service branch modules

Business Intelligence

Enhanced MIS and analytics for strategic decision-making

CBS Benefits & Requirements

Key Benefits

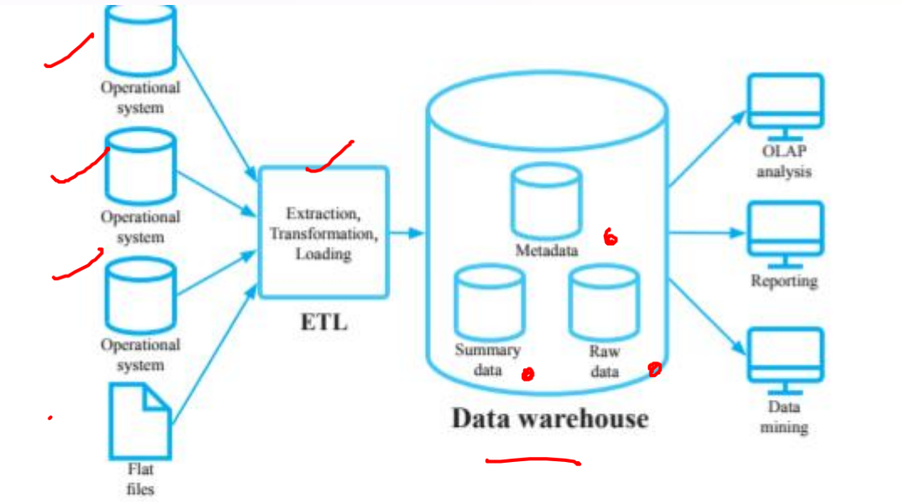
- 24×7 customer services from any branch
- Centralized data repository
- Integrated delivery channels (ATM, Internet, Mobile)
- Standardized software across branches
- Business process re-engineering capabilities

Essential Requirements

- Primary Data Centre with redundant power
- Communication network for all branches
- Disaster Recovery Site (DRS)
- Skilled personnel pool for 24×7 operations

Data Warehousing & Analytics

Banks leverage historical CBS data for analytics through OLAP environments. Data warehouses store subject-oriented, integrated, non-volatile, time-variant information for business intelligence and decision support systems.



Block diagram of a Data warehouse. (Courtesy IBM)

Data Mart: A data mart is a simple form of a data warehouse that is focused on a single subject or line of business, such as sales, finance, or marketing. Given their focus, data marts draw data from fewer sources than data warehouses. Datamart sources can include internal operational systems, a central data warehouse, and external data.

Data Lake: A data lake allows organisations to store large amount of structured and unstructured data (for example, from social media or clickstream data) and immediately make it available for real-time analytics, data science, and machine learning use cases. With a data lake, data is ingested in its original form, without alteration.

Data Mining Applications in Banking

5

Key Applications

Loan risk, credit risk, portfolio analysis, demographics, insurance risk

Risk Analysis

Loan performance evaluation and credit card transaction approval decisions

Customer Insights

Demographic analysis for targeted market focus and behavior prediction

Portfolio Optimization

Securities performance analysis and investment strategy development

Operational Aspects of CBS Environment

Core Banking Solutions: The Digital Backbone of Modern Banking

Core Banking Solutions (CBS) represent the convergence of Communication Technology and Information Technology to meet essential banking needs. Banks can be categorized as non-computerized, partially computerized, or fully computerized based on their level of technological adoption.

Under CBS, client software is installed at different branches to connect to a central server for accessing and updating customer information. Branches connect through lease lines, MPLS, VSAT, RF, 3G/4G and other networking technologies.

Leading CBS Software Solutions

Finacle

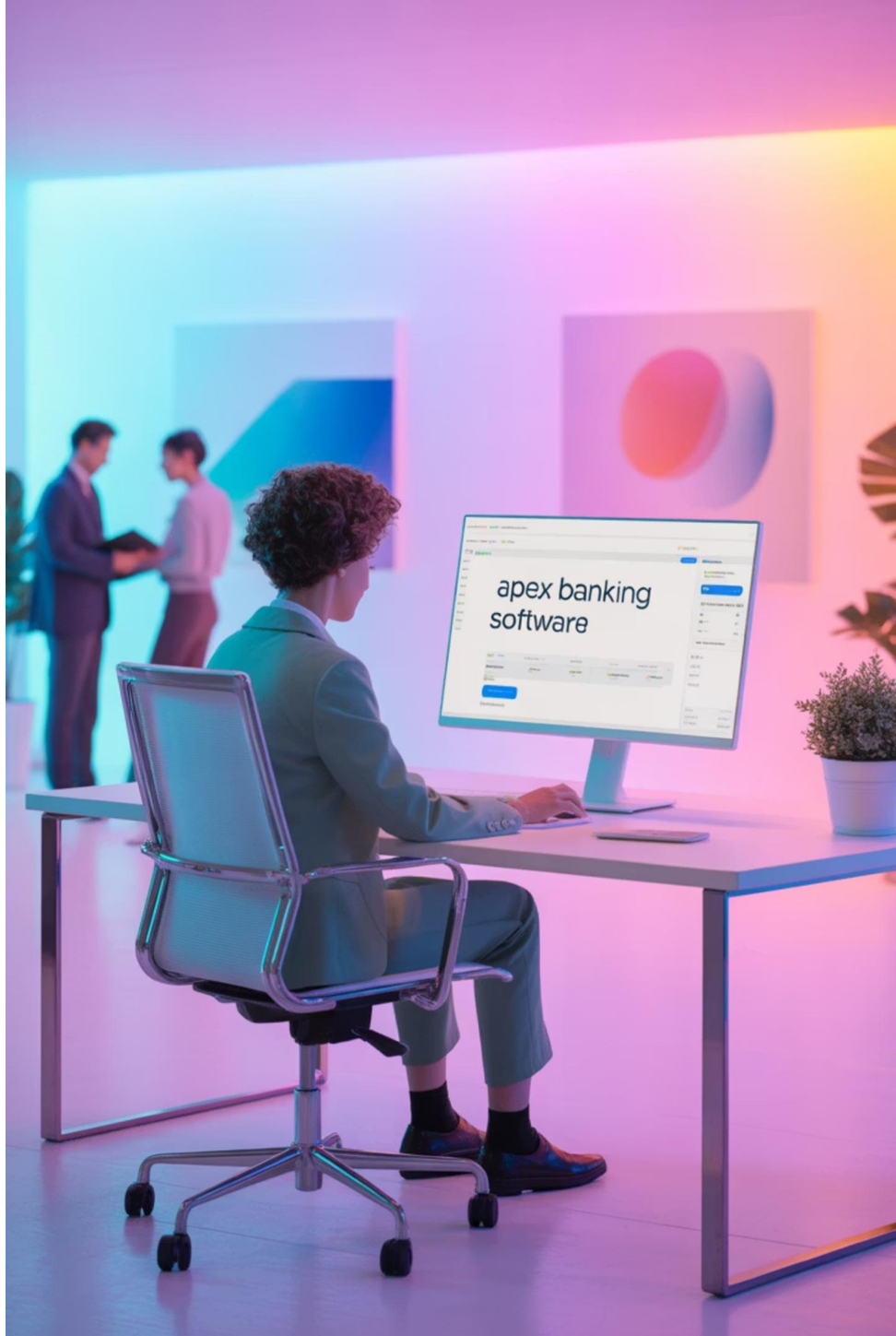
Developed by Infosys, one of the most widely adopted core banking platforms globally

BaNCS

TCS's comprehensive banking solution offering end-to-end financial services.

Flexcube

Oracle's robust core banking platform designed for universal banking needs



Comprehensive CBS Functions

CBS has evolved to handle virtually every banking transaction. The system's capabilities span across all critical banking operations, from basic account management to complex regulatory reporting.

Account Management

Customer accounts and office account management with comprehensive tracking

Transaction Processing

Cash deposits, withdrawals, and complete transaction management including history

Loan Operations

Loans disbursal, management, and comprehensive asset classification

Advanced CBS Capabilities

Financial Operations

- Interest calculation on advances and deposits
- Charges and fees application
- Minimum balance and transaction charges
- Asset classification and income recognition

System Integration

- Payment systems interfaces
- Regulatory compliance connections
- Third-party service provider integration
- Alternative delivery channel support

Digital Banking Revolution

One of CBS's prime features is facilitating online banking operations through digital channels like ATMs, mobile banking, and internet banking. This has revolutionized customer experience and operational efficiency.

1

Faster Clearing

Accelerated cheque clearing processes

2

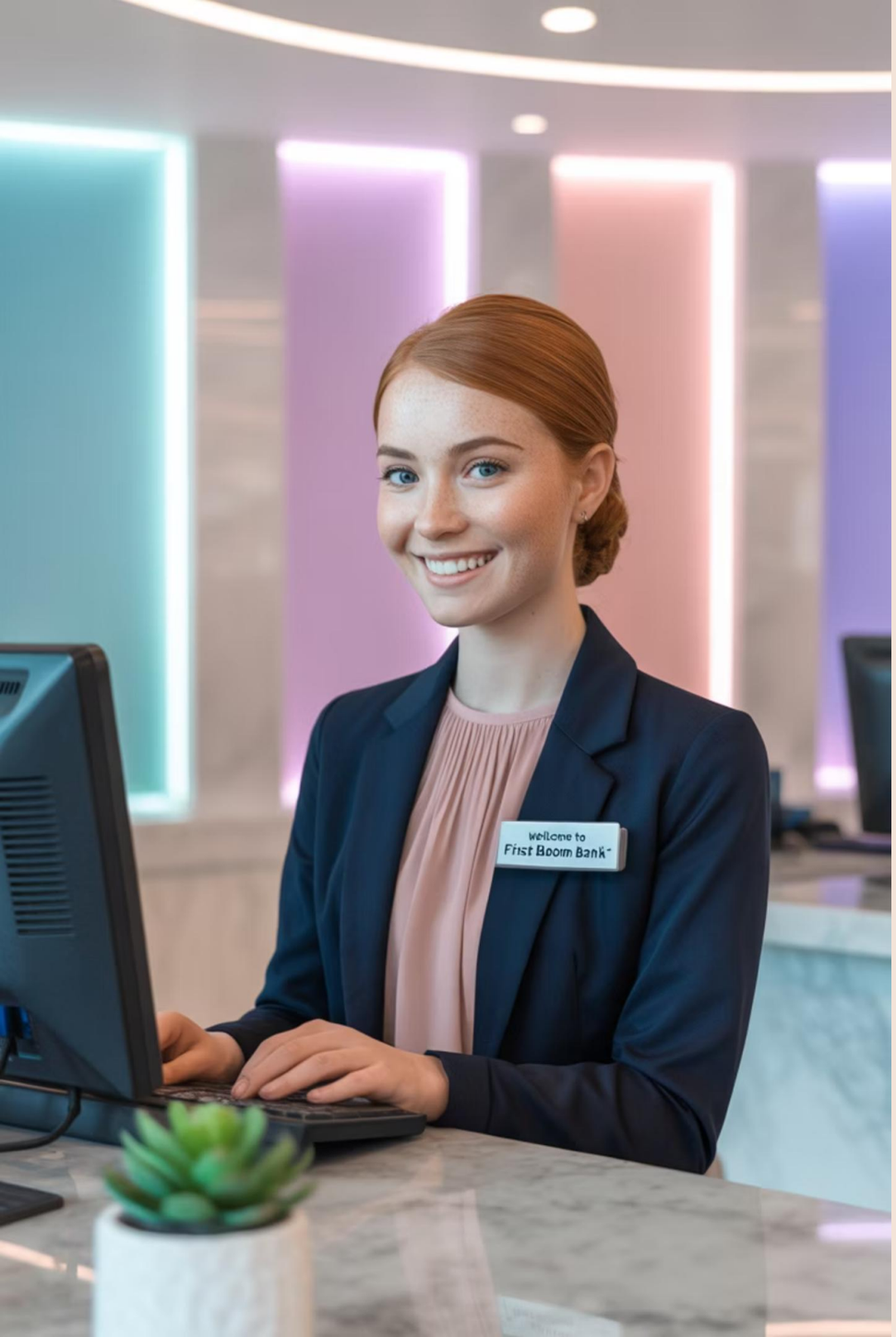
Improved Housekeeping

Prevention of income leakages

3

Automated Reconciliation

Faster, accurate inter-branch reconciliations



Three Types of CBS Transactions

Cash Transactions

Direct cash deposits and withdrawals processed at branch locations

Clearing Transactions

Cheque clearing and inter-bank settlement processes

Transfer Transactions

Electronic fund transfers between accounts and institutions

Transaction Flow Architecture

Transactions from branches, customers through alternative delivery channels, or third-party vendors are ultimately reflected in the central database. Each channel has different workflow requirements and security protocols.

01

User Authentication

Branch users log in with credentials and biometric authentication at CBS terminals

02

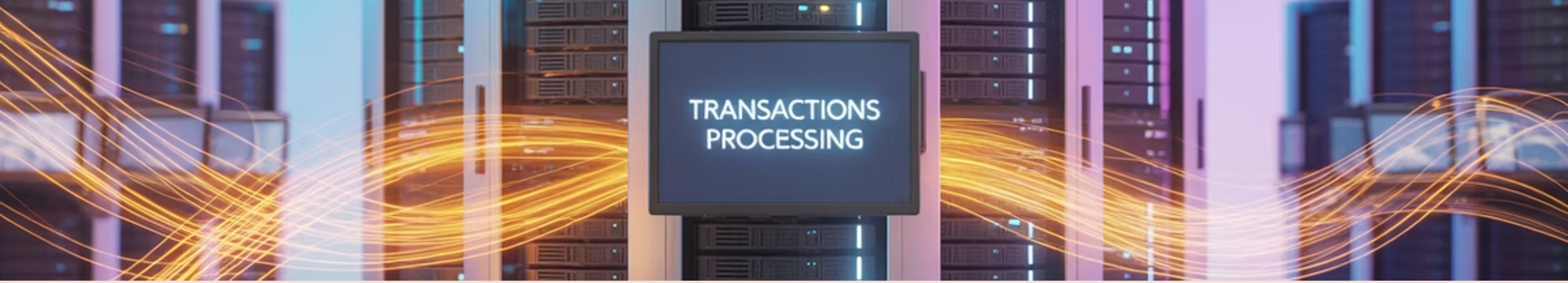
Transaction Processing

Transactions follow maker-checker functionality with multi-factor authentication

03

Central Database Update

Transactions commit to central database after all legs are completed

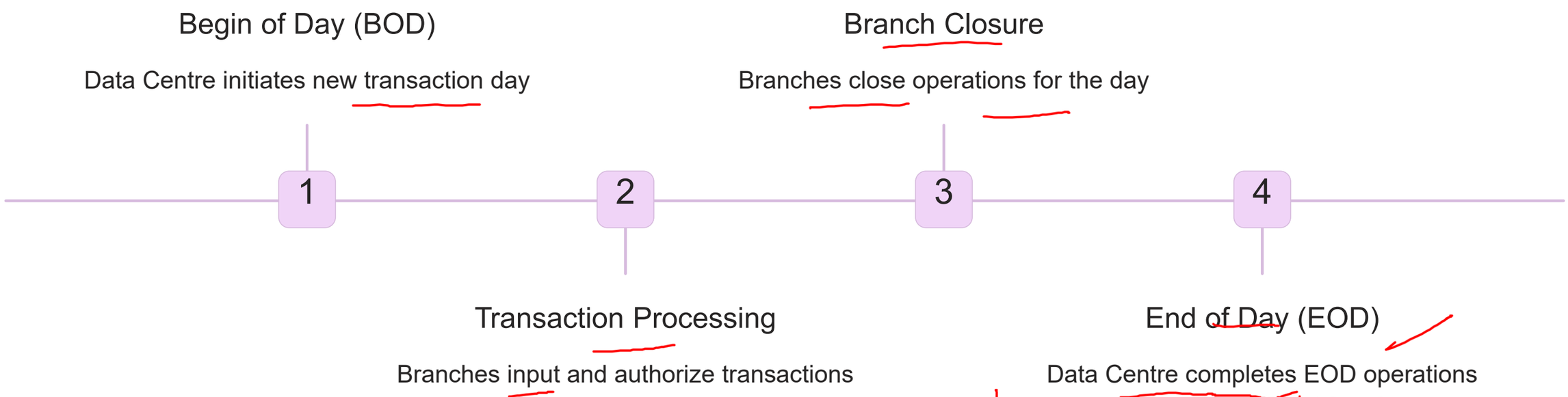


Real-Time Transaction Processing

Core banking solutions operate as Online Transaction Processing Systems on a real-time basis. Transactions are simultaneously processed across all sub-systems including customer account ledgers, general ledger, and other accounting books.

The system validates account numbers, balances, teller authority, officer authorization, and other product-level parameters. Transactions also flow from alternative delivery channels and treasury systems into the core banking system.

Critical Daily Operations Cycle



This cycle includes reports checking, backup operations, interest application, standing instructions execution, and generation of various reports including exceptional reports.

Begin of Day (BOD) Operations

BOD process opens a new transaction day and depends on the previous day's EOD completion. Days are business days specified in branch calendars, so BOD runs even if only one branch operates.

New Day Initialization

System starts fresh transaction day

Time Deposit Processing

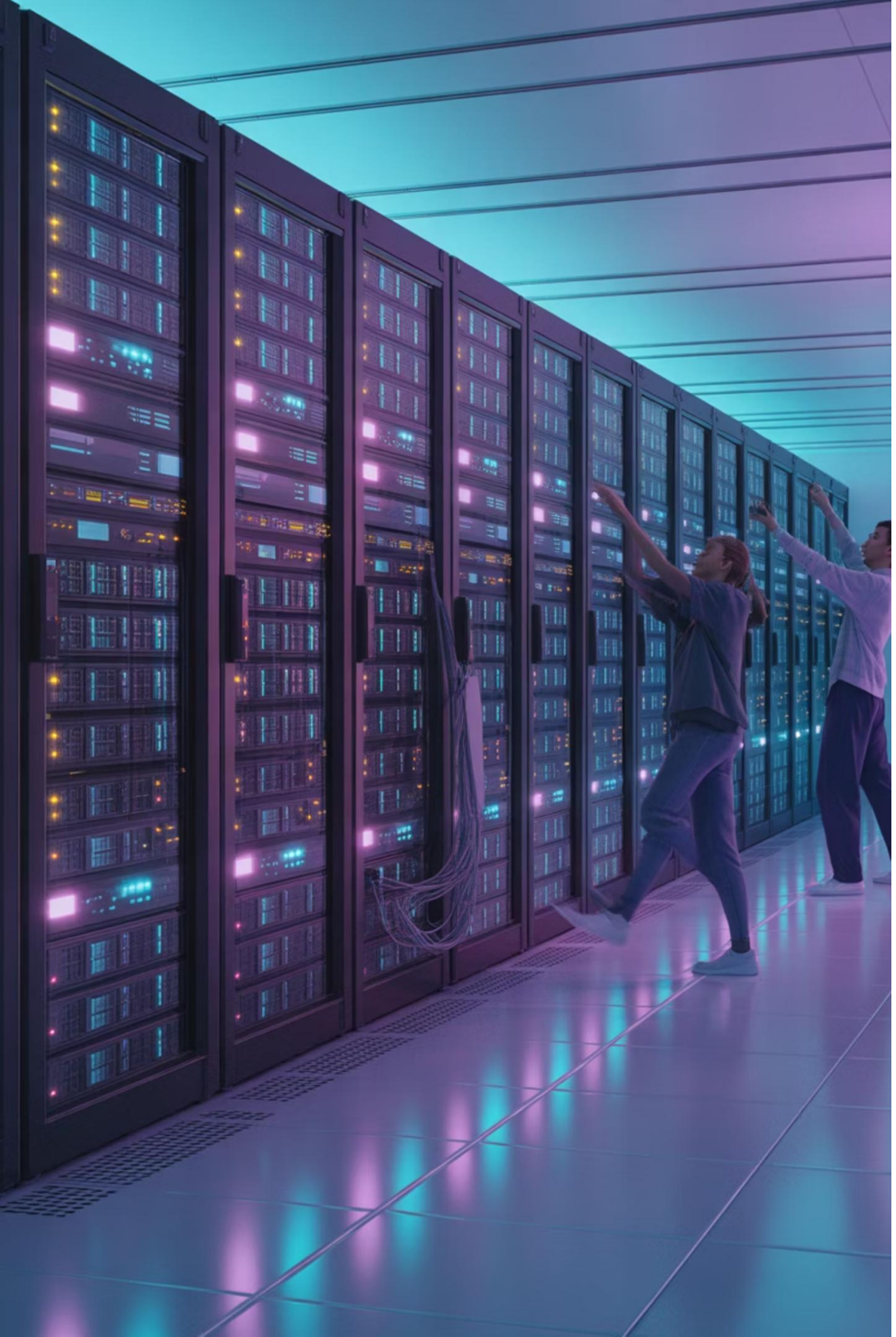
Interest calculations and maturity processing

Standing Instructions

Automated execution of recurring transactions

Value Date Processing

Cheque processing based on system setup



End of Day (EOD) Critical Activities

Banks must ensure EOD activities are carried out regularly and documented. Most activities occur at the Data Centre or Branch depending on CBS architecture.

Financial Processing

- Minimum balance calculations
- Current account product calculations
- Mandatory report generation
- Backup procedures activation

Documentation & Security

- Access log generation
- Audit trail creation
- Transaction numbering
- Secure backup storage

Robust Password Security Framework

CBS supports strong password access control mechanisms with comprehensive security requirements. Basic operational controls include segregation of duties, four-eye principle, rotation of duties, and ownership of systems for access rights.

Password Requirements

- Minimum eight characters with mixed case
- Letters, numbers, and special characters
- No dictionary words or password reuse
- Periodic changes and encrypted storage

Access Control

- Multi-factor authentication for critical modules
- Disabled passwords during employee absence
- Dual control for sensitive operations
- Protected system administrator passwords

Master Files and Parameters

Parameter/Master Files store all relevant account information including interest rates, penal charges, commission rates, and operation limits. This setup occurs during initial computerization implementation.

Account Master Data

Complete customer account information and parameters

System Parameters

Interest rates, charges, and operational limits configuration

Holiday Management

Bank holidays and business day calendars

⚠ Parameter files must be read-only for operators to prevent unauthorized modifications that could lead to revenue leakage.

Essential Master File Components

- **Account Structure**

  General ledger account types and organizational structure

- **Interest Rate Management**

  Advances and deposit interest rates for various schemes and tenors

- **Authorization Framework**

  User types, work classes, and exceptional transaction rights

Logical Access Control Framework

To safeguard assets and maintain data integrity, comprehensive access controls must be implemented. The Chief Information Security Officer ensures available security features are properly deployed.

01

Minimum Access Principle

Users receive only the minimum access level needed for their job functions

02

Restricted Application Access

Access limited to specific applications, menus, files, and servers

03

Maintenance Controls

File maintenance restricted to minimum personnel with proper approval

04

Security Monitoring

Regular access level reviews and violation detection methods

Operational Security Controls

Key security aspects ensure authorized, accurate, and complete data processing while preventing unauthorized system access and program amendments.

Data Integrity Controls

- System restart without record distortion
- Prevention of unauthorized program changes
- Access controls matching staff responsibilities
- Segregation of duties and user monitoring

System Security Measures

- Parameter change authentication
- Manual charge authorization
- Complete module implementation
- Regular exceptional report verification

Backup and Recovery Protocols

Banks must maintain comprehensive backup procedures with proper documentation and secure storage. Daily and monthly backups require specific protocols and custody arrangements.

Daily Backup Requirements

Six sets for weekdays, properly labeled and indexed under joint custody

Monthly Backup Sets

Twelve sets for each month with maintained backup register

Secure Storage

Fireproof cabinets with lock and key, off-site emergency preservation

Cybersecurity and System Protection

Banks must implement comprehensive security measures to protect against cyber-attacks and electronic payment system misuse, following RBI guidelines on information security and technology risk management.

Anti-Virus Protection

Latest version software installed on all servers and PCs, regularly updated for new threats

Security Patches

Timely application of vendor-released security updates and patches

Physical Access Control

Restricted computer room access to authorized personnel only

Comprehensive Bank Responsibilities

Banks must establish robust frameworks addressing increasing cyber-attacks and electronic payment system misuse. RBI guidelines mandate specific policies and procedures for comprehensive risk management.

1 Policy Framework

IT Policy, data processing interfaces, integrity, and security protocols

2 Business Continuity

Disaster recovery plans and accounting manual procedures

3 Control Documentation

E-banking products, MIS reports, and exceptional report generation

4 Audit Compliance

System audits, internal reviews, and customer complaint resolution

System Audit Requirements

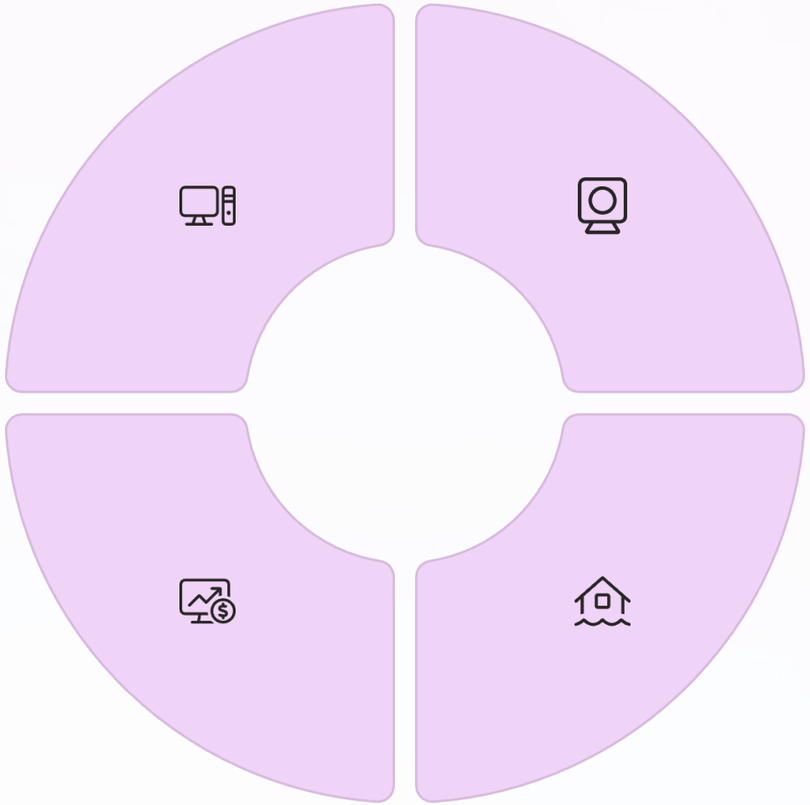
Banks must conduct system audits by chartered accountant firms to ensure safe, secure, sound, and efficient payment system operations according to RBI-authorized process flows.

Hardware Structure

Evaluation of physical infrastructure and operating systems

Security Controls

Access controls on key applications and security measures



Personnel Training

Staff competency in system and application management

Recovery Plans

Disaster recovery capabilities and business continuity

Thank You

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