



SYSTEM OUTLINE PAPER CIBEX2-SOP V001

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Chrysalis Information Systems Ltd.

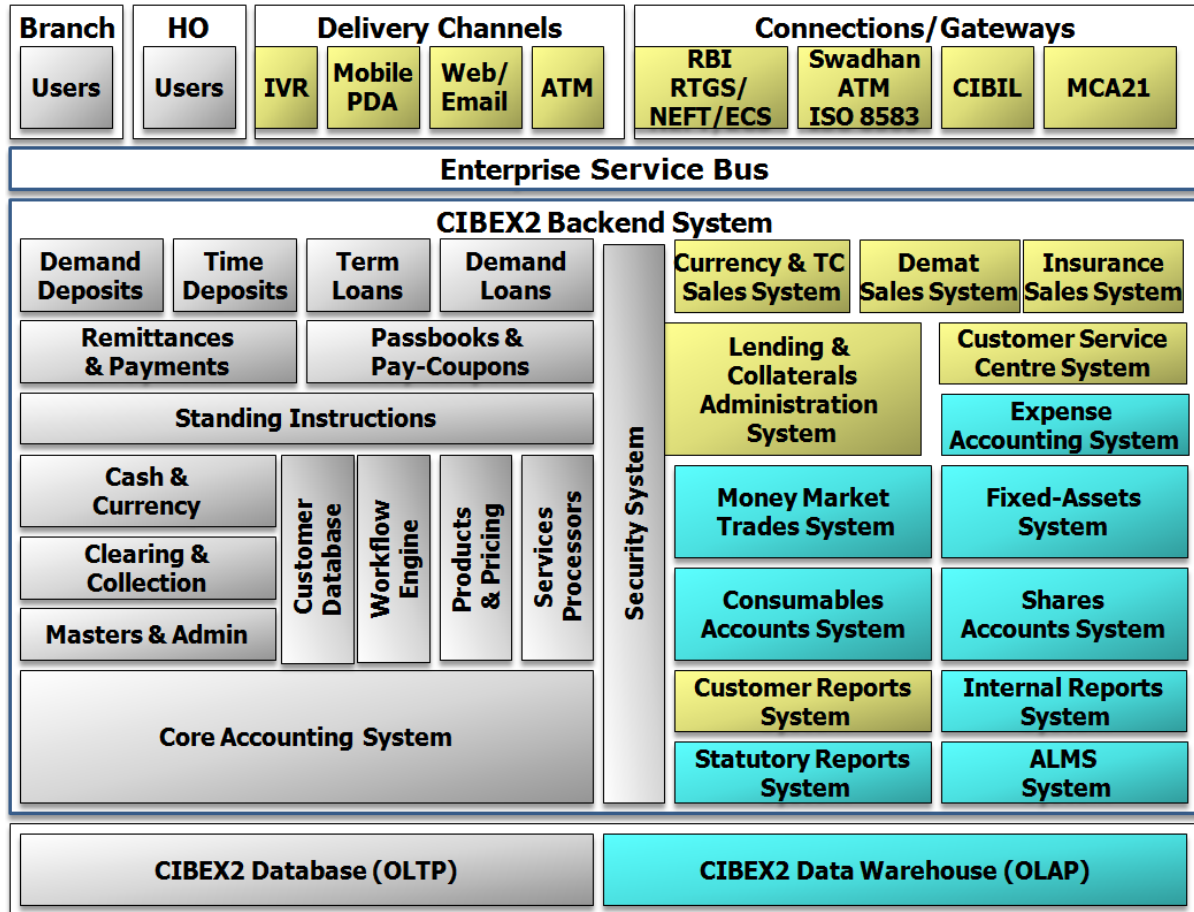
#3 Samruddhi Venture Park MIDC Andheri East Mumbai 400093 India
Voice 91-22-2824-0178 Fax 91-22-2837-3920

10 Jay Street Suite 208, Brooklyn NY 11201 USA
Voice (718) 488-8837 Fax (718) 488-8839

Mail info@cislworld.com



APPLICATION SCHEMATIC





COVERAGE SUMMARY

Module/System	Summary Remarks
Architecture & Workflow Engine	New module needed for core banking multi-branch connectivity.
Security System	Removes current problems in CIBEX.
Core Accounting Engine	New module. Handles ALL the accounts of the bank including Customer Accounts, Counter-party Accounts & Bank's Internal Accounts
Customer Accounts	Makes many improvements on CIBEX, works across branches
Customer Transactions	Makes many improvements on CIBEX, provides full value-dating, voucher printing etc.
Services Products & Pricing	New Module. CIBEX had many things hard-coded. This module provides the flexibility here.
Cash Transactions	Like CIBEX
Clearing Transactions	New Module. CIBEX clearing module is now outdated. New module includes RBI ECS Interface.
Transfer Transactions	Removes current problems in CIBEX.
Savings & Current Accounts	Removes current problems in CIBEX.
Term Deposit Accounts	Removes current problems in CIBEX.
Term Loan Accounts	Removes current problems in CIBEX. Adds modules for orderly management of limits & liens.
Remittances & Payments	Removes current problems in CIBEX.
Passbooks & Pay-Coupons	Like CIBEX. Pay-Coupons new module.
Standing Instructions	CIBEX only handles one-time & repetitive payments. This module adds Collections, Balance Sweeps etc.
Web Banking	New module for Customer Delivery.
IVR/Tele-banking	New module for Customer Delivery.
Banking Emails	New module for Customer Delivery.
Mobile Banking	New module for Customer Delivery.
Banking SMSs	New module for Customer Delivery.
RBI RTGS Interface	New module for customer payments.
RBI NEFT Interface	New module for customer payments.
Swadhan ISO8583 Interface	New module for ATM/Switch Interface.
Customer Service Centre System	New module for Customer Support
Lending & Collateral Management System	New module for loan capture, administration, collateral/security management, assessment etc.
CIBIL Interface	New module for Collateral Management
MCA21 Interface	New module for Collateral Management
Customer Reports System	Includes all CIBEX reports. Adds new reports relating to customers.
Internal Reports System	Includes all CIBEX reports. Adds new internal reports.
Fixed Assets System	New module for management of Fixed Assets of the Bank
Consumables Accounts System	New module for accounting of consumables such as stationery
Expense Accounting System	New module for accounting of non-operating





COVERAGE SUMMARY

Module/System	Summary Remarks
	expenses such as travel, etc.
Shares Accounting System	New module for accounting for stock-holders.
Party Database	New module handles database of non-customer parties such as Trade Counter-parties, Suppliers etc.
Money Market Trades System	New module for management of money market trades.
Asset Liability Management System	New module for treasury management including generating reports for RBI/Basel-II (Gap Statements, Risk Adjusted Capital reports etc.).
Statutory Reports System	New module. Generates reports for RBI, Income Tax Authorities etc.





Customer Database

1) Single Database.

Currently CIBEX has 3 files where customer information is stored. These are:

- a) SB, CD, CC, OD Accounts File
- b) TD Customers File
- c) Loan Customers File

CIBEX2 on the other hand will have a single database. This will make name search better and accounts consolidation possible.

2) Customer Category.

There is fundamental difference between the data/details captured, mode of operation and other processes for 2 fundamental categories of customers:

- a) Individual & Family Customers
- b) Corporate/Business Customers
- c) CIBEX does not have this differentiation. CIBEX2 makes this differentiation. This is especially needed when the loan origination & credit monitoring system is implemented.

3) Customer Category based Differentiations.

The effects of this differentiation are:

- a) Forms and Details Captured can be different for each Customer Category.
- b) Mode of Operation can be different for different customer categories. Corporate Customer's mode of operation is related to the Designation (such as VP Finance or Finance Manager) and not a person (such as Mr S Kumar). Also the mode of operation needs to support formatted rules (such as "VP Finance can sign up to Rs 100,000", "VP Finance and VP Marketing together can sign up to Rs 800,000" etc.). CIBEX does not support these currently.

4) Party Concept.

CIBEX accepts names of Authorized Signatories and Joint Names independently. There is no link between the instances of the same person appearing both as a Joint Name as well as an Authorized Signatory, even in the same account. Also, there is no link between instances of the same person appearing in multiple accounts. CIBEX2 provides a concept of identifying each person as a "Party" and each instance of the person appearing against an account is linked.

Party records also include records of other entities such as Suppliers, Stock Holders, Employees etc.





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5) Customer ID Related Issues.

a) New Account-ID.

CIBEX currently implements an Account-ID as a "GL-Code + Account-No" (such as SB-101, TD-1005, LOAN-191 etc.). Changing Account-IDs can be catastrophic (as many banks have found out), as it leads to confusion among customers. CIBEX2 will first implement Account-ID as "Branch-Code + GL-Code + Account-No" (such as 19-SB-101, 21-SB-101, 22-TD-919 etc.). Since all customers do know the branch where they have an account, this will ensure that there is no confusion when the new system is implemented (as customers don't need to remember new account numbers).

b) De-Duplication & Consolidations.

CIBEX2 will enable users to de-duplicate data in respect of same customer with multiple accounts and same person appearing as Joint Name or Authorized Signatory in multiple instances. This can be an ongoing process until such time as the bank is satisfied that all de-duplication is complete. De-duplication will not be a pre-condition for implementation of CIBEX2.

c) Accounts-Grouping.

CIBEX2 enables users to group Customer Accounts in multiple ways. The grouping can be different for different purposes such as Internet Access, Credit Control, Common Correspondence Address, Interest Income Tax Deduction at Source etc. This ensures even if customers don't want accounts grouped for TDS purposes they can be grouped for other purposes.

d) Clearing/MICR Account ID.

The new clearing system requires a six-digit Account-ID in the MICR band. CIBEX2 provides for this as additional Account-ID printed on the MICR band.

While 6 digits allow for 999,999 accounts, because there could be more than 100 branches in future adding a Branch code to Account ID may not be a good idea (as it leaves only 3 digits for Account ID). For the same reasons adding a GL-Code is not a good idea either. Given the limitation of 6-digits there is no scope for keeping a check-digit.

So there are 2 options:

- i) Sequential Generation of Account ID. This number should be a sequential number, generated only for accounts with cheque-books, sequentially across branches, based on date when account was opened. Since it is a 6-digit ID, leading zeroes will be added where needed.





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- ii) Customer-ID with Account Serial No. An alternate can be to generate a 5-digit Customer-ID and add a single-digit Account-Serial-No (within the Customer-ID).

Decision in this respect will be made jointly.

6) ID Documents.

CIBEX2 will capture details and images of ID Documents for the customer such as IT PAN Card, Drivers License, Passport etc. Currently CIBEX has no provision for this.

7) Photographs.

CIBEX2 will include interface to a camera to store customer's photograph. Currently CIBEX has no provision for this.

8) Addresses.

CIBEX2 will allow users to add as many addresses as they may want. Addresses will include Phone-Nos and Email IDs. Currently CIBEX allows only 2 addresses per account.

9) Account Persons.

CIBEX2 enables customer to add as many Account Persons as needed. Currently CIBEX limits itself to 99 persons per account (although this limit is not a real problem).

Account Persons can be assigned roles (such as Joint Name, Authorized Signatory, Proprietor/Director, etc.). The system also captures additional details about the Account Person, Guarantor such as IT PAN, Address, Photograph, etc. Currently CIBEX has no provision for this.

10)Power-of-Attorney.

CIBEX2 captures Power-of-Attorney details. Currently CIBEX has no provision for this.

11)Introducer.

Because all branches will be online and connected, the introducer details including signature will be available online. In CIBEX introducer details cannot be validated online because the branches are not inter-connected.

12)Borrower/Stock-Holder Link.

CIBEX2 will link the stock-holding of a customer as a borrower to his borrower record – currently not possible in CIBEX. Currently CIBEX has no provision for this.





Accounting System

1) All General Ledger Accounts.

The CIBEX General Ledger contains all GL accounts for the branch. It does not include GL accounts not included in the branch (such as Share Holders Accounts, Payroll, etc.). CIBEX2 GL contains ALL the GL Accounts of the bank.

2) Full General Ledger.

CIBEX2 General Ledger includes all components:

- a) Balance Sheet Accounts
- b) Profit/Loss Accounts
- c) Off Balance Sheet Accounts – such as Memorandum Income accounts

This includes:

All Customer Accounts in the Balance Sheet such as SB, CD, LOAN etc.
All Non-Customer Accounts in the Balance Sheet such as Suppliers, Fixed-Assets, Equity/Stock, RBI Clearing-House Account (Mirror) etc.
All P&L Accounts

All Off-Balance Sheet Accounts such as Bills Collection, etc.

CIBEX does not handle Off Balance Sheet Accounts right now.

3) Reconciliation of RBI Accounts.

The Accounting Engine will handle entry-by-entry reconciliation of bank's accounts with RBI. Currently CIBEX does not provide for any HO accounts.

4) Expense Accounts.

CIBEX2 includes specific treatment for Operating & Non-Operating Expenses. The process of posting debits to expense accounts includes a workflow for necessary authorization/approval. Further expenses can be classified for reporting and analysis. Currently CIBEX has no provision for this.

5) Income Accounts.

CIBEX2 automatically posts incomes to correct income accounts such as Interest Income, Commission, Service Charges etc. No manual entries are needed for this. Currently CIBEX has no provision for this.

6) Comprehensive Accruals Processing.

One of the major weaknesses of CIBEX is that it does support accruals of income and expense items. All bookings are made as per a Cash System of accounting as against





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a Mercantile System which is the norm and RBI recommendation now. THE BANK has to shift to accruals and for this alone CIBEX2 is a must.

CIBEX2 allows users to accrue any type of income or expense. Any income or expense can be:

- a) Posted into Accrual Accounts (Income Earned Not Collected or Expense Incurred Not Paid)
- b) Posted into Customer or Cash Accounts (Income Collected or Expense Paid)
- c) Posted into Off Balance Sheet Memorandum Accounts
- d) Accrued from Advance Collection Accounts (Income Collected Not Earned or Expense Paid Not Incurred)
- e) Booked from Memorandum Accounts
- f) Capitalized (eg: Interest Converted to Principal)
- g) Booked on the Spot (Accrued and Posted together)

Further, CIBEX2 enables users to set independent frequencies for Accrual, Posting and Capitalization for each item of income or expense.

So (for example) the user can accrue deposit interest expense daily and loan interest income monthly if needed – frequency can be defined independently.

7) Backdating of Transactions.

One of the major shortcomings of CIBEX is that it does not support backdating of transactions, which means this very onerous task has to be done manually. Again this is a fundamental shortcoming of CIBEX.

CIBEX2 allows users to backdate transactions as long back as they want. CIBEX2 has a very robust and correct backdating module which can go back across accounting periods also.

8) Scheduled Cashflows Table.

CIBEX2 includes a table for scheduled cashflows for Projected Cashflows Statement. Instances where cashflows are scheduled include:

- a) RD Installments & Repayment
- b) Loan Installments, Interest Payments & Repayment/s
- c) TD Interest Payments & Repayment
- d) MIC/QIC Repayment Installments
- e) Vault Income Accruals
- f) Money Market Deals related payments such as Coupon Interest, Redemption
- g) Etc.

This table enables users to project future cashflows based on scheduled future cashflows. CIBEX does not have this table.





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9) Accounting Books.

Currently CIBEX defines 3 accounting books: Cash, Clearing & Transfer. The shortcomings are:

- a) Separate Cashbooks cannot be defined for each Cashier, making the task of shift change less controlled – CIBEX2 provides this
- b) Processing and funds-release properties of multiple types of clearing (High Value, Same Day, National Clearing etc.) need to be controlled through manual intervention – CIBEX2 provides methods to define processing characteristics for multiple clearing books, individually defined.
- c) There is no provision for definition of transaction books for correction entries, this provides no control on such entries – CIBEX2 provides multiple transfer books which can be used for this
- d) System generated transactions (such as interest) should ideally be posted through another book, which is not possible in CIBEX – CIBEX2 provides this facility

10) Transaction ID/Numbers.

Currently CIBEX transaction numbering is inconsistent – in Cash a CC-101 means a voucher, in Clearing a GC-101 also means a voucher but in Transfer a TC-101 means a Voucher-Set. CIBEX2 removes this inconsistency.

11) Transaction Source Consideration.

Currently CIBEX processes a transaction the same way, regardless of transaction source. For instance a Cash Withdrawal on the branch counter is treated the same way as an ATM Cash Withdrawal in terms of processing. CIBEX2 on the other hand provides the facility to define different processing steps based on the transaction source. CIBEX2 also provides a facility to store the Reference-No/Date provided by the transaction source and use it for reconciliation purposes (which is not possible in CIBEX currently).

12) Vouchers Printing.

In CIBEX there is no option for voucher printing. So a customer comes to a branch, fills-up a blank voucher (such as a Deposit Slip) and the user enters the details into the CIBEX system and then the voucher is processed. This wastes a lot of time and increases the crowd in the branch.

CIBEX2 will provide the users the option to enter details directly and print the voucher for any type of transaction. Especially for Outward Clearing the MICR band will be read and Bank/Branch Code, Account No., Cheque No. of the issuer will be auto-captured. This will save a lot of time and effort.





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13) Transactions Cross-References.

When transactions are reversed, since it is a manual process, CIBEX does not link the Reversed Transaction to the Reversing Transaction and this link has to be searched manually. CIBEX2 on the other hand links transactions in the following cases:

- a) Reversing & Reversed Transactions – example Cash Withdrawal posted to wrong account reversed for correction
- b) Generating & Generated Transactions – example Commission Income transaction in DD Issue is a generated from the main Cash or Bank Debit transaction. CIBEX2 ensures generated entries cannot be independently cancelled.
- c) Correction or Adjustment Transactions – example any transaction passed to make adjustments is linked to the transaction being corrected/adjusted.

14) Multi-Currency General Ledger.

CIBEX has a single currency General Ledger. This becomes a basic hindrance in handling foreign currency accounts and transactions.

CIBEX2 has a multi-currency General Ledger. CIBEX2 can produce separate GLs for the bank in each currency admissible and also consolidate them into a single currency (booking the exchange rate fluctuation associated profit or loss into user defined accounts).

15) Account Reclassifications.

CIBEX has a basic capability to re-classify Liability Accounts (such as SB) with negative balances into Assets.

CIBEX2 has a more complete module for this and enables re-classification based on:

- a) Balance-Sign – re-classification is made for Negative-Balances in Demand Liability Accounts (such as SB) and Positive-Balances in Asset Accounts (such as Loans).
- b) Inactivity – move all Dormant Accounts to another GL earmarked for accounts with no Activity in the last 3 years (for example)
- c) Asset Class – Based on RBI regulations and its own prudence, bank may want to reclassify Asset Accounts as Regular, Underperforming, Non-Performing and Write-Offs
- d) Reconciliation-Age – Un-reconciled Entries (such as TD Interest Payable) are often re-classified based on age. For instance all open items more than 3 years old could be moved to a separate GL Account.





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- e) Period-to-Maturity – Term Deposits maturing over the next 30 days are often no more taken as Time Liabilities and become Demand Liabilities.

16) APIs.

CIBEX has no APIs (Application Programmers Interfaces); so interfacing CIBEX with third-party systems is difficult. CIBEX2 on the other hand includes a comprehensive set of APIs which can be used to integrate CIBEX with third-party systems. These include:

- a) Accounts API
- b) Transactions API

17) Advisements.

CIBEX has no means of differentiating between Customer-Initiated-Transactions (such as Cash Deposit, Cash Withdrawal etc.), where the customer does not need an advisement, and, Non-Customer-Initiated-Transactions (such as Inward Remittance, Charges Debits etc.), where the customer does need an advisement. So CIBEX cannot automatically select transactions where an advise has to be sent to the customer.

CIBEX2 is able to identify which transactions were not initiated by the Customer and sends advises automatically. Advises can be Emails, SMSs or printed paper.

18) Instruments Track.

CIBEX controls instruments issued by the bank or customer of the bank through a field in the transactions file. This is not a very robust method and makes the job of searching for instruments status slow. Currently this table does not support tracking of non-customer instruments such as Payslips, cheques issued out of bank's accounts with other banks etc.

CIBEX2 has a table which is used to track of all instruments issued.

19) Flexible Begin-of-Day and End-of-Day Processes.

The definitions of Begin-of-Day and End-of-Day processes in CIBEX is hard-coded in programs. Also there are no inter-program controls or a flexible framework for Audit Trail, Errors Management and Processing Control in execution of these batch processes. This makes BoD and EoD the most error prone and support intensive parts of the system. Currently a significant portions of the calls for support are in these 2 areas – this will not be needed for CIBEX2.

One of the major priorities in CIBEX2 design is to make BoD and EoD processes robust and to reduce the support effort needed for them. CIBEX2 does the following for this:





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- a) Centralized Execution. Under CIBEX2 there will be no need for elaborate BoD or EoD processes at branch level. All major work associated with these processes (such as Standing Instructions Execution, Interest Calculation etc.) will be done from the central server. So need for branch level support will be almost eliminated.
- b) Externally Defined BoD/EoD Scripts: In CIBEX2 BoD and EoD processes are executed on script files which can be edited without changing any program.
- c) Execution Framework: CIBEX2 provides a comprehensive framework for execution of BoD and EoD processes. This includes:
 - i) Audit Trail Framework
 - ii) Error Management Framework
 - iii) Control Reporting Framework

Due to lack of these frameworks, the BoD and EoD are the most error-prone parts of CIBEX.





Clearing System

If there is one system which is completely different in CIBEX2 than it is in CIBEX currently, it is clearing. Current clearing system in CIBEX is not useable in the changed circumstances in which clearing cheques are processed by RBI. CIBEX2 has a complete re-write of the clearing module.

1) Interface to EBI ECS.

CIBEX has no electronic interface to RBI Electronic Clearing System (ECS). This is a must for a banking system now. CIBEX2 provides this interface.

2) No Data Entry of Inward Clearing.

In CIBX 40-50% of data entry in branches is on account of Inward Clearing. This can be completely eliminated as Inward Clearing file is available as an upload from RBI ECS. CIBEX2 implements STP (Straight Through Processing) for this.

3) Auto Aggregation for Overdraft Approvals.

Currently users manually total up cheques issued in an account to find out how much the total overdraft is likely to be. CIBEX2 does this automatically and generates a list of all accounts where Inward Clearing can lead to overdrafts, along with total overdraft amount.

4) No Need for Separate Deposit Slips in Outward Clearing.

Currently customers are asked to separate cheques by clearing type (High Value, Same Day, National etc.) and fill separate deposit slips for Outward Clearing. Under CIBEX2 this will not be necessary.

5) Inter-branch/Local Clearing becomes Transfers.

Because now the branches will be connected, cheques where Drawee and Drawer are both in Citizen Bank, will no more go to RBI and will be treated as transfers.

6) MICR Reader Interface.

CIBEX does not have an MICR interface. So bank code, branch code etc. items from MICR band are manually entered and take a lot of time. CIBEX2 will capture these details automatically and will save the users a lot of effort.

7) MICR Encoder Interface.

Currently the MICR encoding is a separate exercise where instrument details are re-entered and MICR encoding of the amount is done. This is not only duplicate data entry, it also wastes a lot of time when RBI time deadline is to be met. CIBEX2 will eliminate this duplicate entry.





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8) Third-party Debits using Mandates.

CIBEX does not support these transactions. These are handled manually right now. CIBEX2 will not only handle these transactions but will also provide to scan the mandate and inspect it before passing any debit. Mandate details will be available as both data and image. Also say if the mandate is for one debit every month, the system will validate and throw exceptions if a second debit on account of the same beneficiary happens in the same month.

9) RBI Account Reconciliation.

Because the account with the RBI is currently maintained at the Head Office, CIBEX currently has no track of it. CIBEX2 will maintain this account and reconcile balances and transactions in RBI Account as they appear in the bank's books with the statement of account received from RBI. This reconciliation includes calculation of interest on outstanding balances in the account.

10)HO Clearing House Account at Branch Level.

Right now Clearing Entries are routed through HO Clearing House account at branch level. In CIBEX2 there would be no need to do this routing. The contra account will be for the bank as a whole and will be the RBI ECS Account that the bank has with RBI. Branch-users will generate reports at branch-level and use them for correcting data entry errors.

HO Clearing House account introduces another account to be reconciled between HO and branches, for which there is no need now. This will save reconciliation effort. Additional time spent in branches in bulk posting entries into the HO Clearing House account can be saved as there would be no need to do that.





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Security System

1) Organization Chart by Location.

CIBEX2 includes database of the various locations of the bank (including branches, ZOs, ROs, etc.) and configuration of an Organization Chart. This functionality is not included in CIBEX.

2) Organization Chart by Person.

CIBEX2 also includes database of the various employees and consultants working as incumbents in specific capacities and having specific designations in the bank. This will cover ALL the employees of the bank. The system will enable the users to configure an Organization Chart as per designations and positions.

3) Unique User ID across Bank & Transfers.

CIBEX has User-IDs which are unique within a branch. CIBEX2 will have User-IDs unique across the bank. The proposed user ID is: "Branch-Code + CIBEX-User-ID".

While for access purposes the user can use this new ID, the bank will also create Employee-No of the user as a secondary ID of the user. For all internal storage purposes the Employee-No will be used. If the employee gets transferred from one location to another, the User-ID can change but the Employee-No will not. This ensures there is a permanent ID associated with each user in CIBEX2.

CIBEX does not support this.

4) Bank-wide Administrator and Location Specific Administrators.

Currently CIBEX has an administrator for each branch. CIBEX2 will have an Administrator across the bank. This will take away some work load from the branches. CIBEX2 also supports Location-specific-Administrators who can handle admin tasks associated with the location (and all Locations below the location in the Organization Chart). This provides for a flexible work division as per the load.

5) Data Access Control.

CIBEX data access is local and there is no need for data access control by location.

In CIBEX2 each user has access to their own Location Data, plus all data for Locations under their location (in the Organization Chart). Specific access restrictions can be placed to restrict this access. So HO users can be configured to have access to all data from all branches.

6) Login Session Control.

CIBEX does not implement Session Control and Inactivity Logout except at the Menu Screens. This is a fairly serious security flaw.





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CIBEX2 will have Inactivity Logout implemented uniformly across the system at all screens.

Further, due to an inherent "bug" in the Microfocus Cobol compiler (used by CIBEX), a certain key-combination takes the user to the system prompt, which is also a major security flaw.

CIBEX2 provides no such escape mechanism and is more fool-proof in respect of session security.

7) Forgotten Password.

If a user forgets their password, in CIBEX, the Super-User assigns a new password to them. While this is not exactly a security loophole it is not a recommended practice (as for a brief period of time, the Super-User knows the password of the user).

CIBEX2 provides 2 options in case of forgotten password:

- a) Secret Question based Login. The user can login using a Secret Question defined by them. Logins affected in this manner are useful only for one option – "Change of Password". This is a safer option than the Super-User knowing the Password.
- b) Mail Response URL based Login. Alternately CIBEX2 can send a URL (clickable link) into a user defined mail address. The user can click this URL and login. Again, Logins affected in this manner are useful only for one option – "Change of Password". This is a safer option than the Super-User knowing the Password.

8) Dormant User-ID Disablement.

As per security guidelines for banks (DoD Orange Book), User-IDs not used for more than N (usually 90) days should be auto-disabled. CIBEX does not provide this feature, CIBEX2 does.

9) Access Timings Control.

CIBEX does not provide any feature for access control based on permitted access timings. CIBEX2 allows Administrator to define access timings for all users and users will be barred from accessing the system outside of these times.

10) Web Application Security Standards.

This issue never arose for CIBEX because CIBEX is a departmental/local solution.

In CIBEX2 instead of arguing whether it is safe enough or not, we have decided to implement the industry-grade security standards recommended for banking industry (including the full implementation of JAAS standards):

- a) SSL2. All transmissions between the client and the server shall be encoded using SSL2 (Secure Sockets Layer 2) and https (HTTP Secure) protocol.





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- b) TLS. Transport Layer Security will be implemented using standard tools.
- c) LDAP/LTPA Authentication. Lightweight Direct Access Protocol will be used to provide authentication of user domains. Again an open source component will be used to do this.
- d) PKCS/X.509 Certificates. Public Key Cryptography Standard and X.509 (Self-Signed Certificates) will be provided using an open source system.

11) Manual Supplements to Security.

In addition to web application standards, the security will be enhanced by these manually enforced security principles:

- a) Manual Approval of Transactions. Unless the bank configures the system otherwise, by default any transaction initiated on the web shall need a manual approval before it is posted to the system. This includes processing of Inward Clearing, Inter-branch Transactions and Customer Initiated Transactions.
- b) Additional Password for Transactions. All customer initiated transactions shall need an additional password, in addition to the password needed for accessing the account and viewing details.
- c) PIN-Embedded Verification Code. All transactions requiring a large (configurable amount) in the customer account, initiated by the customer, can be configured to need a "PIN-Embedded Verification Code (PEVC)". A PEVC is a printed booklet with codes of specific length (usually 12-14 characters). These codes have specific digits missing where the customer is to add a 4-6 digit PIN before entering the code into the system. This ensures that the hacker cannot initiate a transaction even if they are able to break the User-ID Password and Second Password mechanism.
- d) Biometric ID. All in-house users of the system can be forced to submit biometric IDs (thumb/finger prints or retina scans). Any access to the system can be limited by matching of these with those stored in the database.

12) Database Repair Environment.

Currently any damage in database due to power-outages or database (Btrieve) corruption are handled using manual updates. While processes are in place to provide a controlled environment for this, the system does not force anything. In CIBEX2 instances of database repair needed would be almost none, still in order to anticipate the unexpected, CIBEX2 provides a controlled environment for database repair which includes:





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- a) A system of permissions to repair database
- b) Exact specification of changes being made
- c) Updates through a program instead of manual
- d) Complete Audit-Trail of all changes made





General Architecture

1) Deleted Master Records & Cancelled Transactions.

One of the fundamental principles of banking systems is that data cannot be physically deleted, it must be logically deleted and if needed the auditor should be able to extract it back.

CIBEX currently does not implement this principle in its entirety. While CIBEX does not delete transactions and record is maintained of cancelled transactions, CIBEX does not implement this philosophy when dealing with Master Records. This is a drawback in CIBEX.

CIBEX2 provides a complete functionality for maintaining cancelled transactions as well as deleted master records. These records can be retrieved and accessed.

2) Checker can say "No".

The way Maker-Checker is implemented in CIBEX forces the Checker to either not do anything or accept the transaction. The Checker cannot reject the transaction.

CIBEX2 provides this missing functionality. For each transaction or master update any Checker or Authorizer can either accept it or reject it.

3) Workflow.

CIBEX implements a very limited concept of workflow in that each transaction needs a Maker and a Checker/Authorizer. CIBEX cannot handle more complex workflows.

CIBEX2 implements industry standard BPML (Business Process Markup Language) compliant workflows. CIBEX2 workflows are dependent on:

- a) Subject/Entity – which is an Account or a Master such as SB, CD, CC, OD, Transaction Book, Location etc.
- b) Activity – such as Open, Close, Update, Delete, Cash Debit etc.

CIBEX2 workflow queues span across locations, users and even calendar dates.

4) Audit Trail.

CIBEX implements Audit Trail in a selective manner. So while the audit trail works for some parts of the system, it does not for others.

CIBEX2 has a central implementation of audit-trail from the ground-up. It works across the system in a uniform manner.





MAJOR FEATURES

5) Search.

CIBEX has a single search for Account Names which also works only for SB, CD, CC & OD Accounts.

CIBEX2 on the other hand provides search on: Account Names, Person Names, Branch Names, User Names, Transaction Descriptions, Transaction Dates, Transaction Amounts and a whole lot of other parameters.

6) Extra Fields.

At least some customization needed for CIBEX could have been handled without programming if CIBEX enabled users to define extra fields for Customer Data, Account Data and Transactions Data. It does not.

CIBEX2 allows users to define any number of extra fields for these.

