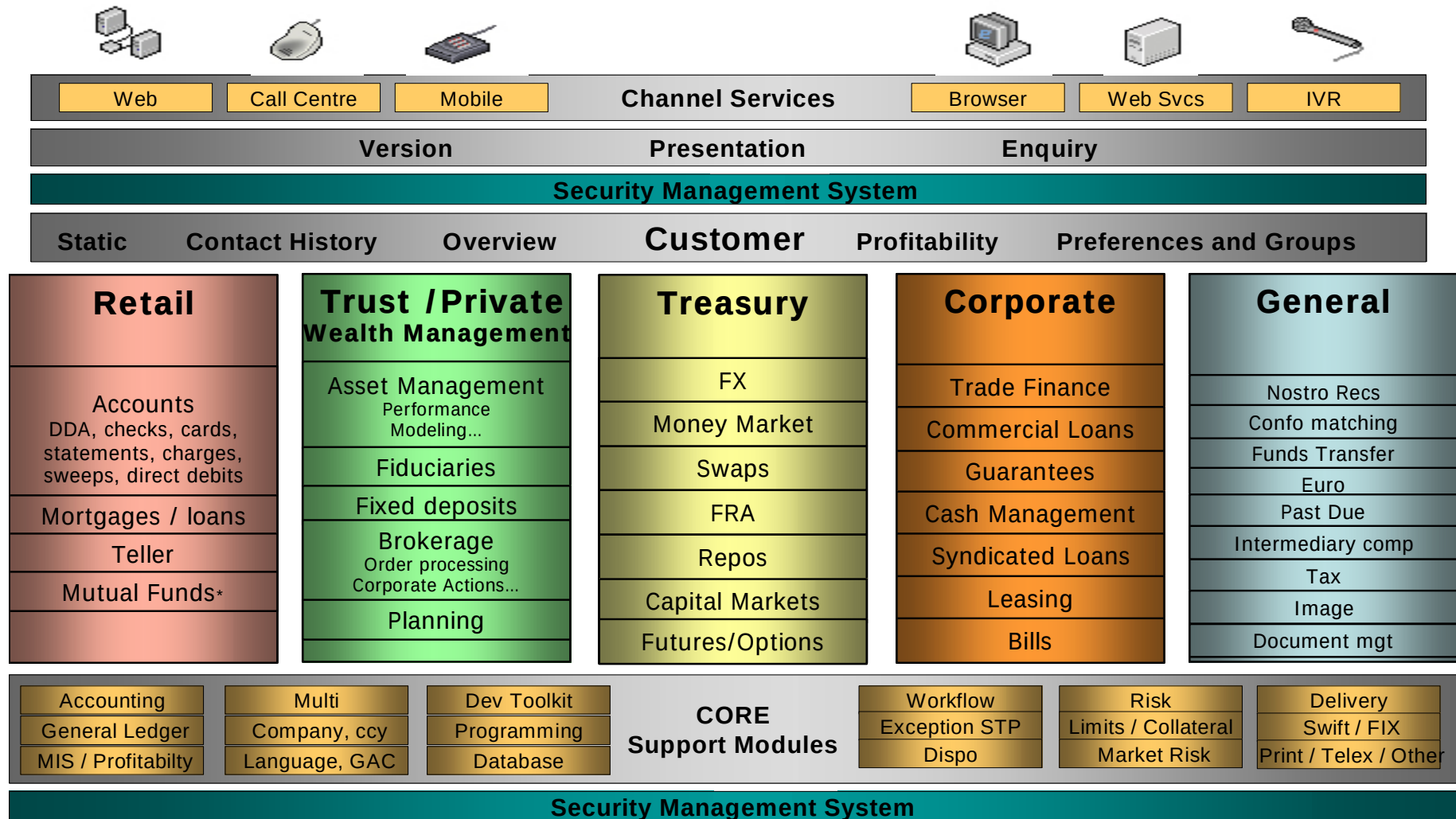


T24 CORE BANKING SYSTEM

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I. FUNCTIONAL ARCHITECTURE



II. CORE SUPPORT MODULES

Modules	Description
A. CUSTOMER INFORMATION FILE	A Customer is an entity either individual or non-individual who has been accepted by your institution to conduct business with and as such a Customer record will need to be opened on Model Bank (T24) to reflect this. As T24 is a customer-orientated system all accounts, except internal accounts, will be connected to a CUSTOMER record. The customer application contains all the basic information about any client with which the bank has dealings. Consequently, a CUSTOMER record will need to be opened for correspondent banks, brokers, guarantors etc as well as the more 'traditional customers' who maintain current, saving and loan accounts with your institution. Most applications within T24 will refer to the CUSTOMER record during processing and as such they should be opened before any customer activity is recorded in T24. The existence of these CUSTOMER records will minimize the required input of data on certain transactions e.g. MM.MONEY.MARKET, FOREX etc where details of banks (who are 'customers' of your institution) are nearly always necessary to indicate the settlement details of these transactions. One of the great advantages of being a customer-orientated system is that the static data of the client only needs to be input once regardless of the number of accounts, in any currency that they may require. This also eliminates the need for extensive maintenance of customer information when for example a customer changes their address. It should be remembered that the details on the actual CUSTOMER record are only descriptive and not financial, the balances where appropriate will be stored under the ACCOUNT application. A customer can be a: • Individual customer • Corporate customer
B. ACCOUNTING/GENERAL LEDGE	All transactions / contracts create the relevant accounting entries across the clients accounts and for the banks own internal records Entries are automatically generated for authorised transactions Combination of entries generated from STMT.ENTRY, CATEG.ENTRY and RE.CONSOLE.SPEC.ENTRY There is no need for a consolidated General Ledger account for accounting entries – only 'virtual' accounts. Hence information is held at a KEY (grouping condition) level

	ACCOUNTS: Positive and Negative signs (+ / -) for balances interchangeable • Customer type Accounts: Current Account, Savings Account, Nostro Account, Vostro Account etc • Internal Accounts (Assets & Liabilities in nature): Cash Account, Suspense Account, Furniture Account etc CONTRACTS: Balances can have only one sign as determined at the beginning and generally has a stated beginning and end. Types of contract are as follow: • Loans • Deposits • Money Market • Securities • Foreign Exchange PROFIT & LOSS HEADS • Interest earned account, Salary account, Miscellaneous expenses account etc • (In T24, we do not open accounts for P & L heads, but balances consolidated through use of Category codes and consolidation keys) T- 24 APPLICATIONS • Account based applications are used to move money between accounts – Customer type, Internal or P & L type. They cannot be used to generate contracts / deals. • Contract applications are used to generate contracts and resultant movements in accounts CATEGORY CODES • In T24, Category codes reflect accounting plan and used to classify transactions by products such as Customer Accounts, Internal Accounts, Contracts and Profit and loss items and sub-products • For financial operations, category codes are assigned automatically if parameterized or could be input where not parameterized • Category codes, together with fixed choices of consolidation and user selection criteria defined in CONSOLIDATE.COND table, like Residence and Industry, help banks produce reports reflecting a coordinated and structured view of their operations
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C. MIS/PROFITABILITY	The TEMENOS Model Bank (T24) Management Information (MI) has been designed to provide financial management information on customers, products, departments, income and expense, average balances and other information, from which management may analyze profitability and performance. The system consists of a series of user definable databases, constructed periodically from which reports and enquiries can be generated. For the purposes of the Model Bank, 4 sample databases have been set up and the procedure for building them is explained. Example reports and enquiries are provided to illustrate the potential uses of the system and to provide prototypes upon which users may base their own system. This module includes these below aspects: • Building Balance Movement file • View Balance Movement Records • Build Customer Loan Product Profitability database • Build Non Interest Income Analysis database • Build Interest Income & Expenses Analysis database • Build Operating Expense Analysis database • Viewing Reports
D. WORKFLOW	T24 Process Workflow (PW) is aimed at grouping the various activities of the bank into a logical process. This grouping further enables allocation of work to different users, tracing the path of a particular process dynamic decision-making process as regards to the sequence and number of activities. The individual activities are defined at micro level and the rules, status and the user groups are defined to be reused. This module does not carry any business functionality but can be used to define and tune the flow of business supported by other T24 modules. PW enables speedy creation of activities and also linkages to the defined activities through Process workflows. By providing tools in this arena we can significantly reduce the time it takes to implement a system-oriented process and also well reduce the level of expertise required. Process Workflow definitions and activities are stored in T24 and they can be imported / exported via XML into a variety of modeling tools for manipulation, simulation and update back to T24. Standard features of T24 enable ad hoc and scheduled reports and queries on both the evolution of a given process workflow definition and any given instance of a process. Features of Process workflow: • Tools given reduce the implementation time and reduce requirements of expertise • Activities can be defined micro level. • Rules, status and the user groups can be reused

	• PW module is a rule based workflow engine. • PW enables import/export of Process Workflow. • Workload balancing across participants. • New activities are created automatically and assigned to participants according to the activity definition and participant definition. • Enables tracing the path of a particular process. • Passing dynamic values between activities or across the process workflow. • A tool to monitor Process productivity and Time utilization.
E. LIMIT	The LIMIT system controls credit risk against customers and markets. It monitors the availability and utilization of credit limits in the following categories: • Customers and groups of customers • Countries and groups of countries • Commodities • Currencies Customer limits are monitored in real-time during Model Bank (T24) on-line transaction processing. Other limits are monitored and reported on during the Model Bank (T24) overnight batch. Limits may be established at two levels individual and group. Individual limits are those where the concerned customers are liable only for themselves. Group limits can be set up for Corporate Clients under the same control and individuals of the same family. Examples of these will be given later in the document. Limits can be either non-revolving (reducing) or revolving (revolving). Non-revolving will reduce with each repayment e.g. Term Loan whereas Non-reducing will not be affected by repayment e.g. Overdraft. By way of a brief summary, within Model Bank (T24) Credit Limits are held on the LIMIT application. Sub-products, products, and global definitions are held on the LIMIT.REFERENCE application. Customers and customer liability definitions are held on the CUSTOMER application. Finally the LIMIT.PARAMETER application defines various high level parameters concerning the application and also links contracts and accounts to LIMIT.REFERENCE. These files will be explained in greater detail later in the document. The LIMIT system also integrates closely with the COLLATERAL application.
F. COLLATERAL	COLLATERAL can be linked into the LIMIT module, and allows the definition and control of collateralized limits. Unlike LIMIT which is a core module which will be invoked by CORE

	immaterial of the Bank's practices, COLLATERAL is optional and needs to be implemented only if the Bank has the requirement. An item of collateral can take many forms and could vary from a ship to a house or from paintings and sculptures to a single stamp or an entire collection. These items can then be valued against the market value on a set frequency or ad-hoc basis. Items which are contained within Model Bank (T24) itself may be valued automatically, especially in cases such as a Deposit Account, fixed term Deposit, or all (or part) of a Client portfolio of stocks & shares. While there will be others like fixed assets, paintings etc for which the value needs to be filled in manually for the system to take into reckoning
G. DELIVERY	• The Delivery module integrates with the business applications and transactions, and will generate appropriate messages. • A background process - it requires Activities, Advice codes and format of messages to be defined for each application. • The messages are generated when a transaction is authorized, details of these will be recorded on transaction & can be viewed using enquiries • The Delivery Reference or Message Identifier can be found in the originating transaction record when authorized • It is the unique ref no to track the message through the Delivery process The Delivery System manages the flow of all messages from T24, such as confirmations, payments and advices whilst giving users full control over formatting and language of presentation. Messages are generated automatically as soon as contract entry is complete or when a scheduled diary event occurs. All messages may be either printed or sent via electronic carrier systems, such as SWIFT, Telex, etc. Messages from external carrier systems are received by the Delivery System and, if necessary, formatted according to the user-determined requirements. Following this, printed output containing the incoming information is produced. For example Payment messages are passed onto the FUNDS.TRANSFER module, which, after authorisation, updates accounts and related information. Although the Delivery process is fully automated, users may take control over many aspects of message management. For this purpose, facilities are provided to inspect and control message queues; graphical displays are available giving a view of queue status, such as the volume of traffic by priority and carrier. Once queued, individual messages may be displayed, amended or re-routed.
H. SECURITY	The Security Management System (SMS.) controls who is

MANAGEMENT SYSTEM	allowed to use T24, when they are allowed to use it and to what components of the System they can have access. It will detect, record and stop any attempt at unauthorised use of the System. SMS also records all activities performed by the system users. Details of each authorised User are held in the USER file. Some of the details are listed below • Sign On name – Unique name given to a user to login to the system. • Password – It is required along with the sign on name to login to the system. This data is encrypted and stored in the system. • Permitted times of use – The time limit in which the User can access the system. • Applications Allowed – The tables the User can have access. E.g., ACCOUNT, CUSTOMER, • Functions Allowed – The mode in which the user enters into an application. E.g., “I”, “S”, “P”. • Enquiries Allowed – The enquiries the User can run and see the output. Before being allowed to use T24 each User must be identified to the SMS by their Sign On name and Password, all subsequent activity is then checked against their User details before being allowed access. SMS operates only within T24. It is the responsibility of the installation security manager to ensure security of access to the network, the operating system and jBASE
I. COMMON LISTS	Including these below tables: • Currency related tables • Interest related tables • Charges & Commissions • Correspondents & relationships
J. RISK MANAGEMENT (CREDIT SCORING)	In T24, the SA module enables the bank to define its scoring models (score card) for various types of products. It generates a credit score for the applicant based on the data provided. Although the SA module can be operated independently of other T24 products, it will be of most use when linked to other products using Process Workflow (PW). The module provides for a generic scoring mechanism that is fully customisable. Score models / Scorecards can be defined in the system according to product. Though the product could be the same, scorecards could differ based on certain other attributes such as Residential Status, Industry etc. The module enables the bank to define the various data and ratios required for credit scoring. Credit scoring can be handled for both

	consumer loans and corporate loans. The module provides the following Credit rating and ratio analysis functions: • Ability to define score cards for various products. • Ability to define the data required/ ratios to be calculated for credit scoring for each product. • Ability to define formulae and calculate various ratios. • Ability to define different models of financial statements based on need. • Define the recommended limits (exposure level) for each block of score. • Allocate foreign currency limits and provide the exchange rate to be reckoned. • Download (through interface or manual input) a borrower's financials, perform ratio analysis, • consider recommended limits and calculate the actual limit
K. MULTI COMPANY	T24 supports the operation of multiple companies within one system. These can operate independently or can share CUSTOMER files and/or certain controlling ("static") financial information files. Companies can also share operation of Nostro accounts. SMS maintains security of access at company level. Transactions can take place involving accounts in different companies with appropriate entries being made to inter-company accounts automatically. You can produce CRF reports for combinations of companies with currencies converted as required

III. BUSINESS MODULES

Modules	Detail functions
A. CORPORATE BANKING	
A.1. Trade finance	The Trade Finance (TF) module within Model Bank (T24) supports the recording and administration of Letters of Credit (LC) and Documentary Collections. This module is fully integrated with the rest of the Model Bank, taking advantage of limits processing, accounting, position management, and customer portfolio and security features. Trade Finance transactions can be handled in any currency. Drawings made under an LC can also be in a currency different from currency of the parent LC. Charges taken under an LC can also be denominated in a currency different

	from both the LC and the Drawing. Foreign currency entries will automatically update positions where required. The system can be configured to automatically produce and dispatch all advices, covering letters, Letter of Credit documents, and SWIFT messages necessary for the type of LC, Documentary Collection or Drawing being processed. The advices, documents and covering letters can easily be redefined or amended within the Delivery application/Module. The Drawings application within TF has a flexible payment and reimbursement mechanism whereby funds can be collected or paid via a number of intermediaries, and even be paid to parties not involved in the LC (third parties or agents). The Trade Finance application supports the following products and product characteristics: A.1.1. Letters of credit/documentary credit • Import Letters of Credit – Pre Advice, Sight, Usance, Negotiation and Standby LC • Export letters of credit – Pre Advise, Confirmed/Unconfirmed, Sight, Usance, Negotiation LCs and Transferable LCs • Documents under LC - Payments at sight, Acceptance/Deferred Payment, Discounting of Acceptances, Rejection of Discrepant Documents under Import/Export LCs as also Sight Negotiation/Discounting and Payment Under Reserve under Export LC A.1.2. Documentary collections • Documents against payment, • Documents against acceptance, • Purchase of Sight Bills, Discounting of Usance Collection bills • Clean collections, Payment of the same The Trade Finance module consists of two closely related applications, Letters of Credit and Drawings, which work together to provide a wide range of support for Trade Finance business. The Letters of Credit application records the initial liability of an LC (i.e. the amount of the facility) or the request to make a collection. The Drawings application handles the payment, acceptance and maturity of Usance drawings besides processing of Collection and Discrepant documents under the LC or Collection
A.2. Commercial	This module within Model Bank (T24) covers both Loans and Deposits (LD). A Deposit is a contract to receive funds from

Loans/Deposit	a client and place them on Deposit. The term of the Deposit could be fixed, call or on a notice basis. Interest could be either fixed for the life of the deal or floating linked, for example, to a base rate via a key. Whereas a Loan is the opposite i.e. the funds are lent to a client and can again either be on a fixed term, call or notice basis with fixed interest or floating interest linked to a base rate via a key. Model Bank, if required, can process a transaction through its life cycle without any intervention from the user or alternatively, the user can opt for full manual control and a comprehensive set of on-line enquiry facilities are available within this module. On the books of the Bank/Financial Institution a Deposit will be booked as a liability and a Loan will be booked as an asset In this Module, there are following functions: A.2.1. Loan: • Creation of Loan/commitment • Maintenance of Loan • Authorisation of Loan transaction A.2.2. Deposit • Input/Creation of Deposit • Maintenance of Deposit • Authorise/Delete Deposit A.2.3. LD Enquiries A.2.4. View Accounting entries A.2.5. View COB reports The Loans and Deposits module (LD) covers the standard product types used in the commercial loans sector. These are: • Commitment • Loan • Deposit • Account Receivable • Sundry Deposit • Leasing and Annuities
A.3. Guarantees (Miscellaneous deals)	The Miscellaneous Deals (MD)/Guarantees module within Model Bank (T24) is used to record the miscellaneous contingent deals that are required to record 'Guarantee' type transactions in the banks' books. These can range from straightforward guarantees both issued and received, to

	more specific Trade Finance related deals such as Shipping Guarantees. This module allows for forward dated contracts, full charging facilities using standard Charges and Commission tables. In addition customised delivery advices can be produced if required. The functions of this module are as follow: • Guarantees issued • Multi party/participation Guarantees • Guarantees received • External Asset register • Authorise/Delete Guarantee transaction • Enquiries • Accounting entries
A.4. Syndicated loan	The SL module within Model Bank (T24) automates the business of administering syndicated facilities where the bank is either the lead manager/lead participant/agent or a mere participant. It handles basic to complex multi-lender, multi-tranche, multi-product, multi-currency, and multi-borrower facilities from application stage to maturity, based on workflow approach with rigorous condition checking. The system handles the workflow in the following stages: • Pre-Syndication – This stage starts with recording terms of mandate and culminates with recording the final terms of the credit agreement. Information that may be recorded includes the nature of facility sought, details of banks to which information memorandum is circulated and their response, details of underwriters with underwriting fee, participations brought in by each underwriter, details of final allotment to participants with the commitment fee at participant level. Collection and distribution of underwriting fee and accounting for underwriting, if required, is also handled at this stage. • Facility – This is a line of credit or a facility granted to the borrower. The administration of the facility is broadly based on its product type, nature of credit (revolving or non-revolving), tenor and the currency of the facility. Method of calculation of commitment fee and its collection frequency is defined in this stage. Tranches may be defined under a facility to phase out disbursements, with each tranche having its own set of terms and conditions for drawdown management. • Drawing – This is a drawdown against a facility. Multiple loans may be drawn down against a facility until the facility is fully utilised. Features such as default of interest rates from facility, rollover/merger/split of loans are also available

A.5. Leasing	An agreement in which one party gains a long-term rental agreement, and the other party receives a form of secured long-term debt.
A.6. Bill	The scope of this Module is restricted to Discounting, sending the Bills for collection and taking Bills as Collateral. The handling of rediscount, acceptance are not covered in this Module which we are trying to cover in our future releases. The types of Bills handled by the Banks are: • Trade Bills (Demand Bills which are payable on demand and Usance Bills payable on a future date or after certain number of days from Bill-Date or Acceptance). • Direct Bills (Drawer and Drawee are same and with a maturity-date). • Clean Bills (Cheques) • Individual bill types and their nomenclature differ from country to country. Irrespective of the Type of bills, the possible operations for a Bill are: • Collecting and crediting the customer • Using Bills as collateral to secure limits to customers • Discounting and lending by the Bank The BL application handles the above operations for different type of Bills which is explained the following section
A.7. Cash Management	Manage your cash flow effectively. One-stop consumer banking portal.
B. RETAIL BANKING	
B.1. Teller	The Teller module in Model Bank (T24) processes a wide variety of retail transactions. It incorporates the administration of the Tills, the processing of Local and Foreign Currency Transactions, Travellers Cheques, Denomination Control of the Tills, Rate Defaulting etc. It can also when appropriate process passbook updates, advice production and automatic charges Teller module includes these functions: B.1.1. Head Teller: • Till administration • Till transfer • Travellers Cheque • Enquiries

	B.1.2. Teller: • Teller cash • Currency exchange • Travellers cheque • Account transfer • Till transfer • Till administration • Enquiries
B.2. All in one Account (AZ)	The All-in-One module (AZ) provides the basic functionality of loan and deposit contracts within an account based environment. The account-based environment provides the facility to have loans and deposits with Cheque, Card and complex charge functionality. The module is linked to a product parameter application that allows you to define different loan and deposit products that will govern the input defaults and validations at the account level. B.2.1. AZ Deposit • Open • Amendments • Partial withdrawal • Pre closure • Enquiries • Accounting entries • View COB reports B.2.2. AZ Loan • Limit • Opening • Drawdown • Amendment • Repayment • Enquiries • Accounting entries
B.3. Mortgage/loans	The Mortgages module (MG) within Model Bank/T24 allows for the maintenance of a wide range of mortgage and personal loans, which can have different repayment characteristics. This module is ideal for generating and tracking loans with a large number of regular repayments. Mortgage loans can be input as single or grouped contracts and against mortgage rates that can be maintained centrally. There is also functionality to allow for special payments and

	early repayments. • MG functionalities are below: • Limit, collateral details • Create mortgage • Maintenance of mortgage • Authorise mortgage transactions • Mortgage enquiries • Accounting entries
B.4. Cheque	B.4.1. Cheques (issuing) T24 facilitates Stock maintenance, Issue and processing of cheques (presentation, clearing, returns and stopped cheques) by the cheque types registered on the system. • Functions are include: • Receipt of stock • Issue Cheques • Stop payment of Cheque • Revoke Stop payment of cheque • Enquiries B.4.2. Cheques for collection Model Bank/T24 allows for the Acceptance of cheques for Local clearing / Outstation Cheques, Batching of Cheques and Marking returns: • Outward Clearing LCY – Direct: implies that the cheque amount deposited will be reflected in the customer's account immediately, but the funds will not be released for withdrawal until the cheque is cleared • Outward Clearing LCY – Indirect Under this method the cheque deposit amount will be posted to an internal suspense account. On marking the cheque status as CLEARED, the system will reverse it from the suspense account and credit it to the customer's account immediately • Outstation cheques • Cheque collection • Change outward clearing details • Enquiries
B.5. Standing order	A STO (Standing Order) refers to the Instructions given by an account holder to their Banker for effecting regular payments at a defined frequency. The Bank will have the necessary authority to debit a particular Account and pay away funds to a beneficiary, whose account may be held at the same Bank or in a different Bank, normally at a regular

	frequency (e.g. a regular monthly payment to an Internet Service Provider). STO can also be cross currency i.e. the currency of the Account debited can be different to the currency of the Account to be credited. The STO module, which forms part of FT, also handles Balance Maintenance (BM), which facilitates the sweeping of surplus funds out of Accounts or the replenishing of Account balances that have fallen below the minimum requirement. A maximum of 999 STO can be defined on the same Account. T24 keeps track of this and defaults the serial number at the time of creation of new STO. BM STO must always have a number of 900 to 999 and hence must be specifically input by the User
B.6. Direct Debit	A Direct Debit is an instruction from a customer to a Bank or Building Society authorizing the organization to collect varying amounts from the Customer's Bank Account The above business requirement can be achieved in T24 through the DIRECT.DEBIT (DD) module which supports Mandate handling, Creation of Claim, generation of Claim file, Claim Accounting, Return and Resubmission of Claims for Outward claims. Recording of rejection and Item creation for rejection and definition of file format is supported for the Inward claims from DD module and local accounting interface can be used for raising Accounting entries related to above. The Direct Debit (DD) module is designed to interface with existing T24 applications via core Accounting System. Currently the MG.MORTGAGE application has the link to DD module and claims can be generated automatically based on MORTGAGE schedules for payment Interest Amount, Principal Amount, Commission and Charges. Also DD claims can be generated manually (without linking to any T24 application) based on frequency or one time
C. TREASURY	
C.1. Foreign exchange (FX)	The Foreign Exchange (Forex) module within Model Bank (T24) covers the accurate recording of all types of Spot, Forward, Option contracts complete with limit exposure, position updates, brokerage and delivery of the related advices, confirmations and payments: • Exchange rates • Treasury client operations: Spot, forward, split value deal, precious metal deal, banks internal deal • Non treasury client operations • FX enquiries • Viewing accounting entries

C.2. Transactions on Money Market	The Money Market (MM) module within Model Bank (T24) provides dealer and management support for the processing of the standard product types used in the commercial Money Market sector. These include: C.2.1. Placement This is a contract to place funds at a Bank or other Financial Services Counter party. The term of which can be either fixed, call or notice basis and interest can be either fixed or floating linked to a base rate via a key. C.2.2. Taking This is a contract to receive funds from a Bank or other Financial Services Counter party and provides the same contract options as the placement. The processing in this module is straightforward but very flexible. Interest is always calculated and paid in arrears. The term of the Money Market (MM) Contracts can be for a fixed period or with a stipulated Call or Notice period. Interest rates can be fixed or floating against base rates. MM contracts can be matured, or rolled over into a new deal period with or without 'auto rollover' facility. Payment and receipt functions allow for partial or total repayment of the contract Also Brokerage charges/calculation can be made against individual MM contracts if required
C.3. Swaps	The T24 SWAP module supports the recording and administration of both IRS (Interest Rate Swaps) and CIRS (Currency Interest Rate Swaps). It also supports one-legged contract types (asset or liability), which are essentially loans or deposits. Additionally, it incorporates these swaps into T24 Limits, Accounting and Position Management modules. The module supports the following types of SWAP : • Plain vanilla interest rate swap • Currency interest rate swap with or without exchange of principal • Amortising swap • Accreting swap • Roller-coaster swap • Balloon swap And covers options such as: • IRS/CIRS Single Contract • Simple Loan/Deposit Contract • Definable Schedules (Date and Frequency Based) • Fixed/Floating/Spread/Caps/Collars/Floors • ISDA Day Convention • Payment Netting

	• Definable Delivery • Full T24 Integration
C.4. FRA	The Future Rate Agreement module (FRA) supports processing for both Hedging and Trading purposes. The module is fully integrated with T24 facilities such as Limits and Position management. In addition, Trading FRAs can be monitored via separate FRA positions. Accounting in the FRA module is flexible; the user can exercise a level of control over FRA processing and accounting rules. Reports included with the module highlight transactions, which remain, unconfirmed, or due for rate fixing
C.5. Derivatives	Derivatives performs on-line real-time updates of derivatives trading positions and cost of positions. Full revaluations may be performed at any stage during the system day for reporting purposes, and the End of Exchange process may either be run online or during the main T24 batch run to generate and post to the accounts the 'official' margin figures. All operations carried out in Derivatives raise a record in the main derivatives transaction file. This file provides a comprehensive record of a customer's activities within the Derivatives module and is the basis for most client reporting/statements etc. Each transaction is also associated with one or more 'events' in the life of a contract that form the basis of the module's event-driven accounting updates
C.6. Non deliverable forward	A Non Deliverable Forward (NDF) is a product where a currency is unable to be settled. Because of this the deal must be fixed at a time and from a rate source arranged at the time of the original trade. When the rate is fixed on the fixing date, the settlement will be a net settlement in the deliverable currency only, calculated by using the difference between the original FX rate and the fixing rate. Additionally it incorporates NDFs into T24 Limits, Accounting and Position Management modules.
C.7. Position management	• Position Management module assists in management of funds and control of position risk • Flexible parameter tables to define relevant activities and transactions • Enquiries to reflect latest information There are 3 pre-defined position types to control: • Currency position - FXP • Cash flow position - CAS • Interest mismatch position – GAP

	The Position Management (PM) module consists of a set of ENQUIRY records that will assist the Bank in the management of funds and the control of position risk. These always reflect the latest information known to T24. Because of the nature of the controls that need to be exercised, the construction of the ENQUIRY records is left to each user to customise to their individual needs. However, within the design flexibility, the opportunity to 'drilldown' to the lowest element on any given line remains available. The PM module comprises a series of flexible Parameter tables made available to users to define all the relevant activities and events of transactions processed within T24. Each of these defined activities is given a unique identification. For example, on a Money Market Loan the principal movements over CUSTOMER or Nostro ACCOUNT records at takedown are identified separately from the principal and the interest amount movement at the maturity of the contract. From the specified activities each ENQUIRY is constructed according to need by the inclusion of the uniquely identified events. Processing options available at the generation stage include the netting or grossing of accumulated line totals, averaging of rates and links to other significant tables. These tables may determine process rules such as 'time band buckets' into which data is aggregated and displayed, or combining specific dealer desks into unique enquiries. In order to cater for products not processed in T24 there is a facility to input positions directly into the PM module. The main process within the PM module is designed around on-line screen based enquiries, however the printing of hard copy reports is also facilitated
D. PRIVATE BANKING	
D.1. Asset Management (AM)	• AM Back Value Management • AM Performance • AM Portfolio Modelling • AM Valuation Portfolio Consolidation
D.2. Securities	The TEMENOS Model Bank (T24) Securities Module (SC) has been designed to enable the processing, maintenance and control of order input, trade, settlement and custodial functions. The Securities Module contains a comprehensive Portfolio and Investment Management application, which in turn enables account and/or fund managers to provide a full range of services to private clients. Besides the module also enables trading and maintenance of positions for the bank's own portfolios, be it trading or

	investment. The Model Bank covers only the own book portfolios of the bank and does not cover services to private clients. The TEMENOS Model Bank (T24) Securities Module supports the following major activities: • Order Placement and execution • Trading on behalf of itself for investment, available for sale and trading portfolios • Off-market trades • Position transfers • Settlement processing • Detailed security-wise/location-wise position maintenance for various own book portfolios • Mark to market for bank's own positions • Profit/loss booking for bank's own trades and capital gains processing • Accrual/amortization of discount/premium for own book bond positions • Automated coupons and redemptions processing for bonds positions • Corporate action processing
D.3. Fiduciaries	The Fiduciary Deposits module of T24 is used to take deposit orders from clients and place them, individually or in groups, with foreign institutions that may be either external or a member of the same group as the deposit unit. A small handling commission is charged and as there is no liability for either the deposit or placement they are recorded 'below the line' on the bank's general ledger. The module has two main files used; FD.FID.ORDER used by the account officer to record the clients' deposit request and FD.FIDUCIARY used by the dealer to make the placement with the external institution
D.4. Portfolio management	T24 supports three types of portfolio: • Banks Own Position Portfolios. • Customer Portfolios. • Memo Account Portfolios. All three have to be set-up on the application SEC.ACC.MASTER, however from there on they are treated quite differently by T24
D.5. Commissions for Intermediaries (RETROCESSIONS)	A RETROCESSION is a part of a commission (paid by a customer to the bank), which is given back to either an Introducer or External Funds Manager for: • Having brought a customer into the bank and/or • Managing the customer's assets (partially or entirely).

	The retrocession is based on the NET COMMISSION or FEES paid by the customer to the bank. The retrocession can be also based on: Margin interest or Number of pips in FOREX deals. The retrocession amount due to either an External Funds Manager or Introducer must be paid ONLY when the customer is effectively debited with the Total Net Commission Amount for the transaction related to
D.6. Custodial operations	This is a specific module of T24 to fit the requirements of some banks in Luxemburg, Netherlands, Belgium and Germany
D.7. Planning	The overall planning of a person's wealth, including the preparation of a will and the planning of taxes after the individual's death
E. GENERAL	
E.1. Nostro Reconciliation	NOSTRO Accounts are accounts maintained by a Bank with their Correspondents (mostly abroad). While the actual account is maintained at the Correspondent Bank, the Bank (i.e. the Model Bank) maintains a mirror account to reflect the operations in the NOSTRO account NOSTRO reconciliation involves matching Credits/Debits in NOSTRO ledger (which represents the operations in the mirror account) against Debits/Credits in the correspondent statement (the account statement sent by the Correspondent). This is dependent on the matching criteria defined by the user (e.g. match by value date, currency, amount and transaction reference) and reporting un-reconciled postings. The NOSTRO reconciliation module is made up of the following process. • Message captures for incoming S.W.I.F.T MT940 and MT950 messages. • Capture of NOSTRO ledger data in the form of MT940 messages diverted from DELIVERY. • Statement extraction from aforementioned messages into T24 files. • Definition of matching parameters and controls. • Automatic matching procedure. • Manual matching procedure. • Manual un-matching procedure. • Manual statement input procedure. • Online and batch Enquiries and Reports. • Controls and audit trail. • Archiving.

	Bank holds NOSTRO accounts with correspondent banks throughout the world. Normally they receive daily statements of these accounts by S.W.I.F.T. These statements are then reconciled with the NOSTRO ledger account, the reflection of the NOSTRO account on the bank's own books. The reports generated by this process are then reviewed and acted upon by the relevant departments. The RECONCILIATIONS product in T24 provides automated support for this function. Although the main function of the product is the reconciliation of NOSTRO accounts it can also be used for any reconciliations of either multiple or single (e.g. suspense) accounts
E.2. Fund transfer	In Model Bank Funds Transfer (FT) is used to effect payments, which can either be internal from one Account to another, or externally to another Bank. These payments can be cross currency and the module also covers the issuing of Drafts (Bankers Cheques) as well as Inward Remittances/Transfers. Charges and commissions can either be taken based on a variety of conditions or input directly into individual payments. FT handles internal and external funds movements: • Customer payments • Banks own payments • Incoming • Outgoing • Internal It is integrated with: • Accounting • Central liability • Delivery (Outgoing) • Delivery (Incoming) • Position management Real time updates are applied to: • Balances • Positions • Cash flows • Limits
E.3. Past Due	The Payment Due Processing module within Model Bank (T24) allows users to monitor and control overdue loan payments. Payments to Loans monitored by the PD module are only made where funds are available. If payment is not made, the contract becomes 'overdue' and can be monitored and processed accordingly.

	Whether a loan is monitored by the Payment Due module or not is determined by a flag set on a field within the contract, the Liquidation Mode. Contracts input via the following Model Bank modules can currently be automatically monitored by the Payment Due module: • Money Market • Mortgages • Loans and Deposits • AZ loans • Drawings • Guarantees In addition to the above, a past due on an account or contract which does not have an automatic link to the Payment Due module can be captured manually. When, for example, PD monitors a loan and a payment is not made on its due date, that payment becomes 'overdue'. Overdue payments go through a Model Bank debt ageing process - the PD module performs different actions as the payment becomes overdue. PD will: • Accrue, charge and post penalty interest • Send chaser advices for the overdue amounts • Report the loan according to the age of the debt It is important to note that PD processing is at payment level and therefore each payment can travel through the PD debt cycle independently. So at any one time a Customer may have outstanding PD at different stages within their life cycle
E.4. Tax	The Tax Engine (TX) module interfaces T24 transactions to external tax systems for mainly 2 purposes; tax calculations and tax reporting. This module enables the user to: • Maintain user defined Tax databases for tax reporting purposes. • Interfaces T24 data to an external/local tax calculation system. The main features of the TAX ENGINE module are: • Allow a user exit in the tax calculation API, which would allow local routines to modify/calculate tax amounts. • Allow definition of Tax Databases, which would be user-defined fields to hold tax related information for reporting purpose. • Allow specification of mapping between different applications and Tax databases. • Allow definition of conditions for each application based

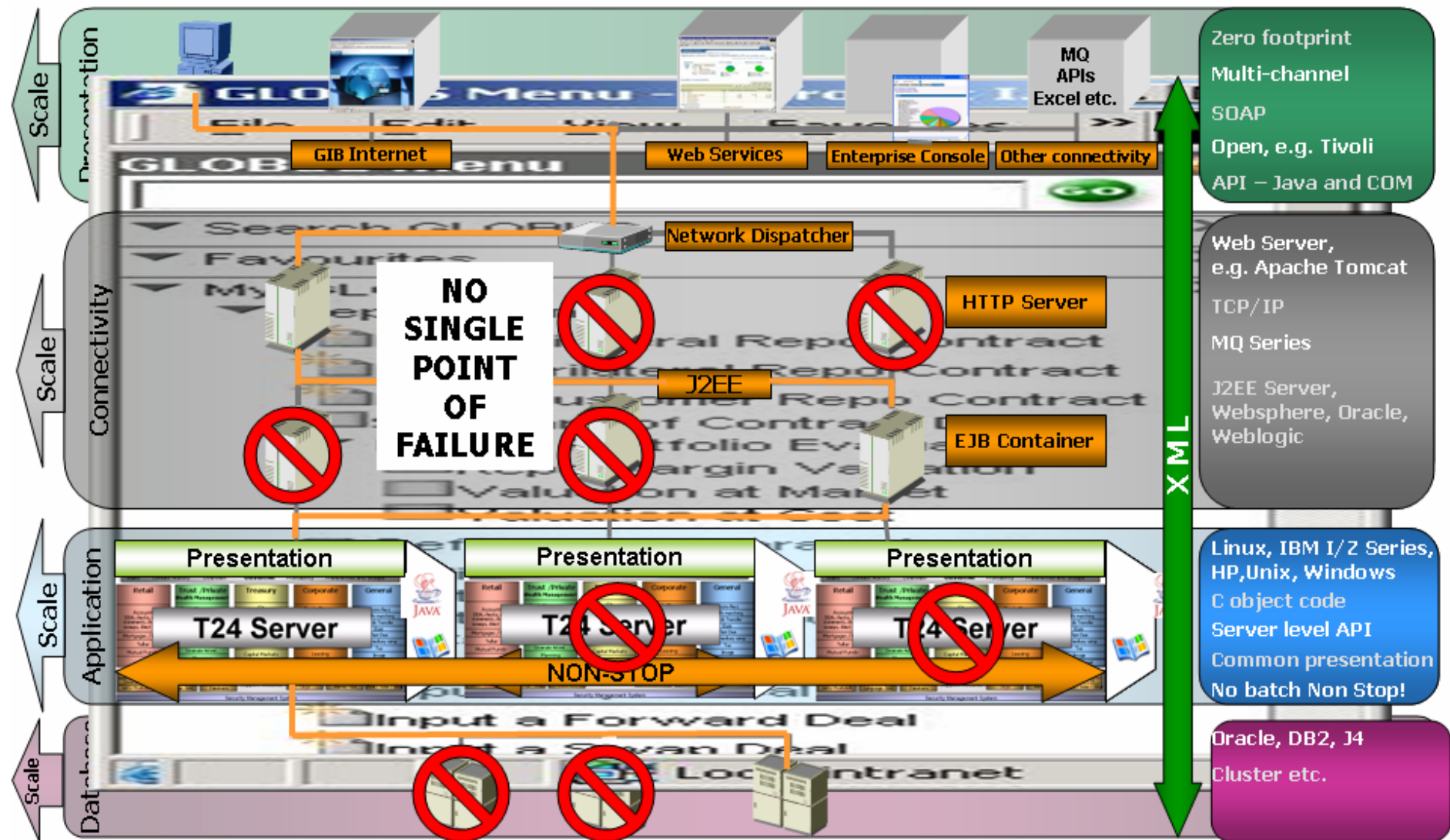
	on which the tax databases need to be updated
E.5. Document management	The Document Management (DM) module provides the functionality to manage the documents obtained from Customers for availing various facilities with a Bank. With this module installed, it would be possible to specify details about Classification and types of documents, conditions for required documents when a customer relation is established and for the various facilities offered to Customers. The module would track the status of required documents and would produce appropriate overrides or errors when the required documents are with an invalid status
E.6. Image management	The Image Management product in T24 is used in conjunction with the Graphical User Interface (GUI) and gives you the ability to capture images. Image management module benefits the user by providing immediate access to digital copies of essential data such as signatures, loan documentation, birth certificates or passports. There is no need to access the physical document itself – indeed this may not be possible with items such as passports, or if the item itself is stored somewhere for safekeeping. Only the capture station needs access to a scanner; any standard PC can view the stored images

IV. SPECIALIZED CONNECTION GATEWAYS

Gateways	Descriptions/Concepts
A. IBPS	CI-TAD Application Component in Member Banks
B. BankNet	Vietnam National Financial Switching Joint-Stock Company (BankNetVN). BankNetVN was founded with its major objective of establishing a national financial switching system interconnecting payment card systems of BankNetVN's member banks ("the member"). BankNet has following members: • Vietnam Bank for Agriculture and Rural Development (VBARD) • Bank for Investment and Development of Vietnam (BIDV) • Industrial and Commercial bank of Vietnam (ICB) • Asia Commercial Bank (ACB) • Eastern Asia Commercial bank (EAB) • Saigon Bank for Industry and Trade (Saigonbank) • Saigon Thuong Tin Commercial Joint Stock Bank (Sacombank)
C. SBV REPORT	Create reports under format defined by SBV and send to SBV periodically.
D. SWIFT	Society for Worldwide Interbank Financial Telecommunications – SWIFT: An industry cooperative that provides a standard format for transmitting payments, stock transactions, letters of credit and other financial messages to more than 7,500 member banks, broker-dealers and investment organizations around the world. Founded in 1973 as the Society for Worldwide Interbank Financial Telecommunication, millions of transactions worth several trillions of dollars are sent each day with an average transit time of 20 seconds. Working like a bank routing number, a SWIFT code is widely used to transfer funds between banks.
E. Reuters 3000 Xtra	Reuters 3000 Xtra: Reuters 3000 Xtra is a high-speed, integrated information and transaction service. It gives users a commanding view of the global real-time financial arena and provides a combination of news, information and insight as well as access to the global Reuters trading community. Its integrated price discovery and trading capabilities across all asset classes mean that decisions can be made and executed from a single desktop. Reuters 3000 Xtra reflects Reuters vast experience in global financial markets; functionality is continually upgraded and content enriched
F. International Card	VISA: Visa is a brand of credit card and debit card operated by the Visa International Service Association of San Francisco, California, USA,

Organizations	an economic joint venture of 21,000 financial institutions that issue and market Visa products. MasterCard Worldwide: MasterCard Worldwide is a membership organization owned by the 25,000+ financial institutions that issue its card. MasterCard is also the company's brand of credit cards. It was originally created by United California Bank, Wells Fargo, Crocker Bank, and the Bank of California as a competitor to the BankAmericard issued by Bank of America. BankAmericard is now the VISA credit card, issued by Visa International.
G. Internet banking	Internet banking: Internet banking (or Online banking) is a term used for performing transactions, payments etc. over the Internet through a bank, credit union or building society's secure website. This allows customers to do their banking outside of bank hours and from anywhere where Internet access is available. In most cases a web browser such as Internet Explorer or Mozilla Firefox is utilized and any normal Internet connection is suitable. No special software or hardware is usually needed.
H. Mobile banking	Mobile banking: Mobile Banking (also called as M-Banking or mBanking by some) consists of three inter-related applications: • Mobile Accounting • Mobile Brokerage • Mobile Financial Information Services Most services in Accounting and Brokerage are transaction based. The non-transaction based services of informational nature are however imperative to conduct transaction. For instance, balance enquiries might be needed before committing a money remittance. The accounting and brokerage services are therefore offered invariably in combination with information services. Information services, on the other hand, may be offered as an independent module.

V. T24 SYSTEM ARCHITECTURE MODEL



VI. SYSTEM ARCHITECTURE CONTENTS

A. SYSTEM COMPONENTS

A.1. Application server

The T24 Application server is the core component of the TEMENOS T24 solution. It includes the business logic of the T24 solution.

A.1.1. Operating system

T24 can support following operation systems:

- Windows
- NT
- UNIX
- LINUX
- ...

Currently, The Operating System chosen by MILITARY Bank and SEABank to support their Core Banking solution is IBM AIX. The TEMENOS T24 solution is generally available for the AIX operating system.

A.1.2. Application framework

The T24 application will be delivered on jBase Application Framework release 4.1. The generally available release of jBase 4.1 products for the defined Operating System will be used.

A.2. Database server

T24 can support following database:

- Oracle
- DB2
- jBase

A.2.1. jBase 4.1 Database engine

The T24 Database will be implemented on jBase 4.1 engine. This database engine enables connectivity to databases and data files through the jBase External Device Interface.

A.2.2. Oracle 10g Database engine

The T24 Database can also be implemented on Oracle 10g engine. The connectivity from T24 Application to the database will be done using Oracle OCI. This will enable Oracle standard implementation in terms of architecture, like cluster and replication.

The link to Oracle database at the T24 application server level will be done with the jBase External Device Interface for Oracle XML: jEDI Oracle XML.

A.3. Browser server

The T24 Browser server is the T24 Web Application Server. It provides Microsoft Internet Explorer 5.5 (and above), which will have access to the different versions and enquiries provided by T24

The T24 Browser server runs on the top of a web and servlet server. At this stage,

T24 Browser server is generally available for the Tomcat Apache web and servlet server release 4.1.12.

The release number of Apache Tomcat to be used for the T24 Browser provided will be confirmed at build time.

A.4. T24 Desktop

The T24 Desktop is Visual Basic thin client. It runs on Microsoft Windows Workstations and Professional releases of NT 4.0 and above. It is recommended that the Bank should implement the T24 desktop client initially. The Bank is required to acquire the Web server in order to launch the T24 Browser. Once the Web server is configured and launched, a plan for the smooth replacement of the Desktop by T24 Browser can be achieved

The generally available release of the T24 Desktop, supporting Unicode UTF-8 and SSL encryption with the T24 Application server, is 1.4

A.5. TEMENOS connector

The Temenos Connector allows external programs to link to T24 via the OFS (Open Financial Service) module. The java TCServer opens up T24 to external access via OFS. This can be done using many different channels, including MQSeries, TCP, SSL

The Temenos Connector consists of:

A.5.1. Server side tCS

The TEMENOS Connector Server, tCS, is providing T24 standard connectivity to the sub-systems. It is generally available in release 1.3.

The TEMENOS Connector server does not support automatic character translation, neither does OFS. The character translation will be provided either by the sub-system server of the Bank environment, which will also ensure support for the OFSML message parsing both ways; or by a translation routine at the tCS level.

Bank is can use MQ Series message bus to secure the message delivery in-between solutions

A.5.2. Client side tCC

The TEMENOS Connector Client, tCC, is presently available in two different releases: java and COM+.

The integration requirements of this project; with the Front-End environment developments for Internet Banking, As the present teams are also working on the Windows environment, the tCC COM+ will also be used

A.6. Temenos connection manager

The TEMENOS T24 Connection Manager provides connectivity from T24 Desktop to T24 Application servers.

- JconMan :The TEMENOS Connection Manager is receiving the T24 Desktop Connection requests and returns back the information of the T24 Application server they can connect to
- jConServ : The TEMENOS Connection Service is providing T24 Connection Manager with its availability information

B. MIDDLEWARE AND INTERFACES

The technical solutions for interfacing with external system (IBPS, SWIFT, Reuters 3000, SBV report...) are as follow :

B.1. Direct interfaces

The file base import and export features will be supported with ftp and dedicated directories. The file base export requiring push will use scripts to perform this "file push".

There is no real time processing for file transfer, the files will be processed through batch services, for both incoming and outgoing files

B.2. Indirect interfaces

The Front End link to T24 Application server will be done through the TEMENOS Connector Client API. The development to integrate TEMENOS Connector Client API and Front End environment is not part of TEMENOS project scope.

- Message Bus: The IBM Message Queue, MQ Series, will be supported via the tCC and tCS connection and via native MQ Series support from tCS
- TCP/IP sockets : The IP Socket messages will be supported via the tCC and tCS connection and via native IP socket support from the tCS

C. SECURITY

C.1. Security management system (SMS)

The SMS module of T24 is part of the Core of the T24 product. It enables to limit the access, the functionalities and the perimeter of the user business transaction input and output.

It is a business module. The description of the scope and deliverables for the SMS module are part of a separate document addressed through TEMENOS business consultant specialists

C.2. Encryption

TEMENOS T24 implements encryption to the standard communication mechanism:

- Desktop communication to T24 server, using IP socket, via jConMan and jConServ.
- TEMENOS Connector Client API, using IP socket, via Connector server tCS.
- tCS direct communication from MQ Series or IP port, using TEMENOS Connector encryption methods.

The implementation of encryption is not defined at this stage and a review of the resulting increase in communication volumes is advised before going in this direction

C.3. Connection manager

Connection server accepts the protocol SSL v2/v3 and TLSv1. For security reason, the version 2 of SSL is disabled.

The connection manager solution doesn't provide a PKI (Public Key Infrastructure). You must implement a policy regarding the generation of certificates

C.4. TEMENOS connector

The encryption provided by TEMENOS Connector is based on symmetric cryptography. It supports SSL v3 protocol.

TEMENOS Connector provides methods to create and manipulate the Certificates and process the encryption.

The TEMENOS Connector Client is providing direct support for encrypted communications.

When using native IP communication sources to TEMENOS Connector Server, some TEMENOS Connector methods will have to be used to provide both the support for encryption and the formatting of the messages to be sent

D. MONITORING

D.1. Log information

The T24 database provides the PROTOCOL file, which is updated real-time by T24. All logs information are stored in the PROTOCOL file as text messages.

It is possible to follow the business activity of the T24 Application servers by monitoring the PROTOCOL file

D.2. Enterprise Console

The T24 Enterprise Console provides Information Panel, Summary and Detail views of the T24 solution activity.

Hanoi, 27th, October, 2006
E-Bank team