Riskflow Digital Treasury Platform

intelligent financial performance monitoring

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1.0 RISKFLOW DIGITAL TREASURY PLATFORM

F or over 30 years, Riskflow has developed treasury solutions for stakeholders across the finance industry, the latest innovation to market being the Riskflow Digital Treasury Platform (RDTP).

The Treasury Platform comes with its own built-in dashboard which is a flexible and self-definable Dashboard solution. The Dashboard is automatically linked to the various components of the Treasury Platform. The Dashboard can be viewed on any device linked to the internet or intranet.

The objective of the dashboard is to allow the client to define its own KPIs (Key Performance Indicators), business metrics and analytics to monitor the health and overall well-being of the institution. The information can be presented in various ways i.e. in graphic format (line, bar and pie charts) and info boxes, which will be able to display ratios, percentages, amounts with indicators showing the direction of the movement. Information can also be displayed in tabular format.

The Dashboard has an administrative component allowing the client to administer who can view and make changes to the Dashboard.

Typical embedded information included are:
▶ Cash in- and outflow
▶ Cost of funds
▶ Cash or near cash available
▶ Liquid assets
▶ FX positions
▶ Gap analysis

The Dashboard can also be populated with information from the organisation's trial balance to produce the ratios such as:
▶ Return on Equity (ROE)
▶ Cost to Income ratio
▶ Staff cost to Income ratio
▶ Staff cost to Total costs ratio
▶ Interest income to Total income ratio
▶ Non-Interest income to Total income ratio
▶ Non-Interest income to Operating expenses ratio
▶ Composition of Interest Income
▶ Composition of Non-interest Income
▶ Current month's Net rate spread on Interest bearing products
▶ Current month's Capital Adequacy Ratio (CAR)

The Dashboard has the unique capability to show the following information from its forecasting capability such as:
▶ Graphical display of the next 12 months projected figures for:
  ■ Average yield
  ■ Required yield to break even
  ■ Profit differential
  ■ Average cost
  ■ Net rate spread
  ■ Projected Net Interest Income (NII)
  ■ Projected NII with interest rates shocks
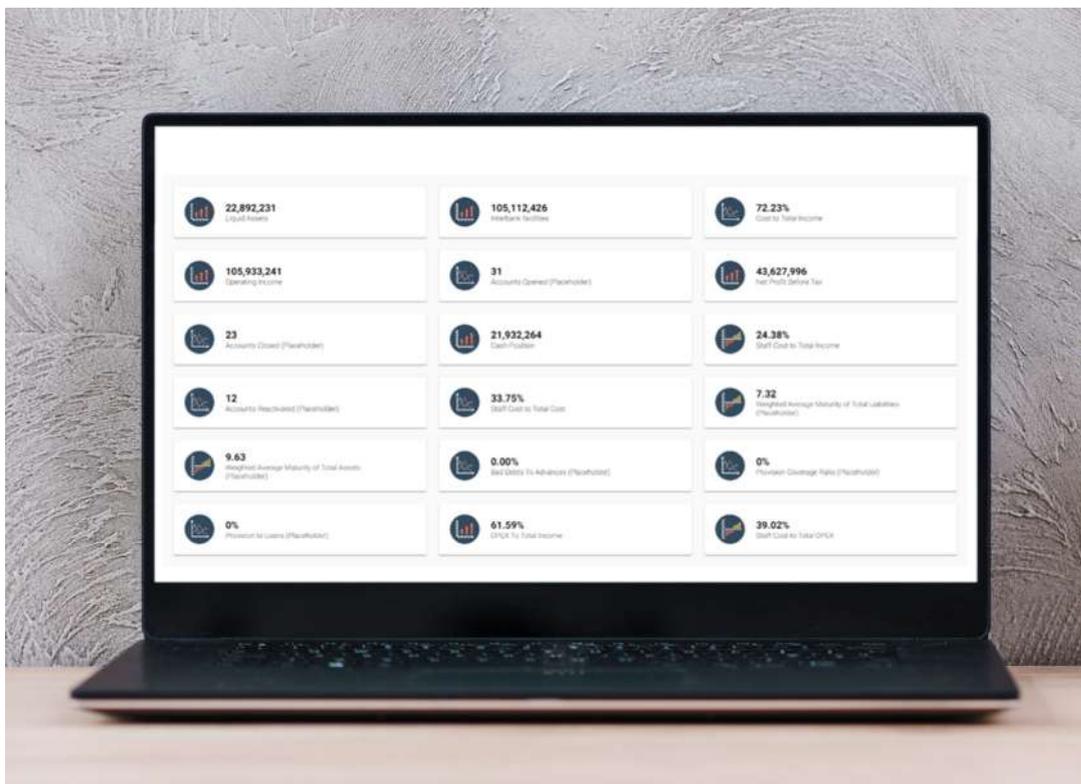
2.0 INDEX FORECASTING CAPABILITY

Another important feature of our Treasury Platform is that it has a built-in Index forecasting capability. Through a simple user interface, the user can forecast future indices and yield curves based on historical correlations.

The algorithms make use of advanced forecasting models and statistical methods to create these forecasts in an easy to use manner.

2.1 Forecasting
The user imports a selection of interest rates (bank rate, LIBOR rate etc), indices (oil price, inflation rate, etc) and yield curves (Treasury bills, Government bonds, etc) and selects one that they believe to be a prominent driver in the economy. The system programmatically correlates the rates, rejecting any rates that fall below a user-defined threshold.

2.2 Yield Curve
There is a selection of five different forecasting methods to choose from. Detailed knowledge of statistics is not required as there is an option for the system to select the best suited method for the given data set.

Given a user's forecast of the driving rate the system computes the forecast for all other imported rates. In the forecast procedure the system considers the fact that rates do not always react in the same time period - a shift in one rate this month may only reflect on another rate in 3 months as the market takes time to adjust - and so the forecasts are adjusted according to the leads or lags in the rates. The system can also convert different maturity bands into yield curves for that edge when examining market trends.

2.3 Monte Carlo
Beyond straight forecasting the system can be used to generate Monte Carlo scenarios, but what makes the system stand out is that the Monte Carlo generations are not simply a randomisation of market rates but uphold certain relationships. For example, if two rates have maintained a spread of 350 bps over the last ten years, then it is impractical for scenario planning to allow these rates to randomly deviate from one another. Thus, the Monte Carlo scenarios are generated in such a way that the user is never left basing decisions on unrealistic forecasts.

2.4 Monte Carlo Display
All rate views and Monte Carlos are viewed through a sleek and interactive graphing system that brings your data to life. For advanced users, there are user-definable parameters to customise forecasts e.g. by specifying random walk step size, number of sub-correlations and other model-specific variables.
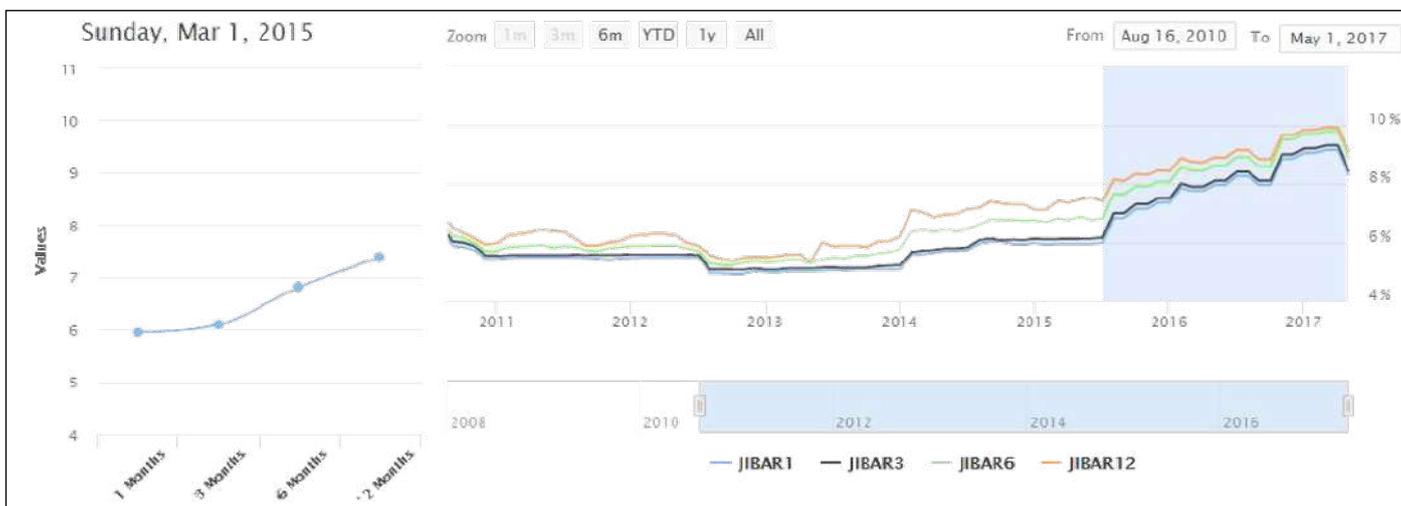
▶ *Figure 1.0 Yield Curve*

3.0 A REAL-TIME INTEGRATED TREASURY TRADING PLATFORM

The core element of the Platform is to address the needs of Treasury and to provide a real-time integrated treasury trading platform that also includes asset and liability management with functions to do regulatory reporting and funds transfer pricing. It provides total accounting flexibility with special reference to operational, liquidity, market, interest and exchange risk issues on an operational level.

The Treasury Platform is a specialist sub-system developed to cater for the financial instruments dealers encounter in the treasury environment and provides a unique combination, catering for account-based instruments such as call and term accounts and transaction-based instruments such as buying and selling bonds, treasury bills and FX transactions.

The Treasury Platform is developed on one open, integrated and adaptive web-based platform which must host details regarding the dealers, counterparties, treasury instruments, portfolios, limits, etc, and make use of the latest GUI functionality such as Windows connectivity products.

It is a real-time system: there are no time delays. All positions and limits are updated immediately. The Platform can interface with other systems available in the market to create a straight-through process. Likewise, it contains a facility to extract, transform and load data from external sources such as core operational systems in order to validate, cleanse and enrich the data to minimise the effect of missing data values.

The Platform has its own sub-ledger system that provides a real-time update of the trial balance.

The Platform is a real-time, fully integrated treasury trading system that segregates the FRONT, MIDDLE, and BACK OFFICE on security access levels.

▶ *Figure 2.0 Monte Carlo*

4.0 CORE FUNCTIONS OF THE PLATFORM

FRONT OFFICE (Dealer) Section

The FRONT OFFICE section of the system, which is only accessible to the dealers through the security set-up procedure, allows the dealers to:

- ▶ Provide customer service through on-line account enquiries, updating, and rate changes.
- ▶ Support paperless trading. There is no need to fill in dealing slips and deals will be directly captured on-screen for verification by the BACK OFFICE.
- ▶ Deal with the latest real-time information (including on-line profit/loss) with no end-of-day runs.
- ▶ Be more productive. It is user friendly, designed by users.
- ▶ Do full cash management activities on all bank accounts with system-generated entries such as maturities and also allowing for manual updates of cash transactions outside the system.
- ▶ Use dealing analytic tools such as price calculations, break-even analysis, calendar and carry transaction calculators.
- ▶ Produce profit and loss reporting.

BACK OFFICE (Administration) Section

The BACK OFFICE section of the Platform handles confirmations, settlements, statements, journal entries, regulatory information reports, and other administrative procedures.

The back office section includes an action flags function that signals pending events such as deposits maturing, payments that are due, interest payments etc.

Reporting capabilities allow you to have up-to-date, on-demand reports. Confirmation correspondence is automatically generated and can be processed as required.

A Trial Balance is updated automatically as transactions are processed. Detailed journals are kept and can be exported to a company-wide GL system. In the BACK OFFICE SECTION you set up all environmental details in preparation for dealing activities. These details include:

- ▶ Portfolio breakdowns
- ▶ Counterparty information
- ▶ Settlement account details
- ▶ Dealer specifications
- ▶ Brokers' details
- ▶ Instrument in which you deal
- ▶ Public holidays
- ▶ Currencies
- ▶ Rates and
- ▶ General organisation information

The System Supervisor's role is executed through the Administration section. Users are granted access to specific activities in a section.The authorisation to setting user access levels is granted, only by the organisation's System Administrator. Only then can a trial balance facility post entries to the General Ledger daily, weekly or monthly.

General Ledger Entry Transactions include:
- ▶ Detail transactions
- ▶ Detail bank transactions
- ▶ Consolidated transactions
- ▶ Export to general ledger system
- ▶ Remove old general ledger transactions
- ▶ General ledger balance report

MIDDLE OFFICE (Risk Control) Section

The middle office section is the management and control section. Except for the defining of limits the middle office can view everything in the system but is not allowed to enter any deals or do any of the administrative actions. Middle office can do the following:
- ▶ Online, real-time information
- ▶ Comprehensive limit monitoring/reporting
- ▶ Enforces limit, i.e. Dealers cannot breach limit prescribed by middle office
- ▶ Revaluation with rate feed from Reuter
- ▶ What-if analysis
- ▶ Dealers/products/portfolio/aggregate profitability
- ▶ Transfer pricing to adjust profitability for funding cost
- ▶ Comprehensive operational controls, e.g. rate/date deviation, audit trails

The Middle Office has access to a balance sheet (ALM) financial forecasting

The ALM section is a multi-dimensional financial decision modelling component, specifically designed for those institutions frequently faced with evaluations: how to fund the business or a specific project, how to hedge it or where and how to invest surplus cash.

The unique feature of this component is that it provides the user with the modelling capabilities to simulate virtually any financial instrument the user can define. This makes the system perfectly appropriate for institutions that need to either fund from or invest in interest bearing products.

▶ The ALM section is used for balance sheet management and specifically to evaluate the liquidity and free cash position of the institution.
▶ This component allows the user to budget/project the full financial position of the institution into the future. There are no restrictions on how far you wish to project into the future: 1, 2, 5 or 10 years (maximum time horizon is only limited by your computer capabilities).
▶ The forecasting integrity of this component is protected by complying with generally accepted accounting principles which guard the user against mistakes and one-sided entries. The functionality also allows for mark-to-market and fair value adjustments.
▶ The primary objective is decision-making and evaluating those decisions against the various risk profiles set in the system like liquidity, interest, market and foreign exchange rate risks. This component caters for an unlimited list of interest rate views allowing for typical Monte Carlo or VAR type analysis. Unlimited scenarios can be defined, illustrating the impact of different targets, growth percentages, new business etc. This component also provides for unlimited exchange rate views. The ALM section also caters for funds transfer pricing measuring the internal cross funding of divisions.
▶ All reports (see list at the end of document) are viewed by slicing and dicing in a cube-like fashion. This allows for drilling deeper or providing the opportunity to compare the impact of various interest rate views, exchange rate views and various strategies on any specified item such as cash flow, net interest income, retained income etc. The ALM section has built-in statistical operators to assist the user in interpreting the results.
▶ Data is populated into this component by importing extraction files from the institution's operating systems. Interest and foreign exchange rates can be imported as well predefined strategies.
▶ The ALM section has the capability to define various business units or consolidate various models into a single unit. The ALM section can be used to create a budget and has a variance analysis module.

Benefits of the ALM section for the Balance Sheet/ALM/Risk Department

Risk Department

Balance Sheet management is aimed at finding the optimal mix of assets and liabilities given:
▶ the expected changes in interest rates
▶ the expected changes in foreign exchange rates
▶ liquidity constraints
▶ capital adequacy

The purpose of the ALM section for managing interest rate risk, exchange rate risk and liquidity risk, is therefore to assist the Risk department in protecting and enhancing the bank's balance sheet by means of modelling / forward projecting of the cash flows and income within the given constraints, the bank's view on future interest and exchange rate changes and the strategy of the bank as pertaining to the management of their rate sensitive assets and liabilities.

Strategic management of the balance sheet is aimed at achieving sustained growth, profitability and solvency. It involves an array of management activities and responsibilities, including the formulation of long-term strategic goals and objectives and the management of associated risks. The ALM Section provides this within the framework of:
▶ a system that is fully compliant with GARP (generally accepted accounting principles) and IFRS (International Financial Reporting Standards), meeting the standards of IAS39
▶ a graphic user interface (GUI)
▶ an unlimited number of rate views and strategy simulations
▶ a database with accessible data inputs AND simulation results
▶ financial analytics
▶ pre-defined risk reports
▶ reporting tools for user-defined risk, financial and management reports
▶ complete back-testing capabilities
▶ fully documented algorithms and calculation formulae

Too often rate risk measurement assumes that credit risk and liquidity risk are constant. Concurrently, credit risk measurement assumes that rate risk and liquidity risk are held constant. The ALM Section offers integrated credit risk, market risk, asset & liability management, and performance measurement in a single software solution. This single platform enables risk practitioners to manage ALL the risks inherent in their portfolios and to identify market opportunities. In compliance with Basel requirements, the ALM Section offers stochastic as well as deterministic modelling, so that all models can be tested on a common platform, subject to identical tests on identical data.

5.0 REGULATORY REPORTING

The ALM section also allows the user to produce regulatory reports. It not only helps banks comply with the daunting task of producing regulatory reports, it also provides the bank with the capability to assess its most current data. By utilising the regulatory framework, it indicates high risk/attention areas and provides critical management information.

The Regulatory functionality does not only report the current (historical/static) position of the bank but enables the bank to look forward (dynamic) for selected reports in order to see the impact of any management decisions.

In essence, the Regulatory functionality is a Central Bank reporting system that generates current position call reports represented by Schedules for capital, credit risk, operational risk, market risk, liquidity risk, financial inclusion and management. A list of current reports produced by the system is shown below. Riskflow undertakes to add and adjust all reports to comply with the local conditions in each country on a time and material basis.

The (available) data has to be provided through extraction programs or via manual input. Manual input is usually necessary to capture info such as the names of bank committees and management or even to make final adjustments. All client-related data is placed in a data repository from where the Regulatory reporting program will read it.

The data repository has the unique capability to enrich the data, i.e. to re-engineer missing information in order to classify, group and populate the various reports/schedules.

All schedules are produced in XLSX format, using the template(s) supplied by the Regulator.
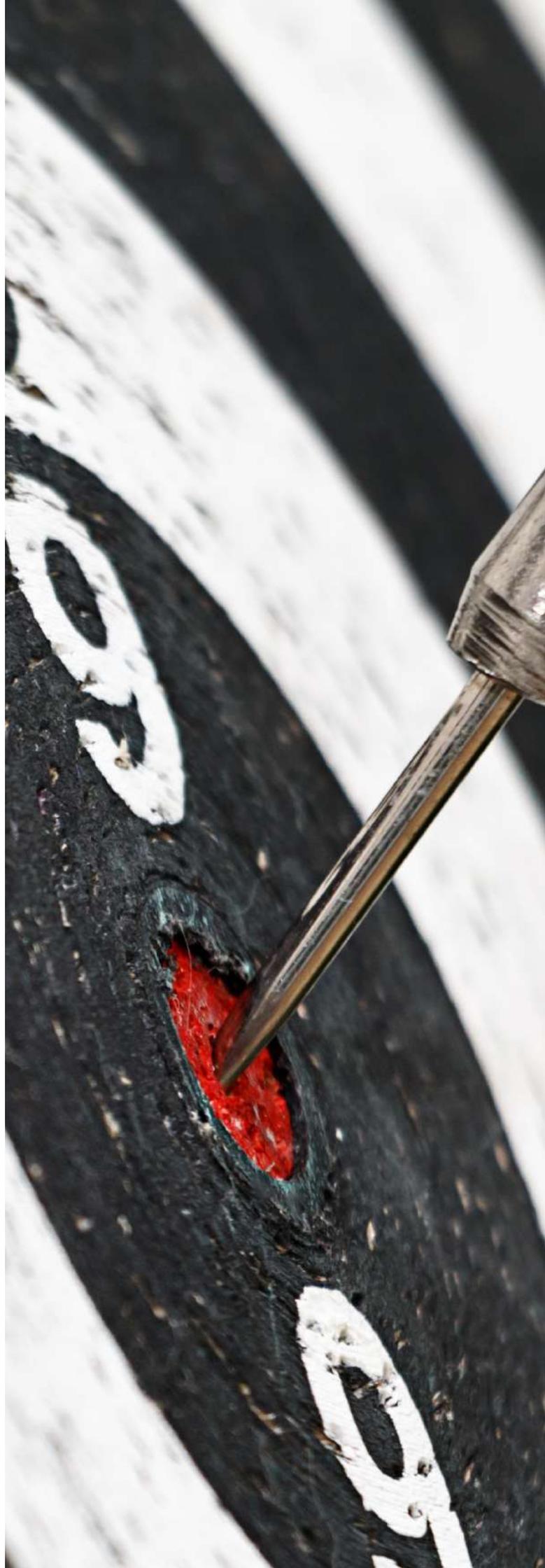
6.0 LIST OF REPORTS PRODUCED BY THE PLATFORM

1 **Consolidating the banks' qualifying regulatory capital (i.e. Tier 1 and Tier 2 capital):**

1. Statement of Financial Position
2. Statement of Comprehensive Income
3. Consolidated Return on Capital Ratio
4. Changes in Equity Capital
5. Specification of All Other Liabilities
6. Specification of All Other Assets
7. Investment in Unconsolidated Subsidiaries
8. Leverage Ratio
9. Minority Interest and Specified Items

2 **Reports that address credit risk**

1. Risk-Weighted Assets for Credit Risk - Standardised Approach
2. Write-Offs and Recoveries on Loans and Leases
3. Distribution of Loans and Advances by Sector
4. Distribution of Loans and Advances by Type
5. Overdue and Non-Accrual Loans, Leases and Other Assets by Sector
6. Distribution of Non-Performing Loans, Provisions and Interest in Suspense on Loans and Lease by Sector
7. Non-Performing Credit Facilities (Loans and Advances)
8. Loans Restored to Accrual Status
9. Changes in Provisions and Interest in Suspense
10. Distribution of Non-Performing Loans, Provisions and Interest in Suspense on Loans and Lease by Sector
11. Off-Balance Sheet Items
12. Large Loan Exposures
13. Insider Lending Exposures
14. Overdue and Non-Accrual Loans, Leases, and Other Assets by Type
15. Exposures to Directors of Other Financial Institutions

3 **Reports that address operational risk**

1. Operational Risk Basic Indicator and The Standardised Approach
2. Frauds, Forgeries and Losses
3. Return of Unclaimed Funds by Commercial Banks
4. Operational Risk Losses

4 **Reports that address market risk**

1. Market Risk Capital Summary Report
2. Interest Rate Risk Initial Capital Charge
3. Interest Rate Risk Vertical and Horizontal Disallowance
4. Equity Exposures (Trading Book)
5. Foreign Exchange Risk
6. Interest Rate Sensitivity
7. Foreign Currency Lending Ratio
8. Foreign Currency Lending Ratio Worksheet for Computing Average FCDA Balances
9. Distribution of Repo by Sector
10. Distribution of Securities by Sector

5 Reports that address liquidity risk

1. Liquidity Ratio Computation
2. Details of Deposits, Bills and Borrowed Funds by Sector
3. Details of Largest Depositors
4. Liquidity Risk
5. Liquidity Coverage Ratio
6. Details of Deposits, Bills and Borrowed Funds by Sector

7 Reports that address the management of the bank

1. Management
2. Top Ten Share Holders
3. Board Members
4. Board Committees
5. Management Committees

6 Financial inclusion indicators

1. Financial Inclusion Indicators

7.0 LIST OF ANALYTICS REPORTS PRODUCED BY THE PLATFORM

1 Financial Reports

1. Balance Sheets
2. Income Statements
3. Cash flow Analysis
4. Treasury Report

2 Budgetary Reports

1. Budget Comparison
2. Variance Report
3. Other Comparisons

3 Valuation Reports

1. Rate Spread
2. Match Fund Transfer Pricing
3. Fair Value
4. Net Present Value
5. Scenario Comparison

4 Stress testing

1. Balance Sheets Sensitivity
2. Income Statement Sensitivity
3. Price Sensitivity
4. Interest Sensitivity
5. MVPE

5 Liquidity risk

1. Gap
2. Cumulative Gap
3. Duration

6 Interest rate risk

1. Liquidity Need Report
2. Liquid Asset Composition Report
3. Capital Maturity

7 Management reports

1. Executive summary
2. Production Target Report

8.0 FUNCTION OF THE ALM SECTION

8.1 How the ALM section assists the Liquidity Manager

Liquidity risk (the potential for loss to the organisation arising from either its inability to meet its financial obligations as they fall due or to fund increases in assets without incurring unacceptable loss) is considered one of the major risks for financial institutions.

The primary responsibility of the Liquidity Risk Manager is therefore to maintain adequate liquidity at all times, so that the bank is in a position (in the normal course of business) to meet all its obligations, to repay depositors, to fulfill commitments to lend and to meet any other commitments it may have made. Further, they must plan for unforeseen events that may cause a liquidity crisis.

The ALM Section enables the liquidity risk manager to identify potential liquidity risk and areas of vulnerability by providing the following functionality:

▶ Monitoring withdrawals and customer behavior
▶ Identifying unexpected outflow of funds
▶ Taking cognisance of unrecoverable loans and advances when projecting future cashflows
▶ Identifying unexpected increases in loans and advances
▶ Highlighting lack of funds inflow from counterparties
▶ Modelling (and thereby measuring the impact and effect of) diverse sources of funding
▶ Determining the dependence on large depositors.
▶ Establishing the appropriate amount of liquid assets for use in a liquidity crisis
▶ Ensuring that the balance sheet is not excessively weighted with illiquid assets.
▶ Monitoring the potential liquidity impact of off-balance sheet activity

How the ALM section measures the Liquidity Risk

Liquidity risk is measured by conducting an analysis of net funding requirements, which is determined by analysing future cash flows based on the assumptions about changes in rates and the expected behaviour of assets and liabilities, as well as off-balance sheet items. In its essence, the "engine room" of the Treasury Platform is the modelling of these future cash flows. By running (an unlimited number of) different rate view / strategy / behavioural combination models, the ALM Section evaluates the results under different scenarios, namely going concern / business as usual and stress situation. Each scenario will consider significant positive and negative liquidity movements that could occur. The ALM Section not only measures and reports on mismatches between assets and liabilities on a contractual basis (to meet Regulatory reporting requirements).

In practice, current accounts and savings deposits are not withdrawn the next day and overdrafts are not repaid on demand. The ALM Section caters for this "real life" situation by also calculating these mismatches on a 'business as usual' basis. The "business as usual" mismatch calculation predicts future cash flow patterns based on past behavioural patterns as specified by the user.

In addition to mismatch calculations, the ALM Section allows the user to calculate "net liquid assets", which the difference between liquid assets and volatile liabilities within the portfolio. This is referred to as the liquidity gap.

The ALM Section offers facilities for stress testing, in order to assess the extent of the bank's exposure to liquidity risk. To determine net liquidity under stressed conditions, liquidity outflow is quantified for each scenario, and cash inflows to mitigate liquidity shortfalls are identified. This also assists the Liquidity Risk manager in assessing adequacy of liquidity cushion and contingency funding.

Sound liquidity risk management requires that sources of available funds must be diversified in order for the organisation to capitalise on changes in market conditions and to be more resilient in tight market conditions. The ALM Section allows for the modelling of

any combination of funding sources, to see the effect of different funding mixes.

The ALM Section ensures that modelling of future cash flows meet all existing (or perceived future) regulatory requirements in terms of minimum liquid asset holdings.

The ALM Section enables continuous monitoring of liabilities (e.g. deposits from the public) to assess the bank's ability to raise funds. Future cash flow projections calculate and highlight the funding shortfall or surplus (for each month in the modelling horizon) that will result from each modelling scenario.

The ALM Section offers the following standard Liquidity reports:
▶ Liquidity need report
▶ Liquid asset composition report
▶ Capital adequacy report.

Furthermore, by virtue of the fact that all modelling results are stored on a database in the Treasury Platform, it allows the Liquidity Risk manager to create an unlimited number of user-defined reports using its powerful report writer.

Examples of reports that can be generated using this facility:
▶ actual cash flows against budget
▶ performance against limits
▶ liquid assets held per prudential requirements
▶ additional liquid assets held
▶ ratio of liquid assets to demand deposits
▶ ratio of non-performing assets to total assets
▶ ratio of short-term demand deposits to total deposits
▶ ratio of contingent liabilities for loans to total loans
▶ ratio of pledged securities to total loans

By defining reports in the ALM Section the Liquidity Risk manager can create a report suite that will serve as early warning monitor for liquidity concerns such as:
▶ Concentrations in a particular portfolio of assets or liabilities

▶ Deterioration in asset quality
▶ A decline in earnings performance or projections
▶ Funding cost increases
▶ Heavy cash withdrawals
▶ Transaction size reductions
▶ A large off-balance sheet exposure

By virtue of the fact that an unlimited number of future scenarios can be modelled in the ALM Section, stress testing can be conducted to assess the ability of the bank to withstand stressed liquidity conditions and to determine how it will cope in such a situation. This allows for identification of expected losses and assessing the impact of unlikely but still plausible events. Stress testing in the ALM Section allows for any (user-specified) upward and downward basis point rate shock. Stress tests can also be performed to measure the effect of any (user-specified) reduction in deposit base.

The ALM Section's "what-if" scenario modelling facilities can also model the effects of different potential sources of funding available, e.g.
▶ deposit growth
▶ lengthening of maturities of liabilities
▶ cash injections

How the ALM section assists the Interest Rate Risk (IRR) Manager
Interest rate risk is the risk that the company will experience deterioration in its financial position as interest rates move over time.

The ALM Section enables the IRR manager to identify, measure and monitor the following sources of interest rate risk:
▶ Repricing Risk, which reflects the fact that assets and liabilities are of different maturities and are priced off different interest rates.
▶ Basis Risk, which arises when there is an imperfect correlation in the adjustment of the rates earned and paid on different instruments with otherwise similar repricing characteristics. When interest rates change, these differences may give rise to

unexpected changes in the cash flow and earnings spread between assets, liabilities and off-balance sheet instruments of similar maturities or repricing frequencies.

▶ Optionality Risk, arising from the options embedded in the assets and liabilities and off-balance sheet portfolios. An option may be embedded within a portfolio, e.g. loans that give borrowers the right to prepay balances and deposits that give the depositor the right to withdraw funds prior to final maturity without penalties.

How the ALM section measures Interest Rate Risk

The following standard IRR reports are available in the ALM Section:

▶ Gap report
▶ Cumulative gap report
▶ Interest sensitivity report
▶ Balance sheet sensitivity report
▶ Income statement sensitivity report
▶ Rate spread report

A myriad of stress testing facilities exists on the platform to provide information on the kinds of conditions under which the bank's strategies would be most vulnerable. Examples include:

▶ abrupt changes in the general level of interest rates,
▶ changes in the relationships among key market rates (i.e. basis risk),
▶ changes in the volatility of market rates.

By modelling different strategies, the ALM Section will enable the IRR manager to minimise risk while maximising earnings and net worth. This is done by means of measuring the projected earnings for different product mixes, with strategies such as:

▶ Buying and selling assets
▶ Changing liability structure and mix
▶ Introducing new products (assets and/or liabilities)
▶ Hedging

The ALM Section will identify the appropriate strategy, which will depend on the current level of risk, the time frame, and the current interest rate environment, as a strategy for an expected increasing interest rate cycle will not be appropriate for a decreasing interest rate cycle.

How the ALM section assists the Foreign Exchange Rate Risk (FXR) Manager

Foreign exchange ("FX") risk management may be defined as managing exposure to adverse exchange rate fluctuations within an acceptable range at an acceptable cost.

The ALM Section allows the FXR manager to model an unlimited number of foreign exchange rate views. These can be defined for all of the currencies that the bank are currently trading in, as well as currencies which are considered for future trading.

As is the case with Interest Rate Risk modeling, the

ALM Section calculation engine will produce results for strategies based on any number of FX rate views to measure the effect of changes in exchange rates on future projected cash flows.

The ALM Section allows the modeller to define each product in terms of a selected currency and thus reporting is done taking cognisance of current and future FX rates. This allows for reporting based on (current and projected future) cash flows as converted to the base currency. The user can specify currency conversions as direct (e.g. 1 ZAR = 0.1 EURO) or indirect (e.g. 1 USD = 6 ZAR).

In a multi-currency model, all reports (standard ALM Section reports as well as user-defined reports) can be produced for one or more selected currencies only. This enables the FX Risk manager to analyse that portion of their portfolio (or the whole book) that pertains to one currency only, so as see the effect of perceived changes in FX rates on the cash flows (and future profitability of the bank).

The ALM Section also caters for the following FX derivatives to measure their effectiveness in terms of hedging FX risk:
▶ FX swaps
▶ Forward Exchange contracts (FECs)

These deals can be specified as off-balance sheet items so as not to affect the future balance sheet projection reports.

The ALM Section calculates (and reports on) swap costs and accumulated interest swap costs (for FX swaps) and premium costs (for FECs) are calculated.

To further assist the FX Risk manager in evaluating possible hedges, the ALM Section offers the facility to view each hedging contract in terms of:
For FX swaps:
▶ Capital swap cost
▶ Total cost
▶ Yield cost (as percentage of base currency)

For FEC's
▶ Transaction valued at spot rate
▶ Transaction valued at forecasted FX rate
▶ Profit/Loss

How the ALM section measures Foreign Exchange Rate Risk
The effect of changes in future exchange rates (FX risk) is reflected in each of the standard risk reports in the ALM Section.
In addition, the ALM Section has a standard Hedge Effectiveness report, which shows:
▶ The repricing gap before and after derivatives
▶ The aggregate impact of derivatives
▶ The cumulative impact on Net Interest Income for rate shocks (up and down)

■ Including derivatives
■ Excluding derivatives

8.2 Benefits of the ALM section for the Finance Department
The ALM Section is effectively a management decision support system that will provide the Finance Department with the capability to do inter alia the following:
▶ Budgets
▶ Support Management Decisions
▶ Do What-if scenarios
▶ Produce User-Defined Reports
▶ Create Management Information
▶ Do Fair value calculations

How the ALM section assists the Bank in doing Budgets
The ALM Section allows its user to simulate an indefinite number of Balance Sheets, Income Statements, Cash flow statements and User-Defined Reports into the future.
▶ The time frame used may vary from situation to situation, depending on the purpose of the simulation. For example, a five-year time frame might be used if the simulation is done to calculate the future need for capital, whereas a six to twelve-month time frame could be used to measure the impact of interest rate changes in the current financial year or eighteen months to be able to produce a budget for the next financial year.
▶ The ALM Section is an effective budgeting tool giving the user unlimited access to define various scenarios.
▶ Scenarios, comprising a strategy, interest and exchange rate view can be set as a budget, called the original budget in the system. An additional revised budget can be created, which can be reset from any future month for a defined planning horizon.
▶ Variance analysis - The ALM Section has the capability to do variance analysis based on interest bearing products comparing actual to an original budget, revised budget and any of the myriad scenarios the user has defined. To be able to do variance analysis the ALM Section accepts historical data for average balances, interest earned or paid per product defined.The ALM Section provides variances in terms of volume and price (rate).
▶ Consolidations, business unit and portfolios - The ALM Section has a unique feature to merge simulations from different models, allowing consolidated models to use projections generated by source models. Consolidations can be very useful when budgets are created for various business units (branches) and portfolios. Due to the unique funding and investment algorithm of the ALM Section, models can also be created to determine short or long (open) positions per currency. Money can be transferred between models to fund shortfalls or the investment of surpluses. All financial and risk reports are available per consolidated and sub models. Consolidated models contain the same level of details as their

source (sub) models.

▶ Fixed Assets - All projected Capital Expenditure can be captured in the ALM Section. The ALM Section has the capability to define fixed asset classes, calculate depreciation and measure the impact of acquisitions and disposal as well as the timing thereof on the need for cash.

▶ Non-interest items - The ALM Section caters for setting up rules for the calculation of fee and other income items as well as operational expenditure items. Rules can be set up to calculate provisions and reserves.

▶ Year-to-date figures - Income statement items can be presented on a monthly and year-to-date basis, incorporating the actual figures for the current financial year. The YTD figures can be used for the following:
  ■ to proportion operational expenses,
  ■ to provide the base for growth in other income lines and
  ■ to do YTD reporting

8.3 How the ALM section assists in Management Decisions
■ Funding of cash shortfall
■ Investment of surplus cash
■ Limit risk exposure
■ Strategies/budgets into the future

The major advantage of using the ALM Section is the quantification of management decisions, for example, the volume of time (fixed) deposits by tenure required on a monthly basis or the new business (production) to be written on mortgages on a monthly basis.

8.4 How the ALM section assists in "What-if" scenarios

▶ The ALM Section allows management to analyse the impact of any defined (internal) or external (interest and currency rates) factors on funding requirements, debt management and cash flow.

▶ Every "what-if" can be defined as a scenario and be compared with a base case or another scenario.

8.5 How the ALM section assists in defining User Defined Reports
The ALM Section is an integrated system complying with general acceptable accounting principles. This allows the user to refer to any of the financial report lines and specific variables.

8.6 How the ALM section assists in providing Management information
The ALM Section has a vast number of standard reports besides the risk and financial reports covered above providing the following type of management information:

▶ Rate spreads - This report provides interest rate returns and cost on a NACM basis, allowing the user to compare rates on a similar basis per currency. An example of how it can be applied is to divide Loans and Advances into Performing versus Non-performing in order to obtain a net return position for Loans and Advances, highlighting the impact of defaulting.

▶ Executive summary - This report calculates the break-even yield on assets in order to have a zero net interest margin. This report also provides the profit differential between interest bearing assets and liabilities.

▶ Ratio Analysis - Thanks to the facility to define user defined reports, there are no limitations to the number of ratios that can be expressed in the ALM Section. Common ratios include:
  ■ Earning Assets/Total Assets

- Total Advances/Total Deposits
- Total Expenses/Total Income
- Return on Assets
- Return on Equity
- Transfer Pricing

The ALM Section can do funds transfer pricing (FTP). FTP refers to:
▶ the technique of analysing the interest rate margin broken down into asset margin, liability margin and mismatch margin.
▶ the process and methodology of establishing the cost of allocating funds within an organisation at rates internal to the organisation.

8.7 How the ALM section assists in doing Fair Value Calculations (IFRS 7)
Future cash flows of all instruments are "present valued" at a rate determined by a yield curve.
For a product with an indeterminate maturity date (such as "standard products"), the future flows are not considered. Instead, the product's capital (face value) is taken as the fair value.

Fair value calculations in the ALM Section are very much influenced by the type of interest calculation that is set by the user. The setting of fair value calculations in the ALM Section is based on the selection of the mark-to-market calculation.

8.8 Instrument types
Within the ALM Section the following instrument types are specifically influenced by this of type calculation, namely:
▶ YTM product type (Typical Bond calculation)
▶ Discount product type
▶ NCD type instrument where interest is payable at the end of the term

8.9 Benefits of the ALM section for the Corporate & Institutional Department
In order to refrain from repeating most of the items listed above which could very well be used in the corporate and institutional department it might be worth highlighting some aspects such as:
▶ The ALM Section has a product type called pre-structured product flows which allows the user to construct a financial transaction using a spreadsheet to calculate loan repayments unique to a single deal incorporating capital outflows, interest accruals and paybacks.
▶ The ALM Section can be used to define production targets (new business) and the impact of different repayment schedules.
▶ Specific deals could be inserted to see impact on profitability and cash flow, allowing an indefinite number of "What-if" scenarios.
▶ The corporate and institutional department can be modeled as a separate entity selling surplus funds to and borrowing funds from a central unit (treasury)

8.10 Why the ALM section is the perfect budgeting tool
In essence, the budgeting process is the primary strategy for achieving the organisation's objectives - be it growth, maximising profit, achieving sales targets, or any combination thereof.

Underpinning the budgeting process is the production requirements for meeting the budget. It is essential that those who are responsible for managing production (sales) and controlling expenses, understand what the capital requirements are in order to "make the budget".

A budget is said to be "out of date" as soon the first set of actual results become available. As such, it requires performance measuring on a regular basis and access to information such as:
▶ Are we on target to make the budgeted figures?
▶ What is the variance between the actual results and the budget?
▶ What do we have to do the meet the budget target?
▶ What are the cash flow and liquidity constraints?
▶ What will be the effect of changes in external factors (e.g. changes in interest rates, foreign exchange, etc.) on the budget?
▶ What will be the effect of credit impairments (or other forms of deterioration in asset quality on the targets?

Adjusting the budget is a reality. It is no use to ignore variances (between the actual results and budget/targeted), or to be unrealistic in believing that those variances will somehow disappear. Early warning signals should be recognised and strategies put in place to address the variances. Most importantly, senior management must be forewarned as soon as it becomes clear that targets may not be achieved.

Modern budgeting techniques make extensive use of modelling for the forward projection of the organisation's Balance sheet, Income statement and Cash flow statement to see what the financial effects will be if the budget targets are reached. Best-practice models will allow the comparison of different strategies for reaching the targets and measuring the effectiveness of each planned strategy.

9.0 LIST OF DYNAMIC (PROJECTED) REPORTS PRODUCED BY THE ALM SECTION

Financial Reports

1. Balance Sheets
2. Income Statements
3. Cash flow Analysis
4. Treasury Report

Budgetary Reports

1. Budget Comparison
2. Variance Report
3. Other Comparisons

Valuation Reports

1. Rate Spread
2. Match Fund Transfer Pricing
3. Fair Value
4. Net Present Value
5. Scenario Comparison

Stress Testing

1. Balance Sheets Sensitivity
2. Income Statement Sensitivity
3. Price Sensitivity
4. Interest Sensitivity
5. MVPE

10.0 UNIQUE FEATURES

The unique features of the Treasury Platform include the following:

▶ Building interfaces such as to Reuters, general ledgers in response to user needs
▶ Excellent internal controls e.g. Audit trails, segregation of front and back office, and custodian and bank script
▶ Cash management facility
▶ Open systems technologies
▶ Report builders
▶ Real-time update of all limits
▶ Counterparty details including statements for the receiver of revenue
▶ Exposure evaluation which instantaneously:
  ▪ Revalues FX positions
  ▪ Revalues bond positions
  ▪ Revalues discount instruments
  ▪ Calculates interest to date on all instruments
  ▪ Displays the effect of changes in interest rates
  ▪ Updates cash position by currency
  ▪ Separates settlement from dealing operation
  ▪ Imposes constraints on user and dealer accessibilities
▶ IFRS calculations - Fair value calculations

11.0 FUNCTIONAL REQUIREMENTS

11.1 Deal capturing and recording
The Platform covers activities in the money market, capital market, derivative market and foreign exchange market.
The Platform caters for the following instrument categories:

11.2 Transaction & Accrual-based Instruments Instrument Types
Call Deposits | Call Investments | Term Deposits | Term Investments | Notice Deposits | Notice Investments

Features
▶ Interest Calculations: Days/365, Days/360, Coupons
▶ Rates: Discretionary, Linked, Tier etc...
▶ Commission/Brokerage
▶ Various Interest Frequencies
▶ Time structures
▶ Daily Position Statements
▶ Withholding Tax Calculations
▶ Confirmation letters By Transaction
▶ Journals by Transactions
▶ Interdivisional Transfers

Examples
Fixed Deposits | Saving Accounts | Overnight Deposits | Call |Current Account | Loans

11.3 Contract-based Instruments
Instrument Types
Discount (Primary) | Discount (Secondary) | Yield (Primary) | Yield (Secondary) | Bond Issues

Features
▶ Discount Basis & Yield Basis
▶ Coupon Investments
▶ Integrated Script Management
▶ Revaluations on Yield Curves
▶ Multi-Currency
▶ Interest Calculations: Days/365, Days/360, Coupons
▶ Commission/Brokerage
▶ Daily Position Statements
▶ Withholding Tax Calculations
▶ Confirmation Letters by Transaction
▶ Journals by Transaction

Examples
Bankers Acceptances | Promissory Notes | Commercial | Paper | Treasury Bills | NCD's & Corporate Bonds

11.4 Secured Instrument
Instrument Types
Repo | Reverse Repo | Secured Investments

Features
▶ Based on Discount or Yield Instruments
▶ Multi-Currency
▶ Interest Calculations: Days/365, Days/360, Coupons
▶ Collateral Instruments
▶ Commission/Brokerage
▶ Integrated Script Management
▶ Daily Position Statements
▶ Withholding Tax Calculations
▶ Confirmation Letters by Transaction
▶ Journals by Transaction

Examples
Repurchase Agreements | Secured Investments | Collateral Lending

11.5 Derivatives
Instrument Types
Interest Rate Swaps

Features
▶ Multi-Currency
▶ Interest Calculations: Days/365, Days/360/ Coupons
▶ Rates: Discretionary, Linked, Tier etc...
▶ Commission/Brokerage
▶ Various Interest Frequencies
▶ Time structures
▶ Daily Position Statements

Examples
Interest Rate Swaps | Future Rate Agreements

11.6 Bonds
Instrument Types
Bonds Trading | Carries | Index Linked Bonds | JSE Compliant | Floating Rate Bonds

Features
▶ Discount Basis & Yield Basis
▶ Coupon Investments
▶ Integrated Script Management
▶ Revaluations on Yield Curves
▶ Multi-Currency
▶ Interest Calculations: Days/365, Days/360, Coupons
▶ Commission/Brokerage

Examples
Government Bonds | Corporate Bonds & Carries

11.7 Foreign Exchange
Instrument Types
Spot Transactions | Forwards | FX Swaps | FX Extensions/Drawdowns/Surrenders

Features
▶ Based on Discount or Yield Instruments
▶ Multi-Currency
▶ Interest Calculations: Days/365, Days/360, Coupons
▶ Collateral Instruments
▶ Commission/Brokerage
▶ Integrated Script Management
▶ Daily Position Statements
▶ Withholding Tax Calculations
▶ Confirmation Letters by Transaction
▶ Journals by Transaction

12.0 CASH MANAGEMENT

The Treasury Platform has an integrated cash management component that allows the user to create cash flow reports specifying the cash flow per account, currency, specific date or period into the future for all transactions captured in the system as well as user defined external cash flow transactions that may have an impact.

It allows the user to drill down for transaction detail making up the consolidated information.

12.1 Risk Management
▶ Online, real-time information
▶ Comprehensive limit monitoring/reporting
▶ Enforces limit, i.e. Dealers cannot breach limit prescribed by middle-office
▶ Revaluation with rate feed from Reuter
▶ What-if analysis
▶ Dealers/products/portfolio/aggregate profitability
▶ Transfer pricing to adjust profitability for funding cost
▶ Comprehensive operational controls, e.g. rate/date deviation, audit trails

12.2 Reporting
There are many standard reports from The Platform. There is also an end-user report writer, RESULTS, available for users to design their own reports and queries. All Reports can be exported to Excel or Text format.

13.0 OTHER REQUIREMENTS

Real time application
The Platform offers a fully integrated, online, real-time, multi-currency treasury system, that covers the Money, Repo, Capital (Bonds), Forex, Equity and Derivatives Markets with a linked facility to the ALM section.

Straight-through Processing
The Platform supports Straight-through Processing, Front to Back.

Internal and External Integration
The Platform provides accounting flexibility and Riskflow has experience in integrating the Platform clients to different accounting packages. Riskflow also has the skills to integrate the Platform to any other system as required.

13.1 Access Controls
Segregation of the FONT, MIDDLE and BACK OFFICE is access controlled and within each module.

13.2 Regulatory Compliance
The Platform already conforms to a number of regulatory requirements such as AC133 fair value calculations, mark-to-market and will have no problem to comply with IFRS7 Financial Instruments disclosures.

13.3 Administration
Riskflow provides all the necessary services in the form of a help desk, internet support, manuals and training to ensure the successful implementation and running of its systems.

14.0 CLEANSING & ENRICHMENT OF DATA

The threat of reporting and decision-making based on unclean data is considered by industry experts as the biggest operational risk in banking today. Banking data is characterised by huge volumes of business transactions, maintenance of history records and the need to have multiple, disparate applications for various banking functions. The stringent statutory requirements in Banking present vastly different needs for data management than any other industry.

Unless information is based on clean, quality (record-level) data, there is no guarantee as to the accuracy of this information. This poses a real threat in terms of:
▶ Regulatory/ Compliance reports
▶ Internal reports – both for management and operational purposes
▶ Financial models used for decision-making or decision support
▶ Anything using information from source as input

The old adage in Information Systems - "garbage in / garbage out" – Prompted us to develop functionality that allows you to perform in-depth analysis of the bank's interest-bearing products, using record-level data as extracted from the bank's primary source systems for operational ("core") banking and treasury.

Our data cleansing tool imports data from any source systems, so that it can be fixed at source prior to performing any analyses. This ensures that no reports are produced based on unclean data, also ensuring that all downstream applications benefit from better quality data.

15.0 FUNCTIONALITY

Once the data quality in the database is ensured, the following functionality is available:

- ▶ Maturity reports for Time & Notice Deposits (with daily/monthly time buckets)
- ▶ Expected cash outflows for non-maturing deposits (based on user-defined behaviour criteria)
- ▶ Ageing of loans (based on Basel Performing & Non-performing or user-defined classifications)
- ▶ Repayment schedules for loans (based on user-selected loan performance classes)
- ▶ Cash inflows from Treasury products (Discount & Yield-to-maturity instruments)
- ▶ Net expected Cash flow report (with daily/monthly time buckets)
- ▶ Position reports - splitting Capital and Accrued Interest - by:
    - ■ Portfolio
    - ■ Industry
    - ■ Age (and/or Age class)
    - ■ Performing and non-performing Loan classes
    - ■ Organisation sector
    - ■ Other user-defined groups
    - ■ Large loan exposures, by counterparty
    - ■ Details of large deposits
    - ■ Classification of deposit balances (per user-defined capital buckets)
    - ■ Loan impairment based on bank's calculation methods
    - ■ Grouping and sub-grouping of accounts for analysis on higher levels of granularity

The cleansing of data is not a turn-key solution. Each implementation is customised according to the source data, user-specified classifications and specific requirements of the bank. Implementations take place on-site, ensuring that there is constant communication between the Riskflow team and the various role-players in the bank.

16.0 FUNDS TRANSFER PRICING (MFTP)

In any bank, the Treasury Department acts as "the bank's bank": deposits taken by the commercial departments are transferred to Treasury, who in turn make the money available either to lend out to the bank's customers, or to invest in other financial instruments such as Treasury Bills. If there is a shortfall in cash, the Treasury department has to fund this shortfall; if there is an excess (surplus) of cash, Treasury must invest it.

The capital associated with a bank's interest bearing products (both assets and liabilities) have a cost associated with them: the costs associated with these activities are called "Funds Transfer Pricing" (FTP), as it reflects how funds are transferred to and from the Treasury department to the various business units. The costs are reflected in the FTP rates associated with the products offered by the bank.

These rates are of relevance internally to the organisation and are different to the rates earned/ charged from the external dealings in the products. From the principal amounts and FTP rates, "FTP interest" is calculated. This makes it possible for the bank to separate a product's FTP interest from its commercial interest (which is based on the products' external interest rates). Another way to rephrase this is that FTP looks at what the bank's commercial cost of funds are (i.e. getting their funding from deposits), vs what the cost would be if those funds were raised and invested in the market.

FTP Methodology
The Riskflow approach to Funds Transfer Pricing (FTP) is that of matched maturity, referred to as Matched Funds Transfer Pricing: to determine the transfer (internal) price, the time from origination to maturity of any deal is used to determine the rate. Once priced (at origination date), a loan (or term deposit) does not get repriced in subsequent periods. This is done in line with the concept of "original maturity matching" and ensures that Interest Rate Risk is transferred from the commercial departments (who have no control over movements in market rates) to the Treasury. These internal (FTP) rates used to price the product need not necessarily be market rates. However, most banks often use a SWAP curve such as LIBOR as the internal (FTP) curve. Before determining the commercial (external) interest earned on loans, our data extracting repository first classifies each loan as "Performing" or "Non-performing", as only performing loans are deemed to generate income. This ensures that Credit Risk is transferred from the Treasury (who have no control over client behaviour) to the commercial departments who are responsible for ensuring that customers repay their loans.

Results
The FTP report calculates the bank-wide Net Interest Income (NII) and breaks it down in terms of which portion is attributed to the commercial side of the bank (the so-called "Asset Margin" and "Liability Margin") and what comes from Treasury (known as the "Mismatch Margin"). The reported rates are weighted rates (with rates of each account proportionally weighted against the amount of capital in the account).
The curves are defined by a set of daily points (i.e. 1 day, 91 days, 182 days, 365 days, 2 years, 5 years, 10 years etc). The system uses linear interpolation to price

products with terms not explicitly defined on the pricing curve.

The FTP report breaks down results as:
▶ Bank Interest (@rate charged to the client) = Asset Margin+ Liability Margin
▶ FTP Interest (internal cost of funds) based on FTP Rates
▶ Mismatch (Treasury) Margin= Commercial Interest- Internal Funding costs
▶ Nett Interest Income= Asset Margin+ Liability Margin + Treasury Margin

The report can further break down the assets and liabilities by business unit, branch, product, currency or country to measure effectiveness and profitability and therefore assist in the allocation of capital according to the principle of Economic Capital.

Data Requirements:
Funds Transfer Pricing is a module of the Treasury Platform and cannot run as a stand-alone solution (or receive data from any source other than the data repository within the platform).

The application needs a set of account level information for loans, non-time deposits, time deposits and overdrafts that have already been priced (i.e. data is taken on with pre-priced contracts). Alternatively, the book as at a particular time can be priced based on a specified set of pricing curves.

The account level information must be imported in each subsequent month, to price new loans and term deposits.

Spreadsheets containing the curves for pricing Assets and Liabilities must be supplied each month. These represent the rates at which Treasury would have obtained or invested funds in the market (if there was a funds shortage or surplus). It is possible to use the same curve for all products. A simple FTP model typically uses the relevant SWAP curve (e.g. LIBOR) for both sets of transfer prices.

Mechanics:
Firstly, the relevant pricing curves are updated to reflect the current period's curves. Next the current month's account level information is imported into the system. The system checks to see if there are any new (unpriced) loans or time deposits and then it prices them according to the defined pricing curves. New loans and deposits get added to the system's pricing table. The non-time deposits get priced off the 1-day liability curve and then the whole non-time book gets added to the "priced" table (i.e. non-time deposits are repriced monthly). From here the MFTP report is generated.

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