

Implementing Reveleus: A Case Study



techlogix

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Reveleus is a state of the art risk management tool that assists financial institutions in measuring and managing risks. It encompasses the following modules:

- ◆ BASEL – II Solution (Standardized Approach)
- ◆ Market Risk (VaR) Solution

BASEL – II Solution

Financial institutions can accelerate their Basel II compliance initiatives with the Reveleus Basel II Solution. The open, pre-built solution supports greater readiness, easier deployment, and manageability of the complex rules underlying the Basel accord.

Key benefits

- ◆ Provides credit, market and operational risk measurement in accordance with Basel II guidelines and is customizable to the local regulatory requirements.
- ◆ Basic, standard and advanced internal calculation options are pre-built and delivered in an advanced data warehouse-based framework for consistency, accuracy and extensibility.
- ◆ True integration of risk measurement systems.
- ◆ Includes complete reporting set to meet even the most stringent disclosure requirements.

The solution is designed as a series of inter-related rules that cover a variety of processes for computing regulatory capital as per Pillar I of the accord. It includes pre-built rules for handling various Exposure Types, Collaterals and Credit Risk Mitigants, assigning Risk Weights, computing Effective Maturity, add-ons for Over-The-Counter (OTC) derivatives, Credit Conversion Factors (CCF) assignments for OBS (On Balance Sheet) items, Netting Arrangements as well as Risk Weighted Asset computations. The entire capital calculation process is executed in a completely transparent and auditable manner.

Implementation at Askari Bank

Askari Bank Limited is a mid-sized commercial Bank in Pakistan providing a full set of banking services to more than 700,000 customers through 250 branches throughout the country. Techlogix was asked to implement Reveleus at Askari Bank as the Bank moved to a systems based solution for implementing BASEL II.

The system is built around BIS BASEL II guidelines. Implementing the system in Pakistan required a greater understanding of the local regulatory rules and regulations besides the structure of banking products, customers, transaction types and asset classes. Our focus was to exceed customer expectations by deploying the best technical and functional resources available. The strategy worked and phase-I of the project i.e. BASEL –II standardized approach and Market Risk (VaR) went live in 10 months. The achievement was quite significant as most other banks in Pakistan took multiple years to implemented Basel II.

Basel – II (Standardized Approach)

The solution offers banks a standard approach, along with advanced approaches, to achieving Basel II compliance by using a set of analytic applications with pre-built data structures, computational engines and information delivery templates. Below is the list of approaches configured by Techlogix at Askari:

- ◆ BASEL – II Standardized approach for Credit Risk with CEM approach for Non-market related exposures and Simple approach for Credit Risk Mitigation.
- ◆ Standardized approach for Market risk with Duration method for General Market risk capital charge for fixed income instruments.
- ◆ Basic Indicator Approach and Standardized Approach for Operational Risk.

Challenges

The biggest challenge in implementing a BASEL II solution is gathering and cleansing of data in required formats for further processing. Our understanding of the local banking structure has helped us a lot in configuring and customizing an otherwise international solution to local requirements. Following are some of the tasks performed, challenges faced and remedial actions taken to achieve the objectives:

- ◆ Assigned codes to 250+ On-Balance sheet products and mapped to the Reveleus BASEL-II products.
- ◆ Mapped 50+ off-balance sheet products to Reveleus standard products for CCF calculation.
- ◆ Added local credit rating agencies codes and mapped to Reveleus standard rating codes.
- ◆ Evolved data gathering and cleansing processes by interacting with the Askari team.
- ◆ Helped develop a complete validation model for assuring authenticity and accuracy of the reports generated by Reveleus. It will also help Askari Bank in justifying the calculated figures to its Auditors.
- ◆ Created multiple runs to cater to the needs of Stand-alone / Consolidated CAR reporting.
- ◆ Developed additional runs for Credit, Market and Operational risk depending on the availability of data and responsibility of resources.
- ◆ Developed a framework for handling the interest rate risk arising out of Derivatives in Market Risk charge calculation. Techlogix built rules for automatically creating cash flows and calculate price sensitivities for these synthetic positions on a net off basis.
- ◆ Rules were created to identify the insignificant currencies and calculation of risk charge.
- ◆ Configuration of reports is one the most challenging tasks in the whole process. Standard outputs provided by the system had to be conformed to SBP formats. It was nothing less than a milestone achieved to develop a complete set of customized quarterly and annual CAR reports. The system is now capable to generate these reports on Stand-alone as well as on Consolidated basis. The solution purchased by Askari did not support the consolidation, which was completely developed by Techlogix. The bank only needs to upload the data and the system itself generates all the reports ready to be submitted to SBP.

Market Risk (VaR)

Market Risk provides extensive and robust computations that enable institutions to effectively evaluate and manage risk across interest rate, commodity, equity & currency exposures through calculation of measures such as Value-at-Risk (VaR), Conditional Value-at-Risk (CVaR) and Component VaR and covers a wide range of instruments types. Below is a list of instruments handled by the system as Askari Bank:

- ◆ Pakistan Investment Bonds
- ◆ Euro Bonds (Fixed Rate)
- ◆ Corporate TFCs (Fixed Rate)
- ◆ Government Sukuk (Fixed Rate)
- ◆ Corporate Sukuk (Fixed Rate)
- ◆ Corporate TFCs (Floating)
- ◆ Euro Bonds (Floating Rate)
- ◆ Corporate Perpetual Bond (Floating Rate)
- ◆ Corporate Sukuk (Floating Rate)
- ◆ Government Sukuk (Floating Rate)
- ◆ T-Bills
- ◆ Government Sukuk (Zero Coupon)
- ◆ Corporate Sukuk (Zero Coupon)
- ◆ Corporate Certificates of Investments (COIs)
- ◆ Common stock
- ◆ Preferred stock
- ◆ Stock rights issues
- ◆ Equity funds
- ◆ Bond funds
- ◆ Money market funds
- ◆ Hybrid funds
- ◆ Private equity funds
- ◆ Equity futures
- ◆ Equity forwards
- ◆ Currency spot
- ◆ Currency forwards

Analytical Method (Variance – Covariance Approach)

The Variance-Covariance Matrix of risk factors is estimated using the Exponentially Weighted Moving Averages (EWMA) method. Seasonal adjustments are factored in while estimating variance and covariance for risk factors, such as commodities, which exhibit seasonal behavior in the price movements.

Historical Simulation Method:

The system supports valuation of all the instruments present in the Askari portfolio. The system is very flexible to accommodate larger look back periods and different confidence levels.

Following VaR models were constructed at Askari:

- ◆ Historic Simulation 1 day VaR at 99% & 95% Confidence Level
- ◆ Analytical Model 1 day VaR at 99% & 95% Confidence Level

- ◆ Analytical Model 10 days VaR at 99% & 95% Confidence Level

Assess risk at any level of granularity

Oracle Reveleus Market Risk enables institutions to estimate the risk for multiple, user-defined portfolios. Portfolios are defined based on a combination of one or more dimensions such as Counterparty, Line of Business, Legal Entity, Asset Class and Instrument Type Etc. This enables assessment of risk at any required level of granularity in the organization.

Askari required Techlogix to devise a strategy for portfolios so that maximum granularity can be achieved. To start with we defined 53 portfolios (35 for Equity Asset Class, 9 for Fixed Income Securities, 5 for Currency Asset Class and 2 each for different Trading Strategies and Trading Desks). The system is now capable of measuring VaR for all these portfolios on a daily basis. Also, further portfolios, either a sub-set or a super-set of these portfolios can be defined by the Askari functional team as they require without the support of Techlogix.

The screenshot shows the Oracle Reveleus Market Risk application interface. The top navigation bar includes the Reveleus logo, user information (Muhammad Zahid Zia), and utility links (Help, Search, Logout). The left sidebar contains a navigation menu with categories like Home, Unified Metadata Manager, Rules Framework, Operations, and Market Risk. The main content area displays a table titled 'VaR Model Definition' with the following data:

VaR Model Name	VaR Model Description	Methodology	Confidence	Reporting Currency
ANAVAR10DAY95PC	Analytical VaR for 10 Day at 95 percent	ANALYTIC	95%	Pakistan Rupee
ANAVAR10DAY99PC	Analytical VaR for 10 Day at 99 percent	ANALYTIC	99%	Pakistan Rupee
ANAVAR1DAY95PC	Analytical VaR for 1 Day at 95 percent	ANALYTIC	95%	Pakistan Rupee
ANAVAR1DAY99PC	Analytical VaR for 1 Day at 99 percent	ANALYTIC	99%	Pakistan Rupee
HISVAR1DAY95PC	Historical Simulation VaR for 1 Day at 95 percent	HISTORICAL	95%	Pakistan Rupee
HISVAR1DAY99PC	Historical Simulation VaR for 1 Day at 99 percent	HISTORICAL	99%	Pakistan Rupee
testModel	This is a test VaR Model for User Training	HISTORICAL	99%	Pakistan Rupee

Back-Testing

Back Testing is very important for validating the accuracy of the model in capturing the risks. Reveleus compares the VaR computed for portfolios with the Hypothetical and Actual P&L of the portfolio. Hypothetical P&L is computed by Reveleus using historical positions as part of VaR computation process. Loss exception is the number of times the hypothetical / actual loss exceeds the estimated VaR value for a given confidence level. Following are some of the reports configured at Askari for Back Testing:

- ◆ Hypothetical P&L
- ◆ Profit/Loss Exceptions
- ◆ P-value
- ◆ Critical Value
- ◆ Loss Exception Deviation
- ◆ Average Loss Duration
- ◆ Loss Duration Deviation

Stress Testing

Stress Testing is an important component of any risk management process and complements the VaR measures. Stress scenario definition is quite flexible and allows for multiple risk factors shocks for different portfolios. Below is a list of stress testing scenarios defined for Askari:

- ◆ Equity 5%, 10% & 20%
- ◆ Fixed Income 1%, 2%, & 5% (different rates can be used for different tenors)
- ◆ Forex 5%, 10% & 15%
- ◆ Trading Book Several scenarios consisting of a combination of risk factors.

The system is configured in such a way that the Askari team can change or add as many stress scenarios as they want for several portfolios.

Reports

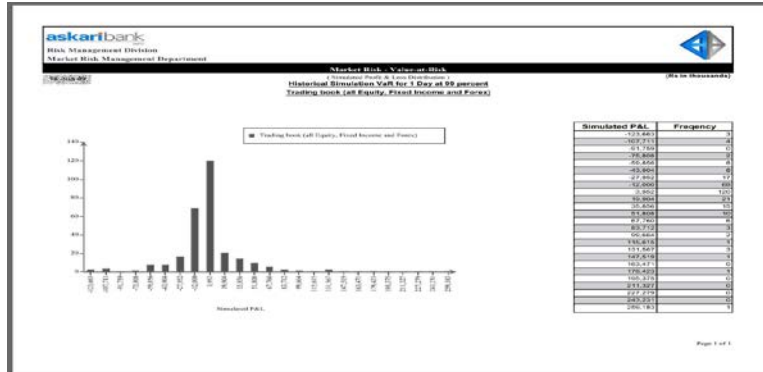
Reveleus provides a standard set of seven reports in a view form consisting of:

- ◆ Back Testing
- ◆ Cash Flow Matrix
- ◆ Component VaR – Instrument Level
- ◆ Component VaR – Time Vertex Level
- ◆ Portfolio P / L distribution
- ◆ Portfolio Risk Measures – (VaR, CVaR, MTM Value etc.)
- ◆ Stress Testing Report

However, Askari required some additional graphical and tabular reports which were customized by Techlogix as follows:

- ◆ **VaR Trend Report (both VaR in figures and in %age of Market Value):** The report was configured with the following parameters:
 - Portfolio
 - MIS date
 - VaR Model
 - Time Period (weekly, monthly, semiannual or annual)
- ◆ **VaR Component-wise** across Trading book, Currency, Asset class, Portfolio and Instrument
- ◆ **Yield Curve:** The report was configured having all the 18 standard tenors on the horizontal axis and consists of the following parameters:
 - Currency
 - Yield Parameter (Z, MM or GA)
 - Asset Class Code (AAA, AA,D)
 - MIS date

- ◆ **Simulated P&L** across different portfolios.



- ◆ **Equity Portfolio – Benchmark comparison:** A comparison of equity portfolio returns with the KSE index return.
- ◆ **Sensitivity:** Change in the value of debt for change in PKR zero rates
- ◆ **Portfolio Return Moving Average:** 30-day and 60-day moving average of portfolio returns.

About Techlogix

Techlogix is a global Consulting and IT Services company. With over 300 consultants in the US and Asia, Techlogix delivers solutions in key practice areas including Core Banking, BPM/SOA, Master Data Management, Business Intelligence, Project Portfolio Management and Enterprise Applications. Our practices areas deliver breakthrough business value for enterprise customers.

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