

# Sep 2011



## [Cloud Enabled Value at Risk Solution]

This document details a Value at Risk Solution which can be enabled on the cloud and offered as a service to internal departments. This would allow financial institutions to use the same infrastructure to compute VaR for different departments ensuring consistency of computations and saving in costs. The solution demonstrates an integrated risk approach which firms need to adopt to manage the impact of changes in the regulatory framework.

## Changing Nature of Risk Management

Financial Institutions all around the world are strengthening their risk functions from the back office to a strategic role. This has been marked by the gradual evolution of the risk function from the silo-ed risk manager attached to a desk to the Chief Risk Officer having jurisdiction across trading, fund management, marketing, operations and IT.

One of the key drivers of this change is the increased regulatory requirements such as the Dodd-Frank act and the Basel III norms which are emphasizing the need to take a holistic view of risk faced by the firm across the enterprise. The regulations are also increasing the reporting requirements in terms of both the amount and type of information which needs to be reported to the regulators.

At the same time, senior management requires more frequent and in some cases, real time reporting of risk with breaches in risk parameters reported as quickly as possible. Senior management is concerned about not only the risk exposure of investments, but also the higher costs associated with cross fund risk, operational and reputational risks. Increasingly risk is a part of the investment decision making process itself. The consumers of risk reports, including the retail clients, are also expecting transparency in the risk computations.

There is also a realization that fat tailed risks need to be understood in a better fashion. In the current economic scenario, firms would also be forced to look at managing their risk by spreading and/or expanding to newer geographies and asset classes. In turn, this increases the number and nature of counter parties they deal with along with an increase in the number of currencies they need to deal with.

## VaR Solution Architecture

Value at Risk (VaR) is a widely used market risk measure of potential loss on a specific portfolio of financial assets. It aims to compute the maximum reasonable loss over given period of time. Given, the ease of interpretation as a summary risk measure and the consistent treatment of risk across different financial products and asset classes, it has become one of the widely used parameters for measuring and reporting risk. VAR Computation can be used for the following purposes

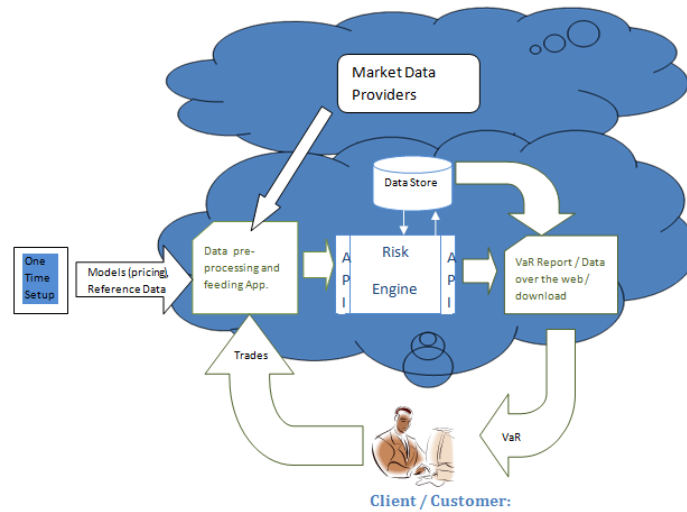
- Monitoring
- Hedge Effectiveness
- What-if modeling of candidate trades
- Risk targets and threshold setting

Though large firms generally have the necessary infrastructure to run these heavy VaR computations and mostly can build the logic for Risk Analysis in-house, the systems they have built do not cater to some of the more extreme fat tailed risks which have been seen in the market place. Also, small firms

which want to understand the risk which their portfolios lack the necessary infrastructure or knowledge bank for building a suitable measure.

We feel that one of the first areas where firms will reengineer their risk systems is in the area of Value-at-Risk computation. We built a web based service to host these VaR computations, with the following significant components

- **Risk Engine:** We have used a commercially available risk engine to do the computations required for pricing the portfolio under various expected scenarios using a Monte Carlo simulation
- **Data:** It takes essentially 4 types of information to generate VaR (Value at Risk) numbers

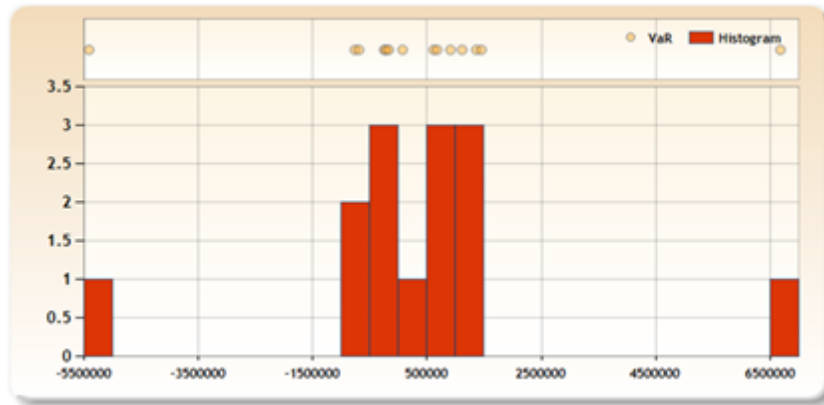


- 1) **Market Data :** Depending on the calculation logic, the Risk Engine may rely on the Historical Series data like Market data snapshot of complete one year to come up with more accurate Risk numbers. This data includes Floating Rates, MMI Rate, CMS Rate, CPI Price, FX Rate, EQ Price and EQ Dividend history.
- 2) **Trades / Portfolio:** The transaction or set of transactions (Trades for particular counterparty / asset class) for which risk is to be calculated. The VaR result can be produced at trade level or at portfolio level and can be drilled down for study.
- 3) **Reference Data:** This is an infrequently updated data which includes Bond, Equity, Indices and their Conventions, Currency, Counterparty and Corporate Entity data.
- 4) **Model (Pricing):** These are set of rules for pricing, or modeling the value of the assets under various scenarios. The risk engine we have used can provide pricing models for most asset classes including equity, risk, options, futures, swaps, etc.



- **Data Feeds:** As mentioned above, 4 types of information needs to be fed to the risk engine. This could come in any form depending on the provider and can be integrated using a reference data product.

- **VaR Data / Reports:** Once the Risk number (VaR) is generated, it can be made available either on web UI or can be downloaded (received) directly by the client who requested it. If



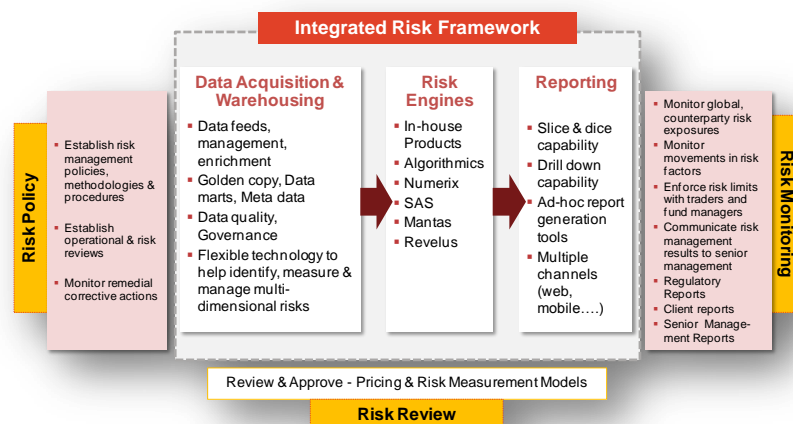
downloaded for offline viewing, the report would be static. If viewed over the web, the report can be more interactive. Drilldowns, filters and ability to group have been provided at different levels such as asset class, portfolio, counterparty etc. In addition, other reports such as scenario analysis and various greeks have also been provided.

## Need for Integrated Risk Management

Risk policies are increasingly cutting across the entire organization and regular risk monitoring is seen as key success factor for organizations. Heightened awareness of the field along with research amongst both the academia and the industry has laid the basis for highly evolved, highly sophisticated models of risk. Numerous software product vendors have kept pace with these developments and have built advanced risk engines to support firms in their endeavor to measure and manage risk.

However, to operationalize risk solutions, financial institutions need to not only choose the right risk engines, but also make the linkages between the various existing systems and risk engines and ensure that the calculated risk measures

are distributed across the firm. Risk engines need linkages to acquire data from both external market /



static data sources and internal sources such as trading systems. The acquired data needs to be cleansed, enriched and warehoused using enterprise data management tools. The data warehouses form the source for risk engines to calculate risk measures, which then need to be distributed to users, who can span from traders to senior management to regulators, as usable reports. Tying up the components of data acquisition, data management, warehousing along with building analytics and reporting thus becomes critical for the success of an Integrated Risk Solution. Risk vendors normally concentrate on the quant part of risk solution and not the system integration part of solution.

As a leading SI, Mahindra Satyam can help Financial Institutions cover the gap in implementing these solutions. We have worked on numerous data acquisition and data management projects to acquire data from multiple sources and have worked on data quality and data governance projects. Our iDecisions framework enables us to create risk specific data marts and meta data tags in the areas of market, credit and operational risk. We have a strong business intelligence practice which helps create reports with slice and dice, and drill-down capabilities. Besides this we have tied up with many risk engine vendors to provide implementation and risk modeling services on their behalf.

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