



SAS® High-Performance Risk

Enabling faster, better decisions based on the most up-to-date views of your overall risk exposure

Overview

In the midst of the recent financial crisis, the world's financial institutions were unable to assess their risk exposures quickly and accurately enough in response to market volatility. This inability left many firms unable to make timely decisions to unwind and/or hedge positions. And the results were disastrous.

Now, in the post-crisis environment, firms are grappling with exploding data volumes, greater problem complexity, mounting performance expectations, shrinking decision-making windows and ever-growing, ever-changing regulatory requirements. The need for timely assessment of firmwide exposure across all risk types – e.g., market, credit and liquidity risk – has never been greater, but many financial institutions are feeling overwhelmed.

What if you could perform intraday or near-real time risk assessments and gain accurate information on current exposures? What if you could use that insight to make strategic decisions and take quick, appropriate actions to minimize losses – or seize opportunities before they disappear? You can with **SAS High-Performance Risk**.

SAS High-Performance Risk merges the power of an integrated risk platform with a high-performance analytics infrastructure, enabling you to assess your risk exposures with speed and precision so you can make quick, well-informed decisions that will safeguard and enhance the overall financial position of the firm.



Challenges

- **Organizational silos.** Scattered data, inconsistent methodologies across trading desks, and the propensity to manage positions in isolation can lead to undue funding concentrations and the tendency to over/undercorrect.
- **Market volatility.** Even small movements in market indices can have a huge impact, but the limited capacity to identify and aggregate exposures firmwide inhibits the ability to act quickly and decisively to counter the effects – or take advantage – of rapidly changing market conditions.
- **System limitations.** Existing risk systems (e.g., black box) are often restricted in the types of calculations they can do, and it is hard to reconfigure them to calculate new risk measures to meet changing business needs and regulatory requirements.
- **Rigorous regulatory demands.** The increased complexity and frequency of regulatory requirements can be a major distraction, particularly during times of volatility when the firm really needs to focus on the business itself.



How SAS® Can Help

A high-performance analytics infrastructure enables SAS High-Performance Risk to solve complex problems in near-real time.

- **In-memory analytics** allow complex analytical computations and big data to be processed in-memory and distributed across a dedicated set of nodes.
- **Grid computing** promotes efficiency, lower cost and better performance by processing jobs in a shared, centrally managed pool of IT resources.
- **Multithreading techniques** enable simultaneous, parallel execution of multiple tasks for greatly improved performance, throughput and responsiveness.

SAS High-Performance Risk provides **maximum value in “must act now” situations** in response to, or in anticipation of, changing market conditions.

- **Market risk managers** can access accurate portfolio risk measurements quickly for trading complex instruments in volatile markets.
- **Liquidity risk managers** can access timely, intraday analysis of the liquidity balance sheet in order to assess current and potential future liquidity situations and make the most advantageous decisions.
- **Credit portfolio risk managers** can cut long batch times significantly for large-scale risk simulations of the whole balance sheet, thus enabling intraday, firmwide credit portfolio simulations and ad hoc stress testing.

Why SAS® High-Performance Risk?

SAS High-Performance Risk enables you to ask questions – and get fast, precise answers – to address business issues that normally entail significant time delays before results can be obtained. The solution lets you assess and update firmwide market, credit and liquidity risk intraday or in near-real time in order to gain accurate information on current exposures, make timely, well-informed decisions on security positions, and minimize losses – even in highly volatile and stressed markets.

With the faster response times made possible by SAS High-Performance Risk, you can meet today’s significant business challenges head-on, while the solution’s scalable computing environment ensures your ability to meet the ever-increasing scope, scale, complexity and pace of change well into the future. SAS High-Performance Risk delivers:

- **Greater processing speed, by several orders of magnitude**, which enables you to retrieve key risk results within the time window of critical business decisions.
- **Significantly greater precision** in enormously complex portfolio valuations, versus the overly simplistic approximations common today.
- **The level of detail that’s right for the user** – from executives needing high-level summary views of the firm’s overall risk, to analysts needing to drill into the most granular level of detail in response to regulatory inquiries.

Benefits

Get Fast, Accurate Portfolio Risk and Exposure Measures

SAS High-Performance Risk uses patent-pending techniques to perform complex risk analyses of very large portfolios, enabling significant performance gains. As a result, you can:

- Analyze firmwide portfolio risk and perform dynamic stress tests on complex portfolios of almost any type of financial instrument – with millions of positions – in just minutes or hours versus days or weeks.
- Calculate incremental VaR, counterparty exposure measures and complete risk aggregations in near-real time (intraday).
- Quantify and take into account millions of correlations spanning financial instruments, market indices, economic indicators and counterparties.

React to Market Events Faster and with Greater Precision

SAS lets you perform intraday, large-scale simulations and ad hoc stress tests based on **all** available portfolio data – not just a sample – so you get highly accurate results quickly, enabling a faster response to market fluctuations. With the solution, you can:

- Price and manage complex, intraday incremental trades based on the full distribution of market states.
- React to market shocks promptly, and recognize and take advantage of better arbitrage opportunities.

Quickly Identify Optimal Actions and Make the Best Decisions

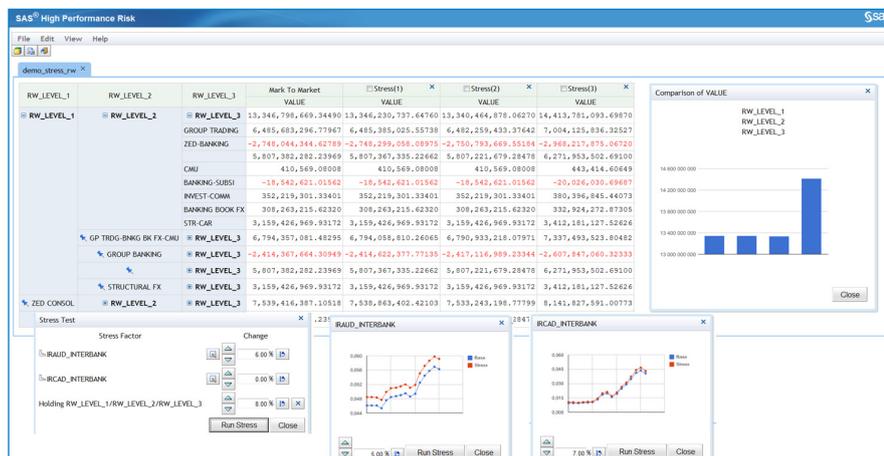
SAS High-Performance Risk enables rapid, on-demand scenario analysis, so you can find optimized solutions to your liquidity and capital needs at the speed of the market. The solution lets you:

- Produce “what if” scenarios based on the most complex portfolios, positions and instruments across multiple time horizons.
- Quantify the impact of various scenarios on cash flow, P&L and the balance sheet, then change parameters and rerun scenarios on demand to examine outcomes relative to potential capital gains/losses, changes in yield or cost of funds.

Plan Ahead and Formulate Contingencies

SAS High-Performance Risk uses in-memory technology to simultaneously deal with millions of correlated positions, overlapping constraints and thousands of market states relative to market shocks, asset or currency depreciation, funding shortages, domino effects, etc. As a result, you can:

- Generate a full range of possible scenarios in order to anticipate and quantify their effects on your firm’s financial performance (i.e., earnings, cash flows, risk exposures and balance sheet structure).
- Determine which courses of action will produce the outcomes that are most beneficial to your business.



SAS High-Performance Risk lets you generate stress tests and review results interactively.

The SAS® Difference

- **Results in minutes, not days.** SAS delivers risk calculation results faster than anyone else using patent-pending techniques that dramatically accelerate processing time for even the most complex risk calculations.
- **Instantaneous, interactive scenario analysis.** Dynamic, in-memory OLAP cubes enable you to interact with output to quickly locate desired information and immediately interpret model results.
- **Real-time stress testing.** Respond quickly and decisively to market fluctuations by stress testing firmwide portfolios in real time so you can make well-informed decisions on position hedging and unwinding.
- **Intraday recalculation of risk and exposure.** Update actual firmwide risk and exposure as often as needed to respond to changing market conditions and make timely decisions on portfolio strategies.
- **A flexible, open environment.** Configure new instruments, develop new pricing functions, construct more complex scenarios and produce custom reports, so you can adapt the solution to fit your firm’s future requirements as they evolve.
- **A more comprehensive modeling regimen.** Gain a greater understanding of the overall risk position and capital adequacy of the firm, which enables faster management decisions in times of high volatility.

Capabilities

A Powerful, Flexible Risk Engine

SAS High-Performance Risk features a powerful, flexible risk engine in an open environment that lets you configure new instruments, develop new pricing functions, add new risk factors and create new scenarios as needed. In addition:

- Multithreading techniques increase responsiveness and concurrency, which dramatically reduce run times.
- Risk analysis results are held in-memory, which enables instantaneous stress testing, scenario analysis and interrogation of results on multiple portfolios.

Flexible Risk Analysis Capabilities

The solution uses the most advanced analytics available and gives you the power to perform smarter analyses faster than your competitors. With SAS High-Performance Risk, you can:

- Analyze and measure risk using a range of techniques – VaR, sensitivity analysis, profit/loss analysis, etc.
- Compute base case calculations, including mark-to-market (MtM) valuation and current exposure.
- Perform interactive scenario analysis and stress testing on demand, along with multiple types of simulation – covariance, Monte Carlo, etc.

Interactive Stress Testing

All levels of users – from quantitative analysts to business users – can create and run complex shock and recovery scenarios interactively via a user-friendly interface. Users can create ad hoc scenarios, define subportfolios and compare scenario results, then interactively change parameters and rerun the scenarios to analyze the effects of extreme changes in risk factor values. The solution also:

- Aggregates both the banking and trading books in a single environment that accelerates stress testing and allows the application of a common set of scenarios and factors.
- Integrates most existing stress-testing models, eliminating the need to rewrite them.

Centralized Pricing Model Library

SAS High-Performance Risk provides a centralized library of standard pricing models for a wide range of financial instrument types. The solution also supports third-party (e.g., FINCAD) and in-house pricing libraries, enabling you to program, test and implement any pricing model.

Customizable, Web-Based Interface

SAS High-Performance Risk includes a user-friendly interface that can be customized to suit the needs of individual users. The interface can be used both to build new, custom risk analysis projects, and to interact with analysis results based on user-defined outputs.

The interface lets you explore model output in a richer context for a better understanding of the firm's overall risk position and capital adequacy by enabling you to:

- Store model output in-memory in hierarchical risk cubes that include multiple dimensions (asset class, trading desk, line of business, etc.) and levels of data (trade level, trader, security owner, execution window, etc.).
- Drill into risk cubes that reflect aggregate risk exposures, asset positions and capital allocations down to any level of granularity.

Comprehensive Data Management

The solution removes the complexity and manual efforts typically associated with risk management data by rapidly aggregating portfolio and market data from a wide variety of both internal and external sources. The solution offers complete data management capabilities, including:

- Common metadata and security frameworks.
- A common set of native access engines.
- Embedded data quality capabilities.

About SAS

SAS is the leader in business analytics software and services, and the largest independent vendor in the business intelligence market. Through innovative solutions, SAS helps customers at more than 55,000 sites improve performance and deliver value by making better decisions faster. Since 1976 SAS has been giving customers around the world THE POWER TO KNOW®. For more information on SAS® Business Analytics software and services, visit sas.com.



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