

SAP for Banking

Think Risk Management, Think SAP

Creating an On-Demand, Strategic Picture of Risk
for the Banking Industry

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Aggregated Risk On Demand – Next-Generation Architecture for a Volatile World

As the **risk domain continues to expand**, the role, perceptions, and performance expectations of risk management are evolving, both at an individual and institutional level. Gone are the days when risk was merely regarded as a loss-mitigation function.

The financial crisis of 2008 exposed the dependency between credit risk, market liquidity, and funding risk, ushering in a new era of transparency that demands the convergence of risk controls. Regulatory pressure has intensified, with new measures in the Basel III accord for capital adequacy, the Vickers Report published by the Independent Commission on Banking, and the Dodd-Frank Wall Street Reform and Consumer Protection Act.

However, beyond the need for compliance, the ability to manage risk can translate into significant business advantage. As such, the risk function is becoming pivotal to the economic performance of banks, with risk-adjusted decision making a significant driver of profitability. But obtaining a comprehensive view of the entire risk landscape in today's complicated banking environment is hardly a straightforward task, particularly in entities deemed "too big to fail."

There is a growing urgency for the banking industry to define new, real-time risk architectures that are fit for the speed and challenges of current market events. To enable a deeper level of scrutiny, more granular information is required as well as higher frequency reporting. Institutions also need to adopt a culture of predicting and searching out emerging threats and empowering risk managers to make proactive, rational decisions.

Once equipped with a clear picture of aggregated risk on demand, a firm can understand what sort of businesses it should invest in, the real risks it is facing, the true costs involved, and the genuine revenue opportunities available. And, in addition to its role as the bank's safeguard, the risk function can metamorphose into the strategic powerhouse it has the potential to be.

KEY FACTS ABOUT SAP

Around **1,000** SAP® solution experts are **dedicated to the banking industry**.

There are more than **3,700** SAP banking customers in **120** countries.

SAP has been serving the banking industry with **industry-specific applications** since **1998**.

KEY FACTS ABOUT THE BANKING INDUSTRY

40% of iPad **business deployments** are in financial services – four times that of any other industry.

Between **2012 and 2019**, there will be at least **29 new amended regulations** coming into effect.

Better, Safer Risk Management with SAP® Solutions

SAP is dedicated to helping forward-thinking banks in the pursuit of the “on-demand risk enterprise” by accelerating access to insight and enabling a broader spectrum of actual and anticipated scenarios to be evaluated more comprehensively in shorter time frames.

As one of the world’s leading providers of business software, we already work with 3,700 banking customers across 120 countries.

They choose SAP not only for our tools and technologies but also for our deep understanding of what it takes to succeed in today’s banking landscape, coupled with our knowledge of best practices accumulated over decades working with leading organizations in the industry.

In addition to our banking-specific applications for risk management outlined in the following section, we offer a foundation of tools and technologies to help you create a truly next-generation risk architecture.

IN-MEMORY COMPUTING – THE ENGINE THAT DRIVES “RISK ON DEMAND”

If you can’t measure risk, you can’t manage it. But at decision time, every second counts. Only after you can identify and analyze events as they happen can you take swift and decisive mitigating action – whether for a single trade or the entire firm.

The SAP HANA® platform, our breakthrough for in-memory computing, transforms risk architecture by being able to process terabytes of data at a rate of hundreds of millions of rows per second rather than minutes, hours, or even days. The performance acceleration over traditional, disk-based systems is phenomenal. But the key advantage of being able to analyze

Big Data is the ability to deliver insight into events, as they unfold, in unprecedented granularity, enabling accurate aggregates as well as deep dives into the detail.

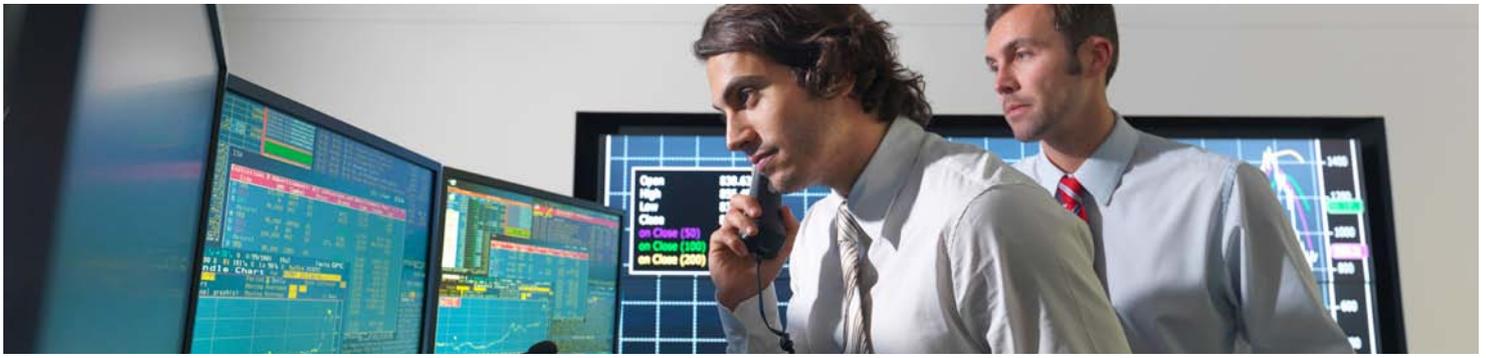
You achieve further agility by eliminating the need to aggregate data from disparate sources into a cube, enabling sophisticated queries across multiple dimensions to be built on demand without predefined calculations.

The application layer allows you to preserve existing software investments and migrate your proprietary, computationally intensive applications onto the SAP HANA platform. It can be readily integrated with financial libraries, analytical tools, dashboards, reporting, and mobile apps to enable live risk exposure monitoring and support capital optimization and liquidity measurement.

DATA QUALITY – CREATING A FOUNDATION FOR SOUND DECISIONS

Data underpins regulatory reporting, internal policies, and processes and executive decision making, so there is little virtue in producing real-time, in-depth insight based on a flawed foundation. Basel II and III emphasize a bank’s responsibility for data quality and data management in examining the accuracy of its risk exposure calculations throughout the entire business. This demands a thorough assessment of data quality, efficient business-specific strategies to cleanse data, and appropriate stewardship to maintain data integrity.

Our enterprise information management tools can effectively operationalize data quality across departmental and organizational boundaries and provide a framework for ongoing data governance.



DATA MANAGEMENT – PROVIDING A SINGLE SOURCE OF TRUTH

The integrated finance and risk architecture (IFRA) for our analytical banking applications provides a simplified and flexible data architecture for all finance and risk applications. The source data layer offers central source data storage for unified and consistent financial and risk data so that all of your risk and accounting applications can operate on one common database – providing a “single source of truth” for all modeling, calculation, analytics, and reporting requirements, eliminating data redundancy and reducing maintenance costs.

LIMIT MANAGEMENT – FLEXIBLE, BANK-SPECIFIC LIMIT STRUCTURES

Our centralized limit management solution is designed to help you define flexible, bank-specific limit structures using any combination of characteristics for countries, industries, partners, product groups, or traders. Using different limit structures, exposures can be managed for various risk types. The limit management functions are decoupled from the calculations of risk figures for maximum flexibility: any risk exposure – calculated by SAP® software or a third-party engine – can be considered for limitation. The solution also provides Web-based services for online limit check, such as for operational reporting of portfolio limits and the immediate consideration of newly created deals for related portfolio limits.

As one of the world's leading providers of business software, we already work with 3,700 banking customers across 120 countries.

PREDICTIVE ANALYSIS – FINDING RISKS AND OPPORTUNITIES IN DATA

Our predictive analysis solution provides a highly intuitive, user-friendly environment for designing predictive models – such as outlier detection analysis, regression analysis, and time series analysis – and visualizing data. This allows you to uncover risks and untapped opportunities that are hidden in the data.

For the intuitive design of complex predictive models, data can be drawn from different SAP and non-SAP sources and then selected, prepared, and processed via simple drag-and-drop. Using the predictive analysis solution in combination with SAP HANA fully exploits the capabilities of real-time data access without the need for preaggregations on huge data volumes, allowing business users to run their predictive models on the fly.

In addition to the extreme performance gained through SAP HANA, users can leverage the predictive analytical library to develop whole new analytical scenarios. Using clustering, segmentation, and association algorithms, models can be built for forecasting, identifying key drivers, uncovering trends, and understanding data correlations to detect anomalies.





REPORTING AND VISUALIZATION – MEANINGFUL, ACTIONABLE INSIGHT

We can help you streamline reporting on risk levels and stress tests, assess regulatory capital levels across the business, improve the accuracy of asset valuations, and promote transparency and accountability at all points across the enterprise.

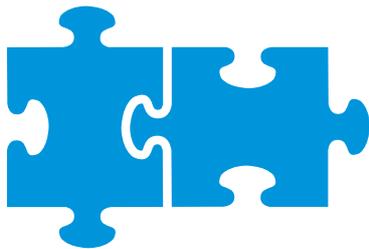
Our comprehensive enterprise risk-reporting framework enables you to quickly integrate the most relevant metrics for all risk categories. Risk controllers benefit from a consolidated, enterprise-wide view of risk data and can more easily monitor key risk indicators across relevant dimensions, such as business unit, geography, product, or counterparty.

In addition to a predefined and ad hoc reporting function, visualizations in the form of dashboards and heat maps present information in a clear, easily digestible way that allows both high-level and detailed analysis and supports direct action. This insight can be made available to every level of user, from the operational team to senior executives, and forms the basis for risk reporting.

ENTERPRISE MOBILITY – RISK INFORMATION AT YOUR FINGERTIPS

Recognizing the increasingly mobile working patterns of risk controllers and executives, our risk analytics applications, together with many of our governance and compliance solutions, are accessible via mobile devices to allow anytime, anywhere visibility and control.

Automate key risk indicator monitoring, answer “what if” questions, and proactively alert users to emerging risks so they can take decisive action with all the facts at their fingertips, no matter where they are. Robust mobile device management helps ensure that sensitive data is protected at all times, whether on corporate-issue or employee-owned smartphones and tablets.



Our comprehensive enterprise risk-reporting framework enables you to **quickly integrate the most relevant metrics** for all risk categories.

Our Solutions

Discover how SAP solutions can equip you to manage and mitigate liquidity, credit, operational, and market risks, maintain compliance, and streamline the preparation of financial and regulatory statements for a faster close.

GAINING A FLUENT GRASP OF LIQUIDITY RISK

If banks can't fund themselves, they can't fund their clients. When poor funding suppresses trading, market liquidity is reduced, thereby tightening risk management and potentially creating a liquidity spiral. The priority for many banks is to gain a clear, unequivocal picture of their liabilities and determine how to preserve their cash flow.

However, current spreadsheet applications perform sluggishly due to growing volumes of data, while legacy reporting functions restrict analysis to aggregated data sets, which make meaningful ad hoc analyses a challenge, especially since the increasing frequency of regulatory reporting demands rapid turnaround of liquidity reports.

Calculating Liquidity Risk at the Speed of Thought

As risk and finance data grows exponentially each year, the need for a secure, reliable data store to warehouse millions of rows of data and allow highly scalable analysis becomes ever more critical. Our columnar database speeds up retrieval for analysis and back-testing of risk strategies. Combined with complex event processing – event-driven, high-volume, high-performance business logic and rules – it can transform your risk architecture.

Our liquidity risk solution, powered by SAP HANA, is designed to calculate, analyze, and simulate your short-, mid-, and long-term liquidity situation based on millions of individual cash flows and granular assets and liabilities. It analyzes liquidity

curves with comprehensive drill-down features, calculates the key risk figures, and supports the entire regulatory reporting requirement for liquidity risk. You can simulate stress scenarios by applying stress factors to the data – for example, to gauge the effect of varying haircut and runoff rates, or the reclassification of certain assets. Alternatively, you can upload stressed cash flows – including operative, simulated, and stressed data from multiple SAP and non-SAP source systems – for stress run consideration.

The liquidity analysis is based on millions of granular cash flows that are processed at the speed of SAP HANA: for example, you can calculate the liquidity profile for 220 million cash flows in under a second, with drill-down to the lowest granular level and simulations similarly available on the fly, sharpening your collective reactions and supporting better business decisions. Liquidity reports can be made accessible anywhere, at any time, via mobile devices.

The priority for many banks is to **gain a clear, unequivocal picture** of their liabilities and determine how to preserve their cash flow.

The solution provides a robust framework that goes beyond merely satisfying mandatory requirements to calculating any liquidity risk key figure you may be interested in. For specific sets of regulatory key figures, such as the Basel III ratios, the calculations are provided as content for computation.

Combating the Three Cs: Credit Default, Concentration, and Country Risk

For most banks, loans are the largest and most obvious source of credit risk. But further sources of credit or counterparty risk exist in financial instruments such as interbank transactions, foreign exchange transactions, trade financing, swaps, bonds, equities, and options. Additionally, concentration risk – whether in entity, industry, or location – can threaten a bank's core operations, while sovereign risk is a source of ongoing concern in the Eurozone, for example.

Failure to manage credit risk across the entire company can put banks on a collision course with an unforgiving market and demanding regulators as well as having a detrimental impact on profitability. Credit risk needs to be holistically identified, measured, monitored, and controlled – based on consolidated, auditable data from across the enterprise – to establish capital adequacy.

BUILDING A NEXT-GENERATION CREDIT RISK ARCHITECTURE

With our solutions, you can build a credit risk architecture that lets you confidently manage credit risk across your entire organization.

Credit Risk Calculation and Reporting

Our credit risk solution fully supports all credit risk calculation methods permitted under the Basel frameworks and provides a standard platform for both effective internal reporting and external disclosure, to help you fully comply with the supervisory review process. The calculation of risk-weighted assets (RWAs) and regulatory capital requirement supports all kinds of products – including the complete securitization framework,

all risk categories (default, dilution, settlement, residual-value, specific market risk), and all approaches. An optimization algorithm for collateral distribution helps ensure the optimal collateral attribution to the exposures in order to minimize your capital requirement.

The solution includes a historical database for collecting and storing data such as credit risk parameters, creating a record of risk parameters and credit risks for audits and regulatory reviews, managing historical time series, and meeting regulatory requirements for reporting and plausibility. It also provides standard reports that support Basel requirements for general credit risk reporting as well as giving you the flexibility to design, create, or expand reports to address your specific policies for credit risk management.

All reports can be integrated into Microsoft Office products, sent via e-mail, published to a portal, or stored locally as PDFs. Content can encompass key figures, such as risk-weighted assets or credit value at risk, from group level down to single-exposure level.

To support end-to-end credit risk management, users can not only drill down within the reporting layer but also drill through to the underlying credit risk calculation engines (Basel II, limit management, credit portfolio management, credit exposure calculation).

To accelerate your deployment of credit risk management solutions from SAP, we also offer extensive business content for standard reporting to meet regulatory requirements, based on industry best practices.



Portfolio Management

Our portfolio management application gives you the functionality you need for economic capital modeling to identify, measure, limit, and manage credit risk. With economic capital models, bulk risk for specific segments of a portfolio can be identified, quantified, and limited; the models provide banks with key risk figures like expected loss and standard deviation as well as credit value at risk, expected shortfall, and risk contributions – which are derived from the portfolio loss distribution. The solution contains a robust and advanced default mode model that is based on the original Credit Risk+ methodology proposed by Credit Suisse and incorporates a variety of methods beyond those in the original model. Both types of models provide support for stress scenarios and can help you flexibly monitor limits on the result data at the level of granularity you require.

Stress Testing

Our stress test solution for credit risk is based on flexible scenarios and an intuitive interface firmly focused on nontechnical business users. You can execute stress runs either as complete stressed valuations runs or in terms of approximate stress tests, based on the results of an unstressed run. The reduced processing time of the accelerated stress testing alternative allows a vast increase in the number of scenarios that can be evaluated within a given time frame. User-friendly handling is a central theme of this solution, allowing nontechnical users to quickly configure stress scenarios without IT support and perform “what if” analyses through ad hoc stress testing.

To support end-to-end credit risk management, users can not only drill down within the reporting layer but also drill through to the underlying credit risk calculation engines.



Managing the Uncertainties of Operational Risk

Operational risk – broadly defined as a breakdown in internal processes, people, systems, or external events – is having a significant impact on capital adequacy requirements, not least because it is harder to quantify than market and credit risk. High-profile loss events, such as rogue trading, deliberate fraud, employee compensation claims, human error, negligence, and even IT failures, have attracted the attention of regulators, who are now taking greater interest in operational risk policies, procedures, and practices.

Basel III will set criteria for implementing more advanced approaches to producing internal calculations, to reduce the capital budgeting requirement for operational risk. This will demand that banks conduct more accurate analysis of potential and actual losses and proactively monitor key risk indicators.

MANAGING KNOWN UNKNOWN WITH GREATER CONFIDENCE

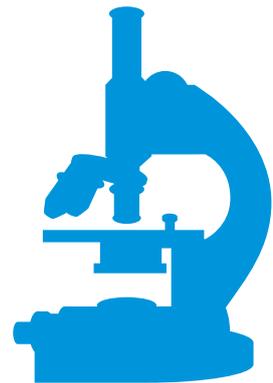
SAP software can help you identify, analyze, and monitor operational risk based on Basel II and Basel III criteria, anticipate and swiftly respond to loss events, and monitor your overall risk portfolio with key risk indicators. Decision makers can be automatically alerted when high-impact and high-probability risks exceed bank-specific thresholds. Analyze risks in terms of severity and likelihood of impact, and monitor risk mitigation activities and time frames, using personalized dashboards and reports that offer high-level views and trend analysis as well as

SAP software can help you **identify, analyze, and monitor operational risk** based on Basel II and Basel III criteria, anticipate and swiftly respond to loss events, and monitor your overall risk portfolio with key risk indicators.

drill-down access to detailed information. Managers can be empowered to create effective mitigation or response strategies that address the risks specific to their areas of responsibility. The application tracks the status of each response (and the cost of implementation), so you can be confident that risks are being appropriately addressed.

To prevent fraudulent activity and inadvertent error, role-based access control functionality enables you to identify and control violations through continuous, automated monitoring of financial applications and business processes. Manage by exception with automated alerts, notifications, and escalation procedures. Identify and remediate potential risks, such as conflicting authorizations within a single user's access profile, and actual risks, including business functions executed in conflict with segregation-of-duties mandates.

To align risk and compliance management processes across your business, we can help you automate controls for key risks with control monitoring, manual control tests, and self-assessment functionality. Process control also lets you manage libraries and monitor critical configurations, business transactions, and IT controls across applications.



Putting Greater Stock in Market Risk Management

Market risk – the risk of losses arising from adverse movements in market prices – exposes banks to day-to-day uncertainty in the market value of their investment portfolios.

Value-at-risk (VaR) models are designed to estimate the maximum amount that a bank could lose on a given trading portfolio over a specific time period with a given probability. However, while VaR is no doubt a powerful tool, its summary estimate can only provide a bank's senior management with a guide to the size of potential losses and their anticipated frequency under normal circumstances. A comprehensive approach to risk management supplements VaR with an effective stress-testing program to methodically examine the potential impact of extreme market events or scenarios. Such insights can be fed into strategic planning, capital allocation, hedging, and other major decisions.

TAKING THE STRESS OUT OF STRESS TESTING WITH SAP SOLUTIONS

SAP solutions provide real-time data management and reporting functionality that allows you to increase visibility into market risks and aggregate them accurately. With powerful visualization and reporting functionality, you can better understand the effect of market events and stress test your portfolio. The solutions enable large financial organizations to integrate proprietary models with our real-time data platform to significantly reduce the time to complete scenario tests.

SAP solutions provide [real-time data management and reporting](#) functionality that allows you to increase visibility into market risks and aggregate them accurately.



Maintaining Integrity with Regulatory Compliance

Regulation aims to protect the integrity of the financial system by subjecting institutions to specific requirements, restrictions, and guidelines. Since the global financial crisis of 2008, headline-grabbing instances of market manipulation, incompetence, and violations have attracted negative attention to the industry as a whole. Regulatory pressure has become more intense and pervasive in an attempt to restore confidence in the banking industry by ensuring the solvency of institutions and encouraging more standardized assessments of risk.

Accords such as Basel III aim to promote transparency of risk across the enterprise, enabling institutions to understand and articulate their appetite for risk, demonstrate control of it, and report on it regularly, both within the business and to the regulators. These measures aren't simply the "stick" of regulatory imperative but rather the "carrot" of opportunity for banks to embed risk-based decision making at the heart of their culture to profitable and competitive advantage.

MAKING REGULATORY COMPLIANCE REAL TIME, NOT ONE TIME

Our in-memory computing platform, SAP HANA, can provide crucial early advantage in detecting compliance breaches. It can turbocharge traditionally flawed processes to enable, for example, near-instant verification of prospective customers' data against targets on the global financial sanctions list. This speed and precision can thwart money-laundering attempts before they happen, protecting financial institutions from hefty fines after the event.

Integrated with SAP HANA, our enterprise risk-reporting solutions can help you achieve greater transparency, [assess and manage risk in real time](#), and improve accountability.

Our suite of governance, risk, and compliance solutions can help you control the cost of compliance, prevent risk and compliance violations, minimize the impact of adverse events, and align compliance programs with strategic initiatives. We can also support you in improving risk analysis and reporting to meet mission-critical regulatory requirements, such as Basel III and the Dodd-Frank Act. Integrated with SAP HANA, our enterprise risk-reporting solutions can help you achieve greater transparency, assess and manage risk in real time, and improve accountability.



Overcoming the Challenges of Regulatory Reporting

Preparing and publishing financial data presents ever-greater challenges for banks worldwide. They are now required to report electronically thousands of extra risk and capital data points – a huge increase in volume and complexity in the face of aggressive timelines. But while all the banks report similar information to the regulators, each does so in a slightly different way, making direct comparisons difficult. Standards such as the fourth Capital Requirements Directive (CRD IV) call for a list of templates and technical standards to harmonize reporting, but the practical challenges of implementation are a concern for banks and regulators alike.

SAP SOLUTIONS – PROVIDING “LAST MILE” REPORTING

SAP solutions allow banks to update and generate annual, additional, supervisory board, status, and sustainability reporting on a workflow basis. They minimize the risk of errors, reducing the audit trail and the amount of time and effort involved in status monitoring.

XBRL (eXtensible Business Reporting Language) and iXBRL (Inline eXtensible Business Reporting Language) reporting automates electronic financial reporting to tax authorities on behalf of central tax departments of company groups. Provision is made for regulations, including:

- European Banking Authority – common reporting (COREP) and financial reporting (FINREP)
- U.S. Securities and Exchange Commission – 20-F, 10-K, and 10-Q reports
- EU regulatory agencies (European Banking Authority and European Insurance and Occupational Pensions Authority)
- Federal Gazette reporting

SAP solutions allow banks to **update and generate** annual, additional, supervisory board, status, and sustainability reporting on a workflow basis.

With taxonomy adjustment and extension, consistent and audit-proof concern reporting enables subsidiaries to collate, aggregate, and report on International Financial Reporting Standards (IFRS) and GAAP notes and investments as well as corporate responsibility and sustainability information, replacing inconsistent spreadsheet-based reporting throughout the company hierarchy.

SAP – ASSURANCE IN A WORLD OF UNCERTAINTY

Financial events in our recent history have highlighted the need to renovate risk architectures and enhance risk management strategies from the inside out. Lessons learned need to be internalized to make the global financial system more resilient and better equipped to handle future challenges.

SAP brings to the banking industry game-changing technology that forms the core of the next-generation architecture required for a next-generation approach to risk and capital management. Overlay our comprehensive suite of specialist banking applications and governance, risk, and compliance solutions, and we are poised to help your bank address the need for systemic risk mitigation, meet regulatory demands, and run more profitably.

FIND OUT MORE

To learn more about how SAP can help your banking organization manage risk, call your SAP representative today or visit us on the Web at www.sap.com/banking.

And join our blog at blogs.sap.com/banking.



www.sap.com/contactsap

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