SUNGARD

THE FUTURE OF CREDIT RISK

An Adaptiv White Paper

TECHNOLOGY FOR THE FUTURE OF CREDIT RISK MANAGEMENT

Innovations such as credit derivatives and collateralised loan obligations have triggered a continuing revolution in credit risk management. "Making only good loans" is no longer sufficient for successful credit risk management, effective portfolio analysis is also essential. Building the comprehensive infrastructure to support this approach requires a coherent vision and the willingness to persevere.

Adaptiv Credit Risk is a comprehensive, global credit risk management and control solution. It provides a total, real-time, credit risk solution for global exposure aggregation and limit management, credit risk analytics, collateral management and Web-based communications. The innovative Adaptiv Credit Risk solution is based on powerful server systems using Intel architecture. Intel® Xeon™ processor family-based servers deliver the performance, reliability and scalability that mission-critical, high transaction volume financial applications demand.

THE CHANGING WORLD OF CREDIT RISK MANAGEMENT

Credit risk management is in the middle of an ongoing revolution. Twenty years ago a significant share of the market was highly illiquid with much private debt being both originated and held on the balance sheets of commercial banks. In that world, most banks were effectively hostage to the industry profile of their local regions. Excess portfolio concentrations were of some intellectual interest, but possibilities for correcting these imbalances were distinctly limited. All this began to change in the early 1990s.

In the past ten years, financial innovations such as credit derivatives and structured fixed income obligations have injected market discipline and improved liquidity into traditional debt markets. These innovations have allowed improved management of many traditional risks while introducing new risk related issues of their own. Increased visibility and accountability for risk have accompanied these changes.

Regulatory initiatives have concentrated the attention of corporate boards and senior management on the role of risk oversight and control. The recent past has highlighted the dangers of unpredictable counterparty default. Predictive models of default probability based on financial data have limited utility when fraud or reputational risk is involved. Faced with having to control this situation, many institutions are looking to implement robust global counterparty limits and control systems to cap these risks and to allow for portfolio-wide reporting and analysis.

Thorough analysis and careful underwriting of new commitments must be supplemented with effective portfolio analysis.

SHORTING CREDIT RISK

The essential structural impact of credit derivatives was the ability to go short credit risk in a customised fashion. Prior to that, shorting corporate bonds was the primary way to gain from deterioration in the credit standing of a specific institution. This market was, however, quite illiquid and constrained by the physical availability of the appropriate bonds to borrow and sell short. It also confounded risk arising from general interest rate movements and changes in general credit spreads with deterioration in the credit of an individual name.

With the advent of credit derivatives, banks had an efficient *and anonymous* means of hedging excessive concentrations to a single name or group of names. As in all such innovations, the initial spreads were wide, reflecting limited liquidity, significant start-up costs and a modest volume of transactions. Frequent readjustment of positions was, therefore, prohibitively expensive.

Nevertheless, banks now had a means of hedging their most significant regional and industrial concentrations while continuing to structure and originate loans in areas of their special expertise. In addition, the derivative nature of the contracts meant that growth in the market was not limited by available physical securities or legal restrictions on the trading of such securities.

THE RISE OF COLLATERALISED SECURITIES

A second aspect of the revolution in credit risk management has been the acceptance and rapid expansion of the collateralised debt market. In particular, collateralised loan obligations (CLOs) allowed banks to reduce selected balance sheet exposures by transferring some loans into the underlying asset pools of such instruments.

Equally importantly, the structuring of customised tranches to absorb initial versus subsequent default losses has attracted a wide variety of investors with differing risk reward trade-offs into the corporate debt markets. The more recent development of synthetic CLO and collateralised debt obligation (CDO) structures has added further liquidity to this market, making it a yet more attractive mechanism for managing credit risk from a portfolio perspective.

As both the credit derivative and CLO/CDO markets have matured and become more liquid, they have generated vital price discovery and correlation data that are essential for a rigorous portfolio approach to credit risk management.

INCREASING COMPLEXITY

While credit derivatives have opened up new and valuable risk management options, they have also introduced a new dimension of complexity. Purchasing protection with a credit default swap creates secondary credit risk to the counterparty to that contract. How much risk it creates depends on what other derivative contracts are in place with that counterparty and on the correlations between default drivers affecting the underlying name and those affecting the counterparty.

Holding the first-, second- or nth-to-default tranche of a CLO or CDO adds still more complexity. There is default exposure to all the underlying names, but only on a conditional basis. Estimating the full implications of such a holding requires analysis of the behaviour of all the names in the underlying portfolio as well as all other exposure to those names.

All this is compounded by the much older problem of assessing potential future credit exposure from traditional products such as interest rate, currency, equity and commodity derivatives.

It has been widely recognised for many years that only a sophisticated Monte Carlo simulation with:

- Exposure profiling over the full life of a counterparty's portfolio
- Aging and run-off of transactions through time
- Appropriate recognition of netting where applicable
- Integrated treatment of collateral and
- Endogenously generated simulation dates to reflect the run-off of large deals,

will yield an acceptably accurate presentation of trading credit exposure. This approach has now been confirmed by the Basel Committee in its April 2005 proposal to allow use of this type of exposure simulation modeling as the basis for deriving the credit risk capital charge on derivative trading.In light of these developments, we can identify several factors that have served to complicate the challenge of measuring credit risk effectively:

- Product innovations, such as those noted above, produce transactions that individually take an appreciable amount of time to value. Whereas it may be acceptable to take five seconds to price a new trade, when computing credit exposure using simulation techniques the multiplicative effect of many scenarios across multiple time-steps greatly magnifies the computational overhead. Naively using the above trade valuation routine in a simulation (for example at 30 time points into the future with 5,000 market scenarios) results in over 200 hours of computation time. Clearly this is unacceptable and certain simplifying assumptions need to be made
- Increasing portfolio size is also driving up the complexity of counterparty credit risk calculations. Not only have trade volumes increased dramatically in certain product areas, but mergers between organisations have increased portfolio concentration overnight
- A single obligor view of credit is a bare minimum if the true picture of risk is to be known. At its simplest this involves aggregating all transactions with a counterparty (lending and trade finance activities, securities bought or sold that are issued by the counterparty, derivative contracts with the counterparty etc.) to produce a single, unified risk report. Taking this further requires an integrated simulation of these outstanding obligations and risk drivers to achieve a coherent model of future risk.

Alongside this counterparty-by-counterparty view of credit risk is the increasing desire to model a bank's wider portfolio. This is driven both by the need to compute regulatory and economic capital and by the emergence of the portfolio management function that actively manages a bank's credit portfolio independent of the origination and distribution process. The long-term goal of many portfolio management groups is to migrate from being a control and cost-centre to becoming a strategic partner to the business and a profit-centre in their own right.

A SOPHISTICATED PORTFOLIO APPROACH IS ESSENTIAL

The central implication of all these changes for credit risk management is that good micro-analysis and careful underwriting of new credit extensions no longer represent best practice credit risk management. A sophisticated portfolio approach is essential to assure that a bank is achieving the optimal trade-off between risk and return.

The important challenge is to achieve an integrated view of credit risk across both the banking and trading books in the context of an institution's full credit risk portfolio. No simple "silver bullet" is available to accomplish this goal. Nor will it be achieved in a few months spent on a crash project. Rather it requires a coherent vision of what is to be achieved, a strategy for getting there and the perseverance to see the process through to completion. To this end, a realistic architecture that both encompasses today's technology and is flexible enough to incorporate advances that will become available in future years is crucial. The focus of activity around complying with Basel-II regulations has highlighted the deficiencies in many banks' underlying data - both the ability to consolidate across the enterprise and the availability of reliable inputs for credit models.

The stringent requirements for back testing and stress testing combined with banks' reluctance to share underlying data have meant much duplicated effort in the industry to achieve compliance. Given the enormous investments in this area it is imperative that the results are leveraged fully, not just in regulatory reporting but also as the foundation for more advanced economic capital models. This way, when the regulators start to consider the use of firm-wide internal capital models as an alternative to the current prescriptive approaches, banks will have built a history of comparable results to justify adoption.

Only once the firm foundations have been laid can more advanced approaches such as jointly simulating market and credit risk be profitable endeavours.

TECHNOLOGY FOR THE FUTURE OF CREDIT RISK MANAGEMENT

Supporting the risk infrastructure that fulfils the above vision will require progress on many fronts from the typical systems we see in production in banks today. Batch oriented, fragmented and hard to use systems will be unable to cope with the changing requirements of credit risk management. In failing to meet the challenges of the 21st century, such systems are likely to incur regulatory opprobrium and hence punitive capital treatment.

Adaptiv Credit Risk, SunGard's global counterparty credit exposure measurement and limit control solution, is designed to address many of these issues. Our vision is to ensure that Adaptiv remains a market leading solution and supports banks' transitions to newer ways of managing credit risk through the adoption of new functionality, technology and operating models.

Adaptiv Credit Risk's use of a powerful network of high-performance servers powered by Intel® Xeon™ processors enables high transaction rates, fast response times and the uncompromising dependability that demanding risk analysis applications require. Intel® Server Platforms provide the performance, reliability and scalability to help grow your business, reduce costs and mitigate risk.

Intel® Xeon™ processor-based servers also provide the architectural agility and platform innovation to:

- Deliver the performance, reliability and scalability that mission critical, high transaction volume financial applications demand
- Provide the flexibility to scale as needed, delivering optimum performance and return on investment while mitigating risk for uncompromising dependability
- Support robust and compute-intensive server operations that are enhanced by the application of hyper-threading technology. Hyper-threading technology allows a more efficient use of processor resources for greater parallelism and improved performance. This allows enterprise applications to handle more operations and deliver faster response times.

SEVERAL KEY AREAS NEED TO BE ADDRESSED

Data integration is at the heart of any credit risk infrastructure. We do not advocate the creation of all-encompassing data warehouses that were popular in the 1990s. Rather, the goal is to capture a relevant level of detail for the required analysis. To operate effectively, credit relies on many feeder systems in a bank, from trade data to legal agreements, key pieces of information are required to account correctly for the economic and legal framework that drives portfolio exposure. Technical initiatives such as XML-based standards and common message busses can help ease the integration pains, but a pragmatic and robust approach to data requirements and mapping is the foundation upon which successful initiatives will be based. Adaptiv Credit Risk is designed with credit in mind, and has a very well defined data model to support these requirements. Over 15 years of experience has given us deep insight into solving the data problem and, just as importantly, keeping it solved.

Sophisticated analytics will inevitably be required to compute the raw risk numbers. Technologies such as Grid computing need to be harnessed to make these computations achievable in workable time-frames. There is a trade-off to be had between the instant gratification of a pre-deal check request (which may have to be completed in 3-4 seconds) and the requirements for ad-hoc enquiries and periodic (typically end of day) processing runs. By intelligently prioritising tasks and allocating compute resources accordingly, a cost-effective and reliable solution can be delivered. The analytics currently available in Adaptiv Credit Risk offer advanced calculation techniques for a variety of situations, ranging from simulation-based techniques to faster but more approximate closed form analytical approaches. Close attention to the important characteristics of the credit problem (such as simulating on all key portfolio dates and not simply on a pre-defined fixed time grid) ensure that reliable and actionable results are generated.

Looking forward, Adaptiv Credit Risk will be leveraging technology advances from Intel® to support these complex real-time computations. With the increased complexity of the financial models required to measure the risk of new products, 64-bit processing and multi-core architectures will be used to keep pace with users' ever growing demands on systems.

For example, we expect to improve time-to-information with integrated market, customer and transaction data running on code optimised for 64-bit Intel® Xeon™ processor-based servers.

Information dissemination will become ever more important as risk systems grow and encompass more and more of the bank's activities. Risk systems need to become less about simple policy enforcement and more about making value-added decision information readily available to end-users. The evolution of web technologies has driven how Adaptiv Credit Risk supports end-user data access. Web-based deployment ensures simplified roll-out of the solution to as wide an audience as required. Powerful graphics and content management combined with strong data security ensure that key decision makers have the relevant up-to-date information at hand in real-time wherever they may be based around the globe.

Process control and verifiability are essential to reducing operational errors and complying with the supervisory review of Basel. Adaptiv Credit Risk supports concepts such as credit ownership and active risk management to help guide users through daily tasks, ensuring that work is prioritised, important review dates are not missed and administrative tasks are as efficient as possible.

CHANGE IS THE ONLY CONSTANT

In summary, continuing innovations in the realm of credit risk present a daunting challenge to those responsible for its management. Meeting this challenge requires harnessing continued advances in both computing power and communications and maintaining a range of advanced techniques that can be geared to specific analytical requirements. Perhaps most importantly, such a system must be able to keep pace with as yet unforeseen requirements as they arise, to adapt, if you will, to an inevitably changing future environment.

For those who are serious about meeting the challenges of global credit risk management, the answer is Adaptiv Credit Risk. Please contact us at:

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