

Capital Model



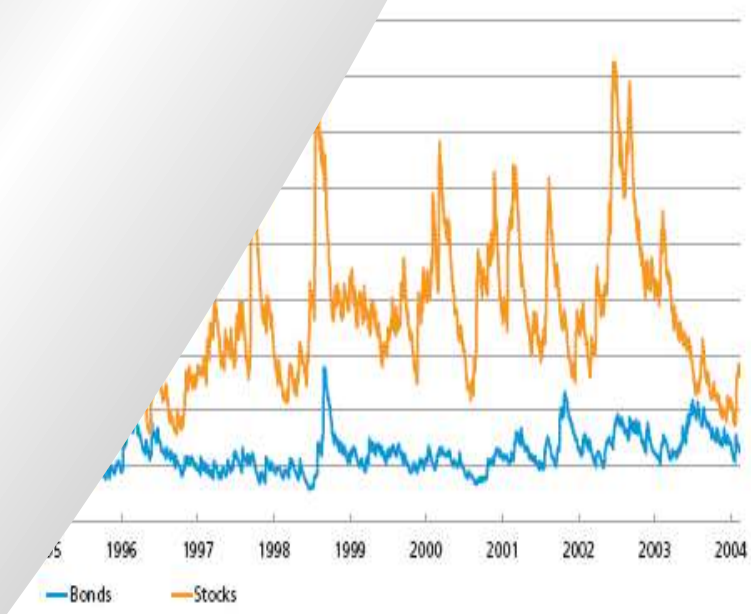
ebusinessware

running time accelerates with eBusinessware

solution



Add new and automated features to your credit risk analysis model with eBusinessware offering



It takes more than an innovative idea to grow into a multi-million dollar business within half a decade of launching a start-up. This innovation, whether in technology or a business process, needs to be supported with excellent processes and disciplined approach. For a US-based group, this innovation lay in seeking to take credit derivatives trading online in an era when Internet connectivity was yet to achieve today's penetration. The group completely automated the trading platform to ensure straight through processing for some of the most complex transactions in the wholesale markets.

Another important hurdle was cleared by working with major rating agencies to define conditions under which, one of the group's subsidiaries could receive and maintain a AAA rating. A leading rating agency's AAA counterparty credit rating soon followed and within three years, through its principal operating subsidiaries for financial products and asset management, the group emerged as a leader in key segments of the global credit risk transfer market.

Throughout the formative years, ebusinessware remained the technology partner of the group. Once the first goal of enabling the group's web-based straight-through processing system was achieved by ebusinessware, unwavering focus on investment process discipline drove the experienced management team to bolster back end processes. Among these was the development of a credit risk capital model to ensure total compliance with credit requirement norms.

Little time was wasted by the group in spearheading the development of this credit risk capital model to determine whether the amount of capital available with the group's triple A-rated subsidiary at any given point in time met its top end counterparty credit rating requirements, as well as respective target ratings for any of its capital structure components, which included approximately \$180mm of A2-rated preferred stock and Aaa-rated subordinated notes. In short it enabled the group to underwrite credit risks through a rigorous quantitative and qualitative credit analysis process.

PROBLEM

The Model was a Monte Carlo simulation based cash-flow model that incorporated all potential future cash flow events affecting the capital adequacy of the subsidiary Company through portfolio maturity. This included calculating credit losses from multiple reference entity defaults, preferred share dividends, AAA notes coupon payments, swap premium payments, interest income operating expenses, and anticipated tax payments. The Monte Carlo simulation procedure captured low probability (high severity) tail events, the risk of temporal cash flow mismatches and the effects of the portfolio's non-homogeneous reference asset mix.

In its present state of development, the client was using the model only to analyze and evaluate their credit requirements, against the earned rating. The team would feed in the credit reserve available with the company and run the simulations to check if that reserve matched with their triple A rating. If not, the team would alter the reserve level by some percentage to see what rating was now achieved. This revision to the model's entry-level credit amount would go on until the model showed the triple A rating. Not only was this exercise manual in nature, with multiple credit level feeds to arrive at the desired level, it was also time consuming for the team to arrive at the credit reserve information for disclosure and compliance.

This brought the team to its imminent problem pertaining to the performance standards of the model in its present form. Running

time for the industry standard of a million simulations could last up to 12 hours! The client engaged ebusinessware primarily to solve the extended running time problem. But ebusinessware's domain expertise led to the critical suggestion of imparting the "solver capability" to the model to automate the determination of credit reserves vis-à-vis the current available reserve maintaining the rating as the constant factor.

SOLUTION

The solution was envisaged for the dual problem of extended running time of the model and the addition of the "solver capability".

In fact, ebusinessware onshore team's effective business analysis skills first brought to the forefront the possibility of developing the model further for automatically solving queries regarding the sought credit reserve vis-à-vis the current reserve with the earned rating remaining constant at triple A. This would enable the client to prepare for rating agencies' compliance procedures much in advance and impart more competitive advantage, even if current reserves were not favorable. Moreover, at the core was the model's performance issue.

For the problem of prolonged running time, ebusinessware envisioned that re-engineering the code alone would take care of the performance time and save the client team valuable hours before it got to know their answers regarding credit reserves for disclosure and compliance purposes. The simulation procedure was enhanced in such a way that running the mandatory million simulations to arrive at credit reserves was reduced from the earlier excel based application's 12 hours to a sixth of that 2 hours for the longest tests, and to a range of 30 minutes to an hour for the majority of the tests. While a large part of this was done with the help of code re-engineering, the right choice of compilers further hastened the process.

SCOPE

To solve the prolonged running time issue or the model's performance problem, the team was required to focus on re-engineering the code. Testing with different environments and with multiple compilers, the team managed to drastically reduce the running time for the model for the stipulated million simulations. Also coding requirements for minor changes to the model were brought down to the minimum. In fact, adding a new type of trade boiled down to a few plug-ins amounting to a couple of days' work with streamlined code maintainability.

As an added functionality, the model was endowed with features for break-even estimation. This enabled calculations to predict the amount of capital required by the client to offset losses in case against an existing portfolio and a certain level of capital reserves. This was a real big breakthrough simply because the client had tried to achieve this sort of estimation repeatedly before and had not succeeded. Additional services included easy code maintainability such that the least number of changes would suffice in case the client team sought alterations.

The code was streamlined in such a way that the impact of minor code changes did not affect the running time of the model. The scope also included dynamism in the sense that new capital structures could be added and deleted.

Further to the scope of the primary project objectives, the client also signed for an extension for adding functionality such as estimating cash flows quarterly in addition to the earlier achieved yearly flow estimation. The extension phase was centered on core development efforts.

APPROACH

The ebusinessware approach revolved around a blend of re-engineering and development efforts in this project. This was further blended into service offerings based on the onshore-offshore model of project development. In order to ensure that the domain knowledge understanding was uniform among all team members, including the offshore members, elaborate brainstorming sessions were conducted in the initial phase.

As part of the architecture design, the team made an important departure from earlier standards in the model. It ensured that totally different data structures were used in the new effort to ensure easy code maintainability and increased performance of the model. These data structures were clearly superior in terms of less consumption of time and led to visibly lower running time for the simulations.

To ensure performance improvement on the ground, the team conducted performance testing and profiling following the development of each module. Once coding was concluded, as an added measure, the team conducted testing on both Unix and Windows environments to determine which conducted the simulations speedily. The feedback was passed on to the client for their final decision.

Unhappy with the speed achieved for running the million simulations on the model with re-engineered code, the team looked for more options to improve the model's performance. This led to a search for better compilers and testing was conducted with both. The results were very encouraging with one of the compilers and this compiler was adopted in the solution.

Seeking improvement in the model's performance, and code maintainability, the team added functionality such as "break-even" estimation. The performance improvement enhanced operations such as rating mechanism, payback/loan usage calculations for the client's borrowed amounts, securing of loans by showing calculations of current funds and loan funds etc.

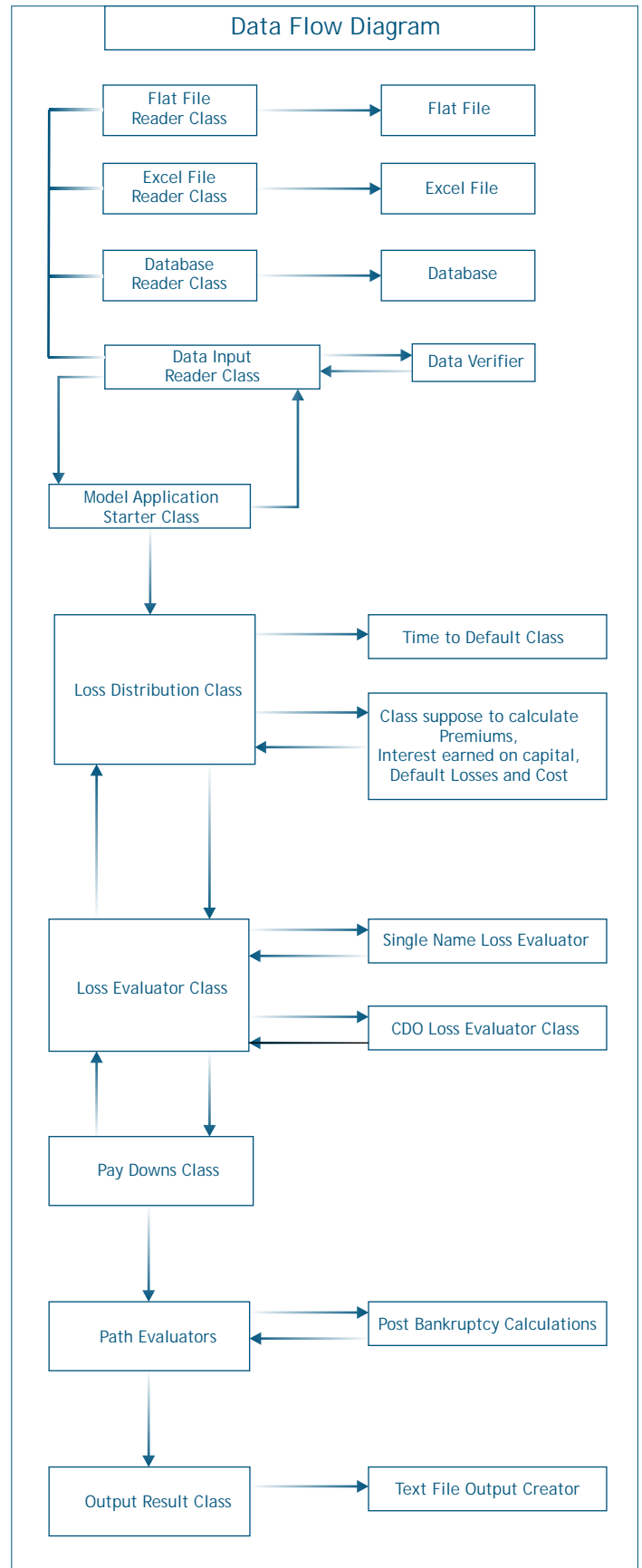
Moreover, in the original model, the inputs were in the form of text files. ebusinessware enhancements in the follow up to the initial solution enabled the phasing of coding allowing the model to directly read from the database of swaps, avoiding the need to convert data into text files and reducing one step in the workflow.

Rigorous QA & Testing was conducted for performance measurement. The new code was tested against proper benchmarks and results compared with the earlier code's performance with the same parameters.

APPLICATION ARCHITECTURE

The application architecture dealt with issues such as code maintainability. Code was re-engineered and written in such a way that in future evaluating a new trade would simply require the addition of a new class for the new trade for the client team. Adding only the class to the model would be sufficient and no other change would have to be made. The architecture also included a dynamic capital structure, which enabled the client to add and remove capital structures as and when required. In future, loans could be added and their productivity checked by the client to take an informed decision as to whether to opt for the loan or not.

Thus, the application architecture played a significant role in speeding up the corporate decision-making process. Use of proper data structures was adopted to ensure substantial performance improvement.



TECHNOLOGY

C++, VC++ IDE, VC++ profiler, Qcotime Profiler, Intel High Performance Compiler, Linux

UniRAD

Apart from the able leaders, the guiding force in the entire team's development efforts all through was UniRAD, ebusinessware's solution implementation methodology. UniRAD documentation requirement as integral part of the ebusinessware Center of Excellence was never compromised in spite of very challenging and severe deadline demands on the team. UniRAD Specified Quality Standards were respected by the team throughout the project life cycle. At the end of each of the stages entire team would dedicate itself to analyze and track down any open defects in a very careful and diligent way. This exercise helped the team to identify many of the defects before they could even hit the system at any of the later stages.

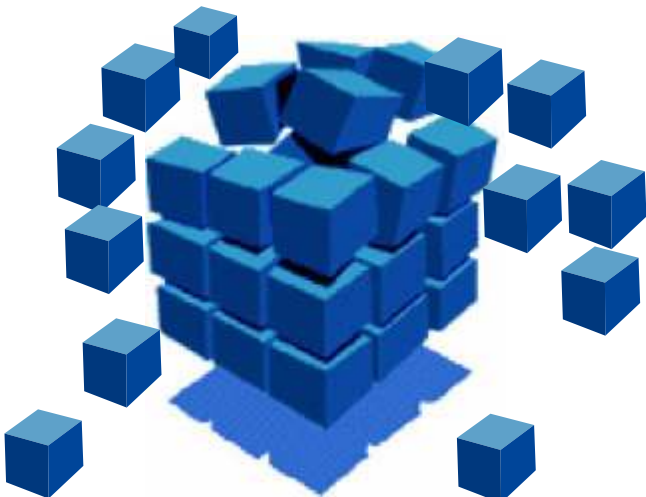
TEAM

ebusinessware proposed to develop the system using its offshore capability, bringing together a rare yet easily scalable combination of senior business managers, senior technologists and a highly skilled development team for the re-engineering and development exercise.

In-house expertise enabled the team to work independently, taking up the least amount of time from the client's technology specialists during the effort. Perfect estimation enabled the development effort to be completed within the scheduled period of 5 months involving a team of 5 full or part time resources. Keeping the team updated on the domain knowledge was an important part of the exercise. Necessary training on the required business domain was provided with the help of the faculty from the ebusinessware Institute of Applied Software Engineering (EIASE), and onshore team members without having to engage the client's crucial people. The successful imbibing of knowledge by the offshore team, which ensured a smooth development experience, established the efficacy of ebusinessware training processes to the client.

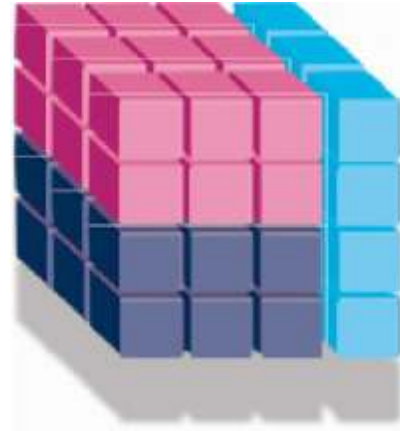
CHALLENGE

Performance Improvement and solving the break-even capital estimation emerged as the biggest challenges in this initiative. Given that performance improvement was the basic criterion, providing services such as easy code maintainability appeared challenging.



INNOVATION

Coding was greatly enhanced and better compilers were provided. Subsequently, when a new trade was introduced it barely took a couple of days to include it in the model. The team simply wrote a new evaluator and used it.



RESULT

The performance improvement and the addition of the "solver capability" were the primary gains accruing to the client once the solution was deployed. In its new form, the model retained some of the earlier code and the original GUI.

Based on input such as trades, deals, loss severity (of major rating agencies), stress factor, capital input (of rating agencies), foreign exchange forward rates, USD forward labor rates, USD forward government rates, monthly and yearly probabilities of rating agencies, loss rates, termination spreads, transition matrix of rating agencies, country mapping of rating agencies, Mean Recovery Rates of rating agencies etc., the Capital Model was now being successfully run at the client site for the following output: *Test Results*, displaying the result of tests depending upon the model specified, whether the benchmark has been reached and the time taken; *Display of losses'* amount, frequency and cumulative percentage; *Cash flow* information for each year till the maximum maturity of the trades; *Statistics of losses* and confidence level; and Display of *break even capital* required to achieve the benchmark.

The calculation of PayDowns consisting of Adjustment/ Replenishing of losses and premiums in different capital structures (Static: Cash Capital, Reserve; Dynamic: Debts, Surety and Stocks) and that of Net PL, Taxes and Post Bankruptcy loss ratios was now a smooth exercise. The model also determined whether the survival rate of the client after all the simulations, was in effect up to its given benchmark.

Also used in the working of the rating mechanism, the model calculated payback /loan usage of amounts the client was borrowing. This model enabled the client to secure loans by showing calculations of current funds and loan funds etc. Moreover, in the original model, the inputs were in the form of text files, a practice discontinued, in favor of input being directly read from the database of the swaps avoiding the need to convert data into text files, once the enhancements to functionality were concluded. Added functionality also enabled the client to estimate quarterly cash flows in addition to the earlier achieved annual cash flow estimation.

Your Best Value
Knowledge Partner



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ebusinessware enjoys the membership of
NASSCOM, STPI and BEP

ebusinessware Company Profile

BACKGROUND

ebusinessware is a global technology and business services firm offering innovative solutions to a varied customer base. Founded in 1999, ebusinessware is headquartered in New York City. In addition to our presence in the US, we have established operations in India, Singapore and UK.

OBJECTIVE

Our primary goal is to provide the highest quality technology and business process outsourcing services while tightly managing project costs and reducing overall project risk.

SERVICE OFFERINGS

- Custom application development and integration
- Production support
- Application architecture and design
- Quality assurance and testing
- Re-engineering and migration services
- Reverse engineering and UML documentation
- Legacy application web enablement
- Financial data management services
- Knowledge process outsourcing (KPO)
- Helpdesk support
- Staff supplementation services

EXPERTISE

Our technology professionals have deep subject matter understanding in areas that are critical to our clients' business. Our process focus ensures efficient communication between our teams and our clients' teams, resulting in high quality, cost-effective and timely implementations. We are market driven, and have the necessary technology and business skills to make our customers succeed.

TECHNICAL SKILLS

- Java and J2EE on UNIX / Windows
- .Net Platform
- XML based solutions (FinXML/FPML)
- EAI/ETL Tools
- Data Warehousing/Mining/KDD tools/BIApplication
- Server Deployment (Websphere/Weblogic)
- Security tools
- Legacy system maintenance
- Testing tools (Mercury, eTest, Rational Robot)
- UML modeling tools (Enterprise architect, Rational)
- Open source tools
- IBM Mainframe and COBOL expertise
- RDBMS (Oracle, Sybase, MySQL, SQL Server etc.)
- Middleware
- CRM products

BUSINESS SKILLS

- Market & Credit risk management, Reporting, Mapping, Measurement and Modeling
- Credit derivatives, Trading and Straight through processing
- FX and Fixed income derivatives and Global trading systems
- Hedge funds and Prime brokerage
- Electronic trade management and Order routing
- Portfolio reconciliation services
- Institutional and Private client Asset and Wealth management
- Managed accounts, Money managements, and Securities lending
- Portfolio measurement and Performance solutions
- Fixed and Variable annuities business
- Sales CRM, Data warehousing and Business intelligence
- Credit and Reference data counterparty
- Strategy Management

"We help our clients to save money, enhance quality and lower the risk of IT projects."

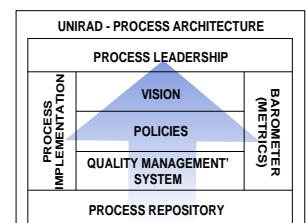
OUR VALUE PROPOSITION

Our combination of in-depth industry expertise coupled with an ability to rapidly scale on and off-shore development, analyst and business processing teams on short notice helps our clients to get their projects done on time and within budget. Our technical professionals are experienced in a broad range of technologies ranging from legacy systems to cutting edge technology, enabling us to succeed in a wide variety of challenging assignments. Our business processing professionals are experienced in specific areas of data management and transaction processing, reducing learning curves and increasing productivity.

IMPLEMENTATION METHODOLOGY

ebusinessware technology architects have developed the UniRAD methodology framework for undertaking even the most complex collaborative project development assignments. UniRAD formalizes a quality management system practiced at the organizational level, such that progression of those best practices to all projects is natural, automatic and smooth for its workforce.

UniRAD derives the best process components from the popular Rational Unified Process project methodology and the Rapid Application Development approach, providing a structured and delivery focused project approach.



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