



SCICOMP

All Change

Dean Tallam discusses SciComp's outlook on technology in the quant finance space for 2017

We believe financial service firms in 2017 will be focused on two major issues: adapting business practices to a rapidly changing regulatory environment; and an increased scrutiny of strategic models concerning businesses' lines pursued and geographical markets served.

Challenges facing financial service firms include the ballooning cost of compliance, increasing cost of capital, shrinking margins, streamlining of execution (brokers are under increasing pressure from available e-solutions) and opportunities in available IT infrastructure and solutions.

Successfully adapting to this fluid business and regulatory environment often requires changes to a firm's business practices and the implementation of bespoke solutions. Such undertakings can be time consuming and costly.

SciComp Inc, a major provider of derivatives pricing and risk models for two decades, provides financial modeling solutions that effectively and economically address today's market challenges – rapid development of pricing

models and calibration, both industry standard and bespoke; comprehensive model validation, firm-wide consistency of market data sets and risk models; aggregation of risk measures across business lines; and independent portfolio valuations.

SciFinance, the premier derivatives pricing code generation technology, is an in-house development technology that facilitates the development of derivatives pricing models. **Analytic Space** is a customizable portfolio pricing and risk management framework for the comprehensive management and analysis of exchange traded and OTC cash and derivatives instruments.

SciFinance automatically generates C++ pricing model source code from concise, high-level model specifications for any financial derivative that can be described via partial differential equations (PDEs) or stochastic differential equations (SDEs) for both industry standard pricing models or customized approaches.

SciFinance eliminates programming by automatically translating model specifications for any financial derivative into fully documented C++

or CUDA source code in minutes. SciFinance generates wrapper code (in Java, Python, .xll, COM, or .NET) to automate integration without imposing proprietary data models.

Using an intuitive, very high-level programming language (VHLL) for describing financial contracts and numerical methods, SciFinance provides a friendly, versatile environment in which to make and implement modeling decisions. Specify the choices that are important, then let SciFinance handle the rest using its extensive knowledge base.

Analytic Space is a portfolio pricing and risk management solution that may be used as a standalone solution or to enhance and complement existing trading, risk, and position keeping systems.

Designed by professionals with extensive trading, risk management and valuation expertise, Analytic Space employs an intuitive, configurable environment for independently building and sharing market data sets, pricing models, and custom financial reports. A guiding principle in its design is easy access to sets of advanced analytical models and algorithms (including in-house developed and/or third-party licensed pricing libraries). Employing a centralized service approach Analytic Space makes it easy for traders, portfolio

managers, risk managers, and valuation teams to implement and share analytical solutions tailored to their particular needs and requirements.

Changing Requirements of End Users in the Quant Finance Space

The focus for many participants in the quant finance space center around issues such as model validation, data integrity/management, calculation of risk exposures (e.g., the growing family of XVAs), enhanced capital management and improved risk management.

SciFinance provides complete model transparency and has no “black box” components. Users have full control through all stages of pricing model development. In addition, SciFinance is infinitely customizable with no limitations when defining instrument features, terms and conditions of the contract, underlying model dynamics, numerical methods, market data and its format, and model outputs including risk exposures.

Analytic Space offers an ideal environment for managing model risk and complexity. By facilitating a multiple model framework and constant model testing for extreme market scenarios, Analytic Space allows for a comprehensive understanding of model behavior and underlying model dynamics. In addition, parallel implementations of different models and

regime switching (i.e., different models for different market behaviors) helps provide an in-depth understanding of current market conditions and market evolutions.

A key design feature of Analytic Space is the aggregation of market data, pricing models and risk analytics into a centralized service. Such an approach substantially reduces the cost of the market data acquisition (via the reuse of the market data components across the organization), provides a more effective environment for the cleaning of market data and facilitates the implementation of more complex simulations. The net effect is an improvement in the quality of market data as it is not always possible to detect flaws in the data entries prior to building and calibrating market objects.

The calculation of risk adjusted factors (e.g., CVA, FVA, KVA, VaR) is often undertaken independently by different groups within a financial organizations and their results combined into reports. Such an approach for deriving risk adjustments fails to take into account all available information, does not allow for effective capital allocation and lacks an understanding as to the sources of capital utilization. Analytic Space facilitates a holistic approach to capital allocation across the organization - both vertical and horizontal - by providing a more comprehensive understanding of the capital allocation needs for different lines of business as well as their clients.

The centralized portfolio pricing and risk analysis framework employed by Analytic Space provides a readily sharable and consistent set of in-depth valuation and risk analysis tools that facilitate effective communication and idea flows between front office and capital allocation groups. Such an improved communication flow can help identify and quantify hidden risks

and provide for an effective and quantifiable capital allocation management framework.

Trading, risk, and valuation teams often work in silos, rather than cooperative groups. This segmentation of functions often contributes to an incomplete understanding of trade

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book risk. In addition, access to historical data and the performance of “what-if scenarios” tend to be one-off issues and not part of daily routines.

Utilizing a centralized service approach, Analytic Space combines market data, pricing models, and risk analytics into a readily sharable and consistent set of valuation and risk management tools. Analytic Space helps facilitate a more comprehensive understanding of trade desk risk management issues including:

- Modeling Bid-Ask spread
- Bid-Ask spread implications for long term profitability
- “Unwarehousing” of risk
- Decomposition of risk and P&L by product type and maturity
- Dependency between market sensitivities and risk measures
- Assessing maximum potential loss due to model risk and computational limitations

Current Technology Practices: Business as Usual or All Change

Business as usual is not an option. Many financial services firms are looking for ways to reduce the cost of IT services. Massive, monolithic systems cannot deliver required solutions on time and within available budget. Hence, it’s hard to imagine such massive, multimillion, green field IT pro-

jects of years past being pursued today.

Rather, firms are seeking solutions that are flexible in design, support the implementation of bespoke solutions, can quickly be adapted to new business practices, and are cost effective.

Analytic Space, with its non-monolithic design, effectively addresses the

share cost and have model portability between different systems and business divisions. Implemented once, the same pricing model is available across business lines and functional verticals for all valuations and risk analysis.

Analytic Space can be deployed via intranet or cloud, further reducing run

time and support cost.

Analytic Space also provides tangential cost savings such as improved front/middle office functionality where the consistent coupling of market data and pricing analytics streamlines environments and improves inter-group cooperation.

Regulatory Impact on the Direction of Technology: Is the Dust Settling?

By no means is the regulatory impact on the direction of technology settled. Regulatory requirements tend to be vague. It takes a significant period of time for clarification and the deadlines for implementation are constantly being changed.

For financial service firms to push back on regulations they believe to be unjustified requires significant back testing in order to demonstrate the adverse impact and cost of such regulation.

most pressing IT issues faced by financial services firms today.

Designed by business people for business people, Analytic Space employs an intuitive, configurable environment for independently building and sharing market data sets, pricing models, and custom financial reports. Given its flexible architectural design, Analytic Space easily supports bespoke solutions that can quickly be implemented in response to market and regulatory changes by business units with little or no IT support and minimal implementation cost.

By providing aggregated market data, pricing models and risk analytics as a centralized service, Analytic Space provides significant cost benefits. Users may readily re-use generic components across different asset classes, pricing models, risk analysis, and reports. In addition, seamless and transparent prototyping on Microsoft Excel helps to reduce scope creep and minimize project implementation risk.

A case in point, Analytic Space provides a “single source of truth.” Instead of using multiple implementations of the same pricing model in different systems and contending with implementation inconsistencies, Analytic Space provides a modern system set-up approach with centralized model management. Users can

Analytic Space provides robust archiving/retrieval functionality for both market data objects used for calibration and valuation, as well as the underlying pricing models. All market data objects and models are available for back testing and comprehensive portfolio analysis such as P&L analysis and attribution or understanding P&L and risk evolution.

