

# Technology Innovation of the Year



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## Numerix advances risk analysis, product design & hedging capabilities for insurers



> The current environment in the US, with its low interest rates, new volatility dynamics and inflation concerns, is fertile ground for product innovation, especially for insurers.

The success of variable annuities (VAs) with guaranteed minimum withdrawal, income, accumulation or death benefits, and fixed index annuities (FIAs) such as point to point, point to average and monthly sum cap, have resulted in insurers accumulating large portfolios of sophisticated structures. Such portfolios require advanced risk analysis and dynamic hedging programmes.

New York-based Numerix, which has its roots in pricing and risk analytics for banks, has been evolving its software to handle the new developments in the capital markets. Meanwhile, several insurers have noted the cross-asset capabilities and flexibility of the company's software and have been adopting it for their product structuring and hedging.

"We enable insurance clients to understand how banks are seeing and dealing with the same issues they're facing, thereby providing deeper understanding and a levelling of the playing field, especially in terms of how very complex insurance products must be managed," says Steven O'Hanlon, New York-based chief executive officer and president of Numerix.

Numerix now has more than 20 US insurance clients in the Americas that use its technology for risk management, product design and hedging. Iowa-based Transamerica Capital Management, for example, has been implementing Numerix software since 2011 as part of a multi-phase, multi-year asset and liability management strategy. In the first phase, it loaded 160,000 guaranteed minimum withdrawal benefits annuities policies into Numerix's Leading Hedge life and annuity product hedging platform. The second phase included loading an additional 50,000 policies, and upgrading to a more complex market model with a term structure of volatility, which increased risk factor sensitivities [Greeks] from six to 12.

"One would think that, because the number of policies, Greeks and attributions all increased while the product logic became substantially more complex, that the run-time would similarly increase," says Hunt Blatz, vice-president and head of model development at Transamerica Capital Management. "However, Transamerica's run-times for both the



Steven O'Hanlon

Greeks run and the attributions run decreased from three hours to between two and two-and-a-half hours as a result of technical improvements in the Leading Hedge software."

The third phase of the strategic project, which is currently undergoing user-acceptance testing, includes introducing nested stochastics – stochastic-on-stochastic scenario simulations – to product valuation for financial planning and International Financial Reporting Standards deferred acquisition cost calculations. This entails very large data sets and may require the use of new NoSQL database technology and Numerix's high-performance cloud computing capabilities.

The fourth phase includes integrating

Transamerica's portfolio of hedging assets into Leading Hedge, and the implementation of stochastic equity volatility and stochastic rates into the company's market models using Numerix's hybrid model framework, says Blatz. Meanwhile, the Europe and Asia business units of Transamerica's parent company Aegon have also decided to adopt Leading Hedge, and the Transamerica team are helping with the implementation and operation of the system for these units.

As Leading Hedge is still evolving, it does not yet include all the features that Transamerica requires. Nevertheless, Blatz says: "I believe Numerix Leading Hedge has the fastest run-time while also being the most flexible projection software available, as well as being relatively easy to learn and use."

Another major US insurer started out with Numerix's Excel analytics add-in to help manage VAs and other structures, and eventually brought its entire portfolio of derivatives under Numerix's modelling, implementing the Numerix Portfolio front-office system for this purpose. More recently, the insurer has created a new desk for handling the credit, debit, funding and other valuation adjustments that over-the-counter derivatives now entail, using Numerix analytics and its high-performance CrossAsset Server.

In another instance, an insurance group that was already using Numerix analytics to support its VA and FIA hedging was looking for a way to reduce the \$250 million cost of call options bought from banks to support its billions of liabilities. Numerix was able to help the company select and validate a model – the Heston stochastic volatility model – to allow it to manufacture the calls itself. ●