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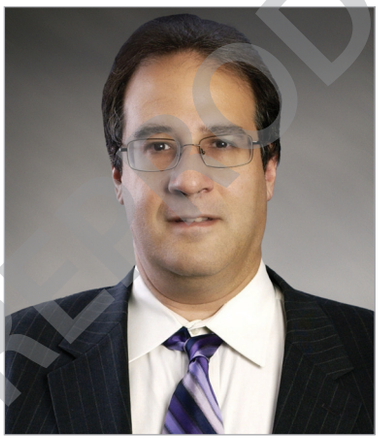
MetLife: A global innovator in variable annuity risk management

Andrew Rallis, MetLife's senior vice president and global head of asset/liability management, charts the insurer's recent history of success, and expounds on their sophisticated IT platform and innovative new products, and how MetLife plans to meet the growing worldwide demand for retirement products

The seeds of MetLife's success in the variable annuity business were planted back in 2002 upon a foundation of two core principles of sustainability and prudent risk management. First, to enter the then exploding marketplace for variable annuity living benefits, we needed to be prepared to maintain our presence for the long haul. Third-party distributors might not give shelf space to a sleepy former mutual company getting involved in something as sophisticated as guaranteed minimum income benefits (GMIBs) if they felt we would be frightened off at the first sign of trouble. Second, we needed to demonstrate to senior management that we understood the risks we were taking and that there were mechanisms in place to manage that risk. This began right upfront with prudent product design, involving product features designed to control the amount of risk we were taking, such as a 10-year waiting period for election of annuitisation, at a time when seven years was much more common.



Andrew Rallis, senior vice president, global head of asset-liability management

The next innovation of risk management of the block involved third-party reinsurance, but capacity was quickly reached with rapid sales growth. It was at that time when MetLife made a strong commitment, both in the form of technology and of dedicated skilled actuaries and derivatives traders, to develop its own hedging capabilities. This was the only way to ensure that we could satisfy the needs of the marketplace and senior management. By staying true to our core principles through difficult market conditions, we are now poised to capture a significant share of the global variable annuity marketplace as we embark on the next phase of our evolution to becoming the pre-eminent global life insurer.

Brian Cartwright, manager of the IT projects supporting hedging, notes that "MetLife has come a long way in its IT capabilities for risk management of variable annuity since hedging was first implemented in 2004".

When the first effort was being designed, 20 servers were ordered to handle the expected processing needs. At that time, this was considered an unusually large capacity order for the company. Our goal back then was to systematically create in-force files for our only GMIB rider, and feed them into a single calculation engine to produce daily risk analytics (the 'greeks') to our trading desk. Since that time, processing capabilities have grown exponentially in order to support new variable annuity products both domestically and internationally. Analytics are used for hedging and other results utilised for valuation purposes such as VACARVM, FAS 133 and SOP-03-1, as well as other such purposes as economic capital and stress testing. This project has demanded constant improvement for technology in our data, grid and reporting capabilities. In the span of just seven years, the technologies used to process these models has changed at least three times.

As the environment grew, it became apparent there was a need to store and organise both inputs and outputs. As a result, an interface was implemented to better manage and add workflow and controls for such things as parameters, assumptions, scenarios and approvals. The IT group is constantly looking for ways to automate processes, provide quicker results on a daily, weekly, and monthly basis, and eliminate the need for manual intervention. In an environment where there is almost constant demand to add functionality to support new products and variations of results, there are several programs currently being run. Installations occur several times a month to meet the needs of the business, but must first pass rigorous testing, review and approval by the business partners in asset-liability management (ALM).

Managing the growth of computing time needs is challenging, but we have developed a strategy to prioritise and load-balance many types of runs in the grid environment for higher central processing unit utilisation. The size of the computing grid has grown to more than 500 processing cores running on 64-bit

operating systems, which enable better memory use for larger models. Stability is also a necessity for these important calculations. Processing is geographically load-balanced over two locations to ensure the results can be delivered. As new capabilities to deliver results are discovered, the team looks to move the technology forward to increase capabilities and reduce time to delivery. There are efforts starting now to look at dynamically growing and shrinking processing capacity to meet demands of peak processing times, testing demands and ad-hoc analysis. Updating our calculations to run faster processors, such as graphical processing units, are expected to create future benefits – leading to potentially significantly reducing run times and capacity needs.

MetLife uses Milliman's MG-Hedge software to perform the production calculations. Jim Brackett, leader of the Milliman financial risk management technology team since 2003, says the relationship with MetLife exemplifies what it takes to sustain success: "Milliman developed MG-Hedge technology to deliver tremendous power through innovation and a commitment to quality, but the true potential is only realised in the hands of an organisation that sets clear priorities, demands excellence and gets its hands dirty with the hard work. The technical sophistication and pragmatic thinking of MetLife has enabled both companies to jointly develop cutting-edge, ultra-reliable and cost-efficient systems that are the envy of the industry, and there's no sign of slowing down. We look forward to many more years of success together."

Not all of MetLife's hedge positions relate directly to the variable annuity book but also include hedges against its other lines of business. Even with only a portion of this total derivatives portfolio dedicated to variable annuity, however, this still represents a significant capital allocation. "When you look at how we run our hedging programme it is quite resource-intensive. When you provide rider benefits with all sorts of guarantees embedded in them, you have to try to optimise those guarantees versus the risks they present. Under the guidance of [Andrew] Rallis' ALM team, we work closely with our product teams to design innovative variable annuity products and to price variable annuity guarantee products based on true market hedging cost of inherent risks," says Sean Huang, managing director for MetLife global variable annuity hedging in Morristown, New Jersey. "The substantial size and volume of the derivative hedges we have utilised allows us to take advantage of operating efficiencies and to diversify risks while benefiting from best liquidity and resources provided by our hedging partners."

From left to right, pictured receiving *Risk*'s 2011 Insurance Risk Manager of the Year award: Brian Cartwight, Director, corporate services IT; Dennis Montagna, Assistant vice president, asset/liability management; Shailendra Ghorpade, Regional chief executive officer, UK and Ireland; and Sean Huang, Managing director, global variable annuity hedging

In this age of 'de-risking' and volatile capital markets, our more recent product innovation tends to be more on the risk management side as opposed to the product feature side. Just to maintain the current product features, we need to find innovative ways to continue providing the current features with less risk and at cost to the customer. We are a big variable annuity writer in the US, Japan, the UK and Korea, and the marketing story for variable annuities has always been "ability to participate in the equity markets, yet having downside protection".

Given the increased market risks and costs, we continually search for other ways to provide equity participation with downside protection. We have either introduced or are exploring products that lower the risk to the company through mechanisms such as asset allocation algorithms that seek to provide the downside protection on its own (constant proportion portfolio insurance (CPPI)), or volatility controlled funds that limit risk and cost by moving out of equities when volatility is high (and vice versa). These types of mechanisms lessen the amount of hedging in which the company has to engage, in order to provide the downside protection. Less hedging translates into lower costs and less risk. We've already launched a CPPI type of product in Korea, and will be launching one in the UK shortly. We have also begun looking into these types of products in places like India and China, but have to wait for regulatory clarity before we can pursue these much further. We are also exploring volatility controlled funds as part of our variable annuity offerings in both existing variable annuity locations as well as in locations where we may be offering variable annuities in the future.

Through the dedicated efforts of our actuaries, investment professionals, IT professionals and many departments throughout the company, MetLife's variable annuity programme exemplifies a spirit of innovation within a culture that is firmly grounded in prudent risk management. With a sophisticated IT platform and new product designs, we look forward to being a leader in meeting the growing demand for retirement products globally.

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