MICROSOFT PERSPECTIVES

EMPOWERING

INSURANCE RISK MODELLING

Improving risk, pricing, and reserving through unlimited compute power in the cloud

Microsoft

CONTENTS

FOREWORD

Risk modelling in insurance

Just a few years ago, risk modelling was a task done a few times a year at most by teams of actuaries, often using their own IT infrastructure to run models that enabled them to analyse data, optimise pricing, and manage their risk and reserves. But in today's global risk and regulatory environment, insurers are required to manage ever larger quantities of data and complex parallel computations – often on an ad hoc, monthly or quarterly basis. Volatile financial markets and natural catastrophes have created a fast-moving risk landscape in both life and non-life insurance. In addition, since the financial crisis of 2008, many insurers must comply with more stringent regulatory regimes to show they can cope with the risks they face.

The need for risk modelling has grown significantly, with time-critical spikes in demand often exceeding available compute power. Many insurers have moved their modelling from desktop systems to high-performance grids, greatly improving modelling run times. However, even the best managed grids often cannot meet today's demands during the spikes, and sit unused for close to 40% of the year when factoring in the lull periods, according to a report from industry analyst firm Celent. Many organisations are finding that their investment in high-performance grids cannot meet the peaks in demand, and the cost structure doesn't make sense for infrastructure that only enjoys 60% utilisation over the course of a year.

Some insurance firms are turning to high-performance computing grids in the cloud to address these challenges. The firms retire their physical infrastructure and shift the cost of their grids from capital expense to operations expense. The grids are accessible as a utility, giving actuaries access to elastic compute power. And with the ability to run more models and simulations more often, these companies are taking advantage of opportunities to overhaul and improve their risk management practices.

Moving to the cloud has not been without its challenges. Some IT departments have been reluctant to move to the cloud, due to compliance concerns. However, the architecture of risk modelling solutions that can 'burst' against the cloud-based grids can mitigate many cloud concerns. And many advances have been made to make cloud computing more secure, including, in the case of Microsoft, the introduction of a specific Financial Services Cloud Compliance programme developed after consultations with multiple financial services regulators globally.

The cloud will become mainstream in the insurance industry across multiple workloads. In risk modelling, early adopters will enjoy competitive advantages through the improved risk insight they gain from incorporating cloud-based compute power for their complex modelling needs. Celent estimates that 6% of insurers are now running their analytics and risk applications either in the cloud or through a hybrid model with bursting capabilities – a figure that is destined to grow, with some software providers reporting an eight-fold increase in clients requesting cloud-based solutions during the last 24 months.

Microsoft has a long history of working with partners to deliver the enterprise-level capabilities insurers need. In this publication, you'll find out how we're working with multiple risk and actuarial modelling partners to enable incisive, efficient risk modelling in this increasingly complex and fast-moving environment.

Tony Jacob
Managing Director, Worldwide Insurance
Microsoft

INTRODUCTION

The future of risk modelling

Risk modelling is one of the fastest growing workloads in insurance – and the cloud is helping insurers to manage it in a way that delivers immediate value to the business and its customers

JONATHAN SILVERMAN: MICROSOFT

In risk modelling, speed and capacity are the keys to business value. The faster you can run your models and the more scenarios you run within them, the more accurate your models will be. But there is no value in managing an infrastructure to deliver capacity that you only use sometimes – and that's where the cloud can make a real difference.

In a recent calculation conducted by Willis Towers Watson, the team established the cost of insuring the world's population to be approximately $190 trillion, or roughly 2.5 times the world GDP (with a standard deviation of roughly 15% of world GDP). The calculation, run on the Microsoft Azure cloud platform, involved an analysis of the insurance cost of providing each of the world's 7.3 billion people with a $100,000 whole-of-life insurance policy and took under two hours to execute. Microsoft Azure enables that level of performance, either through a software-as-a service model with all your software and data in the cloud, or through an infrastructure-as-a-service model that enables you to burst to the cloud when you need additional capacity.

That on-demand capacity makes a significant difference in terms of speed to value and total cost of ownership (TCO). If an insurer normally uses 2,000 cores, but needs 5,000 to run quarterly or annual risk models, then it's much more cost-efficient to pay for that extra capacity only when they need it. In a TCO analysis for one customer we estimated that continuing to run their modelling onsite would cost the customer $5.5m a year, while providing that same compute capacity in the cloud would cost $1.7m a year, with no up-front investment for the on-premise servers required to expand the grid. The cost of the compute capacity to support the additional runs is 45-65% less expensive. In the cloud, the customer isn't managing the infrastructure. The customer is consuming the compute to support the modeling run times.

In addition, with the availability of the G-Series boxes, customers access the compute power needed for even the most complex models. With 30 data regions globally (22 online today), Microsoft can support insurance customers globally with high performance computing grids in the cloud that are often very close to where customers want to support their risk modeling runs.

Regulatory demands are also driving insurers towards the cloud. Motivated by some of the major issues we've encountered over the last few years, new standards such as Solvency II, Dodd Frank and the International Financial Reporting Standards mean that insurers are now being asked to run more complex models, more often. In order to achieve this, many insurers have no choice but to expand their existing infrastructure – which can take six to nine months before the system can deliver value to the business – or to look for another way to add the capacity they need. The cloud enables insurers to spin up a new environment in minutes, delivering capacity as and when it's needed so they can stay focused on their business rather than on developing their infrastructure.

Trust is key when committing to a new way of doing business. In an industry where companies value and evaluate risk daily, it's natural for them to look at the risk of doing these types of workloads in the cloud. Insurers often ask: is the cloud secure? Does it meet regulatory requirements? Can it satisfy the needs of users? And is it equivalent to or better than what can be provided in-house?

The answer is yes. At Microsoft, we work with regulators, deal with compliance and make sure that we meet all of the appropriate security standards. And we provide detailed security, privacy and compliance information about our cloud services through the Microsoft Azure Trust Center, to help customers make their initial regulatory assessments. In most instances, companies find that the cloud provider has more stringent security standards and requirements than their own data centre. Given the regulatory, privacy and security requirements of our financial services customers, Microsoft has implemented a compliance programme specifically to address customer requirements related to these concerns. This new programme is explained in detail at https://azure.microsoft.com/en-us/documentation/videos/azurecon-2015-financial-services-compliance-in-azure.

> "The cloud enables insurers to spin up a new environment in minutes, delivering capacity as and when it's needed"

Early adopters have already found out how the cloud can transform their business, and we're seeing a huge rise in the number of customers investigating the possibilities of the cloud to manage their risk workloads. Some are choosing the software-as-a-service option and picking solutions that enable them to manage the entire risk modelling process in the cloud rather than consolidating the disparate systems they manage onsite. And in many cases, customers find that the cloud enables them to make use of existing technology investments – for example, with Cortana Analytics and PowerBI they can use powerful mapping visualisations and analytics to do catastrophic risk modelling, enabling them to put measures in place to minimise losses and manage the amount of claims related to an event.

The partners we work with at Microsoft are key to ensuring that Microsoft Azure delivers all the benefits we've discussed here, enabling rapid time to value. On the following pages you'll find examples of how some of those partners are working with insurers to enable reduced calculation times, increased efficiencies and lower costs – and how they can provide you with an upgrade path to the cloud so you can stop worrying about your infrastructure and focus with confidence on your business. ●

Jonathan Silverman is Industry Solutions Director, Worldwide Insurance at Microsoft

ACTUARIAL RISK

Providing flexible solutions for insurers

Insurers need flexible solutions to measure value, manage risk and safeguard solvency. We asked Joel Fox and Stephen Hollands how Willis Towers Watson is helping insurers achieve those goals

Measuring and managing risk has always involved intensive calculations that can stretch insurers' minds and technology capability. Now, increasingly frequent and tight reporting deadlines are driving organisations to look for more efficient ways to manage the peaks and troughs in compute demand.

"Shorter reporting timelines are pushing insurers to do more in less time," says Joel Fox, Director and Global Life Financial Modelling and Reporting Leader at Willis Towers Watson. "For example, Solvency II solo entity Quantitative Reporting Templates, which came into force at the beginning of 2016, currently gives insurers just eight weeks after the period close to do reporting for which the equivalent was previously done in four to six months. That timeframe will reduce over the next few years and by 2019, businesses will have just five weeks to produce those reports. Many insurers are able to satisfy the eight-week requirement, but very few are saying that they're in a position to deliver the long-term requirement of five weeks."

Insurance companies are now looking for efficient ways to ensure they have the resources to respond to these requirements, says Fox. "If an insurer needs to return their numbers in a tenth of the time it previously took, they need a grid with ten times the number of cores. In addition, producing those reports every quarter means short bursts of high activity for a few weeks, followed by a lot of downtime until the next period closes. Maintaining an in-house grid of the size required starts to cost significant amounts of money, with much of that capacity sitting idle most of the time. At the same time, insurers face downward pressure on the operational costs of satisfying these reporting requirements. These factors are driving them to look for other options around how and where they can do this computing, and the cloud is coming to the fore."

Hundreds of insurance companies around the world use Willis Towers Watson's MoSes and RiskAgility Financial Modeller actuarial projection systems, and the company saw that it could help them to automate scheduling in the cloud. "About 40-50% of those clients have built up and maintain their own on-premise high-performance computing grids, and in the past year we've seen more clients looking at cloud solutions either to add extra capacity to existing on-premise solutions or as an alternative to setting up new on-premise grids" says Stephen Hollands, SaaS and vGrid Global Product Leader at Willis Towers Watson. "But while insurers recognise the cost savings that Microsoft Azure's consumption-model pricing can deliver, their IT functions often don't have the toolset in place to turn the resources on and off again in an automated way. As more insurers look to the cloud, many are looking for partners who can solve the problem for them."

Willis Towers Watson worked with Microsoft's Big Compute team to capitalise on the capability of Microsoft Azure Batch to do scheduling in the cloud, and developed its vGrid software to enable clients to benefit from the cloud without having to set up their own Microsoft Azure framework. "Clients can have their data, their model and their environment on their office PC and then send calculations direct from RiskAgility Financial Modeller to Microsoft Azure," explains Hollands. "Our service then builds a grid of the size required, runs the calculations, returns results and closes down the grid as it finishes all the tasks. That leaves insurers with a minimal footprint in Microsoft Azure, for the calculation period only."

As the challenge of doing more for less intensifies over the coming years, the company is focused on delivering not just the capacity, but also the added value insurers are looking for. "A lot of our clients are looking for a holistic service," concludes Hollands. "They're looking for value-adds in terms of scalability, and visibility in terms of cost. RiskAgility Financial Modeller, vGrid and Microsoft Azure give them that scalability and visibility so they can manage seasonal workloads, growth and new projects. Many are reaping the rewards of optimising their workloads and gaining greater insights while managing down their costs." ●

Joel Fox is Director and Leader of Global Life Financial Modelling and Reporting and Stephen Hollands is SaaS and vGrid Global Product Leader at Willis Towers Watson

PARTNERSHIP

Faster modelling on Microsoft Azure

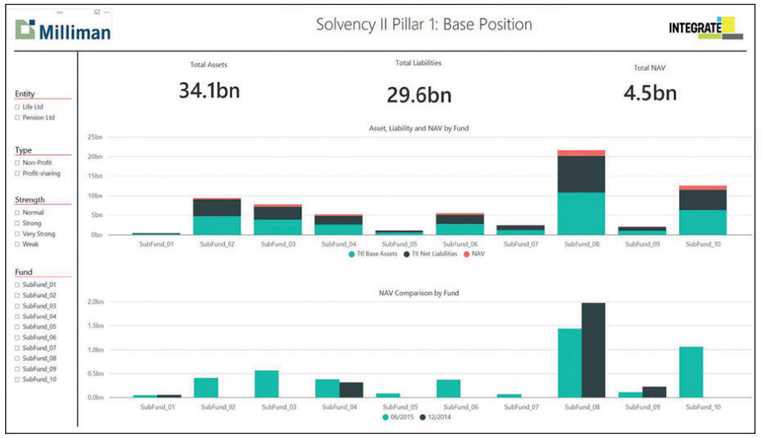
Willis Towers Watson partnered with Microsoft to run an insurance calculation that covers the whole world's population – which took under two hours. The calculation would have taken 19 years on a standalone computer with a single core.

The exercise involved a stochastic analysis of the insurance cost of providing the 7.3 billion people on Earth with a $100,000 whole-of-life insurance policy. The model confirmed that the cost would be approximately 2.5 times the global gross domestic product (GDP), with a standard deviation of roughly 15% of global GDP.

It was executed from a RiskAgility Financial Modeller client utilising more than 100,000 cores across 13 globally distributed Microsoft Azure data centres, using the vGrid service.

Cloud solutions for risk modellers

A complete cloud solution delivers efficient risk modelling with a wealth of benefits. We asked Pat Renzi how Milliman is delivering solutions with added value to drive collaboration



Regulatory changes and an increasingly unpredictable risk environment are challenging insurers to do more in less time while enabling faster responses. "Regulatory changes are significantly increasing the workload," says Pat Renzi, a principal with the Life Technology Solutions practice of Milliman. "It's a trend that is particularly strong in the UK and European Union at the moment, and we're beginning to see the same pressures affecting US insurers. One of our customers estimates that they are having to do eight times more work to comply with regulations, in a shorter period of time. From a risk management perspective for the organisation, delivering that with confidence is a huge challenge."

At the same time, the risk environment has changed and insurers need to be able to respond quickly to new and unexpected risks. "Risk management is no longer simply a case of planning for events such as fluctuations in interest rates or people living longer," explains Renzi. "There are so many unknown risks now, and insurers need to prepare themselves to respond quickly to unexpected events, to assess the impact of the risk or identify the opportunities it opens for the organisation. That means being able to do more real-time risk management, so having access to information in an almost real-time basis is essential in enabling insurers to be safer and more competitive."

> "We've created a full end-to-end process, from the data coming in to the results coming out"

Insurers are now looking to the cloud in order to achieve the compute power they need to calculate risk more quickly, but Renzi says that the benefits of cloud solutions go far beyond that. "Having access to the compute power that you can get in the cloud is critical to achieving the productivity and real-time information insurers need," says Renzi. "But compute power is just the beginning. We've seen a lot of organisations with systems for risk management and actuarial modelling that are just not as controlled as they should be, and that affects the quality of the data coming in and the information coming out. It comes back to having confidence in your information, and that necessitates a completely controlled environment."

Milliman's Integrate solution takes a holistic approach to the automation and governance of actuarial modelling and reporting, using the power of Microsoft Azure to deliver an environment that can support insurers in today's business environment. "With Microsoft Azure, Microsoft has focused on making sure the cloud is ready for enterprise customers, and that was really important to us," says Renzi. "We've created a full end-to-end process, from the data coming in to the results coming out. It's a very controlled, highly governed environment which delivers the speed insurers are looking for in a way that enables confidence."

Integrate harnesses the power of the cloud to deliver key efficiency benefits too. "Having the system in the cloud enables us to deliver valuable collaboration capabilities," says Renzi. "Everyone in the organisation, wherever they are, can access the system to get what they need, whether that's data, results or collaborative workflow tools. People can review results, sign them off, pass them to colleagues and discuss them with colleagues wherever they are, simply by logging into the system. It eliminates the email trail and enables a very collaborative – and very efficient – environment in which everything can be tracked, logged, versioned and managed."

As more insurers move to cloud-based solutions for actuarial risk modelling, they are also realising that a holistic approach can deliver tremendous benefits across the organisation. "Industry studies have found that people are spending 70-80% of their time on manual work, and only 20-30% of their time is spent on analysing the information – so highly skilled staff are spending most of their time doing low value work," says Renzi. "If you can eliminate that manual work by automating everything, you free up your resources to focus on making strategic decisions. That delivers huge value to the organisation." ●

Pat Renzi is a Principal with the Life Technology Solutions Practice of Milliman

CASE STUDY

Achieving competitive advantage

Phoenix Group, the largest insurance consolidator in the UK, had acquired dozens of companies – and almost as many modelling systems. Add to this the mountain of new insurance products and regulations, and the Phoenix actuaries simply could not keep pace.

The company turned to Integrate, and the improvements have been dramatic. More than 900 manual processes have been reduced to 44, and the time it takes the company to produce quarterly data has been cut from four months to just three days. By the end of three years, the savings generated had paid for the project three times over.

Most importantly, Phoenix now generates information in a cost-effective and timely manner, which has positioned it to achieve its biggest goal of all: a competitive advantage.

Empowering the world

Peter Haslebacher of FIS told us how the company is helping insurers to meet multiple risk and regulatory requirements

PETER HASLEBACHER: FIS

Risk management is an increasingly complex challenge for insurers, especially if they operate on an international scale. "It's challenging enough to comply with regulations in a single geographical location," says Peter Haslebacher, Head of Global Insurance Strategic Alliance at FIS. "But that challenge is multiplied for insurers that operate in multiple countries, because they need to comply with a range of local and regional regulations in a very short window of time. A company that is headquartered in a European Union country currently will need to comply with Solvency II, but if it also operates in Asia, for example, it may need to comply with regulations such as Risk-Based Capital in Thailand and IFRS 4 in Korea. At the same time, the business needs to comply with internal parameters and guidelines related to risk profiles and product ranges. One of our clients has 18 different entities that need to ensure compliance not only on a local and regional basis, but also in a consolidated and aggregated form for the group."

Ensuring that the capacity is available to model risk scenarios when they are needed is key to complying with those regulations, says Haslebacher. "It requires a lot of computing power to make sure you can model all these different risk scenarios. Insurance companies are producing terabytes of data and they need the capability to extract the relevant information that can help them drive the business, assess risk and react quickly to market changes by getting new products out to the market. The more agile an organisation can be, and the faster it can react, the more potential revenues and business it can generate. Due to the high volatility of capital markets, management is increasingly asking for more analyses in ever shorter periods of time – another reason for more efficiency and flexibility in data processing."

Insurance businesses are increasingly looking at hosted environments as a means to achieve those goals. "It's almost impossible for insurance companies to manage all the applications they're using in their business processes in-house," says Haslebacher. "As a result, we are now seeing a drive from insurance companies to move their applications into hosted application managed environments. On top of that, insurers need to cope with large fluctuations in the capacity they need – and that's where the cloud's elasticity is delivering key benefits, not only in the risk space. Cloud computing offers the capability to move capacity up and down as it is required for the business. From an operational perspective, it is much more economical because you only pay for and operate the peak capacity for the period when you need it. Hardware refresh and data storage is all delivered on a consumption-as-you-use model."

> "With Prophet and Microsoft Azure, insurance businesses can run millions of policies in a very short time and get an accurate number on their liability exposure"

Insurers around the world are using the FIS Prophet risk management platform to work efficiently and effectively with the capacity they need, when they need it. "Prophet is designed with all the features needed to meet internal and external requirements, such as data security and data controls, and this is all available in an outsourced environment, including the Microsoft Azure cloud," explains Haslebacher.

By combining automation with capacity on demand, and ensuring the right parameters are in place, insurance organisations can use Prophet to streamline the task of meeting their risk and regulation responsibilities. "Regulatory compliance is a complex matter that involves many internal elements, operational risk and other issues," says Haslebacher. "A software solution cannot ensure regulatory compliance – that is the responsibility of the organisation – but it can take a lot of pain out of the process. By enabling automation and elastic capacity, Prophet and Microsoft Azure are helping insurance companies to comply with regulations in a timely manner."

Prophet enables significant productivity gains for insurers by empowering highly-skilled staff to focus on high-value activities. "Over the past four to five years we've seen a shift in the industry from handling all the work in-house to outsourcing it using solutions like Prophet," says Haslebacher. "By automating and outsourcing production of the numbers, insurers are freeing up human capacity to focus on analytical and planning activities. This increases the productivity of an actuary several-fold because they can use their time to analyse those numbers and make meaningful decisions."

The combination of Prophet and Microsoft Azure also allows insurance companies to run their entire policy portfolio against their financial assumption models, which eliminates some of the estimation activities they had to do before. "In the past, some insurance businesses had to extrapolate samples to determine total liability," says Haslebacher. "But with Prophet and Microsoft Azure they can run millions of policies in a very short period of time and get an accurate number on their liability exposure. This delivers a higher level of accuracy and more meaningful information, supporting staff to make the right decisions at different levels within the business." ●

Peter Haslebacher is Head of Global Insurance Strategic Alliance at FIS

A comprehensive solution for life insurance companies

Trevor Howes of GGY told us how the company is delivering comprehensive capabilities to meet the complex needs of life insurance businesses

TREVOR HOWES: GGY

Life insurance businesses are operating in an environment of rapidly changing risks and economic parameters, with several key trends driving them towards more complex, resource-intensive measurement techniques. "The 2008 meltdown and rapid, volatile swings in stock markets and interest rates have hit insurance companies, and over the past 10-20 years their products have evolved quickly to compete for market share and save on costs," says Trevor Howes, vice president and actuary at GGY. "At the same time, regulators are taking sophisticated approaches in order to address new risks. For example, regulators in the US – GGY's biggest market of growth – are now looking at a principles-based approach. Life insurers are having to move away from the formulaic approach to policy liability calculation that has served them for many years, and use more stochastic approaches. Instead of doing one calculation of a model they're having to do perhaps a thousand."

That principles-based approach is only going to become more pervasive, says Howes. "It's being used in many places as a risk measurement technique – not just because the regulators require it, but because if you want to understand your risks and your pricing, you need to know the distribution and the cost of volatility."

In addition, insurers face a need to review their assumptions constantly in relation to their latest experience. "Many regulations now require life insurers to reset their assumptions on a regular basis," says Howes. "That means the assumptions have to apply down to a more detailed level of business, distinguishing between areas of policies, risk classes, places where policies are sold and small contractual differences. To achieve that, actuaries have to do a lot more work resetting those assumptions and changing their models, which have also become more granular. Whereas in the past companies might have taken averages and shortcuts to model on a segment of business, now they're more likely to want to do many of these calculations at the policy level."

As life insurers face increasing demand for consistent, consolidated models, many are looking at how they can transform their actuarial systems. "Organisations in the US are realising that they need to embark on actuarial transformation projects to reform their systems and make them more able to produce their results quickly," says Howes. "They can't waste so much time running numbers and getting their results ready once the books close off, so they need an automated close and the ability to test and stress-test their models and get more information out of them."

Established in 1989 and acquired by Moody's Analytics in 2016, GGY developed its AXIS high-performance actuarial software to meet the complex needs of life insurance businesses. "We developed the capability to do holistic financial modelling on both assets and liabilities, fully integrating all the risks, and to use that same software for multiple purposes to make actuaries more efficient," says Howes. "That has become increasingly important as new risk and reporting paradigms emerge around the world.

"Axis provides a fully holistic solution that can handle complex nests of stochastic financial projections using a multi-strategy approach to the distribution of tasks. Our GridLink distribution and pathway managing software enables intelligent changes in distribution patterns to take advantage of free resources and we have developed a capability to help customers spin up resources in the cloud, so we can automatically configure as many cores as the business needs within minutes."

Those capabilities are enhanced by GGY's supportive service model. "Our solution differs in several ways to the way the market has traditionally been served," says Howes. "We take away most of the need for companies to write their own code because we have made our software configurable without writing much code, and we provide full training and support."

> "Life insurers are having to move away from the formulaic approach to policy liability calculation that has served them for many years, and use more stochastic approaches"

Howes notes a growing interest in the cloud as insurers recognise some of the potential advantages it holds. "The increasing demand for computation ability really crystallises at reporting dates, and cloud resources enable insurance businesses to handle that," he says. "One trend we're seeing is that insurers are bursting through to the cloud, and there is more willingness to consider starting from the cloud when we're implementing our solution. One of our clients is fully embarked on a Microsoft Azure implementation where they're moving all of their various operating units onto cloud-based resources. That's a very flexible arrangement that allows them to expand as needed for a given workload, to share throughout the company and be much more flexible and responsive." ●

Trevor Howes is a Vice President and Actuary at GGY

Unified corporate financial management

Carmela Owens of Tagetik told us how the company is helping insurance companies around the world to simplify and streamline business processes

Insurers need to manage increasingly complex risk and reporting processes to comply with ever-tougher regulations, both in the country where they're headquartered and in the various countries where they do business. For finance teams grappling with multiple source systems, this kind of reporting is difficult to control. "These requirements require disclosure about business performance, governance and risk management, valuation methodology, plus large amounts of prescribed data about capital, solvency, risk profile and other financial matters," says Carmela Owens, alliance manager at Tagetik. "In addition, these disclosures must be made publicly available and can run to over 100 pages of data, analysis and commentary. Teams face tight deadlines to provide reports which often include multiple sets of audited US GAAP statements and statutory reports."

Merger and acquisition (M&A) activity adds more complexity, as new companies are incorporated into existing systems and processes. "Insurance companies must actively consider their risk exposures to current and future investments over extended timeframes and ensure they have sufficient capital reserves to cope with potential risks," says Owens.

Digitisation is key to overcoming these challenges, enabling automated processes that speed up turnaround times and reduce error. "Big data holds the potential for improvements in customer segmentation, risk calculation, fraud identification and other areas," says Owens. "The challenge is to cost-effectively enhance the IT infrastructure and capabilities, either internally or through off-the-shelf systems."

More than 750 customers in over 35 countries – including Talanx, Manulife, Generali, Aegon, and Allianz – count on Tagetik to achieve those goals. "Tagetik automates and controls the regulatory and risk management reporting process with a single solution that provides built-in financial intelligence and collaborative workflow, reducing the time it takes to produce regulatory reports and eliminating the errors that occur in heavy manual processes," explains Owens. "We also provide a comprehensive, pre-packaged application to handle the current and future reporting obligations of companies that need to comply with European Solvency II standards."

Tagetik can be deployed on-premise or in the Microsoft Azure cloud, and enables finance teams to manage processes with little IT support. "Internal management reporting, external reporting and regulatory reporting can be managed through Tagetik's Performance Books, which uses Microsoft Office as its interface, making it easy for the end user to work with," says Owens. "But unlike stand-alone Office documents, Tagetik's reporting information is stored in a database, so any changes made to underlying numbers are automatically reflected in documents, notes and disclosures. Numbers are subject to rigorous validation and business rules that ensure all is in balance before being presented."

> "Multi-dimensional reporting, delivered through familiar technologies, is key to enabling efficient analysis"

The solution's forecasting and modelling capabilities enable insurers to quickly compare scenarios and conduct 'what-if' analyses, supporting better decision-making and assisting in preparation for M&A activity, says Owens. "Structural changes are effectively handled to provide insight into the impact of events such as the value of the investment at any stage, net equity impact or rollover into a dividend. In addition, multi-standards awareness is provided to handle US GAAP and IFRS, and to show year-over-year comparisons. Cash flow is automatically calculated, as double-entry logic is part of the system."

Multi-dimensional reporting, delivered through familiar technologies, is key to enabling the efficient analysis that is critical to today's insurance businesses. "Tagetik enables insurers to immediately analyse results, model and compare the full financial statement impact of business scenarios, adjust the plan, and update rolling forecasts," says Owens. "Analysis can be delivered through Analysis Services, Reporting Services and PowerBI, leveraging the skills of Microsoft-trained internal resources. Insurance executives can see the profitability of each product, analyse which policies are underperforming and why, and quickly understand the impact of business decisions on the firm's profit and loss, cash position and financial performance."

By automating many of the manual processes involved in financial management, insurers can enable themselves to meet current and future industry demands, concludes Owens. "Insurers gain more time to focus on analysing the data, rather than producing it. This enables them to respond flexibly to the inevitable changes as regulators and the industry continue to debate and adjust the requirements." ●

Carmela Owens is Responsible for Partner Alliances at Tagetik

CASE STUDY

Streamlined reporting

Manulife, a leading financial services group based in Canada, acquired US insurance leader John Hancock in 2004 to become one of the largest insurance companies in the world.

The company needed to align financial reporting processes between the US and Canada, reducing the amount of manual work and reliance on spreadsheets, and creating a central repository for financial statement data.

Manulife implemented Tagetik Collaborative Disclosure Management to deliver a single source of truth for reporting and disclosure. The company saw a significant reduction in manual processing, with only 5-10% of data entry now done manually. The solution has enabled streamlined data collection from multiple business areas and standardised quarterly reporting for the audit committee and board of directors. As a result, Manulife now benefits from faster reporting, improved management review processes and consistency across financial statements.

The use of ‘R’ in data science

Leading insurers are harnessing the analytical and intelligence capabilities of Microsoft R Server, SQL Server 2016 and Microsoft Azure to deliver faster results from increasing volumes of data

GREG FULLER AND JOHN HARDIGREE: MICROSOFT

Insurers today operate in an increasingly connected, data-rich environment in which they face demands for faster, more accurate results. The amount of available data has grown rapidly in the past 12 months, and it will continue to grow in volume and variety. All of that information can enable insurers to create an increasingly accurate picture of risk and make informed, timely business decisions – but only if the business can turn that data quickly into actionable insight.

Microsoft Azure services, with Microsoft R Server and SQL Server 2016, are empowering insurers through intelligent apps using advanced analytics, machine learning, emerging cloud development models and the internet of things.

Take property and casualty insurance as an example. Weather predictions have been used for many years to identify the risk, severity and location of events, enabling insurers to alert customers and prepare themselves for the resulting claims. Those predictions are ever more sophisticated and, combined with data from a growing range of sources, from telematics to self-driving cars, they open up a world of potential for risk management, profiling and customer care. Customer segmentation can be based on a far more granular image of the insured, enabling efficient responses to the risk or profitability that each customer represents. Leading insurance organisations like State Farm and Progressive Corporation are using telematics to help them understand individual driving behaviours, so they can lower the premium for a good driver or raise it for one who presents more of a risk.

Exposing that data from a front office and back office perspective enables a more granular picture of the risk profile and faster, responsive decision-making to manage risk. Intelligent applications optimise the use of data to analyse regulatory exposures and improvement areas, or to profile customers in order to prevent fraud and make sure the organisation is attracting and retaining the customers it wants.

Microsoft works with insurers to enable them to adapt and improve their data analytics so they can do what is best for their business. By adding the speed and agility of Microsoft R Server to the power of SQL Server, and combining that with the global connectivity of Microsoft Azure, we are delivering intelligent cloud and on-premise solutions that enable insurers to run any number of models, analyse information, identify trends and make the results available to those who need them, without having to worry about where their data is stored or where claims adjusters are located. Quite simply, it’s a game-changer.

Customers in our testing group have found that SQL Server 2016 with built-in Microsoft R Server capability enables dramatic reductions in the time it takes to run complex analytics. For example, one customer found that an analytics routine that had taken days using their old techniques now takes only 30 minutes using SQL 2016 with Microsoft R Server.

Business or regulatory requirements might mean that insurers want to store their data in a specific place – but in terms of technology, the location of data is much less relevant. Insurers no longer have to make the choice between moving to the cloud or handling their data analysis on-premise – they can do both. The speed, accuracy and analytic capability they need is available through SQL Server with Microsoft R Server on-premise, or in the Microsoft Azure cloud. Wherever an insurer’s data is stored, the pervasive, open-source nature of Microsoft R Server means they can now run it anywhere. If an insurer has SQL Server database and Microsoft R Server on-premise but decides later on that they want to move all or some of that infrastructure into the cloud, there is a migration path that makes it relatively easy for them to do that.

The combination of Microsoft R Server, SQL Server and Microsoft Azure means that whatever choice insurers make about on-premise, cloud or hybrid infrastructure, there is no wrong answer. The important choice faced by insurers today is whether to embrace the increasing volumes of data now, in order to ensure faster, more accurate data analysis to support the business.

In our increasingly connected world, the volume of data will continue to grow and demands for rapid, incisive risk management – whether for regulatory reporting or day-to-day operations – are only going to intensify. Insurers who embrace that volume of data now are going to win. By applying advanced analytics, leading insurers are already enabling intelligent processing that empowers the business to gauge any number of factors – from identifying the right customers to building the right portfolio, adjusting premiums or responding to risk events – more accurately. In doing so, they are enabling fast, intelligent decisions that deliver value for the business and its customers. ●

> “Microsoft works with insurers to enable them to adapt and improve their data analytics so they can do what is best for their business”

Greg Fuller is Director, Advanced Analytics Solutions Sales at Revolution Analytics – a Microsoft Company, and John Hardigree is Data Platform Partner Strategy Lead at Microsoft

Big Compute futures

Big Compute delivers modelling, simulation, data gathering and analytics capabilities that are transforming the way insurers do business

ALEX SUTTON: MICROSOFT

Faster, more granular modelling, simulation and analytics have become essential to insurers as they respond to today's competitive and regulatory challenges. Critically, insurers need high-performance compute power to do calculations at scale and in parallel, so they can better understand their business and support informed decision-making.

That's what Big Compute is about – taking advantage of the power of advanced processors and accelerators like graphics processing units (GPUs) to run large numbers of models, simulations and variables. This is a way of thinking supported by technology: if you have a number of independent tasks, you can speed things up by running them in parallel and then create tight feedback loops of modelling, experimentation, data gathering and analysis.

> "The compute power and analytics that were only available to the largest players in the industry are now available to virtually anyone, and this really changes the game in terms of competitiveness"

As compute demands continue to grow at a rapid pace, many insurers are finding it difficult to keep up using their on-premises technology. Some simply don't have any more space, power or cooling for yet more servers. At the same time, spikes in compute capacity requirements when actuaries are developing new models, or when companies are closing their order books or reporting to regulators, are causing organisations to question whether they should add more servers that are going to sit idle much of the time. Many are asking whether there is another way to get the capacity to handle that peak load, and this is driving customers to evaluate the cloud.

A lot of insurers currently run a compute cluster for in-house or commercial applications. A very easy starting point is to run jobs in the cloud using the Microsoft HPC Pack cluster management tool, which provides a set of tools for bursting into Microsoft Azure. This enables insurers to easily add compute capacity in the cloud, move the data, run the applications, and turn it off when they're done.

The next step in that evolution is for customers to extend their clusters into the cloud, setting up virtual machines (VMs) that they can manage and are in full control of. This provides an alternative way to expand the cluster, with VMs that can appear as part of the corporate network.

Some customers are taking that model one step further and moving from a hybrid environment to deploy complete clusters in Microsoft Azure. They may still have some on-premise data centres, but they're replicating what works for them, all in the cloud. This gives them full control over the lifetime of those VMs, and they can manage the storage, networking and so on.

Ultimately, some insurers are now moving to a model where they're submitting jobs to the cloud, not clusters. They're managing the applications, but the code that makes things work in the cloud is managed by a service provider or partner. All the actuary needs to do is provide their application, input data and parameters, specify the type of quantity of VMs they need and the cloud service will take care of the rest. One way to develop these services is with Azure Batch, which delivers job scheduling as a service to automate cluster management and task execution. It's a different paradigm that enables a much lower operational overhead because the organisation doesn't have to worry about the infrastructure. That's the true promise of the cloud – we take care of it for you.

A cloud native approach also makes a lot of new scenarios possible because insurers can move towards a self-service model that enables users to run the applications they want when they need them, within policy or cost restrictions. The organisation has control of its data sets and can manage which applications are available to users, but users can spin up on-demand and run their compute-intensive jobs. Insurers can fine-tune the types of VMs they choose for each job, using GPUs and high-end processors for compute-intensive tasks. They can do more testing of their application models, such as A/B testing where they're running jobs twice with different settings because they're not constrained by the kit they have on-premise. Insurers can transform how their actuaries and developers work and help solve new problems for the business, while minimising costs.

The compute power and analytics that were only available to the largest players in the industry are now available to virtually anyone, and this really changes the game in terms of competitiveness. Smaller firms can now more readily compete with big ones, and big firms can take advantage of their scale in different ways. If an insurer has better visibility into their portfolio, they can ask a lot more 'what-if' questions to get more of a real-time feel on their risk exposure and transform how they operate the business. As they build a holistic view of the business and evolve towards a self-service model for actuaries and risk officers, rapid simulation workflows and feedback loops with machine learning is making this transformation possible. ●

Alex Sutton is Group Program Manager of the Azure Big Compute Team at Microsoft

DATA INTELLIGENCE

Big data and analytics creates intelligent insurers



Cortana Intelligence Suite and Azure Machine Learning are helping insurers unlock data and provide insights beyond areas supported by actuaries

KATHERINE LIN, TROND BRANDE AND TAO WU: MICROSOFT

Data has been an important part of the insurance industry for centuries, but the emergence of big data has brought unprecedented challenges to insurers around the world. Today, insurance companies large and small need to ingest, process, analyse and act on massive amounts of data from heterogeneous sources quickly and cost effectively. As legacy analytics tools fail to provide the necessary capability and agility for new big data workloads, insurers are discovering Cortana Intelligence Suite, a fully managed big data and advanced analytics suite, as an enabler for their new data, analytics and intelligence needs.

For example, If P&C Insurance, a leading property and casualty insurance company serving three million customers in the Nordic region, found that it was able to uncover the value of data more quickly and cost-effectively using Cortana Intelligence Suite's advanced analytics capability. If P&C worked with Microsoft to complete a pilot project on Cortana Intelligence Suite, with a focus on Azure Machine Learning (ML). The main goal was to evaluate how well Cortana Intelligence Suite handles different aspects of predictive modelling as a replacement for If P&C's on-premises legacy data analytics platform. The success of the pilot led the company to replace its legacy SAS platform with the Cortana Intelligence Suite based solution.

Three use cases were evaluated in the pilot: a churn model was used to predict whether or not a customer would cancel their policy in a 40-day window surrounding their renewal date, while an upsell model predicted the probability of success of a potential upsell communication to a given customer. Data including age, duration of the policy, product composition, payment solution, household data and contact points on phone and web was used for these two models. The third case, an email text analytics project, helps to classify inbound email, such as identifying messages with negative sentiment that may indicate increased risk of customer churn.

The solution met or exceeded If P&C's expectations in all the use cases that were evaluated. As Cortana Intelligence Suite components are designed to work together, the company was able to use Azure ML web services to quickly integrate the output of predictive analytics into an end-to-end data pipeline. The solution also helped to boost user productivity, enabling much shorter ramp times for data scientists and engineers. In addition, If P&C estimates that it will realise significant cost savings using Cortana Intelligence Suite. Besides Azure ML, the company is also adopting Azure Data Factory, Azure Data Lake, Azure SQL Data Warehouse and Azure HDInsight, and is integrating these with Microsoft Dynamics CRM.

By utilising Cortana Intelligence Suite, insurers can uncover the value of data quickly and cost-effectively and deliver meaningful visualisations to support focused, insightful information that empowers actuaries to identify and respond quickly to risk. For example, financial modelling can be used to create a vivid, up-to-date view of risk focusing on areas such as customer profitability, customer churn and potential fraudulent activity.

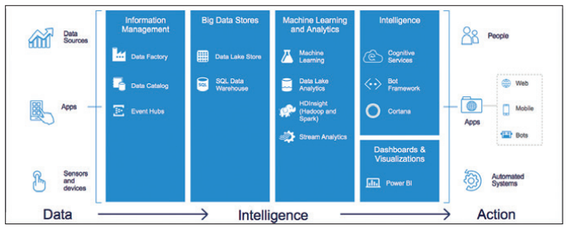
The advanced analytics capabilities of Cortana Intelligence Suite enable constant analysis of the customer base which can be combined with rich visualisation to deliver value to insurers in any number of areas relating to risk. Milliman is leading the way in this area, with its Power BI solution that provides data to actuaries in a far more visual, meaningful way than the traditional tabular view.

As the insurance business generates growing volumes of data, risk management will continue to demand increasing amounts of data modelling. With Cortana Intelligence Suite, insurers can enhance the data set they get from their models, generate more insight from that data, and put themselves in a position to make better decisions, transforming their data into business value.

Katherine Lin is a Data Scientist, Trond Brande is Principal Solutions Specialist, and Tao Wu is Principal Data Scientist Manager at Microsoft

BIG DATA ANALYTICS

Cortana Intelligence Suite



Cortana Intelligence Suite is a fully managed big data and advanced analytics suite to transform data into intelligent action.

Azure Data Factory orchestrates data movement between different services and enables the building of data pipelines for easier analysis. Azure Data Catalog provides a metadata catalogue and facilitates knowledge sharing across the enterprise. Azure Event Hubs can ingest millions of events per second and streams them into multiple applications, enabling insurers to process and analyse the massive amounts of data produced by connected devices and applications.

Structured data can be stored and managed in Azure SQL Data Warehouse, an elastic data warehouse-as-a-service with massive parallel processing capability. Azure Data Lake Store provides a hyper-scale repository with no file size limits for big data analytics workloads.

A wide range of analytics services such as Azure Machine Learning, Azure Data Lake Analytics, Azure HDInsight and Azure Stream Analytics can then be used to create analytics services and models specific to the company's business needs, from real-time demand forecasting to risk analysis and reporting.

The results can be surfaced as interactive dashboards and visualisations through Power BI. In addition, Cognitive Services and Bot Framework give insurers new cognitive capabilities in vision, speech, text and conversations.

For more information, visit https://azure.microsoft.com/en-us/solutions/cortana-intelligence

CONCLUSION

Choosing the right cloud for financial services

As insurers look to the cloud to support workloads, they should factor in not only cost, but also compliance capabilities that reflect the regulatory environment

JONATHAN SILVERMAN AND SEAN FOLEY: MICROSOFT

Insurance is an industry based on managing risk by manipulating and interpreting data – and one that demands constant increases in compute power to meet regulatory and reporting requirements.

Now that insurers have started to embrace the cloud our customers are asking targeted questions, including:

- How do you protect my data?
- How do you use my data?
- How can you help me with my compliance needs?
- Where is my data, and who has access to it?
- What do you do in response to government demands for customer data?

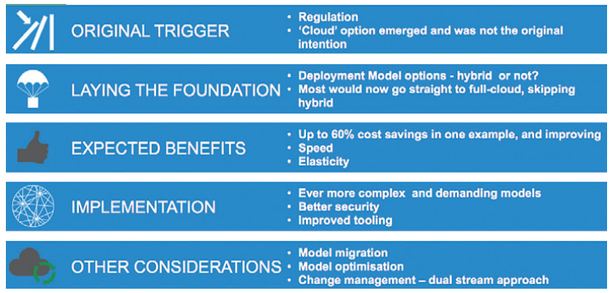
This really boils down to one question: 'Why should I trust you?'

Making the right decision entails answering all of these questions, reviewing the data, analysing your needs and finding the right technology partner to enable success.

Financial regulators want the right to inspect, and they want businesses to have greater control over their cloud operation environment. In many countries, regulatory bodies need to be engaged in these discussions. Even where they don't, it's better to be proactive and get a 'no objection' from the regulator than to have them reviewing and 'disapproving' your solution.

Cloud service providers need to have a strong security foundation with appropriate practices in place to support their services – and you need the tools to authenticate, access, manage, encrypt, monitor and build on your secure solutions. Once you have all this, it's easy to bring third parties into your virtual environment in a secure, seamless fashion.

Cloud providers must also adhere to key principles within the ISO 27018 Privacy Standard, including transparency over the handling and location of data, communication with customers and regulators in the event of a breach, and giving customers control over how their data is used.



Learning from early adopters, a recent study by Celent, provides insight for carriers looking to the cloud as a solution for their risk workload

With a secure environment in place we can enable solution providers, like those showcased in the previous pages, to build proven, lower-cost solutions that can seamlessly run in – or with – the cloud to bring more value to your business, your users and your bottom line. The support structure and trust required for this can only be achieved by building these industrial-sized solutions together, using the same tools and technologies from concept to delivery and beyond.

We hope this publication has helped you to think through your next steps for improving risk insight within your organisation. Microsoft and our partners are happy to engage in further investigation using our tools and resources to help you make the right decisions. ●

Jonathan Silverman is Industry Solutions Director, Worldwide Insurance at Microsoft and Sean Foley is the Chief Technology Officer for Microsoft's Worldwide Financial Services Industry Group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