A Closer Look at Reporting Systems

Solution Comparison: Insurance Reporting Solutions for Finance & Risk Departments
The reporting pressure on insurance companies has been increasing immensely in recent years and will continue to do so in the future. This is not limited to finance and risk reporting, but these areas are particularly impacted.

KPMG invited leading software vendors to describe the capabilities of the solutions they use to address reporting requirements, specifically for Solvency II Risk reporting and the upcoming finance reporting according to IFRS 17 and IFRS 9. By putting a clear emphasis on functional capabilities, our Solution Comparison enables Finance & Risk officers and their departments to obtain an overview of the products available in the market.

As Solvency II is already in place, there are many solutions that support Solvency II reporting to a certain extent, but that support varies. Of the 15 solutions considered in this solution comparison, every solution supports part of the Solvency II reporting. And while seven of the considered solutions are able to consider IFRS 9, eight are able to consider IFRS 17.

When selecting one or multiple solutions it is important to consider the current as-is state of the insurers’ systems architecture on the one hand. On the other hand, the flexibility of the solution, synergies between Solvency II, IFRS 9 and IFRS 17 and the future content development path of the solution need to be considered.
Comparison
Design

Chapter 1
Motivation

Despite the fact that the market for Solvency II solutions has been growing in recent years, some questions remain with regard to the new requirements concerning IFRS (mainly IFRS 17 (formerly known as IFRS 4 phase II) and IFRS 9) along with local GAAP requirements (such as GoBD for Germany or US-GAAP changes).

Comparison questions

A number of Solvency II solution comparisons have been published over the past few years targeting CIOs and IT managers. At KPMG we focus on the Finance & Risk departments with the goal of helping them obtain an overview of solutions especially designed for their needs. We identified business requirements from various sources, discussed these within our expert groups, summarised and aggregated them where possible and consolidated them into our Solution Comparison of Finance & Risk reporting solutions.

In total we came up with about 100 functional questions (FG, FS, F17 and F9), 25 non-functional questions (NI and NF) and 25 general questions (GP, GS and GI).

We split the functional questions into one section on overarching topics (category FG) and one on reporting specific questions (FS for Solvency II-specific questions, F17 for IFRS 17 specific questions and F9 for IFRS 9 specific questions).

Solution capabilities

Leading solution vendors were invited to participate in our solution comparison. The responses from vendors were taken as is – further validations were not performed. Our solution comparison provides an unbiased view on the available solutions and their capabilities. The results of each solution were sent to the respective vendor and feedback was collected and considered. Naturally, a set of 20 to 25 questions per reporting regime can provide only an overview and not address the full breadth and depth of the requirements.

A summary of each solution can be found in section 2. Each solution is compared with a peer group. For simplification reasons, three peer groups were defined: solutions focusing on Solvency II requirements, solutions addressing Solvency II and IFRS 17 requirements and solutions addressing Solvency II, IFRS 17 and IFRS 9 requirements.

Technical Coverage

We not only wanted to provide an overview of functional and non-functional capabilities, but also look at technical coverage. In order to compare the various solutions we developed a simplified generic Finance & Risk reporting architecture.

Mapping functional requirements and capabilities to architecture components enabled us to compare the various solutions with regard to the coverage of these components.

A comparison of the coverage of these components for the various solutions is provided in section 3.
Solution Capabilities

Chapter 2
ADDACTIS® Solvency 2

ADDACTIS® Worldwide is a worldwide network that delivers actuarial services and ADDACTIS® Software solutions for (re)insurance companies. Their new generation actuarial software provides reserving, pricing and modelling services supported by a network of 200 expert actuaries and ITs.

ADDACTIS® Solvency 2 solution is a user-friendly software solution that fits Solvency II requirements. It packages four interconnected solutions: ADDACTIS® Pillar 3, ADDACTIS® Modelling, ADDACTIS® IBNRS® and ADDACTIS® Workflow.

Currently, ADDACTIS® Solvency 2 solution supports 112 insurance companies throughout Europe.

Solution Capabilities

ADDACTIS® Solvency II solutions are developed using the Delphi and C# environments.

ADDACTIS® offers optional packages such as ADDACTIS® Modelling for calculations, ADDACTIS® Workflow for data integration and ADDACTIS® IBNRS® for Best Estimate calculation.

This solution offers a complete audit trail and supports data integration as well as data quality handling via process automation.

Solventy II Capabilities

ADDACTIS® Solvency 2 solution is able to address Pillar 1, Pillar 2 and Pillar 3 requirements.

For Pillar 1, the solution provides solo and group SCR/MCR calculation with the standard formula, a partial model as well as an internal model. Models are set up by users or consultants and calibration can be done automatically or manually. Different metrics are available by default (e.g. Value at Risk).

Regarding Pillar 2 requirements, the solution provides functionalities for ORSA reporting, planning and simulation processes.

And for Pillar 3, the solution provides EIOPA Quantitative Reporting Templates (QRTs) and narrative reports filling. Users can build templates with tags that will be populated by the software with figures directly taken from XBRL projects.

Source: KPMG, Germany, 2016

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Aon, headquartered in the United Kingdom, is a provider of risk management, insurance and reinsurance brokerage, human resources solutions and outsourcing services. With ReMetrica®, Aon provides software that is already capable of dealing with the challenges associated with all three of the upcoming regulations: Solvency II, IFRS 17 and IFRS 9.

Currently, Aon supports 105 mainly small and medium-sized insurance companies in Europe.

**Solution Capabilities**

ReMetrica® is a general purpose dynamic financial analysis software tool, widely used in the insurance industry for capital modelling (internal models) and business decision making. Programming languages of the solutions are Microsoft C#.Net, Microsoft Visual C++ and Python. Customers can decide between different editions of the solution and several additional options:

- **Options:** 1st cloud option. 2nd life health and pensions (LHP) library. 3rd portfolio optimizer.

For reporting purposes, the tool can either rely on Microsoft Excel or use an external SQL Server if the database option is selected. ReMetrica® can run on desktops or servers and is also fully programmable via Addins or external software. Thus, it can easily be linked to other systems or form the core of a system.

**Figure 4: ReMetrica® Solution Capabilities**

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**Solvency II Capabilities**

ReMetrica® covers the requirements of Pillar 1, Pillar 2 and Pillar 3. With regard to Pillar 1, ReMetrica® is an internal modelling tool that supports the calculation of SCR/MCR with the standard formula, a partial internal model and an internal model on both solo and group level. Furthermore, the solution is able to perform stochastic calculations. ReMetrica® provides functionalities to create SII balance sheets on solo and group level. Moreover, it provides various additional functionalities such as the consideration of risk mitigation techniques, the calculation of undertaking specific parameters, etc.

Regarding Pillar 2, ReMetrica® provides functionalities for the ORSA reporting process and for planning and simulation. Thus, ReMetrica® is able to develop and process simulation scenarios. Focusing on Pillar 1 and 2 requirements, ReMetrica® supports a limited portion of Pillar 3 requirements. While it provides functionalities for filling QRTs, it does not yet provide either functionalities for narrative reporting or an XBRL generator.

**Figure 5: ReMetrica® Solvency II Capabilities**

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Source: KPMG, Germany, 2016
**IFRS 17 Capabilities**

ReMetrica® is able to address several IFRS 17 requirements, covering both BBA- (Building Block Approach) and PAA- (Premium Allocation Approach) specific issues. While the solution is not yet able to support different granularity levels of insurance contracts or an interaction between different granularity levels, it might be possible to extend the solution in the future. ReMetrica® supports the preparation of data for actuarial calculations. Moreover, it already provides a predefined set of accounts for IFRS 17 and accounting rules to generate IFRS postings. ReMetrica® components model accounting logic in a comprehensive way so that both Solvency II and IFRS 17 are covered by the same components through the selection of components and parameters.

Concerning PAA, the solution supports the calculation of premium reserves and is able to process the results with regard to onerous contracts. For BBA, actuarial deterministic and stochastic modelling of future cash flows as well as the calculation of present values of these cash flows are already possible. This solution is also able to calculate the CSM (Contractual Service Margin). The solution does not yet support the calculation of OCI.

ReMetrica® will consider contracts with discretionary participation features in the future.

**Figure 6: ReMetrica® IFRS 17 Capabilities**

<table>
<thead>
<tr>
<th></th>
<th>BBA</th>
<th>PAA</th>
<th>VFA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>VFA will be supported</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Since the final IFRS 17 standard has not been published yet, there remains uncertainty regarding the final conception of the Variable Fee Approach. Therefore, providers were only asked if their solution will be able to support the VFA in the future.

**IFRS 9 Capabilities**

ReMetrica® is capable of addressing several IFRS 9 requirements. For example, the solution provides functionalities for simulation as well as customer-specific classification of assets according to IFRS 9. However, ReMetrica® is not able to support valuation for IFRS 9 for all financial instruments, but it may be possible to extend the solution. Regarding impairment and hedge accounting, ReMetrica® does not support the entire range of requirements. However, it does provide several functionalities such as the linking of financial instruments to statistical and risk data, which can be useful for IFRS 9.

**Figure 7: ReMetrica® IFRS 9 Capabilities**

- Classification & Measurement
- Impairment
- Hedge Accounting

Source: KPMG, Germany, 2016
Ark Solutions are regulatory and statutory reporting specialists, offering a range of reporting solutions to clients all over the world. With their Solvency II Reporting Tool, Ark Solutions support over 100 insurance customers throughout Europe, providing a simple and streamlined approach to EIOPA compliance.

The tool supports filers with their Pillar 3 XBRL conversion. Customers download the most recent templates, populate them, and convert them into XBRL format via a secure online portal.

**Solution Capabilities**

The Solvency II Reporting Tool is a cloud solution, which means instantaneous deployment and no installation. Arkk hosts the solution on Microsoft Azure used by more than half of Fortune 500 companies. Arkk Solutions are ISO 27001 certified.

Ark’s support team has an average response time of 29 minutes and often receives 100% satisfaction ratings from clients. The team extends its support hours around the filing deadlines.

In addition to e-mail and phone support, all customers have access to the Knowledge Base, a site full of guides and video tutorials on how to use the tool. The tool’s interface is user-friendly and the majority of customers do not need any training. If the client prefers, there is an option to purchase training days with Arkk’s Solvency II experts.

The programming language of the solution is C#.

**Figure 8: Arkk Solutions Solution Capabilities**

<table>
<thead>
<tr>
<th>Name of solution</th>
<th>Employees specialised in the solution</th>
<th>Total revenue in 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solvency II Reporting Tool</td>
<td>12 out of 40 in total</td>
<td>n/a million euro</td>
</tr>
</tbody>
</table>

**Solvency II Capabilities**

Ark’s tool focuses on the Pillar 3 XBRL conversion, taking Word or Excel templates and converting them to compliant XBRL via an online portal.

As internal requirements differ dramatically for Solvency II, Ark’s tool can be modified to suit a variety of reporting needs beyond the QRT’s. Quarterly releases ensure that the solution is always compliant with EIOPA and the local regulator’s requirements, and Arkk regularly review the functionality of its solution with its clients.

In addition to the EIOPA rules built into the templates, there is an additional validation screening prior to XBRL conversion. This level of validation prevents invalid data entry.

Ark also provide the NSTs (National Specific Templates) for Irish regulators, and the ECB (European Central Bank) reporting templates required for solo reporting. The roll-forward function enables seamless transposition of data into new templates when the regulators issue an update to the taxonomies, which means less manual data entry for filers.

**Figure 9: Arkk Solutions Solvency II Capabilities**

Source: KPMG, Germany, 2016
SII Engine

Asseco, headquartered in Poland, provides solutions for several industries, one of them being the insurance industry where it provides a wide range of insurance applications, e.g. policy administration systems. With SII Engine, Asseco provides a module for Solvency II, which also covers several requirements of IFRS 17.

Currently, more than 60 companies in 10 different countries are using SII Engine.

Solution Capabilities

The development roadmap of SII Engine follows any changes and amendments from EIOPA. The programming language of the solution is Java. SII Engine supports Pillar 1, 2 and 3 of Solvency II.

Asseco also offers optional packages such as:
- Data Mart (for automated data sourcing)
- Non-Life Best Estimate module
- ECB Reporting module.

The solution also provides several functionalities useful for IFRS 17. However, the solution’s focus is on Solvency II.

Solvency II Capabilities

SII Engine provides functionalities for all three pillars of Solvency II. SII Engine supports the calculation of SCR with the standard formula. It also supports internal and partial models. The solution provides functionalities for the creation of solo as well as group balance sheets.

Regarding Pillar 2 requirements, the solution provides functionalities for the ORSA reporting process and allows for customised stress testing, forecasting and scenario analyses.

SII Engine sources data to EIOPA QRTs automatically from the Pillar 1 calculation engine, and can also support the production of narrative reporting. It contains all crosschecks and validations, which are part of the QRT reporting. The solution also provides an XBRL generator so that all reports can be delivered in XBRL format.

Asseco

Employees specialised in the solution

Total revenue in 2015

SII Engine

as released in May 2016

30

out of 19,000 in total

1,500

million euro

Source: KPMG, Germany, 2016
AxiomSL, headquartered in the United States, is a global provider of regulatory reporting and risk management solutions for the financial services industry. With ControllerView®, AxiomSL provides a multipurpose platform, which can be individually enhanced and which is able to support all three regulations: Solvency II, IFRS 17 and IFRS 9.

**Solution Capabilities**

ControllerView® is a multipurpose platform where solutions are modules consisting of bundled data objects called projects, which are completely transparent: the logic is displayed and runs via workflows directly in front of the user. The programming language is Java.

As an all-purpose platform, ControllerView® can be enhanced by any self-defined components.

AxiomSL has designed ControllerView® with the aim of enabling full ability to be run via web platforms; in the medium term in cloud. The first complete web-based platform will be available at the end of 2016.

**Figure 12: ControllerView® Solution Capabilities**

<table>
<thead>
<tr>
<th>Name of solution</th>
<th>Employees specialised in the solution</th>
<th>Total revenue in 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>ControllerView®</td>
<td>300 out of 500 in total</td>
<td>n/a million euro</td>
</tr>
</tbody>
</table>

as released in July 2016

**Solvency II Capabilities**

ControllerView® is able to provide modules that include functionalities aimed at fulfilling the requirements of Pillar 1, Pillar 2 and Pillar 3.

Regarding Pillar 1, the solution supports the calculation of the solo SCR/MCR with a standard formula. The calculation of SCR/MCR with an internal model or a partial model is currently not available. ControllerView® can be extended for any additional supporting calculations due to a modular system that can be enhanced on the spot by adding calculation objects, user defined functions, etc. Currently, the creation of a solo or group SII Balance Sheet is also not possible.

Regarding Pillar 2 requirements, the solution provides functionalities for the ORSA reporting process and for planning and simulation.

Concerning Pillar 3, ControllerView® supports functionalities for filling QRTs as well as for narrative reporting. Additionally, the solution provides an XBRL generator.

**Figure 13: ControllerView® Solvency II Capabilities**

Source: KPMG, Germany, 2016
**IFRS 17 Capabilities**

Currently, ControllerView® is not able to address all IFRS 17 requirements. However, the solution does provide several general functionalities that may serve as a starting point for enhancing the solution. The solution supports the calculation of claims reserves, tail estimations and it provides functionalities to prepare data for actuarial calculations.

Currently, ControllerView® is not capable of fully supporting either the Premium Allocation Approach (PAA) or the Building Block Approach (BBA). However, due to its flexibility, the solution could be enhanced in order to cover IFRS 17-specific requirements, such as the calculation of the Contractual Service Margin (CSM), Other Comprehensive Income (OCI), etc. Furthermore, it would be possible to consider reinsurance (e.g. ceded/retroceded) and contracts with discretionary participation features.

**IFRS 9 Capabilities**

ControllerView® supports the valuation for IFRS 9 for all financial instruments. Furthermore, it provides functionalities for simulation and it supports a customer-specific classification of assets. It is also possible to derive the classification from portfolio/business model information. Additionally, ControllerView® includes SSPI testing.

ControllerView® provides functionalities for the impairment process according to IFRS 9. However, it does not yet provide functionalities for hedge accounting, but it would be possible to enhance the solution accordingly.

* Since the final IFRS 17 standard has not been published yet, there remains uncertainty regarding the final conception of the Variable Fee Approach. Therefore, providers were only asked if their solution will be able to support the VFA in the future.

**Source:** KPMG, Germany, 2016
Conning, headquartered in the United States with offices in the UK, Europe, and Asia, is a global investment management firm. Conning supports institutional investors, including pension plans, with investment solutions and asset management offerings, risk modelling software and industry research. With ADVISE® Enterprise Risk Modeler, Conning provides a solution for Solvency II, IFRS 17 and IFRS 9.

Currently, Conning supports 26 small and medium-sized insurance companies in Europe with their solution.

Solution Capabilities

The solution is made up of five modules:

1. GEMS® Economic Scenario Generator
2. Investment Module
3. Management Decision Module
4. Liability Module
5. Financing/Accounting/Tax/Regulatory Module

Future extensions of the software product include additional economies according to market demands, additional credit modelling developments and liquidity modelling research. The software can run fully stand-alone or on a large-scale distributed computing network or grid. It contains built-in grid technology to distribute the computation and data storage, and an optimised query processor that also distributes the computation associated with data analysis.

Solvency II Capabilities

ADVISE® Enterprise Risk Modeler covers the requirements of Pillar 1, Pillar 2 and Pillar 3. Concerning Pillar 1, the solution supports the calculation of solo and group SCR/MCR with the standard formula as well as with an internal or a partial model. Moreover, the solution provides functionalities for creating a SII solo and group balance sheet. In addition to the standard calculations in the system, defined calculations are possible using an Excel-style formula. These user-defined calculations can then be linked to the standard outputs, such as financial statements and solvency ratios. The solutions also support SII variation analysis. The system allows the user to compare the results of model runs as of different dates and with different assumptions. The system’s query tools enable drill-down analysis to understand the sources of variations.

Regarding Pillar 2 requirements, the solution provides functionalities for the ORSA reporting process and for planning and simulation.

Concerning Pillar 3 requirements, the solution supports MVBS postings and provides QRT-Reporting functionalities. However, ADVISE® does not support narrative reporting.
IFRS 17 Capabilities

Concerning IFRS 17 requirements, ADVISE® provides functionalities for the two measurement methods: BBA (Building Block Approach) and PAA (Premium Allocation Approach). The solution allows for the interaction between different hierarchies and granularity levels of insurance contracts. The insurance module will model premiums, losses and expenses by business segment. Ceded reinsurance can be modelled explicitly at the individual treaty level, allowing for rigorous testing of alternative structures.

ADVISE® provides many functional capabilities regarding the approach to independence, such as preparing data for actuarial calculations. Admittedly, there is no support regarding accounting rules for generating IFRS postings. In terms of PAA, ADVISE® is available to support the Premium Allocation Approach calculation; however, it cannot yet process the results with regard to onerous contracts.

Regarding BBA, the solution supports the deterministic modelling of future cash flows, discounting and the calculation of the CSM. Additionally, ADVISE® supports the calculation of OCI. Contracts with profit participation will be considered in the future.

Figure 18: ADVISE® IFRS 17 Capabilities

* Since the final IFRS 17 standard has not been published yet, there remains uncertainty regarding the final conception of the Variable Fee Approach. Therefore, providers were only asked if their solution will be able to support the VFA in the future.

Source: KPMG, Germany, 2016

IFRS 9 Capabilities

There are plans to enable ADVISE® to support valuation of IFRS 9 for all financial instruments. It supports a customer-specific classification of assets according to IFRS 9. The solution does not support SPPI testing. Many other functional capabilities relating to classification and measurement, e.g. mark-to-market valuation, are supported.

Furthermore, ADVISE® supports the impairment process according to IFRS 9. However, the solution does not support hedge accounting.

Figure 19: ADVISE® IFRS 9 capabilities

Source: KPMG, Germany, 2016
Invoke, headquartered in France, is a software company focused on reporting solutions for business performance management, finance and accounting departments, external reporting, regulatory authorities and financial analysts. With Invoke Regulatory S2, Invoke provides a Solvency II solution mainly for Pillar 3 requirements. However, several requirements of Pillar 1 and 2 are also supported by their solution.

Currently, Invoke supports 650 regulated insurance entities in Europe, ranging from large insurance groups (Invoke counts 4 clients amongst the Top 10 Europe Insurance Groups) to smaller entities. Invoke’s solutions are covering the reporting needs of more than 20% of the European regulated entities.

**Solution Capabilities**

The Invoke FAS Regulatory S2 solution is based on 2 complementary modules:

- FAS Regulatory S2 = regulatory reporting platform configured to cover Solvency II obligations
- eRegulatory S2 = web-portal covering the disclosure management of quantitative and qualitative reports to the various national supervisory bodies

Invoke offers additional modules, for example FAS Consolidation to produce consolidated accounts in multiple GAAPs, including IFRS

Program language for the solution based on Core technical components: C, C++, Web user interface: JavaScript and for Windows user interface: Delphi.

**Figure 20: Invoke Regulatory S2 Solution Capabilities**

**Solvency II Capabilities**

Invoke Regulatory S2 includes requirements for Pillar 1, Pillar 2 and Pillar 3. Regarding Pillar 1, the solution supports the calculation of SCR/MCR with the standard formula. The solution supports the creation of SII solo and group balance sheets.

Concerning Pillar 2 requirements, the solution provides functionalities for the ORSA reporting process and for planning and simulation.

The solution is primarily focused on Pillar 3 requirements. It supports narrative reporting and the filling of QRTs. The solution also includes an elaborate XBRL generator.

Invoke’s solution also provides several functionalities that are useful for IFRS 17 and IFRS 9. However, the primary focus of the solution is Solvency II.

**Figure 21: Invoke Regulatory S2 Solvency II Capabilities**

Source: KPMG, Germany, 2016
Milliman, headquartered in the United States, is a global provider of actuarial and consulting services with a focus on the insurance industry. With Integrate™, Milliman provides a solution focusing primarily on Solvency II Pillar 1 requirements. For IFRS 17 and IFRS 9, Milliman has developed prototype models, but which have not yet gone into production.

The solution goes beyond the typical actuarial systems as it focuses not only exclusively on the calculation engine. While Integrate provides calculation engines to support financial reporting, ALM, business planning, risk analysis, etc., the broader focus of the solution is on a platform to support both model change and model execution. Hosting the platform in the cloud provides flexibility and access to a vast array of technologies.

Currently, Integrate is used by about 20 small and medium-sized insurance companies in Europe.

### Solution Capabilities

Integrate provides components for data management, model change management, calculations and reporting. The input data management tools allow for the creation of model inputs from source data; the reporting tools are based on a Big Data solution to enable reporting and data analysis. The change management system provides a structure to manage all model changes in a controlled and highly controlled manner. The assumption management and workflow tools provide the ability to define and execute large numbers of projections with little effort.

The solution is primarily written in C# Version 6 with:

**Backend Frameworks:** .Net Version 4.5.2, ASP.Net Version 5


*Figure 22: Integrate Solution Capabilities*

### Solvency II Capabilities

Integrate focuses primarily on Pillar 1 and 2 requirements. It provides actuarial calculations for the Best Estimate Liability, Risk Margin, SCR, MCR on standard formula, partial model and internal model basis. This can be done on a solo level as well as on a group level. Integrate also supports stochastic calculations. Furthermore, the solution supports the creation of a SII solo or group balance sheet. Regarding QRTs, Integrate produces the actuarial information. However, the solution can receive non-actuarial data in order to populate the entire QRT. This feature depends on the implementation decisions made by the customer.

Integrate supports Pillar 2 requirements by providing a strong reporting framework to allow managers to quickly understand results, drill down to demonstrate components, and gain regular information related to how and why the capital position is impacted by events in the economic environment or within the organisation.

*Figure 23: Integrate Solvency II Capabilities*
ROKOCO is a consulting firm, which focuses on risk management, corporate management/assessment, and on various insurance and financial mathematics topics. The headquarters are in Munich, Germany. With PLA.NET & ALM.IT, ROKOCO has created a Solvency II solution that targets small and medium-sized insurance companies. The solution focuses on combining local GAAP requirements with a market value-oriented perspective and solvency perspective. ROKOCO’s solutions also already cover several requirements of IFRS 17 and IFRS 9.

Currently, the solvency solution is being used by 35 small and medium-sized insurance companies in Germany. It is currently being implemented by 5 further insurance companies in Germany.

**Solution Capabilities**

The solution consists of the PLA.NET core system, including the asset module plus one insurance component, e.g. Life and/or Health and/or P&C incl. Reinsurance.

The programming language of PLA.NET & ALM.IT is .NET Framework.

The following optional packages are available:

- ESG (Economic Scenario Generation)
- Credit risk module
- Model point search and aggregation: A tool to optimise the search of representative model points with clustering and neuronal network techniques
- RisColI: Documentation including mathematical risk valuation and aggregation to manage the identified risk for the purpose of Pillar 2.

**Figure 24: PLA.NET & ALM.IT Solution Capabilities**

**Solveny II Capabilities**

PLA.NET & ALM.IT address Pillar 1 and Pillar 2 requirements. The Pillar 3 support is limited to base data deliveries. The solution supports solo SCR/MCR calculation with the standard formula. Currently, the solution is being extended with an internal or a partial model to provide functionalities for the calculation of SCR/MCR. The solution is already able to perform stochastic calculations. It is also able to support Variation Analysis via a wide range of tools for data/result comparisons of different scenarios and runs. ROKOCO is also enhancing its solution to provide functionalities for the creation of a SII solo balance sheet. Regarding Pillar 2 requirements, the solution provides functionalities for the ORSA reporting process and supports planning and simulation.

**Figure 25: PLA.NET & ALM.IT Solvency II Capabilities**

Source: KPMG, Germany, 2016
With SAP Insurance Analyzer SAP has developed a risk management, accounting and controlling platform based on the already very successful Bank Analyzer platform (called IFRA = integrated finance and risk architecture), which is capable of dealing with the challenges associated with all three of the upcoming regulations: Solvency II, IFRS 17 and IFRS 9.

**Solution Capabilities**

In terms of technical specifications, the solution is mainly developed in ABAP, the proprietary 4th generation programming language of SAP, in which almost the entire source code is available when purchasing the solution. The solution consists of the following modules:

- Solvency management for insurance
- Accounting for insurance contracts
- Accounting for financial instruments

further complemented by other components,

- e.g. Financial consolidation, disclosure management, GRC risk management.

*Figure 26: SAP Insurance Analyzer Solution Capabilities*

**Solvency II Capabilities**

SAP Insurance Analyzer is capable of addressing Pillar 1, Pillar 2 and Pillar 3 requirements. While SCR/MCR can be calculated using a standard formula within the solution, risk modelling results can also be imported from various sources. The calculation of SCR/MCR with an internal model as well as calculation of SCR/MCR with a partial model are currently not provided in standard content, however partial models may be easily configured. Valuation for the purpose of the MVBS is supported and valuation results can be transferred to a general ledger if required.

In terms of Pillar 2, ORSA and qualitative reporting is supported.

For Pillar 3, narrative reporting is supported as well as QRT reporting, and XBRL file generation.

*Figure 27: SAP Insurance Analyzer Solvency II Capabilities*

Source: KPMG, Germany, 2016
IFRS 17 Capabilities

SAP Insurance Analyzer has been designed to address the IFRS 17 requirements, covering both BBA (Building Block Approach) and PAA (Premium Allocation Approach), and provides a predefined set of accounts for IFRS 17.

The solution allows for the interaction between different hierarchies/granularity levels – the level of valuation depends on the liability component; fulfilment cash flows are calculated on a single contract, policy, or coverage basis; RSA (risk adjustment) is retrieved from external sources and allocated down to valuation level (contract, policy, or coverage); CSM (contractual service margin) is calculated on valuation level. According to PAA, it should be emphasised that the solution is able to process the results with regard to onerous contracts. The generation of cash flows will remain in the domain of the actuarial engines. Further opportunities of SAP Insurance Analyzer are:

- Functionalities to prepare data for actuarial calculations
- Support of accounting rules to generate IFRS postings

In addition, it should be noted that it is possible to consider contracts with profit participation, and even changes to the IFRS standard will be implemented.

Figure 28: SAP Insurance Analyzer IFRS 17 Capabilities

IFRS 9 Capabilities

SAP Insurance Analyzer is capable of addressing IFRS 9 requirements. For phase 1 classification and the measurement amortised cost, valuation is supported. Fair values can be interfaced from other sources or can be calculated with an internal fair value server. Impairment calculation for phase 2 is supported, including linking financial instruments to statistical and risk data (e.g. PD, LGD). Hedge accounting incl. validation (e.g. effectiveness test) is also supported.

Figure 29: SAP Insurance Analyzer IFRS 9 Capabilities

* Since the final IFRS 17 standard has not been published yet, there remains uncertainty regarding the final conception of the Variable Fee Approach. Therefore, providers were only asked if their solution will be able to support the VFA in the future.

Source: KPMG, Germany, 2016
SAS® Infrastructure for Risk Management

SAS Institute Inc., headquartered in the United States, is a global software provider. With SAS® Infrastructure for Risk Management, SAS provides a solution that is already capable of dealing with the challenges associated with all three upcoming regulations: Solvency II, IFRS 17 and IFRS 9.

Currently, SAS supports 35 insurance companies in Europe with this solution.

Solution Capabilities

SAS Infrastructure for Risk Management is an integrated framework with several business content modules, which integrates both with additional SAS technologies and 3rd party technologies. The solutions can also be extended to meet additional requirements.

The programming language of SAS Infrastructure for Risk Management is SAS and Java.

The solution consists of the following modules:

- SAS Infrastructure for Risk Management (Platform)
- SAS Firmwide Risk for Solvency II
- SAS UW Risk Management for P&C Insurance
- Model Implementation Platform (IFRS 9)
- SAS Risk and Finance Workbench (IFRS 9, IFRS 17, ORSA).

Solvency II Capabilities

SAS Infrastructure for Risk Management supports the calculation of solo and group SCR/MCR with the standard formula, using an internal and with a partial model. Internal models can be computed externally or within SAS. The Solution allows for these results to be loaded in dedicated tables for the system to use them instead of applying the standard formula. The solution also supports the creation of a SII solo/group balance sheet. Furthermore, it supports variation analysis. A dedicated data model stores the relevant data required for the production of the variation analysis-related reports.

Regarding Pillar 2, the solution provides functionalities for the ORSA reporting process and planning and simulation.

With regard to Pillar 3, the solution supports narrative reporting. SAS supports the creation of Word/PPT/Excel document templates, which embed analytical results computed by the SAS Engine. The solution also provides functionalities for filling Quantitative Reporting Templates (QRTs). National Reporting Templates are also supported.

Source: KPMG, Germany, 2016

Figure 30: SAS Infrastructure for Risk Management Solution Capabilities

Figure 31: SAS Infrastructure for Risk Management Solvency II Capabilities
**IFRS 17 Capabilities**

SAS Risk and Finance Workbench (IFRS 9, IFRS 17, ORSA) supports different granularity levels of insurance contracts. Individual contracts can be processed singularly or aggregated according to a set of properties (line of business, portfolio, product type, currency, etc.). The level of granularity is configurable. The solution will also eventually allow interaction between different hierarchies/ granularity levels. The solution already supports the separation of contract components according to the upcoming IFRS 17 standard.

SAS Infrastructure for Risk Management is already able to support the Building Block Approach (BBA). The solution supports actuarial deterministic and stochastic modelling of future cash flows, discounting (locked-in and current rates) and the historicisation of cash flows. The solution is being extended to provide functionalities for the calculation of the Contractual Service Margin (CSM), Other Comprehensive Income (OCI), etc.

The solution is currently being extended in order to fully support the Premium Allocation Approach (PAA).

There are plans to consider contracts with a discretionary participation feature.

**Figure 32: SAS Infrastructure for Risk Management**

**IFRS 17 Capabilities**

![IFRS 17 Capabilities](source: KPMG, Germany, 2016)

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**IFRS 9 Capabilities**

Regarding IFRS 9, SAS supports valuation for all financial instruments and a customer-specific classification of assets according to IFRS 9. SAS Risk and Finance Workbench provides all functionalities to calculate impairment based on the expected loss concept for 12 months and lifetime and allocate at individual asset level based staging criteria.

It also provides a workflow component to govern the monthly process for accounting impairment. It produces regulatory reports for IFRS 9 impairment and provides required details to support regulatory reporting auditing.

SAS provides hedge accounting functionalities. However, it does not provide validation rules for hedge accounting.

**Figure 33: SAS Infrastructure for Risk Management IFRS 9 Capabilities**

![IFRS 9 Capabilities](source: KPMG, Germany, 2016)

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* Since the final IFRS 17 standard has not been published yet, there remains uncertainty regarding the final conception of the Variable Fee Approach. Therefore, providers were only asked if their solution will be able to support the VFA in the future.

**Source:** KPMG, Germany, 2016
SecondFloor, headquartered in the Netherlands, is a software and consulting firm with clients and offices throughout Europe. With Solvency II Service (SAAS solution) v3.10 (taxonomy 2.0.1) & v3.11 (taxonomy 2.1) & eFrame, SecondFloor established a solution that is able to support a wide range of Solvency II requirements. SecondFloor have also developed a prototype that is able to support the upcoming IFRS 17 accounting standard (IFRS 17 Prototype v.1.0).

SecondFloor currently supports 17 European insurance companies with their solution.

Solution Capabilities

Solvency II Service (SAAS solution) is available as a light, basic or standard version.

For eFrame the following packages are available:

- Process Automation Management (PAM) for generic Governance, Risk and Compliance solutions
- Standard Formula, solution for Pillar 1 to support MCR/SCR calculations
- ORT/XBRL, solution for Pillar 3 reporting
- Disclosure Manager (DM), solution for narrative reporting

The IFRS 17 prototype which is able to deal with the requirements of the upcoming IFRS 17 standard. Currently, the following eFrame packages are being developed:

- Analytics, solution for visualisation of the Solvency II process through dashboards – planned for end of 2016

Solvency II Capabilities

Solvency II Service combined with eFrame support the calculation of SCR/MCR with the standard formula, using an internal and with a partial model. This can be done at solo and group level. The tool supports a flexible hierarchy concept that allows users to configure risk profiles for specific nodes/units in the hierarchy. For those specific/applicable risk types, input parameters can be configured and calculated (or processed) and then, if required, can also be consolidated. The solution also supports the creation of an SII solo and group balance sheet.

Regarding Pillar 2, Solvency II Service & eFrame provide functionalities for the ORSA reporting process. Planning and simulation will be supported in the next two releases.

Concerning Pillar 3, the solution supports the narrative reporting process. Quantitative information can be captured using calculation modules. The solution also provides functionalities for filling Quantitative Reporting Templates (QRTs).

Figure 35: SecondFloor Solvency II Capabilities

Source: KPMG, Germany, 2016

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IFRS 17 Capabilities

SecondFloor has developed an IFRS 17 prototype that covers both Building Block Approach (BBA) and Premium Allocation Approach (PAA) requirements. The company currently does not provide a predefined set of accounts for IFRS 17, but is possible in the future. The solution is not capable at the moment of supporting accounting rules to generate IFRS postings.

The solution already supports the measurement of insurance contracts with PAA. It supports the calculation of premium reserves, the calculation of risk adjustment based on portfolio granularity and is able to process the results with regard to onerous contracts.

According to SecondFloor, their solution supports BBA. However, the solution is not yet able to support actuarial deterministic modelling of future cash flows. However, the solution is able to calculate the Contractual Service Margin (CSM), Other Comprehensive Income (OCI), etc.

Furthermore, the solution is able to consider reinsurance. The consideration of contracts with a discretionary participation feature would be possible in the future.

Figure 36: SecondFloor IFRS 17 Capabilities

BBA

PAA

VFA

* Since the final IFRS 17 standard has not been published yet, there remains uncertainty regarding the final conception of the Variable Fee Approach. Therefore, providers were only asked if their solution will be able to support the VFA in the future.

Source: KPMG, Germany, 2016
Tabular

Solvency II Solutions, headquartered in the United Kingdom, is a company solely focused on providing the insurance industry and asset managers with a customer-centric holistic solution for data collection, validation and submission of Solvency II regulatory & Lloyd’s market returns. With Tabular, Solvency II Solutions has created an Excel-based XBRL reporting solution for Solvency II.

Currently, Solvency II Solution supports 140 insurance companies with Tabular in Europe.

Solution Capabilities

The solution is based on an SQL backend database for calculations and data governance with the C# programming language.

The solution consists of the following modules:

- Company/Return setup/details
- Import (csv, XML, Excel, XBRL, SQL)
- Consolidation and Validation
- In-built guidance (EIOPA LOG files, Q&A entries etc.)
- Export (csv, XML, Excel, XBRL, SQL)
- Workflow and Data quality checks (period-on-period consistency checks)

Figure 37: Tabular Solution Capabilities

Solvency II Capabilities

Tabular supports the calculation of SCR/MCR with a standard formula. It does not support the calculation of SCR/MCR with an internal or partial model. Tabular does support the creation of SII solo and group balance sheets.

Regarding Pillar 2, the solution provides functionalities for ORSA reporting, but does not provide planning and simulation functionalities.

The functionalities relating to Pillar 3 for narrative reporting are an MS Word plug-in that allows users to create a template report and populate this with QRT data points or data from other source documents. These are maintained as live links and, as source data changes, this is reflected in the report. Tabular also provides functionalities for filling the Quantitative Reporting Templates. An XBRL generator is also available.

Figure 38: Tabular Solvency II Capabilities

<table>
<thead>
<tr>
<th>Name of solution</th>
<th>Employees specialised in the solution</th>
<th>Total revenue in 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tabular</td>
<td>10</td>
<td>n/a million euro</td>
</tr>
</tbody>
</table>

Tabular as released in March 2016 out of 10 in total

Source: KPMG, Germany, 2016

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Tagetik Software Srl, headquartered in Lucca, Italy, is a provider of Corporate Performance Management software applications. With its Tagetik 5 software, Tagetik has created a solution that is already capable of supporting all of the three regulations: Solvency II Solution, IFRS 17 and IFRS 9.

Tagetik currently supports 134 small, medium-sized and large insurance companies in Europe.

**Solution Capabilities**

Tagetik is a unified solution including ETL, CDM, XBRL, Reporting, consolidation, etc.

Tagetik offers various optional packages such as budgeting and planning.

The solution is a Java-based enterprise application. Tagetik is not dependent on the operating system of the application server. As a result, it is portable on any operating system supported by the chosen application server. Up to now, portability has been verified both on Windows and Unix-like operating systems (e.g. different Linux flavours, Sun Solaris).

**Solvency II Capabilities**

Tagetik is capable of addressing Pillar 1, Pillar 2 and Pillar 3 requirements. Tagetik supports the calculation of SCR/MCR with a standard formula; an internal or partial model is not supported. Tagetik supports the creation of both solo and group SII balance sheets. The solution also supports SII Variation Analysis. The analysis can be performed via dynamic reports or drill down tools. Moreover, Tagetik has an embedded calculation tool. It is possible to create additional calculation rules using a user interface. Tagetik supports Pillar 2 needs with different functionalities such as ETL to extract/transform/aggregate data from any sources, calculation logics to project different types of data, diagnostic functionalities to ensure data quality in the application, a reporting tool to collect/view and define reports on final data. With regard to narrative reporting, Tagetik has an embedded CDM tool (collaborative disclosure management). CDM is able to collect information (calculations, reports, graphs, etc.) automatically. The solution also provides functionalities for filling Quantitative Reporting Templates (QRTs).

**Figure 39: Tagetik Solution Capabilities**

**Figure 40: Tagetik Solvency II Capabilities**

**Table:**

<table>
<thead>
<tr>
<th>Name of solution</th>
<th>Employees specialised in the solution</th>
<th>Total revenue in 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tagetik</td>
<td>300 out of 350 in total</td>
<td>€64 million euro</td>
</tr>
<tr>
<td>Tagetik 5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: KPMG, Germany, 2016
**IFRS 17 Capabilities**

Tagetik manages both Building Block Approach (BBA) and Premium Allocation Approach (PAA). The solution supports different granularity levels: the hierarchical structures start from contract level data and are aggregated based on different attributes (i.e. issuance, duration, product, etc.) for calculation and then further aggregated to portfolio level data for reporting (with drill down capabilities). The evaluation process could work at different granularity levels depending on source systems: i.e. actual cash flows may be at single contract level, whilst expected cash flows (coming from actuarial engines) usually are provided more aggregated; proper granularity level is identified on each single project during the analysis phase to ensure consistent calculations. Liabilities for incurred claims are managed both under the BBA and PAA approach. Concerning BBA, Tagetik supports discounting, risk adjustment, calculation of Liability for remaining coverage (LRC), Contractual Service Margin (CSM) and their release. A specific treatment is implemented for onerous contracts. Time value of money is considered by accreting liabilities and calculating interest expense. Interest yield curves are always historicized, in order to consider their changings in time, and properly identifying components related to unlocking and unwinding.

Tagetik will provide a predefined set of accounts for IFRS 17 to start with, in order to support accounting rules to generate IFRS postings, as well as to manage reporting and disclosure. Tagetik is currently working on enhancing their solution in order to include reinsurance and contracts with discretionary participation features.

**Figure 41: Tagetik IFRS 17 Capabilities**

BBA
PAA
VFA

* Since the final IFRS 17 standard has not been published yet, there remains uncertainty regarding the final conception of the Variable Fee Approach. Therefore, providers were only asked if their solution will be able to support the VFA in the future.

**Source: KPMG, Germany, 2016**

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**IFRS 9 Capabilities**

Tagetik provides impairment functionalities based on expected loss calculation. The application leverages statistical and risk data to perform stage allocation and stage transfer, monitoring the trend of these data.

Tagetik is currently implementing financial instruments classification within their solution. Its focus being on SPPI test.

Disclosure is managed by means of Tagetik financial reporting platform and by the integration with Qlik sense – at a higher granularity level.

Tagetik applies a modular approach. This means that scope and functionalities could be customized depending on each customer’s special needs; for example the application could optionally (re)calculate the IFRS amortisation plan, as well as EIR/CAEIR, where needed.

At a group level Tagetik can manage centralized or local approaches; it is also possible to implement hybrid solutions.

**Figure 42: Tagetik IFRS 9 Capabilities**

Classification & Measurement
Impairment
Hedge Accounting

**Source: KPMG, Germany, 2016**
With zeb.control, the German consulting and software company zeb has developed a risk management, accounting and controlling platform that is already capable of dealing with the challenges associated with all three of the upcoming insurance regulations: Solvency II, IFRS 17 and IFRS 9.

zeb.control has been implemented at 63 mainly small and medium-sized insurance companies and is growing in implementation projects.

### Solution Capabilities

In terms of its technical specifications, the solution was developed using Java and has the following modules:

- zeb.control.solvency.II: version 2.7
- zeb.control.accounting ifrs 17: version 1.0
- zeb.control.accounting ifrs 9: version 1.8

Source: KPMG, Germany, 2016

### Solvency II Capabilities

zeb.control is capable of addressing Pillar 1, Pillar 2 and Pillar 3 requirements. While SCR/MCR can be calculated using a standard formula at solo and group level, risk modelling results can also be imported from various sources. Pillar 2 ORSA and simulation is provided as well. For Pillar 3, QRT Reporting, XBRL file generation and XBRL validation is supported for further transfer to European authorities or use in narrative reporting.

A new release is planned in 2016 to address the final requirements of the regulations for pillars 1, 2 and 3.

Source: KPMG, Germany, 2016
IFRS 17 Capabilities

zeb.control has recently been extended to address IFRS 17 requirements with the new component zeb.control.accounting. ifrs 7, which includes both BBA (Building Block Approach) and PAA (Premium Allocation Approach). The level of valuation depends on technical components; cash flows are necessary at least on a quarterly portfolio tranche level; CSM is calculated at portfolio level (to allow smoothing effects between insurance contracts).

Deterministic and stochastic models as well as deferred tax valuations can be reused if they are implemented in the Solvency II module of zeb.control.

Contracts with discretionary participation features will be supported in the future. zeb has done conceptual work with regard to the support of the Variable Fee Approach (VFA).

Figure 45: zeb.control IFRS 17 Capabilities

<table>
<thead>
<tr>
<th>BBA</th>
<th>PAA</th>
<th>VFA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>VFA will be supported*</td>
</tr>
</tbody>
</table>

* Since the final IFRS 17 standard has not been published yet, there remains uncertainty regarding the final conception of the Variable Fee Approach. Therefore, providers were only asked if their solution will be able to support the VFA in the future.

Source: KPMG, Germany, 2016

IFRS 9 Capabilities

zeb.control is capable of addressing IFRS 9 requirements. For phase 1, classification and measurement, amortised cost valuation and fair value is supported. Impairment calculation for phase 2 is supported, including linking financial instruments to statistical and risk data (e.g. PD, LGD). In addition, hedge accounting incl. validation (e.g. effectiveness test) is also supported.

Figure 46: zeb.control IFRS 9 Capabilities

<table>
<thead>
<tr>
<th>Classification &amp; Measurement</th>
<th>Impairment</th>
<th>Hedge Accounting</th>
</tr>
</thead>
</table>

Source: KPMG, Germany, 2016
Technical Coverage

Chapter 3
As described above, we have developed a generic Finance & Risk reporting architecture that allows the mapping of functional requirements and capabilities to technical components. We found this to be useful for discussions between business and IT departments.

**Data Sources layer**
- Retrieve and transfer data from insurance systems (e.g. policy mgmt., claims mgmt., commissions, etc.) or other systems, e.g. asset mgmt., general ledger, etc.
- Possibly feedback results to insurance or other systems

**Data Workflow layer**
- Auditably manage data flows from sources through valuation and risk into the reporting layer
- Store valuation and calculation parameters, assumptions, scenarios, etc.
- Harmonise source data, ensure full versioning, perform aggregation, etc.

**Asset Valuation layer**
- Valuate financial assets/instruments according to group and local GAAPs (e.g. for IFRS 9 incl. fair value, impairment and hedge accounting)
- Valuate financial assets/instruments according to risk reporting requirements (e.g. for Solvency II)

**Actuarial Valuation layer**
- Valuate Life/Health insurance contracts (e.g. through actuarial projection)
- Valuate Non-Life insurance and reinsurance contracts

**Risk layer**
- Calculate standard formula/MCR/SCR, risk exposures, stresses
- Strategically allocated assets, perform asset/liability mgmt., prospectively analyse scenarios
- Plan P&L and balance sheet, calculate P&L attribution

**Reporting layer**
- Deliver financial reporting for group (e.g. IFRS, major changes in 2019) and local GAAPs (e.g. GoBD for DE, US-GAAP) in good time
- Deliver risk reporting for group and solo entities (e.g. Solvency II in 2016) in good time
Technical Coverage

- Data Source
- Data Workflow
- Asset Valuation
- Actuarial Valuation
- Risk
- Reporting

- Low Coverage
- Medium Coverage
- High Coverage
- Very High Coverage

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Summary and Recommendations

It’s time to face the challenge

This solution comparison shows there is a wide range of different solutions available. This is especially the case for Solvency II. However, there is also an increasing number of solutions emerging that consider the upcoming standards IFRS 9 and IFRS 17. There may be some overlap in the functionalities of the different solutions but there are also various differences with regard to functionalities and target of the respective solutions. There is no undisputed market leader for either regulation. It is also important to note that any solution does not have to cover all three of the accounting/regulatory standards since also a combination of different solutions for different purposes might be a possible implementation scenario. In the end the choice of one or multiple solutions depends on various aspects.

- It is important for the individual insurance company to assess the current as-is state of their systems architecture, i.e. assessment of the maturity level of the systems architecture, etc.
- Insurers should define their vision of the organisation’s systems architecture’s end state.
- Any identified gaps can serve as a basis for an assessment and the selection of solutions.

In the selection process insurers should consider:

- the flexibility and openness of the vendor and its solution (e.g. is it possible to add additional interfaces; is the solution able to consider results from third-party systems).
- solution synergies between Solvency II, IFRS 9 and IFRS 17.
- since the IFRS 17 standard has not been finalised yet, it is important to check if vendors plan to update their content according to any upcoming changes (e.g. Variable Fee Approach).
The information contained herein is of a general nature and is not intended to address the circumstances of any particular individual or entity. Although we endeavour to provide accurate and timely information, there can be no guarantee that such information is accurate as of the date it is received or that it will continue to be accurate in the future. No one should act on such information without appropriate professional advice after a thorough examination of the particular situation.

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