Getting up to speed
Solvency II data and systems
Executive summary

Streamlined information technology systems and effective data management are core components of a Solvency II implementation initiative and key to the success of any business-driven program. Industry activity over the last 18 months has demonstrated that insurers recognize the importance of data quality in achieving Solvency II. Given the time pressures and broader change agenda, it is clear that data quality requirements continue to represent a major challenge and risk to many insurers’ ability to meet compliance deadlines.

Solvency II is not the only regulatory challenge insurers must prepare for. Insurers need to also factor in the proposed new international financial reporting standards under IFRS 4 Phase II.

IFRS 4 Phase II and Solvency II have many technical similarities. However, contract boundaries, discount rates, risk margins and the residual margin represent significant areas of potential differences between Solvency II and IFRS 4 Phase II, creating the need for solution blueprints to be adaptable to provide leverage opportunities. Since Phase II is likely to commence at a later date, data and system solutions for Solvency II will need to be validated against this new reporting standard to avoid expensive re-tooling when Phase II commences. All of these factors must be addressed when developing the IT strategy, and a single platform solution should not be considered without checkpoints for future developments.

In this article, we will address some of the regulatory requirements and EIOPA (European Insurance and Occupational Pensions Authority, formerly CEIOPS) comments in relation to data quality, take stock of the market response to date, and reflect on the challenges still to come with IFRS 4 Phase II.
Solvency II requirements in relation to data

Data is at the very core of the Solvency II articles, and it is clear that any internal model approval process (IMAP) will focus heavily on data input to the model. It is widely recognized that the increased frequency of Solvency II reporting is likely to require organizations to collect and prepare data faster than they do today. Many in the industry are also finding that they need to aggregate or segment data in new ways, and to source additional data that they have not previously modeled.

But most importantly, EIOPA has set out a number of explicit and stringent data quality requirements, as shown in Figure 1.

Figure 1. EIOPA data quality requirements:

- Embed a system of data quality management across the entity
- Compile a directory of data attributes used in the internal model, stating each attribute’s true source, characteristics and usage
- Define and monitor processes for identification, collection, transmission, processing and retention of data
- Ensure data processing from source to model is transparent and demonstrable
- Define objective metrics for completeness, accuracy and appropriateness of data
- Establish a data policy which sets out the entity’s approach to managing data quality
- Perform periodic data quality assessments, and implement a process for identifying and resolving data deficiencies
- Document instances where data quality may be compromised, including implications and mitigating actions
- Provide an audit trail and rationale for data updates when applying expert judgment in lieu of reliable internal or external data
- Agree with the role of internal and external auditors in assessing data quality
- Establish a process to manage changes or data updates which materially impact model outputs

For many non-life insurers, the Solvency II data requirements pose significant challenges for their liability data. Catastrophe modeling data is a particular concern, with issues around availability and granularity of key non-financial information. Specifically, these issues relate to the age of data, as there are potentially long lags between production of useable datasets (exacerbated for reinsurers), and a lack of granularity about geographical location for all the risks and error rates on building types and other descriptor fields.

For life insurers, there is increasing pressure to obtain greater transparency on asset and investment risk data, with counterparty exposure, corporate debt and liquidity of assets being targeted in particular.

The Solvency II QIS exercises have frequently highlighted to firms a number of additional data requirements to calculate solvency capital under the standard formula, and to populate the reporting templates. Additional processes and controls are likely to be required for all firms, for example, in the sourcing of additional data for complex assets for investment risk and counterparty risk modeling. The most recent QIS 5 exercise highlighted the granularity of asset data as a key challenge facing the industry. In many cases, the current data available was found to be insufficient for performing the full “look-through” calculations for the SCR as required by QIS 5. As a result, a suite of assumptions had to be made on the underlying asset mix, with minor changes to the assumptions, potentially resulting in material changes to model outputs. Regulators are likely to take a dim view of such assumptions being used in lieu of reliable asset data.

Taking stock – the market response to date

In our experience, the maturity of Solvency II data workstreams varies widely from insurer to insurer. Some organizations established strong early momentum as far back as 2009, and have moved steadily from gap analysis, through solution design, to implementation. Other organizations, including some major global institutions, have struggled to make significant progress to date and have begun 2011 by re-planning their data workstreams from the bottom up. Most insurance companies are somewhere between these two extremes, making headway in certain areas, but struggling in others.

Organizations seeking internal model approval only have a few months remaining before they may be required to demonstrate their compliance with Solvency II data requirements to local regulators. Given the relatively short time remaining, it is important that insurers take the opportunity now to review their data workstreams and confirm that they are on track to deliver.

To help organizations take stock of the progress they have made, we have set out our view of the key Solvency II data workstream activities and the key factors that have driven success or failure to date in Figure 2.
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Technology change as an enabler for effective data management

It is important to recognize that insurers are not all starting from the same place in terms of their technology infrastructure and, therefore, it is difficult to set common industry benchmarks in terms of a minimum level of IT spend for Solvency II. Some programs are making little or no change to current IT infrastructure, while others are investing significant seven- or eight-figure sums in new IT to support Solvency II. Despite these wide variations, some common themes have emerged:

• Wholesale remediation of front-end policy systems is not feasible. This is due to the exorbitant cost and time required, along with data quality issues that must then be corrected downstream. The exception is when legacy change programs are already in flight and Solvency II requirements can be incorporated with limited impact on cost.

• Investments are made in standardized system interfaces using common ETL tools, but the focus is initially on the critical interfaces between large policy administration and finance systems to minimize cost and delivery risk.

• There is a significant investment of time to investigate the pros and cons of a Solvency II or enterprise data warehousing solution. Some organizations have elected to take a phased approach by implementing tactical operational data stores orrepositories to replace critical areas of manual data preparation. This approach offers a balance between an organization’s appetite for spend, and the need to achieve Solvency II compliance in a limited time window. Data warehouses also align with a strategy to support increased reporting requirements driven by the proposed new IFRS 4 Phase II standard.

• Selection and deployment of the actuarial modeling tools are being treated as a distinct workstream from remediation of upstream data architecture, and dependent on clear business requirements from other parts of the Solvency II program.
### Figure 2. Key features of workstreams

<table>
<thead>
<tr>
<th>Key activity and regulatory driver</th>
<th>Key features of successful data workstreams</th>
<th>Common issues for struggling data workstream</th>
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</table>
| **Data scoping and prioritization**  
EIOPA advises compiling a directory of data used in the internal model, and applying the principle of proportionality when considering data quality. | Early completion of a robust data directory, which provides greater certainty of scope  
Clear prioritization of data, with efforts targeted at datasets which have the most material impact on modeling activities (For many non-life insurers, the exercise has resulted in a focus on catastrophe modeling data in particular, and insurance risk data in general. For life insurers, investment risk data has been prioritized, targeting data related to counterparty exposure, corporate debt and liquidity of assets.)  
Use of pragmatic, phased approach (focusing on one to two key datasets initially) to establish strong early momentum | Lack of input from the business during prioritization exercise, particularly finance and actuarial functions—failure to obtain formal sign-off of the directory from the business also creates problems with scope creep  
Data directory is based on existing standard formula or QIS data requirements, but does not capture additional Sil data needs from the business  
“Big Bang” rather than phased approach, which can result in far greater strain on business and IT resources, leading to bottlenecks, delays and increased cost |
| **Data lineage**  
EIOPA highlights the importance of understanding and monitoring the systems and processes used to collect, store, transmit and process data. | Data-flow documentation that maps end-to-end lineage of data, from the entries in the Solvency II data directory back to the ultimate sources  
Risk and control assessment of each data-flow, which considers the likelihood and impact of data integrity issues arising between source and model, and identifies potential process and control improvements to mitigate such issues  
Leverage existing SOX or equivalent internal control frameworks to provide some assurance over their data lineage. | Data-flow mapping not sufficiently detailed, particularly in relation to key controls and precise nature of key data transformations  
Data-flows not risk assessed, and potential process and control improvements not identified  
Unwarranted assumption that existing SOX and QIS controls provide sufficient coverage for Solvency II data, and that no additional activity is required |
| **Data quality assessment**  
EIOPA states that internal and external data must be demonstrably appropriate, accurate and complete. | Use of targeted data profiling to prompt discussions on data quality, and to provide starting point for business rule definition  
Agreed business rules and assessment criteria for each material dataset  
Prototype dashboards and MI to summarize and communicate results of data quality assessments  
Defined problem resolution process to track identified deficiencies, investigate root cause and monitor remediation actions to completion | Drafting the data policy as a priority, rather than focusing first on building the data quality assessment regime itself, leading to an aspirational policy document that does not reflect current practice, and that may be difficult to operationalize within the regulatory timeframe  
Adopting a “cart before the horse” approach by performing large-scale data profiling and creating reporting dashboards, without first having defined a comprehensive set of business rules  
“Woolly” business rules cannot be measured objectively |
| **Data governance**  
EIOPA states that “data quality management is a continuous process” that should be supported by formal procedures around data definition, data quality assessment, problem and deficiency resolution and ongoing data quality monitoring. | Current-to-future state analysis of data governance and data quality maturity  
Design of robust data governance solution, including roadmap to implement a future-state data governance framework, and clearly defined future-state data ownership model  
Focus on Solvency II data only in first phase, with scaling possible to rest of enterprise in future | No agreed roadmap for future state data governance  
No agreed executive sponsorship, and lack of clarity over where responsibility for data governance will sit in the business  
Lack of clear implementation plan  
Lack of clear BAU operating model, including requisite people, processes and tools to maintain data governance activities in BAU |
| **Third-party dependencies**  
EIOPA states that internal data should be treated in the same way as external data when assessing data quality, and that the collection, storage, transmission and processing of third-party data should be given particular focus. | Documentation of all key external data dependencies  
Development of SLAs, or amendment of existing third party reporting (e.g., SAS70) to provide comfort regarding the integrity of third-party data processing  
Development of standardized data request procedures and provisioning templates, to ensure data is received in consistent format and timelines  
In-depth discussions with third-party asset managers to ensure that suitable data can be sourced and made available in acceptable timeframes  
Initiation of vendor readiness assessments, whereby right of access is gained to external vendors to assess key data processes and controls | No common understanding of key third-party dependencies, particularly in relation to external asset management processes  
Unfounded assumption that data received from external parties is reliable  
Solvency II workstreams focusing on liabilities data at the expense of asset data  
Limited or no dialogue with key third-party data providers  
Lack of clarity around additional asset data requirements |
What’s next – challenges to come
For many insurers, including those with relatively mature Solvency II data workstreams, the biggest challenges are yet to come if they are to achieve compliance. Over the last 12 months, regulators have repeatedly highlighted data management as an area where the insurance industry still has more to do, relative to other areas of Solvency II.

Data governance – moving from design to implementation
Few organizations have implemented the data governance frameworks they designed over the last 12 to 18 months. Establishing a framework is a potentially complex and lengthy process.

Implementation of a data ownership model can be equally challenging. The use of broad terms such as “data owner” or “data steward” can cause confusion if not properly defined, especially where data frequently changes hands and passes through multiple systems and processes. Insurers must consider all facets of data ownership, for example, who creates or produces data, who receives or consumes data and who is able to change or update data.

It is important that individual roles and responsibilities are clear, and that those individuals receive appropriate support and training to make the roll-out a success.

Data quality assessments – the importance of business rules
When responding to the challenge around data quality, many organizations have commissioned some form of data profiling to identify potential data issues. This presents a risk that insurers are adopting an approach that fails to first define a comprehensive set of business rules. In data management, business rules describe the expected characteristics of the data, for example, a data of birth field may always require six numeric characters. The format of the field must be DDMMYY, and the date specified must be at least 18 years prior to the date entered in the policy inception field. A simple profiling routine can then assess whether these rules have been broken for an entire population of policy records or for a sample group. More complex rules could potentially draw upon census data and past trends in policyholder age to assess the validity of the data entered.

Without business rules, data profiling can highlight potential issues based on statistical analysis, or generic criteria that are assumed to be unacceptable. Although this can provide early warning of major data integrity issues or confirm long suspected problems, such profiling affords only limited insight into the true quality of data.

It is important that organizations develop business rules that facilitate a comprehensive assessment of the completeness and accuracy of their data by engaging with subject matter experts throughout the business. Once rules are defined and agreed on by business stakeholders, data profiling methodologies and tools can provide in-depth, insightful data assessments in a highly efficient and repeatable manner.

Remediation – the hidden cost
Insurers and local regulators generally accept that the current state of data quality will likely fall short of Solvency II minimum requirements. Most Solvency II programs have focused on understanding the current-state data landscape: mapping data lineage from model back to source, identifying existing control points and baselining the current quality of key datasets. Relatively few programs have identified key deficiencies across this landscape or developed a robust remediation plan to improve their data quality before the end of 2012.

For most insurers, the extent of the data remediation effort required to achieve compliance, and the associated cost and timeframes, remains a complete unknown. It is imperative to start planning as soon as possible. The extent of technological change required to support minimum Solvency II may only become clear once a full remediation analysis is completed and business requirements have been crystallized. By initiating IT change before a remediation plan is in place, organizations are at greater risk of either going too far, missing the deadline and overspending, or not going far enough and falling short of the minimum requirements.

In our view, Solvency II data remediation priorities fall into three broad categories as summarized in Figure 3.
Internal model validation – focus on the data

Asset, liability and financial data are often a significant area of change for firms developing and applying for approval of an internal model. To gain internal model approval, it is necessary to demonstrate that the model meets further governance requirements and standards of statistical quality. Processes and controls on the data flows for external as well as internal data will need to be demonstrated. In particular, Article 121 on Statistical Quality Standards requires that all data used for the internal model shall be accurate, complete and appropriate – and this will need to be evaluated as part of the validation of the internal model (regardless of whether the data is sourced internally or externally). To meet the Use Test, it will be necessary to provide evidence that the firm’s governance system has an understanding of the underlying data limitations of its internal model.

Many organizations are performing initial validation of their internal model this year. We recommend that insurers include a robust data validation exercise, including both inputs and outputs, as part of this process.

Figure 3. Solvency II data remediation agenda

<table>
<thead>
<tr>
<th>Direct data profiling and cleansing</th>
<th>Process and control remediation</th>
<th>Sourcing additional data</th>
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<tbody>
<tr>
<td>▶ Focus on quality of non-financial data, as less likely to be previously audited</td>
<td>▶ Additional automated controls over data input, e.g., field validations</td>
<td>▶ Improvements to the granularity of data available for modelling, particularly for asset data where fund-level information may not be sufficient and full look-through to individual asset classes and products may be required</td>
</tr>
<tr>
<td>▶ Assess financial data only where not audited or known to have issues</td>
<td>▶ Additional manual controls over data input e.g., “four-eyes principle” checks</td>
<td>▶ Early interaction with third parties so that additional data can be sourced timely, including use of standardized templates to request additional data, and creation of SLAs specifically relating to data quality</td>
</tr>
<tr>
<td>▶ Base line of historical or run-off data to enable a “once only” approach to data quality</td>
<td>▶ Consistent control framework for automated interfaces</td>
<td>▶ Consistent approach to dealing with timing issues, for instance, underwriting backlogs where policies are incepted months before the policy data is input on systems</td>
</tr>
<tr>
<td>▶ Identify systemic issues through null-fields, duplicate records and other basic profiling checks</td>
<td>▶ Removal of email and optical media as acceptable methods of transferring key data</td>
<td>▶</td>
</tr>
<tr>
<td>▶ Identify non-systemic issues through application of tailored business rules, developed in conjunction with business</td>
<td>▶ Replacement of manual data transfer with automated interfaces where possible, or improve controls over manual interfaces where not</td>
<td>▶</td>
</tr>
<tr>
<td>▶ Cleanse data only where root-cause is understood and there is no risk of creating inconsistency with ultimate data source</td>
<td>▶ Consistent, robust control framework for key EUCs</td>
<td>▶</td>
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<tr>
<td></td>
<td>▶ Deployment of tools to manage EUCs</td>
<td>▶</td>
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<tr>
<td></td>
<td>▶ Replacement of high risk, transformational EUCs with automated ETL tools</td>
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Technology change

Many remediation considerations have a technology element, with potential for additional front-end system controls, automation of interfaces, industrialization of EUCs, implementation of ETL tools and development of data-stores or warehousing solutions.
Conclusion

Poor quality data has the capacity to undermine the integrity of an organization’s technical reserves and internal models, and the potential to derail compliance by 31 December 2012.

Detailed planning and prioritization is essential to make the best use of the short time remaining and to promote a pragmatic approach that targets the most material data. Organizations should focus relentlessly on the areas that are most important to success, such as establishing source and lineage of key data, implementing data-ownership and building robust business rules and data quality metrics. These requirements should be applied on a prioritized basis to the most critical data first. We would encourage non-life insurers to focus particularly on non-financial data used in catastrophe modeling and large loss data. For life insurers, recent QIS processes have highlighted asset data granularity and availability as the key challenges.

Deficiency evaluation and remediation planning should be accelerated, as data quality remediation is increasingly becoming the “elephant in the room” for many Solvency II programs and could require significant additional budget considerations and resources.

Given the time pressure on Solvency II programs, it is important that insurers continue to adopt a pragmatic approach to Solvency II data quality between now and the regulatory deadline. However, organizations should also consider the broader change agenda, including IFRS 4 Phase II and the evolution of enterprise data architecture management. There is a small window of opportunity remaining to understand synergies between Solvency II and other organizational objectives, and to adapt existing programs to harness these synergies. Insurers should begin to think now about what happens after 31 December 2012.
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Contacts
Steve Bell
sbell@uk.ey.com
+44 20 7951 1647

Martin Bradley
mbradley@uk.ey.com
+44 20 7951 8815

David Foster
dfoster@uk.ey.com
+44 20 7951 5687
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SCORE No. EG0070
1105-1254052 NY

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