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Risk Integrator

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Introduction

The **Solvency II** project is a regulatory sea change for the insurance industry that requires a fundamental transformation of both risk management and decision making in insurance companies.

At its heart, it requires that each company develop a risk management system that is fully integrated into the business, one that affects all decisions on products, investments and risk profiles.

As a result, all insurance companies, regardless of their current risk management framework, are facing a new and more demanding relationship with their supervisors. Their entire risk management structure will be under constant review and will need to meet an exacting set of standards covering every aspect from database design to high-level governance structures.

One of the most important challenges in the transition to Solvency II is the development of a stable and robust calculation environment **—a stable platform—** which can manage the integration of the wide range of exposures, parameters and methodologies employed across the company.

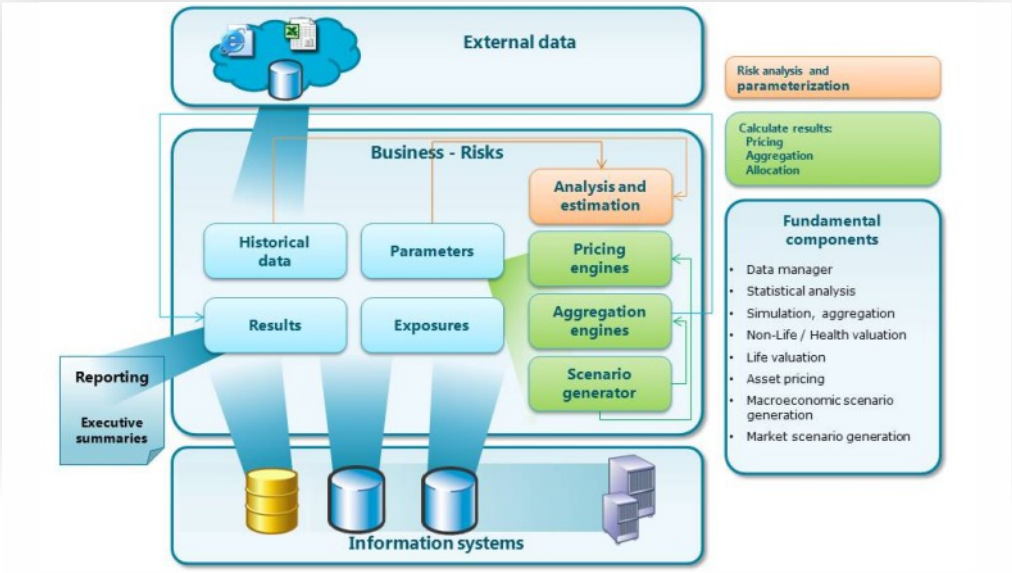
Even for companies with significant experience with integrated risk measurement, achieving and maintaining such a stable platform is rarely an easy task. It requires:

- ⇢ Gathering together all of the different calculations and data dispersed throughout the many departments/areas/software of the company.
- ⇢ A high degree of automation in the calibration and calculation processes.
- ⇢ Strict control of the technical and operational risks related to the calculation process.

Building a stable platform

The figure below is a schematic diagram of a typical architecture for a risk measurement system, highlighting the many different elements and processes that are involved.

Figure 1- Architecture of Integrated Risk Measurement Framework



These include:

⇢ data extraction and loading

⇢ parameter estimation

⇢ scenario generation

⇢ exposure valuation

⇢ risk aggregation

⇢ reporting, etc.

As a consequence of this variety, the risk measurement framework is typically made up of **many types of tools and software**, generally a mixture of in-house and third-party products.

The Role of Risk Integrator

This variety, however, raises significant complications when it comes to producing results that are consistent, reliable and auditable.

Thus, a primordial component of a stable platform is **a controller that can oversee the entire process**, one that can:

⇢ Assure that all of the steps are executed at the right moment and in the right order;

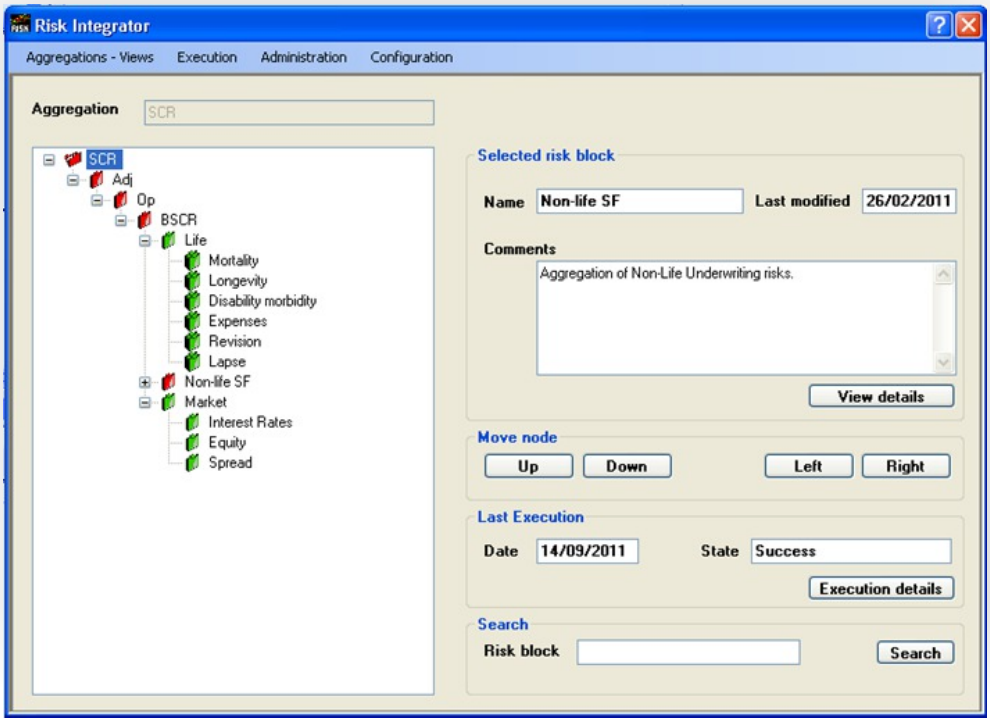
⇢ Manage the coordination between the exposure files, parameter and scenario sets for each risk type;

⇢ Aggregate the resulting risk outputs in a consistent manner.

Without a controller of this type, achieving robust results that meet the demands of all stakeholders can be very costly.

Risk Integrator provide s the required control layer.

Figure 2 - Aggregation Hierarchy of the Risk Integrator

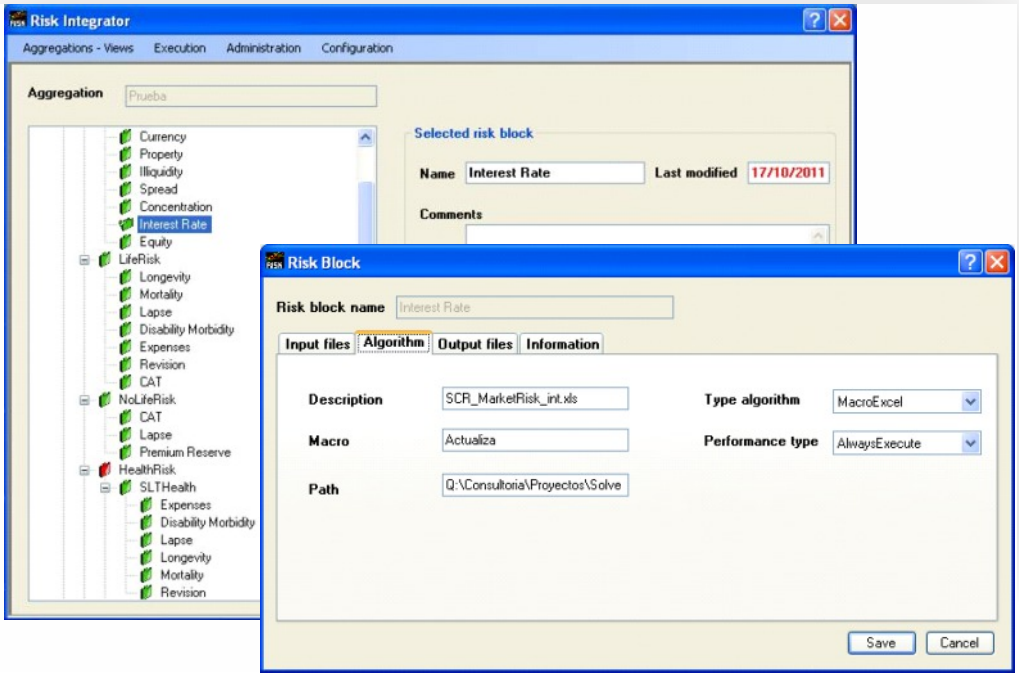


Risk Integrator provides a stable platform for a company's Solvency II calculations (whether the standard formula, internal models or a mixture of both), while at the same time taking full advantage of whatever tools or software are currently place.

As shown in the preceding figure, with Risk Integrator one can organize the risk measurement framework by means of a fully customizable tree structure that mirrors the entire risk aggregation structure, with each node in the tree representing a step in the capital calculation. Each sub-node of the tree can be run separately, the user has easy access to all of the most recent execution details and the nodes are color-coded to provide an instant visual status check of the entire tree.

The nodes of the aggregation tree, called Risk Blocks, represent work steps that the user defines by specifying the input files; the tool or the algorithm to employ; and the output files for the risk results and reporting. The following figure illustrates a Risk Block that defines the work step for the estimation of interest rate risk.

Figure 3 - Risk Block Definition



In a sequence of tabs on the Risk Block definition form, the user defines the input files, the algorithm (and its tool), the output files (both model results and reporting) and also information relating to the documentation of the work step (high-level comments plus references to detailed documentation).

Instead of forcing all calculations onto a single platform, Risk Integrator links across platforms allowing the most suitable tool to be employed in each step. Risk Integrator can be linked with and make calls to the different data sources and tools associated with each work step.

Finally, after every run, Risk Integrator saves all the inputs and outputs, leaving a complete, transparent audit trail and allowing any past run to be repeated in the future.

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Standard Formula

Risk Integrator includes a module for calculating the Solvency Capital Requirement (SCR) with the standard formula, using the fundamental inputs (change in NAV, etc.) supplied by the user. The module is made up of a pre-defined Solvency II aggregation hierarchy and a set of Excel based calculators, one for each node of the tree. All of the worksheets, parameters and calculations are fully transparent to the user. Any of these pre-defined standard Risk Blocks can be combined with user-defined Risk Blocks to create a fully customized aggregation hierarchy.

Flexibility

Risk Integrator can be used as a controller for many other modelling tasks, such as:

- Product profit testing
- Risk reporting (ALM, reinsurance, …)
- Risk/return reporting (e.g. RAROC) by line of business
- Capital projection and other solvency calculations.

Indeed, whenever a company needs to control and run multiple processes and data sources, Risk Integrator can be used as a top-level layer for organizing the whole procedure, providing traceability, flexibility and confidence in the quality of the results.

Technical Architecture

Risk Integrator is implemented in an environment that allows for the decoupling of the presentation layer, data storage and execution settings. It allows both stand-alone as well as distributed installations, aligning itself with the in-place system architecture.

Some of the key features are:

- It can work with both internal data storage and corporate databases (Oracle, SQL Server, Teradata, MySQL, …).
- Its database is supplied open and fully documented, facilitating the audit process and ETL integration strategies.
- The command console and data connectors have been developed in .NET, allowing the tool to interact natively with any system via .NET, ActiveX, VB, VBA, the command-line, shell, etc.
- The execution environment is multithread, meaning that execution time can be optimized by executing non-dependent processes in parallel.

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Summary

Risk Integrator provides:

- Centralized workflow control.
- Traceability / reproducibility of results.
- Management and control of inputs coming from multiple platforms and applications.
- Full transparency of the calculation process and easy incorporation of new methodologies and software.
- Minimal time and cost of installation.
- Minimal cost of further development.

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