

R³S Modeler

Simplifying the complexity of actuarial, regulatory and risk-based modeling.



R³S Modeler enables users to build calculations that reflect the way the company operates

99



R³S Modeler

RNA Analytics R³S Modeler is a current-generation risk and actuarial software tool designed to cater for the needs of insurers when complying with regulatory and reporting requirements, undertaking product development or investigating their risk exposure.

With many regulations and reporting standards taking a principles-based approach, flexibility is paramount in deciding what tool to use. Flexibility was central to the design of R³S Modeler when it was initially developed and this continues to be the case. It enables users to build models to perform many types of calculations and is most commonly used for product pricing and design, budgeting, statutory valuations, marketconsistent embedded value valuations, IFRS 17, asset and liability management (ALM), RBC approach, economic capital and Solvency II calculations.

R³S Modeler enables users to build reusable components covering:

- Accessing external data from multiple sources
- Multidimensional tables of assumptions stored and managed internally or externally
- Programs that define the calculations, which can include interactions between different programs
- Granularity of output necessary to populate required reports

Users can bring these components for data, assumptions, programs and reports together to build models to meet different risk and actuarial requirements. Once built R³S Modeler generates highly-optimized executable files that users can run locally or in the cloud to give results that can be accessed using R³S Modeler, Microsoft Excel® or other third-party reporting tools.



Data in R³S Modeler

R³S MODELER

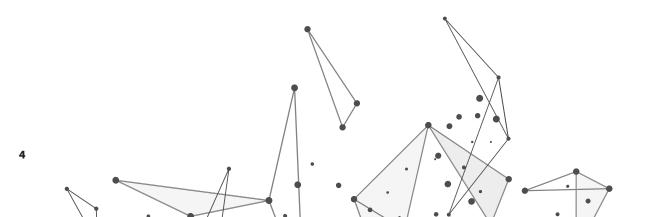
R³S Modeler can read individual data records or representative summary model points from a variety of sources. These include:

- User-specified values
- Fixed-width text files
- Delimited text files (for example .csv)
- Microsoft Excel spreadsheets
- Databases (for example, Microsoft Access® and Microsoft SQL Server®)

The data can be used to calculate other required values to define the initial start position of a projection as well as create and process grouped model points from existing data sources. The software deals with all these tasks efficiently within the same system, so there are no separate preparation stages or manual processes necessary to adjust the data once it has initially been prepared by IT.

How is this useful?

- For statutory valuations, R³S Modeler can access extracts or databases containing details of all contracts on the policy administration systems as well as data from previous runs and reporting periods
- For "what if" asset-liability modeling work, there is a facility to compress the company's investments and contractual liabilities into representative model points to allow faster runs and more scenarios to be considered



Assumptions in R³S Modeler

R³S Modeler assumptions reflect business information, such as:

- The results of analysis into the company's recent experience, such as the share of expenses attributed to policies
- Future predictions, such as investment yields and future mortality rates
- Shared product information, such as the commission scales paid to sales representatives

The software treats assumptions independently of a program, model or run so users can amend the assumptions without having to alter any corresponding programs as well as use the same assumptions for multiple purposes.

Assumptions in R³S Modeler are simple to manage and can be referenced, easily amended or re-used in multiple locations. Also assumptions can be stored and managed in a single assumption file to reduce management and storage requirements.

R³S Modeler can handle multiple assumptions in a wide range of formats, allowing for:

- Easy differentiation of percentages, rates and decimals, which reduces set-up errors
- Inputs as either scalars or multidimensional arrays (which enable multiple parallel calculations)
- Mortality tables that include ultimate and select rates (and can also depend upon other factors, such as calendar year) that can be accessed directly or through commutation and standard actuarial functions

R³S Modeler is built using standard Microsoft Windows® technologies, so that users can easily copy data ranges directly from MS Excel®, to save time in the setup process.

Programming in R³S Modeler

Creating calculation routines within R³S Modeler requires no prior programming knowledge or experience as the syntax is intuitive to use when defining and referencing variables, calculations and components.

When creating models the user is assisted in this by:

- Color-coded syntax highlighting to help make formulas easier to understand
- Built-in mathematical functions, including commutation functions, such as qx and Ax:n
- Event formulas to model features that may repeat many times in a projection step, such as premium payments
- An Analyzer view showing the precedents and dependents of the current variable
- Ability to define data types and display formats for the variables, such as dates, characters, indicators and currencies
- Extensive library of standard code for a wide range of assets, liabilities and processes

The R³S Modeler user-friendly working environment facilitates easy development of the code through:

- Simple intuitive Windows interface
- Drag-and-drop facility to aid programming
- Sharing object code between
 programs
- Code analysis tools that allow users to track precedents and dependents of variables
- Full on-screen help and documentation



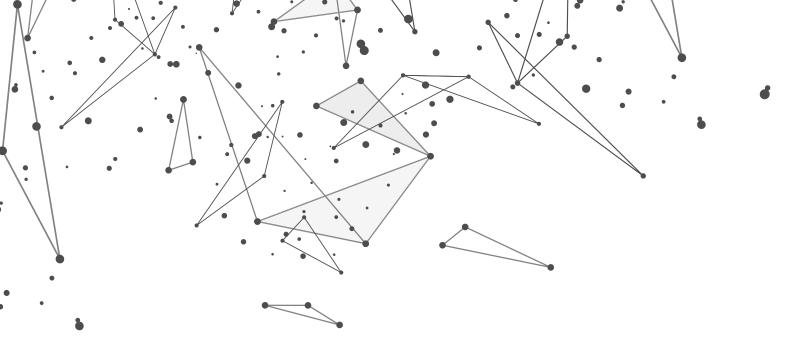
Models in R³S Modeler

The graphical user interface of the software enables users to see the relationships between variables, programs and projection layers visually, which can help with the development and comprehension of complex relationships between various parts of the model. R³S Modeler enables users to build calculations that reflect the way the company operates, including allowing for hierarchical structures when aggregating values and making dynamic feedback decisions.



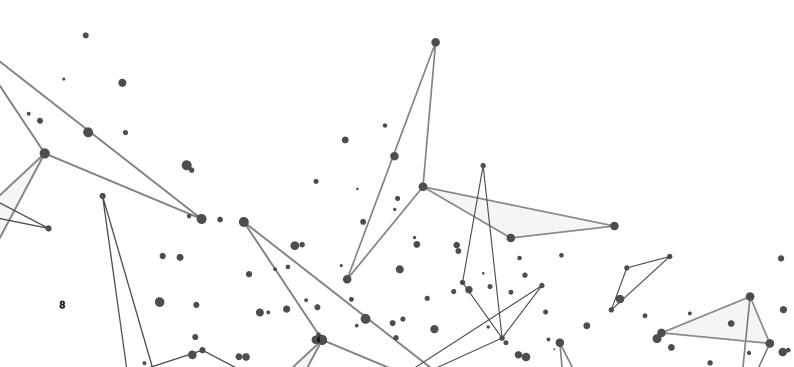
R³S Modeler enables users to:

- Build programs by combining ready-made code for standard products and calculations
- Build ALM models of the company by linking programs in a hierarchical structure
- Expose key parameters so that they can be specified at runtime, allowing the user to build greater flexibility into the model so that, for example, the number of scenarios, the data files, the portfolio date and the projection step lengths can be specified at runtime without editing the model



Results in R³S Modeler:

- R³S Modeler caters for a wide range of output options, including:
- Optimized output where only the calculations necessary for the specified output are completed
- Individual output for obtaining values for each data record
- Results that can be accessed in Microsoft Excel using the provided add-in tool or using other reporting tools via their ODBC drivers





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