

SIMPLE SOLUTIONS TO COMPLEX PROBLEMS



Presentation **innoVar**

Szena is a Spanish software factory specialised in the design and development of technologies for the valuation of financial instruments and financial risks management and control.



Szena Risk

We started our company based on our experience as developers of bespoke software solutions for financial risk management and simulations of nuclear risks in nuclear power plants. Szena Risk is a spin-off of Indizen Technologies, an IT consulting firm specialized in software solutions and quantitative models for financial risks management and has strong presence in the mayor Spanish financial institutions.

Our Principles

In Szena we try to empathize with our clients, the design of our products is based in a deep knowledge of the needs of our clients and the problems of the daily operation. Some of our partners and employees worked previously in financial institutions.

We aim to cope with the most sophisticated functional requirements for what we use our own proved algorithms implemented by means of affordable technologies in terms of cost and maintenance.

Our relationship with our clients is based in the highest ethical standards of honesty. We develop our work with the highest levels of scientific objectivity in order to provide tools to make the best business decisions. We are committed to using the most appropriate techniques and technologies for the benefit of our clients.

Our Advantages

We are offering a highly sophisticated tool for the valuation of financial instruments and portfolio risk management. The development was focused on the use of the most advanced financial algorithms and the best software engineering techniques.

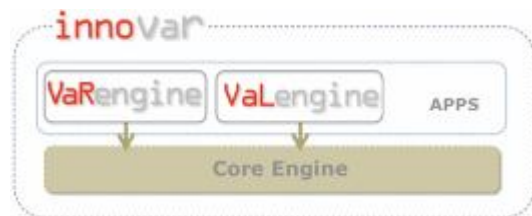
Our solution has a sound methodological background implemented in an open technological framework that provides our clients with direct access to the software, scalable architecture and ease of integration to other systems.



innoVaR

innoVaR is a solution for financial risks management and valuation of financial instruments featured by Szena Risk.

This tool has two different modules: VaREngine is a simulation engine that is designed to carry out numerous valuations of instruments and portfolios and compute risk distributions; VaLEngine is a module for unitary valuation of instruments and portfolios.



Both engines cover different needs but they are integrated into a single tool, taking advantage of the fact that they share a number of common elements:

- ✓ Both modules share a unique architecture and database.
- ✓ Common management of data, structures, hierarchies, interface, reporting tools ...
- ✓ Shared procedures and interfaces.

Its modular design allows for the incorporation of new modules and functionality in a simple and cost effective way.

Advantages

The application has been developed to accomplish with some functional and quality standards:

- ✓ Simple and cost effective technologies to reduce implementation and maintenance costs in order to minimize the investment in complex architectures.
- ✓ Plug-In architecture that facilitates scalability. New pricing function can be added by the user in a short time and in an easy way.
- ✓ Adaptability to clients systems (databases, app servers, ...) by using standard interfaces.
- ✓ Configurable reporting system.
- ✓ Friendly user interface that allows the users to configure the tools accordingly to their needs: aggregation structures and hierarchies, portfolios; data management and validation; alerts and audit tools.
- ✓ Slide&Dice Navigation through the results from portfolio to single position level or risk factor.
- ✓ The simulation process has been designed to allow for parallelization of all the calculations. It is a Grid-Enabled application.
- ✓ Web services based.



VaREngine: The Risk Module

This is a module intended for risk calculation; its main functionality is the valuation of instruments in multiple scenarios in order to generate risk distributions. With this aim this module provides the following functionality:

- ✓ Simulation of future values for the relevant risk factors in configurable time steps. Several methodologies can be used: Historical, Montecarlo or Parametric VaR.
- ✓ Risk metrics such as VaR, EaR, Expected Shortfall, Marginal VaR, Incremental VaR, VaR by risk factor.
- ✓ Potential Future Exposure.
- ✓ Back-Testing.
- ✓ Scenario Analysis and Stress Testing.
- ✓ Sensitivities and Greeks.
- ✓ Limits on each of the available metrics.

Methodology

Our methodology is based on the full revaluation of the portfolio under multiple scenarios. Evolution models are applied to current prices of the relevant risk factors in order to generate possible future values of each of them. Later, each instrument is priced in each future scenario and distributions of future values of each instrument or portfolio are computed to facilitate the generation of risk distributions. Such risk distributions allow for both market and credit risk control by the computation of either VaR or Exposure, in both cases the process is the same, the only change is the way the metric is computed.

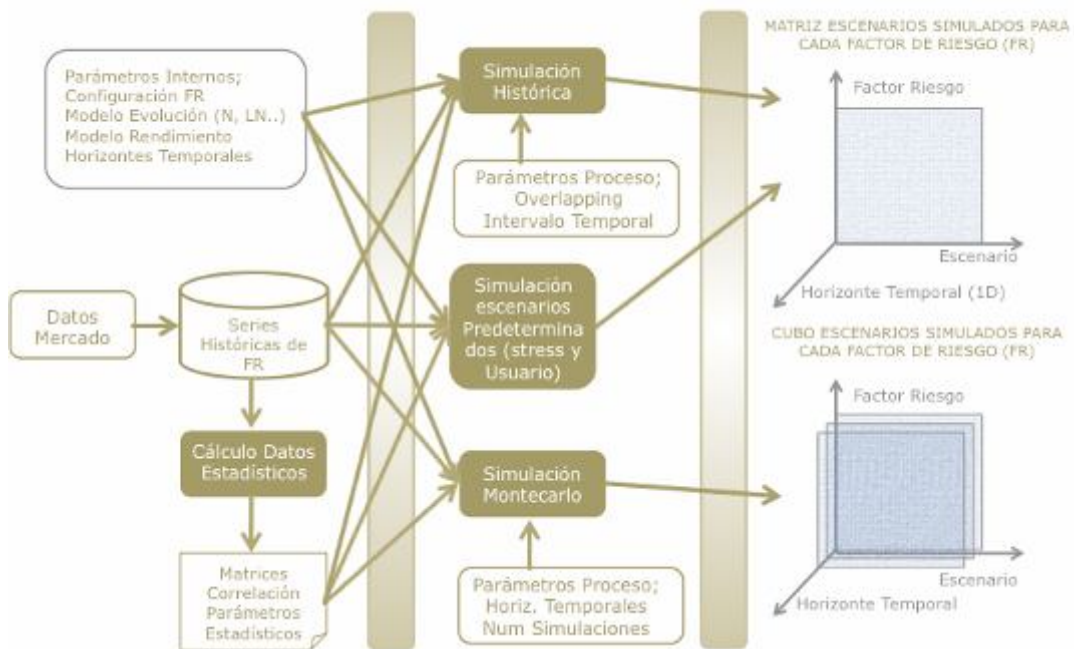
The whole process is separated in four different steps: simulation, valuation, aggregation and risk analytics as explained below.



Simulation

Stochastic evolution models are applied for each of the risk factors that affect the price of the securities. For each risk factor different evolution models can be used and they are calibrated to historical time series so that future simulated values are consisted with recent history.

The result of the simulation process is a cube of changes for each risk factor, time step and scenario. These changes are applied to a base scenario to obtain a cube of simulated values for the risk factors.



Valuation

The valuation is a process in which a unitary investment in each security is valued in each scenario and time step. As a result another cube is generated, per instrument, time step and scenario.

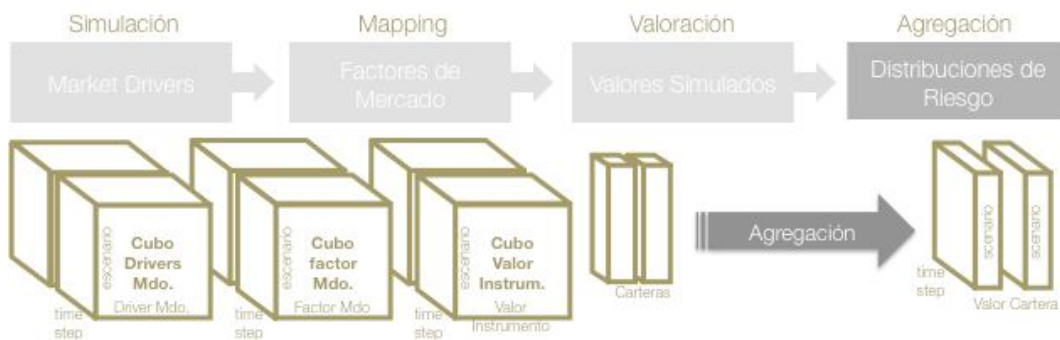
Aggregation

In this part of the process the different portfolios are defined as a vector containing the real investment in each of the securities. For each time step this vector is multiplied by the corresponding matrix generated in the simulation process and as a result we obtain a vector of possible future values for the portfolio, this vector is the distribution of potential values from which risk number will be generated.



Risk Analytics

Different risk metrics are computed by using the risk distributions calculated in the previous three steps. Market Risk measures can be obtained as a quantile of the P&L distribution. Credit Exposure is obtained as a quantile of the values distribution. Additional measures are applied to obtain a complete risk analysis.



VaEngine: Valuation engine

VaEngine is a module intended to carry out a valuation of the portfolio. While VaEngine performs multiple valuations and thus requires the use of fast, sometimes approximate pricing functions, VaEngine only performs a unique valuation in a defined base scenario. This allows VaEngine for the use of complex, time consuming pricing functions.

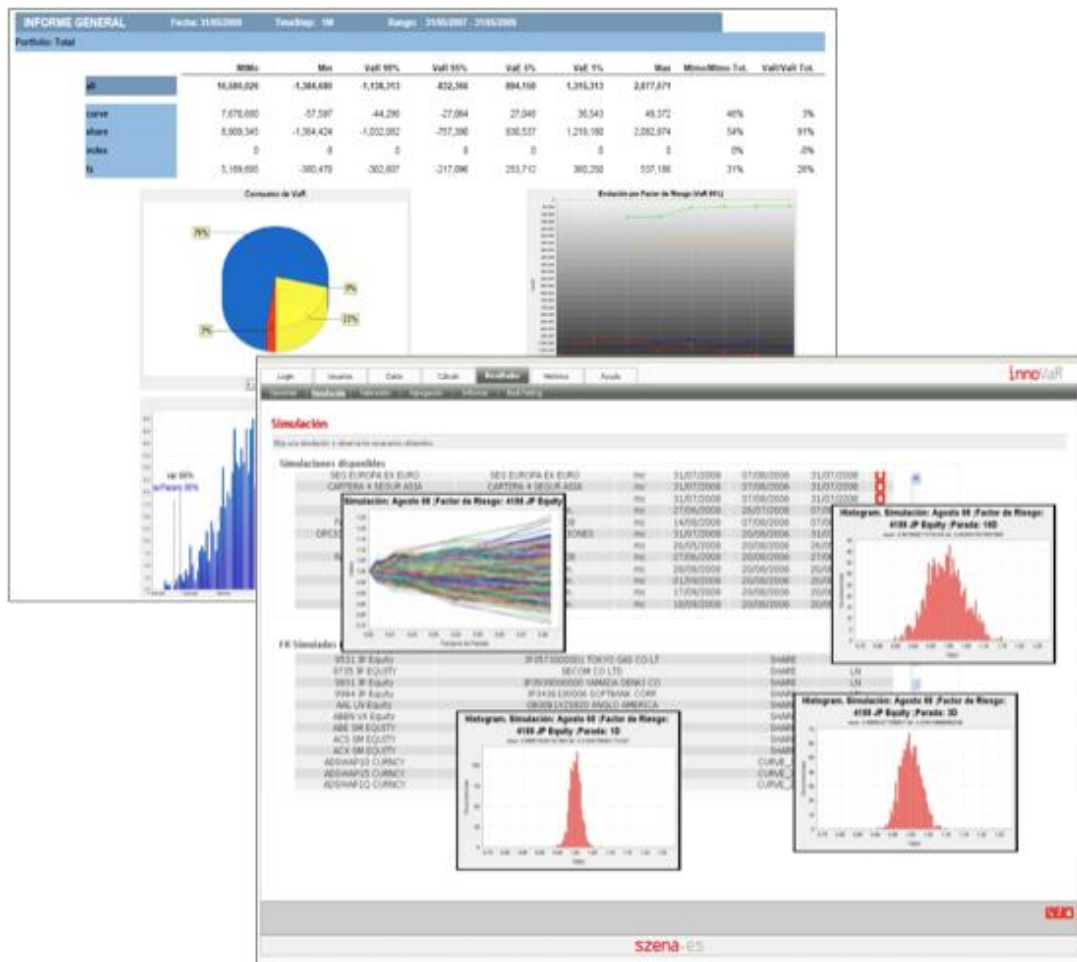


Additionally VaEngine generate two liquidity maps as follows: a map of future cash flows generated by each position and mapped into a defined time window ladder; and a sensitivity map indicating the sensitivity to the different tenors of the interest rate curves.

Reporting

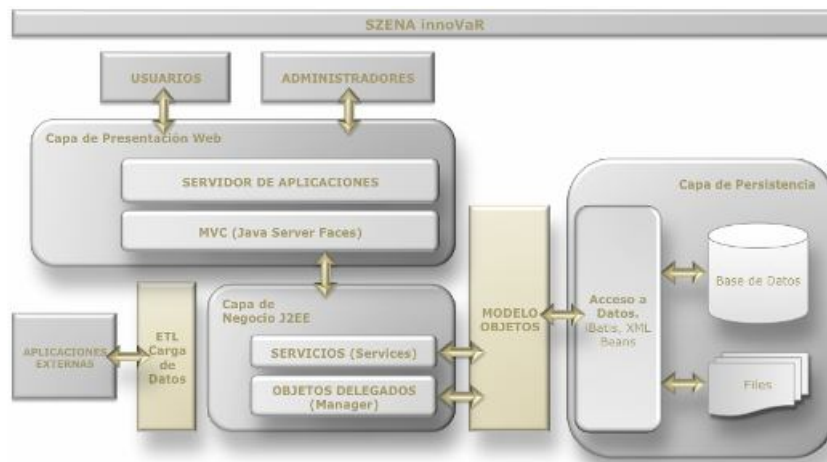
A special care has been taken in constructing a reporting tool that meets the requirements of a risk management area and can be adapted easily to the particular needs of each of our clients.

Customized reports can be generated not only by deciding the information presented but also the way it is presented. Different output formats such as xls, csv or pdf can be used and images, charts and logos can be presented.



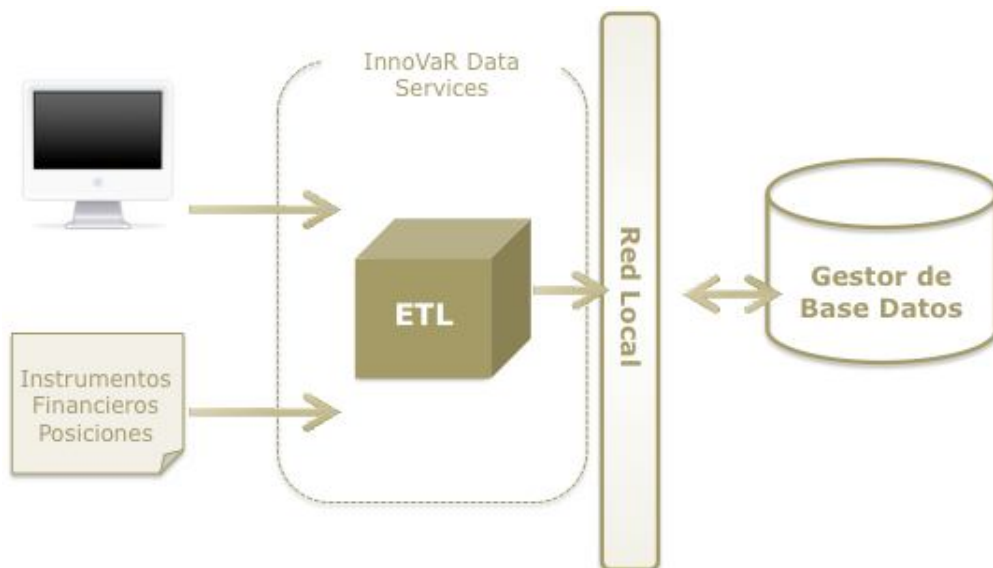
innoVaR's Architecture

An open architecture has been used to develop innoVaR, we took special care that the application is independent of the used database and applications server. This way the application can be implemented into our clients' corporate systems. Currently the application has been successfully tested in different databases (Oracle, Sybase, SQL Server) and applications servers (WebSphere, Tomcat).



Our architecture gives the application the ability to deal with portfolios containing a high number of instruments and compute risk measures in a short time.

Additionally, our Plug-In technology guarantees that new functionality can be added without complex upgrading processes or code migrations.





The computation processes can be launched by the user manually or by means of a batch process programmer.

The application is feed with data by means of files that have been built under standard formats (xml, xls and csv). Input files contain all the necessary information: historic time series, risk factoes, curves, instrument definitions, positions...

The results of the risk computations process is sent to different output files that use the same standards as for the input as well as pdf documents.



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