

Decision Simulator FAQ

Part 1: General

What is simulation?

Simulation is a technique used to forecast the future behavior of a system. It provides a way to evaluate alternative designs or policies without having to wait to see how they play out in the real world. In the context of Decision Management, a simulation is a process that feeds a decision service with data that reflects the target population so the results can be analyzed to assess the potential business impact prior to moving the rules into production.

What is Decision Simulator?

Decision Simulator is a new add-on for FICO™ Blaze Advisor® business rules management system, enabling business users to configure and run simulations to explore the business impact of rules prior to deployment, making it possible to identify opportunities for improvement and avoid costly errors in strategies that might otherwise be missed.

Decision Simulator introduces the ability for business users to create, manage, and generate simulations. Business users can then access these simulations to validate Blaze Advisor system business rule logic and assess potential business impact prior to deployment into a production environment.

Decision Simulator helps both business and technical users meet their needs:

- Business users want easy-to-use simulation capabilities with flexibility to fit their needs
 - Decision Simulator extends Blaze Advisor system for Java to provide business users with an RMA-like decision simulator application (DSA) that enables them to configure and execute simulations and review reports that display results in a variety of useful formats.
- Technical users want tools to quickly setup and configure the Business User experience
 - Decision Simulator adds new functionality and easy to use wizards to the Builder IDE that enable technical users to quickly configure simulations that connect rule services to appropriate data sources, calculate additional items of interest, configure reports to analyze the results, and generate DSAs to expose this to the business users.

Why do businesses need Decision Simulator?

- Understand the business impact of rule changes before they are deployed
 - Verify that the business logic is represented properly and completely
 - Validate that the business logic produces the expected results
 - Confirm that the distribution of results is in line with expectations (e.g. 80% accept, 10% reject, 10% review)
 - Ensure that expected business outcomes are in line with business goals (e.g. Profit & Loss calculations meet goals)
 - Improve decision strategies by comparing alternative approaches (e.g. what-if analysis for champion/challenger)
- Avoid costly strategy errors that might be missed otherwise
- Provide clear evidence to streamline acceptance process for rule updates

How does Decision Simulator fit into FICO™ Blaze Advisor® business rules management system 6.6?

Decision Simulator is an add-on module to the Blaze Advisor system product and is licensed separately.

Can I use Decision Simulator with earlier releases of Blaze Advisor system?

No. To use Decision Simulator you must be on Blaze Advisor system 6.6 or above.

When will Decision Simulator be available?

Decision Simulator will be available in December 2008.

How is Decision Simulator priced?

Decision Simulator is priced as an add-on module like SmartForms. For pricing information please contact your account executive or contact us directly.

Is Decision Simulator available for both Java and .NET?

Decision Simulator is available on Blaze Advisor system for Java. Availability on Blaze Advisor system for .NET will be determined at a later date.

Where else is simulation used by FICO clients?

Decision Simulator leverages many of the lessons learned by our experience using simulation within a wide range of application areas.

- TRIAD® Customer Manager customers have used the distribution reports within the estimation feature for many years to do a quick sanity check of account management strategy updates prior to moving them into production.
- Decision Optimizer provides a sophisticated decision modeling and simulation environment with a rich set of reports to analyze and compare the results from alternative scenarios within an optimization project.
- Decision Optimizer and FICO™ Model Builder customers routinely use sample weights to reduce millions of transactions down to a more manageable dataset while still accurately reflecting the population being analyzed.

Part 2: Technical

What does Decision Simulator do?

- Decision Simulator makes it easy to create simulations that control the set-up, execution and display of results for a variety of simulation purposes.
- Simulations allow business users to:
 - Validate results by comparing simulation results to expected results using data in database tables or XML files
 - Analyze distribution of results (e.g. accept 60%, reject 25%, review 15%) and statistics (e.g. total, average) for items of interest using test data that mirrors the target population
 - Use rule service results to perform additional business calculations to assess business value
 - Compare alternatives by analyzing results from alternative versions of rules services

What are the components of Decision Simulator?

- A **rule service invoker** specifies the target rule service to use for the chosen scenario
- A **simulation object model** incorporates the information required to run the target rule service, along with any additional information needed to support the simulation
- A **data input adapter** marshals the data in the sample cases to run against the target rule service
- **Simulation calculations** specify additional logic to generate business values of interest to the user (e.g. profit, loss) that are not created by the rule service directly

- **A report data adapter** marshals the output for usage by reports
- **A report configuration template** specifies which report types and settings to use to display the simulation results
- **Wizards** guide the set-up, generation, and editing of the above items to generate the necessary simulation components along with a specialized ruleflow that specifies how the simulation logic will be executed
- **Wizards** guide the generation of a DSA to expose appropriate capabilities to the Business User
- **DSA** provides a controlled web based environment that enables Business Users to configure and run simulations and reports.

What is the difference between Decision Simulator and brUnit?

Decision Simulator differs from unit testing software by: allowing you to easily connect to large sets of historical data samples in addition to hand-crafted test cases. You can also add business facts and calculations that generate values of interest to the business user, such as profit and loss that are not available in the raw rule service. It also provides reports that go beyond simple pass/fail validation to show distributions of outcomes such as the percentage or number of accept, reject, refer decisions, and statistics such as min/max and standard deviation for applicant risk scores.

Running simulations as part of your project lifecycle management reduces risk and expedites project entry into production environments. For example, suppose that your business users maintain the business rules that calculate the credit risk of prospective customers applying for a new credit card. They want to evaluate the business impact of adding a new rule and then compare the results to their existing strategy. The business users can accomplish this by first adding the rule to the rule project and then running simulation data through Decision Simulator.

What are the 3 most common business rule simulations?

Three common business rule simulations are:

1. Validation Simulation
2. Business Impact Simulation
3. What-if Simulation

1. Validation Simulation

When you run a validation simulation, you are able to compare the simulation results with the expected results for a specified set of test data. This set of validation test data is called a simulation test case. The test cases are sent to a rule service one transaction at a time. The goal in using simulation test cases is to cover the range of values needed to thoroughly test the logic of your rule service. These test cases are stored in a database or another data source.

After the validation simulation is run, you can determine whether or not each test case met the expected results. You can also identify the transactions that failed during execution. This output data is accessed from the following validation simulation reports:

- Validation summary report: Lists the total number of simulation test cases executed, the number that matched expected results, the number that did not match, and the number that failed to complete.
- Failure detail report: Lists details about each transaction that threw an exception or was unable to complete during execution.
- Case detail report: Lists values for user selected cases & properties (e.g. cases where `allTestsValid = false`).

2. Business Impact Simulation

The goal of this simulation is to assess the likely impact of decisions made using a rule service in the production environment. This yields more accurate results when the data being used, known as

sample cases, is statistically representative of what is likely to be present in the production environment. To save processing time and resources, sampling techniques allow simulations to use smaller sets of data that are assigned appropriate sample weights.

The metrics that matter to the business owner will often include values like revenue and expense that aren't provided by the rule service directly. This means that they will need to be calculated using formulas provided by the business owner. These formulas can be very simple such as "revenue = the number of accepted applicants * \$1000" or as complex as the situation requires. These formulas may use data such as the prime interest rate or other business facts that are not available in the input data or rule service results, which will need to be supplied either by adding them to the sample cases or by capturing them prior to running the simulation.

You can analyze business impact by viewing the distribution or statistics for values that were calculated during the simulation using the following reports:

- **Distribution summary report:** Lists the percent or number of times each unique value occurred for a selected property (e.g. status = 40% accept, 50% deny, 10% refer). This is a quick way to see if the resulting values are occurring in the volumes and distribution expected and is often used as an initial "sanity check" before doing further analysis
- **Statistics summary report:** Lists the statistics, such as the mean, on a set of sample cases.

3. What-if Simulation

The goal of this simulation is to compare the results from two or more alternative versions of a rule service using the same set of data. A scenario is created for each alternative to indicate which rule project to use. Both the Distribution Summary report and the Statistics summary report allow you to then compare the results side by side in a single report.

What are the Simulation Environments?

Decision Simulator extends the Builder environment so that you can quickly create and test simulations. After the testing is completed, you can generate a web based Decision Simulator Application (DSA), which is similar in concept to a Rule Maintenance Application (RMA) and can be linked to one if it is available. Business users can access the DSA using a web browser to run the simulations you created.

Using Simulations in the DSA

DSAs allow business users to access and run simulations in a web-based interface. A DSA establishes a clear separation between your role as a Simulation Developer and the role of the business user. This allows you to focus on the technical details of the simulation implementation while the business user focuses on running the simulations and validating the business objectives of the rules.

You can also link DSAs and Rule Maintenance Applications (RMAs). This allows business users to modify their business rules in an RMA and then link to a DSA to run a simulation to test their newly modified business rules. This iterative process can be executed until the desired results have been achieved.

Creating Simulations within Builder

You can perform the following tasks within Builder:

- Create and test simulations
- Generate relevant reports
- Generate a DSA

You configure simulations by creating scenarios that list and connect one or more rule services to appropriate data sources. In addition, the simulation project includes many templates, which expose specific values that can be edited from the DSA by the business user. When you configure these simulation templates, you provide explicit control over how the editable values display in the DSA.

Workflow for Creating Simulations

In its simplest form, a simulation specifies the data to be used as input by a rule service and the data to analyze as a result of running that rule service with that input data.

What does Decision Simulator add to existing FICO capabilities?

Decision Simulator is an important addition to the decision improvement capabilities already available in FICO™ Blaze Advisor® business rules management system and our FICO decision management tools.

- Blaze Advisor system rule verification provides IDE users with the industry's leading capability to ensure that rules have been implemented properly.
- Blaze Advisor system BRunit testing provides an efficient mechanism for running suites of regression tests using a JUnit/nUnit style approach.
- FICO™ Xpress Optimization Suite provides developers building their own optimization applications with the industry's leading tools and solvers for linear programming, modeling and optimization.
- FICO™ Decision Optimizer wraps layers of functionality around the Xpress-MP LP solver to provide our analytic team and clients with a rich environment for exploring large combinations of alternative actions to identify the optimal set of treatments that best achieves the desired goals within both account and portfolio level constraints.

The introduction of Decision Simulator extends Blaze Advisor system beyond rule verification and regression testing to enable business users to explore and report on the business impact that results from applying a rule service to a set of sample cases that are representative of what is likely to be encountered during production usage. It provides an out-of-the-box approach for improving decision logic by comparing "hand crafted" alternatives of rule service logic prior to their deployment and selecting the one that best meets the business needs.

Decision Simulator is designed to help bridge the gap from current development practices with a pragmatic first step on the path to the more sophisticated automated strategy exploration techniques used in decision optimization. We expect that it will help create a new pool of clients who will eventually want to expand their use of Blaze Advisor system and Decision Simulator to include more sophisticated modeling using Decision Optimizer and/or Xpress-MP.

Part 2: Technical

In summary, Blaze Advisor system with Decision Simulator offers an integrated environment for defining business rules, verifying and validating their results, and running simulations to assess the potential business impact of those rules. This is all done using a single syntax (SRL), business object model (BOM), and common rules management services (repository, versioning, debugging, etc.).



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