Rule-Based Evaluation and Processing of Credit Applications

Credit Management for Banks and Financial Service Providers

Bosch Software Innovations

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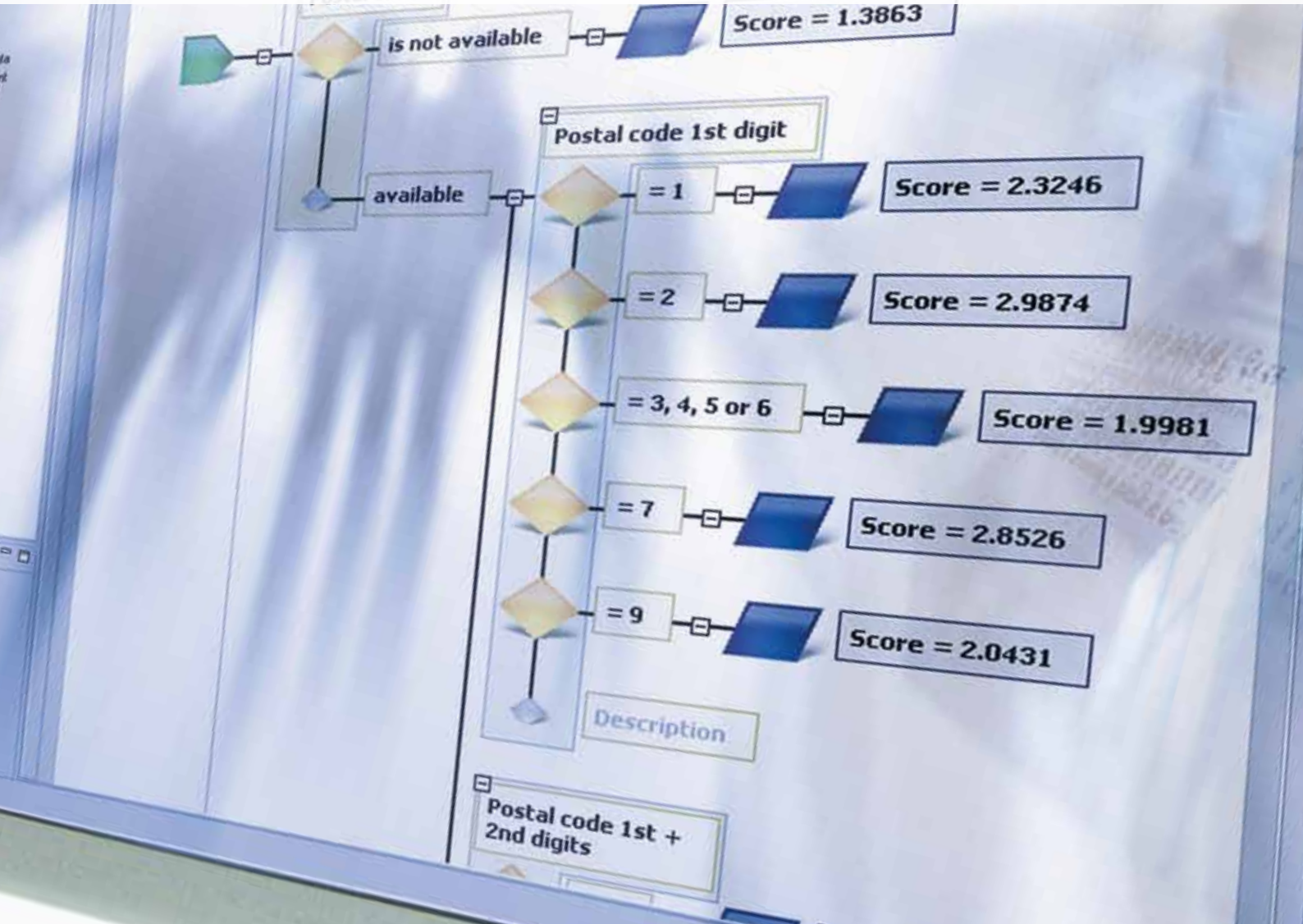


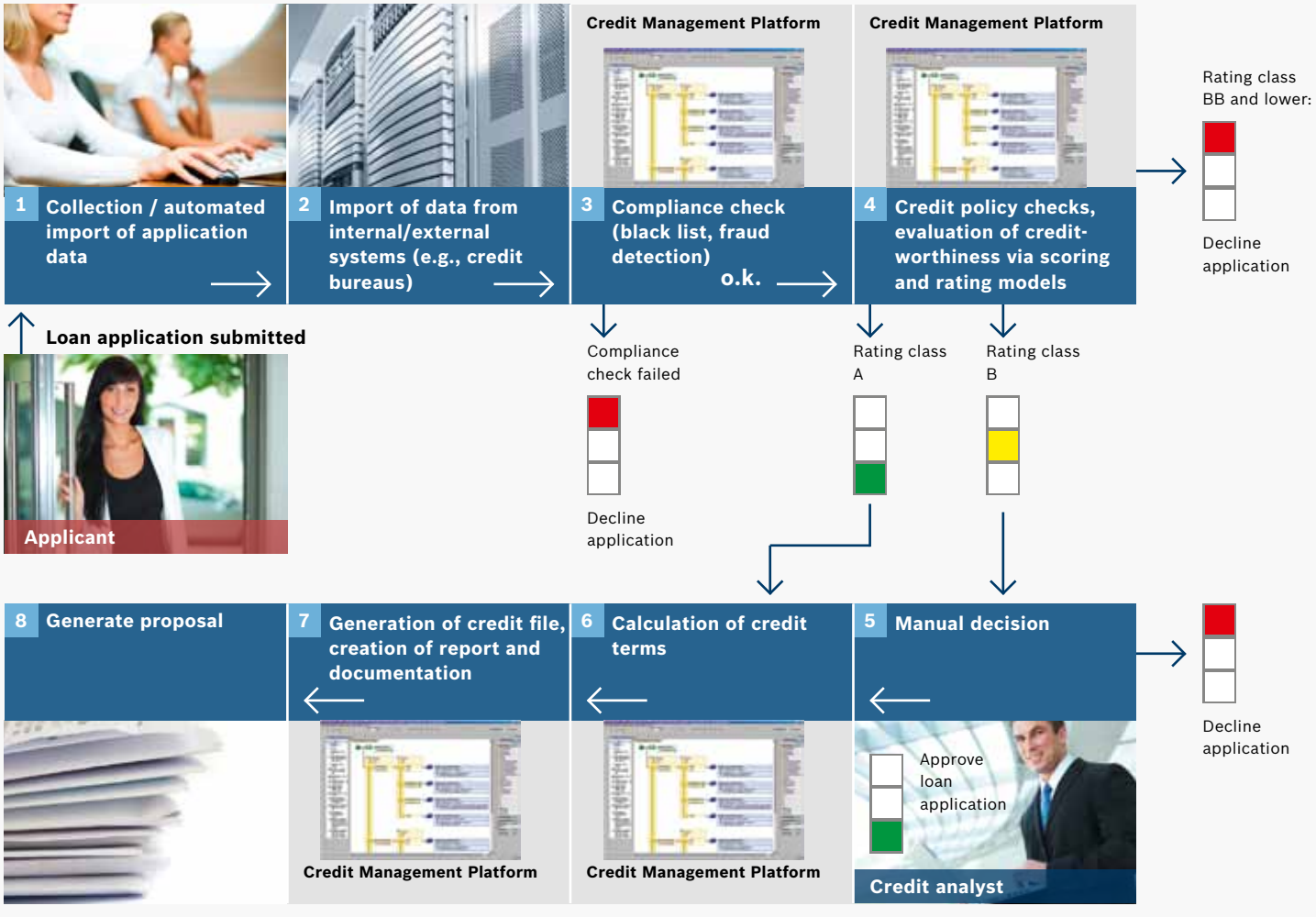
Active Credit Management: Reconciling Automation and Due Diligence

Modern credit management benefits banks and financial service providers by optimizing the end-to-end credit decision process.

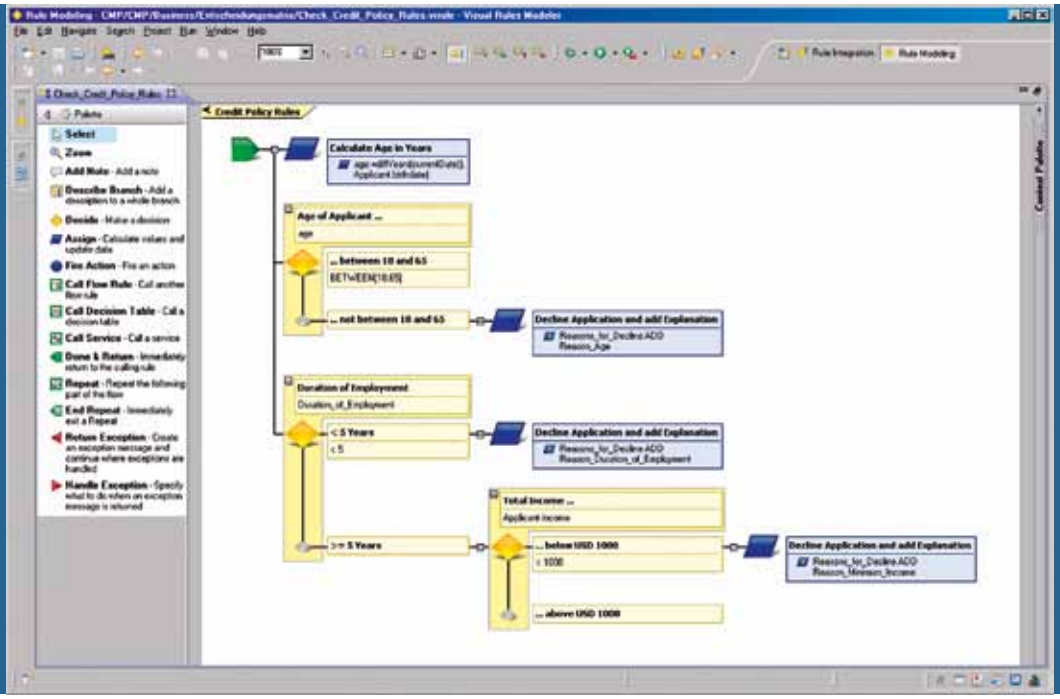
Integrated processes are prerequisites for modern credit management because they give banks and financial service providers the ability to assess credit applications and fully reflect the institution's credit policies and risk appetite. Credit management software must be able to tolerate a high degree of automation for "small ticket lines of business" while ensuring the quality of customer evaluations, especially for complex financial transactions. This is achieved in the Credit Management Platform from Bosch Software Innovations through rule models which are used for automated risk scorings and credit decisions.

Rule models facilitate short processing and, thus, quick response times for credit requests, which permits credit analysts to focus their manual credit evaluation efforts on critical cases. Consequently, banks and financial institutions can make timely credit decisions without sacrificing care and proper diligence.

Credit Management Platform:
An Integrated Solution for Credit Management
The Credit Management Platform from Bosch Software Innovations supports all process steps for data collection and import, credit policy checks, risk assessment, and approval of credit applications. The solution permits the underlying business rules and processes to be modified at any time to flexibly adapt to changing circumstances as needed. All parameters in the credit approval process can be altered as necessary to suit the credit policies of the lending institution concerned.



Support for all steps in the credit management process: Loan origination, compliance checks, risk evaluation and credit decision, risk-based pricing, documentation, and reporting



During the process of evaluating credit applications, credit policies are applied and risk scoring is performed. The Visual Rules rule technology is used to define the underlying business rules. In the example to the left, general credit policy rules are defined that lead to a negative credit decision.

The Credit Management Platform supports the credit decision process

1 + 2 | Data Collection and Import
Comprehensive and up-to-date information is a prerequisite for successful credit decisioning systems. The Credit Management Platform provides data entry screens for entering customer-related and transactional data, as well as interfaces for retrieving information from internal and external data sources. These interfaces with credit bureaus, credit insurance companies, rating agencies and other external providers can feed data into the system as needed. All data are stored in a central database, and are thus available for use at all times.

3 | Compliance Checking
Compliance checks are used to determine whether an applicant appears on a sanctions list or has provided data as part of the application that could indicate an attempted fraud. The Credit Management Platform offers various modules and business rules tailored to compliance checking and fraud detection.

4 + 5 | Policy Rules and Creditworthiness Evaluation
Business rules of any number and degree of complexity may be laid down for applying the credit policy rules and the risk scoring of current and potential obligors. The rules are implemented graphically, and can thus be traced and modified as needed by non-IT business experts. Individualized scoring and rating logic is used, customized to reflect the appetite for risk of the bank. The evaluation often considers both quantitative factors (such as balance sheet information) and qualitative characteristics (such as an assessment of management quality) of the applicant. As a result, scores and ratings are assigned, which can lead to an automatical approval or decline of a loan application. In cases where no automatic decision can be reached, the process continues with a manual evaluation and approval, if granted.

6 + 7 + 8 | Determining Credit Terms, Generating the Credit File, and Reporting
Additional rule models, such as ones taking into account the results of the scoring process, can be implemented to determine which credit conditions to offer. Time periods may be defined for the resubmission of evaluation processes; for example, they may be used to ensure the regular reevaluation of client creditworthiness. Such user tasks are then presented to the end-user using role- and user-specific work lists.

Analytical Credit Management: Monitoring Processes, Simulating Models, and Managing Risk

The Credit Management Platform supports not only the operational credit decision-making process, but also the analytical needs of credit management – process monitoring, simulation, risk management, and an early warning system. This means that the operational and analytical aspects of credit management can be combined on a single technological platform.

Monitoring and Managing Processes

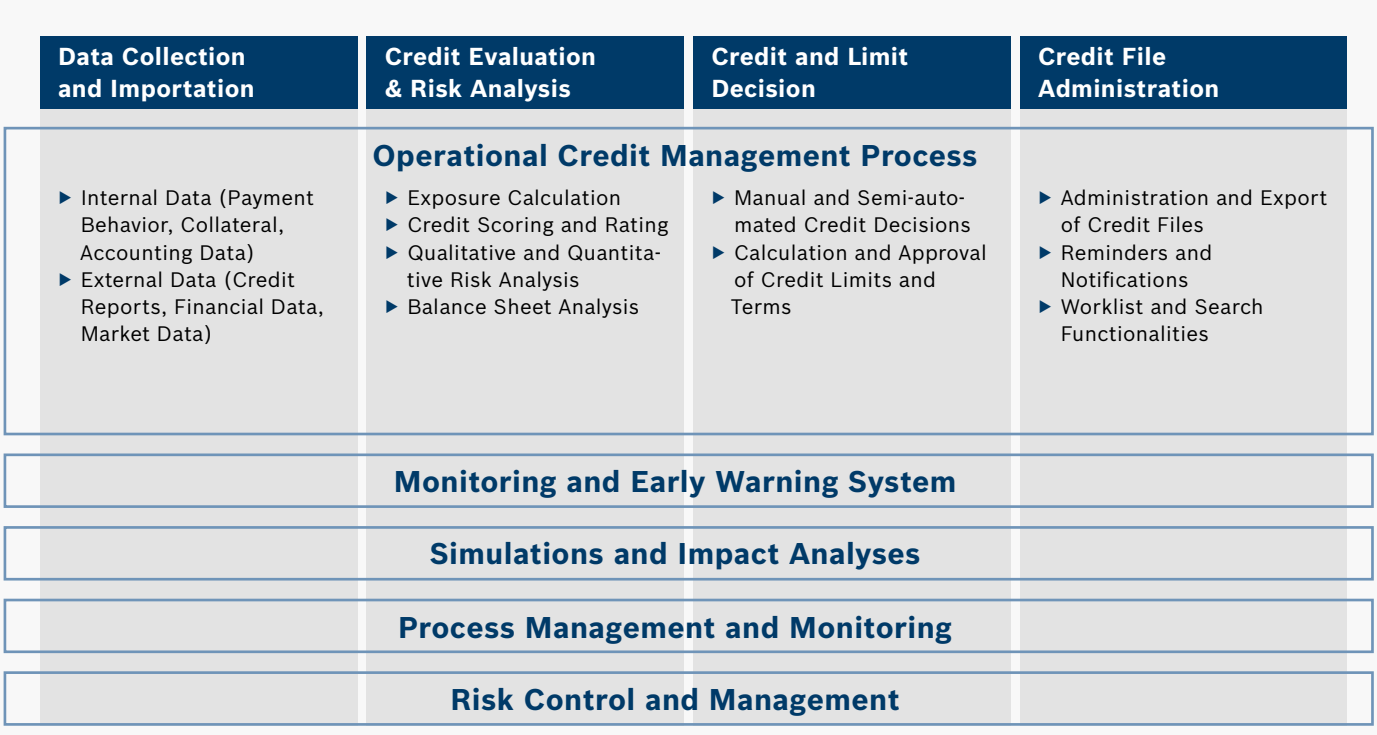
The credit management process is also subject to the ongoing demands for process optimization, e.g., to make more efficient use of available personnel resources. Data gleaned from process monitoring, such as average idle periods and processing times, can be utilized to ensure utmost efficiency.

Simulate and Stress Test Rule Models

A special feature is the ability to simulate rule models before they go live. In this way, analysis can be performed on the effects of model changes (such as weighting) on the outcomes of the scoring and rating models (such as the distribution by rating class), and thus on the proportions of credit applications that were automatically approved, automatically rejected, and manually determined. In simulation runs, stress scenarios can also be played through to represent stress tests. For this purpose, the decision engine's outcomes are recalculated on the basis of modified input parameters, such as lower real estate values. The output result can be, for example, the redistribution of obligors among rating classes or changed regulatory capital requirements in various stress scenarios.

Controlling and Managing Credit Risks

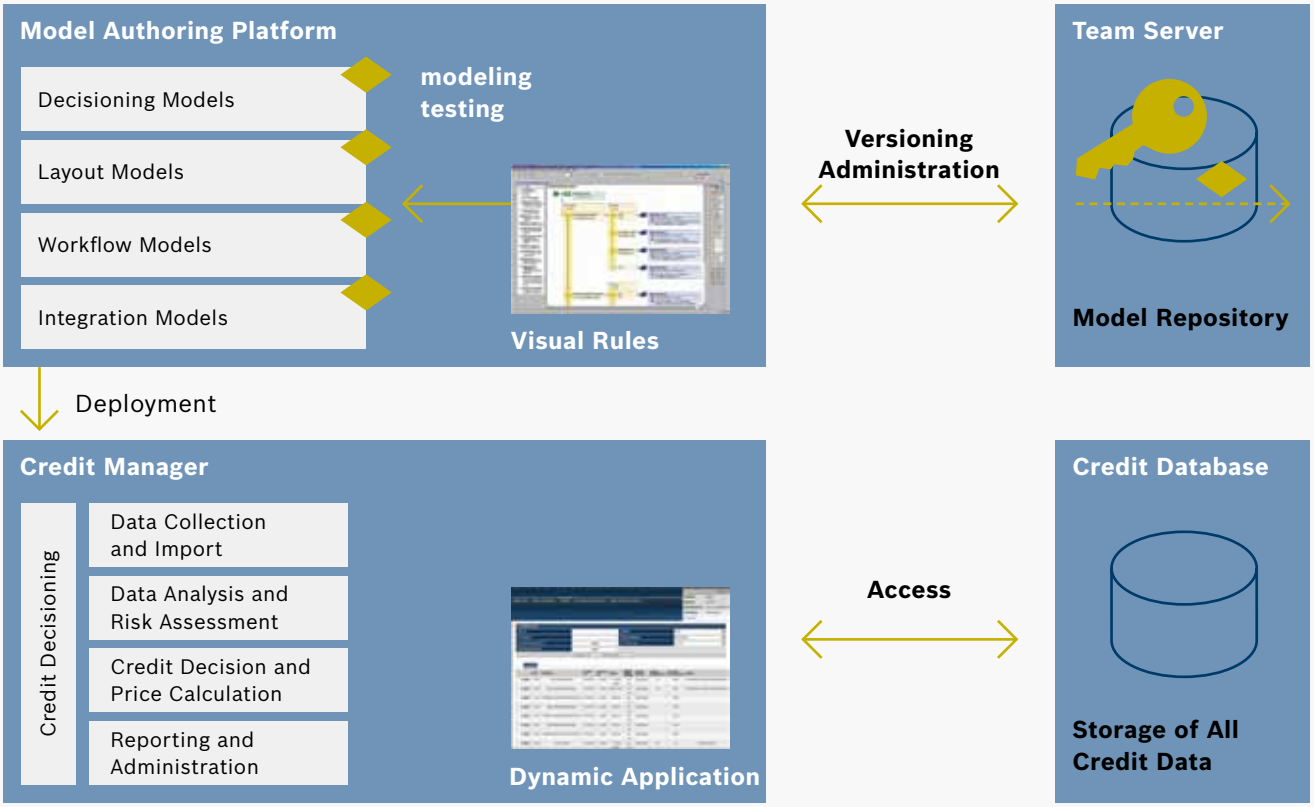
Using the reporting environment, data on single transactions may be aggregated to provide a portfolio view. On the basis of this data, a wide variety of analyses may be performed, providing comprehensive information about the risk distribution within a portfolio, risk concentrations, trend analyses, among other areas. This information, in turn, can be used to chart possible courses of action such as for portfolio optimization.



The Credit Management Platform supports the operational and analytical credit management process.

The Technological Basis: Rule Models Provide Flexibility and Traceability

The Credit Management Platform Comprises Individual Components



Traditional IT applications are often too rigid for use in credit management and cannot meet the increasing demands for complexity, transparency and flexibility. The Credit Management Platform uniquely meets these requirements because it is based on the Visual Rules rule technology. Visual Rules uses a graphical modeling environment to implement and maintain all relevant logic modules of the application – credit policy rules and risk assessment in order to evaluate creditworthiness, rules for approval workflows, even rules for defining the web-based user interface. This allows business units such as the risk management department to independently define and update the relevant business rules. All rules are traceable, and can be modified at any time. Every process step is documented and logged. This provides a high degree of security for any internal or external audit.

Model Authoring Platform for Administrators
Administrators create and maintain rules in the Model Authoring Platform. With these business rules, scorings and ratings are executed, credit decisions are automated, user interfaces are defined, processes are managed, and external/internal data sources are integrated. Of particular importance is the intuitive approach to representing business logic: the graphical representation of the logic components reflects human thought patterns and requires no programming knowledge. Thus, all logic components of the platform can be independently expanded and adapted by model administrators.

Team Server Model Repository – Simultaneous Access to Models by Multiple Administrators
Rule models are stored and administered in a central repository (Team Server), where they may be accessed and modified by multiple model administrators simultaneously. All changes are recorded, so it is always clear who made what change and when.

Credit Manager: Operational Customer Evaluation and Risk Analysis

The Credit Manager module gives end-users (e.g., credit analysts) a user-friendly web-based application for the operational credit management process. The evaluation and process models are based on the rules defined in the Model Authoring Platform. Credit analysts have direct access to customer data via the credit files and can manage transactions using work lists.

In addition to the operational credit management process, support is also provided for analytical credit management. To this end, decision models can be simulated, for example, by applying them to historic data. Reports then compare the actual data to simulated results, making it possible to analyze the impact of the changes to the rule models at a portfolio level, or on the distribution of the automatically or manually generated credit decisions. Stress tests can also be carried out in the Credit Manager. In this case, the models themselves are not changed, but different input data are used and the effects evaluated.

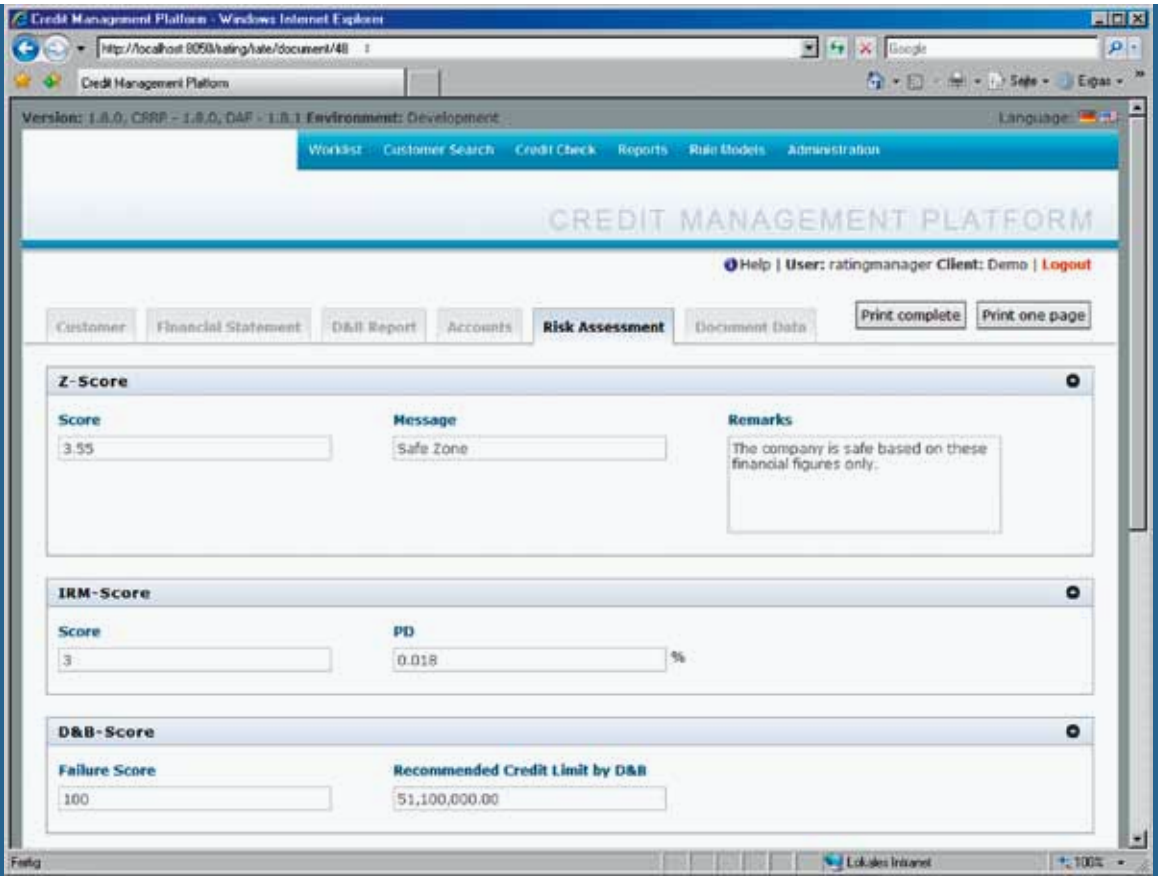
Credit Database: Reliable Database for Internal and External Data

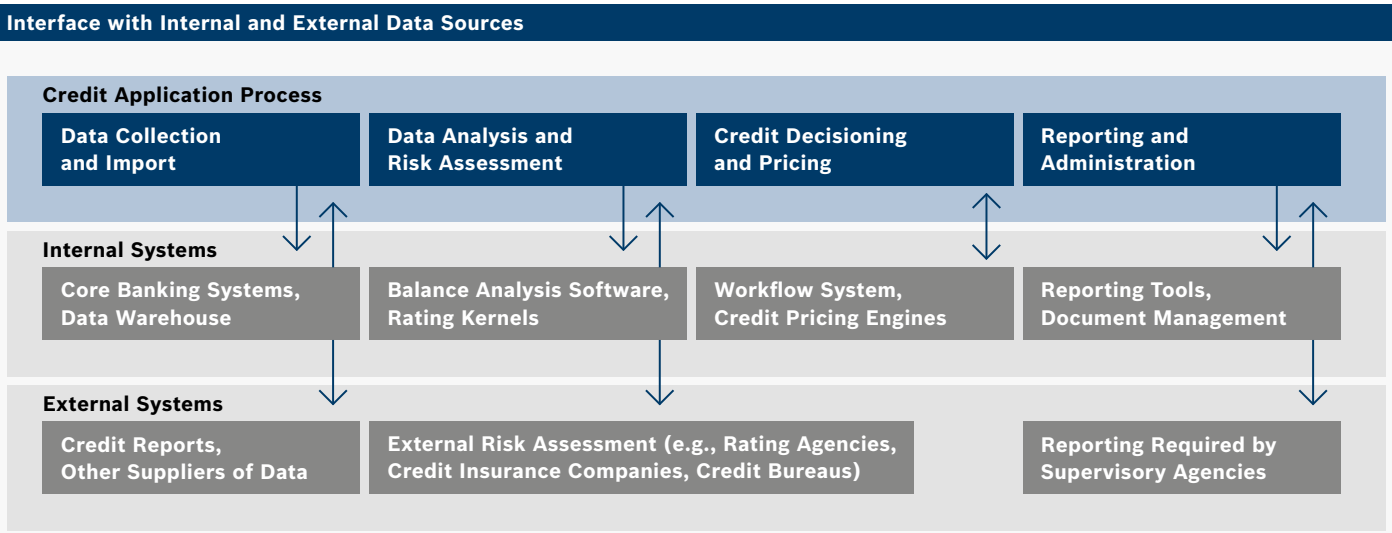
All internal and external input and output data are stored in an auditable database. This complies with all regulatory requirements such as Basel II. In addition, an unlimited number of revisions may be stored for a single credit application in order to record its complete history. This makes it possible to trace who entered which data when, and what decisions were taken.

Interface with Internal and External Data Sources

The Credit Management Platform can be linked to existing internal data sources and third-party systems such as bank applications to permit a bidirectional exchange of data. In addition, external data providers such as credit bureaus, credit insurance companies and rating agencies in order may also be connected to the platform.

Business experts use the Credit Manager to evaluate and administer credit applications. What information the web-based screen displays is also governed by rule models.





Technology and Operations

The Credit Management Platform is operational with many international banks and financial service providers. From a technological perspective, it offers the following advantages:

- Installed in the infrastructure of the financial institution, or offered as a hosted solution (Software-as-a-Service model)
- Dynamic and rule based solution offering a high degree of flexibility
- Comprehensive Security Management for administering users, roles, and groups
- Inbound interface for triggering processes via a Remote API (Web Service)
- Multilingual and multi-tenancy-capability
- Role-based deployment process with quality assurance
- Ad-hoc and batch-based processing of credit applications
- Web application (JEE Web Application) ensures parallel processing and scalability of the system, and permits upstream use of load balancers.
- End-users application is browser-based.
- Hot Swap API for exchange of credit decision models during runtime
- Open interface architecture ensures seamless bidirectional integration with existing systems.

The Advances of the **Credit Management Platform** at a Single Glance:

- **Comprehensive Support in Operational Credit Management**
  The Credit Management Platform supports the entire process of data collection and import, risk assessment and credit evaluation, as well as manual workflows (e.g., approval processes) in credit management.
- **Analytical Credit Management Provides Decision-Making Aids**
  Changes to rule models (e.g., for automated credit decisions) are simulated before being implemented operationally. Process data are recorded and provide the necessary information for implementing escalation mechanisms and process optimization. Evaluations and reports provide insight into the credit portfolio.
- **Rule Technology for Maximum Flexibility and Agility**
  The Credit Management Platform is based on the Visual Rules rule technology. With Visual Rules, model administrators within a business department can define and update the rules that define scoring/rating models, data entry and display screens, and workflows. The business rules can thus be organized entirely around a bank's or financial service provider's unique credit policies.
- **Independence from Internal and External IT Service Providers**
  The rules for credit decisions and process management are defined by business experts within the enterprise, and can be modified or adapted at will. There is no dependence on release cycles of existing applications. This results in a high level of independence from the IT department, but also from external service providers. This, in turn, makes for greater agility and flexibility.

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