Business Rules Management using Visual Rules

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Intuitive modeling. Agile rules. Intelligent decisions.
Innovative competitors, global markets, and a constantly shifting legal framework: if a company is to be successful, it must be agile and it must be flexible. This is where Business Rules Management (BRM) really comes into play, allowing companies to seamlessly integrate specialist areas along the entirety of their business logic chain. What’s more, when integrated into process management, BRM is also a valuable tool in the creation of leaner and more agile processes.

Bosch Software Innovations – your BPM and BRM technology and solution provider

Successful projects worldwide

500+
satisfied customers such as Amway, McDonald’s Deutschland, REWE, Thyssen Krupp Steel Europe

Depth of experience

15+ years
of experience in planning, implementing, and realizing a wide range of projects with inubit BPM and Visual Rules

Full coverage

1 provider
for inubit BPM and Visual Rules covering the entire life cycles of processes and rules

Various applications

20+ scenarios
in areas such as application and process integration, process monitoring, automation, case management, EDI / WebEDI, and decision management
**Business Rules Management using Visual Rules**

Visual Rules offers a particularly intuitive graphical introduction to Business Rules Management. For this reason, it is a favorite of specialist departments and IT professionals alike. The model-based approach guarantees a common understanding and quantifiably expedites the development and provision of new rules versions.

Visual Rules provides comprehensive support to companies that need to define and build up user roles and how they interact, ensuring that the rules and roles comply with policies and that any changes are documented in an audit-proof manner. This even applies within heterogeneous teams whose members serve a variety of different tenants from various locations.

**A variety of applications**

Visual Rules provides comprehensive support for the whole iterative process of drawing up, managing, optimizing, and upkeeping business rules. Here are just some of the potential application scenarios:

- Controlling business processes e.g. in financial controlling or supply chain management
- Optimizing production efficiency (machine control, monitoring, and diagnosis; rules-based evaluation of sensor data; automatic detection and escalation of essential system states)
- Supporting marketing in campaign management, customer profiling, and portfolio analysis
- Assisting in data migration projects or the modernization of old systems in software development

**How Visual Rules benefits you**

- Support for the whole rules lifecycle
- Intuitive, graphical modeling with integrated quality assurance and documentation
- Share rules with a central repository
- Rules and data models are highly reusable
- Code generation for maximum performance
- All Java functionality for data and rules models without any programming
- Transparent and fully revisable rules implementation
- Fully multi-tenant capable architecture
- Scalable licensing and pricing model with quick ROI
Modeling and optimization

Various rule types, one graphical approach.

Visual Rules offers a unique graphical modeling approach that allows subject specialists to create and upkeep rule models quickly and intuitively without any programming knowledge – even when the business logic is extremely complex. Flow rules, decision tables, and event-driven state flow diagrams are modeled visually, and can immediately be tested and tried out in simulation scenarios.

Modeling

The Visual Rules Modeler comes with an array of functions to help rule authors (subject specialists) define flow rules. This is a two-step process; first, rules are modeled, before conditions and calculations are added. The rules are then implemented one after the other in the order specified in the model.

Decision tables are a tool to map rules in a compact and transparent way. The Visual Rules Modeler is capable of importing data from Excel as decision tables.

A state flow diagram shows the potential conditions of a system while in operation. Events that lead to a change in status are also contained within the diagram. Each individual transition can be governed by rules. The code generator takes the modeled conditions and rules and turns them into executable Java code that is seamlessly integrated into the target application.

Documentation

Once rules have been modeled, Visual Rules can supply comprehensive graphical documentation of the rule and data model at the push of a button. Moreover, Visual Rules ensures that the rule model or state flow diagram, its generated code, and the documentation are all up to date with each other. Users can freely configure which data model and rule details are contained in the models’ graphical documentation (HTML or PDF).

Testing and simulation

The test editor helps rule authors to quickly create multiple tests. Specially designed tools help specialist users to define and organize their test scenarios. Each test scenario consists of input data and the expected result. Test suites combine multiple tests for implementation. Process rules and decision tables can be directly executed. The output
data is compared against the expected results, and any deviations are highlighted. At the same time, any weak points, such as unused or untested rules, are explicitly marked within the rule model. This overview makes it easier to manage test coverage and test implementation, as well as to assess rules’ quality and their fulfillment of the relevant specialist requirements. The test-oriented approach ensures that only correctly functioning rules are implemented in business operations.

**Debugging**
If test results determine that the rule model requires modification, debugging also takes place interactively within the graphical model. Aided by individual step execution and by setting breakpoints, users can examine the rule execution process and status of data elements and actions in detail.

**Analysis**
The Visual Rules Modeler can visualize the dependencies between rules and rule packages. This makes it easier to analyze and optimize the structure and organization of rule models and state flow diagrams. For instance, the Visual Rules Modeler identifies bad patterns such as circular references and helps to prevent these types of structures.

Visually comparing various versions of rules and data models helps analyze and optimize rules. Smart search filters and hyperlinks in rule expressions also help users to quickly orient themselves. In order to analyze or simulate rules, Visual Rules supplies runtime values and statistics, either cumulative or for each rule package. To make it clear in what order rules are processed, each execution step has its own color to make it stand out.
Visual Rules in action in the steel industry

ThyssenKrupp Steel Europe AG is one of the leading providers of quality flat steel worldwide. Using automation systems installed in its own steel plants, the company governs its entire production process. This is achieved using sophisticated algorithms that model the functional relationships involved in steel manufacturing across the entire process. On top of this, there are still a host of other changeable factors that impact the quality of steel produced, and which need to be factored in the form of rules/formulas.

ThyssenKrupp Steel Europe uses Visual Rules to implement this rules-based management system. Users can now work with a future-ready software system. In its modeling of the rules governing the formula for the steel, the software demonstrates agility and transparency – two things that are critical to the company’s success.
Administration and deployment

Efficient administration, secure and fast deployment.

Visual Rules makes it a lot easier to organize, version, and reuse rules: specialist departments and IT can work together to manage efficiently via the team component of the Visual Rules Server. Another highlight is the powerful build tools.

Teamwork
The team component of the Visual Rules Server coordinates the simultaneous editing of rule models by multiple authors, and is the tool by which access rights for groups, users, and clients are managed.

Versioning and revision
Within rule projects, rules, tests, and any documentation can be managed and versioned – making them centrally accessible. Different versions can be visually compared and merged at the push of a button. The central repository provides support throughout the rules modification process all the way up to the time they are integrated into operations. A role-based approval process ensures that only consolidated and quality guaranteed rule modifications make it into the production process.

Deployment
Rule deployment is carried out either manually or automated as part of a build process. Automated deployment can be configured and monitored in the team component of the Visual Rules Server or using the integrated Visual Rules Builder. Both approaches enable rule versions to be deployed on the Visual Rules Execution Platform without downtime (hot deployment).

The Visual Rules Builder provides direct access to the versioned business rules and test scenarios in the rule repository. Business rules of a specific version are checked out from the repository and used to generate executable Java code. After this, the rules undergo defined test scenarios and test reports are generated. Only once all the tests have been successfully completed do the business rules automatically enter the production process. As well as Java code, the Visual Rules Builder also provides full documentation for the rules, always updated to match the rules code.

Business/IT alignment
As a unique cooperation platform, Visual Rules has been proven to cut development time and costs by up to 50% and by up to 90% for maintenance. It helps to clearly define the division of roles between specialist departments and IT, thereby creating a new model for collaboration in the company and beyond.
Execution and monitoring

Highly versatile, always traceable.

Visual Rules can be integrated into a broad range of architectures and provides more transparency for all your business processes. It supports a variety of application scenarios, from direct integration into a Java application to the deployment of rules as web services. With Visual Rules, you have an integrated, flexible BRM system that gives you a constant overview of all your rules and allows you to intervene directly!

Execution of business rules
The Visual Rules Execution Platform caters to a variety of clients, supplying rules as web services even for heterogeneous IT landscapes and legacy systems. The platform supports the SOA integration standard and has a versioning capacity, allowing for reliable rule management even in extremely complex scenarios. Usage and access rights can be exactly regulated for users, teams, and tenants – guaranteeing maximum security.

High level of scalability
Executing rules using the Visual Rules Execution Platform is extremely fast. At runtime, Visual Rules uses pre-generated Java code. Any number of parallel threads can be executed using the same rule logic. The rule machine’s execution mode is sequential and stateless, providing linear scalability. The Visual Rules Execution Platform can be implemented in standard Java EE application server clusters and automatically draw on the resources of the cluster.

Because the rules code is loaded dynamically, and any unused rule versions automatically removed, the platform needs a minimum of storage space, even when it hosts thousands of individual rule models (and their various versions).

Direct integration in Java applications
The Java code that Visual Rules generates from the rules models can be directly integrated into your own Java applications, for instance to implement it on mobile devices or for time-critical client/server applications.

To package the Java code, Visual Rules supports what are known as rule artifacts (JAR files), which contain the rule code, the original rule model, and version-specific information about dependencies. These rule artifacts and the runtime libraries are then executed via the classpath as with any other Java library.

Rule executions
Rules are called up from the application using Java API. This offers ways to specify input parameters, execute rules, and retrieve output parameters, actions, and statistics arising from rule processing.

Monitoring
In the graphical model, run-time statistics display the rules processed per request along with the processing time. This provides a transparent overview of all execution details in operations. Further information can be obtained by analyzing log files and executing rules step by step.
Visual Rules features powerful tools and components that you can use to create, manage, and execute business logic for all your applications.

**Visual Rules Modeler**
- Intuitive, graphical modeling of rules, decision tables, and state flows
- Integrated test and simulation management
- Test execution and debugging in a graphical model
- Generation of rules documentation as HTML, DOC, and PDF
- Maven plug-ins for automated code generation, test execution, and rule deployment via the Visual Rules Builder

**Visual Rules Server (Team component)**
- Simultaneous editing of rule models by your team
- Central repository, including versioning of rules, data models, and other documents
- User and team-based access control complete with audit log and either manual or automatic locking
- Recycling of rules and data models

**Visual Rules Builder**
- Automation of the processes for modifying, testing, and publishing rules – either script-based (Maven) or via an administration console

**Visual Rules Execution Platform**
- Hot deployment for seamless exchange of modified rules as well as storage in a rule artifact database
- Deployment of multiple rules versions as web services
- Recording of call history including statistics
- Configurable access control – including for web services requests
- Direct integration into your own applications (executive core) as a Java library

**Authentication and authorization system**
- Management of users, groups, roles, applications, and tenants via OAuth2 standard (e.g. with Keycloak or Bosch IoT Permissions)
Multi-tenancy architecture

High degree of scalability, more economic efficiency.

Visual Rules is fully scalable, from standalone applications to company-wide usage. To this end, Visual Rules offers a sophisticated and comprehensive multi-tenant capability with the opportunity to define roles in accordance with responsibilities in distributed and heterogeneous teams, and to monitor compliance with the access privileges issued.

The full multi-tenancy architecture of Visual Rules allows for a scalable infrastructure facilitating increased economic efficiency and reduced maintenance work across the company. Server components can be shared by multiple tenants at any one time. In this case, the users of various tenants will generally have no access to the rules, data, rules services, build processes, users, and authorization structures of the other tenants.

Tenant management
The connected Authentication system (Bosch IoT Permissions, Keycloak, ...) makes setting up a tenant a convenient process. Each tenant manages their users, groups, roles, rights, domains, and applications themselves. This means that operators and companies are always able to manage, monitor, and document all relevant actions and permissions granted in line with compliance requirements.

Advantages of a multi-tenancy architecture

Greater degree of scalability:
- Multiple instances of the Visual Rules Server component and Execution Platform can be run at the same time using a database and made available to various tenants.
- New tenants can be introduced into active operation and do not cause any direct changes to the existing IT infrastructure.

More economic efficiency:
- Software licenses can be shared by tenants and maintenance costs split among them.
- Better service guarantee and faster updates thanks to a more transparent infrastructure.
“Instead of 2,000 lines of spaghetti code, we’ve now implemented the USPS price catalog in the form of readable modules that are validated by business experts. As a consequence, updates to business logic and to the IT application can go hand in hand. We now have a full understanding of the implemented regulations – and what’s more, we can quickly implement any changes.”

Robert Werner,
Leiter Fachliche Architektur,
DHL Global Mail