

Business Rules Management **with Visual Rules:** intelligent software for intelligent decisions

Software Innovations



BOSCH

Invented for life

BRM

Visual Rules: the intuitive way to model, manage, execute and seamlessly integrate business rules efficiently

Rules management – what are the benefits?

Innovative competitors. Global markets. Legal frameworks that are subject to constant change. Business success is increasingly dependent on two factors: agility and flexibility. This is where business rules management comes into play. It seamlessly integrates business departments along the entire life cycle of business logic. Integrated into process management, it also effectively helps companies design lean and agile processes.

Visual Rules offers companies an intuitive graphical approach to introducing business rules management. This makes it popular not only with IT and the business departments that use it, but also with analysts – all of whom give it an excellent rating. The model-based approach takes everyone into account and measurably shortens the time it takes to develop and implement new versions of existing rules. 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 made to them are documented in an audit-proof manner. This even applies within heterogeneous teams whose members serve a variety of different tenants from various locations.

Business rules management (BRM) is particularly useful in the following cases:

- ▶ **When your company has numerous rules:** optimize the organization and structuring of business logic.
- ▶ **When you need to master high levels of complexity:** pool IT and business expertise together by integrating business departments directly.
- ▶ **When your rules are dispersed:** organize policies and optimize their reusability.
- ▶ **When you want maximum transparency:** create optimum traceability for your auditing requirements and other operations.
- ▶ **When your business environment is subject to frequent changes:** be prepared for changes in market structure and legislation. Not only does BRM help you manage frequent changes and optimizations in your business logic, it also helps you redefine it.
- ▶ **When you want to speed up development:** break out of typical development cycles.

The advantages of working with Visual Rules

- | | |
|--|--|
| <ul style="list-style-type: none"> ▶ Intuitive graphical modeling ▶ Covers all Java requirements for data and rule models without the need for programming ▶ Code generation for maximum performance ▶ Supports the entire life cycle of rules ▶ Thorough, up-to-date documentation of rules and data models ▶ Test-driven quality assurance ▶ High reusability of rule models and data | <ul style="list-style-type: none"> ▶ Central repository for common usage of rules ▶ Traceable change history and version control ▶ Comprehensive analysis and management of dependencies ▶ Fully auditable rule execution ▶ Architecture with full multitenancy, including the management of tenant relationships ▶ Scalable licensing and price model – with low running costs and high ROI |
|--|--|

**DHL**

DHL, the global leader in mail and logistics, uses Visual Rules to intelligently automate pallet tracking, sort letters and calculate postage. This puts the company in the position to continuously optimize and increase margins by responding more flexibly to change, improving efficiency and making full use of the highest discount rates in relevant tariff systems.

Trusted by top names

The proven reliability and flexibility offered by Visual Rules have made it a market leader. Companies from diverse sectors across the globe rely on this award-winning software to implement their business rules.

HanseMerkur

Using Visual Rules, the German insurance group pushed its automation rate for claims processing beyond the 30 percent mark. We are not the only ones to be impressed by this achievement: the company picked up the Europe Gold Award for Excellence in 2011!

Green Charge Networks

Visual Rules is the backbone of the GridSynergy energy management solution, which delivers status updates in real time that are supported by decision-making aids and recommendations. Electricity suppliers benefit from improved handling of demand peaks, automated requirements planning and lower investment and operating costs.

TeamBank AG

Rule models for assessing credit risks, making decisions on loans and calculating credit terms, even for over 800 banks, are no problem for Visual Rules. Seamlessly integrated into its existing architecture, TeamBank successfully implemented traceable and consistent modeling of rule models in credit and risk management throughout its group of companies.

Suzuki International Europe

Visual Rules enabled sensitive data from predecessor systems to be consolidated and transferred directly to the SAP financial accounting system. The visual modeling approach enables close cooperation between business and IT departments.

Application scenarios**Business process management**

- ▶ Process automation
- ▶ Electronic data exchange
- ▶ Workflow routing

Business Intelligence

- ▶ Early warning systems
- ▶ Calculation of KPIs
- ▶ Balanced scorecards

CRM

- ▶ Campaign management
- ▶ Customer profiling and portfolio analysis

Financial controlling

- ▶ Accounting
- ▶ Pricing

Compliance

- ▶ Detection of money laundering
- ▶ Risk evaluation (Basel II, SOX, Solvency)
- ▶ Embargo monitoring
- ▶ Uncovering of market abuse and insider trading

Supply chain management

- ▶ Scheduling material requirements
- ▶ Consignment tracking

Software development

- ▶ Data migration
- ▶ Modernization of old systems

Internet of Things and Services

- ▶ Machine control, monitoring and diagnosis
- ▶ Rule-based evaluation of sensor data
- ▶ Automatic detection and escalation of critical system states

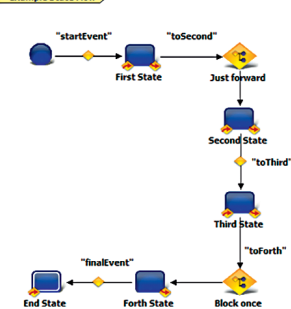
The diagram illustrates the BRM (Business Rule Management) life cycle as a continuous loop. At the center is a red square labeled "BRM". Surrounding this central core is a circular path divided into three segments, each representing a phase of the cycle: "Modeling/Optimization" at the top, "Administration/Deployment" at the bottom right, and "Execution/Monitoring" at the bottom left. The segments are connected by white arrows pointing clockwise, indicating a continuous and iterative process.

Visual Rules supports different execution scenarios: from integration directly into a Java application through mass data processing to deploying rules as web services in a service-oriented infrastructure. What all these scenarios have in common is the ability of users to record execution statistics during runtime and to monitor and trace how rules are executed.

The Petri net model consists of three places: **money_spent** (green), **bonus_card** (yellow), and **bonus_points** (blue). There are six transitions, each represented by a yellow diamond. Transitions 1, 3, and 5 are labeled **bonus_card** and contain a yellow diamond-shaped token. Transitions 2, 4, and 6 are labeled **bonus_points** and contain a blue token. The transitions are connected in a cycle: 1 → 2 → 3 → 4 → 5 → 6 → 1. Transition 1 also has an incoming green token from the left. The labels on the transitions are: 1: money_spent, 2: bonus_card, 3: bonus_card, 4: bonus_card, 5: bonus_card, 6: bonus_card. The labels on the places are: money_spent, bonus_card, bonus_points. The labels on the tokens are: money_spent, bonus_card, bonus_points.

Claim Position Reason Claim_Position.Reason	Claim Position Amount Claim_Position.Amount	Claim Position Accepted Claim_Position.Accepted
is broken = Something_broken	<= 1000 accepted TRUE > 1000 not accepted FALSE	
is stolen = Something_stolen	amount not constrained	accepted TRUE
is lost = Something_lost	<= 200 accepted TRUE > 200 not accepted FALSE	
has technical defect = Something_defect	< 50 not accepted FALSE <= 700 accepted TRUE > 700 not accepted FALSE	

Example State Flow



State flow

Modeling and optimization: a graphical approach to different rule types



A versatile and clear-headed approach right from the start, the unique, intuitive Visual Rules modeling approach ensures that even business users with no programming experience can achieve effective results in no time.

Modeling

The intuitive Visual Rules Modeler and WebModeler make it easy to model rules – even when the business logic is very complex.

Documentation

Once rules are modeled, Visual Rules generates comprehensive graphical documentation of the rule and data model at the push of a button.

Test and simulation

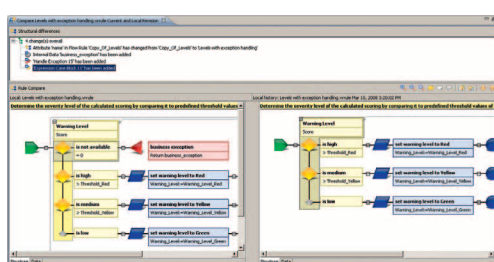
Special tools help business users to define and organize their test cases. In addition, they can view execution statistics and test results and see how they each deviate

from expected reference values. Graphical debugging helps to interactively identify errors and check the plausibility of the rule logic. This test-driven approach ensures that only functionally correct rules are activated.

Analysis

Sophisticated analytical tools make it quick and easy for users to uncover dependencies between rules and data models. Descriptive diagrams illustrate rule dependencies and data usage.

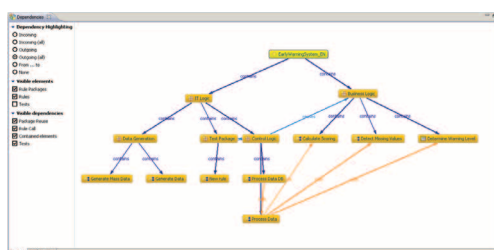
Analytical tools



Compare Editor displays changes to data and rules.

Test Case	Input	Output
Test Case 1	Input 1	Output 1
Test Case 2	Input 2	Output 2
Test Case 3	Input 3	Output 3
Test Case 4	Input 4	Output 4
Test Case 5	Input 5	Output 5
Test Case 6	Input 6	Output 6
Test Case 7	Input 7	Output 7
Test Case 8	Input 8	Output 8
Test Case 9	Input 9	Output 9
Test Case 10	Input 10	Output 10

Test cases are defined in Test Editor.



A dependency graph can be used for models, packages, rules and tests.

A data usage matrix allows users to easily access the data used.

Administration and deployment: efficient, secure, swift

For successful
teamwork

“Build for change” is the name of the game – never before has business logic needed to be as versatile. Working on new rules or rule changes in a team calls for special tools, methods and processes. At the same time, it is essential that only those rules that are both error free and correctly fulfill the specific business objective make their way into production. Fortunately, Visual Rules features and tools cover all these needs.

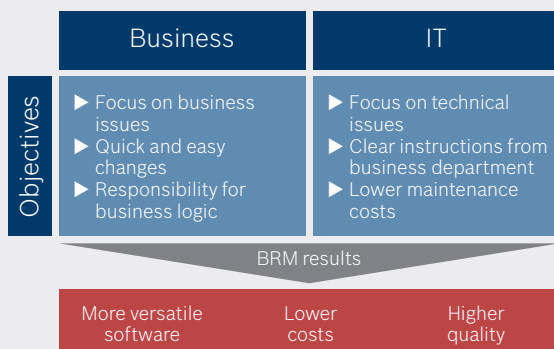
Administration

Visual Rules Team Platform coordinates the simultaneous editing of rule models by several authors and manages access rights for groups, users and tenants. In addition to rules, tests and documentation, the platform allows you to manage as many other documents as you like with-in rule projects, which makes them centrally available in their respective versions to all project participants. You can graphically compare and merge different versions at the push of a button.

Deployment

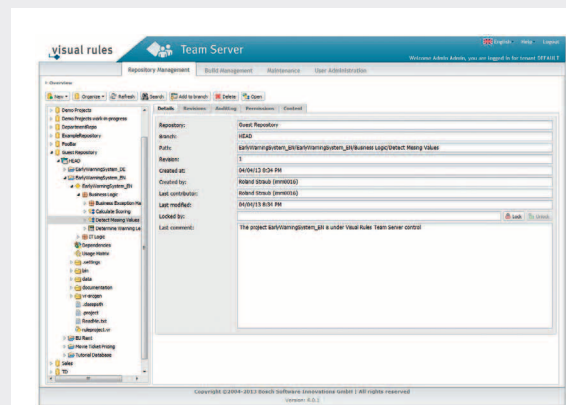
Deployment is carried out either manually with Visual Rules Modeler or automated as part of a build process. Automated deployment can be configured and monitored in Visual Rules Team Platform or using Visual Rules Builder, which is integrated into the build processes. Both approaches enable rule versions to be deployed on the Visual Rules Execution Platform without downtime (i.e. hot deployment).

Business/IT alignment

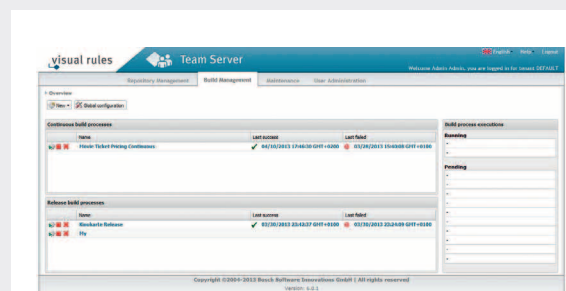


As a unique cooperation platform, Visual Rules has been shown to reduce development time and costs by up to 50%, while cutting maintenance time and costs by up to 90%. It supports the clear separation of roles between business and IT departments, creating a new model of cooperation within companies and beyond.

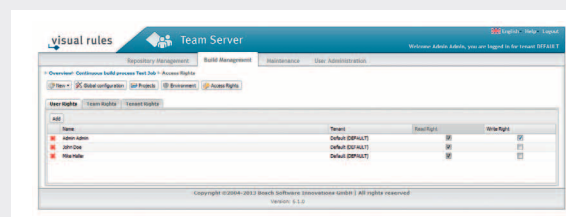
Visual Rules in action: deploying rules



Team Server repository



Team Server build management



Team Server access control

Execution and monitoring:

benefit from the versatility and traceability provided by Visual Rules

Full transparency, maximum performance

Visual Rules can be integrated into a broad range of architectures and ensures greater transparency across the entire span of your business processes. Its integrated, flexible BRM gives you an overview of all rules, at all times. And you can intervene directly whenever the need arises!

Visual Rules Execution Platform

This platform allows different tenants to be served by rules made available in the form of web services – even for diverse IT landscapes and legacy systems. It supports SOA integration standards and different version control options, which facilitate reliable rule management even in very complex scenarios. For the purpose of ensuring maximum security, usage and access rights can be defined precisely for users, teams and tenants.

Batch processing

With Visual Rules Batch Platform, the business logic created for interactive software applications is also used for the non-interactive processing of mass data. The batch applications satisfy the highest requirements in relation to performance and processing large volumes of data.

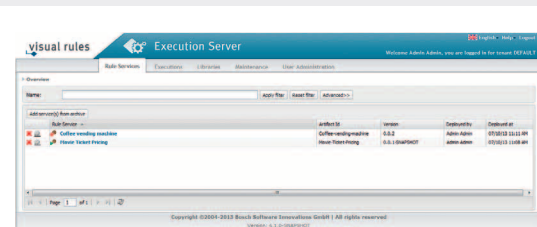
Monitoring

In the graphical model, runtime statistics display the rules processed per request along with the processing time. This allows you to monitor all execution details while the system is running. The evaluation of log files and incremental rule execution supply further information.

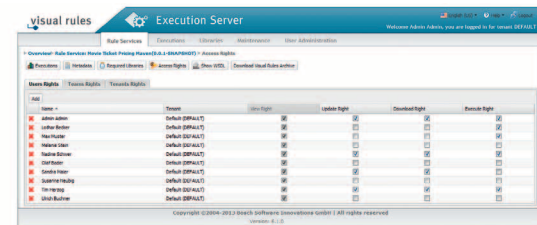
Your benefits

- ▶ High runtime performance and clustering capability
- ▶ Business rules as web service for SOA integration
- ▶ Comprehensive version and dependency management
- ▶ Dynamic identification of suitable rule models at the time of execution
- ▶ Same rules for batch processing and dialog mode
- ▶ Sequential or parallel execution

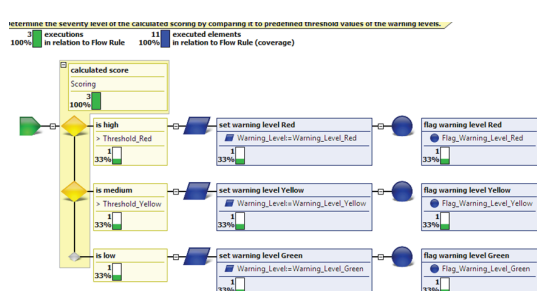
Visual Rules in action: executing rules



Execution Platform web console



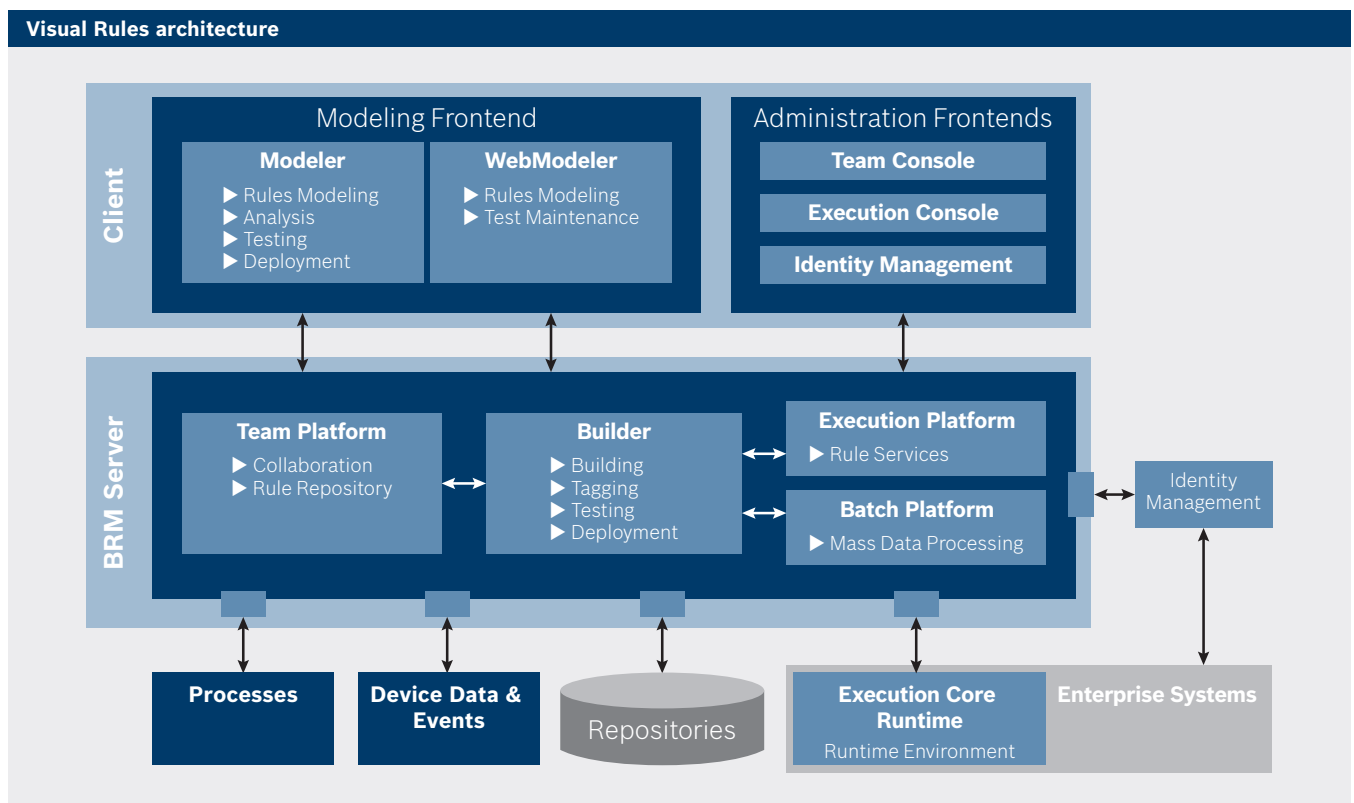
Access control on Execution Platform



Statistics in rule model

Tools and platforms: empowering users

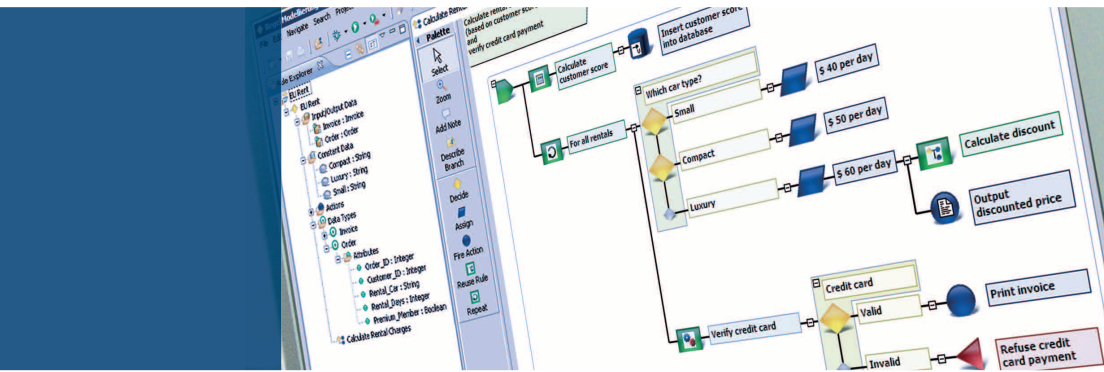
Visual Rules contains powerful tools and platforms for creating, managing and running business logic for all of your applications. Regardless of whether you are working with tenant server systems, enterprise applications or business processes – Visual Rules allows you to swiftly adapt the business logic to new market developments, regulations and strategic decisions.



Visual Rules structure and architecture

Visual Rules BRM technology integrates seamlessly into your current IT infrastructure, merges with your existing applications and supplies high-performance services throughout your company. Business departments are empowered to create and optimize business rules on their own, enabling them to automate operational decisions.





Tools

Visual Rules Modeler

- Intuitive graphical modeling of rules, decision tables and state flows
- Integrated test and simulation management
- Detailed execution statistics
- Test execution and debugging in graphical model
- Rule documentation generated as HTML, DOC and PDF

Visual Rules Builder

- Automation of code generation, test execution and rule deployment
- Ant tasks and Maven plug-ins for integration into existing build and deployment processes

Visual Rules WebModeler

- Creates, changes and publishes rules via a web browser
- Creates, maintains and organizes tests and test suites and displays execution statistics
- Facilitates cooperation in teams spread throughout a company and with partners and customers

Visual Rules DatabaseIntegrator

- Standardized access to relational databases, including transaction control
- Easy generation of executable programs for the rule-based analysis and processing of all types of data (e.g. in a data warehouse)

Platforms

Visual Rules Team Platform

- Centralized rule repository
- Version control for rules and other documents
- User- and team-based access control with audit log and automatic or manual locking
- Recyclable rules and data models
- Administration via web console

Visual Rules Execution Platform

- Hot deployment for replacing changed rules without interruption and storing them in a rule artifact database
- Deploying several rule versions as web services
- Dynamic identification of suitable rule models for service requests and metadata support
- Recording of call history, including statistics
- Administration via web console
- Configurable access control, including for web service requests

Visual Rules Execution Core

- Access to rule artifact database
- Can be integrated directly into Java applications (without Execution Server)

Visual Rules Batch Platform

- Designed for batch processing scenarios of any kind
- Powerful, transparent mass data processing
- Rules for interactive scenarios can be recycled

Identity Management

- Central, standardized user management
- Manages users, groups, roles, rights, domains, applications and tenants
- Manages relationships between tenants and tenant-related access rights
- Web-based, intuitive user interface

Integration into inubit business process management

- Connectors
- Integration during runtime

Added value for a wide range of tenants: Visual Rules for large companies and service providers

Visual Rules architecture has full multitenancy, enabling scalable infrastructure and common use of rules and services. Operations throughout your company will become even more cost-efficient and require significantly less effort to maintain.

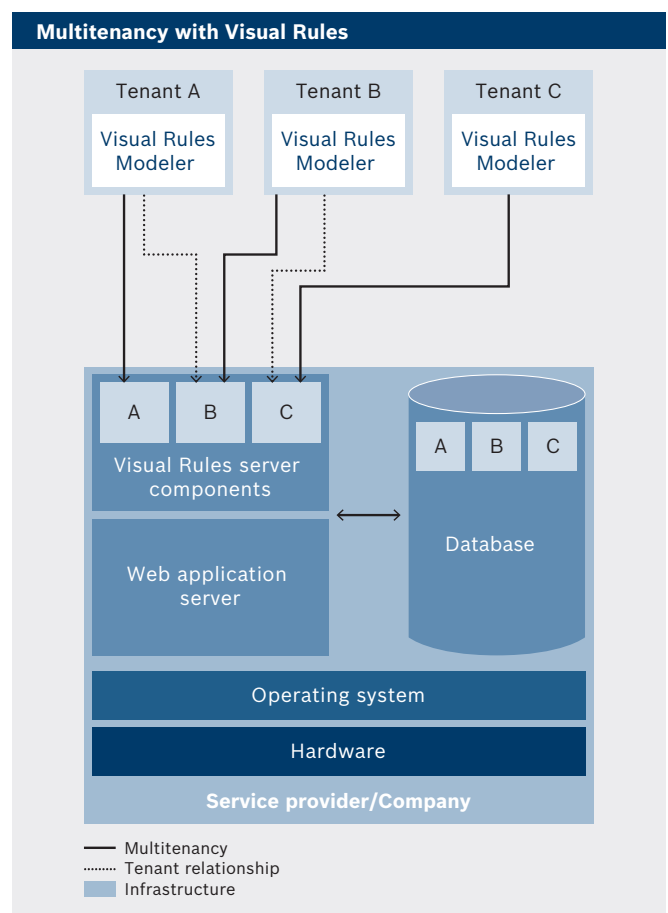
Several tenants can make simultaneous use of instances of Visual Rules server components. In its default configuration, the users of one tenant cannot view the rules, data, rule services or build processes, users and authorization structures of the other tenants. For service providers and companies organized into independently operated departments and units, the new tenant relationships offer the additional option of sharing rules and data – both between service providers and their tenant and among tenants themselves. This enterprise functionality is the basis for a wide variety of business models and new service concepts such as SaaS, cloud services, collaborations as well as the outsourcing of certain rule-based services.

Flexible identity management

The Bosch Software Innovations centralized Identity Management makes it easy to create tenants. Each tenant then manages its own users, groups, roles, rights, domains and applications or they can either hand this task back to the operator or delegate it to another trustworthy tenant.

Company-wide BRM with Visual Rules

Visual Rules scales up all the way from stand-alone scenarios to company-wide use and enterprise decision management. Visual Rules offers fully proven and comprehensive multitenancy. It is used to define roles according to responsibilities in dispersed, heterogeneous teams and to monitor compliance with the allocated access rights. In order to meet even the most



stringent governance requirements, a variety of tried-and-tested features control, monitor and document the entire life cycle of rules. The components involved adapt flexibly to the organization of manual and automatic processes defined by companies.

Multitenancy and tenant relationships – your benefits

Higher scalability:

- ▶ On the basis of a single database, you can run several instances of Visual Rules Team Platform and Execution Platform and provide them to tenants and customers.
- ▶ New tenants can be introduced during runtime and cause no direct changes to the existing IT infrastructure.

Greater cost-efficiency:

- ▶ Tenants can jointly use software licenses and share maintenance costs.
- ▶ A clearer infrastructure guarantees better service and faster updates.
- ▶ New service concepts and business models through the secure sharing of rules and data according to defined tenant relationships.

The Bosch software suite: more intelligence for better business

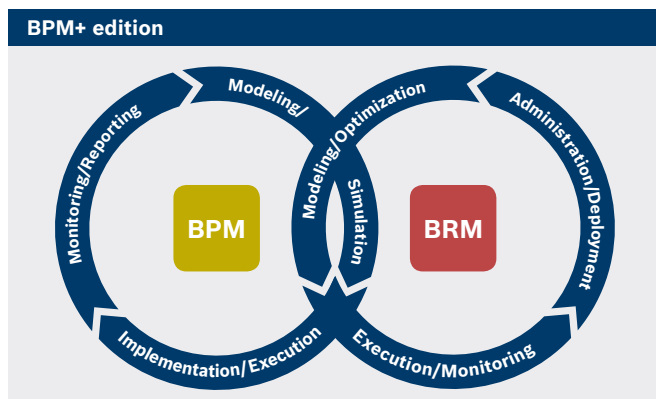


Our modular software suite makes your processes more efficient, automates intelligent decisions, and can even help you to realize brand new projects in the Internet of Things and Services (IoT). With the two editions for IoT and BPM+, it enables you to swiftly implement new business models, cloud services, and classic enterprise applications with process and rules management.

Flexible software for a dynamic market environment

In new business models – and particularly those based on the internet – speed and agility are your trump cards. Processes change and new ideas have to be implemented at top speed so as not to lose your advantage in the marketplace. It is a good thing, then, that flexibility is our software's strong suit and that its integrated approach

ensures greater speed and efficiency of implementation. All of our products for BRM, BPM and M2M work together seamlessly and support you throughout the life cycle of your business logic – including when it comes to using them in processes and integrating them into devices.



BPM+ edition

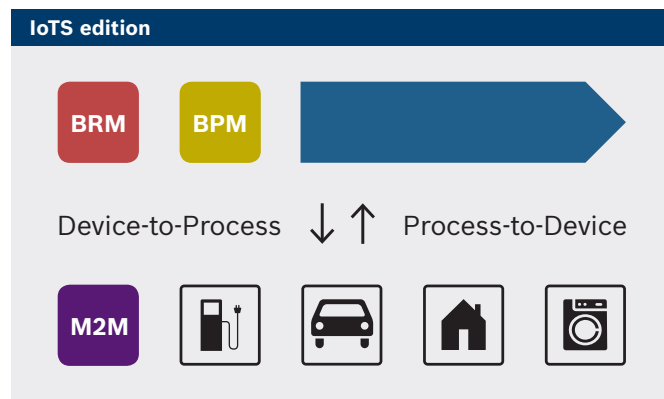
BPM+ edition is an integrated approach to business process management and business rules management that enables continuous/universal process management, which in turn allows the seamless interplay of operations, rules, data, and applications. Both our BPM and BRM software products are pooled with other technologies.

BPM+ =

BPM + BRM + user interaction + data management

Your benefits:

- ▶ Modern business process management (BPM) for structured and unstructured processes
- ▶ Intelligent processes: BPM combined with a powerful business rules management (BRM) system for rule based decision preparation and automation
- ▶ Efficient integration of your master and transaction data from new and existing applications



IoT edition

IoT edition gives you everything you need to secure the success of your projects and make your business models viable: consistent processes, automated decisions, and modern device management. We refer to this concept of end-to-end integration as “device-to-process”.

Your benefits:

- ▶ Complementary software products for the continuous integration of devices into your business processes
- ▶ Compatibility with a large number of devices, back-end systems, and data formats
- ▶ For business partners in the IoT: a continuous platform with unique multitenancy

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Bosch Software Innovations GmbH, the Bosch Group's software and systems house, designs, develops, and operates innovative software and system solutions that help our customers around the world both in the traditional enterprise environment and in the Internet of Things and Services. We place particular focus in this field on the topics of mobility, energy and building, manufacturing, and financial services. Whether in its special, targeted BPM+ and IoT editions or as flexible standalone products, our software suite is the perfect foundation not only for projects relating to the Internet of Things and Services but also for projects in the fields of Business Process Management (BPM) and Business Rules Management (BRM).

With some 550 associates worldwide, Bosch Software Innovations has locations in Germany (Berlin, Immenstaad, and Waiblingen), Singapore, China (Shanghai), Australia (Melbourne), and the United States (Chicago, Palo Alto).

More information can be found at **www.bosch-si.com**

The Bosch Group is a leading global supplier of technology and services, active in the fields of automotive technology, energy and building technology, industrial technology, and consumer goods. According to preliminary figures, more than 306,000 associates generated sales of 52.3 billion euros in 2012. The Bosch Group comprises Robert Bosch GmbH and its more than 350 subsidiaries and regional companies in some 60 countries. If its sales and service partners are included, then Bosch is represented in roughly 150 countries. This worldwide development, manufacturing, and sales network is the foundation for further growth. Bosch spent some 4.5 billion euros for research and development in 2012, and applied for over 4,700 patents worldwide. The Bosch Group's products and services are designed to fascinate, and to improve the quality of life by providing solutions which are both innovative and beneficial. In this way, the company offers technology worldwide that is "Invented for life."

The company was set up in Stuttgart in 1886 by Robert Bosch (1861-1942) as "Workshop for Precision Mechanics and Electrical Engineering." The special ownership structure of Robert Bosch GmbH guarantees the entrepreneurial freedom of the Bosch Group, making it possible for the company to plan over the long term and to undertake significant up-front investments in the safeguarding of its future. Ninety-two percent of the share capital of Robert Bosch GmbH is held by Robert Bosch Stiftung GmbH, a charitable foundation. The majority of voting rights are held by Robert Bosch Industrietreuhand KG, an industrial trust. The entrepreneurial ownership functions are carried out by the trust. The remaining shares are held by the Bosch family and by Robert Bosch GmbH.

Additional information is available online at **www.bosch.com** and **www.bosch-press.com**