

**White Paper**

# Role of Business Rules in SOA

**Industrializing Business Processes  
in Agile Enterprises**

An Analysis of the



**WOLFGANG MARTIN TEAM**  
**powerful connections**

[www.wolfgang-martin-team.net](http://www.wolfgang-martin-team.net)

© 2006 S.A.R.L. Martin,  
6 rue Paul Guiton,  
74000 Annecy,  
France



WOLFGANG MARTIN TEAM  
**powerful connections**

## Copyright

Wolfgang Martin Team S.A.R.L. Martin authored this report. All data and information was gathered conscientiously and with the greatest attention to detail, utilizing scientific methods. However, no guarantee can be made with regard to completeness and accuracy.

S.A.R.L. Martin disclaims all implied warranties including without limitation warranties of merchantability or fitness for a particular purpose. S.A.R.L. Martin shall have no liability for any direct, incidental special or consequential damage or lost profits. The information is not intended to be used as the primary basis of investment decisions.

All rights to the content of this study are reserved by S.A.R.L. Martin. Data and information remain the property of S.A.R.L. Martin for purposes of data privacy. Reproductions, even excerpts, are only permitted with the written consent of S.A.R.L. Martin.

Copyright 2006 S.A.R.L. Martin, Annecy

## Disclaimer

The mere inclusion in this work of general names, trading names, product names etc. without special mention does not infer that these names are freely available for general use under trademark protection legislation. Reference herein to any specific commercial products, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by S.A.R.L. Martin.

## Table of contents

➤	1 Management Summary.....	4
➤	2 Managing Rules and Processes in an SOA.....	6
	2.1 Process and Service Orientation.....	6
	2.2 Principles of an SOA.....	7
	2.3 Process Logic and Decision Logic.....	8
	2.4 Processes and Rules in an SOA.....	9
➤	3 Challenges in Business Rules Management.....	11
➤	4 Positioning of visual rules from Innovations Softwaretechnologie....	13
➤	5 Appendix.....	15

### 1 Management Summary

What differentiates market winners from losers? The attributes of successful companies are well known:

- Higher productivity
- Optimized resources
- Reduced complexity
- Faster processing time
- Lower error rate
- Shortened time-to-market
- Satisfied customers
- Satisfied employees

Arguably, these are the primary goals of management in every enterprise. It's a matter of industrializing processes and of agility in order to become and stay a market winner. Industrialization means standardization, automation and continuous improvement. Agility means flexibility in being able to immediately implement changes in strategy so you can follow changes in the market and meet customer requirements at all times. What do you need to get there? The answer is: a comprehensive approach to **managing the business rules** in the enterprise. Wait a minute! Isn't that the task of **business process management**? Confused? That's understandable.

Many vendors and consultants present **Business Process Management (BPM)** and **Business Rules Management (BRM)** as two different alternatives for creating a flexible, agile enterprise – away from the function-oriented models based on the inflexible applications of the past. Indeed, process engines are based on rules, while rule engines are also able to execute actions without process engines. What can be done?

As always, the truth lies somewhere in the middle. **BPM and BRM are complementary** and can excellently work together, especially if you apply the principles of a service-oriented architecture (SOA). The idea is to strictly separate process logic from decision logic. Process logic is the specific logic of the business process such as controlling the sequence of process activities, adhering to deadlines and handling exceptions. It is implemented using a process engine as part of BPM. Decision logic represents process-independent management policies and principles. It is implemented using a rule engine as part of BRM. Both process and rule engines are used to model, execute and govern the appropriate type of logic. The business gets a transparent modeling and presentation of workflows, policies and principles in the enterprise, leading to rapid implementation of changes and optimizations of all kinds, the key to agility. This is also a major step away from traditional coding by IT towards collaborative modeling and code-free implementation done in cooperation between business and IT.

An SOA changes the way BPM and BRM work together. Because it is used across processes, decision logic becomes a subset of business logic, which in an SOA is strictly separated from process logic. Rules become services which, like all other services in an SOA, are orchestrated using the process engine. You thus get a design principle in order to identify and implement reusability. The key is the question whether manage-

ment policies and principles are process-specific – reusability is then excluded – or process-independent – meaning nothing other than their reusability.

Using BRP and BRM together in an SOA is the methodological and technical prerequisite for industrializing business processes and being agile. BPM creates the automation and standardization of business processes, BRM the standardization and transparency of management policies and principles and an SOA adds the service orientation allowing us to strictly separate specific types of logic of individual processes and logic of bundled competencies and services that is used across processes. This creates agility.

### **visual rules – the Innovations’ solution for Business Rules Management:**

“visual rules” is an especially intuitive and high-performance BRM system for the development of business rules – as part of agile software for agile enterprises. The rules of the logic to be implemented are graphically modeled and converted into Java code at the click of a button, deployed as EJB or can be called as a Web Service. “visual rules” is available as a plug-in for Eclipse, for SAP NetWeaver and for IBM Rational Software.

### **The Goal of this White Paper on “Innovations Softwaretechnologie“**

Agility determines the success of an enterprise. Agility means a continuous, innovative and proactive adjustment of the business model to market dynamics and continually changing customer requirements and demands. An essential prerequisite for agility is the reinvention of collaboration between business and IT. The introduction of appropriate methodologies and technologies able to build on existing architectures is absolutely necessary for this. The key to this is a process and service orientation that allows a strict separation into process-specific logic via BPM and process-independent logic via BRM so that business and IT can use a common language consisting of processes and rules and are thus able to jointly build agile and audit-proof systems for an agile and audit-proof enterprise. The goal of this White Paper is to support decisions in this environment.

## 2 Managing Rules and Processes in an SOA

### 2.1 Process and Service Orientation

Agility and the industrialization of business processes are the factors determining whether an enterprise is among the winners or losers on the global marketplace. Agility means the ability to innovate and the adaptability of your own business models. Rapid responses and proactive initiatives create customer loyalty and knock out the competition. An ever-increasing market dynamic is the driving force. Other driving forces are cost reduction and compliance with regulations! This is why leading and successful enterprises concentrate on implementing their strategies using integrated, intelligent and flexible business processes.

#### A business process is...

a set of activities and tasks carried out by resources  
(services rendered by people and machines)

using different kinds of information  
(structured & unstructured)

by means of diverse interactions  
(predictable & unpredictable)

governed by management policies and principles  
(business rules & decision criteria)

with the goal of delivering agreed upon final results  
(strategies & goals)

- The principles of a process orientation also apply:
- Processes are based on the concept of **sub processes**, a process can thus be a service and a service a process.
- There are two **types of processes**, the automated type carried out by a machine (black box processing) and the type of process based on human interactions.
- A process thus combines both types of processes in any way possible according to process logic.
- Process logic describes the sequence (“flow”) of activities, the responsibilities, the temporal and monetary specifications for the execution of activities, escalation management and exception handling.
- Process logic is strictly separated from **decision logic**, because management policies and principles used across processes, while process logic is part of the process. Decision logic is specified and implemented via **business rules**.

Such a process orientation requires a flexible set of instruments allowing business processes to be standardized and automated, competencies to be bundled regionally and globally into services, peak loads to be covered “on demand” and services to be obtained from third parties in terms of outsourcing. On the bottom line this means a service orientation. Services present the business logic that is traditionally included in

applications. Processes are now application independent. It's their job to orchestrate the services – the business logic – according to process logic.

An application-oriented enterprise is thus transformed into a process-oriented one. The task to be solved is called **SOA based Business Process Management (BPM) or Top Down SOA**.

**BPM** is a closed loop model consisting of three phases:

**Phase 1:** Analyze, plan, model, test and simulate business processes

**Phase 2:** Execute business processes via workflows spanning all applications (process logic) by means of a process engine on a Service Oriented Architecture (SOA) as the infrastructure

**Phase 3:** Plan, monitor and control processes, their performance and the interplay of all business processes

An **SOA** is an architecture for BPM in which business logic is strictly separated from process logic.

## 2.2 Principles of an SOA

The principles of an SOA are:

- SOA is a design approach for a special enterprise architecture **and** for a special information technology software architecture
- SOA is strictly independent from technology
- From a technical point of view, service orientation is an evolution of component architectures (“LEGO”)
- SOA services are business-driven: The granularity of process modeling determines the granularity of the business services.

An architecture is service oriented if the following principles<sup>1</sup> apply:

- Principle 1 – **Consistent Result Responsibility**. The service provider takes responsibility for the execution and result of the service. The service consumer takes responsibility for controlling service execution.
- Principle 2 – **Unambiguous Service Level**. The execution of each service is clearly agreed to in terms of time, costs and quality. Input and output of services are clearly defined and known to both parties by the Service Level Agreement (SLA).
- Principle 3 – **Proactive Event Sharing**. The service consumer is informed about every agreed change of status for his work order. The service provider is required to immediately inform the service consumer of any unforeseen events.

For these 3 principles to work a business vocabulary is needed so that the same language is used in all SOA based processes. The integration hub is to an SAO as business vocabulary is to meta and master data.

<sup>1</sup> According to Jörg Hubacher, Amadee AG

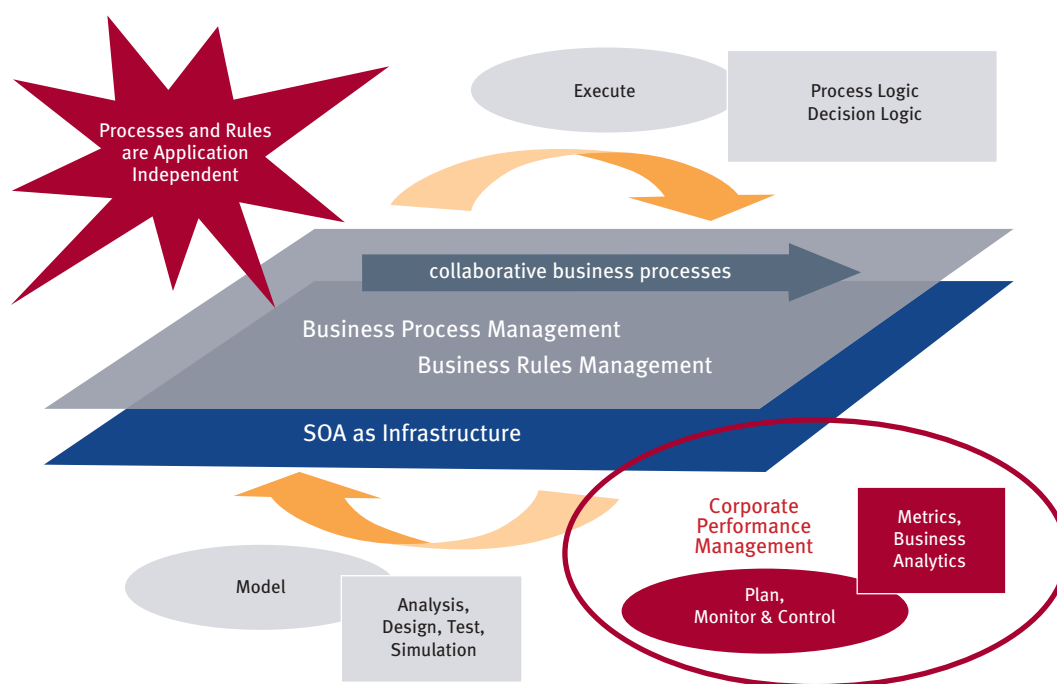
Business vocabulary is implemented by means of a repository, where the architecture of the repository is a hub and spoke architecture so that all meta and master data can be synchronized and historicized across all backend systems.

### 2.3 Process Logic and Decision Logic

As we have previously seen, in process orientation a difference is made between process logic and decision logic. Processes and rules thus represent two complementary and interdependent approaches. A process typically uses multiple rules, while a rule can be used in different processes. It's said that processes are related to rules in an n:m ratio.

**Example:** For value-added tax there is a rule that determines when a lower VAT rate is applied. This rule is used in the processes of buying, selling and controlling. A sales process doesn't use only this rule, but will also use a rule which allows the application of a volume discount and perhaps also a rule to calculate the individual customer discount depending on customer rating.

#### BPM and BRM in an SOA



© 2006 S.A.R.L. Martin

Figure 1: In a process-oriented enterprise, management of business processes (Business Process Management – BPM) and of business rules (Business Rules Management – BRM) is a central element of all entrepreneurial activities and actions. BPM and BRM are based on the model of a closed control loop. Independently of existing applications, functions and systems, processes and rules are modeled, executed, planned, monitored and controlled. The foundation for both, processes and rules, is a common business vocabulary. Corporate performance management is a third model, also a closed loop, to manage the planning, monitoring and control of processes and their performance. Process orientation is the basis of an intelligent, agile enterprise in its quest to master challenges including innovation, collaboration, continuous optimization and compliance.

Here we have the most important reason for strictly separating process and decision logic: When rules are integrated into the processes redundancy is created and you run up against the maintenance problem of having to keep redundantly modeled rules consistent. The problem is not to be underestimated, because rules change more quickly than processes. This is also due to the fact that not all rules in the enterprise are controlled by the enterprise itself, such as legal requirements. If processes and rules are kept strictly separate, then changes to rules only need to be made in one place, while changes in all processes using the rules take effect immediately. This is how the required flexibility is achieved.

*Example:* The government decides to change the VAT rate. If the calculation of VAT is implemented using a rule, then only this one rule needs to be changed and the VAT is correctly calculated in all processes.

Similar to the term BPM, the term **Business Rules Management (BRM)** can now be defined. Like BPM, it is a closed loop model, and based on the business vocabulary it describes the lifecycle of rules from analysis and design, simulation and test, via execution through rule engine and to monitoring and controlling including responsibilities. It is now essential to answer the question how BRM and BPM interact and how this works in an SOA (Fig. 1).

### 2.4 Processes and Rules in an SOA

An SOA regulates the interaction of processes and rules anew. Previously applicable was the dogma created by the Gartner Group that rules and processes should be strictly separated and managed, but that process engines for BPM and rule engines for BRM should be integrated. In an SOA this goes one step further. Instead of integrating proprietary BPM and BRM technologies, rules in an SOA are understood as services orchestrated by the process engine. This is how rule services as a category of services are obtained. A rule service can be understood as the encapsulation of complex rules. In other words, a rule service can also call on another rule service as a sub model. This is similar to the sub process principle in BPM. This makes a rule engine a component of an SOA infrastructure and decision logic becomes a subset of business logic. Thus, as part of an SOA rules have their own administration in the repository, in the registration and governance infrastructure and are based on the same business vocabulary.

Rules are orchestrated by the process engine the same way as other services. This is absolutely consistent and shows the elegance of the SOA approach. Decision logic can therefore be primarily understood as part of business logic, because it is process independent. This underscores the principle of the reusability of services: Rules are modeled and implemented only once and are then available for use in different processes.

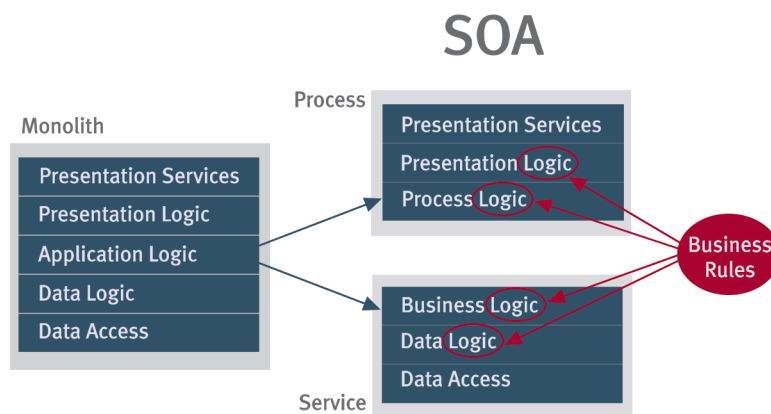
*Example:* Let's look at a process for loan application and approval. The process logic, or the logic specific to this process, comprises the receipt of the loan application, entry of additional information (e.g. customer rating), presentation for approval and signature, document generation, updates of back-end transaction systems, archival storage as per compliance requirements and informing the customer. Here the decision logic, or the process-independent logic, typically comprises checking the completeness of the information, loan scoring and risk analysis (e.g. with respect to Solvency II), carrying out the approval process and ensuring compliance with regulatory requirements.

If you take the service principle of rules a bit further it becomes obvious that logic can be implemented by a rule engine on different levels in an SOA. This always applies when, according to our definition of a process, the management policies and principles for controlling a process are process independent, i.e. an n:m ratio between processes and rules applies. Decision logic can thus not only be separated from process

logic, but this separation makes sense in an SOA on the levels of presentation logic, business logic and data logic. On the bottom line this principle of separation into service-specific logic (e.g. process logic) and service-independent logic (e.g. decision logic) means nothing more than the identification of reusable components in an SOA and their implementation by means of a rule engine.

As an *example* of understanding rules as services on the level of data logic you should be reminded here of semantic tools for data cleansing in data quality management. The semantics are mapped via a rule set.

### BRM in an SOA



**Rules are a design construct for re-usability of cross-process management policies and principles ("Decision Logic")**

© 2006 S.A.R.L. Martin

Figure 2: In traditional monolithic applications the layer of application logic holds both process and business logic. A strict separation is done in an SOA: Processes orchestrate the business logic depicted in services. This goes one step further when using BRM. The logic in all SOA layers can be separated into process-specific and process-independent logic (decision logic) so that decision logic becomes a subset of business logic and is implemented in an SOA by means of a BRM, while process-specific logic is implemented by means of BPM.

Rules can of course be implemented in an SOA without the use of a rule engine. If, however, all rules are integrated in processes, you run into the problem of complexity in maintaining rules and their consistency described above. The same applies if you have implemented all rules by coding them into the back-end applications. The right way consists of using a rule engine by means of BRM for all process-independent rules in an SOA. This brings a number of advantages:

- The reusability of services becomes the design principle. This increases productivity.
- Changes to rules can be carried out in a controlled manner via an application management procedure without interrupting production. This increases the speed of making changes.
- Rule changes are versioned and archived. This creates the required compliance.
- Process-independent management policies and principles become transparent and clearly represented. This creates acceptance in business and in management.

“In addition to the graphical modeling of business rules and the consistent service-oriented focus of the system architecture, for us the total cost of ownership was one of the plus points for visual rules. It is significantly lower than that of the other Business Rules Management systems we evaluated”

Stefan Schulz, SunGard

### 3 Challenges in Business Rules Management

Business Rules Management (BRM) is more than deploying a rule engine. We have already seen that BRM represents a closed loop model. For BRM to work you need a rule repository that supports central rule management including support for governance, versioning, traceability and reusability of rules. In contrast to BPM, where today a strict separation of the business and technical design of process models is typically made, in BRM you are already a step ahead in terms of collaboration between business and IT. Leading BRM systems offer tools whose use puts business staff into a position of being actively involved in the collaborative process of BRM. Enterprises or departments in which business rules frequently change especially profit from such collaborative BRM. It resolves the conflicting aims of greater agility, lower costs and guaranteed quality. In going from a rigid, release-driven approach for managing rules you arrive at an agile, rule-management model à la application management. The essential reasons for this lie in the wide-ranging test functions, the automatic creation of always-current documentation and the easy traceability of rules by the business and IT. All of this is repository based. This is precisely what BPM vendors in general lack: The big weak point in BPM is the repository, a strength of leading BRM vendors. This is where BPM vendors should learn from BRM vendors, because a combined BPM and BRM in an SOA needs world-class systems and a collaborative process in which business and IT can contribute and work together.

#### Lifecycle of Rules – Controlled, Quality Assured, Collaborative Deployment

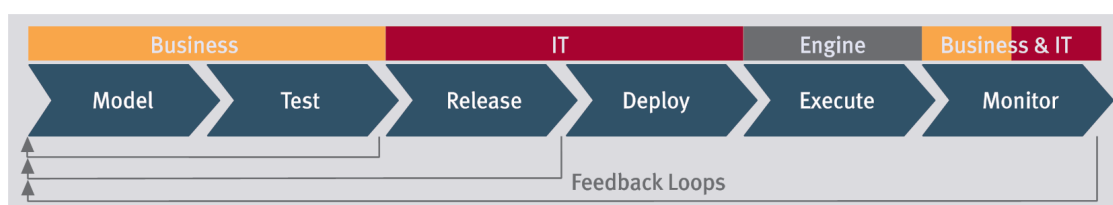


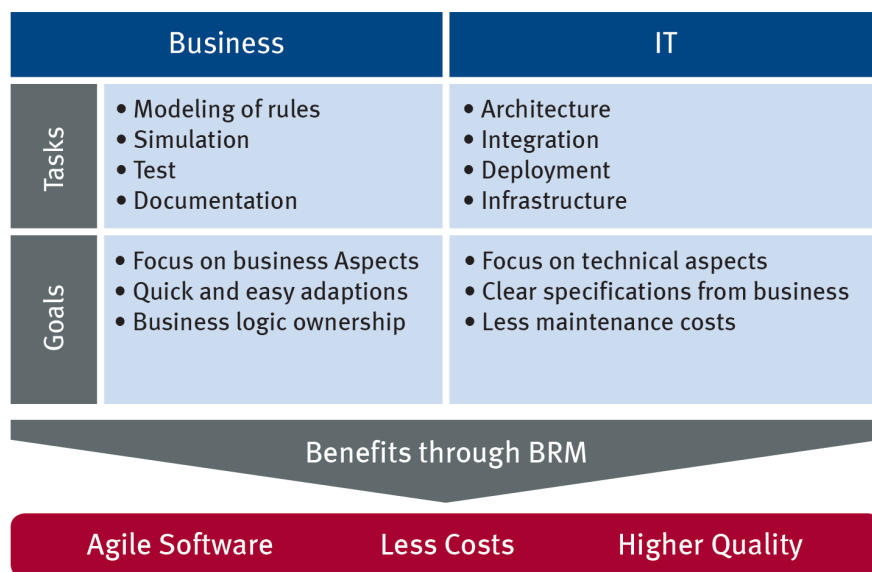
Figure 3: The phases in the lifecycle of rules are collaboratively managed in BRM. The business establishes the business model in the inner feedback loop and ensures business quality via testing. IT checks the quality of the rules in the approval phase and the quality for rule approval is jointly developed in the middle feedback loop. This is how a controlled transfer of rules into production takes place. The rule engine is solely responsible for the execution phase and jointly monitored and controlled in terms of BAM-oriented monitoring in which each department is assigned the performance indicators in accordance with its responsibility. This is how the outer-most feedback loop works.

The **reference architecture of a BRM** system thus consists of a rule engine, a rule repository and the tools to support and monitor a collaborative BRM process in terms of BRM governance.

There is a decisive difference in BRM systems:

- Rete-based or interpretative systems. These systems are based on an inference engine for interpretatively executing rules in accordance with Rete algorithms for rule processing: For this, rules must be described declaratively.
- Non-Rete-based or explicit systems. Here the dependency of rules is explicitly specified. The processing of rules in decision trees, for example, follows the specification of top left to bottom right, similar to human thinking.

### Collaboration of Business and IT



© 2006 S.A.R.L. Martin

Figure 4: Collaborative tasks and goals in BRM for business and IT.

### visual rules from Innovations Softwaretechnologie

visual rules comes with a visual modeling approach and a non-Rete-based or explicit rule engine and fully supports the process of managing rules (Fig. 3). The visual modeling is easily understandable and very intuitive. A 2-day basic training course is usually sufficient to understand and test rules. Practice with visual rules shows that the visual modeling approach corresponds to the way people think: processing from left to right, from top to bottom, rules are modeled in sequence, intuitive elements are available for different rules, etc. The modeled rules are then the basis for generating code. This code may then be readable (for IT), but is protected from intrusion and modification, ensuring consistency between the visual rule model and the generated code.

“In visual rules we found the ideal solution for the smart collaboration of business and IT in modeling business rules. By visualizing the decisions in processes the translation of business language into IT is significantly easier for both parties. The design phase is noticeably shortened – by up to 30% in some projects.”

*Hagen Buchwald, entory*

### 4 Positioning of visual rules from Innovations Softwaretechnologie

visual rules from Innovations Softwaretechnologie is a BRM system that is particularly well suited for use in an SOA. It enables rules to be used as services in an SOA for process-independent management policies and principles. The visual approach with intuitive modeling and display of rules fully corresponding to the way people think is outstanding. There is a clear difference here from BRM vendors whose technologies are based on an inference engine. Understanding the way of working with and testing such inference engines is normally reserved for experts and hampers collaboration with business, especially when dealing with complex rules.

Through the intuitive approach visual rules thus becomes a working communications platform for business and IT, which from a business view supports reusability as a design principle in the modeling of processes and services. Reusability was previously an IT design principle. Here, the collaborative use of visual rules by business and IT creates new opportunities for process and service modeling.

Another benefit of the visual approach is the business-oriented management of business rules. This creates “agile” systems whose lifecycle is jointly managed by business and IT. An agile system is a system that contains frequently changing application components that have to be maintained on a time or need basis, independent from rigid release cycles. visual rules enables this approach by separating the definition of rules from the technical code of an application. Rules can be exchanged on the fly via relevant features such as hot deployment, but can also be checked by means of a multi-stage quality assurance process. The only effort is in modeling, assuring the quality of and deploying rules. The rest is automated.

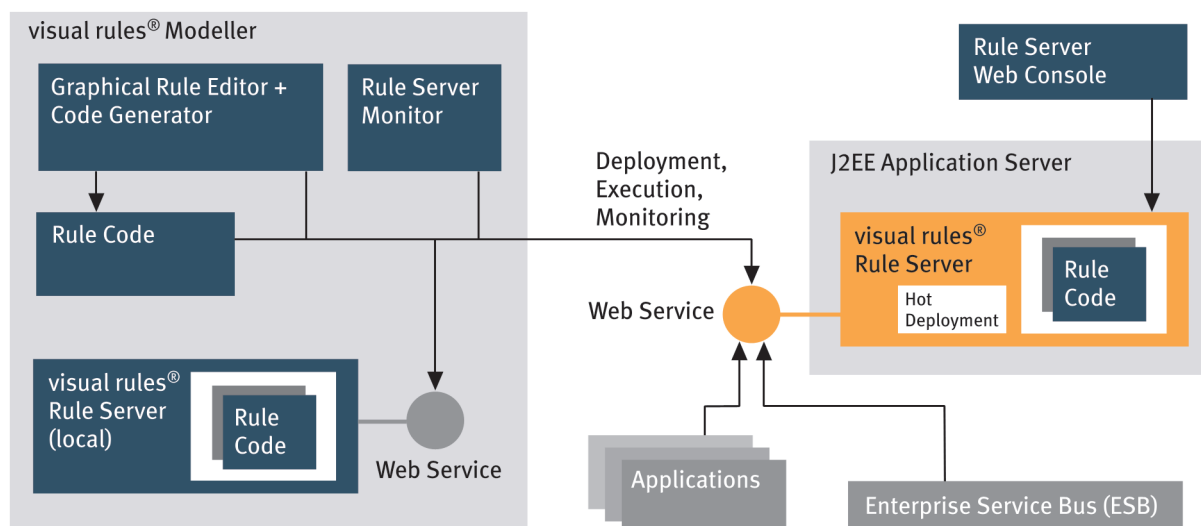
Controlled, quality-assured hot deployment allows the visual rules customer Hypo Vereinsbank to adjust their business rules on a daily basis.

#### Technical data

“visual rules” (Fig. 5) is available as a plug-in for Eclipse, for SAP NetWeaver and for IBM Rational Software.

- The rules of the decision logic to be implemented are graphically modeled and converted into Java code at the click of a button, deployed as EJB or can be called as a Web Service.
- Rules are defined in models. They can call rule units as sub models that can be freely structured. Loops are permitted and, for instance, can be of assistance when processing lists.
- Test, debugging and simulation tools are available for rules.
- During execution a log is created that supports business rule monitoring in the sense of BAM (business activity monitoring).
- Rules management is repository based and supports versioning and authorization as well as controlled hot deployment.
- Rules are self-explanatory.
- visual rules is designed for an SOA.

### visual rules Architecture



© 2006 S.A.R.L. Martin

Figure 5: visual rules generates code ("rule code") from modeled business rules. It is optionally implemented locally or in a Rule Server within a J2EE application server. The rule code can be called via a Web Service interface – or directly from applications or via an Enterprise Service Bus. visual rules also provides functions for monitoring the execution of business rules.

visual rules from Innovations is a state-of-the-art BRM solution, a technology that should definitely be looked at as part of an SOA initiative. IBM and SAP are strong partners, but a powerful, globally represented partner network with regional and segment-specific service and consulting know-how still has to be set up. The great challenge for Innovations is continuous and controlled growth in the growing areas of the IT market and to penetrate the market by means of partners.

#### visual rules creates added value for customers via

- agile systems at lower costs with a higher level of quality
- traceable and audit-proof rule modeling and execution
- Total Quality Management for business rules in an SOA
- scalable and high-performance rule execution in an SOA

and **visual modeling** provides a collaboration platform for business and IT, making the modeling, testing, approval, transfer, execution and monitoring of rules a joint task in which each party complements the other and contributes its know-how to BRM.

“We highly appreciate the possibility of integrating the quality management into the development process. visual rules supports the “test programming first” paradigm. It enables our consultants to develop solutions along clearly defined and automatically executable test scenarios. The cost for quality assurance is especially high in process-oriented projects. We have now managed to significantly reduce it. With visual rules, the business logic of applications can be implemented in higher quality – with the gain in quality becoming manifest for the customers.” *Hagen Buchwald, entory*

## 5 Appendix

### Related Reading

Martin, W., Nußdorfer, R.: Role of Portals in a Service-Oriented Architecture (SOA) – Collaboration and Presentation Services: Pulse Check – Processes and People, iBonD White Paper Vol. 4, [www.soa-forum.net](http://www.soa-forum.net), Munich, 2006, 32 pages

Martin, W., Nußdorfer, R.: CPM – Corporate Performance Management: Analytical Services in a SOA, iBonD White Paper Vol. 2, [www.soa-forum.net](http://www.soa-forum.net), Munich, 2006, 53 pages

Nußdorfer, R., Martin, W.: RTE – Real-Time Oriented IT Architecture: All Together Now, Strategic Planning of IT Architectures, iBonD White Paper Vol. 1, [www.soa-forum.net](http://www.soa-forum.net); 2003, Munich, 35 pages

Nußdorfer, R., Martin, W.: iSO – Integrated Solutions: All Together Now, End-To-End Processes Across Integration Hubs, iBonD White Paper Vol. 3, [www.soa-forum.net](http://www.soa-forum.net); Munich, 2004, 41 pages

Free download of these white papers at [www.wolfgang-martin-team.net](http://www.wolfgang-martin-team.net)

## About Innovations Softwaretechnologie GmbH



Innovations Softwaretechnologie GmbH provides products and services related to Business Rules Management. This comprises the processes and tools for defining and managing business rules for their automated deployment in operational IT systems. With its »visual rules« product, Innovations offers an especially intuitive and high-performance Business Rules Management System with an integrated visual modeling approach. Consulting companies on Business Rules Management and the use of »visual rules« is part of the extended services offered by »visual rules« Professional Services. In addition, Innovations offers rule based solutions employed internationally by companies from the areas of finance, insurance, trade, telecommunications and industry. Since 1997, Innovations has been one of the major players in the Business Rules market. Today, customers and partners world-wide are using and featuring »visual rules«

For further information see: [www.visual-rules.com](http://www.visual-rules.com)

## About the Author



Dr. Wolfgang Martin

Designated in 2001 one of the top 10 most influential IT consultants in Europe (by Info Economist magazine), Wolfgang Martin is a leading authority on Business Integration, Service-Oriented Architectures (SOA), Business Intelligence (BI), Corporate Performance Management (CPM), and Customer Relationship Management (CRM). After 5½ years with META Group, latterly as Senior Vice President International Application Delivery Strategies, Mr. Martin established the Wolfgang Martin Team. Here he continues to focus on technological innovations that drive business, examining their impact on organization, enterprise culture, business architecture and business processes. Mr. Martin is a notable commentator on conference platforms and in TV appearances across Europe. His analytic skills are sought by many of Europe's leading companies in consulting engagements. A frequent contributor of articles for IT journals and trade papers, he is also an editor of technical literature, such as "Data Warehousing – Data Mining – OLAP" (Bonn, 1998), "Strategic Bulletin on EAI" (Munich, 2002, 2003 & 2004), „Strategic Bulletin on CRM“ (Munich, 2002, 2003 & 2004), "Strategic Bulletin on BI" (Munich, 2003, 2004 & 2005), „Jahresgutachten CRM“, (Würzburg, 2002, 2003, 2004 & 2005). Prior to META Group, Wolfgang Martin held various management positions with Sybase and Software AG, responsible for business development, marketing and product marketing. Prior to this, he became an expert on decision support while with Comshare. His academic work included Computational Statistics at the Universities of Bonn (Germany) and ParisSud (France). Dr. Martin has a doctoral rer.nat. degree in Applied Mathematics from the University of Bonn (Germany).