



I D C T E C H N O L O G Y S P O T L I G H T

Breaking the Rules in BRMS Technology

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Business rules management systems (BRMSs) support an important architectural approach to organizing software where business rules are managed independently from the application code. The key benefit of this approach is the agility with which rules can be created, modified, and adjusted without altering the overall application. This approach is well-suited to situations where applications rely on the evaluation of conditions and circumstances, such as case management, complex pricing, insurance and claims processing, or governmental benefits eligibility situations. This Technology Spotlight examines the key benefits and use cases for business rules engines and looks at the Progress Corticon offering and its contribution to the BRMS market.

Introduction

Business rules management systems trace their history to reasoning systems, which were an active area of computer science research in the 1970s under the broad area of artificial intelligence. When applied to business problems, the approach was considered revolutionary in the way it sought to organize facts and rules to build expert systems that can support powerful reasoning about a given knowledge domain. In fact, the core technology inside business rules engines revolves around the process of rule execution, which uses pattern matching optimization algorithms. One important algorithm, the Rete algorithm, developed by Dr. Charles L. Forgy of Carnegie Mellon University in the mid- to late 1970s, has been the source of most implementations of rule execution in most BRMS products.

The algorithms underlying the technology have moved a long way since then, but now most BRMS software employs derivatives, enhancements, or alternatives to the core Rete algorithm. Today, BRMS products are recognized as the go-to architectural solutions for certain types of applications. The types of applications most suited for BRMS products tend to have two key characteristics: They involve decision making, which requires analysis of a complex and varied set of constraints or conditions, and these conditions need frequent updating and evolution requiring the input of subject matter experts. Generally, the more complex the decisioning processes involved, the more likely the application is a good fit for BRMS technology. Examples of areas where BRMSs have been used successfully include the following:

- Regulatory compliance validation
- Eligibility determination for benefits
- Customized product pricing and configuration
- Credit qualification

- Equipment diagnosis and repairs
- Self-service customer support
- Sales pipeline qualification
- Sales promotions and rebates
- Financial services underwriting
- Loan processing
- Insurance coverage

Most buyers use BRMS software in an embedded capacity to deliver end-user applications or other categories of middleware such as model-driven application platforms. In particular, BRMS software continues to be bundled with process-centric model-driven application platform software where the technology has gradually become a core capability. Additionally, BRMS capabilities are increasingly being offered as important ingredients of more comprehensive, multiparadigm, model-driven application platforms. Only by creating tight integration with other approaches to developing applications can the potential of this category be more fully realized in scenarios that call for its capabilities.

Key Market Trends

The BRMS market is expected to exceed \$500 million in 2015 and comprises standalone products that are typically sold as middleware technology to independent software vendors (ISVs) or internal development organizations of larger enterprises. IDC also estimates that an additional \$100 million to \$150 million in BRMS software is integrated into business process management (BPM) software today. This has been driving broader adoption of the technology. The BRMS market is growing as a whole in the high single-digit rates as it leverages growing interest in model-driven application development platforms.

Boosted by intensifying business activity and long-running developer shortages, the adoption of model-driven application development and platform software has been on the rise. In recent decades, enterprises have progressively shifted the focus of their attention toward systems of differentiation and outsourcing the operations and maintenance of their systems to external parties.

Today, both large and midmarket enterprises recognize that application development is at the core of new innovation in business and have begun to invest in ways to accelerate application development. Model-driven approaches that reduce the level of coding or allow applications to be constructed through visual models or abstractions that are appropriate for the problem domain are also attractive because they are able to engage business users in the application development process. Developer skills shortages and an accelerating economy have put a premium on enterprise agility and ways to harness business user innovations more quickly. These trends are leading to considerable new investments being made in model-driven application development in the enterprise.

Model-driven application platforms offer an abstracted approach to application development, which takes advantage of knowledge workers in the business and often produces more effective and responsive applications. Overall, the blending of various model-driven application construction approaches is increasingly being witnessed in the industry as data-centric platforms add process tools, as process-centric platforms add data modeling capabilities, and as both add rule-centric approaches. The driving force behind these trends is the overriding fact that different applications require different approaches, and a universal tool designed to address diverse applications may require multiple modeling capabilities.

IDC believes that research and development investment in developer tools continues at an elevated pace and that the broad space of model-driven application platforms and tools, of which BRMS is a category, is one of the fastest-growing areas. The transformations taking place in the industry toward mobile devices and public cloud services have also been contributing to the acceleration of this investment. Support for mobile development across multiple devices is often handled with model-driven application development tools. The BRMS market is also being helped by continued enterprise investment in big data/analytics correlated with increasing data volumes in enterprises and new application categories involving complex event management and the processing of Internet of Things (IoT) data outputs.

The Benefits of BRMS Implementations

For certain applications, BRMS software lies at the heart of the innovation to be delivered. BRMS software allows the complex rules governing a decisioning application to be identified, documented, and stored in a specialized rule system where they can be changed and managed over the life cycle of the application. This permits isolation of the central value of the application from other code that can be constructed and delivered through traditional approaches.

The business rules subsystem can be embedded and reused by multiple applications over time, but importantly, its evolution is managed separately and independently from other parts of the application. This is important because typically application evolution is a relatively slow and complex IT activity requiring hard-core development.

BRMS software places the decision-making subsystem of the application into the hands of the business, which can manage the rules governing it. The implications are clear: namely that, as the rules change, and often improve, new versions of the application do not have to go through a new rollout. This means that a change made by the business user will not impact the underlying code. Instead, the business can benefit from improved decisioning without delays. IDC identifies the following key benefits of using BRMS software:

- **Application modularity and separation of concerns.** Because business rules are abstracted and separated, the application can be maintained more effectively and productively over time. This decoupling allows the business rules component of the application to be evolved independently and, typically, on a more agile schedule in response to the changing business or regulatory environment.
- **Higher engagement and leverage of business users.** In most BRMS applications, business users are trained to manage the rule system and are able to evolve it in response to new requirements with relative autonomy, requiring fairly modest support from technical IT groups. This not only is a good use of typically scarce IT resources but also allows the business team to be directly engaged in application evolution in a way that traditional application development rarely permits.
- **Reduced need for traditional coding skills.** Pulling an important chunk of the application aside into rules enables available coding skills to be directed more effectively to other parts of the application that involve the user interface or the downstream processing of the rule system's decision outputs. In most cases, reduced coding also leads to a more agile delivery schedule for the overall application.
- **Manageability of business rules.** One of the main advantages of using BRMS software is the overall clarity it provides to the business rules that govern most applications. Having the key business rules that underpin an application documented separately by the BRMS software's rules designer decision table interface can help businesses maintain and evolve these rules more effectively than if they were coded in a programming language.

Considering the Progress Corticon Offering

Corticon is a relatively new BRMS technology that entered the BRMS market in early 2000 after the main wave of business rules innovation began to subside. The technology contributed several new ideas to the market, including a new tabular rule authoring and maintenance paradigm and a more linearly scalable rule execution algorithm that relies on design time optimization. The technology was well-received and recognized for its innovation, which led to significant customer momentum in its first decade of life.

In 2011, Progress acquired Corticon while it was building out a strategic middleware stack. Progress concentrated on integrating Corticon BRMS with its core technologies such as the OpenEdge application development platform, DataDirect database connectors, and middleware. It marketed Corticon to enterprises and ISVs with some success. In 2012, Progress reoriented by selling many of its middleware assets and focusing on building out its application development technology.

The company retained its Corticon BRMS technology while also focusing on launching and aggressively developing its application platform as a service (PaaS). Progress PaaS offerings include the Rollbase technology that the company acquired in 2013, its newly created connectivity as a service DataDirect Cloud, the Modulus deployment-centric application platform, and Telerik Platform. In this context, Corticon is well-aligned with Progress' application focus on model-driven application development. Corticon is available both as a standalone rules engine and as a complementary solution with OpenEdge and PaaS platforms.

Today, Corticon has over 500 customers across various verticals, mainly in finance, insurance, banking, healthcare, retail, and the public sector. The company is also about to launch Corticon 5.5, which represents one of the most significant new updates to the technology in recent years. The key new capabilities for this release include the following features:

- A new Web console for both Java and .NET Corticon customers that will be able to manage multiple Corticon servers
- Rule flow enhancements, designed for improved flexibility and ease of use for the creation of complex decision services and large rule flows (Corticon plans to introduce these enhancements while maintaining full backward compatibility with existing rule flows.)
- Improved thread pooling for decision service execution and support for autoscaling
- A new high-performance and high-scale logging subsystem
- REST API for server management for custom control over server configuration and deployment

Corticon BRMS Differentiators

Corticon implemented several new ideas that caused competitors to respond, including:

- **Visual authoring environment.** The authoring and maintenance of business rules are core functions of a BRMS. Corticon was one of the first players to recognize that this area of the technology needed attention and introduced a patented, visual-spreadsheet-like interface for rule authoring that the company refers to as a model-driven approach. Corticon's special notation for operators and a structured rule layout of rule elements with drag-and-drop support to rule editing were unfamiliar to most experts at the time, but those features resonated with adopters and new customers. Additionally, Corticon's approach also enabled a richer set of rule validation and testing capabilities. The spreadsheet paradigm for rule authoring has now become a BRMS market mainstay as Corticon's competitors have followed suit with similar, albeit more limited, approaches.

- **Referential rule integrity.** Corticon was one of the first BRMS offerings to highlight and address the problem of business rule integrity. Analogous to the concept of referential data integrity in relational databases that prevents illogical data from entering a database, referential rule integrity prevents illogical rules from entering a rule base. Corticon automatically checks rules for conflict, incompleteness, circular logic, and syntax.
- **Pre-runtime optimization.** Unlike almost every other BRMS technology, Corticon does not use the standard Rete algorithm for rule execution. Instead, the company relies on its patented approach to wiring business rules prior to execution in order to reduce the search space for rule resolution. The company claims that this approach yields a more linear scaling model as the complexity of the rule set increases, compared with the exponential scaling of the traditional Rete algorithm. Corticon refers to its algorithm as DeTI for Design-Time Inferencing, as opposed to the runtime inferencing that occurs in the Rete engine. It should be noted that the algorithmic performance of most BRMS software players is regularly improved and most employ approaches that enhance and improve upon the Rete algorithm. Many BRMS vendors now offer multiple engine algorithms to optimize performance under different scenarios, potentially adding to the complexity of implementing a BRMS solution.
- **Strong server integration.** Corticon recognized the importance of integrating BRMS technology with other parts of the software stack to simplify deployment in enterprise IT systems and to interoperate with the types of technologies that enterprises were running. While the server technology was based on Java and integrated well with Java applications, the company added .NET integration early in the product life cycle. Additionally, Corticon is designed to be well-integrated with other parts of the Progress stack, such as the company's set of DataDirect database connectors. Additionally, Corticon supports XML Web and REST service interfaces.

Challenges

The Corticon BRMS offering faces the following market challenges:

- **Limitation of business rules approaches.** The most important challenge facing BRMS software is correctly matching the technology with the right problem to solve. On the face of it, all businesses operate according to some rules and all applications involve some articulation of some rules, but it is not always possible to articulate business rules in a way that is suited for BRMS consumption. Just as importantly, not all applications have a well-documented set of business rules, and the process of developing one may be too time-consuming or might require a perspective not always available to the implementation team. It is important to recognize the suitability of business rules to certain problem domains, but it is equally important to understand where BRMS is not a good fit. IT decision makers should qualify the usage scenarios of intended applications and assess the degree of rule centrality. For example, if the system does not call for the use of a large body of often changing rules that are amenable to business analyst modification or evolution, then structuring the application on a BRMS architecture may not be a fruitful approach.
- **New road map.** As Progress went through strategic realignments, investment attention in the Corticon technology was minimal. Thus, what was a breakthrough technology lost some of its competitive advantage to other products. Corticon technology can benefit from stronger investment in the back-end application architecture to support new capabilities enabling cloud deployment. In particular, features supporting the deployment of a cluster of Corticon servers, server multitenancy, and the ability to manage clusters with efficient logging and performance analytics are required to support a cloud model of deployment. Progress ISVs are increasingly being asked by their customers to run software as a SaaS offering, and they need these features. Fortunately, Progress has recently increased its investment and is adding features in Release 5.5 such as the ability to support the deployment of a cluster of Corticon servers, the ability to manage clusters with efficient logging and performance, and analytics in the form of server and decision service metrics. According to the company, server multitenancy will be included in subsequent releases.

Conclusion

BRMS software has proved itself over the years in a variety of important categories of applications. The benefits delivered by centralizing the management of business rules that underlie a decision-centric application are compelling in the productivity and agility they deliver and in the engagement of business users who are able to contribute new innovation as they evolve the rules application.

IDC believes that innovation in application development tools and platforms will continue at an elevated pace, further catalyzed by the cloud and mobile disruptions. BRMS software, being a type of model-driven application platform, will benefit from this wave of new investment. The BRMS market has been on a growth trajectory, and development platforms offering improved enterprise agility, developer productivity, and deeper business engagement will continue to experience a high level of growth in the market. The Progress Corticon offering has made a key contribution to this market space. To the extent that Progress Software can address the challenges described in this paper, IDC believes that the offering is well-positioned for success.

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