

TECHNOLOGY AUDIT

FICO Blaze Advisor 6.7









FICO


BUTLER GROUP VIEW

ABSTRACT

Already an established Business Rules Management System (BRMS) product, version 6.7 adds further depth to the mature Blaze Advisor product. The product provides a system for decision execution (rules creation, deployment, and management) with the ability to automate decision-making within transaction streams, and uses simulation and analytics techniques based around an inference engine to predict behaviour and optimise actions. By abstracting business rule logic from operational applications and locating it in a central repository, it provides a single point from which complex decisions can be managed and deployed across the enterprise in order to meet the need for consistency, policy enforcement, and process effectiveness, while also supporting agility within the business. Organisations in highly competitive, fast-changing, or highly regulated markets will benefit from using Blaze Advisor, particularly where there is volume and complexity in terms of rules and transactions.

KEY FINDINGS

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|  Extensive Business Rules Management System; accessible by business and IT. |  Single rule repository can be used across Java, .NET, and COBOL environments. |
|  Option to interact using templates, decision trees, decision tables, and scorecards. |  Decision simulation capability provides access to business impact analysis. |
|  Business users can create and adapt rules, and set the content. |  Over-specified and too costly for low-volume situations with infrequent rules changes. |
|  High-performance runtime environment. |  The only rules engine to use the Rete III algorithm. |

Key:  Product Strength  Product Weakness  Point of Information

LOOK AHEAD

Near term – a plug-in for Eclipse deployment; ClearCase 7.1 and Subversion integration; Decision Simulator, and SmartForms updates. Longer term – usability enhancements via the use of Ajax and Web 2.0 capabilities; rewriting the Integrated Development Environment (IDE) on top of Eclipse; support for Business Activity Monitoring; and decision graphs.

FUNCTIONALITY

Product Analysis

Decision making within business has become more complex due to the growing scope of business, the sheer volume of data available, and the move to interrelated business functions and decision making (including recognition of the upstream and downstream impact of those decisions), allied with a faster pace of business in a global environment. Technology and architectural approaches have also changed, with the traditional practice of embedding decision-making logic into hard-coded applications being replaced by principles of componentisation and abstraction, and enacted via Service Oriented Architecture (SOA) and Business Process Management (BPM), to which a Business Rules Management System (BRMS) can add value. At the same time organisations need to be able to act on policies, meet regulatory requirements, and provide consistency in decision making, against a background of increased uncertainty. At its most basic level, a BRMS separates business rules from application code and provides a single point for managing all decision logic. It provides a means to define, manage, and automate the rules used within business processes and, crucially, to make discrete decisions or provide actionable recommendations, based on large volumes of data, in a consistent way. Furthermore, by including an element of analytics, it can deal with uncertainty and make decisions or recommendations that would normally call for human intervention and a judgement call. While not all decisions can be automated, the goal is to reduce the number that do need manual intervention. When rules management is combined with analytics, the proposition moves into the area of business-oriented decision management.

Blaze Advisor 6.7 is the current version of FICO's established BRMS product. It provides a system for decision execution (rules creation, deployment, and management) and the ability to automate decision making within transaction streams, and uses analytics based around an inference engine to predict behaviour and optimise actions. A mature product, regular new versions add to its depth. The remainder of this section highlights some of its key features.

Choice of Rule Management Interfaces

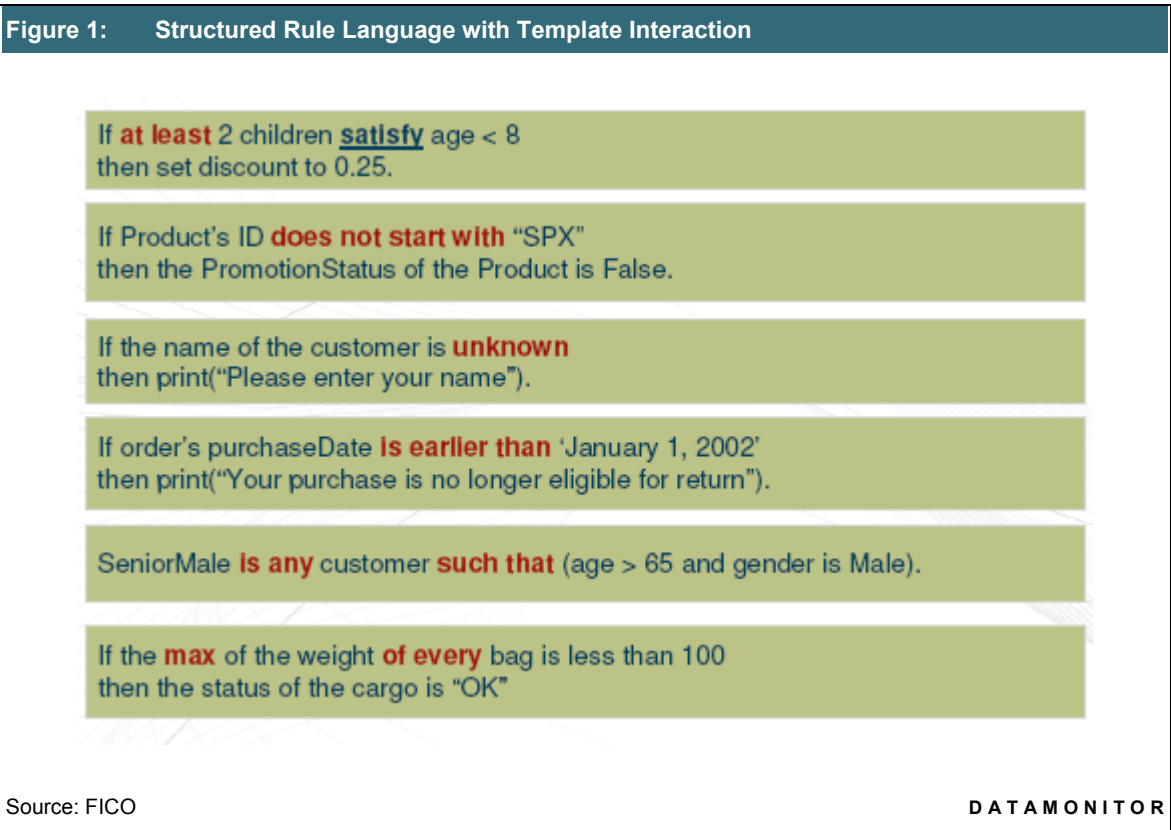
Blaze Advisor provides two distinct approaches to creating, visualising, and editing rules: an IDE aimed at technical IT staff and a Rules Maintenance Application (RMA) for business users. Rules defined by either approach can be viewed and maintained in the other. Rules are grouped together into rule sets that determine the outcome of a particular decision, and rule sets can be invoked as part of multiple decision services. By providing effective visualisation tools and the ability to construct complex rule sets from simple rules, Blaze Advisor aims to increase the complexity of decision making that an organisation might choose to manage automatically before having to revert to human decision makers. By providing appropriate approaches for developers and business users Blaze Advisor brings rules management closer to the business in a controlled manner – developers can use the IDE to architect the rules, then expose elements of the rules to business managers via templates so they can control the content without compromising the rule. Different degrees of authoring are supported, so developers can allow business users to do more or less to the rules in terms of setting content or applying conditions, while business users can author rules using the terminology they are familiar with, without having to learn a syntax. Advances in visualisation, lifecycle management, and usability are important development areas for FICO. Recent advances include a visual comparison editor (available in both the IDE and RMA) that augments the previous text- and list-based one and highlights differences in rows and decision trees. It also includes links in the RMA to jump to specified places on larger decision trees, and filters that allow users to restrict what is displayed.

SmartForms

Typically, BRMSs are applied at the back end of the application stack but through the SmartForms interface rules can be deployed to client-side Ajax rich Web applications, where a typical use is the application of complex form-filling rules without the need for constant time-consuming interactions with the server. SmartForms also help improve the quality of the collected data by ensuring only relevant data is collected and that it is collected in the right format. Rules are executed in the browser to ensure data is captured in the relevant format. From a business perspective, SmartForms can be used to drive an agent or customer to the right result.

Structured Rule Language (SRL)

In place of the natural language, or English language-type representation mapped to a rule syntax approach, that other BRMSs use, Blaze Advisor uses a SRL for rule creation. Typically, the IT department would use the SRL create rules, while business users would create, interact, and maintain rules via templates. The SRL approach does present slightly more of a learning curve than natural language but supports greater accuracy in terms of definitions. FICO says that in situations where business users are exposed to IT-authored rules created using the SRL, there is a high level of comprehension because it is close to English.



Single Repository, Multiple Environments

Rules and rule sets are all stored in Blaze Advisor's repository, where full version management, verification, and change control can be applied. A high-performance runtime engine is provided for .NET and Java environments. Rule sets can be deployed directly to this runtime engine. The same rules can be deployed unchanged across .NET, Java, and COBOL environments. The higher-level applications that need to use the decision service call the rules engine using the native language construct, or alternatively as a Web service. Monitoring capabilities provide an insight into the execution of rule sets and permit a degree of tuning of the way the rules are executed. Audit capabilities are also provided.

Decision Simulator

Designed for decision review and improvement, this module is used for business impact analysis, to determine the effect of rules changes on the businesses strategy and bottom line. By applying rules to historical data, organisations can explore likely outcomes on specific areas of business (e.g., the number of marketing mailings to expected take-up, a comparison of 'lite' versus 'heavy' marketing campaigns), and formulas can be added to rules to calculate expected profit and loss as the result of the application of a particular rule. Modelling occurs in a test environment so as not to impact operational systems or policies.

Product Operation

The operation of Blaze Advisor is best described broken down into the three layers of authoring, structuring, and deploying, as shown in Figure 2.

Authoring

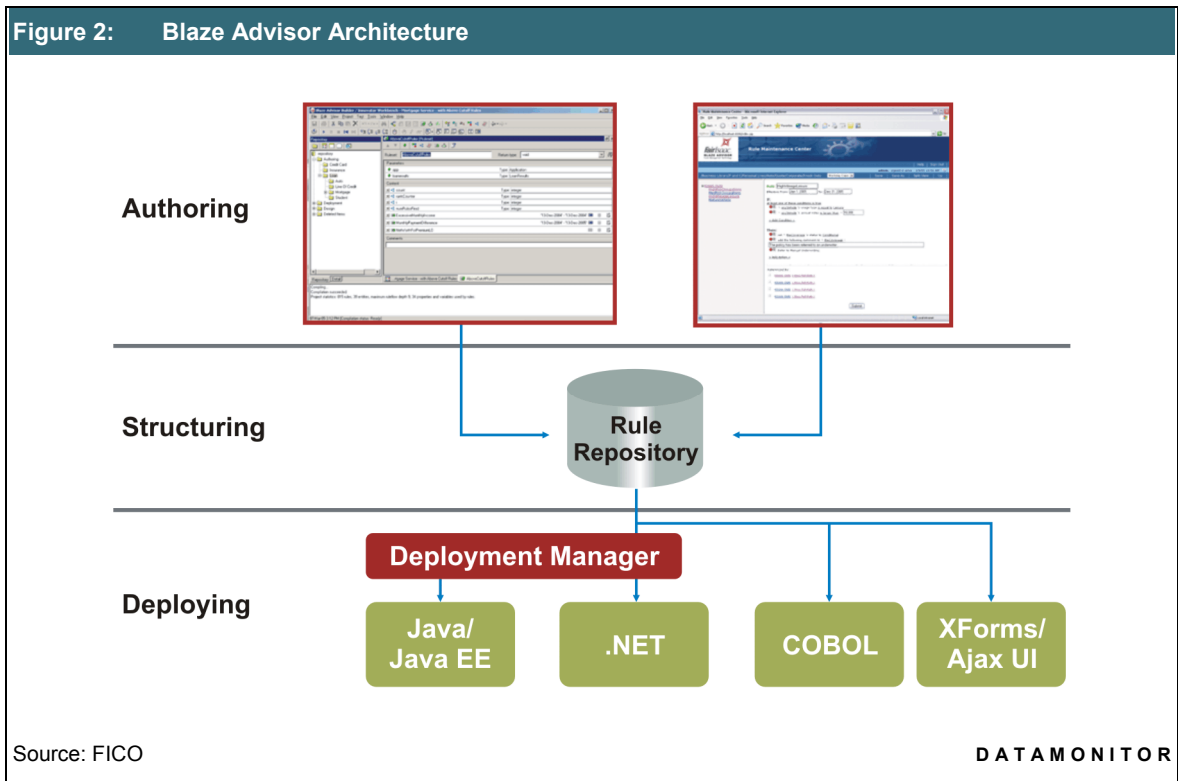
In most complex decision scenarios there will be activities that can only be carried out by IT staff, such as the integration of the rules environment with information sources. However, the logical definition of how a decision is to be made has to involve a business analyst or line-of-business business manager, and Blaze Advisor provides capabilities to give these business-focused staff as much autonomy as possible in the creation and maintenance of rules.

The initial definition of a decision is best accomplished by graphical modelling, and FICO provides a simple flow-charting capability where the logical steps in the decision can be entered and prioritised.

Each of the steps can then be expanded into rules, writing them in a pseudo-English syntax that can be understood without technical expertise. The rules relating to a particular decision are grouped into a rule set. These steps are achieved using the Blaze Advisor Builder, intended for use by IT staff. Interestingly, although the initial model implies a natural sequence of decision steps, Blaze Advisor will use inference technology within each rule set to calculate the optimum sequence of evaluation to minimise the response time and system overhead. If a particular decision requires additional information in order to be evaluated, Blaze Advisor can use backward chaining to proactively gather the needed information from source systems, but will only commit to this additional work if the decision cannot be fulfilled using the information available.

Blaze Advisor provides multiple views of rules and rule sets aimed at presenting the information in a manner that is easy to comprehend by business users. This clarity and ease of comprehension is an important differentiator for Blaze Advisor. These views include decision tables, decision trees, scorecards, and templates. Templates can be created to show the relevant attributes and allow the business user to directly enter the values and results required. This could include time-related rules; for example, the creation of different price calculation rules for a limited-period special offer. Although it is most likely that templates will be used to allow business users to maintain existing rules, they can also be used to permit rule creation by non-IT staff.

Recent additions to Blaze Advisor have focused on streamlining operations for accuracy and productivity. Authoring can take place in the IDE or the RMA. Version 6.7 added useful features to the technical authoring environment such as auto-completion, the ability to compare projects across repositories, enhanced verification, lifecycle management services, and security. The business user environment was also enhanced with a visual comparison feature for comparing changes to rules, and a formula builder and free-form editor for speed and accuracy when creating formulas, which is all part of the overall goal of improving the quality of decision making.



In addition to Blaze Advisor, FICO also offers preconfigured applications based on this technology for certain common industry problems such as fraud detection, payments optimisation, and debt management. These are delivered with the rules and rule sets already populated (but user customisable).

Structuring

Rules and rule sets are stored in the repository with full version control. Before deployment of a new or altered rule set, organisations will wish to establish procedures to control the quality of the resulting logic. Blaze Advisor provides two quality assessment tools: rule verification and rule validation. Rule verification establishes that rules are unique to avoid the problems associated with redundancy, and checks to see if all combinations of conditions have been tested. It identifies errors that result in ‘always true’ or ‘always false’ results, as well as infinite loops and other logical errors. Rule verification is a static test performed on the information in the repository. A classic part of an IDE, verification is also available in the RMA. Rule validation provides regression testing and dynamic validation by executing the rules and rule sets against test data to ensure the anticipated results are delivered. Both of these types of tests can be initiated by business users as well as IT staff.

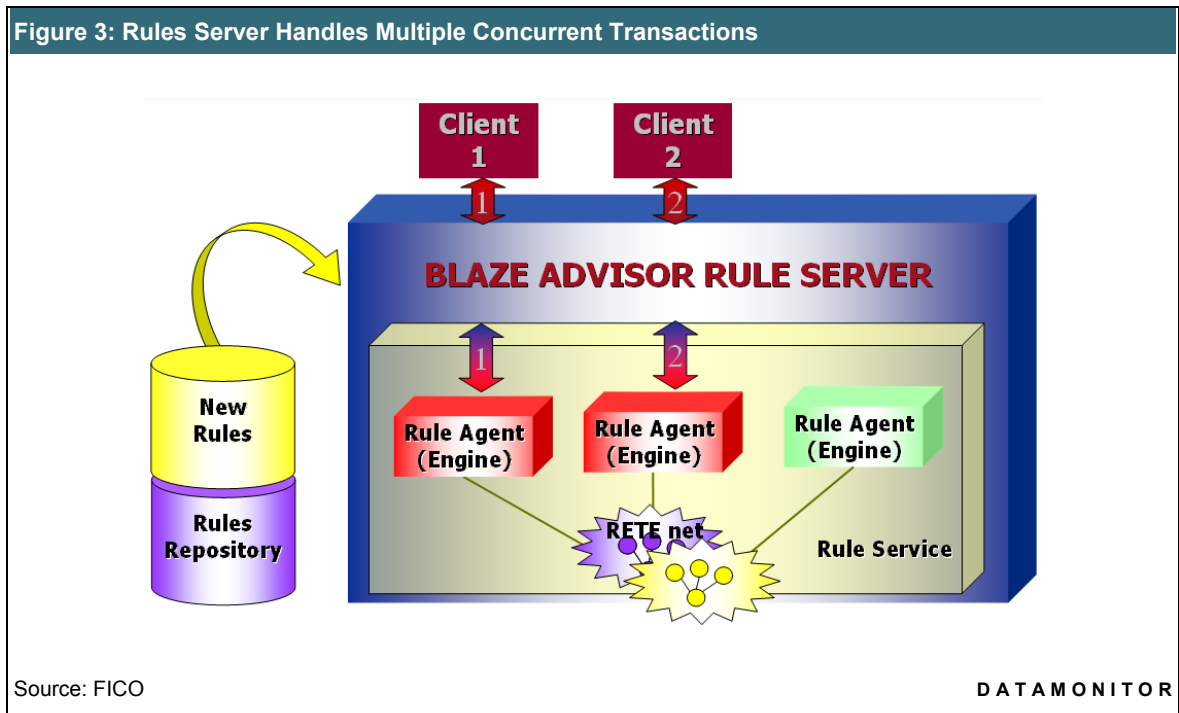
Blaze Advisor provides full change management controls including authorisation checking, version promotion, and reversion, plus customisable lifecycle management tools. It supports an intermediate staging system between the development and production environments, with different levels of approval for moving versions between stages. Once ready for deployment, rules can be implemented using the Deployment Manager, without suspending the rules service. In-flight transactions will continue to use the old version until they complete, while new transactions will dynamically pick up the new version. Additionally, rules can be time-limited and expire automatically at the end of the valid period. The use of a persistent cache helps maintain performance.

Deploying

Blaze Advisor provides several execution algorithms that can be selected according to the dynamics of a particular decision. The default uses the Rete algorithm, a public algorithm that has been recognised for over 20 years as providing efficient management of very large rule sets by organising the rules into networks instead of sequential execution. Blaze Advisor also includes a compiled sequential algorithm, however. Derived from the original Rete algorithm, Blaze Advisor also offers Rete III, which is proprietary to FICO. As Rete is memory-constrained when used with large datasets there are limits to its general applicability, with the execution time increasing disproportionately with the size of the data set. The Rete III algorithm has been designed to provide linear execution-time increases with both increasing data set and increasing rule set sizes. It therefore represents the most effective option where both large rule sets and large data sets are required.

Where the rule sets are less complex, the sequential execution option can be more efficient. This executes rules in their priority sequence. Finally, a cost option provides compiled sequential execution. This provides just-in-time compilation of the rules, which execute in priority sequence. The compiled sequential option provides the fastest performance for small rule sets against very large data sets.

Figure 3 illustrates how the Blaze Advisor rules server handles multiple concurrent transactions and swaps versions of rules if required.



The runtime environment executes on either .NET or Java Enterprise Edition (JEE) application servers, and uses the underlying infrastructure to provide distribution and fault-tolerance features.

Product Emphasis

The role of Blaze Advisor is to provide organisations with a single location from which to create, manage, and automatically execute the rules that lie behind business decision making, in order to provide consistency and the ability to rapidly manage rule change in a structured manner. These objectives are enabled through:

- A high-performance runtime environment with a choice of decision algorithms.
- The ability to create rules and rule sets to resolve complex decisions, while presenting the logic in an intuitive manner that can be understood and modified by business or IT staff.
- Deployment across a heterogeneous environment, including deployment to client-side Web forms.
- Direct integration of analytics through scorecards and other visualisation mechanisms.
- Testing and change management capabilities.

Although most effectively deployed at the enterprise level, the same features make Blaze Advisor appropriate to tactical requirements where it is required to manage complex decisions in discrete projects.

DEPLOYMENT

The runtime environment for Blaze Advisor supports Windows and Java on major Unix and Linux environments (including mainframe Java). Deployment is supported for Java, .NET, and Cobol environments. It can execute within a simple Java Virtual Machine (JVM), and be deployed on a JEE application server, where it can use the distribution and fault-tolerance features provided. It supports Web services, and Enterprise Java Beans (EJB), and JEE platforms, as well as .NET Transaction Server, Component Object Model, and IBM mainframes, and legacy systems. For legacy COBOL applications, Blaze Advisor can generate compiled code instead of using a runtime rules execution engine. A single rule set can be deployed to any number of runtime environments to place the intelligence physically close to the point at which it is needed. As Blaze Advisor executes on the same platform as the calling application (or process) the communication costs and performance overheads are minimised.

The development environment requires either Windows or Solaris. The repository can be deployed on the host file system, in which case it has no third-party prerequisites, or alternatively on a Relational Database, or hosted within a change management system or Lightweight Directory Access Protocol (LDAP) directory. Third-party rule repositories can be integrated, and there is specific support for Rational ClearCase. The business activity monitoring (BAM) infrastructure can be connected to a BAM framework within the organisation using monitored events enabling data about decision events to be captured for use within the Blaze Advisor environment.

Operational data can be captured at the server, services, session, and execution levels in a SOA environment using monitoring classes, and when these are wrapped around a JMX framework in Java or Windows Management Instrumentation (WMI) in .NET they can be accessed by subscribing to the relevant event, rather than having to code. Monitoring is standards-based and class activity can be logged, using a ready-to-go Blaze Advisor configuration file.

Integration with enterprise data sources is carried out using Business Object Model Adaptors and adaptors are available for Java, .NET, COBOL, EMC, and Relational Database Management Systems (RDBMSs). A toolkit is also available for the creation of adaptors.

Most organisations implement Blaze Advisor initially as a single-project tactical deployment, and subsequently expand the scope towards an enterprise deployment. The initial implementation of rules management will usually form part of a larger project, and hence actual times to a live deployment will vary widely, with six to nine months being typical. Most initial projects will be carried out with the on-site assistance of staff from FICO or one of its partners. A pilot project would be expected to take a couple of weeks to set up. For a departmental deployment, organisations should look at a three to six month timeframe, rising to six to 12 months for an enterprise-wide deployment. It is hardly surprising that during implementation one of the core requirements will be for a rules developer, but FICO says a business user is even more critical.

FICO provides a full set of on-site or classroom training classes. Customer support is provided by Web, e-mail, and telephone, with coverage provided during business hours. Support and maintenance is charged at 20% of the licence cost. A small number of users consume Blaze Advisor as a hosted service; currently none of these are small organisations, but this Software-as-a-Service (SaaS) delivery is likely to be popular with smaller companies if FICO chooses to position it this way.

PRODUCT STRATEGY

FICO's overall strategy extends beyond technical-level rules management to encompass the whole of the decision management market. With rules capabilities now commonly provided at the application infrastructure level, the next step is to bring the capability into the business environment as decision management, so that it can be used to support the drive for business agility – in this instance the ability to create and rapidly update decision rules (services) in response to changes in the market. Aware of the lack of knowledge within the general market about how to make the most effective use of the tools and applications that are generally available in this area, one of the company's goals is to educate. An ambition is to establish decision management as a business discipline, moving it from the realms of specialist skills to a mainstream business activity. Butler Group believes the education aspect of its go-to-market strategy is an important element as one of the ongoing considerations around anything analytics-related is knowledge of the possibilities and constraints. Equally important is FICO's work on the usability aspects of its tools and applications, particularly the drive to make them accessible to business users.

This strategy is delivered through a combination of tools, applications, and services. In addition to Blaze Advisor described here, FICO provides a number of preconfigured applications built around common industry decision-making problems (such as fraud analysis) and mathematical modelling for optimised decision making. It also offers bespoke analytic services.

New product releases occur twice a year and plans for the next release, version 6.8 (due during the second half of 2009), will focus on adding a plug-in for Eclipse deployment, integrating ClearCase 7.1 and Subversion, and providing updates to the Decision Simulator and SmartForms modules. Beyond this the plans include using Ajax and Web 2.0 capabilities to improve the usability of the RMA, rewriting the IDE on top of Eclipse in order to improve decision management integration, and adding support for Business Activity Monitoring. New releases are delivered in phases, with the Java product usually released first, or closely followed by (or sometimes at the same time as) the COBOL version, then the .NET release.

FICO's primary target consists of Fortune 1000 companies and large government organisations, but extends to encompass any vertical and any size company that requires a high-performance automated decision-making solution. Although Blaze Advisor technology is appropriate to any vertical industry where there is a need to manage decisions, the financial sector as a whole (including the large insurance sub sector) has been a leading adopter of BRMS and accounts for some 65% of Blaze Advisor revenue. Excluding the insurance sub sector, the Financial Services sector generates 40% of the revenue arising from the application. Outside of this there is a healthy distribution of revenue across several industry sectors including Healthcare Telecoms, Retail, Media, Travel and Hospitality, and Government.

The sales model is primarily direct where Fortune 1000 companies are concerned. Business partners provide the direct sales model in geographical areas where FICO does not have a direct presence. OEM and Independent Software Vendor (ISV) partners also resell FICO products as components within their own applications. FICO has strategic partnerships with IBM, Oracle, Microsoft, HP, and Teradata. The historic dependence on the Financial Services industry for much of its revenue and the difficulties faced by this sector in 2007-2008 have impacted overall revenue. However the revenue from Blaze Advisor has seen modest growth and FICO believes that its solution-focused sales model will broaden its market appeal.

Development and deployment licences are perpetual (on either a named-application basis or as an enterprise licence for a specific organisation and/or geographic region) with a renewable annual maintenance charge. The licence cost depends on the size and scope of the deployment, but is typically around US\$250,000, rising to US\$1 million-US\$3 million for the largest projects. Services come in at approximately 1.5 times the licence fee. This reflects FICO's target market of Fortune 1000 companies. It does have a number of successful implementations in mid-sized organisations, however. An entry-level implementation would be expected to cost in the region of US\$25,000.

The rules management market has undergone significant change in recent years, with a number of platform vendors acquiring smaller BRMS vendors and integrating the products into their product lines. In particular, a number of Enterprise Service Bus (ESB) products and application servers now include a simple rules engine within the product set. While this might dampen the market for entry-level rules management, this is not the market targeted by FICO with its high performance and ability to manage very complex rule sets. Because of this we believe that FICO should be able to grow its current market share. Major competitors in the BRMS marketplace include ILOG (now owned by IBM) and Pegasystems, with Pegasystems significantly smaller than either ILOG or FICO, but with ILOG reporting strong growth.

Butler Group believes that FICO, having a foundation in computing systems based on mathematical algorithms, has transformed its products by the efforts it has made to include non-technical business users in the role of designing and maintaining complex rule sets. We believe that equivalent consideration to business users should be made in several other aspects of IT.

COMPANY PROFILE

FICO’s long history predates the digital age, being founded in 1956 as Fair Isaac Corporation. It was an innovator of credit scoring systems and other scoring-based models such as application processing. The Fair Isaac Credit Organization (FICO) score is now very widely used to determine the credit-worthiness of an applicant (primarily in fields such as mortgage loans and credit cards). FICO’s technology is behind much of the credit card fraud detection in use around the world. Major customers of Blaze Advisor include Bank of America, JPMorgan Chase, Wells Fargo, Siemens Medical Solutions, Northrop Grumman, US Internal Revenue Service, Sun, Toyota, and Dell. There are over 400 customers of the Blaze Advisor product, but still more access components via other FICO applications or via the OEM and ISV channel. The company has around 5,000 customers in total.

In 2005 the company acquired RulesPower, Inc., and through this acquisition took Dr. Charles L. Forgy into the organisation. Dr. Forgy was the originator of the Rete algorithm while at Carnegie Mellon University, and his continuing expertise and enhancements to the original algorithm are a significant benefit to the development of Blaze Advisor.

The company employs 2,250 staff, with 71% in North America, 16% in Asia Pacific, 12% in EMEA, and 1% in Latin America. FICO’s major offices are located in Minneapolis, San Diego, San Rafael, Toronto, London, Birmingham, Madrid, Beijing, Hong Kong, Bangalore, Tokyo, Singapore, and Sao Paulo. 38% of staff are engaged in customer service and support, 32% in research and development, 19% in administration, and 11% in sales, account management, and marketing.

FICO is a public company (NYSE:FICO) and its last three full years’ results are summarised in Table 1. This revenue stems mostly from North America (71%) with international revenue of 29%. Butler Group believes that the product line remains strong and focused on a genuine business need.

Table 1: Financial Details			
Year ending September 30	2008	2007	2006
Revenue (US\$ Million)	744.8	784.2	783.0
Change on Previous Year (%)	-5.0	0.2	4.5
Total Net Income/(Loss) (US\$ Million)	84.0	104.7	103.5
Source: FICO			DATAMONITOR

SUMMARY

Blaze Advisor is a strong and mature tool that has the performance and scalability to function in a high transaction-volume environment. The central rules repository and management and execution capability provide the backbone for an enterprise-wide rules management platform that can add value to both BPM and SOA. Although it is common to view BPMSs from a technical perspective, Butler Group believes the focus should be on establishing the value of decision management and its role in business strategy execution. While Blaze Advisor ticks all the technology boxes (rules design, deployment, change management, automation), its business value lies in its ability to cater for both business and IT groups. It provides a range of tools that bring the two worlds closer together, plus interfaces that provide the business operation with the ability to own and manage their own rule content. This means changes can be made in a timely fashion by those who understand the nuances of the business environment, allowing closer alignment between technology and business, to the benefit of decision making.

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