DECISION MANAGEMENT SOLUTIONS

Decision Management Systems
Platform Technologies Report

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Monitoring Decisions

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Monitoring is one of the five key capabilities needed when building Decision Management Systems. Each can be adopted incrementally, and can scale based on resources and business drivers.

The capabilities to support monitoring and improving of decisions are not typically found in a single software product. Instead, these capabilities drive deployment and other requirements for products used for decision logic management, embedding predictive analytics as well as optimization and simulation:

▶ Decision Services must support experimentation (in both decision logic and analytic models) as well as the logging of decision outcomes and approaches used.

▶ Data about decision performance must be available in standard performance management tools to allow decision performance to be assessed and alternatives used in experiments to be assessed.

▶ Changes to decision logic and the impact of these changes must be manageable by business users.

▶ Analytic models used must be monitored to see if they become less predictive and automated model tuning may be applied.

▶ Scenarios may be re-analyzed to see if a better approach is indicated by data collected.

Effective monitoring and improvement requires the integration of functionality across the platform adopted for building Decision Management Systems.

Navigating the Report

The *Decision Management Systems Platform Technologies Report* is a set of documents describing the best practices and technologies for building Decision Management Systems.

1. *Introducing Decision Management Systems*
2. *Use Cases for Decision Management Systems*
3. *Best Practices in Decision Management Systems.*
4. Five Key Capabilities
   4.1. *Managing Decision Logic with Business Rules*
   4.2. *Embedding Predictive Analytics*
   4.3. *Optimizing and Simulating Decisions*
   4.4. *Monitoring Decisions*
   4.5. *Modeling Decisions*
5. *Selecting Products for Building Decision Management Systems*

All readers should begin with *Introducing Decision Management Systems* as it gives an overview of the category, technologies and rationale.

Business and technical readers can continue with *Use Cases for Decision Management Systems* and *Best Practices in Decision Management Systems*.

Technical readers are recommended to read the five Key Capabilities documents (*Managing Decision Logic with Business Rules, Embedding Predictive Analytics, Optimizing and Simulating Decisions, Monitoring Decisions and Modeling Decisions*) to better understand the component technologies of Decision Management Systems. *Selecting Products for Building Decision Management Systems* will be useful as part of assessing technology needs.

More information on the report, its scope, reproduction and more is in the final section **About The Decision Management Systems Platform Technologies Report.**

Business and Technical Track	Technical Track
Introducing Decision Management Systems	Managing Decision Logic with Business Rules
	Embedding Predictive Analytics
Use Cases for Decision Management Systems	Optimizing and Simulating Decisions
Best Practices in Decision Management Systems	Monitoring Decisions
	Modeling Decisions
	Selecting Products for Building Decision Management Systems

Overview

Capabilities for monitoring and improving decisions over time are essential for Decision Management Systems both because decisions are high change components and because the time it takes a decision to come to fruition can be extensive, making it hard to tell good ones from bad ones.

There are many drivers of change in decision-making.

▶ Regulations change so organizations must change how they make eligibility decisions to remain compliant with those regulations.

▶ Policies change so organizations must, for instance, change their validation of suppliers to track new data requirements.

▶ Competitors change so organizations that wish to remain competitive must change their discounts or pricing.

▶ Markets, such as the financial or credit markets, change so organizations must constantly change the way they assess risk.

▶ Consumer behavior changes regularly and continually so organizations working with consumers must constantly address these changes in their decision-making.

▶ Fraudsters adapt and seek new loopholes to exploit so organizations must change how they detect and process fraud to focus on new fraud as it develops.

In addition to outside changes that explicitly drive changes to decision-making, organizations want to continuously improve their decision-making. The challenge for some decisions is the time it takes for decisions to play out—it may be weeks or months before an organization knows if the decision was a profitable one for instance. To continuously improve in these circumstances, it is essential to be able to conduct experiments and compare their results. Such an experiment makes the same decision in two or more different ways, applying the different approaches to different transactions and comparing the results. Sometimes called adaptive control, champion-challenger, or A/B testing, these approaches drive continuous improvement in decision making.

As shown in Figure 1, continuous decision improvement requires that the results of a decision be evaluated, predictive analytic models and business rules updated and refined and new "challengers" or alternatives developed. These are fed back into the decision-making loop and used to make future decisions. The results of these decisions are evaluated in turn with successful experiments being adopted, unsuccessful ones dropped and new ones developed in a continuing cycle.

Figure 1. Continuous Improvement Cycle
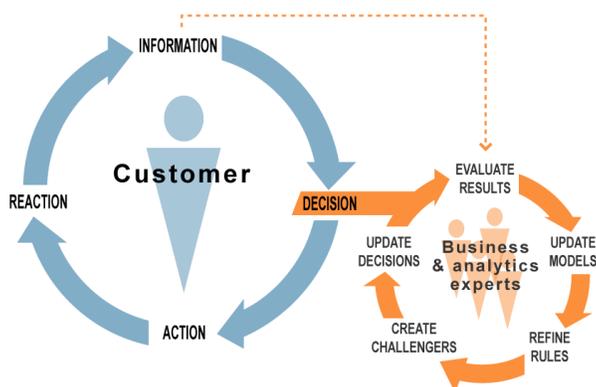
Architecture

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Capabilities

Logging

The primary capability required for decision monitoring is that of logging decision execution. When the Decision Management System makes a decision it must be possible to log how that decision was made, what sub-decisions were made, and which business rules fired. This log should include any predictive analytic model scores calculated during the decision as well as the specific action recommended by the Decision Management System.

In addition, these decision-making logs should be stored in a way that allows them to be integrated with information about the response of customers and others to the decision—did the customer accept the offer, did the salesperson override the price with an additional discount, was the deal closed and so on. This allows the decisions made to be tied to long-term results such as orders placed or customers retained that can be attributed to these decisions.

Logging also supports compliance and audit needs by providing complete execution transparency. When an audit or compliance review is conducted, it will be possible to tell exactly how a decision was made and whether or not that decision followed the correct guidelines.

Experimentation

To ensure continuous improvement of decisions it will often be necessary to conduct experiments. These experiments typically involve multiple approaches to either the decision logic of the decision, the predictive analytic models used in the decision or both. Additional decision logic must be managed to determine which of the approaches should be applied to a specific customer or transaction and it must be possible to record this as part of the decision itself.

All products suitable for managing decision logic can manage experiments in this way. Some products for decision logic management have additional capabilities built in to make it easy to manage, review, and compare the various approaches being used within a decision.

Decision Performance Management

The performance of a decision can and should be managed and monitored in the same way any other aspect of business performance is managed and monitored. Generally, it is straightforward to apply the standard performance management capabilities of an organization to decision logs to see trends, hotspots, etc.

Non-Technical Rule Management

While changes to decisions are sometimes extensive, localized and focused changes are more common. Business users should generally make these so that a full IT

Figure 2. Capabilities for Monitoring Decisions
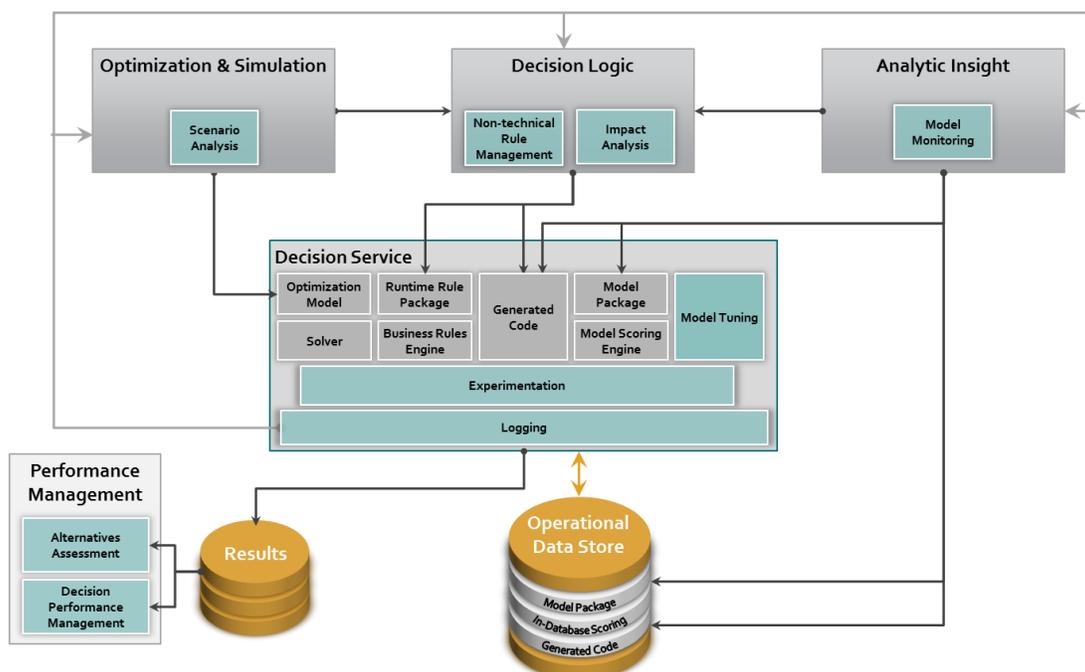
cycle can be avoided for what will be regular, minor updates. It should be possible to use the non-technical decision logic management capabilities to present a business person with their own business rules, in context. Ideally, this environment will only allow them to make changes that make sense and will present no unnecessary information. Most products for managing decision logic either include suitable interfaces or allow suitable interfaces to be developed.

Impact Analysis

When non-technical users are making rapid, agile changes they need to be able to see the impact of those changes. This should cover both design impact and execution impact presented in a business-centric way.

Scenario Analysis

Ongoing logging of data may reveal that alternative scenarios previously rejected should now be considered or preferred. An interface is required that allows a business analyst or business user to run and compare scenarios based on models and new data. Such scenario analysis involves rich visualization based on the historical data generated by the deployed system.

Alternatives Assessment

When multiple decision-making approaches are being used in parallel, it will be essential that the effectiveness of these alternatives can be assessed. Capabilities such as swap set analysis (showing which customers, for instance, would get offer B rather than offer A) as well as more general comparison of business performance metrics are critical. In addition, simulation and what-if analysis tools that can use each alternative approach and compare the outcomes of multiple simulations based on the approaches will be required.

Predictive Model Monitoring

Models are built from a snapshot of data. As such they "age"—as time passes the data being fed into the deployed model may look less and less like the data from which it was built. Deployed analytic models should be monitored to see how their performance is varying over time. Many new models are initially deployed to challenge an existing model and the performance of both the original "champion" model and the new "challenger" model need to be compared to see if the challenger is good enough to replace the champion.

Predictive Model Tuning

Automated model tuning and updating using machine learning techniques may be used to monitor the performance of an analytic model as it is used in deployment and automatically adjust its underlying equation based on that performance. Model Tuning can be left to run forever or it can tune the model within defined boundaries and flag a model for re-building if its performance starts to drift outside those boundaries.

Next Steps

Decision modeling provides a framework for business analysts, business professionals, IT professionals, and analytic teams to specify requirements for technology capabilities, link performance management for results tracking, and orchestrate and coordinate projects as a whole. This makes it easier to focus project teams where they will have the highest impact and to measure results.

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About The Decision Management Systems Platform Technologies Report

This report is focused on platform technologies used to build custom Decision Management Systems and our goal is to be comprehensive within this scope. Many vendors have developed powerful pre-configured Decision Management Systems focused on solving specific decision problems such as loan underwriting, claims handling or cross-channel marketing. For many organizations these solutions are ideal but they are not the focus of this report. Similarly, there are vendors that build custom Decision Management Systems for their customers and that have developed powerful platforms for doing so. If such a platform is not for sale to those building their own solutions, then it is out of scope for this report.

In both these scenarios the report's discussions of what kinds of functionality is useful, best practices and characteristics for suitable products may well be useful in the selection of vendors but some interpretation will be necessary.

Vendors and products in scope for the report are added continually. First Looks are also posted to www.JTonEDM.com as they are completed. Each new version of the report will be made available at decisionmanagementsolutions.com/decision-management-platform-technology/.

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Decision Management Solutions specializes in helping organizations build decision-centric, action-oriented systems and processes using decision management, business rules and advanced analytic technologies.

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