

DECISION
MANAGEMENT
SOLUTIONS

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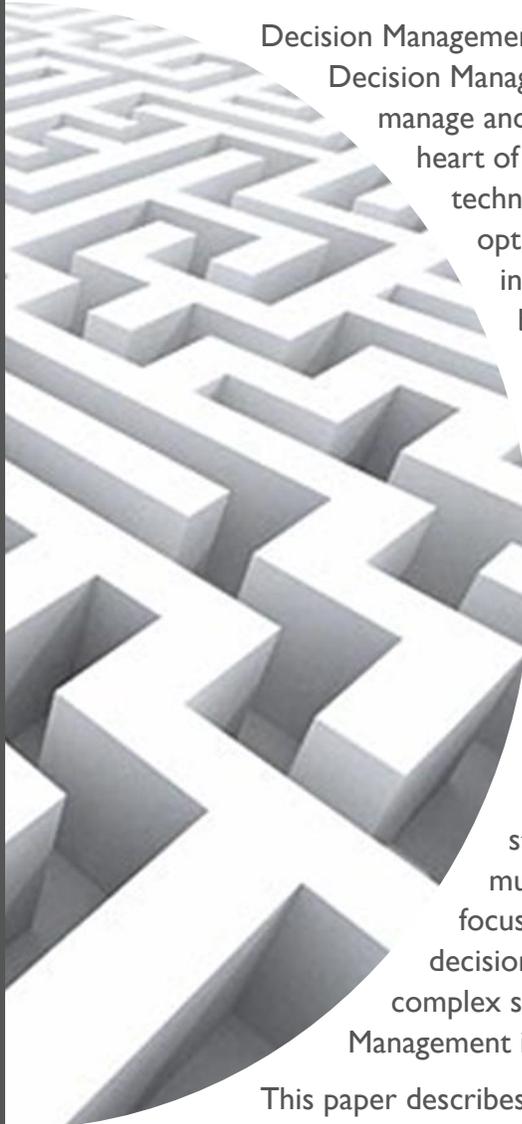
The Decision Management Manifesto

An Introduction

Decision Management is a powerful approach, increasingly used to adopt artificial intelligence (AI) technologies like business rules, machine learning and predictive analytics. The Manifesto lays out key principles of the approach.

The Decision Management Manifesto is designed to help organizations adopt the Decision Management approach, apply it effectively in their own organizational context and increase the value of their technology investments.

The current version of the manifesto is always available online at decisionmanagementsolutions.com/decision-management-manifesto



Decision Management is both an approach and a technology stack. Decision Management allows an organization to control, manage and automate the repeatable decisions at the heart of their business by effectively applying AI technologies like business rules, machine learning and optimization. Decision Management therefore intersects with and complements technology-based approaches:

Business rules are central to Decision Management, as are Business Rules Management Systems. Though not everything you can do with business rules is Decision Management, Decision Management maximizes the ROI of business rules technology by applying it effectively.

Similarly, machine learning and predictive analytics provide analytic insight for Decision Management but can be used also to improve dashboards and reporting, as well as make strategic decisions. Decision Management multiplies the value of machine learning by focusing it on repeatable, numerous day to day decisions. Optimization technology can be used for complex scheduling and allocation problems. Decision Management integrates this technology for business owners.

This paper describes the motivation for the manifesto—why we created it and why organizations and individuals are supporting it—and explains the reasoning and value proposition of each of the five sections.

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I Decisions First

- 1.1 Decisions, especially operational decisions, link an organization's metrics and objectives to its operational systems.
- 1.2 Decisions are first class objects just like business processes or data and should be identified, described, modeled, reviewed and managed in business terms as part of a business architecture.
- 1.3 Decisions should be modeled first before considering how business rules, predictive analytics and or machine learning will be used.
- 1.4 Decisions support business processes and help organizations respond to events but they are not subsumed by either processes or events, simplifying their expression and management.
- 1.5 Business, IT, and analytic professionals all have a role in identifying, describing, modeling, reviewing and managing decisions.

2 Explicitly Design Decisions

- 2.1 The best way to define a Decision is with a question and a set of known, possible answers.
- 2.2 Making a decision requires defined information—input data—such as transaction information, reference data and other verifiable, definitive information.
- 2.3 Making a decision often requires information—answers—generated by making *other* decisions.
- 2.4 A Decision has authorities such as policies, regulations, best practices and expertise that define how it should be made.
- 2.5 A Decision can have analytic insight that shows how it can be improved or made more accurately.
- 2.6 Not all decisions are automated; a manual decision can still be modeled and managed.

3 Use Decision Management Technologies

- 3.1 The details of how a decision will be made can be represented with business rules, decision tables, predictive analytic models, machine learning or optimization algorithms or other decision metaphors.
- 3.2 When implementing a decision-making solution, a mix of technologies (business rules, machine learning, predictive analytics and optimization) may be appropriate.
- 3.3 If technology is applied to a decision it may be to support a human decision maker or to explicitly automate and manage the decision.
- 3.4 Technology may be applied to a decision and any decisions on which it depends or only to some decisions in a model or process.

4 Deploy Digital Decisioning Systems

- 4.1 Digital Decisioning requires both decision-making services and supporting infrastructure for managing the definition of decision-making—not simply business rules or machine learning embedded in business processes or user interfaces.
- 4.2 A Decision Service is decoupled from and provides decision-making to existing systems, business processes or event processing environments.

5 A Decision Service Requires:

- 5.1 Design transparency—to see exactly how the decision will be made in the future.
- 5.2 Execution transparency—to reconstruct how a specific instance of a decision was made in the past.
- 5.3 Impact analysis—to assess the business impact of a change before it is made.
- 5.4 A closed loop—for continuous improvement, and to test and learn, experiment and adapt.

Why A Decision Management Manifesto?

According to Merriam Webster a manifesto is “a written statement declaring publicly the intentions, motives, or views of its issuer.” The Decision Management Manifesto is a public declaration of the views of Decision Management Solutions and of the individuals and companies that share our vision for Decision Management.

Decision Management is an approach that improves day to day business operations. It increases an organizations business agility and adaptability by making its system easier to monitor and change. It puts data to work improving the effectiveness and profitability of every action. It is a proven framework for applying AI technologies such as business rules, machine learning, predictive analytics and optimization.

The manifesto is not specific to a vendor's technology, development methodology or approach but is broadly applicable. It's also not about notations, though it recommends some. It is about core principles you can apply with your own techniques. It is intended to be something you can pin up and refer to, using it to differentiate between effective best practices and other less effective choices.

By publishing this manifesto we will:

- ▶ Reduce some of the confusion in the market about Decision Management.
- ▶ Provide a framework for the effective use of AI technologies.
- ▶ Share critical best practices in a methodology-independent way.

Avoiding Confusion

Decision Management is an increasingly popular phrase. Business rules vendors use the phrase to position their products while machine learning vendors see it as a use case for real-time deployment. This increased visibility is good but has the potential to bring confusion. By publishing the manifesto we hope to clarify several things:

- ▶ While there is an overlap between Decision Management and AI, Business Rules, Machine Learning and Predictive Analytics, they are not the same.
- ▶ Decision Management is an approach that combines multiple AI technologies as required to automate, manage and improve operational decisions and thus day to day business operations.
- ▶ Business rules, machine learning, predictive analytics and optimization can be used for other things than Decision Management. Business rules sometimes control user interfaces or enforce data quality. Predictive analytics are often used to inform strategic decisions.

Technology Framework

There is a regrettable tendency in large enterprises to focus on technology not business solutions and to acquire technology before adopting a framework or

approach that will allow that technology to be effectively adopted. Technology purchased in this way is generally forced into an existing project management and system design framework and so under-exploited. For example, organizations adopt a business rules management system but use their existing approach (whether waterfall or agile) and legacy requirements management techniques to drive the project. The result is higher cost, less agility and worse outcomes. On the machine learning front, organizations embed predictive analytic models into existing reporting infrastructures without developing true business understanding first, resulting in underused analytic insight.

Adopting the Decision Management Manifesto, and Decision Management more broadly, provides a context for successful adoption of these powerful technologies. In particular a focus on decisions, and on treating those decisions as first class objects that should be identified, designed and managed, drives success with both business rule and predictive analytic technologies.

Sharing Best Practices

Over the years Decision Management Solutions has developed many best practices for success with business rules and predictive analytics. The manifesto identifies a core set of these best practices.

One of the *worst* practices we see is that organizations hope that using business rules or machine learning will improve their decision making and decision throughput yet fail to be explicit about the decisions they hope to improve. As the manifesto says, it is critical to actually design the decisions you need to improve rather than simply hoping that adopting the technology will somehow improve it.

Both business rules and machine learning projects go wrong when they focus on details first rather than working top-down. When business rules projects focus on collecting and documenting business rules first, the result is a "big bucket of rules" that are hard to manage or implement and often too diffuse to be useful. Machine learning projects that focus only on building a highly predictive model lack the business context and understanding that will allow that model to be effectively used. A top-down focus on the decisions involved provides structure, context and business awareness for improved results.



An iterative approach is critical in leveraging AI technologies. Decision Management emphasizes this, and the modeling of decisions provides the structure needed for phasing and sequencing decision automation projects.

Finally, success with these technologies depends on effective collaboration between the business, IT and analytics professionals. Decisions work as the intersection, the glue, and decision models allow effective working across skill sets.

The Manifesto Explained

I Decisions First

To effectively manage decisions, it is necessary to focus on them. It is possible to derive some decisions from a list of business rules or to infer the decision making an analytic approach is intended to support. This, however, treats decisions as second-class citizens rather than the critical component of business architecture they are. Explicitly identifying decisions, mapping decisions to the rest of a business architecture, designing and modeling decisions **before** focusing on the specification or implementation details is critical.

Not every kind of decision is suitable for the Decision Management approach, however. The decisions in question should be:

- ▶ Repeatable
Decision Management is concerned with the decision an organization makes over and over again, not one-off strategic decisions.
- ▶ Action oriented
The essence of decision-making is to select from an array of possible actions, pick one and then take it.
- ▶ Non-trivial
If a decision is truly trivial then there is no value to managing it over time. If multiple policies or regulations apply, if there is a wide range of options to select from or lots of data to consider, or the way the decision is made changes often then it is going to repay an investment in Decision Management.
- ▶ Measurable
A return on investing in Decision Management relies on managing decisions that have a measurable business value.

Your business can be thought of as a sequence of decisions over time. Each decision, each choice, affects the trajectory of the business. Each choice you make about products, suppliers, customers, facilities, employees and more is a decision. In fact, decisions are the primary way in which you have an impact on the success or failure of your business. As a result, every decision can and should be linked to the objectives or performance metrics it affects. This allows the value of a decision to be measured in terms the business understands.

It is also worth noting that while decisions are critical to business processes, they are more than just part of a business process. Organizations that manage decisions as peers to business processes make their processes simpler, smarter and more agile. They also gain additional leverage because decisions are re-used between processes. An additional benefit from a focus on decisions is that it makes a process more customer-centric and easier to personalize.

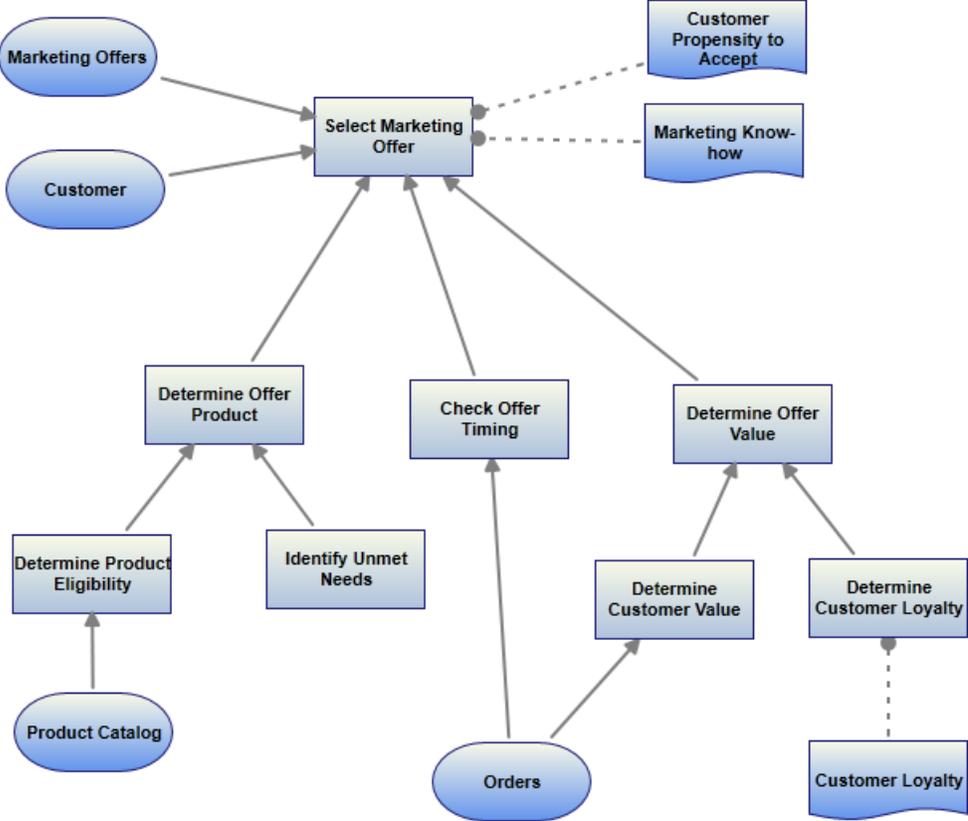
2 Explicitly Design Decisions

Like any component of a business architecture, decisions can be complex. Simply identifying them and giving them a name or description is not enough. Organizations using Decision Management successfully are increasingly scaling that success by investing in explicitly modeling and designing their decision-making before plunging into implementation details.

In the same way that interface-first design works well in SOA, so question-first design works well in Decision Management. Describing a decision in terms of the question being asked and the possible allowed answers bounds it and makes it easy for other elements of the business architecture to design their integration with it.

The emerging Decision Model and Notation standard (DMN), released and maintained by the Object Management Group, lays out a model and a notation for designing decisions. This supports different approaches and technologies. It allows skills and decision models to be reused and shared across projects and platforms. The notation supports the detailed modeling of decisions, the specification of the information needed to make those decisions, the implementation of (some) decision making as decision tables and is extensible to manage the many different kinds of know-how that go into a decision such as policies, regulations, analytic insight or human expertise.

Figure 1: An Example Decision Model

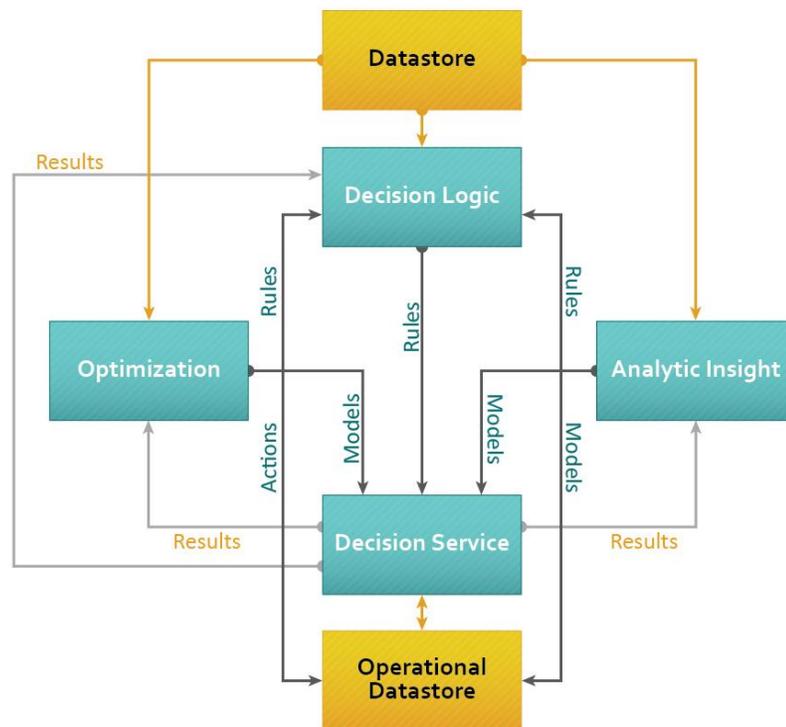


3 Use Decision Management Technologies

Four aspects of digital decisioning drive organizations to adopt new, Decision Management specific, technologies:

- ▶ Managing decision logic for transparency and agility.
Organizations typically adopt a Business Rules Management System to manage decision logic more effectively.
- ▶ Embedding machine learning for analytic decision-making.
Organizations use machine learning algorithms and predictive analytic workbenches, packaged analytic models and other techniques to turn their historical data into usable analytic insight for decision-making.
- ▶ Selecting the best alternative given real-world trade-offs and simulating results.
Some organizations adopt constraint-based optimization tools while others use trade-off matrices, genetic algorithms and other analysis techniques.
- ▶ Monitoring and improving decision-making over time.
Decision Management technologies offer simulation, impact analysis, integration with performance management and more to support ongoing decision analysis.

Figure 2: Four Capabilities



These capabilities can be used to completely automate a decision in every circumstance. More commonly they are focused on just some of the elements of a decision, using a decision model as structure, and deliver both decision support and decision management capabilities.

4 Deploy Digital Decisioning Systems

The logical outcome of a focus on decisions is the creation of systems that are explicitly focused on decision-making. Historically organizations have only thought in terms of Decision Support Systems designed to present data and perhaps some insight to a human decision-maker. With the new capabilities available for automating decisions and the effectiveness of the Decision Management approach it is now possible to deliver Digital Decisioning and automate key decisions and provide decision analysis tools and capabilities for ongoing management and evolution of decisions.

This focus works well with Service Oriented Architectures, delivering Decision Services that can easily be integrated into an SOA approach. Decision Services are being created using traditional, Agile and test-driven approaches. They are supported by business rule, machine learning and optimization model management capabilities to keep them up to date and ensure their effectiveness. Decision Services add value whether an organization is implementing business processes using a Business Process Management System, building event-based or case management systems, or modernizing and extending packaged and legacy applications.

5 Digital Decisioning

Digital Decisioning is Agile, Analytic and Adaptive.

- ▶ Digital decisioning is agile because it focuses on a foundation of business rules and a clear understanding of the decision-making delivers transparency, business collaboration and rapid change when necessary.
- ▶ Digital decisioning is analytic, not because it makes it easy to report on data or analyze it but because historical data is analyzed using machine learning and this analysis is used to adjust the way the system acts.
- ▶ Digital decisioning is adaptive because its performance is explicitly monitored and tied to overall business performance thanks to the links between the underlying model of decision making and metrics and objectives.

A three step process delivers Digital Decisioning:

- ▶ Discover and Model Decisions: identify, model and design the operational decisions that matter in a business process or business area.
- ▶ Build Decision Services: combine business rules, machine learning and optimization technology into decision-making IT components.
- ▶ Monitor and Improve Decisions: close the loop and continuously improve the decision-making and business results of these services.

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Acknowledgements

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