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Port Clearance Rules

By Maarten P.D. Schadd
Product Consultant at Blueriq B.V.

Contents

1 Introduction

The decision management community [1] is a new initiative that started in 2014 to facilitate the sharing of news and knowledge concerning Decision Management (DM). Next to a product catalog, decision model prototypes and case studies, the decision management community also provides a monthly challenge. Every challenge consists of a problem that should be solved using any business rules and decisions management system or none at all.

As Blueriq is a vendor with an integrated rule engine and decision management capabilities in its BPM suite, we accept this challenge. This article describes how Blueriq solves the March 2016 challenge.

2 Problem definition

This challenge asks for a decision model that is able to determine whether a ship is allowed to enter a dutch port. The problem was used as use case in the Game Of Rules by the Business Rules Platform Netherlands [4]. The specifications are:

1. The hold of a ship must be considered clean if the hold does not contain remainders of cargo.
2. An unloaded ship may only enter a Dutch port if the ship complies with the requirements of the Inspection for unloaded ships.
3. A ship must comply with the requirements of the Inspection for unloaded ships if the ship complies with all of the following: a) the ship meets the safety requirements for unloaded ships; b) the ship has a certificate of registry that is valid.
4. A ship must be categorized as large if the total length of the ship is at least 80 meters.
5. A ships hold contains remainders of cargo if the residual cargo measurement is higher than 0.5 mg dry weight per cm^2.
6. A ship only meets the safety requirements for unloaded ships if the ship complies with at least one of the following: a) the ship meets the safety requirements for small unloaded ships; b) the ship meets the safety requirements for large unloaded ships.
7. A ship only meets the safety requirements for large unloaded ships if the ship complies with all of the following: a) the ship is categorized as large; b) the hold of the ship is clean; c) the hold of the ship is double hulled.
8. A ship only meets the safety requirements for small unloaded ships if the ship complies with all of the following: a) the ship is categorized as small; b) the hold of the ship is clean.
9. A ship must be categorized as small if the total length of the ship is less than 80 meters.
10. A ships certificate of registry must be considered valid if the date up to which the registration is valid of the certificate of registry is after the current date.

3 Decision Model

This section describes the decision model that can determine if a ship is allowed to enter a dutch port. Subsection 3.1 describes model during design time, and Subsection 3.2 shows the execution of the decision model at runtime.

3.1 Design

We have created a straightforward domain model based on the given requirements and created decision tables to derive all needed values. Based on the domain model and the decision tables is Blueriq Studio able to generate a Decision Requirements Graph (DRG), which is presented in Figure 1.

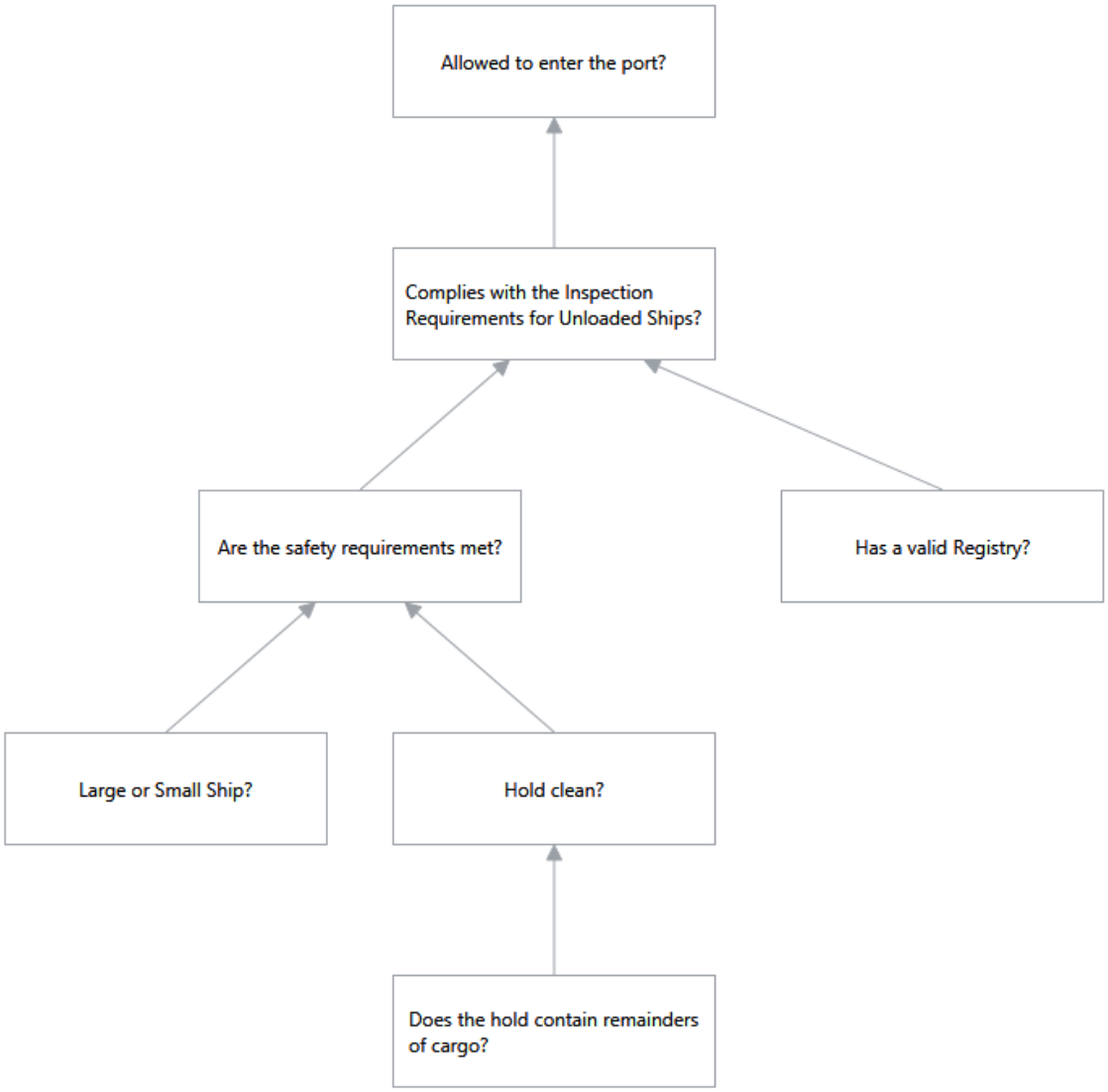

Figure 1: The Decision Requirements Graph

Each of the shown elements in Figure 1 can be expanded to show the details of the decision node, as can be seen in Figure 2. On the left are all input attributes that can not be derived but have to be supplied by the user. In the middle are all business rules depicted that can determine the outcome for the decision. In this case it is a single decision table. Please note that we prefixed the decision with an underscore and a number to indicate the specification number that this decision is based on (see Section 2).[1] It is possible to directly open each element directly from this graph so that business rules and domain elements can be found quickly.

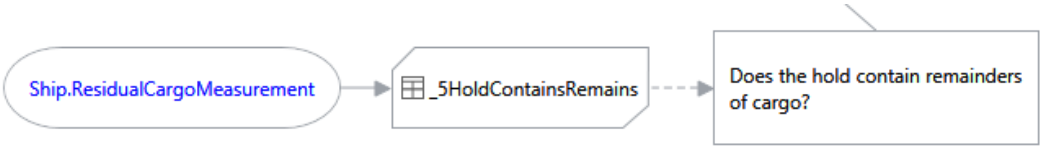

Figure 2: Details of a DRG node

The decision tables are straightforward. We show the most complex decision table in Figure 3. This decision table concerns specifications 6, 7 and 8 in one table. It would have been possible to split this into more tables with an extra decision layer in order to match exactly with the specifications, but for a simple case as this it is not needed.[2] Please note that an asterisk ('*') indicates that the value of the input on the left is not relevant. For more information on the possibilities of decision tables in Blueriq, please see [3].

Ship.Size	"Small"		"Large"		
Ship.HoldClean	TRUE	FALSE	TRUE		FALSE
Ship.IsHoldDoubleHulled	*	*	TRUE	FALSE	*
Ship.MeetsSafetyRequirements	TRUE	FALSE	TRUE	FALSE	FALSE

Figure 3: Decision Table to determine if a ship meets the safety requirements.

3.2 Runtime

At runtime the end user can be prompted to supply the needed input data for the decision, and a result can be shown. This is shown in Figure 4. Please note that one would usually not show all the intermediate attributes on the page to the end user. The top four attributes are editable, all other values are derived.

Blueriq is able to explain all decisions that are taken at runtime. For this purpose a decision graph can be opened that shows all values that were used to derive a value for a decision. The complete decision graph for the decision whether a ship is allowed to enter a dutch port is shown in Figure 5. The graph is similar to the DRG shown in Figure 1. This is not always the case.

[1] It would be better to import the specifications into Blueriq Studio and link the decision tables to the relevant parts of the specification document. Blueriq provides this functionality but it was not used in this exercise.

[2] Rule 6 could have been a separate decision, which is determined if either the requirements are met for small or for large ships. This additional layer seems rather artificial and was omitted in this implementation.

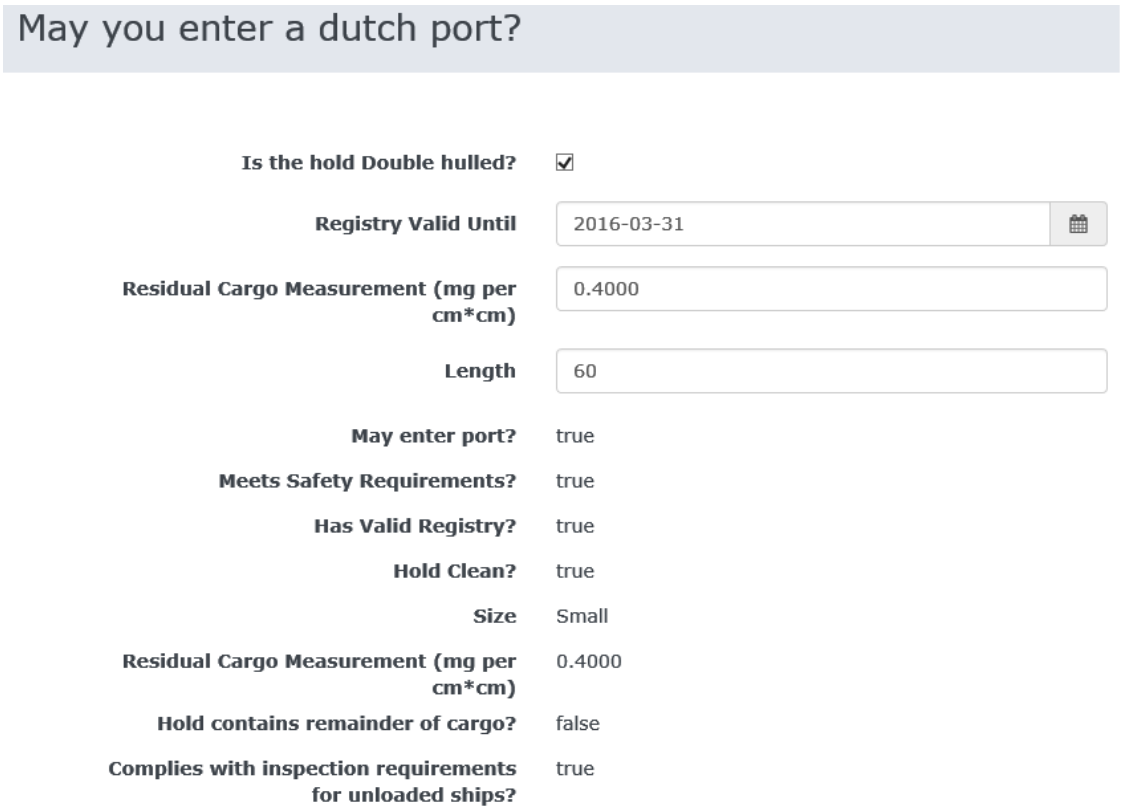

Figure 4: A form for supplying ship data.

Business rules that are not used for a decision is not shown in the runtime decision graph. This is also possible in the port case. If a ship has no valid registry, it does not matter if it meets the safety requirements, and vice versa. In those scenarios, only part of the graph can be shown.[3]

4 Conclusions

Blueriq is able to create an executable decision model from the provided port specifications. A decision requirements graph can be constructed in studio that shows all dependencies of the decision. At runtime, a decision can be explained as well in a decision graph. The port case is a nice and simple case to show the capabilities of Blueriq. The Decision Management Community has previously created more complex problems similar to the port case [2].

[3]This depends on the modeling details. All business rules that are executed is shown, even if there exists a path that was examined later which rendered the first path useless. For example, the runtime could first check if a ship meets the safety requirements, and then check for a valid registry. In this case, the complete graph is shown if the ship meets the safety requirements but has no valid registry.

Figure 5: A runtime decision graph.

Contact Us

If you have any questions about this article or if you would like to start a discussion, do not hesitate to contact us.

Email the author	:	m.schadd@everest.nl
Email Blueriq	:	info@blueriq.com
Call Blueriq	:	+31 (0)73 6450467
Website Blueriq	:	http://www.blueriq.com

Blueriq BV
Veemarktkade 8
5222 AE s-Hertogenbosch
The Netherlands

About Blueriq

Blueriq is a rule-driven software platform designed to deliver dynamic business solutions for organizations with knowledge-intensive processes. It empowers organizations in fast changing environments to quickly and cost-effectively respond to changing business conditions and regulations. Blueriq provides solutions for Decision Management, Dynamic Case Management and intelligent User Experience Management across multiple channels. Solutions based on Blueriq are modeled, not programmed, giving you the opportunity to respond more quickly to your customers needs and improving your business outcomes. With Blueriq, you make your own rules!

References

[1] Decision Management Community. https://dmcommunity.wordpress.com/home/, 2014.

[2] M.P.D. Schadd. Case study: Vehicle insurance userv product derby. Technical report, Blueriq B.V., 's-Hertogenbosch, The Netherlands, 2014.

[3] M.P.D. Schadd. Decision table for vacation days calculation. Technical report, Blueriq B.V., 's-Hertogenbosch, The Netherlands, 2016.

[4] S. Spreeuwenberg, B. Charlotte, and Z. Martijn. *Het spel met de regels.* Business Rules Platform Nederland, The Netherlands, 2013.