

# Port Clearance Rules

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Note: Model developed in Sapiens DECISION, using TDM and DMN notation



[Decision Management Community challenge](#) for March, 2016, is looking for a decision model capable to decide if a ship can enter a Dutch port on a certain date. The rules for this challenge are inspired by the international Ship and Port Facility Security Code. They were originally developed for The Game Of Rules, a publication of the Business Rules Platform Netherlands. The authors: Silvie Spreeuwenberg, LibRT; Charlotte Bouvy, Oelan; Martijn Zoet, Zuyd University of Applied Sciences. The rule set is not intended to be complete for all possible cases.

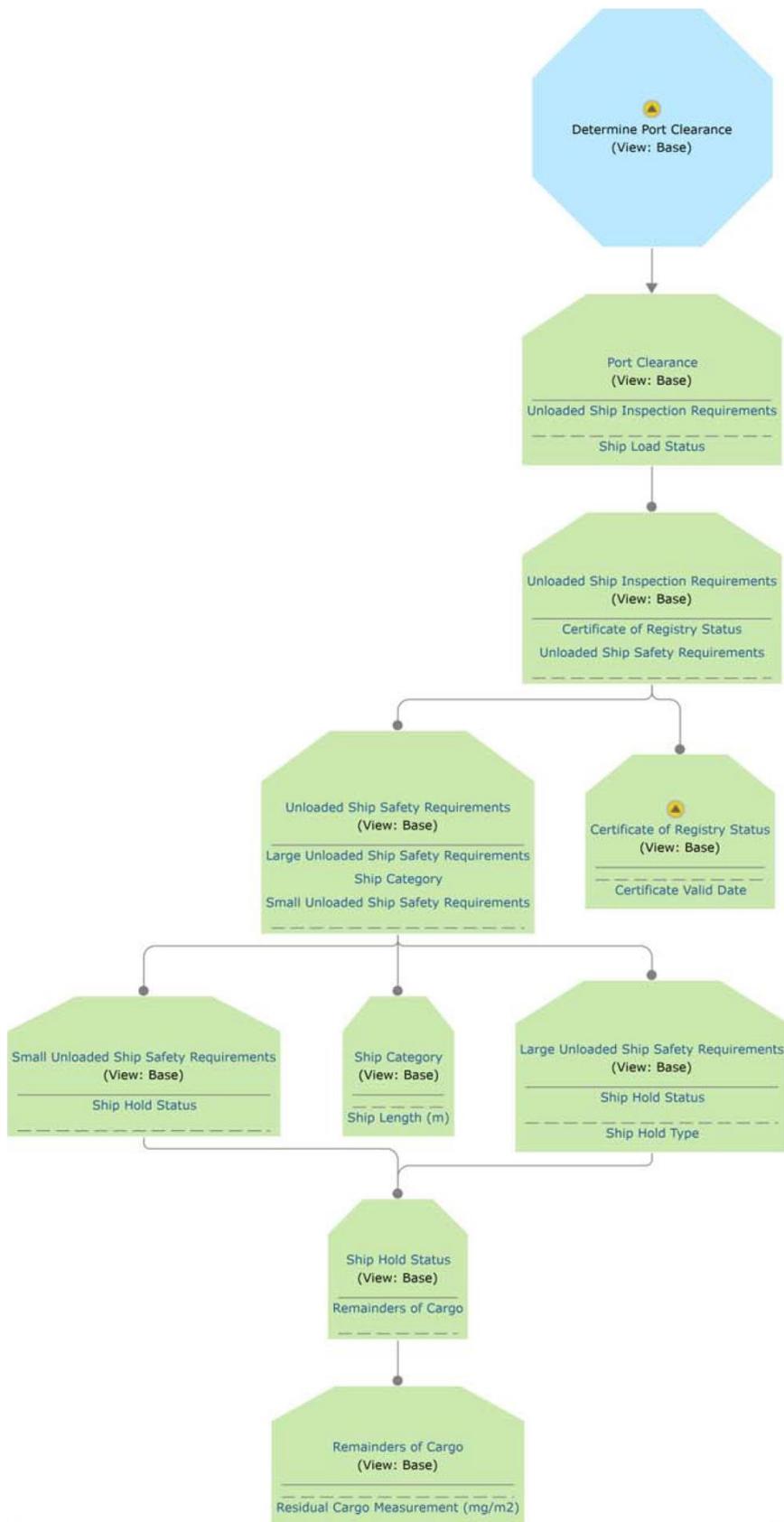
## Here are the rules:

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 ship's hold contains remainders of cargo if the residual cargo measurement is higher than 0.5 mg dry weight per cm<sup>2</sup>.
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 ship's 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.

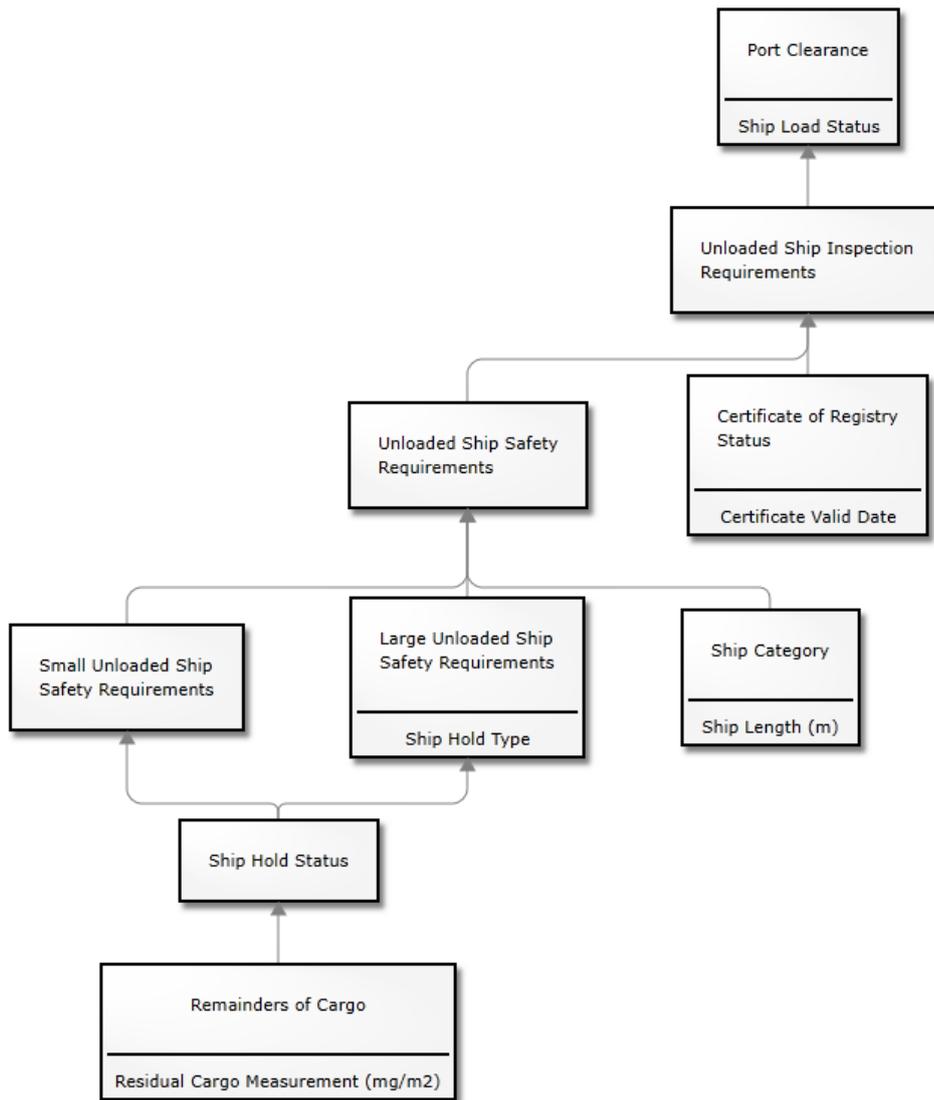
## Business Glossary

Business Friendly Name	Data Type	Valid Values
Certificate Valid Date	DATE	
Certificate of Registry Status	TEXT	Not Valid, Valid
Large Unloaded Ship Safety Requirements	TEXT	Comply, Not Comply
Port Clearance	TEXT	Clear, N/D, Not Clear
Remainders of Cargo	TEXT	Exist, Not Exist
Residual Cargo Measurement (mg/m2)	NUMERIC	
Ship Category	TEXT	Large, Small
Ship Hold Status	TEXT	Clean, Not Clean
Ship Hold Type	TEXT	Double Hulled, Single Hulled
Ship Length (m)	QUANTITY	
Ship Load Status	TEXT	Loaded, Not Loaded
Small Unloaded Ship Safety Requirements	TEXT	Comply, Not Comply
Unloaded Ship Inspection Requirements	TEXT	Comply, Not Comply
Unloaded Ship Safety Requirements	TEXT	Comply, Not Comply

# Decision Model – TDM Notation



## Decision Model – DMN Notation



Decision can show a DMN DRD using a simplified notation, with input data shown inside the decisions (instead of using the Input Data oval shape). Each DMN decision, in fact, maps to a TDM Rule Family, making it easy to switch from one notation to the other.

## Rule Family Tables

TDM principles (applied by DECISION to RF tables) require that the complete fact type domain is considered on a RF table. Underlined heading denote support (interim) fact types which, in turn, also have their own RF table.

Remainders of Cargo (View: Base) V0 - DRAFT

Pattern	Residual Cargo Measurement (mg/m2)	Remainders of Cargo
1	<b>Is Greater Than</b>    <input type="checkbox"/> 0.5	<b>Is</b>    <input type="checkbox"/> Exist
1	<b>Is Less Than or Equal To</b>    <input type="checkbox"/> 0.5	<b>Is</b>    <input type="checkbox"/> Not Exist

Ship Hold Status (View: Base) V0 - DRAFT

Pattern	Remainders of Cargo	Ship Hold Status
1	<b>Is</b>    <input type="checkbox"/> Exist	<b>Is</b>    <input type="checkbox"/> Not Clean
1	<b>Is</b>    <input type="checkbox"/> Not Exist	<b>Is</b>    <input type="checkbox"/> Clean

Large Unloaded Ship Safety Requirements (View: Base) V0 - DRAFT

Pattern	Ship Hold Type	Ship Hold Status	Large Unloaded Ship Safety Requirements
1	<b>Is</b>    <input type="checkbox"/> Double Hulled	<b>Is</b>    <input type="checkbox"/> Clean	<b>Is</b>    <input type="checkbox"/> Comply
2	<b>Is</b>    <input type="checkbox"/> Single Hulled		<b>Is</b>    <input type="checkbox"/> Not Comply
3		<b>Is</b>    <input type="checkbox"/> Not Clean	<b>Is</b>    <input type="checkbox"/> Not Comply

Small Unloaded Ship Safety Requirements (View: Base) V0 - DRAFT

Pattern	Ship Hold Status	Small Unloaded Ship Safety Requirements
1	<b>Is</b>    <input type="checkbox"/> Clean	<b>Is</b>    <input type="checkbox"/> Comply
1	<b>Is</b>    <input type="checkbox"/> Not Clean	<b>Is</b>    <input type="checkbox"/> Not Comply

Ship Category (View: Base) V0 - DRAFT

Pattern	Ship Length (m)	Ship Category
1	<b>Is Greater Than or Equal To</b>    <input type="checkbox"/> 80	<b>Is</b>    <input type="checkbox"/> Large
1	<b>Is Less Than</b>    <input type="checkbox"/> 80	<b>Is</b>    <input type="checkbox"/> Small

Unloaded Ship Safety Requirements (View: Base) V0 - DRAFT

Pattern	Ship Category	Small Unloaded Ship Safety Requirements	Large Unloaded Ship Safety Requirements	Unloaded Ship Safety Requirements
1	<b>Is</b>    <input type="checkbox"/> Small	<b>Is</b>    <input type="checkbox"/> Comply		<b>Is</b>    <input type="checkbox"/> Comply
1	<b>Is</b>    <input type="checkbox"/> Small	<b>Is</b>    <input type="checkbox"/> Not Comply		<b>Is</b>    <input type="checkbox"/> Not Comply
2	<b>Is</b>    <input type="checkbox"/> Large		<b>Is</b>    <input type="checkbox"/> Comply	<b>Is</b>    <input type="checkbox"/> Comply
2	<b>Is</b>    <input type="checkbox"/> Large		<b>Is</b>    <input type="checkbox"/> Not Comply	<b>Is</b>    <input type="checkbox"/> Not Comply

Certificate of Registry Status (View: Base) V0 - DRAFT

Pattern	Certificate Valid Date	Certificate of Registry Status
1	<b>Is After the Date</b>    <input type="checkbox"/> TODAY()	<b>Is</b>    <input type="checkbox"/> Valid
1	<b>Is On or Before the Date</b>    <input type="checkbox"/> TODAY()	<b>Is</b>    <input type="checkbox"/> Not Valid

Unloaded Ship Inspection Requirements (View: Base) V0 - DRAFT

Pattern	Unloaded Ship Safety Requirements	Certificate of Registry Status	Unloaded Ship Inspection Requirements
1	<b>Is</b>    <input type="checkbox"/> Comply	<b>Is</b>    <input type="checkbox"/> Valid	<b>Is</b>    <input type="checkbox"/> Comply
2	<b>Is</b>    <input type="checkbox"/> Not Comply		<b>Is</b>    <input type="checkbox"/> Not Comply
3		<b>Is</b>    <input type="checkbox"/> Not Valid	<b>Is</b>    <input type="checkbox"/> Not Comply

Port Clearance (View: Base) V0 - DRAFT

Pattern	Ship Load Status	Unloaded Ship Inspection Requirements	Port Clearance
1	<b>Is</b>    <input type="checkbox"/> Not Loaded	<b>Is</b>    <input type="checkbox"/> Comply	<b>Is</b>    <input type="checkbox"/> Clear
1	<b>Is</b>    <input type="checkbox"/> Not Loaded	<b>Is</b>    <input type="checkbox"/> Not Comply	<b>Is</b>    <input type="checkbox"/> Not Clear
2	<b>Is</b>    <input type="checkbox"/> Loaded		<b>Is</b>    <input type="checkbox"/> N/D

As there are no rules for Loaded Ships, I decided to include a placeholder to denote “not determined”.

# Testing

Decision can generate test cases based on fact type domain or manually entered.

Test001 Determine Port Clearance (View: Base) Number of Test Cases: 2

Drag a column header and drop it here to group by that column

ID	Executed	Actions	Expected Result	Execution Result	Certificate Valid Date	Residual Cargo Measurement (mg/m2)	Ship Hold Type	Ship Length (m)	Ship Load Status
2215317	<input checked="" type="checkbox"/>	⋮		Clear	31/3/2016	0.2	Double Hulled	90	Not Loaded
2215326	<input checked="" type="checkbox"/>	⋮		Not Clear	31/3/2016	0.6	Double Hulled	90	Not Loaded

Interim results can be shown (using TDM notation) for each supporting rule family, for each test case.

