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The Challenge: Decision Table for Vacation Days Calculation

The Challenge for January stated a request for a decision table representing the following logic:

The number of vacation days depends on age and years of service.

Every employee receives at least 22 days.

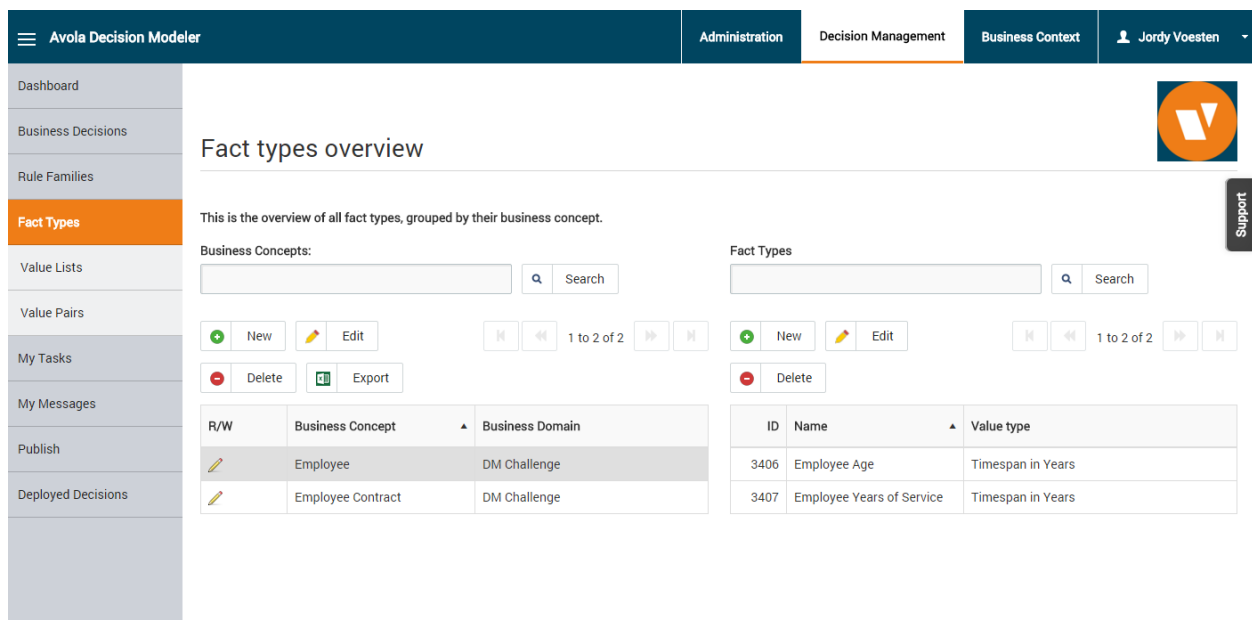
Additional days are provided according to the following criteria:

- 1) Only employees younger than 18 or at least 60 years, or employees with at least 30 years of service will receive 5 extra days.
- 2) Employees with at least 30 years of service and also employees of age 60 or more, receive 3 extra days, on top of possible additional days already given.
- 3) If an employee has at least 15 but less than 30 years of service, 2 extra days are given. These 2 days are also provided for employees of age 45 or more. These 2 extra days can not be combined with the 5 extra days.

When considering this piece of regulation, the following fact types define this decision:

- For an employee, their age and years of service as conditions;
- For an employee contract, the number of vacation days as a conclusion.

All three of these fact types are defined as timespans, the first two in years, the last one in days. In order to keep the solution focused on the requested decision table, the condition fact type age and years of services are considered base facts, instead of using an employee's date of birth, contract start date and the current date as base facts for deriving age and years of service.



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Dashboard Business Decisions Rule Families **Fact Types** Value Lists Value Pairs My Tasks My Messages Publish Deployed Decisions

Fact types overview

This is the overview of all fact types, grouped by their business concept.

Business Concepts:

R/W	Business Concept	Business Domain
	Employee	DM Challenge
	Employee Contract	DM Challenge

Fact Types

ID	Name	Value type
3406	Employee Age	Timespan in Years
3407	Employee Years of Service	Timespan in Years

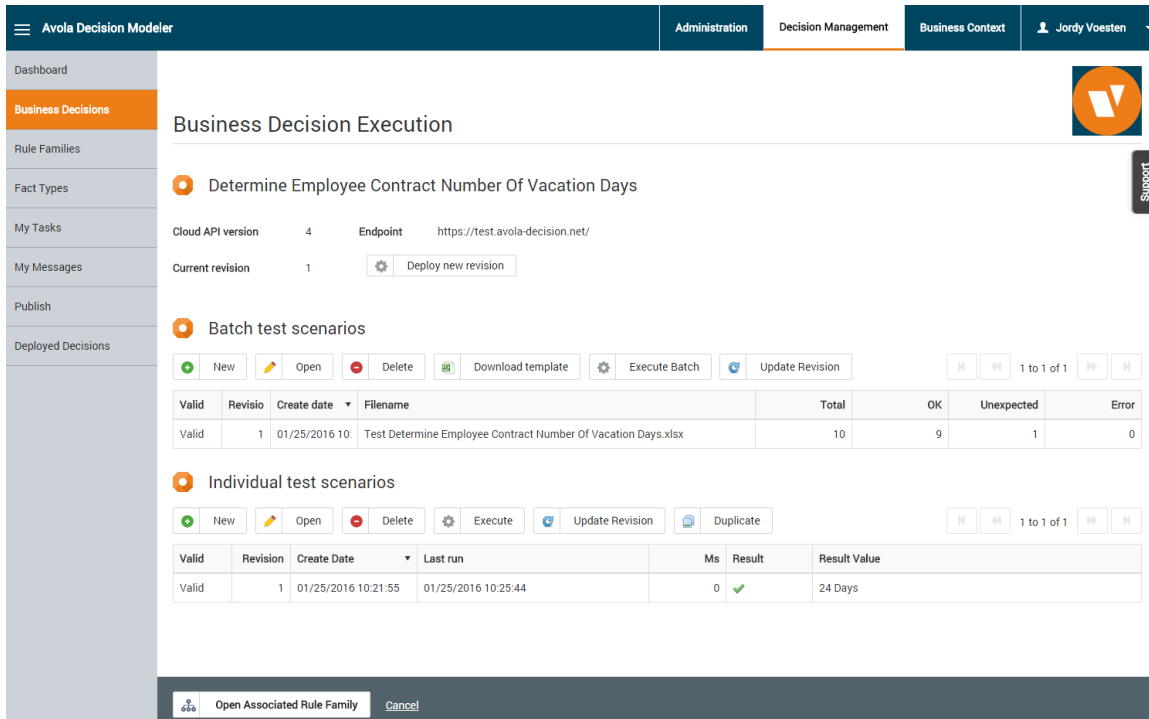
Figure 1: fact types

When considering the rules in the example, they can be modelled in a number of ways. Each rule can be modelled separately, or the rules can be analysed as a whole and also implemented as such. For example, when looking at the combined ruleset, one can see that when an employee reaches the age of 60 or over, their years of service become irrelevant for the outcome of the decision. The same can be said for when an employee has 30 years of service or more. The third combination comes from the (assumed) fact that a person cannot have 15 years of service or more when he or she is under the age of 18.

This leads to the following decision table:

Figure 2: decision table

In order to test the table in the Avola Decision platform it must then be used as a business decision and deployed to the cloud service. It can then be tested using individual test scenario's or by using a batch of test cases with their expected conclusions.



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Business Decision Execution

Determine Employee Contract Number Of Vacation Days

Cloud API version 4 Endpoint <https://test.avola-decision.net/>

Current revision 1 [Deploy new revision](#)

Batch test scenarios

[New](#) [Open](#) [Delete](#) [Download template](#) [Execute Batch](#) [Update Revision](#)

Valid	Revisio	Create date	Filename	Total	OK	Unexpected	Error
Valid	1	01/25/2016 10:	Test Determine Employee Contract Number Of Vacation Days.xlsx	10	9	1	0

Individual test scenarios

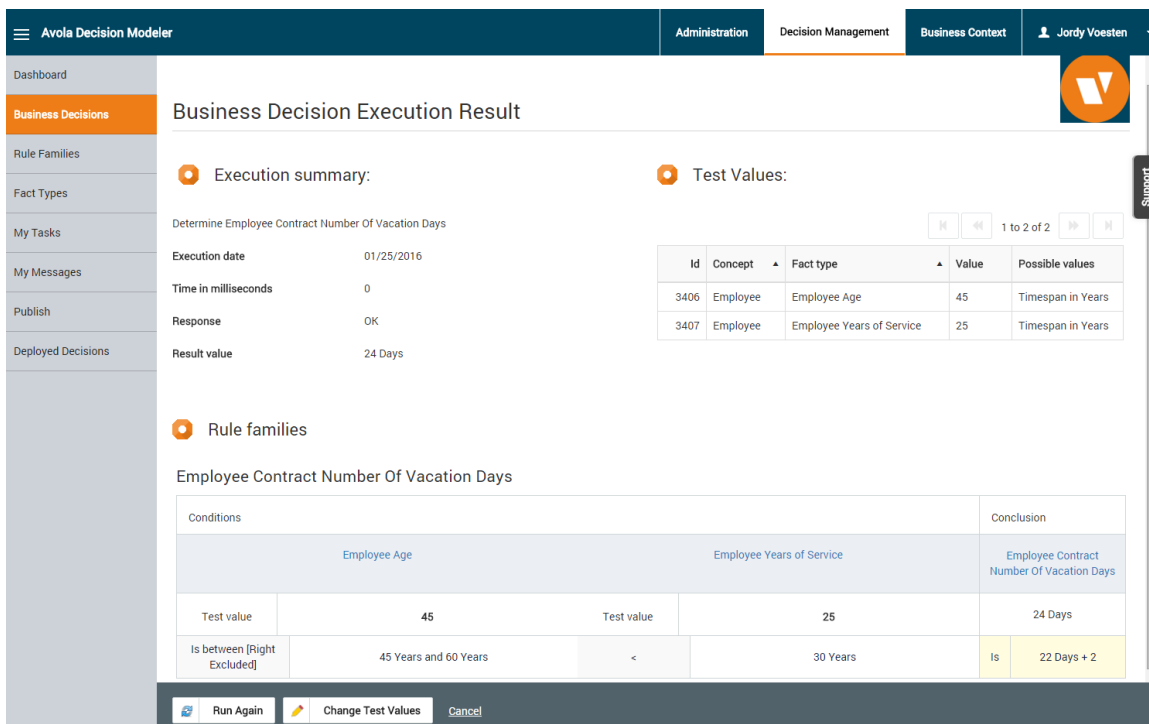
[New](#) [Open](#) [Delete](#) [Execute](#) [Update Revision](#) [Duplicate](#)

Valid	Revision	Create Date	Last run	Ms	Result	Result Value
Valid	1	01/25/2016 10:21:55	01/25/2016 10:25:44	0	✓	24 Days

[Open Associated Rule Family](#) [Cancel](#)

Figure 3: test overview

The individual test scenario shows us information on when the test case was executed, what the input values for the decision were and ends with a trace of the execution showing which row was hit in the decision table using the input values.



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Dashboard Business Decisions Rule Families Fact Types My Tasks My Messages Publish Deployed Decisions

Business Decision Execution Result

Execution summary:

Determine Employee Contract Number Of Vacation Days

Execution date 01/25/2016

Time in milliseconds 0

Response OK

Result value 24 Days

Test Values:

Id	Concept	Fact type	Value	Possible values
3406	Employee	Employee Age	45	Timespan in Years
3407	Employee	Employee Years of Service	25	Timespan in Years

Rule families

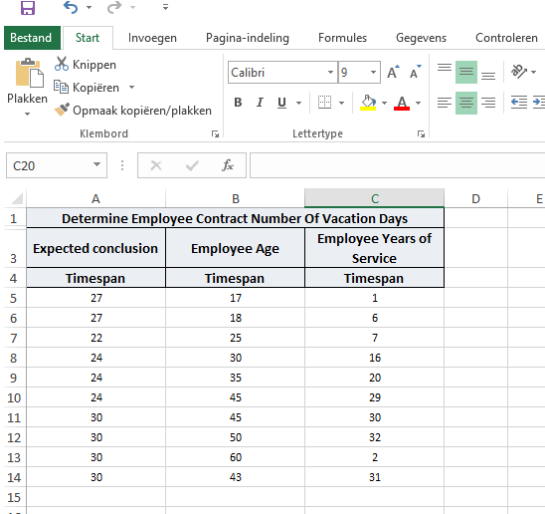
Employee Contract Number Of Vacation Days

Conditions	Conclusion
<div>Employee Age</div> <div>Employee Years of Service</div>	Employee Contract Number Of Vacation Days
<div>Test value</div> <div>45</div> <div>Is between [Right Excluded]</div> <div>45 Years and 60 Years</div>	<div>Test value</div> <div>25</div> <div>30 Years</div>
	24 Days
	22 Days + 2

[Run Again](#) [Change Test Values](#) [Cancel](#)

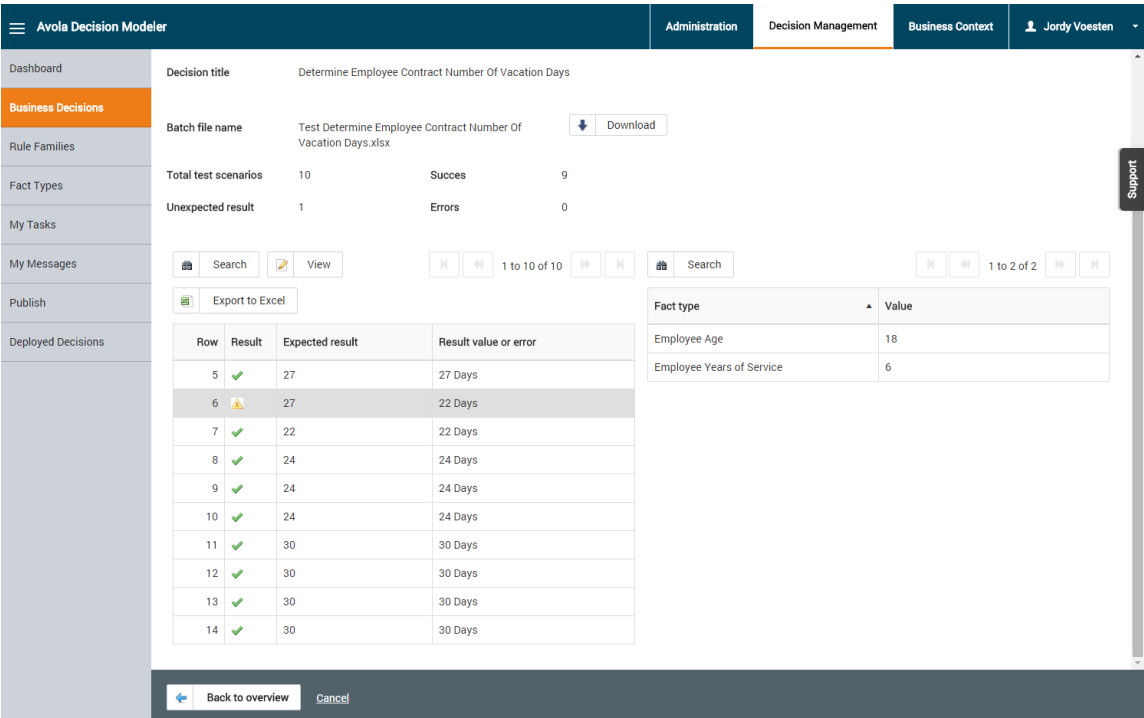
Figure 4: individual test case

When executing a set of test cases in batch (Figure 5), we check them against their expected conclusions and notice the second case tells us there is a difference between the expected conclusion and the actual decision result (Figure 6). When going back to the decision table it is easy to see that the expected conclusion was wrong and the decision outcome was correct.



	A	B	C	D	E
1	Determine Employee Contract Number Of Vacation Days				
3	Expected conclusion	Employee Age	Employee Years of Service		
4	Timespan	Timespan	Timespan		
5	27	17	1		
6	27	18	6		
7	22	25	7		
8	24	30	16		
9	24	35	20		
10	24	45	29		
11	30	45	30		
12	30	50	32		
13	30	60	2		
14	30	43	31		

Figure 5: excel batch test scenarios



Row	Result	Expected result	Result value or error
5	✓	27	27 Days
6	⚠	27	22 Days
7	✓	22	22 Days
8	✓	24	24 Days
9	✓	24	24 Days
10	✓	24	24 Days
11	✓	30	30 Days
12	✓	30	30 Days
13	✓	30	30 Days
14	✓	30	30 Days

Figure 6: batch test outcome