Requirement matrices

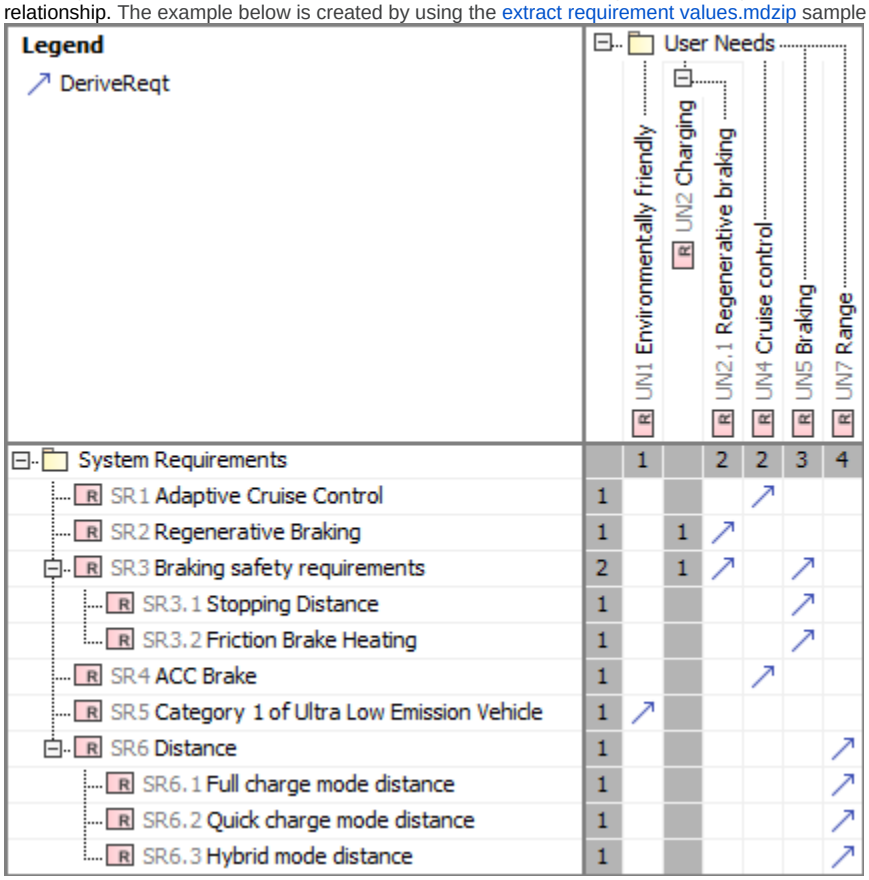
The matrices enables you to analyze, create, and modify relationships between Requirements and other design elements. It is especially valuable that you can display relationships that cannot be represented in diagrams, such as representations (classes by lifeline), behavior representations in other diagrams, operation representations by Call Behavior Actions, etc. All Requirement matrices allows you to perform Requirements gap and coverage analysis.

You can create four kind of Requirements matrices:

- Derive Requirement Matrix.
- Refine Requirement Matrix.
- Satisfy Requirement Matrix.
- Verify Requirement Matrix.

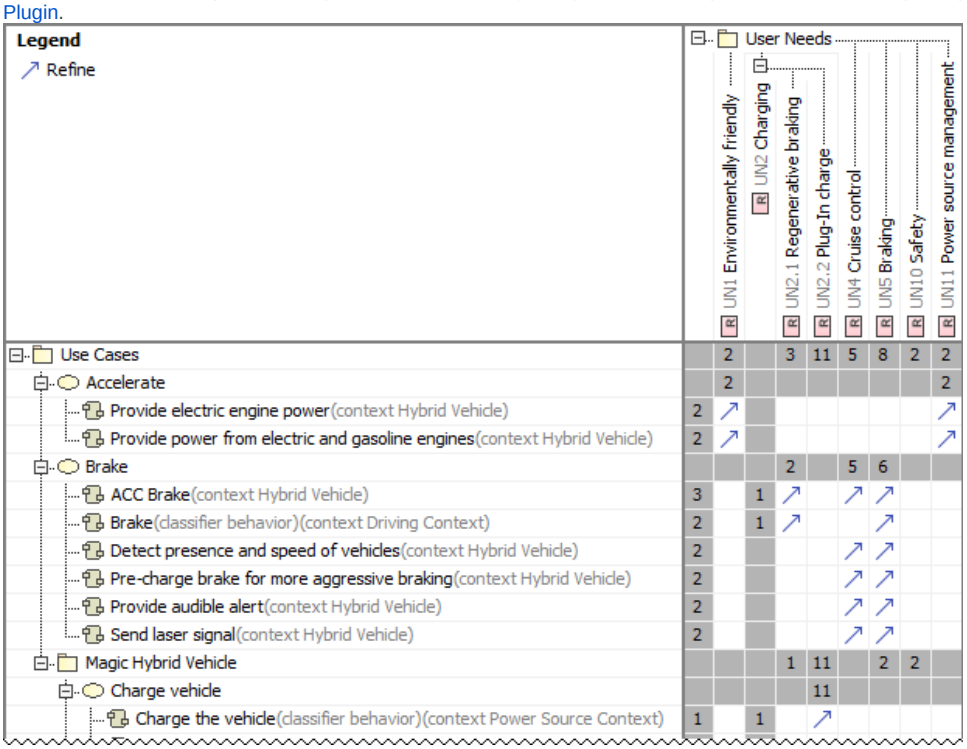
The different purposes for each matrix are illustrated below:

- **Derive Requirement Matrix** allows you to analyze, create, and modify Derive relationships between Requirements and other design elements. Rows represent the elements that are the clients of Derive relationship. Columns represent the Requirements that are the suppliers of Derive relationship. The example below is created by using the extract requirement values.mdzip sample model that comes only with SysML Plugin.



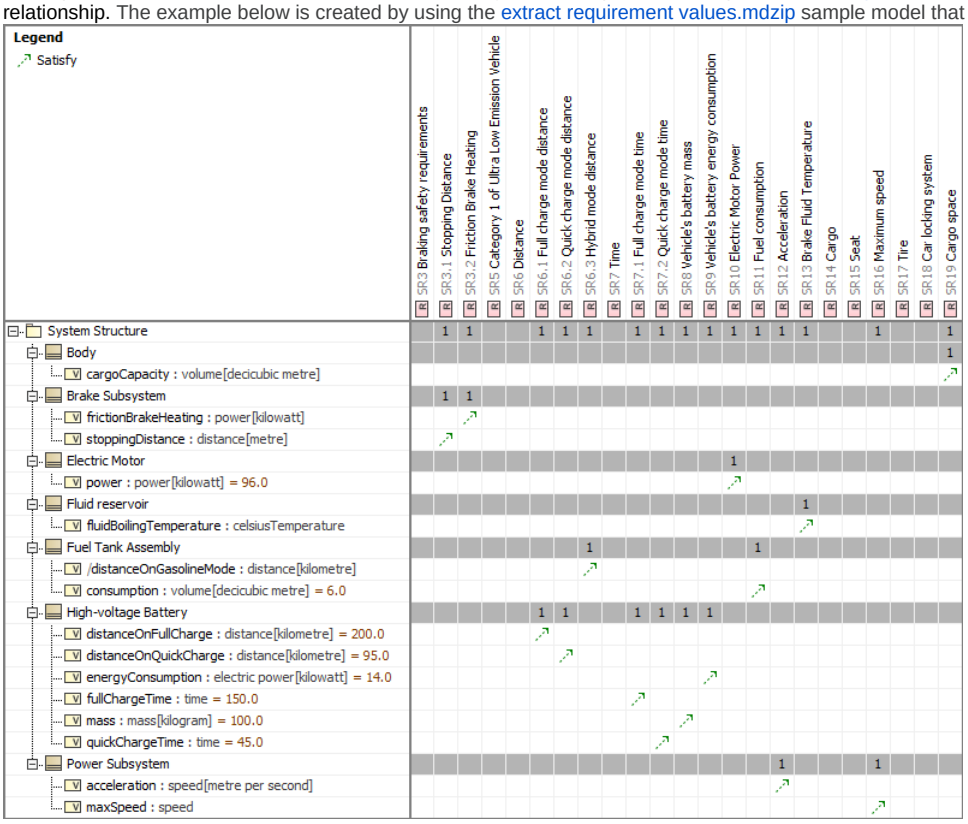
- **Refine Requirement Matrix** allows you to analyze, create, and modify Refine relationships between Requirements and other design elements. Rows represent the elements that are the clients of Refine relationship. Columns represent the Requirements that are the suppliers

of the Refine relationship. The example below is created by using the extract requirement values.mdzip sample model that comes only with SysML Plugin.



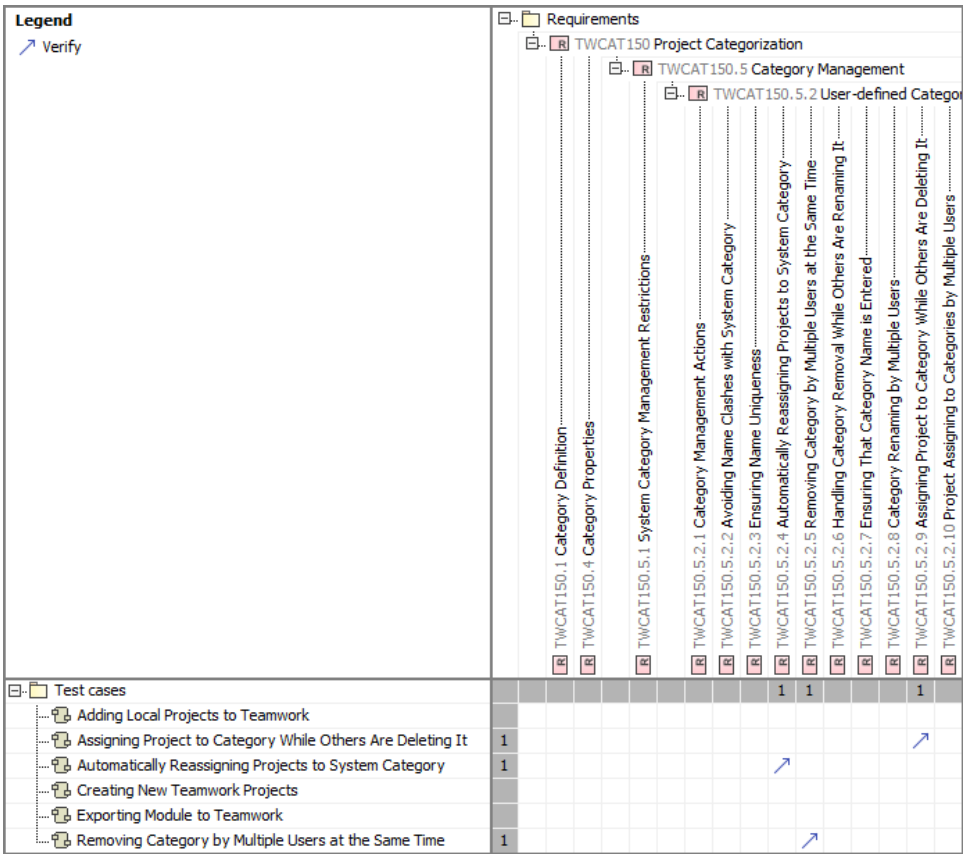
Legend: Refine	User Needs								
	UN1 Environmentally friendly		UN2 Charging	UN2.1 Regenerative braking	UN2.2 Plug-In charge	UN4 Cruise control	UN5 Braking	UN10 Safety	UN11 Power source management
Use Cases	2			3	11	5	8	2	2
Accelerate	2								2
Provide electric engine power(context Hybrid Vehicle)	2	↗							↗
Provide power from electric and gasoline engines(context Hybrid Vehicle)	2	↗							↗
Brake				2		5	6		
ACC Brake(context Hybrid Vehicle)	3		1	↗		↗	↗		
Brake(classifier behavior)(context Driving Context)	2		1	↗			↗		
Detect presence and speed of vehicles(context Hybrid Vehicle)	2					↗	↗		
Pre-charge brake for more aggressive braking(context Hybrid Vehicle)	2					↗	↗		
Provide audible alert(context Hybrid Vehicle)	2					↗	↗		
Send laser signal(context Hybrid Vehicle)	2					↗	↗		
Magic Hybrid Vehicle				1	11		2	2	
Charge vehicle					11				
Charge the vehicle(classifier behavior)(context Power Source Context)	1		1		↗				

- **Satisfy Requirement Matrix** allows you to analyze, create, and modify Satisfy relationships between Requirements and other design elements. Rows represent the elements that are the clients of Satisfy relationship. Columns represent the Requirements that are the suppliers of the Satisfy relationship. The example below is created by using the extract requirement values.mdzip sample model that comes only with SysML Plugin.



Legend: Satisfy	SR3 Braking safety requirements	SR3.1 Stopping Distance	SR3.2 Friction Brake Heating	SR5 Category 1 of Ultra Low Emission Vehicle	SR6 Distance	SR6.1 Full charge mode distance	SR6.2 Quick charge mode distance	SR6.3 Hybrid mode distance	SR7 Time	SR7.1 Full charge mode time	SR7.2 Quick charge mode time	SR8 Vehicle's battery mass	SR9 Vehicle's battery energy consumption	SR10 Electric Motor Power	SR11 Fuel consumption	SR12 Acceleration	SR13 Brake Fluid Temperature	SR14 Cargo	SR15 Seat	SR16 Maximum speed	SR17 Tire	SR18 Car locking system	SR19 Cargo space
System Structure		1	1			1	1	1		1	1	1	1	1	1	1	1			1			1
Body																							1
cargoCapacity : volume[decicubic metre]																							↗
Brake Subsystem		1	1																				
frictionBrakeHeating : power[kilowatt]			↗																				
stoppingDistance : distance[metre]		↗																					
Electric Motor														1									
power : power[kilowatt] = 96.0														↗									
Fluid reservoir																	1						
fluidBoilingTemperature : celsiusTemperature																	↗						
Fuel Tank Assembly								1							1								
/distanceOnGasolineMode : distance[kilometre]								↗															
consumption : volume[decicubic metre] = 6.0															↗								
High-voltage Battery						1	1			1	1	1	1										
distanceOnFullCharge : distance[kilometre] = 200.0						↗																	
distanceOnQuickCharge : distance[kilometre] = 95.0							↗																
energyConsumption : electric power[kilowatt] = 14.0													↗										
fullChargeTime : time = 150.0										↗													
mass : mass[kilogram] = 100.0												↗											
quickChargeTime : time = 45.0											↗												
Power Subsystem																1				1			
acceleration : speed[metre per second]																↗							
maxSpeed : speed																				↗			

- **Verify Requirement Matrix** allows you to analyze, create, and modify Verify relationships between Requirements and other design elements. Rows represent the elements that are the clients of Verify relationship. Columns represent the Requirements that are the suppliers of the Verify relationship. The example below is created by using the Categorization requirements.mdzip sample model that comes only with Cameo Requirements Modeler Plugin.



How to work with Requirement matrices

Requirement matrices are based on Dependency Matrix. That's why all it's procedures are allowable for Requirement matrices:

- Creating Dependency Matrix
- Using Dependency Matrix
- Dependency Matrix environment