

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.mdz](#) sample model that comes only with [SysML Plugin](#).

Legend		User Needs				
DeriveReq		UN1 Environmentally friendly	UN2 Charging	UN2.1 Regenerative braking	UN4 Cruise control	UN5 Braking
System Requirements		1	2	2	3	4
SR1 Adaptive Cruise Control	1					
SR2 Regenerative Braking	1	1				
SR3 Braking safety requirements	2	1				
SR3.1 Stopping Distance	1					
SR3.2 Friction Brake Heating	1					
SR4 ACC Brake	1					
SR5 Category 1 of Ultra Low Emission Vehicle	1					
SR6 Distance	1					
SR6.1 Full charge mode distance	1					
SR6.2 Quick charge mode distance	1					
SR6.3 Hybrid mode distance	1					

- **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		User Needs									
Refine		<div> <div>UN1 Environmentally friendly</div> <div>UN2 Charging</div> <div>UN2.1 Regenerative braking</div> <div>UN2.2 Plug-In charge</div> <div>UN4 Cruise control</div> <div>UN5 Braking</div> <div>UN10 Safety</div> <div>UN11 Power source management</div> </div>									
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		Requirements																		
Satisfy		<div> <div>SR3 Braking safety requirements</div> <div>SR3.1 Stopping Distance</div> <div>SR3.2 Friction Brake Heating</div> <div>SR5 Category 1 of Ultra Low Emission Vehicle</div> <div>SR6 Distance</div> <div>SR6.1 Full charge mode distance</div> <div>SR6.2 Quick charge mode distance</div> <div>SR6.3 Hybrid mode distance</div> <div>SR7 Time</div> <div>SR7.1 Full charge mode time</div> <div>SR7.2 Quick charge mode time</div> <div>SR8 Vehicle's battery mass</div> <div>SR9 Vehicle's battery energy consumption</div> <div>SR10 Electric Motor Power</div> <div>SR11 Fuel consumption</div> <div>SR12 Acceleration</div> <div>SR13 Brake Fluid Temperature</div> <div>SR14 Cargo</div> <div>SR15 Seat</div> <div>SR16 Maximum speed</div> <div>SR17 Tire</div> <div>SR18 Car locking system</div> <div>SR19 Cargo space</div> </div>																		
System Structure		1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Body																				
cargoCapacity : volume[decubic metre]																				
Brake Subsystem		1	1																	
frictionBrakeHeating : power[kilowatt]																				
stoppingDistance : distance[metre]																				
Electric Motor																				
power : power[kilowatt] = 96.0																				
Fluid reservoir																				
fluidBoilingTemperature : celsiusTemperature																				
Fuel Tank Assembly																				
distanceOnGasolineMode : distance[kilometre]																				
consumption : volume[decubic metre] = 6.0																				
High-voltage Battery																				
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																				
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 [Cam eo Requirements Modeler Plugin](#).

