



PI-Data AG

SysLand Toolbox 2017/18

PI-Data AG

Established 1991

Mobile Software stands for

- Automobile – The industry of our most important customers
- Mobile Devices – App development since 2000 – much longer than the word “app” exists
- Mobile Minded – We are meeting IT challenges and creating innovative solutions.

SysLand Toolbox – The UML Toolbox by PI-Data

- 9 years of concentrated Enterprise Architect expertise at Daimler AG
- Big number of users: 6 functional safety projects and 4 modelling projects at Daimler AG
- PI-Data is bridge between users
- High tool quality by large number of users

Philosophy

- Listen to customer and identify its needs
- Use existing standards whenever useful
- Develop and optimize tools based on real life projects

Why SysLand

SysLand Toolbox advantages

- Simplifies working with Enterprise Architect
- Partially hides complexity of modelling
- More efficient working (less clicks)
- Interfaces to DOORS and Excel
- Powerful features are based on UML standard api (enables easy migration to another UML-Tool – Rhapsody already in work)

What is SysLand Toolbox?

- Java application with JavaFX user interface
- Started by an EXE file, then launches Enterprise Architect
- Works like another toolbox for Enterprise Architect
- Installation does not require administrative rights
- Needs actual Java 8 Runtime, at least 1.8_121 (may be placed on disk without installation)

Further parts of SysLand

- Modelling methodology for functional networks
- UML Profile

SysLand development process

No license costs

Each customer or project

- benefits from development of all other customers
- provides features developed for him to all other customers
- is required to finance development of new features

Process for adding new features to SysLand

- Conceptual design together with PI-Data
- Specification in PI-Data's ticketing system (YouTrack), visible to all customers
- PI-Data coordinates new features with needs of other projects
- PI-Data cares about the master plan for SysLand and organizes user meetings
- After effort estimation by PI-Data the customer can order the feature

Development process

- Agile development in 14-day sprints
- Releases based on customer needs, typically every 3 to 6 sprints
- Ticketing system (YouTrack) is used for error reports and feature requests

SysLand-Toolbox overview

Modelling helpers

- Replace many click by a single one
- Care about consistency when creating multiple dependent elements

Navigation aids

- Search and replace

Layout helpers

- Arrange pins on same level
- Inputs on the left, outputs on the right
- Arrange pins/parameters to have same distance

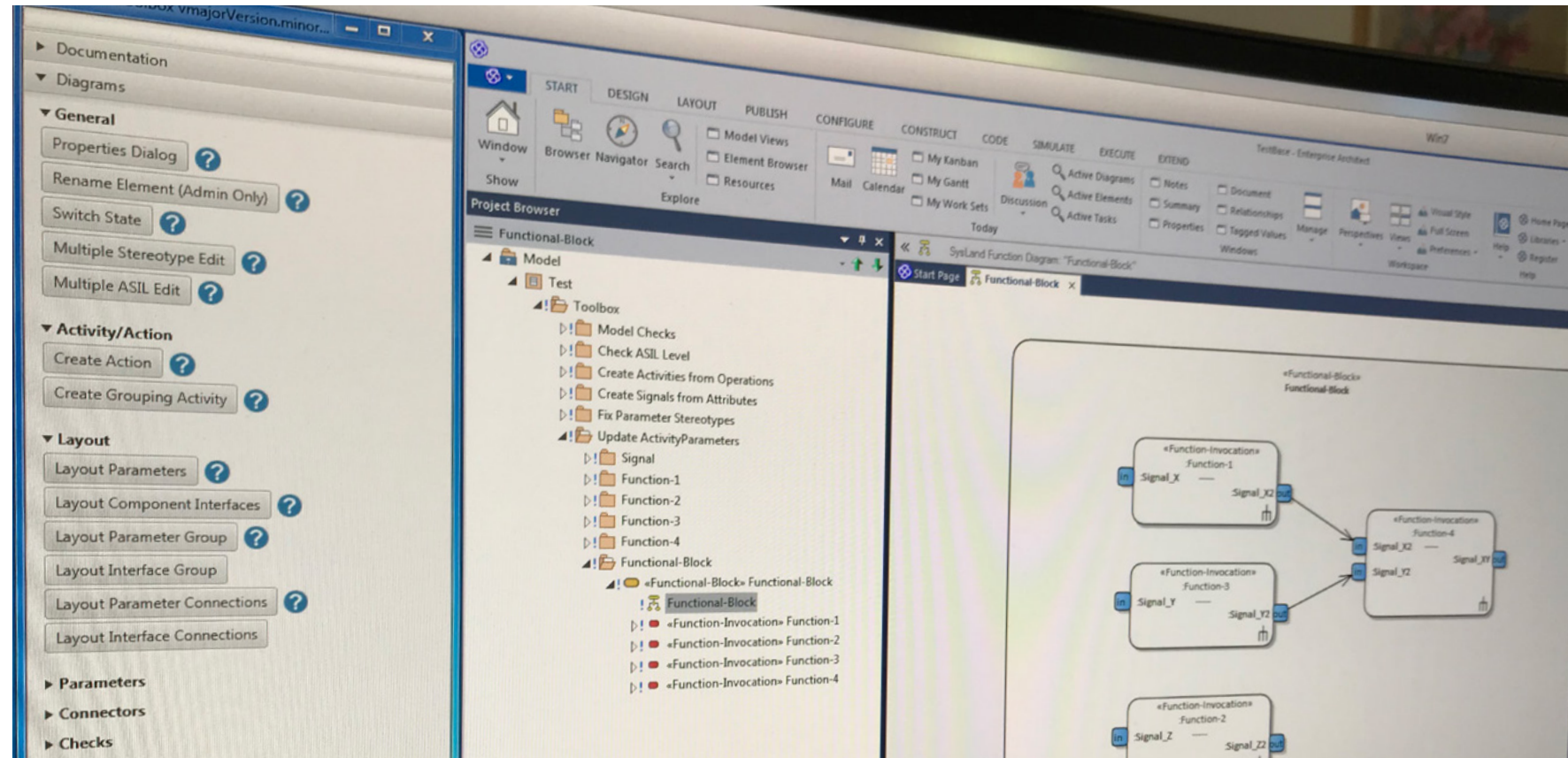
Modell checks

- Care about adherence of modelling rules

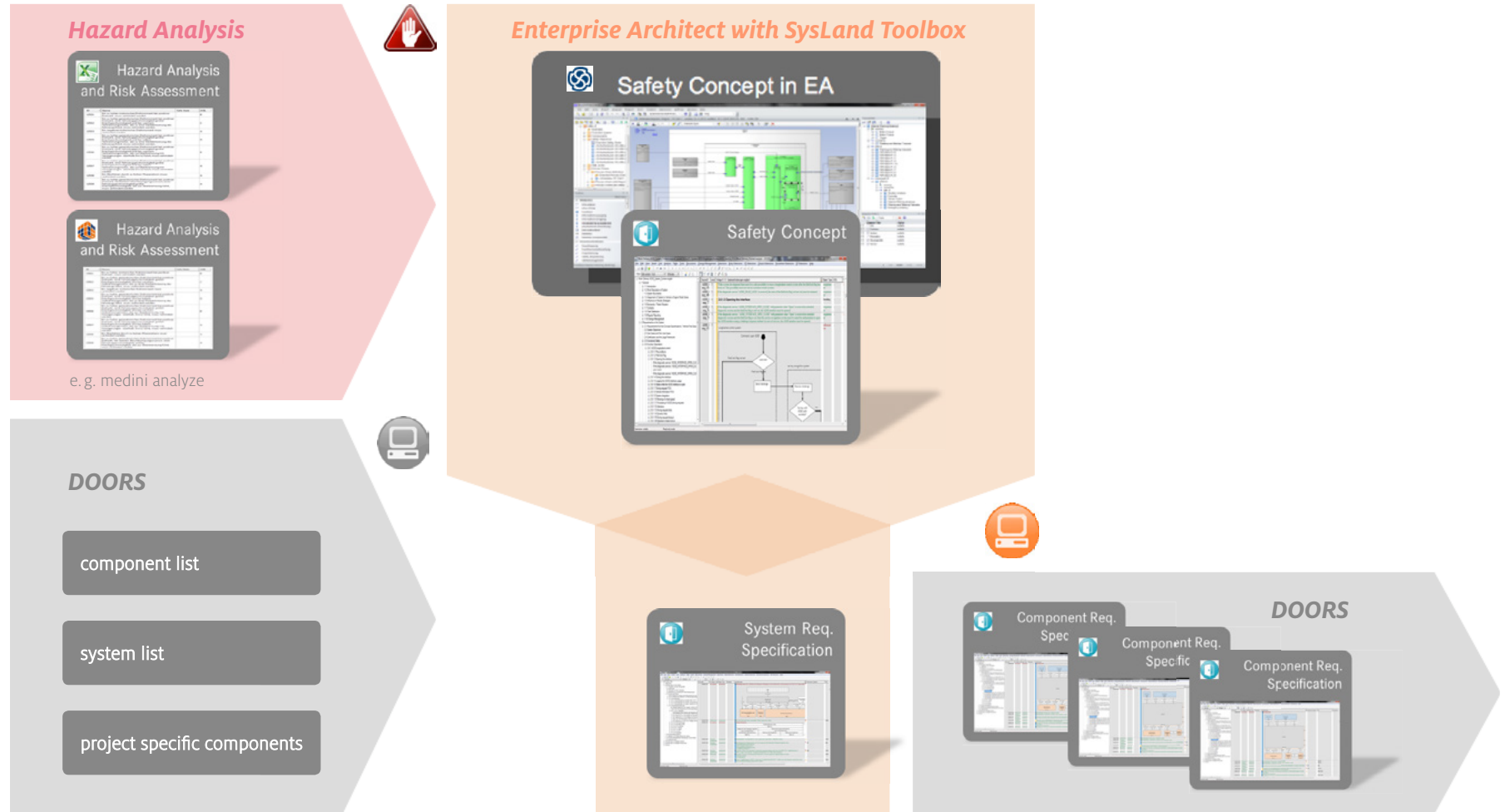
Import/Export

- Excel
- DOORS

Voluminous help documents



Toolbox in context of functional safety



General features 1 | 4

Search and Replace

- General
- Rename Element

Multiple Edit

- Stereotype
- ASIL (TaggedValue)

Create Package from Template

Unlock SubTree

Speed Test

Search and Replace (Prepared)

Search String: search and replace

Replace String:

Element Type	Element Name	Element Parent	Message
Package	Search and Replace	Package: Toolbox	
Requirement	Search and Replace	Package: Search and Replace	
Diagram	Search and Replace	Package: Search and Replace	

Search and Replace (Finished)

Search String: search and replace

Replace String: New Name

Element Type	Element Name	Element Parent	Message
Package	New Name	Package: Toolbox	RENAMED
Requirement	New Name	Package: Search and Replace	RENAMED
Diagram	New Name	Package: Search and Replace	RENAMED

Deployment Diagram: '00_0000'

Properties: Node Settings

- Name: Stereotyped
- Scope: Public
- Type: Node
- Stereotype: stereotyped
- Alias:
- Complexity: Easy
- Version: 1.0
- Phase: 1.0
- Language: Java
- Filename:
- Project:
- Advanced:

Deployment Diagram: '00_0000'

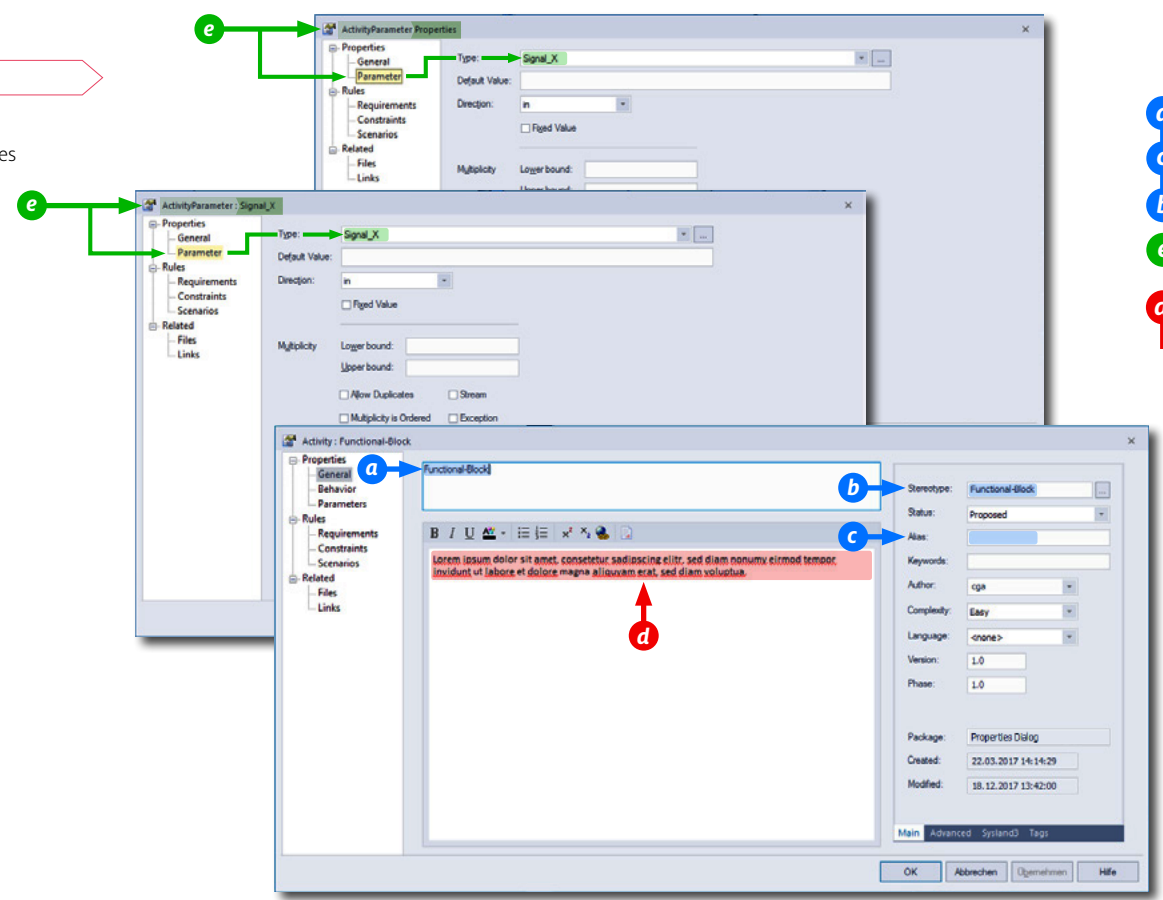
Properties: Node Settings

- Name: Stereotyped
- Scope: Public
- Type: Node
- Stereotype: Series vehicle ECU
- Alias:
- Complexity: Easy
- Version: 1.0
- Phase: 1.0
- Language: Java
- Filename:
- Project:
- Advanced:

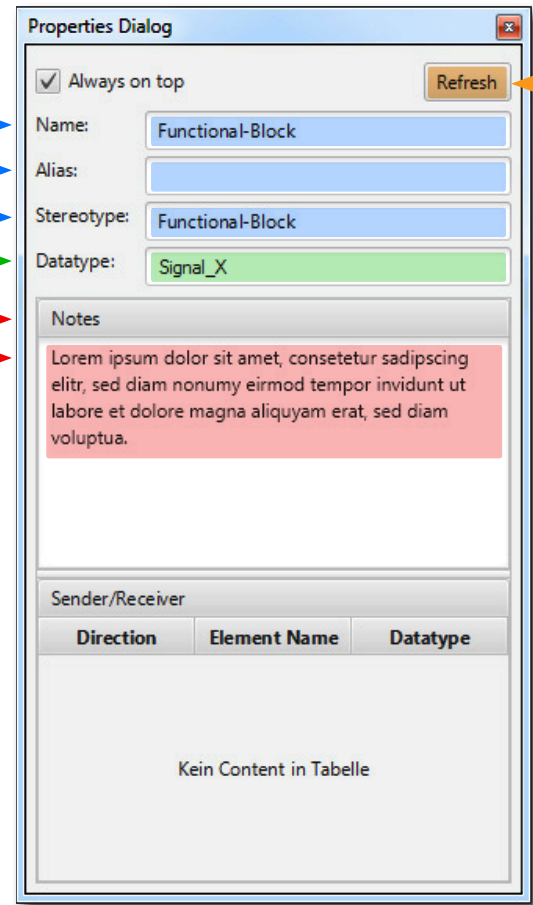
General features 2 | 4

Properties Dialog

- Information about selected Element
- Auto-Update when EA selection changes



- a
- c
- b
- e
- d



Auto-Update

Sender/Receiver		
Direction	Element Name	Datatype
Kein Content in Tabelle		

General features 3 | 4

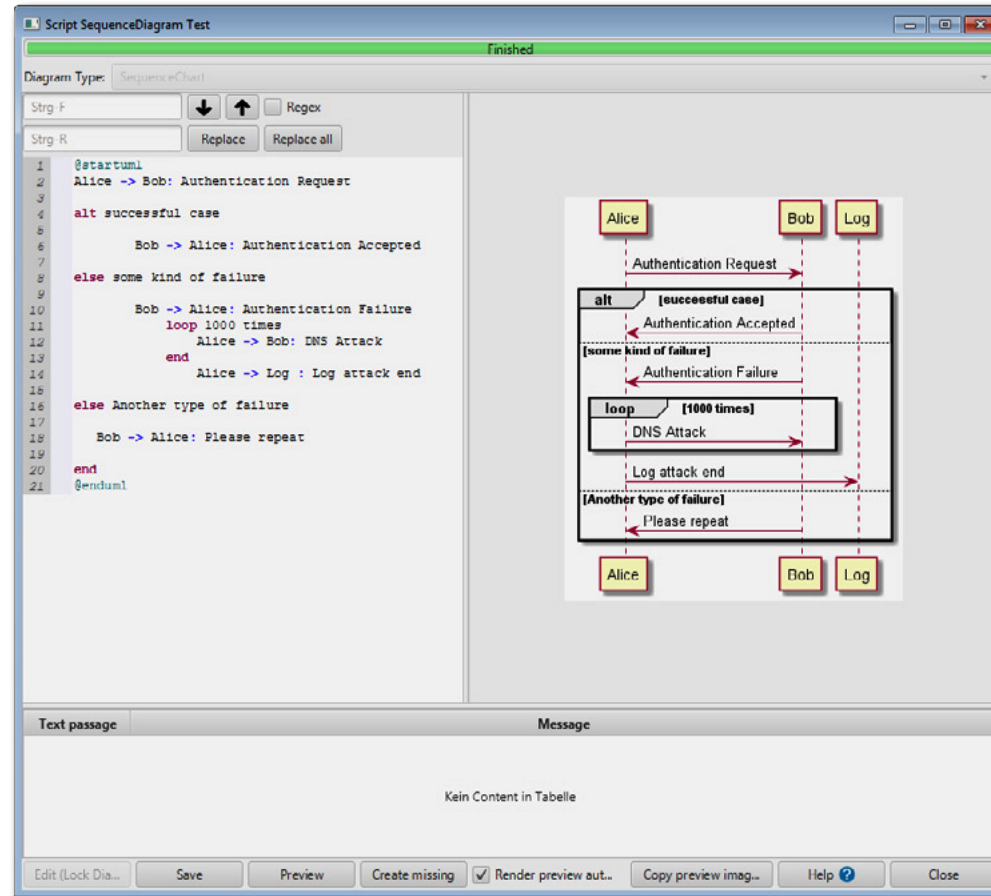
Meta Model Check

The screenshot shows a software development environment with a UML diagram and a Package Check Tool window. The diagram displays various UML elements like Requirements, Safety Goal, and UML-Compositions. The Package Check Tool window shows a table of errors, with a 'message column' highlighted by an arrow.

Source	Source Parent	Error	Target	Target Parent
Signal_Z2	Function-2	Element has Unsupported Object Type 'Note'		
Signal_Y2	Function-4	ActionPin direction does not fit stereotype		
Signal_XY	Function-4	Element has Unsupported Object Type 'Note'		
Signal_XY	Functional Block	Parameter has classifier that is neither a Signal nor a Class nor an Interface		
Signal_Z	Function-2	Parameter has classifier that is neither a Signal nor a Class nor an Interface		
Signal_Z	Functional-Block	Parameter has classifier that is neither a Signal nor a Class nor an Interface		
		no preload for Connector Type 'Aggregation'		
		Skipped Connector [ObjectFlow]: source incorrect		
		Skipped Connector [ObjectFlow]: target incorrect		
		Skipped Connector [ObjectFlow]: target incorrect		
		Skipped Connector [ObjectFlow]: source incorrect		

General features 4 | 4

PlantUML integration



Activity Diagram 1 | 2

Create Actions and Activities

- Create Action » CallBehaviorAction incl. Activity
- Create Grouping Activity » Replace Group of Actions by CallBehaviorAction
- Create Activity from Action
- Create Activities from Operations

Activity Parameters

- Add incoming/outgoing
- Set Direction
- Create outer Parameters
- Fix Pins

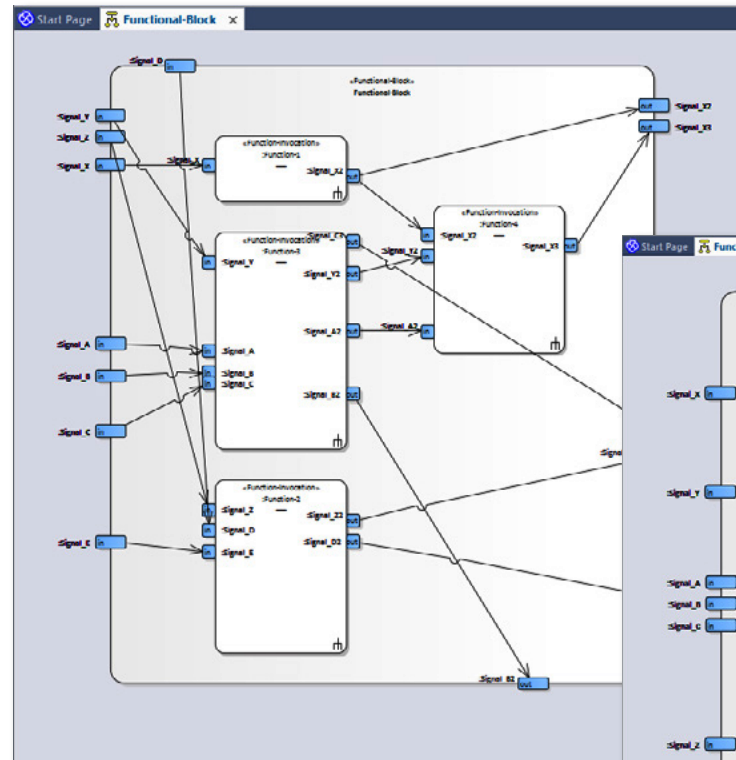
Layout

- ActivityParameters
- ActionPins

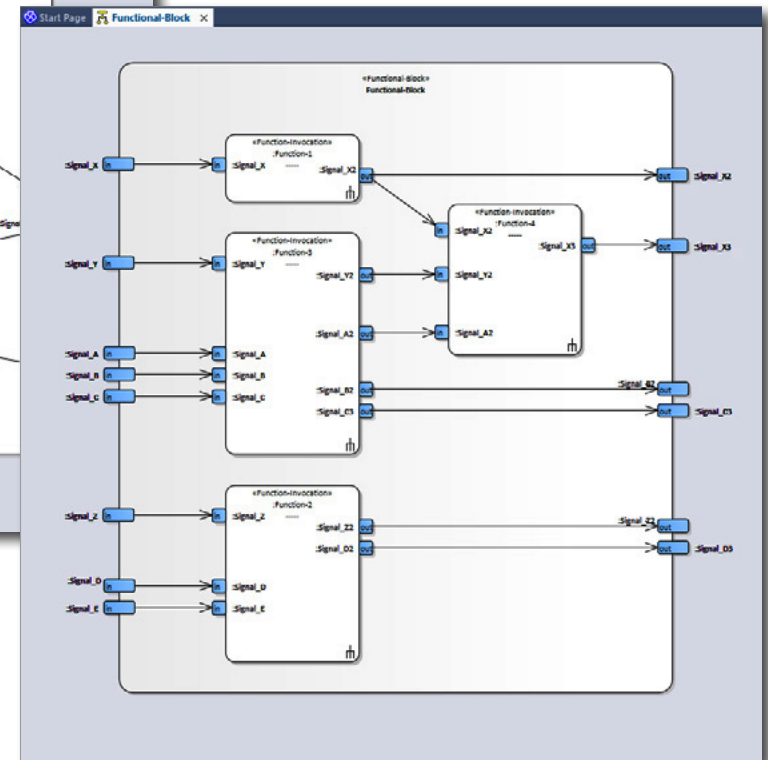
Create Connectors

- Connect matching Pins of Actions
- Connect Parameters and matching ActionPins

before using the **Layout** functions



after using the **Layout** functions



Activity Diagram 2 | 2

Diagram Checks

- Check if types of connected ActionPins matches

EA Bug workarounds

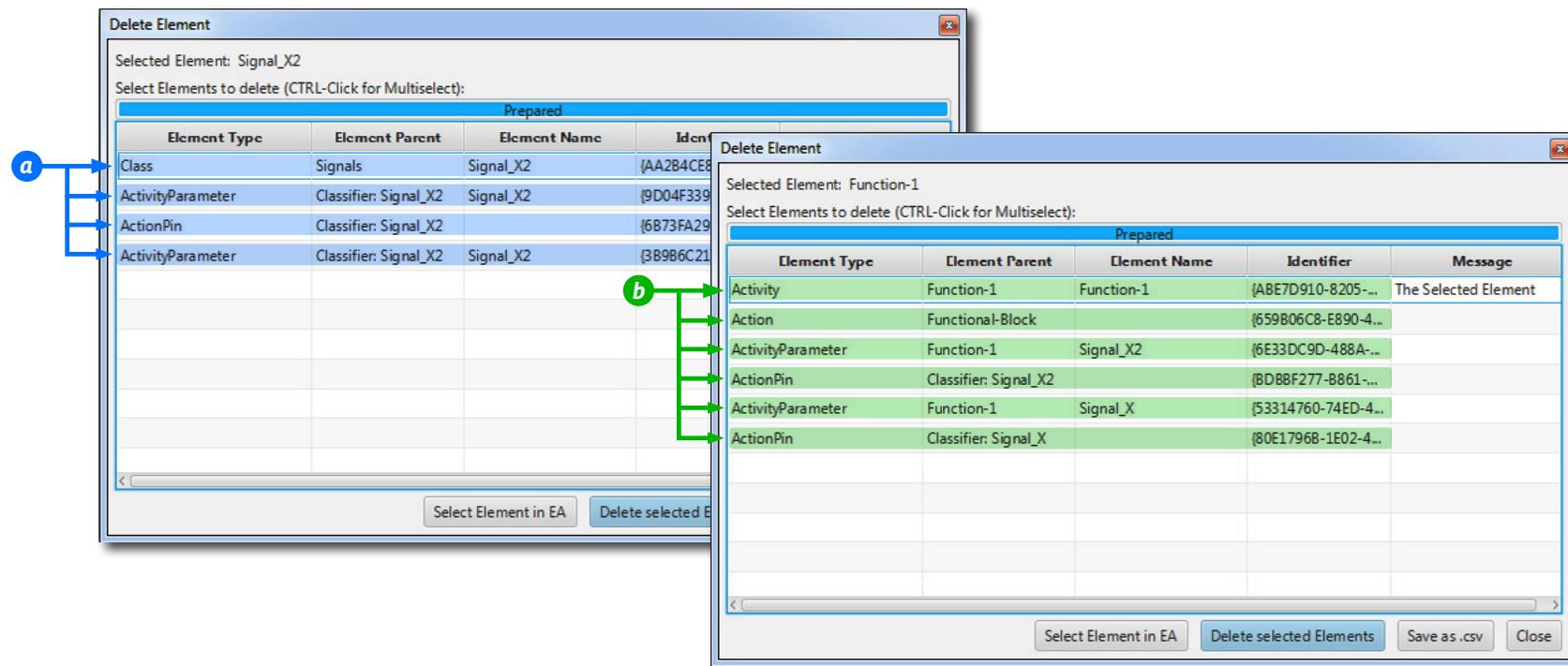
- Fix Parameters

Parameters

- Update ActivityParameters
- Add incoming/outgoing Parameter

Delete Element incl. dependent Elements

- Action, Activity, ActionPin, ActivityParameter, Signal



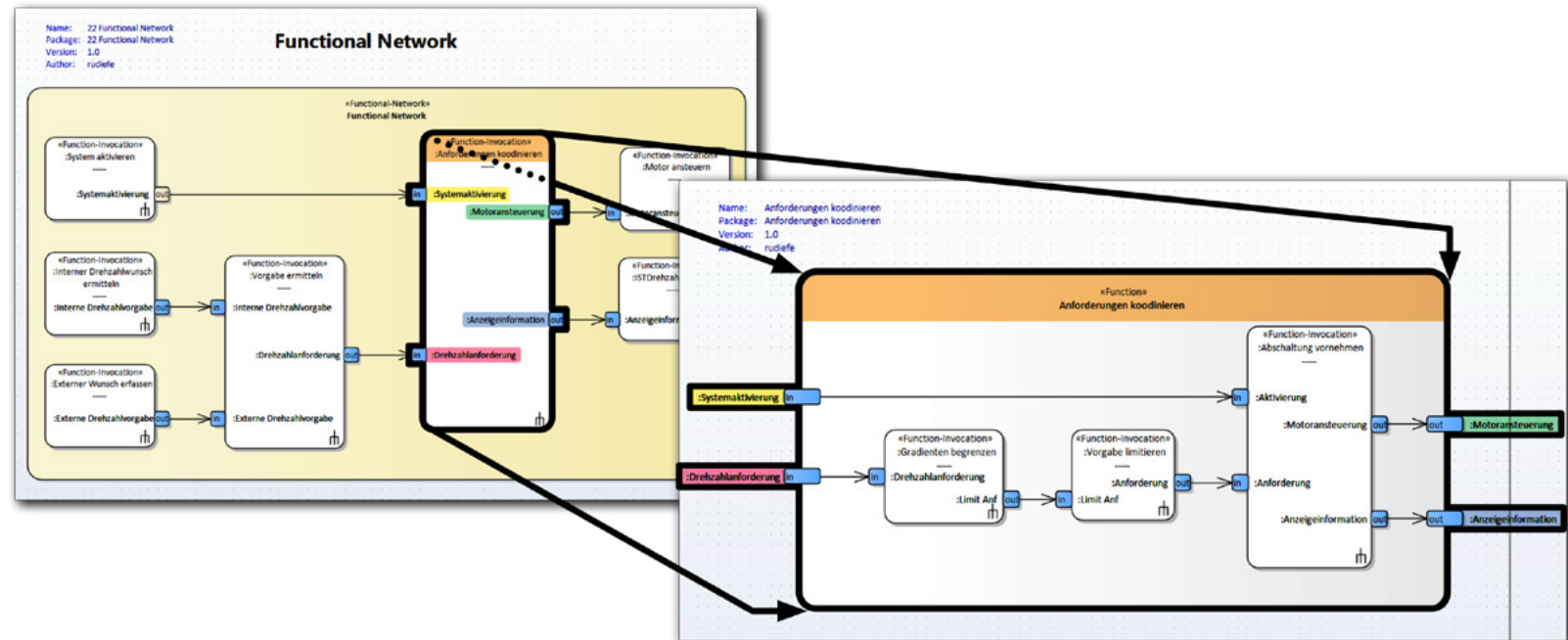
Functional-Network 1 | 4

Graphical development of functional safety

- More overview in EA compared to DOORS
- DOORS-Links can be created in EA
- Creation of functional network:
 - Function
 - Allocation on components
 - Signal flow
 - Grouping functions, e.g. for each control unit

Extra view for each safety goal

- Hide not relevant functions
- Feature for transferring changes on master network to clones
- Write safety requirements and assign them to functions
- Write acceptance criterias
- Write verifications criterias

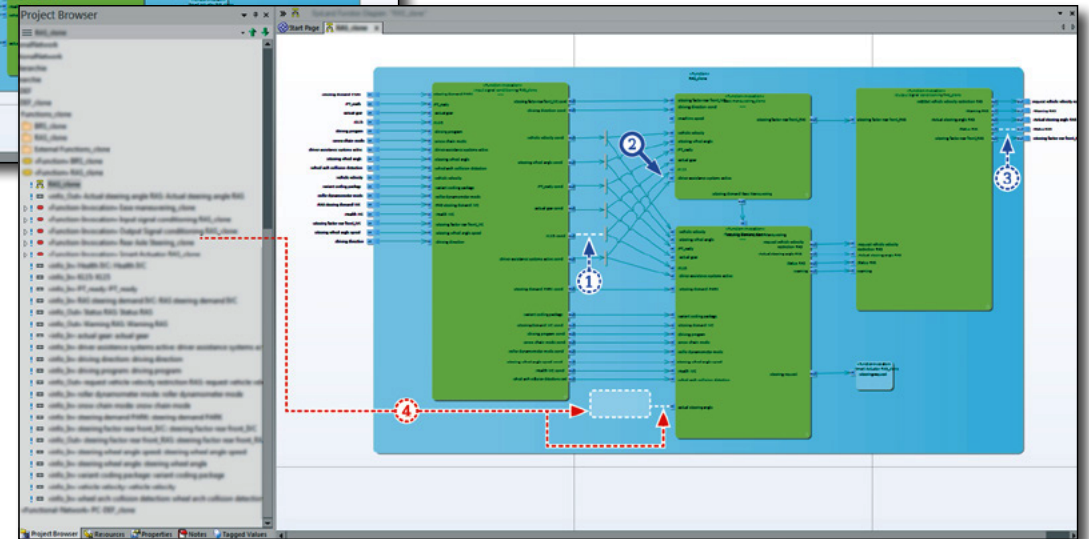
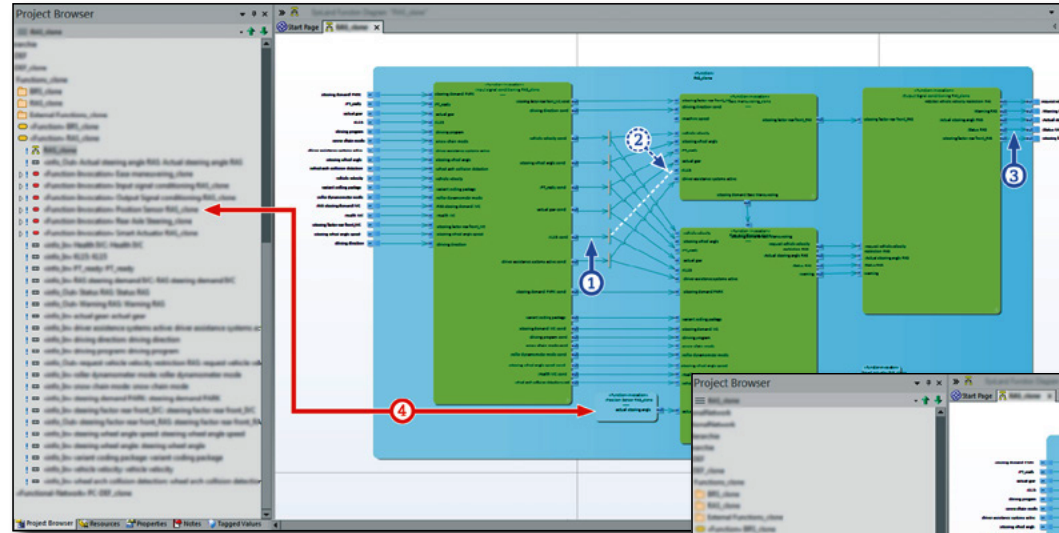


Functional-Network 2 | 4

Create/Update Functional-Network

- Clone from Master

- Update Clone from Master



Functional-Network 3 | 4

Model Checks

- 1 Function → 1 Component
- 1 Component ← x Requirements
- 1 Safety-Goal ← x Acceptance-Criterias
- x Safety-Requirements → 1 Safety-Goal
- x Verification-Criterias → 1 Safety-Requirement
- 1 Safety-Requirement ← x Verification-Criterias
- 1 Safety-Requirement → x Actions/Activities
- Safety-Goal → ASIL
- Safety-Goal → Valid ASIL
- Safety-Requirement → ASIL
- Safety-Requirement → Valid ASIL
- Safety-Requirement's ASIL = Safety-Goal's ASIL
- Activity's ASIL = Safety-Requirement's ASIL
- Signal → ActivityParameter
- ActivityParameter → Signal

various Model Checks

Select checks to run:			Finished					
Category	Available Checks	Status	Check	Source	Source Parent	Error	Target	Target Parent
Activity	Each Function has exactly one Comp...	Failed	Function (1 -> 1) Com...	Activity4	Activity has a higher or...	has no Component ass...		
Requirements	Each Component has Safety-Require...	Failed	Function (1 -> 1) Com...	Activity6	Activity has a higher or...	has no Component ass...		
Requirements	Each Safety Goal has an Acceptance ...	Failed	Function (1 -> 1) Com...	Activity2	Activity has a higher or...	has no Component ass...		
Requirements	Each Safety Requirement is assigned...	Failed	Function (1 -> 1) Com...	CloneFunction1	Function has exactly ou...	has no Component ass...		
Requirements	Each Verification Criteria is assigned ...	Failed	Function (1 -> 1) Com...	Activity1	Safety Requirement is ...	has no Component ass...		
Requirements	Each Safety Requirement has a Verifi...	Failed	Function (1 -> 1) Com...	Activity5	Activity has a higher or...	has no Component ass...		
Requirements	Each Safety Requirement is assigned...	Failed	Function (1 -> 1) Com...	Function-1	Function-1	has no Component ass...		
Requirements	Each Safety Requirement is assigned...	Failed	Function (1 -> 1) Com...	Activity1	Function has exactly o...	has no Component ass...		
Requirements	Each Safety Requirement is assigned...	Failed	Function (1 -> 1) Com...	MasterFunction1	Function has exactly o...	has no Component ass...		
ASIL	Each Safety Goal has an ASIL assigned	Failed	Function (1 -> 1) Com...	Activity8	Activity has a higher or...	has no Component ass...		
ASIL	Each Safety Goal has a valid ASIL assi...	Failed	Function (1 -> 1) Com...	Activity3	Activity has a higher or...	has no Component ass...		
ASIL	Each Safety Requirement has an ASIL...	Failed	Function (1 -> 1) Com...	Function-2	Function-2	has no Component ass...		
ASIL	Each Safety Requirement has a valid ...	Failed	Function (1 -> 1) Com...	Activity1	Activity has a higher or...	has no Component ass...		
ASIL	Each Safety Requirement has the sa...	Failed	Function (1 -> 1) Com...	Activity7	Activity has a higher or...	has no Component ass...		
ASIL	Each Activity and Action has a highe...	Failed	Function (1 -> 1) Com...	Activity4	Safety Requirement is ...	has no Component ass...		
ASIL	Each Activity and Action has highest ...	Failed	Function (1 -> 1) Com...	Function-3	Function-3	has no Component ass...		
Signals	Each Signal is used as Classifier of a...	Failed	Function (1 -> 1) Com...	Activity2	Safety Requirement is ...	has no Component ass...		
Signals	Each ActivityParameter references a...	Failed	Function (1 -> 1) Com...	Activity3	Safety Requirement is ...	has no Component ass...		
			Function (1 -> 1) Com...	Function-4	Function-4	has no Component ass...		
			Function (1 -> 1) Com...	Activity2	Activity has highest AS...	has no Component ass...		
			Function (1 -> 1) Com...	Activity1	Safety Requirement is ...	has no Component ass...		

message column

Functional-Network 4 | 4

Check ASIL Level

- Check invalid ASIL
- Check unplausible ASIL

Check invalid ASIL

ASIL Check Tool

Select Check: **Check invalid ASIL** Run Check

Source	Source Parent	Error	Target	Target Parent
Deactivation of the vehicle	Ease maneuvering	no defined ASIL (ASIL X)		
Third characteristic (Dritte KL...	driving program	no ASIL assigned		
Aggregate Steering Request	Ease maneuvering	no defined ASIL (undefined)		

Check unplausible ASIL

ASIL Check Tool

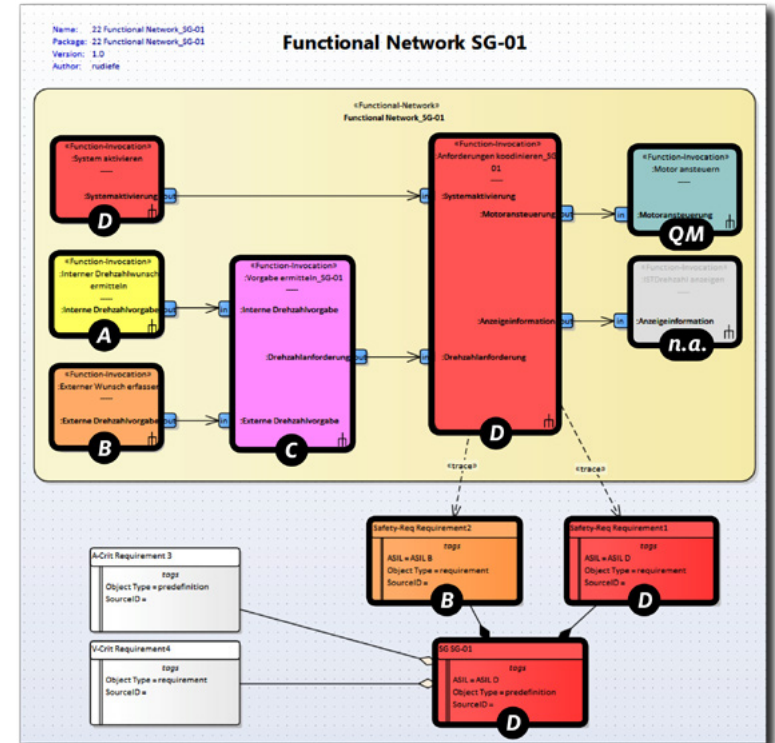
Select Check: **Check unplausible ASIL** Run Check

Source	Source Parent	Error	Target	Target Parent
tail swivel out	Ease maneuvering	ASIL (ASIL D[D]) higher than A...		
Third characteristic (Dritte KL...	driving program	no ASIL assigned		

ASIL colouring per safety goal

- ASIL A >> yellow (see **A**)
- ASIL B >> orange (see **B**)
- ASIL C >> purple (see **C**)

- ASIL D >> red (see **D**)
- ASIL QM >> mint (see **QM**)
- ASIL n.a. >> not applicable/faded (see **n.a.**)

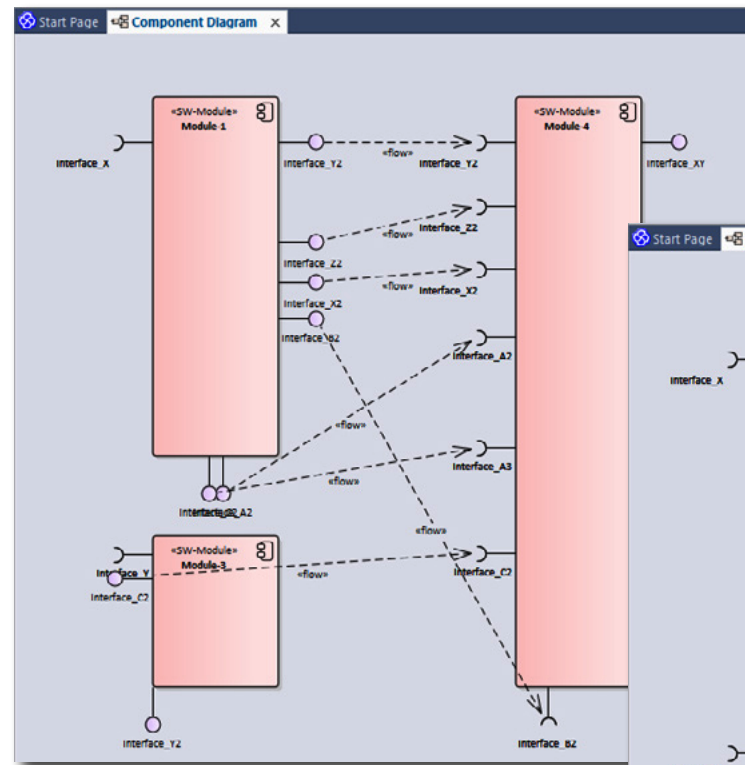


Other Diagrams 1 | 4

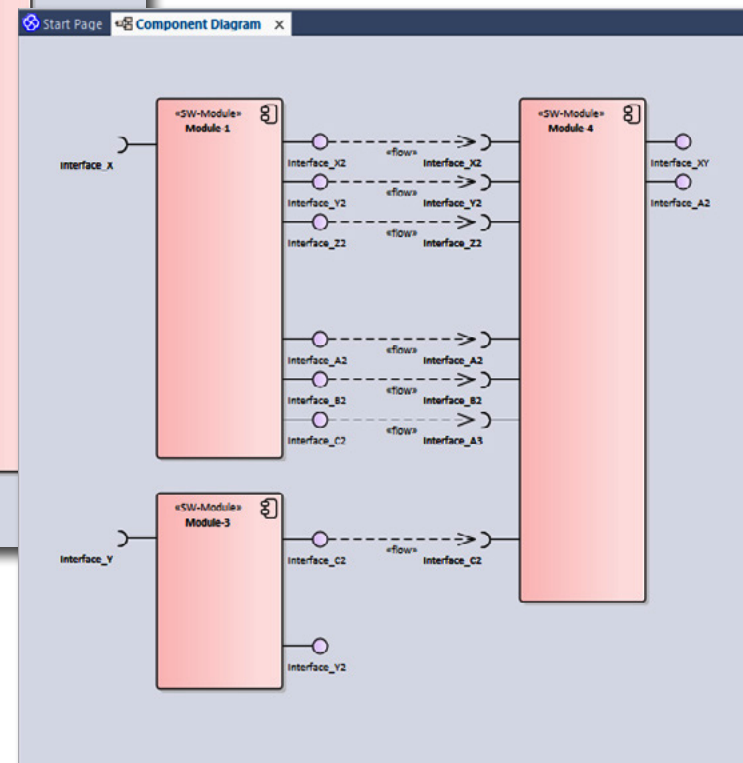
Component Diagram

- Layout » Component Interfaces

before using the **Layout** functions



after using the **Layout** functions

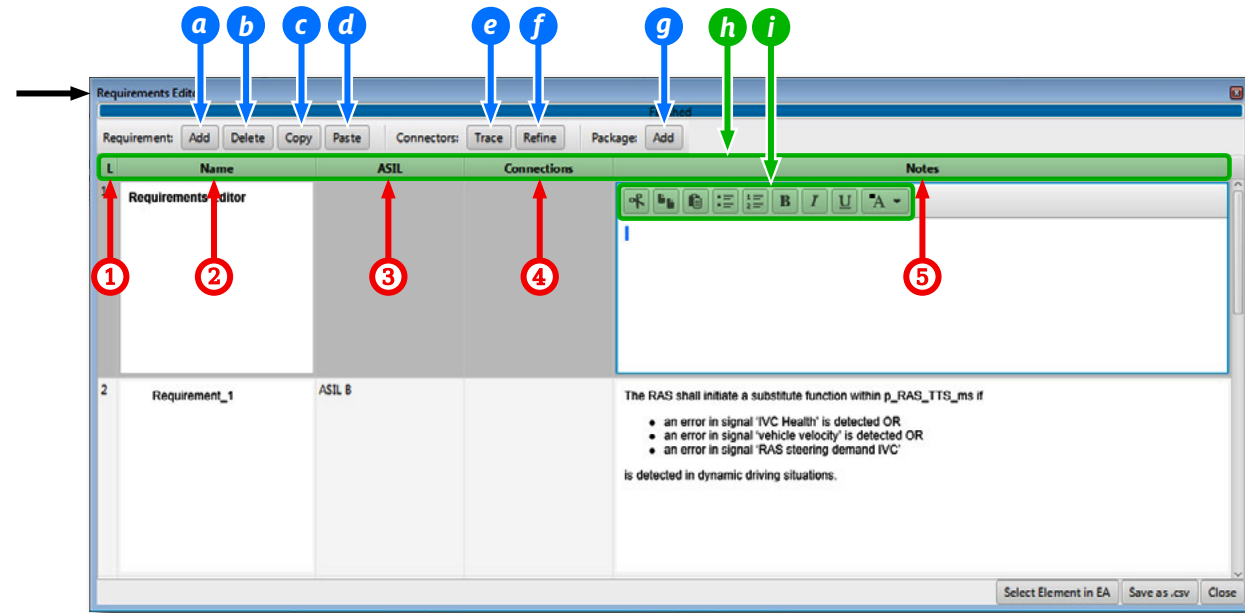


Other Diagrams 2 | 4

Requirements

- Requirements Editor

- Show related Requirements



Other Diagrams 3 | 4

Requirements

- Requirements Editor

- Show related Requirements

The screenshot illustrates the process of generating a requirements list from a function diagram. The main window shows an activity diagram for 'Function-1' with three traceability links labeled 'a', 'b', and 'c'. Link 'a' connects to 'Safety-Info DDC_FuSi-13489', link 'b' to 'Heading DDC_COMMON_DESTAB_DYNAMIC', and link 'c' to 'Safety-Info F-DDC_FuSi-5516'. The Project Browser on the left shows the hierarchy of these elements. The Traceability window on the right displays the 'depends on' relationships. The 'Requirements for Function-1' table at the bottom summarizes the results.

Finished				
Element Type	Element Parent	Element Name	Identifier	Message
Requirement	Show Related Requirements	DDC_COMMON_DESTAB...	{A5FC9CEA-B3C9-4007-A...	
Requirement	Show Related Requirements	F DDC_FuSi: 5516	{19D949DE E445 4acf B1...	F013 ESP off
Requirement	Show Related Requirements	DDC_FuSi-13489	{DB7599E9-CAB8-4195-A...	Depending on the cooperation model with the contractor, ...

ResultList

Other Diagrams 4 | 4

Signals - Create Signals from Attributes

before **Signal** generation

Attributes Dialog

Name	Type	Scope	Stereotype	Alias	Initial Value
Stuff	mbc_Staff_t	Public			

Attribute (Stuff)

Containment	Not Specif.
Static	False
Property	
Const	False
is Literal	False
Transient	False
Derived	False
Derived Union	False
is ID	False
Multiplicity	[1]
is Collection	False
Container Type	

after **Signal** generation

Attributes Dialog

Name	Type	Scope	Stereotype	Alias	Initial Value
Stuff	Stuff	Public			

Attribute (Stuff)

Containment	Not Specif.
Static	False
Property	
Const	False
is Literal	False
Transient	False
Derived	False
Derived Union	False
is ID	False
Multiplicity	[1]
is Collection	False
Container Type	

Attributes Dialog

Name	Type	Scope	Stereotype	Alias	Initial Value
value	mbc_Staff_t	Public			

Attribute (value)

Containment	Not Specif.
Static	False
Property	
Const	False
is Literal	False
Transient	False
Derived	False
Derived Union	False
is ID	False
Multiplicity	[1]
is Collection	False
Container Type	

Import/Export 1 | 1

Export

- Insert/Update single Diagram in DOORS
- FuSi Requirements to Excel
- FuSi Requirements to DOORS
- Nodes to Excel
- State Machine to DOORS
- SW-Modules/SW-Blocks to DOORS

Import

- Signals from Excel (k-Matrix)
- Components from DOORS
- Requirements from DOORS

Navigation

- Find Diagram/Element in DOORS
- Find DOORS Object in EA

Create FuSi SourceID

EA view

DOORS view

Export Results

Element Type	Element Parent	Element Name	Identifier	Message
Activity				Inserted activities notes below current DOORS obje
Activity				Inserted diagram.
Package				Inserted as object heading after current DOORS obje
Package				Inserted as object heading after current DOORS obje
Activity				Inserted activities notes below current DOORS obje
Package				Inserted as object heading after current DOORS obje
Activity				Inserted activities notes below current DOORS obje
Package				Inserted as object heading after current DOORS obje
Activity				Inserted activities notes below current DOORS obje
Package				Inserted as object heading after current DOORS obje
Activity				Inserted activities notes below current DOORS obje
Package				Inserted as object heading after current DOORS obje
Activity				Inserted activities notes below current DOORS obje
Package				Inserted as object heading after current DOORS obje
Activity				Inserted activities notes below current DOORS obje
Package				Inserted as object heading after current DOORS obje
Activity				Inserted activities notes below current DOORS obje
Package				Inserted as object heading after current DOORS obje
Activity				Inserted activities notes below current DOORS obje
Package				Inserted as object heading after current DOORS obje
Activity				Inserted activities notes below current DOORS obje
Package				Inserted as object heading after current DOORS obje
Activity				Inserted activities notes below current DOORS obje

DOORS-Export ResultList

Select element in EA

Thank you for your attention.

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