



The logo for Safe4RAIL, featuring the text "Safe4RAIL" in a green and blue font, with a blue and white checkered pattern below it, all set against a background of a blue and white perspective view of a train track.

Application Profiles

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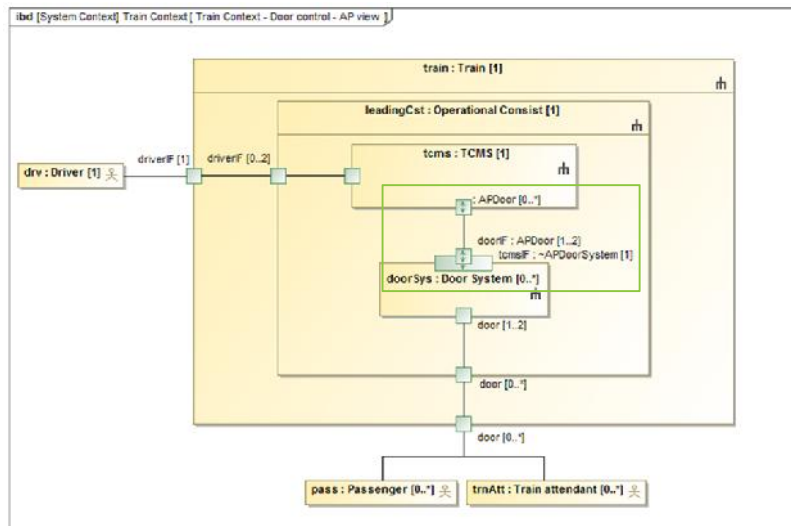


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Safe4RAIL – SAFE architecture for Robust distributed Application Integration in roLling stock (730830)

CONNECTA – CONtributing to Shift2Rail's NExt generation of high Capable and safe TCMS and brAkes (730539)

What is an Application Profile?



Train Context - Door control - AP view

- According to our project goal an Application Profile describes a **functional interface** between the Train Control and Monitoring System (TCMS) and a subsystem
- The interface definition is based on an analysis of which use cases have to be supported and defines the information (flow properties) that can be exchanged between the communication partners

Why did we define the Application Profiles?

Reduce

- Engineering costs due to standardization of
 - Requirements for the subsystem (e. g. Use cases)
 - Interface between TCMS and the subsystem
 - Documentation
 - Tests
- Project duration due to less negotiations between subsystem supplier and integrator
- Problems during system introduction phase, due to less changed software and hardware components



Criteria for the Subsystem Selection for the Definition of the Application Profiles

1. Critical number of suppliers for the subsystem exists
2. Low differentiation potential due to the subsystem
 1. Prerequisite for the disclosure of internal information that is necessary to standardize the interface
 2. Expectation that the existing interfaces are not too unique and that only affordable resources are required to support the new defined standard
3. Ongoing standardization activities



Selected Application profiles

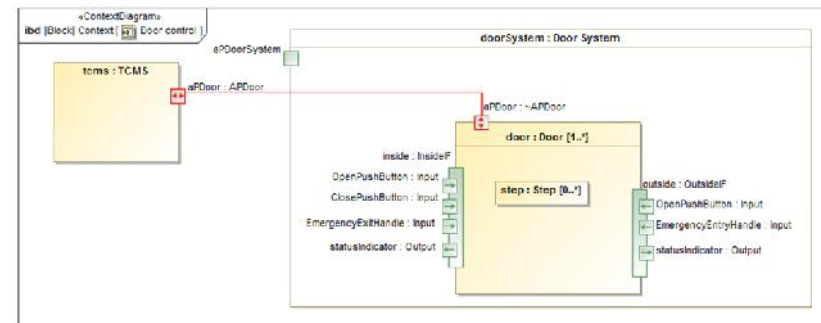
1. Application Profiles according the modeling guide line
 1. HVAC
 2. Doors
 3. BMS
2. Ongoing standardization activities inside X2Rail for ATO subset 139

Results from the State of the Art Analysis about application profile guidelines

- Several are existent in application domain
- None fulfilled the requirements
- Decision analysis “Which of the existing solutions should be used in WP4” brought heterogeneous results
- Decision to define a new guideline

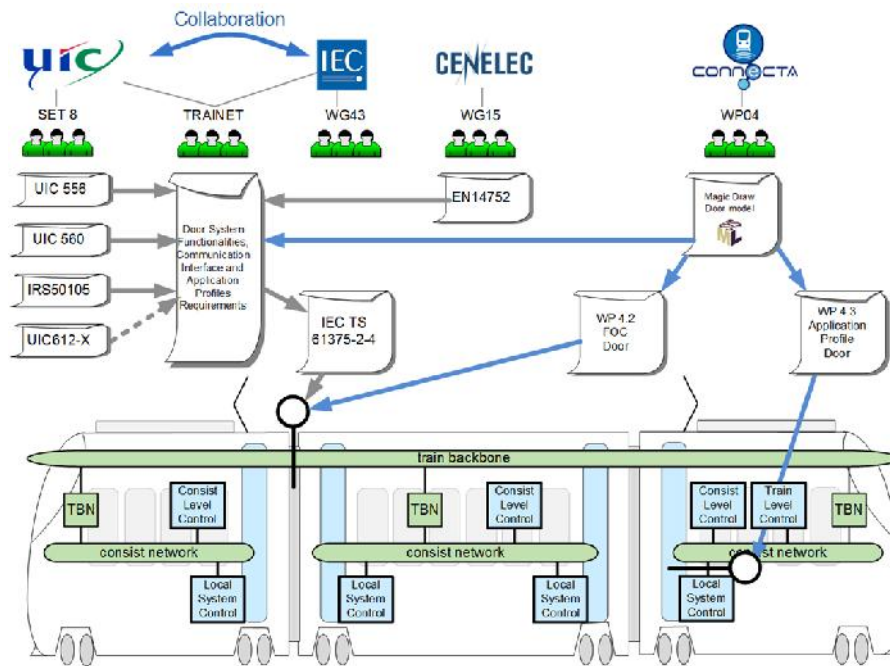
Application profiles in Detail: Basic Concept

- Use established SysML to define
 - static and dynamic architecture of TCMS and subsystem
 - use cases that have to be supported
 - interfaces between components
- Build integrated model for FOC and Application profiles
- Generate consistent reports from this model for different purposes (FOC, Application profiles, ..)



Context of the Application Profile “Door”

Cooperation between Connecta WP4 and TRAINET-Group



Assured consistency between

- Application Profiles
- FOC and
- TRAINET

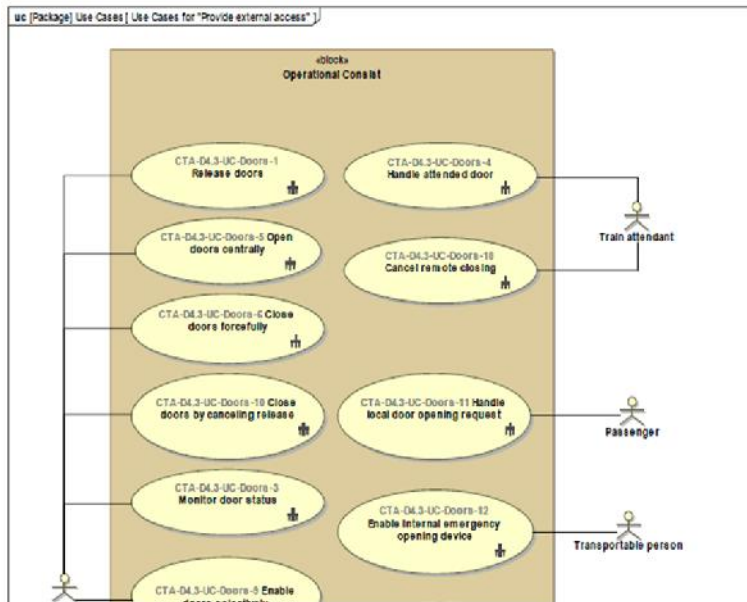
due to export of the documents from the same SysML Model

Safe4RAIL – SAFE architecture for Robust distributed Application Integration in rolling stock (730830)

CONNECTA – CONTRIBUTING to Shift2Rail's NEXT generation of high Capable and safe TCMS and brAkes (730539)

Application Profile – Example

Doors



	Flow property Name : Type [Multiplicity]	Attributes Name : Type [Multiplicity]
out	doorReleaseState : DoorReleaseCmd [1]	<ul style="list-style-type: none"> ● release : DoorReleaseCmdKind [1] Command to set the release state. ● none - The door should not be released. ● releaseInside - The door should be released from the inside (the outside should not be released). ● releaseOutside - The door should be released from the outside (the inside should not be released). ● release - The door should be released from the inside and outside.

Example of flow properties

Use cases for Application Profile Doors



Next station is

- Finalize the review of the ATO subset 139 together with X2Rail
- Implement together with the complementary action an example of the BMS, Doors, and HVAC applications on the urban and the regional demonstrator using the FDF
- Update of the existing Application Profiles and definition of new ones for TCMS functions using the methodology defined in Connecta-1



Conclusions

- ✓ Adequate guideline for the definition of application profiles has been defined
- ✓ Agreement on the application profile for BMS, HVAC and Doors reached
- ✓ Ongoing review for the ATO subset 139