COVER DOCUMENT

System Pillar / EULYNX Baseline Set 4 Release 2

Version: 3
Date: 29-07-2024

Introduction

Europe's Rail Joint Undertaking (EU-Rail) is established by Council Regulation (EU) 2021/2085 of 19 November 2021. It is the new European partnership on rail research and innovation established under the Horizon Europe programme (2020-2027) and the universal successor of the Shift2Rail Joint Undertaking. The vision of EU-Rail is to deliver, via an integrated system approach, a high capacity, flexible, multi-modal and reliable integrated European railway network by eliminating barriers to interoperability and providing solutions for full integration, for European citizens and cargo.

The EULYNX Consortium (EULYNX) is an initiative of 15 European infrastructure managers, started in 2014 with a common goal for standardisation of signalling systems. Aiming for defining and standardising CCS interfaces, the goal is a significant reduction of the lifecycle cost for signalling systems. EULYNX regularly publishes specification documents as Baseline Sets.

EU-Rail and EULYNX have published a common documentation release EULYNX Baseline Set 4 Release 2. This release has been prepared in close collaboration with the European rail control-command and signalling (CCS) sector under the organisation of EU-Rail System Pillar, bringing a part of the EULYNX development under technical authority of the EU-Rail System Pillar.

The EULYNX Baseline Set 4 Release 2 is a documentation update release within the EULYNX Baseline Set 4, continuing the development based on previous releases. The primary focus of this release is to address the feedback from the industry and integration into the EU-Rail System Pillar. All specifications related to trackside assets and transversal functions are applicable for both the current EULYNX architecture and the future rail target architecture, agreed in the framework of the EU-Rail System Pillar, therefore published as a single set of specifications under a common publication by EULYNX and EU-Rail, delivering in total 24 specification documents. The EU-Rail System Pillar takes the role of the technical authority for the documents of the common publication and will ensure their maintenance.

In addition to the common documentation release, EULYNX published also additional specifications and supporting documents for the current EULYNX architecture, which are integrated in the EULYNX part of Baseline Set 4 Release 2, delivering additional 30 documents.

All deliverables are available in PDF format. In addition to the PDF documents, the following supporting artefacts are delivered:

- For all deliverables originating from DOORS, the requirements interchange format ReqIF is available.
- For all model-based deliverables, the underlying models are available as an export from the EULYNX model.

- For all EULYNX field element subsystem specifications, the simulators developed by EULYNX for verification and validation of requirements are available.

Known limitations

A few of the specification documents of Baseline Set 4 Release 2 contain limitations of the specifications that could not be resolved before the publication of the release. Known limitations are present in the following documents:

- Requirements specification for subsystem Point [Eu.Doc.36]
    - The interpretation of the 4-wire patterns as defined in the tables in section 3.4.7.1 (Eu.P.6797) reflects the current state of discussion and may be further developed for a future release.
- Interface definition and specification SMI [Eu.Doc.76]
    - The specification of the service function Loading Procedure will be reviewed in respect to robustness, error handling, security, scalability and version management.
- Interface specifications SDI
    - The specification of the generic and specific diagnostic data points will be further refined in a future release.
- Interface specification SDI-TDS [Eu.Doc.81]
    - The specification of the diagnostic data points for the Subsystem TDS working with track circuits and train detection points needs to be extended.
- Interface specification SDI-LC [Eu.Doc.110]
    - The specification of the diagnostic data points for the Subsystem Level Crossing needs to be extended.
- Security specifications will serve as relevant input to the future revision of the TSI. For tender activities running until the TSI revision is complete, the EULYNX BL4R2 security specifications may be used. Applying the EULYNX security specifications requires an Infrastructure Manager to establish specific requirements, as indicated by column "valid for IM" in the respective security documents.

Next release

The next update of Baseline Set 4 in form of Release 3 is planned for publication in June 2024. The release will address known limitations and pending change requests.

Documents

The System Pillar / EULYNX Baseline Set 4 Release 2 includes the following documents:

Document ID	Document Name	Document Version	CENELEC Phase	Release
Eu.Doc.18	Maintenance and data management specification	4.0 (2.A)	4	06/2023
Eu.Doc.20	Generic interface and subsystem requirements	4.0 (3.A)	4	06/2023
Eu.Doc.119	Generic interface and subsystem requirements for SCI	1.0 (3.A)	4	06/2023
Eu.Doc.120	Generic interface and subsystem requirements for SMI	1.0 (3.A)	4	06/2023
Eu.Doc.92	Interface definition SCI	4.2 (0.A)	5	06/2023
Eu.Doc.93	Interface specification SCI Generic	3.2 (0.A)	5	06/2023
Eu.Doc.77	Interface definition SDI	3.0 (1.A)	5	06/2023
Eu.Doc.94	Interface specification SDI Generic	4.0 (0.A)	5	06/2023
Eu.Doc.76	Interface definition and specification SMI	2.0 (1.A)	5	06/2023
Eu.Doc.32	Requirements specification for subsystem Light Signal	4.2 (0.A)	4	06/2023
Eu.Doc.33	Interface specification SCI-LS	4.2 (0.A)	5	06/2023
Eu.Doc.78	Interface specification SDI-LS	4.0 (0.A)	5	06/2023
Eu.Doc.36	Requirements specification for subsystem Point	4.3 (0.A)	4	06/2023
Eu.Doc.38	Interface specification SCI-P	4.2 (0.A)	5	06/2023
Eu.Doc.80	Interface specification SDI-P	4.0 (0.A)	5	06/2023
Eu.Doc.45	Requirements specification for subsystem Generic IO	4.2 (0.A)	4	06/2023
Eu.Doc.46	Interface specification SCI-IO	4.0 (2.A)	5	06/2023
Eu.Doc.82	Interface specification SDI-IO	4.0 (0.A)	5	06/2023
Eu.Doc.43	Requirements specification for subsystem TDS	4.1 (0.A)	4	06/2023
Eu.Doc.44	Interface specification SCI-TDS	4.0 (2.A)	5	06/2023
Eu.Doc.81	Interface specification SDI-TDS	4.0 (0.A)	5	06/2023
Eu.Doc.108	Requirements specification for subsystem Level Crossing	2.2 (0.A)	4	06/2023
Eu.Doc.109	Interface specification SCI-LC	2.1 (0.A)	5	06/2023
Eu.Doc.110	Interface specification SDI-LC	3.0 (0.A)	5	06/2023

Error corrections

The following Change Requests describe error corrections that shall be considered when applying the documents of Baseline Set 4 Release 2:

CR ID	*CR Description*	*IDs of impacted documents*	*CR date*
EULX-565	Req. Spec. LC Missing Types	Eu.Doc.108	07/2023
EUP-516	Req. Spec. P: Incorrect IO Flow on SD 2.1.2.4.9 (Eu.P.5804) and 2.1.2.4.10 (Eu.P.5374)	Eu.Doc.36	08/2023
EULS-427	Req spec; Correct Signal Aspect reporting after booted again	Eu.Doc.32	09/2023
EUAR-679	Status Report Completed Correction	Eu.Doc.93 Eu.Doc.119	01/2024
EUTDS-499	Correction and simplification of reporting POM and power failures	Eu.Doc.43	01/2024
EULS-475	Req spec LS: Correct multiplicity of the Indicator, Eurobalise and Legacy ATP	Eu.Doc.32	05/2024
EULX-634	Req spec LC: Follow up - Correct cardinality of LC5 in Logical Context	Eu.Doc.108	05/2024
EUAR-751	TCP parameters for SCI-XX	Eu.Doc.92	06/2024

The listed Change Requests can be found in Annex 1.

Functional packages

Documents related to the EULYNX field element subsystems (Light Signal, Generic IO, Point, TDS, Level Crossing) are divided into functional packages. These packages define coherent blocks of capabilities that can be implemented in a product. The packages can be used to delimit the required scope of the functionality of a product, either in the context of tenders for specific implementation projects or in the context of generic product testing and/or certification.

There are two types of packages related to the product capabilities:

- 'Basic packages': One or more packages, at least one of them must be implemented. It is optionally allowed to combine and implement more than one 'basic package' in a product.
- Optional package': One or more packages that can be optionally implemented in addition to (one of) the basic package(s).

Backwards compatibility

The specifications documents of Baseline Set 4 do not include automatic backwards compatibility. Products developed according to the EULYNX specifications of BL4 can't communicate with products developed according to earlier baselines of the EULYNX specifications. Products that must support communication with other products of both BL4 and the previous EULYNX baseline, e.g. because of migration scenarios, must be developed according to a superset of specification documents from different baselines.

The specification documents of Baseline Set 4 are structured in such a way that in a future release it is possible to release a new version of the specification documents related to SCI, SDI, SMI or SSI without the need to publish a new version of the specification document related to the other interfaces. In this way, compatibility of different versions of the four EULYNX interfaces can be managed independent from each other.

Even when the specifications for the interfaces SCI, SDI, SMI and SSI are managed independently in separate documents, there can be technical reasons that create interdependencies between them. This can e.g. be the introduction of a new functionality that requires an update on both SCI and SMI. The new functionality can only be used if a EULYNX product implements the newer version of both SCI and SMI.

To manage this, EULYNX will maintain a compatibility matrix for every subsystem/interface. Every time a new version is released of the defining specification document of one of the 4 interfaces, the compatibility matrix will list all defined versions of the other interfaces with which this new interface version can be combined. The compatibility matrices are listed in the document EULYNX BL4 R2 Compatibility matrices.

Copyright information

Further information

Further information is available from EU-Rail System Pillar unit or the EULYNX Consortium Office.

EU-Rail System Pillar can be contacted through https://rail-research.europa.eu/about-europes-rail/contact

EULYNX Consortium office can be contacted through eulynx.eu and consortium@eulynx.eu.

Annex 1: Error correction CRs

[EULX-565] Req. Spec. LC Missing Types Created: 10.07.2023 Updated: 10.08.2023	
Status:	In Development
Project:	EULYNX CP SCI-LX
Component/s:	None

Type:	Editorial	**Priority:**	None
Reporter:	Philipp Wolber	**Assignee:**	Unassigned
Resolution:	Unresolved		
Remaining Estimate:	Not Specified		
Time Spent:	Not Specified		
Original Estimate:	Not Specified		

Sprint:	SCI-LX BL4R2+ topics

Description

Problem
For some IDs on BL4R2 Req. Spec. SCI-LC the Type Column is empty.

Intended state
Add Type:

Eu.LC.3865 (Info)

Eu.LC.3833 (Req)

Eu.LC.3834 (Req)

Eu.LC.3831 (Info)

Eu.LC.3832 (Req)

Eu.LC.3836 (Req)

Eu.LC.3837 (Req)

Eu.LC.3835 (Info)

Eu.LC.3838 (Req)

Eu.LC.3839 (Info)

Eu.LC.3840 (Req)

Eu.LC.3830 (Info)

Eu.LC.3816 (Info)

Eu.LC.3817 (Info)

Eu.LC.3818 (Info)

Eu.LC.3819 (Info)

Impact

Req. Spec. LC

Comments

Comment by Philipp Wolber [24.07.2023]

ticket implemented in current version of Req. Spec. LC in Doors, no baseline yet

[EUP-516] Req. Spec. P: Incorrect IO Flow on SD 2.1.2.4.9 (Eu.P.5804) and 2.1.2.4.10 (Eu.P.5374) Created: 10.08.2023 Updated: 10.08.2023	
Status:	Einarbeitung qualitätsgesichert
Project:	EULYNX CP SCI-P
Component/s:	None

Type:	Editorial	**Priority:**	None
Reporter:	Philipp Wolber	**Assignee:**	Unassigned
Resolution:	Unresolved		
Remaining Estimate:	Not Specified		
Time Spent:	Not Specified		
Original Estimate:	Not Specified		

Attachments:	Eu.P.5374_Msg_Able_To_Move used.png Eu.P.5374_Msg_Point_Position.png Msg_Ability_To_Move_Point used (corrected).png Msg_point_position used.png
Sprint:	SCI-P BL4R2+ topics

Description

Problem
On SD 2.1.2.4.9 (Eu.P.5804) and 2.1.2.4.10 (Eu.P.5374) in on Step 2 a incorrect IO Flow is used (Msg_Point_Position).

Intended state
Msg_Ability_To_Move_Point should be used.

Impact

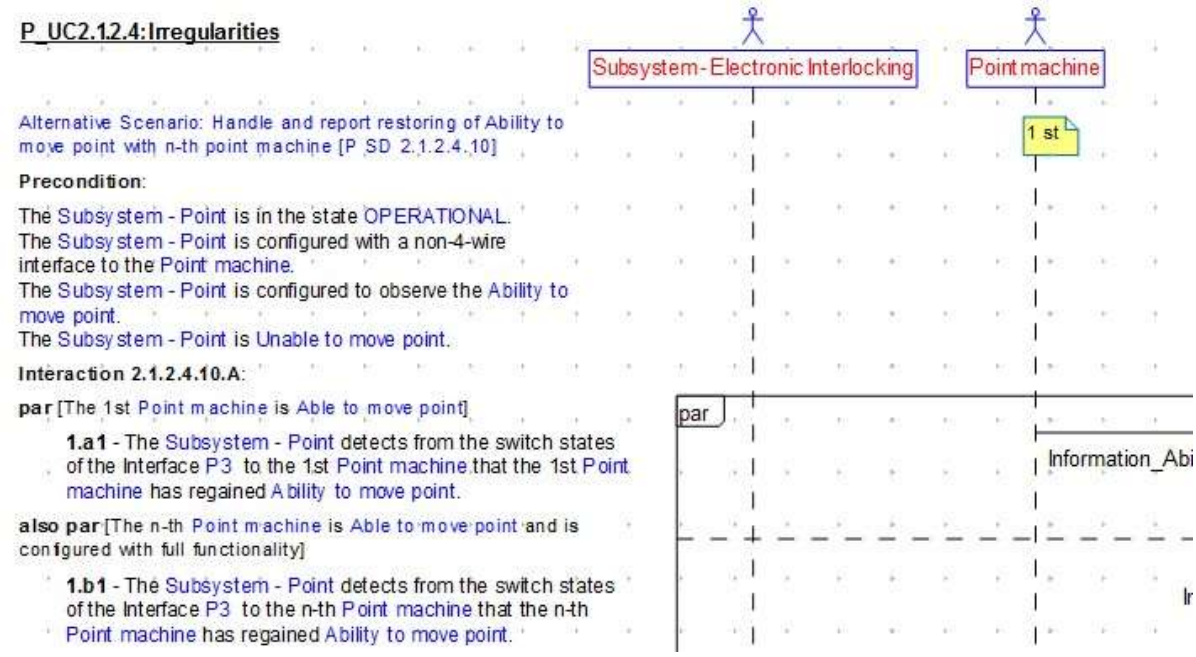
Req. Spec. P

Comments

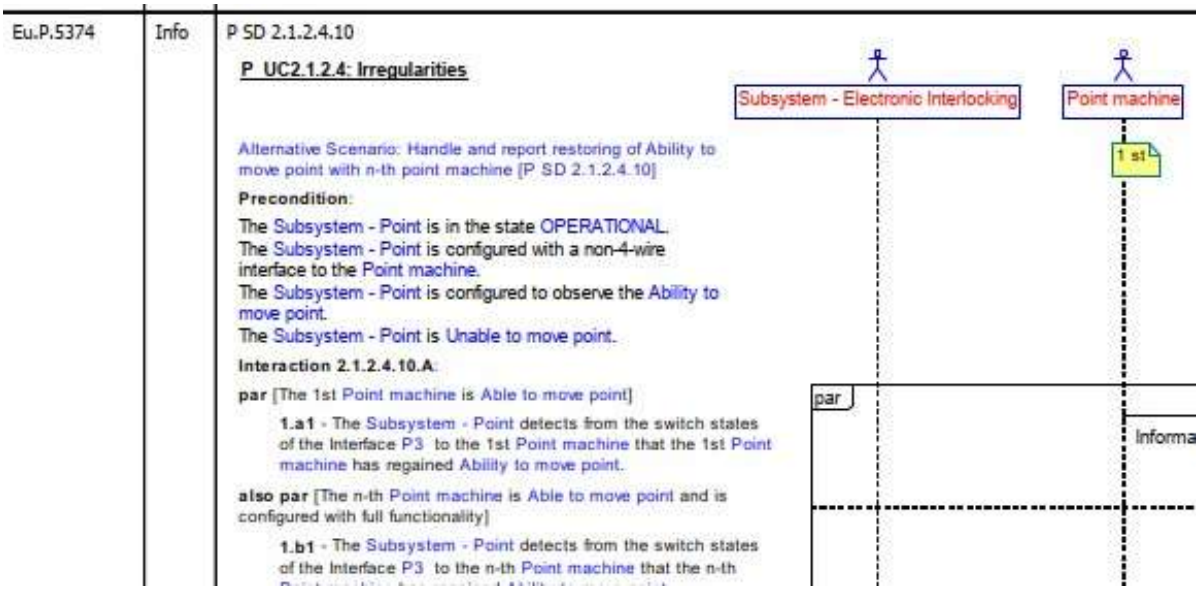
Comment by Philipp Wolber [10.08.2023]

Corrected in PTC. Sync, Ticketed marking needed.

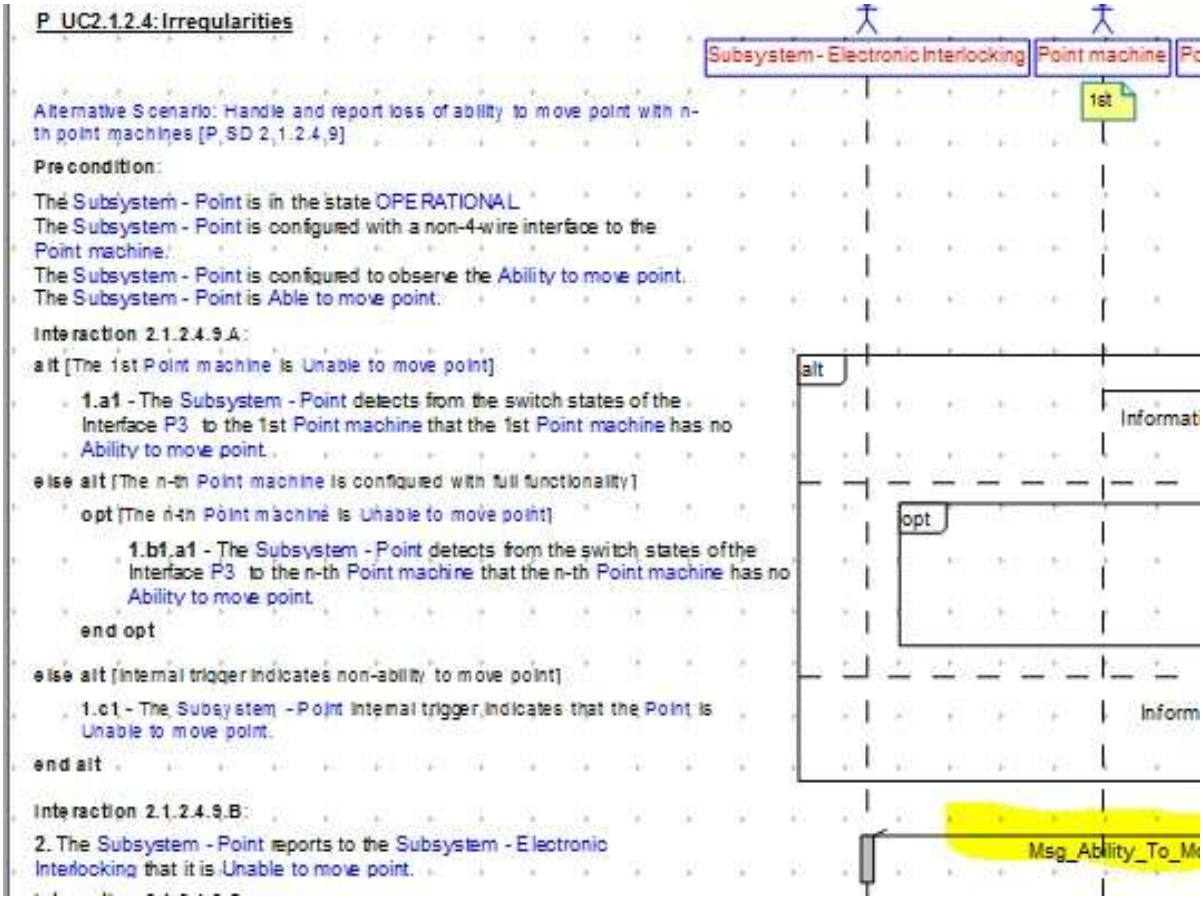
Eu.P.5374_Msg_Able_To_Move used.png



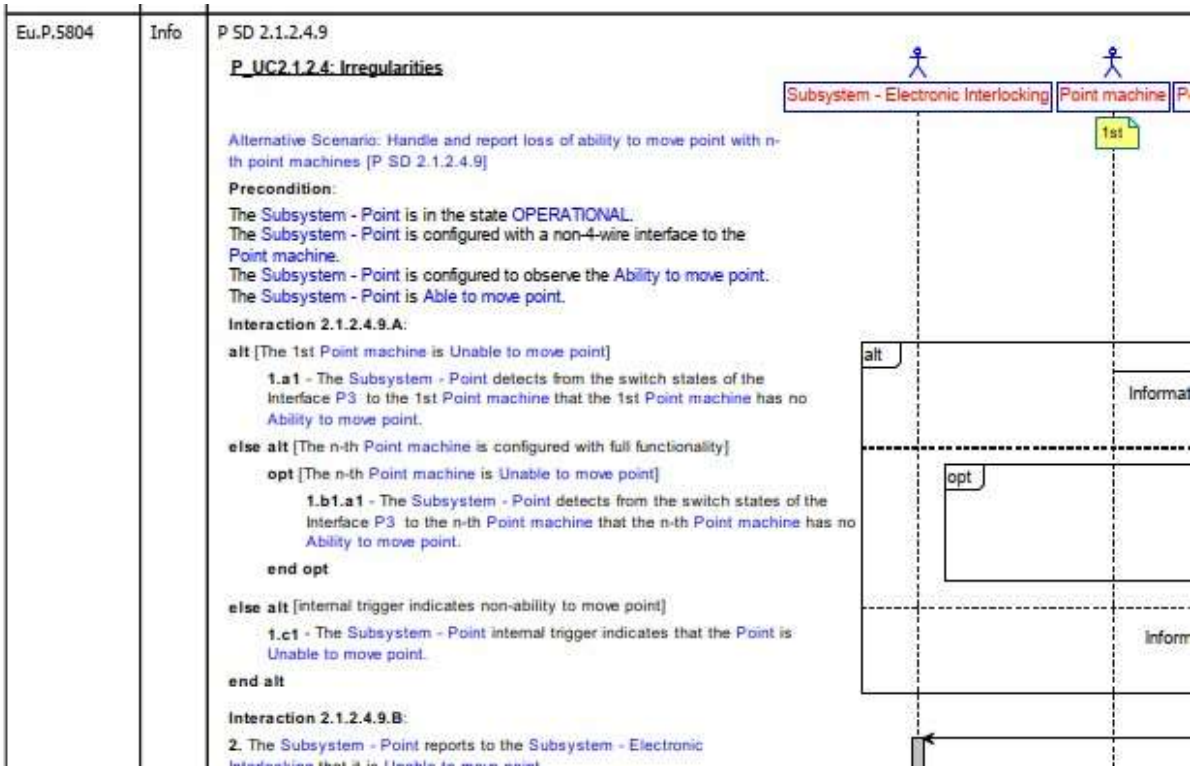
Eu.P.5374_Msg_Point_Position.png



Msg_Ability_To_Move_Point used (corrected).png



Msg_point_position used.png



[EULS-427] Req spec: Correct Signal Aspect reporting after booted again

Created: 15.08.2023 Updated: 22.09.2023

Status:	Open
Project:	EULYNX CP SCI-LS
Component/s:	None

Type:	Error	**Priority:**	None
Reporter:	Filip Giering	**Assignee:**	Unassigned
Resolution:	Unresolved		
Remaining Estimate:	Not Specified		
Time Spent:	Not Specified		
Original Estimate:	Not Specified		

Attachments:	image-2023-08-15-13-44-53-576.png
Sprint:	LS: Postponed to later release

Description

Current state
When the LS will be set from OPERATIONAL (while indicating "most restrict Aspect" back to BOOTING and then back to OPERATIONAL the controller is not able to report the newly set Aspect to the interlocking.

Problem
This is caused due to a deadlock in the observing block as it reacts just on the change trigger of D17 and can therefore not leave the state WAITING.

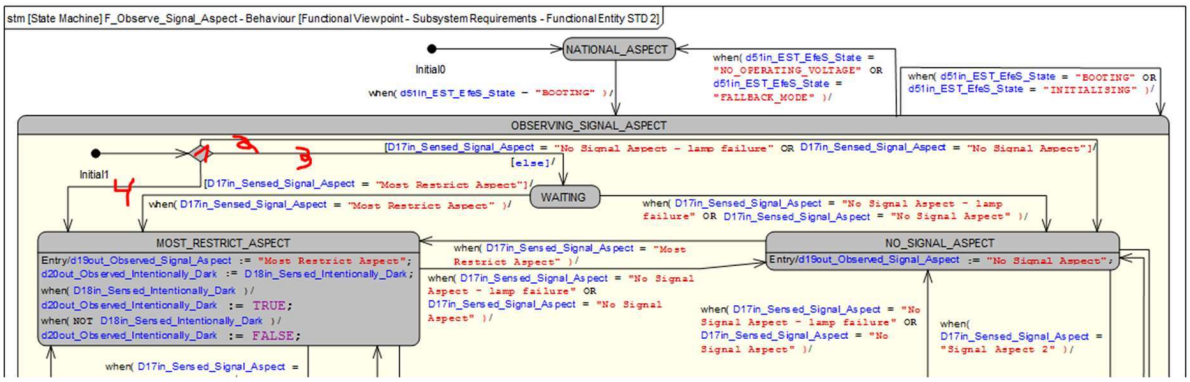
Intended state
The STM for observe Signal Aspect shall be extended with transitions made of purely guard conditions (reacting on current state and not change trigger) as in attached pic shown. The four marked transitions/elements should be added to correct the described behaviour above.

Impact
Req spec of BL4R2(1)

Comments

Comment by Nico Huurman [22.09.2023]
LS 20230920: Agreed to implement in BL4R3

image-2023-08-15-13-44-53-576.png



[EUAR-679] Status Report Completed Correction Created: 09.01.2024 Updated: 18.03.2024	
Status:	In Development
Project:	EULYNX CP Reference Architecture
Component/s:	None

Type:	Error	**Priority:**	None
Reporter:	Philipp Wolber	**Assignee:**	Unassigned
Resolution:	Unresolved		
Remaining Estimate:	Not Specified		
Time Spent:	Not Specified		
Original Estimate:	Not Specified		

Sprint:	BL4R2 CRs

Description

Current state
BL4R2

Problem

Correction of table was incorrect.

mail by Christian Löffler:
"My understading of "Status Report Completed" Message is that it is only relevant for Adjacent Systems but not for Efes (see also Eu.Gen-SCI.489).

EUAR-558 was used to align PDI behaviour of External Level Crossings to Efes. In this context Eu.SCI-XX.PDI.140 was changed for BL4 R2 and sender “EULYNX field element subsystem” was added as last row additionally to existing row for “External Level Crossing System”. Is this change correct? I would still have expected no use of "Status Report Completed" for Efes and also not for External Level Crossings anymore."

Intended state

The correct table in the BL4 R2 style should be:

Sender	Receiver
Subsystem – Electronic Interlocking	Traffic Control System
Traffic Control System	Subsystem – Electronic Interlocking

Subsystem – Electronic Interlocking	Radio Block Centre
Radio Block Centre	Subsystem – Electronic Interlocking
Adjacent Interlocking System	Subsystem – Electronic Interlocking
Subsystem – Electronic Interlocking	Adjacent Interlocking System
Subsystem – Electronic Interlocking	Centralised ETCS L1 Controller
Centralised ETCS L1 Controller	Subsystem – Electronic Interlocking
Subsystem – Electronic Interlocking	Trackworker Safety System
Trackworker Safety System	Subsystem – Electronic Interlocking
~~External Level Crossing System~~	~~External Level Crossing System~~
~~EULYNX field element subsystem~~	~~Subsystem – Electronic Interlocking~~

Eu.Gen-SCI.489 (in Eu.Doc.119), Req Part 2:

Message (Msg) from secondary communication partner to primary

*communication partner **or from primary communication partner to secondary communication partner** that status message transmission of one*

partner is completed. This is only applicable to adjacent system interfaces.

Impact
To be determined.

Eu.Doc.119

Eu.Doc.93?

Comments

Comment by Filip Giering [18.03.2024]
For Eu.Doc.93: Already in new style where only Primary and Secondary is mentioned instead of specific Subsystems!
Comment by Filip Giering [18.03.2024]
Changes for Eu.Doc.119 done in PTC, marked in DOORS. Sync is missing.
Comment by Nico Huurman [17.01.2024]
Endorsed by TACS MG/CCB on 20240117 for implementation in BL4R3
Comment by Ricky Holz [17.01.2024]
Ticket will be solved by Polarion Task SPT2TACS-376.

[EUTDS-499] Correction and simplification of reporting POM and power failures

Created: 21.12.2023 Updated: 15.03.2024

Status:	Finished
Project:	EULYNX CP SCI-TDS
Component/s:	None

Type:	Error	**Priority:**	None
Reporter:	Nico Huurman	**Assignee:**	Unassigned
Resolution:	Unresolved		
Remaining Estimate:	Not Specified		
Time Spent:	Not Specified		
Original Estimate:	Not Specified		

Sprint:	TDS Delivery v4.1 February 24

Description

Current state
BL4 R2 (BL4 R2+)

Problem
ProRail raised that the modelled implementation of the functionality related to Power monitoring and POM failures is not in line with their expectations.

A failure of the power supply, detected by the POM (D50in_Failure_Of_The_Power_Supply = true) always leads to a reported state "TVPS is in state occupied".
It is physically true that absence of power at the track circuit must lead to detection of an occupancy (mandated by the safety principles of track circuits). But this should depend only on D48in_Occupancy_Detected = true, and not directly on D50in_Failure_Of_The_Power_Supply = true.
There are cases possible in which the POM detects a problem with the power supply, but there is still power available to detect a vacant track section (according to the required safety level). Reporting "TVPS is in state occupied" in such cases leads to unwanted reduction of availability.

Intended state
The true/false state of D50in_Failure_Of_The_Power_Supply should lead to exactly the same reporting on SCI-TDS as currently implemented for the true/false state of D49in_Failure_Of_The_POM.
It is therefore no longer needed to distinguish between these 2 distinct input ports in the model-based specifications of SubS TDS.

D50in_Failure_Of_The_Power_Supply will be deleted.
D49in_Failure_Of_The_POM will be renamed to D49in_Power_Monitoring_Failure.
The description in Eu.TDS.6365, Req Part 2 will be updated to:

The port D49in_Power_Monitoring_Failure represents a failure detected by the Power Off Monitoring. The POM detects a failure in the power supply of the track circuit or detects a failure in its own functioning.
- True: failure of the power monitoring
- False: no failure of the power monitoring

Change Description of D48in_Occupancy_Detected: The port D48in_Occupancy_Detected refines the FlowProperty Occupancy_Detected and represents a changing occupancy of a track circuit by a Wheel or absence of power.

Several SDs also need to be corrected or removed (worked out below).

SD 2.2.1.2 (Eu.TDS.4157)

- Reword precondition: The relevant POM is in the state “power supply NOK” ~~due to a failure of the POM~~.

SD 2.2.2.2 (Eu.TDS.2583)

- Reword precondition: The relevant POM is in the state “power supply NOK” ~~due to the failure of the TVPS power supply or a failure of the POM~~.
  - The relevant TVPS is occupied by at least one Wheel or the absence of a Wheel cannot be detected, due to a power supply failure of the relevant TVPS.
- Reword postcondition: The relevant TVPS is in the state "TVPS occupied, unable to be forced to clear and power supply NOK" ~~due to a failure of the TVPS power supply or the combination of a failure of the POM and the Wheel(s) in the TVPS~~.

SD 2.2.2.4 (Eu.TDS.3550)

- will be deleted is now covered by SD 2.2.2.2 (Eu.TDS.2583)

SD 2.2.2.5 (Eu.TDS.3523)

- is now 2.2.2.**4**

SD 2.2.2.6 (Eu.TDS.4208)

- is now 2.2.2.**5**
- Reword precondition: The relevant POM is in the state “power supply NOK” ~~due to a failure of the POM~~.

SD 2.2.2.7 (Eu.TDS.3532)

- is now 2.2.2.**6**

SD 2.2.2.8 (Eu.TDS.4217)

- is now 2.2.2.**7**
- Reword precondition: The relevant POM is in the state “power supply NOK” ~~due to a failure of the power supply of the TVPS or a failure of the POM~~.

SD 2.2.2.9 (Eu.TDS.4226)

- is now 2.2.2.**8**
- Reword step 1: The POM reports "power supply NOK", ~~due to a failure of the power supply of the TVPS or a failure of the POM~~.
- Delete step 2: ~~The Subsystem - Train Detection System recognizes a failure of the power supply of the TVPS or a failure of the POM reporting "power supply NOK".~~
- Reword postcondition: The relevant TVPS is in the state "TVPS disturbed and unable to be forced to clear with a technical reason and power supply NOK" ~~due to a failure of the power supply of the TVPS or a failure of the POM~~.

SD 2.2.2.10 (Eu.TDS.4169)

- is now 2.2.2.**9** and case **4**{}
- Reword precondition: The relevant POM is in the state “power supply NOK” ~~due to a failure of the POM~~.
- Change step 2: The Subsystem - Train Detection System reports the current state of the TVPS to Subsystem - Electronic Interlocking. The status depends on the ability of the relevant TVPS to detect absence of a Wheel. ~~power supply of the relevant TVPS. In this case the TVPS is not occupied by wheels and the power supply has not failed.~~. If the absence of a Wheel can be detected, the status includes the information that the TVPS is in the state "TVPS vacant, unable to be forced to clear and power supply NOK".

SD 2.2.2.11 (Eu.TDS.4236)

- is now 2.2.2.**10**

Reword precondition: The relevant POM is in the state “power supply NOK” ~~due to a failure of the power supply of the TVPS or a failure of the POM~~.
Reword step 1: The POM reports “power supply OK”, ~~due to the restoration of the power supply or the restoration of the POM~~.
Delete step 2: ~~The Subsystem - Train Detection System recognizes a restoration of the power supply of a TVPS or a restoration of the POM due to the relevant POM reporting "power supply OK".~~

SD 2.2.2.12 (Eu.TDS.4246)

- is now 2.2.2.**11**

Reword step 1: The relevant POM reports “power supply NOK”, ~~due to the failure of the POM~~.
Reword step 2: The Subsystem - Train Detection System reports the current state of the TVPS to Subsystem - Electronic Interlocking. The status depends on the ability of the relevant TVPS to detect absence of a Wheel. If the absence of a Wheel can be detected, the status includes the information that the TVPS is in the state "TVPS vacant, unable to be

forced to clear and power supply NOK".
Reword postcondition: The relevant TVPS is in the state "TVPS vacant, unable to be forced to clear and power supply NOK" ~~due to the failure of the POM~~.

SD 2.2.2.13 (Eu.TDS.4255)

- is now 2.2.2.**12**

Reword step 1: The relevant POM reports “power supply NOK” and the absence of a Wheel can no longer be detected. ~~due to the failure of the power supply of the relevant TVPS~~.

add IO Passing detected to step 1
Delete step 2: ~~The Subsystem - Train Detection System recognizes a failure of the power supply of a TVPS due to the combination of the relevant POM reporting power supply NOK and the relevant TVPS reports occupied~~.
Reword step 3: The Subsystem - Train Detection System reports the current state of the TVPS to Subsystem - Electronic Interlocking. The status depends on the ability of the relevant TVPS to detect absence of a Wheel. The status includes the information that the TVPS is in the state "TVPS occupied, unable to be forced to clear and power supply NOK".

SD 2.2.2.14 (Eu.TDS.4265)

- is now 2.2.2.**13**
- Reword precondition: The relevant POM is in the state “power supply NOK” ~~due to a failure of the POM~~.
- Reword step 1: The relevant POM reports "power supply OK", ~~due to a restoration of the POM~~.
- Delete step 2: ~~The Subsystem - Train Detection System recognizes a restoration of the POM of a TVPS due to the relevant POM reporting power supply OK.~~

SD 2.2.2.15 (Eu.TDS.4178)

- is now 2.2.2.**14**
- Reword step 1: The POM reports “power supply NOK”, ~~due to the failure of the power supply of the relevant TVPS or a failure of the POM~~.
- Delete step 2: ~~The Subsystem - Train Detection System recognizes a failure of the power supply of a TVPS due to the or a failure of the POM due to the relevant POM reporting power supply NOK.~~
- Reword postcondition: The relevant TVPS is in the state "TVPS occupied, unable to be forced to clear and power supply NOK" ~~due to the failure of the power supply of the relevant TVPS or a failure of the POM~~.

SD 2.2.2.16 (Eu.TDS.4188)

- is now 2.2.2.**15**
- Reword precondition: The relevant POM is in the state “power supply NOK” ~~due to the failure of the power supply of the relevant TVPS or a failure of the POM~~.
- Reword step 1: The POM reports “power supply OK”, ~~due to a restoration of the power supply or due to a restoration of the POM~~.

- Delete step 2: ~~The Subsystem - Train Detection System recognizes a restoration of the power supply of a TVPS due to the relevant POM reporting power supply OK.~~

SD 2.2.2.17 (Eu.TDS.4198)

- is now 2.2.2.**16**
- Reword precondition: The relevant POM is in the state “power supply NOK” ~~due to the failure of the power supply of the relevant TVPS~~.
- add IO Passing detected to step 1
- Reword step 1: The POM reports “power supply OK”, ~~due to a restoration of the power supply~~ and the absence of a Wheel can be detected again..
- Delete step 2: ~~The Subsystem - Train Detection System recognizes a restoration of the power supply of a TVPS due to the relevant POM reporting power supply OK.~~

Impact
ReqSpec SubS TDS

Comments

Comment by Ricky Holz [11.01.2024]

Ticket will be solved by Polarion Task SPT2TACS-278.

[EULS-475] Req spec LS: Correct multiplicity of the Indicator, Eurobalise and Legacy ATP

Created: 22.05.2024 Updated: 19.06.2024

Status:	Cluster Review
Project:	EULYNX CP SCI-LS
Component/s:	None

Type:	Error	**Priority:**	None
Reporter:	Ricky Holz	**Assignee:**	Unassigned
Resolution:	Unresolved		
Remaining Estimate:	Not Specified		
Time Spent:	Not Specified		
Original Estimate:	Not Specified		

Issue Links:	**BTZ Verknüpfung**			
	wird gefordert durch	EULS-339	Multiplicity of adjacent LS interfaces	Finished
Sprint:	LS BL4R3			

Description

Current state
Draft for BL4R3

Problem
multiplicity on LS4 to Eurobalise is set to 1 .
EULS-339 was approved for implementation in BL4 Release 1, but not correctly implemented.

Same problem is valid for LS3 (Indicator) and LS5 (Legacy train protection system).

Intended state
Change multiplicity for LS3, LS4 and LS5 to 4..8, as defined in EULS-339.

Also error correction for BL4 R1 and BL4 R2

Impact
Req Spec LS

Comments

Comment by Ricky Holz [04.06.2024]

multiplicity adapted - ticket marking done in doors

Comment by Nico Huurman [30.05.2024]

Ticket updated after MG 20240529
Comment by Ricky Holz [22.05.2024]
multiplicity adapted - ticket marking done in doors - sync needed

[EULX-634] Req spec LC: Follow up - Correct cardinality of LC5 in Logical Context

Created: 24.05.2024 Updated: 19.06.2024

Status:	Finished
Project:	EULYNX CP SCI-LX
Component/s:	None

Type:	Error	**Priority:**	Niedrig
Reporter:	Ricky Holz	**Assignee:**	Unassigned
Resolution:	Unresolved		
Remaining Estimate:	Not Specified		
Time Spent:	Not Specified		
Original Estimate:	Not Specified		

Issue Links:	**Ersetzen**
	ersetzt EULX-608 SubS LC Check cardinality of LC5 in L... Finished
Sprint:	SCI-LC BL4R3

Description

Current state
BL4R3

Problem

see EULX-608, approved for BL4R3 to correct the cardinality from 1 to 1..*

The Logical Context diagram of SubS LC (Eu.LC.2776) shows a 1 <> 1...* relation between the SubS LC and the Detection Element on LC5.
This may be an inaccurate representation, as there can be zero instances of the interface LC5.

Intended state
Change cardinality from 1 <> 1...* to 1 <> *

update corresponding req to :

"The Subsystem - Level Crossing shall provide a logical interface LC5 to *each* Detection element."

Also error correction for BL4 R1 and BL4 R2

Impact
ReqSpec LC

Comments

Comment by Ricky Holz [24.05.2024]
updated cardinality and corresponding req - ticket marking done in doors - sync needed

[EUAR-751] TCP parameters for SCI-XX Created: 31.05.2024 Updated: 14.06.2024	
Status:	In Development
Project:	EULYNX CP Reference Architecture
Component/s:	None

Type:	Clarification	**Priority:**	None
Reporter:	Nico Huurman	**Assignee:**	Unassigned
Resolution:	Unresolved		
Remaining Estimate:	Not Specified		
Time Spent:	Not Specified		
Original Estimate:	Not Specified		

Attachments:	2024-06-13 TCP Parameter Discussion result part 2.docx
Sprint:	BL4R3 General RefArch

Description

Current state
Drafts for BL4R3

Problem
Review comment CLo (Thales)
Several TCP parameter values requested by the specification are either hard coded in a modern linux kernel or are configurable only for a complete TCP communication stack in a linux system which then also impacts other TCP connections e.g. for SDI, SMI or SSI with not analysed possible unwated side effects. First discussions came to the conclusion that not all values have a good reason to do such a strange thing . Discussion is already started and Ibtihel is according to my understanind in lead to organise a clarification.
More detailed comment for each parameter was provided via mail.

Intended state
To be discussed in RaSTA WG on June 11th.

Outcome of expert discussion on June 11th and June 13th collected in attached document.

Delete Eu.SCI.204, .205, .206.

Eu.SCI.214
Reduced heartbeat profile: Recommended value tcp_rto_max = 400 ms.
Note: The use of this value is optional, depending on the implementation.

Eu.SCI.235
Fast timeout profile: Recommended value tcp_rto_max = 150 ms
Note: The use of this value is optional, depending on the implementation.

Eu.SCI.236
Fast timeout profile: tcp_rto_init = ~~50~~ 200 ms

Eu.SCI.238
Change Req to Info.
Backwards compatibility profile: Recommended value tcp_rto_max = 400 ms.
Note: The use of this value is optional, depending on the implementation.

Impact
IntDef SCI

Backwards compatibility analysis
The agreed changes are consider as error correction for BL4 Release 1 and BL4 Release 2.

<Provide an answer to the following questions:
Question 1: Can an EfeS implementing the change (new EfeS) operate with an EIL NOT implementing the change (old EIL)?
Question 2: Can an EfeS NOT implementing the change (old EfeS) operate with an EIL implementing the change (new EIL)?
Question 3: Must the PDI version be increased because of this change?>

Comments

Comment by Ricky Holz [14.06.2024]

updated version of reference in Eu.Doc.93 - Eu.SCI-XX.PDI.211 - ticketmarking done in doors

Comment by Nico Huurman [11.06.2024]

Agreed in MG/CCB 20240611 to implement in BL4 Release 3.
Final parameter value to be defined for:
Fast timeout profile: tcp_rto_min = 10 ms

Revision of TCP parameters supporting different RaSTA profiles

Introduction

In EULYNX BL4 R2, three RaSTA profiles were defined for three different purposes if TCP is used.

I. Backwards compatibility profile compatible to RaSTA profile over UDP
II. Reduced heartbeat profile to keep failure detection time and reducing the heartbeats so reducing the processor load. Retransmit by TCP is used for availability.
III. Fast timeout profile to reduce failure detection time and keep the heartbeat frequency. Retransmit by TCP is used for availability.

Due to this different RaSTA profiles and the usage of TCP for a real time communication with small telegrams, several TCP parameters were adjusted. There are statements form the suppliers Thales, Alstom and Siemens on this topic, which are given in the following table.

TCP parametrization statements

In the following table, the TCP Parameters from EULYNX document EU.Doc.92

EULYNX ID	*Parameter name*	*Thales comment*	*Alstom comment*	*Siemens comment*	*Agreement 11.06 and 13.06.2024*
Eu.SCI.196	tcp_nodelay = true	Ok	Active, configurable per connection	Ok	Ok, accepted No changes.
Eu.SCI.199	tcp_quickack = on	Ok	Active	Ok	Ok, accepted No changes.

EULYNX ID	*Parameter name*	*Thales comment*	*Alstom comment*	*Siemens comment*	*Agreement 11.06 and 13.06.2024*
Eu.SCI.202	tcp_sack = enable	In linux based solutions this value is configurable for the complete communication stack only. A restriction to SCI is not possible and only a physical separation and usage of different HW controllers for SCI and other interfaces (SDI, SMI, SSI) allows to avoid side effects on the other interfaces. Is there any requirement for SDI/SMI/SSI related to this value? Otherwise the SCI value will be the master for the other interfaces but this could have very unwanted side effects.	Active, not configurable	Default since Linux Kernel Version 2.2 (1999), used with BANE NOR with no problem There should be no negative impact on other communication.	Ok, accepted No changes.

EULYNX ID	*Parameter name*	*Thales comment*	*Alstom comment*	*Siemens comment*	*Agreement 11.06 and 13.06.2024*
Eu.SCI.205	tcp_thin_dupack = enable	See tcp_sac	-	used with BANE NOR with no problem This parameter is available since at least linux kernel version 6.9 and not activated by default. Give only requirements for TCP parameters which are covered by RFCs, tcp_thin_dupack is not covered by RFCs	Configurable at stack level Agreed: Remove the parameter from the list. Eu.SCI.204, .205 and .206 will be deleted from Eu.Doc.92.
Eu.SCI.208	tcp_thin_linear_timeouts = false	See tcp_sac	-	This parameter is available since at least linux kernel version 6.9 and not activated by default. So, there should be no negative impact on other communication. Give only requirements for TCP parameters which are covered by RFCs, tcp_thin_linear_timeouts is not covered by RFCs.	Ok, default accepted No changes.

EULYNX ID	*Parameter name*	*Thales comment*	*Alstom comment*	*Siemens comment*	*Agreement 11.06 and 13.06.2024*
Eu.SCI.211	tcp_cork = off	See tcp_sac	-	TCP_cork activated may delay sending TCP frames that are not filled up. This contradicts our wish to send immediately. Disabled with BANE NOR with no problem This parameter is used to prevent sending of singular small packets. If it is set to off, nothing happens, so there should be no problem.	Ok, default accepted No changes.

Eu.SCI.213 Eu.SCI.234 Eu.SCI.237	Reduced heartbeat profile: tcp_rto_min = 50 ms; Fast timeout profile: tcp_rto_min = 10 ms Backwards compatibility profile: tcp_rto_min = 50 ms	Ok	For SUBSET037: Interval [1000ms..5000ms] Recommended: 4000ms Configurable for all TCP connections	Currently not aligned – to be discussed Give only requirements for TCP parameters which are covered by RFCs, tcp_rto_min, tcp_rto_max and tcp_rto_init are not configurable according to RFCs. The tcp_rto_min, tcp_rto_max and tcp_rto_init values are hardcoded in Linux, to implement a configurability per socket would need a modification in the linux kernel.	Ok, recommendation is value of 50ms as 10 ms is only the network delay and will not be reached by the TCP RTO computation Fast timeout profile: tcp_rto_min = 10 ms. *Discussion 13.06* MGr: Could be hard to test. Should be possible to do. Doubt the advantage is measurable in real life. Can be set via IP route command. PZie: Can be made. Agree with MGr statements. MGr: Very low probability that a telegram is lost on both channels at the same time. UMe: If we have fast networks, we should tune our TCP to make use of the speed. AEr: A very low rto_min with a network disturbance could lead to

EULYNX ID	*Parameter name*	*Thales comment*	*Alstom comment*	*Siemens comment*	*Agreement 11.06 and 13.06.2024*
					retransmission of a high number of packets. JSc: UMe: TCP values can be set per route. These low values for SCI, it will not influence SDI/SMI/SSI. *Agreement:* No changes needed in Eu.SCI.213, .234 and .237.

Eu.SCI.214 Eu.SCI.235 Eu.SCI.238	Reduced heartbeat profile: tcp_rto_max = 400 ms Fast timeout profile: tcp_rto_max = 150 ms Backwards compatibility profile: tcp_rto_max = 400 ms	In linux based solutions this value is hard coded in the linux kernel and valid for all TCP/IP connections. A restriction to SCI is not possible within one HW controller which makes it impossible to support the required separation for the different standardised interfaces as described in e.g. Eu.PoS.1007 and only a physical separation and usage of different HW controllers for SCI and other interfaces (SDI, SMI, SSI) to avoid overloading of communication channels intended to be used with longer round trip times. This would lead to a cost explosion and seems not to be a good solution. Is the reason for this very demanding value a result of an analysis to avoid any interference with RaSTA functionality? Is there any requirement for SDI/SMI/SSI related to	Interval: >=5000ms Recommended: 10000ms Configurable for all TCP connections	See tcp_rto_min	Recommendation: Use Linux Standard values Default: 120.000 ms *Changes agreed 13.06* Change Eu.SCI.238 from Req to Info. Backwards compatibility profile: Recommended value tcp_rto_max = 400 ms. Note: The use of this value is optional, depending on the implementation. Eu.SCI.214. Reduced heartbeat profile: Recommended value tcp_rto_max = 400 ms. Note: The use of this value is optional, depending on the implementation. Eu.SCI.235. Fast timeout profile: Recommended value tcp_rto_max = 150 ms Note: The use of this value is optional,

EULYNX ID	*Parameter name*	*Thales comment*	*Alstom comment*	*Siemens comment*	*Agreement 11.06 and 13.06.2024*
		this value? Otherwise the SCI value will be the master for the other interfaces increasing the performance requirements towards the Subsystem - Communication System but also to the SDI, SMI and SSI TCP based services of the subsystems (object controllers, MDM, EIL, …). Also this could have very unwanted side effects.			depending on the implementation.
Eu.SCI.215 Eu.SCI.236 Eu.SCI.239	Reduced heartbeat profile: tcp_rto_init = 200 ms Fast timeout profile: tcp_rto_init = 50 ms Backwards compatibility profile: tcp_rto_init = 200 ms	See tcp_rto_max	Interval: [TCP_RTO_MIN..TCP_RTO_MAX[Recomended: TCP_RTP_MIN Configurable per individual connection	See tcp_rto_min	Recommendation: Use Linux Standard values, 200 ms. Change Eu.SCI.236 to 200 ms.

EULYNX ID	*Parameter name*	*Thales comment*	*Alstom comment*	*Siemens comment*	*Agreement 11.06 and 13.06.2024*
Eu.SCI.218	tcp_timestamp = on	See tcp_sac	Off – not configurable	Ok	Ok, accepted No changes.
Eu.SCI.221	tcp_retries2 = 15	See tcp_sac	Interval: [1..5] Recommended: 3 Configurable for all TCP connections	Ok	Ok, accepted No changes.

Remark: Some parameters are now default in linux based implementations. If those parameters are changed, a new assessment of the parameters is necessary.

TCP parameters in original document

The following table contains the Input from EU.Doc.20 with some additional information from RFCs if possible.

Changes agreed 11.06 and 13.06 marked in table.

ID	A_DXL_ID_EU	Eu.Doc.92	A_Object_Type	Information
19	Eu.SCI.195	**3.4.2.1 Nagle Algorithm (tcp_nodelay)**	Head	
47	Eu.SCI.196	tcp_nodelay = true	Req	
46	Eu.SCI.197	Explanation: The Nagle's algorithm is disabled to avoid buffering and combining multiple packets into one TCP-packet.	Info	Default is usage of Nagle´s algorithm, which means tcp_nodelay = false
18	Eu.SCI.198	**3.4.2.2 TCP Fast Retransmit (tcp_quickack)**	Head	
45	Eu.SCI.199	tcp_quickack = on	Req	

ID	A_DXL_ID_EU	Eu.Doc.92	A_Object_Type	Information
44	Eu.SCI.200	Explanation: To immediately acknowledge packets instead of waiting a bit to acknowledge multiple packets.	Info	This option must be set at the socket when sending an ACK immediately and will reset to off afterwards
17	Eu.SCI.201	**3.4.2.3 Selective Acknowledge (tcp_sack)**	Head	
43	Eu.SCI.202	tcp_sack = enable	Req	
42	Eu.SCI.203	Explanation: To reduce the number of retransmissions if multiple packets are lost.	Info	Default since Linux Kernel Version 2.2 (1999)
~~16~~	~~Eu.SCI.204~~	~~**3.4.2.4 Thin Stream Option (tcp_thin_dupack)**~~	~~Head~~	-
~~41~~	~~Eu.SCI.205~~	~~tcp_thin_dupack = enable~~	~~Req~~	-
~~40~~	~~Eu.SCI.206~~	~~Explanation: Optimisations for interactive sessions (as opposed to streaming bulk data).~~	~~Info~~	-
15	Eu.SCI.207	**3.4.2.5 Linear timeouts (tcp_thin_linear_timeouts)**	Head	
39	Eu.SCI.208	tcp_thin_linear_timeouts = false	Req	
38	Eu.SCI.209	Explanation: Usage of exponential backoff is useful but should be well controlled to avoid too large timeouts (controlled by proper RTO-values, see Eu.SCI.212).	Info	
14	Eu.SCI.210	**3.4.2.6 Buffers (tcp_cork)**	Head	
37	Eu.SCI.211	tcp_cork = off	Req	
36	Eu.SCI.246	Explanation: tcp_cork parameter delays sending out partial frames.	Info	
13	Eu.SCI.212	**3.4.2.7 Retransmission timeout (tcp_rto_min, tcp_rto_max)**	Head	
35	Eu.SCI.213	Reduced heartbeat profile: tcp_rto_min = 50 ms	Info	
34	Eu.SCI.214	Reduced heartbeat profile: Recommended value tcp_rto_max = 400 ms. Note: The use of this value is optional, depending on the implementation.	Info	
33	Eu.SCI.215	Reduced heartbeat profile: tcp_rto_init = 200 ms	Info	
32	Eu.SCI.234	Fast timeout profile: tcp_rto_min = 10 ms	Info	

ID	A_DXL_ID_EU	Eu.Doc.92	A_Object_Type	Information
31	Eu.SCI.235	Fast timeout profile: Recommended value tcp_rto_max = 150 ms Note: The use of this value is optional, depending on the implementation.	Info	
30	Eu.SCI.236	Fast timeout profile: tcp_rto_init = ~~50~~ 200 ms	Info	
29	Eu.SCI.237	Backwards compatibility profile: tcp_rto_min = 50 ms	Req	
28	Eu.SCI.238	Backwards compatibility profile: Recommended value tcp_rto_max = 400 ms. Note: The use of this value is optional, depending on the implementation.	~~Req~~ Info	
27	Eu.SCI.239	Backwards compatibility profile: tcp_rto_init = 200 ms	Req	
26	Eu.SCI.216	Explanation: Retransmission Time Out (RTO) will dynamically adapt to the actual round-trip-time (network delay + processing time).	Info	
12	Eu.SCI.217	**3.4.2.8 RTT-accuracy (tcp_timestamp)**	Head	
25	Eu.SCI.218	tcp_timestamp = on	Req	
24	Eu.SCI.219	Explanation: Use of TCP-timestamps according to RFC7323 for more accurate round-trip-time calculations.	Info	
11	Eu.SCI.220	**3.4.2.9 Number of retries (tcp_retries2)**	Head	
23	Eu.SCI.221	tcp_retries2 = 15	Req	
22	Eu.SCI.222	Explanation: TCP-stack should keep trying to retransmit, in case of problems RaSTA will break the connection (the value 15 is the default for TCP). This value defines the time when TCP detects a connection loss based on effective Retransmission Time Out and is between tcp_retries2 * tcp_rto_min and tcp_retries2 * tcp_rto_max.	Info	