



EULYNX Initiative

Variability and Configuration management

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ID	Type	Requirement
Eu.VCM.1	Head	1 Introduction
Eu.VCM.7	Head	1.1 Release information
Eu.VCM.5	Info	[Eu.Doc.28] Variability and configuration management Version: 1.8 (1.A) Approval date: 29.05.2024
Eu.VCM.6	Info	Version history
Eu.VCM.233	Info	version number: 1.5 (0.A) date: 17.05.2022 author: Nico Huurman review: CCB changes: EUAR-537
Eu.VCM.234	Info	version number: 1.6 (0.A) date: 31.03.2023 author: Nico Huurman review: changes: EUAR-541, EUAR-564, EUAR-583
Eu.VCM.235	Info	version number: 1.7 (0.A) date: 27.06.2023 author: Nico Huurman review: CCB changes: EUAR-604, EUAR-613
Eu.VCM.236	Info	version number: 1.8 (0.A) date: 29.04.2024 author: Nico Huurman review: changes: EUAR-681, EUAR-709
Eu.VCM.237	Info	version number: 1.8 (1.A) date: 18.06.2024 author: Nico Huurman review: CCB changes: EUAR-746

ID	Type	Requirement
Eu.VCM.9	Head	1.2 Impressum
Eu.VCM.10	Info	<p>Publisher: EULYNX Initiative</p> <p>A full list of the EULYNX Partners can be found on https://eulynx.eu/.</p>
Eu.VCM.11	Info	<p>Responsible for this document: EULYNX Project Management Office www.eulynx.eu</p>
Eu.VCM.12	Info	<p>Copyright EULYNX Partners All information included or disclosed in this document is licensed under the European Union Public Licence EUPL, Version 1.2 or later.</p>
Eu.VCM.13	Head	1.3 Purpose
Eu.VCM.14	Info	The purpose of the document is the definition and description of the variability and configuration management of EULYNX.
Eu.VCM.15	Info	<p>This document is intended for the following users:</p> <ul style="list-style-type: none"> • safety assessors • infrastructure managers • reference system testers • signalling system suppliers • developers • national safety agency
Eu.VCM.16	Head	1.4 Applicable standards and regulations
Eu.VCM.17	Info	A list of applicable standards and regulations used in EULYNX is listed in the EULYNX Reference Document List [Eu.Doc.12].
Eu.VCM.18	Head	1.5 Input documents
Eu.VCM.19	Info	The current versions of documents used as input to this document are listed in the EULYNX Documentation Plan [Eu.Doc.11].
Eu.VCM.41	Info	<ul style="list-style-type: none"> • System engineering process [Eu.Doc.27]
Eu.VCM.44	Info	<ul style="list-style-type: none"> • Modelling Standard [Eu.Doc.30]
Eu.VCM.21	Head	1.6 Related documents

ID	Type	Requirement
Eu.VCM.215	Info	The current versions of documents related to this document are listed in the EULYNX Documentation Plan [Eu.Doc.11].
Eu.VCM.22	Info	<ul style="list-style-type: none"> • VariSync user guide [VariSyncGuide]
Eu.VCM.31	Head	1.7 Terms and abbreviations
Eu.VCM.32	Info	The terms and abbreviations are listed in the EULYNX Glossary [Eu.Doc.9].
Eu.VCM.34	Head	1.8 Definition of object types
Eu.VCM.35	Info	The following definition for object types is applied in this document:
Eu.VCM.181	Info	<ul style="list-style-type: none"> • "Req" - This denotes a mandatory requirement.
Eu.VCM.36	Info	<ul style="list-style-type: none"> • "Info" - This denotes additional information to help understand the specification. These objects do not specify any additional requirements.
Eu.VCM.38	Info	<ul style="list-style-type: none"> • "Head" - This denotes chapter headings.
Eu.VCM.3	Head	2 Variability management
Eu.VCM.23	Head	2.1 Rationale
Eu.VCM.48	Info	In EULYNX, the participation of various countries requires a management of country specific functionality.
Eu.VCM.49	Info	Despite the goal of EULYNX to harmonise and standardise railway signalling systems, some historical grown or national requirements cannot be generalised. In consequence, these are not applicable to multiple or all countries.
Eu.VCM.50	Info	In the case where a requirement is not applicable to all participants, country specific requirements must be managed in an appropriate way. This does not affect the common requirements which are applicable to all countries.
Eu.VCM.51	Info	Therefore, the concept and rules for variability are defined and described below in this document.
Eu.VCM.61	Head	2.2 Requirements
Eu.VCM.63	Req	Because of the possibility that more than one infrastructure manager (IM) can exist in one country, variability is defined for different IMs of a country, not for whole countries.
Eu.VCM.62	Req	The stability of the functionality and stability of single IM requirements shall be ensured.
Eu.VCM.182	Req	The mandatory part of a specification is defined as a static superset of the functionality of all IMs.

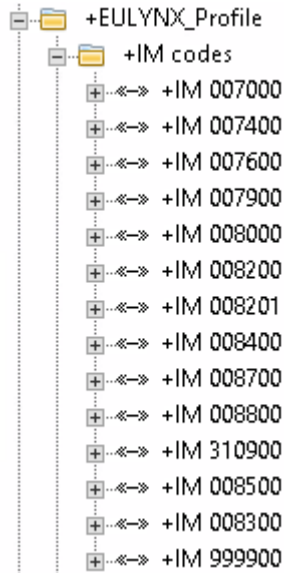
ID	Type	Requirement
Eu.VCM.65	Req	The variability shall be defined in the specifications with applicability information .
Eu.VCM.66	Req	The applicability information is used to define the IM specific subset of functionality so that an IM is able to identify the specific specification.
Eu.VCM.67	Req	The applicability information shall be included in the published requirements deliverables. In detail, these are the following document types: <ul style="list-style-type: none"> • requirements specification • interface definition • interface specification
Eu.VCM.74	Req	The applicability information shall be shown in the column "Appl." in each document. Each requirement shall have an "Appl." attribute.
Eu.VCM.77	Info	Initial information about the applicability information of each requirement or functionality is stored in the function list of each cluster project and shall be taken from there.
Eu.VCM.59	Head	2.3 IM codes
Eu.VCM.56	Info	Each IM is represented by a defined IM code. These codes are based on the UIC numeric code for railway companies "Railway Interchange Coding System" format with appended double digit. IM codes follow the pattern "abcdyz", where abcd is the UIC numeric code for railway companies or a neutral code, and yz is by default "00". The digits "yz" may be used to allow multiple specification subsets for each particular IM, for example for different regions.
Eu.VCM.57	Info	The following table shows the participating IMs with their code, name and country.

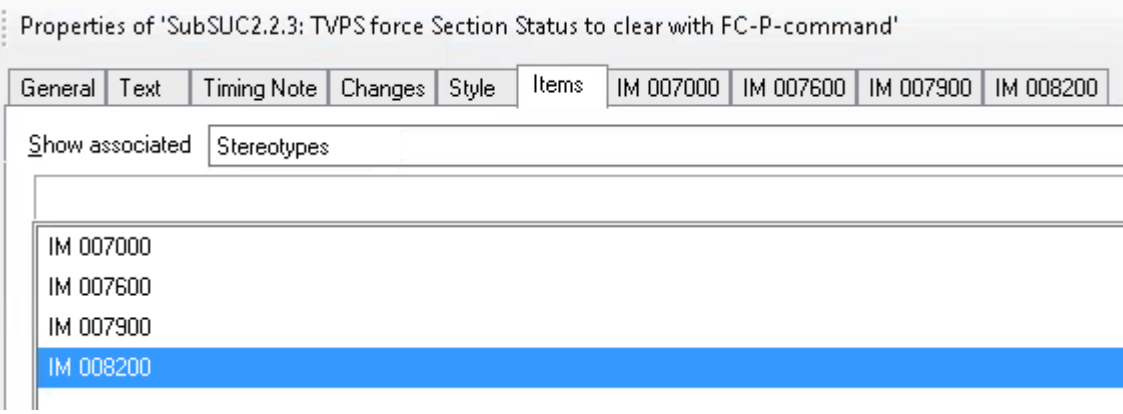
ID	Type	Requirement																																																					
		<table><tr><th>Code</th><th>Infrastructure manager</th><th>Country</th></tr><tr><td>005400</td><td>Správa železnic</td><td>Czech Republic</td></tr><tr><td>007000/ 007001</td><td>Network Rail</td><td>United Kingdom</td></tr><tr><td>007400</td><td>Trafikverket</td><td>Sweden</td></tr><tr><td>007600</td><td>Bane NOR</td><td>Norway</td></tr><tr><td>007800</td><td>HŽ</td><td>Croatia</td></tr><tr><td>007900</td><td>SŽ</td><td>Slovenia</td></tr><tr><td>008000</td><td>DB</td><td>Germany</td></tr><tr><td>008100</td><td>ÖBB Infrastruktur AG</td><td>Austria</td></tr><tr><td>008200/ 008201</td><td>CFL</td><td>Luxembourg</td></tr><tr><td>008300</td><td>RFI</td><td>Italy</td></tr><tr><td>008400</td><td>ProRail</td><td>Netherlands</td></tr><tr><td>008500</td><td>SBB</td><td>Switzerland</td></tr><tr><td>008700</td><td>SNCF</td><td>France</td></tr><tr><td>008800</td><td>Infrabel</td><td>Belgium</td></tr><tr><td>310900/ 310901</td><td>FTIA</td><td>Finland</td></tr><tr><td>999900</td><td>Neutral IM code</td><td>-</td></tr></table>	Code	Infrastructure manager	Country	005400	Správa železnic	Czech Republic	007000/ 007001	Network Rail	United Kingdom	007400	Trafikverket	Sweden	007600	Bane NOR	Norway	007800	HŽ	Croatia	007900	SŽ	Slovenia	008000	DB	Germany	008100	ÖBB Infrastruktur AG	Austria	008200/ 008201	CFL	Luxembourg	008300	RFI	Italy	008400	ProRail	Netherlands	008500	SBB	Switzerland	008700	SNCF	France	008800	Infrabel	Belgium	310900/ 310901	FTIA	Finland	999900	Neutral IM code	-		
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008800	Infrabel	Belgium																																																					
310900/ 310901	FTIA	Finland																																																					
999900	Neutral IM code	-																																																					
Eu.VCM.219	Head	2.4 Neutral IM code																																																					
Eu.VCM.220	Info	In specific cases, a cluster project can decide to describe functionality that is not applicable to any of the participating IMs.																																																					
Eu.VCM.221	Info	A cluster project can do this if it deems that the added functionality is: <ul style="list-style-type: none">• Likely to be applicable in future to IMs currently not participating in the cluster, or• Likely to be applicable to railways not formally participating in EULYNX																																																					
Eu.VCM.222	Req	In the applicability information, the added functionality that is not applicable to any of the participating IMs shall be marked with the neutral IM code.																																																					
Eu.VCM.223	Req	A cluster project shall verify that the functionality added with a neutral IM code is consistent with the rest of the EULYNX specifications.																																																					

ID	Type	Requirement
Eu.VCM.224	Info	The neutral IM code is 9999yz. The digits yz are by default "00". The digits "yz" may be used to allow multiple specification subsets of neutral functionality, for example for different regions.
Eu.VCM.68	Head	2.5 General rules
Eu.VCM.96	Req	Each specification document shall only use the subset of those IM codes, which represent the participating IMs. In addition, the neutral IM code may be used.
Eu.VCM.69	Req	In general, the applicability information for each requirement shall be defined in the following format throughout all published specification documents. This is done in the "Appl." column of the document for each requirement.
Eu.VCM.70	Req	A requirement which is applicable to all participating IMs is identified with "Default".
Eu.VCM.71	Req	A requirement which is not applicable to all participating IMs is identified with a list of IM codes. Such requirement is then only applicable to the IMs represented by the IM codes list.
Eu.VCM.231	Req	IMs shall use in their national railway system only those requirements that are marked as applicable to the respective IM. Note: These are all requirements identified with either 'Default' or with the code of the respective IM.
Eu.VCM.225	Head	2.6 Border interfaces
Eu.VCM.226	Info	When EULYNX is applied on a cross border railway line, EULYNX interfaces can exist between subsystems or adjacent systems that belong to different IMs. Note: In particular such scenarios are expected for the interface SCI-ILS.
Eu.VCM.227	Req	To ensure consistent communication and functionality, a set of harmonised requirements to describe cross border interface functionality shall be agreed by both IMs.
Eu.VCM.228	Info	The subset marker "yz" of the IM code can be used to mark applicability information consistent with the cross border interface functionality by each IM.
Eu.VCM.58	Head	2.7 Realisation and additional information
Eu.VCM.28	Info	There will only be one official EULYNX specification to counteract market fragmentation. After a given time of development, suppliers only will develop and build one type of EULYNX kits (at least for the functional aspects).
Eu.VCM.30	Info	These kits will be configured by applicability data. Part of this data is the IM code that defines the generic behaviour of the kit when in use for a given IM (e.g. reset behaviour for Subsystem - Train Detection System).
Eu.VCM.40	Info	The applicability information within the EULYNX specification indicates the subset of functionality that must be activated if kit is configured for a given IM. A given EULYNX kit is configured from generic level to site specific usage only by configuration data.

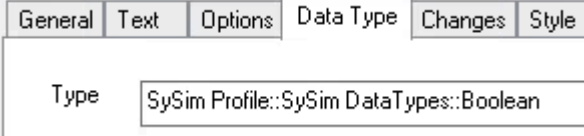
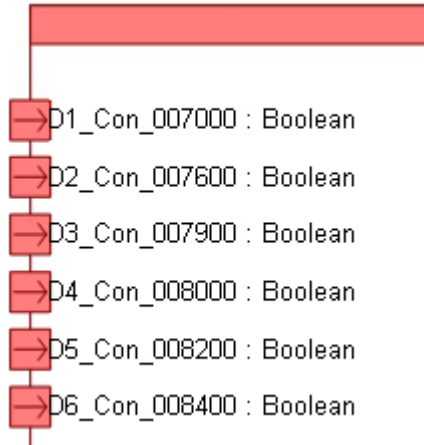
ID	Type	Requirement
Eu.VCM.53	Info	The applicability information may be also used for: <ul style="list-style-type: none"> • comparison of functionality of different IMs for cross acceptance • allowing procurement of country specific kits during development period while full EULYNX kit is not yet available
Eu.VCM.24	Head	2.8 Implementation
Eu.VCM.205	Info	The implementation of the applicability information depends on the used tools and tool chain. The modelling software PTC Integrity Modeler and the requirements software IBM Rational DOORS are used in EULYNX for this purpose.
Eu.VCM.76	Info	The correct representation of the applicability information in the "Appl." column depends on the following working steps which are done by the specification author: <ul style="list-style-type: none"> • gather initial applicability information and store this in the function list • gather additional applicability information due to reviews or other input documents • transfer applicability information from the function list to the model (requirements specification) • transfer applicability information from the model to DOORS (requirements specification) • transfer applicability information from requirements specification to interface specification in DOORS • transfer additional applicability information
Eu.VCM.101	Info	These working steps are not valid for the chapters 1 "Introduction" and 2 "Conditions of use" of the specific documents. All information in these chapters is set to "Default" according to Eu.VCM.70 because only general document information is given there.
Eu.VCM.168	Info	The following diagram depicts the working steps for the implementation of the applicability information to the specification documents.

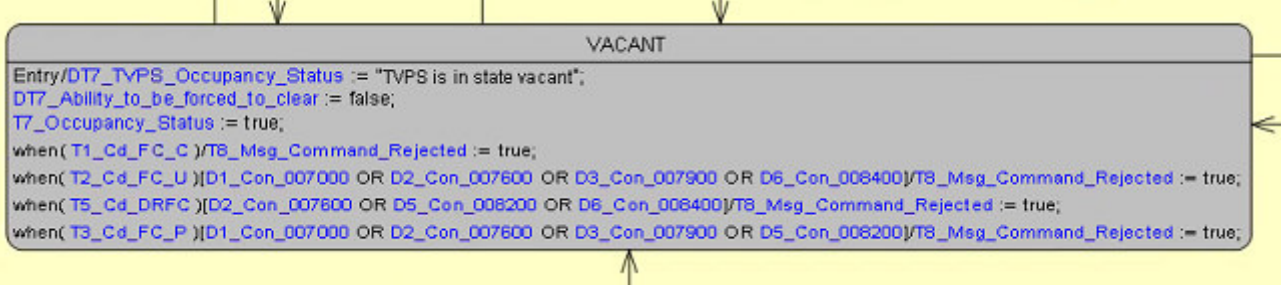
ID	Type	Requirement
		<pre> graph TD A[applicability information from IMs] --> B[function list] B -- transfer manually --> C[model] C -- automatically with VarSync --> D[DOORS] D -- transfer manually --> E[DOORS] F[additional information] -- transfer manually --> C F -- transfer manually --> E subgraph Phase4 [requirements specification Phase 4] C D end subgraph Phase5 [interface definition interface specification Phase 5] E end </pre>
Eu.VCM.78	Info	The required working steps in the model and in DOORS are described in the following sections.
Eu.VCM.25	Head	2.8.1 Model
Eu.VCM.39	Info	In the model of a specification the applicability information is stored through modification of the model elements. This is done with PTC Integrity Modeler in the opened model.

ID	Type	Requirement
Eu.VCM.186	Head	2.8.1.1 System Definition Part 1
Eu.VCM.80	Info	For the abstraction level " System Definition Part 1 " of the Modelling Standard [Eu.Doc.30] the applicability information is implemented by marking the model elements with stereotypes.
Eu.VCM.81	Info	<p>These stereotypes represent the IM codes introduced in Eu.VCM.57 and are predefined in the EULYNX generic profile. These can be found in the model package "EULYNX_Profile" in the sub-package "IM codes".</p>  <pre> graph TD subgraph EULYNX_Profile subgraph IM_codes IM007000[+IM 007000] IM007400[+IM 007400] IM007600[+IM 007600] IM007900[+IM 007900] IM008000[+IM 008000] IM008200[+IM 008200] IM008201[+IM 008201] IM008400[+IM 008400] IM008700[+IM 008700] IM008800[+IM 008800] IM310900[+IM 310900] IM008500[+IM 008500] IM008300[+IM 008300] IM999900[+IM 999900] end end </pre>
Eu.VCM.83	Req	Only these predefined stereotypes in the profile shall be used in the specific model. These stereotypes are called IM code stereotypes.
Eu.VCM.84	Req	To distinguish the IM code stereotypes from other stereotypes in the model, each IM code stereotype shall have a prefix "IM" before the six-digit number. Between the prefix "IM" and the number there shall be a blank character. An IM code stereotype shall be defined and named as "IM abcdyz".
Eu.VCM.85	Req	<p>Based on the definitions of the Modelling Standard [Eu.Doc.30] the IM code stereotypes shall be attached to the following model elements by the needs of the specific model and specification.</p> <ul style="list-style-type: none"> • FlowProperty (child element of FlowSpecification) • Reception (child element of InterfaceBlock) • sequence diagram (child element of UseCase) • UseCase (parent element of sequence diagram)

ID	Type	Requirement
Eu.VCM.91	Info	IM code stereotypes can be also assigned to other model elements which can be needed in the specific model. These can be the following model elements: <ul style="list-style-type: none"> • Block
Eu.VCM.86	Req	The marking of the model elements shall follow the rules below regarding Eu.VCM.70 and Eu.VCM.71: <ul style="list-style-type: none"> • A model element which is applicable to all IMs is not marked with IM code stereotypes and marked with "Default" instead. • A model element which is not applicable to all IMs is marked with a set of one or more IM code stereotypes. The model element is then only applicable to the IMs represented by the IM codes stereotypes.
Eu.VCM.87	Info	The IM code stereotypes are not shown in diagrams.
Eu.VCM.90	Info	A model element can only be applicable to: <ul style="list-style-type: none"> • the set of IMs for which its parent model element is applicable • a subset of the IMs for which its parent model element is applicable
Eu.VCM.179	Info	If needed, a model element may only be applicable to a subset of the IM code stereotypes of the parent element.
Eu.VCM.170	Info	This is an example of a UseCase which is only applicable to four specific IMs. 
Eu.VCM.164	Info	In the following examples show the correct usage of the IM code stereotypes. Correct usage 1: FlowSpecification: Default all FlowProperties of the FlowSpecification: Default Correct usage 2:

ID	Type	Requirement
		<p>FlowSpecification: Default one or more (not all) FlowProperties of the FlowSpecification: IM 007600</p> <p>Correct usage 3: UseCase: Default all sequence diagrams the UseCase: Default all sequences of each sequence diagram: Default</p> <p>Correct usage 4: UseCase: Default all sequence diagrams the UseCase: Default one or more (not all) sequences of one sequence diagram: IM 310900</p> <p>Correct usage 5: UseCase: IM 008000, IM 008200 all sequence diagrams of the UseCase: IM 008000, IM 008200 all sequences of each sequence diagram: IM 008000, IM 008200</p>
Eu.VCM.177	Info	<p>The following examples show incorrect usage of the IM code stereotypes. The specification author must make sure that those and similar cases are not implemented.</p> <p>Incorrect usage 1: FlowSpecification: IM 310900 all FlowProperties of the FlowSpecification: Default</p> <p>Incorrect usage 2: FlowSpecification: IM 007000, IM 008700 one or more (not all) FlowProperties of the FlowSpecification: IM 310900</p>
Eu.VCM.187	Head	2.8.1.2 System Requirements
Eu.VCM.188	Info	For the abstraction level " System Requirements " of the Modelling Standard [Eu.Doc.30] the applicability information is implemented by modelling the logical components.
Eu.VCM.199	Req	The applicability information shall be derived from the IM code stereotype information given by the model elements of the "System Definition Part 1".
Eu.VCM.193	Req	For the structural view of a logical component, the applicability information shall be implemented with adding specific flow ports to a logical component, which are called applicability flow ports .

ID	Type	Requirement
Eu.VCM.189	Req	A logical component shall have one applicability flow port for each used IM code stereotype in the specific cluster project.
Eu.VCM.194	Req	An applicability flow port shall have the information type "Data".
Eu.VCM.197	Req	<p>An applicability flow port shall have the PTC Integrity Modeler SySim data type "Boolean".</p> 
Eu.VCM.191	Req	An applicability flow port shall be named "D<portnumber>_Con_abcdyz".
Eu.VCM.196	Req	The pattern "abcdyz" shall represent the IM code according to Eu.VCM.56.
Eu.VCM.192	Req	For each logical component, the first 50 flow port numbers (range 1 to 50) shall be reserved for the applicability flow ports.
Eu.VCM.198	Info	<p>This is an example of a logical component with six applicability flow ports.</p> 
Eu.VCM.200	Req	For the behavioural view of a logical component, the applicability information shall be implemented with adding guard conditions to the transitions of the state machine.
Eu.VCM.201	Req	A guard condition shall check the current values of the applicability flow ports depending on the requirements and the applicability information so that the transition is triggered only if the condition is true.













ID	Type	Requirement
Eu.VCM.202	Req	The state machine shall be modelled in a way that IM specific behaviour of a logical component can be activated by setting the corresponding applicability flow port to "True".
Eu.VCM.203	Info	<p>This is an example state with transition guards for the applicability flow ports.</p> 
Eu.VCM.26	Head	2.8.2 DOORS
Eu.VCM.119	Head	2.8.2.1 General
Eu.VCM.102	Req	In the DOORS modules of specifications, the applicability information shall be set for each object in the module through predefined and preset columns (applicability attributes). This is valid for the requirements specification, interface definition and interface specification documents.
Eu.VCM.108	Req	Therefore, each module only contains a set of applicability attributes which represents the participating IMs in the cluster project. These applicability attributes shall have the name "a_abcdyz_Applicability" which contains the IM code "abcdyz" according to Eu.VCM.56.
Eu.VCM.166	Req	The applicability attributes of IMs which are not participating in the cluster project shall be deleted.
Eu.VCM.117	Info	The columns for applicability attributes are only shown for module editing purposes. They are not shown in the print of the document.

ID	Type	Requirement																																				
Eu.VCM.172	Info	<p>This picture shows a possible view for editing a module. As depicted, the columns are predefined as the attributes "a_abcdyz_Applicability".</p> <table> <tr> <th>Titel</th><th>Attribut</th><th>Typ</th></tr> <tr> <td>ID</td><td>a_DXL_ID_EU</td><td>String</td></tr> <tr> <td>Object Type</td><td>a_object_type</td><td>t_object_type</td></tr> <tr> <td>Requirement</td><td><Object Heading & Object Text></td><td></td></tr> <tr> <td>007600 Bane NOR</td><td>a_007600_Applicability</td><td>t_Applicability</td></tr> <tr> <td>007900 SZ</td><td>a_007900_Applicability</td><td>t_Applicability</td></tr> <tr> <td>008000 DB</td><td>a_008000_Applicability</td><td>t_Applicability</td></tr> <tr> <td>008200 CFL</td><td>a_008200_Applicability</td><td>t_Applicability</td></tr> <tr> <td>008400 ProRail</td><td>a_008400_Applicability</td><td>t_Applicability</td></tr> <tr> <td>008800 Infrabel</td><td>a_008800_Applicability</td><td>t_Applicability</td></tr> <tr> <td>310900 FTA</td><td>a_310900_Applicability</td><td>t_Applicability</td></tr> <tr> <td>Appl.</td><td>a_Applicability_auto</td><td>Text</td></tr> </table>	Titel	Attribut	Typ	ID	a_DXL_ID_EU	String	Object Type	a_object_type	t_object_type	Requirement	<Object Heading & Object Text>		007600 Bane NOR	a_007600_Applicability	t_Applicability	007900 SZ	a_007900_Applicability	t_Applicability	008000 DB	a_008000_Applicability	t_Applicability	008200 CFL	a_008200_Applicability	t_Applicability	008400 ProRail	a_008400_Applicability	t_Applicability	008800 Infrabel	a_008800_Applicability	t_Applicability	310900 FTA	a_310900_Applicability	t_Applicability	Appl.	a_Applicability_auto	Text
Titel	Attribut	Typ																																				
ID	a_DXL_ID_EU	String																																				
Object Type	a_object_type	t_object_type																																				
Requirement	<Object Heading & Object Text>																																					
007600 Bane NOR	a_007600_Applicability	t_Applicability																																				
007900 SZ	a_007900_Applicability	t_Applicability																																				
008000 DB	a_008000_Applicability	t_Applicability																																				
008200 CFL	a_008200_Applicability	t_Applicability																																				
008400 ProRail	a_008400_Applicability	t_Applicability																																				
008800 Infrabel	a_008800_Applicability	t_Applicability																																				
310900 FTA	a_310900_Applicability	t_Applicability																																				
Appl.	a_Applicability_auto	Text																																				
Eu.VCM.109	Info	<p>In addition, the "Appl." column ("a_Applicability_auto" attribute) is also predefined and preset in each module. The corresponding attribute auto-generates the finalised and summarised applicability information in the format as defined in Eu.VCM.70 and Eu.VCM.71.</p>																																				
Eu.VCM.173	Info	<p>This picture shows a possible module view for printing a specification document. As depicted, the "Appl." column is predefined as the attribute "a_Applicability_auto".</p> <table> <tr> <th>Titel</th><th>Attribut</th><th>Typ</th></tr> <tr> <td>ID</td><td>a_DXL_ID_EU</td><td>String</td></tr> <tr> <td>Type</td><td>a_object_type</td><td>t_object_type</td></tr> <tr> <td>Requirement Part 1</td><td><Object Heading & Object Text></td><td></td></tr> <tr> <td>Requirement Part 2</td><td>art_Description</td><td>Text</td></tr> <tr> <td>Appl.</td><td>a_Applicability_auto</td><td>Text</td></tr> </table>	Titel	Attribut	Typ	ID	a_DXL_ID_EU	String	Type	a_object_type	t_object_type	Requirement Part 1	<Object Heading & Object Text>		Requirement Part 2	art_Description	Text	Appl.	a_Applicability_auto	Text																		
Titel	Attribut	Typ																																				
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Requirement Part 1	<Object Heading & Object Text>																																					
Requirement Part 2	art_Description	Text																																				
Appl.	a_Applicability_auto	Text																																				
Eu.VCM.114	Req	<p>The attribute setting of the objects shall follow the rules below regarding Eu.VCM.70 and Eu.VCM.71:</p> <ul style="list-style-type: none"> • An object which is applicable to all IMs gets the value "True" for all applicability attributes. • An object which is not applicable to all IMs gets the value "True" or "False" for those applicability attributes. The value "True" is set for applicability attribute if the object is applicable to the IM represented by this attribute. Otherwise, the value is set to "False". 																																				
Eu.VCM.105	Req	<p>According to Eu.VCM.101 the objects which do not represent a specific requirement shall get the applicability information "Default". This requires that all applicability attributes are set to "True". As described in Eu.VCM.109, the value "Default" in the "Appl." column is then set automatically.</p>																																				
Eu.VCM.120	Head	2.8.2.2 Requirements specification																																				

ID	Type	Requirement																																																
Eu.VCM.129	Req	<p>For each object in the module, each applicability attribute shall be set to "True" or "False" based on the IM code stereotypes of the corresponding model element.</p> <ul style="list-style-type: none">For a model element which has no IM code stereotypes all applicability attributes are set to "True" in the module.For a model element which has IM code stereotypes only those applicability attributes are set to "True" for which an IM code stereotype exists. All other are set to "False".																																																
Eu.VCM.167	Info	<p>As already shown in Eu.VCM.100, the applicability information is taken from the function list (and maybe from additional input documents) and then manually implemented in the model. From the model, the applicability information is then transferred to the corresponding DOORS module of the model. The DOORS module must be set up accordingly by synchronising the model and its model elements to the module. This has to be done with the "PTC Integrity Modeler Integration for IBM Rational DOORS".</p>																																																
Eu.VCM.174	Info	<p>The following picture shows the dependencies and traceability of the applicability information of a concrete function in the function list, the corresponding sequence diagram model element and the corresponding object in the DOORS module.</p> <div><table><tr><th rowspan="2">ID</th><th rowspan="2">Function</th><th rowspan="2">UC/SD reference</th><th colspan="8">Applicable to</th></tr><tr><th>CFL</th><th>DB</th><th>FTA</th><th>Infrabel</th><th>JBV</th><th>Prorail</th><th>SZ</th></tr><tr><td>ILS.47</td><td>Flank protection across boundary</td><td>SubSUC2.11 SD 2.11.1 SD 2.11.2</td><td>FALSE</td><td>FALSE</td><td>TRUE</td><td>TRUE</td><td>FALSE</td><td>TRUE</td><td>TRUE</td></tr></table><div><p>Properties of 'Main Success Scenario: Request of flank protection across boundary [SubSILS SD 2.11.1]'</p><p>General Text Changes Style Items IM 007900 IM 008400 IM 008800 IM 310900</p><p>Show associated Stereotypes</p><div>IM 007900 IM 008400 IM 008800 IM 310900</div></div><table><tr><th>Object Type</th><th>Requirement</th><th>007600 Base NOR</th><th>007900 SZ</th><th>008000 DB</th><th>008200 CFL</th><th>008400 ProRail</th><th>008800 Infrabel</th><th>310900 FTA</th><th>Appl.</th></tr><tr><td>Req</td><td>SubSILS SD 2.11.1</td><td>False</td><td>True</td><td>False</td><td>False</td><td>True</td><td>True</td><td>True</td><td>007900 008400 008800 310900</td></tr></table></div> <div><p>1. function list</p><p>↓</p><p>2. model</p><p>↓</p><p>3. DOORS</p></div>	ID	Function	UC/SD reference	Applicable to								CFL	DB	FTA	Infrabel	JBV	Prorail	SZ	ILS.47	Flank protection across boundary	SubSUC2.11 SD 2.11.1 SD 2.11.2	FALSE	FALSE	TRUE	TRUE	FALSE	TRUE	TRUE	Object Type	Requirement	007600 Base NOR	007900 SZ	008000 DB	008200 CFL	008400 ProRail	008800 Infrabel	310900 FTA	Appl.	Req	SubSILS SD 2.11.1	False	True	False	False	True	True	True	007900 008400 008800 310900
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ID	Type	Requirement																														
Eu.VCM.136	Req	The transfer of the applicability information from the model to the corresponding DOORS module shall be done automatically with the tool "VariSync" as described in section 2.6.3.																														
Eu.VCM.175	Info	<p>This additional example shows a more detailed view of two example objects representing model elements with a possible set of IM codes represented by the corresponding applicability attributes and the applicability information set for each object.</p> <table><tr><th>Object Type</th><th>Requirement</th><th>007600 Bane NOR</th><th>007900 SZ</th><th>008000 DB</th><th>008200 CFL</th><th>008400 ProRail</th><th>008800 Infrabel</th><th>310900 FTA</th><th>Appl</th></tr><tr><td>Req</td><td><input checked="" type="checkbox"/> Cd_FPR</td><td>False</td><td>True</td><td>False</td><td>False</td><td>True</td><td>True</td><td>True</td><td>007900 008400 008800 310900</td></tr><tr><td>Req</td><td><input checked="" type="checkbox"/> Cd_MRC</td><td>True</td><td>True</td><td>True</td><td>True</td><td>True</td><td>True</td><td>True</td><td>Default</td></tr></table>	Object Type	Requirement	007600 Bane NOR	007900 SZ	008000 DB	008200 CFL	008400 ProRail	008800 Infrabel	310900 FTA	Appl	Req	<input checked="" type="checkbox"/> Cd_FPR	False	True	False	False	True	True	True	007900 008400 008800 310900	Req	<input checked="" type="checkbox"/> Cd_MRC	True	True	True	True	True	True	True	Default
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Eu.VCM.134	Head	2.8.2.3 Interface definition																														
Eu.VCM.135	Req	For each object in the module, each applicability attribute shall be set to "True" or "False" for needs of the described requirements.																														
Eu.VCM.121	Head	2.8.2.4 Interface specification																														
Eu.VCM.130	Req	For each object in the module, each applicability attribute shall be set to "True" or "False" manually based on the information of the requirements specification.																														
Eu.VCM.183	Req	In the case of telegrams, the applicability information shall be derived from the corresponding FlowProperty model element which represents this telegram.																														
Eu.VCM.104	Req	The implementation of the applicability information for an interface specification shall be done for each defined telegram, telegram parameter and permitted values of a telegram parameter.																														
Eu.VCM.207	Info	A parameter can only be applicable to: <ul style="list-style-type: none">• the set of IMs for which its parent element (telegram) is applicable• a subset of the IMs for which its parent element (telegram) is applicable																														
Eu.VCM.208	Info	A permitted value can only be applicable to: <ul style="list-style-type: none">• the set of IMs for which its parent element (parameter) is applicable• a subset of the IMs for which its parent element (parameter) is applicable																														
Eu.VCM.165	Info	<p>In the following examples show correct usage of the applicability information for telegrams.</p> <p>Correct usage 1: telegram: Default</p>																														

ID	Type	Requirement
		<p>all parameters of the telegram: Default all permitted values of each parameter: Default</p> <p>Correct usage 2: telegram: Default all parameters of the telegram: Default one or more (not all) permitted values of one parameter: 007900, 310900</p> <p>Correct usage 3: telegram: Default one or more (not all) parameters of the telegram: 007900, 310900 all permitted values of each of these parameters: 007900, 310900</p> <p>Correct usage 4: telegram: Default one or more (not all) parameters of the telegram: 008400, 008800 one or more (not all) permitted values of one of these parameters: 008400</p> <p>Correct usage 5: telegram: 007000, 008700 all parameters of the telegram: 007000, 008700 all permitted values of each parameter: 007000, 008700</p> <p>Correct usage 6: telegram: 007000, 008700 one or more (not all) parameters of the telegram: 007000 all permitted values of these parameters: 007000</p>
Eu.VCM.209	Info	<p>In the following examples show incorrect usage of the applicability information for telegrams. The specification author must make sure that those and similar cases are not implemented.</p> <p>Incorrect usage 1: telegram: 008200 all parameters of the telegram: Default all permitted values of each parameter: Default</p> <p>Incorrect usage 2: telegram: 007600 all parameters of the telegram: 310900</p>

ID	Type	Requirement																																																																					
		<p>one permitted value of a parameter: 008400</p> <p>Incorrect usage 3: telegram: 007400, 008000 one parameter of the telegram: 007400, 008000, 008200 one or more (not all) permitted values of this parameter: 007400, 008000, 008200, 310900</p>																																																																					
Eu.VCM.210	Info	<p>This example shows a telegram in DOORS with specific applicability information.</p> <table><tr><th>Type</th><th>Requirement</th><th>PDI-Version</th><th>Appl.</th></tr><tr><td>Head</td><td> 3.4.10 Message "DRFC Receipt"</td><td></td><td>007600 008200 008400</td></tr><tr><td>Info</td><td> With this telegram the Subsystem - Train Detection System reports a successful execution of the DRFC.</td><td></td><td>007600 008200 008400</td></tr><tr><td>Info</td><td> Telegram definition for message "DRFC Receipt"</td><td></td><td>007600 008200 008400</td></tr><tr><td></td><td><table><tr><th>Byte-Nr.</th><th>Bit 7</th><th>Bit 6</th><th>Bit 5</th><th>Bit 4</th><th>Bit 3</th><th>Bit 2</th><th>Bit 1</th><th>Bit 0</th></tr><tr><td>00</td><td colspan="8">Protocol Type: 0x20 (1 Byte binary)</td></tr><tr><td>01..02</td><td colspan="8">Message Type: 0x0009 (2 Bytes binary)</td></tr><tr><td>03..22</td><td colspan="8">Sender Identifier (20 Bytes ASCII)</td></tr><tr><td>23..42</td><td colspan="8">Receiver Identifier (20 Bytes ASCII)</td></tr></table></td><td></td><td></td></tr><tr><td>Req</td><td> Permitted values for message "DRFC Receipt":</td><td>Version 1</td><td>007600 008200 008400</td></tr></table>	Type	Requirement	PDI-Version	Appl.	Head	 3.4.10 Message "DRFC Receipt"		007600 008200 008400	Info	 With this telegram the Subsystem - Train Detection System reports a successful execution of the DRFC.		007600 008200 008400	Info	 Telegram definition for message "DRFC Receipt"		007600 008200 008400		<table><tr><th>Byte-Nr.</th><th>Bit 7</th><th>Bit 6</th><th>Bit 5</th><th>Bit 4</th><th>Bit 3</th><th>Bit 2</th><th>Bit 1</th><th>Bit 0</th></tr><tr><td>00</td><td colspan="8">Protocol Type: 0x20 (1 Byte binary)</td></tr><tr><td>01..02</td><td colspan="8">Message Type: 0x0009 (2 Bytes binary)</td></tr><tr><td>03..22</td><td colspan="8">Sender Identifier (20 Bytes ASCII)</td></tr><tr><td>23..42</td><td colspan="8">Receiver Identifier (20 Bytes ASCII)</td></tr></table>	Byte-Nr.	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	00	Protocol Type: 0x20 (1 Byte binary)								01..02	Message Type: 0x0009 (2 Bytes binary)								03..22	Sender Identifier (20 Bytes ASCII)								23..42	Receiver Identifier (20 Bytes ASCII)										Req	 Permitted values for message "DRFC Receipt":	Version 1	007600 008200 008400
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Eu.VCM.206	Info	This example shows telegram parameters in DOORS with different applicability.																																																																					

ID	Type	Requirement																											
		<table><tr><th>Type</th><th>Requirement</th><th>PDI-Version</th><th>Appl.</th></tr><tr><td>Req</td><td><input checked="" type="checkbox"/> Byte Nr. 43: aspect lamp combinations (see Eu.Doc.37) The lamp combinations for the basic aspect types, including main, distant and shunting aspects.</td><td>Version 1</td><td>Default</td></tr><tr><td>Req</td><td><input checked="" type="checkbox"/> Byte Nr. 44: aspect extension lamp combinations (see Eu.Doc.37) The lamp combinations for the extension of the basic aspects, such as indication of route to opposite track or route without an overlap.</td><td>Version 1</td><td>007900 008000 008400 310900</td></tr><tr><td>Req</td><td><input checked="" type="checkbox"/> Byte Nr. 45: speed indicators (see Eu.Doc.37)</td><td>Version 1</td><td>Default</td></tr><tr><td>Req</td><td><input checked="" type="checkbox"/> Byte Nr. 46: speed indicator announcements (see Eu.Doc.37)</td><td>Version 1</td><td>Default</td></tr><tr><td>Req</td><td><input checked="" type="checkbox"/> Byte Nr. 47: direction indicators (see Eu.Doc.37)</td><td>Version 1</td><td>007900 008000 008400 310900</td></tr></table>				Type	Requirement	PDI-Version	Appl.	Req	<input checked="" type="checkbox"/> Byte Nr. 43: aspect lamp combinations (see Eu.Doc.37) The lamp combinations for the basic aspect types, including main, distant and shunting aspects.	Version 1	Default	Req	<input checked="" type="checkbox"/> Byte Nr. 44: aspect extension lamp combinations (see Eu.Doc.37) The lamp combinations for the extension of the basic aspects, such as indication of route to opposite track or route without an overlap.	Version 1	007900 008000 008400 310900	Req	<input checked="" type="checkbox"/> Byte Nr. 45: speed indicators (see Eu.Doc.37)	Version 1	Default	Req	<input checked="" type="checkbox"/> Byte Nr. 46: speed indicator announcements (see Eu.Doc.37)	Version 1	Default	Req	<input checked="" type="checkbox"/> Byte Nr. 47: direction indicators (see Eu.Doc.37)	Version 1	007900 008000 008400 310900
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Eu.VCM.176	Info	<p>This example shows permitted values of telegram parameter in DOORS with different applicability.</p> <table><tr><th>Type</th><th>Requirement</th><th>PDI-Version</th><th>Appl.</th></tr><tr><td>Req</td><td><input checked="" type="checkbox"/> Mode of FC The message byte 43 shall contain the modes of FC. Permitted values: <table><tr><td>value</td><td>meaning</td></tr><tr><td>-----</td><td>-----</td></tr></table></td><td>Version 1</td><td>Default</td></tr><tr><td>Req</td><td><input checked="" type="checkbox"/> 0x00 undefined</td><td>Version 1</td><td>Default</td></tr><tr><td>Req</td><td><input checked="" type="checkbox"/> 0x01 FC-U</td><td>Version 1</td><td>007000 007600 007900 008400</td></tr></table>				Type	Requirement	PDI-Version	Appl.	Req	<input checked="" type="checkbox"/> Mode of FC The message byte 43 shall contain the modes of FC. Permitted values: <table><tr><td>value</td><td>meaning</td></tr><tr><td>-----</td><td>-----</td></tr></table>	value	meaning	-----	-----	Version 1	Default	Req	<input checked="" type="checkbox"/> 0x00 undefined	Version 1	Default	Req	<input checked="" type="checkbox"/> 0x01 FC-U	Version 1	007000 007600 007900 008400				
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Req	<input checked="" type="checkbox"/> 0x01 FC-U	Version 1	007000 007600 007900 008400																										
Eu.VCM.99	Head	2.8.3 Transferring applicability information from the model to DOORS																											
Eu.VCM.118	Req	Each object in the module which was created by the PTC Integrity Modeler Integration for IBM Rational DOORS represents a model element. For each of those objects, the applicability information shall be transferred from the model to the corresponding DOORS module. The transfer shall be done by using the tool "VariSync" (Variability Synchronisation). This additional tool transfers the applicability information of the model automatically from the model to the corresponding DOORS module based on the rules and descriptions given here in this document.																											
Eu.VCM.137	Info	The usage of "VariSync" is described in the corresponding user guide [VariSyncGuide].																											

ID	Type	Requirement
Eu.VCM.27	Head	3 Configuration management
Eu.VCM.138	Head	3.1 Baseline number schema
Eu.VCM.139	Info	The baseline number shall be incremented in a manner to enable indication of type of changes between baselines and shall be compatible with usage of DOORS.
Eu.VCM.140	Info	The basis are types of changes, identified in these three categories: Functional, Editorial, Applicability.
Eu.VCM.141	Info	The baseline number schema consists of four segments: Major.minor (editorial.applicability) or in short M.m (e.a) . An example would be the version 1.2 (1.A).
Eu.VCM.142	Info	Each segment captures a different intent: <ul style="list-style-type: none"> • the major segment indicates major functional development stages and is an integer • the minor segment indicates minor changes of requirements and is an integer • the editorial segment indicates editorial changes and corrections, changes to informative text, without impact to the requirements or to applicability data and is an integer with default value 0 • the applicability segment indicates a change in applicability of requirements, without change of text of the requirements and is a capital case letter with default value A
Eu.VCM.143	Info	Major baselines will be indicated by incrementing the first digit of the baseline version number from M.m (e.a) to M+1.0 (0.A). Major versions are referenced with M.0 (0.A), with minor digit segment always 0, and the editorial and applicability segments always set back to default values 0.A. Example: 1.3 (2.B) will become 2.0 (0.A)
Eu.VCM.145	Info	Minor baselines will be indicated by incrementing the second digit of the baseline version number from M.m (e.a) to M.m+1 (0.A). The changes applied in the baseline release must be declared on the document management page. When a minor baseline is created, the editorial and applicability segments are always set back to default values 0.A. Example: 1.3 (2.B) will become 1.4 (0.A)
Eu.VCM.146	Info	Editorial baselines will be indicated by incrementing the editorial segment of the baseline version number from M.m (e.a) to M.m (e+1.a). When editorial changes without functional changes are applied, the major, minor and applicability segments remain unchanged. Example: 1.3 (2.B) will become 1.3 (3.B)
Eu.VCM.211	Info	Applicability baselines will be indicated by incrementing the applicability segment of the baseline version number from M.m (e.a) to M.m (e.a+1). When applicability changes without functional changes are applied, the major, minor and editorial segments remain unchanged. Example: 1.3 (2.B) will become 1.3 (2.C)
Eu.VCM.190	Info	The following picture shows an example of changing baseline numbers.

ID	Type	Requirement
		<pre> graph TD A["Cluster project baseline variability 1.0 (0.A)"] --> B["Cluster project baseline variability 1.1 (0.A)"] B --> C["Cluster project baseline variability 1.1 (1.A) Editorial update"] C --> D["Cluster project baseline variability 2.0 (0.A)"] D --> E["Cluster project baseline variability* 2.0 (0.B) Applicability update IM1 changes appl."] E --> F["Cluster project baseline variability* 2.0 (0.C) Applicability update IM2 changes appl."] F --> G["Cluster project baseline variability 2.1 (0.A)"] </pre>
Eu.VCM.147	Info	The compatibility of the baseline number schema with DOORS is given in the following way: Major.Minor (Editorial.Applicability) is applied in DOORS as Major.Minor (Suffix).
Eu.VCM.148	Head	3.2 Relation with change management
Eu.VCM.149	Info	The approval of CCB is needed for major, minor and editorial baselines.
Eu.VCM.150	Info	The CCB is informed about applicability baselines. No decisions are needed from the CCB about the applicability information.
Eu.VCM.151	Head	4 Update processes for functionality and variability
Eu.VCM.152	Head	4.1 Additional IM joins cluster without impact to functionality

ID	Type	Requirement
Eu.VCM.154	Info	<ul style="list-style-type: none"> • new IM may only use the latest available baseline • attribute "a_<new IM code>_Applicability" added • attribute "a_Applicability_auto" is updated • new baseline version M.m (e.a+1) • if a new IM joins the EULYNX initiative, the document impressum changes and new IM applicability attributes needs to be added • requirements are unchanged, major and minor versions unchanged, editorial segment is unchanged • CCB informed, no approval required
Eu.VCM.153	Head	4.2 IM changes applicability without impact to functionality
Eu.VCM.155	Info	<ul style="list-style-type: none"> • attribute "a_<IM code>_Applicability" changed • attribute "a_Applicability_auto" is updated • new baseline version M.m (e.a+1) • requirements are unchanged, major and minor versions unchanged, editorial segment is unchanged • check for only "False" applicability for all IDs in applicability attributes (requirement becomes not applicable to anyone) - Maintenance issue – proposal to CCB to remove requirement – handled in next scheduled baseline – • all "False" requirement is filtered from being displayed in published specification until removed from PTC and DOORS • CCB informed, no approval required
Eu.VCM.158	Head	4.3 IM changes functionality
Eu.VCM.159	Info	<ul style="list-style-type: none"> • change request submitted • change approved by cluster/CCB and implemented • requirements added/modified/deleted • attribute "a_<IM code>_Applicability" updated for all IMs and adjusted regarding changes • attribute "a_Applicability_auto" is updated • new baseline minor version M.m+1 (0.A) or major version M+1 (0.A) • CCB approval needed
Eu.VCM.156	Head	4.4 IM leaves cluster

ID	Type	Requirement
Eu.VCM.157	Info	<ul style="list-style-type: none">• attributes "a_<IM code>_Applicability" of leaving IMs needs to be removed• attribute "a_Applicability_auto" is updated• the removing of an IM should be done only in scheduled baselines along with other changes, resulting in new major or minor baseline version (an applicability update solely for IM leaving a cluster is not necessary)• check for only "False" applicability for all IDs in applicability attributes (requirement becomes not applicable to anyone) - Maintenance issue – proposal to CCB to remove requirement – handled in next scheduled baseline –• all "False" requirement is filtered from being displayed in published specification until removed from PTC and DOORS• CCB informed, no approval required