



**EULYNX Initiative**

## **EULYNX Data preparation requirements**

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Baseline: 2.0 (0.A)

EULYNX Baseline Set: 4

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ID	Type	Requirement
Eu.DP.1	Head	<b>1 Introduction</b>
Eu.DP.7	Info	<b>1.1 Release information</b>
Eu.DP.8	Info	[Eu.Doc.51] EULYNX Data preparation requirements CENELEC Phase: 2 Version: 2.0 (0.A) EULYNX Baseline Set: 4 Approval date: 25.04.2022
Eu.DP.103	Info	<b>Version history</b>
Eu.DP.104	Info	version number: 0.1 date: 7.2.2017 author: Mirko Blazic review: - changes: First version based on Excel file
Eu.DP.105	Info	version number: 0.2 date: 22.2.2017 author: Mirko Blazic review: cluster changes: EUDATA-1
Eu.DP.106	Info	version number: 1.0 (0.A) date: 23.3.2017 author: Mirko Blazic review: CCB changes:
Eu.DP.107	Info	version number: 1.0 (1.A) date: 08.12.2017 author: Mirko Blazic review: CCB changes: EUDATA-2

ID	Type	Requirement
Eu.DP.109	Info	version number: 1.1 (0.A) date: 27.01.2022 author: Mirko Blazic, Nico Huurman review: cluster changes: EUDATA-7, EUDATA-8, EUDATA-9
Eu.DP.119	Info	version number: 2.0 (0.A) date: 17.05.2022 author: Mirko Blazic, Nico Huurman review: CCB changes: EUDATA-10
Eu.DP.9	Head	<b>1.2 Impressum</b>
Eu.DP.10	Info	Publisher: <b>EULYNX Initiative</b>  A full list of the <b>EULYNX Partners</b> can be found on <a href="http://www.eulynx.eu/index.php/members">www.eulynx.eu/index.php/members</a>
Eu.DP.11	Info	Responsible for this document: EULYNX Project Management Office <a href="http://www.eulynx.eu">www.eulynx.eu</a>
Eu.DP.102	Info	Copyright EULYNX Partners All information included or disclosed in this document is licensed under the European Union Public Licence EUPL, Version 1.1.
Eu.DP.12	Head	<b>1.3 Purpose</b>
Eu.DP.13	Info	This document is the specification of requirements for EULYNX data preparation.
Eu.DP.120	Info	EULYNX data preparation models the information needed to engineer the signalling system of a yard. The use case of EULYNX data preparation applies to the exchange of signalling engineering information between Infrastructure Managers (IMs) and market parties (e.g. engineering bureaus or signalling suppliers). A data file that is filled and structured according to this model can be applied to build and configure signalling systems. Information exchange based on the EULYNX data preparation model can be automated and more efficient. EULYNX data preparation models engineering configuration, it doesn't model behaviour of signalling functions.
Eu.DP.15	Head	<b>1.4 Applicable standards and regulations</b>
Eu.DP.16	Info	The applicable standards and regulations used in EULYNX are listed in the EULYNX Reference Document List [Eu.Doc.12].
Eu.DP.22	Head	<b>1.5 Applicable documents</b>

ID	Type	Requirement
Eu.DP.23	Info	The current versions of documents used as input or related to this document are listed in the EULYNX Documentation Plan [Eu.Doc.11]. The relationships between the documents are displayed in the Appendix A1 Documentation plan and structure [Eu.Doc.11_A1].
Eu.DP.20	Head	<b>1.6 Terms and abbreviations</b>
Eu.DP.21	Info	The terms and abbreviations are listed in the EULYNX Glossary [Eu.Doc.9].
Eu.DP.27	Head	<b>1.7 Variability management</b>
Eu.DP.28	Info	This document is valid for the complete EULYNX System. Variability management is not used in this document.
Eu.DP.92	Head	<b>1.8 Definition of object types</b>
Eu.DP.93	Info	The following definition for object types is applied in this document:
Eu.DP.94	Info	<ul style="list-style-type: none"> <li>• "Req" - This denotes a mandatory requirement.</li> </ul>
Eu.DP.95	Info	<ul style="list-style-type: none"> <li>• "Info" - This denotes additional information to help understand the specification. These objects do not specify any additional requirements.</li> </ul>
Eu.DP.96	Info	<ul style="list-style-type: none"> <li>• "Head" - This denotes chapter headings.</li> </ul>
Eu.DP.3	Head	<b>2 EULYNX Data Format Requirements</b>
Eu.DP.30	Head	<b>2.1 Modelling technology</b>
Eu.DP.31	Head	<b>2.1.1 General</b>
Eu.DP.32	Req	The EULYNX data exchange between IMs and market parties shall be based on the XML format.
Eu.DP.33	Req	The EULYNX data format shall be constructed as a UML model from which the XML definition (XSD) is derived.
Eu.DP.34	Req	The EULYNX data format shall be readable by humans and machines.
Eu.DP.35	Info	The data in EULYNX data format should be understandable by signalling experts (e.g. planner, checker). This kind of readability has to be achieved by creating tools for visualisation in traditional signalling language (e.g. layout plan, route table).
Eu.DP.36	Req	The XML file shall be the basis for supplier to realise all signalling devices (software and materialization), so that the XML file is the defined interface for both sides of the planning tool chain (IM + supplier).
Eu.DP.97	Req	The XML file shall be the basis for supplier to return the enriched planning data to the IM.

ID	Type	Requirement
Eu.DP.37	Req	The XML file shall contain all parameters of the infrastructure to realise all signalling devices.
Eu.DP.38	Head	<b>2.1.2 Structure</b>
Eu.DP.39	Req	The EULYNX data format shall be based on a modular functional and element structure. Note: The structure splits the content into thematic work packages to allow information engineering in manageable modules. The packages broadly reflect common categories in signalling functions and hardware. This help human readers navigate around the model.
Eu.DP.40	Req	The EULYNX data format structure shall allow the addition of objects and their attributes only in new versions of the model.
Eu.DP.98	Req	The modification of objects (classes) and attributes (elements) should be backward compatible, if tools using the EULYNX data format are developed.
Eu.DP.44	Head	<b>2.1.3 Element properties</b>
Eu.DP.45	Req	An object instance within the EULYNX data format shall be unique using the GUID/UUID approach.
Eu.DP.46	Req	The EULYNX data format shall use universal units for attributes.
Eu.DP.47	Req	The units used shall be declared inside the data model.
Eu.DP.48	Head	<b>2.2 Application of the model</b>
Eu.DP.49	Head	<b>2.2.1 General</b>
Eu.DP.51	Req	The EULYNX data format shall be compatible with data objects and attributes required in: <ul style="list-style-type: none"> <li>• conventional electronic interlocking systems;</li> <li>• ETCS compliant systems.</li> </ul>
Eu.DP.52	Req	The EULYNX data format shall include configuration data for the objects of the interlocking system. Note: Configuration data are data used to execute technical components, such as network addresses and protocol versions, and parametric values defining the intended application of the object.
Eu.DP.99	Req	The EULYNX data format shall support time dimension aspects for implementation of stages. Note: Projects may be split into manageable stages. Stages are snapshots, the intermediate states of a signalling project. A stage is supplemented with project management meta-information as per Eu.DP.100. The staging is designed to match different engineering phases (site survey, pre-design, detailed design etc.) and several states (planned, checked etc.). This approach captures the implementation stages to great detail.
Eu.DP.100	Req	The EULYNX data format shall include project management metadata.

ID	Type	Requirement
Eu.DP.53	Head	<b>2.2.2 Route data</b>
Eu.DP.54	Req	The EULYNX data format shall be able to include route information (mandatory information).
Eu.DP.55	Req	If additional information is required, associated with this routes, the EULYNX data format shall support this additional route information
Eu.DP.56	Req	The EULYNX data format shall be able to include signal aspect sequence for each route. Note: The signal aspect sequence refers to the relation of signal aspects between subsequent signals.
Eu.DP.57	Req	The EULYNX data format shall be able to include signal aspects associated to each route. Note: For a given route the signal aspects are defined at the entry signal.
Eu.DP.60	Head	<b>2.2.3 Track layout data</b>
Eu.DP.61	Req	The EULYNX data format shall be based on the RailSystemModel (RSM) regarding topological and topographical track layout. Note: RailSystemModel (rsm.uic.org) is a systemic model for describing the topology-based railway infrastructure as needed by various applications. RailSystemModel provides a universal representation of a railway network and associated events to support and facilitate business development within the rail sector.
Eu.DP.62	Info	The EULYNX data format should allow the identification of a track element that follows a previous one.
Eu.DP.63	Req	The EULYNX data format shall allow the calculation of the travelled distance between two geographical elements along a continuous set of routes.
Eu.DP.64	Req	The EULYNX data format shall allow the using of geographical track layout (surveying data).
Eu.DP.65	Head	<b>2.2.4 Additional data</b>
Eu.DP.66	Req	The EULYNX data format shall be able to include free text comments for each object.
Eu.DP.67	Head	<b>2.3 Position reference</b>
Eu.DP.68	Req	The EULYNX data format shall be able to deal with geographical data for the objects (GPS, x y z coordinate system shall be used).
Eu.DP.69	Req	The EULYNX data format shall be able to deal with topological positioning (punctual, linear).
Eu.DP.70	Req	The position reference shall be declared inside the data model.
Eu.DP.71	Req	The EULYNX data format shall be able to to handle location and distance information to a resolution of 10 cm along the track.



ID	Type	Requirement
Eu.DP.72	Head	<b>2.4 Version management</b>
Eu.DP.74	Req	The EULYNX data format shall include dedicated objects for version management for the complete data model and the tools.
Eu.DP.75	Req	The version management shall include a version for the data structure and a separate version for the data.
Eu.DP.76	Head	<b>2.5 Safety and Data integrity</b>
Eu.DP.77	Req	The safety level of the EULYNX data format shall be defined by the process/architecture surrounding the EULYNX data format and not by the EULYNX data format itself.
Eu.DP.78	Req	The integrity of data exchanged between Railways and Supplier(s) shall be ensured by the process surrounding the EULYNX data format and not by the EULYNX data format itself.
Eu.DP.79	Req	The integrity of data of the EULYNX data format shall be ensured by the process surrounding the EULYNX data format and not by the EULYNX data format itself
Eu.DP.80	Req	The EULYNX data format shall support authentication of model data by the process/architecture surrounding the EULYNX data format.
Eu.DP.81	Req	The EULYNX data format shall support the definition and proving of valid ranges and valid enumerations for attributes of objects.
Eu.DP.82	Head	<b>2.6 Documentation</b>
Eu.DP.83	Req	The EULYNX data format shall be documented.
Eu.DP.84	Req	The EULYNX data format documentation shall be in English.
Eu.DP.85	Req	All elements within the EULYNX data format structure shall be named in English.
Eu.DP.101	Req	Multilanguage naming in the EULYNX data format shall be possible for national specific elements.
Eu.DP.86	Req	The EULYNX data format documentation shall include a glossary for objects and attributes.
Eu.DP.110	Head	<b>2.7 Requirement management</b>
Eu.DP.111	Req	The model shall describe the implemented requirement management.
Eu.DP.114	Req	Requirements inherited from current IM data models shall be kept in the model.
Eu.DP.115	Req	The model shall trace requirements to the realising elements.
Eu.DP.112	Head	<b>2.8 Publication</b>

# EULYNX Data preparation requirements

ID	Type	Requirement
Eu.DP.113	Req	The EULYNX model shall be published as HTML on dataprep.eulynx.eu.
Eu.DP.116	Req	The XSD files derived from the EULYNX DP model shall be published on dataprep.eulynx.eu.
Eu.DP.117	Req	The XMI version of the EULYNX DP model shall be published on dataprep.eulynx.eu.
Eu.DP.118	Info	Other formats may be published on dataprep.eulynx.eu.