

**Engineering data exchange format for use in industrial automation systems engineering - Part 1: Architecture and General Requirements**

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ICS 25.040.40, 35.060, 35.240.50

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EUROPEAN STANDARD

**EN 62714-1**

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**Engineering data exchange format for use in industrial  
automation systems engineering - Part 1: Architecture and  
General Requirements  
(IEC 62714-1:2014)**

Format d'échange de données techniques pour une  
utilisation dans l'ingénierie des systèmes d'automatisation  
industrielle - AutomationML - Partie 1: Architecture et  
exigences générales  
(CEI 62714-1:2014)

Datenaustauschformat für Planungsdaten industrieller  
Automatisierungssysteme (AutomationML) - Teil 1:  
Architektur und allgemeine Festlegungen  
(IEC 62714-1:2014)

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**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

## Foreword

The text of document 65E/385/FDIS, future edition 1 of IEC 62714-1, prepared by SC 65E "Devices and integration in enterprise systems" of IEC/TC 65 "Industrial-process measurement, control and automation" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62714-1:2014.

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- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2017-07-31

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In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60027 (Series)	NOTE	Harmonized as EN 60027 (Series).
IEC 62264-1	NOTE	Harmonized as EN 62264-1.
IEC 62714-2	NOTE	Harmonized as EN 62714-2
ISO 80000-1	NOTE	Harmonized as EN ISO 80000-1.

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## INTRODUCTION

IEC 62714 is a solution for data exchange focusing on the domain of automation engineering.

The data exchange format defined in the IEC 62714 series (Automation Markup Language, AML) is an XML schema based data format and has been developed in order to support the data exchange in a heterogeneous engineering tools landscape.

The goal of AML is to interconnect engineering tools in their different disciplines, e.g. mechanical plant engineering, electrical design, process engineering, process control engineering, HMI development, PLC programming, robot programming, etc.

AML stores engineering information following the object oriented paradigm and allows modelling of physical and logical plant components as data objects encapsulating different aspects. An object may consist of other sub-objects, and may itself be part of a larger composition or aggregation. Typical objects in plant automation comprise information on topology, geometry, kinematics and logic, whereas logic comprises sequencing, behaviour and control. Therefore, an important focus in the data exchange in engineering is the exchange of object oriented data structures, geometry, kinematics and logic.

AML combines existing industry data formats that are designed for the storage and exchange of different aspects of engineering information. These data formats are used on an "as-is" basis within their own specifications and are not branched for AML needs.

The core of AML is the top-level data format CAEX that connects the different data formats. Therefore, AML has an inherent distributed document architecture.

Figure 1 illustrates the basic AML architecture and the distribution of topology, geometry, kinematics and logic information.

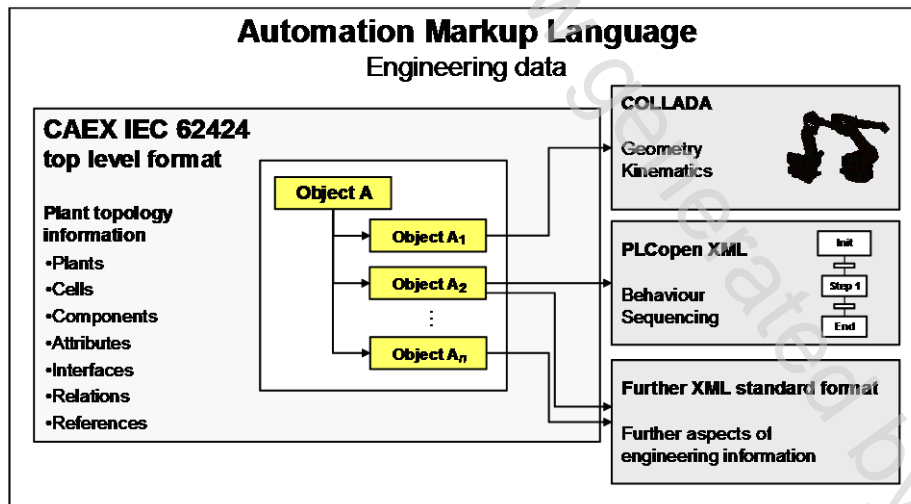


Figure 1 – Overview of the engineering data exchange format AML

Due to the different aspects of AML, the IEC 62714 series consists of different parts focussing on different aspects:

- IEC 62714-1: Architecture and general requirements

This part specifies the general AML architecture, the modelling of engineering data, classes, instances, relations, references, hierarchies, basic AML libraries and extended AML concepts. It is the basis of all future parts, and it provides mechanisms to reference other sub formats.

- IEC 62714-2: Role class libraries  
This part is intended to specify additional AML libraries.
- IEC 62714-3: Geometry and kinematics  
This part is intended to specify the modelling of geometry and kinematics information.
- IEC 62714-4: Logic  
This part is intended to specify the modelling of logics, sequencing, behaviour and control related information.

Further parts may be added in the future in order to interconnect further data standards to AML.

As long as no further parts describe the integration of further standards, it is important to focus on a limited set of sub data formats. Otherwise it would open up the usage of any data format and data exchange would not work.

Annex A gives an informative introduction, use cases and examples regarding AML.

Annex B gives an informative XML representation of the libraries defined in this part of IEC 62714.

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# ENGINEERING DATA EXCHANGE FORMAT FOR USE IN INDUSTRIAL AUTOMATION SYSTEMS ENGINEERING – AUTOMATION MARKUP LANGUAGE –

## Part 1: Architecture and general requirements

### 1 Scope

This part of IEC 62714 specifies general requirements and the architecture of AML for the modelling of engineering information which is exchanged between engineering tools for industrial automation and control systems. Its provisions apply to the export/import applications of related tools.

This part of IEC 62714 does not define details of the data exchange procedure or implementation requirements for the import/export tools.

### 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 62424:2008, *Representation of process control engineering – Requests in P&I diagrams and data exchange between P&ID tools and PCE-CAE tools*

IEC 62714 (all parts), *Engineering data exchange format for use in industrial automation systems engineering – Automation Markup Language*

ISO/IEC 9834-8, *Information technology – Open Systems Interconnection – Procedures for the operation of OSI Registration Authorities: Generation and registration of Universally Unique Identifiers (UUIDs) and their use as ASN.1 Object Identifier components*

ISO/PAS 17506, *Industrial automation systems and integration — COLLADA digital asset schema specification for 3D visualization of industrial data*

COLLADA 1.4.1:March 2008, COLLADA – Digital Asset Schema Release 1.4.1  
(available at <[http://www.khronos.org/files/collada\\_spec\\_1\\_4.pdf](http://www.khronos.org/files/collada_spec_1_4.pdf)>)

Extensible Markup Language (XML) 1.0 1.0:2004, W3C Recommendation  
(available at <<http://www.w3.org/TR/2004/REC-xml-20040204/>>)

PLCopen XML 2.0:December 3rd 2008 and PLCopen XML 2.0.1:May 8th 2009, XML formats for IEC 61131-3  
(available at <<http://www.plcopen.org/>>)

### 3 Terms, definitions and abbreviations

#### 3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.