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INTERNATIONAL STANDARD

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colour inside

Engineering data exchange format for use in industrial automation systems engineering – Automation markup language – Part 2: Role class libraries

Format d'échange de données techniques pour une utilisation dans l'ingénierie des systèmes d'automatisation industrielle – Automation markup language – Partie 2: Bibliothèques de classes de rôles

IEC 62714-2:2015-03(en-fr)

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FOREWORD

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International Standard IEC 62714-2 has been prepared by subcommittee 65E: Devices and integration in enterprise systems, of IEC technical committee 65: Industrial-process measurement, control and automation.

The text of this standard is based on the following documents:

CDV	Report on voting
65E/300/CDV	65E/390/RVC

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 62714 series, published under the general title *Engineering data exchange format for use in industrial automation systems engineering – Automation Markup Language*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

The data exchange format defined in IEC 62714 (Automation Markup Language, AML) is an XML schema based data format and has been developed in order to support the data exchange between engineering tools in a heterogeneous engineering tool landscape. IEC 62714-1 gives an overview about the format.

The goal of AML is to interconnect engineering tools from the existing heterogeneous tool landscape 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.

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 “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, kinematic and logic information.

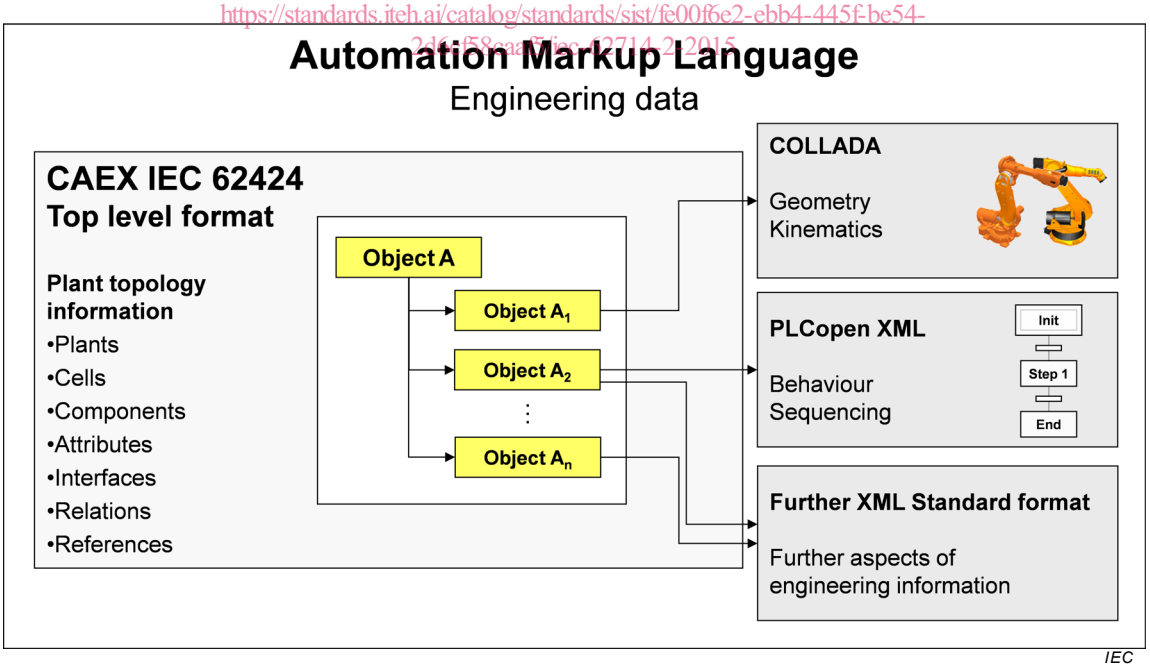

Figure 1 – Overview of the engineering data exchange format (AML)

Due to the different aspects of AML, IEC 62714 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.

- IEC 62714-2: Role class libraries

  This part specifies additional AML libraries.

- IEC 62714-3[1]: Geometry and kinematics

  This forthcoming part is intended to specify the modelling of geometry and kinematics information.

  In addition, another part (possibly Part 4) will 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.

Clause 5 describes normative role class libraries within AML.

Annex A describes the informative AML extended role class library.

Annex B gives an informative example for the usage of AML role classes.

Annex C shows some user-defined role class libraries of different origins.

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

[1] Under consideration.

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

Part 2: Role class libraries

1 Scope

The IEC 62714 series specifies an engineering data exchange format for use in industrial automation systems.

This part of IEC 62714 specifies normative as well as informative AML role class libraries for the modelling of engineering information for the exchange between engineering tools in the plant automation area by means of AML. Moreover, it presents additional user defined libraries as an example. 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 62714-1:2014, *Engineering data exchange format for use in industrial automation systems engineering – Automation Markup Language – Part 1: Architecture and general requirements*

IEC 61360-4, *Standard data element types with associated classification scheme for electric components – Part 4: IEC reference collection of standard data element types and component classes* (available at http://std.iec.ch/iec61360)

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

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

3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 62714-1:2014, as well as the following apply.

3.1.1
robot
industrial robot
automatically controlled, reprogrammable, multipurpose manipulator, programmable in three or more axes, which can be either fixed in place or mobile for use in industrial automation applications

[SOURCE: ISO 8373:2012, 2.9, modified – the notes have been removed]

3.1.2
sensor
unit that detects objects or obstacles in its monitoring range or that is affected by a measurand and which provides an electrical signal or data representing the detection or the measurement

EXAMPLE Limit switch, proximity sensor, pressure transmitter, vibration transducer, strain gauge, photo detector.

3.1.3
measurand
particular quantity subject to measurement

[SOURCE: IEC 60050-311:2001, 311-01-03]

3.1.4
actuator
functional unit that generates the manipulated variable, required to drive the final controlling element, from the output variable of the controlling element

EXAMPLE Contactor, variable speed drive.

[SOURCE: IEC 60050-351:2013, 351-49-07, modified – the notes, example, and figures have been removed]

3.2 Abbreviations

For the purposes of this document the abbreviations given in IEC 62714-1:2014, as well as those given in Table 1, apply.

Table 1 – Abbreviations

AGV	Automated guided vehicle
IPC	Industrial PC
NC	Numerical controller
PAC	Programmable automation controller
PC	Personal computer
RC	Robot controller

4 Conformity

To claim conformity to this part of IEC 62714 with respect to the support of AML, the requirements of Clause 5 shall be fulfilled.

5 AML role classes

5.1 Structure and references

Table 2 gives an overview about the AML related role class libraries specified in IEC 62714-1 and this part of IEC 62714.

Table 2 – Structure of AML role class libraries

AutomationMLBaseRoleClassLib	IEC 62714-1 – normative
AutomationMLDMIRoleClassLib AutomationMLCMIRoleClassLib AutomationMLBMIRoleClassLib AutomationMLCSRoleClassLib	IEC 62714-2 – normative
AutomationMLExtendedRoleClassLib	IEC 62714-2 – informative
UserDefinedRoleClassLib_RedBookVDMA UserDefinedRoleClassLibCompanySpecificStructure UserDefinedRoleClassLib_FoodAndBeverage UserDefinedRoleClassLibPandixPCE UserDefinedRoleClassLibPandixPPE	IEC 62714-2 – informative, user-defined examples

NOTE 1 The concept of role class libraries, especially user-defined role class libraries is described in IEC 62424:2008 and IEC 62714-1:2014, 7.4.

NOTE 2 The role class tree (see Figure 2) does not necessarily reflect the inheritance relations between the classes, but only serves for better readability. The inheritance relation is depicted by the class referenced in curly brackets.

All role class libraries defined in this part of IEC 62714 are based on the AutomationMLBaseRoleClassLib defined in IEC 62714-1:2014 which is shown in Figure 2.

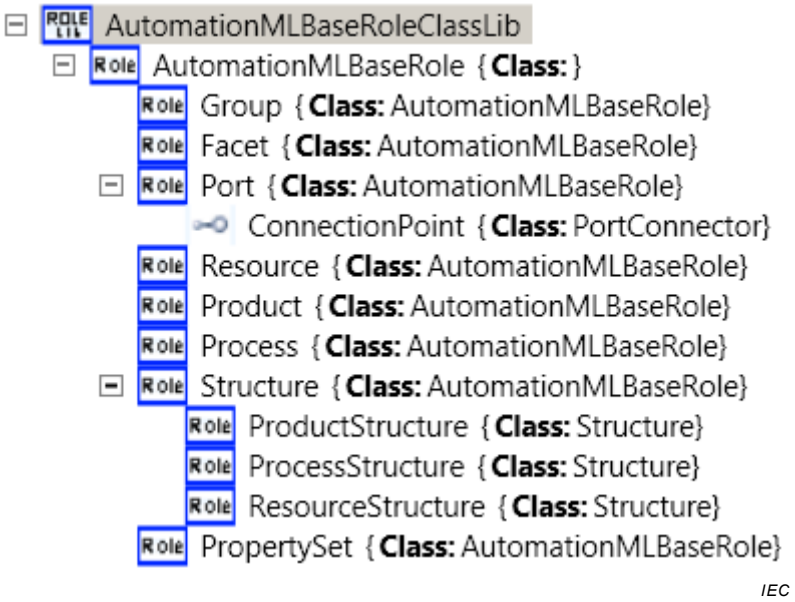

Figure 2 – AutomationMLBaseRoleClassLib defined in IEC 62714-1:2014

Subclause 5.2 defines a normative AML role class library for the discrete manufacturing industry (AutomationMLDMIRoleClassLib).