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Industrial automation systems and integration — Integration of industrial data for exchange, access and sharing

Part 2: Integration and mapping methodology

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National foreword

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Part 2: Integration and mapping methodology

Systèmes d'automatisation industrielle et intégration — Intégration des données industrielles pour l'échange, l'accès et le partage —

Partie 2: Méthodologie d'intégration et de «mapping»

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of normative document:

— an ISO Publicly Available Specification (ISO/PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50 % of the members of the parent committee casting a vote;

— an ISO Technical Specification (ISO/TS) represents an agreement between the members of a technical committee and is accepted for publication if it is approved by 2/3 of the members of the committee casting a vote.

An ISO/PAS or ISO/TS is reviewed after three years in order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn. If the ISO/PAS or ISO/TS is confirmed, it is reviewed again after a further three years, at which time it must either be transformed into an International Standard or be withdrawn.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO/TS 18876-2 was prepared by Technical Committee ISO/TC 184, *Industrial automation systems and integration*, Subcommittee SC 4, *Industrial data*.

This Technical Specification is organized as a series of parts, each published separately. The structure of this Technical Specification is described in ISO/TS 18876-1.

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0 Introduction

0.1 Overview of ISO 18876

This Technical Specification establishes an architecture, a methodology, and other specifications for integrating industrial data for exchange, access and sharing. It supports:

— data sharing and data integration;

— specification of mappings between models;

— data transformation.

ISO/TS 18876-1 provides an overview of the architecture and methodology of this Technical Specification.

0.2 Organization of this part of ISO 18876

The organization of this part of ISO 18876 is as follows:

— clause 1 specifies the scope and field of application of this part of ISO 18876;

— clause 2 identifies additional standards that, through references in this part of ISO 18876, constitute provisions of this part of ISO 18876;

— clause 3 defines terms used in this part of ISO 18876;

— clause 4 describes a number of usage scenarios for the application of the methods defined in this part of ISO 18876;

— clause 5 specifies the methods for integrating application models, and is supported by a detailed activity model presented in Annex B.

The methods specified in clause 5 are independent of modelling languages, mapping languages, and particular integration models. Annex C provides a checklist that can be used to ensure that all required stages in the integration and mapping process have been followed.

0.3 Target Audiences

The target audience for this document is modellers, analysts, systems integrators, and systems developers with a need to integrate application models across a range of systems and/or enterprise functions. The target audience for the introduction to this document is technical managers responsible for integration projects with a need to assess the applicability of this standard.

0.4 Conventions

This part of ISO 18876 includes provisions that indicate requirements strictly to be followed in order to conform to the standard. Such provisions are indicated through the use of the words “shall” and “shall not”. This part of ISO 18876 also includes provisions that indicate that among several possibilities one is recommended as particularly suitable. Such provisions are indicated through the use of the words “should” and “should not”. Additional material that illustrates the provisions of this part of ISO 18876 is presented in the form of notes, examples, and in the informative annexes B, C, and D.

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Industrial automation systems and integration — Integration of industrial data for exchange, access and sharing —

Part 2: Integration and mapping methodology

1 Scope

This Technical Specification establishes an architecture, a methodology, and other specifications for integrating industrial data for exchange, access and sharing. Together these support the following activities:

— integrating data which may be:

  — from different sources or with different model contexts,

  — described by different models, or

  — defined in different modelling languages;

— sharing data among applications through systems integration architectures;

— resolving conflict between models developed with different objectives;

— translating data between different encodings;

— translating models between different modelling languages.

This part of ISO 18876 specifies methods for the following:

— creating and extending integration models;

— evaluating and selecting an integration model that can integrate two or more application models;

— creating an application model that is a constrained subset of an integration model to support particular application domain requirements for exchange, sharing, or both;

— creating a mapping specification between an application model and an integration model.

The following are within the scope of this part of ISO 18876:

— modelling language independent methods for creating and extending an integration model;

— methods for integrating an application model with an integration model;

— mapping language independent methods for mapping an application model to an integration model;

— criteria for the selecting modelling languages and mapping languages that can be used within the specified methods for integration and mapping.

The following are outside the scope of this part of ISO 18876:

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— the structure and content of particular integration models;

— methods for creating and extending particular integration models;

— methods for mapping application models to particular integration models.

NOTE The specific methods that apply to mappings between particular application models and integration models depend on the modelling paradigm(s) applied and on the structure and content of the models.

2 Normative references

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

ISO/IEC 8824-1:1998, *Information technology — Abstract Syntax Notation One (ASN.1): Specification of basic notation*

ISO 10303-1:1994, *Industrial automation systems and integration — Product data representation and exchange — Part 1: Overview and fundamental principles*

ISO/TS 18876-1:2003, *Industrial automation systems and integration — Integration of industrial data for exchange, access and sharing — Part 1: Architecture overview and description*

3 Terms, definitions, and abbreviations

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply; those taken or adapted from ISO 10303-1 and ISO/TS 18876-1 are repeated below for convenience.

NOTE 1 Definitions copied verbatim from other standards are followed by a reference to the standard in brackets, such as "[ISO 10303-1]". In these cases the definition in the referenced document is normative; its repetition here is informative and in the case of any discrepancy the definition in the referenced document has precedence. An explanatory note follows definitions that have been adapted from other standards. In these cases the definition given here is normative for the purposes of this part of ISO 18876.

3.1.1
application model (AM)
model that represents information used for some particular purpose

NOTE 1 Some application models are also integration models (see 3.1.15).

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