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Industrial automation systems and integration — Manufacturing software capability profiling for interoperability —

Part 1: Framework

Systèmes d'automatisation industrielle et intégration — Profil d'aptitude du logiciel de fabrication pour interopérabilité —

Partie 1: Cadre

Reference number
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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.

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 16100-1 was prepared by Technical Committee ISO/TC 184, *Automation systems and integration*, Subcommittee SC 5, *Architecture, communications and integration frameworks*.

This second edition cancels and replaces the first edition (ISO 16100-1:2002), which has been technically revised.

ISO 16100 consists of the following parts, under the general title *Industrial automation systems and integration — Manufacturing software capability profiling for interoperability*:

— *Part 1: Framework*

— *Part 2: Profiling methodology*

— *Part 3: Interface services, protocols and capability templates*

— *Part 4: Conformance test methods, criteria and reports*

— *Part 5: Methodology for profile matching using multiple capability class structures*

The following part is planned:

— *Part 6: Interface services and protocols for matching profiles based on multiple capability class structures*

Introduction

The motivation for ISO 16100 stems from the industrial and economic environment noted by ISO/TC 184/SC 5. In particular, there is broad recognition by industry that application software and the expertise to apply that software are assets of the enterprise. Industry feedback has noted the need for improvement and continued development of current design and manufacturing standards to enable software interoperability.

ISO 16100 specifies a manufacturing information model that characterizes software-interfacing requirements. With interfacing requirements clearly expressed, standard interfaces can be more easily and quickly developed using the Interface Definition Language (IDL) or an appropriate programming language, such as Java and C++. These standard interfaces are expected to enable the interoperability among manufacturing software tools (modules or systems).

The Unified Modeling Language (UML) is used in this International Standard for modelling these interfaces. Also, the manufacturing information model can be used to develop commonly sharable database schema using languages such as the Extensible Markup Language (XML).

Sectors of the manufacturing industry — such as automotive, aerospace, machine tool manufacturing, computer peripheral manufacturing, and mould and die manufacturing — that intensively use computer-aided design (CAD), computer-aided manufacturing (CAM), numerical control (NC) programming, computer-aided engineering (CAE), product data management (PDM) and manufacturing execution systems (MES) will directly benefit from ISO 16100. The software interface requirements in ISO 16100 will facilitate the development of:

a) interoperable design and manufacturing software tools leading to shortened product development time;

b) new software tools that can be easily integrated with current technologies leading to more choices in the market;

c) new application software leading to reduced capital expenditures to replace legacy systems;

d) programming interfaces and database schema leading to cost savings by not having to develop proprietary interfaces for point-to-point software integration.

The end result will be a reduction in product and manufacturing information management cost and lower product costs.

ISO 16100 enables manufacturing software integration by providing the following:

— standard interface specifications that allow information exchange among software units in industrial automation systems developed by different vendors;

— software capability profiling, using a standardized method to enable users to select software units that meet their functional requirements;

— conformance tests that ensure the integrity of the software integration.

At the time of publication of this edition of this part of ISO 16100, there are five published parts to ISO 16100 and one planned part. This part of ISO 16100 specifies a framework for interoperability of a set of manufacturing software products used in the manufacturing domain and its integration into a manufacturing application. ISO 16100-2 specifies a methodology for constructing profiles of manufacturing software capabilities, and includes a methodology for creating manufacturing software capability profiles as well as for using these profiles at the developing stage of manufacturing applications. ISO 16100-3 specifies the interface protocol and templates for various manufacturing application areas. ISO 16100-4 specifies the concepts and rules for the conformity assessment of the other parts of ISO 16100. ISO 16100-5 specifies a methodology for profile matching using multiple capability class structures. ISO 16100-6 will specify the interface services and protocols for matching profiles based on multiple capability class structures.