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Australian Standard™

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

Part 1: Framework

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PREFACE

This Standard was prepared by the Standards Australia Committee IT-006, Information Technology for Industrial Automation and Integration.

This Standard is identical with, and has been reproduced from, ISO 16100-1:2002, *Industrial automation systems and integration—Manufacturing software capability profiling for interoperability,* Part 1*: Framework*.

The objective of this Standard is to provide a framework for the interoperability of a set of software products used in the manufacturing domain and to facilitate its integration into a manufacturing application. This framework addresses information exchange models, software object models, interfaces, services, protocols, capability profiles, and conformance test methods.

This Standard is Part 1 of AS ISO 16100—2004, *Industrial automation systems and integration—Manufacturing software capability profiling for interoperability*, which is published in parts as follows:

Part 1: Framework (this Standard)
Part 2: Profiling methodology

The terms 'normative' and 'informative' are used to define the application of the annex to which they apply. A normative annex is an integral part of a standard, whereas an informative annex is only for information and guidance.

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15745-1	Industrial automation systems and integration—Open systems application integration framework—Part 1: Generic reference description	15745.1	Industrial automation systems and integration—Open systems application integration framework, Part 1: Generic reference description

CONTENTS

Page

1 Scope ... 1

2 Normative references ... 1

3 Terms and definitions ... 1

4 Abbreviations ... 3

5 Manufacturing application ... 4
5.1 Reference application framework ... 4
5.2 Manufacturing domain ... 5
5.3 Manufacturing processes ... 6
5.4 Manufacturing resources ... 6
5.5 Manufacturing information ... 7

6 Manufacturing software interoperability framework ... 7
6.1 Manufacturing software unit interoperability ... 7
6.2 Functional relationships between the manufacturing software units ... 8
6.3 Services, interfaces, and protocols ... 9
6.4 Manufacturing software unit capability profiling ... 10

7 Conformance ... 10

Annex A (informative) Manufacturing application reference model ... 11
A.1 Model of a manufacturing enterprise ... 11
A.1.1 Activity domains ... 11
A.1.2 Business planning and logistics level ... 12
A.1.3 Customer relationship management ... 12
A.2 Corporate services ... 12
A.3 Material and energy management ... 13
A.4 Engineering support ... 13
A.5 Manufacturing operations and control level ... 13
A.6 Production control domain reference model ... 14

Annex B (informative) Examples of the manufacturing activity reference model ... 15
B.1 Activity diagram convention ... 15
B.2 *Develop Products* activity ... 16
B.3 *Design Products* activity ... 19
B.4 *Develop Conceptual Design* activity ... 20
B.5 *Develop Detailed Design* activity ... 21
B.6 *Engineer Process* activity ... 24
B.7 *Conceptual Process Planning* activity ... 25
B.8 *Select Manufacturing Resources* activity ... 26
B.9 *Develop Detailed Process Plan* activity ... 27
B.10 *Generate Operations* activity ... 29
B.11 *Generate Control Programs* activity ... 31
B.12 *Generate Shop Floor Routing* activity ... 32
B.13 *Execute Manufacturing Orders* activity ... 33
B.14 *Develop Operation Sequence and Detailed Schedule* activity ... 36
B.15 *Dispatch Production Units* activity ... 38
B.16 *Track Production Units and Resources* activity ... 39
B.17 *Manage Factory Floor Data and Documents* activity ... 41
B.18 *Collect Production Data* activity ... 43
B.19 *Analyze Data* activity ... 44

Annex C (informative) Use Cases ... 46
C.1 Capability use cases and related scenarios ... 46
C.1.1 Software capability use cases ... 46
C.1.2 User requirements ... 46

Page

C.1.3 Interoperability requirements 46
C.2 Use case — "Assembling a new functionality" 46
C.3 Use case — "Selecting appropriate software" 47
C.4 Use case — "Substituting one software component with another" 47
C.5 Use case — "Migrating to another platform" 47
C.6 Use case — "Managing software inventory" 47
C.7 Use case — "Certifying software to a capability profile" 47
C.8 Use case — "Distributing software to the mass market" 47
C.9 Use case — "Managing Manufacturing Changes" 48
C.10 Use case — "Registering New Software" 48
C.11 Use case — Requirements for Common Understanding 48
C.12 Use case — Business Capability Reference Model 48
C.13 Use case — Web search for software component capability 49
C.14 Use case — Software component dependency statements 49
C.15 Use case — Matching software capability to an application requirement 49
Annex D (informative) Other terms and definitions 50

INTRODUCTION

The motivation for ISO 16100 stems from the industrial and economic environment noted by ISO/TC 184/SC5. 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 Modelling 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 mold 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 :

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

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

c) conformance tests that ensure the integrity of the software integration.

ISO 16100 consists of four parts. Part 1 specifies a framework for interoperability of a set of manufacturing software products used in the manufacturing domain and its integration into a manufacturing application. Part 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. Part 3 specifies the interface protocol and templates for various manufacturing application areas. Part 4 specifies the concepts and rules for the conformity assessment of the other parts of ISO 16100.

NOTES

AUSTRALIAN STANDARD

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

Part 1:
Framework

1 Scope

Part 1 of ISO 16100 specifies a framework for the interoperability of a set of software products used in the manufacturing domain and to facilitate its integration into a manufacturing application (see Annex A for a discussion of a manufacturing application). This framework addresses information exchange models, software object models, interfaces, services, protocols, capability profiles, and conformance test methods.

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 15704, *Industrial automation systems — Requirements for enterprise-reference architectures and methodologies*

ISO 15745-1, *Industrial automation systems and integration — Open systems application integration framework — Part 1: Generic reference description*

ISO/IEC 19501-1, *Information technology — Unified Modelling Language (UML) — Part 1: Specification*

IEC 62264-1, *Enterprise-Control System Integration — Part 1: Models and Terminology*

IEEE 1320.1-1998, *Standard for Functional Modelling Language — Syntax and Semantics for IDEF0*

W3C Recommendation Feb 1998, *Extensible Markup Language (XML) 1.0*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply. Other relevant terms are defined in Annex D.

3.1
advanced planning
production planning over time horizons of months or years using constraint models that treat both materials and capacity

NOTE In some cases, the planning system includes master production scheduling, material requirements planning, or capacity planning.

3.2
CAD/PDM
computer systems that are used for product design and modelling, engineering, product data management, and process data management

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