



BSI Standards Publication

**Automation systems and  
integration — Applications  
integration approach using  
information exchange  
requirements modelling and  
software capability profiling**

**National foreword**

This Published Document is the UK implementation of ISO/TR 18161:2013.

The UK participation in its preparation was entrusted to Technical Committee AMT/5, Industrial architectures and integration frameworks.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2013. Published by BSI Standards Limited 2013

ISBN 978 0 580 82530 9

ICS 25.040.01

**Compliance with a British Standard cannot confer immunity from legal obligations.**

This Published Document was published under the authority of the Standards Policy and Strategy Committee on 31 July 2013.

**Amendments issued since publication**

Date	Text affected
------	---------------

---

---

---

**Automation systems and  
integration — Applications integration  
approach using information exchange  
requirements modelling and software  
capability profiling**

*Systèmes d'automatisation et d'intégration — Approche d'intégration  
des applications utilisant des exigences d'échange d'informations de  
modélage et un logiciel de capacité de profilage*





**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2013

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
Case postale 56 • CH-1211 Geneva 20  
Tel. + 41 22 749 01 11  
Fax + 41 22 749 09 47  
E-mail [copyright@iso.org](mailto:copyright@iso.org)  
Web [www.iso.org](http://www.iso.org)

Published in Switzerland

# Contents

	Page
Foreword.....	iv
Introduction.....	v
<b>1 Scope.....</b>	<b>1</b>
<b>2 Normative references.....</b>	<b>1</b>
<b>3 Terms and definitions.....</b>	<b>1</b>
<b>4 Abbreviated terms.....</b>	<b>3</b>
<b>5 Applications interoperability requirements modelling.....</b>	<b>3</b>
5.1 Application integration framework in ISO 15745 and ISO 18435.....	3
5.2 Elements of information exchanges in ISO 18435.....	4
5.3 Context for information exchange requirements.....	5
5.4 Content for information exchange requirements.....	6
5.5 Conveyance for information exchange.....	7
5.6 ADME for the smart pump application.....	7
<b>6 Approach for smart pump application interoperability.....</b>	<b>8</b>
6.1 Smart pump system information model.....	8
6.2 Resolving ambiguity using OTD.....	8
6.3 Application integration using ISO 18435.....	9
<b>7 Constructing AIME and ADME for smart pump application.....</b>	<b>9</b>
7.1 Overview.....	9
7.2 AIME for pump control application.....	9
7.3 AIME for pump diagnostics application.....	10
7.4 ADME for the integrated smart pump application.....	10
<b>8 General procedures for achieving application integration.....</b>	<b>10</b>
<b>Annex A (informative) Modelling smart pump application.....</b>	<b>12</b>
<b>Annex B (informative) Capability profiling templates of application software units.....</b>	<b>14</b>
<b>Annex C (informative) Application software unit capability profiles.....</b>	<b>30</b>
<b>Annex D (informative) AIME and ADME in smart pump application.....</b>	<b>34</b>
<b>Bibliography.....</b>	<b>40</b>

## 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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2. [www.iso.org/directives](http://www.iso.org/directives)

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received. [www.iso.org/patents](http://www.iso.org/patents)

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

The committee responsible for this document is Technical Committee ISO/TC 184, *Automation systems and integration*, Subcommittee SC 5, *Architecture, communication and integration frameworks*.

## Introduction

The motivation for ISO 16100 stems from the industrial and economic environment, in particular:

- a) a growing base of vendor-specific solutions;
- b) user difficulties in applying standards;
- c) the need to move to modular sets of system integration tools;
- d) the recognition that application software and the expertise to apply that software are assets of the enterprise.

ISO 16100 is an International Standard for the computer-interpretable and human-readable representation of a capability profile. Its goal is to provide a method to represent the capability of manufacturing application software relative to its role throughout the life cycle of a manufacturing application, independent of a particular system architecture or implementation platform. This can lead to reduced production and information management costs to users and vendors/suppliers of manufacturing applications.

ISO 18435 provides a framework for harmonized use of industry and international standards in order to integrate control, diagnostics, prognostics, capability assessment and maintenance applications. By using an ISO 15745 application integration modelling approach, key interoperability interfaces can be identified and concisely documented in terms of profiles.

ISO 18435 also provides the elements and the rules to describe the integration requirements of an automation application. The elements include the key aspects when integrating an automation application with other applications and the relationships of these key aspects. The rules include the information exchanges to support interoperability within an application and between applications.

This Technical Report describes a use case of modelling the smart pump application described in [Annex A](#). The detailed manufacturing software unit profiling templates are described in [Annex B](#). The detailed manufacturing software unit profiles are described in [Annex C](#). The information exchanged among manufacturing software units in the smart pump application based on ISO 18435 methodology is described in [Annex D](#).

Currently in preview, click buy full version

# Automation systems and integration — Applications integration approach using information exchange requirements modelling and software capability profiling

## 1 Scope

This Technical Report describes an approach for using ISO 16100 and ISO 18435 to specify information exchange requirements between applications. This approach is based on the use of ISO 18435 application interaction matrix element (AIME)/application domain matrix element (ADME) templates in conjunction with ISO 16100 manufacturing software unit (MSU) capability profiles.

This Technical Report also provides an example approach as applied to describing the interoperability requirements of the integrated smart pump application, which comprises the pump control application and the pump diagnostics application.

## 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.

ISO 16100-3:2005, *Industrial automation systems and integration — Manufacturing software capability profiling for interoperability — Part 3: Interface services, protocols and capability templates*

ISO 16100-5:2009, *Industrial automation systems and integration — Manufacturing software capability profiling for interoperability — Part 5: Methodology for profile matching using multiple capability class structures*

ISO 18435-2:2012, *Industrial automation systems and integration — Diagnostics, capability assessment and maintenance applications integration — Part 2: Descriptions and definitions of application domain matrix elements*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 16100-3, ISO 16100-5, ISO 18435-2, and the following apply.

### 3.1

#### application domain matrix element

##### ADME

entry in an application domain matrix to organize information exchange among applications

[SOURCE: ISO 18435-2:2012, 3.2]

### 3.2

#### application interaction matrix element

##### AIME

entry in application interaction matrix to denote the capabilities of the resource to support information exchange

[SOURCE: ISO 18435-2:2012, 3.4]