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Part 4: Application methods

Systèmes d'automatisation et intégration — Catalogues de comportement des équipements pour système de production virtuelle —

Partie 4: Méthodes d'application

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Foreword

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This document was prepared by Technical Committee ISO/TC 184, *Automation systems and integration*, Subcommittee SC 5, *Interoperability, integration, and architectures for enterprise systems and automation applications*.

A list of all parts in the ISO 16400 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user’s national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

The ISO 16400 series introduces the concept of an equipment behaviour catalogue (EBC), addresses the requirements of an EBC, and provides requirements and recommendations to generate an executable model representing the dynamic behaviour of a nominal or a physical instance of an equipment. An equipment instance model is implemented, such as a software agent. Such an executable model plays a vital role when configuring virtual production systems used for simulation and verification of a future process as well as monitoring of a current process. Therefore, EBCs will constitute an important part in the development of smart manufacturing.

An EBC enables an efficient and standardized way for a provider of equipment to communicate its dynamic behaviour.

In this document, application methods of an EBC are introduced, and requirements of application methods are described. Application methods of an EBC are defined as methods to integrate elements of an EBC in smart manufacturing applications in a way that is adapted to the smart manufacturing requirements.

This document specifies application methods of an EBC by the usage viewpoints of an EBC with stakeholders including system developers and users, in relation with the usage viewpoints of application systems.

There are several ways to integrate EBCs to smart manufacturing applications according to objectives and scopes of smart manufacturing.

According to the objectives and scopes of smart manufacturing, a level of granularity of integration or types of integration of EBCs can be different. The integration can be achieved via clearly defined interfaces of EBCs to applications. It can be achieved by embedding EBC elements in applications. The other type of integration is to include application behaviour resources into EBCs.

For clarifying the different kinds of application methods of an EBC to manufacturing resources and applications, this document specifies a categorization scheme of EBC application methods based on integration modes between EBCs and manufacturing applications. The categorization scheme helps to clarify differences of various application methods and corresponding use cases of EBCs, and to guide the integration of EBCs in appropriate manner.

This document outlines general requirements, a conceptual application framework, a guide for elaborating application methods, and a categorization of EBC integration methods.

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Automation systems and integration — Equipment behaviour catalogues for virtual production system —

Part 4: Application methods

1 Scope

This document specifies requirements, a framework, a general specification procedure, a guide for elaboration, and categorization of application methods of an equipment behaviour catalogue (EBC) in smart manufacturing.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 16400-1:2020, *Automation systems and integration — Equipment behaviour catalogues for virtual production system — Part 1: Overview*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
application element
component of an information model defining the information requirements in an application method, including application objects, attributes and properties

3.2
aspect
labelled designation for a collection of concepts in a particular context

EXAMPLE Functional, structural, information, security, availability, customer.

Note 1 to entry: An aspect is often expressed as a view across one or more model for a manufacturing system.

Note 2 to entry: Elements of an aspect can have functional, non-functional or other kinds of descriptors.

Note 3 to entry: The identification of an aspect is often the result of prior knowledge, experience and practice in the domain to which the aspect applies.

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