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Automation systems and integration — Assessment on convergence of informatization and industrialization for industrial enterprises —

Part 1: Framework and reference model

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

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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.

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 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

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 22549 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.

Introduction

Convergence of informatization and industrialization (CII) refers to a process that integrates information technology into industrial production. The purpose of convergence is to promote development of industry in a higher value-added direction through wide application of information and restructuring of traditional industry.

CII will promote production and resource allocation in more comprehensive and dynamic as well as optimal way.

ISO 22549 serves as a framework and specification for enterprises to promote the convergence of information technology, its research and development, into the processes of production and operations management.

The purposes of ISO 22549 include, but are not limited to, recommendations and specifications for industrial enterprises:

- for assessing the current situation of CII,
- for finding weakness within the CII,
- for identifying ways to improve CII.

The intended users of ISO 22549 can be grouped into the following categories:

- unaffected third-party assessors, e.g. a consulting company or government department, which conducts a convergence of informatization and industrialization assessment;
- responsible organizations, e.g. production management department, quality management department, inventory management department, etc., which sponsor an assessment of itself or a subordinate organization;
- other industrial sector enterprises.

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Automation systems and integration — Assessment on convergence of informatization and industrialization for industrial enterprises —

Part 1: Framework and reference model

1 Scope

This document defines the basic principles for an assessment concerning the convergence of informatization and industrialization (CII) in industrial enterprises, including the following:

- assessment framework definitions;
- assessment reference model definitions;
- assessment reference model components.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

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

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1 industrialization

procedure of increasing productivity using sequential task allocation to automated or semi-automated methods, or to individuals

3.2 informatization

procedure of generating information from data within a given context using computing and communication technologies

3.3 convergence of informatization and industrialization CII

integrating information technology into industrial production, which promotes the development of industry towards a higher value-added direction through wide application of information and restructuring of traditional industry

3.4 domain application

application of information technology in a single business activity that has a well-defined and identifiable boundary of responsibility and authority for subordinate activities

3.5

Level 4

level containing functions involved in the business-related activities needed to manage a manufacturing organization

Note 1 to entry: See [Annex B](#).

[SOURCE: IEC 62264-1:2013, 3.1.16, modified – “level containing” has been added before functions.]

3.6

Level 3

level containing functions involved in managing the work flows to produce the desired end-products

Note 1 to entry: See [Annex B](#).

[SOURCE: IEC 62264-1:2013, 3.1.17, modified – “level containing” has been added before functions.]

3.7

Level 2

level containing functions involved in monitoring and controlling of the physical process

Note 1 to entry: See [Annex B](#).

[SOURCE: IEC 62264-1:2013, 3.1.17, modified – “level containing” has been added before functions.]

3.8

business activity

partially ordered set of enterprise activities on level 3 and level 4 of functional hierarchy defined in IEC 62264

3.9

comprehensive integration

process of linking together functional applications within an enterprise

3.10

collaborative integration

process of linking together functional applications between different enterprises

3.11

reference model

abstract framework or domain-specific ontology consisting of an interlinked set of clearly defined concepts produced by an expert or body of experts in order to encourage clear communication

Note 1 to entry: A reference model can represent the component parts of any consistent idea, from business functions to system components, as long as it represents a complete set. This frame of reference can then be used to communicate ideas clearly among members of the same community.

3.12

assessment objective

statement, provided as part of the assessment input, which defines the reasons for performing the assessment

[SOURCE: ISO/IEC 33001:2015, 3.2.6]

3.13

assessment expert team

group of one or more professional individuals who jointly perform an assessment process

[SOURCE: ISO/IEC 33001:2015, 3.2.10, modified – the word “professional” has been added before individuals.]

3.14

assessment framework

schema for use in characterizing an industrial enterprise quality characteristic of an implemented industrial enterprise

4 Abbreviated terms

CII Convergence of Informatization and Industrialization

OPM Object-Process Methodology

5 Overview of assessment

5.1 General

The assessed objects of a CII assessment include enterprise manufacturing activities, enterprise business activities and enterprise infrastructure. Manufacturing activities are associated with manufacturing operations management. Enterprise business activities are associated with activities on level 3 and level 4 of functional hierarchy. Enterprise infrastructure is associated with capital investment, equipment and facilities etc.

For assessment of CII, data shall be acquired from Level 2, Level 3 and Level 4 to answer questionnaires. [Annex B](#) provides further information for each Level in detail. However, this document covers enterprise activities beyond Level 4 which are many business activities that support the enterprise but are not directly related to manufacturing and are therefore not addressed by the IEC 62264 functional hierarchy.

5.2 Enterprise assessing system

[Figure 1](#) depicts the architecture of the enterprise assessing system and describes the relationship of Enterprise Assessing process with its input and output objects which combine into Extent of CII using the Aggregating process.

NOTE The figures in this document use the graphical notation of object-process methodology, as defined in ISO 19450. See [Annex A](#).

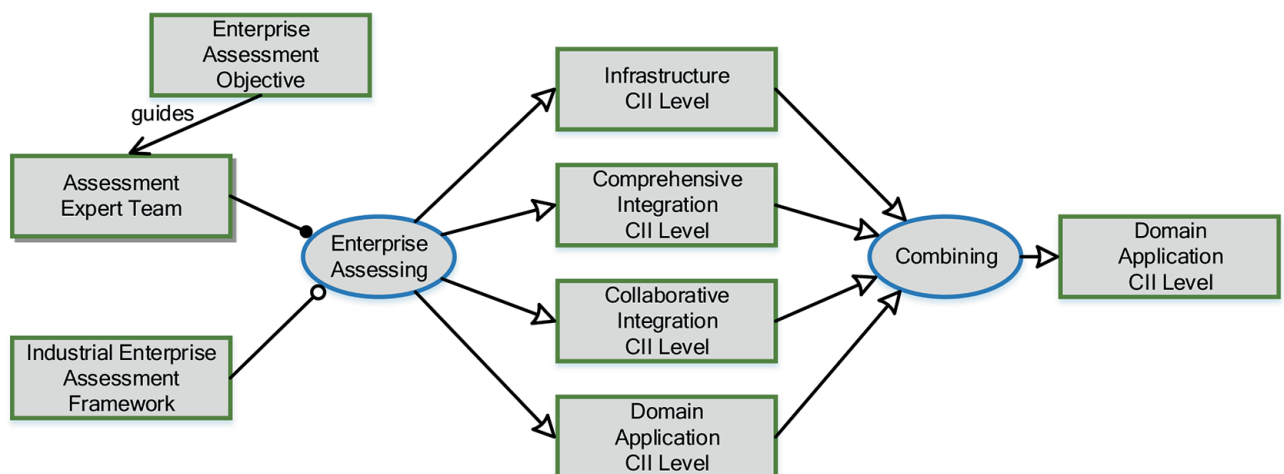


Figure 1 — Enterprise assessing system

Assessment Expert Team enables Enterprise Assessing, which requires Industrial Enterprise Assessment Framework.