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BSI Standards Publication

Industrial automation systems and integration — Integration of life-cycle data for process plants including oil and gas production facilities

Part 8: Implementation methods for the integration of distributed systems: Web Ontology Language (OWL) implementation

bsi.

National foreword

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Contents

Page

Foreword ... **v**

Introduction ... **vi**

1 Scope ... **1**

2 Terms, definitions, and abbreviated terms ... **1**

2.1 Terms and definitions ... **1**

2.2 Abbreviated terms ... 6

3 Fundamental concepts and assumptions ... **7**

3.1 General ... 7

3.2 ISO/TS 15926-7 templates and first order logic rules ... 7

3.3 ISO/TS 15926-4 reference data ... 7

3.4 User-defined taxonomy ... 8

3.5 Templates and specialized templates ... 8

3.6 Use of OWL ... 8

3.7 Namespaces ... 8

4 ISO 15926-2 data model ... **11**

5 ISO/TS 15926-4 reference data ... **11**

6 OWL template specifications ... **12**

6.1 General ... 12

6.2 Contents ... 12

7 Templates ... **12**

7.1 General ... 12

7.2 Template model ... 13

7.3 Metadata ... 13

7.4 Lifted templates ... 13

7.5 Lowered templates ... 14

7.5.1 Instantiating lowered templates ... 14

7.6 Templates in RDF ... 15

7.7 Example: A proto-template ... 15

7.8 Templates as template instances ... 15

7.8.1 p7tm classes for meta-templates ... 15

8 Object information models (OIMs) and specialized templates ... **15**

8.1 General ... 15

8.2 OIM versus specialized template construct ... 16

8.3 Specialization ... 17

8.4 Cardinalities ... 17

8.5 OIM for assemblies ... 17

8.6 Naming convention on template roles ... 17

8.7 Uniqueness context of template roles ... 18

Annex A (normative) **Information object registration** ... **19**

Annex B (normative) **Templates as RDF/OWL n-ary relations** ... **21**

Annex C (normative) **Rules for usage of OWL** ... **25**

Annex D (normative) **Computer interpretable listings** ... **30**

Annex E (informative) **Pattern for an ontology for reference data** ... **31**

Annex F (normative) **Metadata** ... **33**

Annex G (informative) **Assertion versus terminological components** ... **35**

Annex H (informative) **Example use** ... **36**

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Bibliography **45**

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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.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of normative document:

— an ISO Publicly Available Specification (ISO/PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50% of the members of the parent committee casting a vote;

— an ISO Technical Specification (ISO/TS) represents an agreement between the members of a technical committee and is accepted for publication if it is approved by 2/3 of the members of the committee casting a vote.

An ISO/PAS or ISO/TS is reviewed every three years with a view to deciding whether it can be transformed into an International Standard.

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/TS 15926-8 was prepared by Technical Committee ISO/TC 184, *Automation systems and integration,* Subcommittee SC 4, *Industrial data.*

ISO 15926 is organized as a series of parts, each published separately. The structure of ISO 15926 is described in ISO 15926-1.

Each part of ISO 15926 is a member of the following series: data model, reference data, implementation methods, conformance testing methodology and framework, characterization methods, abstract test suites. This part of ISO 15926 is a member of the implementation methods series.

A complete list of parts of ISO 15926 is available from the following URL:

http://www.tc184-sc4. org/titles/OIL_GAS_Tities.htm

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Introduction

ISO 15926 is an International Standard for the representation of process plant life-cycle information. This representation is specified by a generic, conceptual data model that is suitable as the basis for implementation in a shared database or data warehouse. The data model is designed to be used in conjunction with reference data: standard instances that represent information common to a number of users, process plants, or both. The support for a specific life-cycle activity depends on the use of appropriate reference data in conjunction with the data model.

ISO 15926 is organized as a number of parts, each published separately. This part of ISO 15926 specifies the Web Ontology Language (OWL) implementation, using World Wide Web Consortium (W3C) Semantic Web technologies.

This part of ISO 15926 deals with the translation of ISO/TS 15926-4 classes, reference data and the ISO/TS 15926-7 template methodology to Resource Description Framework (RDF) and Web Ontology Language (OWL), which can be used in data modelling, integration and interoperability methods. This part of ISO 15926 is independent of infrastructure and test methods.

This part of ISO 15926 serves as the basis for data integration and interoperability infrastructure and test methods.

This part of ISO 15926 addresses:

— the method of translating ISO/TS 15926-4 classes to RDF/OWL;

— the method of translating ISO/TS 15926-7 templates to RDF/OWL;

— the constructs of specialized templates;

— the use of object information models;

— the constructs of metadata.

Readers of this part of ISO 15926 require an understanding of conceptual data models and of ISO/TS 15926-7.

The target audiences for this part of ISO 15926 are as follows:

— technical managers wishing to determine whether ISO 15926 is appropriate for their business needs;

— implementers wishing to make interface software between legacy systems and ISO 15926 compliant systems;

— implementers wishing to make software internally ISO 15926-compliant for the purpose of data integration.

In this part of ISO 15926, the same English language word might be used to refer to a real world thing, to an EXPRESS representation of the real world thing, or to an RDF/XML representation of the real-world thing. These uses are distinguished by the following typographic conventions:

— if a word or phrase occurs in normal typeface, it refers to the real-world thing;

  EXAMPLE 1 cooling water pump

— if the word or phrase occurs in **bold** typeface with underscores, it refers to the EXPRESS representation from the ISO 15926-2 data model;

  EXAMPLE 2 **class_of_inanimate_physical_object**

— if the word or phrase occurs in **bold** typeface and in CamelCase, it refers to a subtype axiom as defined in ISO/TS 15926-7;

  EXAMPLE 3 **ClassOfInanimatePhysicalObject**

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— if the word occurs in *italic* typeface, it refers to an RDF/RDFS/OWL native entity type.

EXAMPLE 4 *rdfsssubClassOf*

References to identifiers in examples are fictitious.

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Industrial automation systems and integration — Integration of life-cycle data for process plants including oil and gas production facilities —

Part 8: Implementation methods for the integration of distributed systems: Web Ontology Language (OWL) implementation

1 Scope

This part of ISO 15926 specifies implementation methods for integration, sharing, exchange, and handover of life-cycle information about process plants, based on the data model of ISO 15926-2 and the template methodology of ISO/TS 15926-7.

The following are within the scope of this part of ISO 15926:

— defining rules for applying RDF and OWL in the context of this part of ISO 15926;

— mapping of the data model of ISO 15926-2 from its EXPRESS format to OWL-2;

— defining a methodology for creating an OWL ontology for the ISO/TS 15926-4 reference data;

— defining an OWL ontology based on the base templates and the initial set of core templates;

— defining a methodology for creating an OWL ontology for "specialized templates" (see 2.1.32) that defines the types of information for any given instance of **possible_individual** during its lifetime.

The following are outside the scope of this part of ISO 15926:

— the specific type of rule language used to implement the first order logic;

— the decision as to whether data storage and exchange is done using lifted data or by use of lowered template instances and objects only.

NOTE This is a business decision.

2 Terms, definitions, and abbreviated terms

2.1 Terms and definitions

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

2.1.1
base template
template with only entity types in the expansion of its template axiom

[SOURCE: ISO/TS 15926-7:2011, definition 2.1.1]

2.1.2
class
category or division of things based on one or more critera for inclusion and exclusion

Note 1 to entry: A class need not have any known members (things that satisfy its criteria for membership).

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