PD ISO/IEC TR 20943-6:2013

BSI Standards Publication

Information technology — Procedures for achieving metadata registry content consistency

Part 6: Framework for generating ontologies

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National foreword

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

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Part 6: Framework for generating ontologies

Technologies de l'information — Procédures pour réaliser la consistance du contenu de l'enregistrement des métadonnées —

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

In exceptional circumstances, when the joint technical committee has collected data of a different kind from that which is normally published as an International Standard ("state of the art", for example), it may decide to publish a Technical Report. A Technical Report is entirely informative in nature and shall be subject to review every five years in the same manner as 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 and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC TR 20943-6 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 32, *Data management and interchange*.

ISO/IEC TR 20943 consists of the following parts, under the general title *Information technology — Procedures for achieving metadata registry content consistency*:

— *Part 1: Data elements*

— *Part 3: Value domains*

— *Part 5: Metadata mapping procedure*

— *Part 6: Framework for generating ontologies*

Introduction

An ontology is developed for the representation of knowledge and information. By definition, it is an explicit specification of a shared conceptualization for a domain, and describes relations between pairs of vocabulary concepts that can be used to support reasoning about the entities that the concepts describe. W3C developed Resource Description Framework (RDF)[6] and Web Ontology Language (OWL)[7] to identify the web resources and to represent the semantics and relations. ISO/IEC 13250[2] also is a standard for the representation and interchange of knowledge.

ISO/IEC 11179, Metadata registries (MDR) addresses the semantics of data, the representation of data, and the registration of the descriptions of that data. The ISO/IEC 11179 series provides a good introduction to metadata concepts, including a lot of insight into certain aspects of the granularity of metadata. The ISO/IEC 11179 series contributes knowledge integrity in a large scale. In brief, the ISO/IEC 11179 series supports semantic interoperability of data, because it provides a set of shared vocabulary for an application domain.

The ISO/IEC 11179 series provides a way to explicitly record shared vocabulary (metadata, semantics, or concepts) for use in describing the semantics for data within a domain. Domain specific ontologies could be generated by reusing the metadata in the registry. It allows an ontology consisting of common concepts to be built and facilitates usage of the ISO/IEC 11179 series.

The goal of this part of ISO/IEC TR 20943 is to provide a framework for generating ontologies based on the ISO/IEC 11179 series. The objectives of this part of ISO/IEC TR 20943 are to promote the following:

a) the generation of ontologies consisting of well-defined concepts (i.e. well-known concepts, generalized common concepts, and sharable concepts, which are accepted by general users as well as domain experts);

b) support of easy and clear understanding of concepts across the same or similar application domains;

c) formalized ontology generation;

d) support of easy definition (building or generation) of ontology through reuse of metadata in a registry;

e) the enhancement of interoperability between ontologies;

f) the facilitation of use of ISO/IEC 11179 series.

Information technology — Procedures for achieving metadata registry content consistency —

Part 6:
Framework for generating ontologies

1 Scope

This part of ISO/IEC TR 20943 covers the framework for generating ontologies based on ISO/IEC 11179-3, and provides the procedure and mapping model for generating ontologies.

This part of ISO/IEC TR 20943 describes a method to generate ontologies for a context using concepts in ISO/IEC 11179-3. Most ontologies are basically composed of classes (concepts), properties, relations between classes, and instances (objects or individuals). This part considers the generation of ontology consisting of a subset of ontology components required for defining ontologies at the conceptual level which is called "FGO_Ontology". This part uses the prefix "FGO_" to avoid confusion from homonym and to clearly identify each term. For example, "Property" is specified in ISO/IEC 11179-3 as well as in this part, but the meaning is slightly different. This part defines FGO_Class, FGO_Property, and FGO_Relation to distinguish between components of FGO_Ontology and components of ISO/IEC 11179-3.

This part of ISO/IEC TR 20943 specifies the method to generate ontologies using registered concepts in ISO/IEC 11179-3 Concepts metamodel region and Data description metamodel region. This part of ISO/IEC TR 20943 specifies a procedure and method for generating ontologies due to an application domain reusing concepts registered in a metadata registry.

This part of ISO/IEC TR 20943 does not include a way to describe in a specific ontology description language, such as Resource Description Framework (RDF), RDF Schema (RDFS), Web Ontology Language (OWL), Topic Map, and Knowledge Interchange Format (KIF).

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/IEC 11179-3:2013, *Information technology — Metadata registries (MDR) — Part 3: Registry metamodel and basic attributes*

3 Terms and definitions

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

3.1 Terms defined in ISO/IEC 11179-3

3.1.1
class
description of a set of objects that share the same attributes, operations, methods, relationships, and semantics

Note 1 to entry: This definition is from ISO/IEC 19505-2:2012, 7.3.7.