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Information technology — Document Schema Definition Languages (DSDL) —

Part 3: Rule-based validation — Schematron

Technologies de l'information — Langages de définition de schéma de documents (DSDL) —

Partie 3: Validation de règles orientées — Schematron

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Foreword

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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 document 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 on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/IEC JTC 1, *Information technology*, Subcommittee SC 34, *Document description and processing languages.*

This second edition cancels and replaces the first edition (ISO/IEC 19757-3:2006), which has been technically revised.

ISO/IEC 19757 consists of the following parts, under the general title *Information technology — Document Schema Definition Languages (DSDL)*:

— *Part 2: Regular-grammar-based validation — RELAX NG*

— *Part 3: Rule-based validation — Schematron*

— *Part 4: Namespace-based Validation Dispatching Language (NVDL)*

— *Part 5: Extensible Datatypes*

— *Part 7: Character Repertoire Description Language (CREPDL)*

— *Part 8: Document Semantics Renaming Language (DSRL)*

— *Part 9: Namespace and datatype declaration in Document Type Definitions (DTDs)*

— *Part 11: Schema association*

Introduction

ISO/IEC 19757 defines a set of Document Schema Definition Languages (DSDL) that can be used to specify one or more validation processes performed against Extensible Stylesheet Language (XML) or Standard Generalized Markup Language (SGML) documents. [XML is an application profile SGML (see ISO 8879).]

A document model is an expression of the constraints to be placed on the structure and content of documents to be validated with the model. A number of technologies have been developed through various formal and informal consortia since the development of Document Type Definitions (DTDs) as part of ISO 8879, notably by the World Wide Web Consortium (W3C) and the Organization for the Advancement of Structured Information Standards (OASIS). A number of validation technologies are standardized in DSDL to complement those already available as standards or from industry.

To validate that a structured document conforms to specified constraints in structure and content relieves the potentially many applications acting on the document from having to duplicate the task of confirming that such requirements have been met. Historically, such tasks and expressions have been developed and utilized in isolation, without consideration of how the features and functionality available in other technologies might enhance validation objectives.

The main objective of ISO/IEC 19757 is to bring together different validation-related tasks and expressions to form a single extensible framework that allows technologies to work in series or in parallel to produce a single or a set of validation results. The extensibility of DSDL accommodates validation technologies not yet designed or specified.

In the past, different design and use criteria have led users to choose different validation technologies for different portions of their information. Bringing together information within a single XML document sometimes prevents existing document models from being used to validate sections of data. By providing an integrated suite of constraint description languages that can be applied to different subsets of a single XML document, ISO/IEC 19757 allows different validation technologies to be integrated under a well-defined validation policy.

The structure of this part of ISO/IEC 19757 is as follows. Clause 5 describes the syntax of an ISO Schematron schema. Clause 6 describes the semantics of a correct ISO Schematron schema; the semantics specify when a document is valid with respect to an ISO Schematron schema. Clause 7 describes conformance requirements for implementations of ISO Schematron validators. Annex A is a normative annex providing the ISO/IEC 19757-2 (RELAX NG) schema for ISO Schematron. Annex B is a normative annex providing the ISO Schematron schema for constraints in ISO Schematron that cannot be expressed by the schema of Annex A. Annex C is a normative annex providing the default query language binding to XSLT1. Annex D is a non-normative annex providing an ISO/IEC 19757-2 (RELAX NG compact syntax) schema and corresponding ISO Schematron schema for a simple XML language Schematron Validation Report Language. Annex E is a non-normative annex providing motivating design requirements for ISO Schematron. Annex F is a normative annex allowing certain Schematron elements to be used in external vocabularies. Annex G is a non-normative annex with a simple example of a multi-lingual schema.

This edition is backwards compatible with ISO/IEC 19757-3:2006, supercedes it, and augments it with the following capabilities: patterns may validate different documents, the inclusion mechanism has been supplemented by an enhanced extension mechanism, assertions may have linked properties, and SVRL may take richer text. As well, this edition provides extra query language bindings, in particular for XSLT2.

Considered as a document type, a Schematron schema contains natural-language assertions concerning a set of documents, marked up with various elements and attributes for testing these natural-language assertions, and for simplifying and grouping assertions.

Considered theoretically, a Schematron schema reduces to a non-chaining rule system whose terms are Boolean functions invoking an external query language on the instance and other visible XML documents, with syntactic features to reduce specification size and to allow efficient implementation.

Considered analytically, Schematron has two characteristic high-level abstractions: the pattern and the phase. These allow the representation of non-regular, non-sequential constraints that ISO/IEC 19757-2 cannot specify and various dynamic or contingent constraints.

This part of ISO/IEC 19757 is based on the Schematron[2] assertion language. The let element is based on XCSL.[4] Other features arise from the half-dozen early Open Source implementations of Schematron in diverse programming languages and from discussions in electronic forums by Schematron users and implementers.