

This document is a preview generated by EVS

Geographic information - Services (ISO 19119:2016)

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN ISO 19119:2016 sisaldab Euroopa standardi EN ISO 19119:2016 ingliskeelset teksti.	This Estonian standard EVS-EN ISO 19119:2016 consists of the English text of the European standard EN ISO 19119:2016.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 24.02.2016.	Date of Availability of the European standard is 24.02.2016.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 35.240.70

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardikeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardikeskusega:

Aru 10, 10317 Tallinn, Eesti; koduleht www.evs.ee; telefon 605 5050; e-post info@evs.ee

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation:

Aru 10, 10317 Tallinn, Estonia; homepage www.evs.ee; phone +372 605 5050; e-mail info@evs.ee

EUROPEAN STANDARD

EN ISO 19119

NORME EUROPÉENNE

EUROPÄISCHE NORM

February 2016

ICS 35.240.70

Supersedes EN ISO 19119:2006

English Version

Geographic information - Services (ISO 19119:2016)

Information géographique - Services (ISO 19119:2016)

Geoinformation - Dienste (ISO 19119:2016)

This European Standard was approved by CEN on 20 February 2016.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

European foreword

This document (EN ISO 19119:2016) has been prepared by Technical Committee ISO/TC 211 “Geographic information/Geomatics” in collaboration with Technical Committee CEN/TC 287 “Geographic Information” the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by August 2016, and conflicting national standards shall be withdrawn at the latest by August 2016.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN ISO 19119:2006.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 19119:2016 has been approved by CEN as EN ISO 19119:2016 without any modification.

Contents

Page

Foreword	vi
Introduction	vii
1 Scope	1
2 Conformance	1
2.1 Claiming conformance.....	1
2.2 General.....	1
2.3 Enterprise viewpoint.....	1
2.4 Computational viewpoint.....	1
2.5 Information viewpoint.....	2
2.6 Service taxonomies.....	2
2.7 Engineering viewpoint.....	2
2.8 Technology viewpoint.....	2
3 Normative references	3
4 Terms and definitions and abbreviations	3
4.1 Terms and definitions.....	3
4.2 Abbreviations.....	5
5 Notation	7
5.1 General.....	7
5.2 Conformance class.....	7
5.3 Requirements class.....	7
5.4 Rules.....	8
5.5 Identifiers.....	8
5.6 Conceptual schemas.....	8
5.7 Descriptions of concepts.....	8
5.8 Architecture patterns.....	8
6 Overview of geographic services architecture	9
6.1 Purpose and justification.....	9
6.2 Relationship to ISO 19101-1.....	9
6.3 Interoperability reference model based on ISO RM-ODP.....	10
6.4 Service abstraction.....	11
6.5 Interoperability.....	13
6.6 Use of other geographic information standards in service specifications.....	14
7 Enterprise viewpoint: A context for services	14
7.1 Enterprise viewpoint.....	14
7.2 Enterprise viewpoint service specifications.....	15
7.3 Examples of relevant standards.....	16
7.4 Example and tools.....	17
8 Computational viewpoint: A basis for service interfaces and chaining	17
8.1 Component and service interoperability and the computational viewpoint.....	17
8.2 Services, interfaces and operations.....	18
8.3 Computational viewpoint service specifications.....	19
8.3.1 Requirements class for computational viewpoint service specifications.....	19
8.3.2 Service interfaces with operations.....	19
8.3.3 Service behaviour and constraints.....	21
8.4 Service chaining.....	23
8.4.1 General.....	23
8.4.2 Anatomy of a service chain.....	24
8.4.3 Service chain modelling.....	25
8.4.4 Services organizer folder.....	27
8.4.5 Services to enable service chaining.....	27
8.4.6 Architecture patterns for service chaining.....	28

8.4.7	Variations on chaining patterns.....	33
8.5	Service metadata.....	34
8.6	Simple service architecture.....	34
8.7	Examples of relevant standards.....	35
8.8	Examples and tools: Service modelling with SoaML.....	35
9	Information viewpoint: A basis for semantic interoperability.....	35
9.1	Information model interoperability and the information viewpoint.....	35
9.2	Information viewpoint Service specifications.....	36
10	Service taxonomies.....	39
10.1	Need for multiple service taxonomies.....	39
10.2	Service taxonomies and requirements.....	40
10.3	Architectural reference model.....	40
10.4	Definition of the Architectural reference model.....	40
10.5	Uses of the Architectural reference model.....	40
10.6	Overview of the Architectural reference model.....	41
10.6.1	Services and service interfaces.....	41
10.6.2	Identifying services and service interfaces for geographic information.....	42
10.7	Types of geographic information services.....	42
10.7.1	Requirement for service taxonomy.....	42
10.7.2	Types of information technology services relevant to geographic information.....	42
10.7.3	Extension of service types for geographic information.....	44
10.8	Geographic architecture services taxonomy.....	44
10.8.1	Geographic architecture services taxonomy requirements.....	44
10.8.2	Geographic boundary/human interaction services.....	45
10.8.3	Geographic model/information management services.....	46
10.8.4	Geographic workflow/task management services.....	47
10.8.5	Geographic processing services.....	47
10.8.6	Geographic communication services.....	50
10.8.7	Geographic system management and security services.....	50
10.9	ISO suite of International Standards in geographic architecture services taxonomy.....	51
10.10	Geographic service chaining validity.....	51
10.11	User-perspective Lifecycle model for Services.....	52
10.12	User-defined service taxonomies.....	53
10.13	Services organizer folder (SOF).....	53
10.13.1	Grouping of services.....	53
10.13.2	Image exploitation SOF.....	53
10.13.3	Geographic data fusion SOF.....	54
10.14	Semantic information models.....	55
10.15	Examples of relevant standards.....	56
10.16	Examples and tools.....	57
11	Engineering viewpoint: A basis for distribution and communication patterns.....	57
11.1	Distribution transparencies and the engineering viewpoint.....	57
11.2	Distributing components using a multi-tier architecture model.....	58
11.3	Distribution transparencies.....	61
11.4	Engineering viewpoint Service specifications.....	62
11.5	Multi-style SOA.....	63
11.6	Relevant architectural styles.....	63
11.6.1	Service-oriented architectures.....	63
11.6.2	Representational State Transfer (REST).....	64
11.6.3	Web 2.0.....	65
12	Technology viewpoint: A basis for cross platform interoperability.....	66
12.1	Infrastructure interoperability and the technology viewpoint.....	66
12.2	Need for multiple platform-specific specifications.....	67
12.3	Conformance between platform-neutral and platform-specific service specifications.....	67
12.4	From platform-neutral to platform-specific specifications.....	68
12.5	Technology objects.....	68

12.6	Technology viewpoint service specifications.....	68
12.6.1	Requirements class for technology viewpoint.....	68
12.6.2	Technology mappings.....	69
12.7	Architectural classification according to cloud computing service categories.....	71
Annex A (normative) Conformance.....		72
Annex B (informative) Example user scenarios.....		78
Annex C (informative) Principles for mapping to distributed computing platforms.....		81
Annex D (informative) Use case-based methodology.....		92
Annex E (informative) Example — Use case template.....		95
Annex F (informative) Service modelling – SoaML.....		98
Bibliography.....		101

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).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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/TC 211, *Geographic information/Geomatics*.

This second edition cancels and replaces the first edition (ISO 19119:2005), which has been technically revised. It also incorporates the Amendment ISO 19119:2005/Amd 1:2008.

Introduction

The widespread application of computers and use of geographic information systems (GIS) have led to the increased analysis of geographic data within multiple disciplines. Based on advances in information technology, society's reliance on such data are growing. Geographic datasets are increasingly being shared, exchanged, and used for purposes other than their producers' intended ones. GIS, remote sensing, automated mapping and facilities management (AM/FM), Spatial Data Infrastructure (SDI), traffic analysis, geopositioning systems, and other technologies for Geographic Information (GI) are entering a period of radical integration.

This International Standard provides a framework for platform neutral and platform specific specification of services that can enable users to access, process and manage geographic data from a variety of sources, potentially for various distributed computing platforms (DCPs).

- “a framework for platform neutral and platform specific specification of services” means that this International Standard provides requirements for how services shall be specified in such a way that one service can be specified independently of one or more underlying distributed computing platforms. The framework provides requirements for a further mapping to specific platforms in order to enable conformant platform specific specifications to ensure conforming and interoperable service implementations.
- “access, process and manage” means that geodata users can query remote databases and control remote processing resources and also take advantage of other distributed computing technologies, such as software delivered to the user's local environment from a remote environment for temporary use;
- “from a variety of sources” means that users will have access to data acquired in a variety of ways and stored in a wide variety of relational and non-relational databases;
- “across a generic computing interface” means that ISO 19119 interfaces provide reliable communication between otherwise disparate software resources that are equipped to use these interfaces;
- “within an open information technology environment” means that this International Standard enables geoprocessing to take place outside of the closed environment of monolithic GIS, remote sensing, and AM/FM systems that control and restrict database, user interface, network and data manipulation functions;
- services shall be categorised according to a service taxonomy based on architectural areas and may also be categorised according to a usage life cycle perspective, as well as according to domain specific and user defined service taxonomies, providing support for publication and discovery of services.

The difference between this version of this International Standard and the previous ISO 19119:2005 version is the following:

This International Standard has defined a set of requirements and related abstract tests for the specification of services according to enterprise, computational, information, engineering and technology viewpoints. This International Standard has defined a set of requirements for categorizing services according to service taxonomies. The service metadata has been moved to ISO 19115-1.

Service policies, service contracts including service level agreements (SLAs) are currently not specified as part of this International Standard, as these are considered most relevant for service deployment and service ownership, which is not currently a focus for this International Standard.

Geographic information — Services

1 Scope

This International Standard defines requirements for how platform neutral and platform specific specification of services shall be created, in order to allow for one service to be specified independently of one or more underlying distributed computing platforms.

This International Standard defines requirements for a further mapping from platform neutral to platform specific service specifications, in order to enable conformant and interoperable service implementations.

This International Standard addresses the Meta:Service foundation of the ISO geographic information reference model described in ISO 19101-1:2014, Clause 6 and Clause 8, respectively.

This International Standard defines how geographic services shall be categorised according to a service taxonomy based on architectural areas and allows also for services to be categorised according to a usage life cycle perspective, as well as according to domain specific and user defined service taxonomies, providing support for easier publication and discovery of services.

2 Conformance

2.1 Claiming conformance

Any product claiming conformance with the conformance classes in this International Standard shall pass all the associated requirements described in the abstract test suite given in [Annex A](#).

2.2 General

This International Standard defines six conformance classes shown in [Table 1](#) to [Table 6](#), matching the six requirements classes described in [Clause 7](#) to [Clause 12](#). Any service claiming conformance to any requirements class in this International Standard shall pass all of the tests listed in the corresponding conformance class, which are described in detail in the abstract test suites in [Annex A](#). Each test relates to one or more specific requirements, which are explicitly indicated in the description of the test.

2.3 Enterprise viewpoint

The enterprise viewpoint conformance class is shown in [Table 1](#).

Table 1 — Enterprise viewpoint conformance class

Conformance class	/conf/enterpriseviewpoint
Requirements	/req/enterpriseviewpoint (Table 11)
Tests	All tests in A.2

2.4 Computational viewpoint

The computational viewpoint conformance class is shown in [Table 2](#).

Table 2 — Computational viewpoint conformance class

Conformance class	/conf/computationalviewpoint
Dependency	/conf/enterpriseviewpoint
Requirements	/req/computationalviewpoint (Table 12)
Tests	All tests in A.3

2.5 Information viewpoint

The information viewpoint conformance class is shown in [Table 3](#).

Table 3 — Information viewpoint conformance class

Conformance class	/conf/informationviewpoint
Dependency	/conf/uml (2.4)
Requirements	/req/informationviewpoint (Table 18)
Tests	All tests in A.4

2.6 Service taxonomies

The service taxonomy conformance class is shown in [Table 4](#).

Table 4 — Service taxonomies conformance class

Conformance class	/conf/servicetaxonomies
Dependency	/conf/uml (2.4)
Requirements	/req/servicetaxonomies (Table 19)
Tests	All tests in A.5

2.7 Engineering viewpoint

The engineering viewpoint conformance class is shown in [Table 5](#).

Table 5 — Engineering viewpoint conformance class

Conformance class	/conf/engineeringviewpoint
Dependency	/conf/uml (2.4)
Requirements	/req/engineeringviewpoint (Table 26)
Tests	All tests in A.6

2.8 Technology viewpoint

The technology viewpoint conformance class is shown in [Table 6](#).

Table 6 — Technology viewpoint conformance class

Conformance class	/conf/technologyviewpoint
Dependency	/conf/uml (2.4)
Requirements	/req/technologyviewpoint (Table 27)
Tests	All tests in A.7

NOTE The definition of an abstract test suite appears in ISO 19105.

3 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 10746-1, *Information technology — Open Distributed Processing — Reference model: Overview — Part 1*

ISO 19101-1:2014, *Geographic information — Reference model — Part 1: Fundamentals*

ISO 19103, *Geographic information — Conceptual schema language*

ISO 19115-1:2014, *Geographic information — Metadata — Part 1: Fundamentals*

[SoaML] *Service oriented architecture Modeling Language v 1.0.1*, May 2012, OMG standard¹⁾

4 Terms and definitions and abbreviations

4.1 Terms and definitions

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

4.1.1

capability

real-world effect that a *service* (4.1.12) provider is able to provide to a service consumer

[SOURCE: SOA-RAF]

4.1.2

computational viewpoint

viewpoint (4.1.15) on an ODP system and its environment that enables distribution through functional decomposition of the system into objects which interact at *interfaces* (4.1.8)

[SOURCE: ISO/IEC 10746-3:2015, 4.1.1.3]

4.1.3

distribution transparency

property of hiding from a particular user the potential behaviour of some parts of a distributed system

Note 1 to entry: Distribution transparencies enable complexities associated with system distribution to be hidden from applications where they are irrelevant to their purpose.

[SOURCE: ISO/IEC 10746-2:2009, 11.1.1]

4.1.4

engineering viewpoint

viewpoint (4.1.15) on an ODP system and its environment that focuses on the mechanisms and functions required to support distributed interaction between objects in the system

[SOURCE: ISO/IEC 10746-3:2009, 4.1.1.4]

4.1.5

enterprise viewpoint

viewpoint (4.1.15) on an ODP system and its environment that focuses on the purpose, scope and policies for that system

[SOURCE: ISO/IEC 10746-3:2009, 4.1.1.1]

1) <http://www.omg.org/spec/SoaML/1.0.1/>