SLOVENSKI STANDARD
SIST EN ISO 19125-1:2006

01-junij-2006

Geografske informacije - Dostop do enostavnih pojavov - 1. del: Skupna arhitektura (ISO 19125-1:2004)

Geographic information - Simple feature access - Part 1: Common architecture (ISO 19125-1:2004)

Geoinformation - Simple feature access - Teil 1 : Gemeinsame Architektur (ISO 19125-1:2004)

Information géographique - Acces aux entités simples - Partie 1: Architecture commune (ISO 19125-1:2004)

Ta slovenski standard je istoveten z: **EN ISO 19125-1:2006**

ICS:

35.240.70	Uporabniške rešitve IT v znanosti	IT applications in science

SIST EN ISO 19125-1:2006 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 19125-1

March 2006

ICS 35.240.70

English Version

Geographic information - Simple feature access - Part 1: Common architecture (ISO 19125-1:2004)

Information géographique - Accès aux entités simples - Partie 1: Architecture commune (ISO 19125-1:2004)

Geoinformation - Simple feature access - Teil 1 : Gemeinsame Architektur (ISO 19125-1:2004)

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Management Centre: rue de Stassart, 36 B-1050 Brussels

Ref. No. EN ISO 19125-1:2006: E

Foreword

The text of ISO 19125-1:2004 has been prepared by Technical Committee ISO/TC 211 "Geographic information/Geomatics" of the International Organization for Standardization (ISO) and has been taken over as EN ISO 19125-1:2006 by Technical Committee CEN/TC 287 "Geographic Information", the secretariat of which is held by NEN.

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of an identical text or by endorsement, at the latest by September 2006, and conflicting national standards shall be withdrawn at the latest by September 2006.

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Endorsement notice

The text of ISO 19125-1:2004 has been approved by CEN as EN ISO 19125-1:2006 without any modifications.

INTERNATIONAL STANDARD

ISO 19125-1

First edition
2004-08-01

Geographic information — Simple feature access —

Part 1: Common architecture

Information géographique — Accès aux entités simples —
Partie 1: Architecture commune

Reference number
ISO 19125-1:2004(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

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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.

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 19125-1 was prepared by Technical Committee ISO/TC 211, *Geographic information/Geomatics* from a base document supplied by the Open GIS Consortium, Inc.

ISO 19125 consists of the following parts, under the general title *Geographic information — Simple feature access*:

— *Part 1: Common architecture*

— *Part 2: SQL option*

A *Part 3: COM/OLE option* is under preparation.

Introduction

This part of ISO 19125 describes the common architecture for simple feature geometry. The simple feature geometry object model is Distributed Computing Platform neutral and uses UML notation. The base Geometry class has subclasses for Point, Curve, Surface and GeometryCollection. Each geometric object is associated with a Spatial Reference System, which describes the coordinate space in which the geometric object is defined.

The extended Geometry model has specialized 0, 1 and 2-dimensional collection classes named MultiPoint, MultiLineString and MultiPolygon for modelling geometries corresponding to collections of Points, LineStrings and Polygons, respectively. MultiCurve and MultiSurface are introduced as abstract superclasses that generalize the collection interfaces to handle Curves and Surfaces.

The attributes, methods and assertions for each Geometry class are described in Figure 1 in 6.1.1. In describing methods, *this* is used to refer to the receiver of the method (the object being messaged).

The SFA COM function “signatures” may use a different notation from SFA SQL. COM notation is more familiar for COM programmers. However, UML notation is used throughout this part of ISO 19125. There may also be methods used in this International Standard that differ from one part to another. Where this is the case, the differences are shown within the part.

This part of ISO 19125 implements a profile of the spatial schema described in ISO 19107:2003, *Geographic information — Spatial schema*. Annex A provides a detailed mapping of the schema in this part of ISO 19125 with the schema described in ISO 19107:2003.

Geographic information — Simple feature access —

Part 1: Common architecture

1 Scope

This part of ISO 19125 establishes a common architecture and defines terms to use within the architecture.

This part of ISO 19125 does not attempt to standardize and does not depend upon any part of the mechanism by which Types are added and maintained, including the following:

a) syntax and functionality provided for defining types;

b) syntax and functionality provided for defining functions;

c) physical storage of type instances in the database;

d) specific terminology used to refer to User Defined Types, for example UDT.

This part of ISO 19125 does standardize names and geometric definitions for Types for Geometry.

This part of ISO 19125 does not place any requirements on how to define the Geometry Types in the internal schema nor does it place any requirements on when or how or who defines the Geometry Types.

2 Conformance

In order to conform to this part of ISO 19125, an implementation shall satisfy the requirements of one or more test suites specified in the other parts of ISO 19125.

3 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 19107:2003, *Geographic information — Spatial schema*

ISO 19111:2003, *Geographic information — Spatial referencing by coordinates*

4 Terms and definitions

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

4.1
boundary
set that represents the limit of an entity

NOTE Boundary is most commonly used in the context of geometry, where the set is a collection of points or a collection of objects that represent those points. In other arenas, the term is used metaphorically to describe the transition between an entity and the rest of its domain of discourse.

[ISO 19107]

4.2
buffer
geometric object (4.14) that contains all **direct positions** (4.7) whose distance from a specified geometric object is less than or equal to a given distance

[ISO 19107]

4.3
coordinate
one of a sequence of n-numbers designating the position of a **point** (4.17) in n-dimensional space

NOTE In a coordinate reference system, the numbers must be qualified by units.

[adapted from ISO 19111]

4.4
coordinate dimension
number of measurements or axes needed to describe a position in a **coordinate system** (4.6)

[ISO 19107]

4.5
coordinate reference system
coordinate system (4.6) that is related to the real world by a datum

[adapted from ISO 19111]

4.6
coordinate system
set of mathematical rules for specifying how **coordinates** (4.3) are to be assigned to **point** (4.17)

[ISO 19111]

4.7
curve
1-dimensional **geometric primitive** (4.15), representing the continuous image of a line

NOTE The boundary of a curve is the set of points at either end of the curve. If the curve is a cycle, the two ends are identical, and the curve (if topologically closed) is considered to not have a boundary. The first point is called the start point, and the last is the end point. Connectivity of the curve is guaranteed by the “continuous image of a line” clause. A topological theorem states that a continuous image of a connected set is connected.

[ISO 19107]

4.7
direct position
position described by a single set of **coordinates** (4.3) within a **coordinate reference system** (4.5)

[ISO 19107]

4.9
end point
last **point** (4.17) of a **curve** (4.7)

[ISO 19107]

4.10
exterior
difference between the universe and the closure

NOTE The concept of exterior is applicable to both topological and geometric complexes.

[ISO 19107]

4.11
feature
abstraction of real world phenomena

NOTE A feature may occur as a type or an instance. Feature type or feature instance is used when only one is meant.

[adapted from ISO 19101]

4.12
feature attribute
characteristic of a **feature** (4.11)

NOTE A feature attribute has a name, a data type, and a value domain associated to it. A feature attribute for a feature instance also has an attribute value taken from the value domain.

[adapted from ISO 19101]

4.13
geometric complex
set of disjoint **geometric primitives** (4.15) where the **boundary** (4.1) of each geometric primitive can be represented as the union of other geometric primitives of smaller dimension within the same set

NOTE The geometric primitives in the set are disjoint in the sense that no direct position is interior to more than one geometric primitive. The set is closed under boundary operations, meaning that for each element in the geometric complex, there is a collection (also a geometric complex) of geometric primitives that represents the boundary of that element. Recall that the boundary of a point (the only 0D primitive object type in geometry) is empty. Thus, if the largest dimension geometric primitive is a solid (3D), the composition of the boundary operator in this definition terminates after at most 3 steps. It is also the case that the boundary of any object is a cycle.

[ISO 19107]

4.14
geometric object
spatial object representing a geometric set

NOTE A geometric object consists of a geometric primitive, a collection of geometric primitives, or a geometric complex treated as a single entity. A geometric object may be the spatial representation of an object such as a feature or a significant part of a feature.

[ISO 19107]

4.15
geometric primitive
geometric object (4.14) representing a single, connected, homogeneous element of space

NOTE Geometric primitives are non-decomposed objects that represent information about geometric configuration. They include points, curves, surfaces, and solids.

[ISO 19107]

4.16
interior
set of all **direct positions** (4.7) that are on a **geometric object** (4.14) but which are not on its **boundary** (4.1)

NOTE The interior of a topological object is the homomorphic image of the interior of any of its geometric realizations. This is not included as a definition because it follows from a theorem of topology.

[ISO 19107]

4.17
point
0-dimensional **geometric primitive** (4.15), representing a position

NOTE The boundary of a point is the empty set.

[ISO 19107]

4.18
simple feature
feature (4.11) restricted to 2D geometry with linear interpolation between vertices, having both spatial and non spatial attributes

4.19
start point
first **point** (4.17) of a **curve** (4.7)

[ISO 19107]

4.20
surface
2-dimensional **geometric primitive** (4.15), locally representing a continuous image of a region of a plane

NOTE The boundary of a surface is the set of oriented, closed curves that delineate the limits of the surface.

[adapted from ISO 19107]

5 Abbreviated terms

API	Application Program Interface
COM	Component Object Model
CORBA	Common Object Request Broker Architecture
DCE	Distributed Computing Environment
DCOM	Distributed Component Objected Model
DE-9IM	Dimensionally Extended Nine-Intersection Model
IEEE	Institute of Electrical and Electronics Engineers, Inc.
NDR	Little Endian byte order encoding
OLE	Object Linking and Embedding
RPC	Remote Procedure Call
SQL	Structured Query Language

SRID	Spatial Reference System Identifier
XDR	Big Endian byte order encoding
UDT	User Defined Type
UML	Unified Modeling Language
WKB	Well-Known Binary (representation for example, geometry)

6 Architecture

6.1 Geometry object model

6.1.1 Overview

This subclause describes the object model for simple feature geometry. The simple feature geometry object model is Distributed Computing Platform neutral and uses UML notation. The object model for geometry is shown in Figure 1. The base Geometry class has subclasses for Point, Curve, Surface and GeometryCollection. Each geometric object is associated with a Spatial Reference System, which describes the coordinate space in which the geometric object is defined.

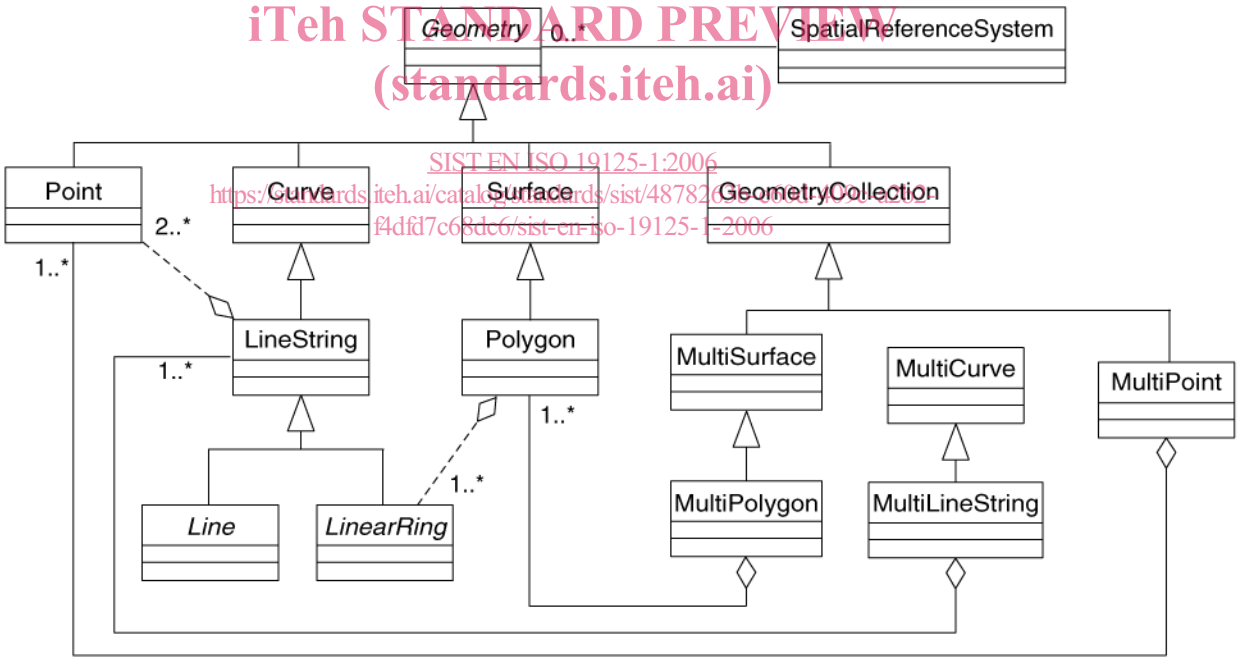

Figure 1 — Geometry class hierarchy

Figure 1 is based on an extended Geometry model with specialized 0-, 1- and 2-dimensional collection classes named MultiPoint, MultiLineString and MultiPolygon for modelling geometries corresponding to collections of Points, LineStrings and Polygons, respectively. MultiCurve and MultiSurface are introduced as abstract superclasses that generalize the collection interfaces to handle Curves and Surfaces. Figure 1 shows aggregation lines between the leaf-collection classes and their element classes; the aggregation lines for non-leaf-collection classes are described in the text.