SLOVENSKI STANDARD
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Geografske informacije - Model domene za zemljiško administracijo (LADM) - 2. del: Vpis v zemljiško knjigo (ISO/DIS 19152-2:2024)

Geographic information - Land Administration Domain Model (LADM) - Part 2: Land registration (ISO/DIS 19152-2:2024)

Geoinformationen - Land Administration Domain Model (LADM) - Teil 2: Erfassung von Grundeigentum (ISO/DIS 19152-2:2024)

Information géographique - Modèle du domaine de l'administration des terres (LADM) - Partie 2: Enregistrement foncier (ISO/DIS 19152-2:2024)

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Geographic information — Land Administration Domain Model (LADM) —

Part 2: Land registration

Information géographique — Modèle du domaine de l'administration des terres (LADM) —

Partie 2: Enregistrement foncier

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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.

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 of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 211, *Geographic information/Geomatics*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 287, *Geographic Information*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This edition of ISO 19152-2 together with ISO 19152-1 cancel and replace the first edition (ISO 19152:2012), which has been technically revised.

The main changes are as follows:

— This version of ISO 19152-2 defines the fundamental terms, basic components, relationships, attributes and constraints for land registration. A detailed overview of the model has been presented in its individual packages.

— The terms, although unchanged in principle, have been defined more rigorously (i.e., administrative source, liminal spatial unit), enriched with examples and notes. Updates in ISO/TC 211 standards (i.e., definitions, data types) have been reflected, and corresponding adjustments have been made where necessary.

— Requirements that a land registration system can conform been formulated in contrast to ISO 19152:2012. It is noted that the use of 'shall' only in requirements statements is mandatory according to ISO rules.

— While 3 new (featureType) classes different from ISO 19152:2012 have been introduced in ISO 19152-1 (i.e., LA_RequiredRelationshipRRR, LA_LegalSpaceCivilEngineeringElement, LA_LegalSpaceParcel), 13 new (featureType) classes different from ISO 19152:2012 have been introduced in ISO 19152-2 (i.e., LA_SurveySource, LA_DesignSource, LA_SurveyRelation, LA_DistanceObservation, LA_LevelObservation, LA_AngularObservation, LA_ImageObservation, LA_TPSObservation, LA_PointCloudObservation, LA_GNSSObservation, LA_GNSSCorrection, LA_GPRObservation, LA_MBESObservation). No (featureType) classes have been removed from 19152:2012.

— The surveying and representation subpackage have been refined with types of observation information, such as distance, level, angular, image, TPS, point cloud, GNSS and GPR.

— In order to support all types of spatial units two new subclasses for LA_SpatialUnit have been introduced in ISO 19152-2: LA_LegalSpaceCivilEngineeringElement and LA_LegalSpaceParcel. An optional geometry attribute has been added to LA_SpatialUnit.

— The LA_LegalSpaceUtilityNetwork (featureType) class has been renamed to LA_LegalSpaceUtilityNetworkElement. LA_UtilityNetworkType code list has been renamed to LA_UtilityNetworkElementType.

— In order to represent topological relationships between spatial units, two new (dataType) classes (i.e., TopoRelation and IntersectionPatternMatrix) have been created based on the definition given in 19107:2019 and have been introduced in ISO 19152-2. In addition, 3 code lists (i.e., TopoRelationType, DimensionExtension and SetMask) have been created based on the definition given in 19107:2019 and have been introduced in ISO 19152-2.

— Only one multiplicity of an association has been changed: A point may now be associated to zero or more [0..*] spatial units, not [0..1] spatial unit.

— The Annex I (informative) – Social Tenure Domain Model (STDM) of ISO 19152:2012 has been refined and moved to the Annex B (formative) of ISO 19152-2.

— Annex A (normative) – Abstract Test Suite has been redesigned using the requirements introduced the main part of ISO 19152-2.

— Annex C (informative) – 2D and 3D Representations of Spatial Units has been refined and extended in order to support all types of spatial unit representation.

— Annex G (informative) – Code Lists has been refined and extended to support semantically enriched code list values. Generic definitions for code list values have been provided. Existing code lists have been refined with new values and 24 new code lists have been introduced (i.e., LA_CivilEngineeringType, LA_ParcelUseType, LA_SurveyPurposeType, LA_AutomationLevelType, LA_PlatformType, LA_SurveyMethodType, LA_ObservationsAccuracyType, LA_LifecyclePhaseType, LA_DesignFileCreatorRoleType, LA_DesignObjectType, LA_SourceFileType, LA_SpatialTransactionType, LA_DistanceType, LA_AngleType, LA_SatelliteSystemType, LA_GNSSSurveyType, LA_GNSSReferenceStationsNetworkType, LA_GNSSReferenceStationsNetworkScale, LA_CorrectionServiceType, LA_GNSSFrequencyType, LA_SSR_Error_Components, TopoRelationType, DimensionExtension and SetMask) in ISO 19152-2.

— Annex H (informative) – The LADM and LPIS, Annex M (informative) – Modelling land administration processes and Annex N (informative) – History and dynamic aspects of ISO 19152:2012 have not been included in ISO 19152-2. Annex K (informative) – LADM and IndoorGML and Annex L (informative) – LADM and legal spaces in buildings have been introduced in ISO 19152-2. All the other not mentioned annexes has been updated and refined.

— The bibliography has been revised to include additional references and has been reformatted.

A list of all parts in the ISO 19152 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

This document defines the Land Administration Domain Model (LADM). The LADM is a conceptual model, and not a data product specification (in the sense of ISO 19131).

The purpose of the LADM is not to replace existing systems, but rather to provide a formal language for describing them, so that their similarities and differences can be better understood. This is a descriptive standard, not a prescriptive standard.

Land administration / geo-regulation is a large field; the focus of this document is on that part of land administration that is interested in rights, responsibilities and restrictions affecting land, and the geometrical (geospatial) components thereof. The LADM provides a reference model which will serve two goals:

a) to provide an extensible basis for the development and refinement of efficient and effective land administration systems, based on a Model Driven Architecture (MDA); and

b) to enable involved parties, both within one country and between different countries, to communicate, based on the shared vocabulary (that is, an ontology), implied by the model.

The second goal is relevant for creating standardized information services in a national and international context, where land administration / geo-regulation domain semantics have to be shared between regions, or countries, in order to enable necessary translations. Four considerations during the design of the model were:

— it will cover the common aspects of land administration / geo-regulation worldwide;

— it will be based on the conceptual framework of 'Cadastre 2014' of the International Federation of Surveyors (FIG);

— it will be as simple as possible to be useful in practice;

— the geospatial aspects follow the ISO/TC 211 conceptual model.

The first edition of this standard, ISO 19152:2012 concentrated on Land Administration, Land Registration and Cadastre. This information is about the relationship between people and land. This is now included in Part 2 with a more refined survey model, namely by this standard. Part 1 of this standard provides the general reference model for all aspects of regulation in a geospatial environment. Part 3 is Marine georegulation, Part 4 Valuation information and Part 5 Spatial plan information. Part 6 provides an overview of relevant aspects in implementations.

Until now, most countries (or states, provinces) have developed their own Land Administration System. Some systems are centralized, and others decentralized, while some are based on a general boundaries approach, others on fixed boundaries. Some systems have a fiscal background, others a legal one. The different implementations (foundations) of the various Land Administration Systems do not facilitate meaningful communication across borders. However, looking from a distance, one will observe that the different systems are in principle largely the same: they are all based on the relationships between people and land, linked by (ownership or use) rights, and are in most countries influenced by developments in Information and Communication Technology (ICT). Furthermore, the two main functions of every land administration (including cadastre and/or land registry) are:

i) keeping the contents of these relationships up-to-date (based on regulations and related transactions); and

ii) providing information from the (national) registers.

Land administration is described as the process of determining, recording and disseminating information about the relationship between people and land. If ownership is understood as the mechanism through which rights to land are held, then it can be viewed as a type of land tenure. A main characteristic of land tenure is that it reflects a social relationship regarding rights to land, which means that in a certain jurisdiction the relationship between people and land is recognised as a legally valid one. These recognised rights are in

principle eligible for registration, with the purpose being to assign a certain legal meaning to the registered right (e.g., a title). Therefore, land administration systems are not just 'handling geographic information', as they represent a lawfully meaningful relationship amongst people, and between people and land.

As land administration activity on the one hand deals with huge amounts of data, which moreover are of a dynamic nature, and on the other hand requires a continuous maintenance process, then the role of ICT is of strategic importance. Without the availability of information systems it will be difficult to guarantee good performance with respect to meeting changing customer demands. Organizations are now increasingly confronted with rapid developments in technology, a technology push (the Internet, geospatial databases, modelling standards, open systems, BIM and GIS), as well with a growing demand for new services, a market pull (e-governance, sustainable development, electronic conveyance, and the integration of public data and systems). Modelling is a basic tool, facilitating appropriate system development and reengineering and, in addition, it forms the basis for meaningful communication between different systems.

Standardization has become a well-known process in the work of land administrations and land registries. In both paper-based systems and computerized systems, standards are required to identify objects, transactions, relationships between objects (e.g., parcels, generally referred to as spatial units) and persons (e.g., citizens and generally referred to as parties), classification of land use, land value, map representations of spatial units, and so on. Computerized systems require further standardization when topology and the identification of single boundaries are introduced. In existing land administration systems and land registries, standardization is generally limited to the region, or jurisdiction, where the land administration (including cadastre and/or land registry) is in operation. Open markets, globalization, and effective and efficient development and maintenance of flexible (generic) systems, require further standardization.

The scope of this document is provided in Clause 1. Conformance in relation to this document is given in Clause 2, and a conformance test is specified in Annex A. Normative references are presented in Clause 3 and the used terms, definitions and abbreviations in Clause 4. Clause 5 provides the notation and context. Clause 6 gives a global overview of packages. Clause 7 introduces the classes, attributes and associations in detail. Annex B gives an overview of Social Tenure Domain Model (STDM). Annex C explains the 2D and 3D representations of spatial units, spatial unit profiles and refined survey model. A comprehensive set of informative examples (using instance level cases) is available in Annex D.

It must be noted that this is a generic domain model. It is expandable and it is likely that additional attributes, operators, associations, and perhaps even additional classes, will be needed for a specific region or country. Code list values in the main text are informative (not normative) and can only be considered as examples. Specific parts of the LADM are further detailed in the legal profiles in Annex E. Some examples of using the LADM in a specific context are: the INSPIRE cadastral parcels in Annex F. It is possible to use only a subset, or profile, of the LADM for a specific implementation. Annex G presents the LADM code lists as a basis for describing a flexible enumeration, and gives an overview of semantic technologies for representing code list values.

The construction of external databases with party data, address data, taxation data, land cover data, physical utility network data, and archive data, is outside the scope of the LADM. However, the LADM provides stereotype classes for these data sets (if available), see Annex H. Interface classes are in Annex I. Annex J explains the link to other ISO international standards. Annex K presents a framework for the integration of the LADM and IndoorGML. Annex L proposes a framework for representing legal spaces in building.

Geographic information — Land Administration Domain Model (LADM) —

Part 2: Land registration

1 Scope

This document:

a) defines a reference Land Administration Domain Model (LADM) covering basic information-related components of Land Administration (including elements above and below the surface of the earth);

b) provides an abstract, conceptual model with three packages and one sub-package related to

   1) parties (people and organizations) [19152-2];

   2) basic administrative units, rights, responsibilities, and restrictions (ownership rights) [19152-2];

   3) spatial units (parcels, and the legal space of buildings and utility networks and other geometry) with a sub-package on surveying and spatial representation (geometry and topology) [19152-2];

c) provides terminology for land administration, based on various national and international systems, that is as simple as possible in order to be useful in practice. The terminology allows a shared description of different formal or informal practices and procedures in various jurisdictions;

d) provides a platform for comparison and monitoring that is based on indicators;

e) provides a basis for national and regional profiles; and

f) enables the combination of land administration information from different sources in a coherent manner.

The following is outside the scope of this document:

— interference with (national) land administration laws that may have any legal implications; and

— construction of external databases with party data, address data, land cover data, physical utility network data, archive data and taxation data. However, the LADM provides stereotype classes for these data sets to indicate which data set elements the LADM expects from these external sources, if available.

This document provides the concepts and the detailed structure for standardization in the land administration domain.

2 Normative references

The following documents are referred to in the main text in such a way that some or all of their content constitutes requirements 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/IEC 5218:2022, *Information technology — Codes for the representation of human sexes*

ISO 19103:2015, *Geographic information — Conceptual schema language*

ISO 19105:2022, *Geographic information — Conformance and testing*

ISO 19107:2019, *Geographic information — Spatial schema*

ISO 19109:2015, *Geographic information — Rules for application schema*

ISO 19111:2019, *Geographic information — Referencing by coordinates*

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

ISO 19152-1:2024, *Geographic information — Land Administration Domain Model (LADM) — Part 1: Generic conceptual model*

ISO 19156:2023, *Geographic information — Observations, measurements and samples*

OGC *Land and Infrastructure Conceptual Model Standard (LandInfra)*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 19152-1 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1.1
administrative source
<LADM> source comprised of the administrative description (where applicable) of the parties involved, the rights, restrictions and responsibilities created and the basic administrative units affected

EXAMPLE 1 The evidence of a party's right to a basic administrative unit.

EXAMPLE 2 A document describing a transaction (a deed), or a judgement of the register holder.

3.1.2
boundary
set that represents the limit of an entity

Note 1 to entry: 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.

[SOURCE: ISO 19107:2019, 3.6]

3.1.3
boundary face
face that is used in the 3-dimensional representation of a boundary of a spatial unit

Note 1 to entry: Boundary faces are used when the implied vertical and unbounded faces of a boundary face string are not sufficient to describe 3D spatial units. Boundary faces close volumes in height (e.g., every apartment floor), or in depth (e.g. an underground parking garage), or in all other directions to form a bounded volume. The volumes represent legal space (in contrast with physical space).

[SOURCE: ISO 19152-1:2024, 3.22]

3.1.4
boundary face string
boundary forming part of the outside of a spatial unit

Note 1 to entry: Boundary face strings are used to represent the boundaries of spatial units by means of linestrings in 2D. This 2D representation is a 2D boundary in a 2D land administration system. In a 3D land administration system, it represents a series of vertical boundary faces where an unbounded volume is assumed, surrounded by boundary faces which intersect the earth's surface (such as traditionally depicted in the cadastral map).

3.1.5
face
<topology> 2-dimensional topological primitive

Note 1 to entry: The geometric realization of a face is a surface. The boundary of a face is the set of directed edges within the same topological complex that are associated to the face via the boundary relations. These can be organized as rings.

[SOURCE: ISO 19107:2019, 3.38]

3.1.6
level
<LADM> set of spatial units, with a geometric, and/or topologic, and/or thematic coherence

EXAMPLE 1 One level of spatial units for an urban cadastre and another for spatial units for a rural cadastre.

EXAMPLE 2 One level of spatial units to define basic administrative units associated with rights and another level of spatial units to define basic administrative units associated with restrictions.

EXAMPLE 3 One level of spatial units to define basic administrative units associated with formal rights, a second level for spatial units to define basic administrative units associated with informal rights and a third level for spatial units to define basic administrative units associated with customary rights.

EXAMPLE 4 One level with point based spatial units, a second level with line based spatial units, and a third level with polygon based spatial units.

3.1.7
liminal spatial unit
<LADM> spatial unit with a geometry represented as a combination of boundary face strings (2D) and boundary faces (3D)

Note 1 to entry: A liminal spatial unit is represented by a spatial unit on the threshold between 2D and 3D representations.

3.1.8
point
0-dimensional geometric primitive, representing a position

Note 1 to entry: The boundary of a point is the empty set.

Note 2 to entry: A point may be used to define one or more boundary faces or boundary face strings.

Note 3 to entry: Points can be observed by e.g., terrestrial surveying, but also by photo interpretation, image interpretation, or identification on an existing map.

[SOURCE: 19136-1:2020, 3.1.47, modified —Note 2 and 3 to entry to entry have been added.]

3.1.9
utility network
<LADM> network describing the legal space of the topology of a utility

EXAMPLE The legal space needed to locate and maintain the network.

Note 1 to entry: A utility network may be attributed with information about its legal, recorded or informal space.

Note 2 to entry: A utility network can also be modelled as a basic administrative unit.

3.2 Abbreviations

BAUnit	Basic Administrative Unit
FIG	International Federation of Surveyors
GNSS	Global Navigation Satellite System
GPR	Ground-penetrating radar
IHO	International Hydrographic Organization
INSPIRE	Infrastructure for Spatial Information in Europe
LA	Land Administration
LAS	Land Administration System
LADM	Land Administration Domain Model
MBES	Multibeam Echosounder
OGC	Open Geospatial Consortium
RRR	Right, Restriction, Responsibility
SDI	Spatial Data Infrastructure
STDM	Social Tenure Domain Model
TPS	Terrestrial Positioning System
UML	Unified Modelling Language

4 Conformance

4.1 Conformance requirements and testing

Conformance to this part of the ISO 19152 series on Land Administration Domain Model (LADM) (Part 2 – Land registration) consists of alignment with the requirements established in Clauses 4.2 and 7 in this document. The Abstract Test Suite given in Annex A describes a methodology for testing conformance to these requirements.

4.2 Conformance classes

1) **'Based on Generic Conceptual Model'**

   https://standards.isotc211.org/19152/-2/1/req/basedongenericconceptualmodel

Requirement 1: This part of the standard is based on Part 1 – Generic Conceptual Model. All requirements contained in 19152-1 shall apply to this part of the standard.

2) **'Continuum of Rights'**

   https://standards.isotc211.org/19152/-2/1/req/continuumofrights