



SLOVENSKI STANDARD
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**Geografske informacije - Geoprostorski API za funkcije - 1. del: Osrednji profil
(ISO/DIS 19168-1:2023)**

Geographic information - Geospatial API for features - Part 1: Core (ISO/DIS 19168-1:2023)

Geoinformationen - Raumbezogene API für Features - Teil 1: Kern (ISO/DIS 19168-1:2023)

Information géographique - API géospatiale pour les entités - Partie 1: Profil minimal (ISO/DIS 19168-1:2023)

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Part 1: Core

*Information géographique — API géospatiale pour les entités —
Partie 1: Profil minimal*

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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 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 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*.

This second edition cancels and replaces the first edition (ISO 19168-1:2020), which has been technically revised.

The main changes are as follows:

Bugfixes:

- Fix core.xsd
- Correct links to RFCs
- describedBy -> describedby
- Fix Abstract Test Suite
- Add dependencies in ATS
- Fix links to RFCs
- Set rel in the links schema to required
- Reference RFC 723x for HTTP 1.1
- Fix issues in the Abstract Test Suite
- Correct reference
- Value of parameter profile should be in quotes

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- Change dateTime to datetime in [Annex A](#)

Improvements and clarifications:

- Add conformance class URIs to [clause 2](#)
- Add note to clarify requirements on spatial/temporal
- Update OpenAPI 3.0 reference
- Update definition of dataset
- Relax use of "distribution"
- Clarify use of a degenerated bbox
- Clarifications on temporal coordinate reference systems
- Update links to OpenAPI Specification
- Enforce that bbox extents are 4 or 6 numbers
- Discuss self and alternate links for collections
- Clarify /req/oas30/oas-definition-1
- Add clarification on next links
- Add clarification on headers in GML-SF responses
- Clarification on limit parameter
- Clarify use of 'default CRS'
- Add recommendation for self/alternate links on landing page
- Add references to bbox-crs
- Clarify /req/core/sfc-md-success
- Add definition of landing page
- Clarification on multiple bounding boxes in an extent
- Clarification on paging and extent
- Wording of test for featureId ambiguous
- Clarify interval terminology
- Add note on itemType

A list of all parts in the ISO 19168 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

OGC API standards^[10] define modular API building blocks to spatially enable Web APIs in a consistent way. The OpenAPI specification is used to define the API building blocks.

The OGC API family of standards is organized by resource type. This standard specifies the fundamental API building blocks for interacting with features. The spatial data community uses the term 'feature' for things in the real world that are of interest.

For those not familiar with the term 'feature,' the explanations on Spatial Things, Features and Geometry in the W3C/OGC Spatial Data on the Web Best Practice document^[7] provide more detail.

OGC API Features provides API building blocks to create, modify and query features on the Web. OGC API Features is comprised of multiple parts, each of them is a separate standard. This part, the "Core," specifies the core capabilities and is restricted to fetching features where geometries are represented in the coordinate reference system WGS 84 with axis order longitude/latitude. Additional capabilities that address more advanced needs will be specified in additional parts. Examples include support for creating and modifying features, more complex data models, richer queries, additional coordinate reference systems, multiple datasets and collection hierarchies.

By default, every API implementing this standard will provide access to a single dataset. Rather than sharing the data as a complete dataset, the OGC API Features standards offer direct, fine-grained access to the data at the feature (object) level.

The API building blocks specified in this standard are consistent with the architecture of the Web. In particular, the API design is guided by the IETF HTTP/HTTPS RFCs, the W3C Data on the Web Best Practices,^[8] the W3C/OGC Spatial Data on the Web Best Practices,^[7] and the emerging OGC Web API Guidelines. A particular example is the use of the concepts of datasets and dataset distributions as defined in DCAT^[9] and used in schema.org.

This standard specifies discovery and query operations that are implemented using the HTTP GET method. Support for additional methods (in particular POST, PUT, DELETE, PATCH) will be specified in additional parts.

Discovery operations enable clients to interrogate the API, including the API definition and metadata about the feature collections provided by the API, to determine the capabilities of the API and retrieve information about available distributions of the dataset.

Query operations enable clients to retrieve features from the underlying data store based upon simple selection criteria, defined by the client.

A subset of the OGC API family of standards is expected to be published by ISO. For example, this document is in the process to be published by ISO as ISO 19168-1. To reflect that only a subset of the OGC API standards will be published by ISO and to avoid using organization names in the titles of ISO standards, standards from the "OGC API" series are published by ISO as "Geospatial API." That is, the title of this document in OGC is "OGC API - Features - Part 1:Core" and the title in ISO is "Geographic Information - Geospatial API for Features - Part 1: Core."

For simplicity, this document consistently uses:

- "OGC API" to refer to the family of standards for geospatial Web APIs that in ISO is published as "Geospatial API;"
- "OGC API - Features" to refer to the multipart standard for features that in ISO is published as ISO 19168 / "Geographic Information - Geospatial API for Features;" and
- "OGC API - Features - Part 1: Core" to refer to this document that in ISO is published as ISO 19168-1 / "Geographic Information - Geospatial API for Features - Part 1: Core."

This standard defines the resources listed in [Table 1](#). For an overview of the resources, see [section 7.1 Overview](#).

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Table 1 — Overview of resources, applicable HTTP methods and links to the document sections

Resource	Path	HTTP method	Document reference
Landing page	/	GET	7.2 API landing page
Conformance declaration	/conformance	GET	7.4 Declaration of conformance classes
Feature collections	/collections	GET	7.13 Feature collections
Feature collection	/collections/{collectionId}	GET	7.14 Feature collection
Features	/collections/{collectionId}/items	GET	7.15 Features
Feature	/collections/{collectionId}/items/{featureId}	GET	7.16 Feature

Implementations of OGC API Features are intended to support two different approaches how clients can use the API.

In the first approach, clients are implemented with knowledge about this standard and its resource types. The clients navigate the resources based on this knowledge and based on the responses provided by the API. The API definition may be used to determine details, e.g., on filter parameters, but this may not be necessary depending on the needs of the client. These are clients that are in general able to use multiple APIs as long as they implement OGC API Features.

The other approach targets developers that are not familiar with the OGC API standards, but want to interact with spatial data provided by an API that happens to implement OGC API Features. In this case the developer will study and use the API definition - typically an OpenAPI document - to understand the API and implement the code to interact with the API. This assumes familiarity with the API definition language and the related tooling, but it should not be necessary to study the OGC API standards.

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Geographic information — Geospatial API for features —

Part 1: Core

1 Scope

This document specifies the behavior of Web APIs that provide access to features in a dataset in a manner independent of the underlying data store. This standard defines discovery and query operations.

Discovery operations enable clients to interrogate the API, including the API definition and metadata about the feature collections provided by the API, to determine the capabilities of the API and retrieve information about available distributions of the dataset.

Query operations enable clients to retrieve features from the underlying data store based upon simple selection criteria, defined by the client.

2 Normative references

The following documents are referred to in the 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.

OPENAPI INITIATIVE (OAI), **OpenAPI Specification 3.0** [online]. 2020 [viewed 2020-03-16]. The latest patch version at the time of publication of this standard was 3.0.3, available at <https://spec.openapis.org/oas/v3.0.3>

INTERNET ENGINEERING TASK FORCE (IETF), RFC 2818: **HTTP Over TLS** [online]. Edited by E. Rescorla. 2000 [viewed 2020-03-16]. Available at <https://www.rfc-editor.org/rfc/rfc2818.html>

INTERNET ENGINEERING TASK FORCE (IETF), RFC 3339: **Date and Time on the Internet: Timestamps** [online]. Edited by G. Klyne, C. Newman. 2002 [viewed 2020-03-16]. Available at <https://www.rfc-editor.org/rfc/rfc3339.html>

INTERNET ENGINEERING TASK FORCE (IETF), RFC 7230 to RFC 7235: **HTTP/1.1** [online]. Edited by R. Fielding, J. Reschke, Y. Lafon, M. Nottingham. 2014 [viewed 2020-04-28]. Available at <https://www.rfc-editor.org/rfc/rfc7230.html>, <https://www.rfc-editor.org/rfc/rfc7231.html>, <https://www.rfc-editor.org/rfc/rfc7232.html>, <https://www.rfc-editor.org/rfc/rfc7233.html>, <https://www.rfc-editor.org/rfc/rfc7234.html>, and <https://www.rfc-editor.org/rfc/rfc7235.html>

INTERNET ENGINEERING TASK FORCE (IETF), RFC 8288: **Web Linking** [online]. Edited by M. Nottingham. 2017 [viewed 2020-03-16]. Available at <https://www.rfc-editor.org/rfc/rfc8288.html>

OPEN GEOSPATIAL CONSORTIUM (OGC), OGC 10-100r3: **Geography Markup Language (GML) Simple Features Profile** [online]. Edited by L. van den Brink, C. Portele, P. Vretanos. 2012 [viewed 2020-03-16]. Available at http://portal.opengeospatial.org/files/?artifact_id=42729

INTERNET ENGINEERING TASK FORCE (IETF), RFC 7946: **The GeoJSON Format** [online]. Edited by H. Butler, M. Daly, A. Doyle, S. Gillies, S. Hagen, T. Schaub. 2016 [viewed 2020-03-16]. Available at <https://www.rfc-editor.org/rfc/rfc7946.html>

WHATWG, **HTML**, Living Standard [online, viewed 2020-03-16]. Available at <https://html.spec.whatwg.org/>

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SCHEMA.ORG, **Schema.org** [online, viewed 2020-03-16]. Available at <https://schema.org/docs/schemas.html>

3 Terms and definitions

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

ISO and IEC maintain terminological 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 Terms and definitions

3.1.1

dataset

collection of data

Note 1 to entry: Published or curated by a single agent, and available for access or download in one or more serializations or formats.

Note 2 to entry: The use of 'collection' in the definition is broader than the use of the term collection in this document. See the definition of 'feature collection.'

[SOURCE: DCAT,^[9] 6.6, modified — Definition split into definition and Note 1 to entry; Note 2 to entry has been added]

3.1.2

distribution

specific representation of a *dataset* (3.1.1)

EXAMPLE A downloadable file, an RSS feed or an API.

[SOURCE: DCAT,^[9] 6.7, modified — Definition has been shortened]

3.1.3

feature

abstraction of real-world phenomena

Note 1 to entry: The explanations on Spatial Things, Features and Geometry in the W3C/OGC Spatial Data on the Web Best Practice document^[Z] provide more detail.

[SOURCE: ISO 19101-1:2014, 4.1.11, modified — Note 1 to entry has been added]

3.1.4

feature collection **collection**

a set of *features* (3.1.3) from a *dataset* (3.1.1)

3.1.5

resource

entity that might be identified

Note 1 to entry: The term "resource", when used in the context of an OGC API standard, should be understood to mean a web resource unless otherwise indicated.

[SOURCE: ISO 15836-2:2019, 3.1.10, modified to remove source notes and add informative note specific to this Standard]

3.1.6

Web API

API using an architectural style that is founded on the technologies of the Web

Note 1 to entry: Best Practice 24: Use Web Standards as the foundation of APIs in the W3C Data on the Web Best Practices^[8] provides more detail.

Note 2 to entry: the original source is DWBP,^[8] 8.10.1, which has been modified by being rephrased for clarity.

3.1.7

web resource

resource (3.1.5) that is identified by a HTTP URI

3.2 Abbreviated terms

API Application Programming Interface

CORS Cross-Origin Resource Sharing

CRS Coordinate Reference System

HTTP Hypertext Transfer Protocol

HTTPS Hypertext Transfer Protocol Secure

IANA Internet Assigned Numbers Authority

OGC Open Geospatial Consortium

TRS Temporal Coordinate Reference System

URI Uniform Resource Identifier

YAML YAML Ain't Markup Language

4 Conformance

This standard defines six requirements / conformance classes.

The standardization targets of all conformance classes are "Web APIs."

The main requirements class is:

— Core.

The *Core* specifies requirements that all Web APIs have to implement.

The *Core* does not mandate a specific encoding or format for representing features or feature collections. Four requirements classes depend on the *Core* and specify representations for these resources in commonly used encodings for spatial data on the web:

— HTML,

— GeoJSON,

— Geography Markup Language (GML), Simple Features Profile, Level 0, and

— Geography Markup Language (GML), Simple Features Profile, Level 2.

None of these encodings are mandatory and an implementation of the *Core* may also decide to implement none of them, but to implement another encoding instead.

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That said, the *Core* requirements class includes recommendations to support, where practical, HTML and GeoJSON as encodings. [Clause 6](#) (Overview) includes a discussion about the recommended encodings.

The *Core* does not mandate any encoding or format for the formal definition of the API either. One option is the OpenAPI 3.0 specification and a requirements class has been specified for OpenAPI 3.0, which depends on the *Core*:

- OpenAPI Specification 3.0.

Like with the feature encodings, an implementation of the *Core* requirements class may also decide to use other API definition representations in addition or instead of an OpenAPI 3.0 definition. Examples for alternative API definitions: OpenAPI 2.0 (Swagger), future versions of the OpenAPI specification, an OWS Common 2.0 capabilities document or WSDL.

The *Core* is intended to be a minimal useful API for fine-grained read-access to a spatial dataset where geometries are represented in the coordinate reference system WGS 84 with axis order longitude/latitude.

Additional capabilities such as support for transactions, complex data structures, rich queries, other coordinate reference systems, subscription/notification, returning aggregated results, etc., may be specified in future parts of the OGC API Features series or as vendor-specific extensions.

Conformance with this standard shall be checked using all the relevant tests specified in [Annex A](#) (normative) of this document. The framework, concepts, and methodology for testing, and the criteria to be achieved to claim conformance are specified in the OGC Compliance Testing Policies and Procedures and the OGC Compliance Testing web site.

Table 2 — Conformance class URIs

Conformance class	URI
Core	http://www.opengis.net/spec/ogcapi-features-1/1.0/conf/core
HTML	http://www.opengis.net/spec/ogcapi-features-1/1.0/conf/html
GeoJSON	http://www.opengis.net/spec/ogcapi-features-1/1.0/conf/geojson
GML, Simple Features Profile, Level 0	http://www.opengis.net/spec/ogcapi-features-1/1.0/conf/gmlsf0
GML, Simple Features Profile, Level 2	http://www.opengis.net/spec/ogcapi-features-1/1.0/conf/gmlsf2
OpenAPI Specification 3.0	http://www.opengis.net/spec/ogcapi-features-1/1.0/conf/oas30

5 Conventions

5.1 Identifiers

The normative provisions in this standard are denoted by the URI:

`http://www.opengis.net/spec/ogcapi-features-1/1.0`

All requirements and conformance tests that appear in this document are denoted by partial URIs which are relative to this base.

5.2 Link relations

To express relationships between resources, RFC 8288 (Web Linking) is used.

The following registered link relation types^[3] are used in this document.

- **alternate**: Refers to a substitute for this context.

- **collection**: The target IRI points to a resource which represents the collection resource for the context IRI.
- **describedby**: Refers to a resource providing information about the link's context.
- **item**: The target IRI points to a resource that is a member of the collection represented by the context IRI.
- **next**: Indicates that the link's context is a part of a series, and that the next in the series is the link target.
- **license**: Refers to a license associated with this context.
- **prev**: Indicates that the link's context is a part of a series, and that the previous in the series is the link target.
 - This relation is only used in examples.
- **self**: Conveys an identifier for the link's context.
- **service-desc**: Identifies service description for the context that is primarily intended for consumption by machines.
 - API definitions are considered service descriptions.
- **service-doc**: Identifies service documentation for the context that is primarily intended for human consumption.

In addition, the following link relation types are used for which no applicable registered link relation type could be identified.

- **items**: Refers to a resource that is comprised of members of the collection represented by the link's context.
- **conformance**: Refers to a resource that identifies the specifications that the link's context conforms to.
- **data**: Refers to the root resource of a dataset in an API.

Each resource representation includes an array of links. Implementations are free to add additional links for all resources provided by the API. For example, an **enclosure** link could reference a bulk download of a collection. Or a **related** link on a feature could reference a related feature.

5.3 Use of HTTPS

For simplicity, this document in general only refers to the HTTP protocol. This is not meant to exclude the use of HTTPS and simply is a shorthand notation for "HTTP or HTTPS." In fact, most servers are expected to use HTTPS, not HTTP.

5.4 HTTP URIs

This document does not restrict the lexical space of URIs used in the API beyond the requirements of the HTTP and URI Syntax IETF RFCs. If URIs include reserved characters that are delimiters in the URI subcomponent, these have to be percent-encoded. See Clause 2 of RFC 3986^[2] for details.