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Geographic information — Geospatial application programming interface (API) for tiles —

Part 1: Core

Information géographique — Interface de programmation d'application (API) géospatiale pour les tuiles —

Partie 1: Profil-minimal

Reference number
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Foreword

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Introduction

This document is an ISO adaptation of *OGC API – Tiles – Part 1: Core* (OGC 20-057). The normative content is identical to that in the OGC standard, but some minor editorial changes have been made to bring this document in line with the ISO/IEC Directives, Part 2.

This document defines building blocks for implementing web application programming interfaces (APIs) that support the retrieval of tiled geospatial information. A web API is an application programming interface for either a web server or a web browser. This document is sometimes referred to as the "Tiles API".

The OGC suite of web API standards is an extensible framework for building HTTP-based services that can be accessed in different applications on different platforms such as the web, desktop, mobile, etc. This document specifies how different forms/types of geospatial resources are supported, such as tiles of vector features ("vector tiles"), coverages and maps (or imagery). Although this document can be used independently, the building blocks (e.g. subsets of the API definition that provide for specific functions) can be combined with other OGC API standards (or the ISO equivalents, such as ISO 19168-1) for additional capabilities or increased interoperability for specific types of data. This document references *OGC Two Dimensional Tile Matrix Set and Tile Set Metadata,* Version 2.0 (OGC 17-083r4). That standard defines logical models and encodings for specifying tile matrix sets and describing tile sets. A tile matrix set is a tiling scheme that enables an application to partition and index space based on a set of regular grids defined for multiple scales in a coordinate reference system (CRS).

This document is an alternative to *OpenGIS® Web Map Tile Service Implementation Standard* (OGC 07-057r7). Instead of a fixed web interface, this document focuses on simple reusable Representational State Transfer (REST) API building blocks which can be described using the OpenAPI specification. Whereas *WTMS OpenGIS® Web Map Tile Service Implementation Standard* (OGC 07-057r7) focuses on map tiles, this document is designed to support any form of tiled data.

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Geographic information — Geospatial application programming interface (API) for tiles —

Part 1: Core

1 Scope

This document specifies the behaviour of web application programming interfaces (APIs) that provide access to tiles of one or more geospatial data resources (collections) that the web API offers.

This document describes how to:

— discover which resources offered by the web API can be retrieved as tiles;

— get metadata about the available tile sets (including according to which tile matrix set each tile set is partitioned and the limits of that tile set within a common potentially global tile matrix set);

— request a tile.

The core conformance class is defined in a way that can be easily included in a web API, even if that API does not conform to the *OGC API – Common* Standard. A web API can combine some requirements classes of this document with those of other OGC API standards (including *OGC API – Common*) to extend the scope of the web API by adding functionality.

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.

Masó, J., Jacovella-St-Louis, J. (eds.) *OGC Two Dimensional Tile Matrix Set and Tile Set Metadata.* Version 2.0. OGC 17-083r4. Open Geospatial Consortium, 2022. Available at: https://docs.ogc.org/is/17-083r4/17-083r4.html

Heazel, C. (ed.) *OGC API – Common – Part 1: Core*. Version 1.0.0. OGC 19-072. Open Geospatial Consortium, 2023. Available at: https://docs.ogc.org/is/19-072/19-072.pdf

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions 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/

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3.1.1
coverage tile
tile (3.1.7) that contains information, often in a gridded form, where the values represent observations or measurements as a count, or quantity using some unit of measure

Note 1 to entry: Coverage tiles can be generated in combination with the proposed *OGC API – Coverages*, and can also be generated by combining a subset (trim) and resampling operation. Usually, visualizing a coverage tile on a rendering device implies mapping those values to colours.

Note 2 to entry: Coverages are described in ISO 19123-1.

3.1.2
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: A *web API* (3.1.14) implementing *OGC API – Common – Part 1: Core* (OGC 19-072) often gives access to a single dataset which may be comprised of one or more *geospatial data resources* (3.1.3).

[SOURCE: ISO 19168-1:2025, 3.1.1, modified — Note 2 to entry replaced.]

3.1.3
geospatial data resource
web-accessible resource that consists of a set of geospatial data

Note 1 to entry: In this document, geospatial data are sometimes referred to using the abbreviated form "geodata".

Note 2 to entry: In *web APIs* (3.1.14) implementing *OGC API – Common – Part 2: Geospatial Data* (OGC 20-024), geospatial data resources are referred to as collections and are defined in the collections conformance class.

3.1.4
geospatial resource aspect
web-accessible resource that represents a component of geospatial information (e.g. metadata, schemas) or geospatial data accessed using a particular mechanism and data model (e.g. feature items, *tiles* (3.1.7), maps, coverages) of a more generic *geospatial data resource* (3.1.3) (e.g. a collection)

Note 1 to entry: A geospatial resource aspect is not to be confused with a web accessible resource representation. While resource representations share the same path and are selected by format negotiation, geospatial aspects use different paths. Commonly a geospatial aspect is a subpath of a geospatial data resource.

3.1.5
landing page
page whose primary purpose is to contain a description of something else

Note 1 to entry: Landing pages often provide summaries or additional information about the thing that they describe (e.g. W3C, URLs in Data Primer).

Note 2 to entry: In the context of the OGC API standards, a landing page serves as the root node of the API Resource tree and provides the information needed to navigate all the resources exposed through the API. The landing page provides access to the root of a *dataset* (3.1.2).

3.1.6
map tile
tile (3.1.7) that contains information in a raster form where the values of cells are colours which can be readily displayed on rendering devices

3.1.7
tile
geometric shape with known properties that can be (but are not necessarily) the result of a tiling (tessellation) process

Note 1 to entry: A tile consists of a single connected “piece” without “holes” or “lines” (topological disc).

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Note 2 to entry: In the context of a 2D *tile matrix* (3.1.8), a tile is one of the rectangular regions of space, which can be uniquely identified by row and column integer indices, making up the tile matrix.

Note 3 to entry: In the context of a geospatial data *tile set* (3.1.10), a tile contains data for such a partition of space as part of an overall set of tiles for that tiled geospatial data.

Note 4 to entry: Tiles are useful to efficiently request, transfer, cache, display, store and process geospatial data for a specific resolution and area of interest, providing deterministic performance and scalability for arbitrarily large *datasets* (3.1.2).

Note 5 to entry: Tiles can contain a variety of data types, such as grid-based pictorial representations (*map tiles* (3.1.6)), coverage subsets (*coverage tiles* (3.1.1)) or feature-based representations (*vector tiles* (3.1.13)).

[SOURCE: *GC Core Tiling Conceptual and Logical Models for 2D Euclidean Space* (OGC 19-014r3)]

3.1.8
tile matrix
tiling grid in a given 2D coordinate reference system, associated to a specific scale and partitioning space into regular conterminous *tiles* (3.1.7), each of which being assigned a unique identifier

Note 1 to entry: Each tile of a tile matrix is uniquely identifiable by integer indices for the row and the column. The number of rows is referred to as the matrix height, while the maximum number of columns is referred to as the matrix width (the number of columns can vary for different rows in variable width tile matrices).

[SOURCE: *OGC Two Dimensional Tile Matrix Set and Tile Set Metadata,* Version 2.0 (OGC 17-083r4)]

3.1.9
tile matrix set
tiling scheme (3.1.11) consisting of a set of tile matrices defined at different scales covering approximately the same area and having a common coordinate reference system

[SOURCE: *OGC Two Dimensional Tile Matrix Set and Tile Set Metadata,* Version 2.0 (OGC 17-083r4)]

3.1.10
tile set
set of *tiles* (3.1.7) resulting from tiling data according to a particular *tiling scheme* (3.1.11)

[SOURCE: *GC Core Tiling Conceptual and Logical Models for 2D Euclidean Space* (OGC 19-014r3), modified — to clarify that in the context of this document, a tile set refers specifically to a set of tiles containing data and following a common tiling scheme.]

3.1.11
tiling scheme
scheme that defines how space is partitioned into individual *tiles* (3.1.7), potentially featuring multiple levels of detail (each tiling at a different granularity to reflect a different resolution or scale)

Note 1 to entry: A tiling scheme defines the spatial reference system and the geometric properties of each tile defined by the scheme. Those properties include which space each tile occupies (the tile's spatial extent), as well as a tile coordinate origin if a particular corner of origin convention is established.

Note 2 to entry: A tiling scheme can be defined on top of a coordinate reference system (CRS) as well as other spatial reference systems such as a discrete global grid system (DGGS) and other organizations including irregular ones. In this document, only tiling schemes based on CRSs are supported.

[SOURCE: *OGC Two Dimensional Tile Matrix Set and Tile Set Metadata,* Version 2.0 (OGC 17-083r4)]

3.1.12
tile set metadata
additional metadata beyond the common properties defining the *tile set* (3.1.10)

Note 1 to entry: Metadata describing common properties defining a tile set, layers and styles used to produce the tile set, the limits of the *tile matrix* (3.1.8) with actual data and common metadata such as abstract, owner, author, etc.

[SOURCE: *OGC Two Dimensional Tile Matrix Set and Tile Set Metadata,* Version 2.0 (OGC 17-083r4)]

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3.1.13
vector tile
tiled vector feature data
tile (3.1.7) that contains vector data that have been generalized (simplified) at the tile scale resolution and clipped by the tile boundaries

[SOURCE: *OGC Two Dimensional Tile Matrix Set and Tile Set Metadata,* Version 2.0 (OGC 17-083r4)]

3.1.14
web API
web application programming interface
API using an architectural style that is founded on the technologies of the web

[SOURCE: *OGC API – Features – Part 1: Core* (OGC 17-069r4)]

3.2 Abbreviated terms

ABNF	Augmented Backus Naur Form
API	application programming interface
CRS	coordinate reference system
DGGS	discrete global grid system
HTTP	Hypertext Transfer Protocol
HTTPS	Hypertext Transfer Protocol Secure
JSON	JavaScript Object Notation
MVT	Mapbox Vector Tiles
NetCDF	Network Common Data Form
REST	Representational State Transfer
URI	Uniform Resource Identifier
WMS	Web Map Service
WMTS	Web Map Tile Service
XML	Extensible Markup Language

4 Conformance

4.1 General

This document defines multiple requirements classes and their associated conformance classes.

The standardization targets of all conformance classes are “web APIs”.

The Tiles API requirements classes are summarized in 4.2 to 4.6 and in more detail in Clauses 7 to 16.

4.2 Requirements classes defining resources

4.2.1 Requirements class “Core”

Requirements class “Core” (http://www.opengis.net/spec/ogcapi-tiles-1/1.0/req/core).

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