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Open Geospatial Consortium

OGC API - DISCRETE GLOBAL GRID SYSTEMS - PART 1: CORE

STANDARD
Implementation

CANDIDATE SWG DRAFT

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I ABSTRACT

This specification defines building blocks which can be used as part of a Web API to retrieve geospatial data for a specific area, time and resolution of interest, based on a specific Discrete Global Grid System (DGGS) and indexing scheme, as defined in OGC Abstract Topic 21, as well to query the list of DGGS zones from which data is available and/or matching a specify query (in combination with other building blocks defining queries, such as a filter defined using the OGC Common Query Language (CQL2).

II KEYWORDS

The following are keywords to be used by search engines and document catalogues.

ogcdoc, OGC document, API, openapi, html, ogcapi

III PREFACE

NOTEOGC API standards 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.

OGC API — Discrete Global Grid Systems provides API building blocks to retrieve data and query zones based on Discrete Global Grid Systems (DGGS) concepts defined in OGC Abstract Topic 21. Additional parts for *OGC API — Discrete Global Grid Systems* may be defined in the future to provide additional capabilities.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. The Open Geospatial Consortium shall not be held responsible for identifying any or all such patent rights.

Recipients of this document are requested to submit, with their comments, notification of any relevant patent claims or other intellectual property rights of which they may be aware that might be infringed by any implementation of the standard set forth in this document, and to provide supporting documentation.

IV SECURITY CONSIDERATIONS

No security considerations have been made for this document.

V SUBMITTING ORGANIZATIONS

The following organizations submitted this Document to the Open Geospatial Consortium (OGC):

- Pangaea Innovations Pty. Ltd.
- Ecere Corporation

VI SUBMITTERS

All questions regarding this submission should be directed to the editors or the submitters:

Name	Affiliation
Matthew Brian John Purss (editor)	Pangaea Innovations Pty. Ltd.
Jérôme Jacovella-St-Louis (editor)	Ecere Corporation

1

SCOPE

1 SCOPE

NOTEInsert Scope text here. Give the subject of the document and the aspects of that scope covered by the document.

2

CONFORMANCE

2 CONFORMANCE

This standard defines XXXX.

Requirements for N standardization target types are considered:

- AAAA
- BBBB

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.

In order to conform to this OGC® interface standard, a software implementation shall choose to implement:

- Any one of the conformance levels specified in Annex A (normative).
- Any one of the Distributed Computing Platform profiles specified in Annexes TBD through TBD (normative).

All requirements-classes and conformance-classes described in this document are owned by the standard(s) identified.

3

NORMATIVE REFERENCES

3 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.

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4

TERMS AND DEFINITIONS

4 TERMS AND DEFINITIONS

This document uses the terms defined in OGC Policy Directive 49, which is based on the ISO/IEC Directives, Part 2, Rules for the structure and drafting of International Standards. In particular, the word “shall” (not “must”) is the verb form used to indicate a requirement to be strictly followed to conform to this document and OGC documents do not use the equivalent phrases in the ISO/IEC Directives, Part 2.

This document also uses terms defined in the OGC Standard for Modular specifications (OGC 08-131r3), also known as the ‘ModSpec’. The definitions of terms such as standard, specification, requirement, and conformance test are provided in the ModSpec.

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

This document uses the terms defined in Sub-clause 5.3 of [OGC06-121r9], which is based on the ISO/IEC Directives, Part 2, Rules for the structure and drafting of International Standards. In particular, the word “shall” (not “must”) is the verb form used to indicate a requirement to be strictly followed to conform to this standard.

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

4.1. **example term**

term used for exemplary purposes

Note 1 to entry: An example note.

Example Here’s an example of an example term.

[**SOURCE:** ISO 19101-1:2014]

5

CONVENTIONS

5 CONVENTIONS

This sections provides details and examples for any conventions used in the document. Examples of conventions are symbols, abbreviations, use of XML schema, or special notes regarding how to read the document.

5.1. Identifiers

The normative provisions in this standard are denoted by the URI

`http://www.opengis.net/spec/{standard}/{m.n}`

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

6

DGGS – CORE CONFORMANCE CLASS

6 DGGS — CORE CONFORMANCE CLASS

Paragraph

6.1. Clauses not containing normative material sub-clause 1

Paragraph

6.2. Clauses not containing normative material sub-clause 2

7

DGGS – DATA RETRIEVAL CONFORMANCE CLASSES

7 DGGS — DATA RETRIEVAL CONFORMANCE CLASSES

7.1. Requirement Class DGGS — Data Retrieval

The Data Retrieval conformance class allows to retrieve data from a specific Discrete Global Grid System (DGGS) in a particular indexing scheme from either an individual zone, or a list of zones referenced by ID. It describes an HTTP GET operation, as well as its response. The selected DGGS is listed as available and described in the Core conformance class, and conforms to OGC Topic 21. The conformance makes use of URI templates for a variable representing the Zone ID. The data retrieved from a Web API using this conformance class can either be for a particular collection of geospatial data, for a dataset as a whole, or in connection with *OGC API — Processes — Part 3: Workflows & Chaining*, the output of a processing workflow.

REQUIREMENTS CLASS 1	
TARGET TYPE	DGGS Data Retrieval
PREREQUISITE	http://www.opengis.net/spec/ogcapi-common-1/1.0/req/core
LABEL	http://www.opengis.net/spec/ogcapi-dggs-1/0.0/req/data-retrieval

7.1.1. Retrieve data from single zone

The following requirements describe how a client can retrieve data from a single DGGS zone at the resource path …`/dggs/{dggsId}/zones/{zoneId}/data`.

7.1.1.1. Operation

REQUIREMENT 1	
LABEL	/req/data-retrieval/single-zone-data-op
STATEMENT	For retrieving data for a single DGGS zone:

REQUIREMENT 1	
A	The Implementation SHALL support an HTTP GET operation at a resource path ending with .../dggs/{dggsId}/zones/{zoneId}/data.
B	The Implementation SHALL provide a templated link to this resource path using the link relation type http://www.opengis.net/def/rel/ogc/1.0/dggs-zone-data.

7.1.1.2. Response

REQUIREMENT 2	
LABEL	/req/data-retrieval/single-zone-data-response
STATEMENT	For the response to a query retrieving data for a single DGGS zone:
A	The response of the HTTP GET operation SHALL have a status code of 200.
B	The content of the response SHALL be a data packet corresponding precisely to the area covered by the DGGS zone.
C	The content of the response SHALL be a data packet whose resolution / scale correspond to that zone's hierarchy level. This would usually imply more than a single value being returned for each zone request. The data packet would include values for descendent zones at *x* levels deeper than the requested zone's level, where *x* may be defined by the indexing scheme or data packet encoding, or otherwise be specified. e.g., requesting data for a level 10 zones might be returning individual values for each level 18 zones contained within that level 10 zone for which data is being requested.
D	The selection of an encoding for the response SHALL be consistent with HTTP content negotiation.

7.2. Requirement Class DGGS — Multi-Zone Data Retrieval

The Multi-Zone Data Retrieval conformance class allows to retrieve data from a specific Discrete Global Grid System (DGGS) in a particular indexing scheme from a list of zones referenced by ID. It describes an HTTP GET operation, as well as its response. The selected DGGS is listed as available and described in the Core conformance class, and conforms to OGC Topic 21. The conformance makes use of URI templates for a variable representing the Zone ID. The data retrieved from a Web API using this conformance class can either be for a particular collection of geospatial data, for a dataset as a whole, or in connection with *OGC API — Processes — Part 3: Workflows & Chaining*, the output of a processing workflow.

REQUIREMENTS CLASS 2	
TARGET TYPE	DGGS Multi-Zone Data Retrieval
PREREQUISITE	http://www.opengis.net/spec/ogcapi-common-1/1.0/req/core
LABEL	http://www.opengis.net/spec/ogcapi-dggs-1/0.0/req/multi-zone-data-retrieval

7.2.1. Retrieve data from multiple zones

The following requirements describe how a client can retrieve data from a single DGGS zone at the resource path …`/dggs/{dggsId}/data?zones={zoneId},…`.

7.2.1.1. Operation

REQUIREMENT 3	
LABEL	/req/data-retrieval/multi-zone-data-op
STATEMENT	For retrieving data for multiple DGGS zones:
A	The Implementation SHALL support an HTTP GET operation at a resource path ending with …`/dggs/{dggsId}/zones/data`.
B	The Implementation SHALL support a `zones` query parameter, consisting of a list of zone IDs in a format consistent with the indexing scheme for the selected DGGS ID.
C	The Implementation SHALL provide a link to this resource path using the link relation type http://www.opengis.net/def/rel/ogc/1.0/dggs-zone-data and the variable `{zoneID}` in the template URL.

7.2.1.2. Response

REQUIREMENT 4	
LABEL	/req/data-retrieval/multi-zone-data-response
STATEMENT	For the response to a query retrieving data for multiple DGGS zones:
A	The response of the HTTP GET operation SHALL have a status code of 200.

REQUIREMENT 4	
B	The content of the response SHALL package data packets corresponding precisely to the area covered by each of the DGGS zones being requested.
C	The content of the response SHALL package data packets whose resolution / scale correspond to those zones' hierarchy levels. This would usually imply more than a single value being returned for each zone returned. The data packet would include values for descendent zones at *x* levels deeper than the requested zone's level, where *x* may be defined by the indexing scheme or data packet encoding, or otherwise be specified. e.g., requesting data for a level 10 zones might be returning individual values for each level 18 zones contained within that level 10 zone for which data is being requested.
D	The selection of an encoding for the response SHALL be consistent with HTTP content negotiation.

8

DGGS – ZONE QUERY CONFORMANCE CLASS

8 DGGS — ZONE QUERY CONFORMANCE CLASS

8.1. Requirement Class DGGS — Zone Query

The Zone Query conformance class allows to request the list of DGGS zones from a specific Discrete Global Grid System (DGGS) in a particular indexing scheme for which there is data available, or matching a particular query (e.g., using a filtering parameter). It describes an HTTP GET operation, as well as its response. The selected DGGS is listed as available and described in the Core conformance class, and conforms to OGC Topic 21. The list of zones from a Web API using this conformance class can either be for a particular collection of geospatial data, for a dataset as a whole, or in connection with *OGC API — Processes — Part 3: Workflows & Chaining*, the output of a processing workflow.

REQUIREMENTS CLASS 3	
TARGET TYPE	Implementation Specification
PREREQUISITES	http://www.example.org/req/blah /req/data-retrieval
LABEL	http://www.opengis.net/spec/ABCD/m.n/req/zone-query

8.1.1. Retrieve the list of zones

The following requirements describe how a client can retrieve the list of zones from which data is available at the resource path …/`dggs/{dggsId}/zones`.

8.1.1.1. Operation

REQUIREMENT 5	
LABEL	/req/zone-query/list-zones-op
STATEMENT	For retrieving a list of DGGS zones:
A	The Implementation SHALL support an HTTP GET operation at a resource path ending with …/`dggs/{dggsId}/zones`.

REQUIREMENT 5	
B	The Implementation SHALL provide a link to this resource path using the link relation type http://www.opengis.net/def/rel/ogc/1.0/dggs-zone-query.

8.1.1.2. Response

REQUIREMENT 6	
LABEL	/req/zone-query/zones-list-response
STATEMENT	For the response to a query requesting a list of DGGS zones:
A	The response of the HTTP GET operation SHALL have a status code of 200.
B	The content of the response SHALL be a list of zones fully covering where data is available (in the case where the resource is associated with a particular dataset), and matching any additional query parameters specified by the client (e.g., a filtering query parameter), without any redundancy.
C	Unless the zones is a compact list of zones (see `compact-zones` parameter), the zones returned SHALL all be of the same DGGS hierarchy level.
D	The selection of an encoding for the returned list of zones SHALL be consistent with HTTP content negotiation.
E	The implementation SHALL support at minimum a JSON encoding (media type `application/json`) where each zone ID is specified as a string within an array of zones assigned to a `zones` property within a JSON object (e..g, `{ "zones": [ "1-E-14", "1-E-15", "1-F-14", "1-F-15", "1-F-16" ] }`.

8.1.2. `zone-level` parameter

The following requirements describe how a client can specify the DGGS hierarchy level at which to retrieve the list of zones.

8.1.2.1. Parameter

REQUIREMENT 7	
LABEL	/req/zone-query/zone-level-parameter
STATEMENT	For specifying a level at which to return a list of DGGS zones:

REQUIREMENT 7	
A	The Implementation SHALL support a `zone-level` query parameter for the zone query operation (resource path ending with …/`dggs/{dggsId}/zones`).

8.1.2.2. Response

REQUIREMENT 8	
LABEL	/req/zone-query/zones-list-response
STATEMENT	For the response to querying a list of DGGS zones using `zone-level` query parameter:
A	If a compact zones list is used (the default), the zones returned in the response SHALL be of the DGGS hierarchy level specified by the `zone-level` query parameter, or of a lower hierarchy level standing in for a compact representation of multiple zones at the requested hierarchy level.
B	If a compact zones list is not used, the zones returned in the response SHALL be of the DGGS hierarchy level specified by the `zone-level` query parameter.

8.1.3. `compact-zones` parameter

By default, implementations return a compact list of zones where children zones fully covering a parent are recursively replaced by the parent zones, allowing to express large areas in a much more compact list of zones. The following requirements describe how a client can disable returning a compact list of zones.

8.1.3.1. Parameter

REQUIREMENT 9	
LABEL	/req/zone-query/compact-zones-parameter
STATEMENT	For specifying whether to return a compact list of zones:
A	The Implementation SHALL support a boolean `compact-zones` query parameter for the zone query operation (resource path ending with …/`dggs/{dggsId}/zones`), where a value of `true` corresponds to the default behavior when the paramter is not specified, and a value of `false` disables the use of compact-zones in the response.

8.1.3.2. Response

REQUIREMENT 10	
LABEL	/req/zone-query/compact-zones-response
STATEMENT	For the response to querying a list of DGGS zones using `compact-zones` query parameter:
A	When the `compact-zones` parameter is to false, the zones list response SHALL NOT be a compact list, and SHALL explicitly list every individual zone at the requested or default DGGS hierarchy level.
B	When the `compact-zones` parameter is to true (or unspecified), the zones list response SHALL be a compact list, where children zones completely covering the area of a parent zone SHALL be replaced by that parent zone, in a recursive manner all the way to the lowest DGGS hierarchy level.

8.1.4. Paging capability and `limit` parameter

The following requirements describe how a client can specify a limit to the number of zones to be returned and page through large list of zones as multiple requests and responses.

8.1.4.1. Parameter

REQUIREMENT 11	
LABEL	/req/zone-query/limit-parameter
STATEMENT	For specifying a limit to how many zones should be returned in a zone query:
A	The Implementation SHALL support a parameter `limit` integer query parameter, with a minimum value of 1.

8.1.4.2. Response

REQUIREMENT 12	
LABEL	/req/zone-query/limit-response
STATEMENT	For the response to a zone query:

REQUIREMENT 12	
A	The response SHALL not contain more zones than specified by the optional `limit` parameter (if specified).
B	If the API definition specifies a maximum value for the `limit` parameter, the response SHALL not contain more zones than this maximum value.
C	If the value of the `limit` parameter is larger than the maximum value, this SHALL NOT result in an error (but instead be replaced by the maximum as the parameter value).
D	If using compact zones, the parent zones SHALL count as a single zone, rather than the number of children zones they stand in for.
E	If an implementation does not return the full list of zones for the request, a link with relation type `next` SHALL be included in a `links` array property of the response, which a client can request to resume listing the zones.

9

MEDIA TYPES FOR ANY DATA ENCODING(S)

9 MEDIA TYPES FOR ANY DATA ENCODING(S)

A section describing the MIME-types to be used is mandatory for any standard involving data encodings. If no suitable MIME type exists in http://www.iana.org/assignments/media-types/index.html then this section may be used to define a new MIME type for registration with IANA.

A

ANNEX A (INFORMATIVE) CONFORMANCE CLASS ABSTRACT TEST SUITE (NORMATIVE)

A

ANNEX A (INFORMATIVE) CONFORMANCE CLASS ABSTRACT TEST SUITE (NORMATIVE)

NOTEEnsure that there is a conformance class for each requirements class and a test for each requirement (identified by requirement name and number)

A.1. Conformance Class A

A.1.1. Requirement 1

REQUIREMENT A.1	
TEST PURPOSE	Verify that…
TEST METHOD	Inspect…

A.1.2. Requirement 2

B

ANNEX B (INFORMATIVE) TITLE

B

ANNEX B (INFORMATIVE) TITLE

NOTEPlace other Annex material in sequential annexes beginning with “B” and leave final two annexes for the Revision History and Bibliography

C

ANNEX C (INFORMATIVE) REVISION HISTORY

C

ANNEX C (INFORMATIVE) REVISION HISTORY

Table C.1

DATE	RELEASE	EDITOR	PRIMARY CLAUSES MODIFIED	DESCRIPTION
2021-05-17	0.1	Matthew Purss	all	initial version

BIBLIOGRAPHY

BIBLIOGRAPHY

NOTEThe TC has approved Springer LNCS as the official document citation type.

Springer LNCS is widely used in technical and computer science journals and other publications

– Actual References:

[n] Journal: Author Surname, A.: Title. Publication Title. Volume number, Issue number, Pages Used (Year Published)

[n] Web: Author Surname, A.: Title, http://Website-Url

[1] *OGC: OGC Testbed 12 Annex B: Architecture* (2015).