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OGC API-Common Users Guide

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i. Abstract

<Insert Abstract Text here>

ii. Keywords

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

ogcdoc, OGC document, <tags separated by commas>

iii. Preface

NOTE

Insert Preface Text here. Give OGC specific commentary: describe the technical content, reason for document, history of the document and precursors, and plans for future work. > 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.

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Organization name(s)

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Name Affiliation

Chapter 1. Scope

NOTE

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

Chapter 2. Conformance

This Best Practice defines XXXX.

Requirements for N target types are considered: * AAAA * BBBB

Conformance with this Best Practice shall be checked using all the relevant tests specified in Annex A (normative) of this document.

In order to conform to this OGC® Best Practice, 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 document(s) identified.

Chapter 3. References

The following normative documents contain provisions that, through reference in this text, constitute provisions of this document. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. For undated references, the latest edition of the normative document referred to applies.

Insert References here. If there are no references, state “There are no normative references”.

References are to follow the Springer LNCS style, with the exception that optional information may be appended to references: DOIs are added after the date and web resource references may include an access date at the end of the reference in parentheses. See examples from Springer and OGC below.

Smith, T.F., Waterman, M.S.: Identification of Common Molecular Subsequences. *J. Mol. Biol.* 147, 195–197 (1981)

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ISO / TC 211: ISO 19115-1:2014 Geographic information — Metadata — Part 1: Fundamentals (2014)

ISO / TC 211: ISO 19157:2013 Geographic information — Data quality (2013)

ISO / TC 211: ISO 19139:2007 Geographic information — Metadata — XML schema implementation (2007)

ISO / TC 211: ISO 19115-3: Geographic information — Metadata — Part 3: XML schemas (2016)

OGC: OGC 15-097 OGC Geospatial User Feedback Standard. Conceptual Model (2016)

OGC: OGC 12-019, OGC City Geography Markup Language (CityGML) Encoding Standard (2012)

OGC: OGC 14-005r3, OGC IndoorGML (2014)

Chapter 4. Terms and Definitions

This document uses the terms defined in Sub-clause 5.3 of [OGC 06-121r8], 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 Best Practice.

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

4.1. term name

text of the definition

Chapter 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 document 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.

Chapter 6. Users Guide

The OGC API Users Guide document contains information useful to a developer or user of OGC API-Common. This information is not normative. That is, it is not mandatory. However, it may prove essential to fully understand the normative text in the OGC API - Common Standards.

6.1. Architecture

The following "architecture" captures the core concepts which inform all OGC API standards.

6.1.1. Datasets

Web APIs implement a Resource Oriented approach to Web-based distributed computing. A coherent set of APIs must be based on a common understanding of the Resources to be shared. For OGC APIs, those resources would be identified using an abstract concept of a geospatial dataset. Such a dataset would have the following characteristics:

- A dataset can be a vector feature collection, a coverage/imagery, or a collection of datasets (therefore potentially a mix of any of these things)
- A dataset has associated metadata, including some essential information:
 - Information about what type of data set it is (vector features (and what type of vector features if limited to one type, e.g. polygons, lines, points), coverages (values) / imagery (pixels), or sub-datasets-- more than one of those things)
 - A textual identifier (e.g. which figures in the resource path)
 - A title (short name / description)
 - Access point for the dataset (could be hosted locally or remote)
 - Geospatial & temporal extent
 - Resolution/scale
 - Units/Range/Bit-Depth/Channels/Dimensions etc. for imagery/coverages
 - A description of queryables, if applicable
- Keywords/Tags, and longer descriptions are also a commonly useful piece of metadata information
- Any other ISO 19115 metadata fields can also be associated with the dataset, but are nowhere near as essential to discovering and using geospatial data as those mentioned above. Meta data containing at minimum those essential elements can always be retrieved in ISO 19115 and potentially other formats.

6.1.2. Processes

Processes take one or more datasets as input, add parameters, and produce one or more datasets as output. This ties the processes together with the data delivery services on both ends.

I suggested so far 3 kinds of processes which can all run on a server where the data lives:

1. The complex process built as a container or executable, as typical of WPS
2. Process description languages such as WCPS
3. Pre-defined named processes such as 'vectorization', 'buffering', 'rasterization' or 'rendering of a styled map'

All of these kinds of processes could share aspects such as taking in an OGC API dataset as input and their output being usable as an OGC API dataset, for direct access and/or asynchronous delivery, and support multiple data partitioning/access mechanisms, estimates/billing elements, and so on.

6.1.3. Server-side rendering

Highlighting here that the rendering of a styled maps based on multiple source data sets and a style as a parameter, outputting a styled 'rendered map' imagery dataset as a result, fits perfectly well the description of a process (3).

6.1.4. Data partitioning

For all of data access / exchange mechanisms, e.g. to retrieve coverages/vector features directly, for a process to access its input, or to retrieve the output from a process, or throughout a daisy chain of processes, there are a variety of ways in which data can be partitioned for efficient access. The most efficient way most likely depends on the overall workflow and the implementations on both ends. I am suggesting most of the OGC API should be agnostic of this and support many such ways, so that both ends of such connection or a workflow manager can negotiate the best approach. Examples of different ways to partition/access data include:

- Bounding boxes
- Tiles
- n-dimensional sub-setting
- DGGS cells
- Single point value

This is the overall diagram of these ideas that I presented a couple weeks back at the OWS Common telecon and got the chance to explain in more details in person to some of you:

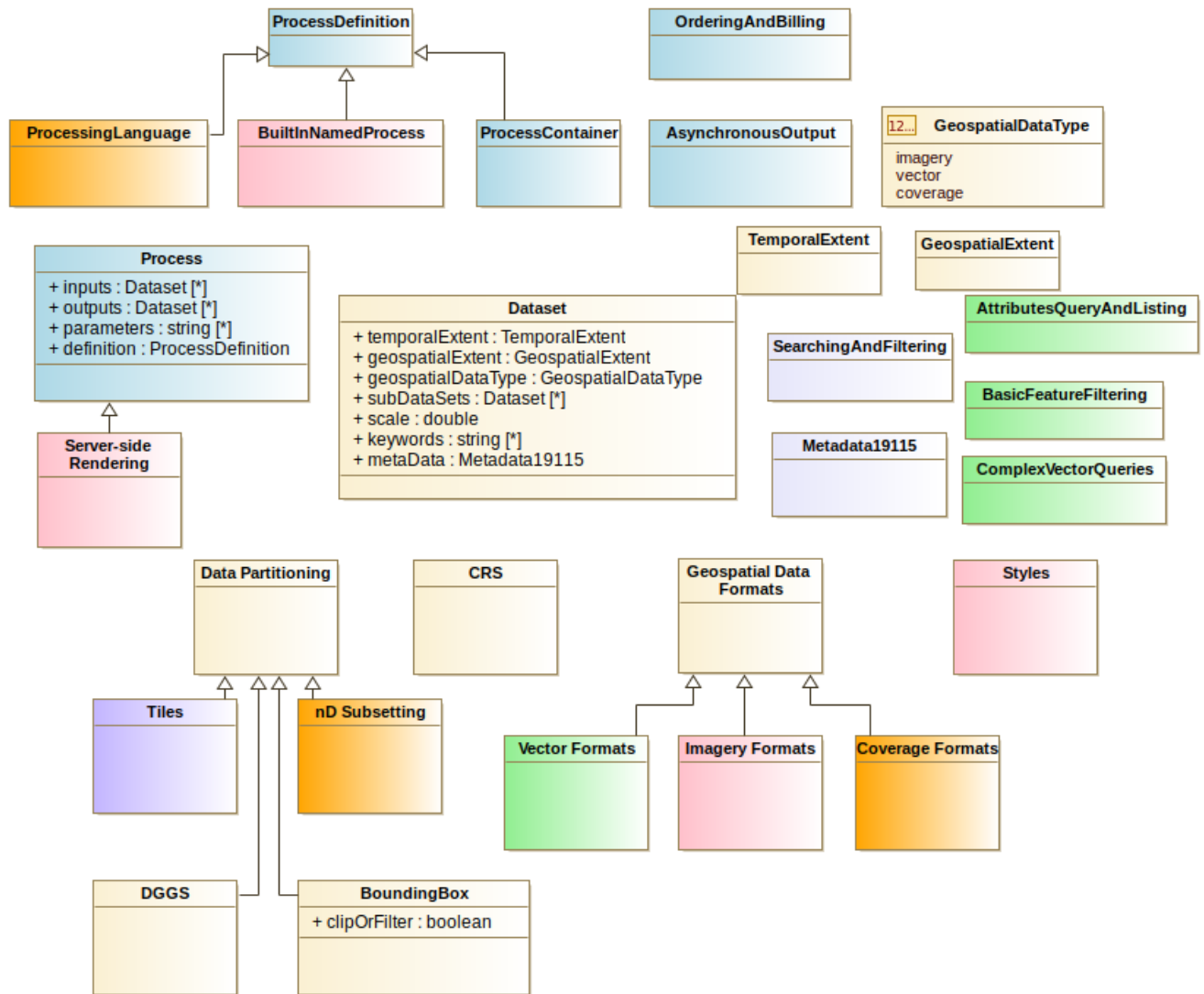


Figure 1. Dataset Concept

You might notice that this is color-coded based on where these API blocks originated from in classic services:

- Orange: Coverages (WCS)
- Red: Server-side rendering (WMS)
- Blue: Processes (WPS)
- Green: Vector features (WFS)
- Very light blue: Catalogs (CSW)
- Violet: Tiles (WMTS)

6.1.5. Resource Paths

The resources exposed through OGC APIs are accessed through standardized URL templates. These "paths" and their associated resources are described in [Table 1](#). This table documents the paths and resources as of December 2019. This information will be updated as these standards mature.

Table 1. OGC Dataset Paths

Path Template	Resource
Common	
/collections	Metadata describing the spatial collections available from this API.
/collections/{collectionId}	Metadata describing the collection which has the unique identifier {collectionId}
Features	
/collections/{collectionId}	The Feature Collection resource identified by the {collectionId} parameter.
/collections/{collectionId}/items	The individual Features in a Feature Collection
Coverages	
/collections/{collectionId}/coverage	A general description of the coverage identified by {collectionId} including the coverage's envelope.
/collections/{collectionid}/coverage/description	returns the whole coverage description consisting of domainset, rangetype, and metadata (but not the rangeset)
/collections/{collectionid}/coverage/domainset	returns the coverage's domain set definition
/collections/{collectionid}/coverage/rangetype	returns the coverage's range type information (i.e., a description of the data semantics)
/collections/{collectionid}/coverage/metadata	returns the coverage's metadata (may be empty)
/collections/{collectionid}/coverage/rangeset	returns the coverage's range set, i.e., the actual values in the coverage's Native Format (see format encoding for ways to retrieve inspecific formats)
/collections/{collectionid}/coverage/all	returns all of the above namely the coverage's domainset, rangetype, meatadata, and rangeset comparable to a GetCoverage response
Maps and Styles	
Note: A map is associated with a resource. {resource} is a place holder for a path segment appropriate for a resource type.	
/collections/{collectionId}/{resource}/map	A data structure with specific information necessary to get a fragment of the map representing the resource collection.
/collections/{collectionId}/{resource}/map/{styleId}	A map representing the geospatial resource identified by /collections/{collectionId}/{resource}.
Tiles	
Note: A tile is associated with a resource. {resource} is a place holder for a path segment appropriate for a resource type.	

Path Template	Resource
/collections/{collectionId}/{resource}/tile/{styleId}/{tileMatrixSetId}/{tileMatrixId}/{tileRow}/{tileCol}	Tile representation of real-world elements at a given resolution restricted by the selected Tile Matrix Set. {styleId} is optional.
/collections/{collectionId}/{resource}/tiles	An enumeration of the Tiles and Styles that are available at some TileMatrixSetId
/tileMatrixSet/{tileMatrixSetId}	A description of the TileMatrixSet identified by the {tileMatrixSetId} identifier.
Processes	
/process	Lists the processes this API offers.
/processes/{process-id}	Returns a detailed description of a process.
/processes/{process-id}/jobs	Returns the running and finished jobs for a process (GET), Executes a process, i.e. creates a new job. Inputs and outputs will have to be specified in a JSON document that needs to be send in the POST body. (POST)
/processes/{process-id}/jobs/{job-id}	Returns the status of a job of a process.
/processes/{process-id}/jobs/{job-id}/results	Returns the result of a job of a process.
Records (Catalog)	
/collections/{collectionId}/tbd	TBD

6.2. Modular APIs

This section of the Best Practice discusses OGC principals and practices regarging modular APIs.

6.3. Link Relations

provides a discussion of link relations, the governing policies and standards, as well as how they should be used.

Links between elements of an OGC API are encoded using the link relation schema provided in [Figure 1](#).

```
type: object
required:
  - href
  - rel
properties:
  href:
    type: string
    example: http://data.example.com/buildings/123
  rel:
    type: string
    example: alternate
  type:
    type: string
    example: application/geo+json
  hreflang:
    type: string
    example: en
  title:
    type: string
    example: Trierer Strasse 70, 53115 Bonn
  length:
    type: integer
```

6.3.1. Href Attribute

The **href** attribute is mandatory.

"The Locator Attribute (href) supplies the data that allows an application to find a remote resource or resource fragment. The value of this attribute is an IRI which serves as the Uniform Resource Identifier for the remote resource." (W3C XLink Version 1.1)

6.3.2. Rel Attribute

The **rel** attribute is mandatory.

"In the simplest case, a link relation type identifies the semantics of a link. For example, a link with the relation type "copyright" indicates that the current link context has a copyright resource at the link target.

Link relation types can also be used to indicate that the target resource has particular attributes, or exhibits particular behaviours; for example, a "service" link implies that the link target can be used as part of a defined protocol (in this case, a service description).

Relation types are not to be confused with media types [RFC2046]; they do not identify the format of the representation that results when the link is dereferenced. Rather, they only describe how the current context is related to another resource.

Relation types SHOULD NOT infer any additional semantics based upon the presence or absence of

another link relation type, or its own cardinality of occurrence. An exception to this is the combination of the "alternate" and "stylesheet" registered relation types, which has special meaning in HTML for historical reasons.

There are two kinds of relation types: registered and extension." (RFC8288)

Relation types are discussed in more detail in [Relation Types](#).

6.3.3. Type Attribute

The **type** attribute is optional

"The "type" attribute, when present, is a hint indicating what the media type of the result of dereferencing the link should be. Note that this is only a hint; for example, it does not override the Content-Type header field of a HTTP response obtained by actually following the link. The type attribute MUST NOT appear more than once in a given link-value; occurrences after the first MUST be ignored by parsers." (RFC8288)

6.3.4. Hreflang Attribute

The **hreflang** attribute is optional.

"The "hreflang" attribute, when present, is a hint indicating what the language of the result of dereferencing the link should be. Note that this is only a hint; for example, it does not override the Content-Language header field of a HTTP response obtained by actually following the link. Multiple hreflang attributes on a single link-value indicate that multiple languages are available from the indicated resource." (RFC8288)

6.3.5. Title Attribute

The **title** attribute is optional.

"The "title" attribute, when present, is used to label the destination of a link such that it can be used as a human-readable identifier (e.g., a menu entry) in the language indicated by the Content-Language header field (if present). The title attribute MUST NOT appear more than once in a given link; occurrences after the first MUST be ignored by parsers." (RFC8288)

6.3.6. Length Attribute

The **length** attribute does not appear to be defined in the normative standards.

6.4. Relation Types

There are two kinds of relation types; registered and extension.

Registered relation types are registered in the IANA register at <https://www.iana.org/assignments/link-relations/link-relations.xhtml>. Registered relation types are used in OGC API standards whenever appropriate.

Extension relation types are those which are not registered with IANA. These extension types are in

the form of "--- a URI [RFC3986] that uniquely identifies the relation type. Although the URI can point to a resource that contains a definition of the semantics of the relation type, clients SHOULD NOT automatically access that resource to avoid overburdening its server.

The URI used for an extension relation type SHOULD be under the control of the person or party defining it or be delegated to them.

When extension relation types are compared, they MUST be compared as strings (after converting to URIs if serialised in a different format) in a case-insensitive fashion, character by character. Because of this, all-lowercase URIs SHOULD be used for extension relations.

Note that while extension relation types are required to be URIs, a serialisation of links can specify that they are expressed in another form, as long as they can be converted to URIs." (RFC8288)

Extension relation types used in OGC API Standards are registered at <https://github.com/opengeospatial/NamingAuthority/blob/master/registers/linkrelations.csv>

Annex A: Revision History

Date	Release	Editor	Primary clauses modified	Description
2016-04-28	0.1	G. Editor	all	initial version

Annex B: Bibliography

Example Bibliography (Delete this note).

The 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

NOTE

- For citations in the text please use square brackets and consecutive numbers:
[1], [2], [3]

– 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).