

# OGC API - Maps - Part 1

## ***Core***

## Open Geospatial Consortium

Submission Date: <yyyy-mm-dd>

Approval Date: <yyyy-mm-dd>

Publication Date: 2019-03-06

External identifier of this OGC® document: <http://www.opengis.net/doc/{doc-type}/{standard}/{m.n}>

Internal reference number of this OGC® document: 20-058

Version: 0.0.1

Category: OGC® Implementation Specification

Editor: Joan Masó

### OGC API - Maps - Part 1: Core

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Document type:  
OGC®ImplementationSpecification  
Document subtype: if applicable  
Document stage: Draft  
Document language: English

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## **i. Abstract**

The draft OGC API - Maps - Part 1: Core specification defines a Web API for requesting map images over the Internet. OGC API - Maps makes it easy for a client to request images, changing parameters such as size and coordinate reference systems at the time of request. A server that implements OGC API - Maps provides information about what maps it offers, as well as producing a map and answering queries about the content of the maps. OGC API - Maps addresses use cases similar to those addressed by the **Web Map Service (WMS)** [[http://portal.opengeospatial.org/files/?artifact\\_id=14416](http://portal.opengeospatial.org/files/?artifact_id=14416)] standard.

## **ii. Keywords**

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

ogcdoc, OGC document, maps, API, OpenAPI, OGC API

## **iii. Preface**

This document defines the draft OGC API - Maps - Part 1: Core specification. A 'map' is portrayal of geographic information as a digital image file suitable for display on a computer screen (**OGC 06-042** [[http://portal.opengeospatial.org/files/?artifact\\_id=14416](http://portal.opengeospatial.org/files/?artifact_id=14416)]). Suggested additions, changes and comments on this standard are welcome and encouraged. Such suggestions may be submitted using the online change request form on OGC web site: [http://portal.opengeospatial.org/public\\_ogc/change\\_request.php](http://portal.opengeospatial.org/public_ogc/change_request.php)

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

Organization name(s)

## **v. Submitters**

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

Name	Affiliation
Joan Masó	UAB-CREAF
TBA	TBA
TBA	TBA
TBA	TBA
TBA	TBA

# Chapter 1. Scope

This draft specification specifies how to access maps and tiles in a manner independent of the underlying data store. The standard makes use of the **OpenAPI** [<https://www.openapis.org/>] specification and specifies resources for discovery, retrieval and querying of maps from a Web API.

Specifically, this draft OGC API - Maps specification supports the following:

- Discovery operations allow the API to be interrogated to determine its capabilities and to retrieve information (metadata) about this distribution of maps. This includes the API definition as well as metadata about the map layers provided through the API and the Coordinate Reference Systems supported by the API.
- Retrieval operations that allow a client application to get a map from the API
- Query operations that allow a client application to retrieve data (e.g. feature attributes) at a point on a map



# Chapter 2. Conformance

This standard defines **TBD** requirements / conformance classes.

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

The requirements classes specified in this draft specification include:

- Map resource,
- Bounding Box Subset,
- Dataset Map,
- Geospatial Data Resource Selection and
- Geospatial Data Resource Map.

This draft specification does not mandate a specific encoding or format for representing maps. TBD requirements classes specify options for representations of resources in commonly used encodings for maps on the web:

- HTML,
- JPEG and
- PNG.

None of these encodings are mandatory and an implementation of this draft specification may also decide to implement none of them, but to implement another encoding instead.

That said, this draft specification includes recommendations to support, where practical, HTML.

The draft specification does not mandate any encoding or format for the formal definition of the API either. One option is the OpenAPI 3.0 specification as described in the following requirements class:

- OpenAPI specification 3.0.

An implementation of the draft specification 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, or an OWS Common 2.0 capabilities document.

The draft specification is intended to be a minimal useful API for fine-grained read-access to maps. Additional capabilities may be specified in future parts of the OGC API - Maps 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.

# 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.

- OGC: OGC 19-072, **OGC API - Common - Part 1: Core** (in development)  
<http://docs.opengeospatial.org/DRAFTS/19-072.pdf>
- 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 <http://spec.openapis.org/oas/v3.0.3>
- ISO and IEC: ISO/IEC 10918-1:1994, **Information technology — Digital compression and coding of continuous-tone still images: Requirements and guidelines** (1994)  
<https://www.iso.org/standard/18902.html>
- ISO and IEC: ISO/IEC 15948:2004, **Information technology — Computer graphics and image processing — Portable Network Graphics (PNG): Functional specification** (2004)  
<https://www.iso.org/standard/29581.html>
- Internet Engineering Task Force (IETF). RFC 8288: **Web Linking** [online]. Edited by M. Nottingham. 2017 [viewed 2020-03-16]. Available at <http://tools.ietf.org/rfc/rfc8288.txt>
- WHATWG. **HTML**, Living Standard [online, viewed 2020-03-16]. Available at <https://html.spec.whatwg.org/>
- schema.org. **Schema.org** [online, viewed 2020-03-16]. Available at <http://schema.org/docs/schemas.html>

# 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 standard.

This document also uses terms defined in the OGC Standard for Modular specifications (OGC 08-131r3 [[https://portal.opengeospatial.org/files/?artifact\\_id=34762](https://portal.opengeospatial.org/files/?artifact_id=34762)]), 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.

## 4.1. coordinate reference system

coordinate system that is related to the real world by a datum (source: ISO 19111)

## 4.2. coordinate system

set of mathematical rules for specifying how coordinates are to be assigned to points (source: ISO 19111)

## 4.3. geographic information

information concerning phenomena implicitly or explicitly associated with a location relative to the Earth (source: ISO 19101)

## 4.4. map

portrayal of geographic information as a digital image file suitable for display on a computer screen (source: OGC 06-042)

## 4.5. portrayal

presentation of information to humans (source: ISO 19117)

## 4.6. Web API

An Application Programming Interface (API) using an architectural style that is founded on the technologies of the Web (source: OGC 17-069r3)

**NOTE**

See [Best Practice 24: Use Web Standards as the foundation of APIs](#) [<https://www.w3.org/TR/dwbp/#accessAPIs>] (W3C Data on the Web Best Practices) for more detail.

# Chapter 5. Conventions

This section 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/ogcapi-maps-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 \[IANA\]](#) are used in this document.

- **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.
- **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.

Each resource representation includes an array of links. Implementations are free to add additional links for all resources provided by the API.

# Chapter 6. Overview

## 6.1. Evolution from OGC Web Services

OGC Web Service (OWS) standards have historically implemented a Remote-Procedure-Call (RPC) architectural style using Extensible Markup Language (XML) for payloads over HTTP. This was the state-of-the-art when some of the initial versions of OGC Web Services were originally designed in the late 1990s and early 2000s. This architectural style has now a competing RESTful API style that is proposed as an alternative to RPC pattern. A RESTful API style is resource-oriented instead of service-oriented. This draft OGC API - Maps specification defines a Web API that follows this resource-oriented architecture and in particular the W3C/OGC best practices for sharing Spatial Data on the Web, as well as the W3C best practices for sharing Data on the Web.

The draft OGC API - Common specification is the foundation upon which OGC APIs will be built, including this draft OGC API - Maps specification. The draft OGC API - Common specification specifies the common kernel of an API approach to services that follows current resource-oriented architecture practices. This common API is to be extended by resource-specific API standards. This draft specification therefore extends OGC API - Common to support Map resources.

Beside the general alignment with the architecture of the Web (e.g., consistency with HTTP/HTTPS, hypermedia controls), another goal for OGC API standards is modularization. This goal has several facets:

- Clear separation between Core requirements and more advanced capabilities. The draft OGC API - Maps - Part 1: Core specification presents the requirements that are relevant for almost everyone who wants to share or use maps at a fine-grained level. Additional capabilities that several communities are using today will be specified as extensions to the Core API.
- Technologies that change more frequently are decoupled and specified in separate modules ("requirements classes" in OGC terminology). This enables, for example, the use/re-use of new encodings for spatial data or API descriptions.
- Modularization is not just about a single "service". OGC APIs will provide building blocks that can be reused in APIs in general. In other words, a server supporting the OGC API - Maps draft specification should not be seen as a standalone service. Rather it should be viewed as a collection of API building blocks that together implement OGC API - Maps capabilities. A corollary for this is that it should be possible to implement an API that simultaneously conforms to conformance classes from the Features, Coverages, Maps, Tiles, and other future OGC API standards.

This approach intends to support two types of client developers:

- Those that have never heard about OGC. Developers should be able to create a client using the API definition without the need to adopt a specific OGC approach (they no longer need to read how to implement a GetCapabilities, allowing them to focus on the geospatial aspects).



- Those that want to write a "generic" client that can access OGC APIs. In other words, they are not specific to a particular API.

As a result of following a RESTful approach, OGC API implementations are not backwards compatible with OWS implementations per se. However, a design goal is to define OGC APIs in a way that an OGC API interface can be mapped to an OWS implementation (where appropriate). OGC APIs are intended to be simpler and more modern, but still an evolution from the previous versions and their implementations making the transition easy (e.g. by initially implementing facades in front of the current OWS services).

This document provides simple examples throughout the document. The examples are based on a dataset that contains buildings and the API provides access to the datasets via a single feature collection ("buildings") and two encodings: JSON and Hypertext Markup Language (HTML).

## 6.2. Relationship to OGC API - Tiles

WMS and WMTS share the concept of a map and the capability to create and distribute maps at a limited resolution and size. In WMS the number of rows and columns can be selected by the user within limits and in WMTS the number of rows and columns of the response is predefined in the tile matrix set.

With time, the concept of a tile has been generalized to other data models such as feature data (some vendors use the expression *vector tiles*) and even to coverage data. This draft specification presents an approach to tiles that can be applied to almost every resource type that returns data representations. If applied in conjunction with the OGC API - Features standard and on top of a feature collection, the expected result is tiled feature data. If applied in conjunction with the OGC API - Maps draft specification and on top of a collection that is transformed into a map by applying a style, the result should be map tiles (usually in PNG or JPEG format). The relationship between the Maps and Tiles capabilities of OGC API - Maps and OGC API - Tiles was illustrated by the OGC Testbed-15 initiative as shown in [Figure 1](#).

### NOTE

OGC API - Tiles includes a core specification and extensions for defining tile matrix sets, tiles from more than one collection, multi-tiles and multitiles from more than one collection. An info extension is foreseen but not fully developed. In contrast, OGC API - Maps is only partially described based on Testbed-15 requirements. The Maps API is described only to the extent to allow for map tiles to be created on top of a map created by selecting a collection with style or multiple collections with styles. This draft specification contains a section for retrieving a map of an arbitrary number of rows and columns but is not fully formulated. Other extensions for maps are also foreseen. In the future, the WMS SWG could take this document and complete the missing capabilities.

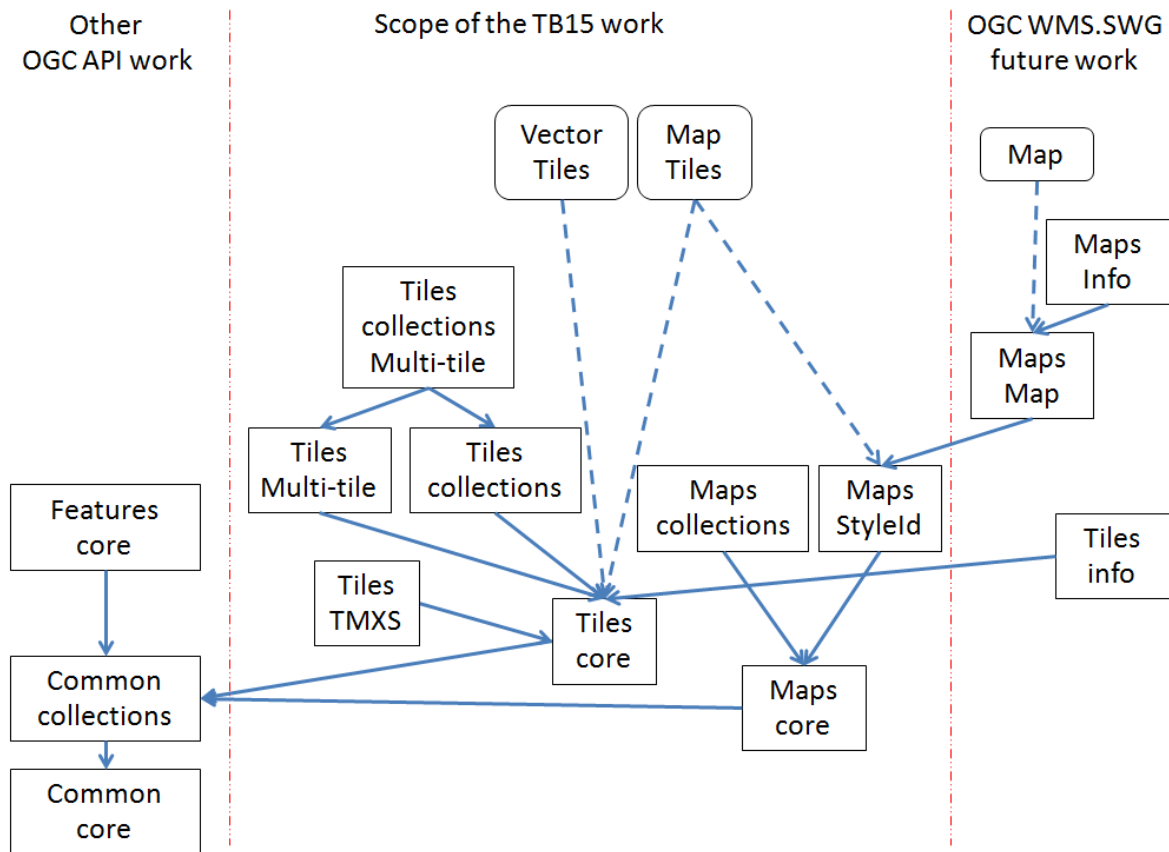


Figure 1. Modular approach in the Maps and Tiles draft specification

## 6.3. How to approach an OGC API

There are two ways to approach an OGC API.

- Read the landing page, look for links, follow them and discover new links until the desired resource is found
- Read an API definition document that will specify a list of paths to resources.

For the first approach, 'rel' properties identifying link relation types are used to determine the meaning of a relation represented by a link. The following figure illustrates those the links, including others from OGC API - Tiles.

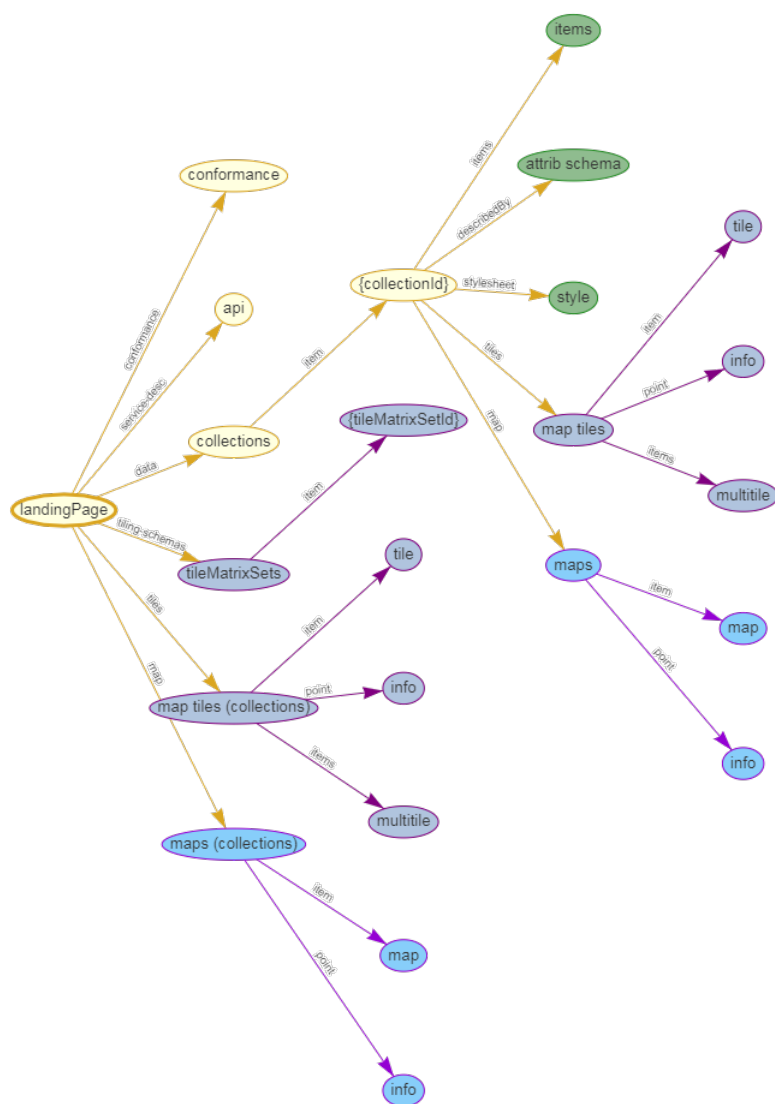


Figure 2. Resources and relations to them via links

For the second approach, the section [\[OpenAPIExamples\]](#) provides some examples of OpenAPI definition documents that enumerate the paths to the necessary resources.

Resource name	Common path
Landing page	/
Conformance declaration	/conformance
Collections	/collections
Collection	/collections/{collectionId}
Maps description	/collections/{collectionId}/map
Maps description collections <sup>1</sup>	/map

Table 1. Overview of resources and common direct links defined in OGC API - Maps

When OGC API - Maps is used along with the OGC API - Tiles specification, the resources listed in [Table 2](#) become available.

Resource name	Common path
Tiling Schemas	/tileMatrixSets
Tiling Schema	/tileMatrixSets/{tileMatrixSetId}
Map tiles description	/collections/{collectionId}/map/
Map tiles description collections <sup>1</sup>	/map/tiles
Map tile with style	/collections/{collectionId}/map/{styleId}/tiles/{tileMatrixSetId}/{tileMatrix}/{tileRow}/{tileCol}
Map tile collections <sup>1</sup>	/map/tiles/{tileMatrixSetId}/{tileMatrix}/{tileRow}/{tileCol}

*Table 2. Overview of map tile resources and common direct links defined in OGC API - Tiles*

<sup>1</sup>: In first column of the table, the word "collections" means "from more than one collection"

# Chapter 7. Requirement Class "Map Core"

## 7.1. Overview

Add a note that one can implement OGC API - Common or not

Requirements Class	
<a href="http://www.opengis.net/spec/ogcapi-maps-1/1.0/req/core">http://www.opengis.net/spec/ogcapi-maps-1/1.0/req/core</a>	
Target type	Web API
Dependency	<a href="#">RFC 2616 (HTTP/1.1)</a>
Dependency	<a href="#">RFC 2818 (HTTP over TLS)</a>
Dependency	<a href="#">RFC 8288 (Web Linking)</a>

Shall we add a dependency to the Landing Page requirement in OGC API - Common

It specifies a map resource: a resource that contains information on how to formulate a request to a map. This document includes the CRSs and styles supported and other metadata (including attribution). It also specifies how to apply a style to a map resources to get a styled map.

### TBD

A map distribution of a dataset is a pictorial representation of geospatial resources. To create a pictorial representation a style is added to the data in the geospatial resource. Styles are defined internally and have a identifier. New styles can be added or modified if the OGC API - Maps draft specification works in combination with the OGC API - Styles draft specification. After associating styles to geospatial resources, a map can be retrieved by specifying a set of parameters that will determine its resolution (width, height, bounding box and CRS) or can be retrieved as tiles.

This section defines the core part of the OGC API - Maps standard that allows defining a map representation for a geospatial resources. To retrieve a fragment of the map, this core needs to be combined with an OGC API - Tiles core standard or with the OGC API - Maps - Bbox extension standard.

To keep the core of the OGC API - Maps standard simple, the core only includes a mechanism to select the default style but it does not define any mechanism to declare, define or select a style other than the default one. The core only assumes that the service is capable of knowing which is the default style while the client ignores all the details about it (including its name).

### End of TBD

## 7.2. Declaration of conformance classes

To support "generic" clients that want to access multiple OGC API standards and extensions - and not "just" a specific API / server, the API has to declare the conformance classes it implements and conforms to.

### 7.2.1. Response

The conformance page mainly consists of a list of links.

Requirement <b>13</b>	/req/core/conformance-success
A	If the API has a mechanism to advertise conformance classes, the API SHALL advertise the maps core conformance class with a link to <a href="http://www.opengis.net/spec/ogcapi-maps-1/1.0/conf/core">http://www.opengis.net/spec/ogcapi-maps-1/1.0/conf/core</a> .

[Add link to page in OGC API - Common](#)

If the server declares also conformity to OGC API - Common or to OGC API - Features v1, then it has to consider the OGC API - Common requirements for declaring conformance, i.e. the use of a the conformance page. In the JSON format the conformance page is an array of links following the link schema defined in the OGC API - Common or in OGC API - Features v1. Below is an example fragment of a conformance information page of an API conformant to OGC API - Common and OGC API - Maps.

[Mention part number of OGC API - Features - Part 1: Core](#)

*Example 1. Conformance Information Page fragment*

```
{
  "conformsTo": [
    "http://www.opengis.net/spec/ogcapi-common-1/1.0/conf/core",
    "http://www.opengis.net/spec/ogcapi-common-1/1.0/conf/collections",
    "http://www.opengis.net/spec/ogcapi-maps-1/1.0/conf/core"
  ]
}
```

[One too many bracket. The extra bracket needs to be removed.](#)

[update Part 2 URI](#)

## 7.3. Map resource

A map resources is defined by a map description document that contains the necessary metadata to enable a client application to formulate a map request from a single geospatial resource, some geospatial resources for from the entire dataset.

The core class does not specify how to retrieve a map description. It can be link to more that one resource and there are extensions indicating how to get the map.

### 7.3.1. Map description document

The core introduces the way data will be combined with styles to create a map. The only mandatory element in the map description document is the list of styles that are used to

transform a resource into a map

Requirement 14	/req/core/styles
A	A successful execution will of a map request will return a map document that SHALL contain a property called <i>styles</i> that enumerates a list of the styles available for the resource.
B	Each style in the <i>styles</i> array SHALL contain a property called <i>id</i> that identifies the style as well as one link pointing to the styled map (that can be later retrieved subsetting it by tiles or by bounding box). The link relation for this link shall be <b>map</b> .
C	<p>Each style in <i>styles</i> is an object that SHALL conform with the following data mode (shown as OpenAPI Specification 3.0 fragment):</p> <pre>type: object required:   - id properties:   id:     type: string     nullable: true   title:     type: string     nullable: true   links:     type: array     nullable: true     minItems: 1 <small>remove minItems because there may not be any styles</small>     items:       \$ref:         'https://api.swaggerhub.com/domains/UAB-CREAF/ogc-api-common/1.0.0#/components/schemas/link'</pre>

## Example 2. API collection response fragment

```
"styles": [  
  {  
    "id": "night",  
    "title": "Topographic night style",  
    "links": [  
      {  
        "href": "https://example.com/api/1.0/styles/night?f=sld10",  
        "type": "application/vnd.ogc.sld+xml;version=1.0",  
        "rel": "stylesheet"  
      },  
      {  
        "href":  
"https://example.com/api/1.0/styles/night/metadata?f=json",  
        "type": "application/json",  
        "rel": "describedBy"  
      }  
    ]  
  },  
  {  
    "id": "topographic",  
    "title": "Regular topographic style",  
    "links": [  
      {  
        "href":  
"https://example.com/api/1.0/styles/topographic?f=sld10",  
        "type": "application/vnd.ogc.sld+xml;version=1.0",  
        "rel": "stylesheet"  
      },  
      {  
        "href":  
"https://example.com/api/1.0/styles/topographic/metadata?f=json",  
        "type": "application/json",  
        "rel": "describedBy"  
      }  
    ]  
  }  
]
```

Should we register this rel?

Add link to styled map as done on SwaggerHub example

Add link to legend as done in CubeWerx example

Add a 'preview' rel for the thumbnail

The mandatory element **id** designates the id of the style. The work "default" is reserved to designate the default style.

The optional links element is useful for retrieving a styles description document. The format of a



style description document is out of scope of this document. A possible encoding is the OGC Symbology Encoding.

Recommendation 7	/rec/core/default-style
A	A successful execution will of a map request will return a map document that MAY contain a property called <i>defaultStyle</i> that points to an style id that will be considered the default style
B	The value of the default style SHOULD be one of the ids listed in the property <i>styles</i>
C	<i>defaultStyle</i> conforms with the following data mode (shown as OpenAPI Specification 3.0 fragment): <div><pre>default-style:   type: string   description: the style id of a recommended   default style to use for this collection. This is   informative and optional.   example: 'topographic'</pre></div>

Example 3. API collection response fragment

```
"defaultStyle": "topographic"
```

Two following two recommendations for having two specific properties in a map description are inherited from WMS: **cascade** and **opaque**.

[Joan to recommend removing both Cascaded and Opaque](#)

Recommendation 8	/rec/core/opaque
A	The maps description response may include a boolean property <b>opaque</b> .
B	'false' means that map data represents geometries or observations that probably do not completely fill space and the resulting map should mark those parts as `no data`. 'true' means map data are mostly or completely opaque.

C	If the property is not provided, it should be interpreted as false (the default value)
---	--

<b>Recommendation 9</b>	<b>/rec/core/smc-cascaded</b>
A	The map description document may include a numeric property in with the name <b>cascaded</b> .
B	0 means that the data or the map have not been retransmitted another map service or API into this server (the cascade concept). A positive number indicates how many times the data or the map has been retransmitted.
C	If the property is not provided, it should be interpreted as 0 (the default value)

[Add requirement to say that the Extent is mandatory on the Map resource.](#)

## 7.4. Map

[Add a recommendation that the Extent corresponds to that of what is being mapped or a subset.](#)

This OGC API - Maps core standard does not specify how to retrieve a subset of a map. However, it does specify that in order for a map to be retrievable a parameter styleId should be added to a map resource in order to be ready to subset it other parameters may condition the style of the map. A map can be subset with bounding boxes or retrieved as tiles.

### 7.4.1. Operation

<b>Requirement 15</b>	<b>/req/core/map-op</b>
A	Every map SHALL be available as a HTTP GET request to a URI that will be composed by three parts: the first part is the URI of a resource that can be represented as a map, the second part follows the pattern /map/{styleId} and the third part completing the retrieval parameters if needed
B	Only the resources (e.g. collection) that advertise one of more links following the pattern ../map/{styleId}... in the maps metadata can be retrieved as maps.

<b>Permission 3</b>	<b>/per/core/map-op</b>
---------------------	-------------------------

A	<p>A map resources SHOULD be retrieved subsetting as maps or as tiles. This standard does <sup>NOT</sup> recommend to retrieve the whole map.</p> <p>The whole map may be retrieved by not specifying any subsetting parameters.</p>
---	--

The bbox of the resulting map shall be the whole extent indicated in the map description, at a width and height at the server's discretion.

## 7.4.2. Parameter styleId

Requirement 16	/req/core/styleId-definition
A	<p>The map operation SHALL support a parameter <b>styleId</b> with the characteristics defined in the OpenAPI Specification 3.0 fragment</p> <pre> name: styleId in: path description:   'The styleId that should be included in   the map or tile. Each collectionId has a valid   list of stylesId. To know the valid styleId   values of each collectionId use   /collections/{collectionId}.' required: true schema:   type: string </pre>
B	{styleId} SHALL be replaced by one of the <i>styles</i> id's that are provided as part of the map resource document
C	One possible value for the <b>styleId</b> is the reserved word <b>default</b> . The server is free to decide which is the default style. The server MAY advertice the default value in the map resource document

## 7.4.3. Parameter transparent

Requirement 17	/req/core/mc-transparent-definition
----------------	-------------------------------------

A	<p>The operation SHALL support an optional parameter <b>transparent</b> to force a transparent background with the characteristics defined (shown as OpenAPI Specification 3.0 fragment)</p> <pre> name: transparent in: query description:   'Background transparency of map (default=true).' required: false style: form explode: false schema:   type: boolean   default: true </pre>
B	<p>If <b>transparent</b> is not specified, the server will use <b>true</b>.</p>

#### 7.4.4. Parameter bgcolor

Requirement 18	/req/core/mc-bgcolor-definition
A	<p>The operation SHALL support an optional parameter <b>bgcolor</b> to define a background color with the characteristics defined (shown as OpenAPI Specification 3.0 fragment)</p> <pre> name: bgcolor in: query description:   Hexadecimal red-green-blue[-alpha] color value for the background color. If alpha is not specified a binary opacity will be used depending on the transparent parameter. required: false style: form explode: false schema:   type: string   default: 0xFFFFFFFF </pre>

B	If <code>bgcolor</code> is not specified, the server is free to choose a background color that's appropriate for the requested style, or 0xFFFFFFFF (white) if no such information is available.
---	--

If the client wants to force an opaque color, apart from defining the appropriate background color it should ensure that the parameter `transparent` is set to `false`. For the formats that reserve a color to define transparency, it still makes sense to combine background color and `transparent=true` with the purpose of helping the server to select a color that does not interfere with the actual values and colors in the map.

### 7.4.5. Response

The response of a GET request to this resource is not completely specified by this core. Without extra parameters, the response could result in a map representing the whole geospatial data resource at maximum resolution that could be too difficult to generate by the server or too big to be efficiently retrieved by the client. Instead, it is expected that other path and query parameters are added by other extensions of this core to completely define the response.

[Remove the note about what happens with extra parameters](#)

# Chapter 8. Requirement Class "Geospatial Dataset Map"

[Change the title to Geospatial Data](#)

## 8.1. Overview

Requirements Class	
<a href="http://www.opengis.net/spec/ogcapi-maps-1/1.0/req/geodata">http://www.opengis.net/spec/ogcapi-maps-1/1.0/req/geodata</a>	
Target type	Web API
Dependency	<a href="http://www.opengis.net/spec/ogcapi-maps-1/1.0/req/core">http://www.opengis.net/spec/ogcapi-maps-1/1.0/req/core</a>

[Add dependency to OGC API - Common - Part 2](#)

It specifies a map resource: a resource that contains information on how to formulate a request to a map. This document includes the CRSs and styles supported and other metadata (including attribution). ~~It also specifies how to apply a style to a map resources to get a styled map.~~

### TBD

A map distribution of a dataset is a pictorial representation of geospatial resources. To create a pictorial representation a style is added to the data in the geospatial resource. Styles are defined internally and have a identifier. New styles can be added or modified if the OGC API - Maps draft specification works in combination with the OGC API - Styles draft specification. After associating styles to geospatial resources, a map can be retrieved by specifying a set of parameters that will determine its resolution (width, height, bounding box and CRS) or can be retrieved as tiles.

This section defines the core part of the OGC API - Maps standard that allows defining a map representation for a geospatial resources. To retrieve a fragment of the map, this core needs to be combined with an OGC API - Tiles core standard or with the OGC API - Maps - Bbox extension standard.

To keep the core of the OGC API - Maps standard simple, the core only includes a mechanism to select the default style but it does not define any mechanism to declare, define or select a style other than the default one. The core only assumes that the service is capable of knowing which is the default style while the client ignores all the details about it (including its name).

### End of TBD

## 8.2. General

<b>Recommendation</b> <b>10</b>	<b><a href="#">/rec/geodata/api-common</a></b>
------------------------------------	--

A	An implementation this standard should consider to implement the requirements specified in the <a href="http://www.opengis.net/spec/OAPI_Common/1.0/req/core">http://www.opengis.net/spec/OAPI_Common/1.0/req/core</a> and <a href="http://www.opengis.net/spec/OAPI_Common/1.0/req/collections">http://www.opengis.net/spec/OAPI_Common/1.0/req/collections</a> requirement classes of the OGC API-Common version 1.0 Standard. <span style="float: right;">URI update</span>
---	--

This building block stays flexible and does not require to implement OWS Common, allowing for other API architectures outside the OGC API framework to adopt it. However, a server under the OGC APIs is expected to implement OGC API Common. If so, in practice, this means that the landing page and the conformance page follow OGC API - Common core and collections requirement classes will be used. Temporarily, it is also possible to combine this building block with OGC API features v1 that is not tied to OWS Common.

## 8.3. Declaration of conformance classes

To support "generic" clients that want to access multiple OGC API standards and extensions - and not "just" a specific API / server, the API has to declare the conformance classes it implements and conforms to.

### 8.3.1. Response

The conformance page mainly consists of a list of links.

Requirement 19	/req/geodata/conformance-success
A	If the API has a mechanism to advertise conformance classes, the API SHALL advertise the maps core conformance class with a link to <a href="http://www.opengis.net/spec/ogcapi-maps-1/1.0/conf/geodata">http://www.opengis.net/spec/ogcapi-maps-1/1.0/conf/geodata</a> .

If the server declares also conformity to OGC API - Common or to OGC API - Features v1, then it has to consider the OGC API - Common requirements for declaring conformance, i.e. the use of a the conformance page. In the JSON format the conformance page is an array of links following the link schema defined in the OGC API - Common or in OGC API - Features v1. Below is an example fragment of a conformance information page of an API conformant to OGC API - Common and OGC API - Maps.

```
{
  "conformsTo": [
    "http://www.opengis.net/spec/ogcapi-common-1/1.0/conf/core",
    "http://www.opengis.net/spec/ogcapi-common-1/1.0/conf/collections",
    "http://www.opengis.net/spec/ogcapi-maps-1/1.0/conf/core",
    "http://www.opengis.net/spec/ogcapi-maps-1/1.0/conf/geodata"
  ]
}
```

Part 2 URI update

## 8.4. Geospatial data resources

This standard does not specify how geospatial resources are exposed in the API and if they have the possibility to be retrievable as geospatial data (e.g. feature items). For example OGC API features v1 includes the definition of collections and each collection is available in the /collections/{collectionId} path. OGC API common will provide a similar mechanism. Other paths in the API could also give access to geospatial resources.

### NOTE

The concept of geospatial resource path substitutes the concept of "layer" in WMS but it intended to give a better integration between data visualization and data access.

Requirement 20	/req/geodata/desc-links
A	If the API has a mechanism for their geospatial data resources to expose links to geospatial aspects (e.g. feature items, metadata...), the API SHALL include a <b>link</b> with the <b>href</b> pointing to a the map that presents a map aspect of this geospatial data resource and with <b>rel: "map"</b> .

### NOTE

In WMS layers have a hierarchical dependency. At the time of writing this standard neither OGC API - Features nor OGC API - Common do not consider his possibility.



Example 5. Fragment of a collection with a links array with one item of the array pointing to a map.

```
"id": "buildings",
"title": "Buildings in the city of Bonn",
"description": "This collection contains buildings",
"attribution": "OpenStreetMap",
"extent": {
  ...
}
"links": [
  ...
  {
    "href": "http://data.example.com/collections/buildings/map",
    "rel": "map",
    "type": "application/json",
  }
]
```

## 8.5. Map description

The maps core defines a **map** resource that is associated with an operation that contains the necessary information to later formulate a map subset request. Nevertheless, the core does not require any mandatory information since the map core alone does not specify how to retrieve a map.

### 8.5.1. Map path

Requirement 21	/req/geodata/operation
A	Every geospatial data resource available as a map SHALL support an path URL and a HTTP GET operation to retrieve the description of the map the API implementation can provide
B	The URI shall be composed by two parts: the initial part is the URI of the geospatial data resource that can be represented as a map and the final part follows the pattern <b>/map</b>

This standard does not specify the need for any additional query parameter in the GET request.

## 8.5.2. Response

A successful GET response is described in the core class

[mention the URI of the requirements class](#)

# Chapter 9. Requirement Class "Dataset Maps"

## 9.1. Overview

Requirements Class	
<a href="http://www.opengis.net/spec/ogcapi-maps-1/1.0/req/dataset">http://www.opengis.net/spec/ogcapi-maps-1/1.0/req/dataset</a>	
Target type	Web API
Dependency	<a href="http://www.opengis.net/spec/ogcapi-maps-1/1.0/req/core">http://www.opengis.net/spec/ogcapi-maps-1/1.0/req/core</a>

[Add dependency to OGC API - Common - Part 2](#)

Defines how to get a map resource from the dataset (or datasets) represented by the services. it will tell the path to get a map resources

### TBD

In previous clauses maps that are produced from one and only one resource is discussed. This is achieved by concatenating the map path to a resource (e.g. a feature collection). This extension discusses the possibility of combining more than one resource to create a map. This is achieved by using by adding the map path to the root of the service.

### End of TBD

## 9.2. General

Recommendation 11	/rec/dataset/api-common
A	An implementation this standard should consider to implement the requirements specified in the <a href="http://www.opengis.net/spec/OAPI_Common/1.0/req/core">http://www.opengis.net/spec/OAPI_Common/1.0/req/core</a> Requirements Class of the OGC API-Common version 1.0 Standard.

This building block stays flexible and does not require implementation OGC API - Common, allowing for other API architectures outside the OGC API framework to adopt it. However, a server under the OGC APIs is expected to implement OGC API - Common. If so, in practice, this means that the landing page and the conformance page follow OGC API - Common core and collections requirement classes when used. Temporarily, it is also possible to combine this building block with [OGC API - Features - Part 1: Core, version 1.0](http://www.opengis.net/doc/IS/ogcapi-features-1/1.0) [http://www.opengis.net/doc/IS/ogcapi-features-1/1.0] that is not tied to OGC API - Common.

## 9.3. API landing page

[Change title to Dataset API landing page](#)

The landing page provides links to start exploring the resources offered by the API. It mainly consists of a list of links to root resources. This standard extension requires a new link in the landing page for getting a description of the URL that allows for retrieving tiles of the resources in the dataset

### 9.3.1. Response

Requirement 22	/req/dataset/landingpage
A	If the API has mechanism to expose root resources (e.g. a landing page), the API SHALL advertise a URI to retrieve maps defined by this service as links to the descriptions paths with rel: <b>map</b> .

In the landing page, in JSON format, the links follow the link schema defined in the OGC API - Common or in OGC API - Features v1. Below you can find an example fragment of the response to an OGC API - Maps landing page showing the link to root tiles.

*Example 6. API Landing Page fragment that advertises dataset mps*

```
{
  links: [
    ...,
    {
      "href": "http://data.example.org/tiles",
      "rel": "tiles",
      "type": "application/json",
      "title": "Link to information on map tilesets from the dataset",
    }
  ]
}
```

## 9.4. Declaration of conformance classes

### 9.4.1. Response

The conformance page mainly consists of a list of links. OGC API - Common already requires some links.

<b>Requirement 23</b>	<b>/req/dataset/conformance-success</b>
A	The API conformance path SHALL advertise the capability of generating maps from the dataset by adding the conformance class for this capability as a link to <a href="http://www.opengis.net/spec/ogcapi-maps-1/1.0/conf/dataset">http://www.opengis.net/spec/ogcapi-maps-1/1.0/conf/dataset</a> .

In the conformance page (typically in JSON format) the links follow the link schema defined in the OGC API - Common. The following is an example fragment of the response of an OGC API - Maps conformance information page

*Example 7. Conformance Information Page fragment*

```
{
  "conformsTo": [
    "http://www.opengis.net/spec/ogcapi-common-1/1.0/req/core",
    "http://www.opengis.net/spec/ogcapi-maps-1/1.0/req/core"
    "http://www.opengis.net/spec/ogcapi-maps-1/1.0/req/dataset"
  ]
}
```

*replace /req/ with /conf/*

## 9.5. Dataset maps

The response to the dataset map operation is a map description that contains the necessary information to later formulate a map subset request from the dataset.

### 9.5.1. Operation

<b>Requirement 24</b>	<b>/req/dataset/operation</b>
A	If the dataset is exposed <b>a a</b> map, the web API SHALL support an path URL and a HTTP GET operation to retrieve the description of the map the API implementation can provide
B	The URI shall be <b>/map</b>

The request of this operation has no parameters.

## 9.5.2. Response

A successful response to a map request is a data structure defined by the core class

## 9.6. Dataset Map subset

[Consider moving this to the BBOX extension. It might actually be redundant.](#)

The bbox extension have information on how to retrieve a subset of the map representing a piece of information in the dataset in the way explained in the bbox class. The OGC API - Tiles also contain classes that allow to retrieve a tile representation of a subset of the map.

### 9.6.1. Response

<b>Recommendation 12</b>	<b>/rec/dataset/geodata-selection</b>
A	When it is possible and sensible, all geospatial data resources supporting the crsId parameter value SHOULD be represented in the tiles.

<b>Permission 4</b>	<b>/per/dataset/geodata-selection</b>
A	If it is not possible and sensible to represent all geospatial data resources in a map (e.g. it compromises performance or tiles are become packed with too many elements), the server is allowed to select only the most significant geospatial data resources.

### 9.6.2. Response

To retrieve a subset of the map as a map or a tile another extension is needed. No requirements are provided here.

# Annex A: Conformance Class Abstract Test Suite (Normative)

## NOTE

Ensure 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

<b>Test id:</b>	/conf/conf-class-a/req-name-1
<b>Requirement:</b>	/req/req-class-a/req-name-1
<b>Test purpose:</b>	Verify that...
<b>Test method:</b>	Inspect...

### A.1.2. Requirement 2

## Annex B: Revision History

Date	Release	Editor	Primary clauses modified	Description
2019-03-21	Template	C. Heazel	all	initial template