OGC APIs for Tiles and Maps
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OGC APIs
APIs with consistent elements allow Interoperability

Multiple Maps with common semantics - Interoperability (Source: Joan Maso)
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OGC APIs - [https://ogcapi.ogc.org/](https://ogcapi.ogc.org/)

- “Building blocks” that can be used to assemble novel APIs for web access to geospatial content
- Ultimately will replace and enhance the existing OGC Web Service standards
- Defined with OpenAPI and published in discrete, easily implementable parts
- Ensure that geospatial data are “web native”
Multiple Maps with common semantics - Interoperability (Source: Joan Maso)
Standardization in the field of digital geographic information.
Deployment model example

User: just want features in WGS 84, but want to query

- Features: CQL
- Features: CRS

User: need features supporting other CRSs

User: tile it up and make it work on my phone

User: I am a fire incident commander: give me everything

OGC API - Common

Data

Features: Core

Features: Transactions

EDR

Tiles

Maps

Coverages
A sample API implementing Common, Features, Tiles, Styles

Daraa
This is a test dataset for the Open Portrayal Framework thread in the OGC Testbed-T5 as well as for the OGC Vector Tiles Pilot Phase 2. The data is OpenStreetMap data from the region of Daraa, Syria, converted to the Topographic Data Store schema of NGA.

Links to the main resources
Access the data
Access a web map with the data
Access the data as vector tiles
Styles to render the data in maps

API information
API description
Definition of the API in OpenAPI 3.0
Documentation of the API

API provider
Clemens Portele, interactive instruments GmbH
portele@interactive-instruments.de

Data license
The dataset was provided by the US National Geospatial Intelligence Agency (NGA) for development and testing. For any reuse of the data outside this API, please contact NGA.

Spatial Extent
Resources in OGC API Standards

Diagram of Resources in OGC API Standards, including:
- Conformance Declaration
- API Definition
- (Data) Collections
- Tiling Schemes
- Styles
- Collection
- Tiling Scheme
- Style
- Routes
- Processes
- Jobs
- Route
- Process
- Job
- Coverage
- EDR Query
- Route Definition
- Results
- Features
- Schema
- Records
- Tile Sets
- Map
- Feature
- Record
- Tile Set
- Tile Sets
- Range Set
- Range Type
- Domain Set
- Metadata
- Tile
Location Building Blocks

Powering geo-enabled APIs

Tell me More

I need some specific bits of functionality to geo-enable my API.

Granular Resources

I need a full fledged API for accessing a specific kind of geospatial resource.

Location-ready APIs
OGC APIs for Maps and Tiles
OGC APIs: Maps and Tiles

OGC API Maps Part 1

OGC API Maps Part 2...

OGC 20-057

Two Dimensional Tile Matrix Set
OGC 17-083r2

Core tiling conceptual and logical model
OGC 19-014r1

OGC API Tiles Part 1

OGC API Tiles Part 2...

OGC 19-072

Common Tile Matrix Set In the Definition Servers

OGC API Common Part 1

OGC API Common Part 2...
OGC API Tiles
Modular architecture: requirement classes

- Core
- Tilesets (tile partition)
- TilesetList (tile partition)
- Origins
  - Dataset tilesets
  - Geodata tilesets
- Parameters
  - Collection selection (collections=)
  - Temporal subsetting (datetime=)

- Representations
  - OpenAPI 3.0
  - XML tileset metadata
  - PNG
  - JPEG
  - TIFF
  - NetCDF
  - GeoJSON
  - MVT
**Minimalist Core (Tiles)**

- Tiles retrievable according to some *Tile Matrix Set* definition
- A templated URL with variable identifiers should allow to express the path to individual tiles  
  Example: `{someAPI}/{column}/{row}/{level}.png`
- In *Core*, no specific identifiers or order specified, but they correspond to the tile matrix (zoom level), tile row and tile column
- This enables most tile-based web mapping platform to conform
- No mechanism to communicate *Tile Matrix Set* definition or templated URL – done out of bounds via other *OGC API* – *Tiles* conformance classes
## Compare WMTS with OGC API - Tiles

<table>
<thead>
<tr>
<th>WMTS</th>
<th>OGC API - Tiles core</th>
</tr>
</thead>
<tbody>
<tr>
<td>GetCapabilities</td>
<td>Tileset Metadata</td>
</tr>
<tr>
<td>DataURL</td>
<td>Connected to collections</td>
</tr>
<tr>
<td>GetTile (KVP, REST)</td>
<td>REST interface only</td>
</tr>
<tr>
<td>Only one Layer</td>
<td>Any combination of collections or the whole dataset</td>
</tr>
<tr>
<td>Mainly raster tiles</td>
<td>Also natural use of vector tiles</td>
</tr>
<tr>
<td>GetFeatureInfo</td>
<td>Resolved using OGC API - Features or OGC API - Coverages</td>
</tr>
<tr>
<td>Multidimensions</td>
<td>Time is native. Other dimensions can be supported by OpenAPI</td>
</tr>
</tbody>
</table>
OGC API Maps
Modular architecture: requirement classes

- Core
- Map tilesets (tile partition)
- Parameters
  - Collection selection (collections=)
  - Scaling (width=, height=)
  - Spatial subsetting (bbox=, subset=)
  - CRS (crs=)
  - Temporal subsetting (datetime=)
- Origins
  - Styled maps
  - Dataset maps
  - Geodata resources map
- Representations
  - OpenAPI 3.0
  - PNG
  - JPEG
  - TIFF
  - HTML
Minimalist Core (Maps)

- Retrieve a map from a resource
- **Server is free to**
  - Return the whole extend or not
  - Return a reasonable amount of cells
  - Return a reasonable CRS
  - Default style
- **Server will indicate in the response headers the CRS and BBOX**
## Compare WMS with OGC API - Maps

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<tr>
<td>GetCapabilities</td>
<td>Every Collection description</td>
</tr>
<tr>
<td>DataURL</td>
<td>Connected to collections (API Features or API Coverages)</td>
</tr>
<tr>
<td>GetMap (KVP)</td>
<td>REST interface only</td>
</tr>
<tr>
<td>More than one Layer</td>
<td>Any combination of collections or the whole dataset</td>
</tr>
<tr>
<td>Style names or SLD</td>
<td>OGC API - Styles</td>
</tr>
<tr>
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Sprints
Joint with ISO/TC 211

METADATA CODE SPRINT

📅 OGC API Records, STAC, ISO 19115 and JSON-FG
WEB MAPPING CODE SPRINT

💡 OGC API - Tiles, Maps, Styles and OGC Styles & Symbology
Thank you

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