OGC API Records: Overview and early implementations

Angelos Tzotsos
OSGeo President
OGC API Records SWG member
OSGeo: Empower everyone with open source geospatial

• Working with the community and our partners:
  • **Open Source:** a collaborative approach to software development.
  • **Open Data:** freely available information to use as you wish
  • **Open Standards:** avoid lock-in with interoperable software
  • **Open Education:** removing the barriers to learning and teaching
  • **Open Science:** share data and software for responsible research
• OSGeo projects heavily involved in the implementation of INSPIRE
OSGeo Projects

Community projects

View all projects
Choose a project

OSGeo Projects

Content Management Systems
GeoNode

Desktop Applications
Marble
gvsIG Desktop
QGIS Desktop
GRASS GIS

Metadata Catalogs
GeoNetwork
pycsw

Other
OSGeoLive

Web Mapping
MapServer
degree
OpenLayers
GeoMoose
Mapbender
PyWPS
GeoServer

Geospatial Libraries
PROJ
GeoTools
Orfeo ToolBox
GDAL/OGR
GEOS

Spatial Databases
PostGIS
Geospatial API Evolution

• 1990s:
  • Service Oriented Architecture (SOA)
  • WMS (1999)

• 2000s:
  • Web 2.0 (Ajax, JavaScript, Slippy maps, Tiles)

• Today:
  • REpresentational State Transfer (REST)
  • HTTP verbs, HTTP codes
  • JavaScript Object Notation
  • OpenAPI: Specification on how to describe a REST API
• W3C Spatial Data On The Web Best Practices
• Developer friendly
• Modular specification development
• Development on GitHub (closer to Open Source development)
• OGC API Roadmap
• OGC API Features Part 1: Core (standard)
• INSPIRE Best Practice Document
• OGC API Records Part 1: Core (draft)

• /ows?request=GetFeature&typename=roads&featureid=5
• /api/collections/roads/items/5
OGC API Records: Building Blocks

- Query parameters (q, type, etc.)
- Query Params
- Advanced filtering.
- CQL
- Search API (items of OGC API Features)
- RECORD as GeoJSON
- JSON
- COLLECTION
- Description of a related collection of RECORDs (i.e. a catalogue).
- RECORD
- RECORD as ATOM
- ATOM
- RECORD as HTML
- HTML
- OpenSearch API
- Core Queryables (extensible)
- Sorting of Response.
- OPEN SEARCH
- OPEN SRCH
- Feature API+
Crawlable Catalogue
GET /collections/MyCat/items?bbox=-69.64,37.76,-56.12,46.63&datetime=2020-01-11T00:00:00/2020-01-12T00:00:00
<table>
<thead>
<tr>
<th>ACCESS PATH</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>/</td>
<td>GET: Landing page</td>
</tr>
<tr>
<td>/api</td>
<td>GET: Service or API description document (OpenAPI)</td>
</tr>
<tr>
<td>/conformance</td>
<td>GET: conformance statement</td>
</tr>
<tr>
<td>/collections</td>
<td>GET: list of catalogue identifiers with hypermedia controls to each catalogue</td>
</tr>
<tr>
<td>/collections/{catalogueId}</td>
<td>GET: Metadata about the specific catalogue including hypermedia controls to other resources POST: create a new catalogue</td>
</tr>
<tr>
<td>/collections/{catalogueId}/item</td>
<td>GET: query the catalogue (simple) POST: create a new record</td>
</tr>
<tr>
<td>/collections/{catalogueId}/items/{recordId}</td>
<td>GET: get the record PUT: update the record DELETE: remove the record</td>
</tr>
<tr>
<td>/collections/{catalogueId}/queryables</td>
<td>GET: list of queryables that can be used in a filter</td>
</tr>
</tbody>
</table>
# Conformance Classes

## Table 2. Conformance class URIs

<table>
<thead>
<tr>
<th>Conformance class</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crawlable Catalogue</td>
<td><a href="http://www.opengis.net/spec/ogcapi-records-1/1.0/conf/crawlable-catalogue">http://www.opengis.net/spec/ogcapi-records-1/1.0/conf/crawlable-catalogue</a></td>
</tr>
<tr>
<td>Searchable Catalogue</td>
<td><a href="http://www.opengis.net/spec/ogcapi-records-1/1.0/conf/searchable-catalogue">http://www.opengis.net/spec/ogcapi-records-1/1.0/conf/searchable-catalogue</a></td>
</tr>
<tr>
<td>Local Resources Catalogue</td>
<td><a href="http://www.opengis.net/spec/ogcapi-records-1/1.0/conf/local-resources-catalogue">http://www.opengis.net/spec/ogcapi-records-1/1.0/conf/local-resources-catalogue</a></td>
</tr>
<tr>
<td>Record</td>
<td><a href="http://www.opengis.net/spec/ogcapi-records-1/1.0/conf/record-core">http://www.opengis.net/spec/ogcapi-records-1/1.0/conf/record-core</a></td>
</tr>
<tr>
<td>Record Collection</td>
<td><a href="http://www.opengis.net/spec/ogcapi-records-1/1.0/conf/record-collection">http://www.opengis.net/spec/ogcapi-records-1/1.0/conf/record-collection</a></td>
</tr>
<tr>
<td>Record API</td>
<td><a href="http://www.opengis.net/spec/ogcapi-records-1/1.0/conf/record-api">http://www.opengis.net/spec/ogcapi-records-1/1.0/conf/record-api</a></td>
</tr>
<tr>
<td>Sorting</td>
<td><a href="http://www.opengis.net/spec/ogcapi-records-1/1.0/conf/sorting">http://www.opengis.net/spec/ogcapi-records-1/1.0/conf/sorting</a></td>
</tr>
<tr>
<td>CQL</td>
<td><a href="http://www.opengis.net/spec/ogcapi-records-1/1.0/conf/cql">http://www.opengis.net/spec/ogcapi-records-1/1.0/conf/cql</a></td>
</tr>
<tr>
<td>OpenSearch</td>
<td><a href="http://www.opengis.net/spec/ogcapi-records-1/1.0/conf/opensearch">http://www.opengis.net/spec/ogcapi-records-1/1.0/conf/opensearch</a></td>
</tr>
<tr>
<td>JSON-Record</td>
<td><a href="http://www.opengis.net/spec/ogcapi-records-1/1.0/conf/json">http://www.opengis.net/spec/ogcapi-records-1/1.0/conf/json</a></td>
</tr>
<tr>
<td>ATOM-Record</td>
<td><a href="http://www.opengis.net/spec/ogcapi-records-1/1.0/conf/atom">http://www.opengis.net/spec/ogcapi-records-1/1.0/conf/atom</a></td>
</tr>
<tr>
<td>HTML-Record</td>
<td><a href="http://www.opengis.net/spec/ogcapi-records-1/1.0/conf/html">http://www.opengis.net/spec/ogcapi-records-1/1.0/conf/html</a></td>
</tr>
</tbody>
</table>

**Building Blocks:**
- RECORD
- Query Parameters
- CQL
- JSON RECORD
- HTML RECORD
- Collection
- Sort
- OpenSearch
- ATOM Record
pycsw

• **pycsw** is an OARec and OGC CSW server implementation written in Python.
• Early implementation of OGC API Records along many other open source implementations
• Demonstration
pycsw Geospatial Catalogue gisdata demo

pycsw is an OARec and OGC CSW server implementation written in Python

Collections

OpenAPI

Swagger

JSON

Conformance

CSW 3.0.0

CSW 2.0.2

OpenSearch

STAC API

OAI-PMH

SRU

Powered by pycsw 3.0.dev0
Conformance

- http://www.opengis.net/spec/ogcapi-common-1/1.0/conf/core
- http://www.opengis.net/spec/ogcapi-common-2/1.0/conf/collections
- http://www.opengis.net/spec/ogcapi-features-1/1.0/conf/core
- http://www.opengis.net/spec/ogcapi-features-3/1.0/req/filter
- http://www.opengis.net/spec/ogcapi-records-1/1.0/conf/core
- http://www.opengis.net/spec/ogcapi-records-1/1.0/conf/sorting
- http://www.opengis.net/spec/ogcapi-records-1/1.0/conf/json
- http://www.opengis.net/spec/ogcapi-records-1/1.0/conf/html
- https://api.stacspec.org/v1.0.0-beta.2/core
- https://api.stacspec.org/v1.0.0-beta.2/item-search
### pycsw Geospatial Catalogue gisdata demo

Home / Collections / pycsw Geospatial Catalogue gisdata demo / items

<table>
<thead>
<tr>
<th>Title</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>AG_PRESERVE</td>
<td>vector digital data</td>
</tr>
<tr>
<td>AG_PRESERVE_CONTRACTS</td>
<td>vector digital data</td>
</tr>
<tr>
<td>Agriculture_Commodity</td>
<td>vector digital data</td>
</tr>
<tr>
<td>Point_Of_Sale</td>
<td>vector digital data</td>
</tr>
<tr>
<td>Standards_Devices</td>
<td>vector digital data</td>
</tr>
<tr>
<td>Agriculture_Trap_Grid</td>
<td>vector digital data</td>
</tr>
</tbody>
</table>
type: "FeatureCollection"

features:

- type: "Feature"
  id: "urn:uuid:dc906692-932a-11ea-ad0f-823cf448c401"
  geometry:
    type: "Polygon"
    coordinates:
    - 8:
      0: -117.35
      1: 32.58
    - 8:
      0: -117.35
      1: 33.45
    - 8:
      0: -116.21
      1: 33.45
    - 8:
      0: -116.21
      1: 32.68
  properties:
    datestart: "*20070911*
    end_date: "null"
    externalId: "urn:uuid:dc906692-932a-11ea-ad0f-823cf448c401"
    recordupdated: "*2020-05-18T11:58:88Z*
    type: "vector digital data"
    language: "en-US"
    title: "*4C_9966REV*"
    description: "Agriculture Preserve Lands)The California Land Conservation Act, better known as the Williamson Act, has been the state's premier tool for preserving farmland since 1965. More than 16 million of the state's 30 million acres of farmland are currently protected under the act. The California Land Conservation Act of 1965 was passed by the California State Legislature to preserve agricultural and open space lands by discouraging premature and unnecessary development of agricultural lands. These agreements are in a rolling term 18-year contract (i.e., unless the other party files a notice of nonrenewal), the contract will run for 18 years. In return, restricted parcels are assessed for property tax purposes at a rate consistent with their actual use, rather than the current fair market value. The agreement terminates if the property is sold or redeveloped. The land located within an agricultural preserve is regulated by rules and restrictions designed to ensure that the land within the preserve is maintained for agricultural use for at least 18 years. The land is considered to be "agricultural" when at least 50% of the land area is used for agricultural purposes. All land located within an agricultural preserve is subject to these regulations, regardless of its actual use."
    formats:
    - "vector digital data"
    keywords:
    - "Agriculture Preserve"
<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>datetime</td>
<td>20070911</td>
</tr>
<tr>
<td>start_datetime</td>
<td>None</td>
</tr>
<tr>
<td>end_datetime</td>
<td>None</td>
</tr>
<tr>
<td>externalId</td>
<td>urn:uuid:dc9b6d52-932a-11ea-ad6f-823cf448c401</td>
</tr>
<tr>
<td>recordUpdated</td>
<td>2020-05-10T21:58:08Z</td>
</tr>
<tr>
<td>type</td>
<td>vector digital data</td>
</tr>
<tr>
<td>language</td>
<td>en-US</td>
</tr>
<tr>
<td>title</td>
<td>AG_PRESERVE</td>
</tr>
<tr>
<td>description</td>
<td>Agriculture Preserve Lands The California Land Conservation Act, better known as the Williamson Act, has been the state's premier agricultural land protection program since its enactment in 1965. More than 16 million of the state's 30 million acres of farm and ranch...</td>
</tr>
</tbody>
</table>
"Agriculture Preserve Lands" The California Land Conservation Act, better known as the Williamson Act, has been the state’s premier agricultural open space lands by discouraging premature and unnecessary conversion to whereby private landowners contract with counties and cities to voluntarily restrict their land to agricultural and compatible open-space use. A rolling term 10-year contract (i.e., unless either party files a notice of nonrenewal), the contract is automatically renewed for parcels assessed for property tax purposes at a rate consistent with their actual use, rather than potential market value. A land area within which a city or county will enter into contracts with landowners. The boundary is designated by resolution of the board of supervisors having jurisdiction. Only land located within an agricultural preserve is eligible for a Williamson Act contract. Preserves are regulated on a rolling basis to ensure that land within the preserve is maintained for agricultural and open space use.
https://github.com/opengeospatial/ogcapi-records

https://github.com/opengeospatial/ogcapi-records/blob/master/implementations.md

• Thanks to Peter Vretanos (OGC API Records SWG chair) for his slides contributions!
Thank you!

Welcome to open geospatial

Photo by Javi Lorbada on Unsplash