UCD Library Data Services APIs

UCD Digital Library Geographic Data and Information Services API

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<th>Version</th>
<th>0.6 DRAFT</th>
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<tr>
<td>Date</td>
<td>2017-04-29 (v. 0.6)</td>
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</table>

Service Overview

UCD Library Digital Data Services implements an API with methods

1. to deliver data and information pertaining to geocoded entities in the UCD Digital Library;
2. to deliver data and information in response to requests about places or geographic features referenced by entities within the UCD Digital Library;
3. to deliver data and information about geographic places in Ireland generally, or about other areas, in support of scholarship at UCD and beyond.

Methods of the first kind deliver metadata and geographic point data associated with items described and represented digitally in the UCD Digital Library. Many items in the UCD Digital Library have a spatial dimension—the location of a building, monument, or a place depicted in an image; the bounding box of an historical map; the place of origin and/or destination of a letter; etc. Metadata may reference linked data or authoritative sources of place name information, such as Logainm (http://logainm.ie), as well as geospatial reference resources, such as geonames.

Requests for geospatial reference data via methods 2-3 above may deliver a combination of polygons/multi-polygons, centroid point values and bounding box coordinates, as well as additional secondary source references. Unless specified otherwise, these boundary data are derived from OpenStreetMap and are made available under the terms of the Open Database License; for details see www.opendatacommons.org/licenses/odbl.

These services enable diverse new uses of UCD Digital Library data and information. In particular, the services enable

- geospatially informed use and analysis of information in the UCD Digital Library;
- external referencing of these data;
- arbitrary reuse of information supporting leisure activities, cultural tourism, etc.;
- integration of GeoJSON outputs to with web mapping applications; etc.

Please note: all references to geospatial coordinates in requests and responses use the WGS 84 Web Mercator projection.

Services are exposed via a REST endpoint on the host data.ucd.ie:

https://data.ucd.ie/api/geo/v1/dl/
REST API (April 2017- )

UCD Digital Library Geographic Data and Information Services API

Overview
The Digital Library Geographic Information Services enables retrieval of information from the UCD Digital Library based on four query prototypes:

- search for entities nearby a given point, search radius specified in km – nearby()
- search for entities that lie within a given bounding box – bbox()
- search for entities that lie within the boundaries of certain geopolitical land areas (province, county, etc.) – region()
- retrieve information for a single entity identified by an external namespace and an identifier within that namespace – placeByID()
- retrieve information for a single entity identified by a Digital Library ID – id()
- retrieve information for a single collection of entities represented by a Digital Library identifier (PID) (e.g., all geocoded entities with hasMember relationship to ivrla:31284) – collectionId()

It further enables general geographic information that can be useful in data analysis or in the visualisation of map data in web environments:

- search for boundary data for geographic entities by name – geometryByName()
- search for boundary data for geographic entities by identifier – geometryByld() (not applicable)

Searches are executed against a PostgreSQL/PostGIS database. For the seven query methods above, search results are returned in the following sort orders:

- nearby() – ORDER BY distance, ascending, from the point given in the search request
- bbox() – ORDER BY database key, ascending
- region() – ORDER BY database key, ascending
- id() – Not applicable
- placeByID() – Not applicable
- collectionId() – ORDER BY Digital Library ID number, ascending
- geometryByName() – ORDER BY database key, ascending
- geometryByld() – not applicable

The delivery format of search results is specified in the query request; if omitted, data is returned in JSON format by default. The following formats are supported:
### UCD Geographic Data and Information Services API

<table>
<thead>
<tr>
<th>Format</th>
<th>Internet Media Type</th>
<th>Delivery</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSV</td>
<td>text/csv</td>
<td>Download *.csv</td>
</tr>
<tr>
<td>GeoJSON</td>
<td>text/json</td>
<td>Stream</td>
</tr>
<tr>
<td>GPX</td>
<td>text/xml</td>
<td>Download *.gpx</td>
</tr>
<tr>
<td>KML</td>
<td>application/vnd.google-earth.kml+xml</td>
<td>Download *.kml</td>
</tr>
<tr>
<td>JSON</td>
<td>text/json</td>
<td>Stream</td>
</tr>
<tr>
<td>Shapefile</td>
<td>application/zip</td>
<td>Download *.zip</td>
</tr>
</tbody>
</table>

Note that, as of v. 0.5 of the API, the Atom/GeoRSS format is deprecated.

### REST URL syntax


All queries follow the prototype:

https://data.ucd.ie/api/geo/v1/{serviceID}/searchFilter={searchFilter}/{filter}/{format}/{limit}/{callback}

where {filter}, {format}, {limit} and {callback} are optional; with query method geometryById {format} options may be limited, while {limit} is irrelevant and has no effect if specified. The {callback} option is only meaningful when {format} specifies json.
URL Component | Req/Opt | Options (coordinates in decimal notation)
--- | --- | ---
ServiceID | Req | dl
searchFilter | Req | Information about Digital Library entities:
nearby(lat,lon,distance), distance is km
bbox(southLatitude,westLongitude,northLatitude,eastLongitude)
id(PID)
collectionId(PID)
region(administrative unit){placename})
Information about geographic places:
geometryByName({placename}{,administrative unit:OPT})
geometryByID({identifier},{resource name})

filter | Opt | key/value pairs separated by the operator eq, where key is either category or theme, and the value is selected from a controlled list (see the Appendix for allowable values)
format | Opt | csv | geojson | gpx (not valid with geometryByID() or geometryByName() | km | json | shp
If omitted, JSON is returned by default
limit | Opt | A numeric value in the range of 1 to 350; if omitted, a default of 100 is applied; a maximum of 350 records is enforced unless searchFilter applied the collectionId method, in which all geocoded collection members are returned
callback | Opt | A string value specifying the name of a JSON callback function that is called by the client when the response to the request is received. The JSON object provided in the response is passed to the callback function.

HTTP Requests and Responses

Client applications may make requests via HTTP GET or POST; POST requests must be accompanied by a Content-Type HTTP header when the request body contains parameters:

Content-Type: application/x-www-form-urlencoded

The following HTTP response codes are returned as circumstances determine:

<table>
<thead>
<tr>
<th>HTTP/1.1 Response Code</th>
<th>Text</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>OK</td>
</tr>
<tr>
<td>302</td>
<td>Found</td>
</tr>
<tr>
<td>400</td>
<td>Bad Request</td>
</tr>
<tr>
<td>404</td>
<td>Not Found</td>
</tr>
<tr>
<td>415</td>
<td>Unsupported Media Type [invalid format parameter]</td>
</tr>
<tr>
<td>500</td>
<td>Internal Server Error</td>
</tr>
<tr>
<td>503</td>
<td>Service Unavailable</td>
</tr>
</tbody>
</table>

In addition, requests that yield any of HTTP response codes 400, 404, or 415 are sent a profile Link header with a reference to documentation for the API:

Link: <https://data.ucd.ie/docs/apiGeo.pdf>; rel="profile"
Nota bene: As of v. 0.6 of the API, GeoJSON responses include feature styling via `simplestyle-spec`, which enables styling of marker icons when used with the `Mapbox.js` and `Leaflet.js` web mapping frameworks.

**Brief Examples**

Find all geocoded Digital Library entities within a bounding box area defined by two lat/lon pairs; return data in the default JSON format wrapped by the named callback function

```
https://data.ucd.ie/api/geo/v1/dl/searchFilter=bbox(-6.789551,52.84923,-5.971069,53.212612)&jsonp=myCallbackFunctionName
```

Find geocoded entities in the Digital Library that are associated with County Kerry and are tagged with the theme ‘ethnography’; return information in GeoJSON format

```
https://data.ucd.ie/api/geo/v1/dl/searchFilter=region(County,Kerry)&filter=theme%20eq%20ethnography&format=geojson
```

Find information about a listed building from the Dublin City Council *Record of Protected Structures*; return information in GeoJSON format

```
https://data.ucd.ie/api/geo/v1/dl/searchFilter=placeByID(DublinCiCo,6010)&format=geojson
```

Find boundary data for County Carlow using its Logainm identifier, return data in KML format

```
https://data.ucd.ie/api/geo/v1/dl/searchFilter=geometryByID(logainm,100004)&format=kml
```
Detailed Examples

Example 1: Find entities with coordinates within 10km of St. Werburgh’s Church that are architectural sites, return maximum 2 results in JSON format

https://data.ucd.ie/api/geo/v1/dl/searchFilter=_nearby(53.3429041,-6.2697134,10)&format=json&filter=theme_eq_architecture&limit=2

Returns:

```json
{
  "rows": [
    {
      "id": 1276,
      "pid": "ivrla:31285",
      "title": "St Werburgh (C. of I.), Werburgh Street",
      "place": "St Werburgh (C. of I.), Werburgh Street",
      "date": "1715/1719",
      "category": "religious-christian",
      "dbpediareference": "",
      "geonamesreference": "",
      "theme": "architecture",
      "centroid": "SRID=4326;POINT(-6.2697134 53.3429041)",
      "distance": 0,
      "marker-symbol": "religious-christian",
      "license": "Open Database License (ODbL) v1.0; http://opendatacommons.org/licenses/odbl/summary"
    },
    {
      "id": 1274,
      "pid": "ivrla:31287",
      "title": "St Werburgh (C. of I.), Werburgh Street",
      "place": "St Werburgh (C. of I.), Werburgh Street",
      "date": "1715/1719",
      "category": "religious-christian",
      "dbpediareference": "",
      "geonamesreference": "",
      "theme": "architecture",
      "centroid": "SRID=4326;POINT(-6.2697134 53.3429041)",
      "distance": 0,
      "marker-symbol": "religious-christian",
      "license": "Open Database License (ODbL) v1.0; http://opendatacommons.org/licenses/odbl/summary"
    }
  ],
  "time": 0.013,
  "fields": {
    "id": {"type": "number"},
    "pid": {"type": "string"},
    "title": {"type": "string"},
    "place": {"type": "string"},
    "date": {"type": "string"},
    "category": {"type": "string"},
    "dbpediareference": {"type": "string"},
    "geonamesreference": {"type": "string"},
    "theme": {"type": "string"},
    "centroid": {"type": "string"},
    "distance": {"type": "number"},
    "marker-symbol": {"type": "string"},
    "license": {"type": "string"}
  },
  "total_rows": 2
}
```
Example 2: Retrieve information about UCD Digital Library object ivrla:31492 as referenced by the database record ID, return data in GeoJSON format

https://data.ucd.ie/api/geo/v1/dl/searchFilter=id(12)&format=geojson

Returns:

```json
{
    "type": "FeatureCollection",
    "features": [{
        "type": "Feature",
        "geometry": {
            "type": "Point",
            "coordinates": [
                -6.266763,
                53.352238
            ]
        },
        "properties": {
            "id": 12,
            "pid": "ivrla:31492",
            "title": "Dominick Street Lower, No. 20",
            "place": "",
            "date": "1758/1760",
            "category": "building",
            "theme": "architecture",
            "centroid": "53.3522380,-6.2667630",
            "dbpediareference": "",
            "geonamesreference": "",
            "marker-symbol": "building",
            "license": "Open Database License (ODbL) v1.0; http://opendatacommons.org/licenses/odbl/summary/"
        }
    }]
}
```
Example 3: Retrieve a GPX file identifying sites described in the George Dublin Civic & Ecclesiastical Architecture collections, identifying all entities as waypoints

https://data.ucd.ie/api/geo/v1/dl/searchFilter=collectionId(ivrla:31284)&format=gpx

Returns:

```xml
<?xml version="1.0" encoding="utf-8"?>
<gpx xmlns="http://www.topografix.com/GPX/1/1"
     xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
     creator="UCD Library Digital Services, University College Dublin, Belfield, Dublin 4, Éire"
     version="1.1"
     xsi:schemaLocation="http://www.topografix.com/GPX/1/1 http://www.topografix.com/GPX/1/1/gpx.xsd">
  <metadata>
    <author>
      <name>UCD Library, University College Dublin, Belfield, Dublin 4, Éire</name>
      <email domain="ucd.ie" id="digital.library"/>
      <link href="http://digital.ucd.ie/"/>
    </author>
    <copyright>© University College Dublin</copyright>
    <time>2013-01-22T14:43:30Z</time>
  </metadata>
  <wpt lat="53.3429841" lon="-6.2697134">
    <name>St Werburgh (C. of I.), Werburgh Street</name>
    <type>religious-christian</type>
  </wpt>
  <wpt lat="53.3429841" lon="-6.2697134">
    <name>St Werburgh (C. of I.), Werburgh Street</name>
    <link href="http://digital.ucd.ie/view/ivrla:31287"/>
    <type>religious-christian</type>
  </wpt>
  <wpt lat="53.3574835544141" lon="-6.26341381318656">
    <name>St George (C. of I.), Hardwicke Place</name>
    <link href="http://digital.ucd.ie/view/ivrla:31289"/>
    <type>religious-christian</type>
  </wpt>
  ...
</gpx>
```
Example 4: Find all geocoded entities in the UCD Digital Library that lie within the boundaries of Derryheanlish (Townland), return results in GeoJSON format

https://data.ucd.ie/api/geo/v1/dl/searchFilter=region(Townland,Derryheanlish)&format=geojson

Returns:

```json
{
  "type": "FeatureCollection",
  "features": [{
    "type": "Feature",
    "geometry": {
      "type": "Point",
      "coordinates": [-7.164165, 54.262407]
    }
  },
  "properties": {
    "id": 200,
    "pid": "ivrla:31125",
    "collectionid": "ivrla:31056",
    "title": "Charming Edward Boyle, sung by John Joe Murphy, a farmer, in Derryheanlish, Roslea, County Fermanagh",
    "place": "Derryheanlish (County Fermanagh, Ireland)",
    "date": "24959",
    "theme": "ethnography",
    "dbpediareference": "",
    "geonamesreference": "",
    "coordinates": "54.26240695, -7.16416493432504",
    "license": "Open Database License (ODbL) v1.0; http://opendatacommons.org/licenses/odbl/summary/"
  }
}]
```
Example 5: Find boundary data for Meenataggart (Townland)

Note: Since Irish place names are often not unique, developers may have to filter search results returned by `geometryByName()` to address ambiguities; alternatively, request boundary data by a place’s `Logainm` identifier using the `geometryByID()` method;

https://data.ucd.ie/api/geo/v1/dl/searchFilter=geometryByName(Meenataggart,Townland)&format=geojson

Returns:

```
{
  "type": "FeatureCollection",
  "features": [
    {
      "type": "Feature",
      "geometry": {
        "type": "MultiPolygon",
        "coordinates": [[[
          [-8.129873, 54.722196], [-8.128503, 54.723412], [-8.126636, 54.725084], [-8.125478, 54.725965], [-8.122239, 54.72821], [-8.121199, 54.72892], [-8.120443, 54.729514], [-8.120029, 54.729172], [-8.119793, 54.728817], [-8.118824, 54.727951], [-8.118528, 54.727596], [-8.118056, 54.726995], [-8.117689, 54.726531], [-8.117134, 54.725855], [-8.116815, 54.725405], [-8.116318, 54.724941], [-8.115846, 54.724452], [-8.115361, 54.724128], [-8.115183, 54.723981], [-8.115283, 54.723993], [-8.11523, 54.723715], [-8.115283, 54.723534], [-8.115183, 54.723237], [-8.115077, 54.723046], [-8.115047, 54.72294], [-8.115165, 54.72282], [-8.115526, 54.722756], [-8.115827, 54.722721], [-8.115916, 54.722698], [-8.116069, 54.722452], [-8.116193, 54.722274], [-8.116406, 54.722145], [-8.11653, 54.722053], [-8.116713, 54.721804], [-8.116784, 54.721705], [-8.117115, 54.721558], [-8.117369, 54.721503], [-8.117606, 54.721377], [-8.11773, 54.721244], [-8.117854, 54.721128], [-8.117954, 54.720933], [-8.11799, 54.720844], [-8.118197, 54.720681], [-8.118427, 54.720558], [-8.11874, 54.720476], [-8.118906, 54.720401], [-8.119107, 54.720373], [-8.119284, 54.720377], [-8.119668, 54.720162], [-8.119816, 54.720036], [-8.119987, 54.719971], [-8.120164, 54.719943], [-8.120679, 54.719807], [-8.121193, 54.719708], [-8.121571, 54.719636], [-8.121648, 54.719537], [-8.121701, 54.719387], [-8.121795, 54.719244], [-8.121849, 54.719134], [-8.121967, 54.719049], [-8.122132, 54.718954], [-8.122351, 54.718773], [-8.122635, 54.718732], [-8.122983, 54.718575], [-8.123143, 54.718496], [-8.123237, 54.718383], [-8.12316, 54.718206], [-8.123231, 54.718066], [-8.123391, 54.717933], [-8.123551, 54.717858], [-8.123846, 54.717462], [-8.124011, 54.717284], [-8.124189, 54.71723], [-8.124585, 54.717254], [-8.125205, 54.717339], [-8.125394, 54.717377], [-8.125749, 54.717305], [-8.125914, 54.717216], [-8.125991, 54.717018], [-8.125938, 54.716841], [-8.126091, 54.716673], [-8.126594, 54.716616], [-8.126996, 54.716547], [-8.12701, 54.716633], [-8.126921, 54.716752], [-8.126945, 54.716868], [-8.126992, 54.717008], [-8.127069, 54.717103], [-8.127216, 54.717172], [-8.127465, 54.717359], [-8.127411, 54.717534], [-8.1274, 54.717626], [-8.127565, 54.717766], [-8.127689, 54.717885], [-8.127754, 54.718165], [-8.127731, 54.718424], [-8.127636, 54.718732], [-8.127299, 54.71894], [-8.127151, 54.719049], [-8.127051, 54.719148], [-8.127157, 54.71925], [-8.127399, 54.720124], [-8.128024, 54.720384], [-8.128057, 54.720635], [-8.128375, 54.721041], [-8.128659, 54.721331], [-8.129361, 54.721881], [-8.129873, 54.722196]]
    },
    {"properties": {
      "id": "87692",
      "admin_unit": "Townland",
      "name": "Meenataggart",
      "geonamesreference": "geonames:3308569",
      "osmreference": " urn:osm:relation_id:5613155",
      "logainmreference": "14097",
      "centroid": "54.72028,-6.12417",
      "bbox": "54.71128,-6.13974,54.72927,-8.10859",
      "marker-symbol": null,
      "license": "Open Database License (ODbL) v1.0; http://opendatacommons.org/licenses/odbl/summary/"
    }}
  ]
}
```
Example 7a: Find boundary data for Baltinglass (Civil parish), County Carlow, search by Logainm identifier, return results in JSON format (default)

https://data.ucd.ie/api/geo/v1/dl/searchFilter=geometryByID(logainm,318)

Returns:

```json
{
  "rows": []
  "id": 72462,
  "pid": null,
  "name": "Baltinglass",
  "admin_unit": "Parish",
  "category": "other",
  "theme": "",
  "centroid": "52.8957843813,-6.6735718325",
  "geonamesreference": null,
  "osmreference": "urn:osm:relation_id:2296496",
  "logainmreference": "318",
  "bbox": null,
  "license": "Open Database License (ODbL) v1.0; http://opendatacommons.org/licenses/odbl/summary/"
},
"time": 0.136,
"fields": {
  "id": {"type": "number"},
  "pid": {"type": "string"},
  "name": {"type": "string"},
  "admin_unit": {"type": "string"},
  "category": {"type": "string"},
  "theme": {"type": "string"},
  "centroid": {"type": "string"},
  "geonamesreference": {"type": "string"},
  "osmreference": {"type": "string"},
  "logainmreference": {"type": "string"},
  "bbox": {"type": "string"},
  "geometry": {"type": "string"},
  "marker-symbol": {"type": "string"},
  "license": {"type": "string"}
}
"total_rows": 1
```
Example 6b: Retrieve available geometry from supporting or external geospatial databases for a place identified by namespace identifier and resource ID; this example retrieves boundary geometry for ancient Rome from the data services of the Ancient World Mapping Center (AWMC) at the University of North Carolina, returns results in GeoJSON format

https://data.ucd.ie/api/geo/v1/dl/geoFilter=geometryByID(awmc,168941)&format=geojson

Returns:

```json
{
  "type": "FeatureCollection",
  "features": [
    {
      "type": "Feature",
      "geometry": {
        "type": "MultiPolygon",
        "coordinates": [[[12.277522262845, 41.752867186885], [12.76665656883, 41.75315272206], [12.7760835323, 41.754390041929], [12.281519757335, 41.756483967614], [12.283899218341, 41.756769502935], [12.2855172825, 41.757340573577], [12.287991891271, 41.758292357979], [12.289053785501, 41.758292357979], [12.293892954565, 41.759053785501], [12.293131527043, 41.759053785501], [12.29725400093, 41.759053785501], [12.291323136679, 41.759053785501], [12.288562961912, 41.759053785501], [12.28649036227, 41.759053785501], [12.285326894944, 41.759053785501], [12.279235474769, 41.759053785501]]],
        "properties": {
          "title": "Ostia",
          "awmc_id": "168941",
          "awmc_link": "http://awmc.unc.edu/api/omnia/168941",
          "pid": "422995",
          "pleiades_link": "http://pleiades.stoa.org/places/422995",
          "type": "urban",
          "mindate": null,
          "maxdate": null,
          "description": "Urban area polygon"
        }
      }
    }
  ],
  "id": 0
}
```
Appendix: Vocabularies for ‘category’ and ‘theme’

The following terms can be used to specify values for ‘category’ when using the filter parameter on requests for data:

- bank
- building
- castle
- cemetery
- college
- courthouse
- grocery
- hospital
- letter
- library
- mint
- museum
- other
- place-of-worship
- post
- public_building
- religious-christian
- school
- theatre
- water_well
- windmill

The following terms can be used to specify values for ‘theme’ when using the filter parameter on requests for data:

- architecture
- art
- correspondence
- ethnography
- history
- history_of_science
- literature
- maps
- other
- urban_scenes