

UCD Library Data Services APIs

UCD Digital Library Geographic Data and Information Services API

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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.

Methods of the first kind deliver metadata and geographic point data; the latter two may deliver a combination of multi-polygons/polygons, centroid point values and bounding box coordinates.

These services enable diverse new uses of UCD Digital Library data and information. In particular, the services will 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.;
- web mapping applications; etc.

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

- [http:// data.ucd.ie/api/geo/v1/dl/](http://data.ucd.ie/api/geo/v1/dl/)

REST API (January 2013-)

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 – *geometryById()*

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
- *geometryById()* – 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:

Format	Internet Media Type	Delivery
Atom/GeoRSS	application/atom+xml	Stream
CSV	text/csv	Download *.csv
GeoJSON	text/json	Stream
GPX	text/xml	Download *.gpx
KML	application/vnd.google-earth.kml+xml	Download *.kml
JSON	text/json	Stream
Shapefile	application/zip	Download *.zip

REST URL syntax

The REST API URL syntax is modeled generally on the Query API of Bing Maps Spatial Data Services (see: <http://msdn.microsoft.com/en-us/library/ff701734.aspx> and <http://msdn.microsoft.com/en-us/library/gg585126.aspx>).

All queries follow the prototype:

```
http://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	<i>Information about Digital Library entities:</i> nearby(lat,lon,distance), distance is km bbox(southLatitude,westLongitude,northLatitude,eastLongitude) id(PID) collectionId({PID}) region({administrative unit},{placename}) <i>Information about geographic places:</i> geometryByName({placename},{administrative unit:OPT}) geometryByID({identifier},{resource name})
filter	Opt	key/value pairs separated by the operator eq, where key is either <i>category</i> or <i>theme</i> , and the value is selected from a controlled list
format	Opt	atom csv geojson gpx (not valid with geometryByID() or geometryByName()) kml 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:

HTTP/1.1 Response Code	Text
200	OK
302	Found
400	Bad Request
404	Not Found
415	Unsupported Media Type [invalid format parameter]
500	Internal Server Error
503	Service Unavailable

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: <http://data.ucd.ie/docs/apiGeo.pdf>; rel="profile"
```

Brief Examples

Find all geocoded Digital Library entities within 10km of a point in Dublin City Centre; include only entities tagged with the theme 'architecture'; return information in Atom/GeoRSS format

```
http://data.ucd.ie/api/geo/v1/dl/searchFilter=nearby(53.3429041,-6.2697134,10)
&format=atom&filter=theme eq architecture
```

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

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

Find all geocoded items in the UCD Sculpture Trail (collection ucdlib:21000), return results in GPX format (for ingestion as waypoints to a GPS navigation device, etc.)

```
http://data.ucd.ie/api/geo/v1/dl/searchFilter=collectionId(ucdlib:21000)&format=gpx
```

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

```
http://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

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

Find boundary data for County Carlow, return data in KML format

```
http://data.ucd.ie/api/geo/v1/dl/searchFilter=
geometryByName("National Museum of Ireland, Archaeology")&format=geojson
```

Detailed Examples

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

`http://data.ucd.ie/api/geo/v1/dl/searchFilter=nearby(53.3429041,-6.2697134,10)&format=json&filter=theme%20eq%20architecture`

Returns:

```
{
  "time": 0.021,
  "total_rows": 78,
  "rows": [
    {
      "id": 11,
      "dl_id": "ivrla:31287",
      "title": "St Werburgh (C. of I.), Werburgh Street",
      "place": "",
      "date": "1715/1719",
      "category": "religious-christian",
      "theme": "architecture",
      "geometry": "SRID=4326;POINT(-6.2697134 53.3429041)",
      "distance": 0
    },
    {
      "id": 10,
      "dl_id": "ivrla:31285",
      "title": "St Werburgh (C. of I.), Werburgh Street",
      "place": "",
      "date": "1715/1719",
      "category": "religious-christian",
      "theme": "architecture",
      "geometry": "SRID=4326;POINT(-6.2697134 53.3429041)",
      "distance": 0
    },
    ...
  ]
}
```

Example 2: Retrieve all DL entities whose coordinates lie within a bounding box with SW and NE corners of, respectively, 52.84923, -6.789551 and 53.212612, -5.971069, return results in Atom/GeoRSS format

`http://data.ucd.ie/api/geo/v1/dl/searchFilter=bbox(-6.789551,52.84923,-5.971069,53.212612)&format=atom`

Returns:

```
<?xml version="1.0" encoding="utf-8"?>
<feed
  xmlns="http://www.w3.org/2005/Atom"
  xmlns:dc="http://purl.org/dc/elements/1.1/"
  xmlns:georss="http://www.georss.org/georss">
  <updated>2013-01-22T15:27:54Z</updated>
  <id>urn:uuid:26623685-2E17-3A9F-BA8A-0E921879DA8B</id>
  <author>
    <name>UCD Library Research &amp; Innovation, UCD Library, University College Dublin, Belfield,
    Dublin 4, Éire</name>
    <email>digital.library@ucd.ie</email>
    <uri>http://digital.ucd.ie/</uri>
  </author>
  <link
    href="data.ucd.ie"
    rel="via"/>
  <rights
    type="html">© University College Dublin. Made available under the terms of a &lt;a rel="license"
    href="http://creativecommons.org/licenses/by-nc-sa/3.0/ie/"&gt;Creative Commons Attribution-
    NonCommercial-ShareAlike 3.0 Ireland License&lt;/a&gt;. Rights and terms of use beyond the scope of this
    license may be described at &lt;a
    href="http://digital.ucd.ie/terms/"
    rel="cc:morePermissions"&gt;http://digital.ucd.ie/terms/.&lt;/a&gt;</rights>
  <dc:description>24 item(s) returned from query http://data.ucd.ie/api/geo/v1/dl/searchFilter=bbox(-
  6.789551,52.84923,-5.971069,53.212612)</dc:description>
  <entry>
    <id>urn:uuid:BD6F14A9-277D-C81D-60F9-2F5C0E348393</id>
    <updated>2013-01-22T15:27:54Z</updated>
    <rights
      type="html">© University College Dublin. Use subject to the terms of a &lt;a rel="license"
      href="http://creativecommons.org/licenses/by-nc-sa/3.0/ie/"&gt;Creative Commons Attribution-
      NonCommercial-ShareAlike 3.0 Ireland License&lt;/a&gt;. See also: &lt;a
      href="http://digital.ucd.ie/terms/"&gt;http://digital.ucd.ie/terms/.&lt;/a&gt;</rights>
    <dc:relation>uri:U5D:api:geo/dl:8</dc:relation>
    <link
      href="http://digital.ucd.ie/view/ivrla:4697"
      rel="alternate"/>
    <title>Aquatint of 'The Waterfall in Powerscourt Park, Co. Wicklow' / by Jonathan Fisher.</title>
    <dc:date>1795-01</dc:date>
    <category
      term="other"
      label="category"/>
    <georss:point>53.1457845 -6.2105037</georss:point>
  </entry>
  ...
</feed>
```

Example 3a: Retrieve information about Digital Library object ivrla:31289 as referenced by the cartoDB record ID, return data in GeoJSON format

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

Returns:

```
{
  "type": "FeatureCollection",
  "features": [{
    "type": "Feature",
    "properties": {
      "id": 12,
      "dl_id": "ivrla:31289",
      "title": "St George (C. of I.), Hardwicke Place",
      "place": "",
      "date": "1802/1813",
      "category": "religious-christian",
      "theme": "architecture"
    },
    "geometry": {
      "type": "Point",
      "coordinates": [
        -6.263414,
        53.357484
      ]
    }
  ]
}
```

Example 3b: Retrieve information about Digital Library object ivrla:31289 as referenced by the cartoDB record ID, return data in GeoJSON format, specifying a callback function

`http://data.ucd.ie/api/geo/v1/dl/searchFilter=id(12)&format=geojson&jsonp=myCallbackFunction`

Returns:

```
myCallbackFunction({"type":"FeatureCollection","features":[{"type":"Feature","properties":{"id":12,"dl_id":"ivrla:31289","title":"St George (C. of I.), Hardwicke Place","place":"","date":"1802/1813","category":"religious-christian","theme":"architecture"},"geometry":{"type":"Point","coordinates":[-6.263414,53.357484]}}]});
```


Example 4: Retrieve a GPX file identifying sites described in the George Dublin Civic & Ecclesiastical Architecture collections, identifying all entities as waypoints

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

Returns:

```
<?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 author="© University College Dublin"/>
    <time>2013-01-22T14:43:30Z</time>
  </metadata>
  <wpt
    lat="53.3429041"
    lon="-6.2697134">
    <name>St Werburgh (C. of I.), Werburgh Street</name>
    <link
      href="http://digital.ucd.ie/view/ivrla:31285"/>
    <type>religious-christian</type>
  </wpt>
  <wpt
    lat="53.3429041"
    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 5: Find all geocoded entities in the Digital Library that lie within the boundaries of Galway (City), return results in KML format

[http://data.ucd.ie/api/geo/v1/dl/searchFilter=region\(City-Town,Galway\)&format=kml](http://data.ucd.ie/api/geo/v1/dl/searchFilter=region(City-Town,Galway)&format=kml)

Returns:

```
<?xml version="1.0" encoding="utf-8" ?>
<kml xmlns="http://www.opengis.net/kml/2.2">
<Document><Folder><name>sql_statement</name>
<Schema name="sql_statement" id="sql_statement">
  <SimpleField name="Name" type="string"></SimpleField>
  <SimpleField name="Description" type="string"></SimpleField>
  <SimpleField name="id" type="int"></SimpleField>
  <SimpleField name="dl_id" type="string"></SimpleField>
  <SimpleField name="collectionid" type="string"></SimpleField>
  <SimpleField name="title" type="string"></SimpleField>
  <SimpleField name="place" type="string"></SimpleField>
  <SimpleField name="date" type="string"></SimpleField>
  <SimpleField name="category" type="string"></SimpleField>
  <SimpleField name="theme" type="string"></SimpleField>
  <SimpleField name="centroid" type="string"></SimpleField>
</Schema>
  <Placemark>
    <ExtendedData><SchemaData schemaUrl="#sql_statement">
      <SimpleData name="id">511</SimpleData>
      <SimpleData name="dl_id">ivrla:10487</SimpleData>
      <SimpleData name="collectionid">ivrla:10100</SimpleData>
      <SimpleData name="title">Galway County courthouse, built after
original courthouse (situated in the Tholsel in Shop Street) was burned down.</SimpleData>
      <SimpleData name="place">Galway County Courthouse (Galway, Ireland)</SimpleData>
      <SimpleData name="date">1923</SimpleData>
      <SimpleData name="category">other</SimpleData>
      <SimpleData name="theme">ethnography</SimpleData>
      <SimpleData name="centroid">SRID=4326;POINT(-9.0549557 53.2758499)</SimpleData>
    </SchemaData></ExtendedData>
  </Placemark>
  <Placemark>
    <ExtendedData><SchemaData schemaUrl="#sql_statement">
      <SimpleData name="id">626</SimpleData>
      <SimpleData name="dl_id">ivrla:10251</SimpleData>
      <SimpleData name="collectionid">ivrla:10100</SimpleData>
      <SimpleData name="title">Exterior shot of two small houses, Claddagh, Co.
Galway.</SimpleData>
      <SimpleData name="place">Claddagh (Galway, Ireland)</SimpleData>
      <SimpleData name="date"></SimpleData>
      <SimpleData name="category">other</SimpleData>
      <SimpleData name="theme">ethnography</SimpleData>
      <SimpleData name="centroid">SRID=4326;POINT(-9.0552822 53.2674717)</SimpleData>
    </SchemaData></ExtendedData>
  </Placemark>
</Folder></Document>
</kml>
```

Example 6: Find boundary data for Carradooey (Townland), County Longford

`http://data.ucd.ie/api/geo/v1/d1/searchFilter= geometryByName
(Carradooey,Townland)&format=geojson`

Returns:

```
{
  "type": "FeatureCollection",
  "features": [{
    "type": "Feature",
    "properties": {
      "id": 7194,
      "admin_unit": "Townland",
      "name": "Carradooey",
      "geoname_id": "",
      "osm_id": "urn:osm:place_id:98159311",
      "logainm_id": "33179",
      "centroid": "53.74675165,-7.75912118366394",
      "bbox": "53.7415313720703,-7.76690292358398; 53.7519683837891,-7.74990081787109"
    },
    "geometry": {
      "type": "MultiPolygon",
      "coordinates": [[[
        [-7.766902,53.747109],[-7.76668,53.74709],[-7.766406,53.747096],[-7.766224,53.747141],[-7.765969,53.74722],[-7.765819,53.747335],[-7.765687,53.747515],[-7.765596,53.747785],[-7.765489,53.748283],[-7.765451,53.74846],[-7.765365,53.748625],[-7.765163,53.748865],[-7.764978,53.748984],[-7.764663,53.749139],[-7.764276,53.749256],[-7.763896,53.749383],[-7.762565,53.749865],[-7.761836,53.750122],[-7.76111,53.750392],[-7.760473,53.75063],[-7.758815,53.751245],[-7.757601,53.751661],[-7.757136,53.751826],[-7.756576,53.751934],[-7.756197,53.751965],[-7.755849,53.751968],[-7.75542,53.751917],[-7.755007,53.751848],[-7.754192,53.751715],[-7.753413,53.751581],[-7.752051,53.751375],[-7.751091,53.751204],[-7.750101,53.751062],[-7.749901,53.751034],[-7.749917,53.750966],[-7.750001,53.75067],[-7.750124,53.750289],[-7.750246,53.75009],[-7.750624,53.749383],[-7.75093,53.748803],[-7.751036,53.748522],[-7.751374,53.7479],[-7.751639,53.747374],[-7.751718,53.747264],[-7.75193,53.746968],[-7.752394,53.746352],[-7.752629,53.746001],[-7.753035,53.745481],[-7.753218,53.745247],[-7.753377,53.745082],[-7.753462,53.744911],[-7.753741,53.744616],[-7.753784,53.744508],[-7.754009,53.744257],[-7.75425,53.743997],[-7.754599,53.743683],[-7.754824,53.743435],[-7.755023,53.74321],[-7.755447,53.742921],[-7.755833,53.74261],[-7.756176,53.742341],[-7.756444,53.742116],[-7.756874,53.741912],[-7.757329,53.741741],[-7.757769,53.741633],[-7.758145,53.741535],[-7.758284,53.741646],[-7.758714,53.74202],[-7.759127,53.742411],[-7.759454,53.742712],[-7.760028,53.743293],[-7.760934,53.744105],[-7.761702,53.744847],[-7.762098,53.745167],[-7.762426,53.745319],[-7.762935,53.745485],[-7.763171,53.745595],[-7.763547,53.745711],[-7.764046,53.745896],[-7.764303,53.746005],[-7.764534,53.746084],[-7.764775,53.746119],[-7.765591,53.746497],[-7.766578,53.746947],[-7.766902,53.747109]
        ]]]]
    }
  ]
}
```

Example 7a: Find boundary data for Baltinglass (Civil parish), County Carlow, search by Logainm identifier, return results in JSON format (default)

[http://data.ucd.ie/api/geo/v1/dl/searchFilter=geometryByID\(logainm,318\)](http://data.ucd.ie/api/geo/v1/dl/searchFilter=geometryByID(logainm,318))

Returns:

```
{
  "time": 0.034,
  "total_rows": 1,
  "rows": [{
    "id": 2392,
    "admin_unit": "Civil parish",
    "name": "Baltinglass",
    "geoname_id": "",
    "osm_id": "urn:osm:place_id:98136613",
    "logainm_id": "318",
    "centroid": "52.8957862994739,-6.67361621116645",
    "bbox": "52.8888626098633,-6.67967367172241; 52.9022369384766,-6.66615390777588",
    "geometry": "SRID=4326;MULTIPOLYGON((( -6.6796734 52.8913378, -6.6793967 52.891717, -6.6792193 52.8922397, -6.679171 52.8924718, -6.679192 52.8927039, -6.6793139 52.8932366, -6.679335 52.8935182, -6.6793013 52.8938759, -6.6790953 52.8942602, -6.6788031 52.894694, -6.6786832 52.8950453, -6.678719 52.8952203, -6.6790196 52.8956313, -6.6792088 52.8959838, -6.679253 52.8962197, -6.6792256 52.896481, -6.6791142 52.8966814, -6.6789607 52.8969224, -6.6787631 52.897625, -6.6785949 52.8979243, -6.678084 52.8986053, -6.6772788 52.8996034, -6.6764946 52.9003364, -6.6763685 52.9005279, -6.6762991 52.90076, -6.6762634 52.9015386, -6.6762361 52.9016844, -6.6761099 52.9018315, -6.6755519 52.9022339, -6.6730897 52.9020675, -6.6707874 52.9019221, -6.6686743 52.9015832, -6.667286 52.9015731, -6.6661543 52.9014691, -6.6678455 52.8975722, -6.6705627 52.8913103, -6.6719359 52.8888653, -6.6754625 52.8893973, -6.6791268 52.8890905, -6.6791983 52.8895785, -6.67948 52.8903459, -6.6795915 52.8906656, -6.6796734 52.8913378)))"
  ]
}
```

Example 7b: 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

[http://data.ucd.ie/api/geo/v1/dl/geoFilter=geometryByID\(awmc,168941\)&format=json](http://data.ucd.ie/api/geo/v1/dl/geoFilter=geometryByID(awmc,168941)&format=json)

Returns:

```
{
  "type": "FeatureCollection",
  "features": [{
    "type": "Feature",
    "geometry": {
      "type": "MultiPolygon",
      "coordinates": [[[
        [
          12.277522262845,
          41.752867186885
        ],
        [
          12.276665656883,
          41.753152722206
        ],
        [
          12.276760835323,
          41.754390041929
        ],
        [
          12.277141549084,
          41.755246647891
        ],
        [etc.]
      ]],
    },
    "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
  }]
}
```