Developing Flexible Interfaces in Support of a Heterogeneous Digital Repository

John B Howard (UCD)

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The Mission of the UCD Digital Library is to capture representations of cultural heritage resources and research outputs of University College Dublin as well as its collaborators and partners, to preserve, sustain and enhance the usability of these assets, and to enable their broad dissemination.
Background: IVRLA


• Objectives: resource digitisation; new research using digital source materials; new ethnographic research; proof of concept in design of a Trusted Digital Repository

• Outcomes:
  – 35 curated collections (drawn from original UCD-held material in the James Joyce Library and the participating repositories)
  – 16 research collections (drawn from demonstrator research projects)
  – Digital repository services (fedora 2.X, Apache Wicket, etc.)
Rebranding signifies end of project, start of a new phase of service addressing:

- Organisational sustainability
  - UCD Library Research Services, currently 10.3FTE
- Technical development
  - Transition to new service infrastructure
  - Review of data model, restructuring of content (orthodox adoption of Project Hydra models for structuring digital objects)
  - Introduction of new discovery interface, faceted search
  - Ongoing new content development
current phase (2014-)

• Refinement of data model and descriptive practices: linked data orientation
• Creation of new metadata preparation and workflow management tools
• Reconception of the applications stack:
  – Old: SOA based on OAIS Reference Model, fedora services framework, search plugins
  – New: administrative micro-services, repository services modeled on the OAIS Reference Model, fedora 3.X, search plugins, a range of modular services to expose data to end users in flexible ways via RESTful APIs
API driven

basis for web user experience
basis for third-party integration of resources
What is an API?

- In computer programming, an application programming interface (API) specifies how some software components should interact with each other.
- Representational state transfer (REST) is an architectural style consisting of a coordinated set of architectural constraints applied to components, connectors, and data elements, within a distributed hypermedia system.

What APIs are available?

- IIIF Image API 1.0
- Geospatial Data API
- Quantitative Data API
- Linked Data API
- OpenSearch API
- Web API (query, view, get, download)
- unAPI
access to digital images: IIIF image API

• Scenario 1: serve static images
• Scenario 2: serve dynamic and specialised image resources
  – JPEG2000: application services to deliver images in multiple formats, resolutions
  – Georeferenced images (e.g., GeoTIFF), georeferenced + spatially rectified images
IIIF Image API: services architecture
IIIF Image API: query methods

http://data.ucd.ie/api/img/{PID}/info.{json|xml}
http://data.ucd.ie/api/img/{PID}/region/size/rotation/quality{.jpg|gif|png}

Brief Examples:

http://data.ucd.ie/api/img/ivrla:31422/info.json
http://data.ucd.ie/api/img/ivrla:4260/full/0.25/90/native.png
http://data.ucd.ie/api/img/ivrla:29985/full/0.5/0/native.gif
The collection also contains some images of Irish Army units in more formal poses, including an interesting panorama of the first IRA unit in Irish Free State Army uniform (4 February 1922) and a fine group photograph by the Laffayette studios of the officers and men of the Army Education School, possibly taken at the time (see above). I believe this was Minister for Defence (1927-32).

A final group of portraits and photographs of historical occasions from 1921-2 includes an interesting image of Michael Collins with a group of hurlers, possibly taken during the Treaty debates.

"Michael Collins addressing a small group of hurlers" held by UCD Archives. Digital image: © University College Dublin, published by UCD Digital Library.

DOI: http://dx.doi.org/10.7925/ds1.ucdlib_30859
geospatial API

• Facilitate access to …
  – Cultural objects with a geographic association
    • Monuments
    • Places (structures, natural features, geopolitical boundaries)
    • Maps
  – Geospatial objects
    • GeoTIFF and other spatially referenced images
    • Shapefiles
    • Remote sensing data (lidar, ECW images, etc.)

• Requirements: facilitate previews of spatial coverage of a resource; query interface to PostgreSQL/postGIS database; response formats to suit different communities’ needs
# Geospatial API: query methods

http://data.ucd.ie/api/geo/v1/dl/

<table>
<thead>
<tr>
<th>URL Component</th>
<th>Req/Opt</th>
<th>Options (coordinates in decimal notation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ServiceID</td>
<td>Req</td>
<td>dl</td>
</tr>
</tbody>
</table>
| 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  
| 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. |
Geospatial Data API: services architecture
application: distribution of resources in a virtual collection
application: distribution of respondents to qualitative survey
application: geographic coverage of LiDAR dataset
Geospatial API: point & boundary data with a historic basemap
He paid twopenny halfpenny to the slatternly girl and went out of the shop to begin his wandering again. He went into Capel Street and walked along towards the City Hall. Then he turned into Dame Street. At the corner of George's Street he met two friends of his and stopped to converse with them. He was glad that he could rest from all his walking. His friends asked him had he seen Corley and what was the latest. He replied that he had spent the day [Page 70] with Corley. His friends talked very little. They looked vacantly after some figures in the crowd and sometimes made a critical remark. One said that he had seen Mac an hour before in Westmoreland Street. At this Lenehan said that he had been with Mac the night before in Egan's. The young man who had seen Mac in Westmoreland Street asked was it true that Mac had won a bit over a billiard match. Lenehan did not know: he said that Holohan had stood them drinks in Egan's.

He left his friends at a quarter to ten and went up George's Street. He turned to the left at the City Markets and walked on into Grafton Street. The crowd of girls and young men had thinned and on his way up the street he heard many groups and couples bidding one another good-night. He went as far as the clock of the College of Surgeons: it was on the stroke of ten. He set off briskly along the northern side of the Green hurrying for fear Corley should return too soon. When he reached the corner of Merrion Street he took his stand in the shadow of a lamp and brought out one of the cigarettes which he had reserved and lit it. He leaned against the lamp-post and kept his gaze fixed on the part from which he expected to see Corley and the young woman return.

His mind became active again. He wondered had Corley managed it successfully. He wondered if he had asked her yet or if he would leave it to the last. He suffered all the pangs and thrills of his friend's situation as well as those of his own. But the memory of Corley's slowly revolving head calmed him some [Page 71] what: he was sure Corley would pull it off all right. All at once the idea struck him that perhaps Corley had seen her home by another way and given him the slip. His eyes searched the street: there was no sign of them. Yet it was surely half-an-hour since he had seen the clock of the College of Surgeons. Would Corley do a thing like that? He lit his last cigarette and began to smoke it nervously. He strained his eyes as each tram stopped at the far corner of the square. They must have gone home by another way. The paper of his cigarette broke and he flung it into the road with a curse.

Suddenly he saw them coming towards him. He started with delight and keeping close to his lamp-post tried to read the result in their walk. They were walking quickly, the young woman taking quick short steps, while Corley kept beside her with his long stride. They did not seem to be speaking. An intimation of the result pricked him like the point of a sharp instrument. He knew Corley would fail; he knew it was no go.

They turned down Baggot Street and he followed them at once, taking the other footpath. When they stopped he stopped too. They talked for a few moments and then the young woman went down the steps into the area of a house. Corley remained standing at the edge of the path, a little distance from the front steps. Some minutes passed. Then the hall-door was opened slowly and cautiously. A woman came running down the front steps and coughed. Corley turned and went
The Iberian Book Project

Iberian Books (IB) is an ongoing research project based at the Centre for the History of the Media at University College Dublin. It is funded through a generous grant from the Andrew W. Mellon Foundation under their Scholarly Communications and Information Technology Scheme. The objective of IB is to produce a foundational listing of all books published in Spain, Portugal and the New World or printed elsewhere in Spanish or Portuguese during the Golden Age, 1472-1700.

News and Events

Iberian Books Project confirms two new appointments (August 2014)

The Project are delighted to announce the addition of two new appointments to the team: Dr Alejandra Ulla Lorenzo and Dr Alba de la Cruz

Read more »
application: spatial/temporal visualisation of publications in the Iberian sphere of influence
Quantitative Data API: services architecture
Quantitative Data API: query methods

http://data.ucd.ie/api/geo/v1/quant/

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<td>quant</td>
</tr>
<tr>
<td>API version</td>
<td>Req</td>
<td>v1</td>
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| method, parameters | Req    | getStudyList()  
getStudyMetadata({studyID})  
getStudyVariables({studyID})  
getVariableGroups({studyID})  
getChildGroups({groupID})  
getVariables({groupID})  
getVariableMetadata({variableID})  
download({studyID},{CSV|SPSS|SPSSPORT|SAS|STATA|STATA6|STATA7|NSDSTAT}) |
Quantitative data API: quantitative survey dataset

Irish National Election Study

1. Irish National Election Study: SPSS
   - Label: #1
   - Extent: 1 data file; 1,142,619 bytes
   - MIME type: application/zip
   - Download: download

2. Irish National Election Study: SPSS Portable
   - Label: #2
   - Extent: 1 data file
   - MIME type: application/zip
   - Download: download

3. Irish National Election Study: SAS
   - Label: #3
   - Extent: 1 data file
   - MIME type: application/zip
   - Download: download

4. Irish National Election Study: CSV
   - Label: #4
   - Extent: 1 data file
   - MIME type: application/json
   - Download: download

5. Irish National Election Study: Stata
   - Label: #5
   - Extent: 1 data file
   - MIME type: application/zip
   - Download: download

6. Irish National Election Study: Stata6
   - Label: #6
   - Extent: 1 data file
   - MIME type: application/zip
   - Download: download

7. Irish National Election Study: Stata7
   - Label: #7
   - Extent: 1 data file
   - MIME type: application/zip
   - Download: download

8. Irish National Election Study: NSDStat
   - Label: #8
   - Extent: 1 data file
   - MIME type: application/zip
   - Download: download

Irish Election Survey 2002

- Number of Cases: 2683
- Number of Variables: 569

Variables:
- constituency code
- Categories:
  - Carlow-Kilkenny (34)
  - Cavan - Monaghan (89)
  - Clare (65)
  - Cork East (88)
  - Cork North-Central (47)
  - Cork North-West (50)
  - Cork South-Central (72)
semantic first

integral to data model, integral to description, integral to dissemination/WebAPI
structural metadata: object-to-object relationships
  <titleInfo>
    <nonSort>The </nonSort>
    <title>Four Courts</title>
    <subTitle>ruined interior</subTitle>
  </titleInfo>
  <name authority="naf" type="personal" authorityURI="http://id.loc.gov/authorities/names#conceptscheme" valueURI="http://id.loc.gov/authorities/names/nr2006013899#concept">
    <namePart>FitzGerald, Desmond, 1888-1947</namePart>
  </name>
  <name type="personal">
    <namePart>Hogan, W. D.</namePart>
  </name>
  <typeOfResource>still image</typeOfResource>
  <physicalDescription>
    <extent>1 still image : digital ; 46603.648 KB</extent>
    <form authority="marcform" authorityURI="http://www.loc.gov/standards/valuelist/marcform.html">electronic</form>
    <reformattingQuality>preservation</reformattingQuality>
    <internetMediaType>image/gif</internetMediaType>
    <internetMediaType>image/jp2</internetMediaType>
    <internetMediaType>image/jpeg</internetMediaType>
    <digitalOrigin>reformatted digital</digitalOrigin>
    <note type="source characteristics" displayLabel="MD5 checksum">95bba2d847e3f74202e285dc87c66d77</note>
  </physicalDescription>
  <genre authority="bgtchm">Photographs</genre>
  <abstract>Photograph by W.D. Hogan of the ruined interior of the Four Courts. Debris and broken pillars lie around. The imposing statue of a judge has been badly damaged.</abstract>
  <subject authority="lcsh" authorityURI="http://id.loc.gov/authorities/conceptscheme" valueURI="http://id.loc.gov/authorities/subjects/sh85068028#concept">
    <geographic>Ireland</geographic>
    <topic>History</topic>
    <temporal>Civil War, 1922-1923</temporal>
  </subject>
  <subject>
    <geographic>Ireland</geographic>
    <geographic>Dublin</geographic>
  </subject>
  <subject>
    <name authority="naf" authorityURI="http://id.loc.gov/authorities/names#conceptscheme" valueURI="http://id.loc.gov/authorities/subjects/sh99000189#concept" type="corporate">
      <namePart>Four Courts (Dublin, Ireland)</namePart>
    </name>
    <cartographics authority="OpenStreetMap" authorityURI="http://nominatim.openstreetmap.org/" valueURI="urn:osm:place_id:28889485">
      <coordinates>53.34611595, -6.27383877649958</coordinates>
    </cartographics>
  </subject>
</mods>

Descriptive metadata: MODS serialisation
Photograph by W.D. Hogan of the ruined interior of the Four Courts. Debris and broken pillars lie around. The imposing statue of a judge has been badly damaged.
Web API: requesting RDF metadata

VoID ([http://www.w3.org/TR/void/](http://www.w3.org/TR/void/))

http://data.ucd.ie/.well-known/void

URI


HTTP content negotiation example

```bash
```

HTTP/1.1 200 OK
Date: Sat, 22 Mar 2014 09:39:56 GMT
Server: Apache/2.2.22 (Ubuntu)
X-Powered-By: PHP/5.3.10-1ubuntu3.9
Pragma:
Cache-Control: no-store, no-cache, must-revalidate
Expires: Sat, 26 Jul 1997 05:00:00 GMT
Last-Modified: Sat, 22 Mar 2014 09:39:56 GMT
Cache-Control: post-check=0, pre-check=0
Content-Length: 10828
Content-Type: text/rdf+n3; charset=utf-8
SPARQL endpoint (Virtuoso)
http://data.ucd.ie:8890/sparql

```
select distinct ?Concept where {[] a ?Concept} LIMIT 100
```
(also consumption of linked data: Europeana)
Opensearch API

- **OpenSearch:**
- **OpenSearch description document**
  - [http://digital.ucd.ie/opensearchdescription.xml](http://digital.ucd.ie/opensearchdescription.xml)
- **template:**
  
  http://data.ucd.ie/api/search/v1/?
  q={searchTerms}
  &start={startIndex}?
  &count={count}

- **Example:**
  - [http://data.ucd.ie/api/search/v1/?q=General+Post+Office&start=1&count=1](http://data.ucd.ie/api/search/v1/?q=General+Post+Office&start=1&count=1)

- **Responses in RSS 2.0 or JSON formats**
Web API

- Responsive web site (Bootstrap 3.X) built over lean MVC web application
- Web API methods:
  - q (query == search)
  - view
    - HTML5 page views
    - RDF content negotiation
  - get (content delivery, streamed)
  - export (citation export)
  - download (content delivery, download)
UCD Digital Library

Enter search terms

Or browse collections, images, datasets, & more

New Resources

Desmond FitzGerald Photographs
Haunting photographs depicting the aftermaths of the Easter Rising, 1916, the War of Independence and the Irish Civil War.

Hibernia
Data recovered from the project "Historic Ireland's Build Environment and Road Network Inventory Access" (Hibernia).

Aerial laser scanning (ALS) data
Aerial laser scanning (ALS) data collected over an area of around 1 square km in Dublin city in 2007.

Heritage

Cultural heritage repositories at UCD hold unique resources that reflect the heritage and history of Ireland. UCD Digital Library provides access to resources from many UCD cultural repositories, including: UCD Library Special Collections; UCD Archives; the National Folklore Collection UCD; the UCD Irish Dialect Archive; map collections in the Schools of UCD School of Geological Sciences and Geography, Planning & Environmental Policy; the UCD School of Art History and Cultural Policy; the UCD Classical Museum; and more.

Many collections in the Digital Library are also published to Europeana, the digital online gateway to European

Research

The UCD Digital Library and Repository are an integral part of UCD’s research infrastructure, and of Irish and European digital infrastructure in general.

The Digital Library hosts research datasets pertinent to UCD research activities as well as data created through research activities at UCD. It provides value-added services, including the assignment of Digital Object Identifiers (DOIs) to research datasets and propagation of citation information to international data registries, such as DataCite and OpenAire. To optimise opportunities for re-use of data, many data types are also exposed via specialised APIs.

digital.ucd.ie
Q & A / Discussion

Contact: digital.library@ucd.ie
Twitter: @UCDDigital
Presenter: john.b.howard@ucd.ie