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A tutorial for OpenCitations and Crossref API

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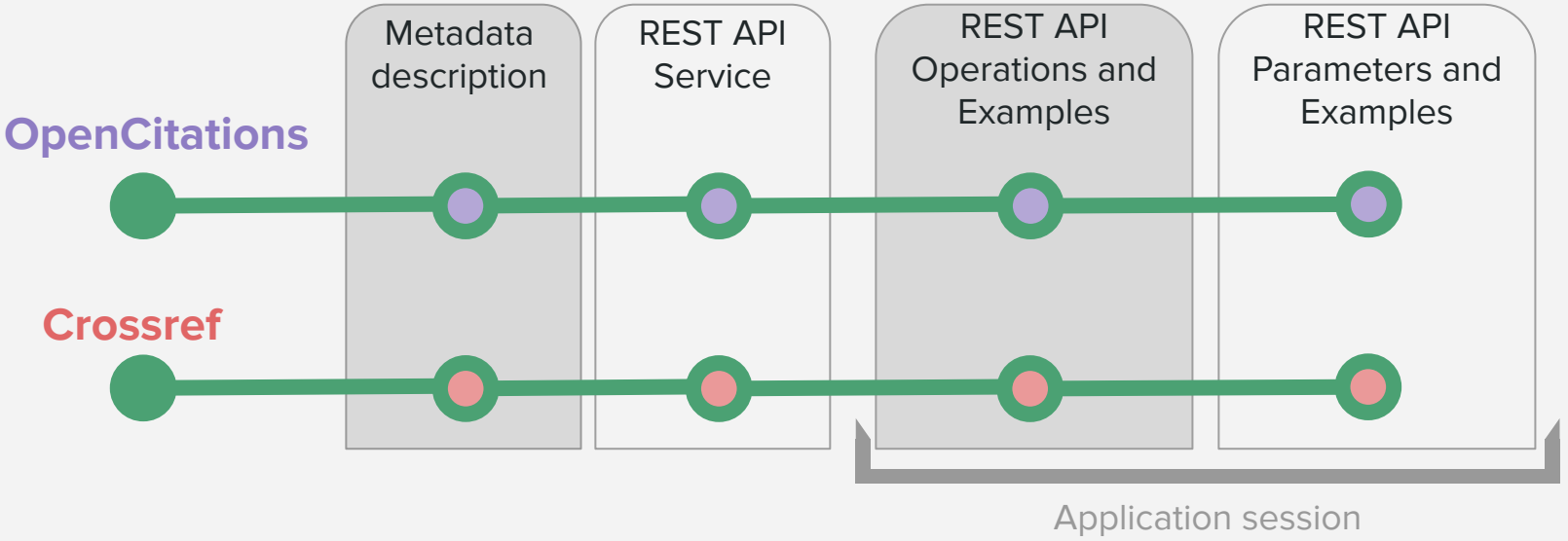
Introduction

- A tutorial on querying and exploring the bibliographic metadata of two major organizations, **OpenCitations** and **Crossref**, using there **REST API services**.



OpenCitations Metadata

- **The OpenCitations Corpus (OCC)**[1]: is an **open repository of Bibliographic metadata** made available under a Creative Commons public domain dedication. OCC currently contains 326743 citing bibliographic resources and about almost 14 million citations.
- **The Open Citation Indexes** : some **bibliographic indexes recording citations** between publications using the data available in particular bibliographic databases. The first and more popular index of these is **COCI**, the OpenCitations Index of Crossref open DOI-to-DOI references, a new RDF dataset of around 450 million citations.

[1] The OpenCitations Corpus (OCC), http://w3id.org/oc/corpus
[2] The Open Citation Indexes, http://w3id.org/oc/index

OpenCitations REST API

- Implemented by means of RAMOSE, the Restful API Manager Over SPARQL Endpoints.
- Two main REST API services are provided:
  - For the OpenCitations Corpus (OCC): w3id.org/oc/api/v1
  - For all the OpenCitations Indexes, e.g. COCI, CROCI.
    In this tutorial we will focus on COCI: w3id.org/oc/index/coci/api/v1
- REST API Call structure:

  <api_url><operation>?*<parameter_1>*&*<parameter_2>*...*<parameter_n>*

OpenCitations REST API: Operations

w3id.org/oc/api/v1

OCC

/metadata/{*dois*}	This operation allows one to get the metadata of all the articles specified in input by means of their DOIs.
/coauthorship/{*dois*}	This operation allows one to get co-authorship matrix of all the articles specified in input by means of their DOIs.

w3id.org/oc/index/coci/api/v1

COCI

/references/{*doi*}	Retrieves the citation data for all the references to other works appearing in the bibliographic entity identified by the input DOI.
/citations/{*doi*}	Retrieves the citation data for all the references appearing in other works to the bibliographic entity identified by the input DOI.
/citation/{*oci*}	Retrieves the citation data for the citation identified by the input Open Citation Identifier (OCI).
/metadata/{*dois*}	This operation retrieves the metadata for all the articles identified by the input DOIs.

OpenCitations REST API: Basic query examples (OCC)

Query format: <api_url><operation>

OCC Example (1)

Query

Get the **metadata** for the article identified by **DOI= 10.1016/j.websem.2012.08.001.**

https://w3id.org/oc/api/v1/metadata/10.1016/j.websem.2012.08.001

Results


```
[
  {
    "title": "FaBiO and CiTO: Ontologies for describing bibliographic resources and citations",
    "doi": "10.1016/j.websem.2012.08.001",
    "volume": "17",
    "occ_id": "br/2384552",
    "author": "Peroni, Silvio; Shotton, David",
    "occ_reference": "",
    "year": "",
    "doi_reference": "",
    "citation_count": "1",
    "source_title": "Web Semantics: Science, Services and Agents on the World Wide Web",
    "page": "33-43",
    "issue": ""
  }
]
```


OCC Example (2)

Query

Get the **co-authorship matrix** for all the authors which have contributed on both the articles identified by **DOIs= 10.1016/j.websem.2012.08.001, 10.1108/jd-12-2013-0166.**

https://w3id.org/oc/api/v1/coauthorship/10.1108/jd-12-2013-0166__10.1016/j.websem.2012.08.001

Results


```
[
  {
    "coauthorship_count": "1",
    "author1": "Dutton, Alexander",
    "author2": "Gray, Tanya"
  },
  {
    "coauthorship_count": "1",
    "author1": "Dutton, Alexander",
    "author2": "Peroni, Silvio"
  },
  ...
]
```

OpenCitations REST API: Basic query examples (COCI)

Query format: <api_url><operation>

COCI Example (1)

Query

Get the list of **citations** received by the article identified by the **DOI= 10.1002/adfm.201505328**.

https://w3id.org/oc/index/coci/api/v1/citations/10.1002/adfm.201505328

Results


```
[
  {
    "author_sc": "no",
    "creation": "2017-02-06",
    "journal_sc": "no",
    "oci": "020...-020...",
    "timespan": "P11M20D",
    "cited": "10.1002/adfm.201505328",
    "citing": "10.1002/jrs.5087"
  },
  ...
]
```


COCI Example (2)

Query

Get the **metadata** for the article identified by the **DOI= 10.1108/jd-12-2013-0166.**

https://w3id.org/oc/index/coci/api/v1/metadata/10.1108/jd-12-2013-0166

Results


```
[
  {
    "title": "Setting Our Bibliographic References Free: Towards Open Citation Data",
    "doi": "10.1108/jd-12-2013-0166", ... ,
    "volume": "71",
    "author": "Peroni, Silvio; Dutton, Alexander; Gray, Tanya; Shotton, David",
    "oa_link": "",
    "year": "2015",
    "reference": "10.1001/jama.295.1.90; ... ,
    "citation_count": "13",
    "source_title": "Journal Of Documentation",
    "page": "253-277",
    "issue": "2",
    "source_id": "issn:0022-0418"
  }
]
```

OpenCitations REST API: Parameters

exclude=<*field_name*>	All the rows that have an empty value in the <field_name> specified are removed from the result set
filter=<*field_name*>:<*operator*><*value*>	Only the rows compliant with <value> are kept in the result set. E.g. “filter=date:>2016-05” returns all the rows that have a date greater 2016-05.
sort=<*order*>(<*field_name*>)	Sort in ascending (<order> set to "asc") or descending (<order> set to "desc") order the rows in the result set according to the values in <field_name>
format=<*format_type*>	the final table is returned in the format specified in <format_type> that can be either "csv" or "json" - e.g. format=csv returns the final table in CSV format.
json=<*operation_type*>("<*separator*>", <*field*>, <*new_field_1*>, <*new_field_2*>, ...)	in case a JSON format is requested in return, transform each row of the final JSON table according to the rule specified. For instance, considering the JSON table [{ "name": "Doe, John" }, ...], the execution of “json=dict(", ",name,fname,gname)” returns [{ "name": { "fname": "Doe", "gname": "John" }, ...]. N.B. This parameter is used also by VOSviewer as a pre-processing parameter to manipulate the input JSON in a different format.

OpenCitations REST API: Parameter query examples

Query format: <api_url><operation>?<parameter_1>& ...<parameter_n>

COCI Example (1)

Query

Get the list of **citations** received by the **DOI = 10.1002/adfm.201505328**, which have been **created on 2018 or later,** in a **CSV format,** and **sort** the final results according to their **creation date** in **descending order**.

https://w3id.org/oc/index/coci/api/v1/citations/10.1002/adfm.201505328?filter=creation:>2018&sort=desc(creation)&format=csv

Results

```
oci,citing,cited,creation,timespan,journal_sc,author_sc
020010000023610281810370200010800000504 03-020010000023610131522370200010500050302 08,10.1002/asia.201800543,10.1002/adfm.201505328,2018-08-23,P2Y6M6D,no,no
020010000023612171422370200010800010901 02-020010000023610131522370200010500050302 08,10.1002/chem.201801912,10.1002/adfm.201505328,2018-08-16,P2Y5M30D,no,no
...
```

OCC Example (2)

Query

Get the **metadata** of the document identified by **DOI = 10.1002/adfm.201505328** in **JSON format**, and **redefine the "author" field as an array of all the authors of such document.**

https://w3id.org/oc/api/v1/metadata/10.1016/j.websem.2012.08.001?format=json&json=array("; ",author)

Results


```
[
  {
    "title": "FaBiO and CiTO: Ontologies for describing bibliographic resources and citations",
    "doi": "10.1016/j.websem.2012.08.001",
    "volume": "17",
    "occ_id": "br/2384552",
    "author": [ "Peroni, Silvio",  "Shotton, David"],
    "occ_reference": "",
    "year": "",
    "doi_reference": "",
    "citation_count": "1",
    "source_title": "Web Semantics: Science, Services and Agents on the World Wide Web",
    "page": "33-43",
    "issue": ""
  }
]
```

Crossref Metadata [1]

- Each content stored/registered with **Crossref includes metadata**, such as:
  - **Bibliographic metadata (such as author, article titles, journal names)**
  - Funding metadata
  - License metadata
  - … and more

- Crossref collects metadata for many **scholarly items.** The content types are:
  - Journals: includes records for journal articles, as well as supplemental materials.
  - Books: book-level and/or chapter-level records, monographs, series, or sets.
  - Conference Proceedings: information and records about a single conference
  - Datasets
  - Peer Reviews
  - … and more.

[1] Crossref metadata and content type overview, https://tinyurl.com/y3knwo3g

Crossref REST API [1]

- **Exposes the metadata that members provide Crossref,** such as: Bibliographic metadata, funding data, license information, full-text links, ORCIDs, abstracts, and Crossmark updates. These are all available, if included in members' metadata.
- No sign-up is required, and the **data can be freely treated** as facts from members. It is **not subject to copyright**, and its available to use for whatever purpose.

  N.B. Crossref asks users to specify a User-Agent header that properly identifies the script and a way to contact you via email.

- REST API Call structure:
  <api_url><operation_1>...<operation_n>?<parameter_1>& ...<parameter_n>

[1] Crossref REST API, https://tinyurl.com/yyh5363m

Crossref REST API: Operations

https://api.crossref.org

/works/{doi}	Returns metadata for the specified Crossref DOI.
/funders/{funder_id}	Returns metadata for the specified funder and its suborganizations. (e.g. the funder identified with DOI “10.13039/100000015”)
/prefixes/{owner_prefix}	Returns metadata for the DOI owner prefix. (e.g. 10.1016)
/members/{member_id}	Returns metadata for a Crossref member.
/types/{type_id}	Returns information about a metadata work type. (e.g. journal-article)
/journals/{issn}	Returns information about a journal with the given ISSN

- The above operations could be combined together. For instance, to return the list of works from a given journal: /journals/{issn}/works

Crossref REST API: Basic query examples

Query format: <api_url><operation_1>...<operation_n>

Example (1)

Query

Get the **metadata** of the document identified by **DOI = 10.3233/ds-190016** in **JSON format**.

https://api.crossref.org/works/10.3233/DS-190016

Results


```
{
  "status": "ok",
  "message-type": "work",
  "message-version": "1.0.0",
  "message": {
    "indexed": {
      "date-parts": [[2019,4,12]],
      "date-time": "2019-04-12T15:10:57Z",
      "timestamp": 1555081857687
    },
    "reference-count": 18,
    "publisher": "IOS Press",
    "short-container-title": ["DS"],
     "DOI": "10.3233/ds-190016",
    "type": "journal-article",
   ...
}
```


Example (2)

Query

Get the list of **all the documents** published by the "Scientometrics" journal, identified with **ISSN=0138-9130**

https://api.crossref.org/journals/0138-9130/works

Results


```
{
  "status": "ok",
  "message-type": "work-list",
  "message-version": "1.0.0",
  "message": {
    "facets": {

    },
    "total-results": 5894,
    "items": [ ... ]
}
```

Crossref REST API: Parameters

query=<*query_terms*>	Query the results containing the given terms.
filter=<*filter_name:value*>	Filter results by specific fields having a given value (e.g. "*filter=has-orcid:true*"). The list of filter names is written in the git repository of the API (github.com/CrossRef/rest-api-doc#filter-names).
rows=<*integer_number*>	Controls the number of results returned. The default number is usually set on 20. To get the results summary, this value should be equal to 0 (zero).
sort=<*field_name*>	Sort the results by a certain field. E.g. "sort=published". The list of field names available to be sort on, is written in the git repository of the API (github.com/CrossRef/rest-api-doc#sorting)
order=<*order_value*>	Set the sort order to asc or desc
facet=<*facet_name:value*>	Provides a facet field name along with a maximum number of returned term values. For example *"facet=orcid:10"*.

Crossref REST API: Parameter query examples

Query format: <api_url><operation_1>...<operation_n>?<parameter_1>& ...<parameter_n>

Example (1)

Query

Get all the **documents** from the “Major Gifts Report” journal (**ISSN=1549-7712**), which have been **indexed after the 2018 year**. **Sort** the returned results in **descending order**, according to their **published-print date**.

https://api.crossref.org/journals/1549-7712/works?filter=from-index-date:2018&sort=published-print&order=desc

Results


```
{
  "status": "ok",
  "message-type": "work-list",
  "message-version": "1.0.0",
  "message": {
    "facets": {},
    "total-results": 24,
    "items": [ ... ]
    ...
}
```


Example (2)

Query

Get an **overview** of the **total number of works** in Crossref classified according to their **type**.

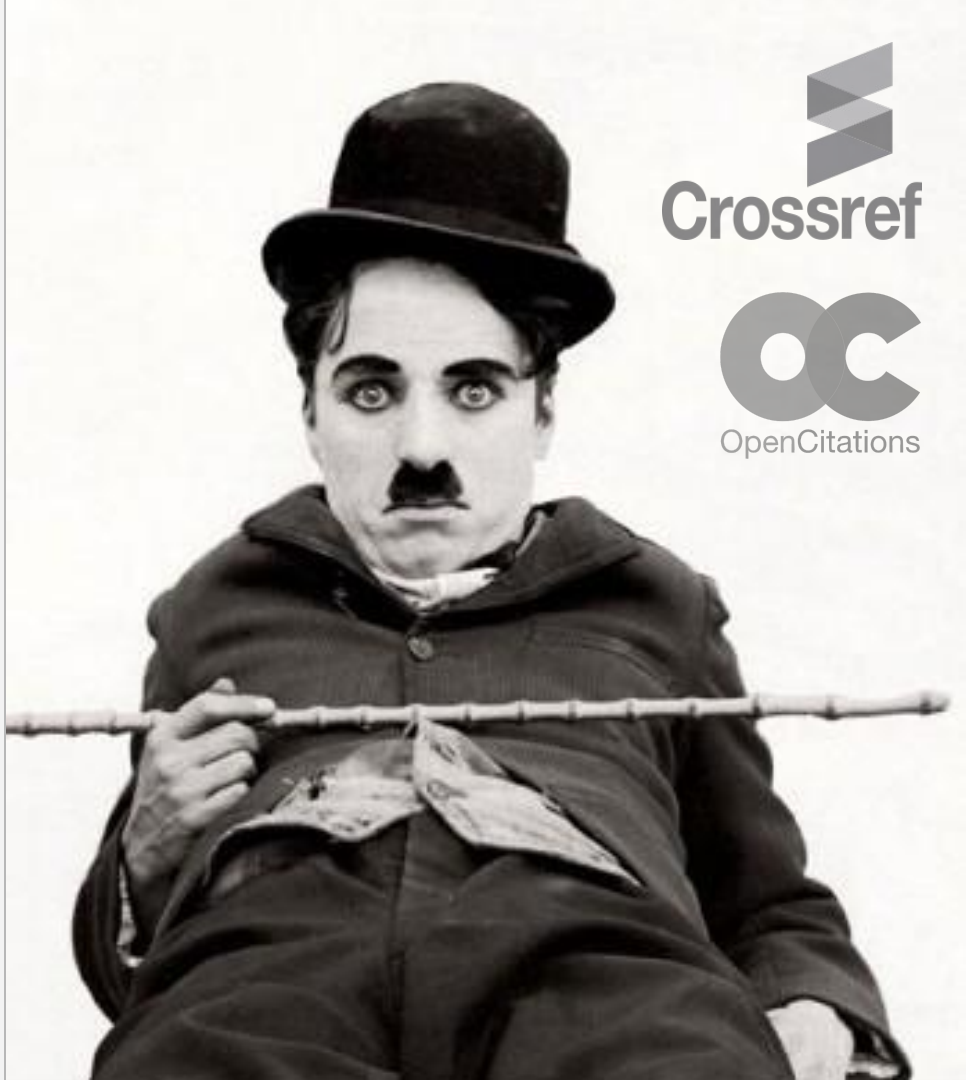
https://api.crossref.org/works?rows=0&facet=type-name:*

Results


```
{...
  "message": {
    "facets": {
      "type-name": {
        "value-count": 26,
        "values": {
          "Journal Article": 77859296,
          "Chapter": 13268443,
          "Conference Paper": 5930443,
          "Component": 3859301,
          "Dataset": 1811741,
          "Entry": 871054,
          ...
        }
        "total-results": 107417941,
        "items": [ ... ],
        ...
    }
```

Thank you
for your attention

Please use the OpenCitations and Crossref REST APIs, and contact us for any help.



Exercises (1)

Compare the number of citations appearing inside the OpenCitations Corpus and those inside the COCI dataset, for the document identified with DOI = “**10.4103/2008-7802.156835**”.

Solution (highlight the text under to see it)
{

}

Exercises (2)

Get the list of citations for the document identified by the DOI=**“10.1002/adfm.201505328”** from the COCI dataset, which are also journal self citations. Then use the Crossref API to identify the name of the publisher.

Solution (highlight the text under to see it)
{

}