

# A Developer's Guide to LTI Resource Search

Hello and thank you for joining us today.  
We will start at the top of the hour.

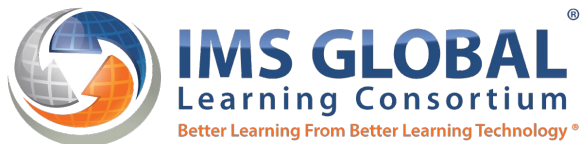
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Use the Q&A feature to submit your questions!

# A Developer's Guide to LTI Resource Search



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# Who Am I?

- **Consumer** - As a consumer, you'll be constructing calls to a REST API to search digital resource repositories.
- **Provider** - As a provider, you will be exposing your digital resource repository through a REST API.

# Endpoints

As a consumer, you will be interacting with two endpoints:

- **/subjects** - Lists the subjects that have resources available for searching
- **/resources** - Allows searching of the resource repository

...and if the endpoint is secured, you may also need:

- **/token** - An endpoint that generates an access token for the rest of the endpoints (and may not be named /token)

# Authorization

LTI Resource Search endpoints can be secured using OAuth 2.0 tokens. OAuth 2.0 token endpoints vary based on the authentication strategy but we'll use OpenEd as an example.

To fetch an OAuth 2.0 token from the OpenEd /get\_token endpoint, you will need:

- **Username** - A valid username
- **Client ID** - A unique id given to you by the OpenEd repository admin
- **Client secret** - A unique secret given to you by the OpenEd repository admin. This acts as your password, so don't share it!



# Obtaining a Token - 1

Your client id and secret are concatenated together with a ':' in between and then Base64 encoded.

```
my_id:my_secret
```

passed through a Base64 Encoder gives you...

```
bXlfaWQ6bXlfc2VjcmV0
```

# Obtaining a Token - 2

POST [https://partner.opened.com/2/oauth/get\\_token](https://partner.opened.com/2/oauth/get_token)

Headers:

Authorization	Basic bXlfaWQ6bXlfc2VjcmV0
Content-Type	application/json

Body:

```
{"grant_type":"client_credentials","username":"myuser@schoolco.org"}
```

## Obtaining a Token - 3

Extract the access token from the response payload. This will be your ticket to being able to search the repository.

```
{  
  "access_token": "58501b3a0c62d85dd077",  
  "expires_in": 2592000  
}
```

# Making Secure Calls

To use the access token during calls to the resource search endpoints, include it as a header value. Because this is a token and not credentials, use the Bearer authentication scheme:

Authorization	Bearer 58501b3a0c62d85dd077
---------------	-----------------------------

If you don't include the authorization header, forget to specify "Bearer", or pass an invalid token, you'll receive an authorization error.

```
{  
  "error": "Unauthorized"  
}
```

# Subjects

## GET /subjects

Because a resource repository can contain resources for a broad number of subjects, each repository fronted by an LTI Resource Search-conforming REST API provides an endpoint listing the subjects included in the repository.

If you're building queries that search by subject, you will want to limit your searches to subjects returned by the subjects endpoint.

# Retrieving Subjects - 1

GET <https://<base repository URL>/ims/rs/v1p0/subjects>

Headers:

Authorization	Bearer bXIfaWQ6bXIfc2VjcmV0
---------------	-----------------------------

# Retrieving Subjects - 2

Sample Subject JSON:

```
{
  "subjects": [
    {
      "identifier": 1,
      "name": "Mathematics",
      "parent": "0"
    },
    {
      "identifier": 2,
      "name": "Geometry",
      "parent": "1"
    },
    {
      "identifier": 4,
      "name": "Algebra",
      "parent": "1"
    }
  ]
}
```

# Resources

## GET /resources

This is the core endpoint of the LTI Resource Search specification. This endpoint allows a user to find resources within the exposed repository that match specific criteria.

The endpoint supports:

- Multi-criteria searches
- Sorting
- Paging
- Field selection



# Searching Resources - 1

GET <https://<base repository URL>/ims/rs/v1p0/resources>

Headers:

Authorization	Bearer bXIfaWQ6bXIfc2VjcmV0
---------------	-----------------------------

Default behavior of the /resources endpoint is to return the first 100 resources in the repository in (since no sorting was specified) any order it chooses.

# Searching Resources - 2

## Sample Resource JSON:

```
{
  "resources": [
    {
      "id": 1,
      "name": "RESOURCE_001",
      "description": "This is a searchable resource - 001",
      "publisher": "Education Co.",
      "subject": [
        "Mathematics"
      ],
      "url": "https://www.educationco.com/resources/1",
      "... more attributes are here..."
    },
    "... more resources are here"
  ]
}
```

# Constructing a Filter - 1

Resource searches can be concentrated to the list of resources meeting specific criteria with the addition of filters. A filter consists of:

- **data field** - The data field you'd like to filter by
- **predicate** - The type of match you'd like to have. Filters can be exact [=], can look for fields that contain values [~], or for numbers can specify > or < or <= or >=
- **value** - The value to match on

## Constructing a Filter - 2

A properly constructed filter combines the three pieces of data:

```
[data_field][predicate][value]
```

... and then is URL-encoded to play nice when included in the query string:

```
subject='geometry'
```

=>

```
subject%3D%27geometry%27
```

# Constructing a Filter - 3

GET

[https://<base\\_repository\\_URL>/ims/rs/v1p0/resources?filter=subject%3D%27geometry%27](https://<base_repository_URL>/ims/rs/v1p0/resources?filter=subject%3D%27geometry%27)

Headers:

Authorization	Bearer bXIfaWQ6bXIfc2VjcmV0
---------------	-----------------------------

Returns resources pertaining to the subject of geometry

# Filter Chaining

Multiple filters can be combined using ANDs and ORs.

```
[data_field][predicate][value] AND [data_field][predicate][value]
```

... as a real example:

```
subject='geometry' AND description~'triangle'
```

... URL-encoded:

```
subject%3D%27geometry%27%20AND%20description~%27triangle%27
```

# Sorting Results

Search results can be sorted by any of a resource's data fields. Sorting is done through two query parameters:

- **sort** - the name of the field to sort by
- **orderBy** - whether you want the data sorted in ascending order [asc] or descending order [desc]

```
sort=name&order=asc
```

=> Resources sorted by name from A-Z

# Paging Results

Search results can be paged through using two query parameters:

- **limit** - the total number of records to return
- **offset** - the record index to start with. Results are 0-based

limit=50&offset=100

=> 50 resources beginning with index 100



# Combined Example

GET

[https://<base\\_repository\\_URL>/ims/rs/v1p0/resources?filter=subject%3D%27geometry%27&sort=name&orderBy=asc&limit=50&offset=100](https://<base_repository_URL>/ims/rs/v1p0/resources?filter=subject%3D%27geometry%27&sort=name&orderBy=asc&limit=50&offset=100)

Headers:

Authorization	Bearer bXlfaWQ6bXlfc2VjcmV0
---------------	-----------------------------

Returns fifty resources pertaining to the subject of geometry beginning with index 100. Results are sorted by name in ascending order from A-Z.



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