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## APIs and Libraries

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**Title:**

Internet Connection: APIs and Libraries

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**Abstract:**

This column introduces APIs (application programming interfaces) and discusses how APIs are used in various library projects. APIs allow developers to use and reuse information in new ways and on a larger scale. In the landscape of digital libraries, APIs are enabling exciting new endeavors and simplifying routine tasks. Included is a table of library-related APIs from organizations such as OCLC, Ex Libris, and the New York Public Library.

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**Article body:**

The library catalog is a living document. Librarians update the catalog as collections grow and change; records reflect items' current whereabouts; patrons interact with all fields and facets available to explore the library digitally. The catalog is a powerful data source, limited only by its interface. But imagine if you could extract the catalog's data from its rigid interface and use it in new ways — to visualize metadata, automate data-heavy tasks, or design new ways to browse. Enter the API, or application programming interface. APIs allow developers to use and reuse information in new ways and on a larger scale. In the landscape of digital libraries, APIs are enabling exciting new projects and simplifying routine tasks. This column clarifies what APIs are, showcases examples of API uses in the library, and provides a list of APIs from organizations including the Library of Congress and library system vendors.

**What is an API?**

The Digital Public Library of America provides this definition:

At its most basic, an API, or Application Programming Interface, is made up of a set of defined methods that someone can use to communicate with a (frequently complex)

software system, and get back responses in a way that a computer (and, with some practice, a human) can understand. In essence, an API defines the 'language' a system speaks. ... Like a language, you can use it to ask questions and understand responses. ("API Basics," n.d.)

A programmer can use an API to perform an action, such as sending an automated tweet using the Twitter API; or to retrieve information, such as bestseller lists by date using the *New York Times'* Books API. Providing an API is one way that organizations encourage the reuse of their data or services.

Here's a simple, made-up example of how an API could be useful in the library. This human-readable version of code retrieves items in a library catalog that are associated with certain subject headings:

```
subjectHeadingsList = {'Sustainable development', 'Agriculture and
    energy', 'Agriculture and politics -- United States'}
for subjectHeading in subjectHeadingsList:
    query libraryCatalog for items with subjectHeading
    return items
export items as .xls file
```

The above (fake) code would cycle through each of the given subject headings, search the library catalog using the catalog's API, and spit out an Excel file of all the items in the catalog associated with the subject heading. The power of the API lies in the methodical and fast way that information requests can be made. Rather than manually searching each of the subject headings in the catalog and copying each title to an Excel file, a person using the above code could generate a useful file in seconds. Direct access to the database is not needed. The code is flexible and reusable, too — perhaps the `subjectHeadingsList` could be populated with most recent subject headings approved by the Library of Congress or a daily selection of patrons' most requested subject headings.

Not all library catalogs have APIs, though many web-scale discovery solutions now make APIs available to developers. Nor is the library catalog the only useful site for an API. Let's take a look at other ways APIs can be utilized in libraries.

### APIs uses in libraries: three examples

OCLC offers APIs for WorldCat, including Search (to retrieve information about bibliographic holdings) and Metadata (to retrieve and update bibliographic records). Johnston (2015) used both APIs in tandem to perform a low-cost, large-scale deletion and update of her institution's OCLC holdings. The APIs allowed her to work with information about over 450,000 items and complete a task that would have been expensive to order otherwise.

Eaton (2016) used the Primo API from Ex Libris to build an interactive visualization of his institution's collections. Users search for a term and then view a bubble visualization of where the term appears in the collections by Library of Congress classification number, year of creation, or subject heading. The API enabled him to use collection data to encourage a different, more visual way of exploring library holdings.

Domínguez (n.d.) used the APIs from the Digital Public Library of America and Europeana to power one search box that accesses both collections, which in turn provide access to hundreds of digital collections across the United States and Europe. Utilizing multiple APIs this way opens new search capabilities: item metadata may be stored in different places in multiple schemata, but rather than having to fiddle with database fields or crosswalking headaches, the developer only has to become familiar with how each API formats search requests. Perhaps a future project might harness the power of APIs across the world for a universal digital collections search box.

### Select library-related APIs

The following table is a selection of major library organizations that provide APIs.

Organization	URL	Usage
OCLC	<a href="http://platform.worldcat.org/api-explorer/apis">platform.worldcat.org/api-explorer/apis</a>	Several APIs, including APIs for WorldCat and VIAF
Library of Congress: Prints and Photographs Online Catalog	<a href="http://loc.gov/pictures/api">loc.gov/pictures/api</a>	Retrieve images and information about items and collections
Library of Congress: Chronicling America	<a href="http://chroniclingamerica.loc.gov/about/api/">chroniclingamerica.loc.gov/about/api/</a>	Search titles, retrieve information about newspapers and newspaper content
HathiTrust	<a href="http://hathitrust.org/data_api">hathitrust.org/data_api</a>	Retrieve page images, OCR, and more
Digital Public Library of America	<a href="http://dp.la/info/developers/codex/">dp.la/info/developers/codex/</a>	Search items and collections, retrieve metadata for specific item
LibraryThing	<a href="http://librarything.com/services/">librarything.com/services/</a>	Retrieve book covers and metadata
Ex Libris Primo	<a href="http://developers.exlibrisgroup.com/primo/apis">developers.exlibrisgroup.com/primo/apis</a>	Search and retrieve information from an instance of Primo
EBSCO Discovery Service	<a href="http://ebscohost.com/discovery/api">ebscohost.com/discovery/api</a>	Search and retrieve information from an instance of EDS
Proquest Dialog	<a href="http://go.proquest.com/pqdAPI">go.proquest.com/pqdAPI</a>	Search and retrieve information from Dialog (for internal usage)
Serials Solutions Summon	<a href="http://api.summon.serialssolutions.com">api.summon.serialssolutions.com</a>	Search and retrieve information from the Summon Unified Index

### Select libraries that provide APIs

The following table is a small sample of individual libraries that provide API access to their collections or to a portion thereof.

Institution	URL	Usage
NYPL Digital Collections	api.repo.nypl.org/	Search digitized collections
UNLV Digital Collections	digital.library.unlv.edu/api/	Search, list, and view objects and collections
Harvard Libraries	library.harvard.edu/librarycloud	Retrieve item metadata from catalog, image collections, archives
NCSU Libraries	lib.ncsu.edu/reports/catalogws	Search catalog for items and facets

Not all APIs in the above two tables may be used by anyone. The documentation at the provided URLs should include access policies and any limitations.

### How to get started using an API

A great intermediate step in learning how to code is using an API to take advantage of interesting data. Most APIs have thorough documentation online, although documentation can sometimes be intimidatingly dense or confusing. Usually, it will list *requests* that can be made using the API — that is, types of data you can access, how to format the query, and how the response will be formatted. Often, queries can be made in the form of a URL, e.g., <http://api.somecollection.org/items?q=tomatoes>, which may send back a highly structured text file containing the metadata of tomato-related items in the collection. Formatting your requests and handling these structured responses is the basis of using an API.

In order to use an API, you will likely have to register as a developer with the institution or company order to obtain a *key*. You will include the key in your requests to let the institution know that you are an authenticated, trusted developer.

If you are looking for an easy way to get started with a particular API, you may benefit by looking at open source code that other developers using that API have put online. You might find some of these open source code repositories at GitHub. The developers' code license may allow you to modify their code so you can customize it for your institution or goals.

### References

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