

APIs and You

An Introduction to APIs and Their Role in the Library

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Julia Frankosky
Devin Higgins

WHAT IS AN API?

Formal Definition

An Application Programming Interface (API) is “a software tool...which performs a particular computational function...APIs act as building blocks allowing software developers to create new applications without having to code every function from scratch.”

Daniel Chandler and Rod Munday, “Application Programming Interface” in *A Dictionary of Media and Communication* (Oxford University Press, 2011)

In Nontechnical Words

- APIs allow for seamless access and use of information stored elsewhere.
 - Developers do not need to write every piece of code from scratch
 - Data/information does not need to be stored and updated in your own database
 - Makes development of websites, apps, widgets, software, etc. much more efficient

In practical terms

Send a query...

to an API...

and get back information.

In practical terms

Send a query...
(using a protocol)
to an API...
(via the web)
and get back information.
(as XML or JSON)

How to Use an API

- Using a scripting language like Python or PHP, developers can write commands to access data and information from the API.
- When a good API is developed, the API developer will include documentation for using the API so those who want to take advantage of it aren't having to do a lot of trial and error to get this to work.

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Find books, journals, and more

Keyword



Search

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Today's Hours

Main Library 8:00am to
10:00pm

Copy Center 8:00am to
10:00pm

Digital and 8:00am to
Multimedia 10:00pm

Quick Links

[Collections and Libraries](#)

[Course Reserves](#)

[Electronic Resources](#)

What's New

[New Books, etc.](#)

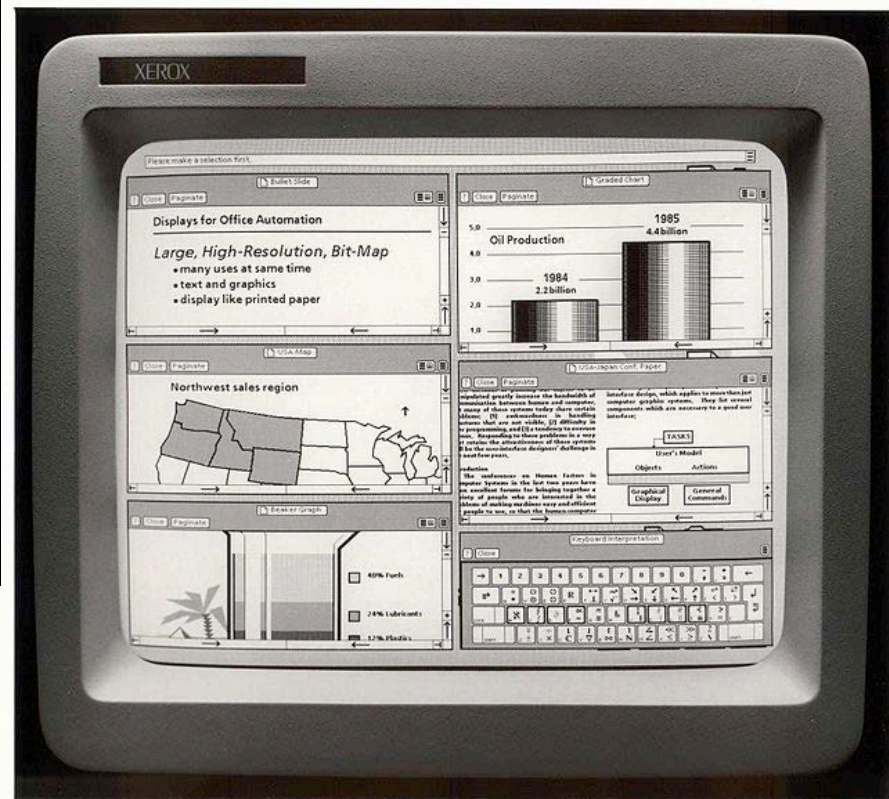
[New and Trial Databases](#)

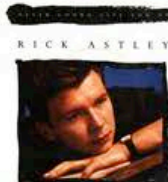
[News & Features](#) 

```

[root@localhost ~]# ping -q fa.wikipedia.org
PING text.pmtpa.wikimedia.org (208.80.152.2) 56(84) bytes of data.
^C
--- text.pmtpa.wikimedia.org ping statistics ---
1 packets transmitted, 1 received, 0% packet loss, time 0ms
rtt min/avg/max/mdev = 540.528/540.528/540.528/0.000 ms
[root@localhost ~]# pwd
/root
[root@localhost ~]# cd /var
[root@localhost var]# ls -la
total 72
drwxr-xr-x. 18 root root 4096 Jul 30 22:43 .
drwxr-xr-x. 23 root root 4096 Sep 14 20:42 ..
drwxr-xr-x.  2 root root 4096 May 14 00:15 account
drwxr-xr-x. 11 root root 4096 Jul 31 22:26 cache
drwxr-xr-x.  3 root root 4096 May 18 16:03 db
drwxr-xr-x.  3 root root 4096 May 18 16:03 empty
drwxr-xr-x.  2 root root 4096 May 18 16:03 games
drwxrwx--T.  2 root gdm  4096 Jun  2 18:39 gdm
drwxr-xr-x. 38 root root 4096 May 18 16:03 lib
drwxr-xr-x.  2 root root 4096 May 18 16:03 local
lrwxrwxrwx.  1 root root    11 May 14 00:12 lock -> ../run/lock
drwxr-xr-x. 14 root root 4096 Sep 14 20:42 log
lrwxrwxrwx.  1 root root    10 Jul 30 22:43 mail -> spool/mail
drwxr-xr-x.  2 root root 4096 May 18 16:03 nis
drwxr-xr-x.  2 root root 4096 May 18 16:03 opt
drwxr-xr-x.  2 root root 4096 May 18 16:03 preserve
drwxr-xr-x.  2 root root 4096 Jul  1 22:11 report
lrwxrwxrwx.  1 root root    6 May 14 00:12 run -> ../run
drwxr-xr-x. 14 root root 4096 May 18 16:03 spool
drwxrwxrwt.  4 root root 4096 Sep 12 23:50 tmp
drwxr-xr-x.  2 root root 4096 May 18 16:03 yp
[root@localhost var]# yum search wiki
Loaded plugins: langpacks, presto, refresh-packagekit, remove-with-leaves
rpmfusion-free-updates                               | 2.7 kB      00:00
rpmfusion-free-updates/primary_db                    | 206 kB     00:04
rpmfusion-free-updates/primary_db                    | 2.7 kB     00:00
rpmfusion-nonfree-updates                             | 5.9 kB     00:00
updates/metalink                                     | 4.7 kB     00:00
updates                                               | 4.7 kB     00:00
updates/primary_db                                   73% [=====] ] 62 kB/s | 2.6 MB     00:15 ETA

```



[More Images](#)

Rick Astley – Never Gonna Give You Up

Label: [RCA – PB 41447](#)
 Format: [Vinyl, 7", 45 RPM, Single](#)
 Country: [UK](#)
 Released: [Jul 1987](#)
 Genre: [Electronic, Pop](#)
 Style: [Euro-Disco](#)

Tracklist

A	Never Gonna Give You Up	3:32
B	Never Gonna Give You Up (Instrumental)	3:30

Companies, etc.

Phonographic Copyright (p) – [BMG Records \(UK\) Ltd.](#)
 Copyright (c) – [BMG Records \(UK\) Ltd.](#)
 Phonographic Copyright (p) – [Pete Waterman Ltd.](#)
 Published By – [All Boys Music Ltd.](#)
 Distributed By – [BMG Records](#)
 Distributed By – [BMG Ariola](#)
 Marketed By – [RCA Records](#)
 Mastered At – [Utopia Studios](#)
 Licensed To – [BMG Records \(UK\) Ltd.](#)
 Record Company – [PWL](#)

Credits

Design – [Me Co*](#)
 Engineer – [Mark McGuire](#), [Mike Duffy](#)
 Mastered By – [MS*](#)

Release

[249504]

[Edit Release](#)[All Versions of this Release](#)

Data Correct

Add to Collection

Add to Wantlist

Marketplace

55 For Sale from \$0.66

Buy Vinyl

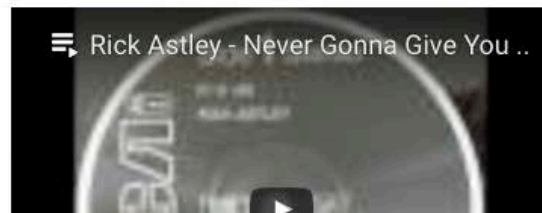
Sell Vinyl

[Share](#)

Statistics

Have:	599	Last Sold:	01 Jul 16
Want:	111	Lowest:	\$0.55
Avg Rating:	3.37 / 5	Median:	\$1.32
Ratings:	65	Highest:	\$3.31

Videos (4) [Edit](#)



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API Benefits

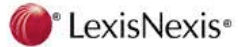
Why use programming to access machine-readable information?

- Build API into larger systems
 - Create code for web page: web page uses weather API; web page selects today's high temp from API response; displays high temp to user (next to info from other APIs: recent tweets?)
- Run hundreds/thousands of queries in sequence
 - Library example: Political Science researcher wants to count and evaluate news articles written about each of ~600 militia groups.

MSU Libraries | Text Assembler

User ID: higgi135

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My Corpus Download Queue

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Search

Instructions: Select source(s), construct search, and preview results. If preview results look appropriate, assign a Corpus Name and queue for download. Downloading is queued for nights and weekends.

Please plan ahead to ensure sufficient time to retrieve results. For more guidance consult the [step by step instructions](#).

Available Sources:

No Publication Type(s) Selected ▾

Apply Publication Type Filter

No Title(s) Selected ▾

Add Titles

Selected Title Ids:

Search Method: (?) Boolean

Date Range:

From: 08/09/2016 To: 08/09/2016 No Date Range

Search Query:

Preview Results

Your Corpus Name:

Queue Corpus for Download

[https://www.amazon.com/s/
ref=nb_sb_noss_2?
url=search-alias=office-
products&field-
keywords=pencils](https://www.amazon.com/s/ref=nb_sb_noss_2?url=search-alias=office-products&field-keywords=pencils)

[https://www.amazon.com/s/
ref=nb_sb_noss_2?
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keywords=pencils](https://www.amazon.com/s/ref=nb_sb_noss_2?url=search-alias=office-products&field-keywords=pencils)

[https://www.amazon.com/s/
ref=nb_sb_noss_2?
url=search-alias=office-
products&field-
keywords=pencils](https://www.amazon.com/s/ref=nb_sb_noss_2?url=search-alias=office-products&field-keywords=pencils)

[https://www.amazon.com/s/
ref=nb_sb_noss_2?
url=search-alias=office-
products&field-
keywords=pencils](https://www.amazon.com/s/ref=nb_sb_noss_2?url=search-alias=office-products&field-keywords=pencils)



Astronomy Picture of the Day API

📅 Metadata Updated: Nov 25, 2015

This endpoint structures the APOD imagery and associated metadata so that it can be repurposed for other applications. In addition, if the concept_tags parameter is set to True, then keywords derived from the image explanation are returned. These keywords could be used as auto-generated hashtags for twitter or instagram feeds; but generally help with discoverability of relevant imagery.

🏛️ Publisher

National Aeronautics and Space Administration

✉️ Contact

Jason Duley

🔗 Share on Social Sites

📧 Google+

🐦 Twitter

📘 Facebook

Access & Use Information

🌐 **Public:** This dataset is intended for public access and use.

📄 **License:** U.S. Government Work

Downloads & Resources



Astronomy Picture of the Day API 📄 24 views

This endpoint structures the APOD imagery and associated metadata so that it...

📄 Download



Landing Page

🔗 Visit page

HTTP REQUEST

```
GET https://api.nasa.gov/planetary/earth/assets
```

QUERY PARAMETERS

Parameter	Type	Default	Description
lat	float	n/a	Latitude
lon	float	n/a	Longitude
begin	YYYY-MM-DD	n/a	beginning of date range
end	YYYY-MM-DD	<i>today</i>	end of date range
api_key	string	DEMO_KEY	api.nasa.gov key for expanded usage

EXAMPLE QUERY

```
https://api.nasa.gov/planetary/earth/assets?lon=100.75&lat=1.5&begin=2014-02-01&api\_key=DEMO\_KEY
```

<https://api.nasa.gov/planetary/earth/assets?>

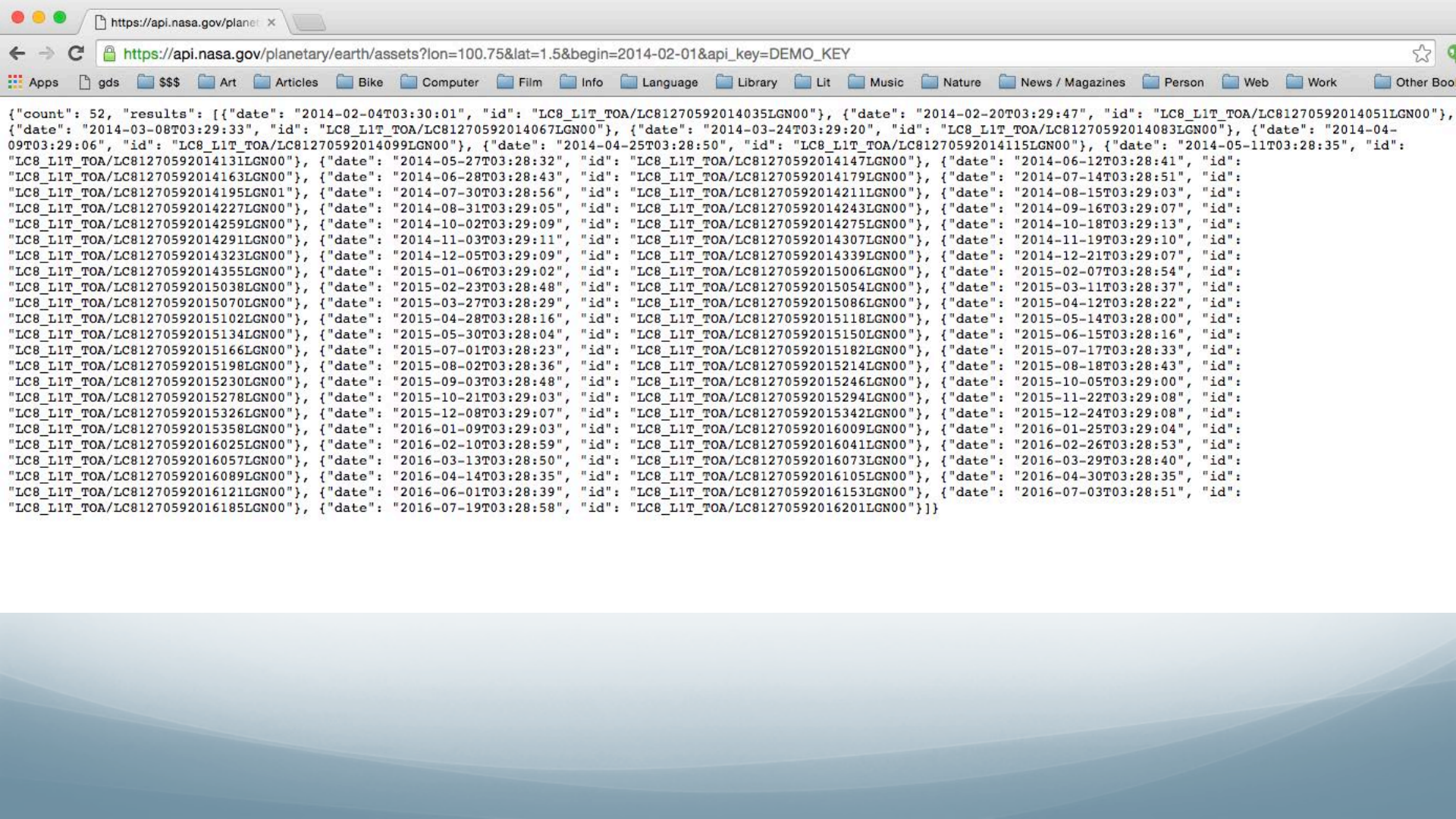
[lon=100.75&lat=1.5&begin=2014-02-01&api_key=DEMO_KEY](https://api.nasa.gov/planetary/earth/assets?lon=100.75&lat=1.5&begin=2014-02-01&api_key=DEMO_KEY)

Base URL - The address of the API resource

? - precedes the query

& - connects parts of the query

api_key - A unique ID often required by APIs



```
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      "id": "LC8_L1T_TOA/LC81270592016009LGN00"
    },
    {
      "date": "2016-01-25T03:29:04",
      "id": "LC8_L1T_TOA/LC81270592016025LGN00"
    },
    {
      "date": "2016-02-10T03:28:59",
      "id": "LC8_L1T_TOA/LC81270592016041LGN00"
    },
    {
      "date": "2016-02-26T03:28:53",
      "id": "LC8_L1T_TOA/LC81270592016057LGN00"
    },
    {
      "date": "2016-03-13T03:28:50",
      "id": "LC8_L1T_TOA/LC81270592016073LGN00"
    },
    {
      "date": "2016-03-29T03:28:40",
      "id": "LC8_L1T_TOA/LC81270592016089LGN00"
    },
    {
      "date": "2016-04-14T03:28:35",
      "id": "LC8_L1T_TOA/LC81270592016105LGN00"
    },
    {
      "date": "2016-04-30T03:28:35",
      "id": "LC8_L1T_TOA/LC81270592016121LGN00"
    },
    {
      "date": "2016-06-01T03:28:39",
      "id": "LC8_L1T_TOA/LC81270592016153LGN00"
    },
    {
      "date": "2016-07-03T03:28:51",
      "id": "LC8_L1T_TOA/LC81270592016185LGN00"
    },
    {
      "date": "2016-07-19T03:28:58",
      "id": "LC8_L1T_TOA/LC81270592016201LGN00"
    }
  ]
}
```

```
{"count": 52, "results": [{"date": "2014-02-04T03:30:01", "id": "LC8_L1T_TOA/  
LC81270592014035LGN00"}, {"date": "2014-02-20T03:29:47", "id": "LC8_L1T_TOA/  
LC81270592014051LGN00"}, {"date": "2014-03-08T03:29:33", "id": "LC8_L1T_TOA/  
LC81270592014067LGN00"}, ... {"date": "2016-03-29T03:28:40", "id": "LC8_L1T_TOA/  
LC81270592016089LGN00"}, {"date": "2016-04-14T03:28:35", "id": "LC8_L1T_TOA/  
LC81270592016105LGN00"}, {"date": "2016-04-30T03:28:35", "id": "LC8_L1T_TOA/  
LC81270592016121LGN00"}, {"date": "2016-06-01T03:28:39", "id": "LC8_L1T_TOA/  
LC81270592016153LGN00"}, {"date": "2016-07-03T03:28:51", "id": "LC8_L1T_TOA/  
LC81270592016185LGN00"}, {"date": "2016-07-19T03:28:58", "id": "LC8_L1T_TOA/  
LC81270592016201LGN00"}]}
```

Caveats

- APIs are hosted on separate sites; there's no downloading for you, the developer, to do. This means that they could potentially disappear without notice.
- To use many APIs you may need to create an account first, request a key or a token.
- Not all APIs have documentation on how to use them, which can make use challenging.

API_KEY_MISSING

No api_key was supplied. Get one at <https://api.nasa.gov>

{NASA APIS}

<open>a p i . N A S A . g o v </data>

Get Started



 NASA DATA PORTAL

 NASA ON GITHUB

 NASA OPEN SOURCE

Welcome to the NASA API portal. The objective of this site is to make NASA data, including imagery, eminently accessible to application developers. The api.nasa.gov catalog is growing.

Getting Started

Most developers getting started with api.nasa.gov wish to leverage NASA data in their applications and services, and this is encouraged! There are also developers that have existing APIs that they may wish to [contribute](#) to the NASA API site. Below describes two paths on how to "use" our APIs as well as "contribute" to our API catalog. First, to get started with using NASA APIs, we recommend [applying for an API key](#), reviewing the [Authentication](#) section, then once ready, dive in to [API calls](#).



Get Your API Key

Sign up your API key to access and use APIs available on both NASA API and api.data.gov developer networks.

* First Name

* Last Name

* Email

How will you use the APIs?
(optional)

Signup



Destination

GET

Follow redirects: [Off](#)

Authentication

[+ Add Authentication](#)

Headers

[+ Add Header\(s\)](#)

Parameters

[+ Add Parameter\(s\)](#)



[⚡ Launch Request](#)

Sorry about the reCAPTCHA! People were using the site for bad things. We're working to improve things so you don't have to check it every time.

HTTP REQUEST

```
GET https://api.nasa.gov/planetary/apod
```

concept_tags are now disabled in this service. Also, an optional return parameter *copyright* is returned if the image is not public domain.

QUERY PARAMETERS

Parameter	Type	Default	Description
date	YYYY-MM-DD	today	The date of the APOD image to retrieve
hd	bool	False	Retrieve the URL for the high resolution image
api_key	string	DEMO_KEY	api.nasa.gov key for expanded usage

EXAMPLE QUERY

```
https://api.nasa.gov/planetary/apod?api\_key=DEMO\_KEY
```



Destination

GET

https://api.nasa.gov/planetary/apod

Follow redirects: [Off](#)

Authentication

[+ Add Authentication](#)

Headers

[+ Add Header\(s\)](#)

Parameters

[remove all](#)

api_key

F3uwjrExvvqReaqs42kTRU9v3FCfIN4MIC9VDK87

date

2016-01-01

[+ Add another parameter](#)

For GET, HEAD and OPTIONS requests, parameters will be added to the querystring in the requested URL.



I'm not a robot



reCAPTCHA
[Privacy](#) - [Terms](#)

[⚡ Launch Request](#)

GET https://api.nasa.gov/planetary/apod?api_key=F3uwjrExvvqReaqs42kTRU9v3FCflN4MIC9VDK87&date=2016-01-01

Edit and Retry

200 OK 1.1 kB 150 ms

[View Request](#) **View Response**

HEADERS

Age: 0

Connection: keep-alive

Content-Encoding: gzip

Content-Length: 662

Content-Type: application/json

Date: Tue, 09 Aug 2016 19:21:10 GMT

Server: openresty

Vary: Accept-Encoding, Accept-Encoding

Via: 1.1 vegur, http/1.1 api-umbrella (ApacheTrafficServer [cMsSf])

X-Cache: MISS

X-Ratelimit-Limit: 1000

X-Ratelimit-Remaining: 999

BODY

[view raw](#)

```
{
  "copyright": "Jos\u00e9 J. Chamb\u00f3",
  "date": "2016-01-01",
  "explanation": "A new year's treat for binoculars, as 2016 begins Comet Catalina (C/2013 US10) now sweeps through planet Earth's predawn skies near bright Arcturus, alpha star of Bootes. But this telescopic mosaic from December 21 follows the pretty tails of the comet across a field of view as wide as 10 full moons. The smattering of distant galaxies and faint stars in the background are in the constellation Virgo. Trailing behind the comet's orbit, Catalina's dust tail fans out below and left in the frame. Its ion tail is angled toward the top right, away from the Sun and buffeted by the solar wind. On January 17, the outward bound visitor from the Oort Cloud will make its closest approach to Earth, a mere 110 million kilometers away, seen near bright stars along the handle of the Big Dipper.",
  "hdurl": "http://apod.nasa.gov/apod/image/1601/2013US10_151221_1200Chambo.jpg",
  "media_type": "image",
  "service_version": "v1",
  "title": "Comet Catalina Tails",
  "url": "http://apod.nasa.gov/apod/image/1601/2013US10_151221_1024Chambo.jpg"
}
```

C/2013 US10 (Catalina)

2015 Dec. 21, NMX. Field 4.7x3.1 deg, N° W>



José J. Chigmbó, cometografia.es

Why Use an API?

- No need to download, store, and update data and information in your own database(s)
- The same data and information are available and useable by any developer
- Help create a more seamless user experience by allowing the creation of interrelated systems
- Helps save time since a lot of useful data/information is found in an API, each developer doesn't have to re-write the same code over and over again

In practical terms

Send a query...

to an API...

and get back information...

in order to use it in a way that would have otherwise
been difficult or impossible.



LIBRARY OF
CONGRESS



OCLC



Crossref



WIKIDATA

Discogs



europaena
think culture



WEB OF SCIENCE

Enhance Metadata

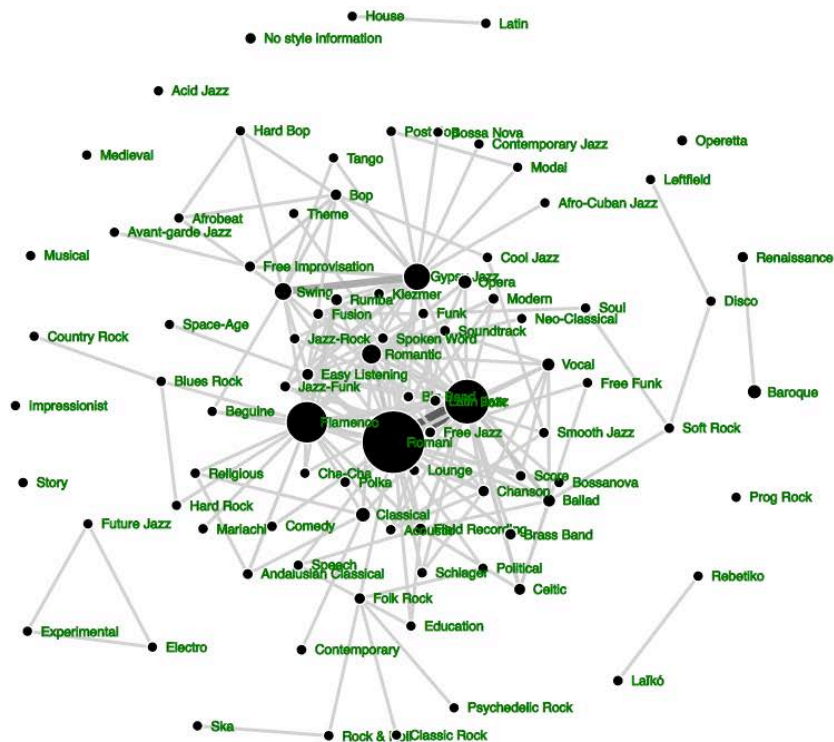


ROVI Collection

- Improve metadata based on user-contributed data

Lockwood Collection

- Create Discogs collection and automatically retrieve and process metadata



Visualization of Musical Styles from Lockwood Collection

Lockwood Collection Styles

Style: Folk

218 releases

Releases

Usnija Redžepova -- Usnija (1982)

Ludová Huzba Eugena Farkaša -- Slovenské Ludové Piesne (Slovak Folk Songs) (1971)

Esma Redžepova, Ansambli Teodosievski -- Zošto Si Me, Majko, Rodila (1974)

Ciganski Orkestar "Čubura" -- Ciganske Narodne Pesme I Igre (Gypsy Folk Songs And Music) (1974)

Ivo Papasov & His Wedding Band -- Orpheus Ascending (1989)



Romanies -- Musiche Tzigane (1976)

Olivera Katarina -- Ciganske Pesme (1977)

Romanies -- Magyarorazági Cigány Népdalok / Gypsy Folk Songs From Hungary (1976)

Gheorghe Zamfir -- Romanian Flutes 1 (1975)

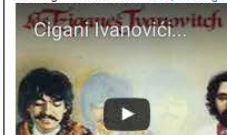
Ljubilja Stojanović - Louis -- Ne Kuni Me, Ne Ruži Me, Majko (1982)

Unknown Artist -- The Travelling People Of Ireland: Irish Tinker Music (1967)

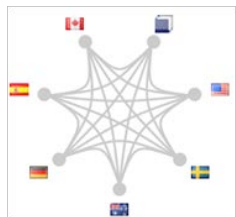
The Travelling Songster -- An Anthology From Gypsy Singers (1977)

Marcel Cellier, Gheorghe Zamfir -- Marcel Cellier Présente La Doina Roumaine - Avec Gheorghe Zamfir (0)

Les Tziganes Ivanovitch -- Gori, Gori Ciganska Ljubav (1982)



Retrieve URIs



Create linked data

- Search by name or subject
- Retrieve unique URI
- Use URI to connect further data sources and/or gather contextual information

710 rows

Show as: **rows** records Show: 5 10 25 50 rows

▼ All		▼ PID		▼ Author	▼ Date	▼ Title
☆	🗨	1.	colloquiaPID:5166	Facet	4/15/2015	Eta Carin
☆	🗨	2.	colloquiaPID:5162	Text filter	4/1/2015	Coronal M
☆	🗨	3.	colloquiaPID:5191	Edit cells	3/9/2015	The Interp
☆	🗨	4.	colloquiaPID:5154	Edit column	3/4/2015	Let it Rair
☆	🗨	5.	colloquiaPID:5119	Transpose	12/15/2014	Risk Clas
☆	🗨	6.	colloquiaPID:5101	Sort...	12/1/2014	Superviso
☆	🗨	7.	colloquiaPID:5113	View	12/1/2014	Liquid Nat
☆	🗨	8.	colloquiaPID:5112	Reconcile	11/17/2014	Nuclear R
☆	🗨	9.	colloquiaPID:5088		10/8/2014	See the E
☆	🗨	10.	colloquiaPID:5088			he E

Start reconciling...

[Open Refine Reconciliation Service](#)

Aggregate Materials



SiRO (Studies in Radicalism Online)

- Define list of relevant queries
- Run (hundreds of) queries
- Transform the results into RDF XML

List of search terms (subject headings):

abolitionists movements,
anarchism,
anti-jewish propaganda,
bacchanalia,
christianity and atheism,
controversial literature,
etc.

Send a query to DPLA for each, for example:

[http://api.dp.la/v2/items?q=abolitionists movements&api_key=KEY](http://api.dp.la/v2/items?q=abolitionists%20movements&api_key=KEY)

http://api.dp.la/v2/items?q=anarchism&api_key=KEY

etc.

Citation Analysis



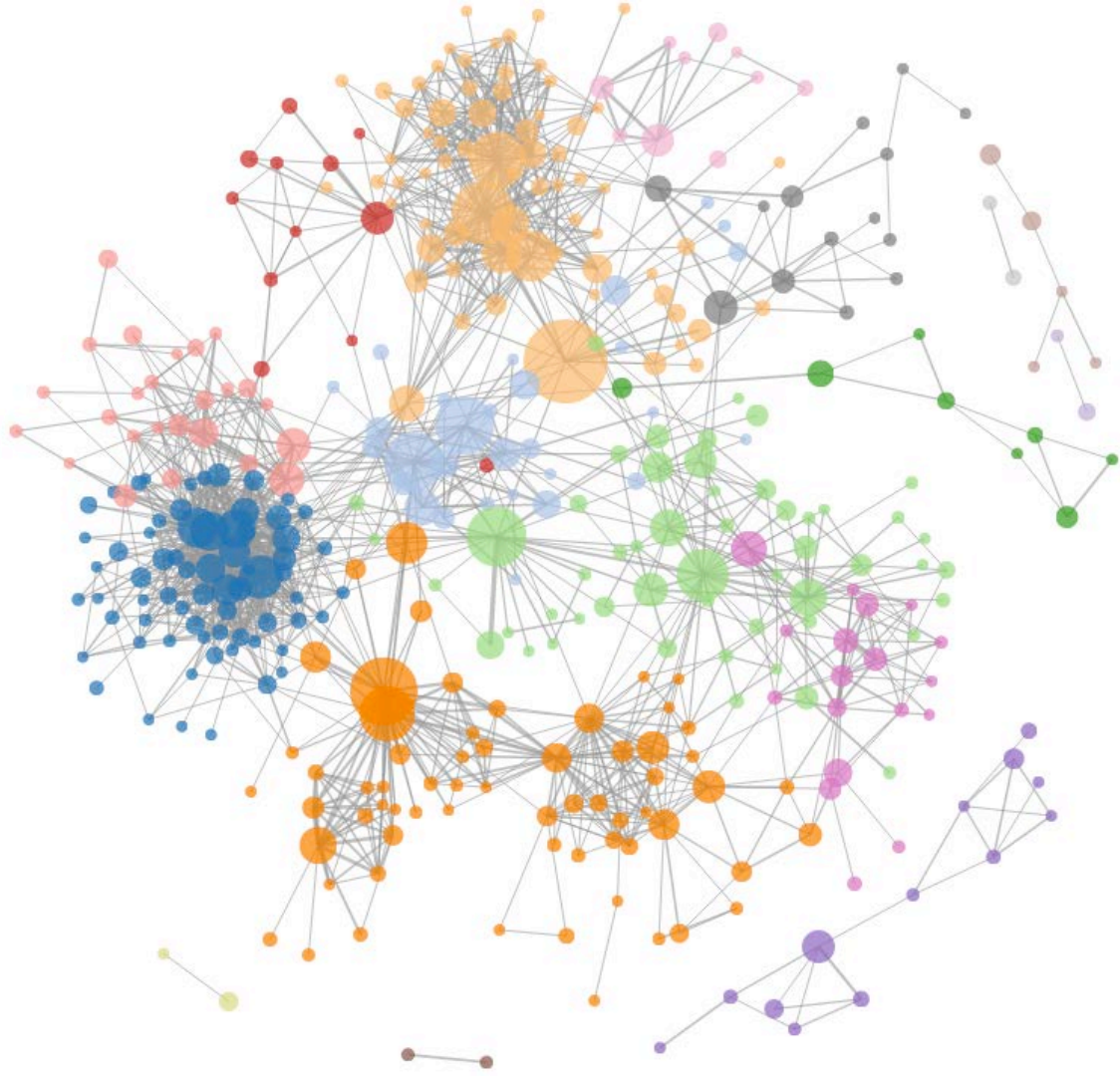
Example: Ecology Literature

- Run set of searches for distinct plant types
- Compare citation patterns

Start with one query to Web of Science
Retrieve all cited works

Query for each cited work
Retrieve all of its cited work

[Repeat]



Network of citations in
sociology papers

**SO YOU WANT TO USE AN API...
NOW WHAT?**



Learn to code interactively, for free

<https://www.codecademy.com>

Learn To Code

Make a Website

HTML & CSS

Make an Interactive Website

JavaScript

Learn Sass

jQuery

Deploy a Website

PHP

Learn Rails

Python

Ruby on Rails Authentication

Ruby

Learn AngularJS

Learn APIs

Learn the Command Line

Learn SQL

SQL: Table Transformation

SQL: Analyzing Business Metrics

Learn Java

Learn Git

APIs

Learn how to use popular APIs to make your own applications.



Learn how to use Python and the National Highway Traffic Safety Administration's API!

Python

DWOLLA

Learn how to use the Dwolla API!

Python



Learn OAuth2 with the GitHub API!

Ruby

WEPAY

Learn how to use the WePay API!

Python

WEPAY

Learn how to use the WePay API!

Ruby



Learn to use the NPR API.

Python



Learn to use the SendGrid API.

Ruby



Learn how to use the SoundCloud API!

Javascript

w3schools.com

THE WORLD'S LARGEST WEB DEVELOPER SITE

<http://www.w3schools.com>

HTML and CSS

Learn HTML

Learn CSS

Learn W3.CSS

Learn Colors

Learn Bootstrap

Learn How To

JavaScript

Learn JavaScript

Learn jQuery

Learn jQueryMobile

Learn AppML

Learn AngularJS

Learn JSON

Server Side

Learn SQL

Learn PHP

Learn ASP

Learn ASP.NET

HTML Graphics

Learn Canvas

Learn SVG

Learn Icons

Learn Google Maps

Web Building

Web Templates

Web Statistics

Web Certificates

XML Tutorials

Learn XML

Learn XSLT

Learn AJAX



Hurl.it — Make HTTP Requests

<https://www.hurl.it>

<https://www.getpostman.com>

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POSTMAN

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Mac App

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Questions



If you have questions after the workshop,
feel free to get in touch!