



Using Excel and VBA with APIs to Wow Your Colleagues and Patrons

Hao Zeng, Yeshiva University
Annamarie Klose Hrubes, William Paterson University



What are APIs?

In computer programming, an **application programming interface (API)** is a set of subroutine definitions, protocols, and tools for building application software. In general terms, it is a set of clearly defined methods of communication between various software components.

Web APIs are the defined interfaces through which interactions happen between an enterprise and applications that use its assets. An API approach is an architectural approach that revolves around providing programmable interfaces to a set of services to different applications serving different types of consumers. When used in the context of web development, an API is typically defined as a set of Hypertext Transfer Protocol (HTTP) request messages, along with a definition of the structure of response messages, which is usually in an Extensible Markup Language (XML) or JavaScript Object Notation (JSON) format.

- *Application programming interface*, https://en.wikipedia.org/wiki/Application_programming_interface

How can you use APIs?

Here's a sample of how using JSON and/or XML records via an API can help:

- Batch download records related to a resource that conform to a specific criteria, e.g. download records of faculty publications
- Download and match information related to records you have, e.g. VIAF entries
- Upload records to a system/platform, e.g. ArchivesSpace

You may already be using a resource that has an API. If they do, look for the documentation and dig in!

Scenario 1 - Need Bibliographic Information for Journal Holdings



The Periodical Department needs to know which electronic journals in our holdings to cut. The holding management system does not provide detailed information regarding individual titles, e.g. subject. However, Ulrich's Web can provide that information and we have a subscription.

Ulrich's Web API

The Ulrich's Web API allows you to export basic metadata, e.g. title, country, subject, about a journal as JSON or XML.

https://knowledge.exlibrisgroup.com/Ulrich's/Product_Documentation/Configuring/Ulrichsweb_API/Ulrichsweb%3A_Fields_Included_in_the_API_Output

However, you need an Ulrich's Web subscription to get an API key.

https://knowledge.exlibrisgroup.com/Ulrich%27s/Product_Documentation/Configuring/Ulrichsweb_API/Ulrichsweb%3A_Administration_Console_-_Ulrich%27s_API

Ulrich's Web API - Sample query & output

```
GET http://ulrichsweb.serialssolutions.com/api/[API KEY]/search?query=issn:15551296
```

```
GET http://ulrichsweb.serialssolutions.com/api/[API KEY]/search?query=title:International Journal of Business Research
```

```
{ "status": "Success", "totalRecords": 1, "results": [ { "title": "International Journal of Business Research (Turlock)", "toc": false, "historicTitle": false, "publisher": ["International Academy of Business and Economics"], "startYear": "2004", "coden": null, "otherFeatures": [], "deweyNumbers": [657.0, 658.0], "lcnnumber": null, "serialTypes": ["Journal"], "titleId": "597028", "refereed": true, "availableOnline": false, "openAccess": false, "reviewed": false, "price": "Contact Publisher", "contentTypes": ["Academic / Scholarly"], "frequency": "Semi-annually", "languages": ["English"], "issn": "1555-1296", "id": "519209", "country": "United States", "description": "Contains original research papers in business, international business, economics and related topics.", "subject": ["BUSINESS AND ECONOMICS - ACCOUNTING", "BUSINESS AND ECONOMICS - MARKETING AND PURCHASING", "BUSINESS AND ECONOMICS - MANAGEMENT"], "formats": ["Print"], "openAccessUrl": null, "status": "Active", "keyFeatures": ["AI", "RPR", "URL"], "rss": [], "availableOnlineImg": null, "openAccessImg": null, "refereedImg": null, "tocImg": null, "reviewedImg": null, "historicTitleImg": null, "serialTypesCSV": "Journal", "contentTypesCSV": "Academic / Scholarly", "formatsCSV": "Print", "languagesCSV": "English" } ], "numberOfRecords": 1, "requestQuery": "issn:15551296", "requestRows": null, "requestSortIndex": null, "requestSortOrder": null, "requestStart": null, "statusMessage": null }
```

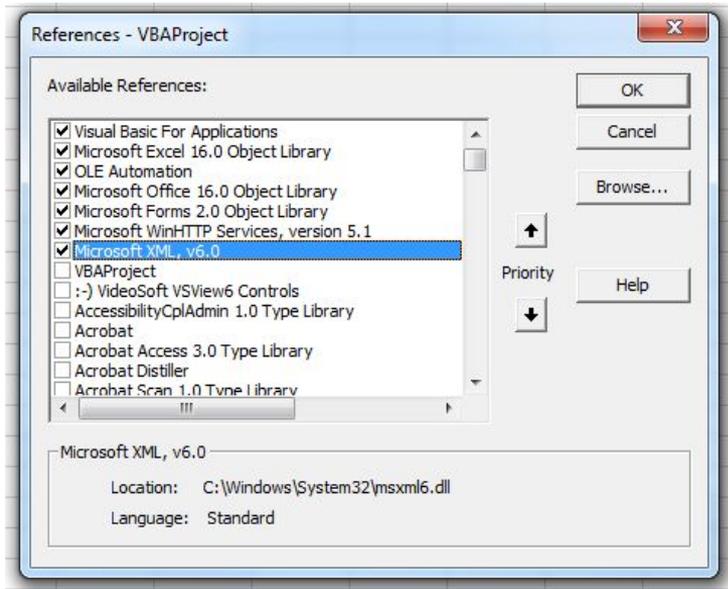
Excel with VBA and Macros

Macros are subroutines that help you automate tasks.

Excel allows you to create and use macros with a computer language called Visual Basic for Applications (VBA).

The macros can be something as simple as changing the font style in a spreadsheet or as complex as interfacing with an API through the internet. In the latter case, we can have the VBA code send a column of data (ISSN) to an API, pull records related to that data, and populate the other columns with the related metadata.

Define your references



If you don't have the Developer's tab in Excel, you need to use it so you can work with VBA.

When you open VBA, you need to set your references. On a PC, the references are:

- Visual Basic for Applications
- Microsoft Excel 16.01 Object Library
- OLE Automation
- Microsoft Office 16.0 Object Library
- Microsoft Forms 2.0 Object Library
- Microsoft WinHTTP Services, version 5.1
- Microsoft XML, v. 6.0 (or version 3.0)

Macros with VBA

While VBA is an event-driven programming language, anyone with experience in object-oriented programming will feel comfortable with it.

You'll just be using it with a GUI in Excel.

```
If last = 1 Then Exit Sub
```

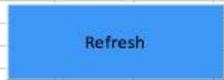
```
Dim ISSN As String
```

```
Dim i As Integer
```

```
For i = 2 To last
```

Populating the spreadsheet

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Journal	Publisher	Platform	Print ISSN	Online ISSN	Reporting Period Total	Reporting Period HTML	Reporting Period PDF			LCNumber	Subject			
2	Visalia Times - Delta / Tulare Advance - Re	Gannett Co	ProQuest			1	0	0							
3	Vital Speeches International	McMurry	EBSCOhost			3	0	0							
4	Voices of Practitioners: Teacher Research i	National As	ProQuest			3	0	0							
5	The Wall Street Journal Americas	Dow Jones	ProQuest			1	0	0							
6	The Washington daybook	Federal Inf	ProQuest			3	0	0							
7	Washington Post Blogs	The Washir	ProQuest			35	0	0							
8	The Washington Post (Online)	WP Compa	ProQuest			8	0	0							
9															
10															



By providing access to the macro through a button, end users can use the macro-enabled spreadsheet more easily on their own.

B I U
Font
Alignment
Number
Conditional Formatting
Format as Table
Check Cell
Explanatory...
Input
Linked Cell
Note
Insert
Delete
Format
Sort & Find & Filter
Clear
Filter
Select

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z		
	Publisher	Platform	Journal D	Proprietar	Print ISSN	Online ISS	Reporting	Reporting	Reporting	Jan-2015	Feb-2015	Mar-2015	Apr-2015	May-2015	Jun-2015	Jul-2015	Aug-2015	Sep-2015	Oct-2015	Nov-2015	Dec-2015	LCN	Number	Subject			
gs	La Leche L	ProQuest			8756-9981		5	0	0	0	4	0	0	0	0	0	0	0	0	0	1	0	RJ216	CHILDREN AND YOUTH (ABOUT PH			
ement Journal	Project M	EBSCOhos			8756-9728	1938-9507	11	0	0	0	0	0	2	1	0	0	0	2	3	3	0	0	HD69.P75	BUSINESS AND ECONOMICS - MAN			
ement Journal	Project M	Wiley Onl			8756-9728	1938-9507	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	HD69.P75	BUSINESS AND ECONOMICS - MAN		
ss in Electrophysiology an	Wiley	Wiley Onl			8756-9264	2374-8419	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
ducation Quarterly	SAGE Publ	EBSCOhos			8756-8705	2168-8605	43	0	0	2	3	0	5	0	0	0	2	2	20	5	1	3			EDUCATION - SPECIAL EDUCATION		
ducation Quarterly	SAGE Publ	ProQuest			8756-8705	2168-8605	31	0	0	1	3	0	6	3	0	0	0	0	0	1	17	0			EDUCATION - SPECIAL EDUCATION		
rtly : the official magazin	National F	EBSCOhos			8756-8667		2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	ML27.U5	MUSIC			
ge Student Psychotherap	Taylor & F	EBSCOhos			8756-8225	1540-4730	54	0	0	2	5	1	2	0	5	4	1	7	8	8	11	RC451.4.S	EDUCATION - HIGHER EDUCATION (
ge Student Psychotherap	Taylor & F	Taylor & F			8756-8225	1540-4730	4	0	0	0	0	0	3	0	0	0	0	0	0	0	1	0	RC451.4.S	EDUCATION - HIGHER EDUCATION I			
nd Medicine	Issues in L	EBSCOhos			8756-8160		25	0	0	0	6	3	3	0	0	1	0	8	1	0	0	3	KF480.A15	PUBLIC HEALTH AND SAFETY LAW A			
nd Medicine	Issues in L	GOLD			8756-8160		7	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	KF480.A15	PUBLIC HEALTH AND SAFETY LAW A		
nd Medicine	Issues in L	ProQuest			8756-8160		1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	KF480.A15	PUBLIC HEALTH AND SAFETY LAW A		
	Access Int	EBSCOhos			8756-8047	1944-8198	187	0	0	3	1	0	83	2	7	1	3	4	7	70	6	RD32.3	HEALTH FACILITIES AND ADMINISTI				
	Access Int	ProQuest			8756-8047	1944-8198	11	0	0	1	0	0	5	0	5	0	0	0	0	0	0	0	0	RD32.3	HEALTH FACILITIES AND ADMINISTI		
Journal	American	EBSCOhos			8756-7962		1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	KF2023.A1	BUSINESS AND ECONOMICS LAW		
Progress	American	ACS Publi			8756-7938	1520-6033	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	TP248.13	BIOLOGY - BIOTECHNOLOGY		
progress	John Wile	Wiley Onl			8756-7938	1520-6033	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	TP248.13	BIOLOGY - BIOTECHNOLOGY		
ork business	Crain Com	EBSCOhos			8756-789X		4	0	0	1	0	0	0	0	0	0	0	0	2	1	0	0	HC107.N7	BUSINESS AND ECONOMICS			
ork business	Crain Com	ProQuest			8756-789X		7	0	0	3	0	0	0	1	0	0	0	0	0	0	0	0	0	HC107.N7	BUSINESS AND ECONOMICS		
ture of Engineering Mater	Wiley-Bla	Wiley Onl			8756-758X	1460-2695	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	TA418.38	ENGINEERING		
ing	Taylor & F	EBSCOhos			8756-7555	1930-8299	62	0	0	2	2	2	2	2	0	1	1	0	1	5	40	6	L11	EDUCATION - HIGHER EDUCATION			
ing	Taylor & F	Ithaka			8756-7555	1930-8299	11	0	0	2	0	0	1	3	0	0	0	0	2	3	0	L11	EDUCATION - HIGHER EDUCATION				
ing	Taylor & F	ProQuest			8756-7555	1930-8299	7	0	0	0	1	0	0	3	0	0	0	1	2	0	0	L11	EDUCATION - HIGHER EDUCATION				
ing	Taylor & F	Taylor & F			8756-7555	1930-8299	28	0	0	0	1	4	5	1	2	1	0	5	2	7	0	L11	EDUCATION - HIGHER EDUCATION				
l, and General Psychology	Heldref Pi	EBSCOhos			8756-7547	1940-5286	24	0	0	0	5	0	0	0	0	0	0	0	5	7	7	LB1101					
l, and General Psychology	Heldref Pi	ProQuest			8756-7547	1940-5286	2	0	0	0	0	0	0	0	0	0	0	0	0	2	0	LB1101					
l, and General Psychology	Heldref Pi	Taylor & F			8756-7547	1940-5286	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	LB1101				
iew	Touro Coll	EBSCOhos			8756-7326	1942-9843	33	0	0	0	0	0	2	1	0	0	0	1	16	4	9	K24	LAW				
	CFO Publi	EBSCOhos			8756-7113		3	0	0	0	0	1	0	0	0	0	0	0	0	1	1	HG4026	BUSINESS AND ECONOMICS				
cs, Instrumentation and D	Allerton P	SpringerLi			8756-6990	1934-7944	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	TK7878	INSTRUMENTS COMPUTERS ELECTR		
Communications in Japan.	John Wile	Wiley Onl			8756-663X	1520-6432	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	TK7800			
Communications in Japan.	John Wile	Wiley Onl			8756-6621	1520-6424	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	TK5101.A1			
Genocide Studies	Oxford Un	Oxford Jo			8756-6583	1476-7937	3	0	0	0	0	0	0	0	0	0	0	0	0	3	0	D810.J4	HISTORY - HISTORY OF EUROPE				
Genocide Studies	Oxford Un	Project M			8756-6583	1476-7937	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	D810.J4	HISTORY - HISTORY OF EUROPE		
genocide studies		Print			8756-6583		8																D810.J4	HISTORY - HISTORY OF EUROPE			

Scenario 2 - Need statistics and bibliographic information for journals

Digital Measures

In 2017, WPU began using Activity Insight, a database by Digital Measures, to track faculty activities. As part of this work, the university wanted to track statistics related to journals that our faculty publish in. Bibliographic information and statistics related to those journals was to be stored in the Journal Instrument.

Elsevier Developer Portal

Elsevier has multiple APIs and provides detailed specifications in its developer portal (<https://dev.elsevier.com/index.html>). They have APIs for:

- Scopus
- ScienceDirect
- SciV
- Engineering Village
- Embase

You can register for a free API key with some limitations. (Subscription members get full access.)

Testing the Elsevier APIs with Swagger

There are 11 APIs for Scopus, alone. We used the Serial Title API.

<https://api.elsevier.com/documentation/SerialTitleAPI.wadl>

Elsevier provides interactive documentation to help you try out queries with its APIs. It's a great way to “get your feet wet” with APIs. They even include an API key for testing purposes.

https://dev.elsevier.com/scopus.html#!/Serial_Title/SerialTitleSearch

Scopus' Serial Title API

Some bibliographic information + Metrics

- CiteScore
- SCImago Journal Rank (SJR)
- Source-Normalized Impact per Paper (SNIP)

<http://api.elsevier.com/documentation/metadata/SerialTitleViews.htm>

<https://journalmetrics.scopus.com/>

Serial Title API - Sample query & output

GET [https://api.elsevier.com/content/serial/title/issn/1555-1296?apiKey=\[API Key\]](https://api.elsevier.com/content/serial/title/issn/1555-1296?apiKey=[API Key])

```
{
  "serial-metadata-response": {
    "link": [
      {
        "@_fa": "true",
        "@ref": "self",
        "@href": "https://api.elsevier.com/content/serial/title/issn/1555-1296",
        "@type": "application/json"
      }
    ],
    "entry": [
      {
        "@_fa": "true",
        "dc:title": "International Journal of Business Research",
        "dc:publisher": "International Academy of Business and Economics",
        "prism:aggregationType": "journal",
        "source-id": "21100322426",
        "prism:issn": "1555-1296",
        "openaccess": null,
        "openaccessArticle": null,
        "openArchiveArticle": null,
        "openaccessType": null,
        "openaccessStartDate": null,
        "oaAllowsAuthorPaid": null,
        "subject-area": [
          {
            "@_fa": "true",
            "@code": "1400",
            "@abbrev": "BUSI",
            "$": "Business, Management and Accounting (all)"
          },
          {
            "@_fa": "true",
            "@code": "2000",
            "@abbrev": "ECON",
            "$": "Economics, Econometrics and Finance (all)"
          }
        ],
        "SNIPList": {
          "SNIP": [
            {
              "@_fa": "true",
              "@year": "2016",
              "$": "0.06"
            }
          ],
          "SJRList": {
            "SJR": [
              {
                "@_fa": "true",
                "@year": "2016",
                "$": "0.159"
              }
            ]
          },
          "citeScoreYearInfoList": {
            "citeScoreCurrentMetric": "0.07",
            "citeScoreCurrentMetricYear": "2015",
            "citeScoreTracker": null,
            "citeScoreTrackerYear": null
          },
          "link": [
            {
              "@_fa": "true",
              "@ref": "scopus-source",
              "@href": "https://www.scopus.com/source/sourceInfo.url?sourceId=21100322426"
            },
            {
              "@_fa": "true",
              "@ref": "homepage",
              "@href": "http://www.iabe.org/domains/iabeX/journal.aspx?Journalid=12"
            },
            {
              "@_fa": "true",
              "@ref": "coverimage",
              "@href": "https://api.elsevier.com/content/serial/title/issn/1555-1296?view=coverimage"
            }
          ],
          "prism:url": "https://api.elsevier.com/content/serial/title/issn/1555-1296"
        }
      }
    ]
  }
}
```

Hacking Hao's Code - Part 1

Change URL

```
Dim URL As String: URL =  
"https://api.elsevier.com/content/serial/title/issn/"  
+ ISSN + "?apiKey=[API Key]&httpAccept=text%2Fxml"
```

Hacking Hao's code - Part 2

```
Dim LC As IXMLDOMNode  
Dim Subject As IXMLDOMNode
```

```
For Each LC In Resp.SelectNodes("//UlrichTitle/LCNumber")  
    W.Range("K" & i).Value = LC.Text  
    On Error Resume Next  
Next LC
```

```
For Each Subject In Resp.SelectNodes("//UlrichTitle/subject")  
    W.Range("L" & i).Value = Subject.Text  
    On Error Resume Next  
Debug.Print "test"
```

```
Next Subject
```

Change:

Variables

Nodes

Columns

Changing the code for Attributes

```
For Each snipYear In Resp.SelectNodes("//SNIPList/SNIP").NextNode.Attributes  
  
    W.Range("I" & i).Value = snipYear.NodeValue  
  
    On Error Resume Next  
  
Next snipYear
```

Change:

Variables

Attributes

Columns

Troubleshooting Scopus - Timeout Error

Scopus is slow and can get bogged down.

```
For Each EISSN In Resp.SelectNodes("//prism:eIssn")
    W.Range("R" & i).Value = EISSN.Text
    On Error Resume Next
Next EISSN
```

```
Application.Wait (Now + TimeValue("0:00:02"))
```

```
Next i
```

```
End Sub
```

Clean-up after populating data

- Sample data to verify that it outputted correctly. Depending on the error, I had to adjust the code (User Error) or fix things manually (API Error).
- Clean-up the data as befits its use. Since WPU faculty would be interacting with this data, I did the following:
 - Changed “TRUE” values to “Yes” and “FALSE” values to “No.”
 - Sorted journal titles in alphabetical order.
 - Used Excel formulas to pull relevant data, ABDC Ratings, from another spreadsheet, match it to the ISSNs, and populate another column.

Tips

- Test API and coding with small examples first.
- Sample API data in spreadsheet and output to ensure the results are correct.
- If necessary, normalize data in your spreadsheet, e.g. hyphens in ISSN and leading zeros as start of ISSN.
- Save macros to your personal workbook so you can use them with other Excel spreadsheets.
- Pulling data from an API with Excel can be very slow. Be patient.

Live Demo

Limitations of Ulrich's Web API

- API data is pulled from brief records which are sometimes incorrect.
- FALSE results, in particular, were unreliable. In the brief records, image icons indicate whether a journal is refereed, open access, etc. If the icon is present, you'll get a TRUE value. If the icon is not, you'll get a FALSE value. However, many journals only show that information correctly in the full record. This means you often get a FALSE result. In error. This required manual correction to fix.
- Some journals only have brief records.

Limitations of Scopus' Serial Title API

- If Scopus discontinues a journal, there will be data gaps. Including the metric's year in data set can help identify older scores.
- The journal metrics, e.g. CiteScore, are controversial.
- Journal-level metrics do not reflect the weight of a specific article.
- In some cases, we found that our faculty had journal articles that were indexed but the journal itself was not.
- In a rare case, the wrong ISSN was assigned to a journal article.
- Query structure is problematic for searching by title.

Alternatives to Excel with VBA

You can use a wide variety of coding standards with APIs, e.g. Python, PHP, Perl. Use what you are most comfortable work.

Look in GitHub! You may find existing code in your preferred scripting language that works with the API.

For example, GitHub has a wide variety of coding options that work with the Scopus API. Don't reinvent the wheel! Hack it.

<https://github.com/search?utf8=%E2%9C%93&q=scopus&type=>

Resources

- Hao's Code on GitHub, <https://github.com/haozeng0/VBAinExcel>
- MARAC API Workshop on GitHub,
https://github.com/jhu-archives-and-manuscripts/MARAC_API_Workshop
- Postman, <https://www.getpostman.com/> - It's a free application to use with APIs

Thank you!

Hao Zeng, hao.zeng@yu.edu

Annamarie Klose Hrubes, klosehrubesa@wpunj.edu