

OpenRefine for Collections Data

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What is OpenRefine?



Tool for Data Clean-Up



Open Source
(download from openrefine.org)



Runs in your browser

What Can OpenRefine Do?

Join and split values

Filter by numeric value, text, or blank/non-blank

Trim whitespace

Split one column into multiple

Find and replace, including "if" conditions

Clustering, i.e. find similar values and merge

Combine data from multiple tables

Run API calls, e.g. to retrieve data from your ILS

Save all steps as a sequence

Other Features

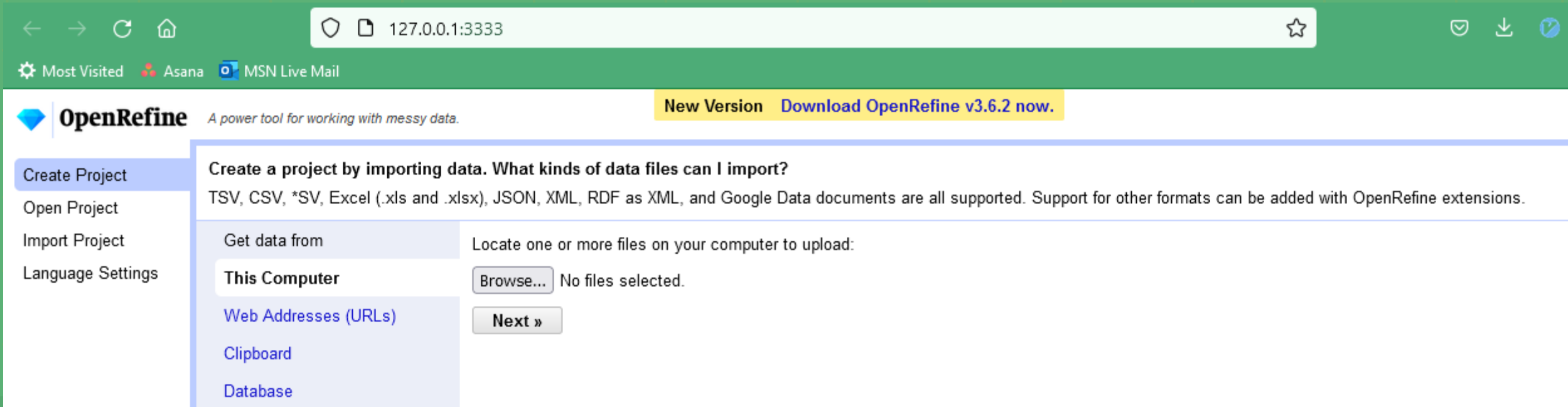
Can handle large tables

Easy to reverse your actions

Saves automatically

Can be used at a basic or
advanced level

Getting Started



The screenshot shows a web browser window with the address bar displaying "127.0.0.1:3333". The browser's address bar includes navigation icons (back, forward, refresh, home) on the left, a star icon for bookmarks on the right, and a shield icon for security. Below the address bar, there are links for "Most Visited", "Asana", and "MSN Live Mail".

The main content area features the OpenRefine logo and tagline "A power tool for working with messy data." on the left. A yellow banner at the top right of the page reads "New Version Download OpenRefine v3.6.2 now.".

The central panel is titled "Create a project by importing data. What kinds of data files can I import?" and lists supported formats: "TSV, CSV, *SV, Excel (.xls and .xlsx), JSON, XML, RDF as XML, and Google Data documents are all supported. Support for other formats can be added with OpenRefine extensions."

Below this, there are three options for "Get data from":

- This Computer**: Includes a "Browse..." button and the text "No files selected." Below this is a "Next »" button.
- Web Addresses (URLs)
- Clipboard
- Database

A left-hand sidebar contains navigation links: "Create Project" (highlighted), "Open Project", "Import Project", and "Language Settings".

Data Sources

CSV

tsv

txt

json

xml

xls, xlsx

ods

MARC

Load a File



127.0.0.1:3333/project?project=2441636642780



Most Visited Asana MSN Live Mail

OpenRefine example for SUNY [Permalink](#)

Open... Export Help

Facet / Filter Undo / Redo 0 / 0

1085 rows

Extensions: Wikidata

Show as: rows records Show: 5 10 25 50 100 500 1000 rows « first < previous 1 of 109 pages next > last »

Using facets and filters

Use facets and filters to select subsets of your data to act on. Choose facet and filter methods from the menus at the top of each data column.





Not sure how to get started?
[Watch these screencasts](#)

All	Title	ISBN	MMS Id	Author	Publisher	Publication Date	Electronic Collection Public Name	Availability	Portfolio Id
<input type="checkbox"/>	1. "Why are all the black kids sitting together in the cafeteria?" : and other conversations about race /	1541617215; 9781541617216; 1282748521; 9781282748521; 9786612748523; 6612748524; 0465060684; 9780465060689; 0465083617; 9780465083619	991036733817203811	Tatum, Beverly Daniel, author.	Basic Books	1997; 2003	Ebook Central Academic Complete	Available	5342287338000:
<input type="checkbox"/>	2. 20 questions about youth and the media /	9781433139352; 1433139359; 9781433139369; 1433139367; 9781433139376; 1433139375; 9781433143915; 1433143917	991036932106003811		Peter Lang	[2018]	Standalone Electronic Titles	Available	5343163803000:
<input type="checkbox"/>	3. A Field Guide to Climate Anxiety : How to Keep Your Cool on a Warming Planet /	0520974727; 9780520974722; 0520343301; 9780520343306	991038133333503811	Ray, Sarah Jaquette, author.	University of California Press	[2020]	EBSCOhost Academic eBook Collection (North America)	Available	5359936749000:
<input type="checkbox"/>	4. A Field Guide to Climate Anxiety : How to Keep Your Cool on a Warming Planet /	0520974727; 9780520974722; 0520343301; 9780520343306	991038133333503811	Ray, Sarah Jaquette, author.	University of California Press	[2020]	EBSCOhost Ebook Public Library Collection - North America	Available	5359995649000:
<input type="checkbox"/>	5. A brief history of death /	1780235046; 9781780235042; 1780233051; 9781780233055	991036735850403811	Spellman, W. M., author.	Reaktion Books	2014.	Ebook Central Academic Complete	Available	5342251293000:

Issues to Resolve

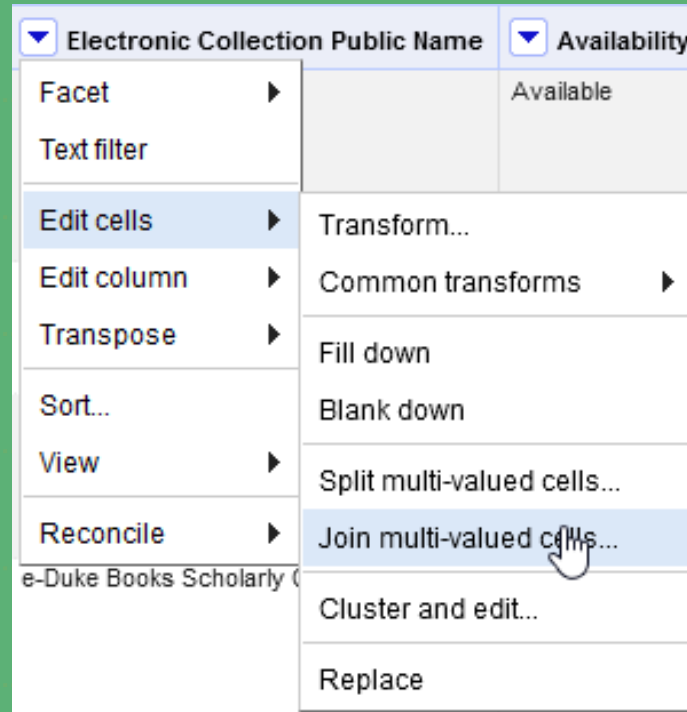
- Bib records repeat multiple times
- Publisher names not standardized
- Want to compare ISBNs with course listings
 - Lots of ISBNs on each line
 - Need data from another file

Repeated Bib Records




		9.	991003616439703811	Introduction to coastal processes & geomorphology	9781306466592; 1306466598; 9781444122404; 1444122401	Masselink, Gerhard.	Hodder Education	2011.	Ebook Central DDA Purchased	Available	53442827850
		10.	991003616439703811	Introduction to coastal processes & geomorphology	9781306466592; 1306466598; 9781444122404; 1444122401	Masselink, Gerhard.	Hodder Education	2011.	MyiLibrary Firm Orders	Available	53380853410




Repeated Bib Records



Repeated Bib Records

		9.	991003616439703811	analysis / Introduction to coastal processes & geomorphology	9781306466592; 1306466598; 9781444122404; 1444122401	Masselink, Gerhard.	Hodder Education	2011.	Ebook Central DDA Purchased;MyiLibrary Firm Orders	Available	53442827850
		10.		Introduction to coastal processes & geomorphology	9781306466592; 1306466598; 9781444122404; 1444122401	Masselink, Gerhard.	Hodder Education	2011.		Available	53380853410



Standardizing Publisher Names

787 matching rows (1085 total) Extensions: Wikidata

Show as: rows records Show: 5 10 25 50 100 500 1000 rows « first < previous 1 of 16 pages next > last »

All	MMS Id	Title	ISBN	Author	Publisher	Publication Date	Electronic Collection Public Name	Availability	Portfolio	
☆	6.	991002159749703811	Memes in digital culture	9781299988354; 1299988350; 9780262525435; 0262525437	Shifman, Limor, 1974	The MIT Press	[2014]	MyiLibrary DDA	Available	53379385580
☆	7.	991002166059703811	Directing in musical theatre an essential guide /	9780415624909; 0415624908; 9780203103852; 0203103858; 9781306319775; 1306319773; 9780415624893; 0415624894	Deer, Joe.	Routledge	[2014]	MyiLibrary DDA	Available	53379380750
☆	8.	991002388159703811	Program evaluation in practice core concepts and examples for discussion and analysis /	1118345827; 9781118345825; 9781306472722; 1306472725	Spaulding, Dean T.	Jossey-Bass	[2014]	MyiLibrary DDA	Available	53379685170
☆	9.	991003616439703811	Introduction to coastal processes & geomorphology	9781306466592; 1306466598; 9781444122404; 1444122401	Masselink, Gerhard.	Hodder Education	2011.	Ebook Central DDA Purchased;MyiLibrary Firm Orders	Available	53442827850
☆	11.	991003710659703811	Emotions and social relations	1446209296; 9781446209295; 9781446209301; 144620930X; 9781306859943; 1306859948	Burkitt, Ian, author.	SAGE	2014.	MyiLibrary DDA	Available	53380889040
☆	12.	991004427479703811	Matter and consciousness	0262316560; 9780262316569;	Churchland, Paul M.,	MIT Press	2013	Project Muse eBook Collection	Available	53381361330

Standardizing Publisher Names

787 matching rows (1085 total) Extensions: Wikidata

Show as: rows records Show: 5 10 25 50 100 500 1000 rows 1 of 16 pages

All	MMS Id	Title	ISBN	Author	Publisher	Publication Date	Electronic Collection	Public Name	Availability	Portfolio
☆	6.	991002159749703811	Memes in digital culture	9781299988354; 1299988350; 9780262525435; 0262525437	Shifman, Limor, 1974				Available	53379385580
☆	7.	991002166059703811	Directing in musical theatre an essential guide /	9780415624909; 0415624908; 9780203103852; 0203103858; 9781306319775; 1306319773; 9780415624893; 0415624894	Deer, Joe.				Available	53379380750
☆	8.	991002388159703811	Program evaluation in practice core concepts and examples for discussion and analysis /	1118345827; 9781118345825; 9781306472722; 1306472725	Spaulding, Dean T.	University Press			Available	53379685170
☆	9.	991003616439703811	Introduction to coastal processes & geomorphology	9781306466592; 1306466598; 9781444122404; 1444122401	Masselink, Gerhard.	Education	Firm Orders	sed;MyLib	Available	53442827850
☆	11.	991003710659703811	Emotions and social relations	1446209296; 9781446209295; 9781446209301; 144620930X; 9781306859943; 1306859948	Burkitt, Ian, author.	SAGE	2014.	MyLibrary DDA	Available	53380889040
☆	12.	991004427479703811	Matter and consciousness	0262316560; 9780262316569;	Churchland, Paul M.,	MIT Press	2013	Project Muse eBook Collection	Available	53381361330

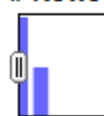
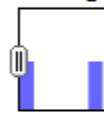
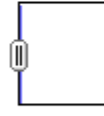

Standardizing Publisher Names

Cluster & Edit column "Publisher"

This feature helps you find groups of different cell values that might be alternative representations of the same thing. For example, the "New York" and "New York City" are very likely to refer to the same concept and just have capitalization differences, and "Gödel" and "Godel" probably refer to the same person.

Method key collision

Keying Function fingerprint

Cluster Size	Row Count	Values in Cluster	Merge?	New Cell Value	# Rows
2	72	<ul style="list-style-type: none">Routledge (71 rows)ROUTLEDGE	<input type="checkbox"/>	<input type="text" value="Routledge"/>	
2	2	<ul style="list-style-type: none">The Free PressThe Free Press; Free Press	<input type="checkbox"/>	<input type="text" value="The Free Press"/>	
2	4	<ul style="list-style-type: none">Routledge Taylor & Francis Group (3 rows)Routledge Taylor & Francis Group; Routledge	<input type="checkbox"/>	<input type="text" value="Routledge"/>	
2	17	<ul style="list-style-type: none">SAGE (15 rows)Sage (2 rows)	<input type="checkbox"/>	<input type="text" value="SAGE"/>	
2	2	<ul style="list-style-type: none">SLACK IncorporatedSlack Incorporated	<input type="checkbox"/>	<input type="text" value="SLACK Incorporated"/>	
2	5	<ul style="list-style-type: none">Penguin Books (4 rows)Penguin Books; Penguin	<input type="checkbox"/>	<input type="text" value="Penguin Books"/>	

Standardizing Publisher Names

Cluster & Edit column "Publisher"

This feature helps you find groups of different cell values that might be alternative representations of the same thing. For example, the two strings "New York" and "New York" are very likely to refer to the same concept and just have capitalization differences, and "Gödel" and "Godel" probably refer to the same person. [Find out more](#)

Method

Keying Function

32	<ul style="list-style-type: none">• University of California Press (30 rows)• University of Oklahoma Press (2 rows)	<input type="checkbox"/>	<input type="text" value="University of California Press"/>
4	<ul style="list-style-type: none">• Vintage Books a division of Penguin Random House LLC (3 rows)• Vintage Books A Division of Random House Inc; Vintage Books	<input checked="" type="checkbox"/>	<input type="text" value="Vintage Books a division of Pengu"/>
2	<ul style="list-style-type: none">• Venture Publishing Inc• Venture Publishing Inc; Sagamore Publishing LLC	<input checked="" type="checkbox"/>	<input type="text" value="Venture Publishing Inc"/>
4	<ul style="list-style-type: none">• Harvard Business Review Press (3 rows)• Harvard Business School Press	<input type="checkbox"/>	<input type="text" value="Harvard Business Review Press"/>
3	<ul style="list-style-type: none">• University Press of Mississippi (2 rows)• University Press of Kentucky	<input type="checkbox"/>	<input type="text" value="University Press of Mississippi"/>
11	<ul style="list-style-type: none">• John Wiley & Sons Incorporated (10 rows)• John Wiley & Sons Inc	<input checked="" type="checkbox"/>	<input type="text" value="John Wiley & Sons Incorporated"/>
2	<ul style="list-style-type: none">• PLUTO PRESS• Polity Press	<input type="checkbox"/>	<input type="text" value="PLUTO PRESS"/>

Split ISBNs onto Separate Lines

787 records Extensions: Wikidata ▾

Show as: [rows](#) [records](#) Show: [5](#) [10](#) [25](#) [50](#) [100](#) [500](#) [1000](#) records « first < previous 1 of 79 pages next > last »

<input type="checkbox"/> All	<input type="checkbox"/> MMS Id	<input type="checkbox"/> Title	<input type="checkbox"/> ISBN	<input type="checkbox"/> Author	<input type="checkbox"/> Publisher	<input type="checkbox"/> Publication Date	<input type="checkbox"/> Electronic Collection Public Name	<input type="checkbox"/> Availability	<input type="checkbox"/> Portfolio Id
<input type="checkbox"/> <input type="checkbox"/>	1. 991000530959703811	Organizing schools for improvement lessons from Chicago /	0226078000; 9780226078007; 9781282537781; 1282537784; 9780226077994; 0226077993		University of Chicago Press	c2010.	MyLibrary DDA	Available	53378513090003
<input type="checkbox"/> <input type="checkbox"/>	2. 991001212389703811	On becoming a leader	9781282449497; 1282449494; 9780465014088; 0465014089	Bennis, Warren G.	Basic Books	c2009.	MyLibrary Firm Orders	Available	53378829890003
<input type="checkbox"/> <input type="checkbox"/>	3. 991001536939703811	Pharmaceutical water system design, operation, and validation /	142007783X; 9781420077834; 9781420077827; 1420077821	Collentro, William V. author.	Informa Healthcare	c2011.	Ebsco Ebook Firm Orders	Available	53378831950003
<input type="checkbox"/> <input type="checkbox"/>	4. 991002070149703811	Not quite white white trash and the boundaries of whiteness /	0822388596; 9780822388593; 9780822338826; 0822338823; 9780822338734; 0822338734	Wray, Matt, 1964-	Duke University Press	2006.	e-Duke Books Scholarly Collection	Available	53379108810003
<input type="checkbox"/> <input type="checkbox"/>	5. 991002112949703811	The war machines young men and violence in Sierra Leone and Liberia /	0822394480; 9780822394488; 6613266140; 9786613266149; 0822350599; 9780822350590; 0822350777; 9780822350774	Hoffman, Danny, 1972-	Duke University Press	2011	e-Duke Books Scholarly Collection	Available	53379129940003
<input type="checkbox"/> <input type="checkbox"/>	6. 991002159749703811	Memes in digital culture	9781299988354; 1299988350; 9780262525435; 0262525437	Shifman, Limor, 1974-	The MIT Press	[2014]	MyLibrary DDA	Available	53379385580003

Split ISBNs onto Separate Lines

787 records Extensions: Wikidata

Show as: **rows** records Show: 5 10 25 50 100 500 1000 records « first < previous 1 of 79 pages next > last »

All	MMS Id	Title	ISBN	Author	Publisher	Public	Collection Public Name	Availability	Portfolio Id
☆	1.	991000530959703811	Organizing schools for improvement lessons from Chicago /	...	The MIT Press	[2014]	A	Available	53378513090003
☆	2.	991001212389703811	On becoming a leader	...	...	...	n Orders	Available	53378829890003
☆	3.	991001536939703811	Pharmaceutical water system design, operation, and validation /	...	...	...	firm Orders	Available	53378831950003
☆	4.	991002070149703811	Not quite white white trash and the boundaries of whiteness /	...	...	...	Scholarly Collection	Available	53379108810003
☆	5.	991002112949703811	The war machines young men and violence in Sierra Leone and Liberia /	...	...	...	Scholarly Collection	Available	53379129940003
☆	6.	991002159749703811	Memes in digital culture	...	...	...	A	Available	53379385580003

Context Menu (ISBN column):

- Facet
- Text filter
- Edit cells** (selected) → Transform...
- Edit column → Common transforms
- Transpose → Fill down
- Sort... → Blank down
- View → Split multi-valued cells... (highlighted by mouse)
- Reconcile → Join multi-valued cells...
- Cluster and edit...
- Replace

ISBN cell content (row 6): 9781306466592; Masse...
1299988350; Limor, 1974-
9780262525435;
0262525437

Separate ISBNs, one per line

797 records Extensions: Wikidata

Show as: [rows](#) [records](#) Show: [5](#) [10](#) [25](#) [50](#) [100](#) [500](#) [1000](#) records « first < previous 1 of 80 pages next > last »

<input type="checkbox"/> All	<input type="checkbox"/> MMS Id	<input type="checkbox"/> Title	<input type="checkbox"/> ISBN	<input type="checkbox"/> Author	<input type="checkbox"/> Publisher	<input type="checkbox"/> Publication Date	<input type="checkbox"/> Electronic Collection Public Name	<input type="checkbox"/> Availability	<input type="checkbox"/> Portfolio Id
<input type="checkbox"/> <input type="checkbox"/>	1.	991000530959703811	Organizing schools for improvement lessons from Chicago /		University of Chicago Press	c2010.	MyLibrary DDA	Available	533785130900034
<input type="checkbox"/> <input type="checkbox"/>			0226078000						
<input type="checkbox"/> <input type="checkbox"/>			9780226078007						
<input type="checkbox"/> <input type="checkbox"/>			9781282537781						
<input type="checkbox"/> <input type="checkbox"/>			1282537784						
<input type="checkbox"/> <input type="checkbox"/>			9780226077994						
<input type="checkbox"/> <input type="checkbox"/>			0226077993						
<input type="checkbox"/> <input type="checkbox"/>	2.	991001212389703811	On becoming a leader	Bennis, Warren G.	Basic Books	c2009.	MyLibrary Firm Orders	Available	533788298900034
<input type="checkbox"/> <input type="checkbox"/>			9781282449497						
<input type="checkbox"/> <input type="checkbox"/>			1282449494						
<input type="checkbox"/> <input type="checkbox"/>			9780465014088						
<input type="checkbox"/> <input type="checkbox"/>			0465014089						
<input type="checkbox"/> <input type="checkbox"/>	3.	991001536939703811	Pharmaceutical water system design, operation, and validation /	Collentro, William V. author.	Informa Healthcare	c2011.	Ebsco Ebook Firm Orders	Available	533788319500034
<input type="checkbox"/> <input type="checkbox"/>			142007783X						
<input type="checkbox"/> <input type="checkbox"/>			9781420077834						
<input type="checkbox"/> <input type="checkbox"/>			9781420077827						
<input type="checkbox"/> <input type="checkbox"/>			1420077821						

Cell Cross



Cross-reference the cells in one file with those in another.



Takes a value from the first file and looks up corresponding information from another.



Works like VLOOKUP in Excel



<https://ruthtillman.com/talk/cell-cross-webinar-2020-03/>

Cell Cross

797 records Extensions: Wikidata

Show as: [rows](#) [records](#) Show: [5](#) [10](#) [25](#) [50](#) [100](#) [500](#) [1000](#) records « first ‹ previous 1 of 80 pages next › last »

All	MMS Id	Title	ISBN	Author	Publisher	Publication Date	Electronic Collection Public Name	Availability	Portfolio Id
☆	1.	991000530959703811	Organizing schools for improvement lessons from Chicago /		University of Chicago Press	c2010.	MyiLibrary DDA	Available	533785130900038
☆									
☆									
☆									
☆									
☆	2.	991001212389703811	On becoming a leader				MyiLibrary Firm Orders	Available	533788298900038
☆									
☆									
☆									
☆	3.	991001536939703811	Pharmaceutical water system design, operation, and validation /	Collent William author.			MyiLibrary Firm Orders	Available	533788319500038
☆									
☆									
☆									
☆	4.	991002070149703811	Not quite white white trash and the boundaries of	Wray, Matt, 1964-	Duke University Press	2006.	e-Duke Books Scholarly Collection	Available	533791088100038

Facet

Text filter

Edit cells

Edit column

Transpose

Sort...

View

Reconcile

Split into several columns...

Join columns...

Add column based on this column...

Add column by fetching URLs...

Add columns from reconciled values...

Rename this column

Remove this column

Move column to beginning

Move column to end

Move column left

Move column right

Cell Cross

Add column based on column ISBN

New column name

On error set to blank store error copy value from original column

Expression Language No syntax error.

Preview History Starred Help

row	value	cell.cross("2022Fall Barnes an ...
1.	0226078000	null
2.	9780226078007	URBE5501
3.	9781282537781	null
4.	1282537784	null
5.	9780226077994	null
6.	0226077993	null

OK Cancel

Cell Cross

797 records

Extensions: Wikidata ▾

Show as: [rows](#) [records](#) Show: [5](#) [10](#) [25](#) [50](#) [100](#) [500](#) [1000](#) records

« first < previous 1 of 80 pages next > last »

All	MMS Id	Title	ISBN	Course	Author	Publisher	Publication Date	Electronic Collection Public Name	Availability	
 	1.	991000530959703811	Organizing schools for improvement lessons from Chicago /	0226078000		University of Chicago Press	c2010.	MyLibrary DDA	Available	533
 			9780226078007	URBE5501						
 			9781282537781							
 			1282537784							
 			9780226077994							
 			0226077993							
 	2.	991001242289703811	On becoming a	9781282440487	Begbie	Basic Books	c2000	MyLibrary Firm Orders	Available	535

Final Steps



Join Cells Again



















Remove the "extra" rows



Export to xls, csv, or tsv

Final Product

787 matching rows (1085 total)							Extensions: Wikidata	
Show as: rows records		Show: 5 10 25 50 100 500 1000 rows			« first < previous 1 of 79 pages next > last »			
All	MMS Id	Title	ISBN	Course	Author	Pub		
 	1.	991000530959703811	Organizing schools for improvement lessons from Chicago /	0226078000;9780226078007;9781282537781;1282537784;9780226077994;0226077993	URBE5501		Univer Chicag	
 	2.	991001212389703811	On becoming a leader	9781282449497;1282449494;9780465014088;0465014089		Bennis, Warren G.	Basic	
 	3.	991001536939703811	Pharmaceutical water system design, operation, and validation /	142007783X;9781420077834;9781420077827;1420077821		Collentro, William V. author.	Inform Health	
 	4.	991002070149703811	Not quite white white trash and the boundaries of whiteness /	0822388596;9780822388593;9780822338826;0822338823;9780822338734;0822338734		Wray, Matt, 1964-	Duke Univer Press	
 	5.	991002112949703811	The war machines young men and violence in Sierra Leone and Liberia /	0822394480;9780822394488;6613266140;9786613266149;0822350599;9780822350590;0822350777;978082235	edit	Hoffman, Danny, 1972-	Duke Univer Press	
 	6.	991002159749703811	Memes in digital culture	9781299988354;1299988350;9780262525435;0262525437		Shifman, Limor, 1974-	The M	
 	7.	991002166059703811	Directing in musical theatre an essential guide /	9780415624909;0415624908;9780203103852;0203103858;9781306319775;1306319773;9780415624893;0415624894	THTR5134	Deer, Joe.	Routle	
 	8.	991002388159703811	Program evaluation in practice core	1118345827;9781118345825;9781306472722;1306472725		Spaulding, Dean T.	Josse	

Undoing

The screenshot shows the OpenRefine interface. At the top, the browser address bar displays `127.0.0.1:3333/project?project=2441636642780`. Below the browser, the OpenRefine header includes navigation icons, a "Most Visited" section with links to Asana and MSN Live Mail, and the project title "OpenRefine example for SUNY" with a "Permalink" link.

The main interface is divided into two panels. The left panel, titled "Facet / Filter", contains a list of 23 undo actions. The "Undo / Redo 23 / 23" button is circled in green. The list of actions includes:

- 12. Mass edit 72 cells in column Publisher
- 13. Mass edit 6 cells in column Publisher
- 14. Mass edit 71 cells in column Publisher
- 15. Mass edit 39 cells in column Publisher
- 16. Mass edit 34 cells in column Publisher
- 17. Mass edit 16 cells in column Publisher
- 18. Mass edit 12 cells in column Publisher
- 19. Split multi-valued cells in column ISBN
- 20. Text transform on 6122 cells in column ISBN: `value.trim()`
- 21. Create new column Course based on column ISBN by filling 313 rows with `grel:cell.cross("2022Fall Barnes and Noble", "EAN-13")[0].cells["Course ID"].value`
- 22. Join multi-valued cells in column Course
- 23. Join multi-valued cells in column ISBN

The right panel, titled "787 records", shows a table of records. The table has columns for "All", "MMS Id", "Title", and "ISBN". The records are numbered 1 through 8. The "Undo / Redo" button is circled in green.

All	MMS Id	Title	ISBN
★	1.	991000530959703811	Organizing schools for improvement lessons from Chicago / 0226078000;978022607800
★	2.	991001212389703811	On becoming a leader 9781282449497;128244949
★	3.	991001536939703811	Pharmaceutical water system design, operation, and validation / 142007783X;978142007783
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★	7.	991002166059703811	Directing in musical theatre an essential guide / 9780415624909;041562490
★	8.	991002388159703811	Program evaluation in practice core 1118345827;9781118345825

Manuals and Lessons

- OpenRefine User Manual <https://openrefine.org/docs>
- <https://datacarpentry.org/openrefine-socialsci/>
- Verborg, Ruben, De Wilde, Max. "Using OpenRefine : the essential OpenRefine guide that takes you from data analysis and error fixing to linking your dataset to the Web." Packt Publishing, 2013.
- <https://joshuadull.github.io/APIs-for-Libraries/05-API-queries-in-OpenRefine/index.html>

Questions



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