

# Knowledge Content Summarizer

Kenn Daniel Chang So

# There's so much information

*It is difficult to track new events and trends daily*

*Consultants & market researchers take hours, even days, to do preliminary research about a recent trend or topic*



impact of brexit



All

News

Videos

Images

Shopping

More ▾

Search tools

About 28,700,000 results (0.42 seconds)

## In the news



### What is Brexit's Impact on Global Economy?

**Barron's** - 2 hours ago

Now the big question: What is the likely economic fallout from the **Brexit** vote on the rest of ...

[Wall Street sings Brexit blues with brutal two-day slide](#)

**Reuters** - 22 hours ago

[Bank Shares Drop, as Analysts Weigh Brexit Impact](#)

**Wall Street Journal** - 19 hours ago

[More news for impact of brexit](#)

### Brexit in seven charts — the economic impact - FT.com

[www.ft.com](#) › [GlobalEconomy](#) › [UK Economy](#) ▾ **Financial Times** ▾

1 day ago - The question of how **Brexit** will affect the UK economy is one of the crucial issues now that Britain has voted to leave the EU. The fall in sterling, ...

### Brexit's Impact on Global Economy Depends on Leaders - WSJ

[www.wsj.com/.../brexits-impact-on-global-economy-depends-on...](#) **The Wall Street Journal** ▾

2 days ago - **Brexit's Impact** on Global Economy Depends on Leaders. How deep a shadow Britain's vote makes on the rest of the world will be driven by ...

### Bank Shares Drop, as Analysts Weigh Brexit Impact - WSJ

[www.wsj.com/.../bank-shares-drop-as-analysts-weigh-brexit-imp...](#) **The Wall Street Journal** ▾

19 hours ago - Shares in U.K. and European banks fell again Monday, as their earlier plans to improve returns looked like pipe dreams after Thursday's vote ...

### Why Brexit Really Is a Big Deal for the U.S. Economy | TIME

[time.com/4383202/brexit-america-fallout-economy-fed/](#) ▾ **Time** ▾

1 day ago - But the folks who are telling us not to worry about the economic **effects of Brexit** on the U.S. have also missed a key, immediate impact of the ...

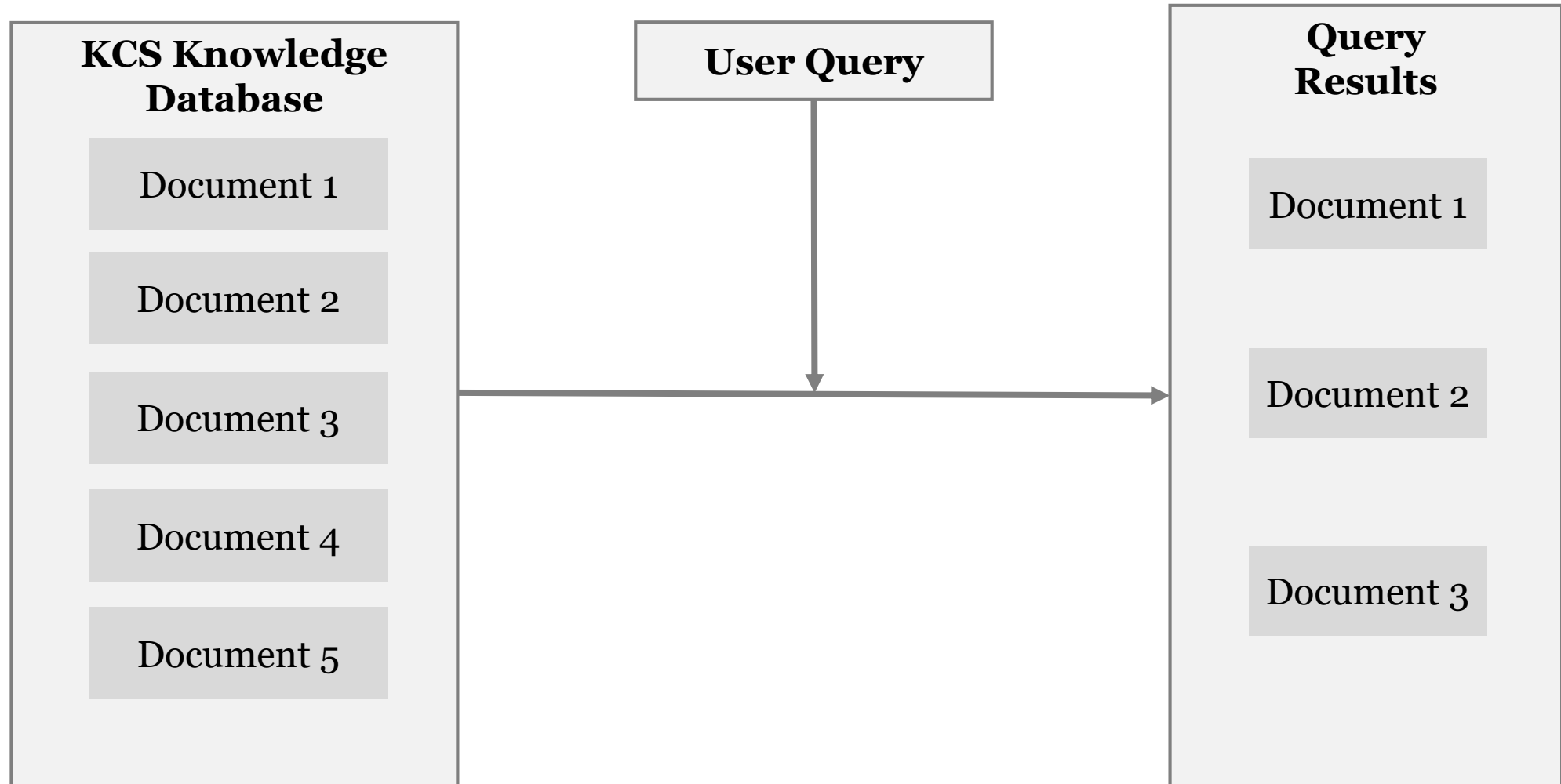
Is there a better way to organize  
& consume information?

# Introducing

# KCS

*Intelligently mining the world's knowledge*

# In a way...a search engine



# How is it different?

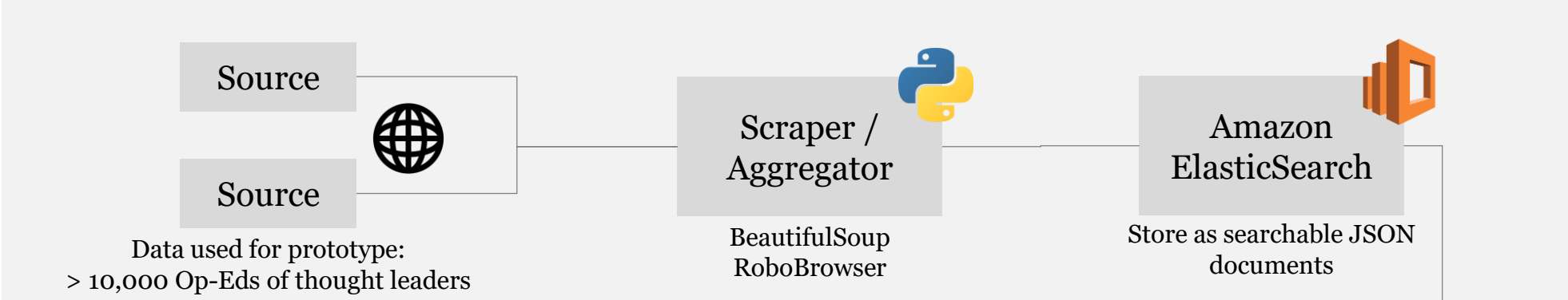
KCS

Traditional  
web search engine

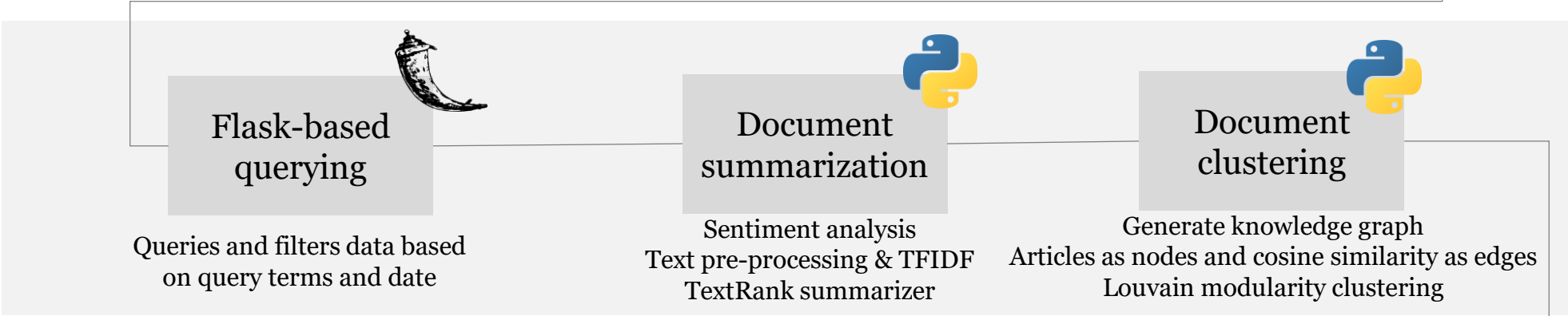
Knowledge Base	<ul style="list-style-type: none"><li>▪ <b>Curated by user or client</b><ul style="list-style-type: none"><li>– Websites, commercial databases, your own data</li></ul></li></ul>	<ul style="list-style-type: none"><li>▪ Public world wide web</li></ul>
Querying	<ul style="list-style-type: none"><li>▪ Fast and scalable through ElasticSearch</li><li>▪ Can handle complex queries</li></ul>	<ul style="list-style-type: none"><li>▪ Very fast</li><li>▪ Can handle complex queries</li></ul>
Consumption	<ul style="list-style-type: none"><li>▪ <b>Document summarization to identify key points</b></li><li>▪ Full-text easily accessible</li></ul>	<ul style="list-style-type: none"><li>▪ 1-2 lines of text preview on search results page</li><li>▪ Open links in multiple tabs and read full-text</li></ul>
Organization	<ul style="list-style-type: none"><li>▪ <b>Document clustering based to identify sub-topics</b></li></ul>	<ul style="list-style-type: none"><li>▪ User has to read and somehow organize everything after poring through numerous documents</li></ul>
Visualization	<ul style="list-style-type: none"><li>▪ <b>Visually map sub-topics, show individual document details and summary</b></li><li>▪ Made for knowledge professionals</li></ul>	<ul style="list-style-type: none"><li>▪ Google trends?</li></ul>

KCS

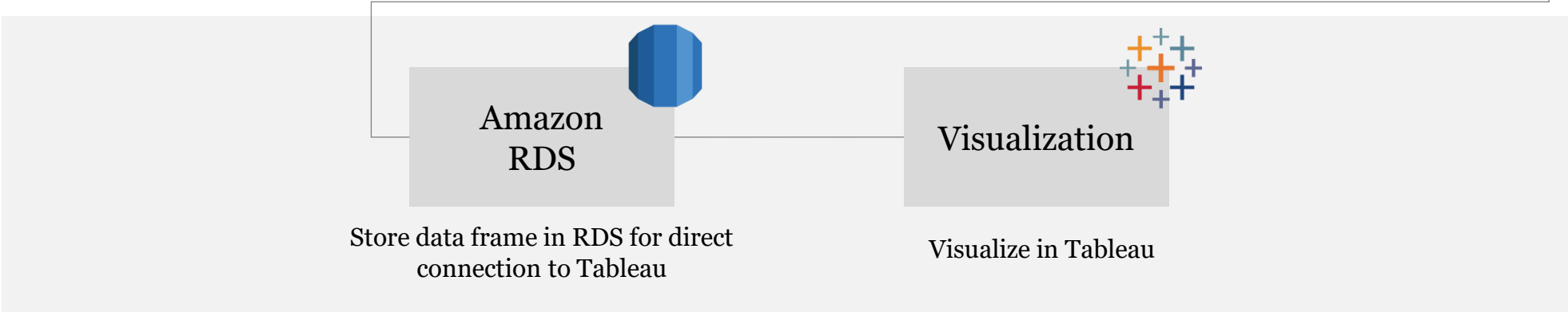
**Data  
Collection &  
Storage**



**Querying &  
Analysis**

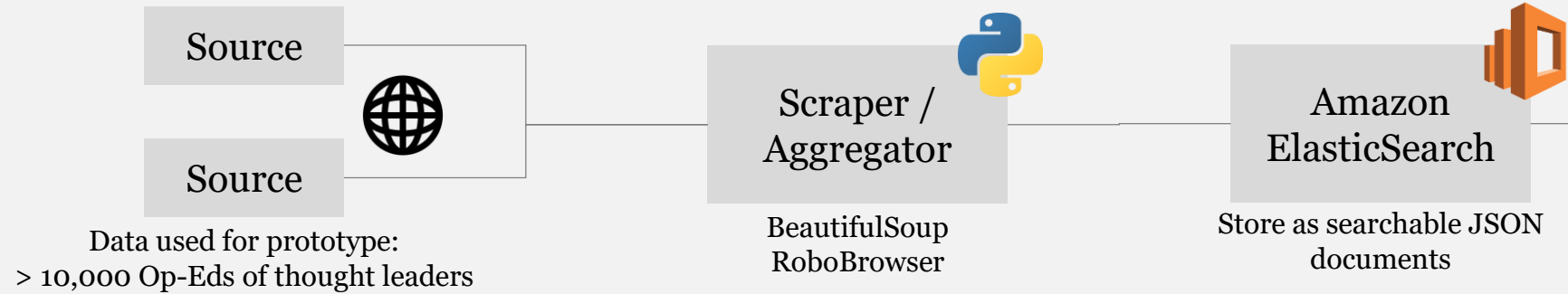


**Visualization**

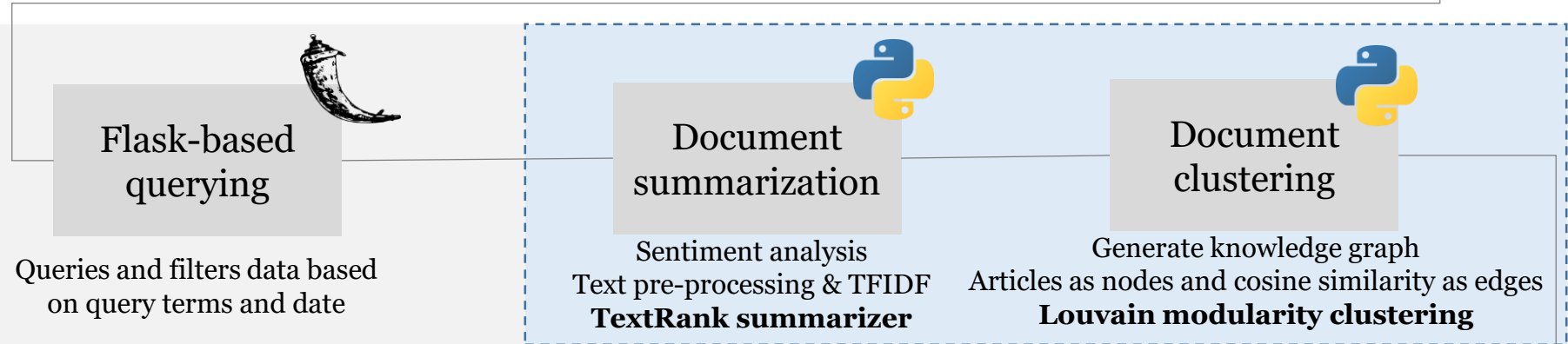




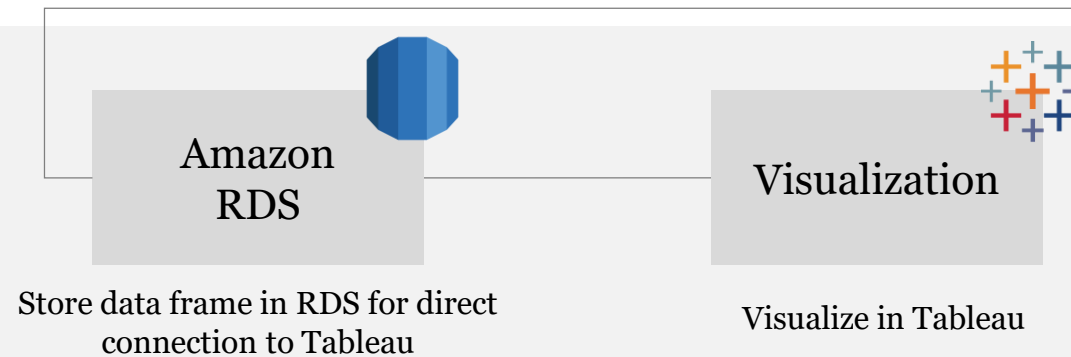
## Data Collection & Storage



## Querying & Analysis



## Visualization

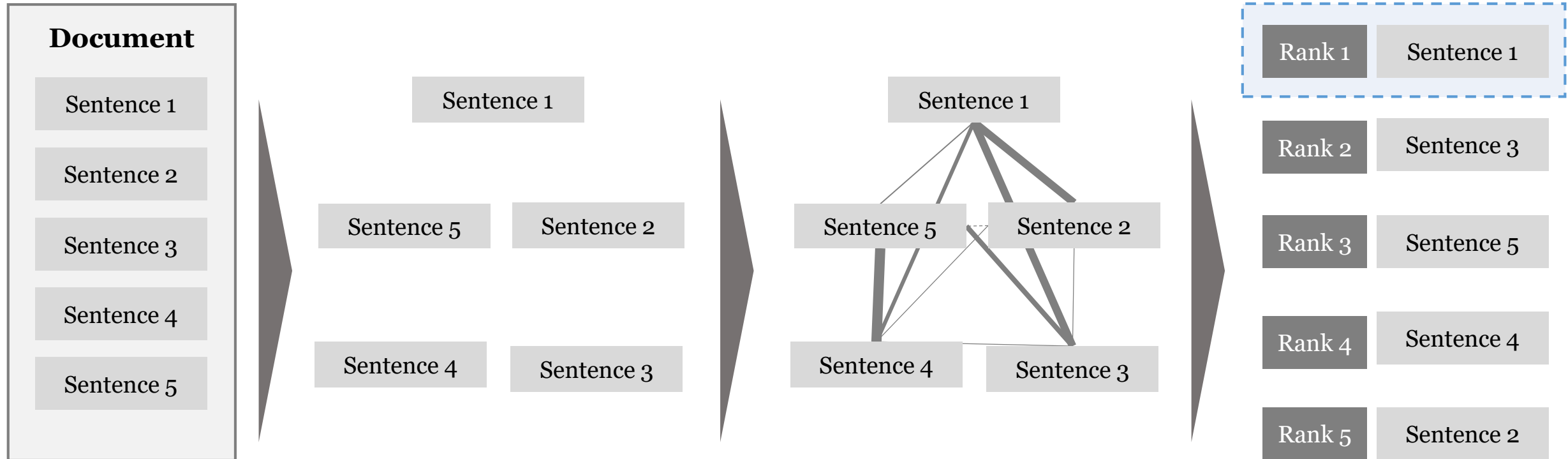


# Text summarization of single documents using TextRank algorithm

Separate document into sentences and set each as a node

Connect sentences based on how many words they share

Representative sentences can be used for summaries

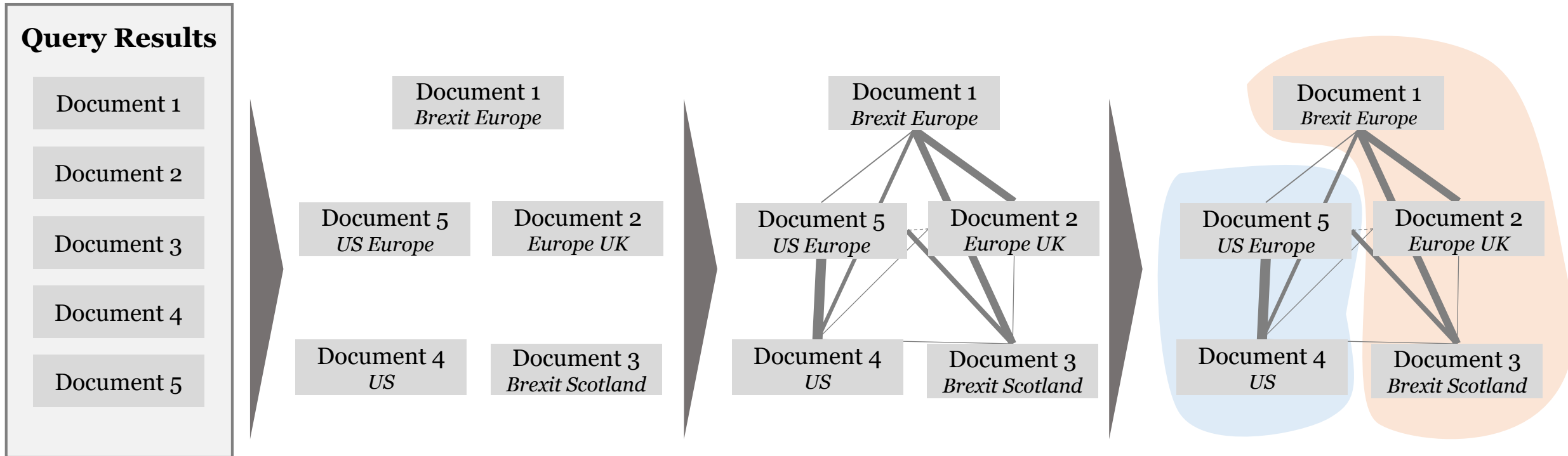


# Knowledge organization (document clustering) using Louvain modularity algorithm

Separate query results into documents and set each as a node

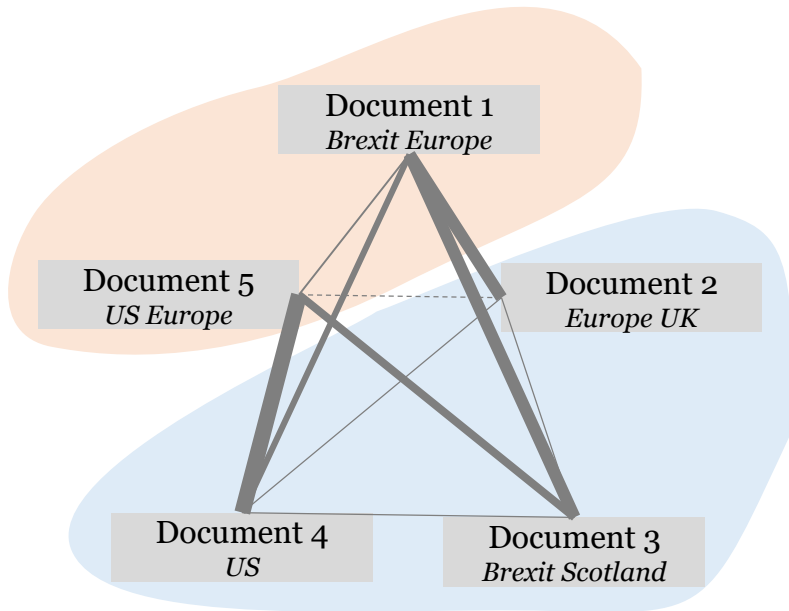
Connect documents based on how many words they share

Cluster similar documents

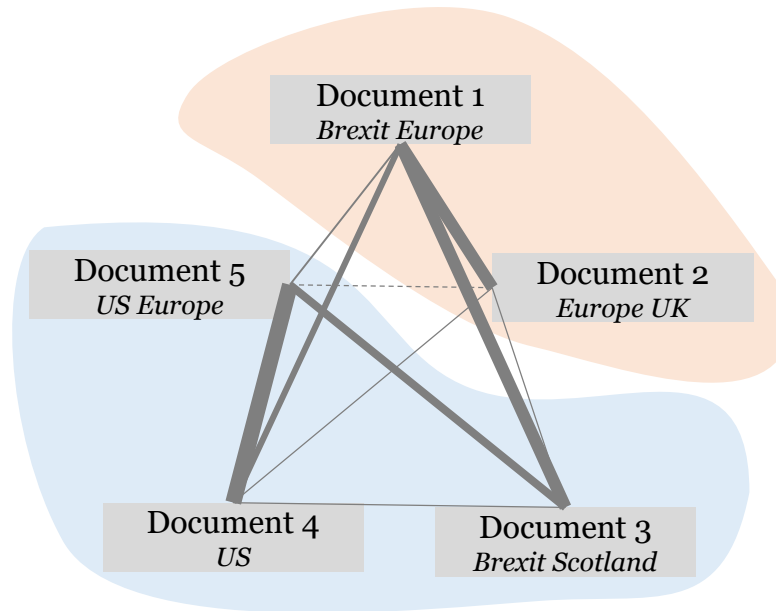


# Knowledge organization (document clustering) using Louvain modularity algorithm

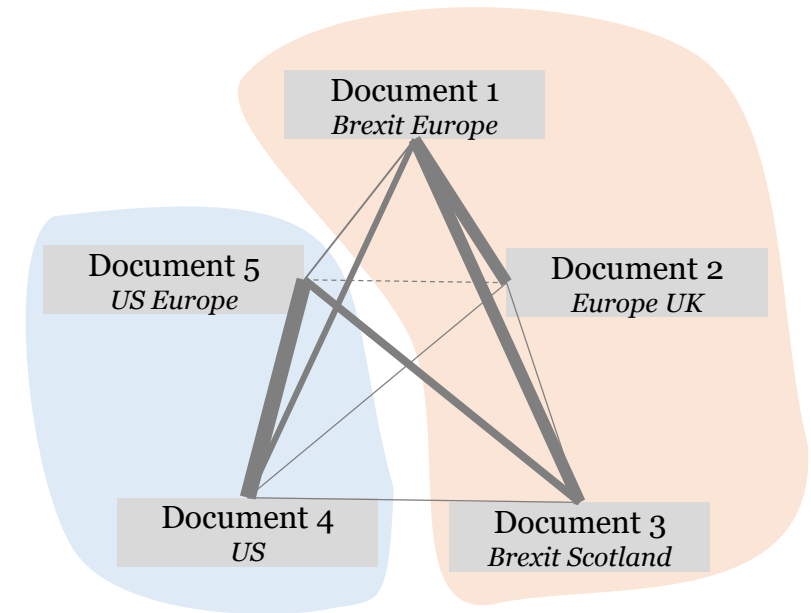
Low modularity



Medium modularity



High modularity



KCS

User Perspective

# Querying & Results

## Knowledge Content Summarizer

Please add query search terms and date

Query Terms:

Earliest Document Date:

# of Docs to be returned:

SUBMIT

## Knowledge Content Summarizer

### Results

Title	Author	Date	Summary	Sentiment	Cluster
The Brexit Alarm	Barry Eichengreen	2016-04-12	To be sure, ties with the EU would not be seve...	0.537495	0
Brexit's Impact on the World Economy	Anatole Kaletsky	2016-06-17	LONDON – The febrile behavior of financial mar...	0.424443	1
Brexit and the Balance of Power	Joseph S. Nye	2016-04-11	If Britain leaves the EU, America's closest al...	0.722187	1
The British Threat to UK Security	Jacek Rostowski	2016-01-11	But the country's decision not to join the Lea...	0.666503	1
How Germany Views Brexit	Clemens Fuest	2016-04-19	Moreover, some European decision-makers might ...	0.632591	0
Will Brexit Break the Pound?	Harold James	2016-03-01	It was under Prime Minister John Major's Conse...	0.289033	2
The Brexit Balance Sheet	Ian Buruma	2015-11-11	BRUSSELS – Prime Minister David Cameron's offe...	0.563648	0
Should Britain Leave the EU?	Michael J. Boskin	2016-04-21	STANFORD – In this, the 400th year since Willi...	0.239910	0

<b>Europe's Barbarians Inside the Gate</b> by <b>Nouriel Roubini</b> November 2015 1,096 words	<b>European Integration With or Without Britain</b> by <b>Kemal Dervis</b> June 2016 923 words	<b>A Happy New Year for Europe?</b> by <b>Carl Bildt</b> December 2015 822 words	<b>The Europe Question in 2016</b> by <b>Nouriel Roubini</b> January 2016 820 words	<b>A</b>
	<b>The Brexit of UK Banking</b> by <b>Howard Davies</b> February 2016 906 words			
<b>The Disintegration of Europe</b> by <b>Philippe Legrain</b> October 2015 1,009 words		<b>Europe's Make-or-Break Year</b> by <b>Joschka Fischer</b> December 2014 807 words	<b>Europe and</b>	<b>Europe's Stillborn Security Strategy</b> by <b>Ana Palacio</b> March 2016 779 words
	<b>The Battle for Britain</b> by <b>Philippe Legrain</b> December 2015 901 words			
<b>Europe's Three Fault Lines</b> by <b>Jean Pisani-Ferry</b> November 2015 1,007 words		<b>Twin Tests for the EU</b> by <b>Hans-Werner Sinn</b> May 2016 796 words		
	<b>Reinventing Europe</b> by <b>Joschka Fischer</b> May 2016 825 words			
<b>No Brexit</b> by <b>Anatole Kaletsky</b> February 2016 1,044 words	<b>The Brexit Muddle</b> by <b>Mohamed A. El-Erian</b> March 2016 998 words	<b>The Trade Costs of Leaving the EU</b> by <b>Roderick Abbott</b> May 2016 956 words	<b>The Causes and Consequences of Brexit</b> by <b>Ana Palacio</b> February 2016 941 words	<b>Why Britain Should Remain European</b> by <b>Simon Johnson</b> March 2016 894 words
	<b>The Economic Consequences of Brexit</b> by <b>Philippe Legrain</b> May 2016 1,017 words			
	<b>The Brexit Balance Sheet</b> by <b>Ian Buruma</b> November 2015 973 words			
<b>Should Britain Leave the EU?</b> by <b>Michael J. Boskin</b> April 2016 1,006 words	<b>Is Europe Worth the Effort?</b> by <b>Jean Pisani-Ferry</b> March 2016 970 words	<b>A British Test of Reason</b> by <b>Jean Pisani-Ferry</b> May 2016 865 words		<b>The Brexit Alarm</b> by <b>Barry Eichengreen</b> April 2016 810 words
		<b>How Germany Views Brexit</b> by <b>Clemens Fuest</b> April 2016 863 words		

<b><u>Trump's Dangerous America First Campaign</u></b> by <b>Yuriko Koike</b> April 2016 1,026 words	<b><u>The Anglosphere Illusion</u></b> by <b>Gareth Evans</b> February 2016 996 words	<b><u>Brexit, Voice, and Loyalty</u></b> by <b>Harold James</b> January 2013 947 words	<b><u>The Global Economy's New Abnormal</u></b> by <b>Nouriel Roubini</b> February 2016 947 words
<b><u>Brexit's Impact on the World Economy</u></b> by <b>Anatole Kaletsky</b> June 2016 928 words		<b><u>Brexit and the Special Relationship</u></b> by <b>Richard N. Haass</b> February 2016 849 words	<b><u>The World's Ins and Outs</u></b> by <b>Lucy P. Marcus</b> June 2016 831 words
<b><u>Last Man Standing</u></b> by <b>Mark Leonard</b> May 2016 921 words		<b><u>Latin America's Rising Right</u></b> by <b>Mohamed A. El-Erian</b> June 2016 772 words	<b><u>The British Threat to UK Security</u></b> by <b>Jacek Rostowski</b> January 2016 691 words
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<b><u>David Cameron and the EU's Waterloo</u></b> by <b>Ashoka Mody</b> June 2015 955 words		<b><u>Why Brexit is Unpatriotic</u></b> by <b>Dominique Moisi</b> February 2016 805 words	
<b><u>Brexit's Questions for Europe</u></b> by <b>Javier Solana</b> March 2016 870 words		<b><u>Ever Closer Union or Common Market?</u></b> by <b>Joschka Fischer</b> March 2016 752 words	
<b><u>Saying Yes to Europe</u></b> by <b>Carl Bildt</b> February 2016 986 words	<b><u>Brexit and New Europe</u></b> by <b>Laszlo Bruszt</b> May 2016 763 words	<b><u>Will Britain Choose Irrelevance?</u></b> by <b>Dambisa Moyo</b> April 2016 734 words	
	<b><u>The Brexit Conspiracy</u></b> by <b>Noëlle Lenoir</b> March 2016 763 words		

<b>Will Brexit Break the Pound?</b> by <b>Harold James</b> March 2016 952 words	<b>A Step Closer to Brexit?</b> by <b>Peter</b>
<b>The Battle for Britain</b> by <b>Danuta Hübner</b> May 2015 895 words	<b>What Now for Britain and Europe?</b> by <b>Giles Merritt</b> May 2015 802 words

Cluster

☒ (All)

☒ 0

☒ 1

☒ 2

☒ 3

☒ 4

☒ 5

☒ 6

<b>Europe's Barbarians Inside the Gate</b> by Nouriel Roubini November 2015 1,096 words	<b>European Integration With or Without Britain</b> by Kemal Derviş June 2016 923 words	<b>Reinventing Europe</b> by Joschka Fischer May 2016 825 words	<b>A Post-Referendum Agenda for Britain</b> by Chris Patten May 2016 807 words	<b>Europe's Make-or-Break Year</b> by Joschka Fischer December 2014 807 words	<b>Trump's Dangerous America First Campaign</b> by Yuriko Koike April 2016 1,026 words	<b>The Anglosphere Illusion</b> by Gareth Evans February 2016 996 words	<b>Brexit, Voice, and Loyalty</b> by Harold James January 2013 947 words
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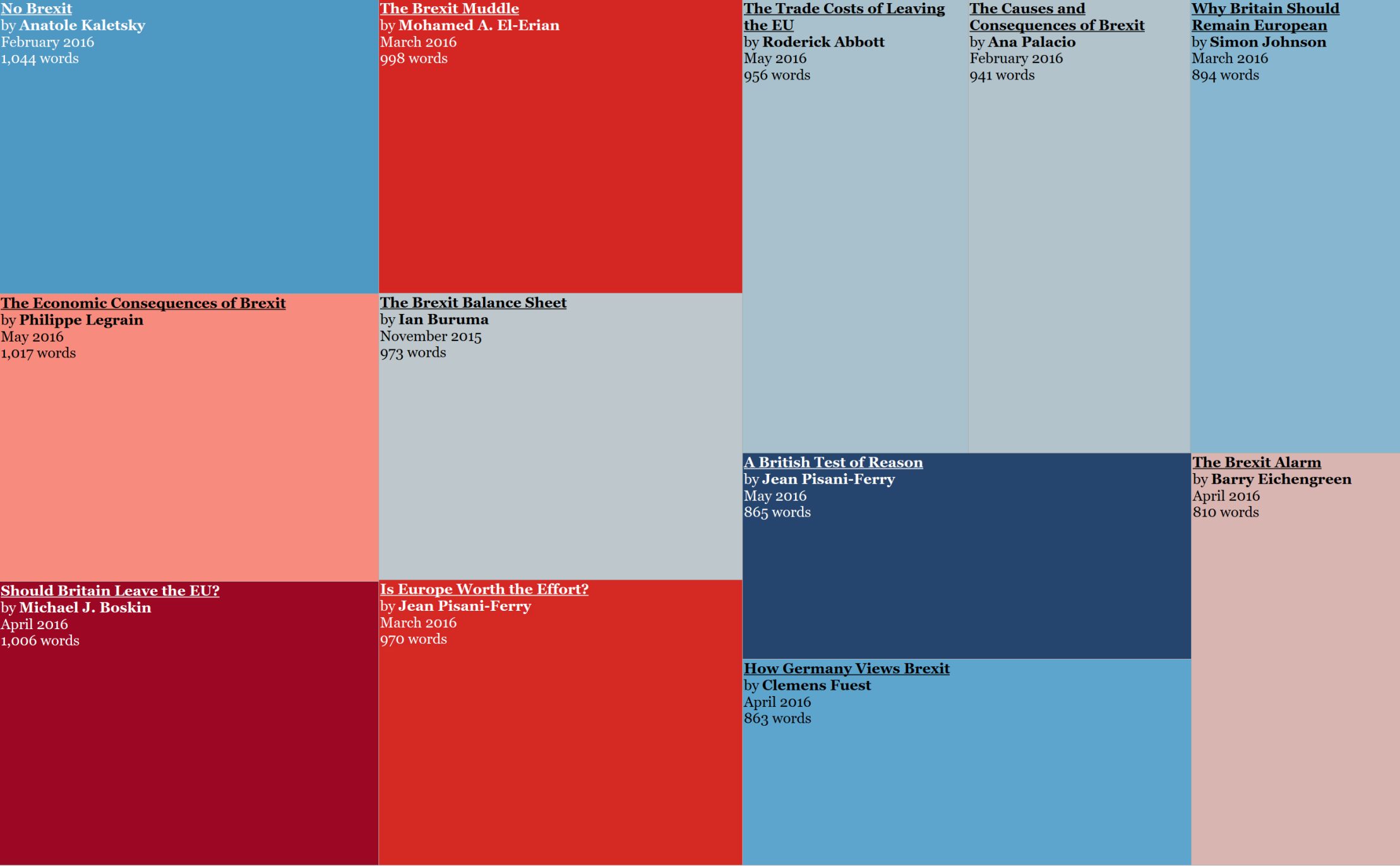
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<p><b>Should Britain Leave</b> by Michael J. Boskin April 2016 1,006 words</p>	<div> <p><b>Title:</b> The Economic Consequences of Brexit  <b>Author:</b> Philippe Legrain  <b>Summary:</b>            They assert that after “Brexit”, the UK could quickly negotiate a bespoke agreement with the EU that offers all the benefits of free trade without the costs of EU membership; strike better trade deals with other countries; and reap huge benefits from scrapping burdensome EU regulations.            The London School of Economics’ Centre for Economic Performance calculates that the long-term costs to Britain of lower trade with the EU could be as high as 9.5% of GDP, while the fall in foreign investment could cost 3.4% of GDP or more.            Britain’s net contribution to the EU budget amounted to only 0.35% of GDP last year, and scrapping EU regulation would bring limited benefits, because the UK’s labor and product markets are already among the freest in the world.            That would provide almost full access to the single market (with opt-outs from EU agriculture and fisheries policies), albeit with customs controls and other trade barriers such as rules-of-origin requirements. Britain’s new trade deals with non-EU countries would also probably involve worse terms.</p> </div>			
		<p><b>h Test of Reason</b> Pisani-Ferry 5 s</p>		<p><b>The Brexit Alarm</b> by Barry Eichengreen April 2016 810 words</p>
		<p><b>rmany Views Brexit</b> ens Fuest 6 s</p>		


Cluster


☐ (All)
 ☒ 0
 ☐ 1
 ☐ 2
 ☐ 3
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 ☐ 6




Cluster

- ☐ (All)
- ☒ 0
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6

 Negative

 Neutral

 Positive

# Further development

- Multi-document summarization (MDS) by document clusters using abstractive summarization methods like shortest path word graphs
  - Using extractive summarization methods, like TextRank, for MDS does not produce reader-friendly summaries
- Function to generate reader-friendly print-ready document cluster summarizations / reports
- Beta KCS
  - Scale infrastructure, strike non-profit deals with data sources

# Thanks!



## **Kenn Daniel Chang So**

- Loves to explore cities by foot
- Former Consultant and Investment Banker
- Github & LinkedIn handles: kenndanielso
- E-mail: kenndanielso@gmail.com