Web Histories & Web Archives

Government Information Day 2016

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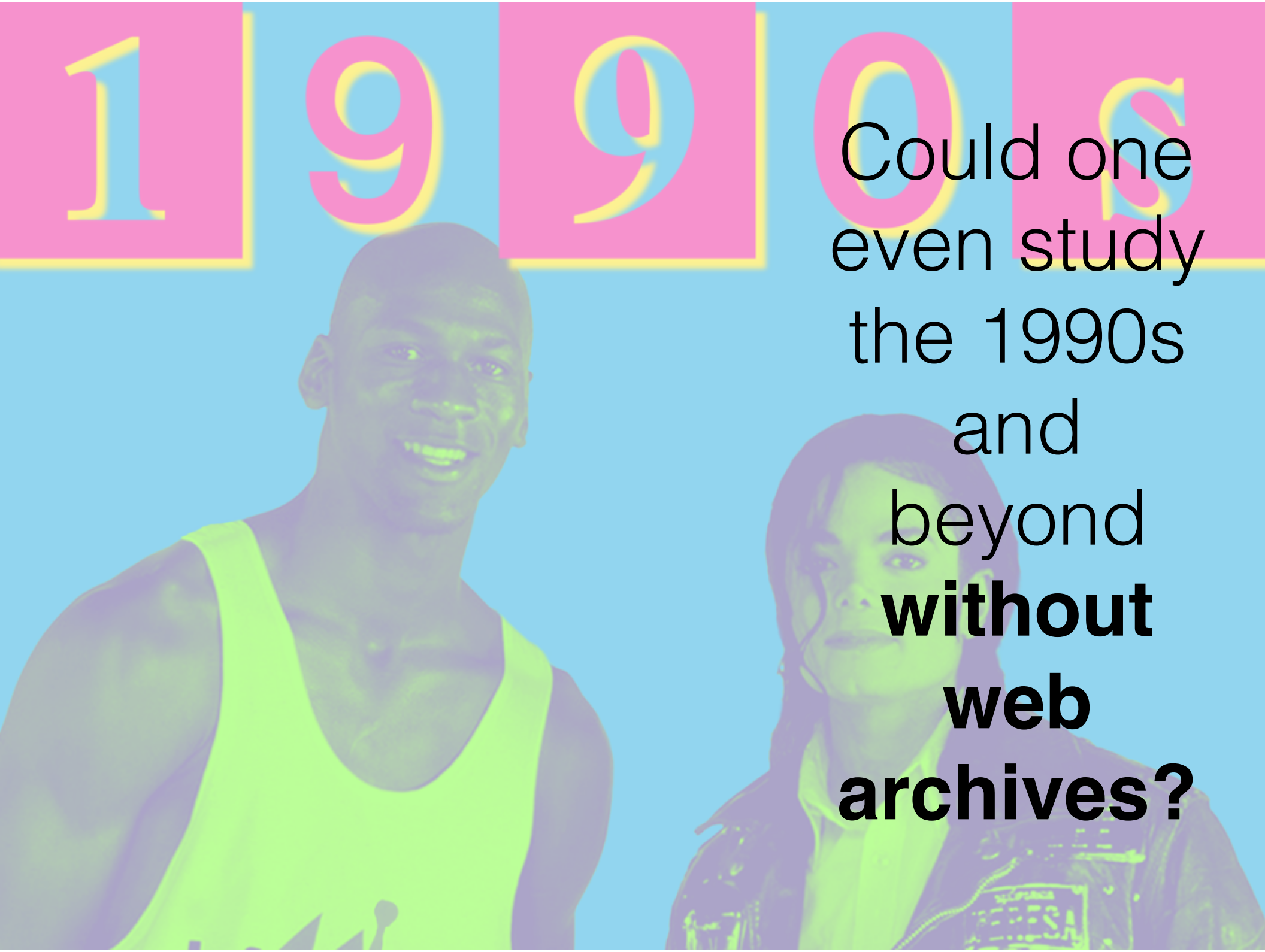
FACULTY OF ARTS
Department of History

Why?

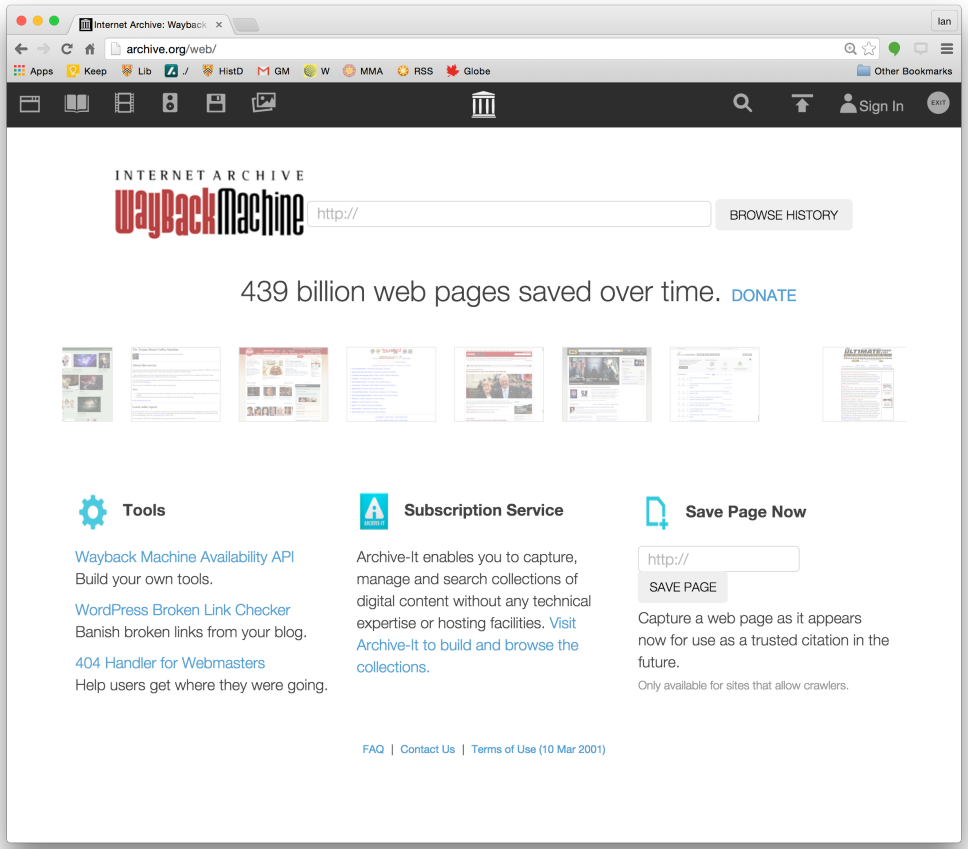
The sheer amount of social, cultural, and political information generated every day presents new opportunities for historians.


1990s
Could one even study the 1990s and beyond **without web archives?**

No.

Historians need to do this now, or we're going to be left behind.

Nightmare Scenario



This won't be enough!

… but what will our search engines look like?

Nightmare Scenario

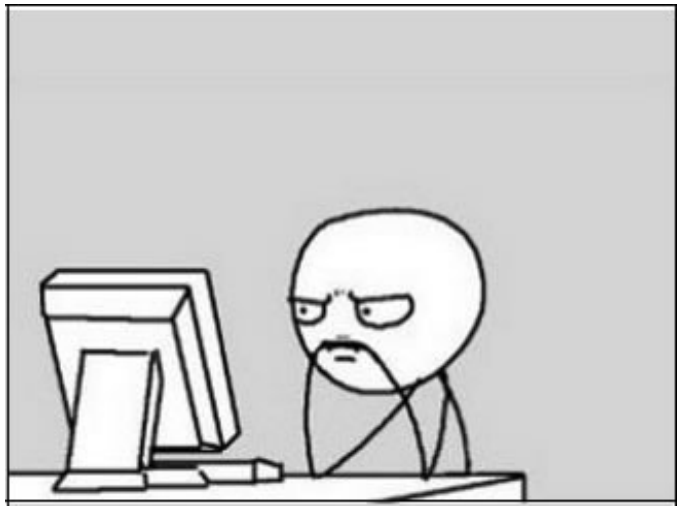
- Historians rely uncritically on **date-ordered keyword search results**, putting them at mercy of search algorithms they do not understand (similar to digitized newspapers);
- Historians are completely left out of post-1996 research, letting everybody else do the work (a la Culturomics project/*Nature* magazine article);
- Our profession gets left behind…

But what will web archives look like?

- Two Case Studies
  - **Wide Web Scrape**, March - December 2011 (Internet Archive) (sample of 80TB WARC collection);
  - **Archive-It Longitudinal Collections, Canadian Political Parties & Interest Groups**, 2005-present (Archive-It/University of Toronto)

Similarities -

Windows into the lives of everyday people.



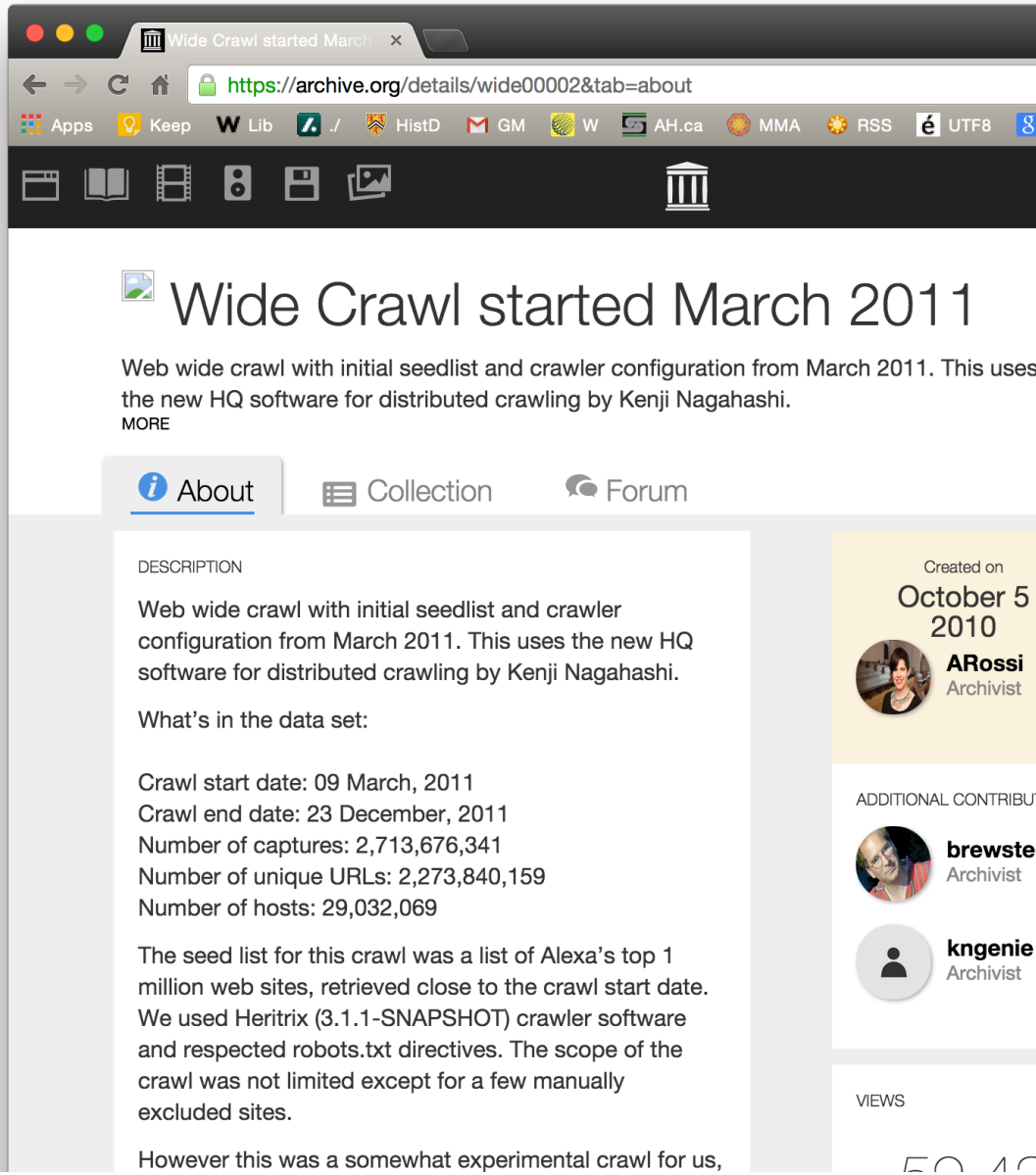
Differences -

Incredible range of technical skills/no common platform!

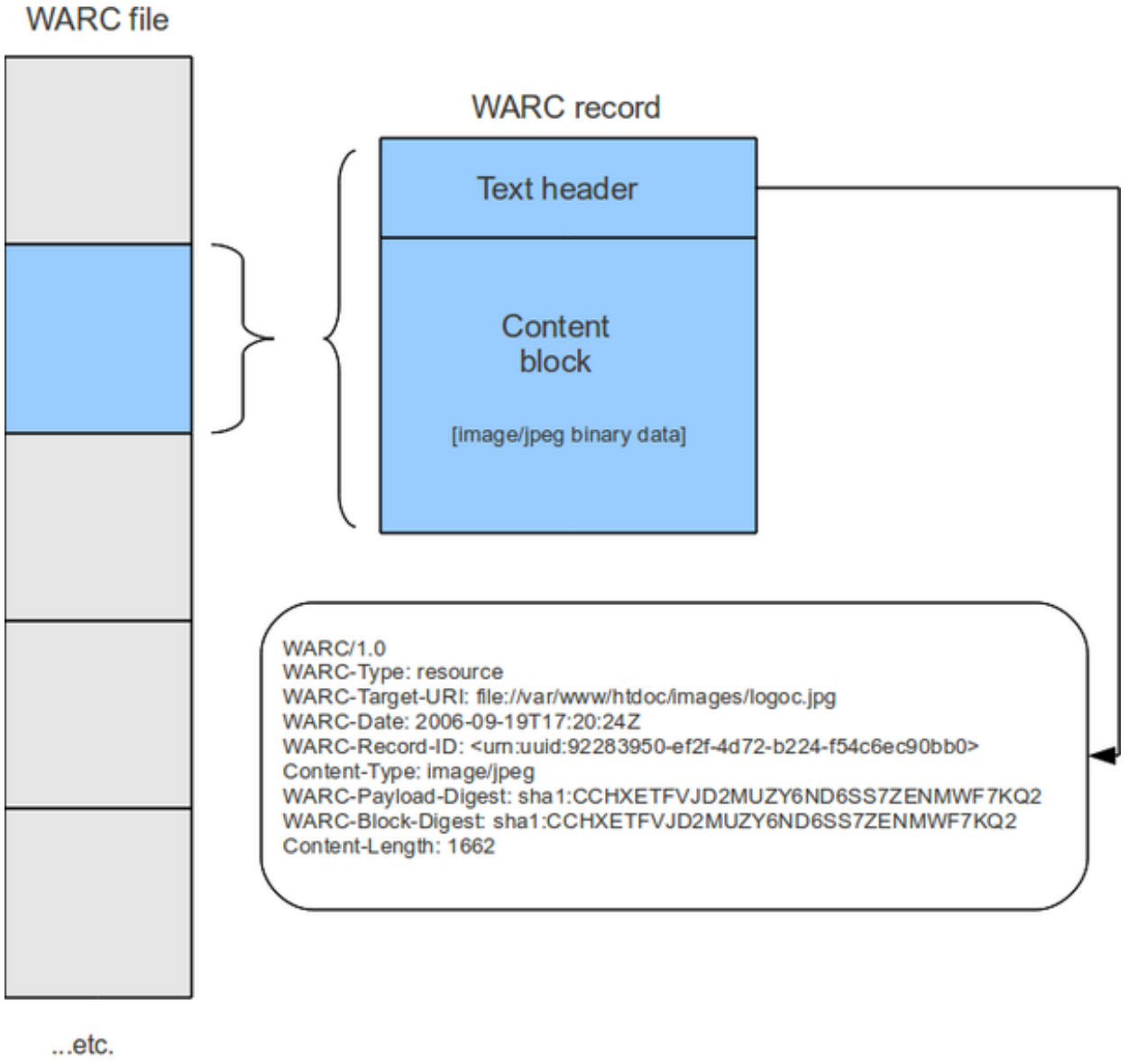
A prologue to the political/government data..

Case Study One

- The **Wide Web Scrape** (~ 80TB) - Snapshot of the Web
- **85,570** WARC files, CDX metadata
- Using it here as **an introduction to what the scale of this data can look like**



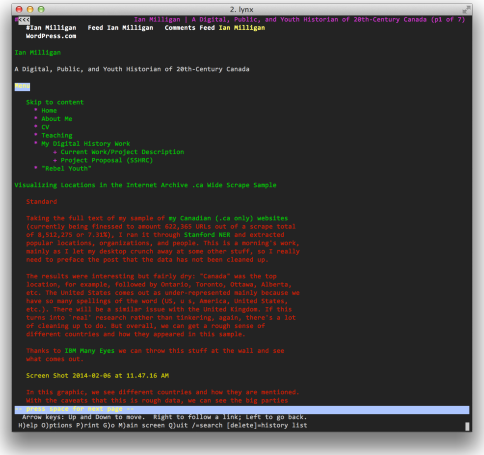
WARC File Format



ca,yorku,justlabour)/ 20110714073726
http://www.justlabour.yorku.ca/ text/html
302 3I42H3S6NNFQ2MSVX7XZKYAYSCX5QBYJ
http://www.justlabour.yorku.ca/index.php?
page=toc&volume=16 - 462 880654831
WIDE-20110714062831-crawl416/
WIDE-20110714070859-02373.warc.gz

Top-Level Domain	Number of Distinct URLs Downloaded in Sample	Number of Overall URLs in Wide Web Scrape (selected domains)	Percentage of URLs Captured
.com	29,219,706	1,260,409,874	2.32%
.org	2,489,050	96,681,268	2.57%
.net	2,438,903	140,726,805	1.73%
.edu	350,482	6,620,283	5.29%
.gov	97,484	2,205,332	4.42%
.mil	10,268	103,507	9.92%
.ca	622,365	8,512,275	7.31%
.uk	464,991	21,870,821	2.13%
.fr	239,160	13,654,404	1.75%
.in	105,287	3,736,316	2.82%
.cn	5,499,593	133,105,864	4.13%
.ke	4883	37,871	12.89%
TOTAL	**41,542,172**	**1,687,664,620**	**2.46%**

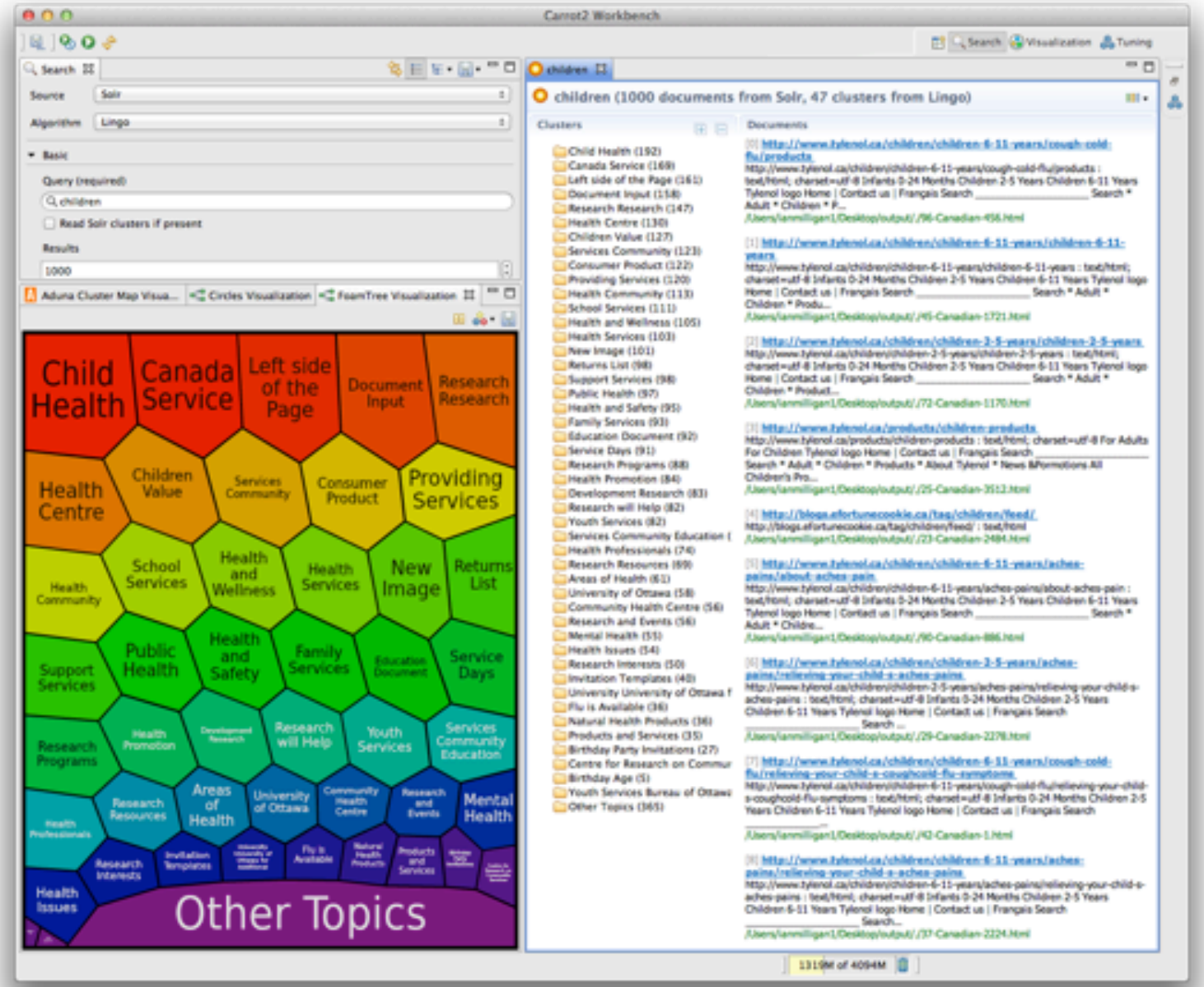
CDX Files
(finding aids)



WARC File

Plain Text
Conversion

Indexing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Consumer Product
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Health Community
School Services
Health and Wellness
Health Services
New Image
Returns List
Public Health
Health and Safety
Family Services
Education Document
Service Days
Support Services
Research Programs
Health Promotion
Development Research
Research will Help
Youth Services
Services Community Education
Areas of Health
University of Ottawa
Community Health Centre
Research and Events
Mental Health
Research Resources
Health Professionals
Research Interests
Invitation Templates
Flu is Available
Natural Health Products
Products and Services
Health Issues
Other Topics
children
children (1000 documents from Solr, 47 clusters from Lingo)
Clusters
Child Health (192)
Canada Service (169)
Left side of the Page (161)
Document Input (158)
Research Research (147)
Health Centre (130)
Children Value (127)
Services Community (123)
Consumer Product (122)
Providing Services (120)
Health Community (113)
School Services (111)
Health and Wellness (105)
Health Services (103)
New Image (101)
Returns List (98)
Support Services (98)
Public Health (97)
Health and Safety (95)
Family Services (93)
Education Document (92)
Service Days (91)
Research Programs (88)
Health Promotion (84)
Development Research (83)
Research will Help (82)
Youth Services (82)
Services Community Education (
Health Professionals (74)
Research Resources (69)
Areas of Health (61)
University of Ottawa (58)
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[4] http://blogs.efortunecookie.ca/tag/children/feed/
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[5] http://www.tylenol.ca/children/children-6-11-years/aches-pains/about-aches-pain
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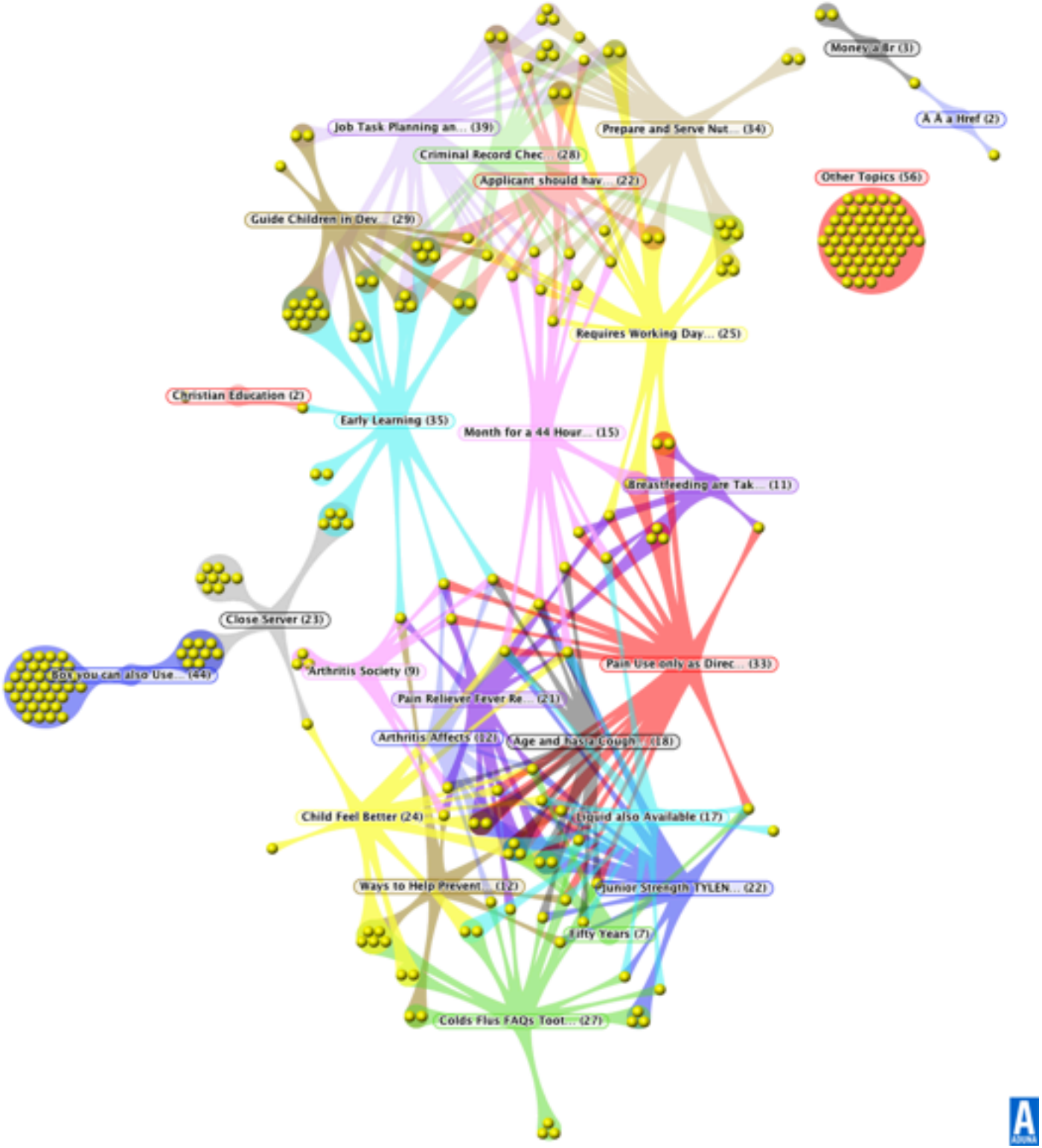
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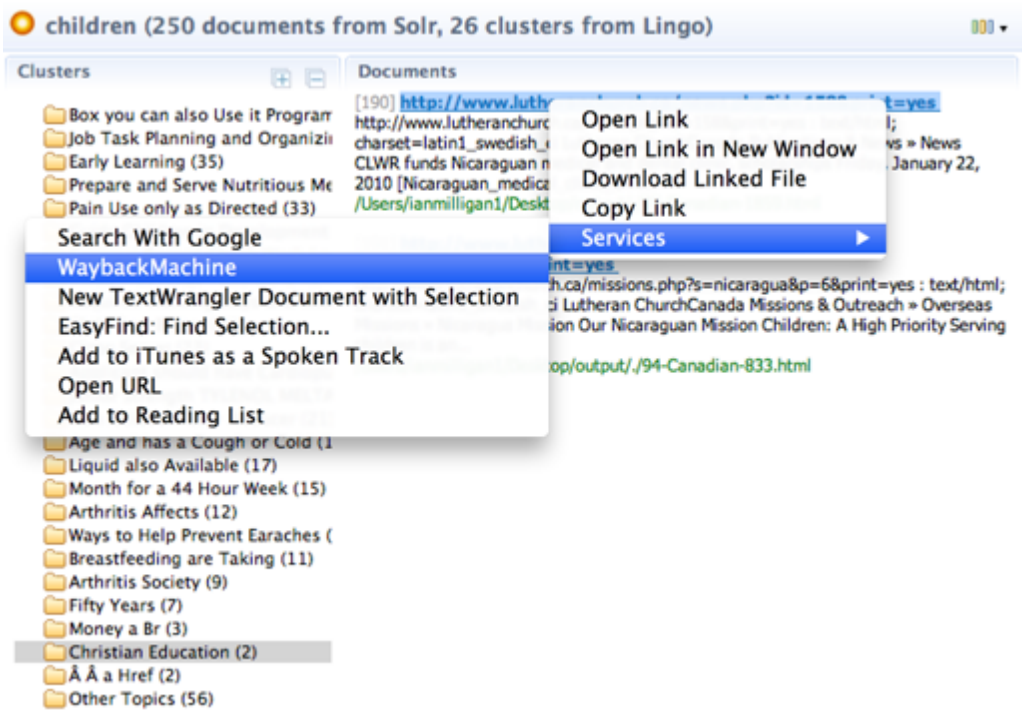
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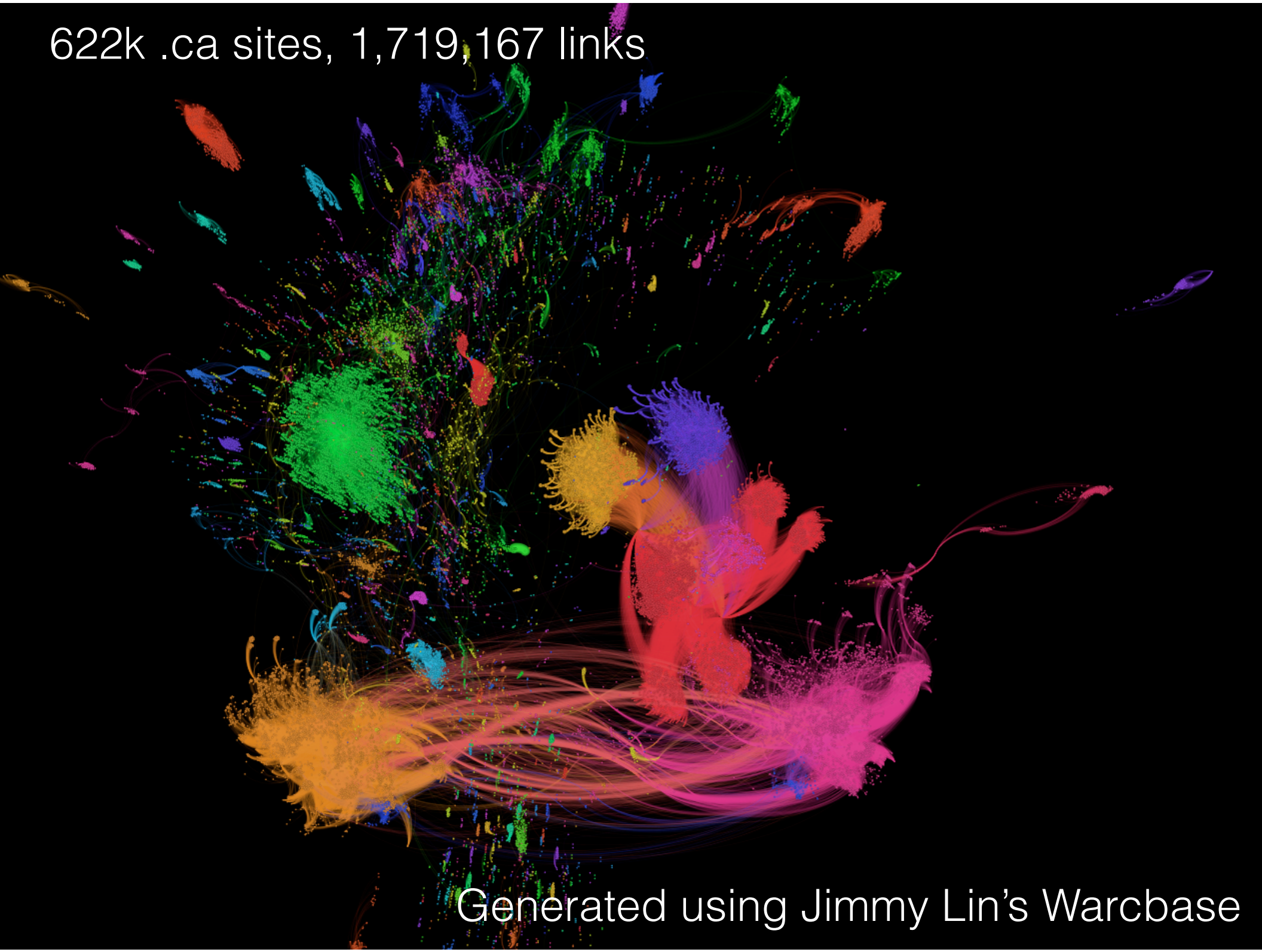
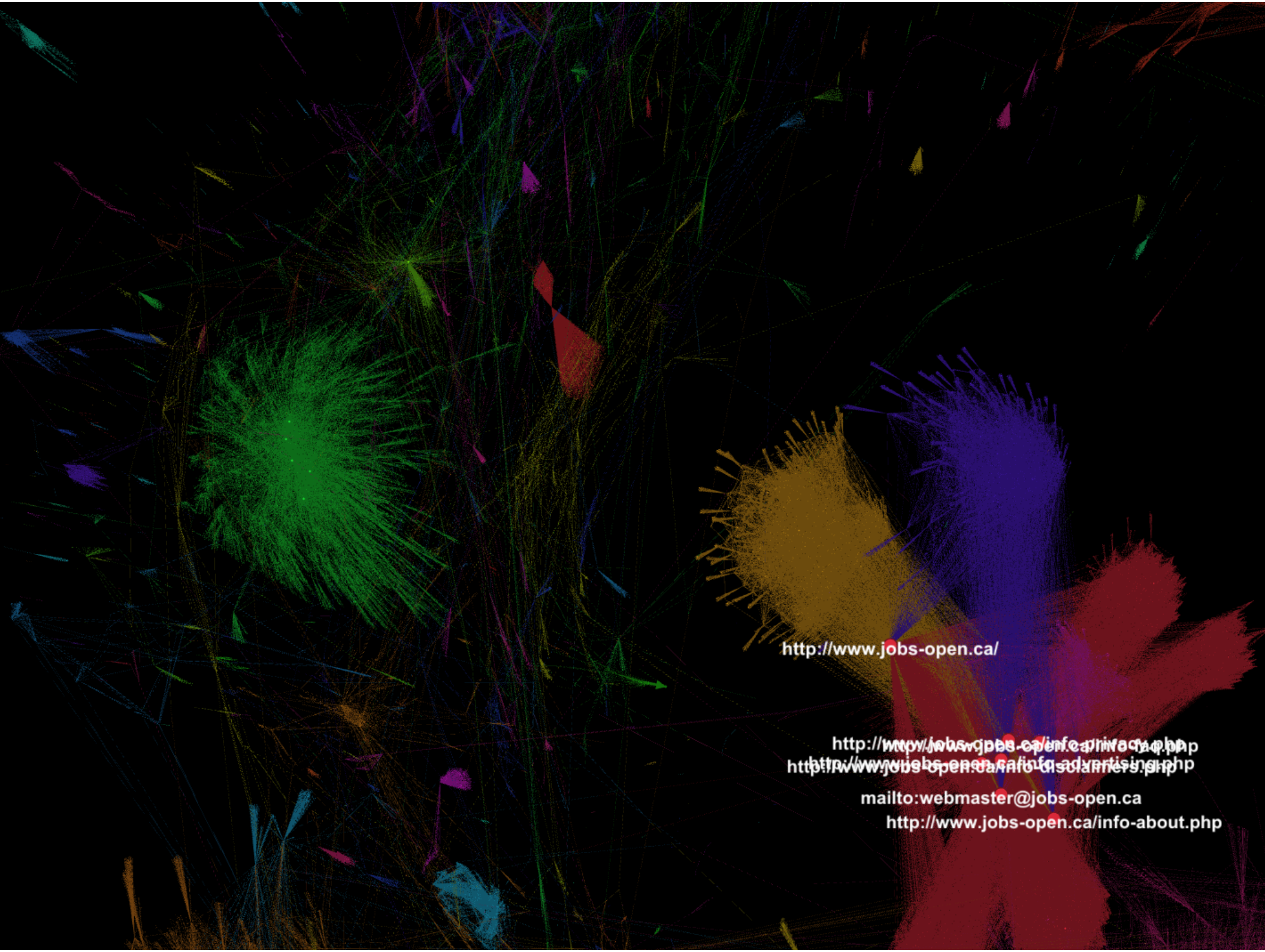
CLWR funds Nicaraguan medical and dental clinic, scholarships
Friday, January 22, 2010
WINNIPEG – Canadian Lutheran World Relief (CLWR) has announced $36,500 in funding for two Lutheran Church–Canada (LCC) programs in Nicaragua this year.
The announcement was made as Iglesia Luterana Sinodo de Nicaragua (ILSN) prepares for its first biennial convention and includes new money for a medical and dental clinic and increased school scholarships.
The medical clinic, which began operations in May 2009, is open every Thursday beginning at 8 a.m. and remains open until all patients have been seen.
The clinic is staffed by a doctor and a dentist, who see an average of 40-45 patients each week, and provides common medications because many patients are too poor to purchase them.
A medical clinic in Nicaragua.
CLWR will continue supporting the Christian Children Education Program.
The program, conducted in all 23 congregations of ILSN, provides an average of 25 scholarships in each community to the neediest children.
The scholarships include the required school uniforms, shoes, backpacks and school supplies.
Each child is also enrolled in the tutoring and Christian-education class held five days a week when children are not in school (Children after school in the morning or in the afternoon.)
These classes, held in the churches and led by teachers and deaconesses, provide tutoring and homework support for the children in math, Spanish and other subjects. A portion of the time is also set aside for Christian education and cultural activities.
More than 750 children are enrolled in the program. CLWR has provided support for about 250 children.
Since 1999, CLWR has partnered with LCC to support community-development projects.
Robert Granke, executive director of CLWR, visited congregations of the ILSN in November. You can read more about his visit at www.
www.lccontheroad.ca , The Canadian Lutheran or in the forthcoming issue of CLWR's Partnership newsletter due out in early February.

Problem is.. you need to know what you’re looking for!


622k .ca sites, 1,719,167 links
Generated using Jimmy Lin's Warcbase


http://www.jobs-open.ca/
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mailto:webmaster@jobs-open.ca
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http://www.biblio.uottawa.ca/index-f.php
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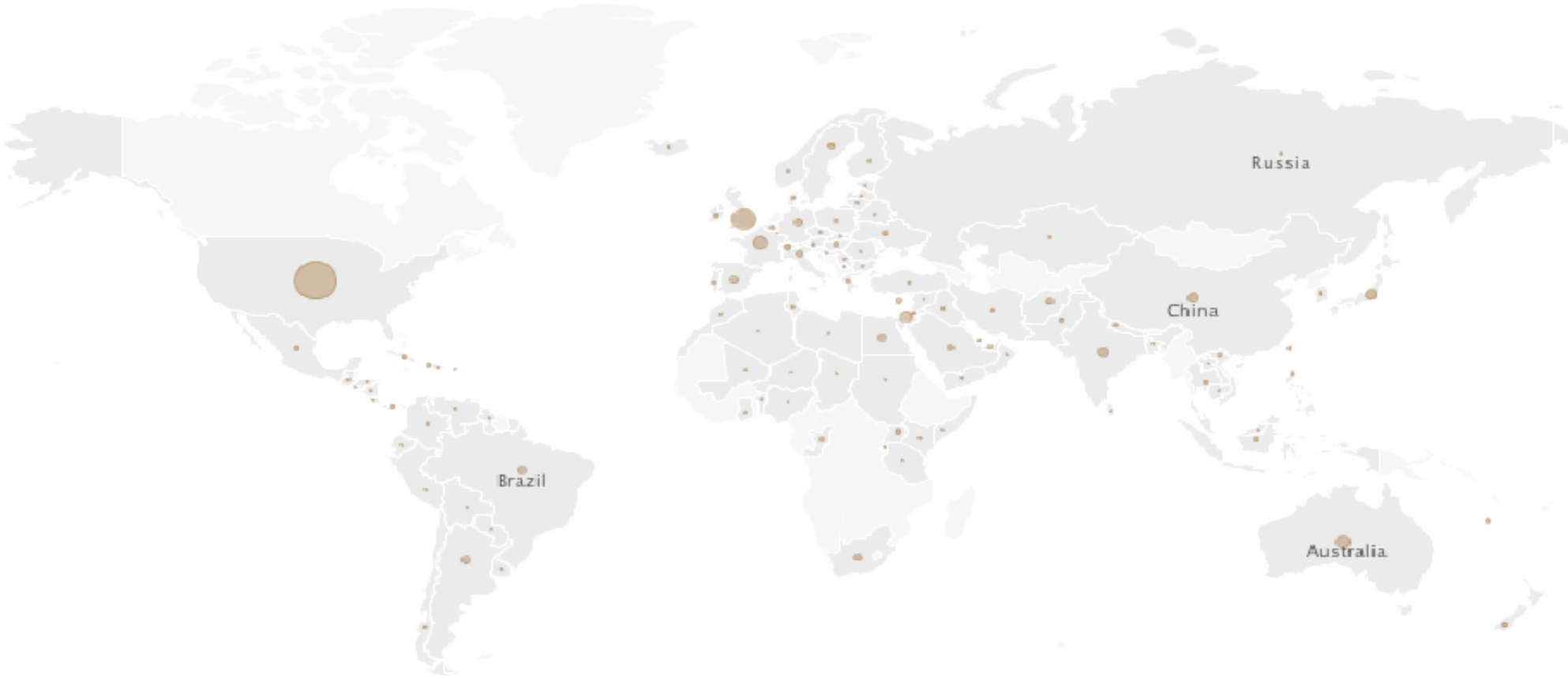
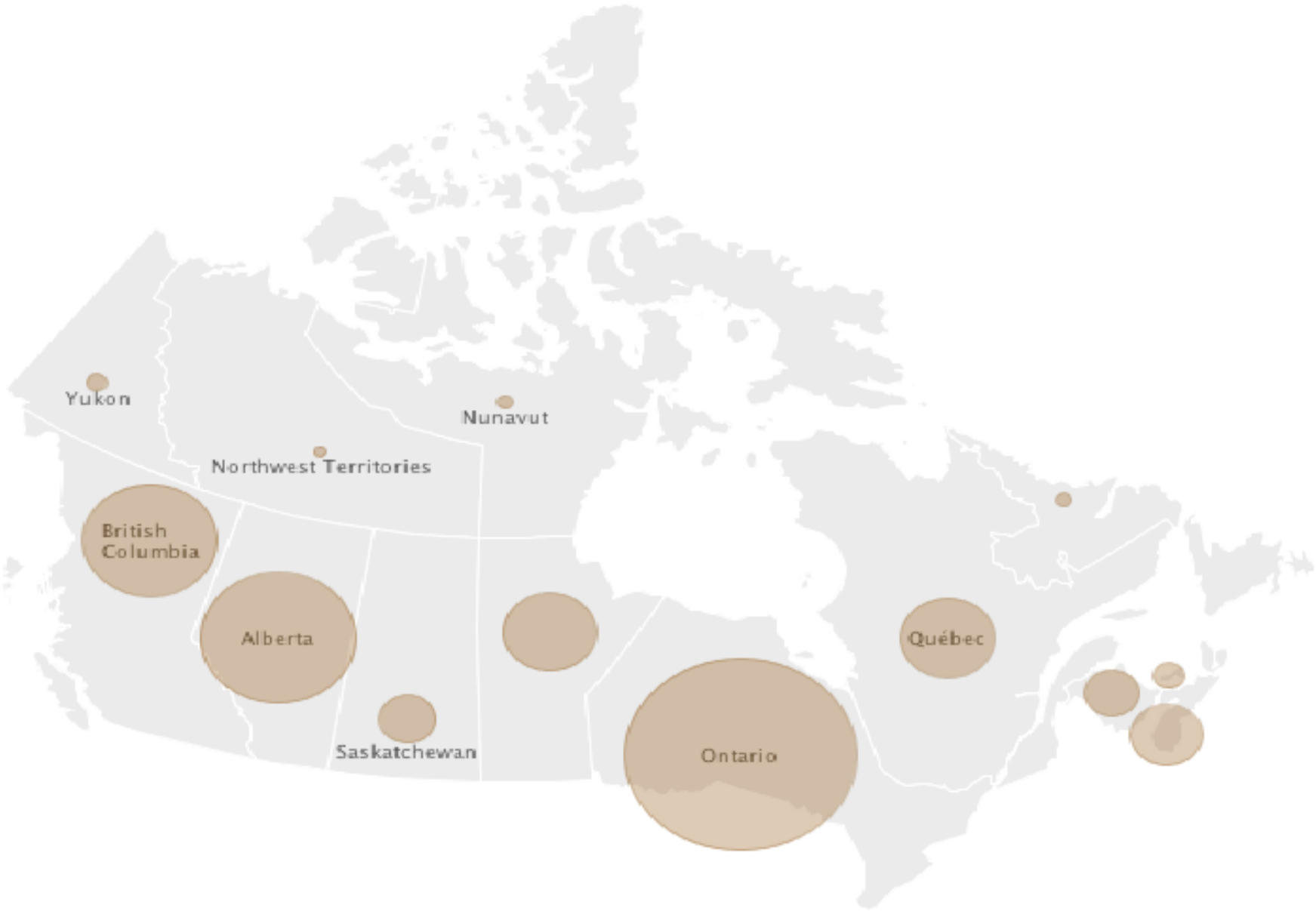
http://www.uottawa.ca/bienvenue.html
https://web3.uottawa.ca/infoweb/logon/fr.html
http://www.ressourcesfinancieres.uottawa.ca/etudiant/payment-university-fees-fr.php
http://www.uottawa.ca/academic/info/regist/crs/programmes.htm
http://www.admission.uottawa.ca/Default.aspx?tabid=2548&sourceqp
http://www.uottawa.ca/contactez-nous.html
http://www.uottawa.ca/requirer.html
http://www.uottawa.ca/Default.aspx?tabid=2672
https://web9.uottawa.ca/services/SiteValidation/a/student/guide/francais/?section/bourses/
http://www.uottawa.ca/icone-recherche/

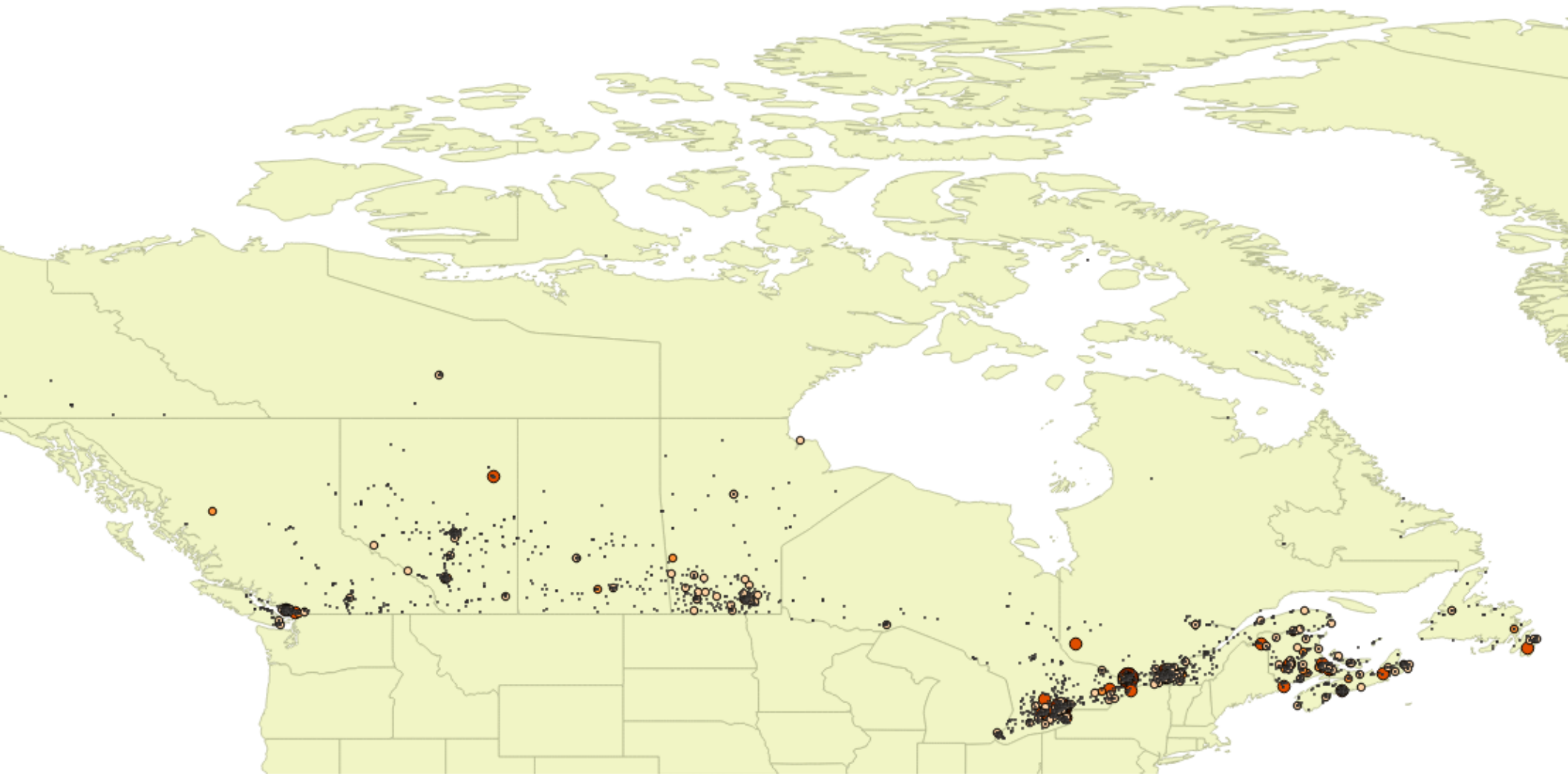
Countries Mentioned in .ca TLD (excluding Canada)



Provinces Mentioned in .ca TLD



Canadian Postal Codes visualized

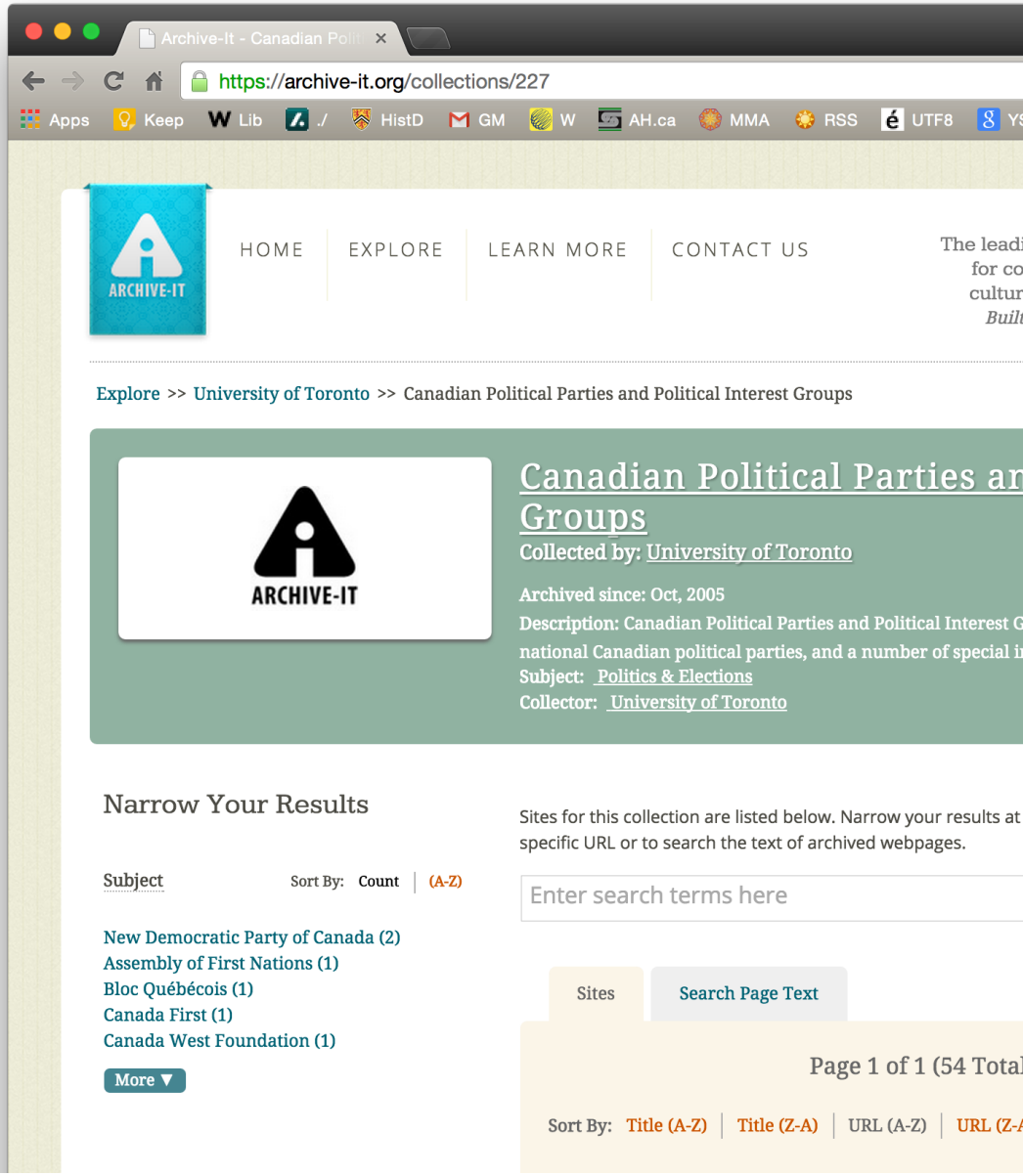


With longitudinal analysis, we could do fantastic things - contextualizing subsequent studies.

Wide Web Scrapes and the **Dream of Social History**.

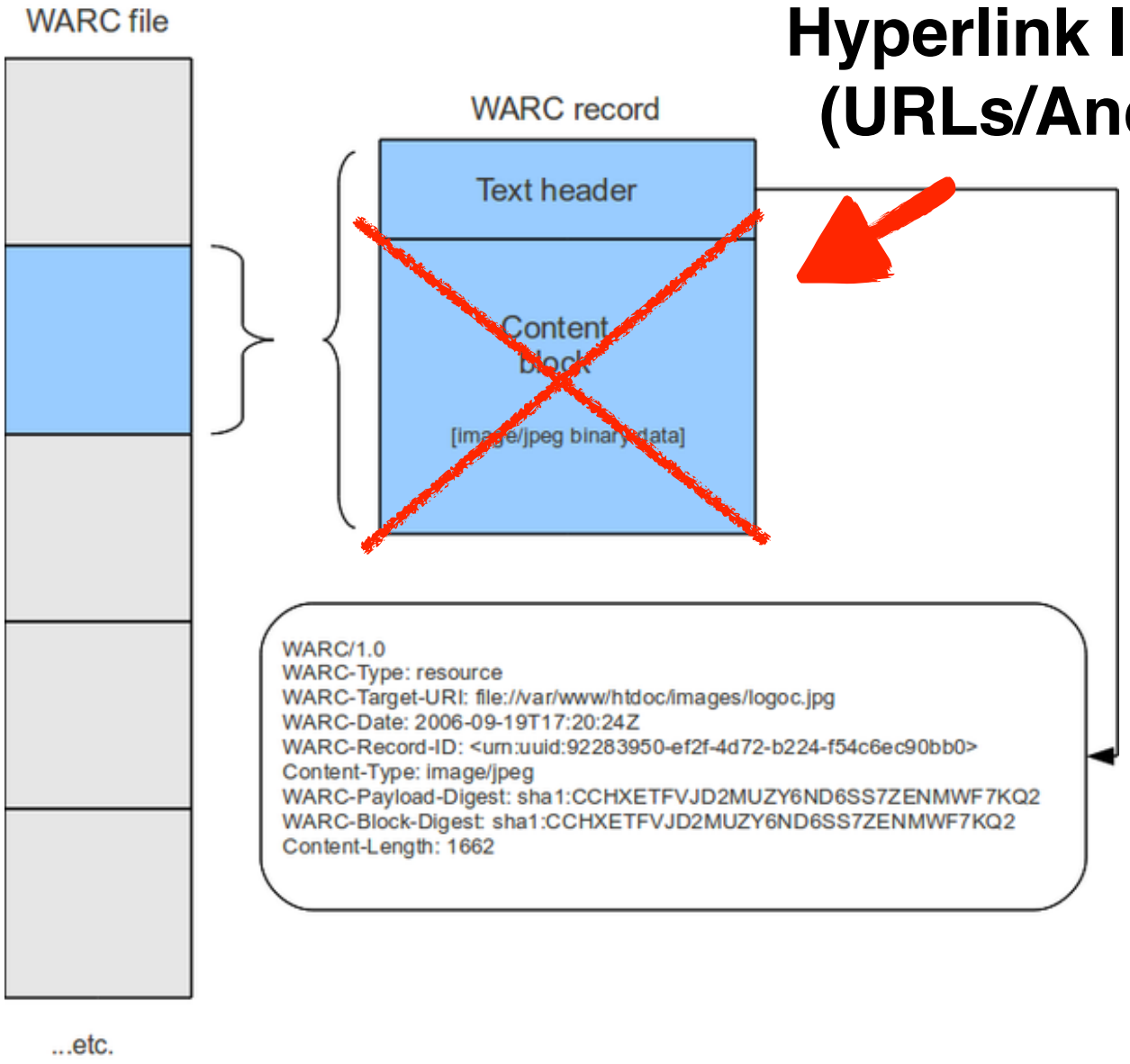
Case Study Two

- **Archive-It Research Services**: "Canadian Political Parties and Political Interest Groups" Collection (Collaborative effort w/ Archive-It & University of Toronto's Nicholas Worby)
- 2005 - 2015
- WAT & WARC files



WAT Files

Hyperlink Information (URLs/Anchor Text)

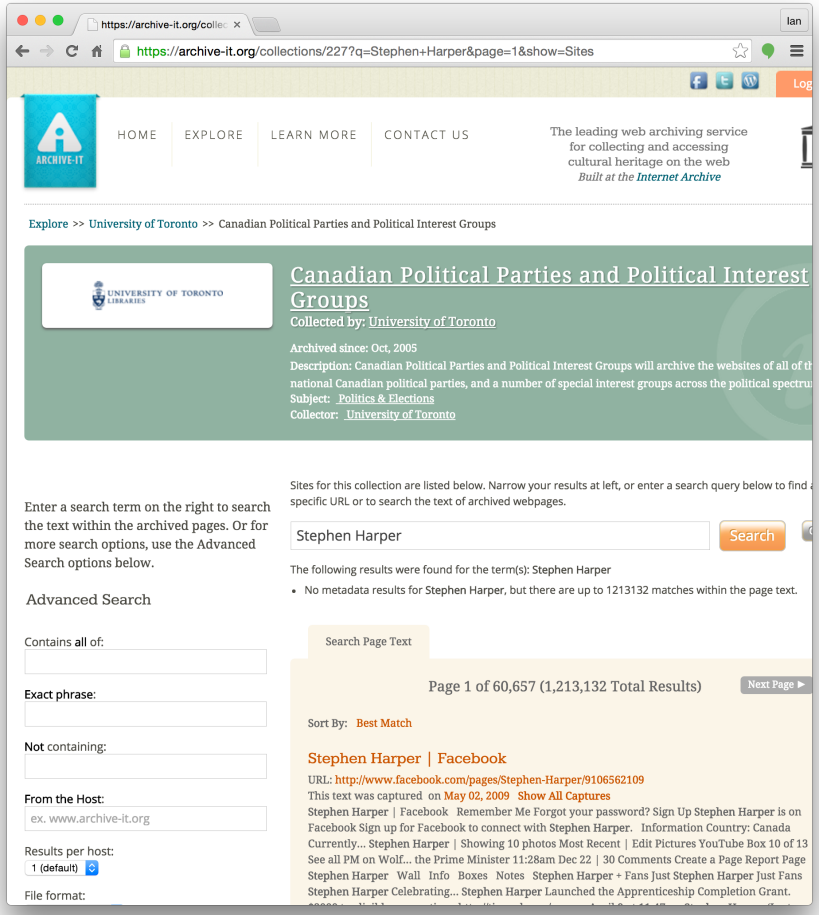


Pivotal Changes in Canadian Politics, 2005-2015

- Militarization of Canadian society?
- Change from ‘natural governing party’ of Liberals to Conservatives
- Major policy changes on foreign policy, environment, etc.
- How to measure?

Current Interface

- Very limited - simple search engine, some advanced options; no facets
- Great collections.. but nobody uses them!

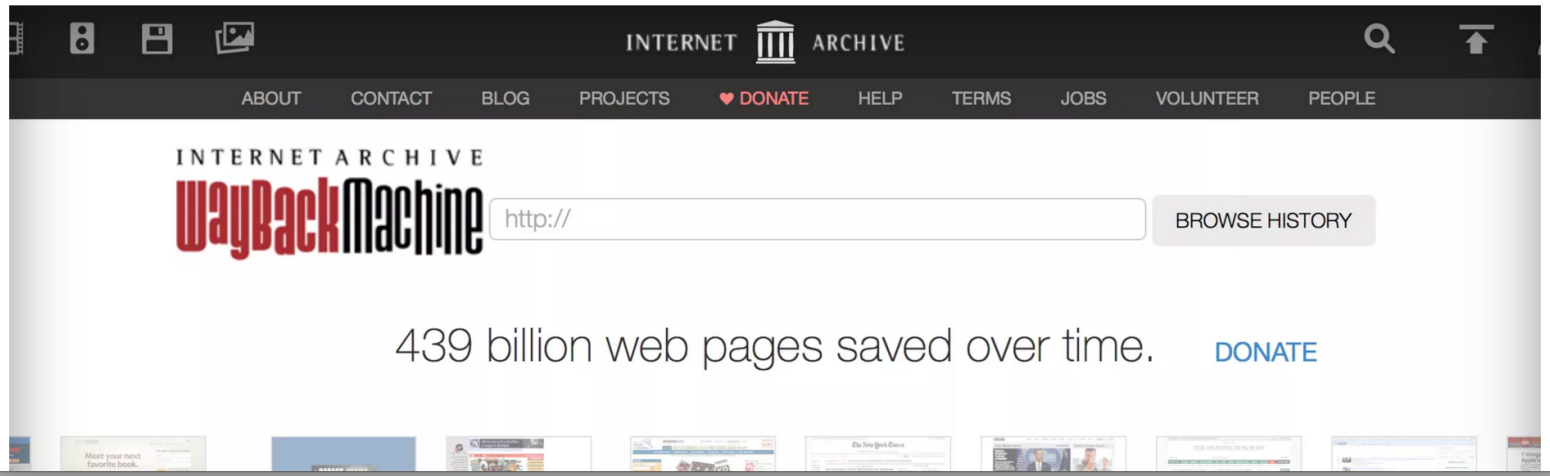


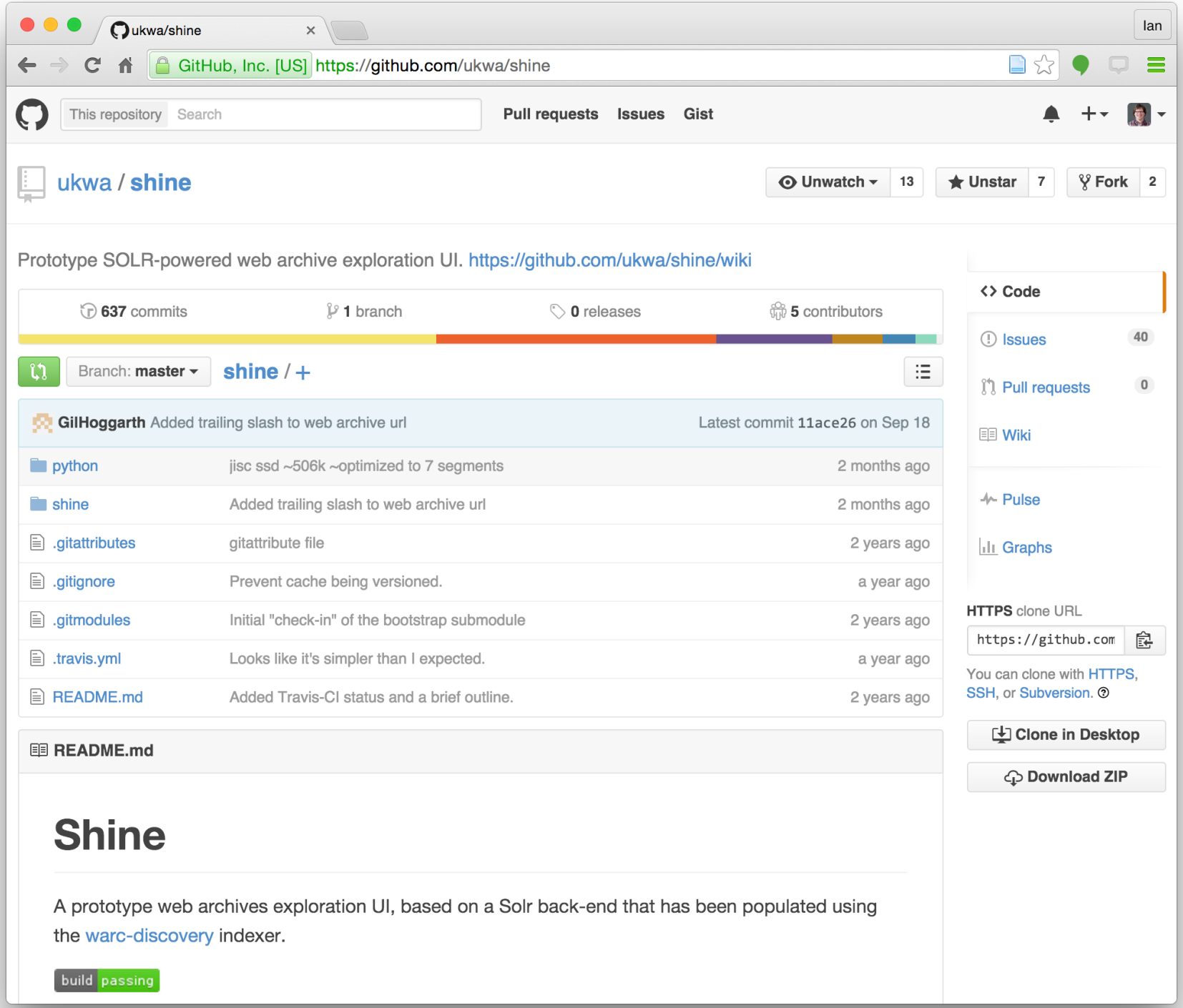
The need to **democratize access**, so that ~~luddites~~ historians can use them.

TECH

The Internet Archive will launch a modernized Wayback Machine in 2017

By Chris Welch on October 22, 2015 12:09 pm Email @chriswelch

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This repository Search
Pull requests Issues Gist
ukwa / shine
Unwatch 13 Unstar 7 Fork 2
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637 commits 1 branch 0 releases 5 contributors
Branch: master shine / +
GilHoggarth Added trailing slash to web archive url
Latest commit 11ace26 on Sep 18
python jisc ssd ~506k ~optimized to 7 segments 2 months ago
shine Added trailing slash to web archive url 2 months ago
.gitattributes gitattribute file 2 years ago
.gitignore Prevent cache being versioned. a year ago
.gitmodules Initial "check-in" of the bootstrap submodule 2 years ago
.travis.yml Looks like it's simpler than I expected. a year ago
README.md Added Travis-CI status and a brief outline. 2 years ago
README.md
Shine
A prototype web archives exploration UI, based on a Solr back-end that has been populated using the warc-discovery indexer.
build passing
Code
Issues 40
Pull requests 0
Wiki
Pulse
Graphs
HTTPS clone URL
https://github.com
You can clone with HTTPS, SSH, or Subversion.
Clone in Desktop
Download ZIP

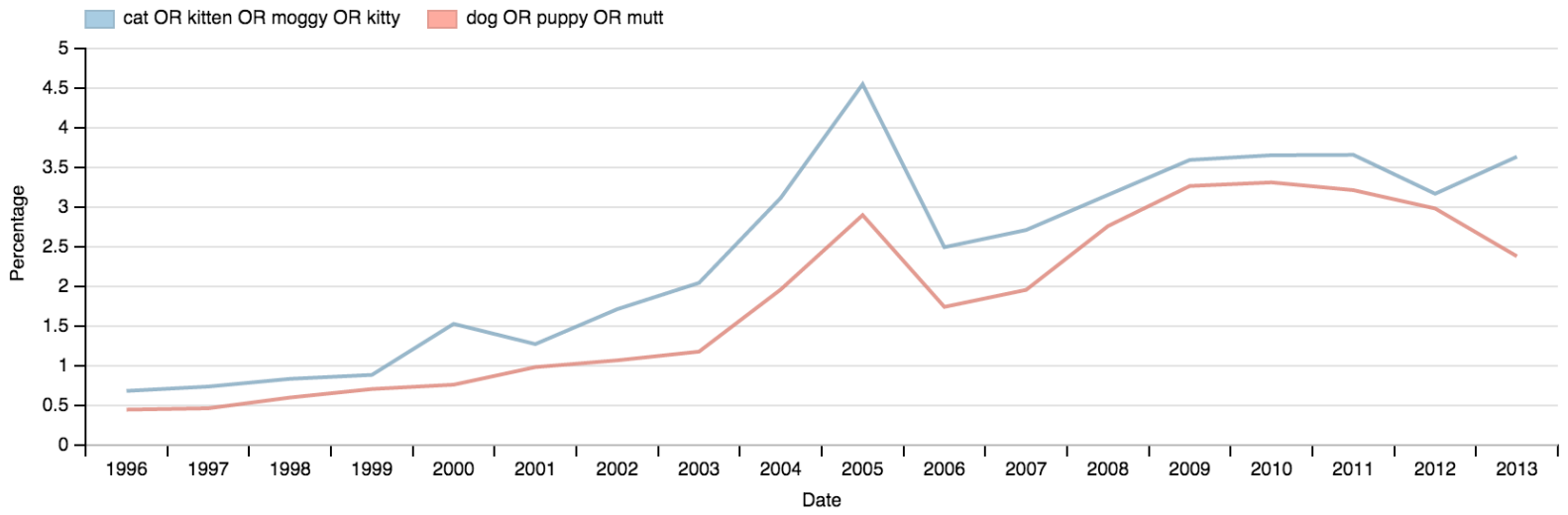
Trend results 1996-2013 fo

https://www.webarchive.org.uk/shine/graph?query=cat+OR+kitten+OR+moggy+OR+kitty%2C+dog+OR+pu...

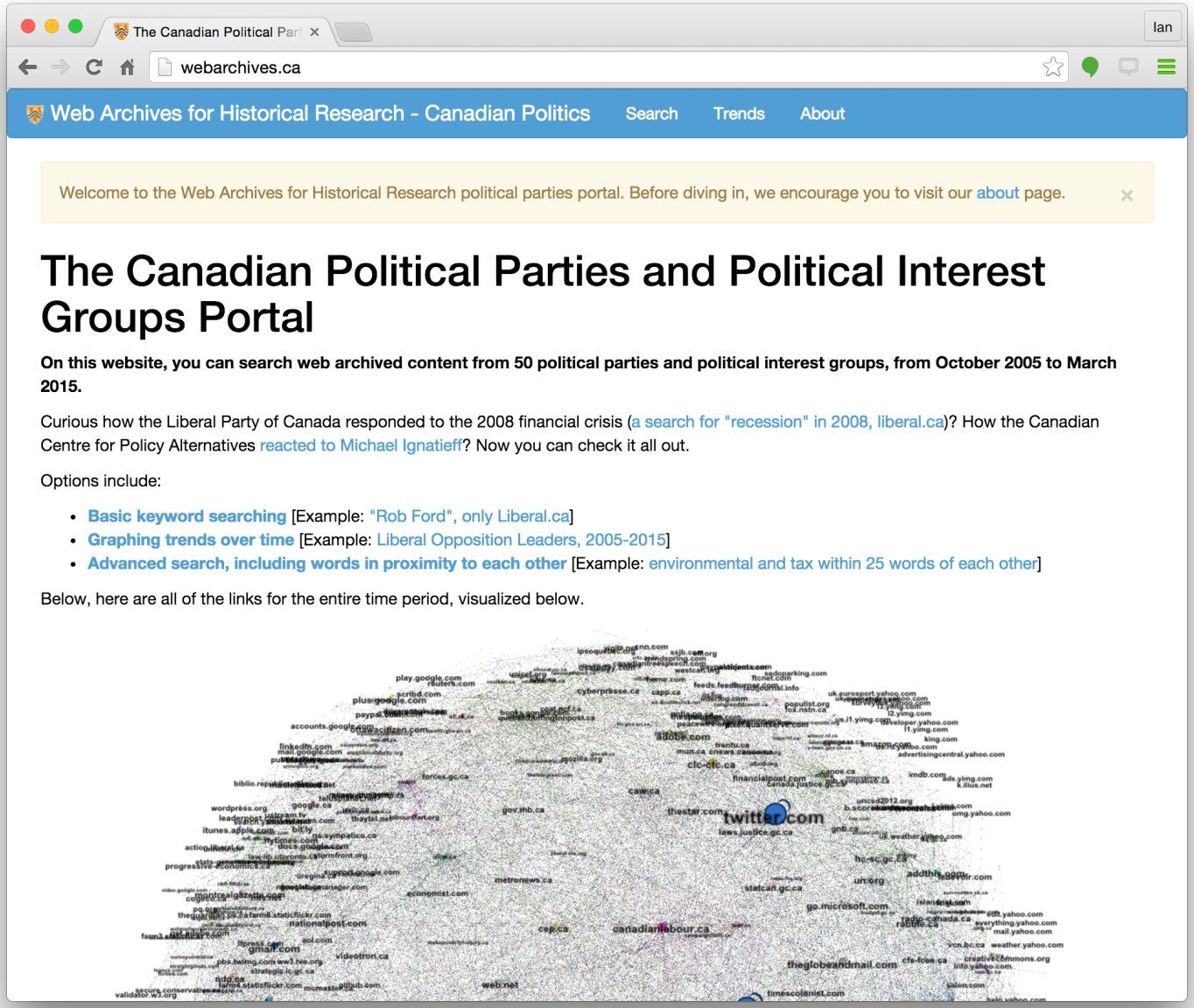
UK Web Archive | Search | Trends | Login

Warning! This is a research prototype for a web archive search service, and may be taken down at any time.

cat OR kitten OR moggy OR kitty, dog OR | 1996 | 2013 | Update Graph | Reset All



Click on a point on the graph to show a random sample of the matching records from that year...



With Nick Ruest (York University), Nich Worby (University of Toronto), Jimmy Lin (University of Waterloo)

Trend results 2005-2015 fo ×

webarchives.ca/graph

Web Archives for Historical Research - Canadian Politics

Search Trends About

Welcome to the Web Archives for Historical Research political parties portal. Before diving in, we encourage you to visit our about page. ×

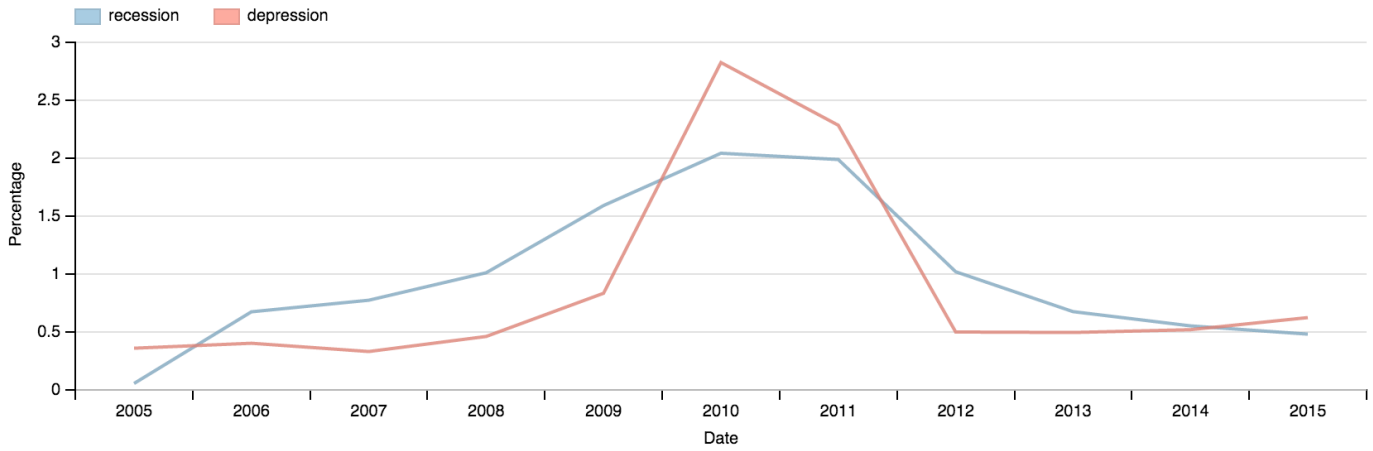
The graph shows the relative frequency of a term in each year - i.e. how often did "recession" appear in 2008 as a percentage of all keywords? Enter your search terms and click "Update Graph." To see actual results, click on the graph's line where it intersects a year.

You can also use this graph to run keyword searches on particular top-level domains. To see how often the word "global warming" appeared in the Conservative Party of Canada's domain versus the New Democratic Party of Canada, search with the query: "global warming" domain:conservative.ca, "global warming" domain:ndp.ca [view this example].

For a full list of domains, consult the about page.

Colours are assigned to the graph below depending on the order they are inputted (i.e. the Conservative Party of Canada will not always be blue).

recession,depression | 2005 | 2015 | Update Graph | Reset All



Some Sample Queries to Get Started With:

- "Public Transit": Liberals/NDP/Conservatives. We use quotation marks to search on the exact phrase.
- "Tar Sands": Amongst the three major parties, who uses and subsequently stops using this phrase for Canada's Oil Sands?
- "Climate Change": Similar to the above two queries, we can see this issue rise and possibly wane in public interest.

Feel free to take these examples and adapt them to your own purposes. If you find something interesting, please let us know!

Trend results 2005-2015 f

webarchives.ca/graph?query="public+transit"+domain%3Aconservative.ca%2C+"public+transit"+domain%3Andp.ca...

Web Archives for Historical Research - Canadian Politics

Search Trends About

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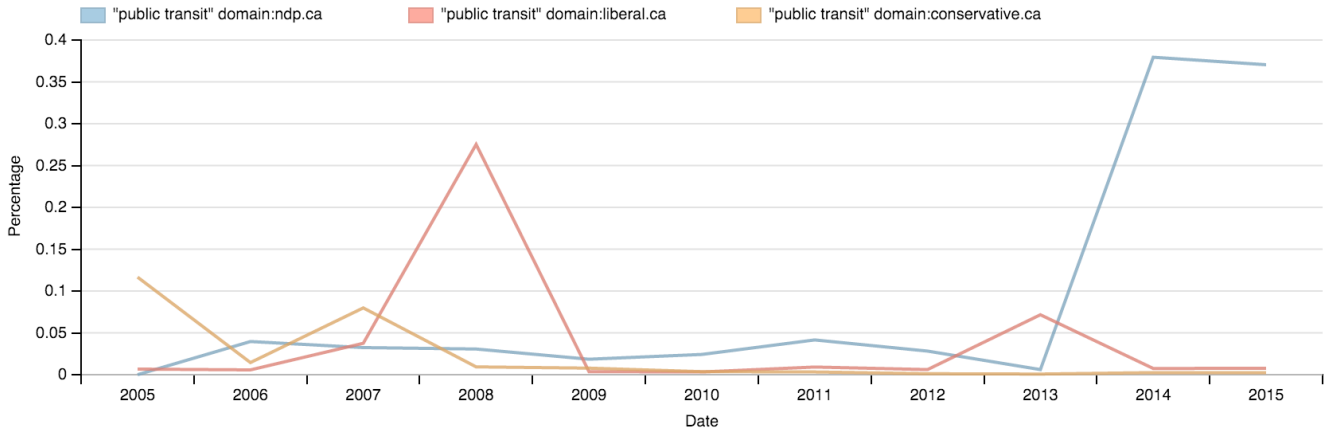
"public transit" domain:conservative.ca, "p | 2005 | 2015 | Update Graph | Reset All



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Click on a point on the graph to show a random sample of the matching records from that year

Welcome to the Web Archives for Historical Research political parties portal. Before diving in, we encourage you to visit our about page. ×

The Canadian Political Parties and Political Interest Groups Portal

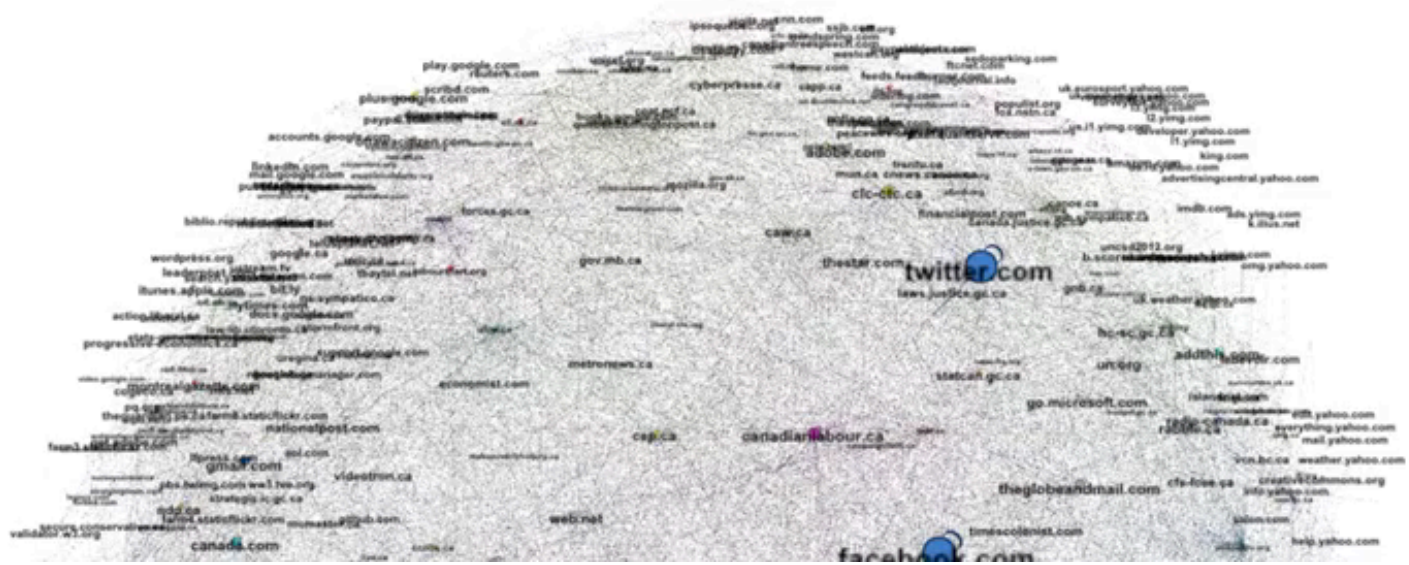
On this website, you can search web archived content from 50 political parties and political interest groups, from October 2005 to March 2015.

Curious how the Liberal Party of Canada responded to the 2008 financial crisis (a search for "recession" in 2008, liberal.ca)? How the Canadian Centre for Policy Alternatives reacted to Michael Ignatieff? Now you can check it all out.

Options include:

- **Basic keyword searching** [Example: "Rob Ford", only Liberal.ca]
- **Graphing trends over time** [Example: Liberal Opposition Leaders, 2005-2015]
- **Advanced search, including words in proximity to each other** [Example: environmental and tax within 25 words of each other]

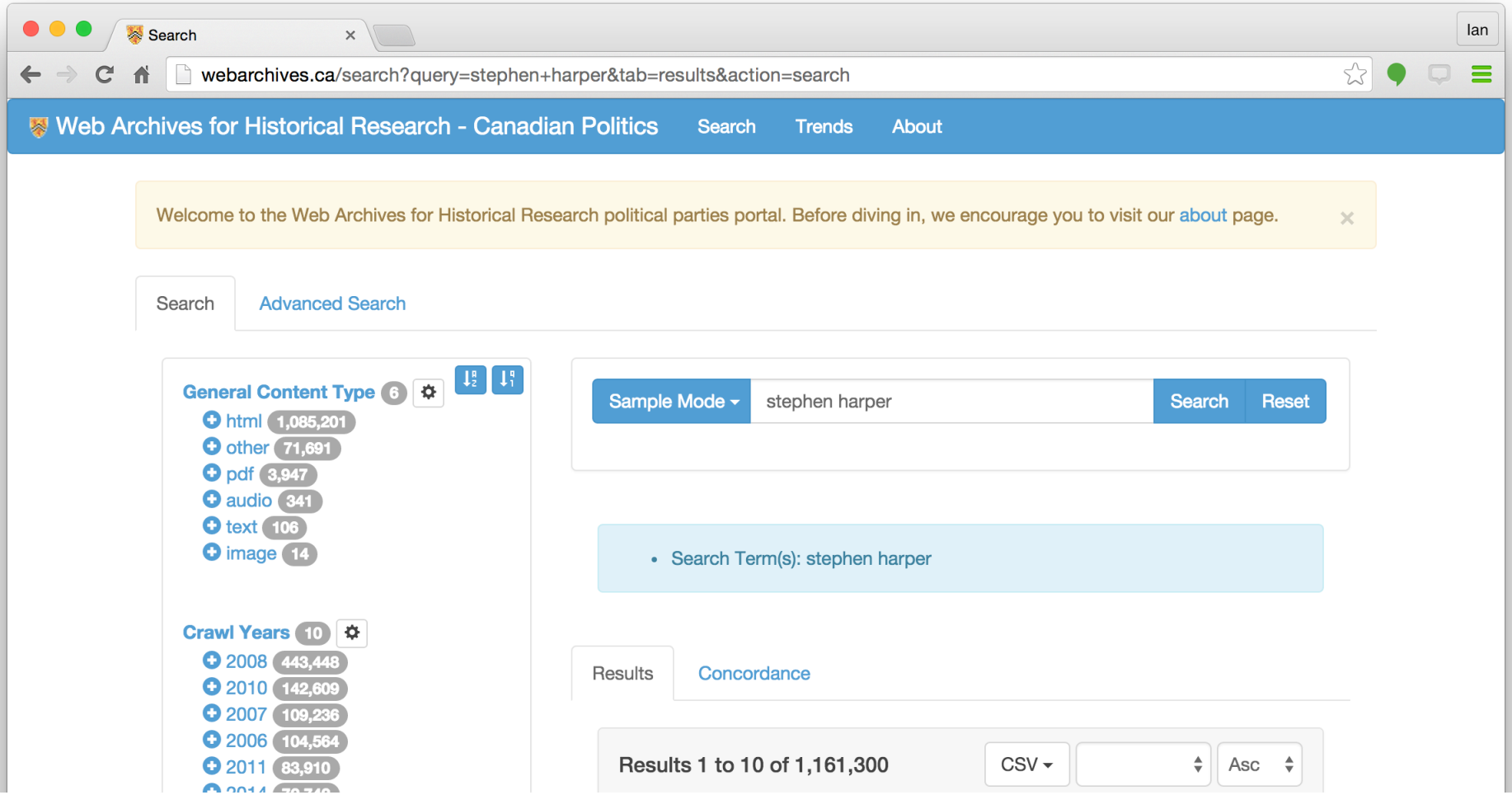
Below, here are all of the links for the entire time period, visualized below.



Five Things We Learned

- Political parties delete content
- User-generated comments were more common in political parties
- Absences can be more informative than presences
- We can see the rise/fall of prominent people
- Enabling user access is truly transformative

Good for public engagement - but limited for scholarship….



Shine

- **Advantages**: accessible to the general public, easy to use, interactive trend diagram allows digging down for context, can move down to level of document itself.

- **Disadvantage**: keyword searching requires you know what to look for; random sampling misleading when tens of thousands of records; etc.

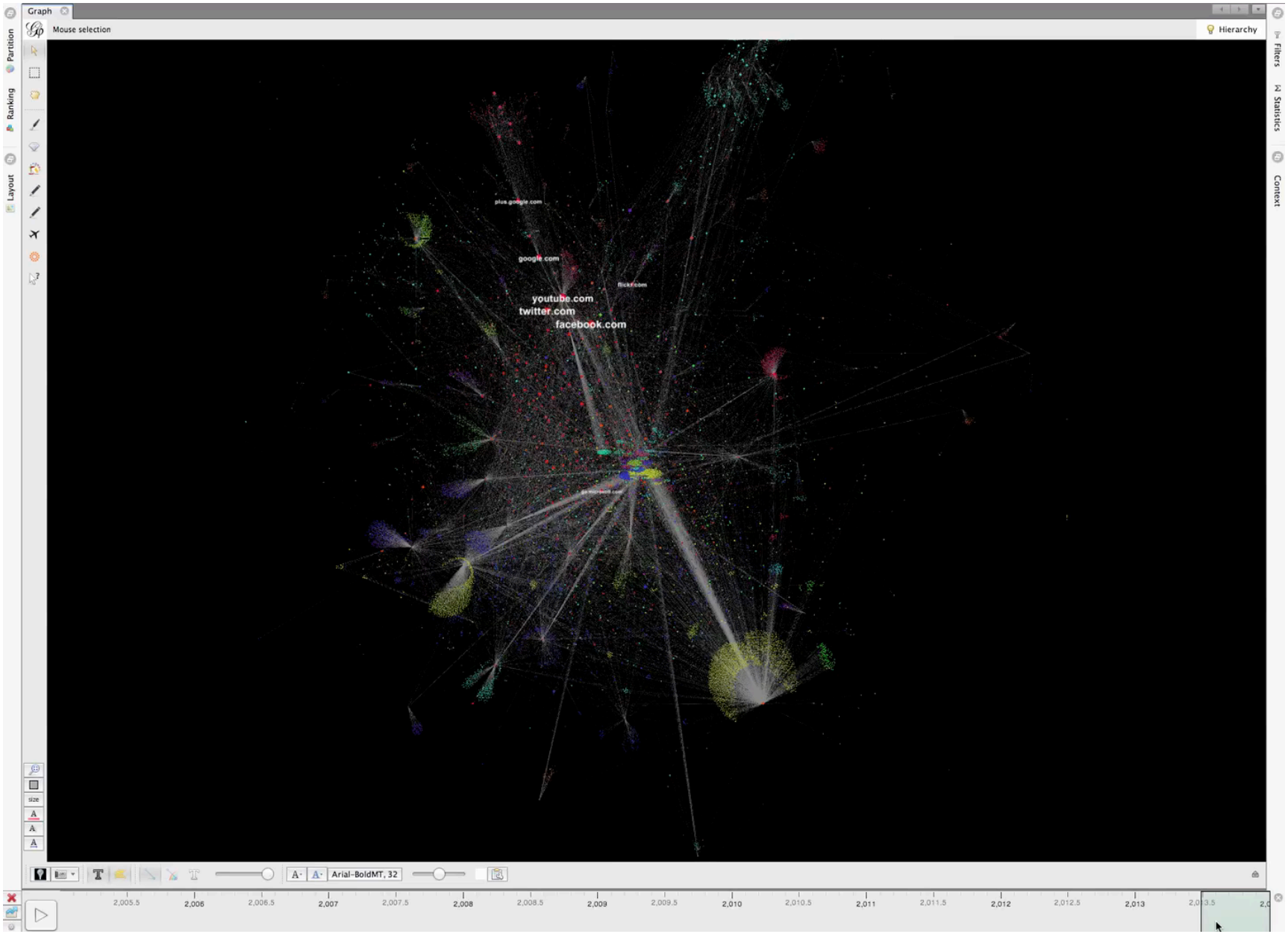
- Doesn’t take advantage of what makes web sources so powerful: hyperlinks

Getting over my bias towards content **and embracing metadata**

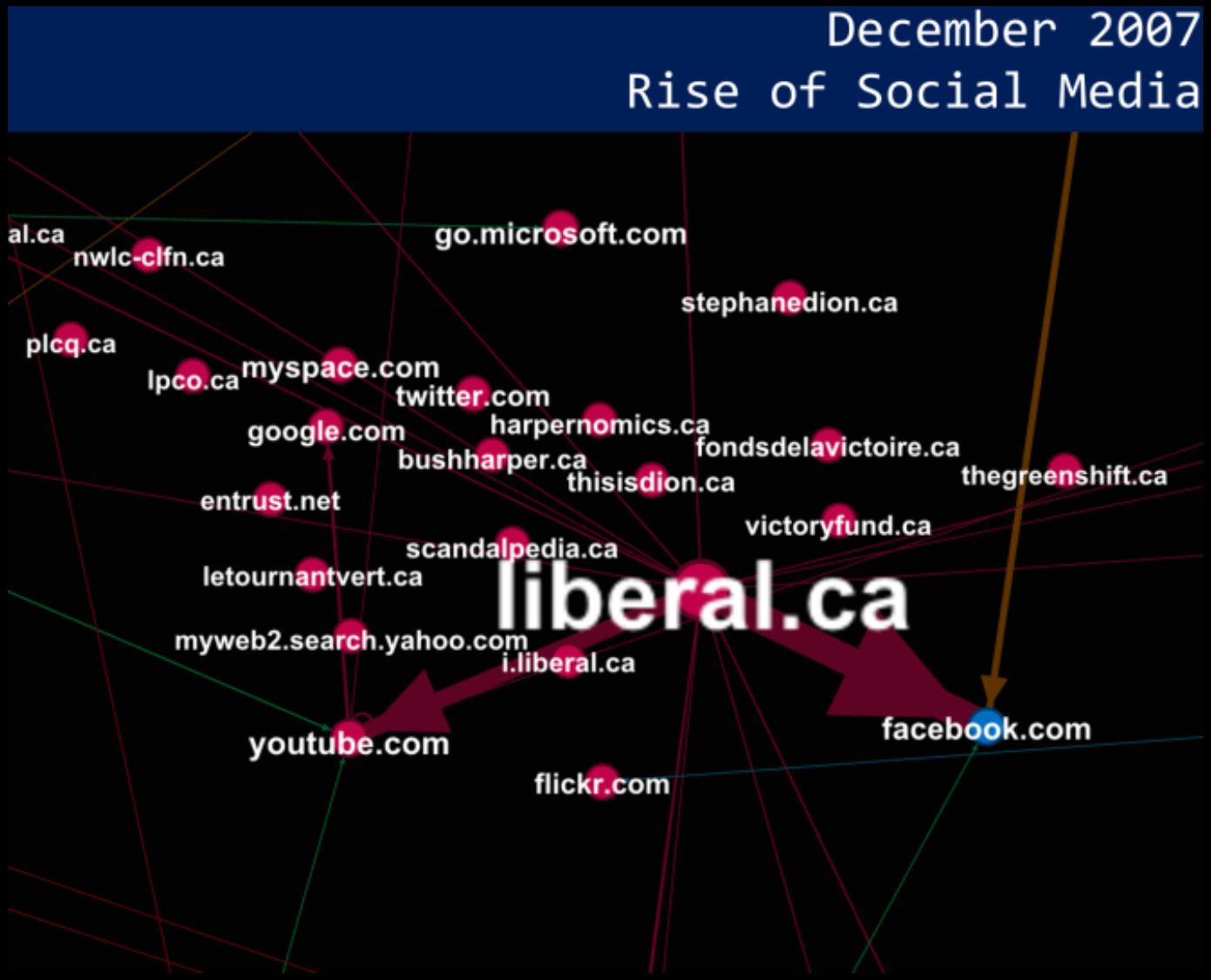
WATs vs. WARCs?

WATs help us find the files we need to use - and to **contextualize them**

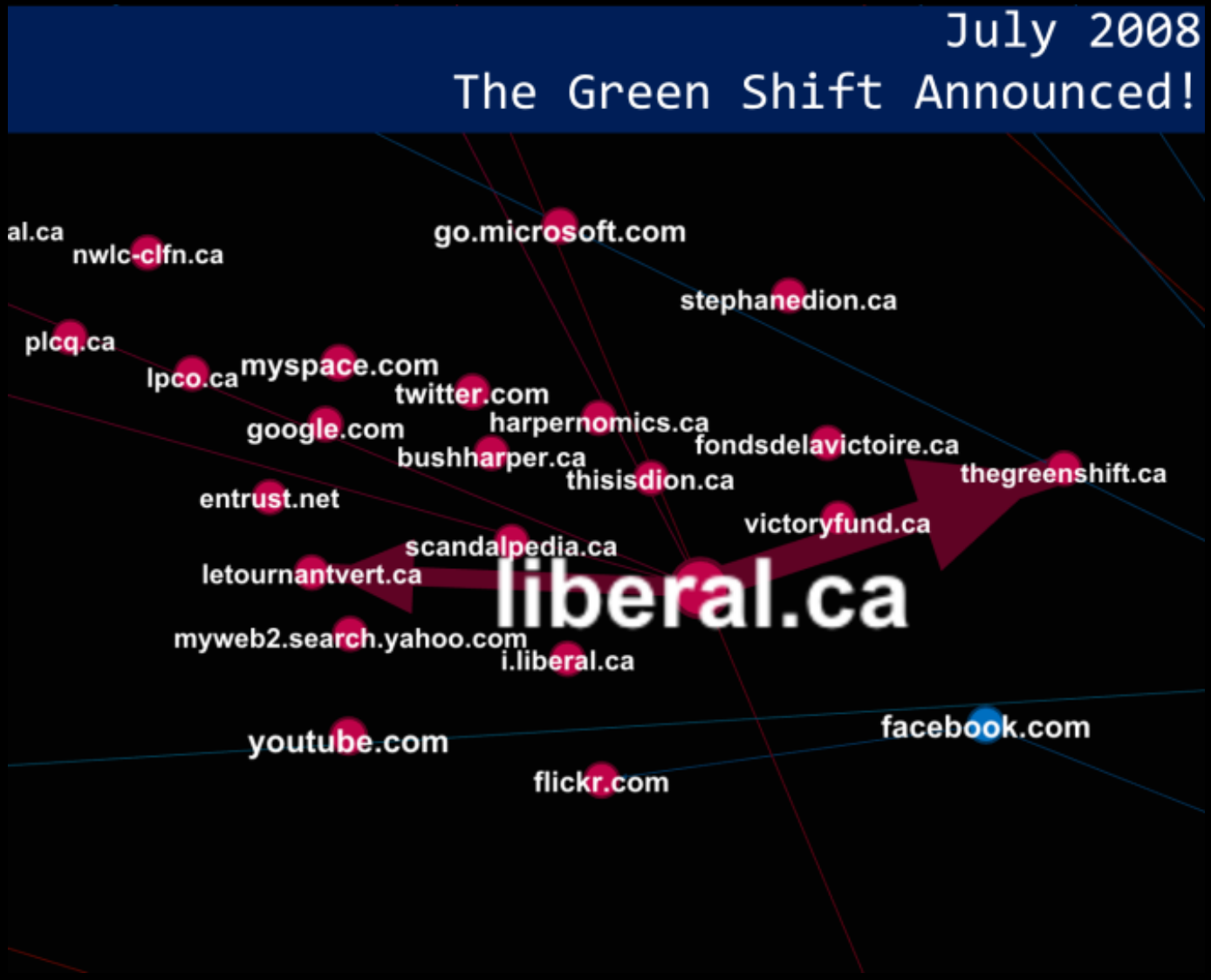
Metadata Extraction

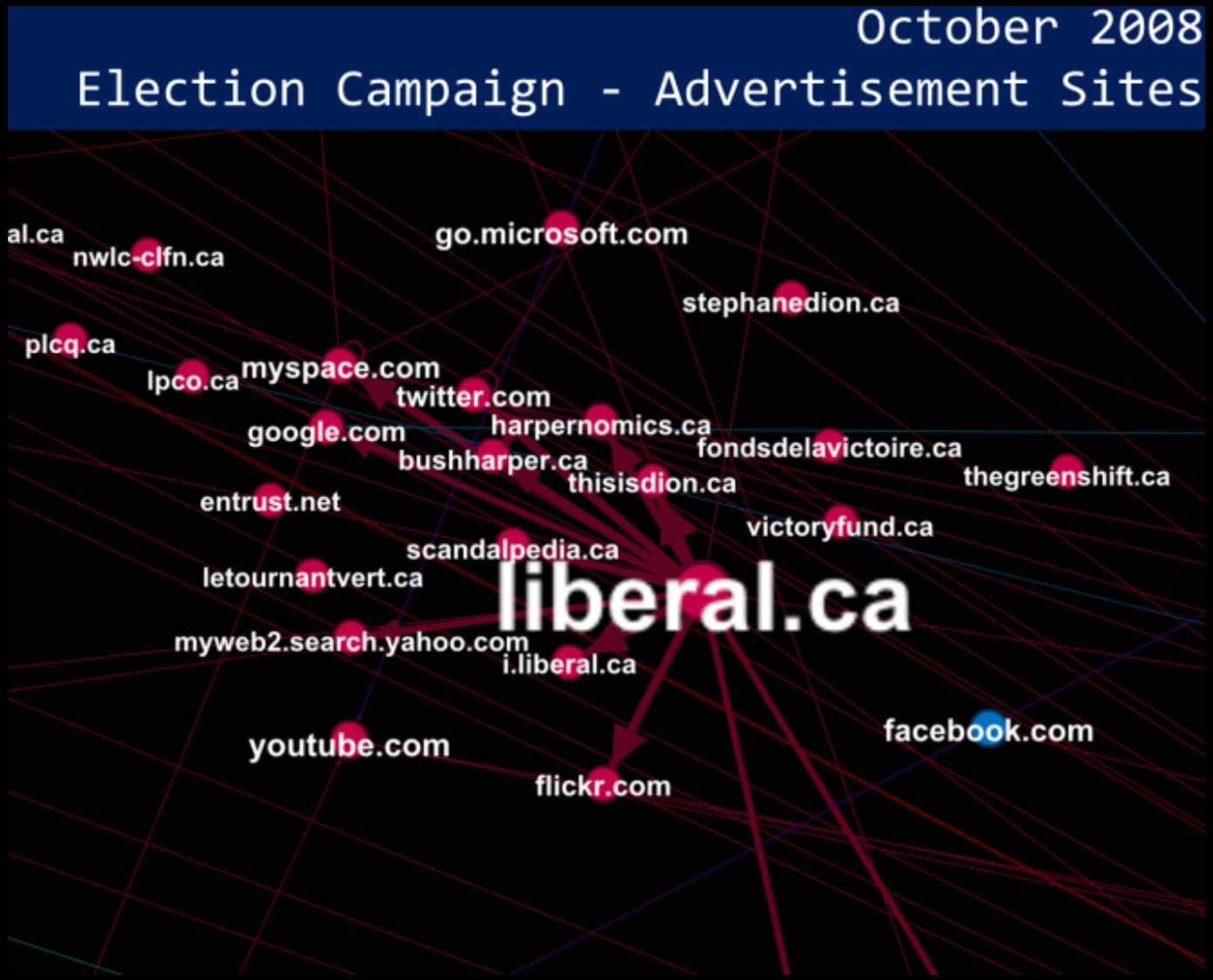



December 2006
Stephane Dion Elected Leader of Party
al.ca
nwlc-clfn.ca
go.microsoft.com
stephanedion.ca
plcq.ca
lpco.ca
myspace.com
twitter.com
google.com
harpernomics.ca
fondsdelavictoire.ca
bushharper.ca
thisisdion.ca
thegreenshift.ca
entrust.net
victoryfund.ca
scandalpedia.ca
letournantvert.ca
liberal.ca
myweb2.search.yahoo.com
i.liberal.ca
facebook.com
youtube.com
flickr.com


December 2007
Rise of Social Media
al.ca
nwlc-clfn.ca
go.microsoft.com
stephanedion.ca
plcq.ca
lpco.ca
myspace.com
twitter.com
google.com
harpernomics.ca
fondsdelavictoire.ca
bushharper.ca
thisisdion.ca
thegreenshift.ca
entrust.net
victoryfund.ca
scandalpedia.ca
letournantvert.ca
liberal.ca
myweb2.search.yahoo.com
i.liberal.ca
youtube.com
facebook.com
flickr.com

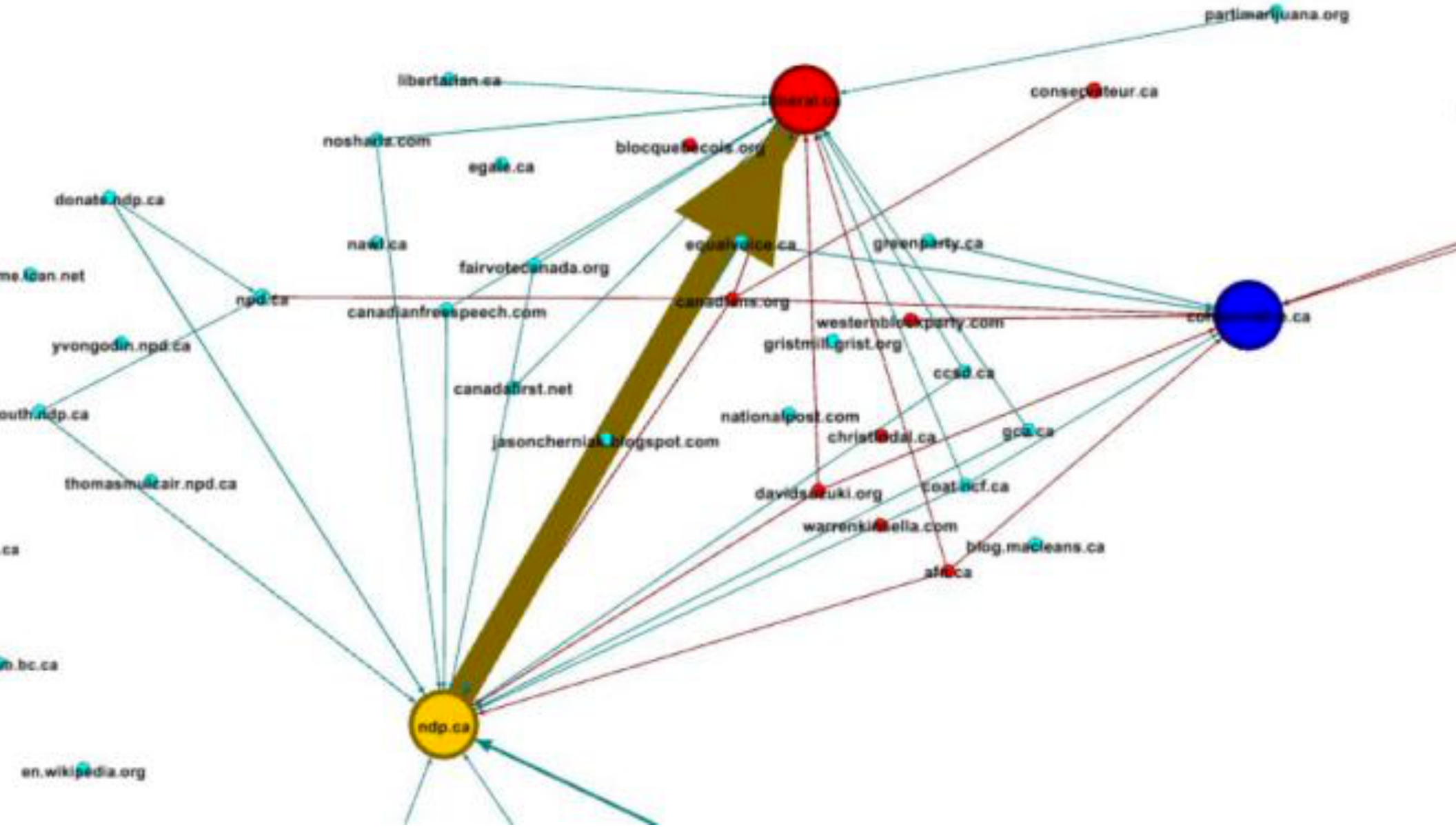

April 2008
Fundraising with the Victory Fund/
Fonds de la Victoire
al.ca
nwlc-clfn.ca
go.microsoft.com
stephanedion.ca
plcq.ca
lpco.ca
myspace.com
twitter.com
google.com
harpernomics.ca
fondsdelavictoire.ca
bushharper.ca
thisisdion.ca
thegreenshift.ca
entrust.net
victoryfund.ca
scandalpedia.ca
letournantvert.ca
liberal.ca
myweb2.search.yahoo.com
i.liberal.ca
facebook.com
youtube.com
flickr.com


July 2008
The Green Shift Announced!
al.ca
nwlc-clfn.ca
go.microsoft.com
stephanedion.ca
plcq.ca
lpco.ca
myspace.com
twitter.com
google.com
harpernomics.ca
fondsdelavictoire.ca
bushharper.ca
thisisdion.ca
thegreenshift.ca
entrust.net
victoryfund.ca
scandalpedia.ca
letournantvert.ca
liberal.ca
myweb2.search.yahoo.com
i.liberal.ca
youtube.com
facebook.com
flickr.com


October 2008
Election Campaign - Advertisement Sites
al.ca
nwlc-clfn.ca
go.microsoft.com
stephanedion.ca
plcq.ca
lpco.ca
myspace.com
twitter.com
google.com
harpernomics.ca
fondsdelavictoire.ca
bushharper.ca
thisisdion.ca
thegreenshift.ca
entrust.net
victoryfund.ca
scandalpedia.ca
letournantvert.ca
liberal.ca
myweb2.search.yahoo.com
i.liberal.ca
youtube.com
facebook.com
flickr.com


December 2008
Election campaign Ends; Attacking Harper
on Anti-American Grounds (bushharper)
al.ca
nwlc-clfn.ca
go.microsoft.com
stephanedion.ca
plcq.ca
lpco.ca
myspace.com
twitter.com
google.com
harpernomics.ca
fondsdelavictoire.ca
bushharper.ca
thisisdion.ca
thegreenshift.ca
entrust.net
victoryfund.ca
scandalpedia.ca
letournantvert.ca
liberal.ca
myweb2.search.yahoo.com
i.liberal.ca
facebook.com
youtube.com
flickr.com

2005 Canadian Federal Election

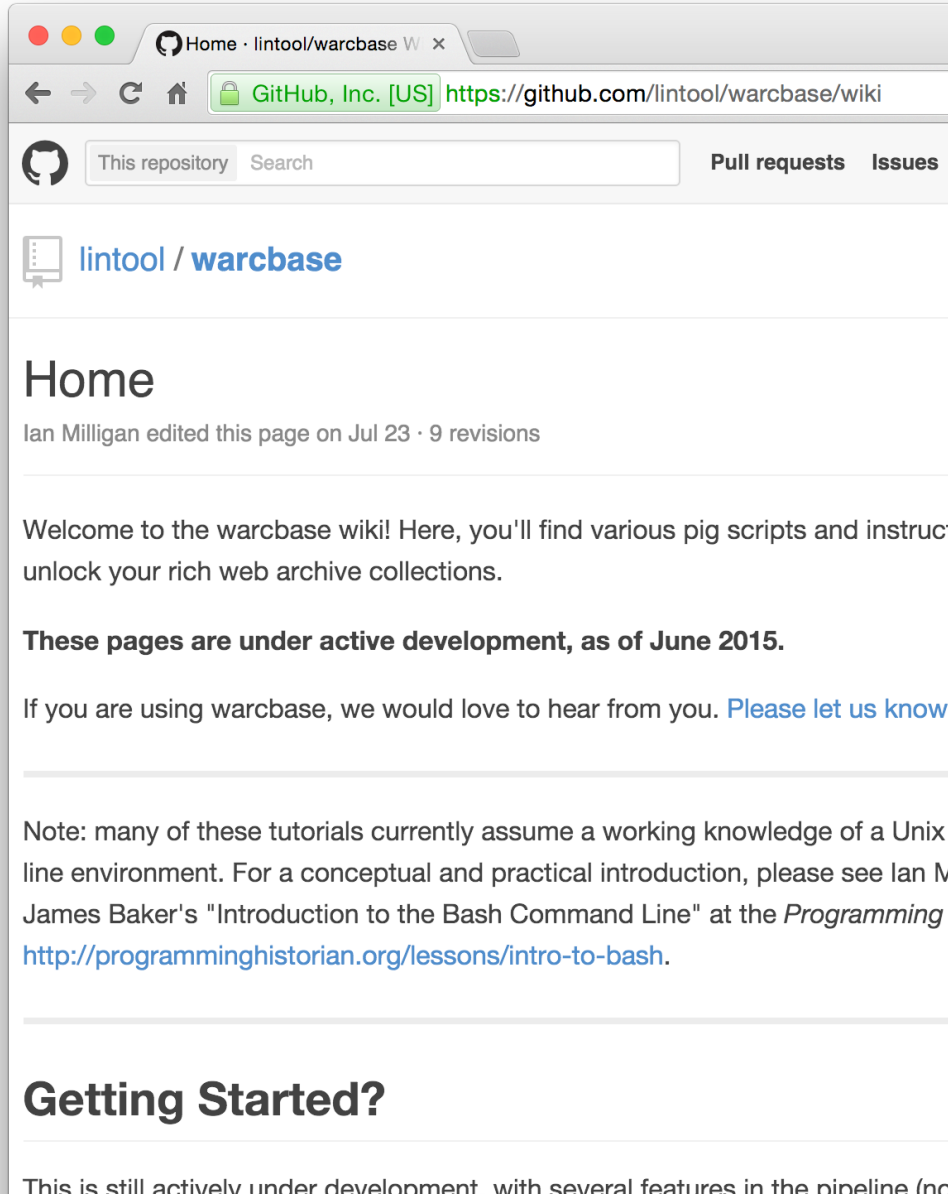


We need to get over our **content fixation** as historians - and embrace metadata!
(make the two talk to each other)

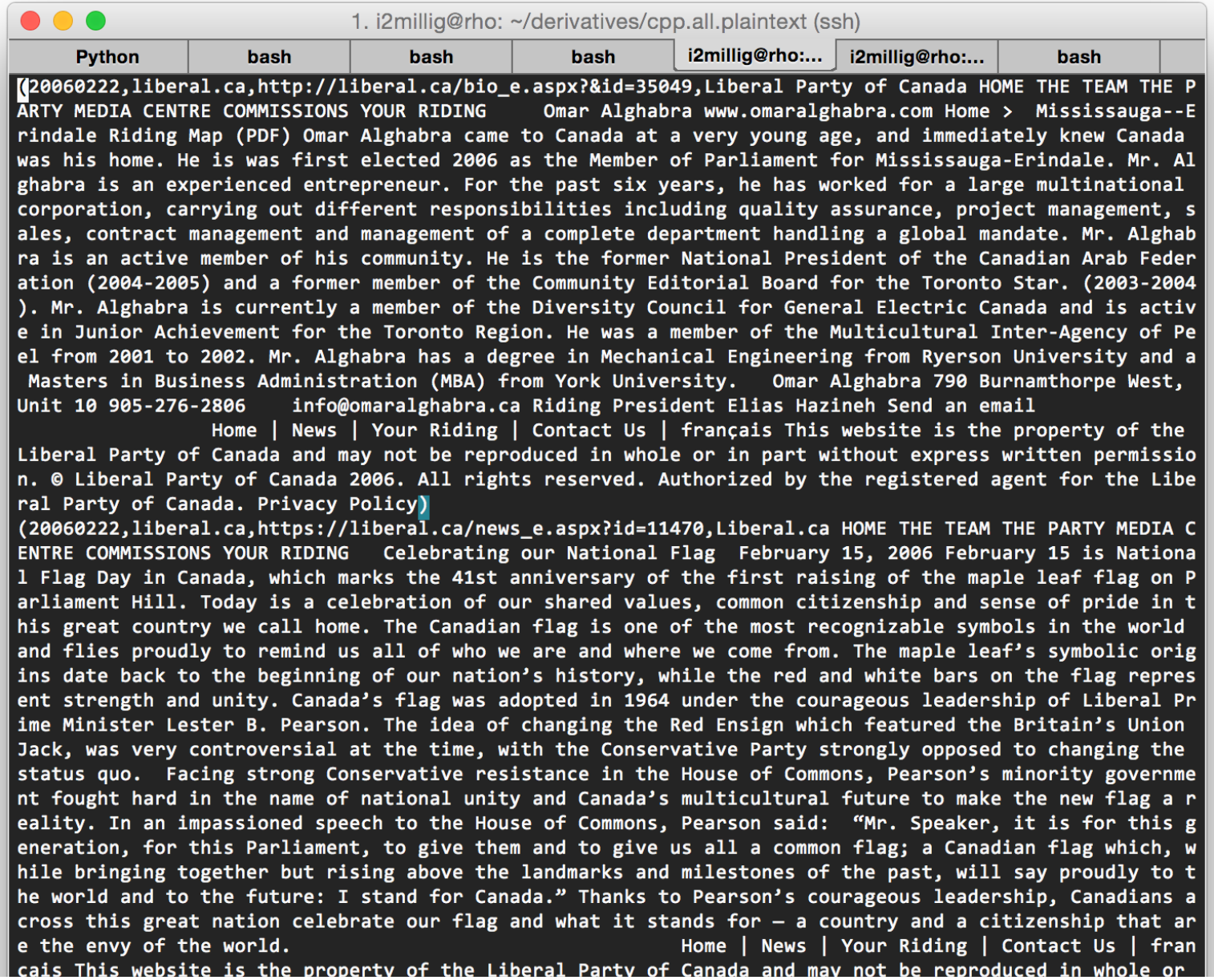
Interdisciplinarity

Warcbase

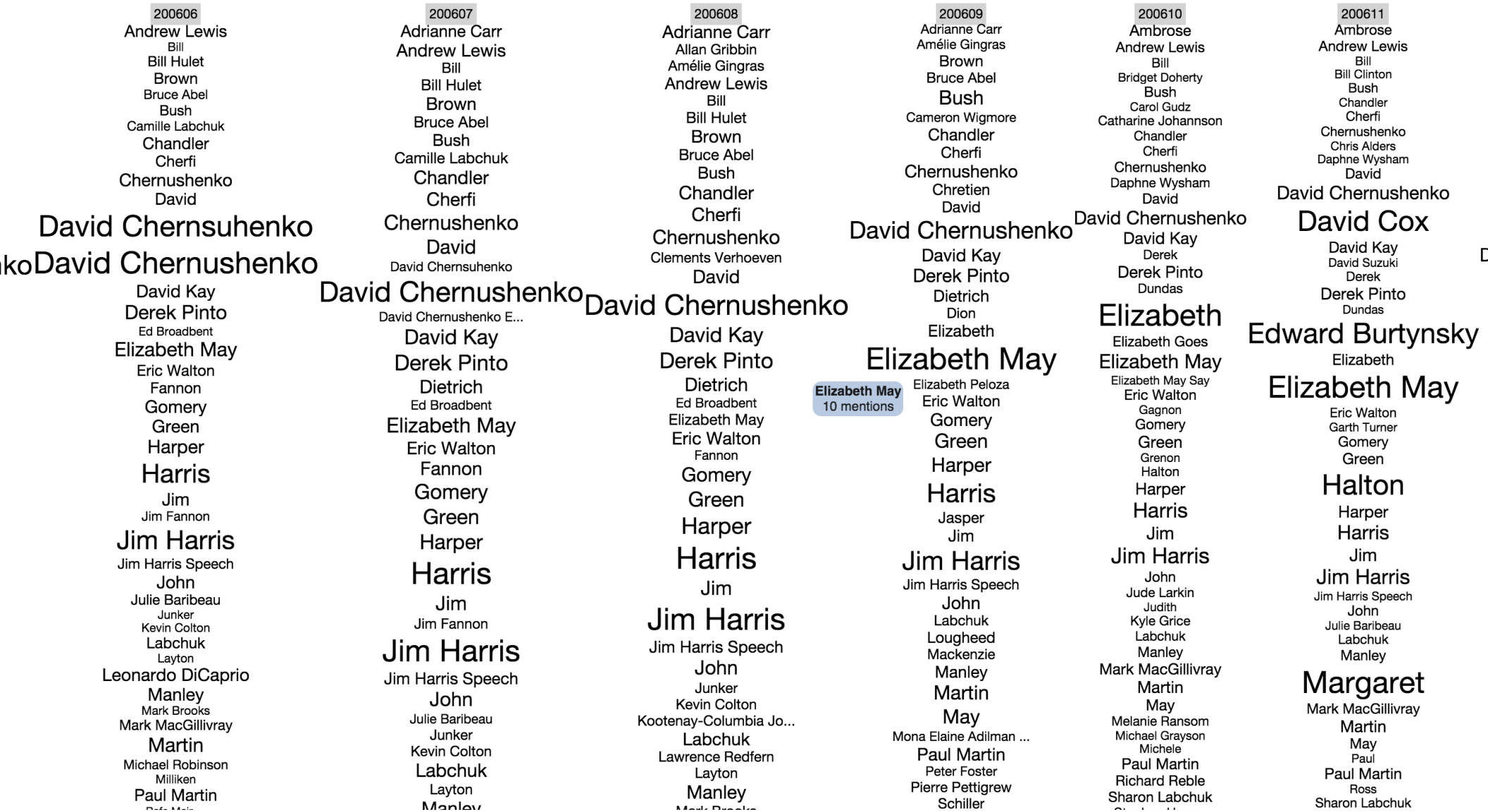
- Jimmy Lin (main developer), Ian Milligan, Jeremy Wiebe, Alice Zhou, all University of Waterloo
- Developing code, walkthroughs, and instructions for historians to be able to take a directory of WARCs and…



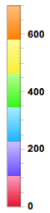
Extract all Plain Text



Extract Entities



Extract Entities

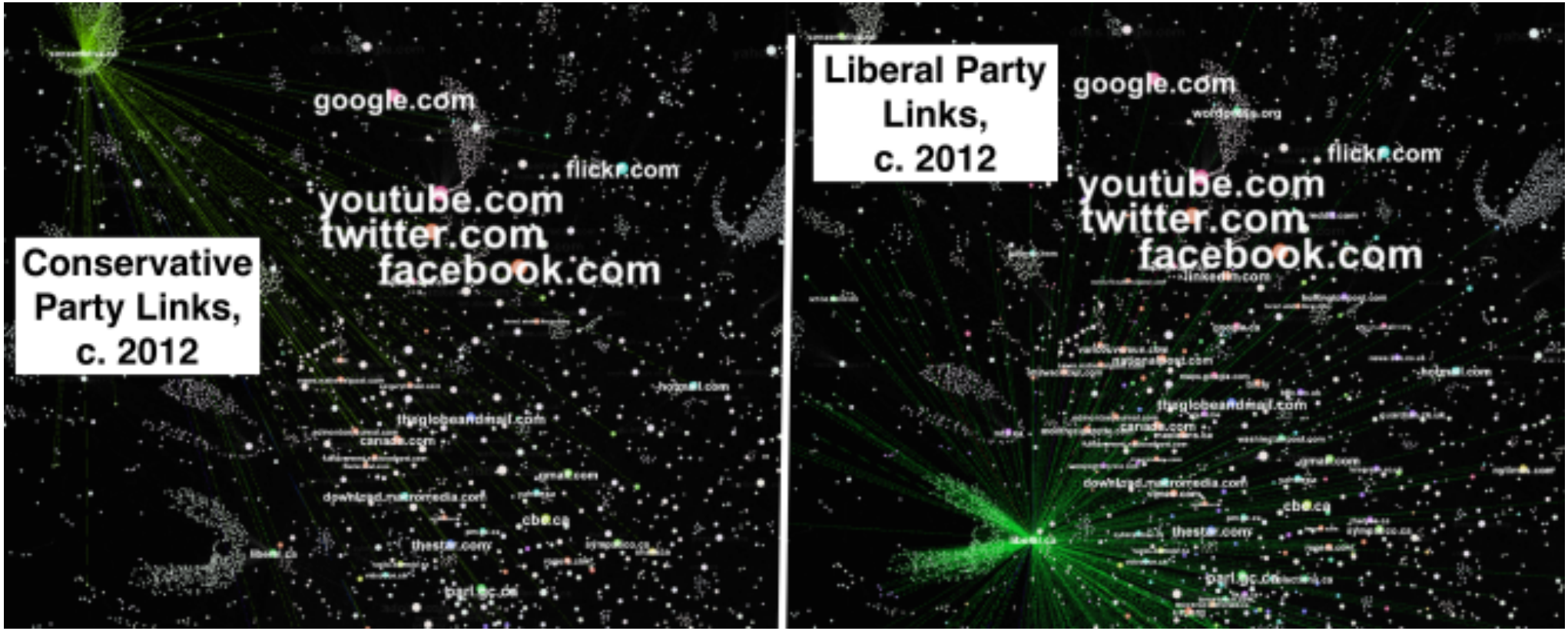



```
In[95]:= int = SemanticInterpretation[#] & /@ processedfreq[[All, 1]]
```

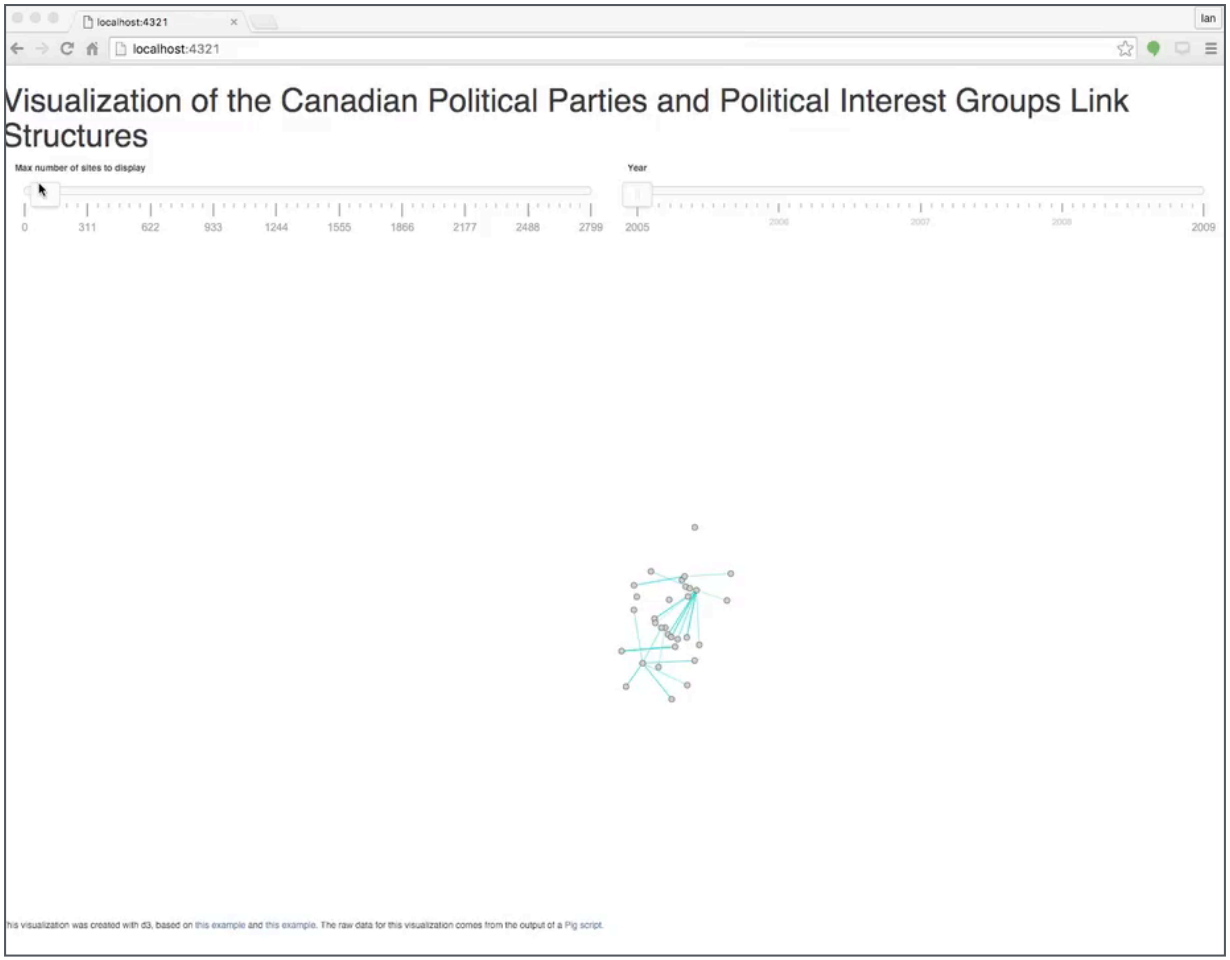
Out[95]= { Canada , Calgary , Colombia , Montreal , $Failed , Ontario, Canada , Afghanistan ,
Ottawa , Manitoba, Canada , British Columbia, Canada , Toronto , Nova Scotia, Canada ,
Saskatchewan, Canada , Quebec, Canada , Alberta, Canada , Winnipeg , Washington ,
Canada , Nunavut, Canada , White Horse , United States , Petawawa , Mumbai ,
Lima , The Americas , Saskatoon , Peru , Edmonton , Mexico , Chicoutimi-Jonquiere ,
New Brunswick, Canada , United States , Newfoundland and Labrador, Canada , Qandahar ,
$Failed , Asia-Pacific , Newfoundland and Labrador, Canada , Victoria , United States ,
Quebec City , India , $Failed , Atlantic Ocean , St. Germain , Durham , Battle of Waterloo ,

Extract Entities

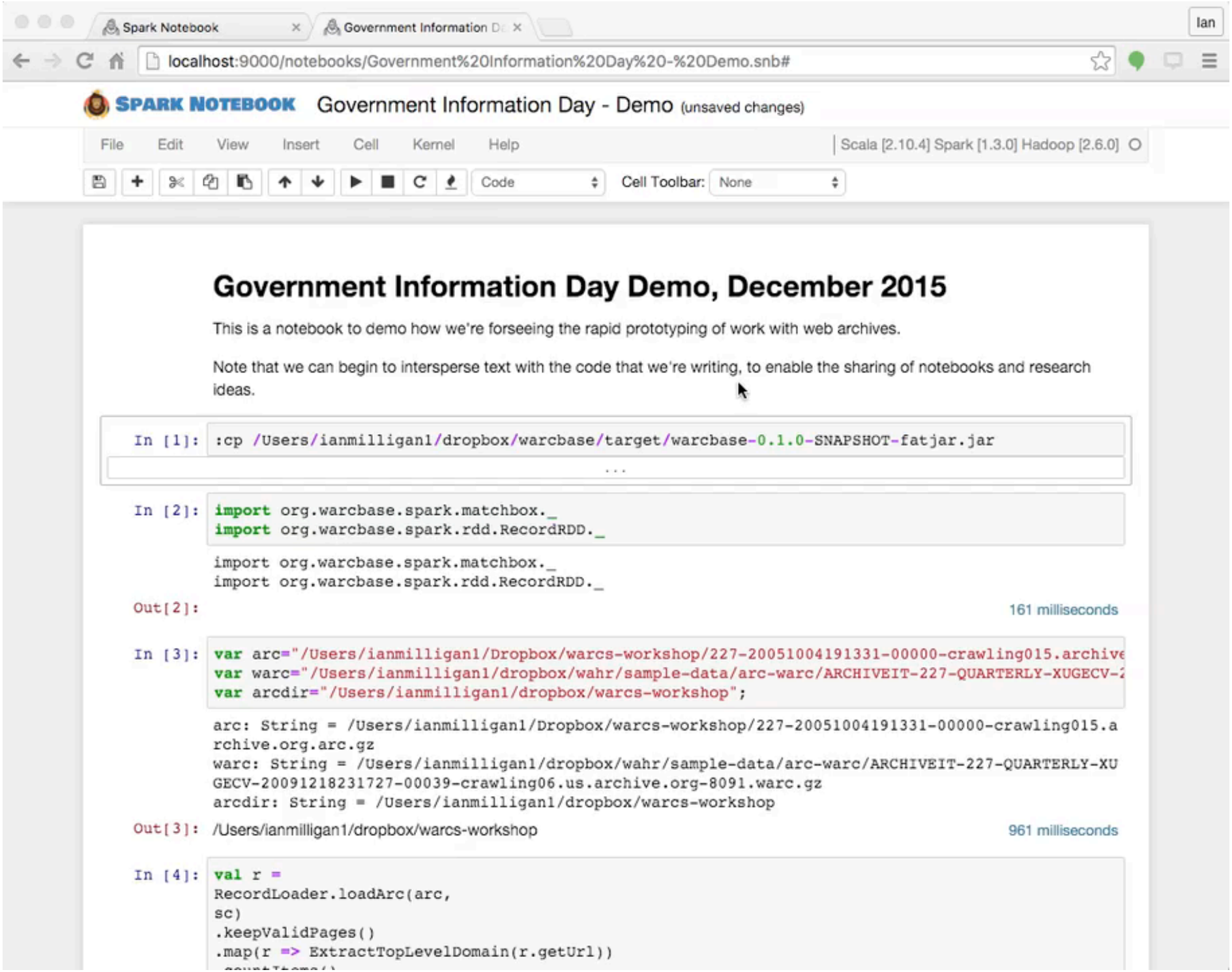
Extract Links/Gephi Connector



Or D3.js link networks in browser



Bringing it all together in a notebook environment


Spark Notebook
Government Information D
Ian
localhost:9000/notebooks/Government%20Information%20Day%20-%20Demo.snb#
SPARK NOTEBOOK Government Information Day - Demo (unsaved changes)
File Edit View Insert Cell Kernel Help
Scala [2.10.4] Spark [1.3.0] Hadoop [2.6.0]
Code
Cell Toolbar: None
Government Information Day Demo, December 2015
This is a notebook to demo how we're forseeing the rapid prototyping of work with web archives.
Note that we can begin to intersperse text with the code that we're writing, to enable the sharing of notebooks and research ideas.
In [1]: :cp /Users/ianmilligan1/dropbox/warcbase/target/warcbase-0.1.0-SNAPSHOT-fatjar.jar
...
In [2]: import org.warcbase.spark.matchbox._
import org.warcbase.spark.rdd.RecordRDD._
import org.warcbase.spark.matchbox._
import org.warcbase.spark.rdd.RecordRDD._
Out[2]:
161 milliseconds
In [3]: var arc="/Users/ianmilligan1/Dropbox/warcs-workshop/227-20051004191331-00000-crawling015.archive
var warc="/Users/ianmilligan1/dropbox/wahr/sample-data/arc-warc/ARCHIVEIT-227-QUARTERLY-XUGECV-2
var arcdir="/Users/ianmilligan1/dropbox/warcs-workshop";
arc: String = /Users/ianmilligan1/Dropbox/warcs-workshop/227-20051004191331-00000-crawling015.a
rchive.org.arc.gz
warc: String = /Users/ianmilligan1/dropbox/wahr/sample-data/arc-warc/ARCHIVEIT-227-QUARTERLY-XU
GECV-20091218231727-00039-crawling06.us.archive.org-8091.warc.gz
arcdir: String = /Users/ianmilligan1/dropbox/warcs-workshop
Out[3]: /Users/ianmilligan1/dropbox/warcs-workshop
961 milliseconds
In [4]: val r =
RecordLoader.loadArc(arc,
sc)
.keepValidPages()
.map(r => ExtractTopLevelDomain(r.getUrl))

Walkthroughs at https://github.com/lintool/warcbase/wiki

And if you have suggestions, let us know!

Building connections between Warcbase and Shine

Shared Problems

- Never have enough processing power or memory;
- Web archive tools often designed for clusters - less than ten historians in North America probably can use one…
- **Tools**
  - Some work on **WARCs**;
  - Some work on **ARCs**;
  - Some work on **WATs**;
  - And some work on **live-web material**;

Should we effect large-scale non-print legal deposit?

(we've got the power in *Library and Archives Canada Act* (2005), right?)

Overlaps on #elxn42?

Could WAT files be shared to researchers as derivative data?

Let's figure it out together!

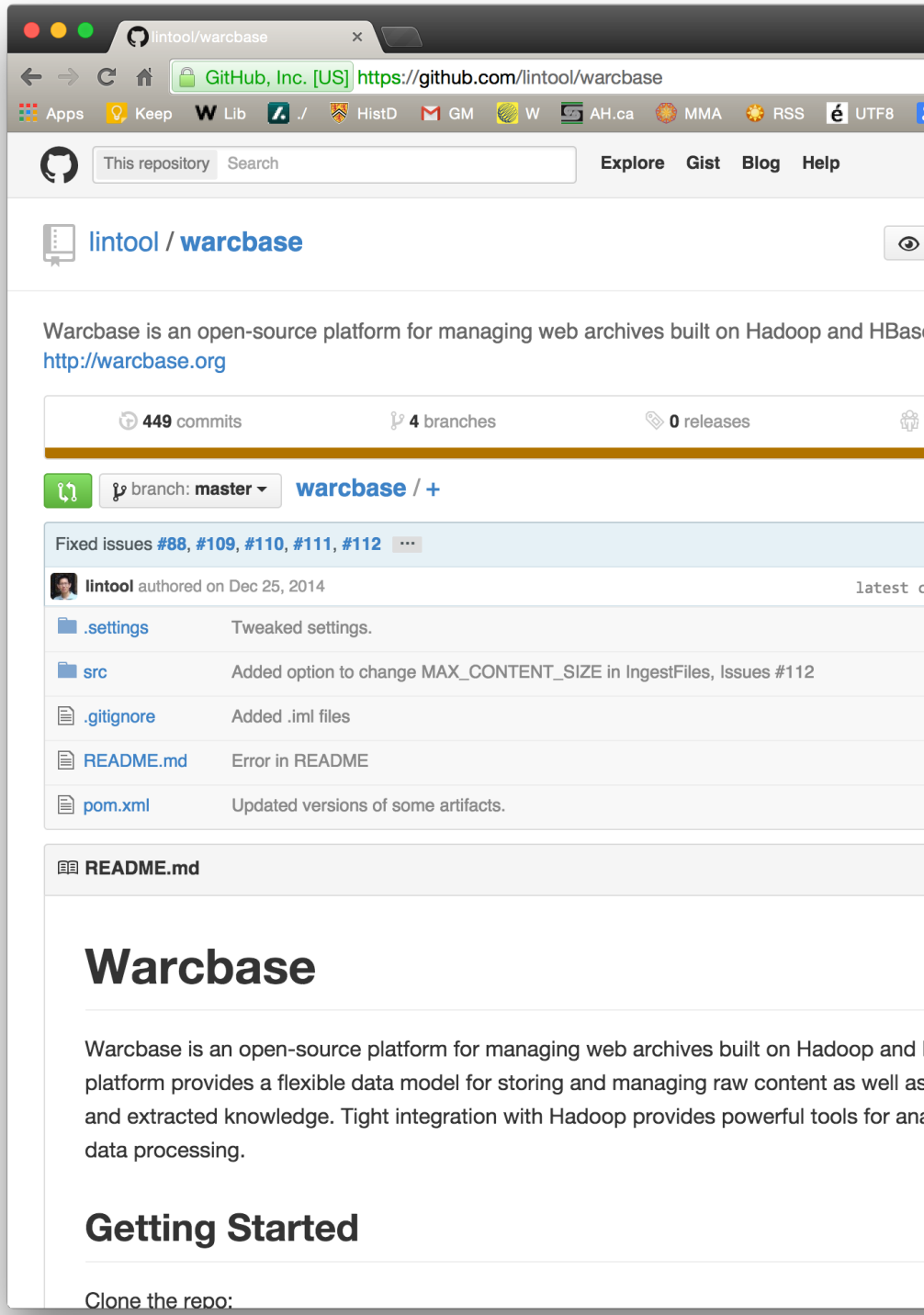
"Archives Unleashed" Hackathon

March 3 - 5 2016, University of Toronto Library

archivesunleashed.ca

Travel funds for grad students/contingent faculty & researchers

End-user tools and co-operation with **CS, librarian, and archivist** colleagues is key.



What happens if we don’t?

- Do we need to become programmers?
- No - but historians need to know how to speak the lingo - to know the possible, the impossible, and what to strive for
- Not enough just to be friendly - need to work in teams, learn numbers, etc.

Because, as I hope I can show today.. **it’s worth it.**

More voices, more people, the promise of social history achieved.

Thanks very much!

Questions?

Ian Milligan
Assistant Professor
@ianmilligan1

UNIVERSITY OF WATERLOO
FACULTY OF ARTS
Department of History