# History Crawling with Warcbase

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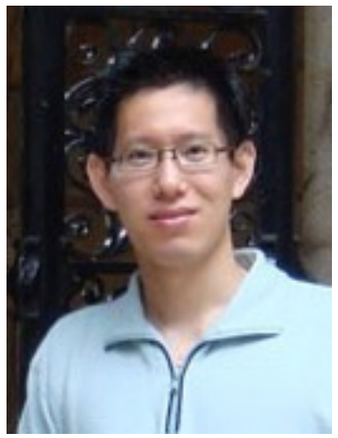
# Team Warcbase

## Historians

## Computer Scientists



## Librarians

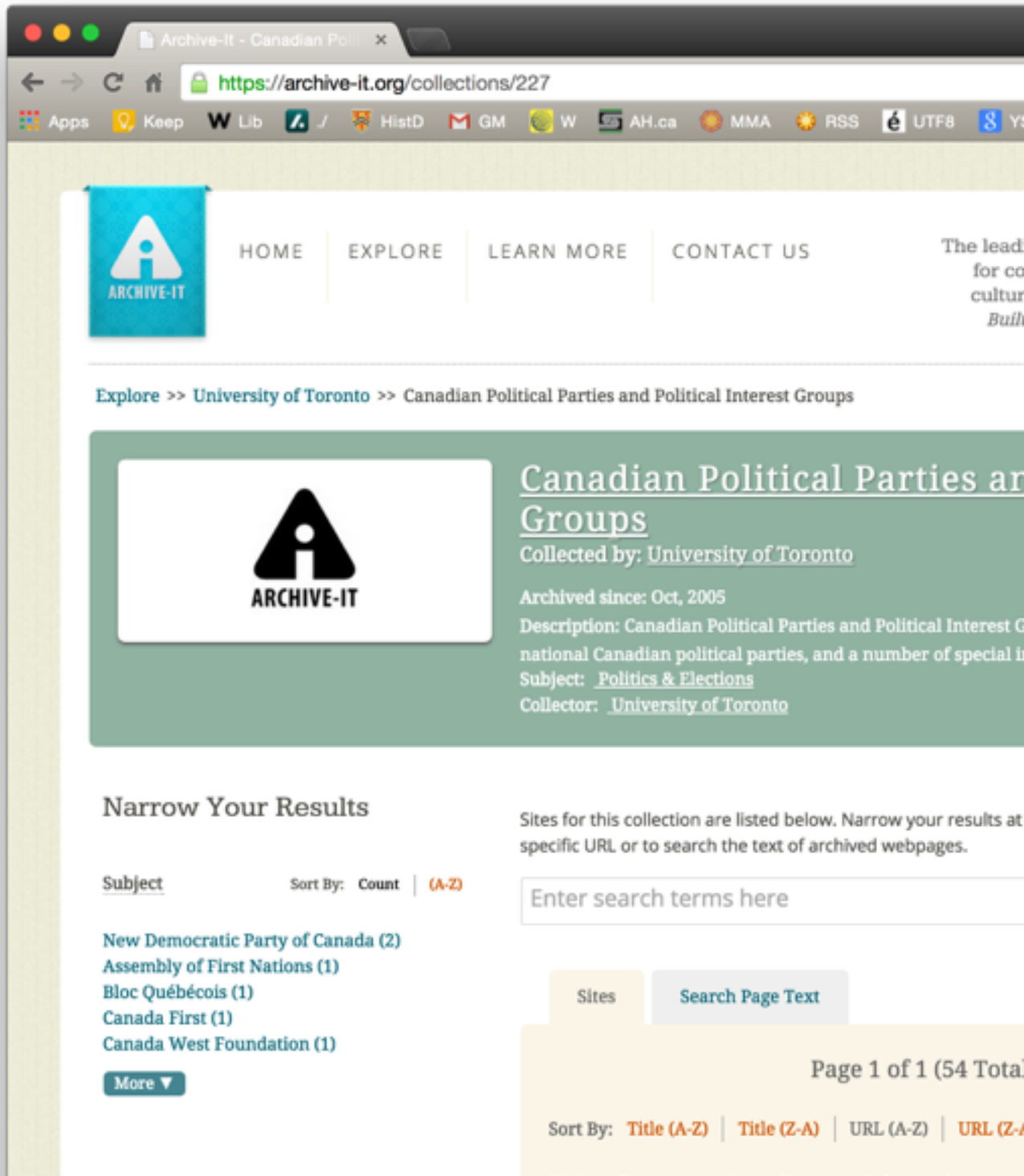
## Networks

# Two Case Studies

- **Archive-It Research Services**: “Canadian Political Parties and Political Interest Groups”

- 2005 - 2015

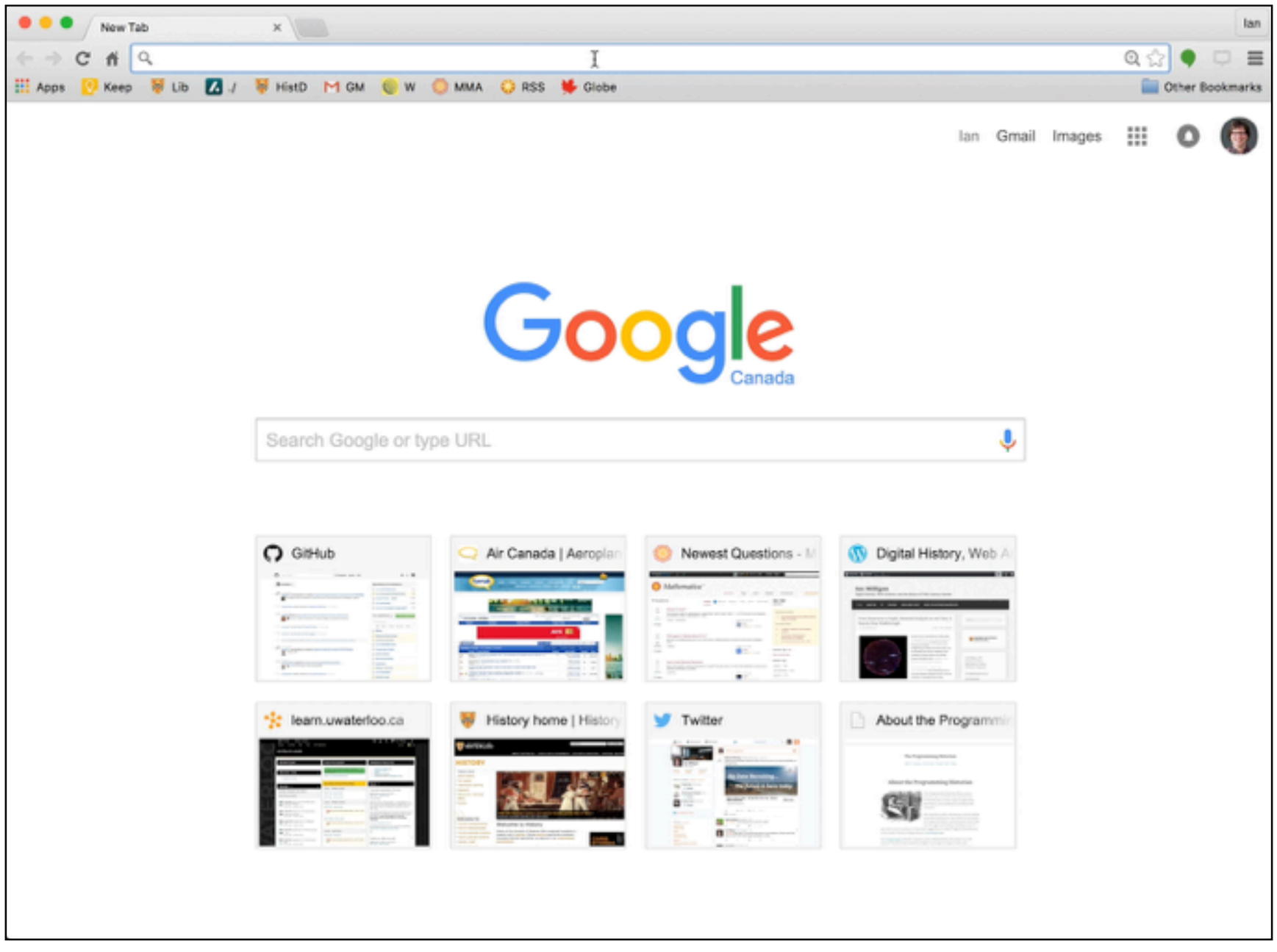
- WARC files



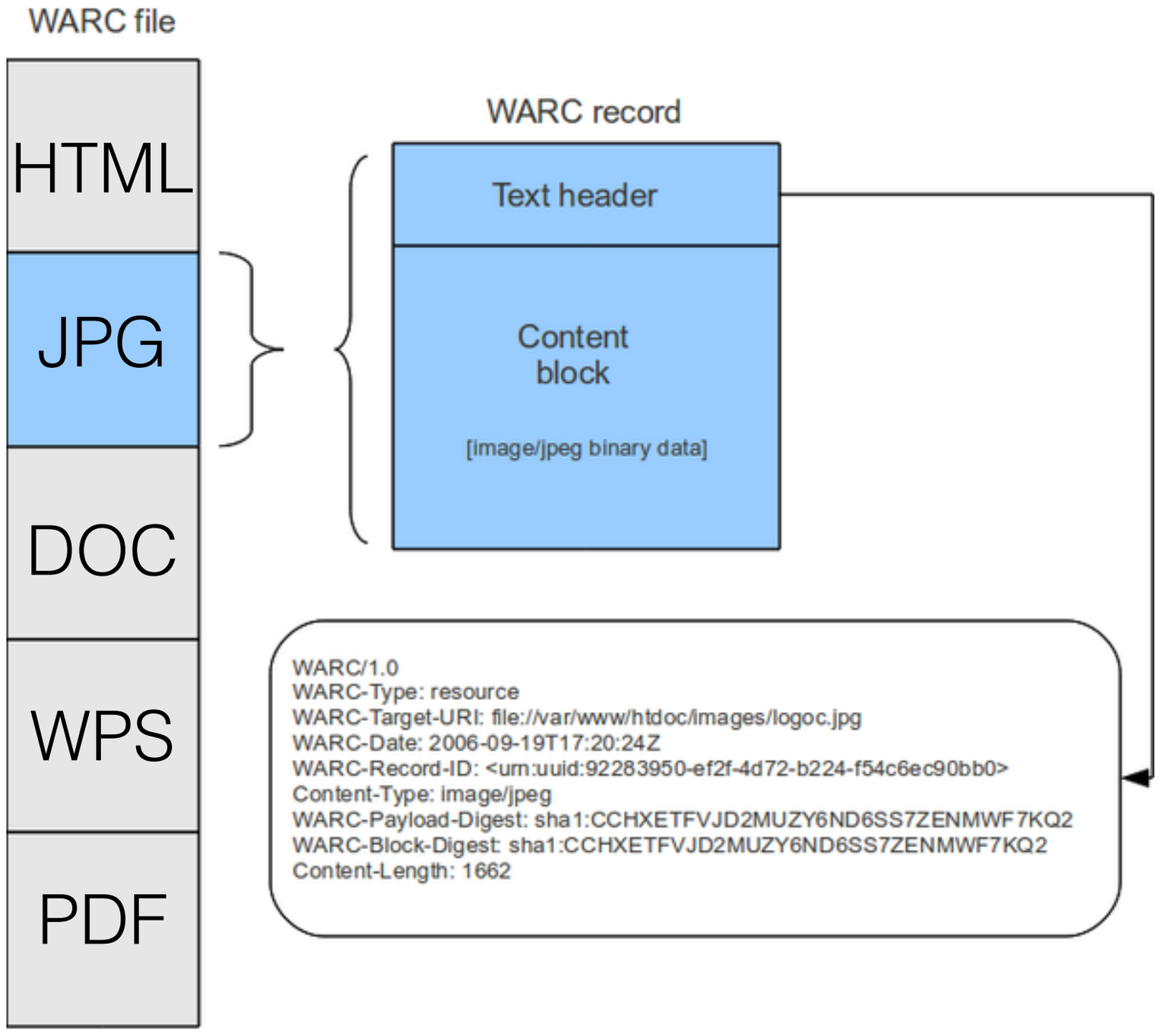
# Two Case Studies


- **GeoCities**
- End-of-life crawl from 2009
- WARC files
- 4.1 TB, 186 million HTML documents

# Moving beyond the Wayback Machine for scholarly access



# Why Warcbase?

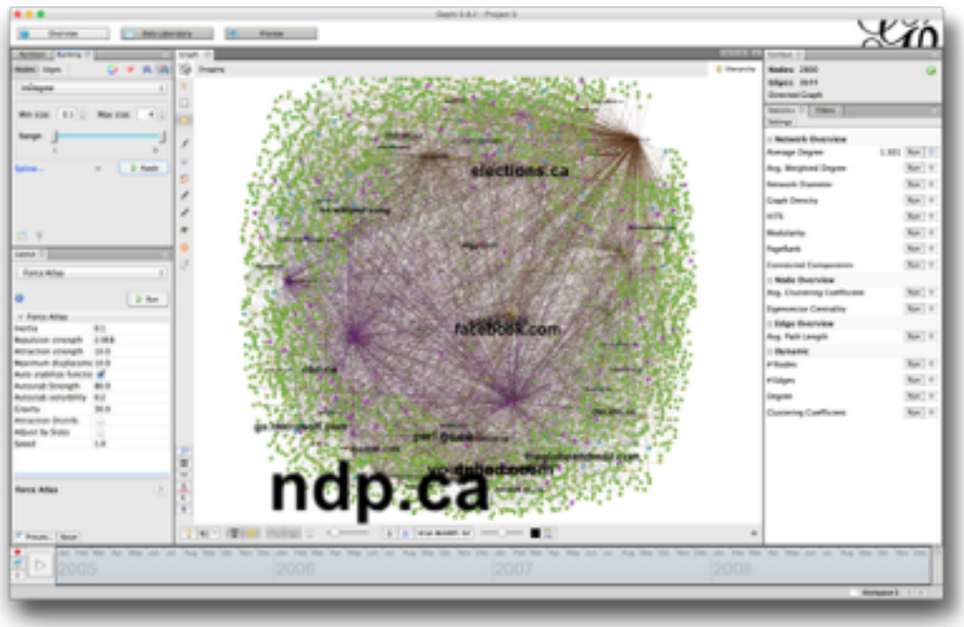
# Warcbase

## An open-source platform for managing web archives

http://warcbase.org

Two main facets

- A flexible data store: your own Wayback Machine
- **Scriptable analytics and data processing**

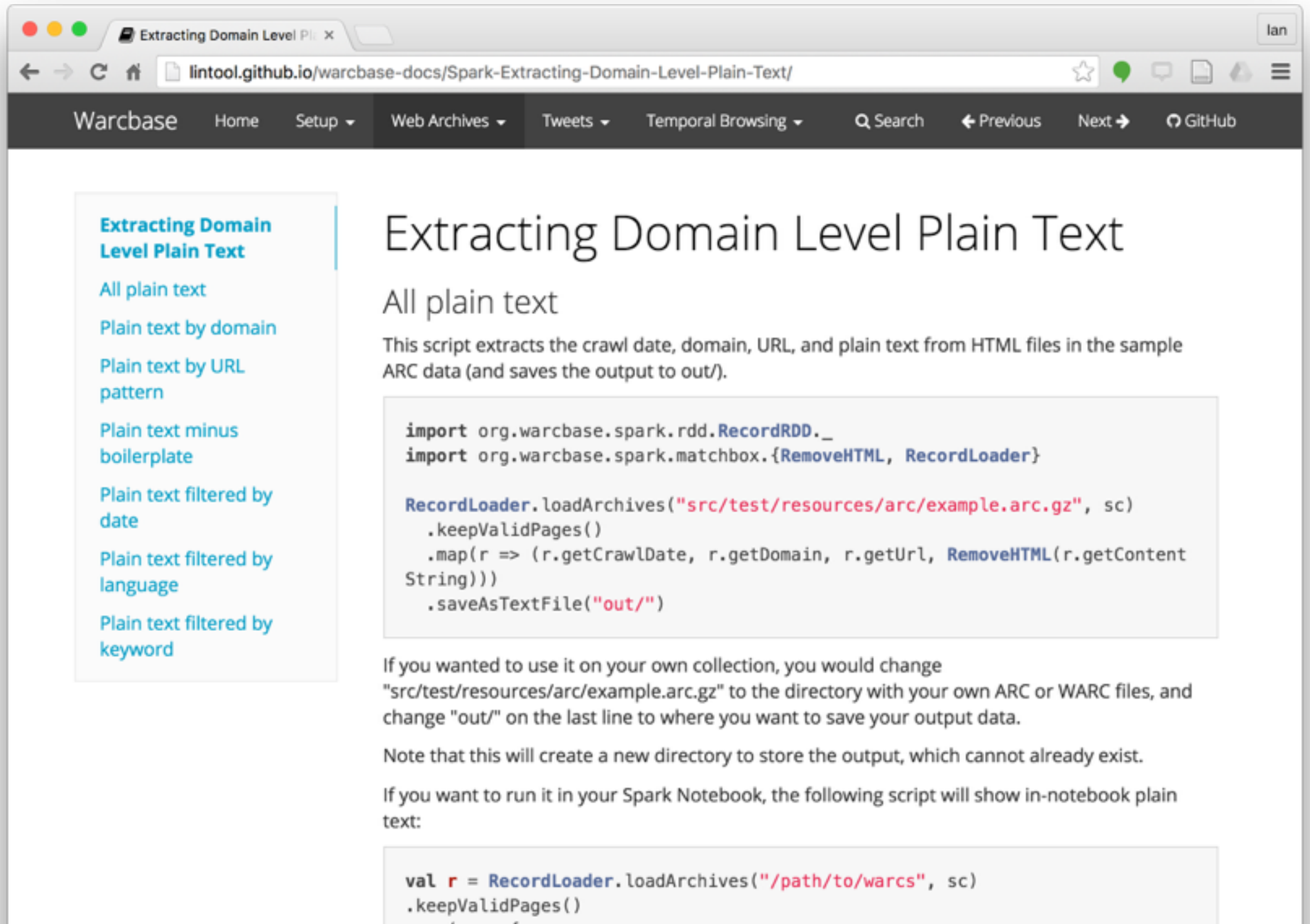

Funded by Mellon, SSHRC, NSERC, and Government of Ontario.

# Warcbase

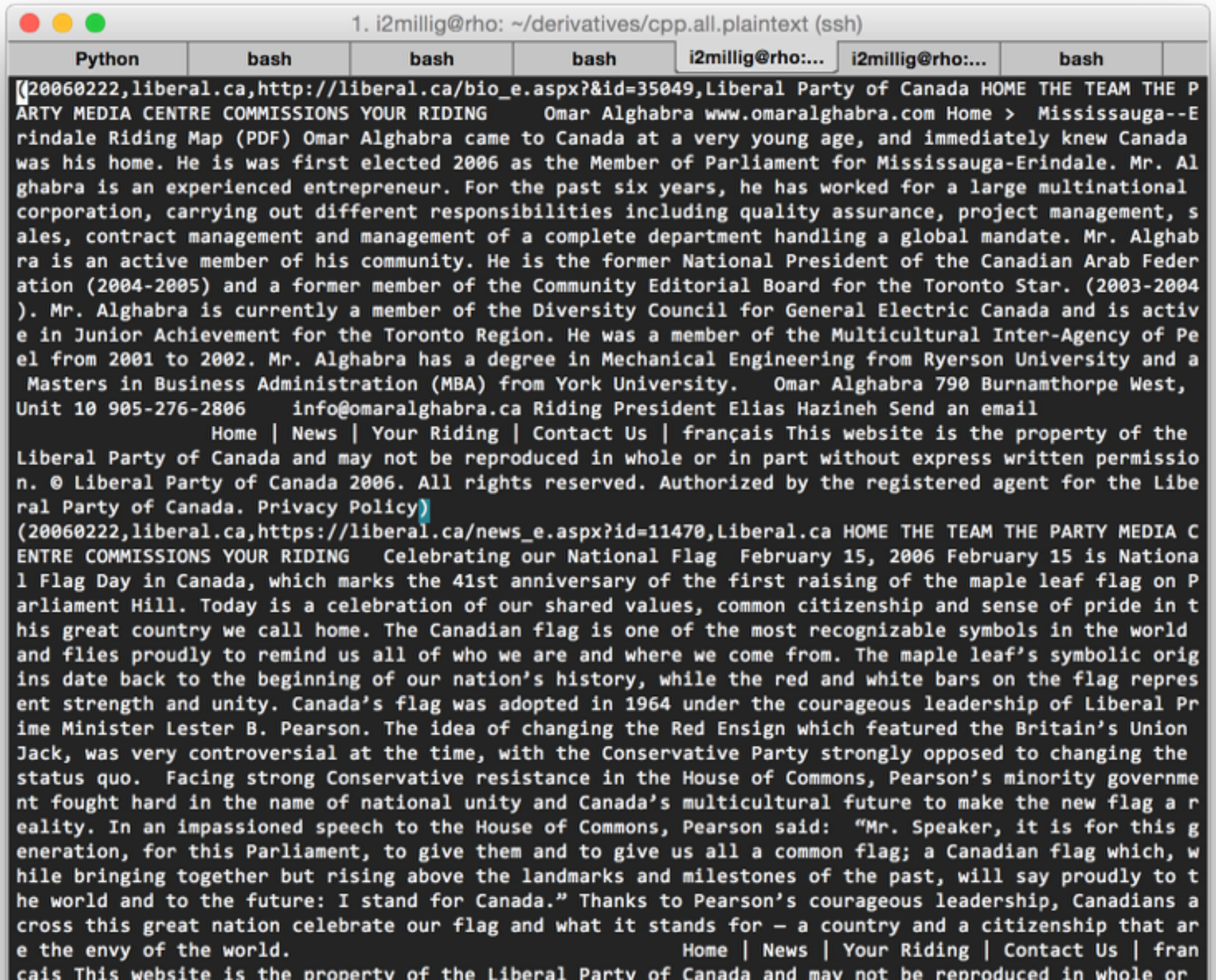


- Scalable
  - From Raspberry Pi, to laptop, to powerful desktop, to single-node beefy server, to cluster
- Potentially very powerful
  - *Trantor cluster*: 1.2PB of disk, 25 compute nodes totalling 3.2TB memory and 300 current-generation Intel cores.

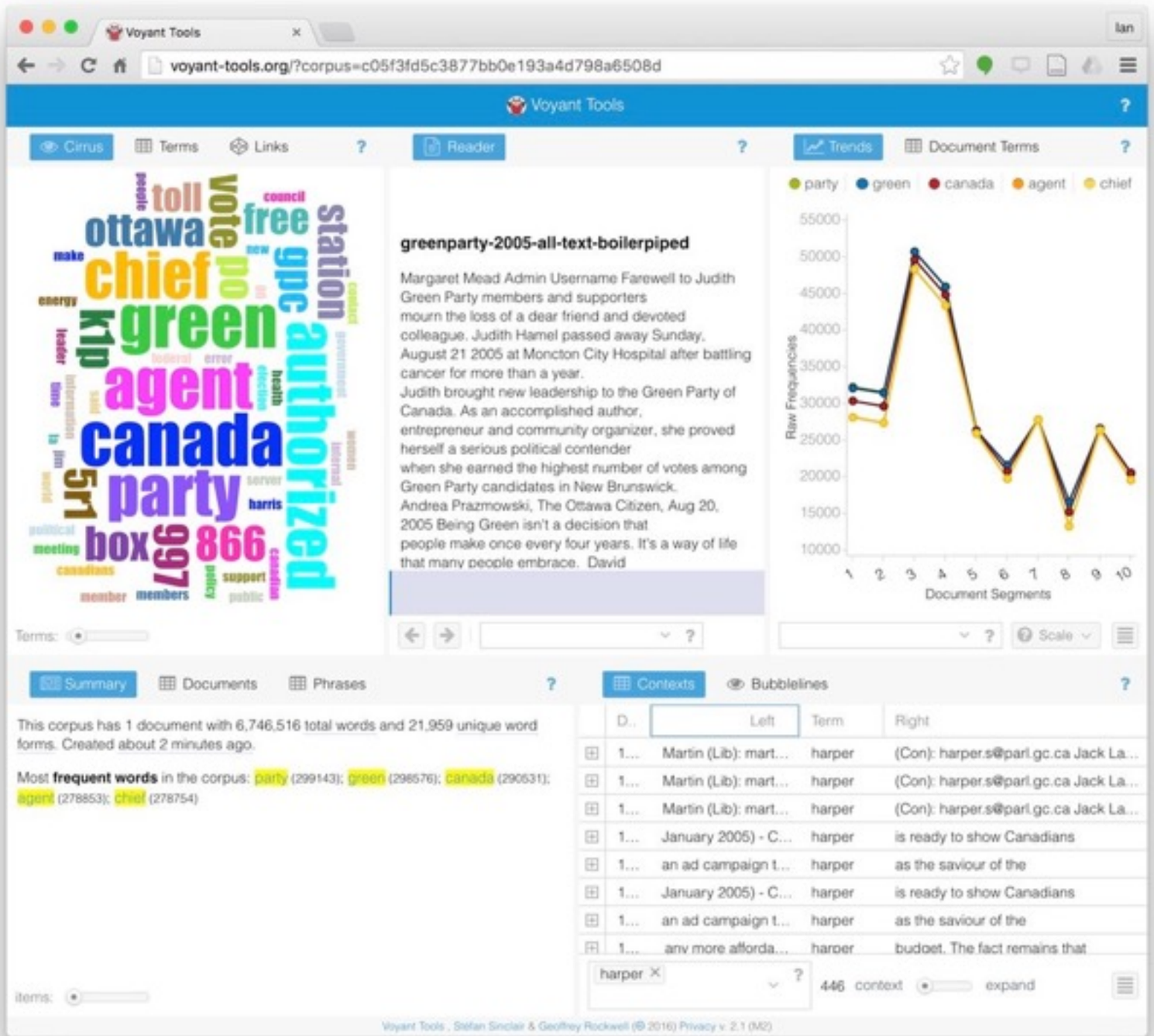
# docs.warcbase.org



# Extract all Text

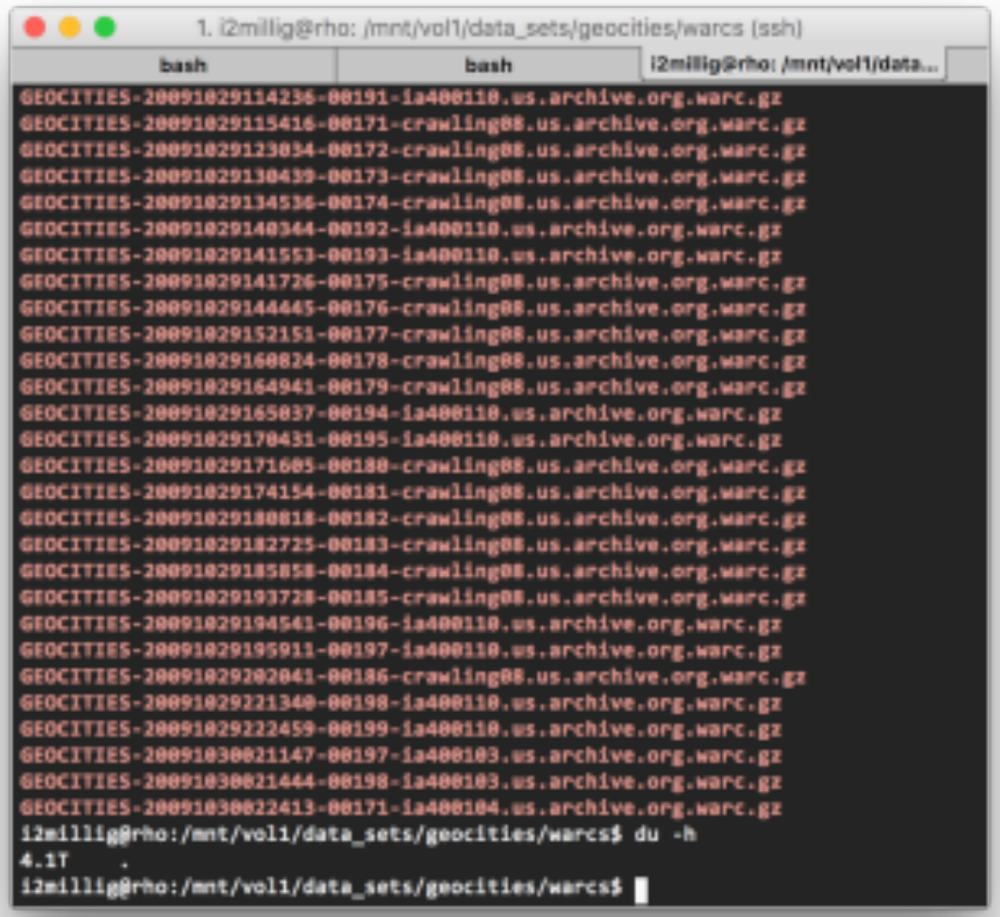


# Extract all Text

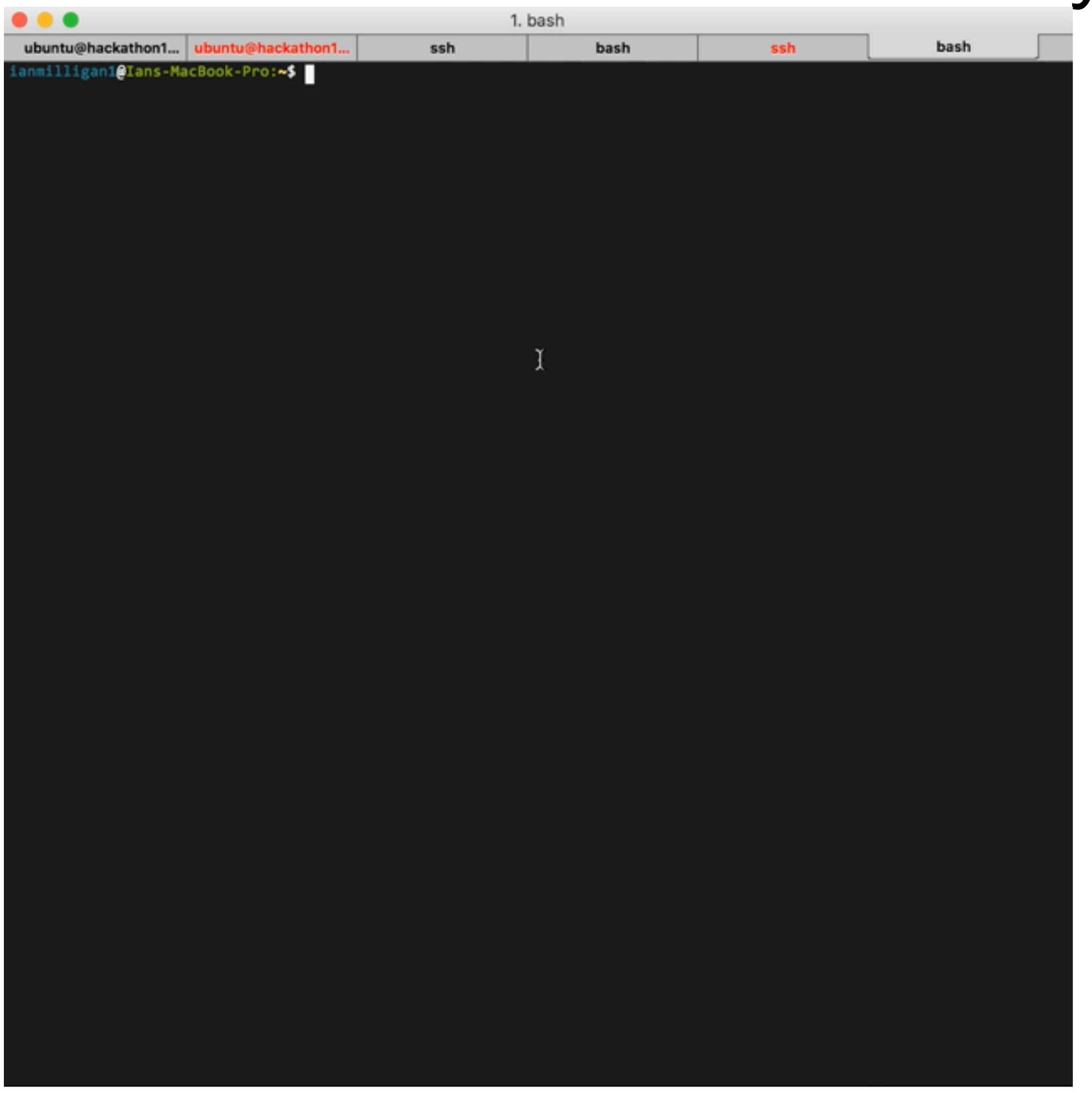


# Using Warcbase to Learn Cool Stuff about web archives!

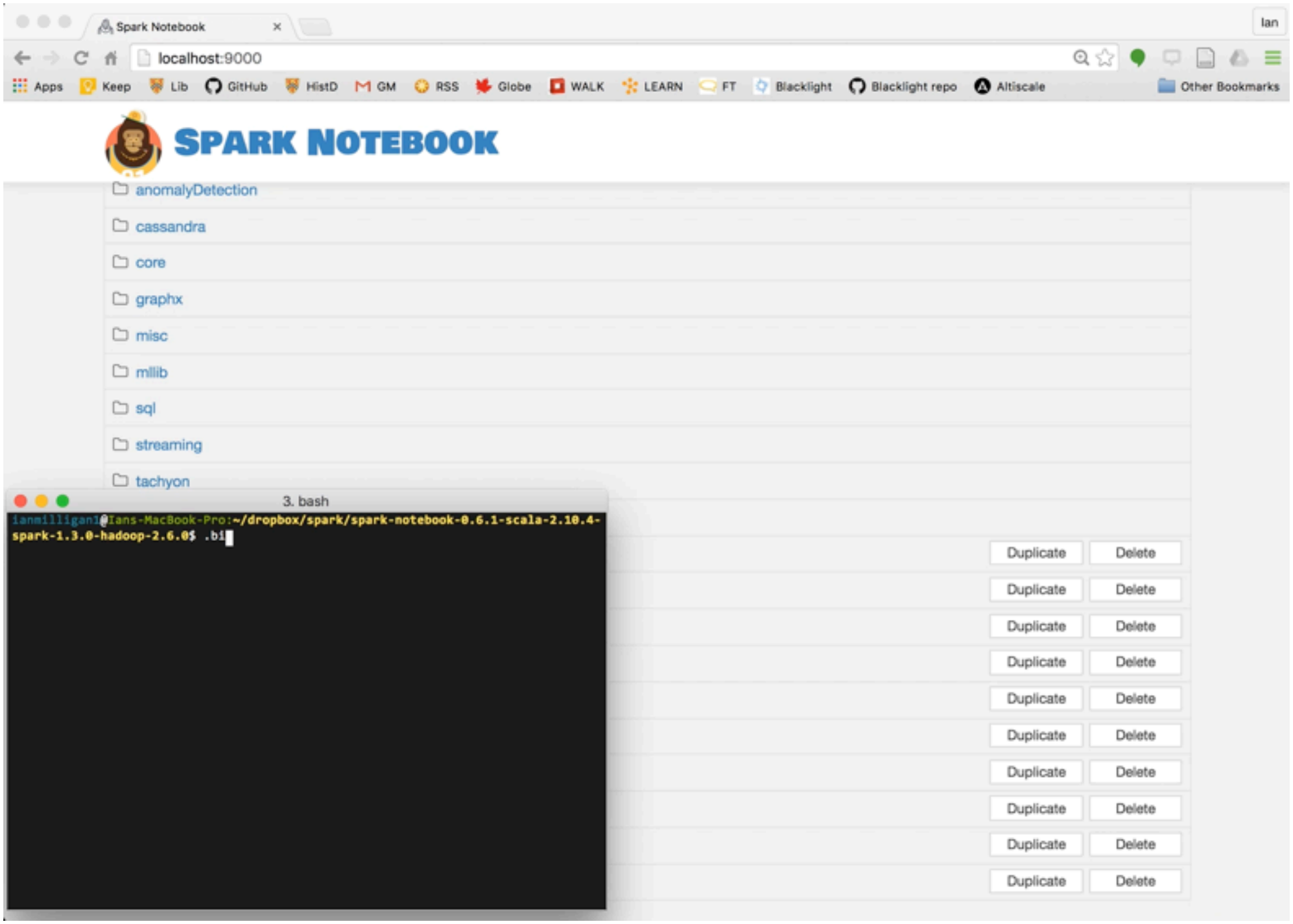
# Step One: Grabbing WARCs

# Step Two: Basic Shell Analysis



# Step Two: Basic Analytics



# Step Three: Filtering a Corpus

```
1  import org.warcbase.spark.matchbox.{ExtractTopLevelDomain,
       ExtractLinks, RecordLoader}
2  import org.warcbase.spark.rdd.RecordRDD._
3
4  RecordLoader.loadArc("/mnt/vol1/data_sets/geocities/warcs/*", sc)
5  .keepValidPages()
6  .map(r => (r.getCrawldate, ExtractLinks(r.getUrl, r.
       getContentString)))
7  .flatMap(r => r._2.map(f => (r._1, ExtractTopLevelDomain(f._1).
       replaceAll("^\\s*www\\.", ""), ExtractTopLevelDomain(f._2).
       replaceAll("^\\s*www\\.", ""))))
8  .filter(r => r._2 != "" && r._3 != "")
9  .countItems()
10 .filter(r => r._2 > 5)
11 .saveAsTextFile("/mnt/vol1/data_sets/geocities/geocities.
       sitelinks")
```

A Link Graph

# Step Three: Filtering a Corpus

```
1  ((20090903,http://geocities.com/saganaki2000/ADSLGR/adslgr.htm,
   http://www.adslgr.com),15337)
2  ((20091026,http://geocities.com/saganaki2000/ADSLGR/adslgr.htm,
   http://www.adslgr.com),15337)
3  ((20091027,http://geocities.com/spankbank69hard/,http://pg.photos
   .yahoo.com/ph/spankbank69hard/my_photos/),9807)
4  ((20090903,http://geocities.com/spankbank69hard/index.html,http:/
   /pg.photos.yahoo.com/ph/spankbank69hard/my_photos/),9807)
5  ((20091027,http://geocities.com/CollegePark/Locker/8187/,http://
   www.comercialuruapan.com),8056)
6  ((20090903,http://geocities.com/CollegePark/Locker/8187/,http://
   www.comercialuruapan.com),8056)
```

## Results

# Filtering


http://geocities.com/WestHollywood/3247
http://geocities.com/WestHollywood/Park/2802
http://geocities.com/WestHollywood/Park/3599
http://geocities.com/WestHollywood/Village/2215
http://geocities.com/WestHollywood/Heights/8470
http://geocities.com/WestHollywood/6036
http://geocities.com/WestHollywood/Heights/1067
http://geocities.com/WestHollywood/Heights/6894
http://geocities.com/WestHollywood/4620
http://geocities.com/WestHollywood/Heights/9995
http://geocities.com/WestHollywood/Castro/1353
http://geocities.com/WestHollywood/Heights/8170
http://geocities.com/WestHollywood/4829
http://geocities.com/WestHollywood/2753
http://geocities.com/WestHollywood/Heights/5359
http://geocities.com/WestHollywood/Chelsea/6553
http://geocities.com/WestHollywood/Heights/4250
http://geocities.com/WestHollywood/Heights/2970
http://geocities.com/WestHollywood/1401
http://geocities.com/WestHollywood/6173
http://geocities.com/WestHollywood/6310
http://geocities.com/WestHollywood/Park/8021
http://geocities.com/WestHollywood/Village/9414
http://geocities.com/WestHollywood/Heights/9159
http://geocities.com/WestHollywood/1459
http://geocities.com/WestHollywood/4543
http://geocities.com/WestHollywood/Stonewall/8751
http://geocities.com/WestHollywood/Castro/1586
http://geocities.com/WestHollywood/2399
http://geocities.com/WestHollywood/9746
http://geocities.com/WestHollywood/3075
cities.com/WestHollywood/Castro/6902

Gephi 0.8.2 - enchantedforest-analysis.gephi

Overview | Data Laboratory | Preview

Graph

Dragging

Hierarchy

Partition | Ranking | Layout

Context | Statistics | Filters

http://www.geocities.com/EnchantedForest/Glade/4821

http://www.geocities.com/EnchantedForest/Glade/3891

http://www.geocities.com/EnchantedForest/1004

http://www.geocities.com/EnchantedForest/7631

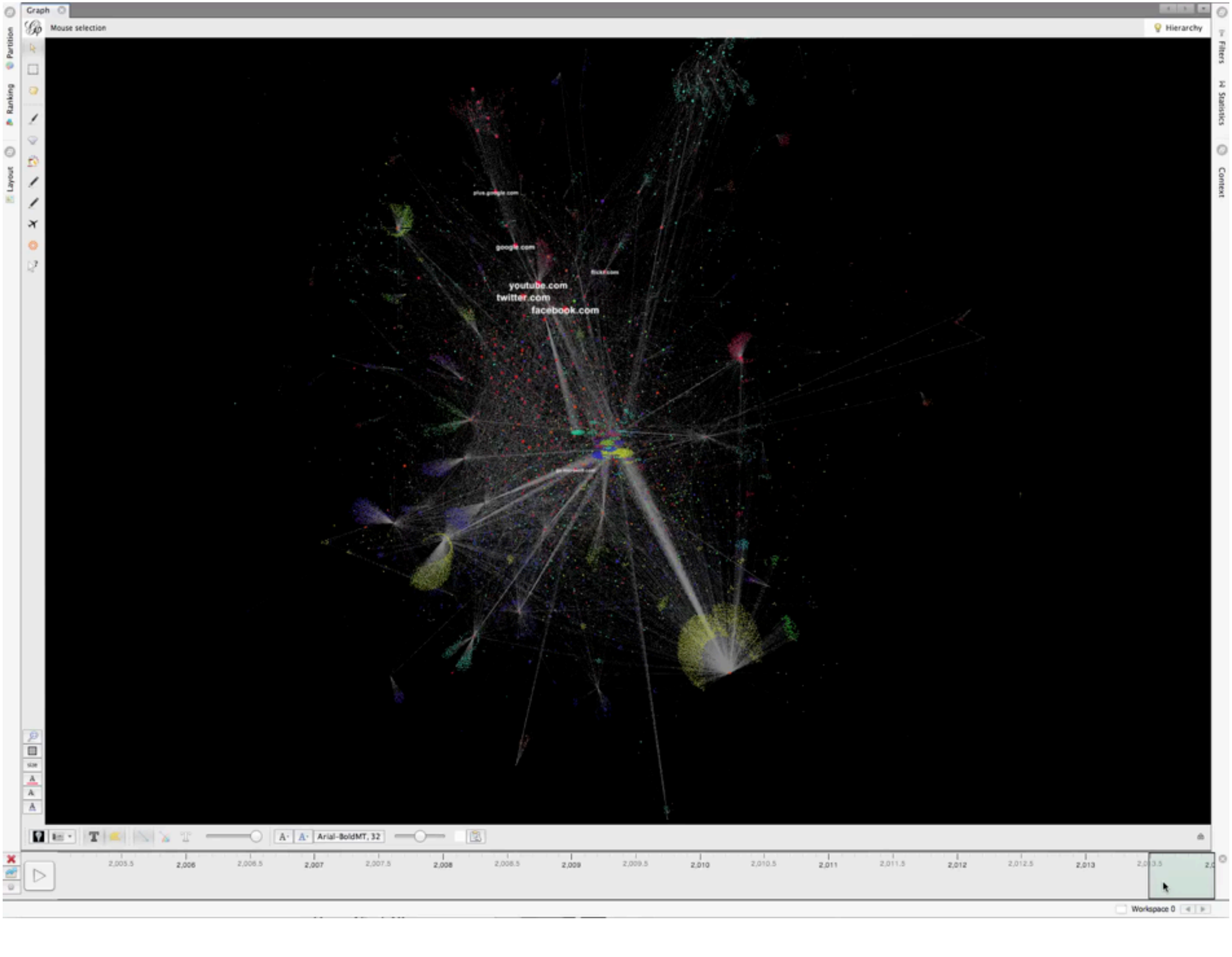
size

Arial-BoldMT, 32

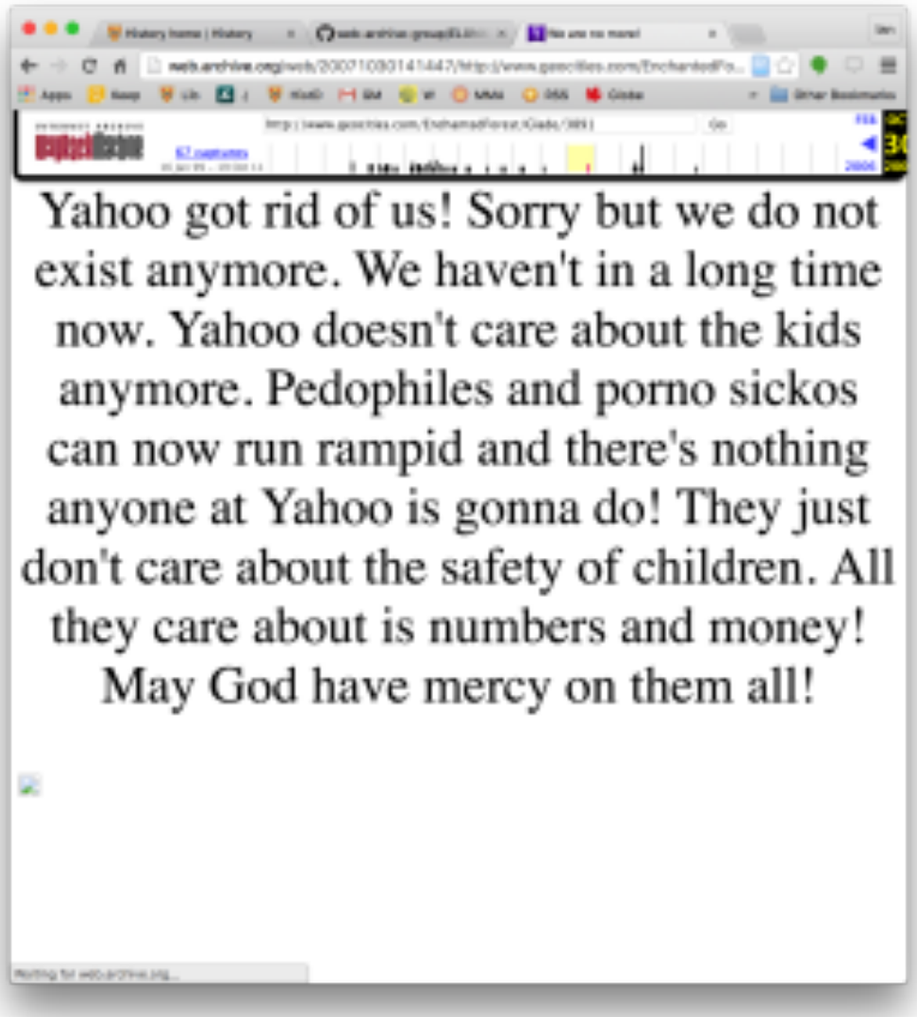
Workspace 0

# Finding cool sites!

| Label | PageRank | In-Degree | Out-Degree | Degree |
|---|---|---|---|---|
| http://www.geocities.com/EnchantedForest/Glade/3891 | 0.008 | 145 | 1 | 146 |
| http://www.geocities.com/EnchantedForest/Glade/9378 | 0.005 | 6 | 13 | 19 |
| http://www.geocities.com/EnchantedForest/1004 | 0.005 | 63 | 26 | 89 |
| http://www.geocities.com/EnchantedForest/7631 | 0.004 | 6 | 3 | 9 |
| http://www.geocities.com/SoHo/Cafe/4690 | 0.004 | 241 | 0 | 241 |
| http://www.geocities.com/EnchantedForest/Glade/4021 | 0.004 | 151 | 0 | 151 |
| http://www.geocities.com/TheTropics/Paradise/4079 | 0.003 | 248 | 0 | 248 |
| http://www.geocities.com/RainForest/Vines/4892 | 0.003 | 5 | 6 | 11 |
| http://www.geocities.com/EnchantedForest/3278 | 0.003 | 106 | 0 | 106 |
| http://www.geocities.com/EnchantedForest/3696 | 0.003 | 70 | 0 | 70 |
| http://www.geocities.com/EnchantedForest/Dell/5914 | 0.003 | 180 | 1 | 181 |
| http://www.geocities.com/EnchantedForest/1469 | 0.003 | 16 | 49 | 65 |
| http://www.geocities.com/EnchantedForest/Tower/9644 | 0.003 | 19 | 42 | 61 |
| http://www.geocities.com/EnchantedForest/Dell/9501 | 0.003 | 79 | 362 | 441 |
| http://www.geocities.com/EnchantedForest/Glade/8851 | 0.003 | 17 | 0 | 17 |
| http://www.geocities.com/Heartland/Meadows/6263 | 0.003 | 9 | 0 | 9 |
| http://www.geocities.com/Heartland/6188 | 0.003 | 56 | 0 | 56 |
| http://www.geocities.com/EnchantedForest/4213 | 0.003 | 158 | 0 | 158 |
| http://www.geocities.com/Athens/Acropolis/1465 | 0.003 | 20 | 0 | 20 |
| http://www.geocities.com/EnchantedForest/8012 | 0.003 | 42 | 197 | 239 |
| http://www.geocities.com/EnchantedForest/3810 | 0.003 | 98 | 147 | 245 |
| http://www.geocities.com/EnchantedForest/Glade/3899 | 0.002 | 14 | 11 | 25 |
| http://www.geocities.com/EnchantedForest/3015 | 0.002 | 64 | 0 | 64 |
| http://www.geocities.com/EnchantedForest/Tower/8143 | 0.002 | 50 | 40 | 90 |
| http://www.geocities.com/EnchantedForest/Meadow/1426 | 0.002 | 41 | 185 | 226 |


Graph
Mouse selection
Hierarchy
Partition
Ranking
Layout
Filters
Statistics
Context
plus.google.com
google.com
flickr.com
youtube.com
twitter.com
facebook.com
Arial-BoldMT, 32
2,005.5
2,006
2,006.5
2,007
2,007.5
2,008
2,008.5
2,009
2,009.5
2,010
2,010.5
2,011
2,011.5
2,012
2,012.5
2,013
Workspace 0

# Step Four: Finding Significant Sites w/ PageRank

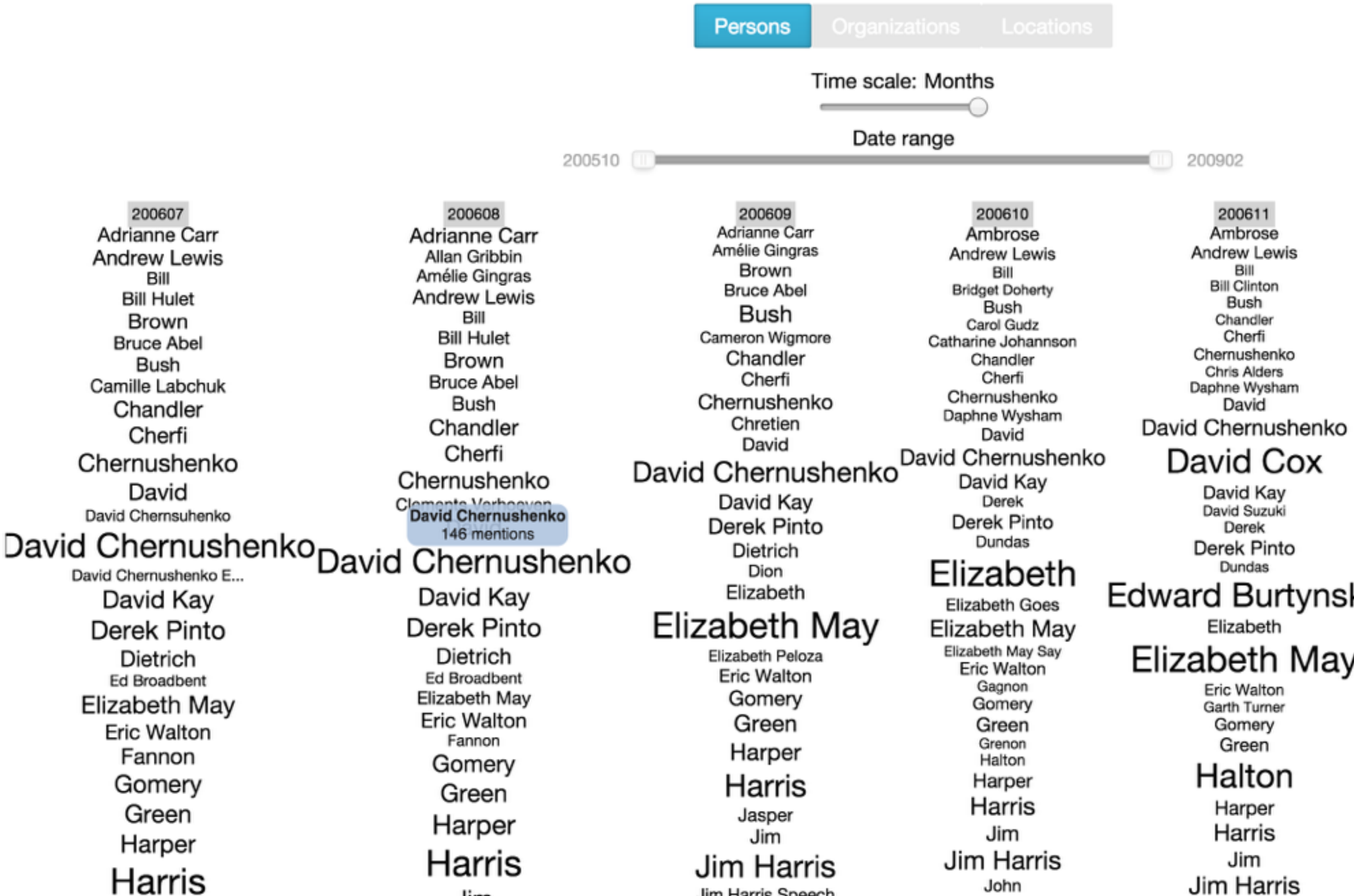
# Step Five: Text Analysis

# Different Ways to Filter

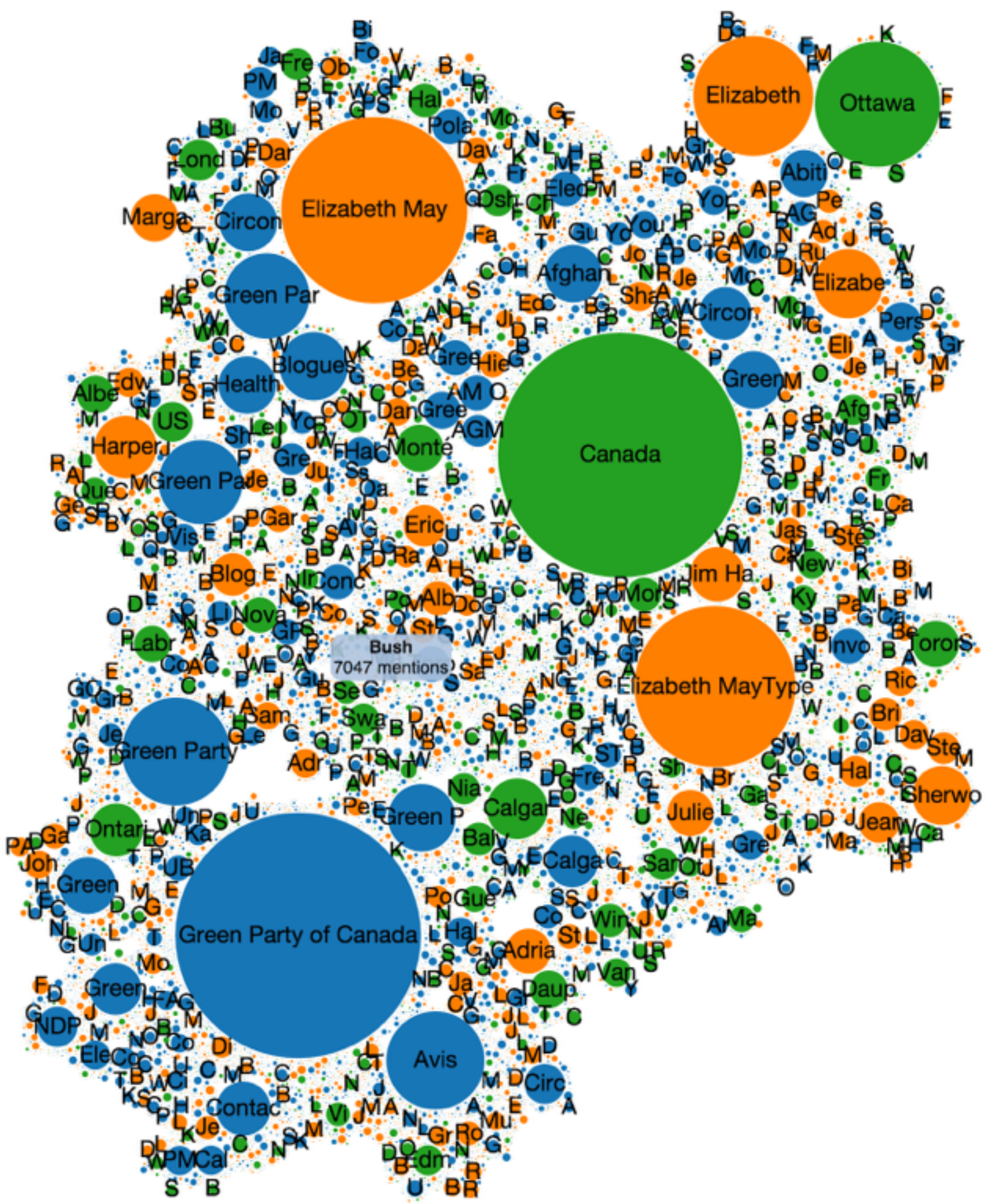
- Get everything
- Filter by domain (i.e. all pages in “greenparty.ca”)
- Filter by URL pattern (i.e. all pages in “greenparty.ca/vegetables/*”)
- Filter out boilerplate (i.e. advertisements, navigational elements, templates, etc.)
- Filter by date (i.e. all pages on July 4th, 2015)
- Filter by languages (i.e. only French language pages from greenparty.ca)
- Or any of the above!

# Named Entity Visualization

Data source: greenparty.csv




Manley
22 mentions


Elizabeth
Ottawa
Elizabeth May
Green Par
Blogue
Health
US
Harper
Green Pa
Canada
Green Party
Green Party of Canada
Elizabeth MayType
Avis
Bush
7047 mentions

Or generate Solr indexes using Warcbase too!

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

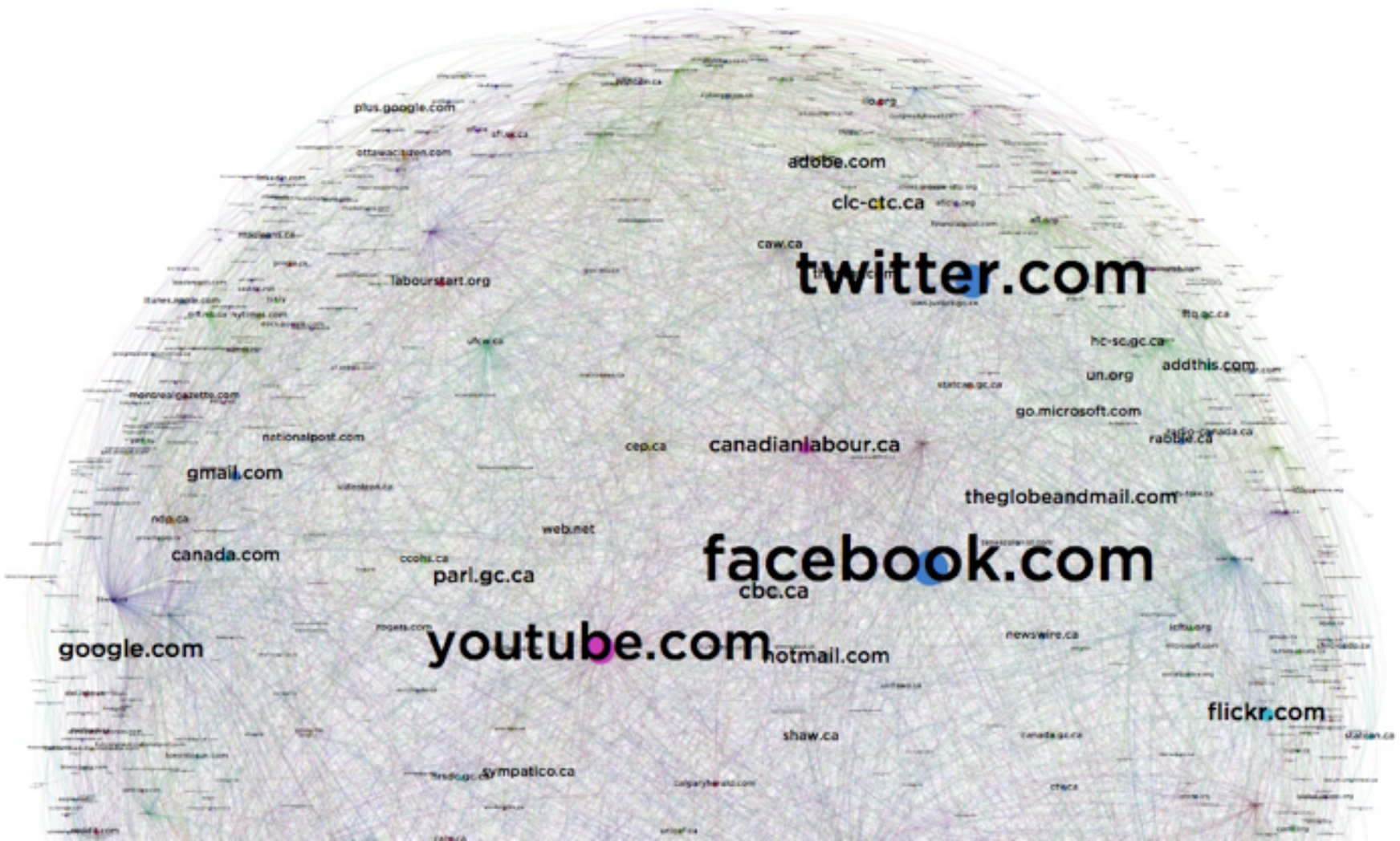
**On this website, you can search web archived content from 50 political parties and political interest groups, from October 2005 to March 2015.**

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:

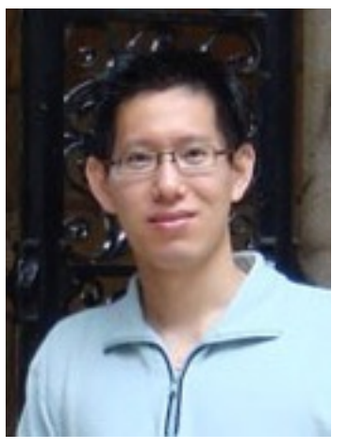
- **Basic keyword searching** [Example: "Rob Ford", only Liberal.ca]
- **Graphing trends over time** [Example: Liberal Opposition Leaders, 2005-2015]
- **Advanced search, including words in proximity to each other** [Example: environmental and tax within 25 words of each other]

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



docs.warcbase.org

or the living docs below:



Social Sciences and Humanities Research Council of Canada
Conseil de recherches en sciences humaines du Canada
Canada
Ontario
compute canada | calcul canada
UNIVERSITY OF WATERLOO
THE ANDREW W. MELLON FOUNDATION
NSERC CRSNG

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