IANCIS

Indexing of Anonymous Networks for Crime Information Search

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IANCIS

Objective: Developing a tool able to crawl onion websites and feed a semantic engine for indexing and clustering collected data.

Website: www.iancis.eu

Consortium:

Istituto per le Applicazioni del Calcolo "Mauro Picone”

Arma dei Carabinieri HQs-ICT Office

Expert System

IANCIS

The tool should:

- Automatically **explore** TOR hidden services
- **Extract** text from collected resources and **analyze** it
- **Visualize** analysis results and **identify** evidences of illegal activities

The tool is meant to be the first step towards the development of an investigation instrument for the TOR network

TOR

Tor is an **anonymity network**, it was originally designed, implemented, and deployed as a third-generation **onion routing** project of the U.S. Naval Research Laboratory.

Tor network is composed by volunteer-operated servers (relays) that allow people to improve their privacy and security on the Internet.

Tor protects users against a common form of Internet surveillance known as **"traffic analysis"**. Traffic analysis can be used to infer **who is talking to whom** over a public network.

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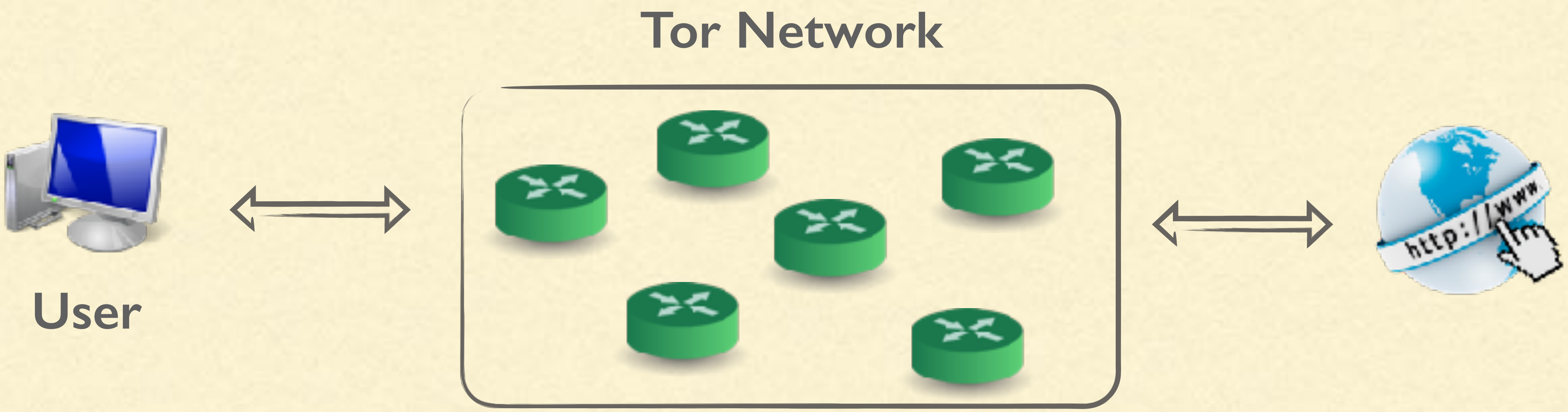

Tor Network

User

Hidden Services

Tor can provide **receiver privacy** for Internet services through a feature called “hidden services”.

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Hidden services are accessible only through the Tor network and each service is identified by its ***onion address.*** An onion address is a **16 characters** string followed by the domain .onion, e.g http://duskgytldkxiuqc6.onion.

The number of Hidden Services is estimated to be in the order of **tens of thousands**[1,2]

[1] Torproject Blog, "Some statistics about onions", https://blog.torproject.org/blog/some-statistics-about-onions
[2] A. Biryukov, I. Pustogarov, and R. Weinmann. 2013. Trawling for Tor Hidden Services: Detection, Measurement, Deanonymization. In Proceedings of SP '13

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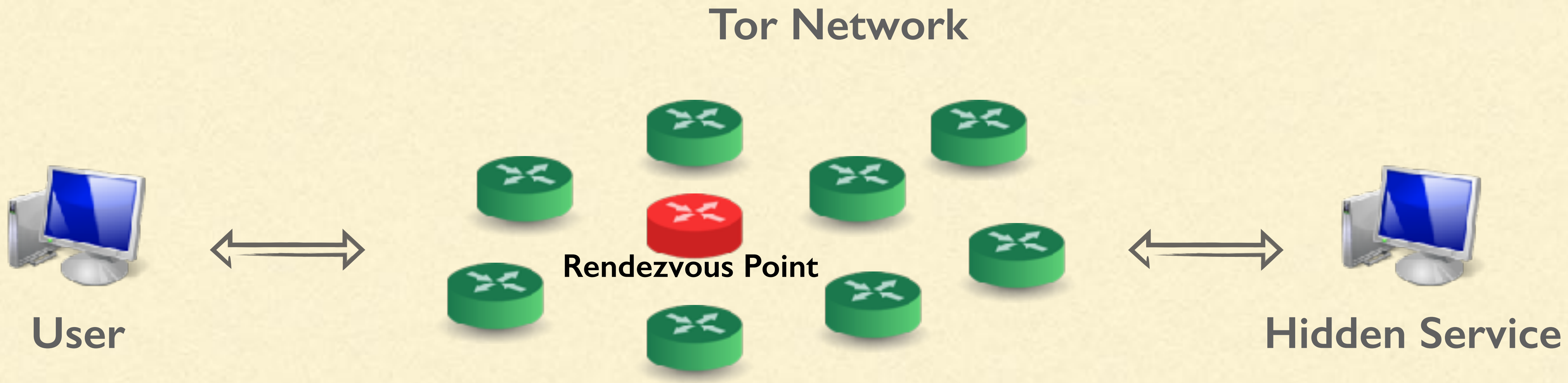

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Hidden Services

Why LEA are interested in Hidden Services?

Several Hidden Services **promote illegal activities** such as:

- Illicit trafficking in weapons
- Illicit trafficking in narcotic drugs
- Child pornography
- Trafficking in human beings
- Terrorism

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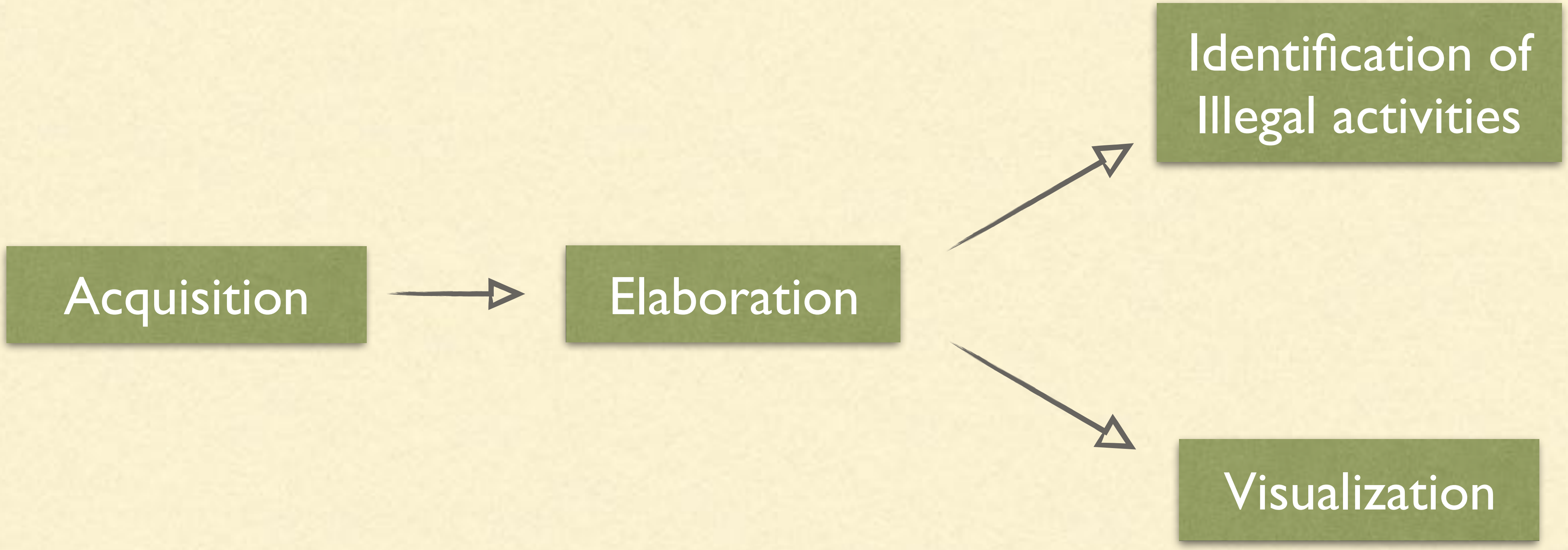
Lolita City hosted child pornography images and videos.

Tool

Workflow



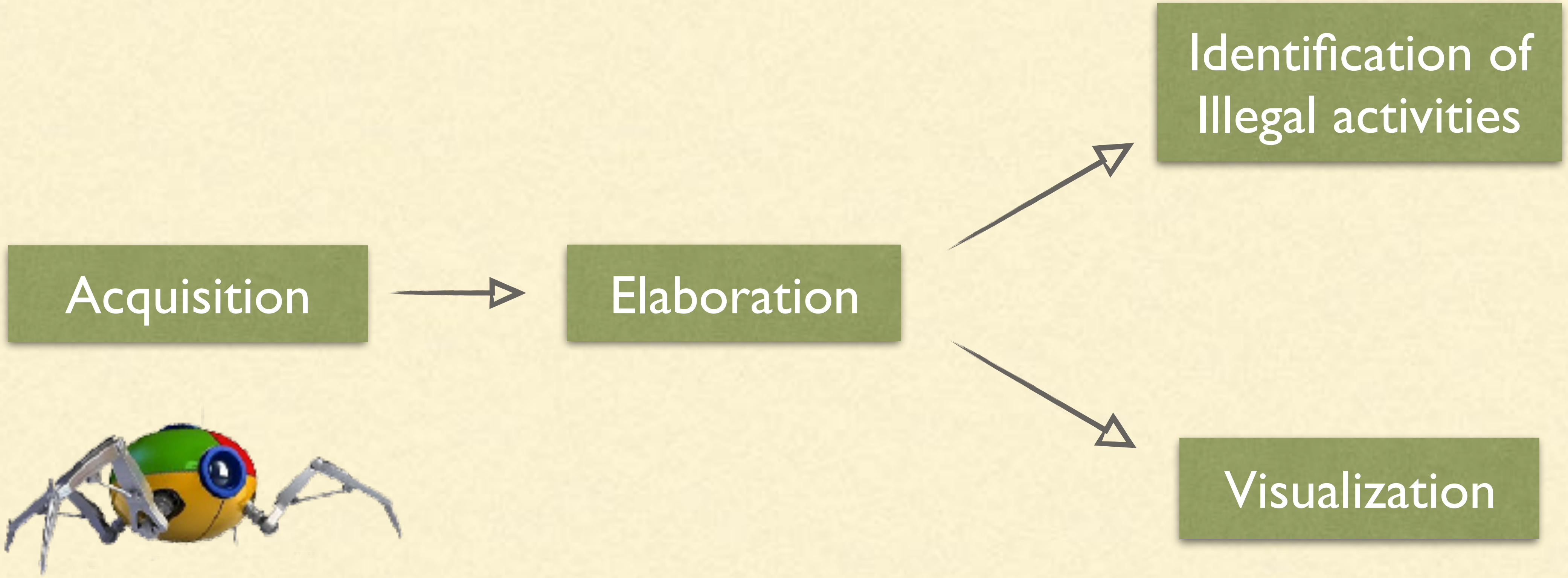
Acquisition

Elaboration

Identification of Illegal activities

Visualization

Workflow



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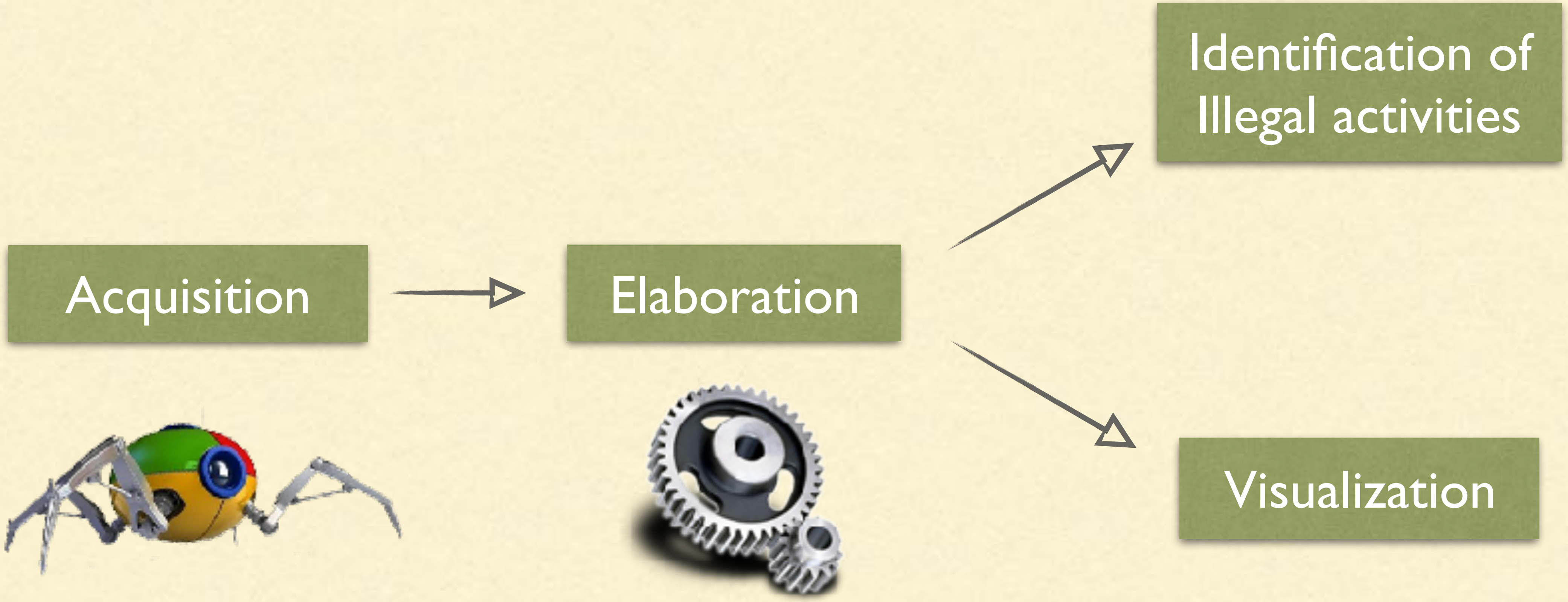

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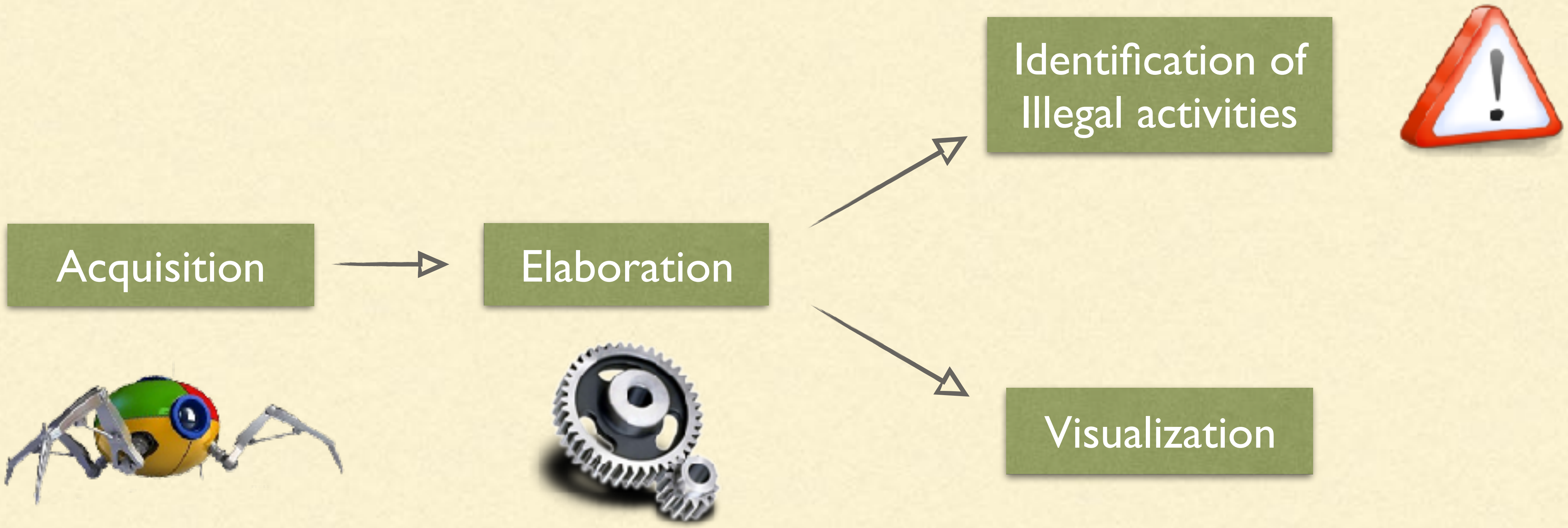

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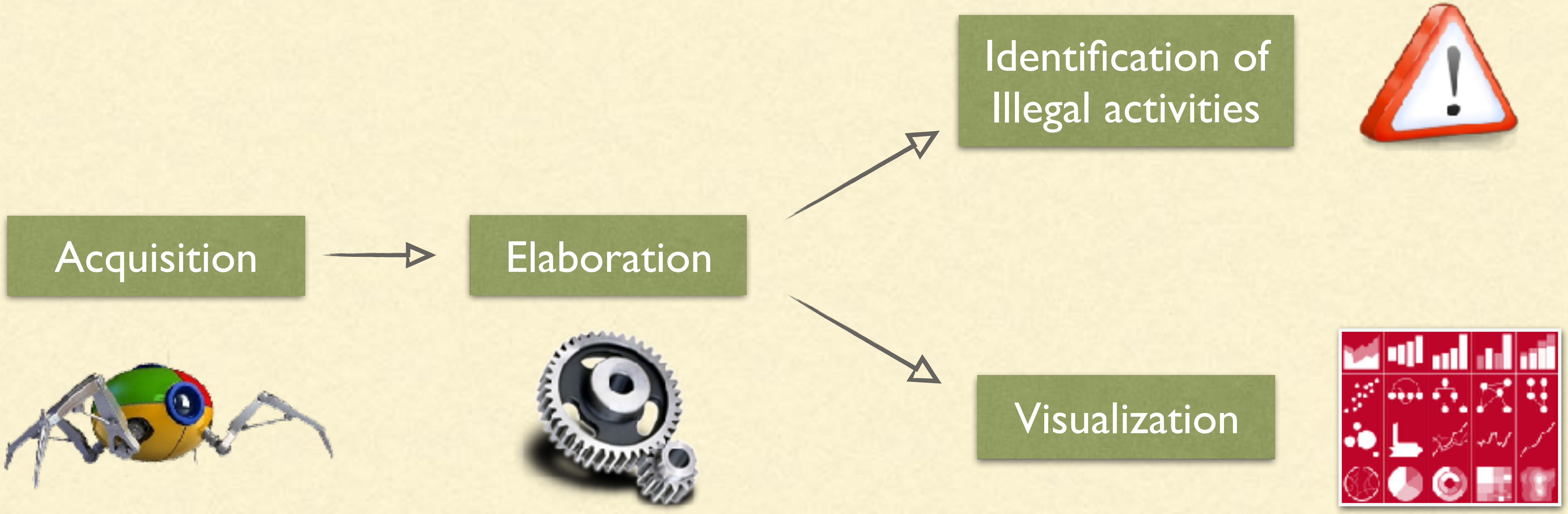

Acquisition

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Identification of Illegal activities

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Technologies

ACQUISITION

ELABORATION **Text**

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BUBING: high performance crawler developed by the Laboratory for Web Algorithmics (LAW) of the University of Milan

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TIKA: open-source software suite for the identification and extraction of text from more than 1000 different file types

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Apache Tika

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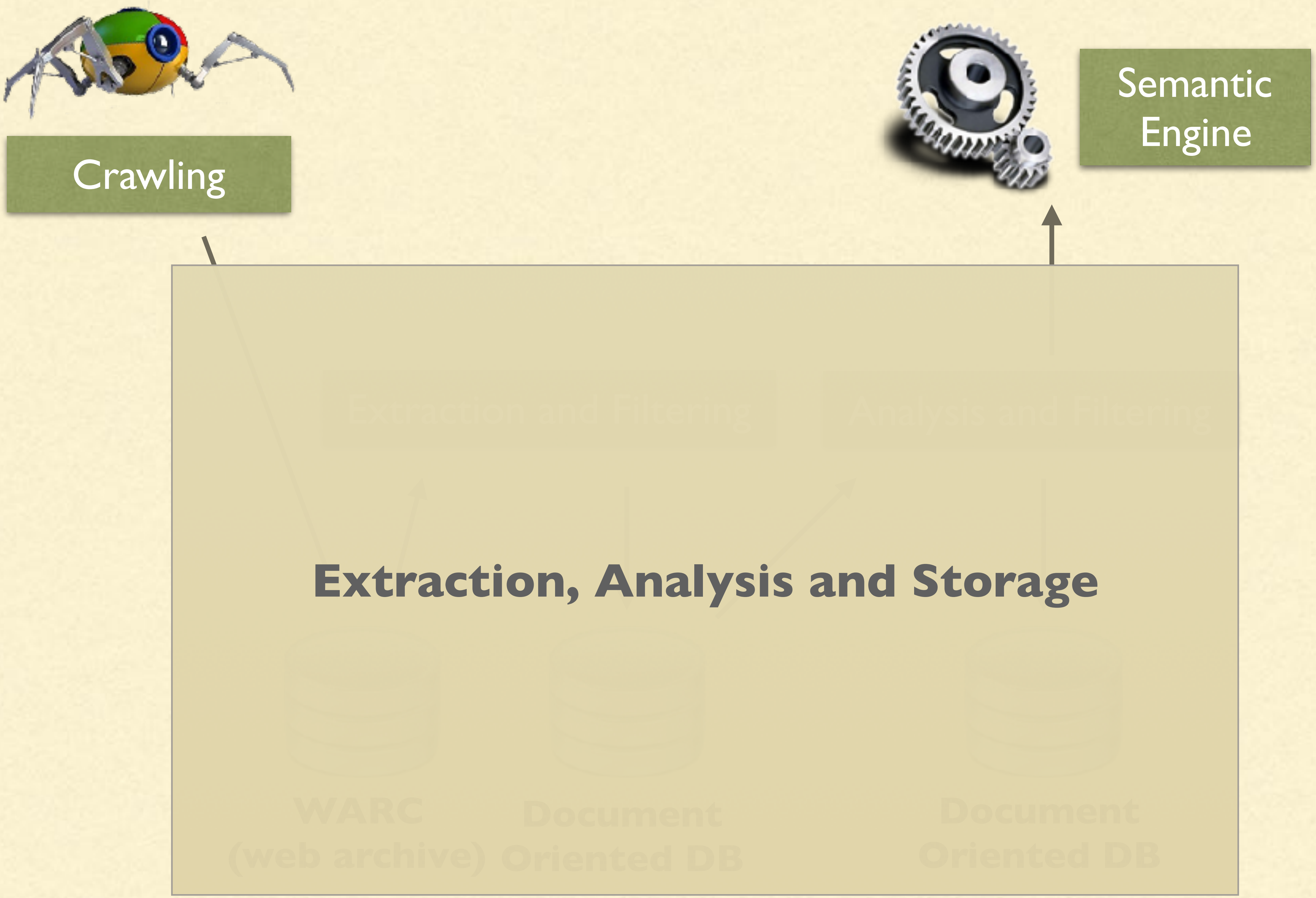
ELABORATION **Text**

COGITO

COGITO: semantical analysis engine by Expert System, that classifies a text according to a suitable taxonomy, providing both quantitative and qualitative information (*what topic* the text is about and *how much* the text discusses such topic)

Architecture



Crawling

Semantic Engine

Extraction, Analysis and Storage

Extraction and Filtering

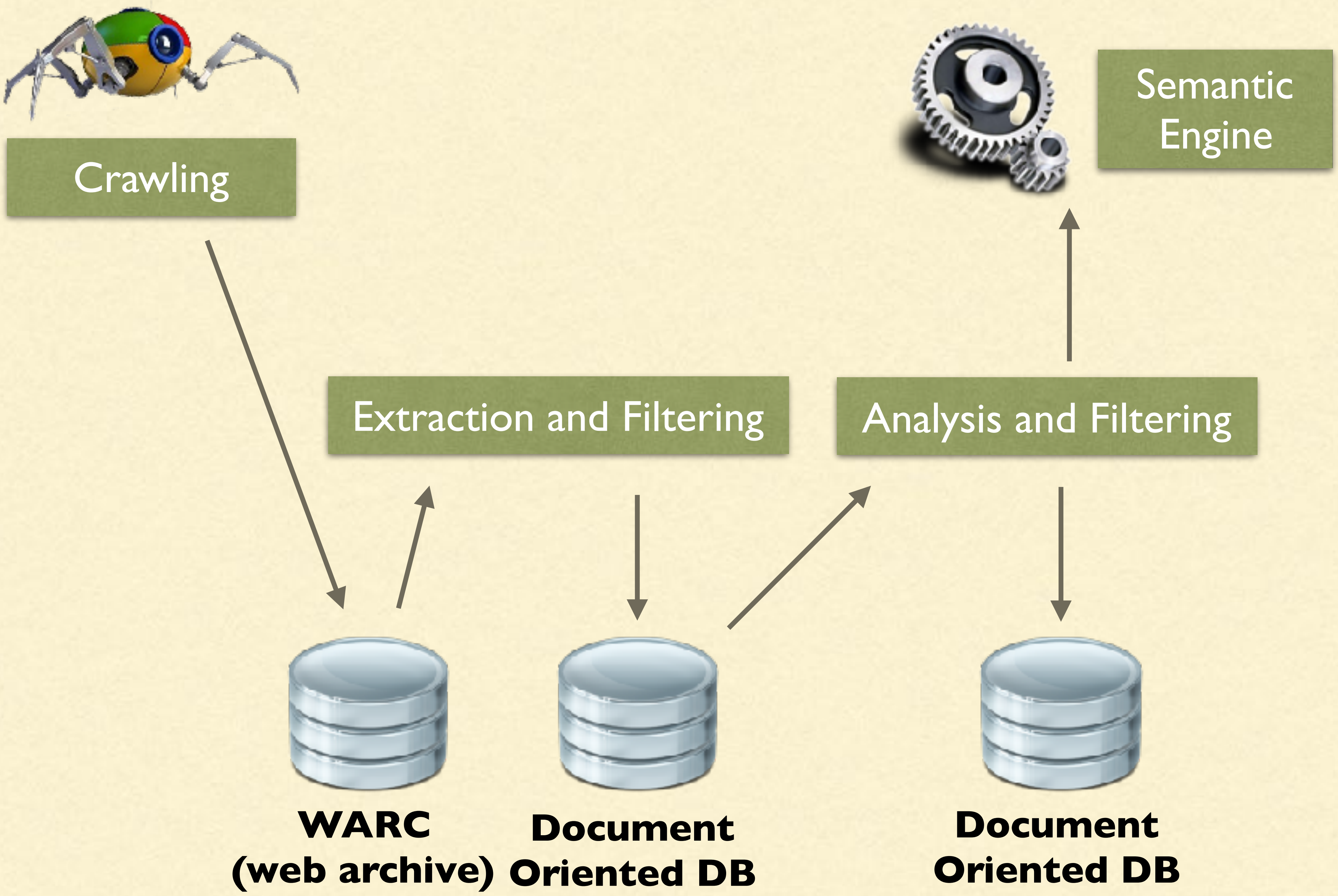
Analysis and Filtering

WARC (web archive)

Document Oriented DB

Document Oriented DB

Architecture



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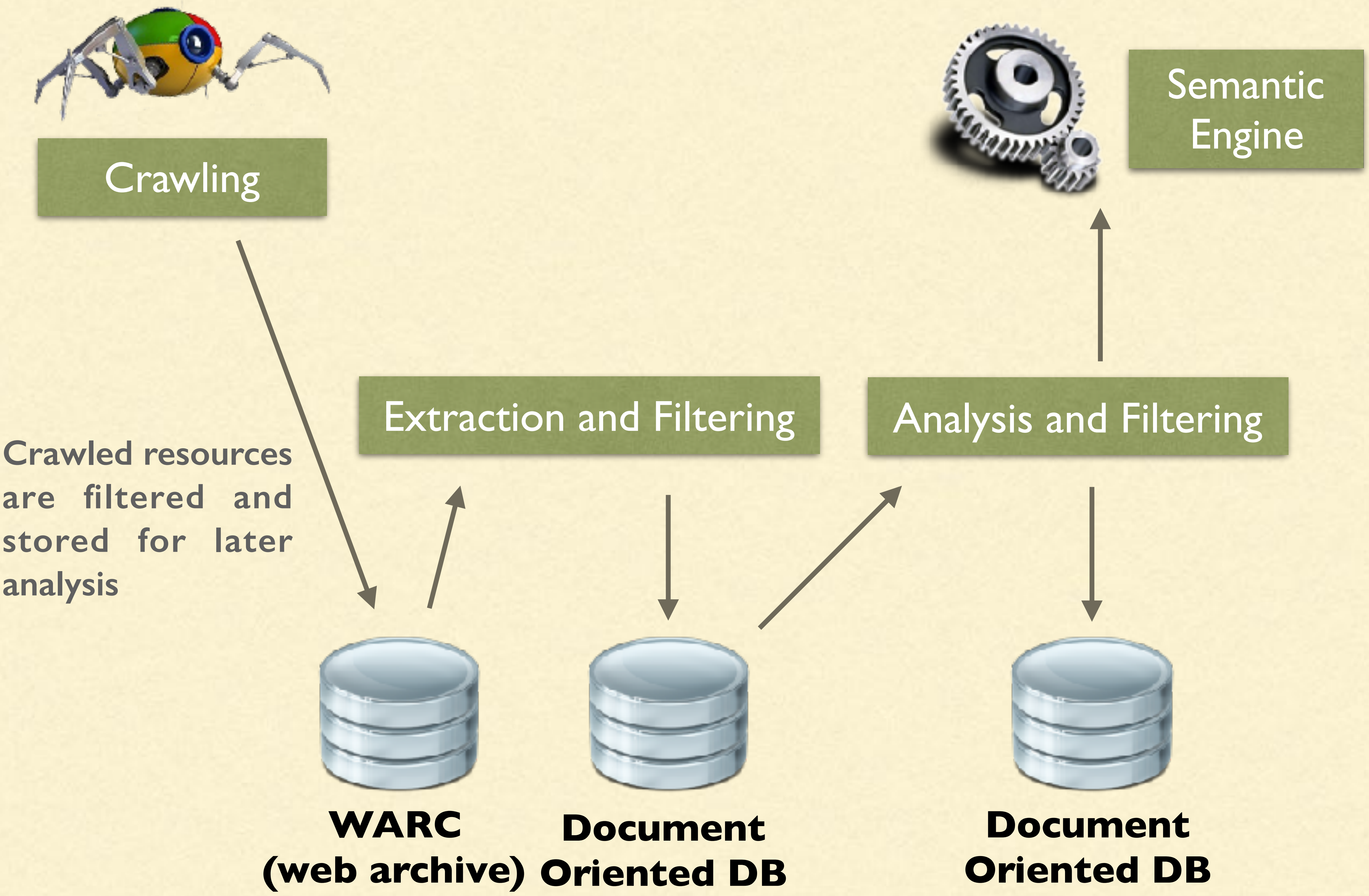

Crawling

Semantic Engine

Extraction and Filtering

Analysis and Filtering

Crawled resources are filtered and stored for later analysis

WARC
(web archive)

Document
Oriented DB

Document
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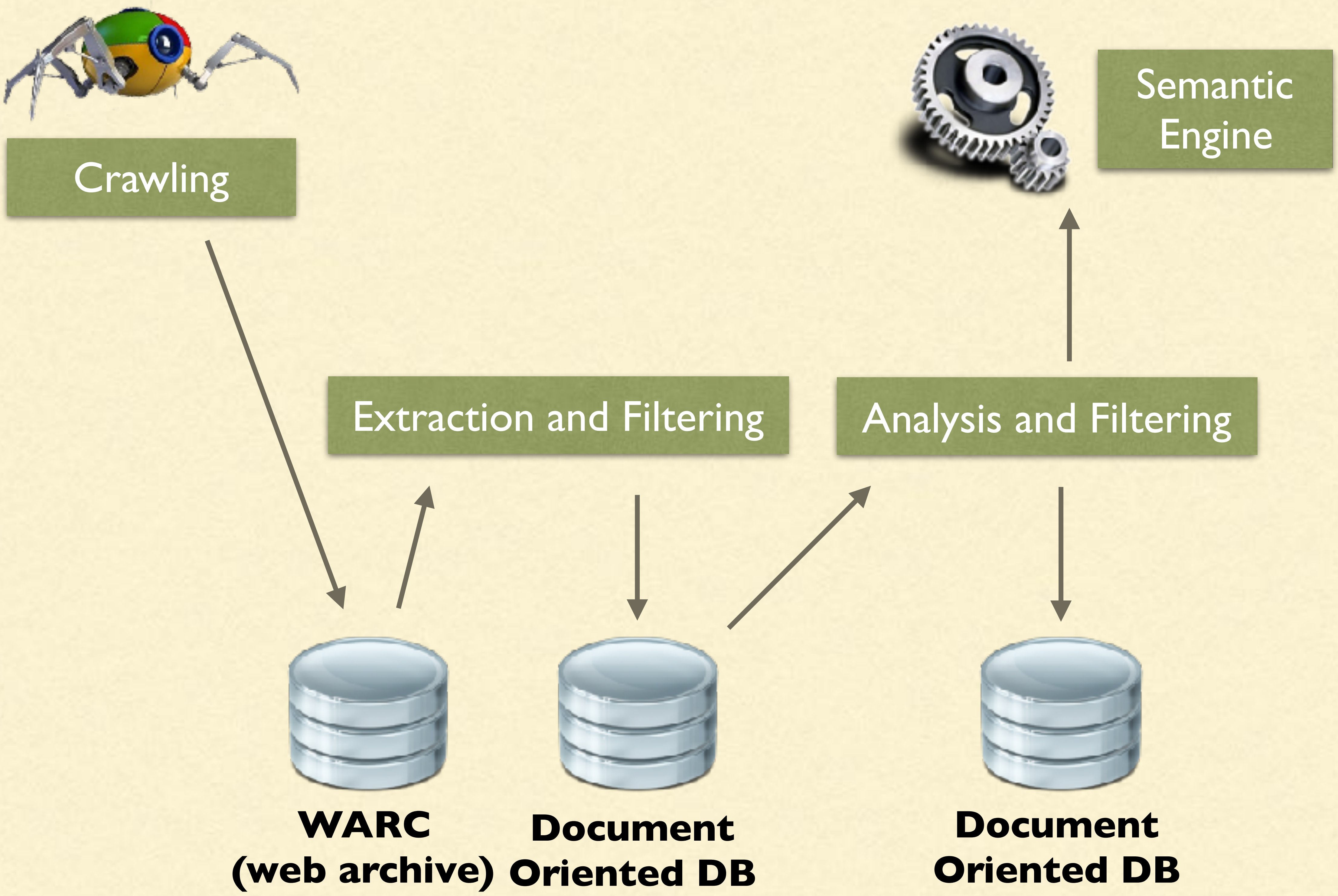
Architecture



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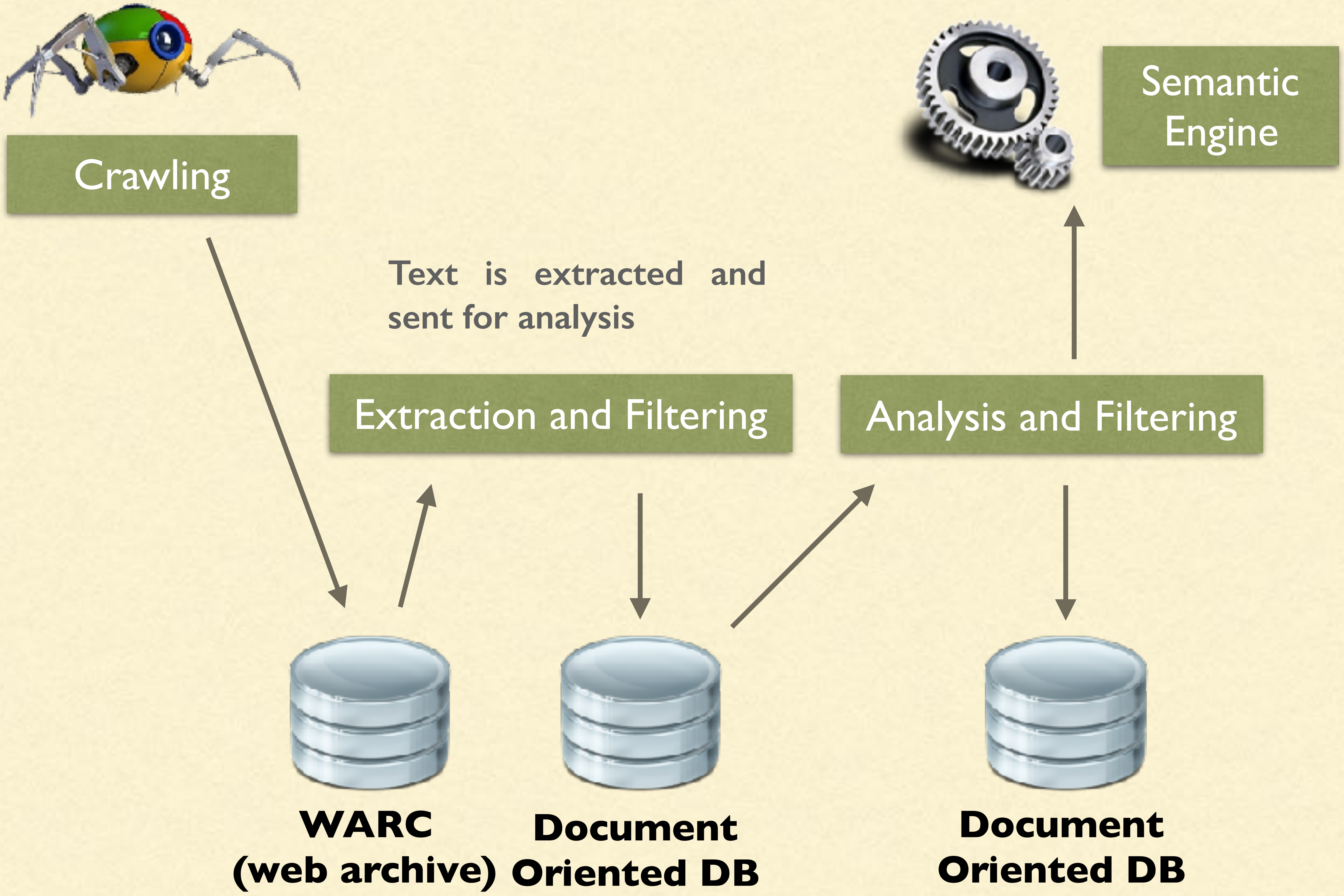

Crawling

Semantic Engine

Text is extracted and sent for analysis

Extraction and Filtering

Analysis and Filtering

WARC (web archive)

Document Oriented DB

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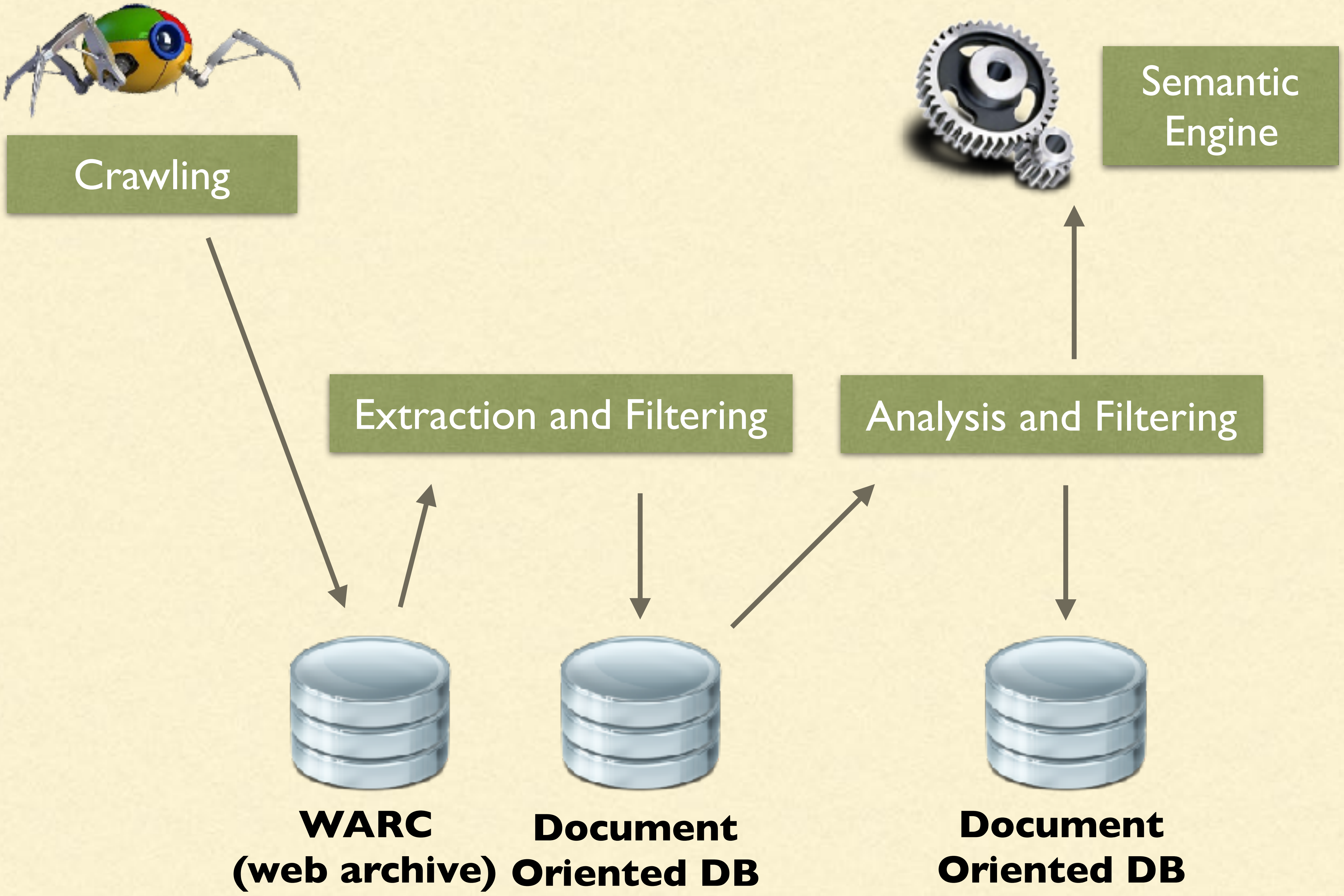
Architecture



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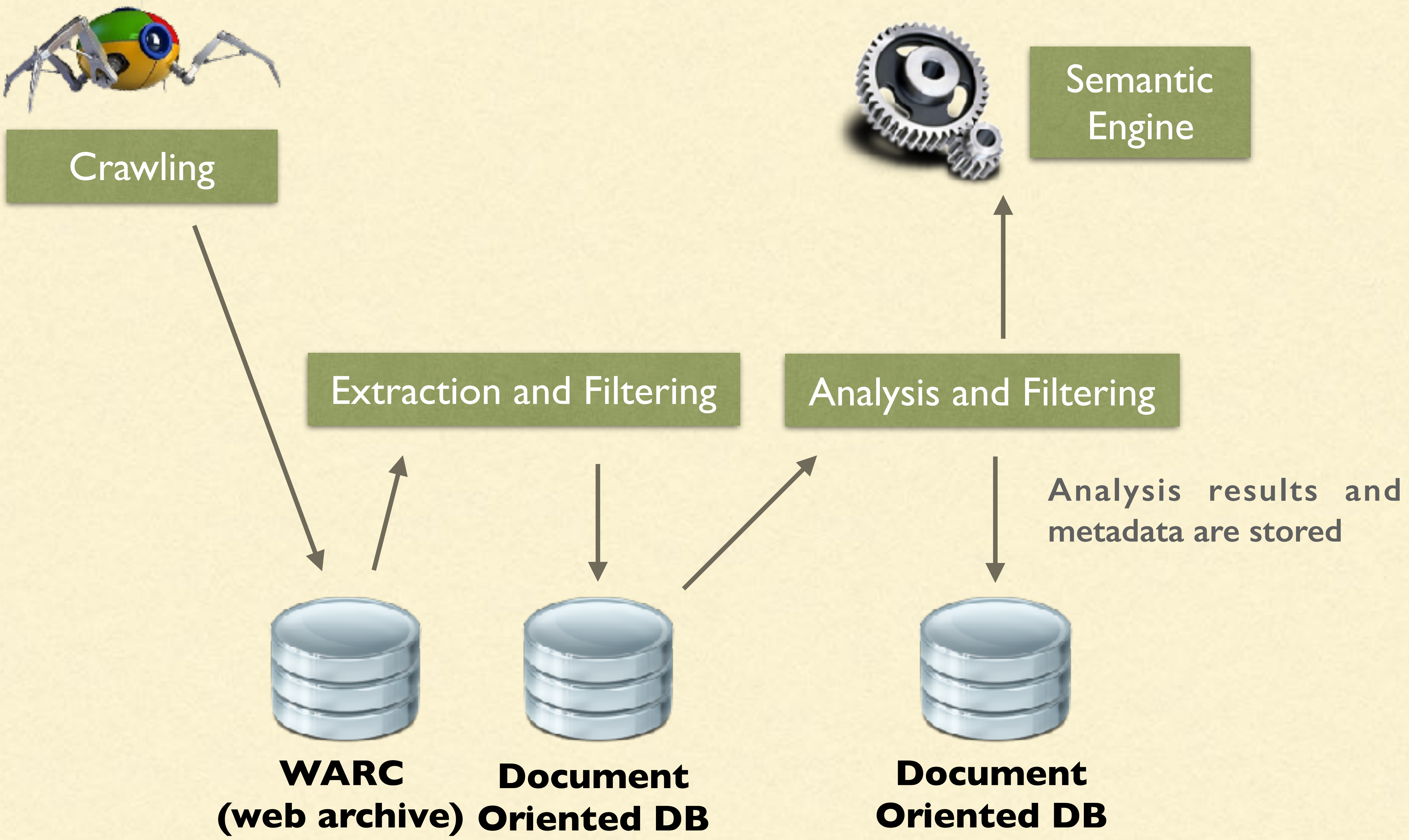


Crawling

Semantic Engine

Extraction and Filtering

Analysis and Filtering

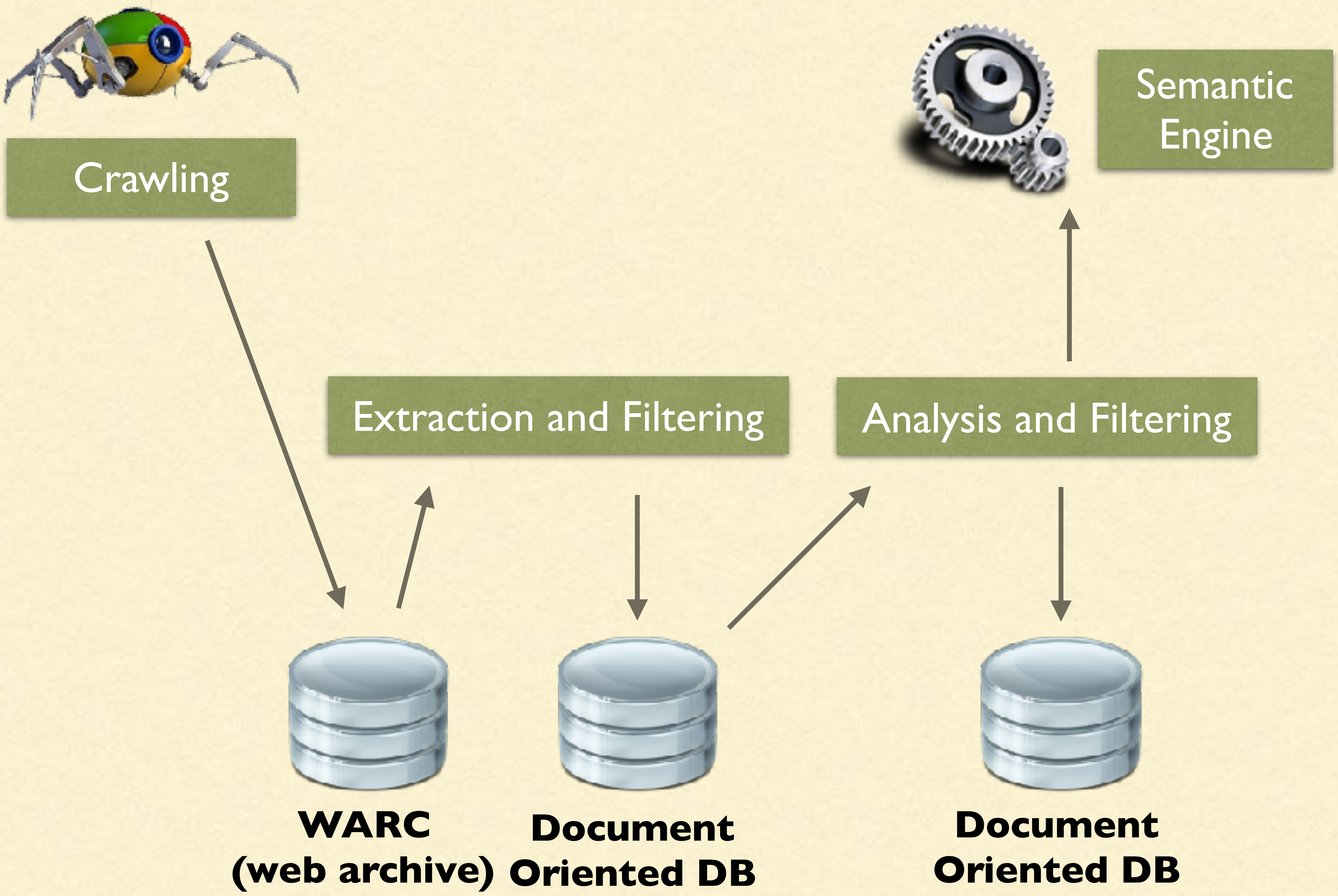
Analysis results and metadata are stored

WARC (web archive)

Document Oriented DB

Document Oriented DB

Architecture



Crawling

Semantic Engine

Extraction and Filtering

Analysis and Filtering

WARC (web archive)

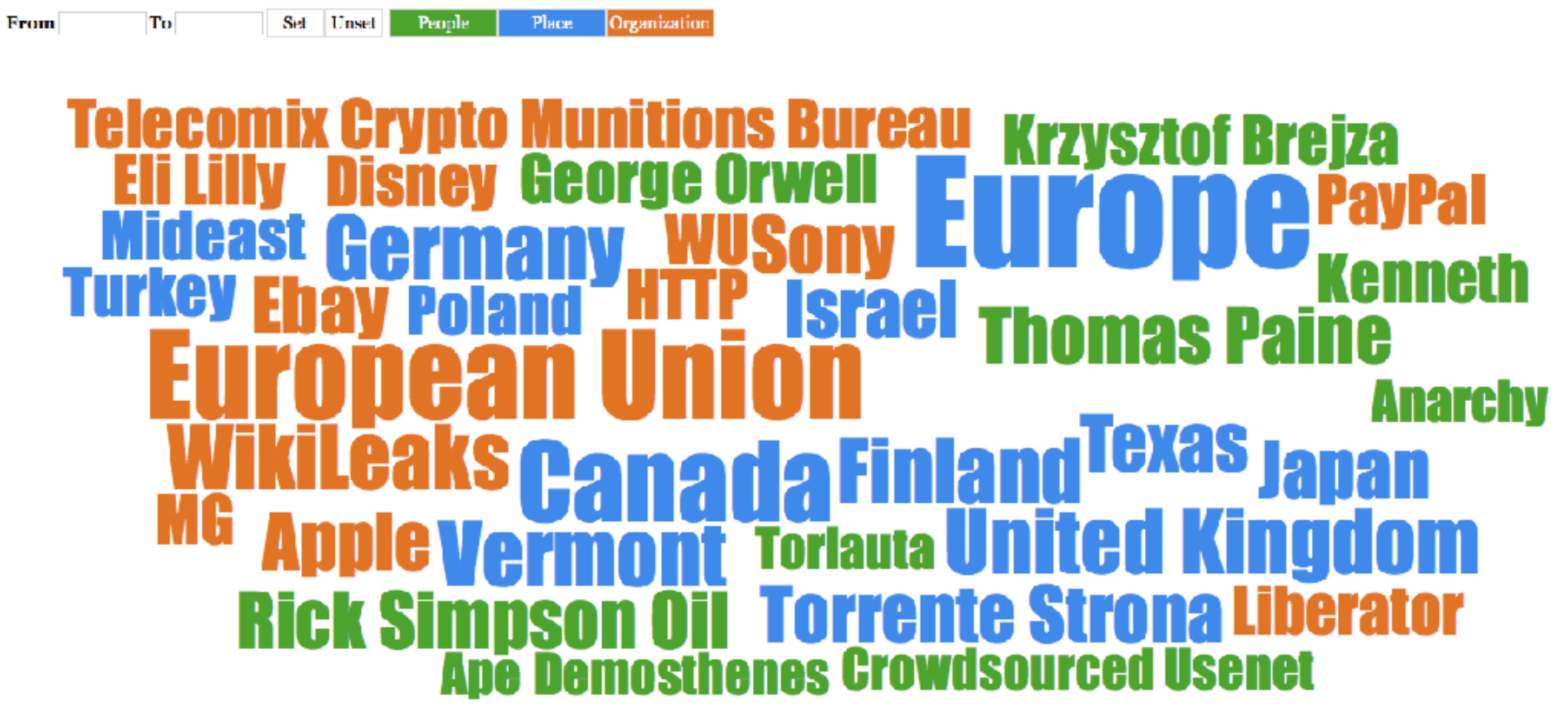
Document Oriented DB

Document Oriented DB

Visualization

Tag Cloud

Shows the **entities extracted** by Cogito
(in the documents retrieved by the crawler)



Three types of entities are identified by the engine → **People**
Places
Organizations

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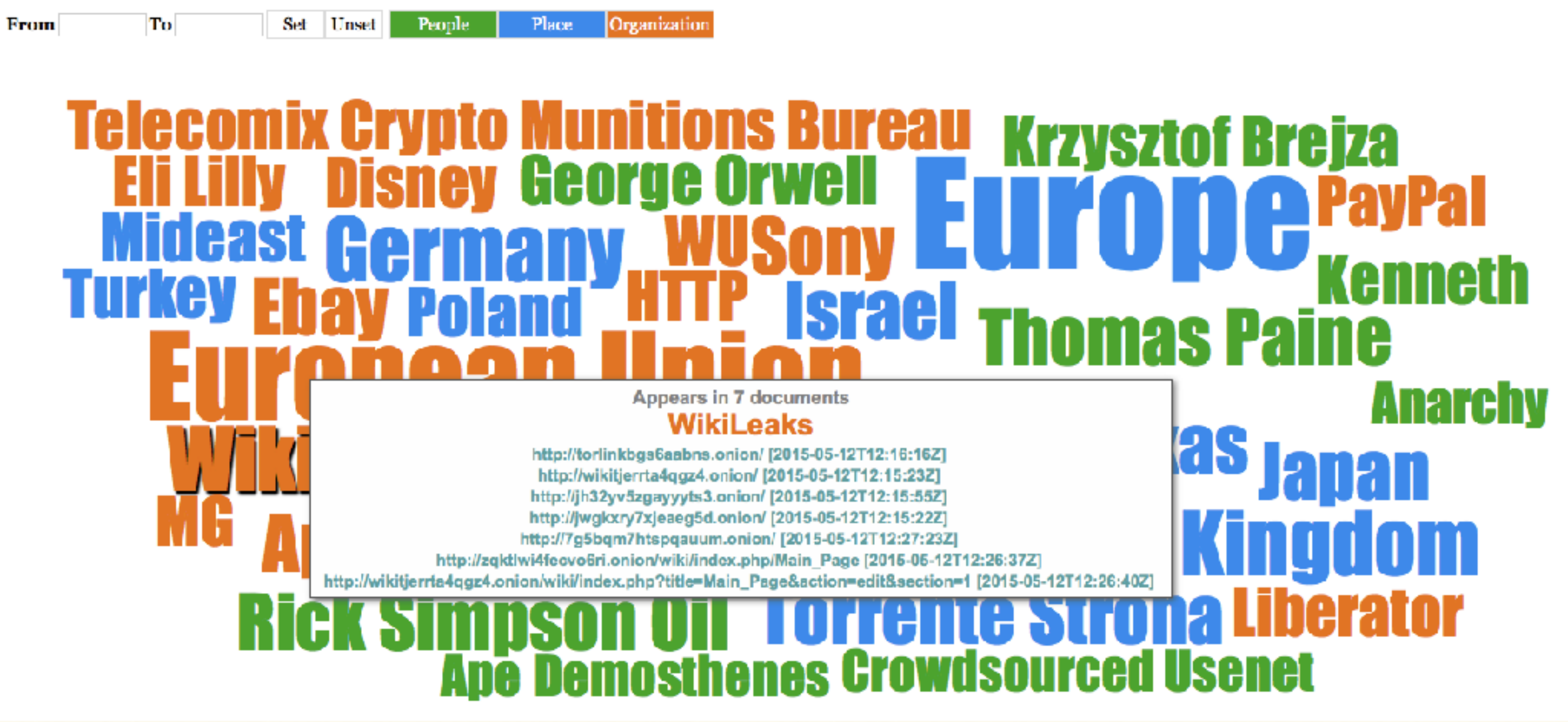

Appears in 7 documents

WikiLeaks

```
http://torlinkbgs6aabns.onion/ [2015-05-12T12:16:16Z]
http://wikitjerrta4qgz4.onion/ [2015-05-12T12:15:23Z]
http://jh32yv5zgayyyts3.onion/ [2015-05-12T12:15:55Z]
http://jwgkxry7xjeaeg5d.onion/ [2015-05-12T12:15:22Z]
http://7g5bqm7htspqauum.onion/ [2015-05-12T12:27:23Z]
http://zqktlwi4fecvo6ri.onion/wiki/index.php/Main_Page [2015-05-12T12:26:37Z]
http://wikitjerrta4qgz4.onion/wiki/index.php?title=Main_Page&action=edit&section=1 [2015-05-12T12:26:40Z]
```

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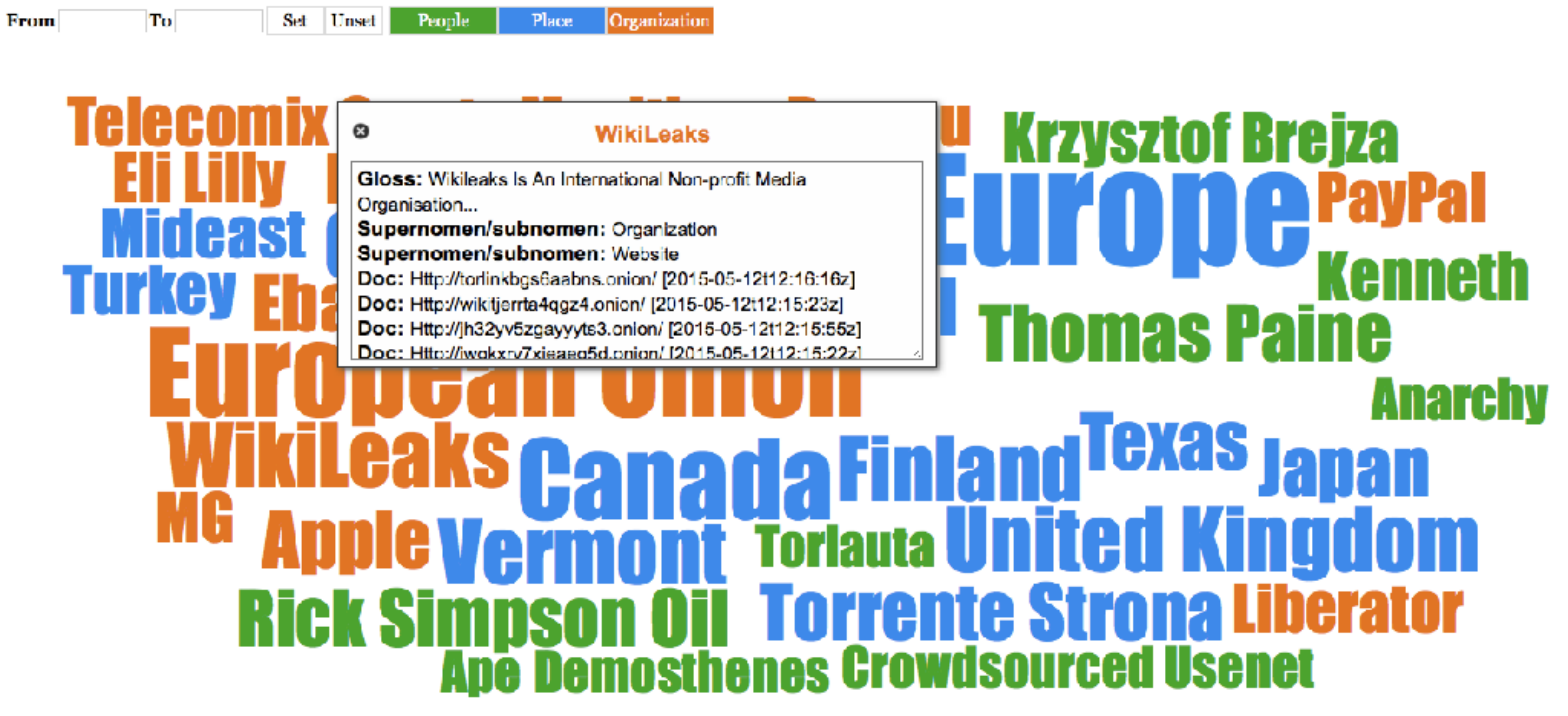

WikiLeaks

Gloss: Wikileaks Is An International Non-profit Media Organisation...
Supernomen/subnomen: Organization
Supernomen/subnomen: Website
Doc: Http://torlinkbgs6aabns.onion/ [2015-05-12t12:16:16z]
Doc: Http://wikitjerrta4qgz4.onion/ [2015-05-12t12:15:23z]
Doc: Http://jh32yv5zgayyyts3.onion/ [2015-05-12t12:15:55z]
Doc: Http://iwokxrv7xieaeg5d.onion/ [2015-05-12t12:15:22z]

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Treemap

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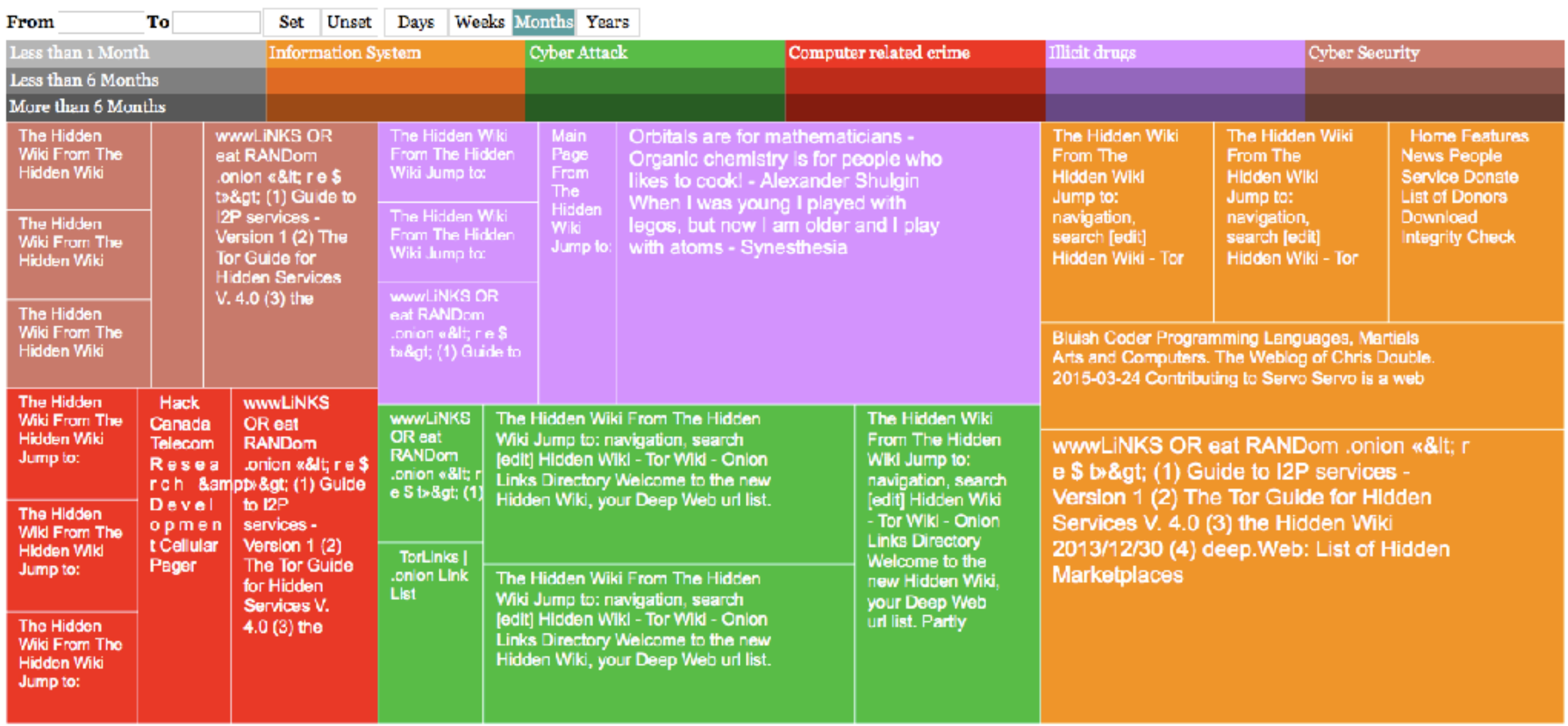

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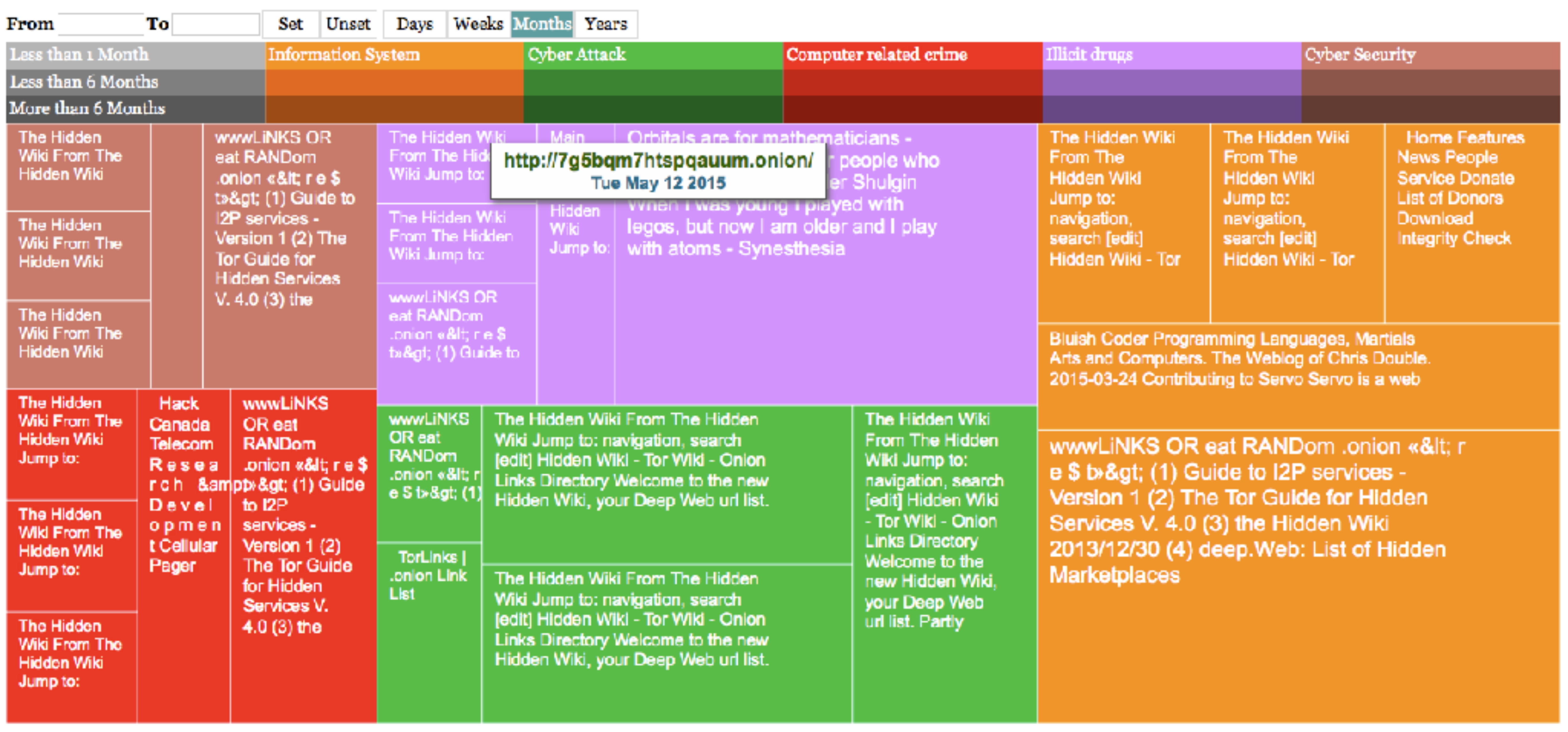

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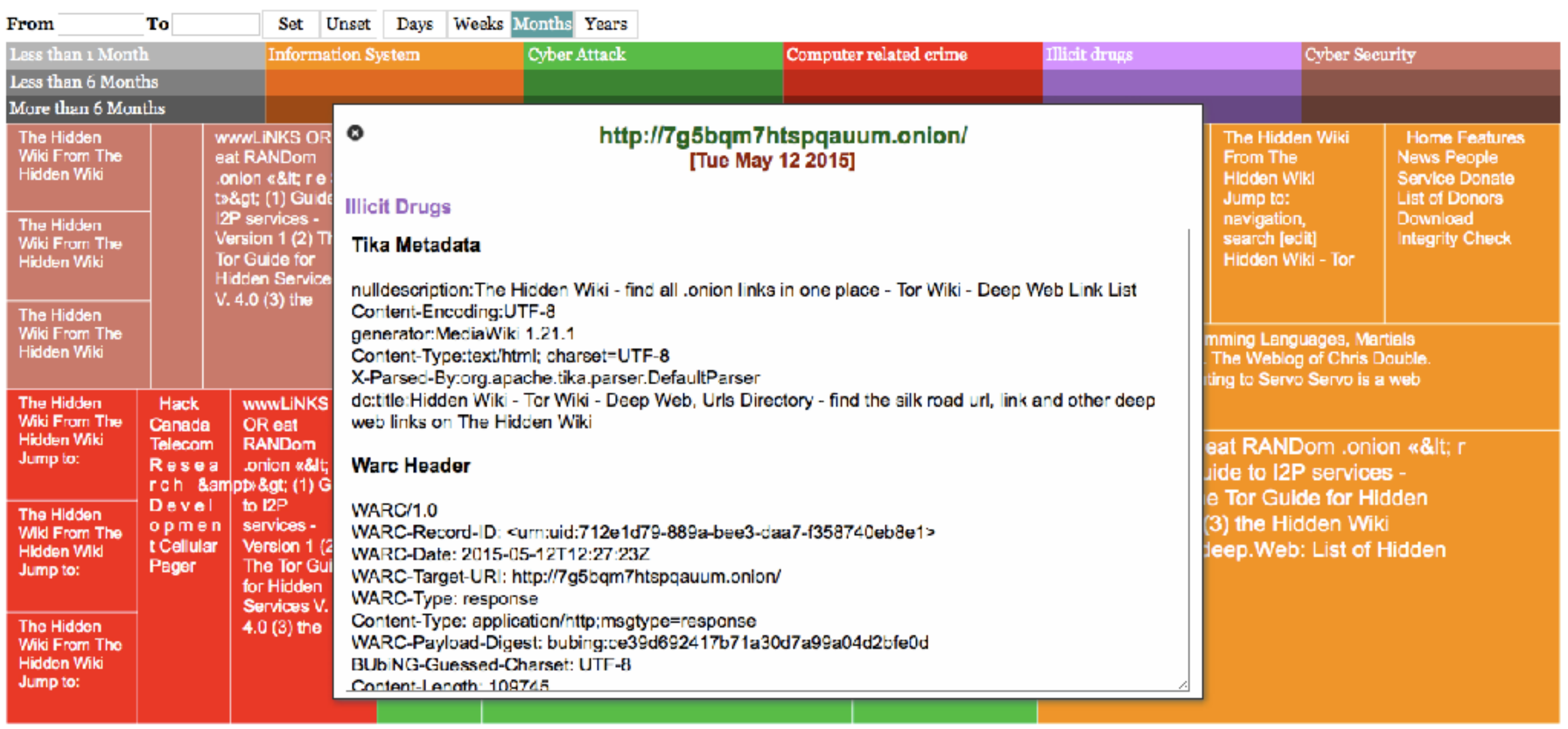
From
To
Set
Unset
Days
Weeks
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Less than 1 Month
Less than 6 Months
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Illicit drugs
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http://7g5bqm7htspqauum.onion/
[Tue May 12 2015]

Illicit Drugs

Tika Metadata

nulldescription:The Hidden Wiki - find all .onion links in one place - Tor Wiki - Deep Web Link List
Content-Encoding:UTF-8
generator:MediaWiki 1.21.1
Content-Type:text/html; charset=UTF-8
X-Parsed-By:org.apache.tika.parser.DefaultParser
dc:title:Hidden Wiki - Tor Wiki - Deep Web, Urls Directory - find the silk road url, link and other deep web links on The Hidden Wiki

Warc Header

```
WARC/1.0
WARC-Record-ID: <urn:uid:712e1d79-889a-bee3-daa7-f358740eb8e1>
WARC-Date: 2015-05-12T12:27:23Z
WARC-Target-URI: http://7g5bqm7htspqauum.onion/
WARC-Type: response
Content-Type: application/http;msgtype=response
WARC-Payload-Digest: bubing:ce39d692417b71a30d7a99a04d2bfe0d
BUbiNG-Guessed-Charset: UTF-8
Content-Length: 109745
```

Thank you for your time