# Technical aspects

Gerald Haesendonck – IDLab UGent
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# Scope

## Initial scope of PROMISE

A prototype to ...

1. Select
2. Capture
3. Access

... web archives collections

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2. Derivative files to facilitate the use of the collections

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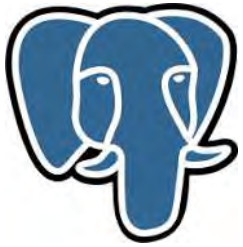
# 1. Selection

**In-house development** (Python, Django, ProstgreSQL)





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BRUXELLES-BRABANT

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DE NAMUR
crids

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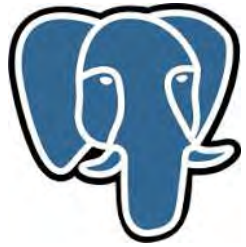

**Basis for application**
OCLC metadata set for web archives








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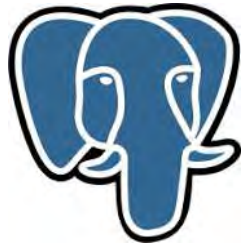

**Basis for application**
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**First**: simple tool to create seed lists

**Later**: automatically start crawling, trigger quality analysis, etc.


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# 2. Capturing

**Heritrix**

broad crawls

configurable

fast

tried and tested

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**Browsertrix, Brozzler**

high quality crawls

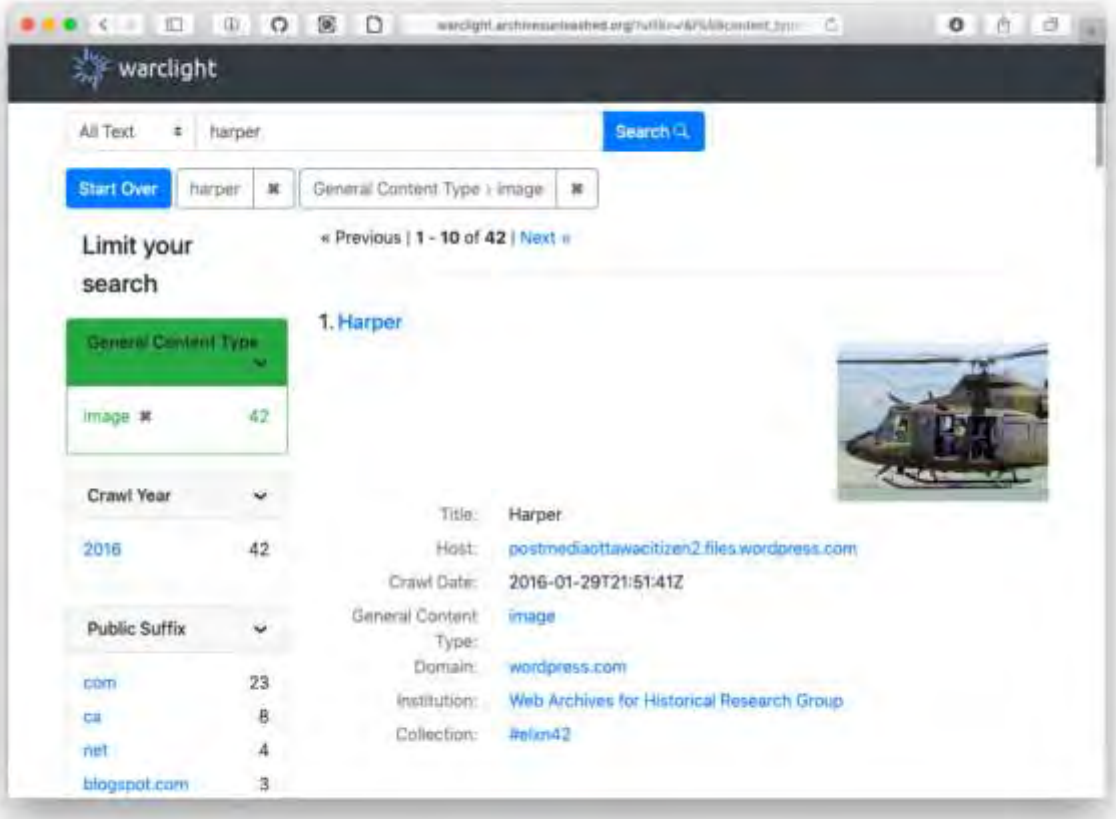
slower

experimental

# 3. Access

Catalog

text search
discovery
based on WARCLight



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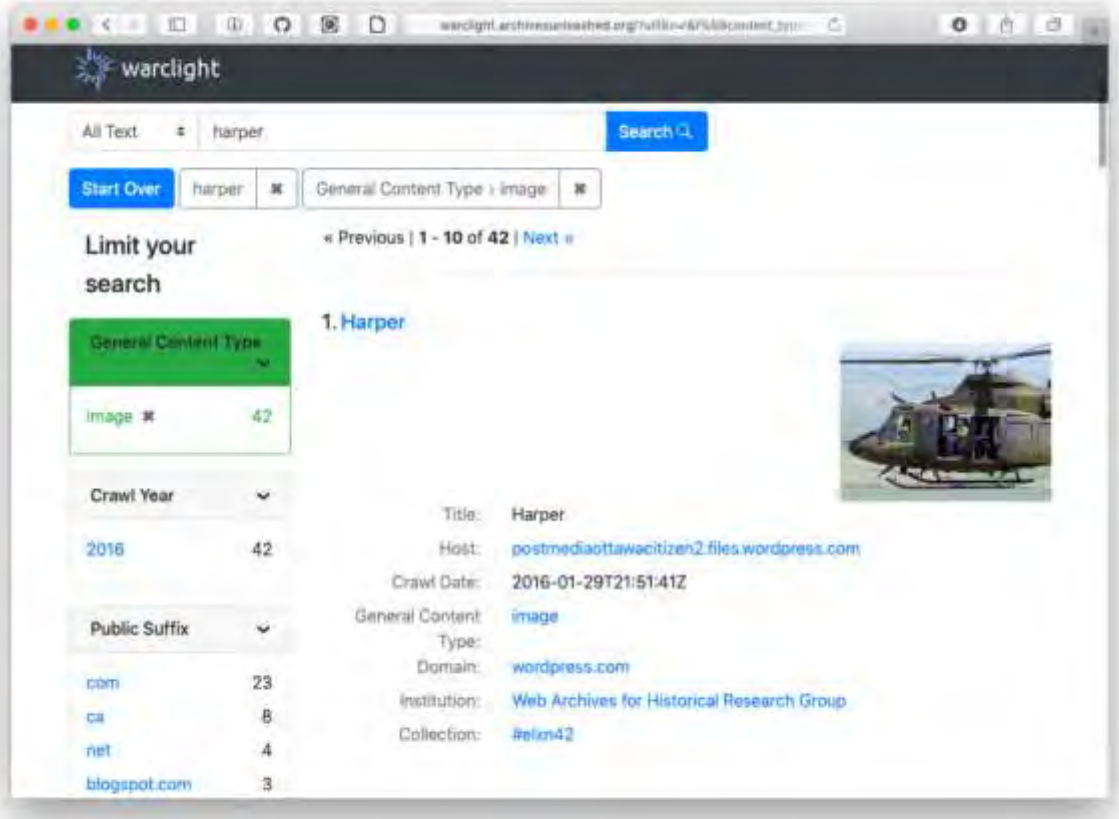
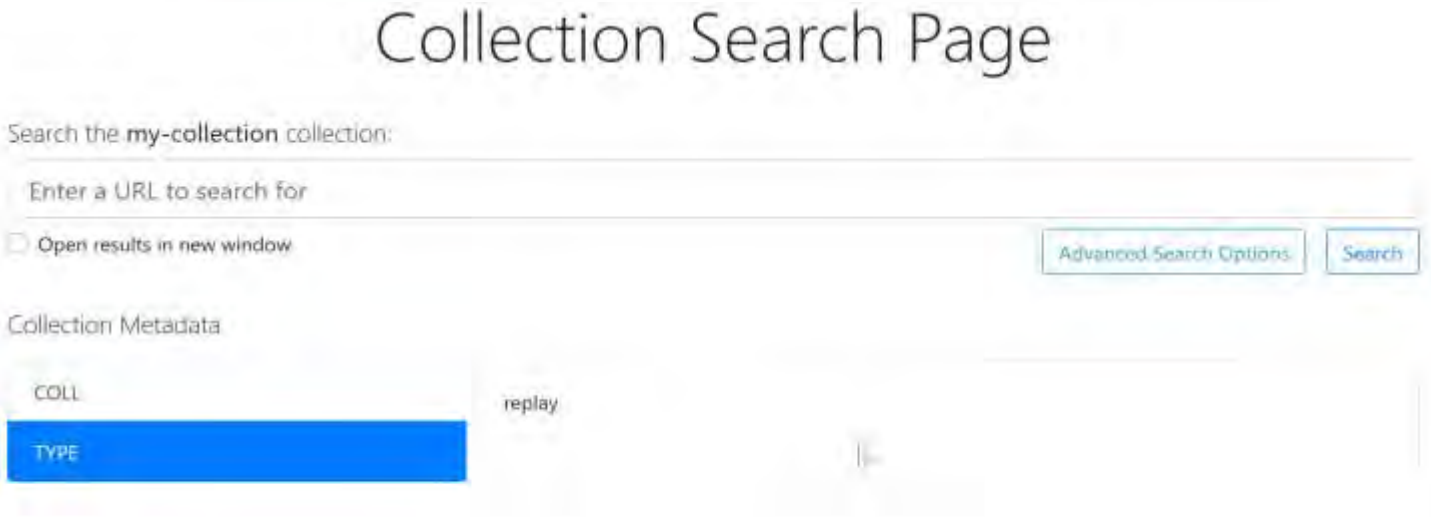



## Replay

URL search
timestamp
based on PyWB



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# Web Archive Quality Analysis

**How well** can we capture and archive web content?
Can we check this **semi-automatically**?

# Quality of content

Visual correspondence

"Does it **look** the same?"

Reyes, Brenda. A Grounded Theory of Information Quality in Web Archives, dissertation, August 2018; Denton, Texas.

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Interactional correspondence (IC)

"Can you **interact** the same way?"

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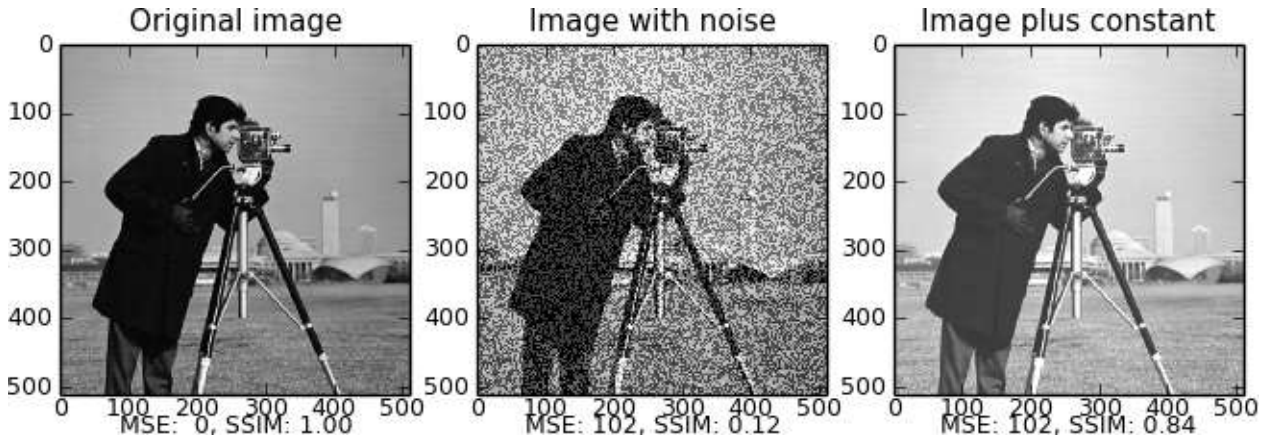
# Visual correspondence

Quality metrics based on:

Structural Similarity (**SSIM**)
sensitive to noise
less sensitive to colour



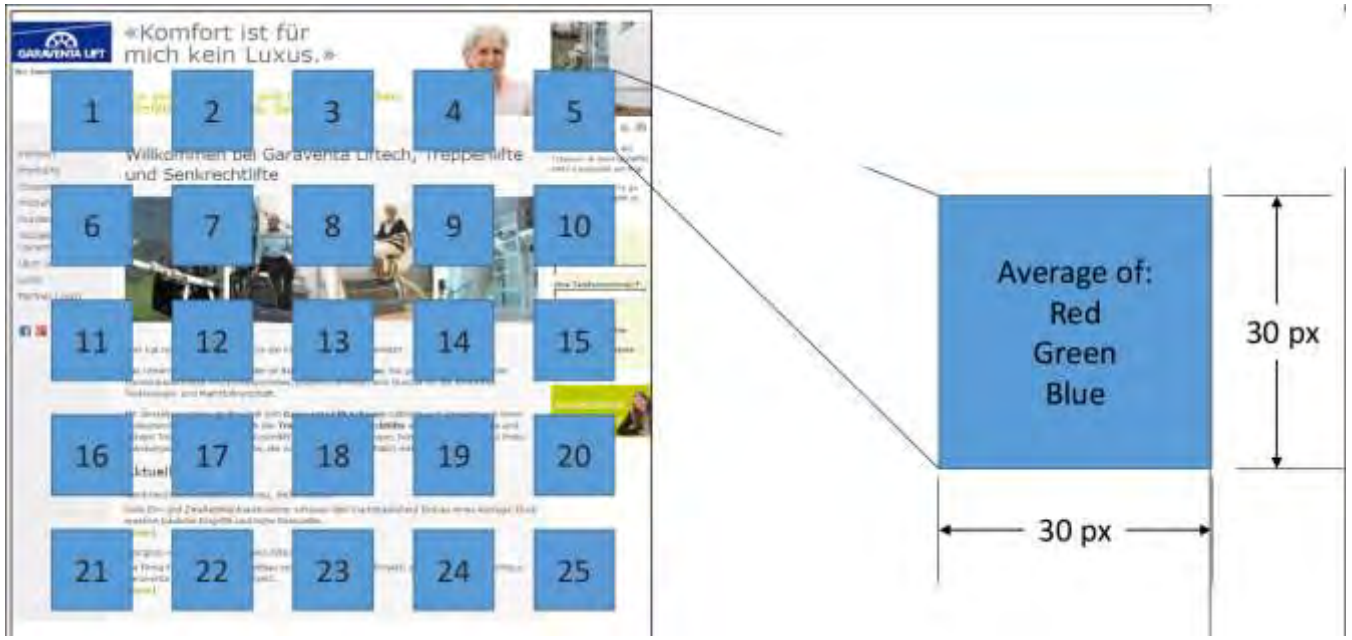

Z. Wang et Al. Image quality assessment: from error visibility to structural similarity. IEEE Transactions on Image Processing

Image: Copyright the scikit-image development team

# Visual correspondence

Quality metrics based on:

Visual Quality Indicator (**VQI**)
sensitive to colour
less sensitive to noise




Swiss National Library. Visual Quality Indicator

Image: Copyright Swiss National Library

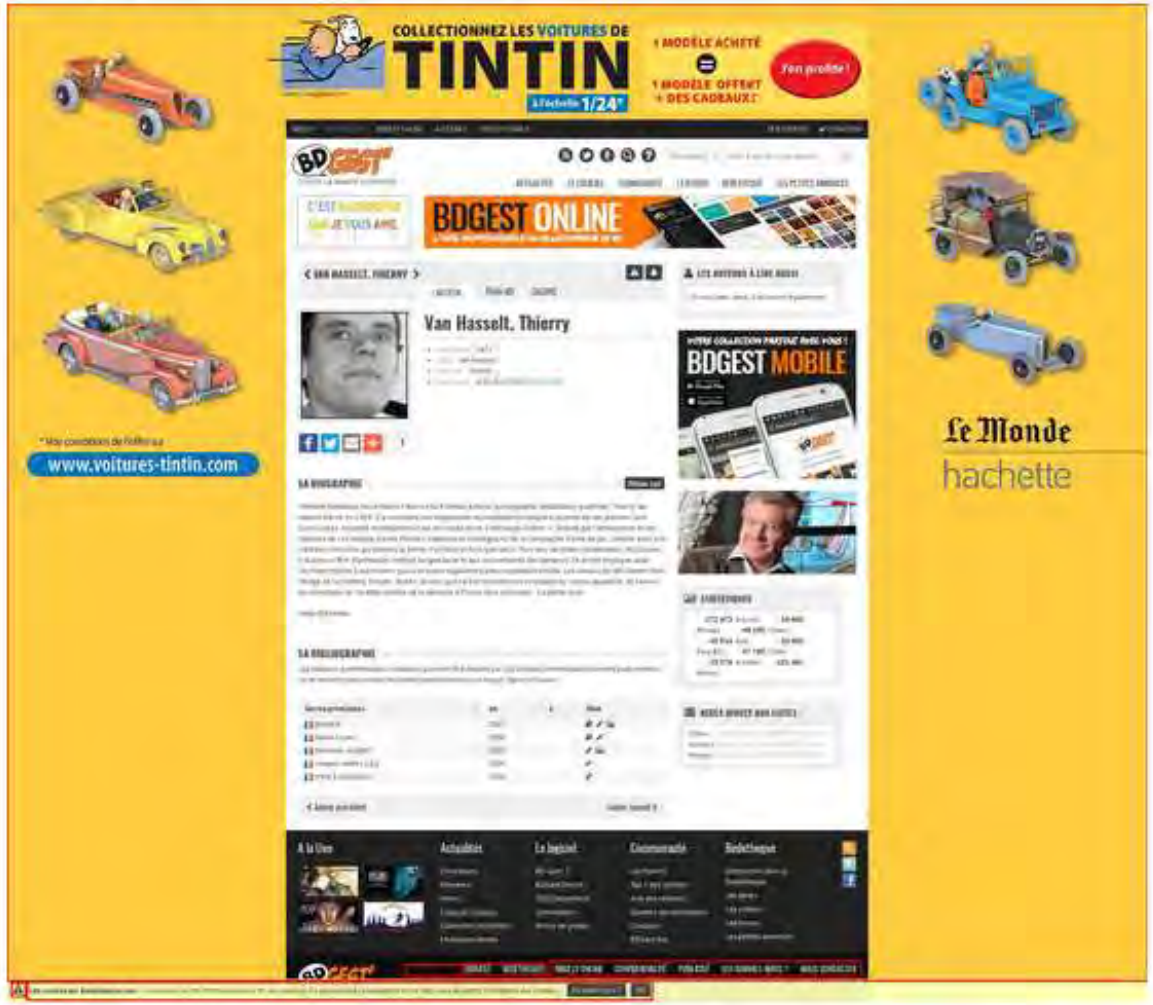
# Automated Quality Metrics

The SSIM of https://www.bedetheque.com/auteur-2872-BD-Van-Hasselt-Thierry.html is of **25.05%**.

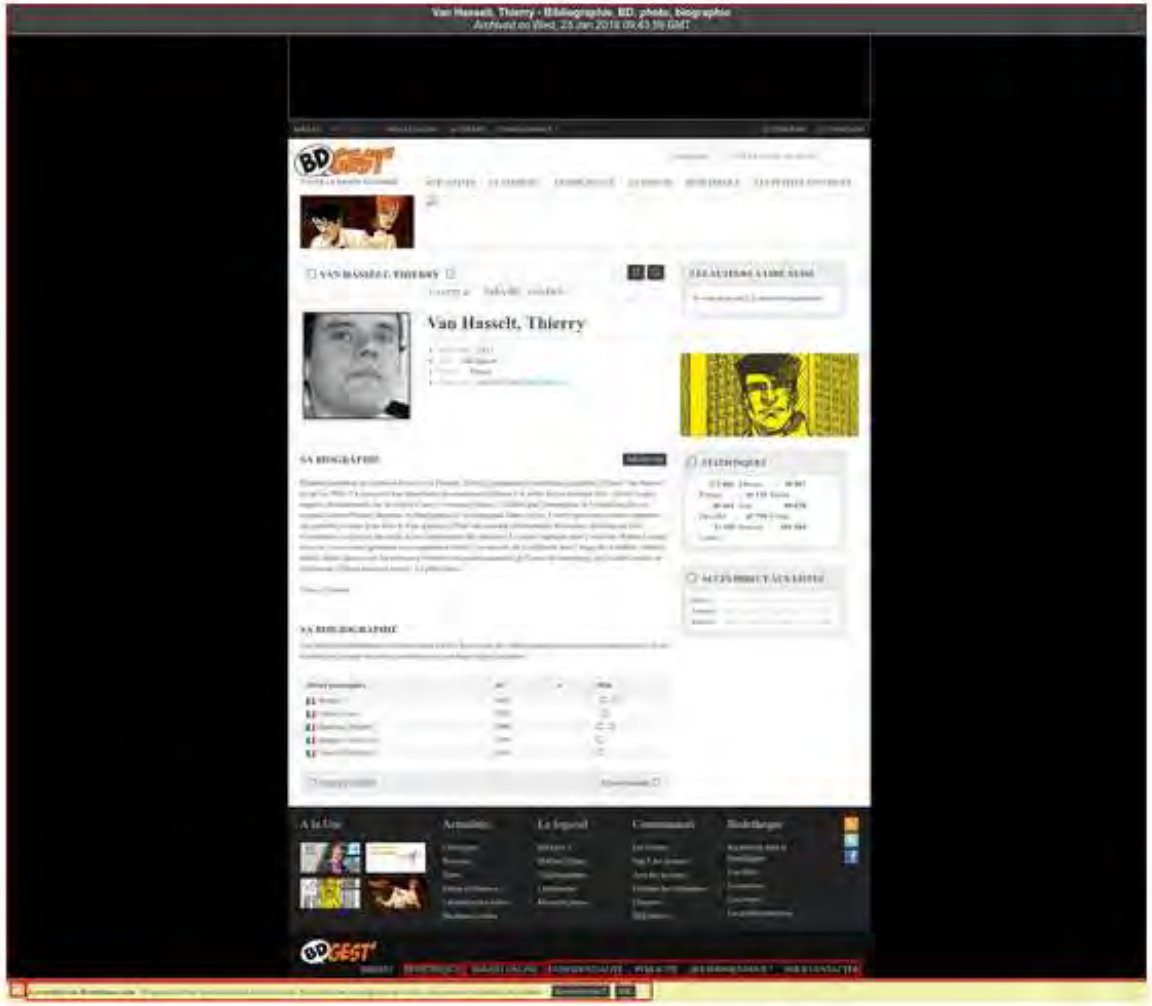
The VQI of https://www.bedetheque.com/auteur-2872-BD-Van-Hasselt-Thierry.html is of **13623.93**. That means that the archived version is **not acceptable**.

# Visualization of the differences

## **Original** version with marks




## **Archived** version with marks



# Automated Quality Metrics

The SSIM of https://directory.unamur.be/teaching/programmes/050K is of **89.09%**.

The VQI of https://directory.unamur.be/teaching/programmes/050K is of **33.83**. That means that the archived version is **acceptable**.

# Visualization of the differences

## **Original** version with marks


## **Archived** version with marks

# Quality of content

Visual correspondence

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Interactional correspondence (IC)

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Completeness

"Do we have **every resource** of the original?"

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Degree to which a user's interaction with the archived website is similar to that of the original

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Idea:

- interacting (e.g.: clicking link) results in browser **requests** (HTML, images, CSS, JS, …) .
- How much of these requests are **successful in archive**?

# IC

$$= \frac{\#\ successful\ requests\ in\ archived\ website}{\#\ requests\ in\ original\ website}$$

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Requests can be **weighted** by their **importance** to decrease the impact of less important requests

# IC: our approach

1. Build **index** from archive → fast lookups

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3. Determine resource importance

# IC: resource importance

Important factors:

- Content type: HTML > images > fonts
- CSS coverage
- Image size & position

J.F. Brunelle et Al. Not all mementos are created equal: measuring the impact of missing resources. International Journal on Digital Libraries, September 2015, Volume 16, Issue 3-4, pp 283-301

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An **image is important** when it:

- Is large
- Overlaps the horizontal center
- Is in the 70% vertical center


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# Web Archive Derivatives

**Represent** (a part of) the archive in a way suited to **answer certain questions**.

# Why?

Provide information **about** a web archive

# Why?

Provide information **about** a web archive

Facilitate **analysis and research** on the archive

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Provide information **about** a web archive

Facilitate **analysis and research** on the archive

Often **smaller** in size, more efficient to process

# Chosen derivatives

Archive-It: **WAT**, WANE, LGA

**Metadata on record level**

- URL
- Original archive file name
- Document information. E.g. HTML:
  - Title
  - Keywords
  - Scripts
  - Links

# Chosen derivatives

Archive-It: WAT, **WANE**, LGA

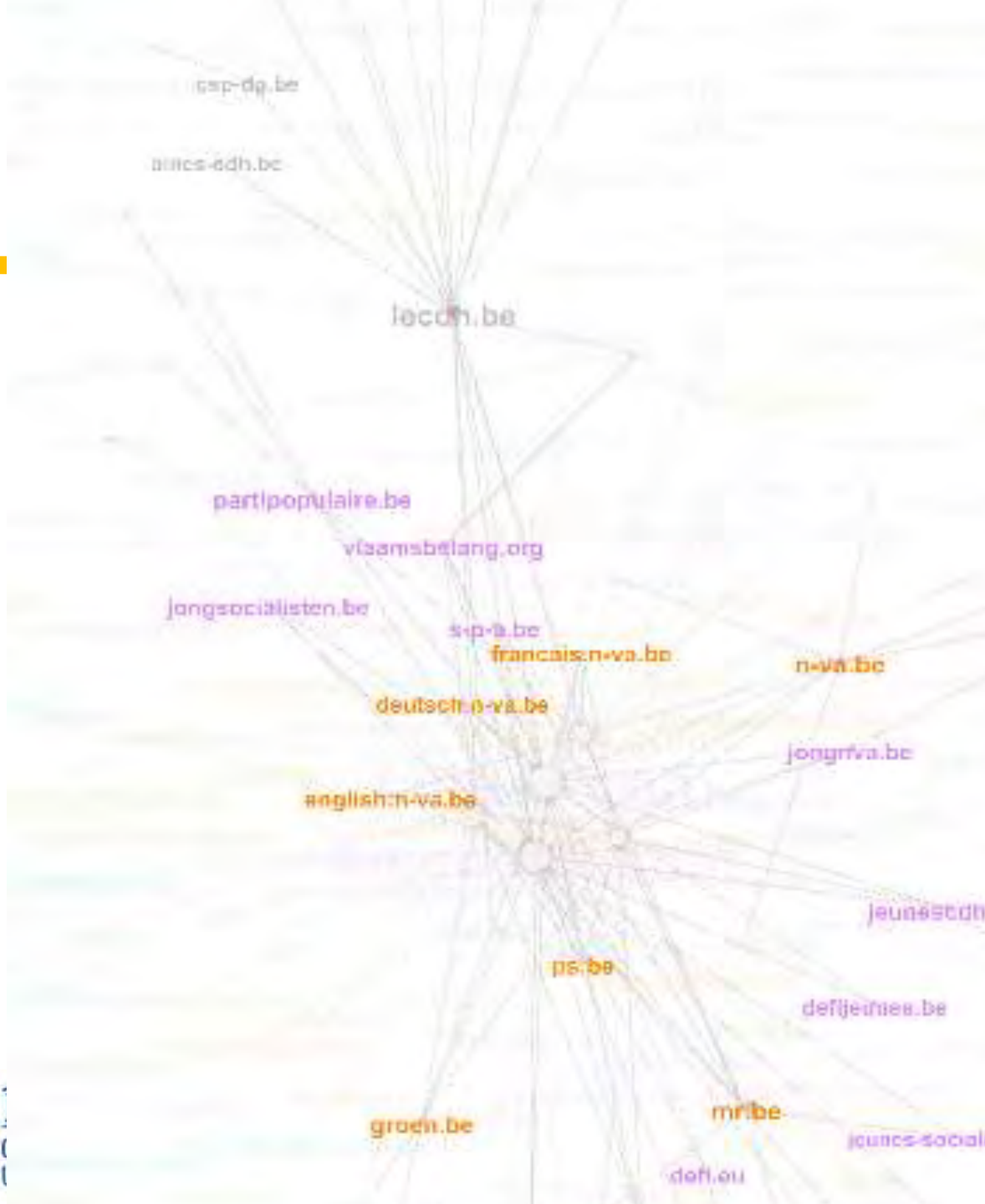
**Named entities**


```
{"url":"https://opac.kbr.be/about.aspx?_lg=en-GB",
 "named_entities":{
    "persons":
       ["Archimed"],
    "organizations":
       ["Royal Library", "OPAC", "KBR"],
    "locations":
       ["Brussels","Belgium"]
}
```

# Chosen derivatives

Archive-It: WAT, WANE, **LGA**

**Graph of web pages**



# Chosen derivatives

Archives Unleashed Toolkit: **Domains**, Plain text, GraphML

**Domain occurrences in archive**

```
(opac.kbr.be,7972)
(belgica.kbr.be,6427)
(isil.kbr.be,2746)
(www.kbr.be,1766)
(uurl.kbr.be,807)
(events.kbr.be,286)
(www.depotlegal.be,250)
(ysaye.kbr.be,212)
(vieuxtemps.kbr.be,129)
(www.adobe.com,64)
(www.ngi.be,28)
(www.youtube.com,16)
(drp.kbr.be,14)
(bartok.kbr.be,11)
(193.190.242.40,10)
(coins.kbr.be,10)
(www.w3.org,9)
(kbr.prezly.com,8)
(www.ultimedia.com,6)
(www.google.com,6)
(lms-web-srv01.kbr.be,4)
(maps.googleapis.com,4)
(sharethis.com,4)
(get.adobe.com,3)
```

# Chosen derivatives

## Archives Unleashed Toolkit: Domains, **Plain text**, GraphML

**Web documents as plain text**

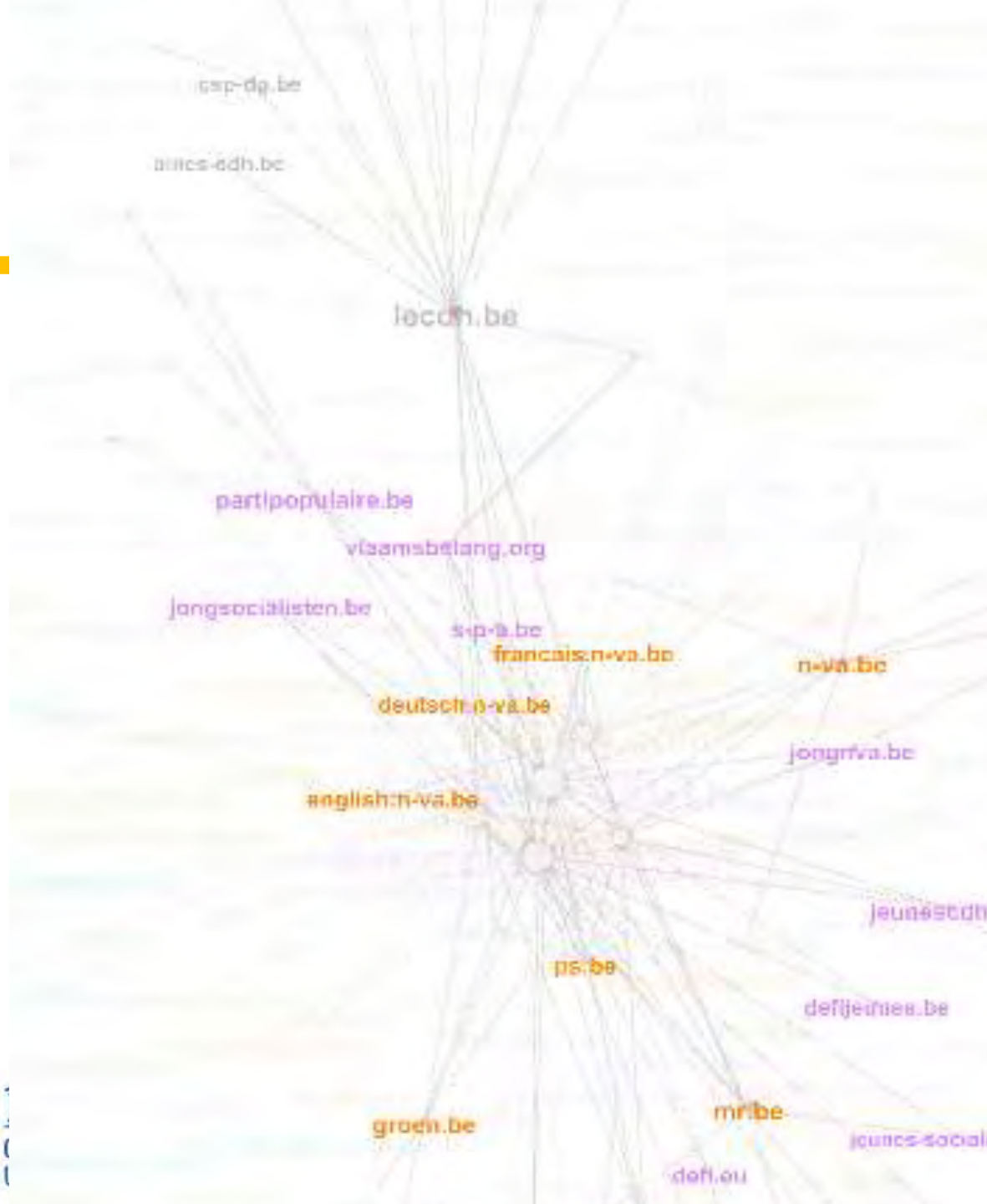
(20190312,opac.kbr.be,https://opac.kbr.be/library/about.aspx?_lg=en-GB,OPAC - About the catalog | Royal Library of Belgium Show menu EN NL FR EN OPAC OPAC Other sites Bibliothèque fédérale Dépôt légal Educatif Galerie My account My account Go to menu Go to content Go to search kbr.be OPAC Bibliothèque fédérale Dépôt légal Educatif Galerie My accountMy account Syracuse media library Your login ID Your login ID Your password Your password OK Register OK Register Catalogue, selected Catalogue Catalogue Search input field Clear search field Start search on the script Advanced search You are here: Home / About the catalog | Royal Library of Belgium / Item details Pré-sélectionner des critères de recherche Modifier les critères pré-sélectionnés NL FR EN FAQ About the online catalog of the KBR Welcome to the online catalog of the Royal Library of Belgium.  What you can and cannot find in this catalog The majority of the collection of the Royal Library is recorded in this catalog, but certain documents aren't (yet) : 1. A lot of manuscripts aren't recorded in the catalog because they are difficult to classify according to modern standards.

# Chosen derivatives

Archives Unleashed Toolkit:

Domains, Plain text, **GraphML**

**Graph, similar to LGA**



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**In-house: web page extraction**

Extract data from certain domain(s) or web pages

Researcher can work on raw data with small size

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Approach:

- Build index on archive → fast lookup
- Crawl the archive
- Put output in new archive

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