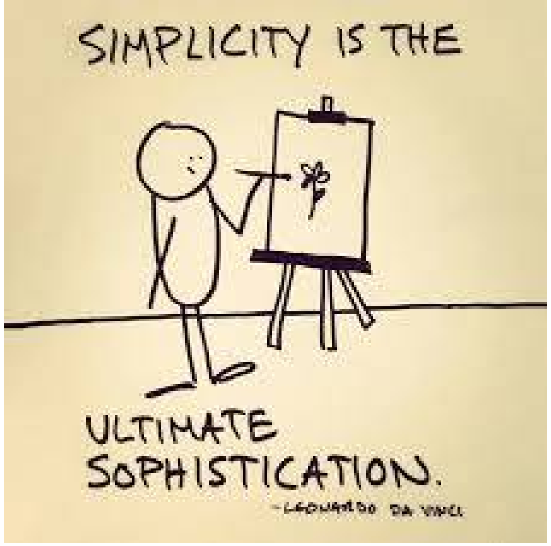

Investigating the effectiveness of client-side search/browse without a network connection

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Repositories in Low-Resource Environments

- What if you want to create an archive to store museum/library collections, with typical discovery services,

BUT

- You are in a **low-resource environment**.

African Problems 1/3

29/06 2006-378P © John Ditchburn

Skills and Education

- Typical archivists are not as highly skilled as counterparts elsewhere.
- Digital media is still not the norm.
- Education levels of general population hinders preservation – end-user data curation is very difficult.

African Problems 2/3

Funding

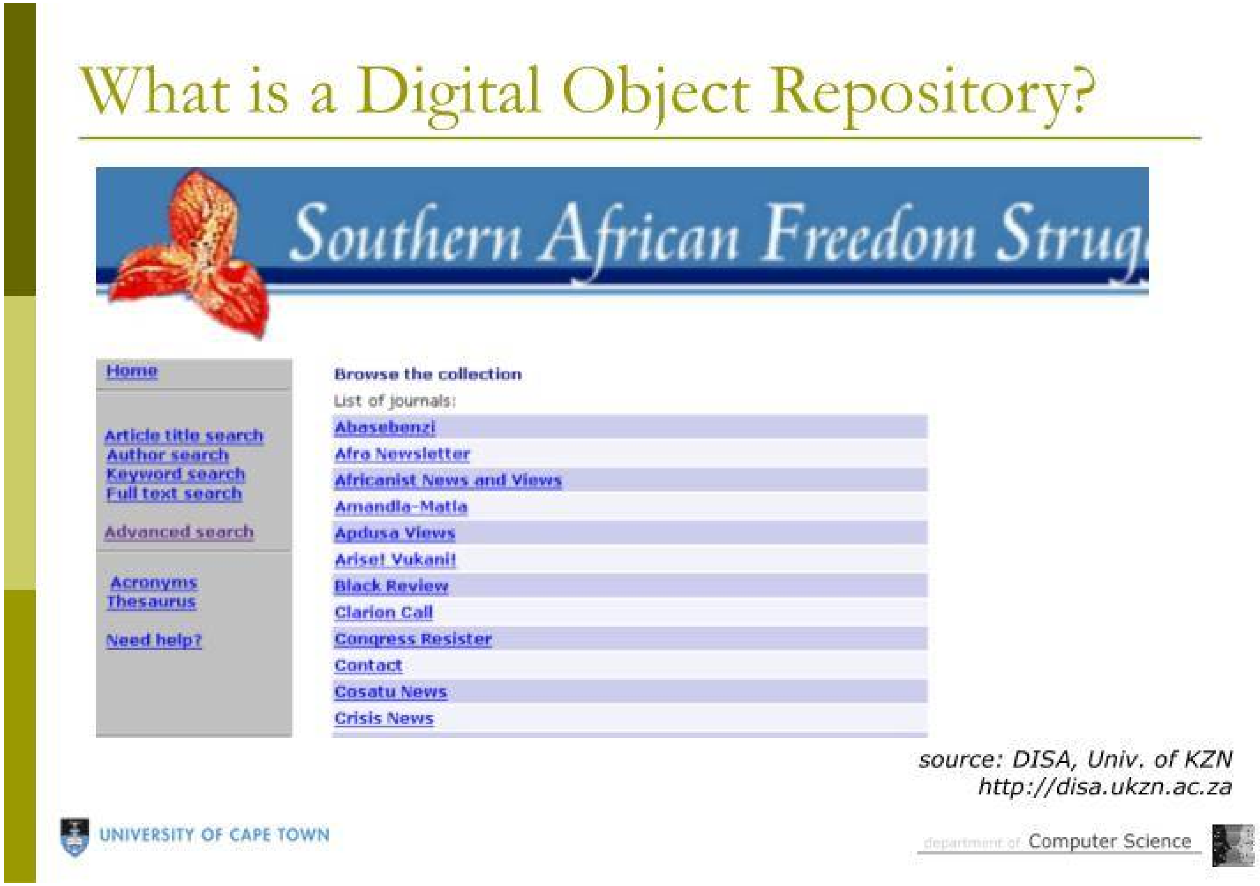
- Typically, there is little.
- Many preservation projects are funded by external agencies, but with restrictions on data accessibility.
- There is a desperate need to do more with less.

African Problems 3/3

Internet Bandwidth (Digital Divide)

- Non-existent in some places and poor everywhere else.
- Preservation projects designed for high bandwidth are not suitable.
- All online solutions must be bandwidth-friendly.

What is the net effect? 1/3



What is a Digital Object Repository?

Southern African Freedom Strug

- Home
- Article title search
- Author search
- Keyword search
- Full text search
- Advanced search
- Acronyms
- Thesaurus
- Need help?

Browse the collection

List of journals:

- Abasebenzi
- Afro Newsletter
- Africanist News and Views
- Amandla-Matla
- Apdusa Views
- Arise! Vukani!
- Black Review
- Clarion Call
- Congress Resister
- Contact
- Cosatu News
- Crisis News

source: DISA, Univ. of KZN
http://disa.ukzn.ac.za

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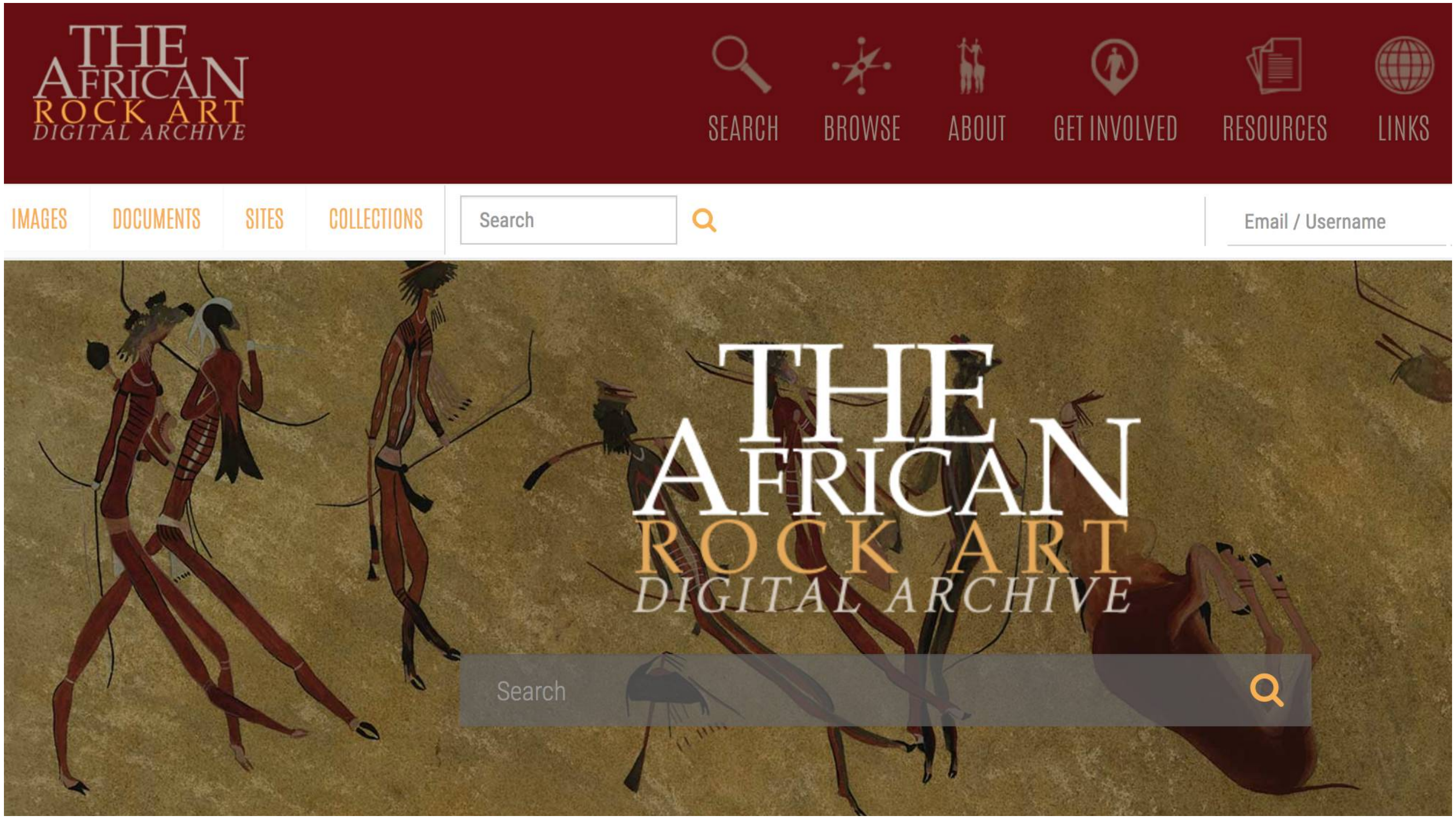
department of Computer Science

What is the net effect? 2/3



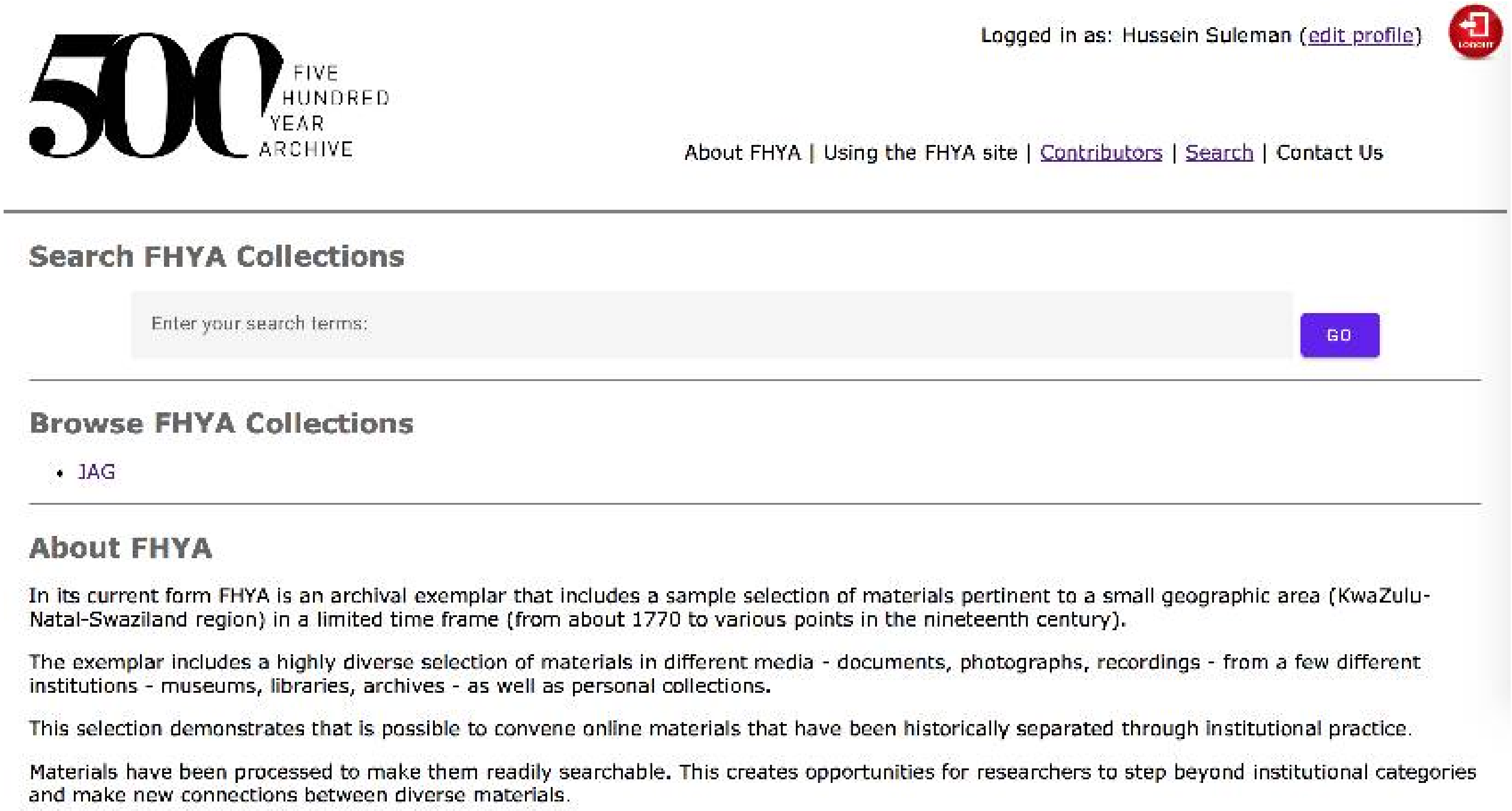
What is the net effect? 3/3

How to build a Low Resource Archive

- "2 million euros and 2 years and we can build any digital repository system"
- Can we use Dspace/AtoM/etc.?

- Can we do the same thing as everyone else?
  - Or
- Can we create a more suitable architecture for low resource environments?

FHYA Prototype 1/3



Logged in as: Hussein Suleman (edit profile)

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Search FHYA Collections

Enter your search terms:

GO

Browse FHYA Collections

- JAG

About FHYA

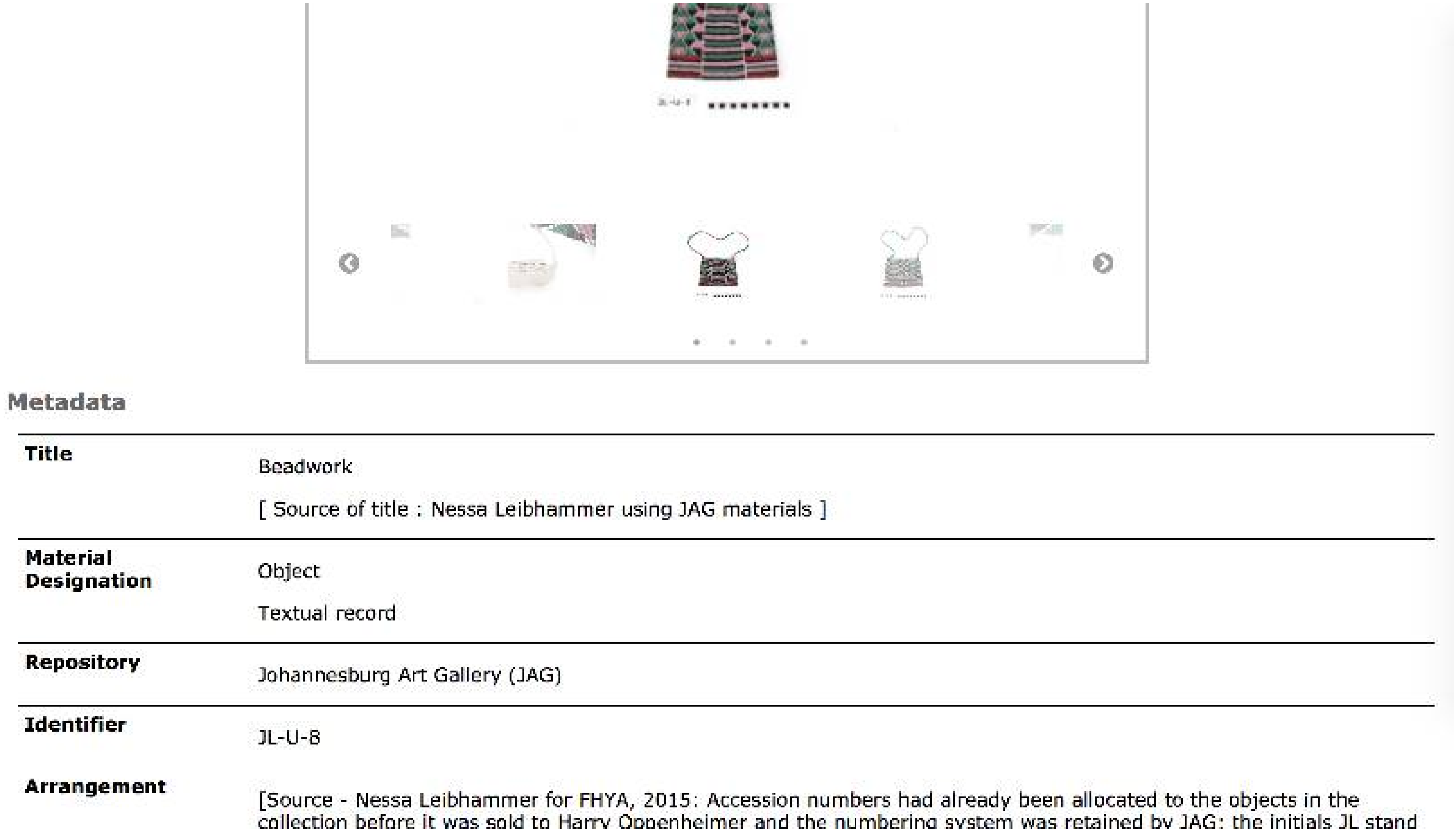
In its current form FHYA is an archival exemplar that includes a sample selection of materials pertinent to a small geographic area (KwaZulu-Natal-Swaziland region) in a limited time frame (from about 1770 to various points in the nineteenth century).

The exemplar includes a highly diverse selection of materials in different media - documents, photographs, recordings - from a few different institutions - museums, libraries, archives - as well as personal collections.

This selection demonstrates that is possible to convene online materials that have been historically separated through institutional practice.

Materials have been processed to make them readily searchable. This creates opportunities for researchers to step beyond institutional categories and make new connections between diverse materials.

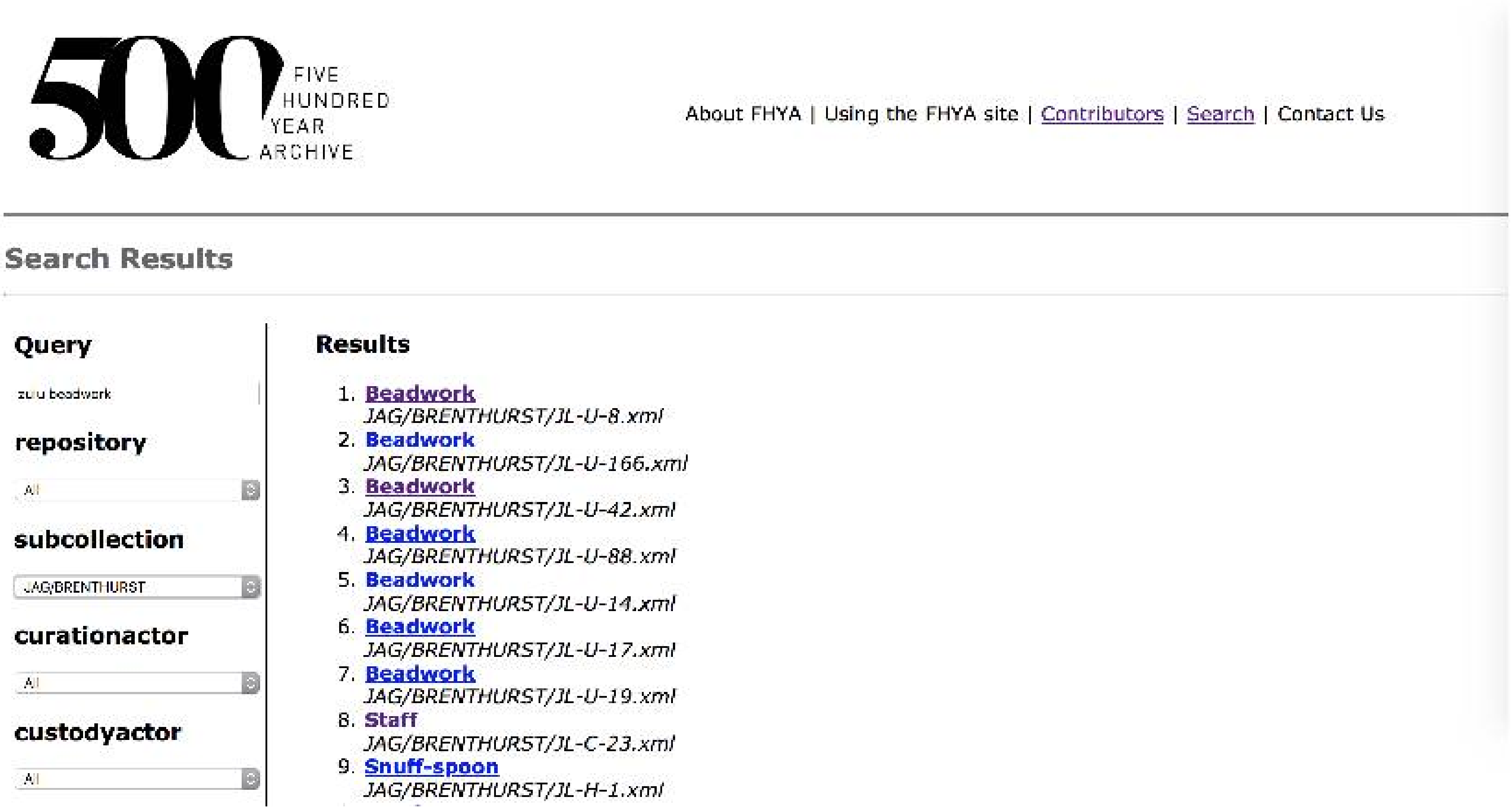
FHYA Prototype 2/3



Metadata

Title	Beadwork [Source of title : Nessa Leibhammer using JAG materials]
Material Designation	Object Textual record
Repository	Johannesburg Art Gallery (JAG)
Identifier	JL-U-8
Arrangement	[Source - Nessa Leibhammer for FHYA, 2015: Accession numbers had already been allocated to the objects in the collection before it was sold to Harry Oppenheimer and the numbering system was retained by JAG: the initials JL stand

FHYA Prototype 3/3



500 FIVE HUNDRED YEAR ARCHIVE

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Search Results

Query

zulu beadwork

repository

All

subcollection

JAG/BRENTHURST

curationactor

All

custodyactor

All

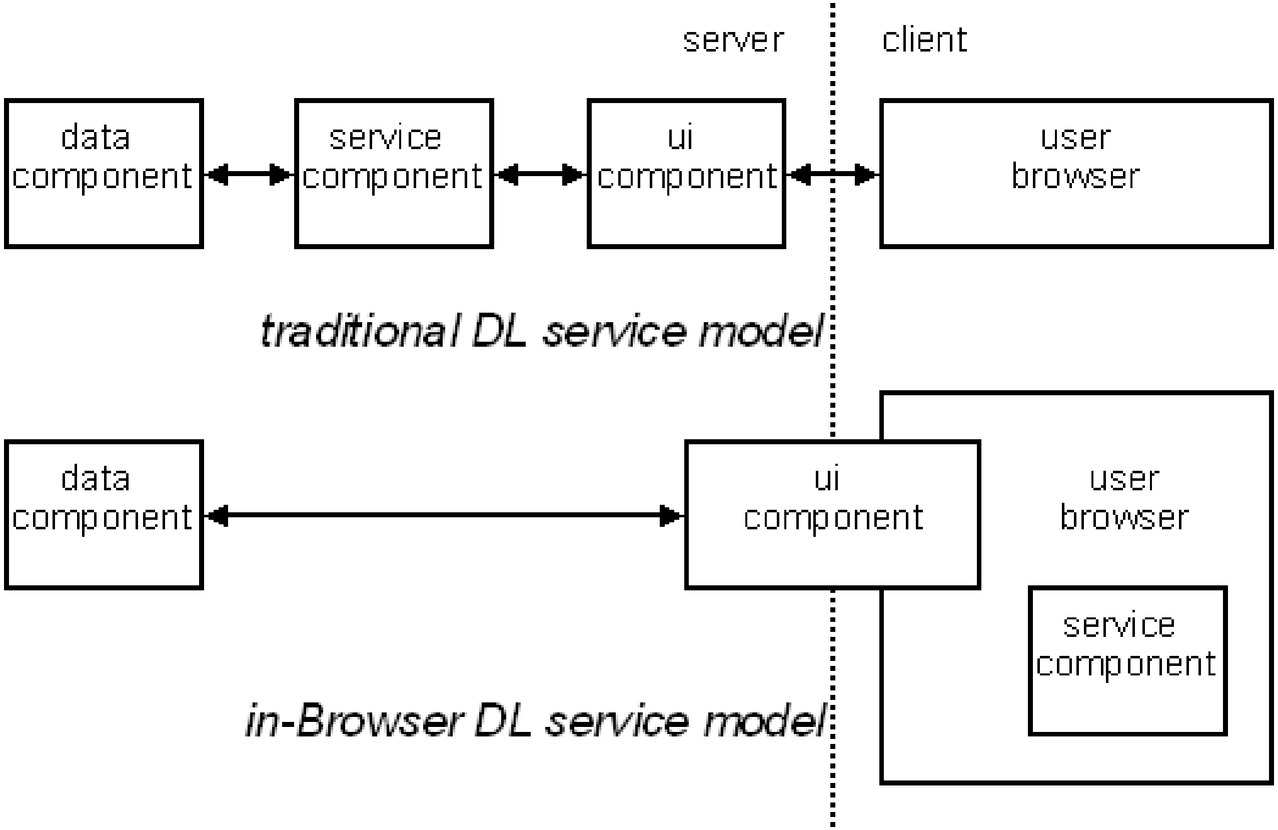
Results

1. Beadwork
   JAG/BRENTHURST/JL-U-8.xml
2. Beadwork
   JAG/BRENTHURST/JL-U-166.xml
3. Beadwork
   JAG/BRENTHURST/JL-U-42.xml
4. Beadwork
   JAG/BRENTHURST/JL-U-88.xml
5. Beadwork
   JAG/BRENTHURST/JL-U-14.xml
6. Beadwork
   JAG/BRENTHURST/JL-U-17.xml
7. Beadwork
   JAG/BRENTHURST/JL-U-19.xml
8. Staff
   JAG/BRENTHURST/JL-C-23.xml
9. Snuff-spoon
   JAG/BRENTHURST/JL-H-1.xml

Low Resource Repository ideas ...

- Minimalism
- Off-line or online
- Data in structured files (e.g., XML), not DBMS
- Pre-generate interfaces where possible
- Preserve by copying
- Works on any system
- Services on the client-side

The in-Browser Service Model



How client-side search/browse works

- Step 1:
  - All metadata stored in files.
- Step 2:
  - Indices created and stored in XML files.
- Step 3:
  - Query processing in Javascript.
  - UI partly pre-generated and partly updated using JS.
- *Notice – this will work even offline!*

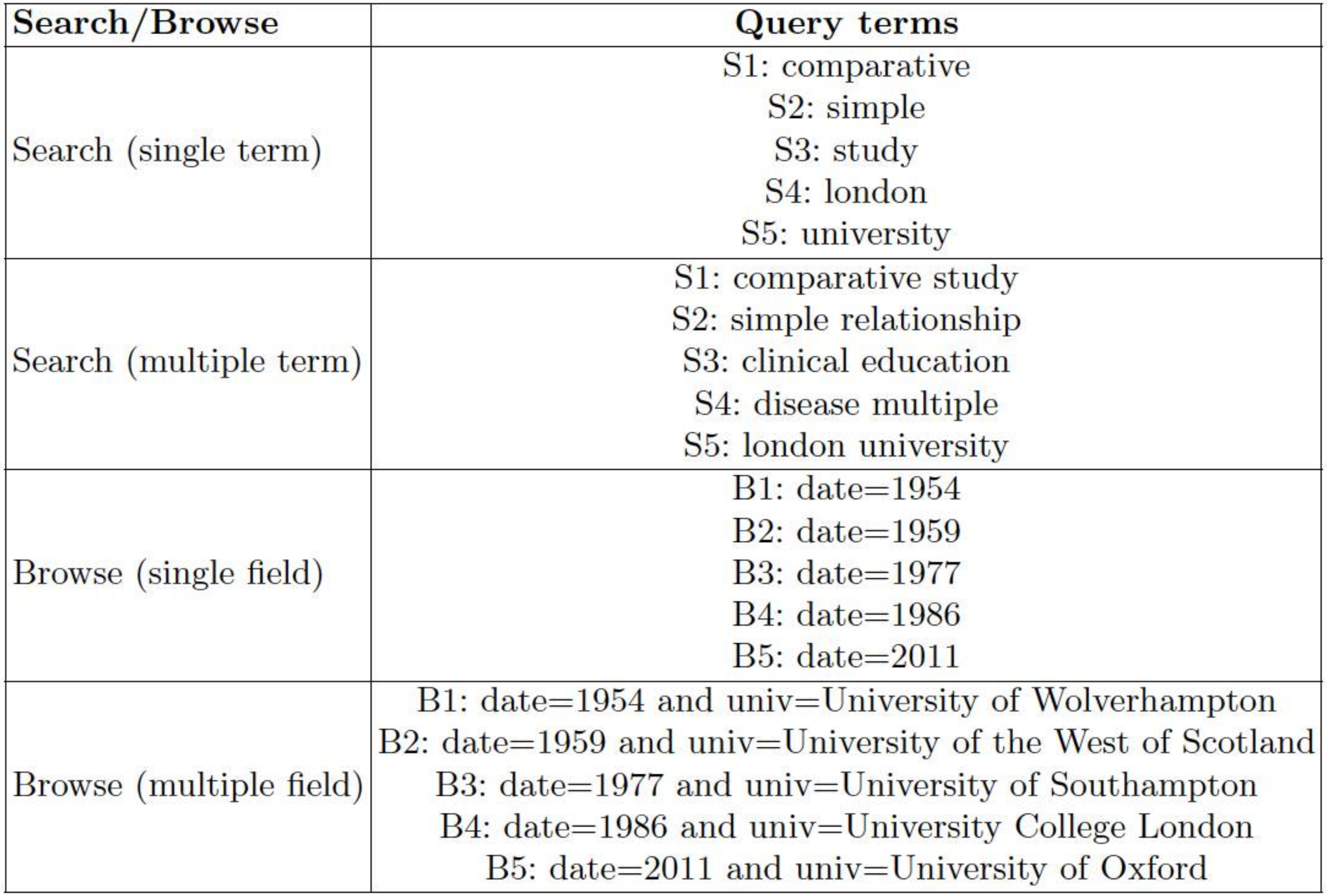
Implementation Details

- Extended boolean search model
- + Faceted search
- Multi-term fielded query terms
  - "title:offline author:hussein"
- Stopwords, normalisation
- Configurable fields for search/facets
- Drop-down boxes for facets
- Multiple indices for different metadata subsets

Experiment

- How well will it work? Surely browsers are too slow and collections too large?
- ETD metadata harvested from NDLTD.
- Test different collection sizes.
  - 2000-32000
- Test different typical operations, varying complexity.
  - Search, browse, search+browse

Queries



Search/Browse	Query terms
Search (single term)	S1: comparative S2: simple S3: study S4: london S5: university
Search (multiple term)	S1: comparative study S2: simple relationship S3: clinical education S4: disease multiple S5: london university
Browse (single field)	B1: date=1954 B2: date=1959 B3: date=1977 B4: date=1986 B5: date=2011
Browse (multiple field)	B1: date=1954 and univ=University of Wolverhampton B2: date=1959 and univ=University of the West of Scotland B3: date=1977 and univ=University of Southampton B4: date=1986 and univ=University College London B5: date=2011 and univ=University of Oxford

Index creation time

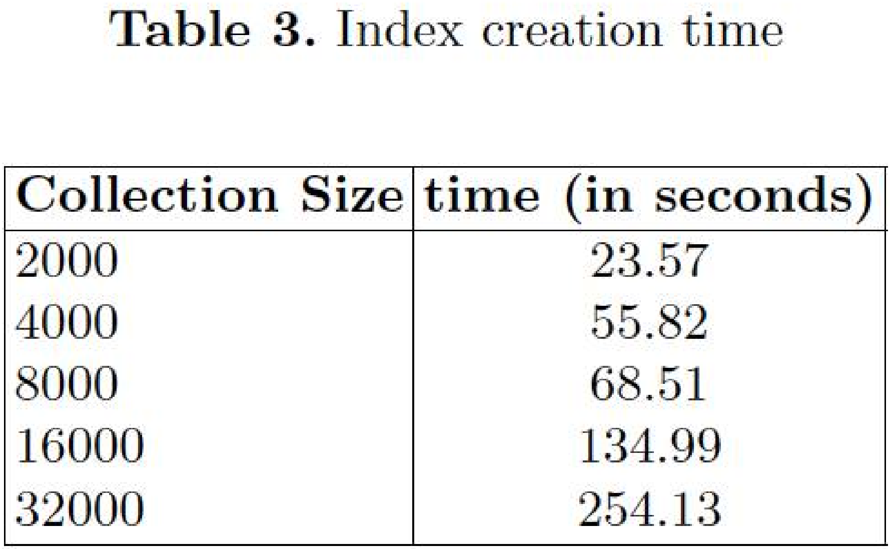


Table 3. Index creation time

Collection Size	time (in seconds)
2000	23.57
4000	55.82
8000	68.51
16000	134.99
32000	254.13

Results – 16000 items

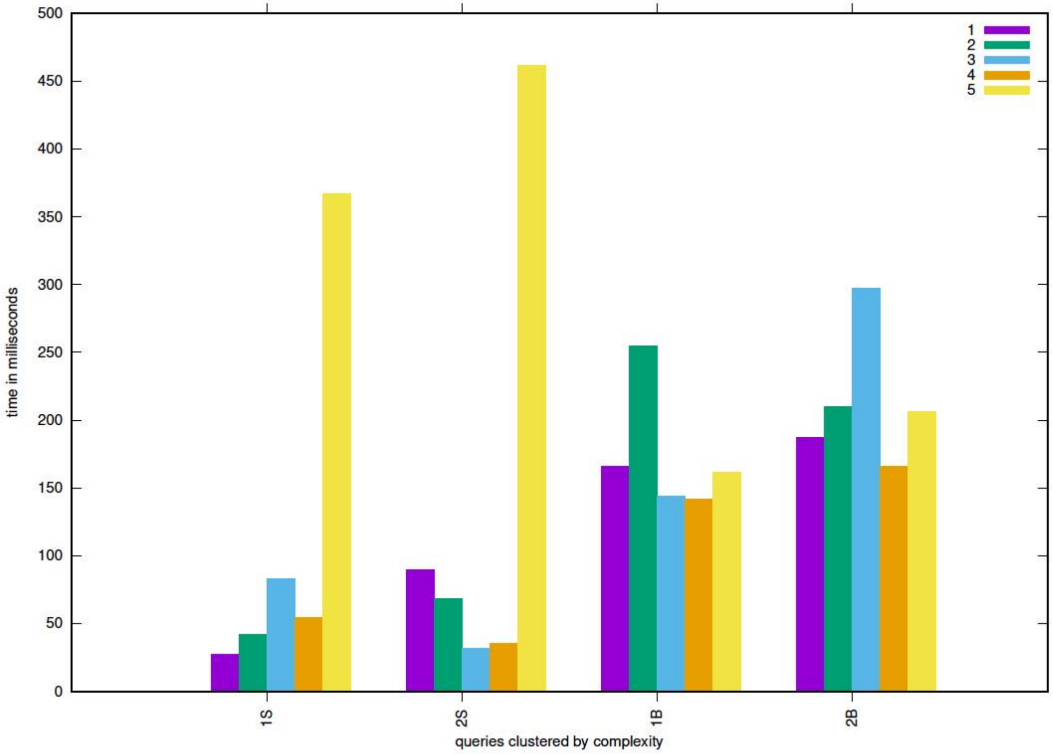


Fig. 2. Average times for queries of difference complexities. 1S/2S/1B/2B are the query complexities while the 5 data points within each cluster are the different queries tested.

Results – Average Performance

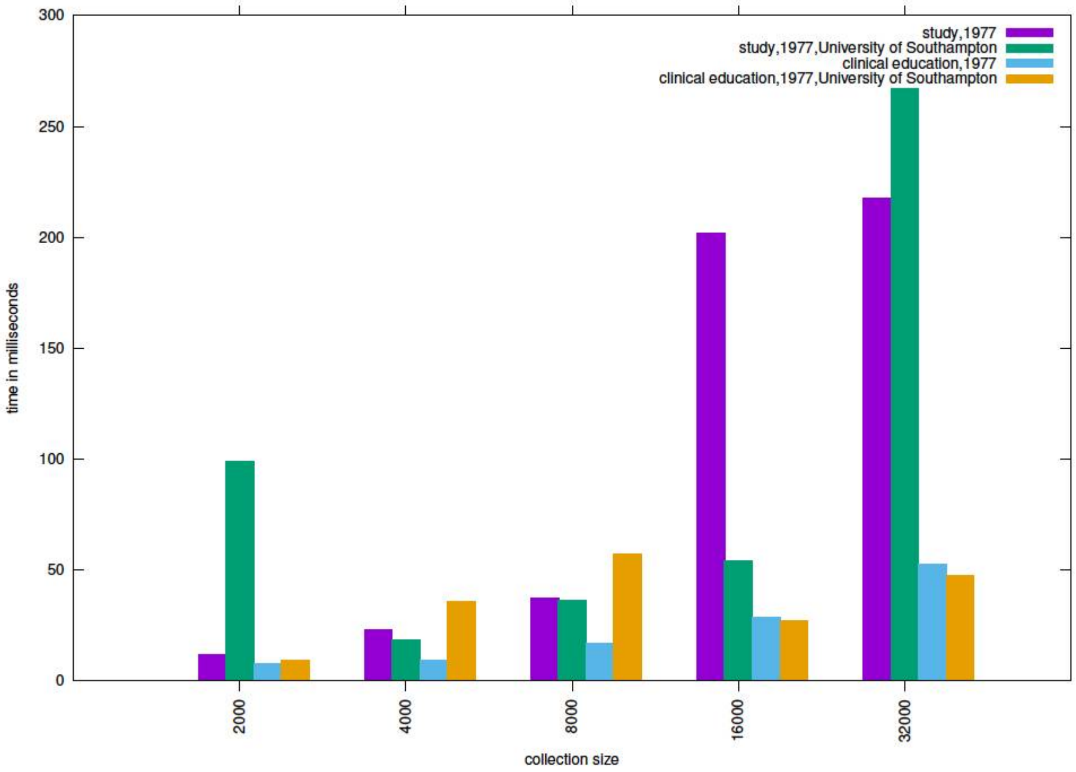


Fig. 5. Average times for faceted search/browse queries of difference complexities across all collection sizes.

Conclusions

- Performance clearly scales with processing needed.
- In most cases, sub-second responses are possible for far more than 32000 records!
- There is no reason for databases, server-side search engines, etc. for small collections.

Reflection

- One size does not fit all.
- Simple solutions for small problems.
  - Complex solutions for big problems.
- Some ideas may lead to better preservation.
  - Only time will really tell…

that's all folks!