

# Visualization Tool Prototype

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## Overview

Using SPARQL queries and Javascript libraries, we built a web-based tool for exploring Harvard geospatial and moving image data converted in the course of the LD4L Labs and LD4P grants. Our goals included visualizing the results of complex queries, demonstrating the use of linked data from external resources to improve discovery, giving individual items context within collections, and in the wider world, providing a user interface that aspires to serendipitous encounters and new observations. The resulting demonstration site uses WebGL and three.js to execute large-scale, three-dimensional, manipulable visualizations of entities representing library resources, driven by live queries on an AWS Neptune triplestore, the Wikidata SPARQL endpoint, and the Geonames API.

## Technical Outputs

### Architecture

A front end visualization tool that makes real time queries against Neptune was developed. The UI includes:

- A query editor for manual input of SPARQL queries and API calls
- A dynamically-generated menu for sorting and grouping a query's results based on linked data descriptions
- Color-coding for visually distinguishing sets of results from separate queries
- Joins to support enrichment of data displayed from one query with data drawn from a different query

Visualization features:

- Tens of thousands of distinct resources displayed spatially, within query result sets represented as planes in three-dimensional space
- Dynamic groupings based on UI selections
- Resource description details displayed as text on mouseover, including data merged from external sources

The software stack is:

- The editor and visualization user interface is based on React + three.js
- The visualization is driven by a backend API using Node + Express
- AWS Cognito is used for user authentication and AWS DynamoDB for storing user and project info
- The linked data storage and SPARQL endpoint is Amazon Neptune

### Code

Code for the visualization tools can be found at:

<https://github.com/ld4l-labs/geoviz>

<https://github.com/ld4l-labs/filmviz>

## Presentations and Publications

The tool was presented at the LD4 Workshop at Stanford in May 2018: <https://docs.google.com/presentation/d/1kt3QzCgLRMv19b1Q234ixSaHYomOdHvb49AwhBMUvyM/edit?usp=sharing>

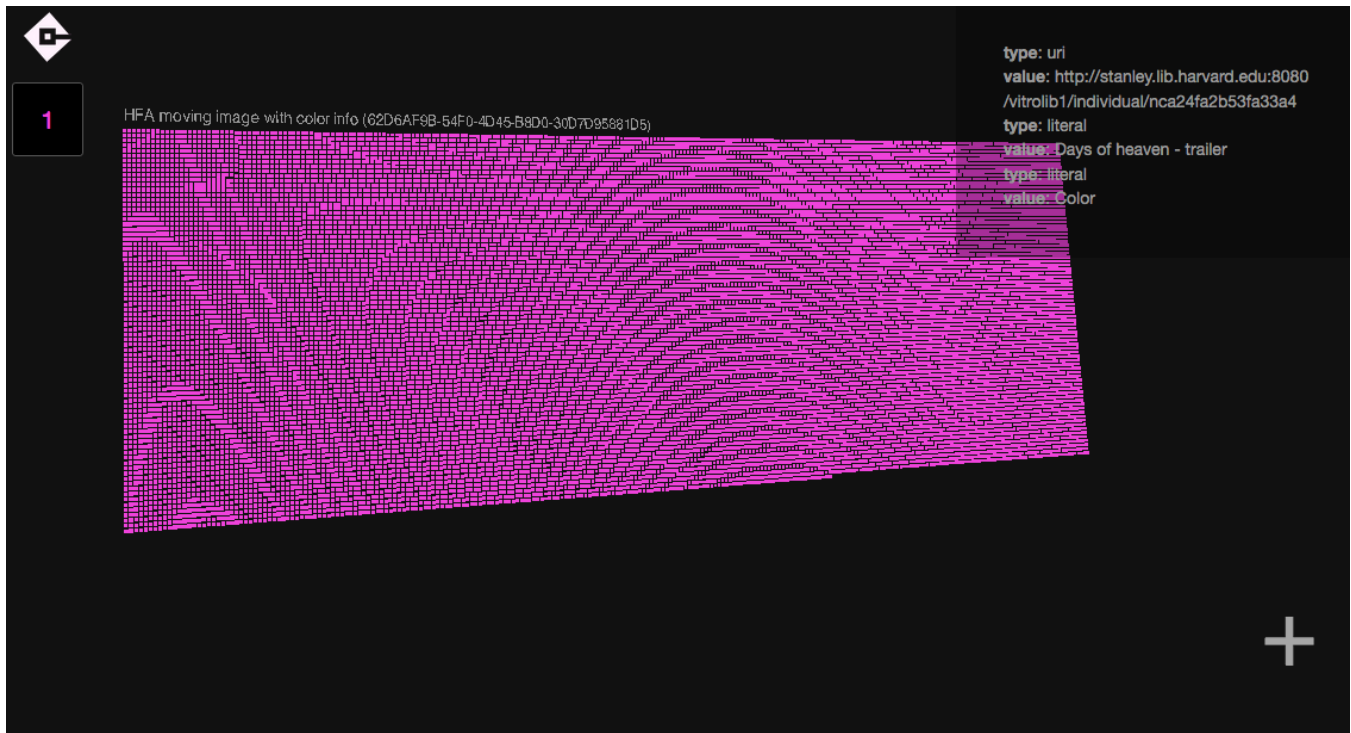
## Demo application

The actual demo application, hosted by maptian.com, is running at <http://visualgraph.harvard.maptian.com/>

Sample user interface and visualization displays are included below. - See the Google doc presentation above for additional screenshots.

The user interface includes the ability to enter custom SPARQL queries as well as to choose from a selection of saved queries. Queries are performed in real time against the Amazon Neptune triple store.

[blocked URL](#)



UI

1

HFA moving image with color info

Add Data

SAVED QUERIES

Saved queries

HFA moving image with color info

NEW QUERY

Endpoint

https://api.film.id4l.harvard.maptian.com/v1/film

Endpoint type

SPARQL

Query title

HFA moving image with color info

Query

```
PREFIX individual: <http://stanley.lib.harvard.edu:8080/vitrolib1/individual/>
PREFIX bib: <http://id.loc.gov/ontologies/bibframe/>
PREFIX ont: <http://bibliotek-o.org/ontology/>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX purl: <http://purl.org/dc/terms/>
SELECT ?subject ?predicate ?color ?label
WHERE {
  ?subject a bib:MovingImage .
  ?subject rdfs:label ?label .
  ?subject bib:colorContent ?colors .
```

Cancel

Send

stanley.lib.harvard.edu:8080

individual

d935165137

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