# Analysis of the entire HathiTrust Digital Library Collection by Source Institution

March 4, 2020

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Library Faculty Meeting



Office of Collections and Technical Services
University Library at the University of Illinois at Urbana-Champaign

# **Research Questions**





**Tools** 



- a) What **Institutions** deposited their digitized volumes?
  Number of deposited volumes by Institution, State, and Country
- b) In which Region and Country / State were the majority of the digitized volumes published? Overall / by Institution
- c) In which Languages were the majority of the digitized volumes published?

  Overall / by Institution



# **Approach**

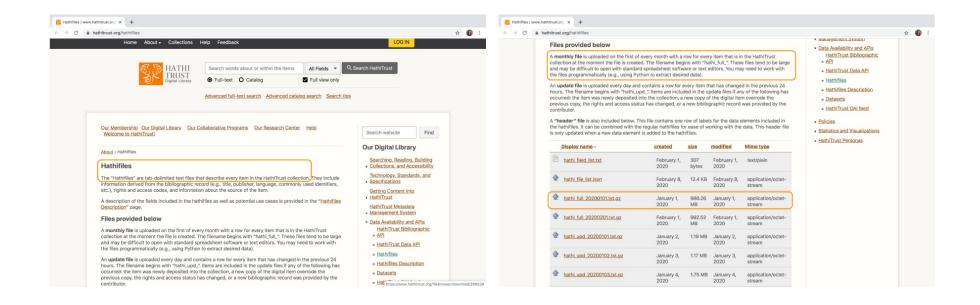
### general workflow of the research

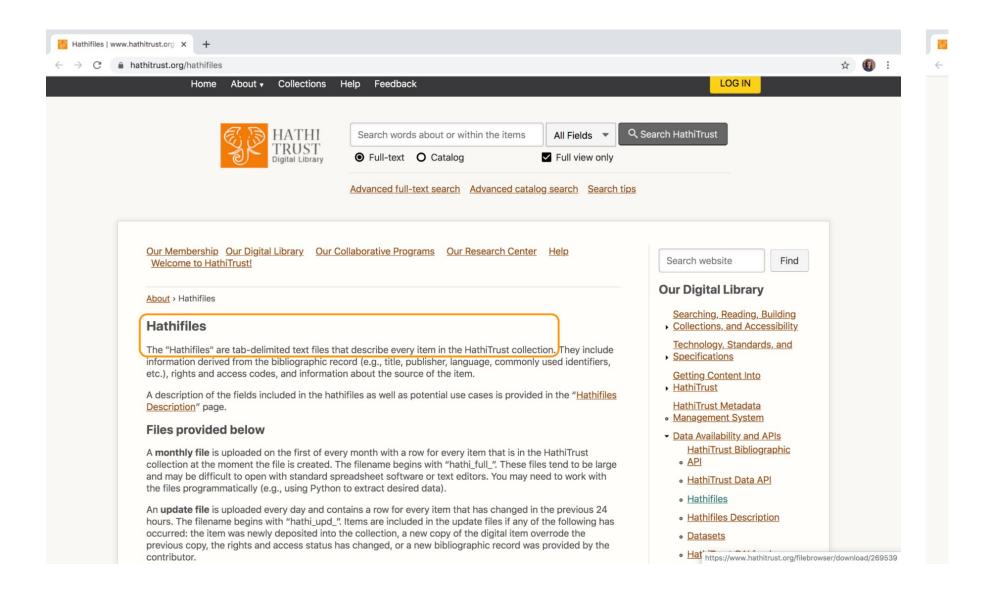
- Obtain the dataset
- Import the dataset to the database
- Decide on what metadata is needed for the analysis
- Query data to evaluate how much data cleaning needs to be done
- · Decide whether additional data ("dictionaries") are needed & where to obtain them
- Perform data cleaning & manipulation (SQL)
- Design various data visualizations and dashboards (Tableau)
- Present the result -> get a feedback -> make corrections -> publish VIZ on Tableau Server for everyone to explore

# **Dataset Overview**

## **Collection of Digitized Items:**

### 17.1 M / 847 K records datasets





- $\leftarrow$   $\rightarrow$
- C
- hathitrust.org/hathifiles

### Files provided below

A **monthly file** is uploaded on the first of every month with a row for every item that is in the HathiTrust collection at the moment the file is created. The filename begins with "hathi\_full\_". These files tend to be large and may be difficult to open with standard spreadsheet software or text editors. You may need to work with the files programmatically (e.g., using Python to extract desired data).

An **update file** is uploaded every day and contains a row for every item that has changed in the previous 24 hours. The filename begins with "hathi\_upd\_". Items are included in the update files if any of the following has occurred: the item was newly deposited into the collection, a new copy of the digital item overrode the previous copy, the rights and access status has changed, or a new bibliographic record was provided by the contributor.

A "header" file is also included below. This file contains one row of labels for the data elements included in the hathifiles. It can be combined with the regular hathifiles for ease of working with the data. This header file is only updated when a new data element is added to the hathifiles.

D	isplay name.▲	created	size	modified	Mime type
	hathi field list.txt	February 1, 2020	307 bytes	February 1, 2020	text/plain
<b>*</b>	hathi file list,json	February 8, 2020	12.4 KB	February 8, 2020	application/octet- stream
<b>2</b> 1	hathi_full_20200101.txt.gz	January 1, 2020	986.26 MB	January 1, 2020	application/octet- stream
<b>1</b>	hathi full 20200201.txt.gz	February 1, 2020	992.52 MB	February 1, 2020	application/octet- stream
<b>*</b>	hathi upd 20200101.txt,gz	January 2, 2020	1.19 MB	January 2, 2020	application/octet- stream
<b>*</b>	hathi_upd_20200102.txt.gz	January 3, 2020	1.17 MB	January 3, 2020	application/octet- stream
<b>*</b>	hathi upd 20200103.txt.gz	January 4, 2020	1.75 MB	January 4, 2020	application/octet- stream

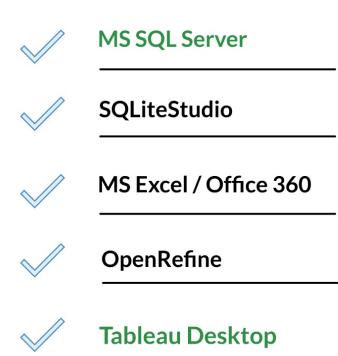
- ivianayement system
- ▼ <u>Data Availability and APIs</u>
  <u>HathiTrust Bibliographic</u>
  - API
  - HathiTrust Data API
  - Hathifiles
  - Hathifiles Description
  - Datasets
  - HathiTrust OAI feed
- Policies
- Statistics and Visualizations
- HathiTrust Personas

9539

# **Tools**

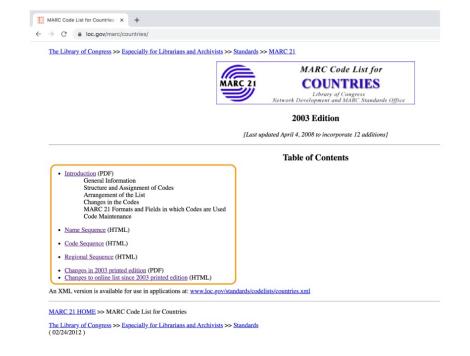
## Data

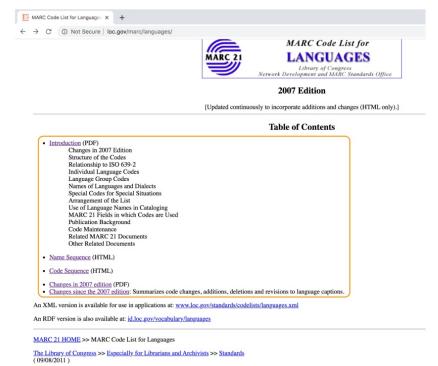
Manipulation
Cleaning
Analysis
& Visualization

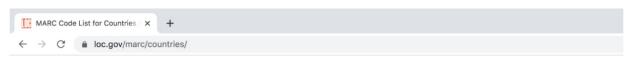


# **Data Cleaning & Manipulation**

### **Publication Place & Language**







The Library of Congress >> Especially for Librarians and Archivists >> Standards >> MARC 21



#### 2003 Edition

[Last updated April 4, 2008 to incorporate 12 additions]

#### **Table of Contents**

Introduction (PDF)
 General Information
 Structure and Assignment of Codes
 Arrangement of the List
 Changes in the Codes

MARC 21 Formats and Fields in which Codes are Used Code Maintenance

- Name Sequence (HTML)
- Code Sequence (HTML)
- Regional Sequence (HTML)
- Changes in 2003 printed edition (PDF)
- Changes to online list since 2003 printed edition (HTML)

An XML version is available for use in applications at: www.loc.gov/standards/codelists/countries.xml

MARC 21 HOME >> MARC Code List for Countries

The Library of Congress >> Especially for Librarians and Archivists >> Standards (02/24/2012)

MARC Code List for La

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Introduction

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Code Relate

Other

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- Name Sequen
- Code Sequen
- Changes in 2Changes sinc

An XML version is

An RDF version is

MARC 21 HOME

The Library of Con (09/08/2011)



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### MARC Code List for LANGUAGES Library of Congress Network Development and MARC Standards Office

#### 2007 Edition

[Updated continuously to incorporate additions and changes (HTML only).]

### **Table of Contents**

Introduction (PDF)

Changes in 2007 Edition
Structure of the Codes
Relationship to ISO 639-2
Individual Language Codes
Language Group Codes
Names of Languages and Dialects
Special Codes for Special Situations
Arrangement of the List
Use of Language Names in Cataloging
MARC 21 Fields in which Codes are Used
Publication Background
Code Maintenance
Related MARC 21 Documents
Other Related Documents

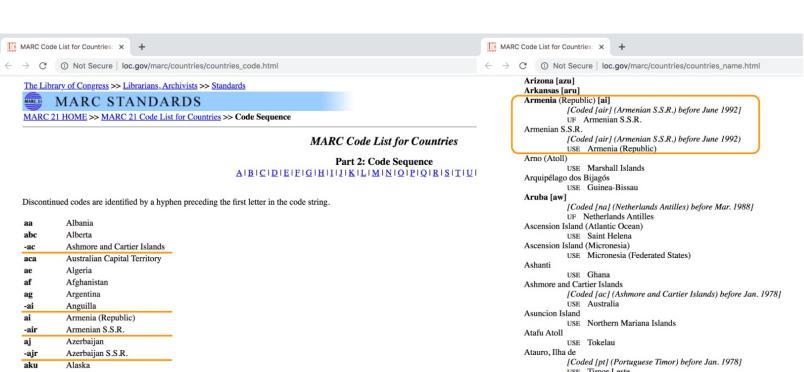
- Name Sequence (HTML)
- Code Sequence (HTML)
- Changes in 2007 edition (PDF)
- Changes since the 2007 edition: Summarizes code changes, additions, deletions and revisions to language captions.

An XML version is available for use in applications at: <a href="www.loc.gov/standards/codelists/languages.xml">www.loc.gov/standards/codelists/languages.xml</a>

An RDF version is also available at: id.loc.gov/vocabulary/languages

MARC 21 HOME >> MARC Code List for Languages

The Library of Congress >> Especially for Librarians and Archivists >> Standards (09/08/2011)



Ashanti

USE Ghana

Ashmore and Cartier Islands

[Coded [ac] (Ashmore and Cartier Islands) before Jan. 1978]

USE Australia

Asuncion Island

USE Northern Mariana Islands

Atafu Atoll

USE Tokelau

Atauro, Ilha de

[Coded [pt] (Portuguese Timor) before Jan. 1978]

USE Timor-Leste

Austral Islands

USE French Polynesia

Australia [at]

UF Ashmore and Cartier Islands

Macquarie Island

Australian Capital Territory [aca]

[Coded [at] (Australia) before Sept. 2005]

Austria [au]

Azerbaijan [aj]

[Coded [ajr] (Azerbaijan S.S.R.) before June 1992]

UF Azerbaijan S.S.R.

[Coded [ajr] (Azerbaijan S.S.R.) before June 1992]

USE Azerbaijan



The Library of Congress >> Librarians, Archivists >> Standards

### MARC STANDARDS

MARC 21 HOME >> MARC 21 Code List for Countries >> Regional Sequence

MARC Code List for Countries Part 3: Regional Sequence

- Africa
- Asia
- Atlantic Ocean
- Australasia Central America
- <u>Europe</u> <u>Indian Ocean</u>
- North America
- Pacific Ocean
- South America
- West Indies
- Other

Africa	
ae	Algeria
ao	Angola
dm	Benin
bs	Botswana
uv	Burkina Faso
bd	Burundi
cm	Cameroon
cx	Central African Republic
cd	Chad
cf	Congo (Brazzaville)
cg	Congo (Democratic Republic)
iv	Côte d'Ivoire
ft	Djibouti
ua	Egypt
eg	Equatorial Guinea
ea	Eritrea
et	Ethiopia
go	Gabon
gm	Gambia
gh	Ghana
gv	Guinea
pg	Guinea-Bissau
ko	Vanua



#### Atlantic Ocean

Bermuda Islands Bouvet Island by Cabo Verde cv Faroe Islands fa fk Falkland Islands Saint Helena хj

South Georgia and the South Sandwich Islands XS

#### Australasia

Australian Capital Territory aca

Australia at New Zealand nz Norfolk Island nx Queensland qea Tasmania tma Victoria vra

Western Australia wea Coral Sea Islands Territory xga

New South Wales xna xoa Northern Territory South Australia xra

Central America Belize cr Costa Rica El Salvador es gt Guatemala Honduras ho Nicaragua nq Panama

#### **Europe**

aa Albania Andorra an Austria au Belarus bw be Belgium

Bosnia and Herzegovina bn

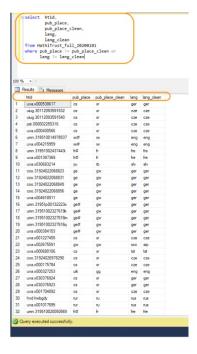
Bulgaria bu Croatia Czech Republic xr

### **Data Cleaning and Manipulation using SQL**

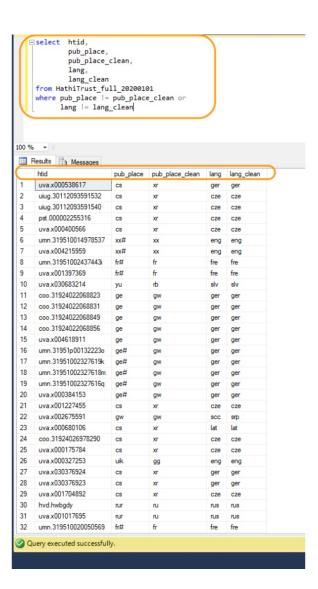
- 1. Created 3 dictionaries based on MARC Code Lists for Countries and Languages:
- for countries
- for states
- for languages



- 2. Assigned new codes to the discontinued ones
- 3. Removed spaces and hashes at the of the codes in the dataset

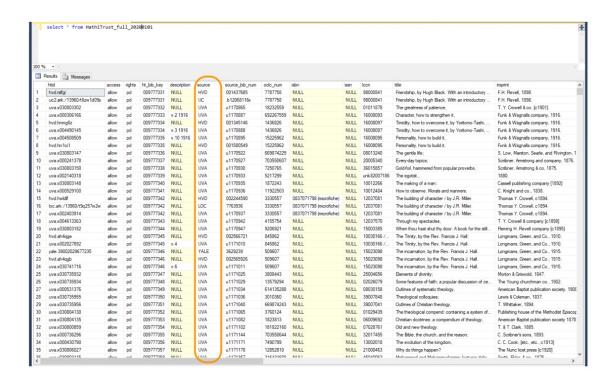






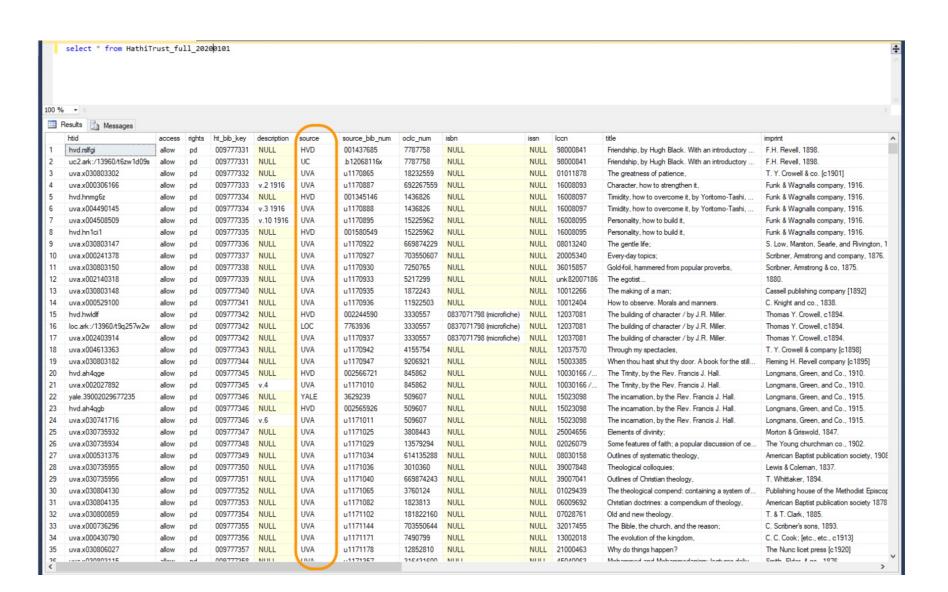
## **Data Cleaning & Manipulation**

### **Source Institution**



Created a dictionary for the Source code (original source of content). Assigned Institution name, city, state, and country to the codes.



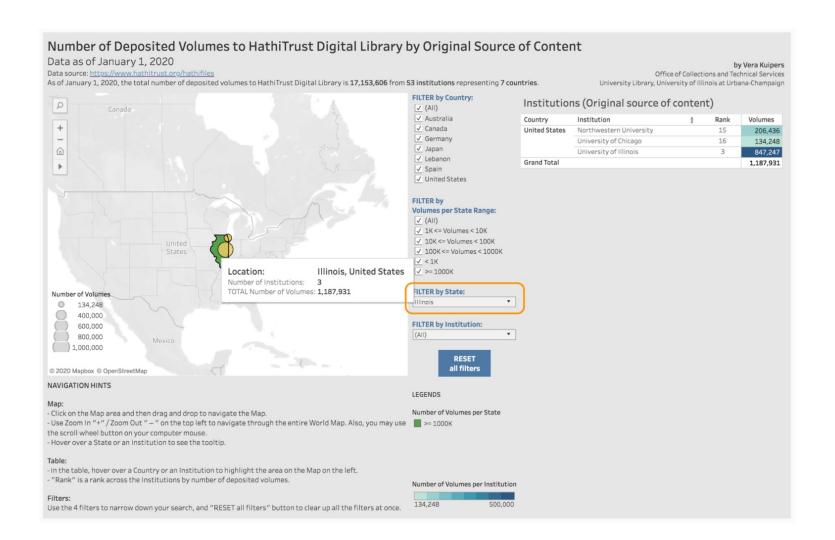




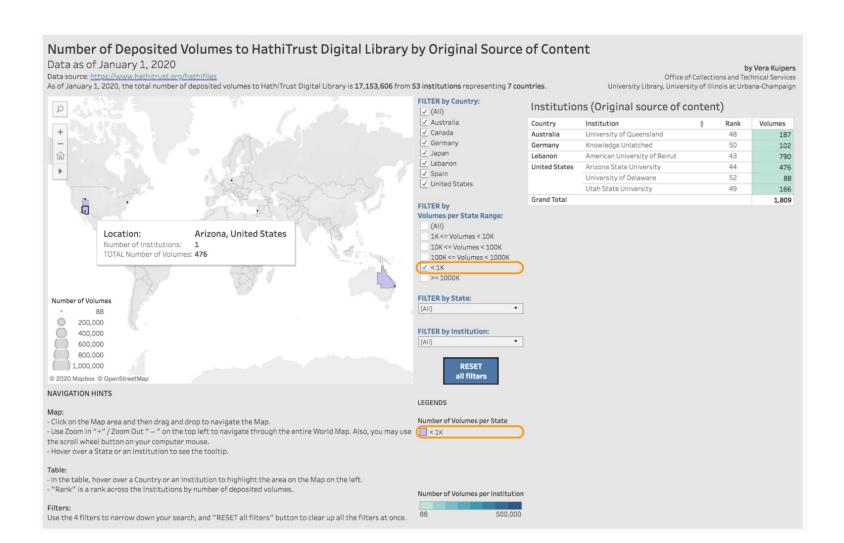


# **Data Visualization 1**

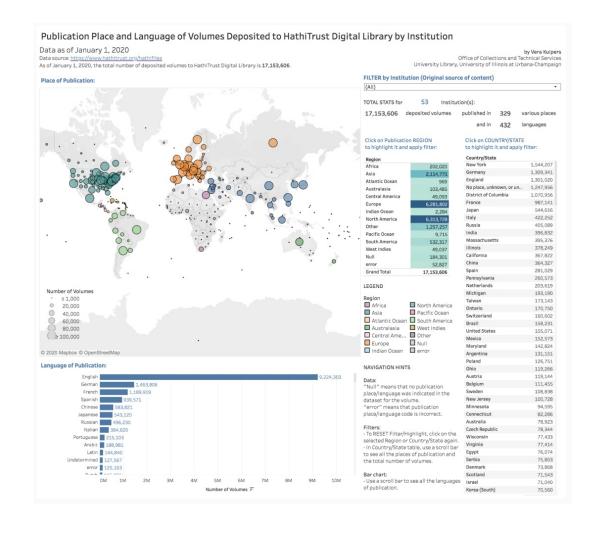


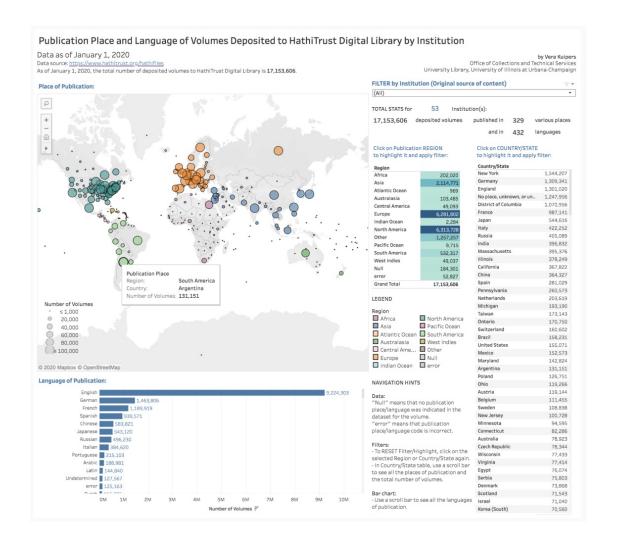


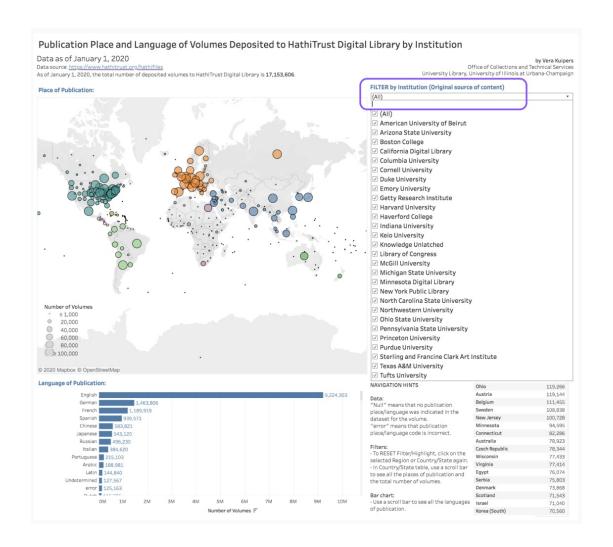


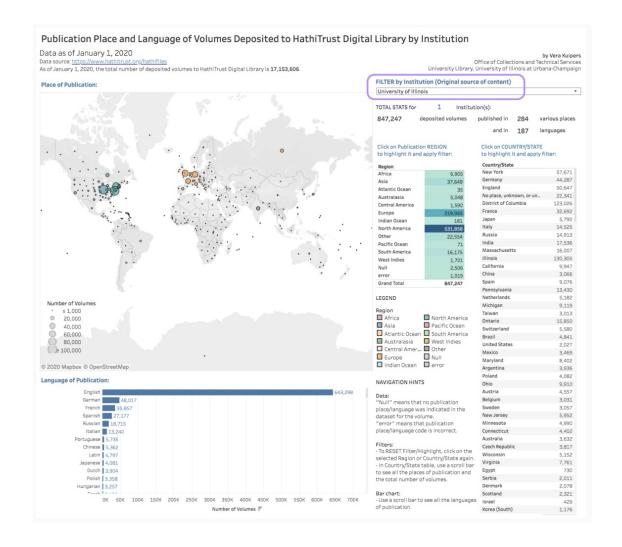


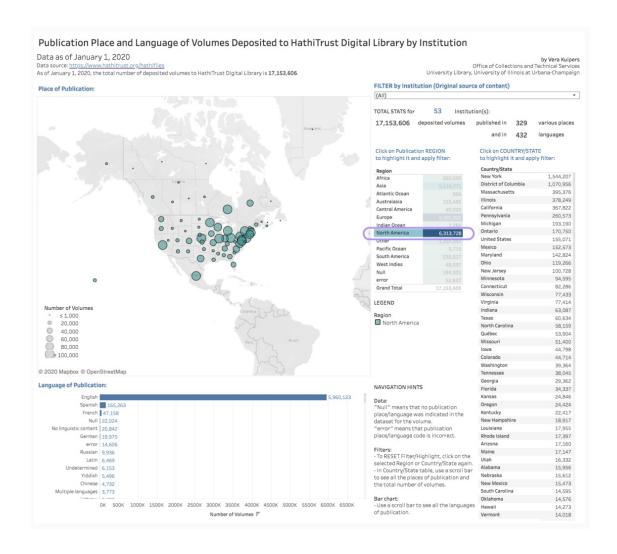
## **Data Visualization 2**











# **Thank You!**