Linked Art

Webinar: Linked Art in Practice using Jupyter Code Notebooks

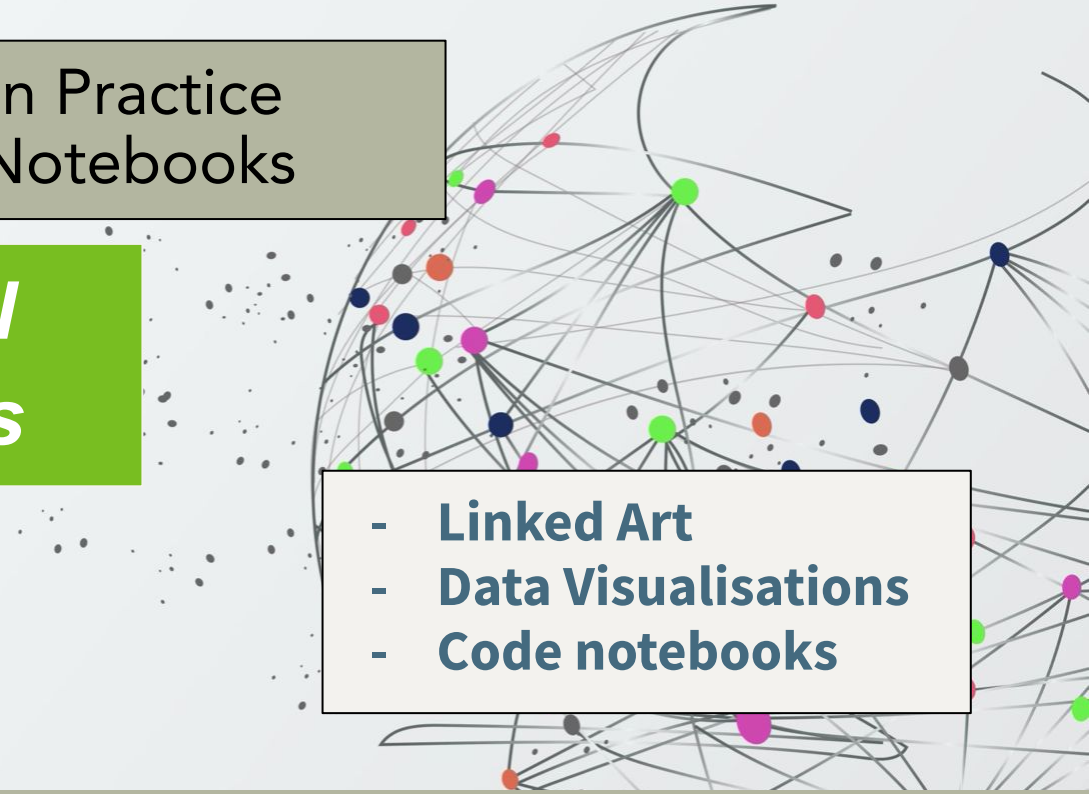
Connecting Cultural Heritage Collections

Tanya Gray

tanya.gray@humanities.ox.ac.uk

University of Oxford

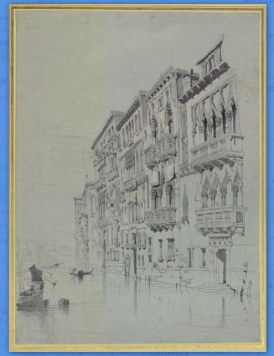
Digital Scholarship @Oxford



- **Linked Art**
- **Data Visualisations**
- **Code notebooks**

October 1874

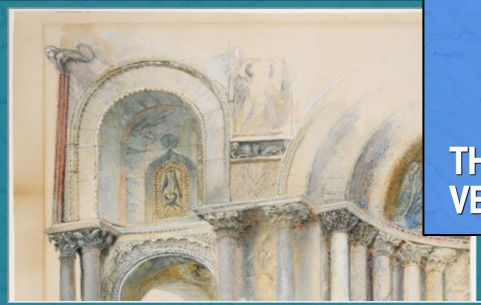
MONT BLANC FROM SAIN SUR-ARVE



Ashmolean Museum

6 - 16 May 1841

THE PALAZZO CONTARINI-FASAN, VENICE

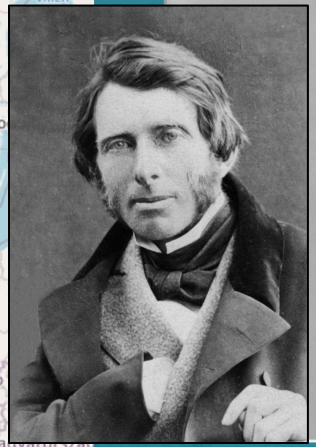


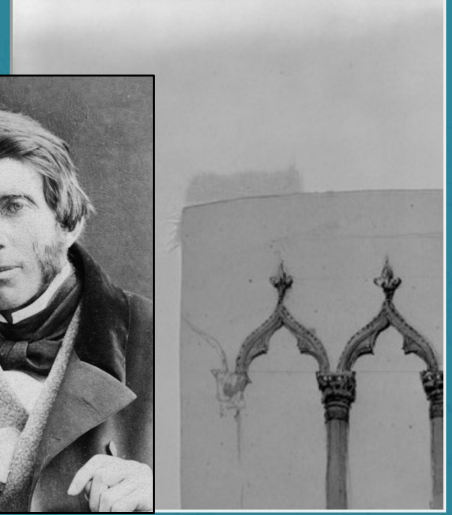
Harvard Art Museum

1879

PART OF A SKETCH OF THE NORTHWEST PORCH OF ST. MARK'S

Map Overview | Back To Beginning





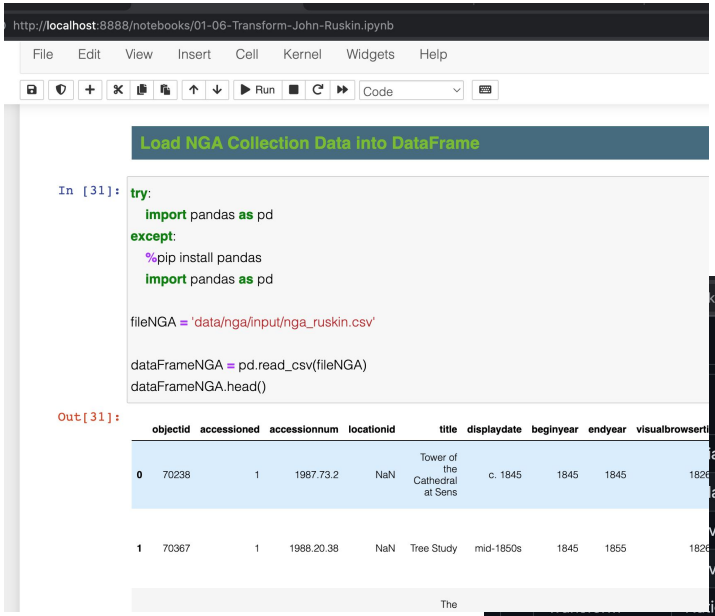
Harvard Art Museum

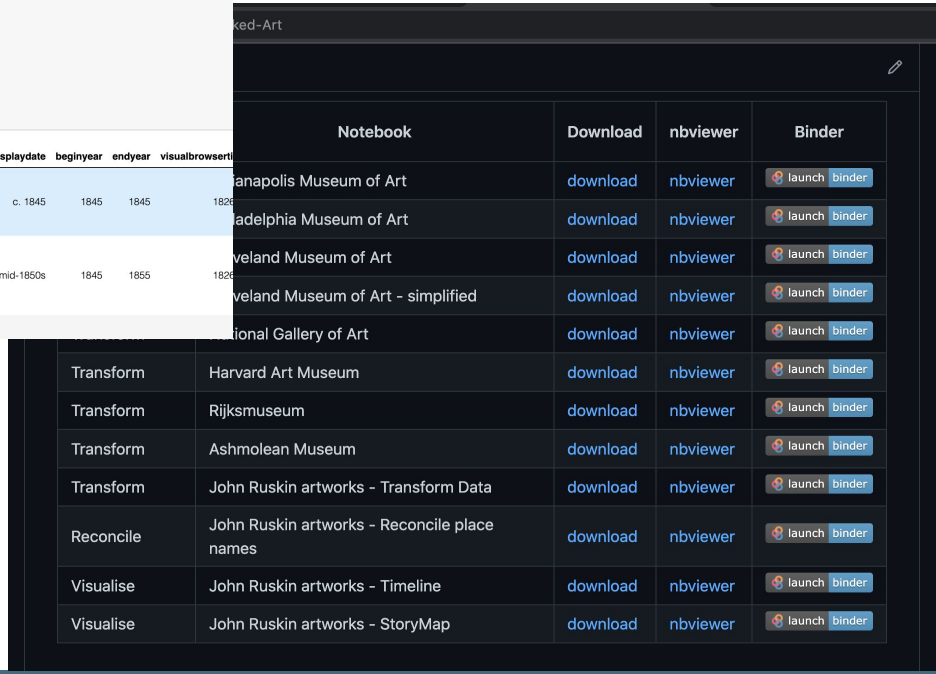
1845

BOAT AND SKETCHES OF TWO FIGURES, VENICE

knight lab

Code Notebooks





Notebook	Download	nbviewer	Binder
anapolis Museum of Art	download	nbviewer	launch binder
adelphia Museum of Art	download	nbviewer	launch binder
veland Museum of Art	download	nbviewer	launch binder
veland Museum of Art - simplified	download	nbviewer	launch binder
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Visualise	John Ruskin artworks - StoryMap	download	nbviewer	launch binder

knight lab

Visual Studio Code

ANACONDA®

jupyter
nbviewer

binder

GitHub

OpenRefine

A free, open source, powerful tool for working with messy data

Data Visualisations

Linked Art:
Sustainable Cultural Knowledge through Linked Open Usable Data

https://linked.art/

ASHMOLEAN MUSEUM OXFORD

Harvard Art Museum

Philadelphia Museum of Art

RIJKS MUSEUM amsterdam

RIJKS MUSEUM

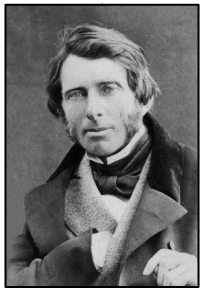
Museum & Galleries Collection Data

Unified representation with Linked Art

John Ruskin. artist

Data visualisation service

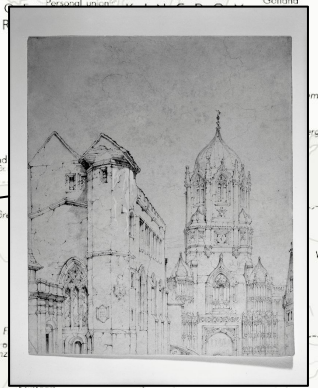
knight lab

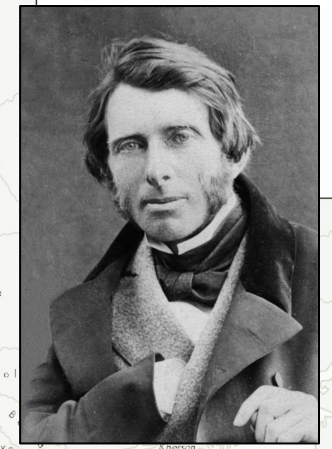


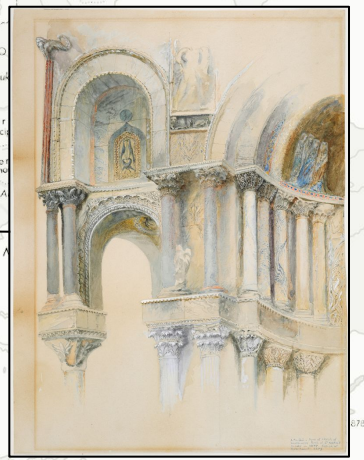
John Ruskin

- Prolific artist
- Social commentator
- European travels
- Depicted nature and architecture
- Influential for ideas on society, art, craft, architecture, building preservation

Artworks now in many private and public collections





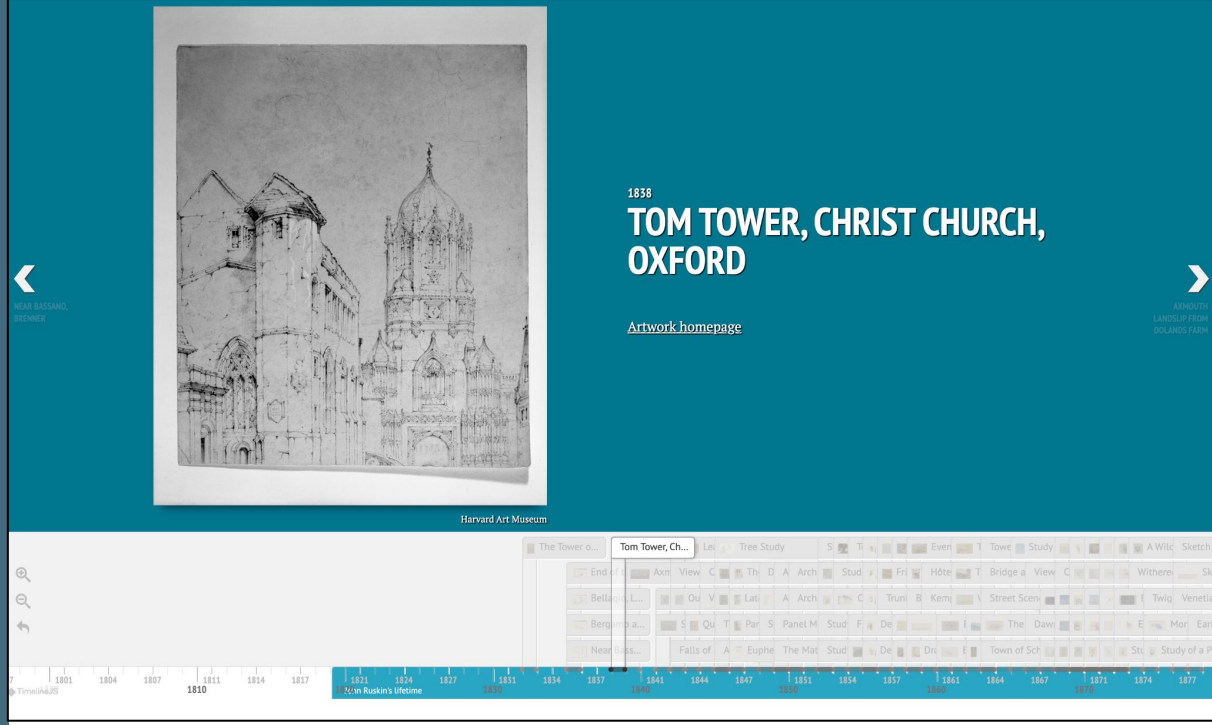


John Ruskin

Timeline visualisation

Uses

- Museum and Gallery collection data
- unified representation with Linked Art
- KnightLab Vis



https://tinyurl.com/3pfteuwf

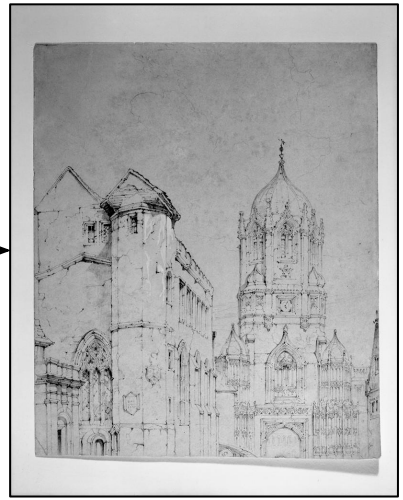
https://cdn.knightlab.com/libs/timeline3/latest/embed/index.html?source=1LttNXCohJsD7XByCSt3KVUC02_J57DFOwtb5Cxq8JuI&font=Default&lang=en&initial_zoom=1&height=850

John Ruskin Timeline Visualisation

Timeline - Future Scholarship

Samuel Prout, Artist

Early influence



Early artwork

Lifetime events

influence?

Later artwork

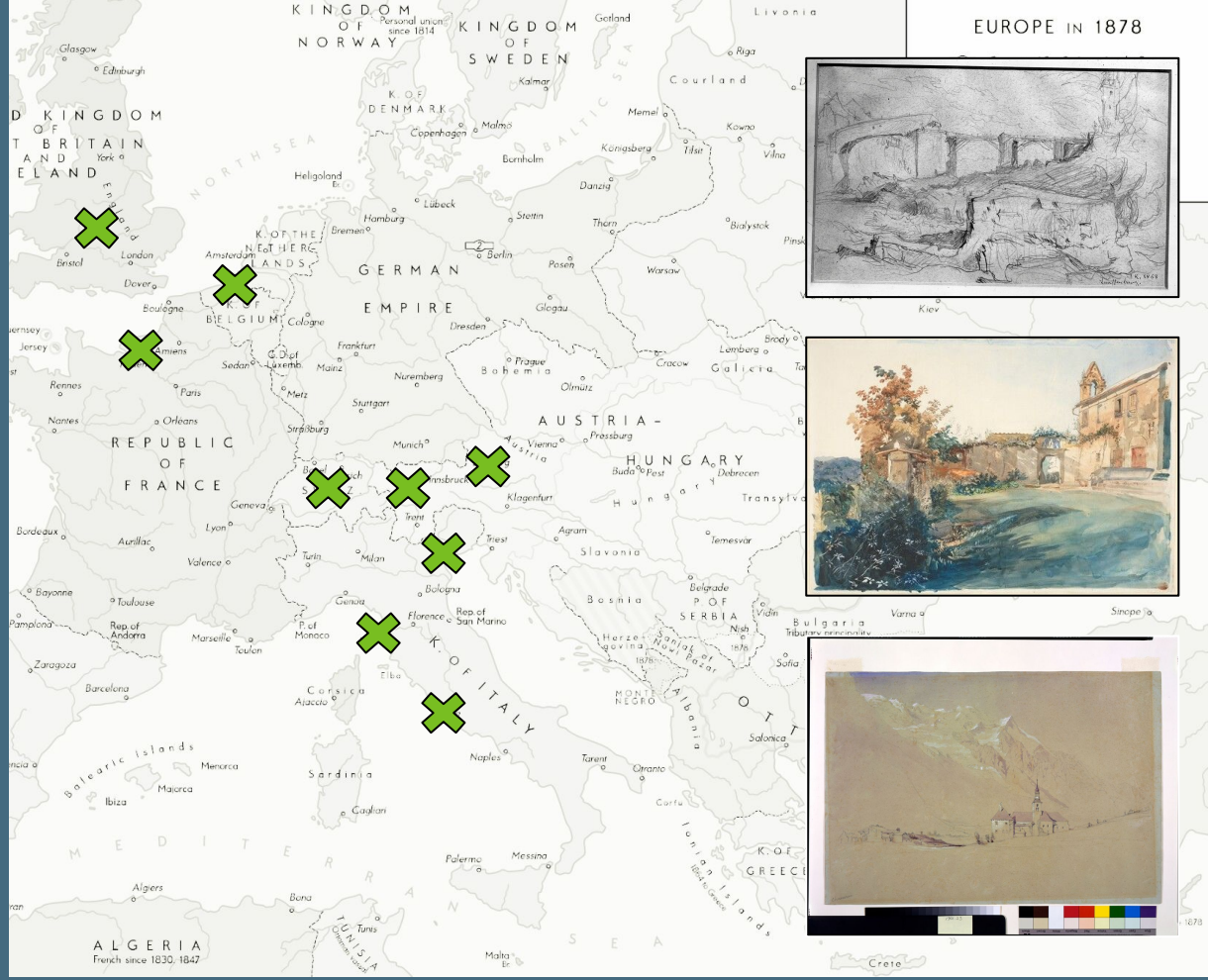
A change in characteristics of Ruskin's artwork through time?

John Ruskin

Travel

Extensive travel in Europe over his lifetime, often to Italy

Recorded travels with drawings and paintings of natural scenery and buildings



John Ruskin

Place name in title

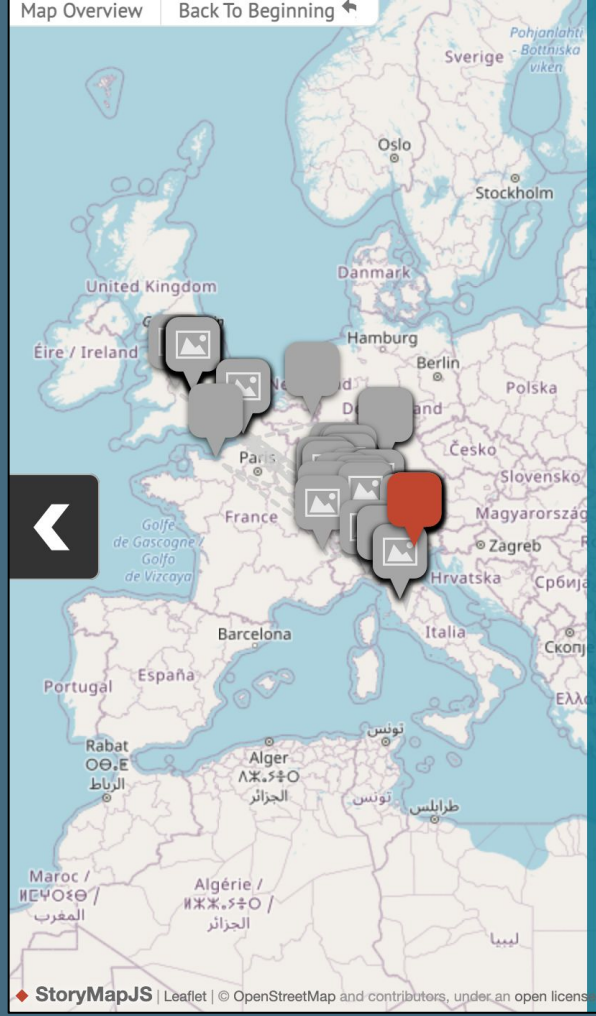
John Ruskin

StoryMap

Uses:

- Collection data
- Unified with Linked Art
- Reconciled with Getty Thesaurus of Geographic Names to extract geocoordinates
- KnightLab vis

https://tinyurl.com/mrxwv3um



Harvard Art Museum

1845

BOAT AND SKETCHES OF TWO FIGURES, VENICE

Fine Arts Department, Harvard University, Cambridge, MA, Transferred to the Fogg Art Museum, 1926.

Artwork homepage

John Ruskin

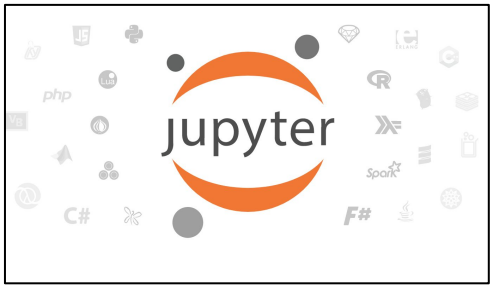
StoryMap

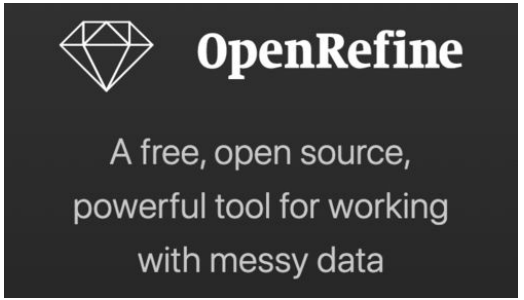
Code Notebooks

ANACONDA®

Visual Studio Code

GitHub





Code Notebooks

https://github.com/tgra/Linked-Art

README.md

Notebook type	Notebook	Download	nbviewer	Binder
Transform	Indianapolis Museum of Art	download	nbviewer	launch binder
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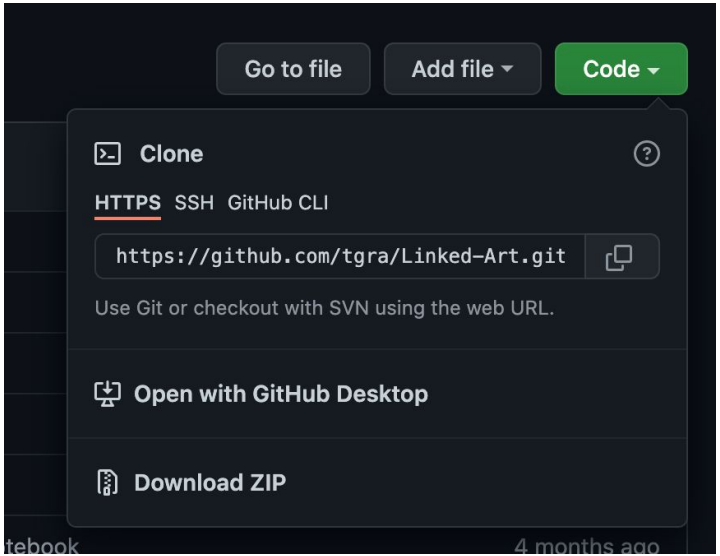
Where to Find Linked Art Code Notebooks

GitHub
github.com/tgra/Linked-Art

Install Git
- Check out with git clone
- Download ZIP

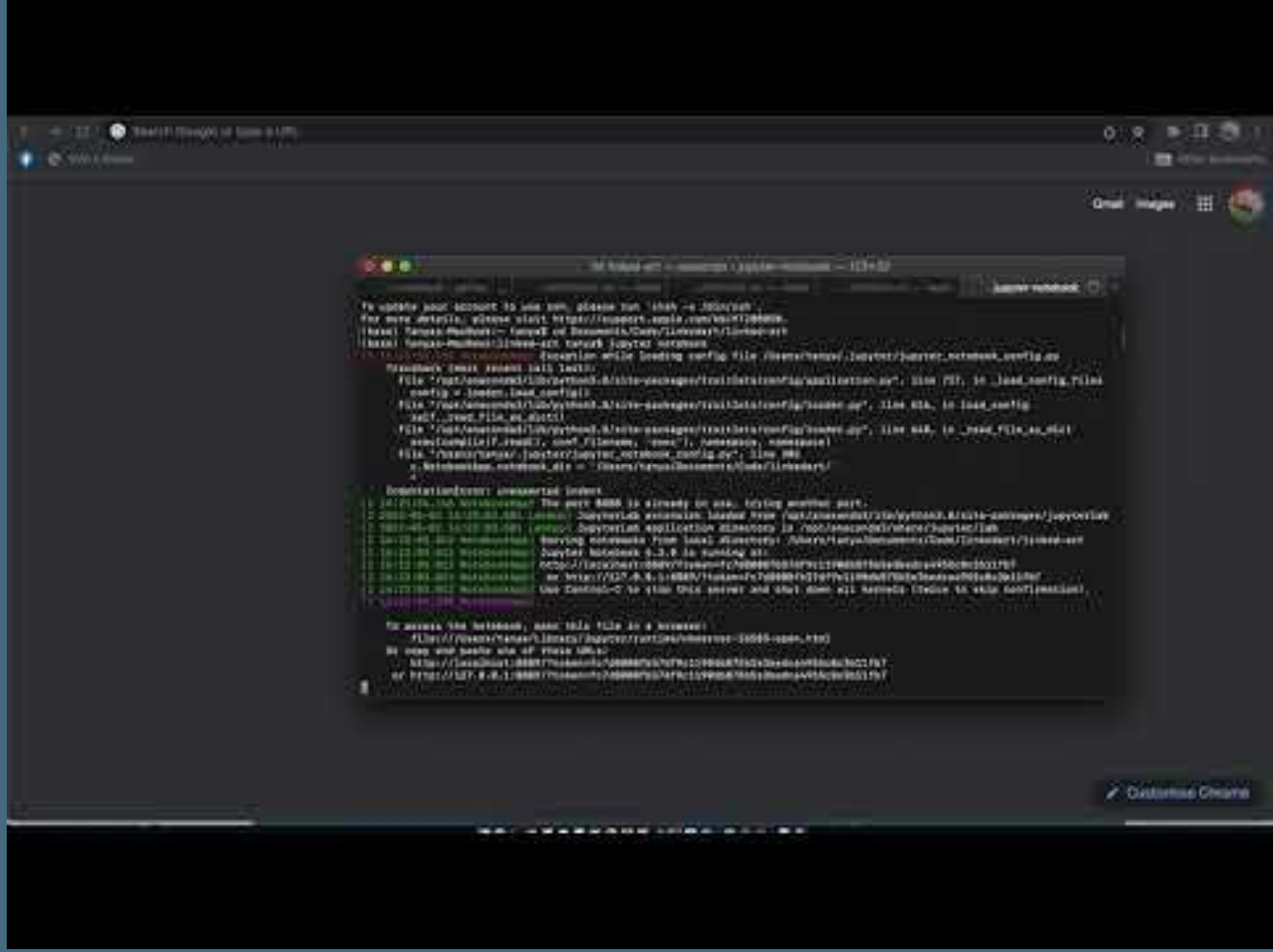


Notebook Tools

- Jupyter command line
- Binder
- Anaconda
- Jupyter Nbviewer
- Visual Studio code
- JupyterHub

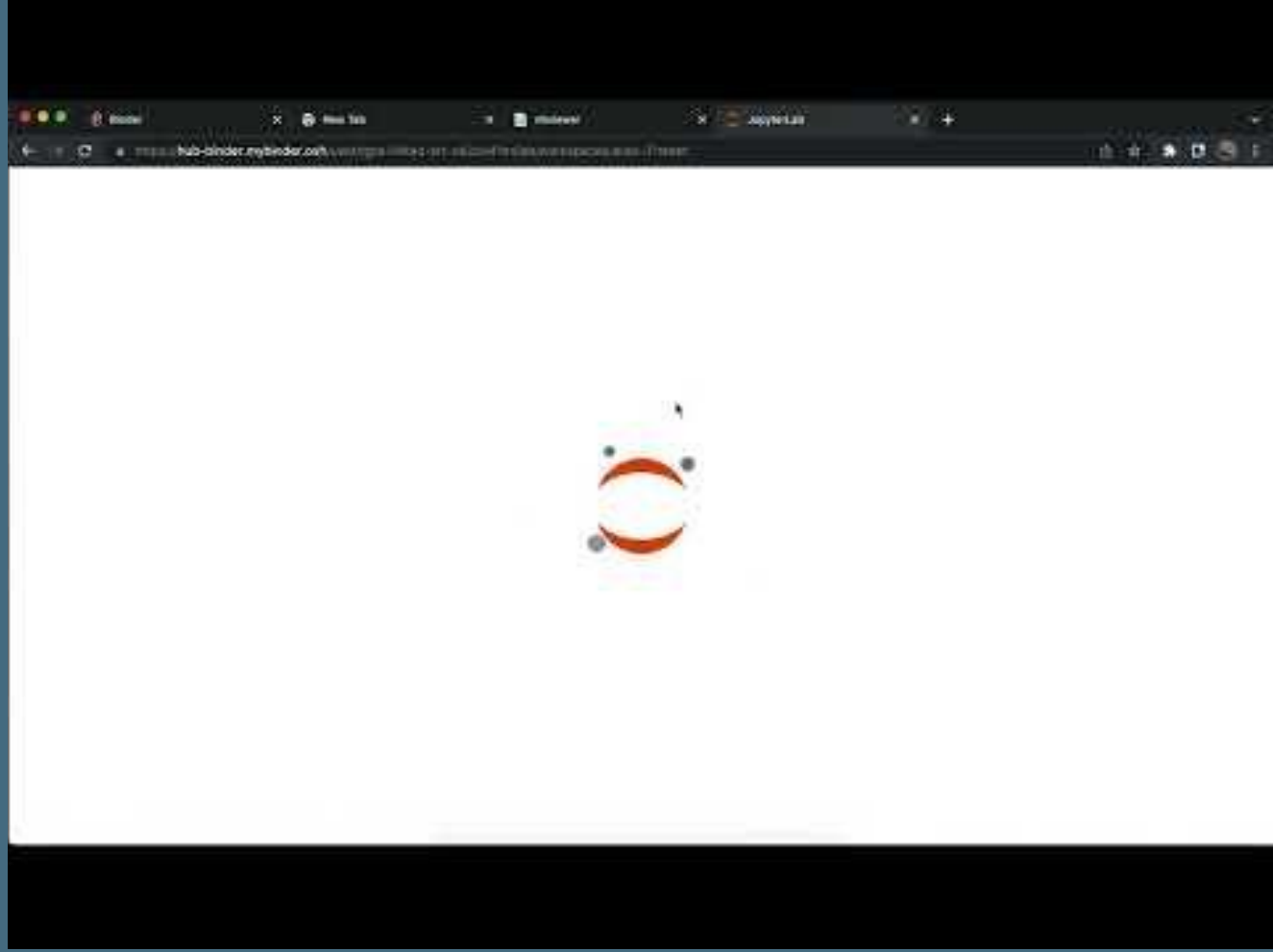
Notebook Tools

Jupyter Notebook via command line



Notebook Tools

Binder via GitHub

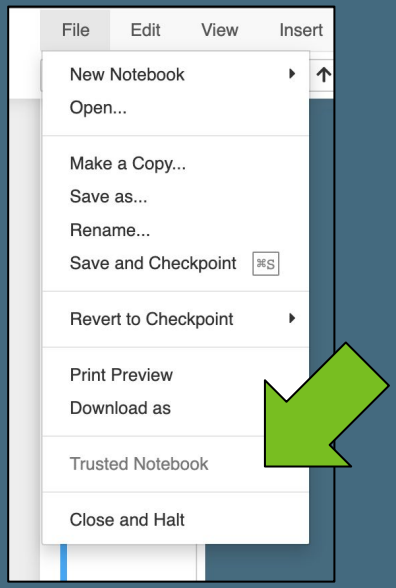


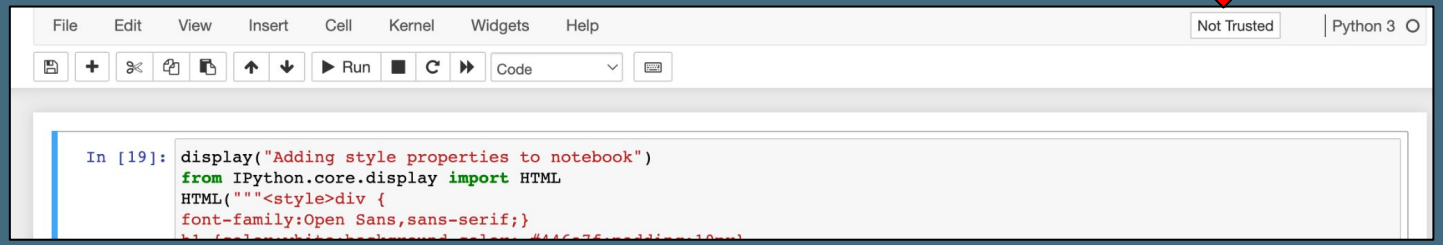
Notebook Tools

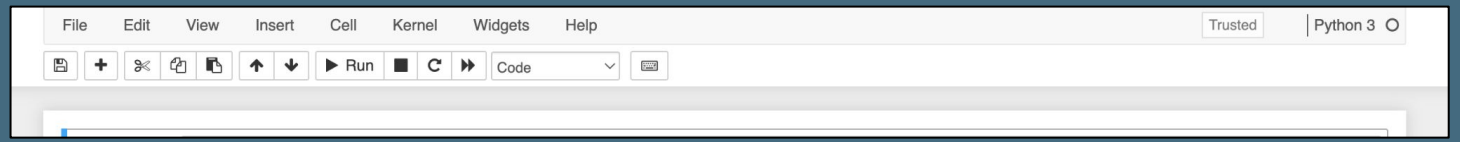
Nbviewer

nbviewer.org

Jupyter Notebooks - Trusted vs Not Trusted







How do I trust a notebook?

Users can explicitly trust a notebook in two ways: 1. **At the command-line,** with: jupyter trust /path/to/notebook. Ipynb. 2. **After loading** the untrusted notebook, with File / Trust Notebook.

Transformation

Reconciliation

Visualisation

Transformation Code Notebook

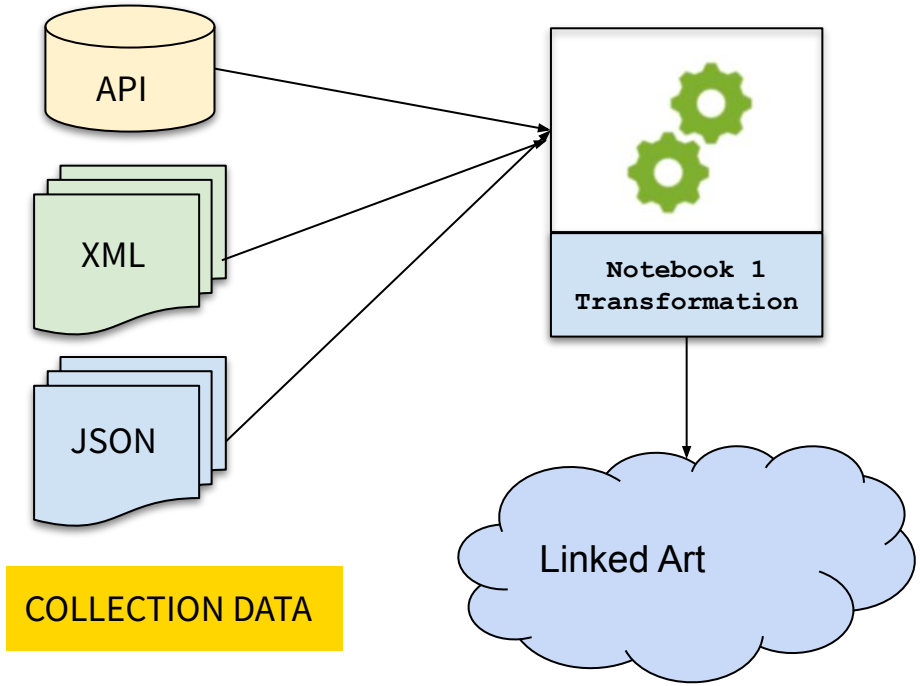
Transformation notebooks demonstrate how to:

- **Extract** data
  - from source
- **Map** data
  - to the Linked Art data model
- **Transform** data
  - to a unified representation using Python code
- **Publish** data
  - as JSON-LD files

Extract Data

- Locate
- Different formats
- Different data models
- Read data into Python dictionary

Format CSV XML JSON HTML



Source

GitHub

API

Web

JSON-LD

Code Notebooks

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Map Data

Understand

- source data model
- Linked Art data model

Manual process

```
mapp = {
  "id":"id",
  "accession_number":"accession_number",
  "accession_date": "",
  "classification" : "type",
  "title": "title",
  "alt_title": "title_in_original_language",
  "notes": "tombstone",
  "date_created":"creation_date",
  "date_created_earliest": "creation_date_earliest",
  "date_created_latest": "creation_date_latest",
  "created_period":"culture",
  "created_dynasty":"",
  "created_inscriptions":"inscriptions",
  "created_notes": "fun_fact",
  "creator":"creator",
  "physical_medium": "Medium",
  "physical_style": "",
  "physical_technique": "technique",
  "physical_description": "",
  "physical_dimensions": "measurements",
  "created_provenance": "provenance" ,
  "credit_line": "creditline",
```

id	id
accession_number	accession_number
accession_date	
classification	type
title	title
alt_title	title_in_original_language
notes	tombstone
date_created	creation_date
date_created_earliest	creation_date_earliest
date_created_latest	creation_date_latest
created_period	culture
created_dynasty	
created_inscriptions	inscriptions
created_notes	fun_fact
creator	NaN
physical_medium	Medium
physical_style	
physical_technique	technique
physical_description	
physical_dimensions	measurements
created_provenance	provenance
credit_line	creditline
collection	department

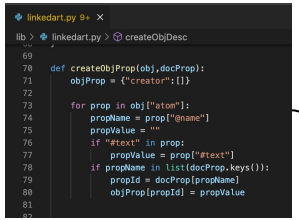
Transform Data

Uses

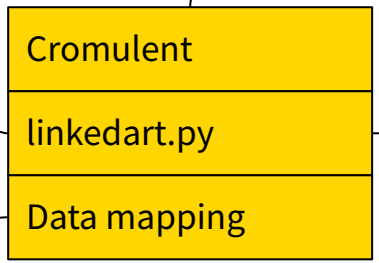
- Data mapping
- Cromulent
- Custom code linkedart.py

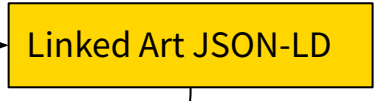
Creates

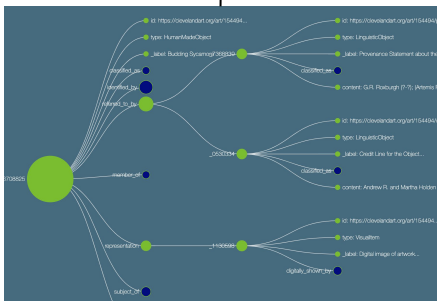
- Linked Art
- JSON-LD



id	id
accession_number	accession_number
accession_date	
classification	type
title	title
alt_title	title_in_original_language
notes	tombstone
date_created	creation_date
date_created_earliest	creation_date_earliest
date_created_latest	creation_date_latest
created_period	culture
created_dynasty	
created_inscriptions	inscriptions
created_notes	fun_fact
creator	NaN
physical_medium	Medium
physical_style	
physical_technique	technique
physical_description	
physical_dimensions	measurements
created_provenance	provenance
credit_line	creditline
collection	department



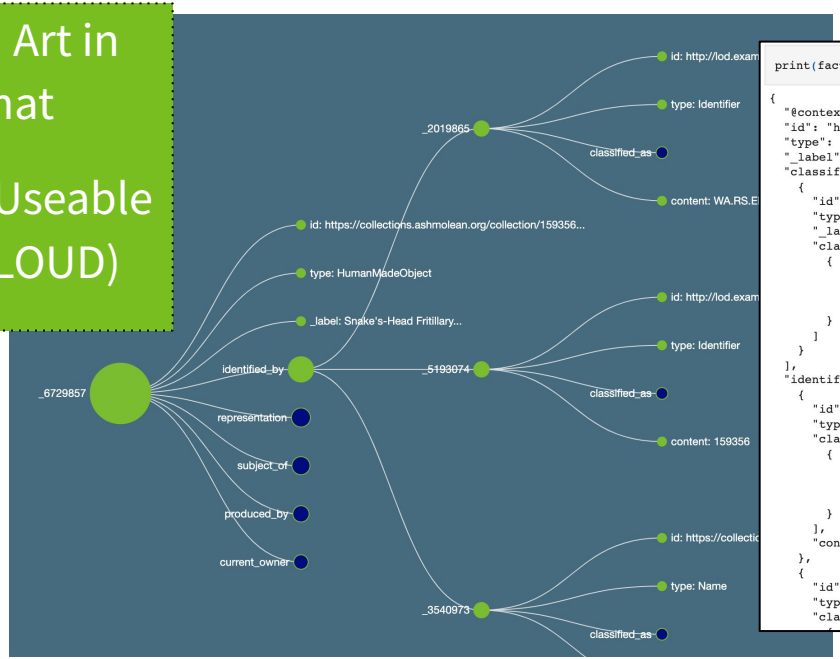




Transformation - Publish

Create Linked Art in JSON-LD format

Linked Open Useable Data format (LOUD)




```
print(factory.toString(objLA, compact=False))
```


```
{
  "@context": "https://linked.art/ns/v1/linked-art.json",
  "id": "https://clevelandart.org/art/74540",
  "type": "HumanMadeObject",
  "_label": "Leda and the Swan",
  "classified_as": [
    {
      "id": "http://vocab.getty.edu/aat/300033973",
      "type": "Type",
      "_label": "Drawing",
      "classified_as": [
        {
          "id": "http://vocab.getty.edu/aat/300435443",
          "type": "Type",
          "_label": "Type of Work"
        }
      ]
    }
  ],
  "identified_by": [
    {
      "id": "http://lod.example.org/museum/Identifier/2015.451",
      "type": "Identifier",
      "classified_as": [
        {
          "id": "http://vocab.getty.edu/aat/300312355",
          "type": "Type",
          "_label": "Accession Number"
        }
      ],
      "content": "2015.451"
    },
    {
      "id": "http://lod.example.org/museum/Identifier/74540",
      "type": "Identifier",
      "classified_as": [
```

Transformation

Reconciliation

Visualisation

Reconciliation Code Notebook

- **Enrich data** with external data source
  - **Identify** place name
  - **Reconcile** place name with name authority
    - Getty Thesaurus of Geographical Names Online (**TGN**)
  - **Extract** authoritative global identifier for place name and geographical coordinates
  - **Add** new data into Linked Art data files

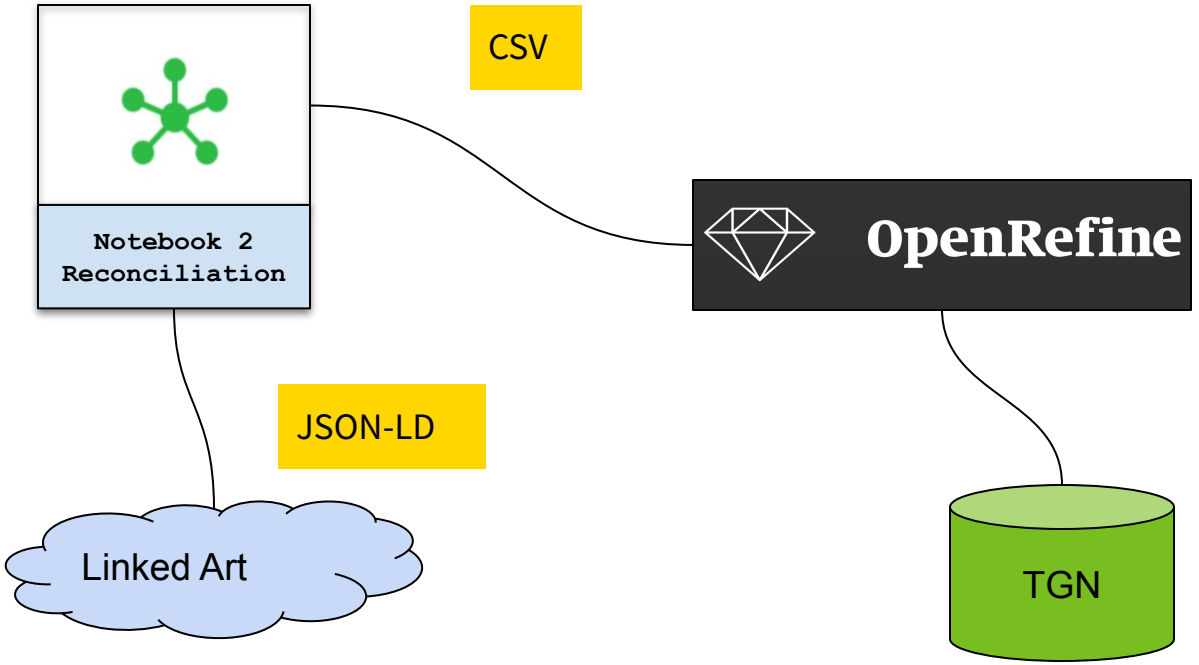
Reconciliation Sub-steps: Identify → Reconcile → Extract → Add

Reconciliation Code Notebook

Transformation

Reconciliation

Visualisation



Identify Place Name

Find place name in artwork title

Semi-manual process

Seed known locations

Result - CSV file with place name column

```
In [14]:
artworkCsvFile = "./data/ruskin/ruskin-places.csv" # file location


# read CSV file into pandas dataframe
dataFrame = pd.read_csv(artworkCsvFile,low_memory=False)


# A list of place names `placeNames` is created to help with extracting place names from the artwork title.
placeNames = [
"Florence","Bologna","Lucca","Alps","Oxford","Rome",  "Venice","Fribourg","Neuchâtel","Sestri","Visp","Chamonix",
"Abbeville","Schaffhausen","Verona","Vorarlberg","Baden","Schaffhausen","Faido","Normandy","Genève","Geneva",
"Gloucester","Basel","Luzern","Padua","Habsburg","Rhine","Zug","Aix-la-Chapelle","Siena","Mont Blanc","Lago di Como",
"Bellinzona","Lake of Lecco"
]

places = {"Venezia":["Venice","Venetian","St Mark","St. Mark"]}


# iterate over dataframe
for index,row in dataFrame.iterrows():

    # iterate over place names
    # check if any place name in placesNames is present in row
    for place in placeNames:
        # if place name found, add to place_modified column
        if place in row["place"]:
            dataFrame.at[index,"place_modified"] = place

    # iterate over place names for Venice
    for place in places["Venezia"]:
        # if place found add `Venezia` to place_modified column
        if place in row["place"]:
            dataFrame.at[index,"place_modified"] = "Venezia"


# remove records where place_modified is blank
dataFrame = dataFrame[dataFrame.place_modified != " "]
dataFrame.to_csv(artworkCsvFile, index=False)
```

place	place_modified
Study of a Venetian Capital	Venezia
Autumnal Cloud filling the Valley of Geneva, t...	Geneva
Tom Tower, Christ Church, Oxford	Oxford
Study of a Venetian Capital	Venezia
View of Bologna	Bologna
...	...
Sketch of the Oak Spray in Mantegna's Fresco o...	Padua
The Garden of San Miniato near Florence	Florence
Part of a Sketch of the Northwest Porch of St....	Venezia
Gezicht op S. Anastasia te Verona, over de Adige	Verona
Study of the Marble Inlaying on the Front of t...	Venezia

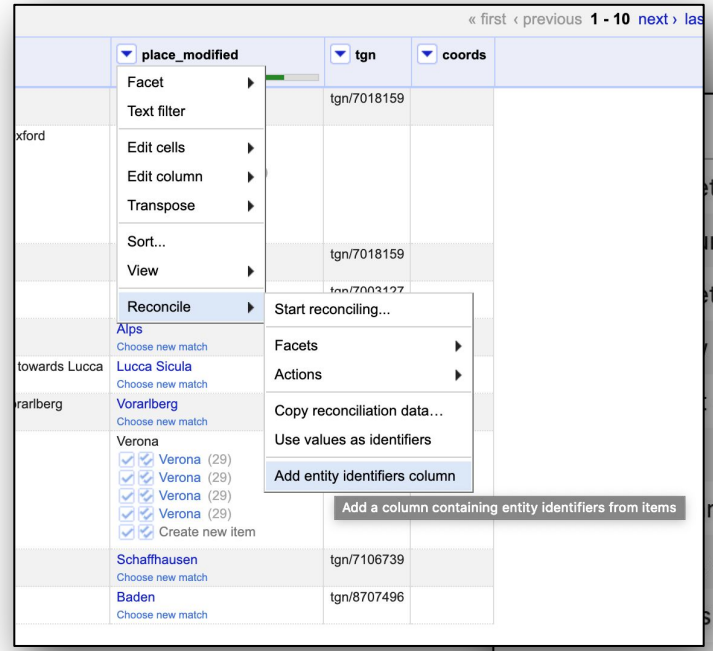
Reconcile

Uses

- CSV file with place name
- OpenRefine
- Getty Thesaurus of Geographic Names

Creates

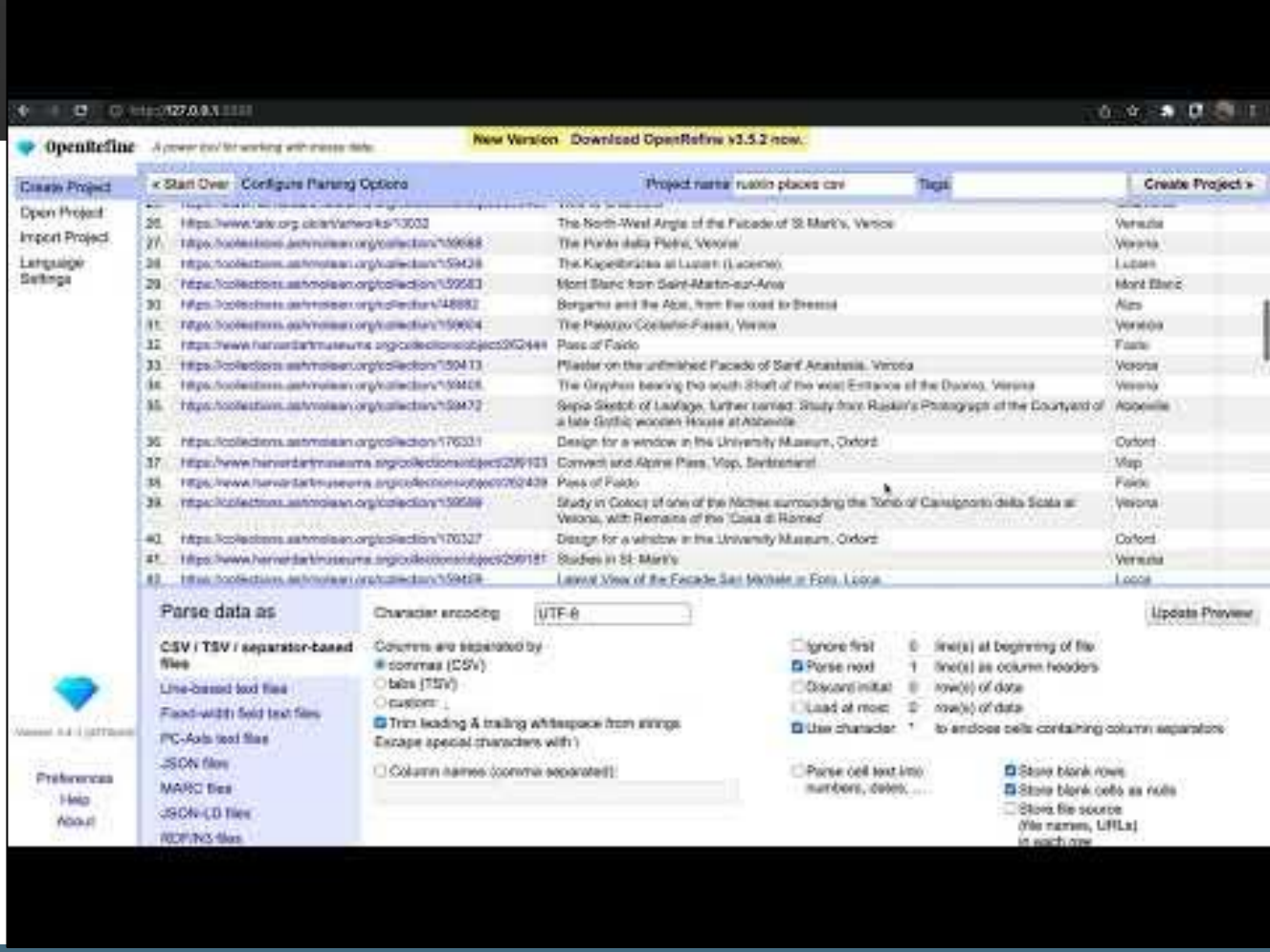
- CSV file with column containing global identifier for place name



place	place_modified	tgn
tian Capital	Venice	tgn/7018159
rch, Oxford	Oxfordshire	tgn/7011931
tian Capital	Venice	tgn/7018159
of Bologna	Bologna	tgn/7003127
of the Alps	Alps	tgn/7007746
...	...	...
rk's, Venice	Venice	tgn/7018159
at Neuch...	Neuchâtel	tgn/7003751
Fresco o...	Padua	tgn/7003085
f the Northwest Porch of St....	Venice	tgn/7018159

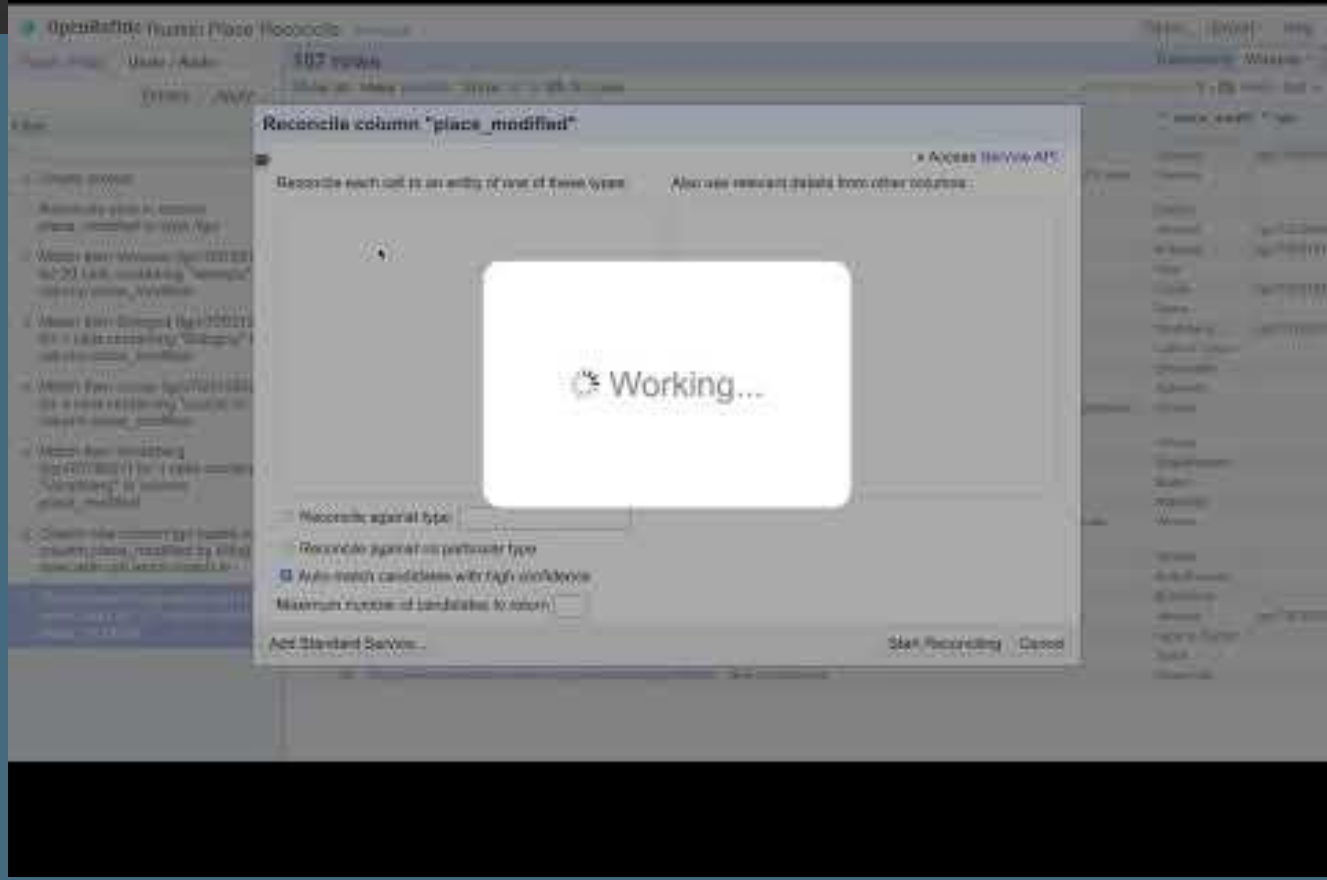
OpenRefine

Create Project



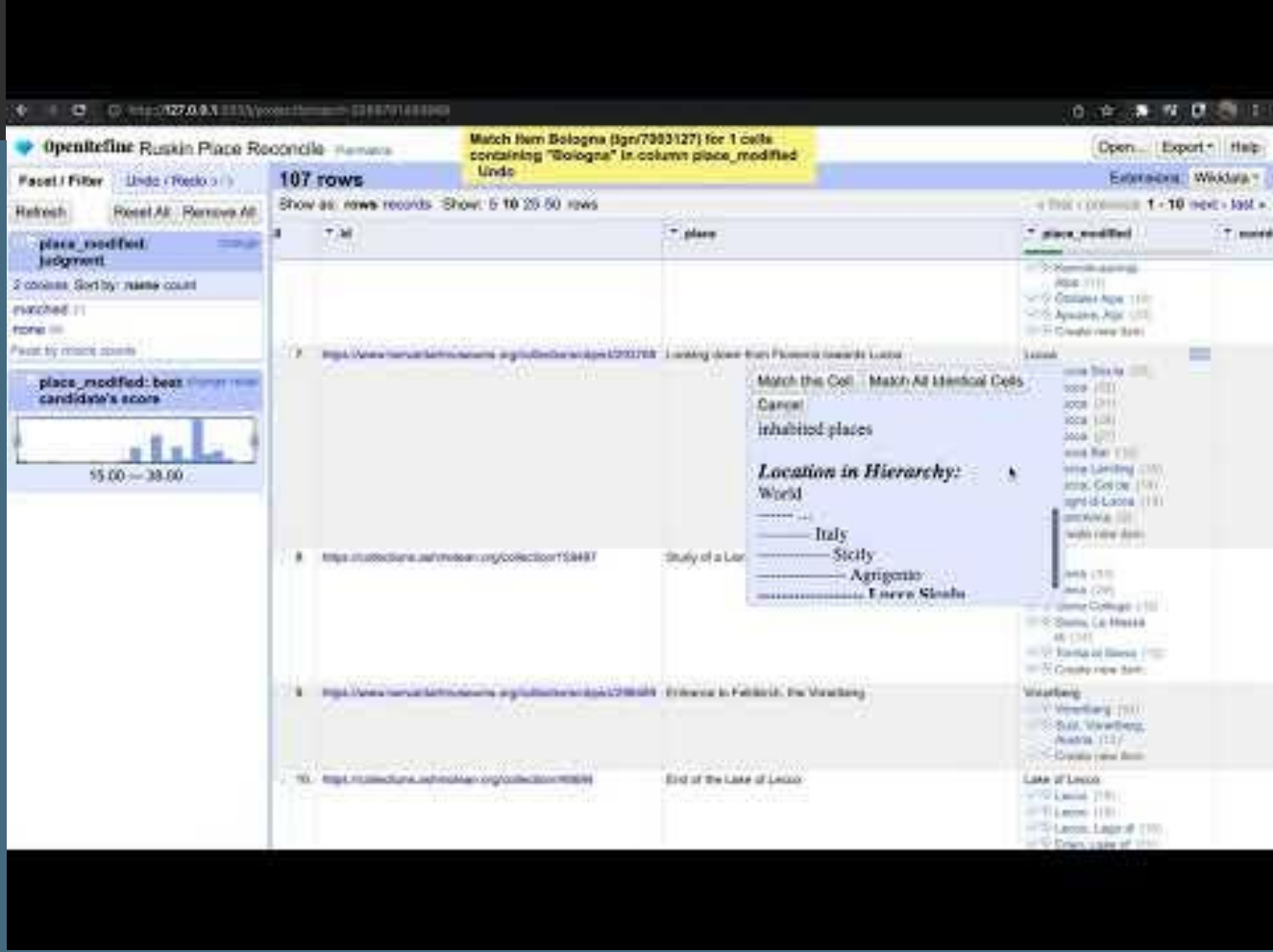
OpenRefine

Reconcile



OpenRefine

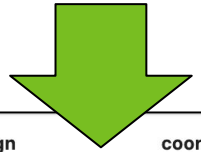
Review Reconciliation Results



Reconciliation: Extract

Extract additional data from name authority

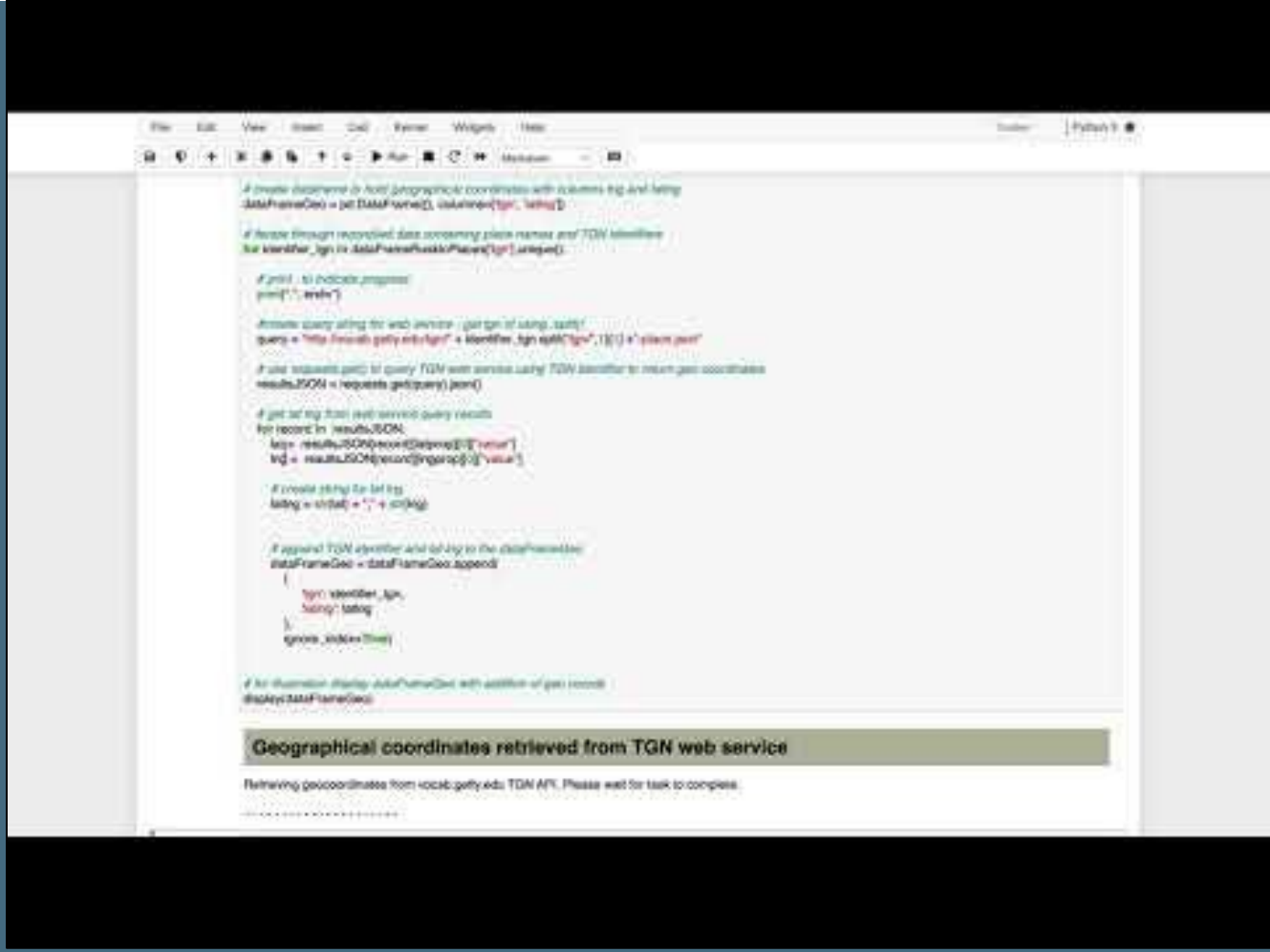
- Geographical coordinates
- Python code
- Uses vocab.getty.edu TGN web service



place	place_modified	tgn	coords
tian Capital	Venice	tgn/7018159	45.438611,12.326667
rch, Oxford	Oxfordshire	tgn/7011931	51.75,-1.25
tian Capital	Venice	tgn/7018159	45.438611,12.326667
of Bologna	Bologna	tgn/7003127	44.466667,11.433333
		07746	46.416667,10
		...	...
		18159	45.438611,12.326667
		03751	46.990867,6.797675
		03085	45.416667,11.883333
		18159	45.438611,12.326667
		18159	45.438611,12.326667

```
for index,row in df.iterrows():
    gid = row["tgn"]
    if "tgn" in str(gid):
        infof = "http://vocab.getty.edu/tgn/" + gid.split("tgn/",1)[1] +"-place.json"
        response = requests.get(infof)
        json_data = response.json()
        for prop in json_data:
            lat= json_data[prop]["http://www.w3.org/2003/01/geo/wgs84_pos#lat"][0]["value"]
            lng = json_data[prop]["http://www.w3.org/2003/01/geo/wgs84_pos#long"][0]["value"]
            latlng = str(lat) + "," + str(lng)
```

Get geocoordinates using TGN API

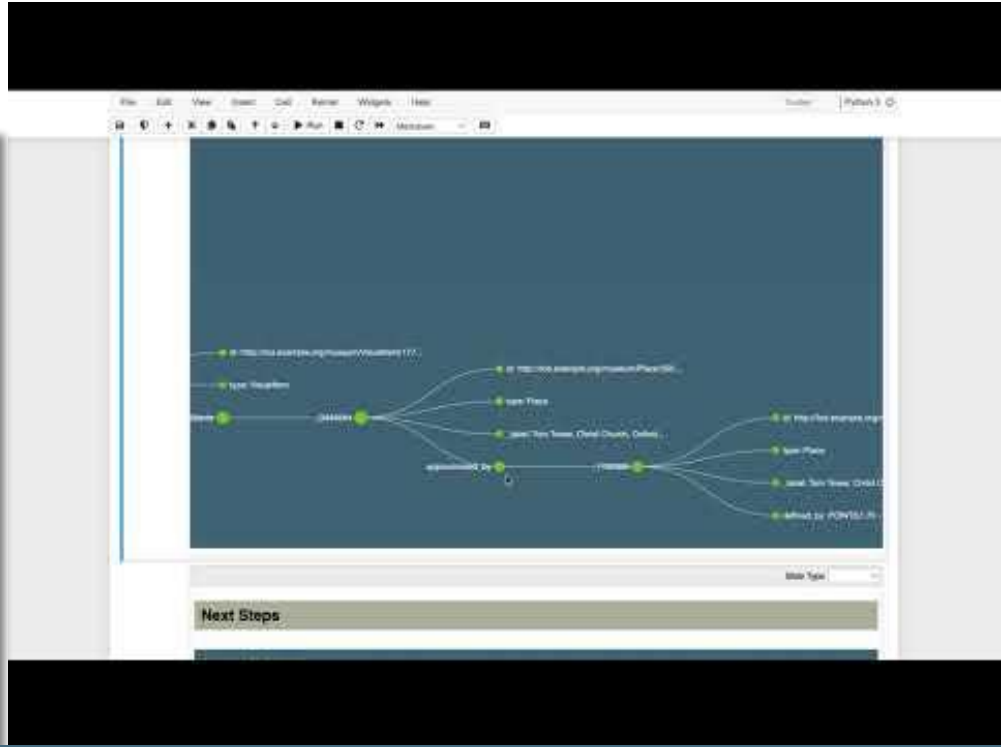


VisualItem → represents → Place

Reconciliation: Add Geo Coords

https://linked.art/model/

```
{
  "@context": "https://linked.art/ns/v1/linked-art.json",
  "id": "https://linked.art/example/object/34",
  "type": "HumanMadeObject",
  "_label": "geographical place name",
    "shows": [
    {
      "type": "VisualItem",
      "represents": [
        {
          "type": "Place",
          "_label": "Lucca",
          "approximated_by": [
                {
                  "type": "Place",
                  "_label": "Lucca - Location Approximation",
                  "defined_by": "POINT(-0.0032937526703165 51.515107154846)"
                }
              ]
        }
      ]
    }
  ]}
```

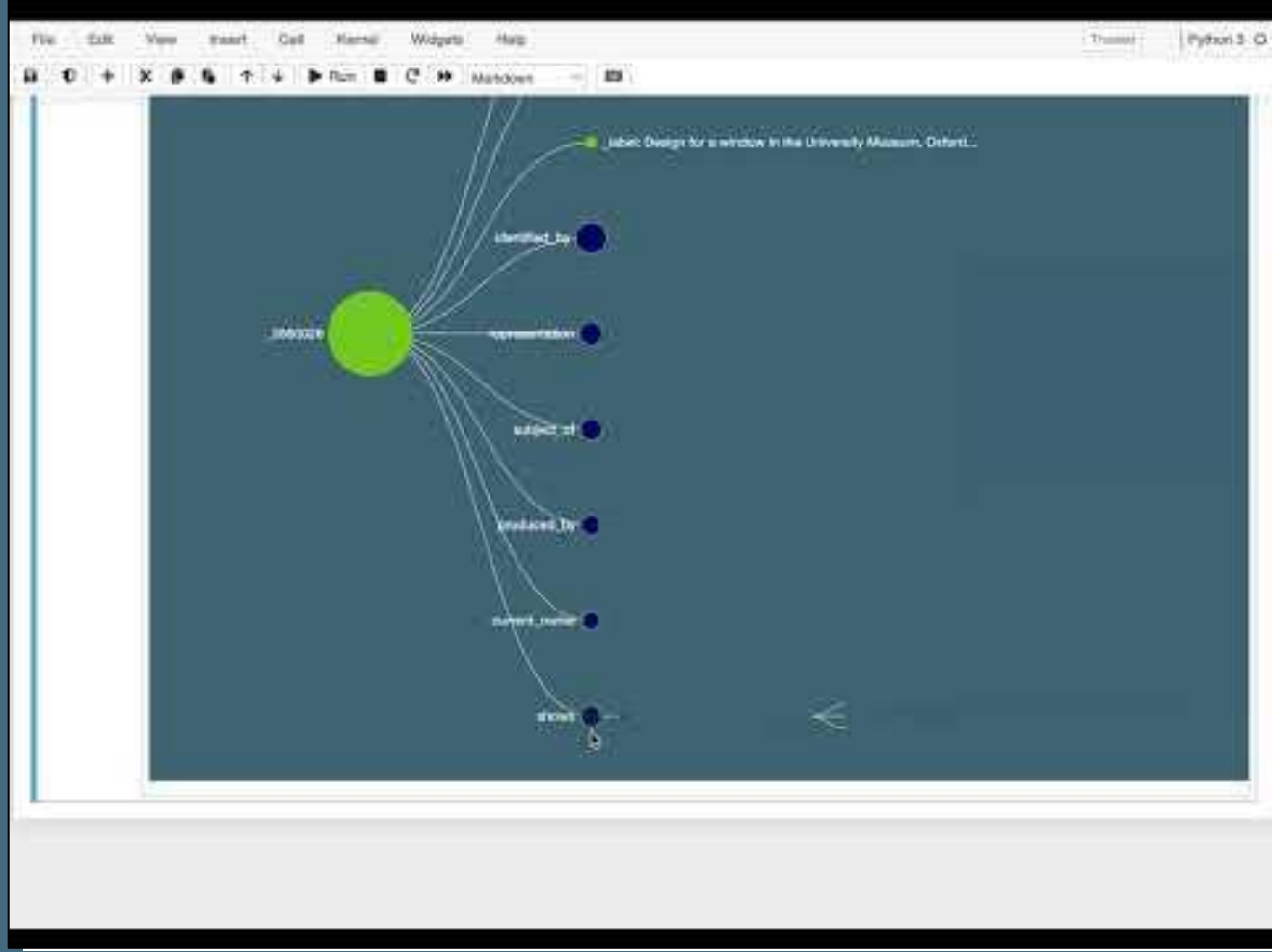


Reconciliation Sub-steps: Identify → Reconcile → Extract → **Add**

John Ruskin

Reconciliation Notebook

Visualisation of JSON-LD for selected artwork



Transformation

Reconciliation

Visualisation

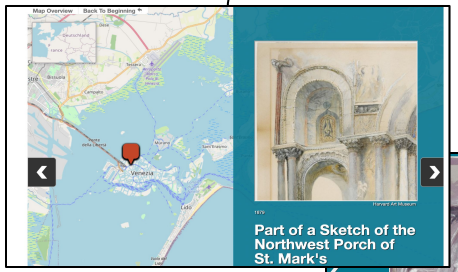
Notebook 3
Visualise

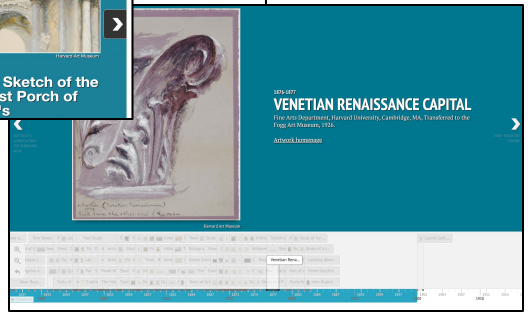
CSV

knight lab

JSON-LD

Linked Art





Visualisation

Uses

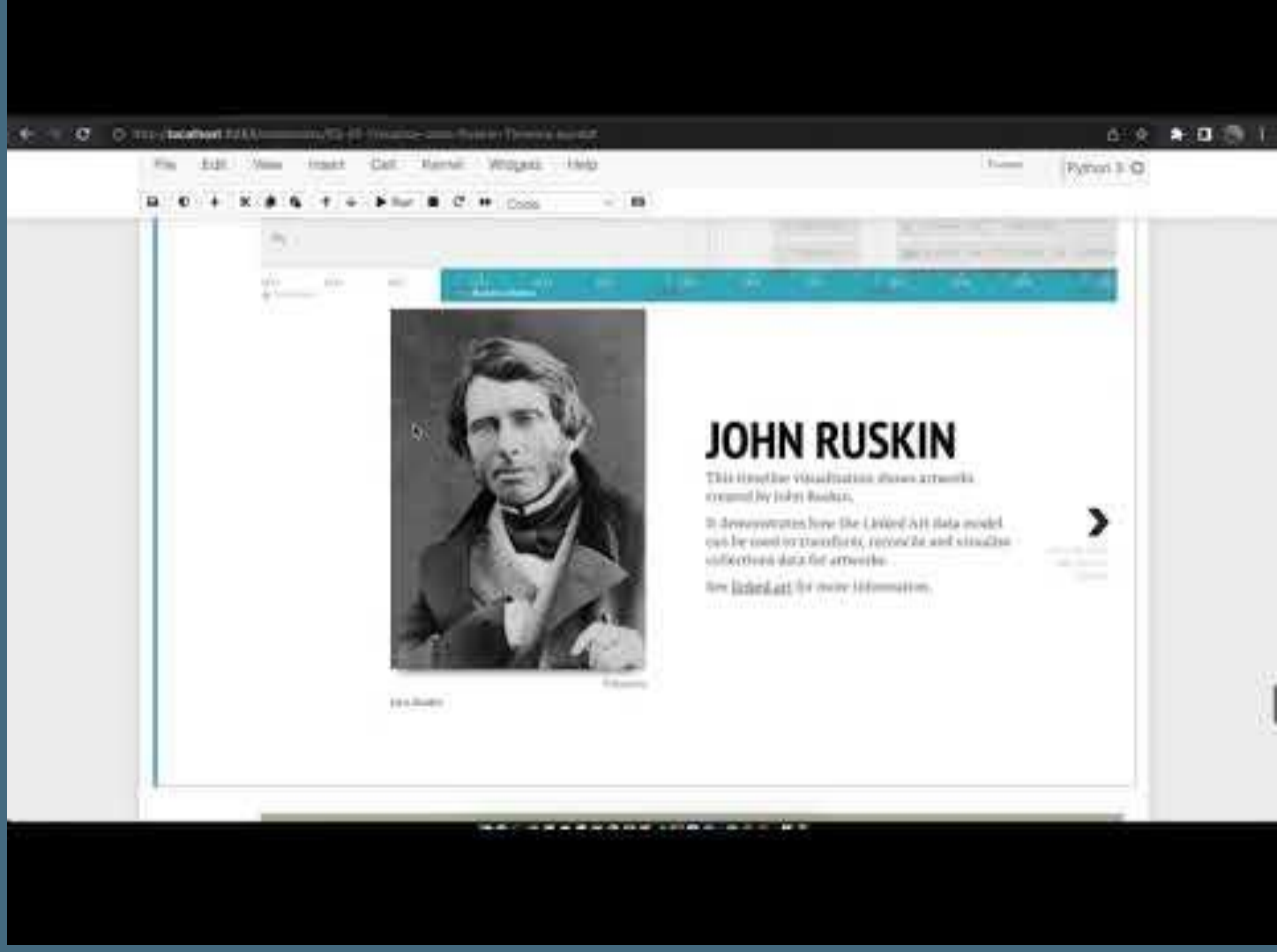
- KnightLab visualisation
- Linked Art JSON-LD
- Script to transform to CSV/JSON

Creates

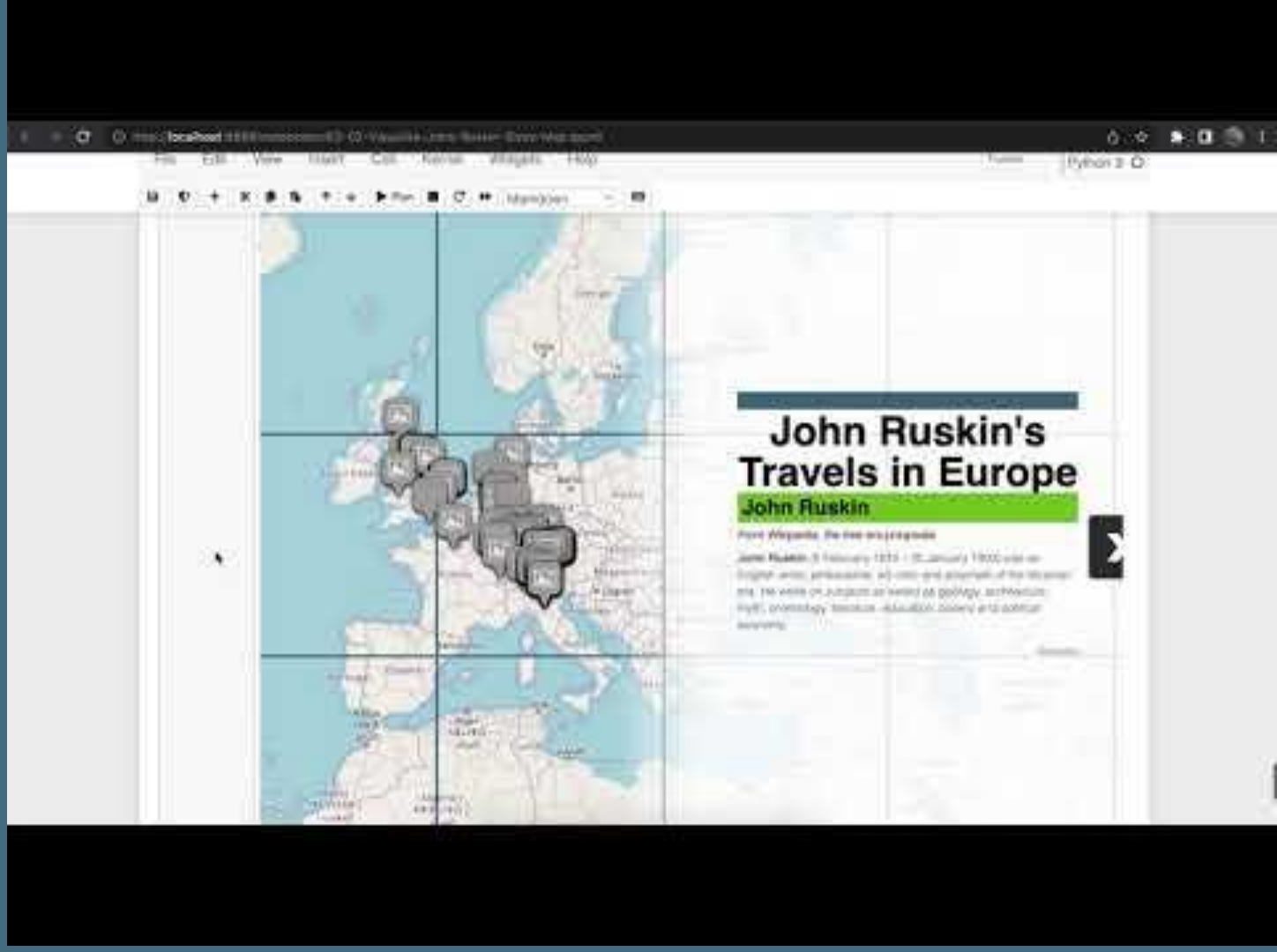
- Timeline
- storymap

knight lab

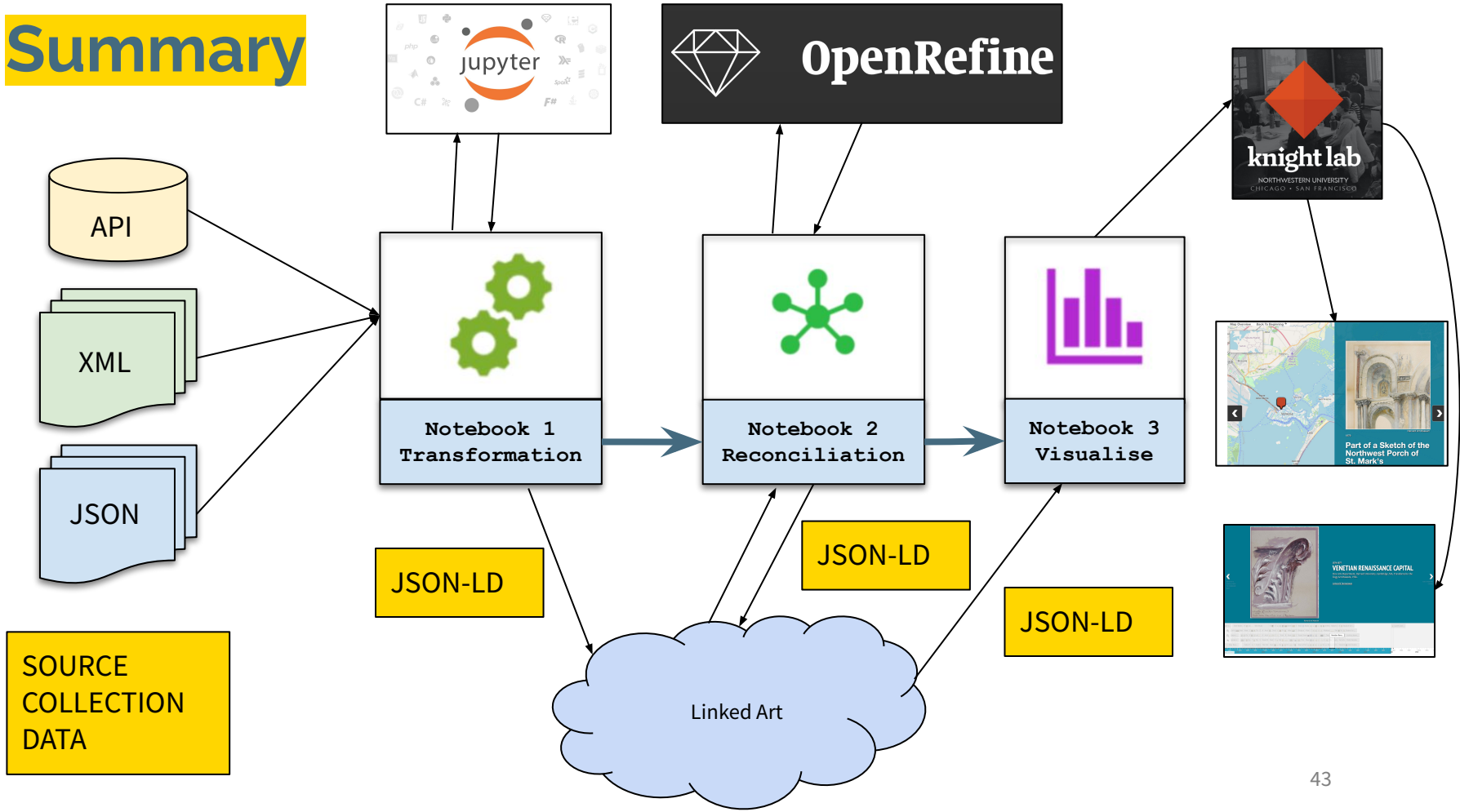
Timeline Notebook



StoryMap Notebook



Summary


jupyter
OpenRefine
knight lab
NORTHWESTERN UNIVERSITY
CHICAGO • SAN FRANCISCO
API
XML
JSON
Notebook 1
Transformation
Notebook 2
Reconciliation
Notebook 3
Visualise
Part of a Sketch of the Northwest Porch of St. Mark's
VENETIAN RENAISSANCE CAPITAL
JSON-LD
JSON-LD
JSON-LD
Linked Art
SOURCE
COLLECTION
DATA

Acknowledgements

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Digital Scholarship @Oxford

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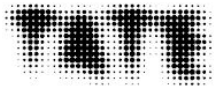
Thank you to the museums and galleries that are making their collection data available for re-use, via APIs and data downloads



RIJKS MUSEUM amsterdam
RIJKS MUSEUM

Philadelphia Museum of Art

Harvard Art Museum

tanya.gray@humanities.ox.ac.uk

Questions & Answers

Next Steps

- **Explore**
  - (and modify) the code notebooks
- **Complete**
  - the Linked Art Questionnaire that seeks feedback on the notebooks, Linked Art and invites collaboration
- **Register**

for the Linked Data strand of the Digital Humanities @ Oxford Summer School (DHOxSS)

Code Notebooks

- https://github.com/tgra/Linked-Art/

Linked Art Questionnaire

- https://linked.art/questionnaire/

Linked Art Data Model & Community

- https://linked.art

Digital Humanities @ Oxford Summer School (DHOxSS)

- https://dhoxss.net

tanya.gray@humanities.ox.ac.uk