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OpenAtlas in Action

Mapping Data, Connecting Knowledge

Alexander Watzinger, Bernhard Koschiček-Krombholz, Katharina Wünsche, Olivia Reichl

14th April 2025, OpenAtlas Workshop at LMU, Munich

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OpenAtlas
A Database System for the Humanities and Beyond

OpenAtlas

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Alexander Watzinger (Alex)

- Lead developer of OpenAtlas
- Since 2017 at the ACDH-CH
- Loves open source and scientific projects

INDIGO workshop 2021

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OpenAtlas

- Project site: https://openatlas.eu
- Open source, browser based database software
- Acquire, edit and manage research data
- Based on the model of CIDOC CRM
- Initiated over 10 ago by Stefan Eichert
- Mainly developed at the ACDH-CH / ÖAW

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Mission Statement

- Open source – open access
- Transparent workflow and communication
- High-quality data integrity and coding standards
- Usability
- Interoperable: CIDOC, API, FAIR principles, ext. references

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OpenAtlas Collaborations

- With projects from all fields of the humanities
- Mostly historical, archaeological and prosopographic projects
- A lot of synergies between the projects

MEMS

connec

bITEM

FemCare Vienna

APPROACHING BYZANTIUM

MEDICON

Moving Byzantium

THANADOS

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Development

- Pure open source technology
- Releases about every month
- Close cooperation with users
- No project branching
- Coding standards, tests

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Structured Data - Aim

- Search
- Compare
- Merge
- Research questions

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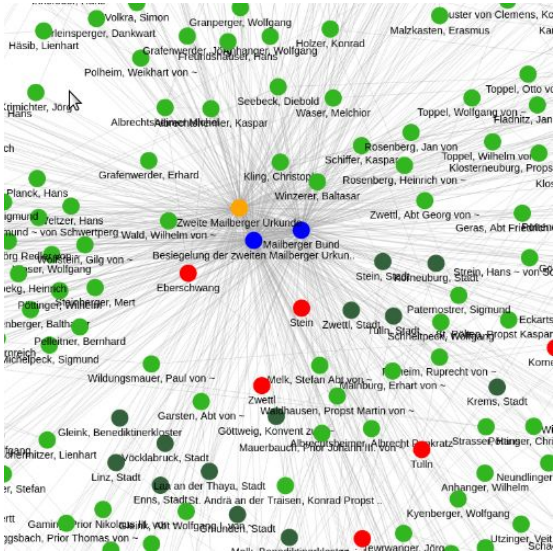
Structured Data - Workflow

- Identify classes for entities
- Add attributes
- Link entities -> network
- Challenge: Balance between easy data entry and acquiring detailed information



https://demo.openatlas.eu/overview/network/

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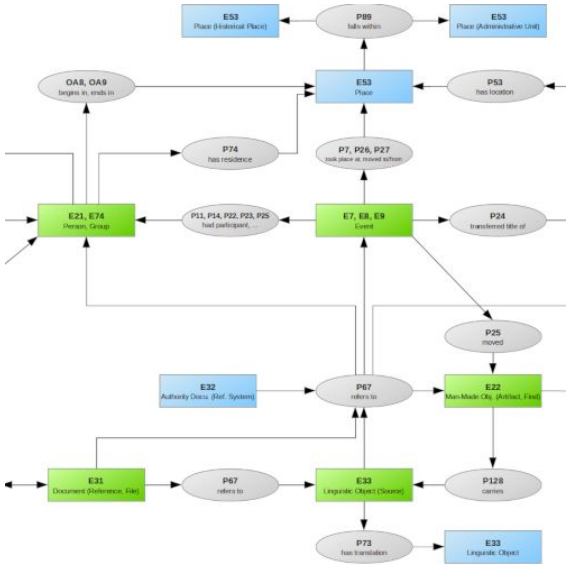
CIDOC Conceptual Reference Model

- International standard (ISO)
- From the CIDOC CRM Special Interest Group
- Specifies classes for entities like actor, source, event, place and rules how to link them
- Stored in an object oriented network



https://demo.openatlas.eu/overview/model

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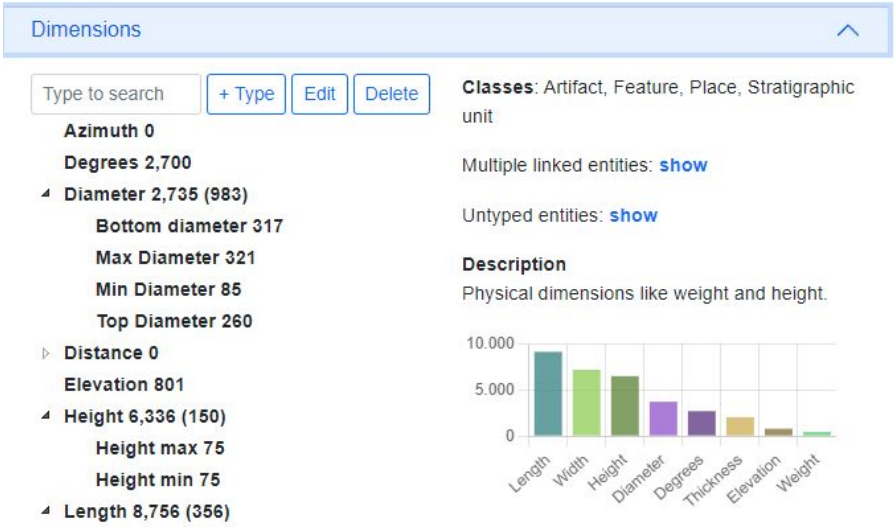
Features - Data Enrichment

- Standard types
- Custom types
- Value types
- Linked open data
  - Wikidata
  - GeoNames
  - Custom, e.g. Viaf, GND



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Features - Solutions for Uncertainty

Time

Begin	1011	01	01	comment
	1020	12	31	
End	1425	08	01	destruction
	1425	10	31	

Space

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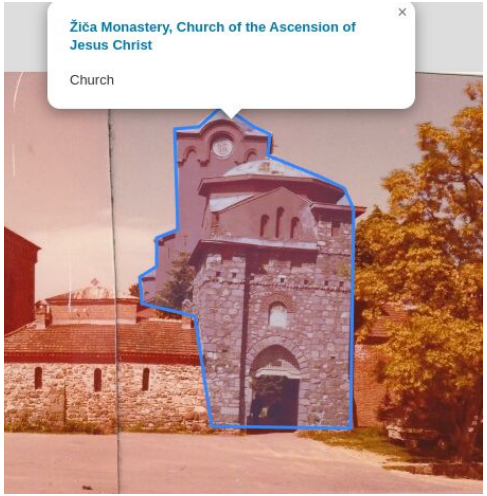
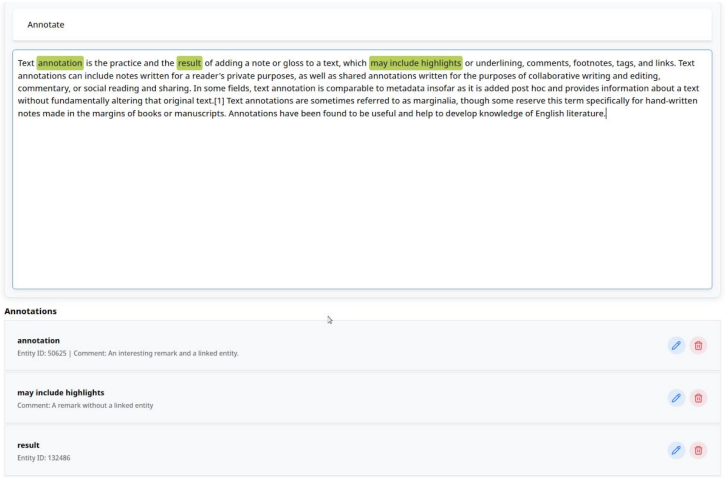
Features - Annotations

Image



Text



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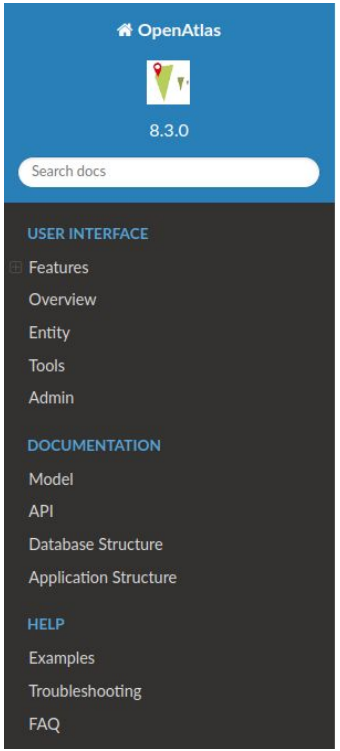
Features - Documentation

- Project website: openatlas.eu
- Code on GitHub
- Extensive User Manual
- Technical Wiki, installation guide
- Ticket system and roadmap for planning
- Public meeting protocols



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Features - and a lot more

- User management
- Archaeological finds with detailed mapping
- Fileupload + IIIF integration
- Data integrity checks
- … see the Features page in manual

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Data Exchange and Semantic Connectivity in OpenAtlas

Bernhard Koschiček-Krombholz

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Bernhard Koschiček-Krombholz

- Studied
  - *Computer Science* at Applied University Technikum Vienna
  - *History* at University of Vienna
- Since 2019 developer at ACDH-CH
- Responsibilities
  - API
  - Backend development
  - Server administration

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Getting data into OpenAtlas

- Manual Entry
- CSV Import
- Custom Scripts

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Manual Entry via User Interface

- Primary & intended method
- User-friendly web forms
- Ideal for detailed, individual records & ongoing work
- Ensures data quality using built-in controls

https://lmu.openatlas.eu/

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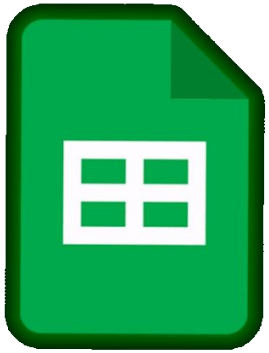

CSV Import via Admin Area

- For importing *bulk,* structured data
- Uses standardized CSV (Comma Separated Values) files
- Requires specific file format/structure
- Check out the Manual

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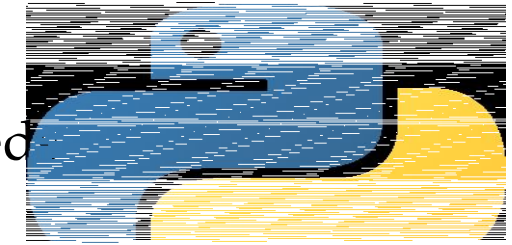
Custom Python Scripts



- Maximum flexibility for complex/custom needs
- Requires:
  - Python programming skills
  - Deep knowledge of OpenAtlas internals (code, database)
- Use with caution; not for typical users

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Getting Your Research Data Out

- Analysis, Visualization, Sharing, Integration
- **Methods**:
  - SQL Access (Direct Database - Advanced)
  - CSV Export (Simple Tables)
  - Web API (Flexible & Structured Data)

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Direct Database Access (SQL)

- Most powerful, most complex
- Direct access to the raw PostgreSQL database
- Requires SQL knowledge & database structure understanding
- Use Cases: Backups, development, very complex queries

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CSV Export

- Simple text files (Comma Separated Values)
- Direct export from web interface
- Good for simple lists & tables
- Network data (nodes/edges for Gephi)
- **Limitations**:
  - "Flattens" complex relationships
  - Can lose context/metadata

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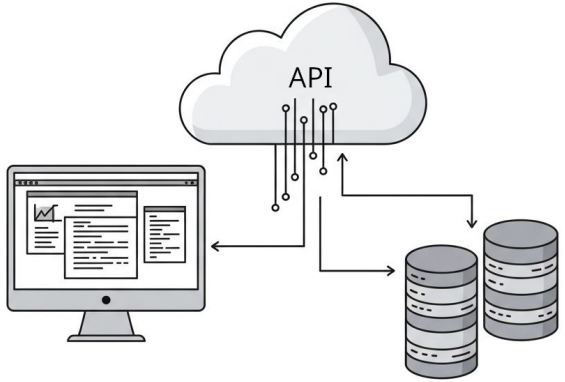
The Web API



- **Flexibility:** Ask for specific data using filters/queries
- **Structure:** Richer formats (like JSON) preserve relationships better
- **Automation:** Allows scripting for analysis/integration
- **Connectivity:** Foundation for linking data across systems

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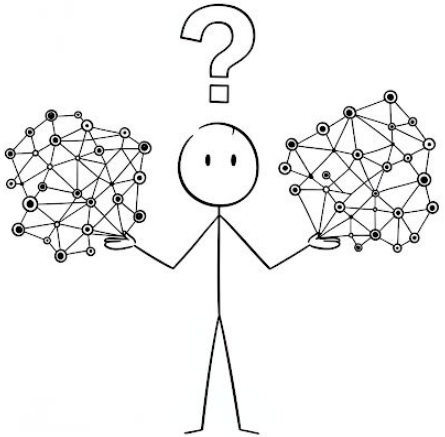
Why Care About "Linked Data"?

- **Today's Web**
- **Semantic Web Vision**
- **Linked Data Principles:**
  - Use **URIs** as unique IDs for things
  - Make these URIs look available online (HTTP)
  - Provide structured data (using **RDF**) when looked up
  - Include **links** (other URIs) to related data



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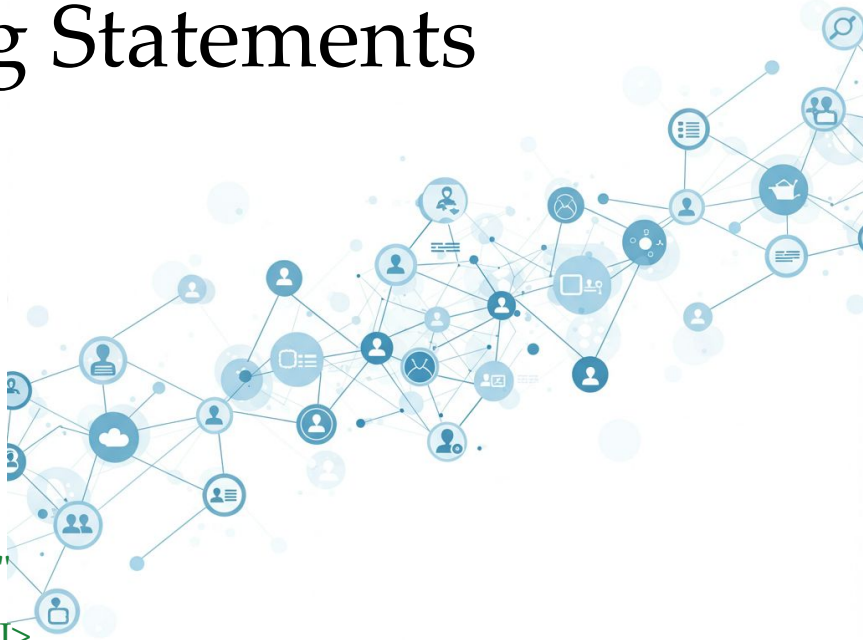
Core Idea: RDF - Making Statements

- **RDF = Resource Description Framework**
- **Data Model:** Simple statements called **Triples**
  - **Subject:** The thing
  - **Predicate:** The property/relationship
  - **Object:** The value or another thing
- **Example:** <Munich_URI> <population> "1.5 Million"
- **Example:** <Munich_URI> <country> <Germany_URI>
- **Result:** A network ('graph') of connected facts.



Web-Friendly Linked Data: JSON-LD

- **JSON:** Very common format for web data.
- **JSON-LD (JSON for Linking Data):** Puts RDF triples into JSON structure.
- **Uses a `@context`:** Maps simple JSON keys (like "name") to full URIs (like `http://schema.org/name`).
- **Benefit:** Embeds meaning into familiar JSON; good for APIs & web apps.

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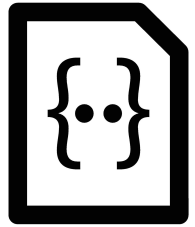

Conceptual Example

```
{
  "@context": {
     "name": "http://schema.org/name",
     "population": "http://example.org/prop/population",
     "country": "http://example.org/prop/country"
   },
  "@id": "http://example.org/entity/Munich", // The Subject URI
  "name": "Munich",
  "population": 1500000, // Literal Object
  "country": { "@id": "http://example.org/entity/Germany"} // Link Object
}
```

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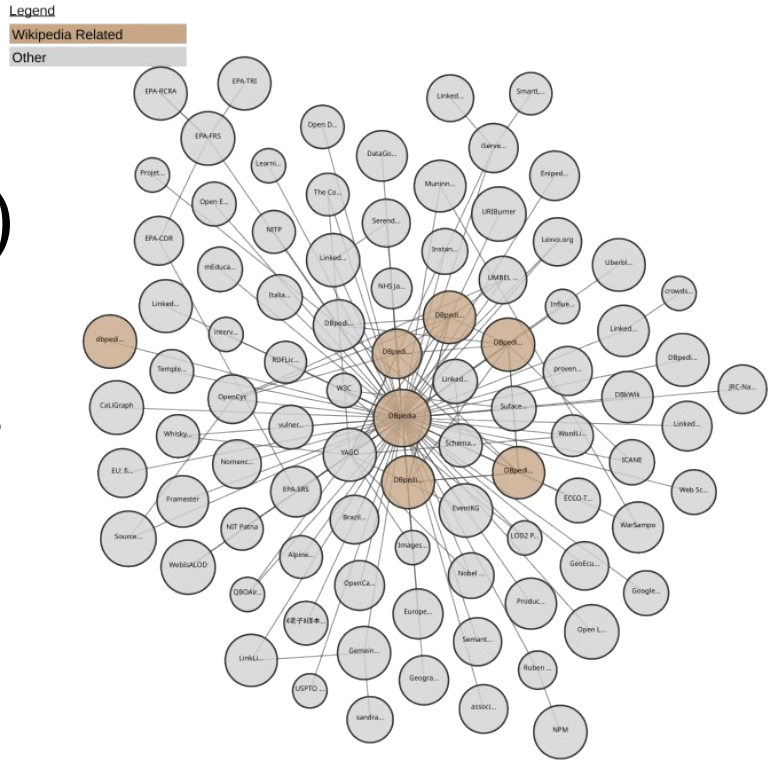
Linked Open Data (LOD)

- **LOD =** Linked Data + Open License
- **Open License:**
  - Permits free use
  - reuse
  - distribution
- **Result:**
  - Global, interconnected, accessible Web of Data



The Cross-Domain Linked Open Data Cloud from lod-cloud.net

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Why LOD Matters for Digital Humanities

- Easier **Data Integration** (combine diverse sources).
- Enhanced **Discoverability** (follow links to related info).
- Build **Smarter Applications** (software understands relationships).
- Increased **Transparency & Reuse** of research data.

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Digital Humanities Key Aggregators/Hubs

- **Europeana:** European cultural heritage
- **Wikidata:** Collaborative knowledge base (like Wikipedia for data)
- **Pelagios Commons:** Linking historical places
- **Getty Vocabularies:** Standard terms/IDs for art, places, names

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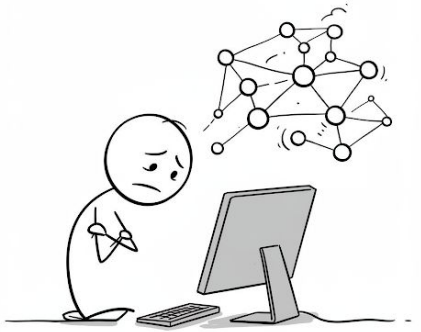
LOD: It's Powerful, But Not Always Easy

- **Complexity:** Learning curve
- **Data Quality:** Consistency is hard across sources
- **Link Rot:** Links can break over time
- **Tooling & Expertise:** Need specialized tools & skills
- **Sustainability:** Keeping data & URIs maintained long-term



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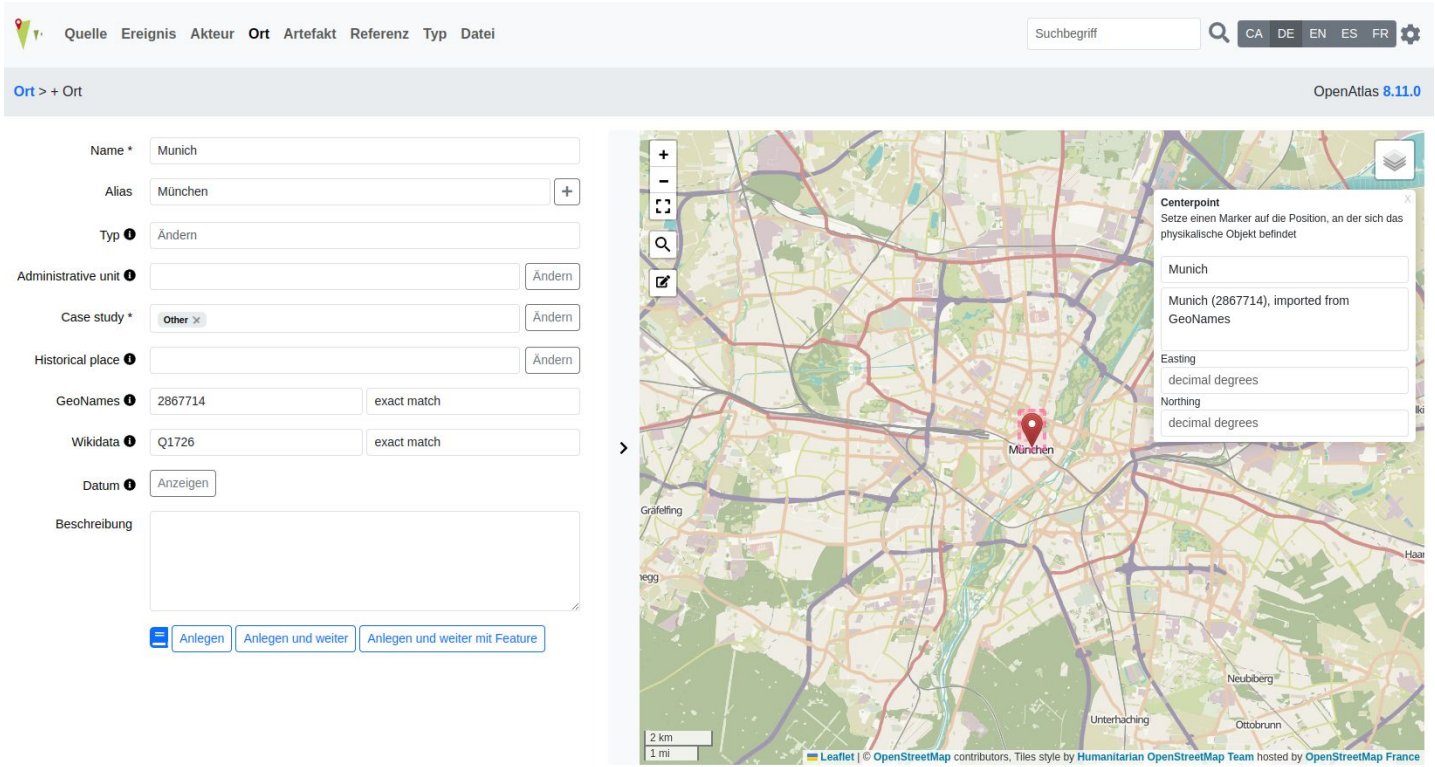

https://lmu.openatlas.eu/insert/place

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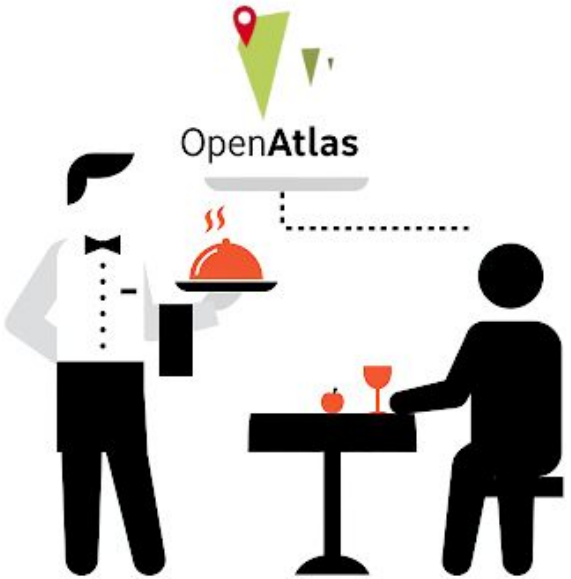
Back to APIs: The Practical Connection

Application Programming Interface



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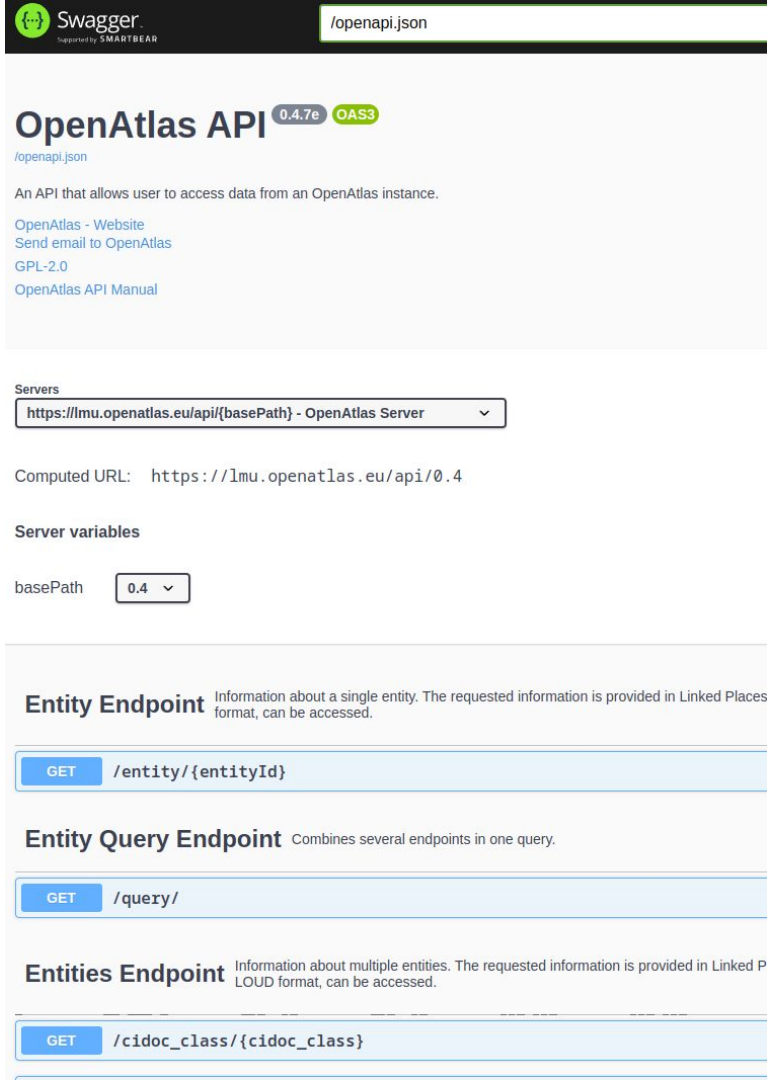
Using the OpenAtlas API

- Specific URLs for specific actions
  - /api/entity/{id}
  - /api/latest/
  - /api/geometric_entities/
  - /api/type_overview/
  - /api/chained_events/{id}
  - /api/search/place/{term}
- Documentation: Manual or Swagger



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Parameters: Customizing Your Request

- Customize/filter requests
- Common Types:
  - **Path Parameters** /api/entity/{id}
  - **Query Parameters** /api/entity/{id}?format=turtle&limit=30
- Check Swagger docs for options per endpoint

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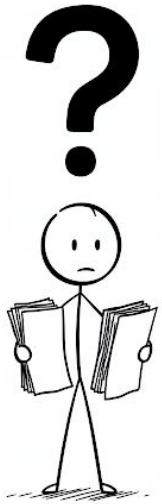
Why Use the API in Digital Humanities?

- Bulk Data Extraction
- Network Analysis
- Custom Visualizations
- Integration



API Evolution: Versioning and Planning

- APIs evolve (fixes, features)
- Changes can break dependent tools
- **Semantic Versioning (v1.2.3):** Standard for changes
  - MAJOR (v**1** -> v**2**): Breaking changes (code adaptation needed)
  - MINOR (v1.**1** -> v1.**2**): New features (backward-compatible)
  - PATCH (v1.1.**1** -> v1.1.**2**): Bug fixes (backward-compatible)
- **Key:** Pay attention to API version; breaking changes are usually announced.

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Key Takeaways & Where to Explore

- **Getting Data In:**
  - Manual
  - CSV
  - Scripts
- **Getting Data Out:**
  - SQL
  - CSV
  - **API**

- **APIs enable:**

  Bulk extraction, Network Analysis, Custom Visualizations, Integration.
- **Linked Data:**

  Provides principles for more meaningful, connected web data (URIs, RDF, Links).
- **Explore:**

  Check out **Manual** & **Swagger**

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OpenAtlas Discovery – A Template for Sharing and Visualizing Research Data

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OpenAtlas Discovery

Presentation site for OpenAtlas projects

Demo: https://frontend-demo-dev.openatlas.eu/

- Currently under development
- Open source, accessible via GitHub
- Goal: make project data and results available to a wider audience

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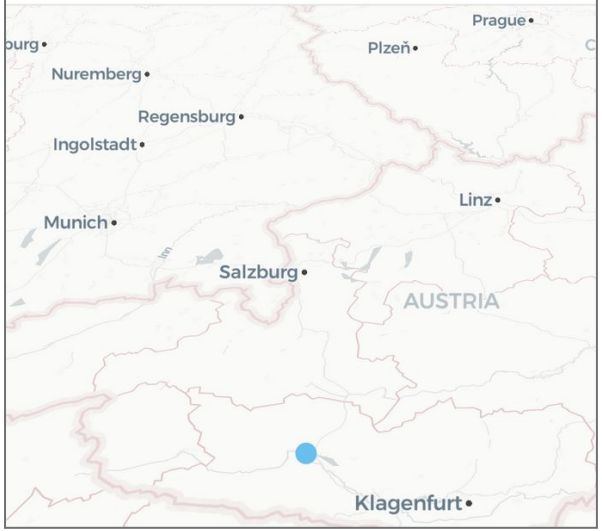
2 Parts

Suche

Suche



Team

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Stefan Eichert

Stefan is the the initiator and master mind behind the OpenAtlas project. His main research fields

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Features

Accessible

Visual

Configurable

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Current Development

- CMS (Content-Management-System)
- Map visualization for movements
- Network visualization for linked data
- Detail views for different categories (persons, places, events)

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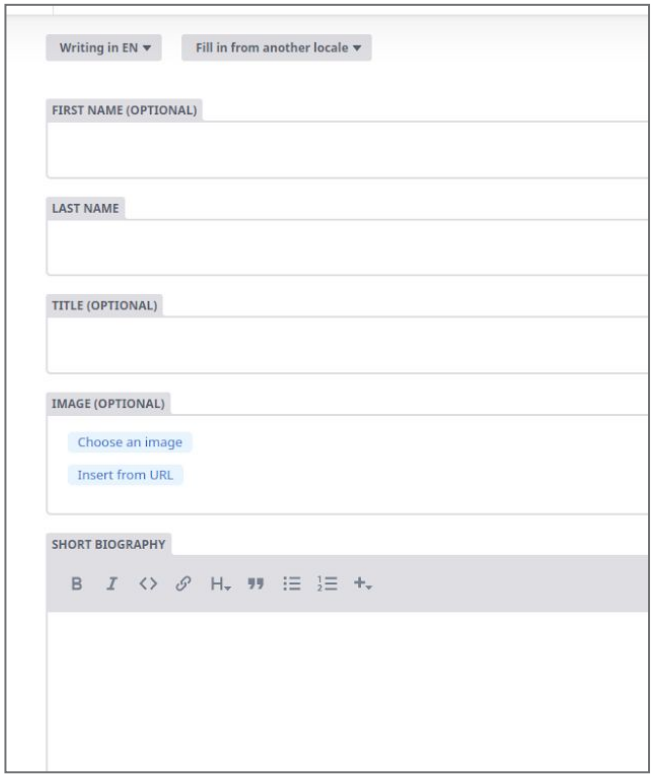

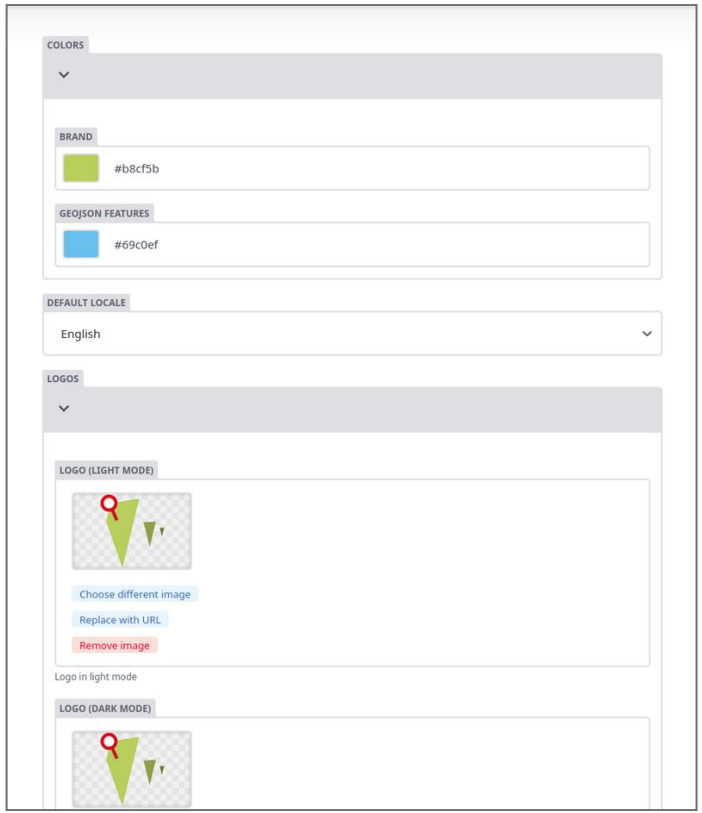

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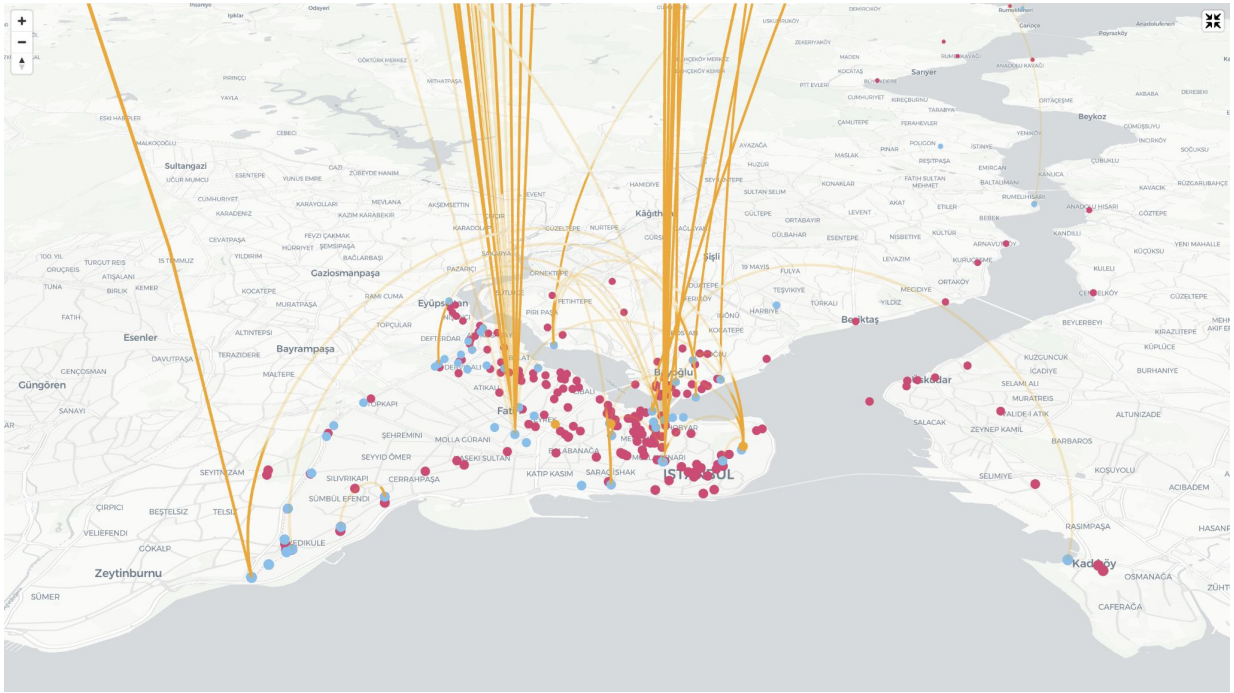

https://approaching-byzantium.openatlas.eu/

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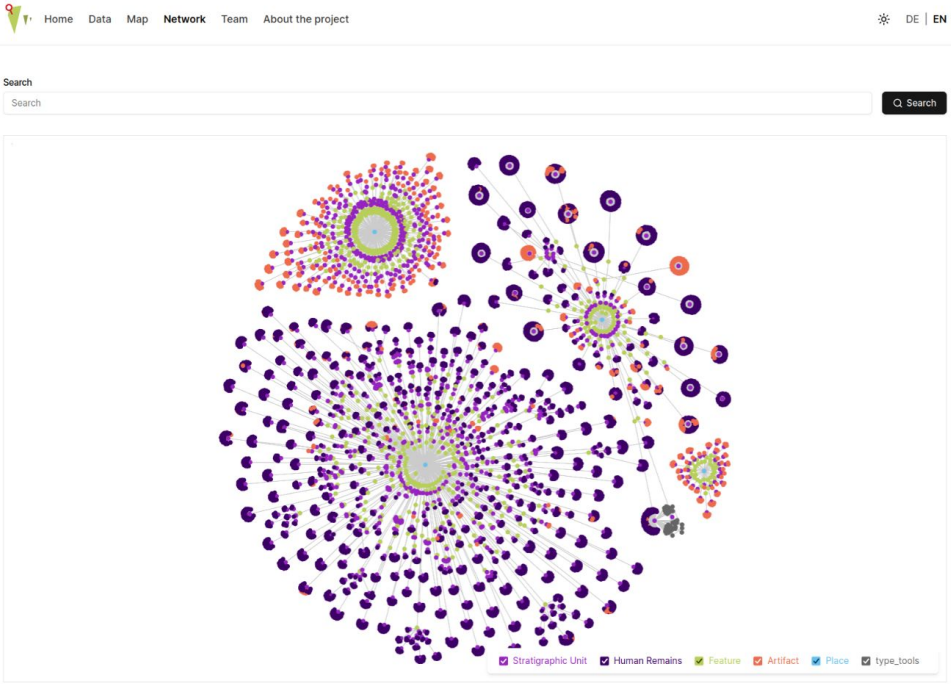

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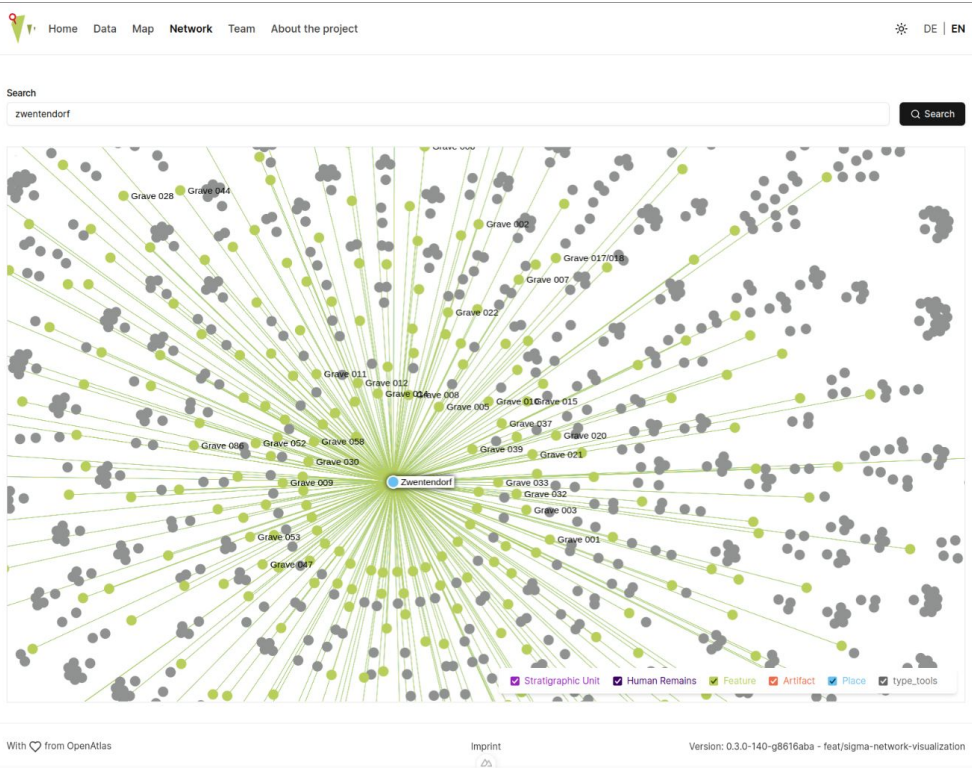

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Feature

Event

Alias 1, Alias 2, Alias 3

No known calendar dates

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut et massa mi. Aliquam in hendrerit urna.

Single Grave | Height | Length | Width | Stone Placement | Flat Grave

Preceding: EventName — Superceeding: EventName

Parent-event title — Dates

Description: Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut et massa mi.

Sub-Events

Sub-Event 1

Actors

Title	Involvement	From - Till

Details

TITLE: Some Property

BIBLIOGRAPHY: Piccottini 1976

STRATIGRAPHIC UNIT: Burial 01/72

Feature

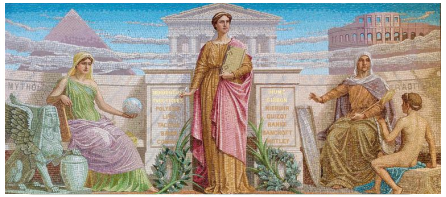
Actor

Alias 1, Alias 2, Alias 3

No known calendar dates

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut et massa mi. Aliquam in hendrerit urna.

Single Grave | Height | Length | Width | Stone Placement | Flat Grave



Important Places

Title	Residency	From - Till
Title	Residency	From - Till
Title	Residency	From - Till

Relations

Title	Involvement	From - Till
Title	Involvement	From - Till
Title	Involvement	From - Till

Title

Details

TITLE: Some Property

BIBLIOGRAPHY: Piccottini 1976

STRATIGRAPHIC UNIT: Burial 01/72

Feature

Group

Alias 1, Alias 2, Alias 3

No known calendar dates

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Single Grave | Height | Length | Width | Stone Placement | Flat Grave

Important Places

Title	Residency	From - Till
Title	Residency	From - Till
Title	Residency	From - Till

Relations

Title	Involvement	From - Till
Title	Involvement	From - Till
Title	Involvement	From - Till

Members

Title	Involvement	From - Till
Title	Involvement	From - Till
Title	Involvement	From - Till

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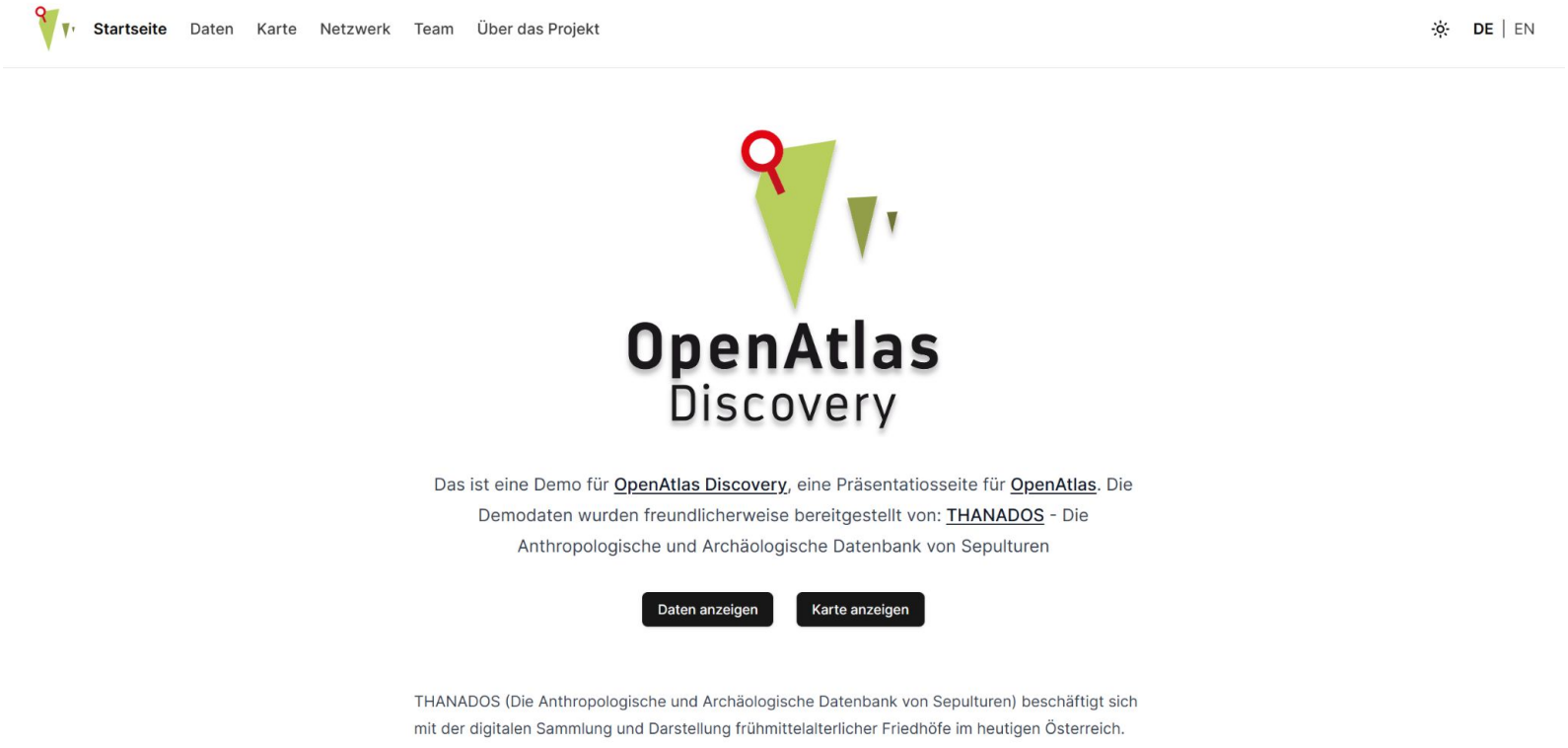
Live Demo



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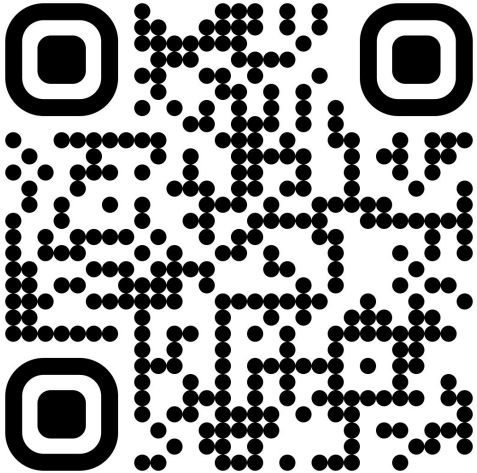

Questionnaire for tomorrow's workshop

https://forms.gle/AAZsVzjmHyEFwTYn6

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Thank you!

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