

Mapping Cultural Heritage on the Streets

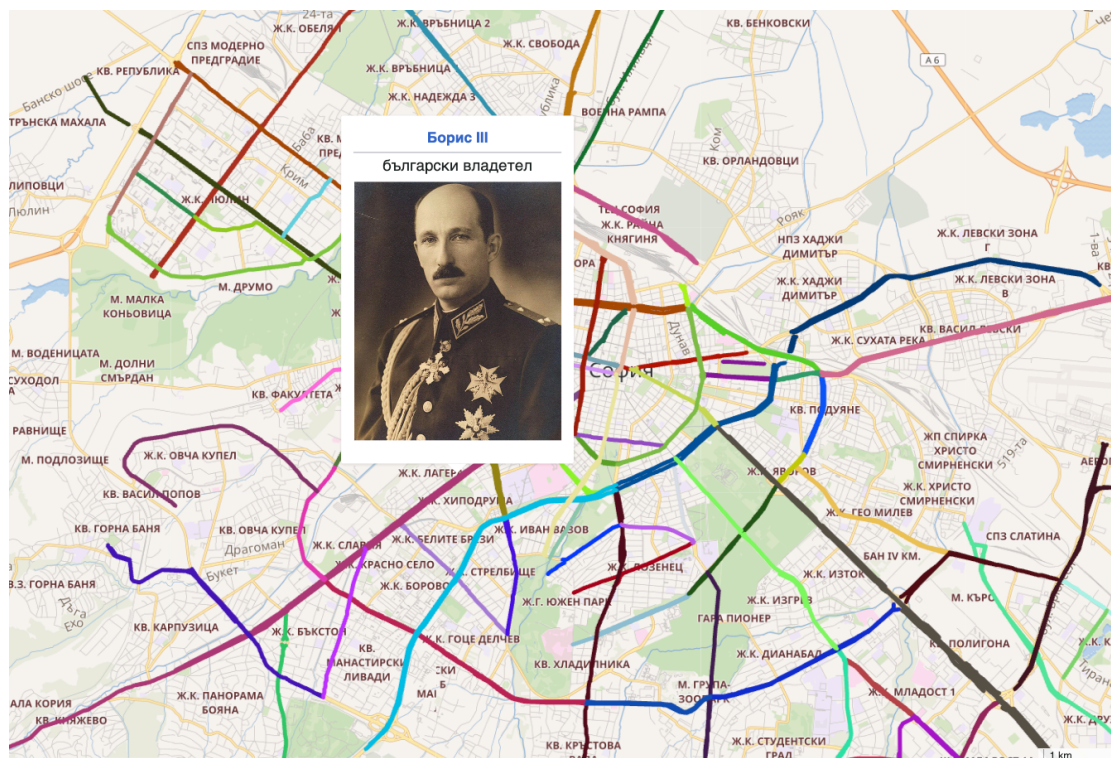
A Wiki-OSM Integration Pattern for Toponymic Data

Nikola Tulechki — FOCUS, IMI / Data for Good, Bulgaria Mini-symposium [Open Innovation for Digital Heritage](#) | [MDS 2026](#), Sofia

Intro

- Mapping urban toponymy using the Wikipedia - Wikidata - OSM stack
- Street geometry, street location, etymological information
- Comprehensive for Sofia Municipality (5931 streets)
- 100% open data / 100% existing infrastructure
- no proprietary GIS layer no custom backend

repeatable pattern for other types of geospatial entities. Monuments, buildings, rivers, remarkable trees, graves...



[Уикипедия:София](#)

Outline

1. The Sources — three platforms, three data models
2. The Semantic Bridge & Methodology
3. Results & Usage — what the linked data unlocks
4. Next Steps

1. The Sources

Three platforms, three data models.

Wikipedia & Commons — context and media

[Wikipedia](#) is the free online encyclopedia — anyone can read and edit articles.

[Wikimedia Commons](#) is a free media library — photos, maps, and other files that anyone can upload and reuse, often linked from Wikidata.

Wikidata — semantics

[Wikidata:Introduction](#) data model: **items, statements, qualifiers, references** — RDF-native, SPARQL-queryable

Street data model

- A street is an item, *instance of* [street \(Q79007\)](#) / [boulevard \(Q54114\)](#)
- Key properties:
 - [P131](#) *located in admin. territorial entity* — administrative hierarchy (district)
 - [P402](#) *OSM relation ID* — OSM geometry
 - [P276](#) *Location* - neighborhood
 - [P138](#) *named after* — links the street to the commemorated entity / etymology
 - [P1448](#) *Official Name* (with qualifiers) - for historical names

Example:

Akad. Georgi Bonchev street in Slatina dist. Sofia (Bulgaria) <https://www.wikidata.org/entity/Q123951360>

Akad. Georgi Bonchev (Q123951360)...

Item
Discussion
Read
Vik

street in Slatina dist. Sofia (Bulgaria)

Enter a schema to check against e.g. E10

In more languages

Language	Label	Description	Also known as
default for all languages	No label defined	—	
English	Akad. Georgi Bonchev	street in Slatina dist. Sofia (Bulgaria)	
Bulgarian	Акад. Георги Бончев	улица в р-н Слатина, София	
French	No label defined	No description defined	
Macedonian	No label defined	No description defined	

All entered languages

Check

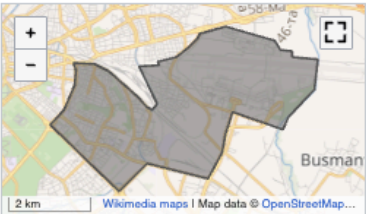
Statements

instance of
street ...
0 references

named after
Georgi Bonchev ...
0 references

country

Bulgaria ...
0 references

located in the administrative territorial entity

Slatina District ...
0 references

OpenStreetMap — geometry

[OpenStreetMap](#) (OSM) is a collaborative, open map of the world — anyone can edit it, and the data is free to use.

- Data model: **nodes** → **ways** → **relations**, free-form key–value tagging
- A street is typically a loose collection of named way segments
- For linking, it must become a single object:
 - a **[type=street relation](#)** aggregating its segments
 - identified by a **stable relation ID**

Example

Relation: Akad. Georgi Bonchev (17028846) <https://www.openstreetmap.org/relation/17028846>

Relation: Akad. Georgi Bonchev (17028846)

Version #1

relations for streets in sofia

Edited over 2 years ago by ntulechki
Changeset #146280202

Tags

int_name	Akad. Georgi Bonchev
name	Акад. Георги Бончев
name:en	Akad. Georgi Bonchev
network	bg:urban
route	road
type	route
wikidata	Q123951360

Members

▼ 8 members

- Way Akad. Georgi Bonchev (1234552001)
- Way Akad. Georgi Bonchev (1208004651)
- Way Akad. Georgi Bonchev (1156065161)
- Way Akad. Georgi Bonchev (1156065160)
- Way Akad. Georgi Bonchev (1156065159)
- Way Akad. Georgi Bonchev (1156065142)
- Way Akad. Georgi Bonchev (1156065140)
- Way Akad. Georgi Bonchev (306172618)

Open licensing

-OSM— [ODbL](#) (share-alike for data) -Wikidata — [CC0](#) (public domain) - **Wikipedia / Commons— [CC BY-SA](#)** - Interoperability is legal as well as technical- CC0 on the linking layer is what permits unrestricted federation and reuse

2. The Semantic Bridge & Methodology



[Wikidata:OpenStreetMap](#) [OSM:Wikidata](#)

The linking mechanism

- On the **OSM side** — tags on the street relation:
 - [wikidata=*](#) — the street's own Wikidata item
 - [name:etymology:wikidata=*](#) — the item of the entity it is named after
- On the **Wikidata side**:
 - [P402](#) *OSM relation ID* on the street item

Bidirectional linking + clever policy

If you want to map it on Wikipedia, link it on OSM### Processing on OSM: Generating street relations from segments

- Most OSM streets exist only as loose named way segments
- Semi-automatic **segment aggregation**:
 1. **Extract** all named highway segments in an area
 2. **Group** by name value
 3. **Cluster** by topological connectivity (shared nodes)
 4. **Merge** clusters whose end nodes lie within a proximity threshold (~200 m)
 5. **Generate** candidate type=street relations — reviewed, then uploaded

Processing on WD: Generation location links with OSM RDF federation

[Query](#) — for each Sofia street with an OSM relation ID, finds which neighbourhood or district (admin levels 6,8) its geometry intersects and returns the corresponding Wikidata item as a candidate [P276](#) *location* link.

- [QLever](#) (University of Freiburg):
 - an RDF engine efficient enough to serve the **full OSM and Wikidata graphs**- [OSM RDF](#) - weekly updated RDF for the entire OpenStreetMap data with precomputed geospatial predicates

3. Results & Usage

What the linked data unlocks.

Coverage statistics

-**5931** named streets, boulevards and squares — all 24 districts -**3404** namesake items linked via [P138](#) (1473 linked to people)

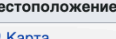
Usage: Live maps inside Wikipedia

- The [Kartographer](#) extension: `<mapframe>` accepts **inline SPARQL** via the geoshape / geoline services
- Query results render as styled geometry **directly in the article**- Popups built from arbitrary SPARQL projections — wikilinks, Commons images, external identifiers (e.g. [IPNI](#) for plants)
- Maps are **self-updating**: they re-run the query on view
- Example: [Уикипедия:София/Улици с име на растение](#) — streets named after plants
- More experiments: [Kartographer Sandbox](#)

БАН IV километър

от Уикипедия, свободната енциклопедия

Той е ограден от булевардите „Цариградско шосе“ и „Шипченски проход“ и улиците „Георги Бончев“ и „Христо Чернопеев“ и застроен главно със сгради и съоръжения на **Българската академия на науките**. Граничи с квартал „**Гео Милев**“ от три страни и с квартал „**Изток**“ на югозапад.^[1]

Път	Наречен на	Местоположение
„Акад. Георги Бончев“	Георги Бончев (1866 – 1955), геолог	Карта
„Акад. Ростислав Каишев“	Ростислав	
„Акад. Стефан Ангелов“	Стефан А	
„Христо Чернопеев“	Христо Че	
„Цариградско шосе“	Истанбул ,	

1. [↑ iSofMap](#)

 Тази статия, свързана с [география](#)

Тази статия, свързана със **София**, все още е **мъниче**. Помогнете на Уикипедия, като я **редактирате** и разширите.

Георги Бончев Николов,
известен като **Георги Бончев,**
е български геолог, един от
основоположниците на
минералогията и
петрографията в България,
академик.



тирате и разширите.

[Георги Бончев#Признание](#)

החומר מוצג במסגרת תוכנית "החומר מוצג" של מוזיאון תל אביב, תחת הדרכתו של ד"ר אביחי גולן.



Паметна плоча на акад. Георги
Бончев на ул. „Асен Златаров“ № 2,
София

Георги Бончев е действителен член на БАН от 1900 г. Основател и пръв директор на **Геологическия институт при БАН (1944 – 1948)**. Пръв председател на Българското геологическо дружество (1925).^[19]^[20]^[21] През 1910 г. съставя геоложка карта на България съвместно с **Георги Златарски**. Основател на гемологията (скъпоценни минерали) и георхеологията (мегалитни паметници) в България.

През 1958 г. българският минералог и негов студент **Иван Костов** открива и наименова в негова памет минерала **бончевит**.^{[22][23][24]}

Неговото име носи улица в академичен комплекс „БАН IV километър“, на която са разположени някои от институтите на БАН ( [Карта](#)).^[25]

През декември 2016 година и по случай 150 години от рождението на Георги Бончев е издадена пощенска марка с неговия лик.^[26]

Почетен гражданин на **София** и **Шумен**.^[25]

Погребан е в парцел 48 на [Централните софийски гробища](#).^[27]

Working queries from the Sofia Wikipedia project – QC, coverage and thematic slices:

- [All streets in Sofia Municipality](#) – every street item in [Столична община \(Q4442915\)](#)
- [Streets and etymologies in Poduyane](#) – neighbourhood example: [Подуяне \(Q12290927\)](#)
- [All streets with etymologies](#) – full city, namesake links where present (slow)
- [QLever freshness check](#) – how current the Freiburg OSM endpoint is
- Person-named streets missing [P138](#) *named after* – [query 1](#), [with districts](#); two-word Bulgarian labels starting with a capital
- [Namesakes by gender](#) – count streets named after people, grouped by sex of the namesake

4. The Tool Ecosystem

Data curation tools

- [OpenRefine](#) – reconciliation of tabular data against Wikidata
- [QuickStatements](#) – batched Wikidata writes
- [Overpass Turbo](#) – ad-hoc OSM queries
- [JOSM](#) /
- [iD](#) – OSM editing and relation review
- [Level0](#) - Minimalist text based OSM editor

Query infrastructure

- [Wikidata Query Service](#) – the canonical SPARQL endpoint
- [QLever](#) (University of Freiburg) - an RDF engine efficient enough to serve the **full OSM and Wikidata graphs**- interactive federation across both **planet scale** joins in seconds

5. Next Steps

Maintenance / Evolution

Mechanism to keep OSM and WD in sync

Alerts/monitoring and alignment dashboard

Modelling toponymical diachrony

- Possible using [P1448](#) official name
- Integration of historical data / interface with IIKT project

🔍 | Tsarigradsko shose (Q7849422) ...

official name	бул „В. И. Ленин“ (Bulgarian) ...	🗺️	🔗 0 references	✎
	named after	Vladimir Lenin		
	end time	1990		
	start time	1945		
	Цариградско шосе (Bulgarian) ...	🗺️	🔗 0 references	✎
	named after	Istanbul		
	start time	1990		
	Цариградски път (Bulgarian) ...	🗺️	🔗 0 references	✎
	end time	1945		
	named after	Istanbul		

Valorisation in Wikipedia via templated maps

Template to show all the streets in one district

Dissemination

Proposal to <https://mappingdiversity.eu/>

Conclusion

The pattern, restated

-**Model**— streets and namesakes as Wikidata items -**Link**— OSM tags and P402, bidirectionally -**Query**— one federated SPARQL query -**Render**— Kartographer, inside Wikipedia -**Maintain**— the same query as QC instrument - All on**shared public infrastructure**

Thanks

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<https://data-for-good.bg/>

[Потребител:Nikola_Tulechki](#)