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Toponymic data files and gazetteers**

**Web application for searching geographical names in the
topographic database of the Netherlands**

Submitted by the Netherlands**

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Introduction

In March 2020 Kadaster, The Netherlands' Cadastre, Land Registry and Mapping Agency, launched a web application that allows users to search and find all geographical names and related toponymic data in the topographic database of the Netherlands. The application is called *Toponamenzoeker* (Topo Names Finder) and can be accessed via www.toponamenzoeker.nl

A linked open dataset of the TOP10NL 1:10,000 scale topographic database, part of the Key Register Topography (*Basisregistratie Topografie*, BRT) is used as the basis for the application. Linked data is an innovative technique that makes data from various sources available online for linking by using a standardized semantic structure. Many governmental datasets in the Netherlands are already available as linked open data (LOD), including the main geographical key registers: Key Register Cadastre (*Basisregistratie Kadaster*, BRK), Key Register Addresses and Buildings (*Basisregistratie Adressen en Gebouwen*, BAG), Key Register Large-scale Topography (*Basisregistratie Grootchalige Topografie*, BGT) and the aforementioned Key Register Topography (BRT).

The linked data technique is not only suitable for linking datasets with each other, but can also be used to make datasets easily accessible and searchable. This can be done by applying queries on the data in the SPARQL query language, by using search engines such as Elasticsearch and by using techniques like fuzzy matching. With a custom made user interface these innovations become usable for the broad public.



Figure 1: homepage web application ‘Toponamenzoeker’

Topographic database structure

The TOP10NL database contains 13 different feature classes: roads, water, railways, terrain, buildings, design features (masts, hedges, road signs, trees, weirs, etc.), relief, height and depth features, functional areas, geographical areas, place name areas, administrative areas and planned topography. The first 6 feature classes can be regarded as base topography layers, the other classes contain essential additional features. All features have a point, line or polygon geometry and multiple attributes. Names are present as feature attributes in all feature classes except relief and height and depth features. Many roads, water features, buildings, design features, functional areas and all geographical areas, place name areas and administrative areas have a name. The web application allows for searching in all values of name attributes present in the TOP10NL linked dataset.

Web application interface and functionality

On the homepage of *Toponamenzoeker*, the interface of the application shows a topographic background map of the Netherlands on the right, as well as a search bar and an explanatory text on the left. There are two possible ways to search names in the application:

1. By typing a name or search string in the search bar, in order to find features with that name or search string
2. By right clicking or pointing a location on the map, in order to see all nearby features with a name

When a user starts typing a text in the search bar the application will immediately start searching in the database for features, with a name that exactly matches the search string or contains the search string. If a user wants to search for exact matches only, quotation marks (“ ”) can be used around the search string.

By right clicking on a location of interest on the map, the application will search for nearby features with a name. On a touch screen or in a mobile environment, this functionality is activated by pointing a finger or pen on the map for two seconds. For a more precise result, it is advisable to zoom in on the map first. Street names are excluded from this search, as they are already shown on the background map (in higher zoom levels) and the sheer number of street name features would suppress other features from the results.

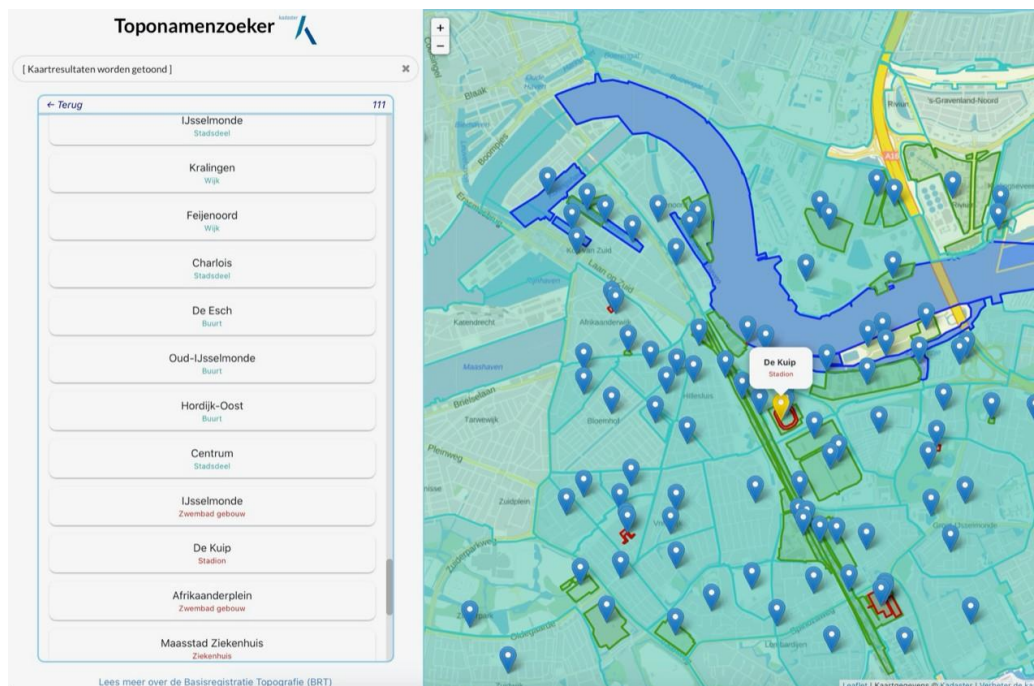


Figure 2: Results screen after right clicking or pointing near football stadium ‘De Kuip’ (‘The Tub’), colloquial name for ‘Stadion Feijenoord’ in Rotterdam.

Results are listed on the left side of the screen and shown as points, lines or polygons with markers on the map. Searching for *name* for example, will return many results, such as *Surinamestraat* (Suriname Street), *Namenlaan* (Namur Avenue, with the Dutch exonym for the capital of Wallonia), *Menamer Feart* (Menaam Canal, a Frisian name), and *Nieuw Namen* (a village). Searching for “*Nieuw Namen*” with quotation marks will only return the eponymous village as a result. For each result the feature type is shown, like in the aforementioned examples *Straat* (street), *Waterloop* (watercourse), and *Woonkern* (residential area).

Clicking on a feature, either in the results list or on the map, will zoom the map to the feature and open its attribute table on the left side. In case a feature is part of a larger object, such as a street, watercourse or lake, all associated features are being clustered into one result. Clicking on a result will

then first unfold the cluster, showing all associated features in the list and on the map. By clicking on one of the features, the map will zoom to the feature and its attribute table will be shown on the left.

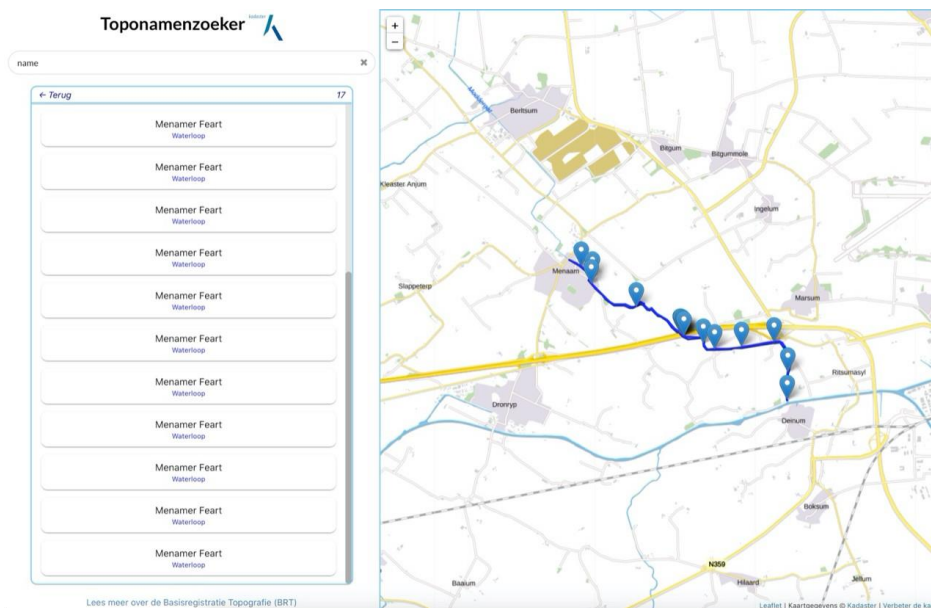


Figure 3: Unfolded results cluster for watercourse features named 'Menamer Feart'

For watercourse features named *Menamer Feart*, name attributes *Naam officieel* (official name, *Menamer Feart*), *Naam Nederlands* (Dutch name, *Menaldumervaart*) and *Naam Fries* (Frisian name, *Menamer Feart*) will appear. For the place name area feature named *Nieuw Namen*, only the official and Dutch name will appear, as no Frisian name is registered for this village in the province of Zeeland. Other attributes that are present here include *bebouwde kom* (built-up area, with value 'yes' or 'no' according to its status under the Road Traffic Act), *aantal inwoners* (number of inhabitants, calculated yearly for each place name area polygon by the Central Bureau of Statistics) and *oppervlakte* (surface).

Users are encouraged in the explanatory text to provide feedback on errors or missing features via the user feedback system *Verbeter de kaart* (Improve the map, www.verbeterdekaart.nl). Furthermore, reference is made to other linked data applications on the Kadaster website and to a web application with over 200 years of Dutch topographic maps, called *Topotijdreis* (Topo Time Travel, www.topotijdreis.nl). On the most recent maps, only a selection of the geographical names available in the TOP10NL database is shown.

Purpose and usability

The main goal of the application is to reveal the huge amount of toponymic data present in the topographic database to the general public. Although formally being open data available for free, geographical key register data are in practice only directly accessible for geographic information systems (GIS) specialists who are familiar with these datasets and their structure. They have the software and knowledge to load, query and analyze the data. The contents of these datasets however might be interesting to others as well; after all, they are designated key registers. Thanks to the availability of the TOP10NL topographic database as linked open dataset and a custom made web application the user range of the dataset and its relevance to society can be massively increased.

Possible users of the application might be professionals who want to find out the correct spelling of a geographical name in the Key Register Topography, researchers searching for spatial patterns in naming as well as general users curious about what names can be found in the topographic database in their own neighborhood or whether their own (family) name is present on the map somewhere.

Finally, the *Toponamenzoeker* web application serves as an example of the technical possibilities of working with linked open data.