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1. Distributed Gazetteer

The *Geographical Names Search* application is a distributed gazetteer\(^1\) that allows to look for toponyms\(^2\) and detailed information about them by using standard web services according to WFS specification created and published by competent organisms in the area of toponymy.

This client has been designed to be opened and interoperable providing the opportunity to add new information sources (WFS\(^3\) services) different from the sources proposed by default. It is denominated «distributed» because the search of geographical names is done independently by each information source selected.

*Figure 1* shows the initial application page.

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\(^1\) A Gaza**etteer** is an ordered catalogue of toponyms with information about its location, the geographical feature type and any other descriptive information or defining each toponym. The ordered catalogue accomplishment of toponyms, for national and international use, is essential to achieve the standardization of the toponymy.

\(^2\) The toponym term comes from the Greek words *topos* (place) and *onoma* (name). Generally it is synonymous of geographical name. Geographical names or toponyms are the names that designate and identify the places around us: streets, towns, cities, rivers, mountains, landscapes, etc.

\(^3\) Web Feature Service (WFS): publication service of vectorial objects, which as far as geographical names is concerned their grafic representation is a point.
The elements needed to search for geographical names and the gazetteer services (WFS services) on which to search, are located on the left side of the application. The search criteria that allow refining the query are explained in Section 3, these criteria are:

- Geographical name
- Type
- Geographical area where the geographical name is located
- Administrative units

2. Sources selection

At the top left of the initial page (Figure 1) is the section «Available gazetteer services». It is a list of gazetteer services which can be selected to search a geographical name.

At the time of writing of this manual, the client has four gazetteer services loaded by default (Figure 2):

- **Basic Gazetteer of Spain (IGN)**: geographical names from the Basic Gazetteer of Spain version 2013. The services complies with the Implementing Rules for Inspire network services and the guidelines for Inspire download services. The geographical names and their coordinates are extracted from de BCN25/BTN25 (Topographic and Cartographic Base 1:25.000 of the National Geographic Institute of Spain). The default Reference System is WGS84 zones 27, 28, 29, 30 y 31. The service URL is [http://www.idee.es/IDEE-WFS-Nomenclator-NG/services](http://www.idee.es/IDEE-WFS-Nomenclator-NG/services).


![Available gazetteer services](image)

**Figure 2: Available gazetteer services**

Additionally, the application offers the user the possibility to add new sources to search on them using the option «Add new service». It also offers the option «Remove gazetteer» to remove from
the list any gazetteer service loaded previously. Both options are located in the bottom of the list of available gazetteer services (Figure 2).

Selecting the option «Add new service» a dialog is displayed (Figure 3) to enter the following information about the new gazetteer service:

* **Name**: Service name used to identify the source in the list of «Available gazetteer services» and, after searching, the results corresponding tab.

* **Service URL**: Address of the new gazetteer service, which will allow to establish the connection to the service for searching. Example of a valid gazetteer service URL:

  http://www.ideandalucia.es/wfs-nga-inspire/services

After filling in the information about the new source, click on the button «Add» and this source will be added to the list of available services (Figure 4). When you perform the next search, if this new source is selected, a new tab will appear with the results obtained from this source.

![Figure 3: Add new source to search](image)

![Figure 4: New source to search](image)
NOTE: This client only allows adding gazetteer services which offer the information of the geographic names stored by them according to a standard structure. In particular, they must match up with one of the following structures:

- Gazetteer Spanish Model (MNE)
- EuroGeoNames (EGN) its structure is defined in the document *D4.2e Conceptual schema & documentation*
- INSPIRE (Geographical Names): established by the document on *INSPIRE Data Specification on Geographical Names -Guidelines*, developed in the scope of geographical names to comply with the *INSPIRE Directive 2007/2/EC* (Infrastructure for Spatial Information in Europe).

The client automatically detects whether the service information is according to one of these structures when trying to add a new gazetteer.

3. Search criteria

3.1. Geographical name criterion

This criterion allows retrieving information from gazetteer services by means of keywords entered by the user. The search is *case-sensitive*, so it is important to write correctly what you enter in the search box.

![Geographical Name](image)

*Figure 5: Text box to enter keywords*

To use this criterion the users have the predictive text help. Meanwhile the user is writing a geographical name a list with all names beginning with the written character sequence will be shown.
Also, to add flexibility to such queries, there are several special characters you can use:

- **Asterisk** (*): this character can be replaced for any characters sequence. Below are examples for use:

<table>
<thead>
<tr>
<th>String to search</th>
<th>Geographical name restrictions</th>
</tr>
</thead>
<tbody>
<tr>
<td>*</td>
<td>Is used to retrieve all existing toponyms of the gazetteer service, unconditionally.</td>
</tr>
<tr>
<td>*Madrid</td>
<td>It will retrieve all those geographical names that, no matter how they start, containing words finished with «Madrid».</td>
</tr>
<tr>
<td>Madrid*</td>
<td>It will retrieve all those geographical names that, no matter how they end, containing words beginning with «Madrid».</td>
</tr>
<tr>
<td><em>Madrid</em></td>
<td>It will find every geographical name containing «Madrid» in any position of it, no matter how begins or ends.</td>
</tr>
</tbody>
</table>

*Table 1*

- **Question mark** (?): this character acts as a wildcard that matches any single character located in the position of the question mark. Below are examples for use:

<table>
<thead>
<tr>
<th>String to search</th>
<th>Geographical name restrictions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Madri?</td>
<td>It will retrieve all geographical names starting with «Madri», and finished with any character, such as: Madria, Madrib, etc.</td>
</tr>
<tr>
<td>Ma?rid</td>
<td>It will retrieve all geographical names starting with «Ma», followed by any character and finished with «rid», such as: Maarid, Madrid, etc.</td>
</tr>
<tr>
<td>?adrid</td>
<td>It will retrieve all geographical names starting with any character and finished with «adrid», such as: Aadrid, Badrid, etc.</td>
</tr>
</tbody>
</table>

*Table 2*

These characters can also be used in combination.

**3.2. Type criterion**

This criterion allows users to restrict the results of a search to a specific type or class according to the classification established by the document on **INSPIRE Data Specification on Geographical Names -Guidelines**, developed in the scope of geographical names to comply with the **INSPIRE Directive 2007/2/EC** (Infrastructure for Spatial Information in Europe).
3.3. Geographical location criterion

This option allows users to restrict the results of a search to a specific geographical area (Bounding Box).

In order to use this criterion, the option «Use map» should be selected.

Users can operate on the map (see Figure 7) using the tools on the top (return to original map, zoom out, zoom in and displacement). The extension of the map displayed sets the minimal coordinates (X minimum and Y minimum) and the maximum coordinates (X maximum and Y maximum) the geographical where the geographical name will be searched.
3.4. Administrative units criterion

This criterion allows users to restrict the results of a search to a specific Spanish administrative unit, which may be an autonomous community and/or a province. This component provides a hierarchical tree of administrative units in Spain where each autonomous community contains their respective provinces.

![Administrative units](image)

*Figure 8: Search window by administrative unit*

4. Launch the search

After introducing the search restrictions, user must press the «Search» button in order to launch the toponyms search (*Figure 9*).

**NOTE:** If user wants to make a new search, it may be useful to delete all search restrictions previously used. To do this, user must press the «Clean» button (*Figure 9*).

![Search and Clean](image)

*Figure 9: Tools «Search» to launch the toponyms search and «Clean» to delete once all restrictions and selected options for the previous search*

4.1. Results

*Figure 10* shows the elements of the page that contains the results of a search.
4.2. Information layout

The application searches the information requesting the selected sources. There is a panel in the right side of the application where a different tab is created in order to show the results of each source.

Figure 10: Results page
4.3. Results list

This section is made up of these elements:

- Total number of results found (geographical metadata).
- Result list (10 results per page) (*See section 4.4*).
- Navigation bar between results pages. You can navigate through the pages by clicking «Next» or «Previous» links or just the page number.
4.4. Found results

Each gazetteer source tab should contain the list of geographical names found that match the specified search criteria.

For each toponym its title (if any) is shown in blue color and then its type (if any) in black color, a button-shaped map to locate the geographical name on the bottom map and, finally, another
monitor shaped button, which opens the generic viewer and center the map at the toponym coordinates.

![Valmadrid Municipio](image)

**Figure 13: Sample result**

For example, the *Figure 13* shows:

- Toponym title: «*Valmadrid*» (it is a link to the page showing a detailed view of the toponym. See section 5).
- Toponym type: «*Municipio*»
- Link to place the toponym in the application map:
- Link to place the toponym in the IDEE map viewer:

4.5. Place a result in the application map

By default, each of the entries in the result list is marked on the map below by a red dot. If we want to locate and distinguish a specific toponym, just press the image of the desired result set. As a result, we obtain that the locating point of the element, has become green, as shown in *Figure 14*.

![Figure 14: Position of a result element in the map](image)

5. Result detailed view

If you click on the title of a result entry, a new tab with detailed information about the geographical name will be opened as shown in *Figure 15*. 
For each toponym the information is structured in different sections:

- Header with the title or name of geographical name
- Index with links to the different detail sections
- Sections with different information about the geographical name depending on the structure of the response provided by the gazetteer service (MNE, EuroGeoNames or INSPIRE).

**NOTE:** This information is provided by the gazetteer service consulted.

**Figure 15:** Result detailed page

6. Place a toponym in the IDEE map viewer

As mentioned in the Section 4.4, it is possible to view a geographical name in the IDEE map viewer clicking on the button 📍. After a few seconds of pressing this button, a new web browser tab or window (it depends on browser) is opened showing the toponym location in the IDEE map viewer (Figure 16).
7. Summary: navigation between application screens

*Figure 16* shows the relations between the different application screens mentioned above.
Figure 17: Navigation between application screens. Initial page (1); Results page (2); Result detail (3); Toponym visualization in the IDEE map viewer (4).