

A demonstration of how simple the Web Feature service can be set up: The Croatian Experience

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- II. EGN Central (WFS) Service
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I. About Web Feature Service (WFS)

What is Web Service?

A web service is a method of communication between two electronic devices.

Open Geospatial Consortium (OGC) Web Services:

- Web Map Service (WMS),
- Web Feature Service (WFS),
- Web Coverage Service (WCS),
- Web Object Service (WOS),
- Catalog Services - Web (CS-W),
- Web Map Tile Service (WMTS),
- Web Processing Service (WPS)...

- **Web Feature Service (WFS)** - OGC Standard provides an interface allowing requests for geographical features across the web using platform-independent calls.
- The WFS is giving us ability to:
 - **Get or Query features,**
 - Create a new feature instance,
 - Delete a feature instance,
 - Update a feature instance.

Extensible Markup Language (XML)

Geography Markup Language (GML)

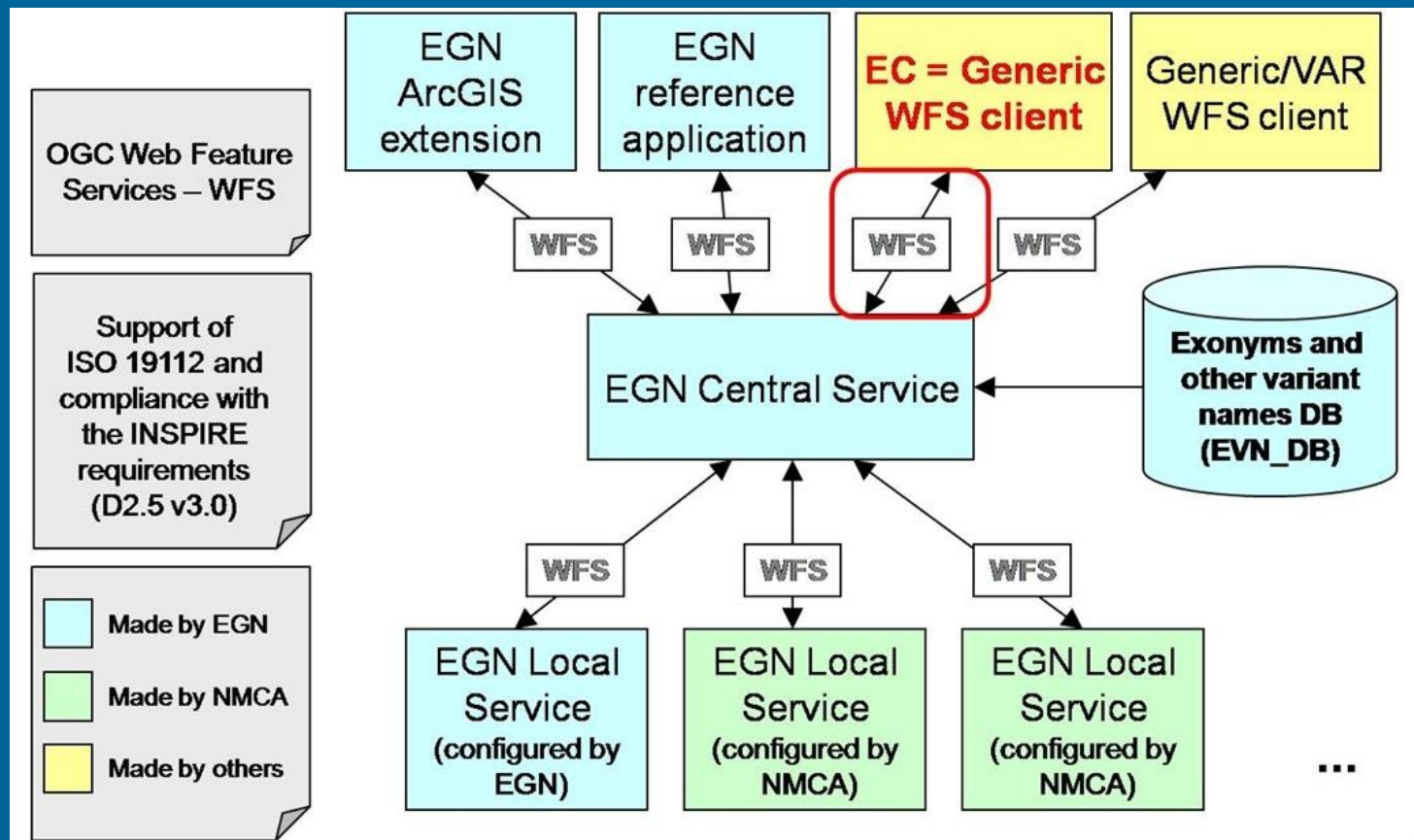
II. EGN Central (WFS) Service

- EGN Central (WFS) Service - access to the distributed EGN Local (WFS) Services

Two Scenarios of joining EGN system:

- 1) development of an EGN Local Service,
- 2) using developed EGN Local Service (EGN Consortium).

Access is provided by a Web Feature Service (WFS) interface implemented at each data provider's database. A so-called EGN Central Service accesses these distributed WFS to query the EGN data network and return standardised result sets to the inquirer.



Source: <http://www.eurogeographics.org/content/overview>

Deegree-WFS

- Deegree WFS - framework offering the main building block for Spatial Data Infrastructure
- Follows: Open Geospatial Consortium (OGC) and ISO/TC 211 standards
- Implementation on the level of OGC Web Services and clients
- Deegree-WFS 2.1 – Requirements
 - **Tomcat 5.5.x**
 - **Java 5 (the same as v. 1.5)**

III. EGN Local (WFS) Services

EGN Local Service Installation Guide

version 11 – 2008-09-10

- Operating System: Windows XP Professional – tested
- Operating system requirements are determined by the requirements of the individual components : Java VM, PostgreSQL, Apache Tomcat, Deegree WFS, GeoServer WFS,
- Take care to configure the firewall.
- EGN Local Service setup requirements: PostgreSQL and POSTGIS setup, DB created and filled with data.

Setup animations:

- **SETUP: Java Runtime Environment (JRE)**
- **SETUP: Apache Tomcat**
- **SETUP: Deegree WFS**
- **SETUP: Local EGN service – 1st part (DB connection)**
- **SETUP: Local EGN service – 2nd part (Local EGN Service parameters)**

SETUP: Java Runtime Environment (JRE)

Deegree 2.1 requires a JRE (or JSDK) version 1.5 (which is the same as 5.0).

1. Is Java 5 or higher version installed?
 1. YES – Go to Apache installation
 2. NO - Continue
2. JRE download - <http://java.com>
3. Setup Java
4. Check Java settings

SETUP: Apache Tomcat

Deegree 2.1 requires Tomcat version 5.5 or higher

1. Download Tomcat: <http://tomcat.apache.org>

Warning: Do not use Tomcat 5.5.26. It has a bug!

2. Setup Tomcat

– Set during setup: <port>, <user>, <password>

3. After installation, change the start up type of the service from 'manual' to 'automatic'

4. Check Apache Tomcat

<http://localhost:<port> <user>/<password>>

<http://localhost:8081> [egn/egn](http://localhost:8081/egn/egn)

SETUP: Deegree WFS

Deegree WFS version 2.1

1. Download Deegree WFS from:
 - a) EGN server
 - b) <http://www.deegree.org>
2. Copy file `deegree_wfs.war` to
C:\Program Files\Apache Software Foundation\Tomcat x.x\webapps
(or a similar Tomcat installation path)
3. Restart Tomcat
4. Check Deegree WFS
<http://localhost:8081/deegree-wfs>

SETUP: Local EGN service – 1st part (DB connection)

1. Download current EGN Local Service setup files from the ftp server <ftp://www.eurogeonames.com> - user/password required
2. Replace Deegree WFS file “wfs_configuration.xml”
 - replace
<tomcat home>\webapps\deegree-wfs\WEB-INF\conf\wfs\wfs_configuration.xml
with downloaded local EGN service file “wfs_configuration.xml”
<EGNSetupDir>/deegree/wfs_configuration.xml
3. Delete all files in the directory “featuretypes”
<tomcat home>\webapps\deegree-wfs\WEB-INF\conf\wfs\ featuretypes\
4. Copy downloaded local EGN service file “egn_gazetteer.xsd”
<EGNSetupDir>/deegree/egn_gazetteer.xsd
in to the directory
<tomcat home>\webapps\deegree-wfs\WEB-INF\conf\wfs\ featuretypes\

5. Restart Tomcat

6. Test: 1st part of instalation – DB Connection

6.1 Test - Internet browser (OUTPUT: FeatureCollection)

`http://localhost:8081/deegree-wfs/services?SERVICE=WFS&VERSION=1.1.0&REQUEST=GetFeature&TYPENAME=egn:Gazetteer&NAMESPACE=xmlns(egn=http://www.eurogeonames.eu/egn)`

6.2 Test: Deegree-WFS - Tomcat Web Application Manager

`http://localhost:8081 (egn/egn)(OUTPUT: Capabilities, ServiceIdentification, ServiceProvider...)`

FILE: `get_capabilities.xml`

```
<?xml version="1.0" encoding="UTF-8"?>
<wfs:GetCapabilities version="1.1.0"
  xmlns:egn="http://www.eurogeonames.eu/egn"
  xmlns:wfs="http://www.opengis.net/wfs"
  xmlns:gml="http://www.opengis.net/gml"
  xmlns:ogc="http://www.opengis.net/ogc"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.opengis.net/wfs
  http://schemas.opengis.net/wfs/1.1.0/wfs.xsd"/>
```

6.2.1 If there is a problem check in the file “EGN_gazetteer.xsd” element `<xsd:appinfo>` if it contains the right DB connection information.

- ...
- `<xsd:appinfo>`
- `<deegreewfs:Prefix`
 `xmlns:deegreewfs="http://www.deegree.org/wfs">egn</deegreewfs:Prefix>`
- `<deegreewfs:Backend`
 `xmlns:deegreewfs="http://www.deegree.org/wfs">POSTGIS</deegreewfs:Backend>`
- `<deegreewfs:DefaultSRS`
 `xmlns:deegreewfs="http://www.deegree.org/wfs">EPSG:4258</deegreewfs:DefaultSRS>`
- `<deegreewfs:SuppressXLinkOutput`
 `xmlns:deegreewfs="http://www.deegree.org/wfs">>false</deegreewfs:SuppressXLinkOutput>`
- `<JDBCConnection xmlns="http://www.deegree.org/jdbc">`
- `<Driver>org.postgresql.Driver</Driver>`
- `<Url>jdbc:postgresql://localhost:5433/egn</Url>`
- `<User>user</User>`
- `<Password>password</Password>`
- `<SecurityConstraints/>`
- `<Encoding>UTF-8</Encoding>`
- `</JDBCConnection>`
- `</xsd:appinfo>`
-

`<Url>jdbc:postgresql://localhost:5432/egn</Url>` - NOT WORKING

6.2.2 Restart Tomcat

6.3 Test: Deegree-WFS - Tomcat Web Application Manager

<http://localhost:8081> (egn/egn) (OUTPUT: Number of geographical names in DB)

FILE: get_hits.xml

- `<?xml version="1.0" encoding="UTF-8"?>`
- `<wfs:GetFeature version="1.1.0" xmlns:egn="http://www.eurogeonames.eu/egn" xmlns:wfs="http://www.opengis.net/wfs" xmlns:gml="http://www.opengis.net/gml" xmlns:ogc="http://www.opengis.net/ogc" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="http://www.opengis.net/wfs http://schemas.opengis.net/wfs/1.1.0/wfs.xsd" resultType="hits">`
- `<wfs:Query typeName="egn:LocationInstanceName" >`
- `</wfs:Query>`
- `</wfs:GetFeature>`

6.4 Test: Deegree-WFS - Tomcat Web Application Manager

<http://localhost:8081> (egn/egn) (OUTPUT: 10 geographical names in DB)

FILE: get_10_features.xml

- `<?xml version="1.0" encoding="UTF-8"?>`
- `<wfs:GetFeature version="1.1.0"`
`xmlns:egn="http://www.eurogeonames.eu/egn"`
`xmlns:wfs="http://www.opengis.net/wfs"`
`xmlns:gml="http://www.opengis.net/gml"`
`xmlns:ogc="http://www.opengis.net/ogc"`
`xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"`
`xsi:schemaLocation="http://www.opengis.net/wfs`
`http://schemas.opengis.net/wfs/1.1.0/wfs.xsd" maxFeatures="10">`
- `<wfs:Query typeName="egn:LocationInstanceName" >`
- `</wfs:Query>`
- `</wfs:GetFeature>`

6.5 Test: Deegree-WFS - Tomcat Web Application Manager

<http://localhost:8081> (egn/egn) (OUTPUT: DB shema)

FILE: get_application_schema.xml

- `<?xml version="1.0" encoding="UTF-8"?>`
- `<wfs:DescribeFeatureType version="1.1.0" xmlns:egn="http://www.eurogeonames.eu/egn" xmlns:wfs="http://www.opengis.net/wfs" xmlns:gml="http://www.opengis.net/gml" xmlns:ogc="http://www.opengis.net/ogc" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="http://www.opengis.net/wfs http://schemas.opengis.net/wfs/1.1.0/wfs.xsd">`
- `<wfs:TypeName>egn:LocationInstanceName</wfs:TypeName>`
- `</wfs:DescribeFeatureType>`

SETUP: Local EGN service – 2nd part (Local EGN Service parameters)

7. Editing wfs_configuration.xml

In the file “wfs_configuration.xml” Local EGN Service information should be added:

<tomcat home>\webapps\deegree-wfs\WEB-INF\conf\wfs\wfs_configuration.xml

Edited should be wfs_configuration.xml file sections:

7a) DEEGREE PARAMETERS SECTION

7b) SERVICE IDENTIFICATION SECTION

7c) SERVICE PROVIDER SECTION

7a) DEEGREE PARAMETERS SECTION:

Essential: <ows: DefaultOnlineResource

```
<deegree:DefaultOnlineResource
```

```
  xmlns:xlink=http://www.w3.org/1999/xlink xlink:type="simple"  
  xlink:href="http://nmca.mycountry.mc/deegree-wfs/services" />
```

replace with

```
<deegree:DefaultOnlineResource
```

```
  xmlns:xlink=http://www.w3.org/1999/xlink xlink:type="simple"  
  xlink:href="http://localhost:8081/deegree-wfs/services" />
```

or

```
<deegree:DefaultOnlineResource
```

```
  xmlns:xlink="http://www.w3.org/1999/xlink" xlink:type="simple"  
  xlink:href="http:// cgn.cgi.hr /deegree-wfs-dev/services" />
```

Before:

```
<!-- ===== -->
<!-- DEEGREE PARAMETERS -->
<!-- ===== -->
<degree:degreeParams>
  <!-- mandatory; used as the default URL for omitted DCP-elements (in the OperationMetadata section) -->
  <degree:DefaultOnlineResource xmlns:xlink="http://www.w3.org/1999/xlink" xlink:type="simple"
    xlink:href="http://egn.geodan.nl/degree-wfs-dev/services" />
  <!-- optional; default = 100 (MB); cache size available for storing feature instances in memory,
not implemented yet -->
  <degree:CacheSize>250</degree:CacheSize>
  <!-- optional; default = 30 (seconds); maximum time allowed for the execution of a request -->
  <degree:RequestTimeLimit>3600</degree:RequestTimeLimit>
  <!-- optional; default = same directory as configuration; list of directories to be scanned for featurtypes/dastores to be served by the WFS -->
  <degree:DataDirectoryList>
    <degree:DataDirectory>featuretypes</degree:DataDirectory>
  </degree:DataDirectoryList>
  <!-- optional; default = directory from system property "java.io.tmpdir" -->
  <!-- <degree:LockManagerDirectory>/tmp</degree:LockManagerDirectory> -->
</degree:degreeParams>
```

After:

```
<!-- ===== -->
<!-- DEEGREE PARAMETERS -->
<!-- ===== -->
<degree:degreeParams>
  <!-- mandatory; used as the default URL for omitted DCP-elements (in the OperationMetadata section) -->
  <degree:DefaultOnlineResource xmlns:xlink="http://www.w3.org/1999/xlink" xlink:type="simple"
    xlink:href="http://localhost:8081/degree-wfs-dev/services" />
  <!-- optional; default = 100 (MB); cache size available for storing feature instances in memory,
not implemented yet -->
  <degree:CacheSize>250</degree:CacheSize>
  <!-- optional; default = 30 (seconds); maximum time allowed for the execution of a request -->
  <degree:RequestTimeLimit>3600</degree:RequestTimeLimit>
  <!-- optional; default = same directory as configuration; list of directories to be scanned for featurtypes/dastores to be served by the WFS -->
  <degree:DataDirectoryList>
    <degree:DataDirectory>featuretypes</degree:DataDirectory>
  </degree:DataDirectoryList>
  <!-- optional; default = directory from system property "java.io.tmpdir" -->
  <!-- <degree:LockManagerDirectory>/tmp</degree:LockManagerDirectory> -->
```


7b) SERVICE IDENTIFICATION SECTION:

Add (if there is not): “<ows:Title>EGN Local Service</ows:Title>”

Before:

```
<!-- ===== -->
<!-- SERVICE IDENTIFICATION SECTION -->
<!-- ===== -->
<ows:ServiceIdentification>
  <ows:ServiceType>WFS</ows:ServiceType>
  <ows:ServiceTypeVersion>1.1.0</ows:ServiceTypeVersion>
  <ows:Fees>None</ows:Fees>
  <ows:AccessConstraints>None</ows:AccessConstraints>
  <ows:Title>EGN Local Service</ows:Title>
</ows:ServiceIdentification>
```

After: no changes

```
<!-- ===== -->
<!-- SERVICE IDENTIFICATION SECTION -->
<!-- ===== -->
<ows:ServiceIdentification>
  <ows:ServiceType>WFS</ows:ServiceType>
  <ows:ServiceTypeVersion>1.1.0</ows:ServiceTypeVersion>
  <ows:Fees>None</ows:Fees>
  <ows:AccessConstraints>None</ows:AccessConstraints>
  <ows:Title>EGN Local Service</ows:Title>
</ows:ServiceIdentification>
```

7c) SERVICE PROVIDER SECTION

After:

```
<!-- SERVICE PROVIDER SECTION -->
<!-- =====>
<ows:ServiceProvider>
  <ows:ProviderName>Geodan</ows:ProviderName>
  <ows:ProviderSite xlink:href="http://www.geodan.com" />
  <ows:ServiceContact>
    <ows:IndividualName>Frans Knibbe</ows:IndividualName>
    <ows:PositionName>EGN developer</ows:PositionName>
    <ows:ContactInfo>
      <ows:Phone>
        <ows:Voice>+31 20 5711347</ows:Voice>
        <ows:Facsimile>+31 20 5711333</ows:Facsimile>
      </ows:Phone>
      <ows:Address>
        <ows:DeliveryPoint>President Kennedylaan 1</ows:DeliveryPoint>
        <ows:City>Amsterdam</ows:City>
        <ows:AdministrativeArea>Noord-Holland</ows:AdministrativeArea>
        <ows:PostalCode>1079 MB</ows:PostalCode>
        <ows:Country>the Netherlands</ows:Country>
        <ows:ElectronicMailAddress>frans.knibbe@geodan.nl</ows:ElectronicMailAddress>
      </ows:Address>
      <ows:OnlineResource xlink:href="http://egn.geodan.nl/deegree-wfs/services" />
      <ows:HoursOfService>Normal business hours</ows:HoursOfService>
      <ows:ContactInstructions>Please use e-mail</ows:ContactInstructions>
    </ows:ContactInfo>
    <ows:Role>PointOfContact</ows:Role>
  </ows:ServiceContact>
</ows:ServiceProvider>
```

Before:

```
<!-- SERVICE PROVIDER SECTION -->
<!-- =====>
<ows:ServiceProvider>
  <ows:ProviderName>State Geodetic Administration</ows:ProviderName>
  <ows:ProviderSite xlink:href="http://www.cgi.hr" />
  <ows:ServiceContact>
    <ows:IndividualName>Željko Hećimović</ows:IndividualName>
    <ows:PositionName>EGN developer</ows:PositionName>
    <ows:ContactInfo>
      <ows:Phone>
        <ows:Voice>+385 1 6321112</ows:Voice>
        <ows:Facsimile>+385 1 6322356</ows:Facsimile>
      </ows:Phone>
      <ows:Address>
        <ows:DeliveryPoint>Savska 41</ows:DeliveryPoint>
        <ows:City>Zagreb</ows:City>
        <ows:AdministrativeArea>Croatia</ows:AdministrativeArea>
        <ows:PostalCode>10144 P.P.19</ows:PostalCode>
        <ows:Country>Croatia</ows:Country>
        <ows:ElectronicMailAddress>zeljko.hecimovic@cgi.hr</ows:ElectronicMailAddress>
      </ows:Address>
      <ows:OnlineResource xlink:href="http://localhost:8081/deegree-wfs/services" />
      <ows:HoursOfService>Normal business hours</ows:HoursOfService>
      <ows:ContactInstructions>Please use e-mail</ows:ContactInstructions>
    </ows:ContactInfo>
    <ows:Role>PointOfContact</ows:Role>
  </ows:ServiceContact>
</ows:ServiceProvider>
```

8. Restart Tomcat – after file “wfs_configuration.xml” is changed

9. Test Local EGN Service

9.1 Test - Internet browser (OUTPUT: FeatureCollection)

[http://localhost:8081/deegree-wfs/services?SERVICE=WFS&VERSION=1.1.0&REQUEST=GetFeature&TYPENAME=egn:Gazetteer&NAMESPACE=xmlns\(egn=http://www.eurogeonames.eu/egn\)](http://localhost:8081/deegree-wfs/services?SERVICE=WFS&VERSION=1.1.0&REQUEST=GetFeature&TYPENAME=egn:Gazetteer&NAMESPACE=xmlns(egn=http://www.eurogeonames.eu/egn))

9.2 “Test.bat” - EGN Server download – test directory

- a few WFS requests - executed by running “test.bat”
- “test.bat” should be called from the directory “test” with the baseURL of the WFS as the one and only argument. For example:

```
<TestDir>test.bat http://localhost/deegree-wfs/services
```

- “test.bat” will execute 4 files:
 - get_10_features.xml
 - get_application_schema.xml
 - file get_capabilities.xml
 - get_hits.xml
- They will create 4 response files as new files:
 - get_10_features_out.xml
 - get_application_schema_out.xml
 - file get_capabilities_out.xml
 - get_hits_out.xml
- “*_out.xml” files should be examined to see if there are any problems.

9.3 Test: Deegree-WFS - Tomcat Web Application Manager

http://localhost:8081 (egn/egn)

(OUTPUT: Capabilities, ServiceIdentification, ServiceProvider...)

FILE: get_capabilities.xml

9.4 Test: Deegree-WFS - Tomcat Web Application Manager

http://localhost:8081 (egn/egn)

(OUTPUT: Number of geographical names in DB)

FILE: get_hits.xml

9.5 Test: Deegree-WFS - Tomcat Web Application Manager

http://localhost:8081 (egn/egn)

(OUTPUT: 10 geographical names in DB)

FILE: get_10_features.xml

9.6 Test: Deegree-WFS - Tomcat Web Application Manager

http://localhost:8081 (egn/egn)

(OUTPUT: DB shema)

FILE: get_application_schema.xml

From Localhost to public address

Localhost

<http://localhost:8081/deegree-wfs/services>

should be replaced with public address

<http://cgn.cgi.hr/deegree-wfs/services>

Changes in “wfs_configuration.xml” file - 2 lines:

7a) DEEGREE PARAMETERS SECTION

7c) SERVICE PROVIDER SECTION

Restart Tomcat – after file “wfs_configuration.xml” is changed

- **IV. EGN Reference Application - Quering and WFS**

<http://www.eurogeonames.com:8080/RefAppI3/ReferenceApplication/ReferenceApplication.html>

V. EGN ESRI Extension and EGN WFS

- The EGN ArcGIS Extension provides access to the EuroGeoNames (EGN) Gazetteer service from within ESRI ArcGIS Desktop.
- The EGN ArcGIS Extension version 1.0.0.0 works with ArcGIS Desktop 9.2 and 9.3.

EuroGeoNames Extension for ArcGIS

Search term: Berlin Find Cancel Number of results (max. 50): 50

Desired feature attributes:

- Countries, administrative areas and other areas
- Populated places
- Non-residential structures and buildings
- Transport and telecommunication features
- Terrain features
- Hydrographic features
- Conservation areas
- Miscellaneous

Search type:

- fuzzy
- exact
- sounds like

Find names that contain:

- all words
- any word
- exact term

Locale settings:

Language: -- All Languages --

Country: -- All Countries --

Spatial filter:

- no spatial filter
- current extent

Result Request Response

Name	Language	Alternatives	LocationType
Berlin	German	0	Administrative units
Berlin	German	0	Administrative units
Berlin	German	0	Administrative units
Berlin	German	4	Populated places
Berlin	German	0	Other populated places
Berlin	German	0	Other populated places
Oberlinxweiler	German	0	Other populated places
Überlingen	German	0	Administrative units
Überlingen	German	0	Administrative units
Überlingen	German	0	Other populated places

LocationInstanceName: 2410062

BoundedBy: ENVELOPE(13.088929176

Name: Berlin

Language: German

Country: Germany

Status: official_endonym

LocalStatus: amtlich

NationalUniqueld: 129157

Gender:

GrammaticalNumber:

XML: <egn:LocationInstanceName

LocationInstanceID: 2410062

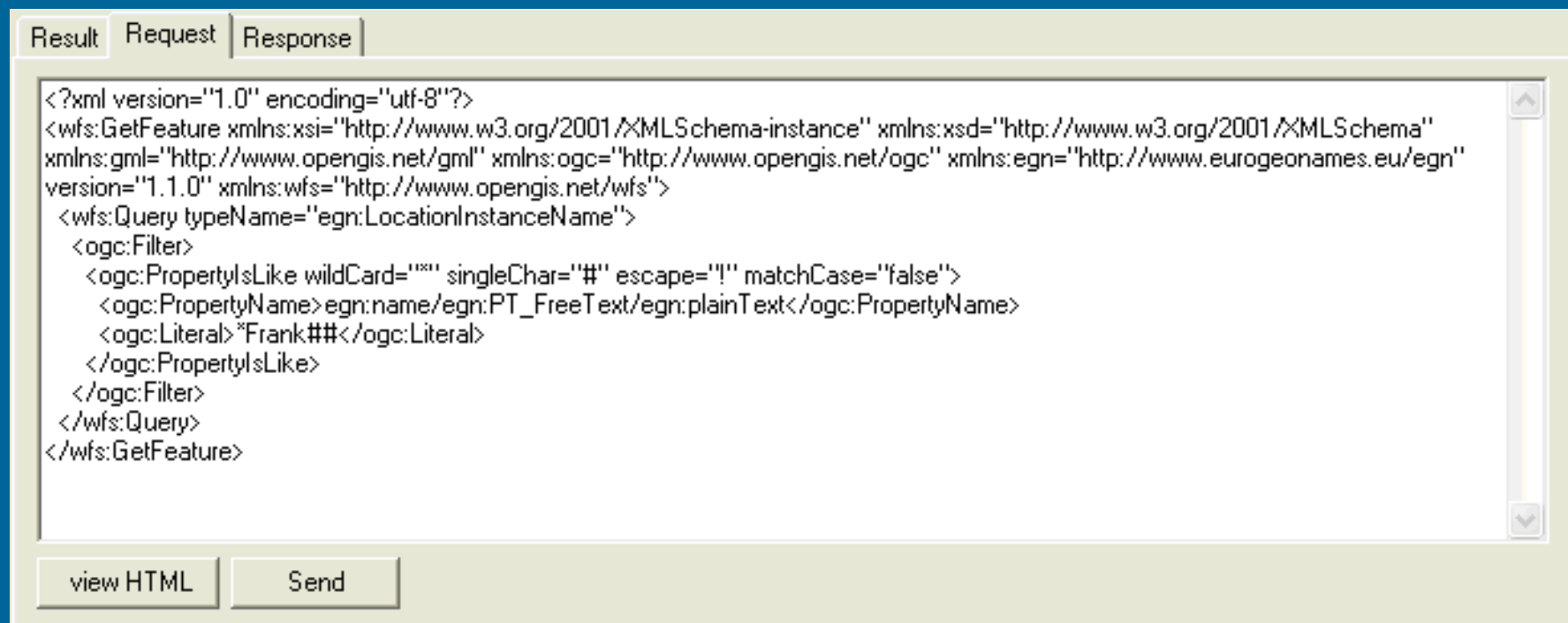
GeographicIdentifier: Berlin.DE.00003T03

Alternatives: 0

AlternativeGeographicIdentifier: ENVELOPE(13.088929176

45 features found.

ESRI Request: WFS:GetFeature + WFS:Query



The screenshot shows a web browser window with three tabs: "Result", "Request", and "Response". The "Request" tab is active, displaying the following XML code:

```
<?xml version="1.0" encoding="utf-8"?>
<wfs:GetFeature xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xsd="http://www.w3.org/2001/XMLSchema"
xmlns:gml="http://www.opengis.net/gml" xmlns:ogc="http://www.opengis.net/ogc" xmlns:egn="http://www.eurogeonames.eu/egn"
version="1.1.0" xmlns:wfs="http://www.opengis.net/wfs">
  <wfs:Query typeName="egn:LocationInstanceName">
    <ogc:Filter>
      <ogc:PropertyIsLike wildCard="" singleChar="#" escape="" matchCase="false">
        <ogc:PropertyName>egn:name/egn:PT_FreeText/egn:plainText</ogc:PropertyName>
        <ogc:Literal>"Frank###"</ogc:Literal>
      </ogc:PropertyIsLike>
    </ogc:Filter>
  </wfs:Query>
</wfs:GetFeature>
```

At the bottom of the browser window, there are two buttons: "view HTML" and "Send".

Thank you for your attention.