

DELIVERABLE

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EuroGeoSource

EU Information and Policy Support System for Sustainable Supply of Europe with Energy and Mineral Resources

Grant Agreement no. 250532

WP 7

Multilingual translation services to provide the translation functions for the EuroGeoSource system

Report

29 March 2012

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1 INTRODUCTION

One of the main requirements for the EuroGeoSource system is that it must be multilingual. The reason for this is that the system is based on data from 11 countries and that the data providers to a high degree use their own language in their everyday work with the data. Users from across Europe will also benefit from being able to search and examine the data using their own language.

On the other hand a lot of the potential international users of the system use English as their normal language for professional work, so it is also a requirement to serve the English language.

The precise requirements for the multilingual functionality of the system are stated in the Description of Work (DoW). Because of the importance of the subject a specific work package (no.7) has been dedicated to deal with it, and the purpose of the work package is formulated as follows:

1. Provide the technology to translate the user interfaces of the EuroGeoSource system.
2. Develop Web services for serving multilingual legends for the maps published as WMS (OGC standard for publishing maps on the Internet).
3. Building the multi-language vocabulary to serve the applications, honouring the specific needs of partner languages.

1.1 Multilingual parts of the EuroGeoSource system

To achieve the requested functionality, the following components are implemented as part of the EuroGeoSource system:

1. A multilingual dictionary containing the following elements:
 - a. Translation into all partner languages of all codes used in the EuroGeoSource central database. In some cases there is no meaningful text for a given code in a certain language. In those cases English will be used. According to the Inspire guidelines code values and their multilingual descriptions should be provided by online vocabularies, but as the vocabularies for energy and mineral resources are not yet available the codes necessary for the EuroGeoSource system are stored in the database.
 - b. Translation into all partner languages of code list names in the EuroGeoSource central database.
 - c. Translation into all partner languages of all table and column names in the EuroGeoSource central database.
 - d. Translation into English of all free texts in the EuroGeoSource central database.
 - e. Translation of all static texts (labels etc.) for the user interface of the EuroGeoSource portal.
2. An extension of the EuroGeoSource system to hold the multilingual terms consisting of:
 - a. Data dictionary tables residing in the central EuroGeoSource relational database containing terms for codes, code list names, table names and column names.

- b. A data dictionary table residing in each of the data provider's local EuroGeoSource relational database containing an English translation of the databases free text fields.
 - c. A data dictionary table residing in the central EuroGeoSource relational database containing English translations harvested from the above mentioned local databases' free text fields.
 - d. Resource bundles residing on the central EuroGeoSource system containing terms for the static texts of the EuroGeoSource portal.
3. A multilingual translation service which can return:
- a. A list of languages supported by the system.
 - b. The codes of the dictionary in any of the supported languages.
 - c. The names of code lists, table and column names of the database in any of the supported languages.
 - d. The free texts from the database in the language of the data provider and in English.
 - e. The user interface static text in any of the supported languages.

The multilingual translation service together with this report is the deliverable 7.1 of the project.

The language codes used in the system are the ISO 639-1 language codes exemplified in table 1 with the languages of project partners.

Language code	Language name
bg	Български
da	Dansk
en	English
et	Eesti
fr	Français
hu	Magyar
it	Italiano
nl	Nederlands
pl	Polski
pt	Português
ro	Română
sl	Slovenščina

Table 1: Codes and names for the project partner's languages.

1.1 Usage of the multilingual terms

The multilingual dictionary together with the multilingual translation service provides the system with the functionality needed to fulfill the requirements from the DoW.

- The translation service contains operations for the delivery of the user interface texts. Some of these texts are static texts (labels) while others are column names of the EuroGeoSource database. The portal itself uses these operations but they are also externally accessible.

- WMS legends. At the time of writing it has not been finally decided in the project which WMS' will be served by the system. In the DoW, 123 existing maps showing different aspects and data about energy and mineral resources in Europe are listed, and they will be available from the system with legends in the language of the data provider and in English. These legends will probably have to be designed individually by each data provider as static images.

In addition to that, the system will maybe serve a number of WMS' showing harmonised data from the central EuroGeoSource database. The legends for those will probably be available in all languages and the multilingual translation service will be used for this translation.

In addition to this all free texts entered into the system will be available in English and the language of the data provider through the translation service.

2 DESCRIPTION OF THE TECHNICAL SOLUTION

Fig. 1 shows a conceptual architecture of the EuroGeoSource system, focused on the place of the translation service. The multilingual parts are shown in red. The translation service is used by the Web application. The Web processing service, that provides data query functionality to the Web application, uses the EGS database to get the translations it needs.

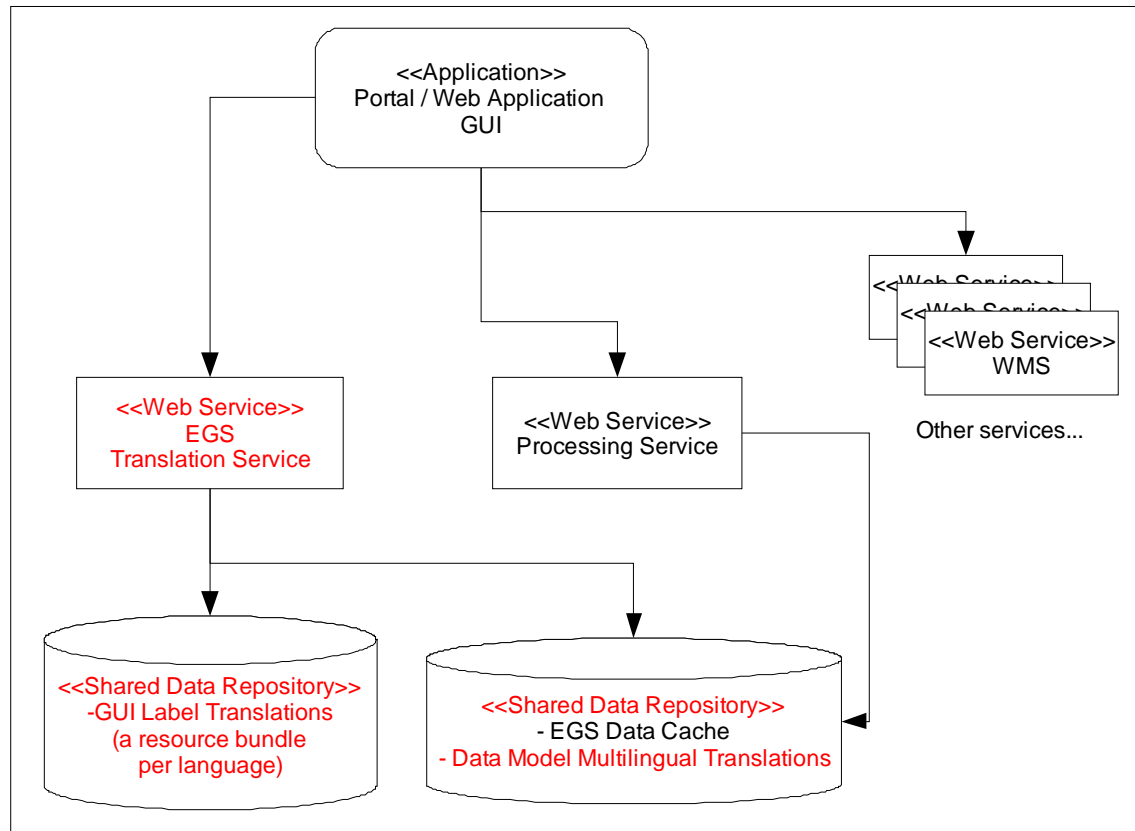


Fig.1 Conceptual model of the multilingual extensions to the EuroGeoSource system.

2.1 Multilingual translation service

The multilingual translation service is implemented as an OGC Web Processing Service (WPS). Requests must be given like this:

```

http://host:port/path?
  Service=WPS&
  Request=Execute&
  Version=1.0.0&
  RawDataOutput=Output&
  Identifier=<operation_name>&
  DataInputs=<input_name_0>=<input_value>;<input_name_1>=<input_value>...
  
```

Here `Identifier` is the name of the operation to execute and `DataInputs` is the list of inputs provided to the operation execution.

The service supports 5 operations:

- `GetLanguages`: Returns the list of languages supported by the system.
- `GetCodes`: Returns the codes used by the system in a certain language. It can return all codes, the codes of one or more specific code lists or the codes identified by a certain value.
- `GetFeatureTypes`: Returns the feature types (table names) and attributes (column names) of the EuroGeoSource database in a certain language. It can return all feature types and attributes, the attributes of one or more specific feature types, certain attributes or certain attributes of a specific feature type.
- `GetFreeTexts`: Returns the content of free text attributes in a certain language. It can return all free texts, the free text attributes of a certain feature type, certain free text attributes of a specific feature type or any of these criteria combined with criteria for which feature to retrieve.
- `GetGUILabels`: Returns the GUI labels for the web application in a certain language.

The service is described in detail in section 3 below.

2.2 Storage of the multilingual terms

To ensure that the multilingual terms are stored in a way that ensures data consistency and, at the same time, making it possible to easily add new languages, code lists, codes, tables and columns to the database, most of the terms are stored inside the database. The only exceptions to this are the static texts of the Web application user interface. For performance reasons those will be stored as resource bundles residing on the central EuroGeoSource server.

A total of 5 multilingual database tables hold the translations (see fig. 2). All the database tables have the ISO 639-1 language code as one of the columns. The `TableName`, `ColumnName`, `ColdListName` and `CodeName` tables are populated before the system goes into normal operation and data only needs to be added in case of new languages or extensions of the EuroGeoSource datamodel. The `Text` table for the free texts is updated by the harvester whenever new data are added in the data provider's databases.

Name: Datamodel ML
 Author: waardenburgfde
 Version: 0.9
 Created: 07-11-2011 14:00:00
 Updated: 06-01-2012 23:06:00



DataProvider

```
«column»
*PK providerCode: varchar(10)
  providerName: varchar(50)
  + countryCode: varchar(2)
*FK languageCode: varchar(2)
  harvestUnit: varchar(100)
  lastHarvested: timestamp
```

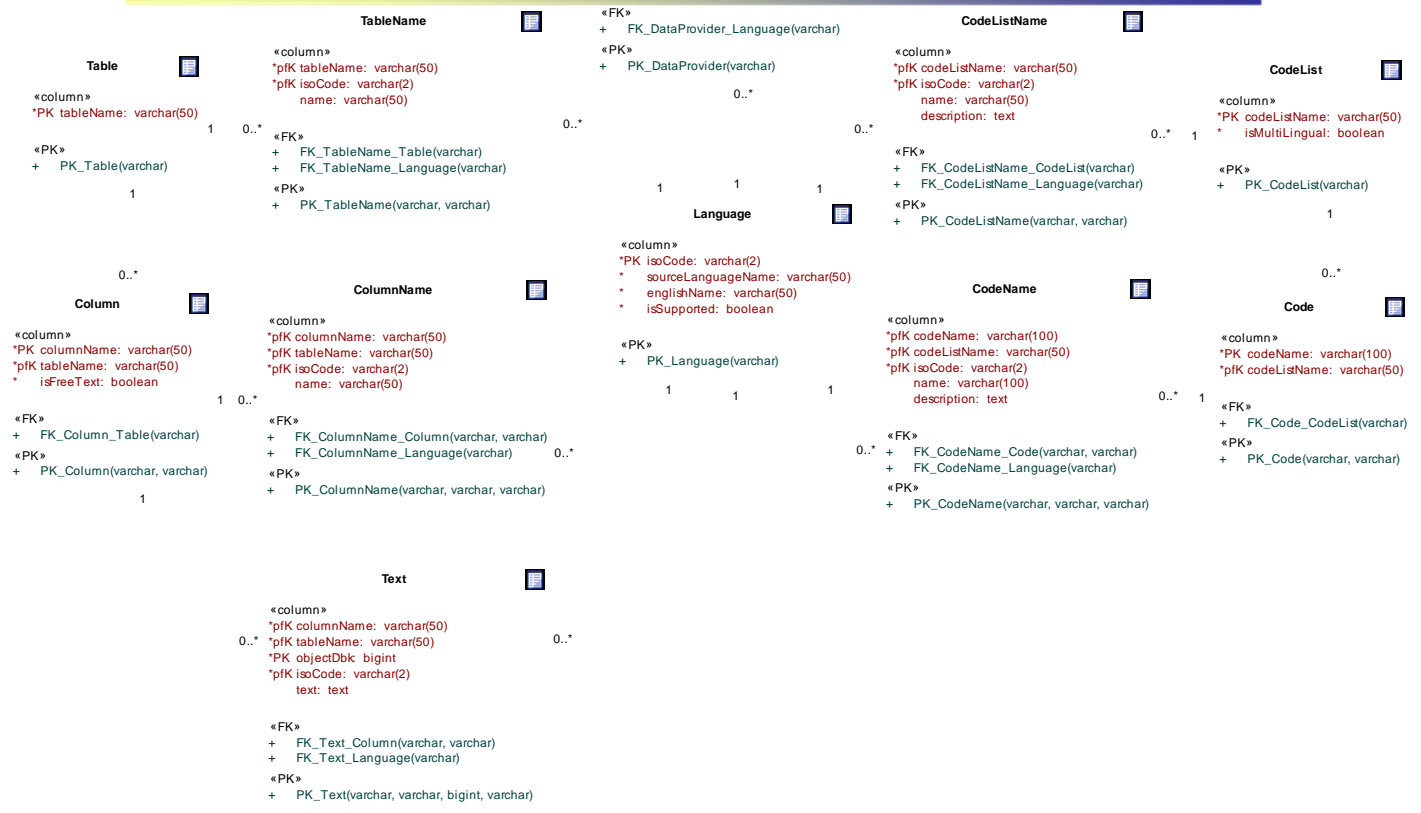


Fig.2 Tables to store multilingual terms

3 DOCUMENTATION OF TRANSLATION SERVICE

3.1 *GetLanguages* operation

Description

This operation allows the client to get the list of languages supported by the system. The list is sorted alphabetically by language code.

Data inputs

Input	Type	Multiplicity	Description
<i>language</i>	String	0 - 1	<p>The language in which to return the name of languages. The allowed values are:</p> <ul style="list-style-type: none"> - <i>native</i> to get the names in their native form - <i>en</i> to get the names in English <p>The default value is <i>native</i>.</p>

Response

A GeoJSON object which is defined by the following JSON schema:

```
{
  "type": "object",
  "required": true,
  "properties": {
    "data": {
      "description": "The requested data",
      "type": "object",
      "required": true,
      "properties": {
        "languages": {
          "type": "array",
          "required": true,
          "minItems": 0,
          "items": {
            "description": "Language supported by EuroGeoSource",
            "type": "object",
            "properties": {
              "code": {
                "description": "ISO 639-1 code of the language",
                "type": "string",
                "required": true
              },
              "title": {
                "description": "Name of the language in the specified language",
                "type": "string",
                "required": true
              }
            }
          }
        }
      }
    }
  }
}
```

Example

Request

```
http://host:port/path?
  Service=WPS&Request=Execute&Version=1.0.0&RawDataOutput=Output&
  Identifier=GetLanguages&
  DataInputs=language=native
```

Response

```
{
  "data": {
    "languages": [
      {
        "code": "bg",
        "title": "български"
      },
      {
        "code": "da",
        "title": "dansk"
      },
      ...
    ]
  }
}
```

3.2 GetCodes operation

Description

This operation allows the client to get the codes used by the system in a certain language. The returned codes are grouped by the code list they belong to.

Data inputs

Input	Type	Multiplicity	Description
<i>language</i>	String	0 - 1	ISO 639-1 code of the language in which to return the response. The default value is <i>en</i> .
<i>codeList</i>	String	0 - 10	Name of a code list used in EuroGeoSource.
<i>code</i>	String	0 - 20	Name of a code used in EuroGeoSource.

Response

A GeoJSON object which is defined by the following JSON schema:

```
{
  "type": "object",
  "required": true,
  "properties": {
    "data": {
```

```

"description": "The requested data",
"type": "object",
"required": true,
"properties": {
  "codeLists": {
    "type": "array",
    "required": true,
    "minItems": 0,
    "items": {
      "description": "Code list used in EuroGeoSource",
      "type": "object",
      "properties": {
        "name": {
          "description": "Name of the code list",
          "type": "string",
          "required": true
        },
        "title": {
          "description": "Human-readable string representation of the code
list name in the specified language",
          "type": "string",
          "required": true
        },
        "description": {
          "description": "Description of the code list in the specified
language (if not in English)",
          "type": "string",
          "required": false
        },
        "codes": {
          "type": "array",
          "required": true,
          "minItems": 0,
          "items": {
            "description": "Code belonging to the current code list",
            "type": "object",
            "properties": {
              "name": {
                "description": "Name of the code",
                "type": "string",
                "required": true
              },
              "title": {
                "description": "Human-readable string representation of the
code name in the specified language",
                "type": "string",
                "required": true
              },
              "description": {
                "description": "Description of the code in the specified
language (if not in English)",
                "type": "string",
                "required": false
              }
            }
          }
        }
      }
    }
  }
}

```

Examples

Request 1 (to get all the codes from all the code lists in English)

```
http://host:port/path?
  Service=WPS&Request=Execute&Version=1.0.0&RawDataOutput=Output&
  Identifier=GetCodes&
  DataInputs=language=en
```

Response 1

```
{
  "data": {
    "codeLists": [
      {
        "name": "er_countrycodetype",
        "title": "Country",
        "codes": [
          {
            "name": "AT",
            "title": "Austria"
          },
          {
            "name": "BE",
            "title": "Belgium"
          },
          ...
        ]
      },
      {
        "name": "er_regiontype",
        "title": "Type of the Energy Resource system",
        "description": "Type of the Energy Resource system",
        "codes": [
          {
            "name": "coalBasin",
            "title": "Coal basin",
            "description": "A sedimentary basin containing coal seams"
          },
          {
            "name": "petroleumSystem",
            "title": "Petroleum System",
            "description": "The petroleum system is a unifying concept that..."
          },
          ...
        ]
      },
      ...
    ]
  }
}
```

Request 2 (to get all the codes from the list er_regiontype in English)

```
http://host:port/path?
  Service=WPS&Request=Execute&Version=1.0.0&RawDataOutput=Output&
  Identifier=GetCodes&
  DataInputs=language=en;codeList=er_regiontype
```

Request 3 (to get all codes identified by AT or coalBasin in English)

```
http://host:port/path?
  Service=WPS&Request=Execute&Version=1.0.0&RawDataOutput=Output&
  Identifier=GetCodes&
  DataInputs=language=en;code=AT;code=coalBasin
```

Response 3

```
{
  "data": {
    "codeLists": [
      {
        "name": "er_countrycodetype",
        "title": "Country",
        "codes": [
          {
            "name": "AT",
            "title": "Austria"
          }
        ]
      },
      {
        "name": "mr_countrycodetype",
        "title": "Country",
        "codes": [
          {
            "name": "AT",
            "title": "Austria"
          }
        ]
      },
      {
        "name": "er_regiontype",
        "title": "Type of the Energy Resource system",
        "description": "Type of the Energy Resource system",
        "codes": [
          {
            "name": "coalBasin",
            "title": "Coal basin",
            "description": "A sedimentary basin containing coal seams"
          }
        ]
      }
    ]
  }
}
```

Request 4 (to get the code identified by AT from the list er_regiontype)

```
http://host:port/path?
  Service=WPS&Request=Execute&Version=1.0.0&RawDataOutput=Output&
  Identifier=GetCodes&
  DataInputs=language=en;codeList=er_regiontype;code=AT
```


3.3 GetFeatureTypes operation

Description

This operation allows the client to get the feature types in a certain language.

Data inputs

Input	Type	Multiplicity	Description
<i>language</i>	String	0 – 1	ISO 639-1 code of the language in which to return the response. The default value is <i>en</i> .
<i>featureType</i>	String	0 – 10	Name of a feature type.
<i>property</i>	String	0 – 20	Name of a feature property.

Response

A GeoJSON object which is defined by the following JSON schema:

```
{
  "type": "object",
  "required": true,
  "properties": {
    "data": {
      "description": "The requested data",
      "type": "object",
      "required": true,
      "properties": {
        "featureTypes": {
          "type": "array",
          "required": true,
          "minItems": 0,
          "items": {
            "description": "Feature type used in EuroGeoSource",
            "type": "object",
            "properties": {
              "name": {
                "description": "Name of the feature type",
                "type": "string",
                "required": true
              }
            }
          },
          "title": {
            "description": "Human-readable string representation of the feature type name in the specified language (if not in English)",
            "type": "string",
            "required": true
          },
          "properties": {
            "type": "array",
            "required": true,
            "minItems": 1,
            "items": {
              "description": "Property of the current feature type",
              "type": "object",
              "properties": {
                "name": {
                  "description": "Name of the property",

```

```
        "type": "string",
        "required": true
    },
    "title": {
        "description": "Human-readable string representation of the
property name in the specified language (if not in English)",
        "type": "string",
        "required": true
    },
    "isFreeText": {
        "description": "Indicates whether it is a free text property",
        "type": "boolean",
        "required": false,
        "default": false
    }
}
}
}
}
}
}
}
}
}
}
}
}
}
```

Examples

Request 1 (to get all the feature types in English)

```
http://host:port/path?
  Service=WPS&Request=Execute&Version=1.0.0&RawDataOutput=Output&
  Identifier=GetFeatureTypes&
  DataInputs=language=en
```

Response 1

```
{
  "data": {
    "featureTypes": [
      {
        "name": "er_energyresource",
        "title": "Energy resource",
        "properties": [
          {
            "name": "productionfacilitiesdesc",
            "title": "Production facilities description",
            "isFreeText": true
          },
          {
            "name": "productionstrategy",
            "title": "Production strategy",
            "isFreeText": true
          },
          {
            "name": "waterdepth",
            "title": "Water depth"
          },
          ...
        ]
      }
    ]
  },
}
```

```

    {
      "name": "er_resourceremark",
      "title": "Resource remark",
      "properties": [
        {
          "name": "remark",
          "title": "Remark",
          "isFreeText": true
        }
      ]
    },
    ...
  ]
}

```

Request 2 (to get the feature type er_energyresource in English)

```

http://host:port/path?
  Service=WPS&Request=Execute&Version=1.0.0&RawDataOutput=Output&
  Identifier=GetFeatureTypes&
  DataInputs=language=en;featureType=er_energyresource

```

Request 3 (to get all properties identified by productionstrategy or remark in Danish)

```

http://host:port/path?
  Service=WPS&Request=Execute&Version=1.0.0&RawDataOutput=Output&
  Identifier=GetFeatureTypes&
  DataInputs=language=da;property=productionstrategy;property=remark

```

Response 3

```

{
  "data": {
    "featureTypes": [
      {
        "name": "er_energyresource",
        "title": "Energiressource",
        "properties": [
          {
            "name": "productionstrategy",
            "title": "Produktionsstrategi",
            "isFreeText": true
          }
        ]
      },
      {
        "name": "er_resourceremark",
        "title": "Ressourcebemærkning",
        "properties": [
          {
            "name": "remark",
            "title": "Bemærkning",
            "isFreeText": true
          }
        ]
      }
    ],
    {
      "name": "mr_mineremark",
      "title": "Minebemærkning",
    }
  }
}

```

```

    "properties": [
      {
        "name": "remark",
        "title": "Bemærkning",
        "isFreeText": true
      }
    ],
    ...
  ]
}

```

Request 4 (to get the property identified by `remark` from the feature type `er_resourceremark`)

```

http://host:port/path?
  Service=WPS&Request=Execute&Version=1.0.0&RawDataOutput=Output&
  Identifier=GetFeatureTypes&
  DataInputs=language=en;featureType=er_resourceremark;property=remark

```

3.4 GetFreeTexts operation

Description

This operation allows the client to get free texts in the EGS data model in a certain language. The returned texts are grouped by the feature they belong to.

Data inputs

Input	Type	Multiplicity	Description
<i>language</i>	String	0 – 1	ISO 639-1 code of the language in which to return the response. The default value is <i>en</i> .
<i>featureType</i>	String	1	Name of a feature type used in EuroGeoSource.
<i>property</i>	String	0 – 10	Name of one of the free text properties of the feature type specified in the <i>featureType</i> parameter.
<i>id</i>	Number	0 – 100	Identifier of a feature instance of the feature type specified in the <i>featureType</i> parameter.

Response

A GeoJSON object which is defined by the following JSON schema:

```

{
  "type": "object",
  "required": true,
  "properties": {
    "data": {
      "description": "The requested data",
      "type": "object",
      "required": true,
      "properties": {
        "features": {
          "type": "array",
          "required": true,

```

```

"minItems": 0,
"items": {
  "description": "A feature instance of the specified type",
  "type": "object",
  "properties": {
    "id": {
      "description": "Identifier of the feature instance",
      "type": "number",
      "required": true
    },
    "properties": {
      "description": "An object containing free text properties of the
feature instance",
      "type": "object",
      "required": true
    }
  }
}
}
}
}
}
}
}
}
}

```

Example

Request 1 (to get all free texts of the features instances of the feature type `er_energyresource`)

```

http://host:port/path?
Service=WPS&Request=Execute&Version=1.0.0&RawDataOutput=Output&
Identifier=GetFreeTexts&
DataInputs=language=en;featureType=er_energyresource

```

Response 1

```

{
  "data": {
    "features": [
      {
        "id": 1,
        "properties": {
          "geologicalCharacteristics": "Some description for this feature",
          "productionFacilitiesDesc": "The production facilities description...",
          "productionStrategy": "The production strategy for..."
        }
      },
      {
        "id": 2,
        "properties": {
          "geologicalCharacteristics": "Some description",
          "productionFacilitiesDesc": "Description of the facilities...",
          "productionStrategy": "The production strategy for..."
        }
      },
      ...
    ]
  }
}

```

Request 2 (to get all free texts of the feature instance 1 of the feature type `er_energyresource`)

```
http://host:port/path?
  Service=WPS&Request=Execute&Version=1.0.0&RawDataOutput=Output&
  Identifier=GetFreeTexts&
  DataInputs=language=en;featureType=er_energyresource;id= 1
```

Request 3 (to get certain free texts of the feature instances 1 and 2)

```
http://host:port/path?
  Service=WPS&Request=Execute&Version=1.0.0&RawDataOutput=Output&
  Identifier=GetFreeTexts&
  DataInputs=language=en;
              featureType=er_energyresource;
              id=1;id=2;
              property=geologicalCharacteristics;property=localId;
```

3.5 GetGUILabels operation

Description

This operation allows the client to get the GUI labels used in the Web application in a certain language.

Data inputs

Input	Type	Multiplicity	Description
<i>language</i>	String	0 - 1	ISO 639-1 code of the language in which to return the GUI labels. Default value is <i>en</i> .

Response

A URL of a resource bundle (in the format used by the portal) with the entire GUI in the specified language.

Example

Request (to get all GUI labels in English)

```
http://host:port/path?
  Service=WPS&
  Request=Execute&
  Version=1.0.0&
  RawDataOutput=Output&
  Identifier=GetGUILabels&
  DataInputs=language=en
```

Response

```
http://www.whatever.com/files/english_gui_labels.txt
```

3.6 Error handling

If the service encounters an error while performing an operation, it will return an exception message as specified in subclause 'Execute exceptions' of the OGC Web Processing Service 1.0 specification. An example exception response is:

```
<ows:ExceptionReport
  xmlns:ows="http://www.opengis.net/ows/1.1"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"

  xsi:schemaLocation="http://www.opengis.net/ows/1.1 ../../ows/1.1.0/owsEx
ceptionReport.xsd"
  version="1.0.0">
  <ows:Exception exceptionCode="OperationNotSupported">
    <ows:ExceptionText>
      Request is for an operation that is not supported by this server
    </ows:ExceptionText>
  </ows:Exception>
</ows:ExceptionReport>
```

4 CONCLUSIONS

The multilingual translation web service described in this report, with the additional functionality required by the system to support the multilingual legends of the WMS provided by the project partners, will deliver the multilingual functionality requested by the EuroGeoSource Description of Work and it is designed in a way that makes it easy to include new languages.

In addition to this, it enables external users to retrieve all free texts from the system in English as well as in the language of the data provider.