Making Arches Multilingual: a guidebook (Version 2.1)

Andrea Zerbini (andrea.zerbini@arch.ox.ac.uk)

The Endangered Archaeology in the Middle East and North Africa (EAMENA) project based at the University of Oxford has been customising Arches 3 with the aim of recording cultural heritage and damage to it across the MENA region.
In a region composed of 20 countries, all but one (Iran) primarily Arabic speaking, full multilingual support in English and Arabic was considered a priority for the team.

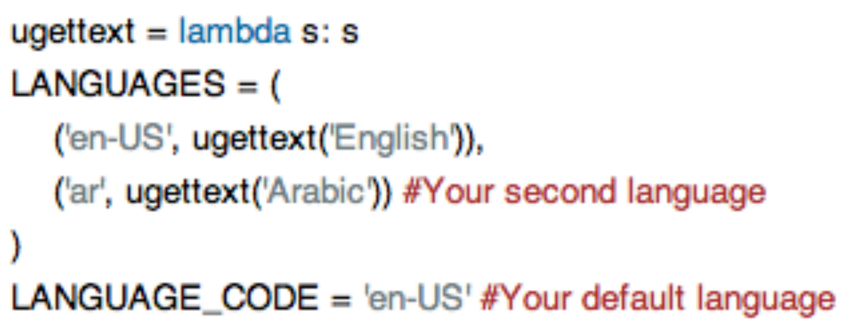
Translation involves both the static strings located in the Arches and Django python files (as well as in the html templates and javascript libraries) and the concept labels and notes saved in the Arches Resource Data Manager (RDM).
The former can be easily achieved by following the steps provided by the Django online documentation on this matter
(https://docs.djangoproject.com/en/1.9/topics/i18n/translation/).

The latter requires a number of additional steps as illustrated in this guidebook.

Step 0. Preliminary changes to settings.py

These changes should be applied when activating Django's internationalization.

- Uncomment 'django.middleware.locale.LocaleMiddlewareyou're your MIDDLEWARE_CLASSES in arches/settings.py
- In your app's settings.py, add the following:



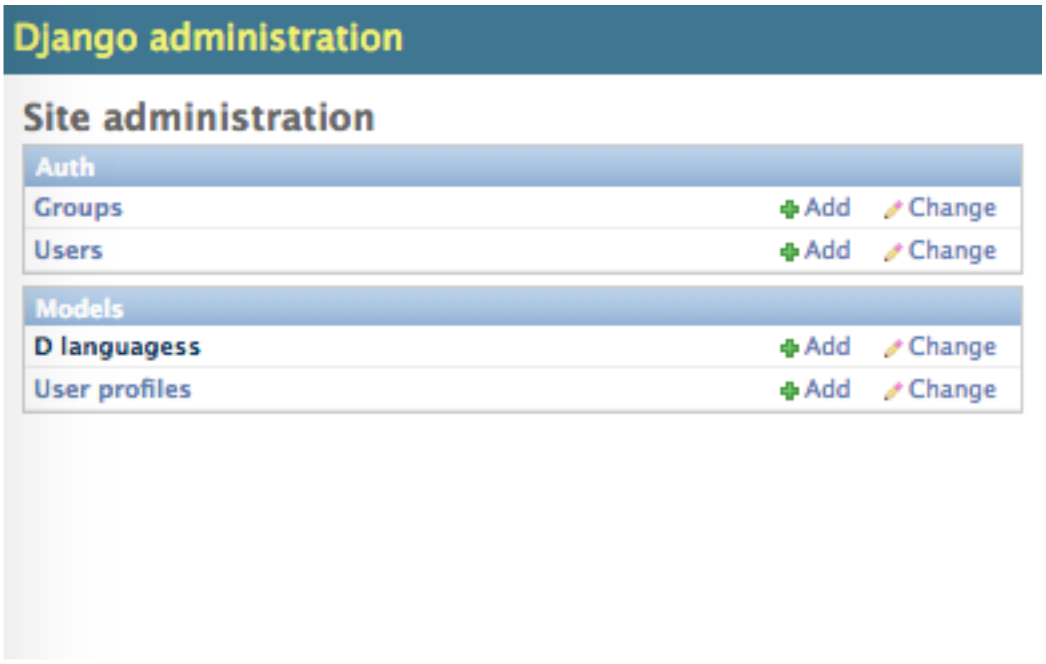
```
ugettext = lambda s: s
LANGUAGES = (
    ('en-US', ugettext('English')),
    ('ar', ugettext('Arabic')) #Your second language
)
LANGUAGE_CODE = 'en-US' #Your default language
```

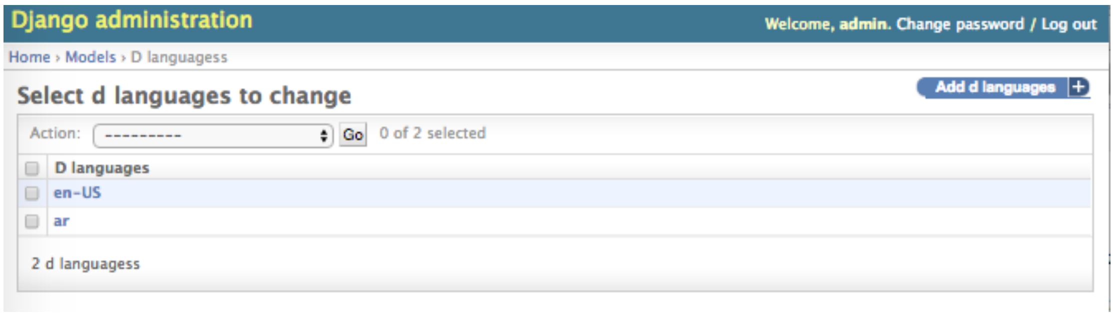
(explanation in http://www.djangobook.com/en/2.0/chapter19.html)

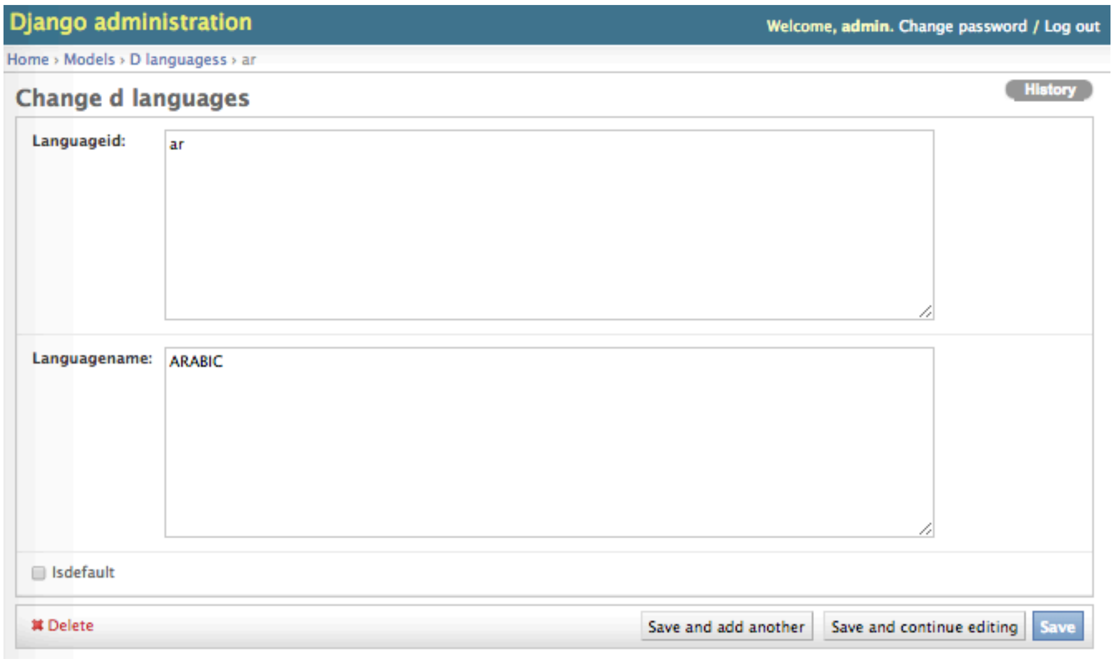
- In settings.py, also add: LOCALE_PATHS = (os.path.join(PACKAGE_ROOT, '../locale'),)

Step 1. Adding a second language support in your Django admin panel

Navigate to your Django admin panel (yourwebsite.com/admin or localhost:8000/admin if you are offline). Arches by default links the model d_languages (a table in the Reference data section of the database) to the admin panel (you can add further models to the admin panel by changing arches/admin.py). Click on d_languages and add a new language by setting Languageid = your second language's standard ISO 639-1 language code (e.g. for standard Arabic this is 'ar').




Django administration
Welcome, admin. Change password / Log out
Home › Models › D languagess
Select d languages to change
Add d languages
Action: --------- Go 0 of 2 selected
D languages
en-US
ar
2 d languagess


Django administration

Welcome, **admin**. Change password / Log out

Home › Models › D languagess › ar

Change d languages

History

Languageid: ar

Languagename: ARABIC

Isdefault

Delete | Save and add another | Save and continue editing | Save

Step 2. Modifying your header.htm template

You are now ready to start modifying the Arches files to support the translation of concept labels. First of all, you will have to modify your header to dynamically obtain a list of languages from the database table d_languages:

- Navigate to your app's template folder and open header.htm, then navigate to <a>{% trans "Languages" %}</a> Replace with the following:

```
<a>{% trans "Languages" %}</a>
<form action="{% url 'set_language' %}" method="post">
{% csrf_token %}
  <input name="next" type="hidden" value="{{ request.get_full_path }}" />
  <select name="language">

<ul class="lenguages">
{% for language in language_list %}
    <li class="active">
        <option value="{{ language.languageid }}"{% if language.languageid == LANGUAGE_CODE %} selected="selected"{% endif %}><a
        href="javascript:void(0);">{{ language.languagename }}<i class="fa fa-check"></i></a> </option>
    </li>
{% endfor %}
  </select>
<input type="submit" value="Change" />
</form>
```

(I have yet to improve on the visualisation of the header. Ultimately I will use a KO viewmodel for this)

Step 3. Adding the header context processor and the i18n url

In order to pull the languages from the database, a custom context processor is needed. Navigate to /arches/app/utils/context_processors.py and add the following:

```
def header(request):
    languages = DLanguages.objects.all()
    return {
        'language_list': languages
    }
```

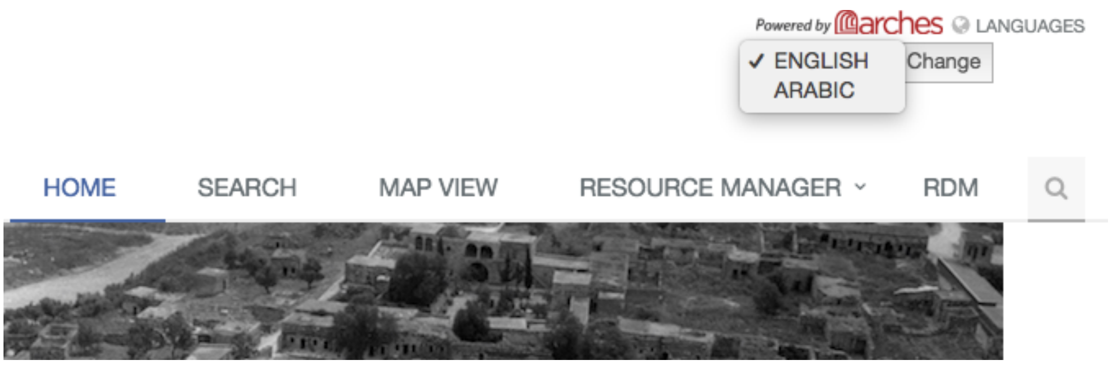
Since you are calling an Arches model, you need to also reference it at the top of this file by adding the following import string at the top of the file:

from arches.app.models.models import DLanguages

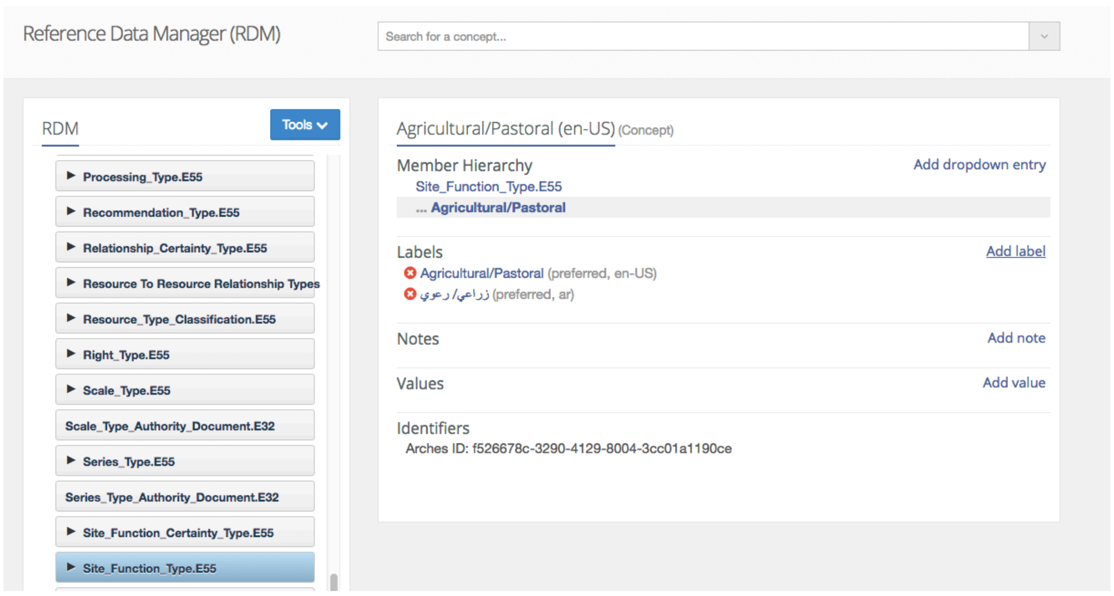
Then, navigate back to the arches/settings.py and add the following like at the end of the list of TEMPLATE_CONTEXT_PROCESSORS:
'arches.app.utils.context_processors.header'

Finally, navigate to arches/urls.py and add, at the bottom of urlpatterns, the following line: url(r'^i18n/', include('django.conf.urls.i18n')),
See here
(https://docs.djangoproject.com/en/1.9/topics/i18n/translation/#the-set-language-redirect-view) for an explanation of this step.

At this point, you should be able to visualise a dropdown containing the languages stored in the DB table d_languages:



You should now proceed to enter your second language's concept labels in the Arches' RDM, see example below:



Reference Data Manager (RDM)

Search for a concept...

RDM

Tools

- Processing_Type.E55
- Recommendation_Type.E55
- Relationship_Certainty_Type.E55
- Resource To Resource Relationship Types
- Resource_Type_Classification.E55
- Right_Type.E55
- Scale_Type.E55
- Scale_Type_Authority_Document.E32
- Series_Type.E55
- Series_Type_Authority_Document.E32
- Site_Function_Certainty_Type.E55
- Site_Function_Type.E55

Agricultural/Pastoral (en-US) (Concept)

Member Hierarchy — Add dropdown entry

Site_Function_Type.E55

... Agricultural/Pastoral

Labels — Add label

Agricultural/Pastoral (preferred, en-US)

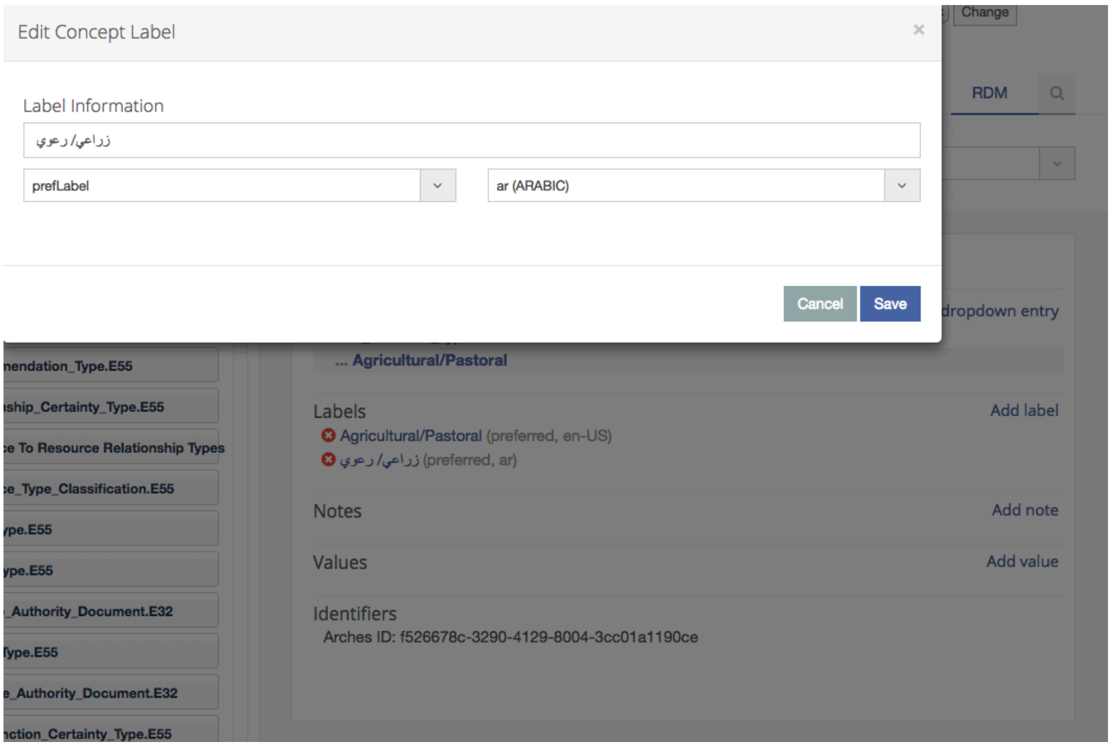
زراعي/رعوي (preferred, ar)

Notes — Add note

Values — Add value

Identifiers

Arches ID: f526678c-3290-4129-8004-3cc01a1190ce



Edit Concept Label

Label Information

زراعي/رعوي

prefLabel

ar (ARABIC)

Cancel Save

Once you have fully translated all of your concepts, you can move on to the next steps. The next steps illustrate how to make sure that, once a second language is selected (that is, a language that is different from the default language given in settings.LANGUAGE_CODE), the concept labels in the Report page, Dropdowns, and the selected branches in the Resource Editor are all displayed in this language.

Step 4. Report page changes

In your Arches_HIP /views folder, navigate to resources.py. In the report() method, you will need to replace lang = settings.LANGUAGE_CODE with lang=

request.GET.get('lang', request.LANGUAGE_CODE) . This will allow the method to obtain the language code from Django's set_language() (called by the header form) instead of by looking it up in the settings.py file. The Report page will now correctly display in the language selected via header.htm.

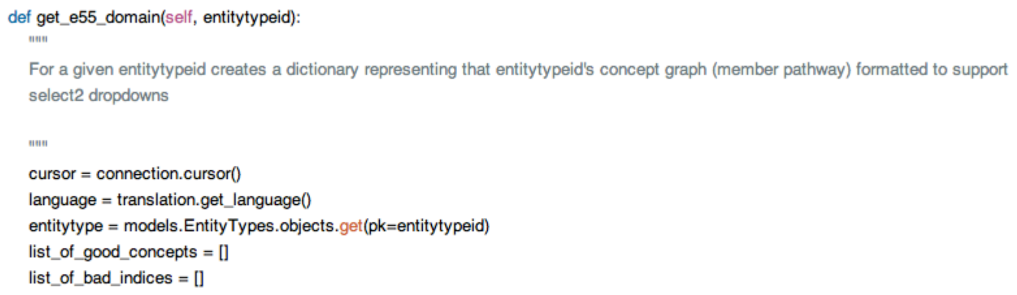
Step 5. Populating the Dropdowns in the correct language in Editing mode

Dropdowns (E55 nodes) are populated via the method get_e55_domain() which gets called by your app's models/forms.py. That method is defined in arches/app/models/concept.py to which you will now need to navigate. Navigate to the get_e55_domain() method (should be around l. 620). The sql query used to collect the concepts that will populate the dropdowns in the Resource Manager does not filter by languageid.

> Version 1 of this guidebook suggested modifying the query by adding a WHERE clause that filters by the target language (passed via translation.get_language()). However, this causes the problem that, if by any chance only some concepts in a dropdown have been translated in the RDM, these will be the only ones to appear in the Resource Editor dropdowns. For this reason, this solution has been deprecated.

To solve this, and to allow us to display dropdowns in mixed languages (necessary if not all concepts need translation, e.g. in the case of percentage ranges), we must modify this method as follows:

- Define two new lists at the beginning of the method:

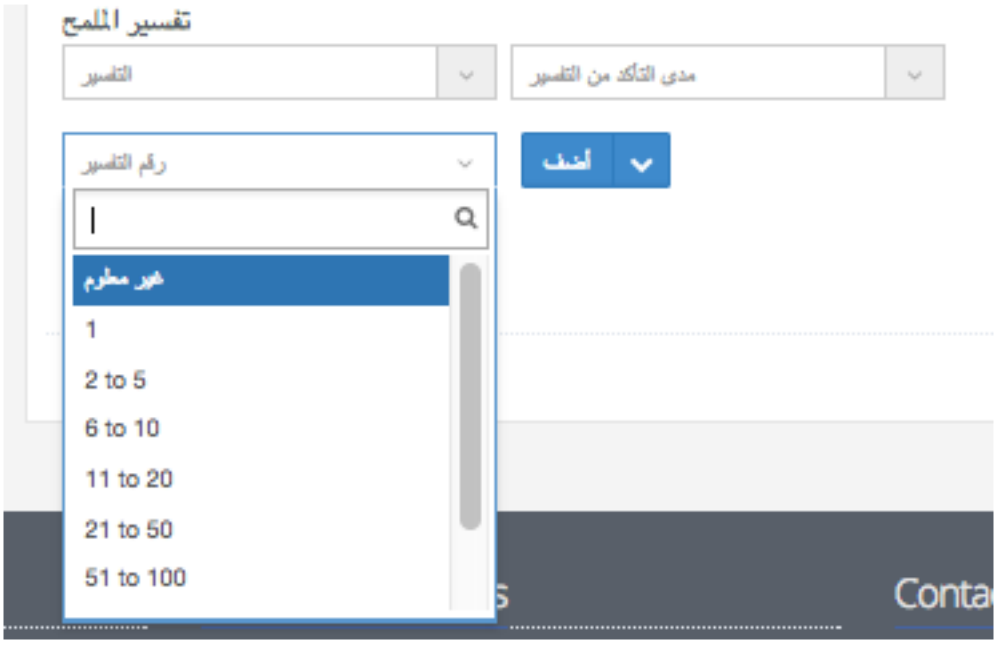


```
def get_e55_domain(self, entitytypeid):
    """
    For a given entitytypeid creates a dictionary representing that entitytypeid's concept graph (member pathway) formatted to support
    select2 dropdowns

    """
    cursor = connection.cursor()
    language = translation.get_language()
    entitytype = models.EntityTypes.objects.get(pk=entitytypeid)
    list_of_good_concepts = []
    list_of_bad_indices = []
```

- Create two additional for loops. The first creates a list of concepts whose labels have been translated in the target language and are present in the RDM; the second contains an index of the rows returned by the SQL query with labels in other languages for concepts the translation of which exists in the RDM. This index is used to purge the SQL output list from these latter rows. The new, purged list (newrows) is then looped through to populate the dropdowns:

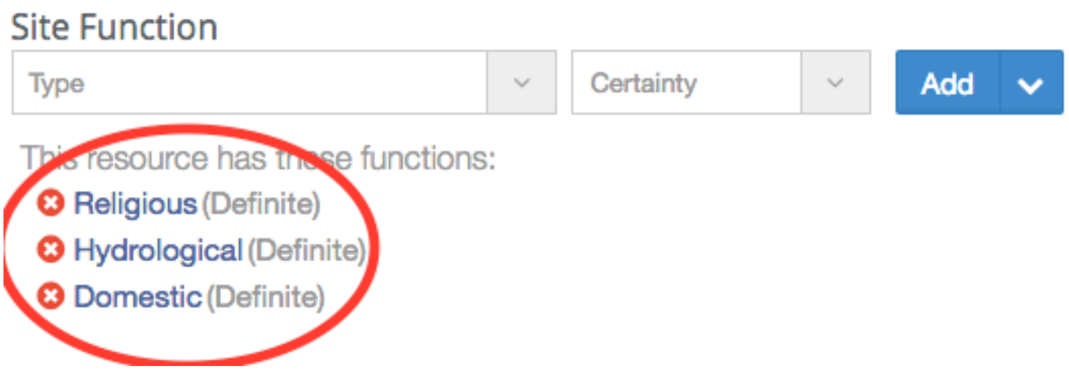
```
for row in rows: # Looks for concepts which have a label in the target language
    rec = dict(zip(column_names, row))
    if str(rec['languageid']).lower() == language:
        path = rec['conceptpath'][-37:-1] #Retrieves the bottom conceptid in the conceptpath
        list_of_good_concepts.append(path)

for row in rows: # Looks for concepts which have multiple-language labels, including the target language, and builds an index of
those rows
    rec = dict(zip(column_names, row))
    if str(rec['languageid']).lower() != language:
        for concept in list_of_good_concepts:
            if rec['conceptpath'][-37:-1] == concept:  #Retrieves the bottom conceptid in the conceptpath
                list_of_bad_indices.append(rows.index(row))

removeset = set(list_of_bad_indices)
newrows = [v for i, v in enumerate(rows) if i not in removeset] # Builds the new set of rows, having purged the rows which contain
concept labels in other languages for concepts that have labels in the target language

for row in newrows:
    rec = dict(zip(column_names, row))
    path = rec['conceptpath'][1:-1].split(',')
    _findNarrower(result, path, rec)
```

The screenshot below shows an example of a mixed-language dropdown:



Step 6. Selected branches

Changes will be required also to the method get_nodes() (which may be found in arches/app/models/forms.py), which is responsible for populating the branches of a node (and its children) which are already stored in the database (e.g. see three branches of the node Site Function and its child (Site Function Certainty Type) below):



This resource has these functions:
Religious (Definite)
Hydrological (Definite)
Domestic (Definite)

Navigate to arches/app/models/forms.py. Add 'import uuid', 'import re' and 'from django.utils import translation' to the list of imports at the top. Then proceed to modify get_nodes as follows:

```
def get_nodes(self, entitytypeid):

    #return self.resource.get_nodes(entitytypeid, keys=['label', 'value', 'entityid', 'entitytypeid'])
    ret = []
    prefLabel  = {}
    entities = self.resource.find_entities_by_type_id(entitytypeid)
    uuid_regex = re.compile('[0-9a-fA-F]{8}-[0-9a-fA-F]{4}-[0-9a-fA-F]{4}-[0-9a-fA-F]{4}-[0-9a-fA-F]{12}')
    for entity in entities:

        flattened = []
        # Iterates through every branch (with its child nodes) to substitute the default label with the desired prefLabel
        for flattenedvalue in entity.flatten():
            # Makes sure that only the visualisation of concepts is altered: free text and geometric data are not
            if isinstance(flattenedvalue.value, basestring) and uuid_regex.match(flattenedvalue.value):
                # Retrieves the concept label in the correct language
                prefLabel = get_preflabel_from_valueid(flattenedvalue.value, lang=translation.get_language())
                flattenedvalue.label = prefLabel['value']
                flattenedvalue.value = prefLabel['id']

            flattened.append(flattenedvalue)

        ret.append({'nodes': flattened})

    return ret
```

This method substitutes a concept's label (a string such as 'Building') and its value (a UUID) with the label and value corresponding to the concept in the selected language.

Step 7. Replacing settings.LANGUAGE_CODE with request.LANGUAGE_CODE in -in arches/app/views/resources.py and concept.py

This step may not be necessary, but I have replaced the standard settings.LANGUAGE_CODE throughout in arches/app/views/resources.py and concept.py with request.LANGUAGE_CODE. The only exception is the last if clause of get_preflabel_from_conceptid(), where if 'preflabel['_source']['language'] == settings.LANGUAGE_CODE and ret == None:'

should be replaced with if preflabel['_source']['language'] == lang and ret == None:

That's it! Let me know if it works. All of the modified source files are available on our github repository: https://github.com/azerbini/eamena2/

AZ