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# **Skosprovider\_sqlalchemy Documentation**

*Release 0.5.1*

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This library offers an implementation of the `skosprovider.providers.VocabularyProvider` interface that uses a `SQLAlchemy` backend. While a `VocabularyProvider` is a read-only interface, the underlying `SQLAlchemy domain model` is fully writeable.

This library is fully integrated into `Atramhesis`, an online open source editor for `SKOS` vocabularies.



If you have questions regarding `Skosprovider SQLAlchemy`, feel free to contact us. Any bugs you find or feature requests you have, you can add to our [issue tracker](#). If you're unsure if something is a bug or intentional, or you just want to have a chat about this library or `SKOS` in general, feel free to join the [Atramhasis discussion forum](#). While these are separate software projects, they are being run by the same people and they integrate rather tightly.

## 1.1 Setup

### 1.1.1 Installation

Installation of `Skosprovider sqlalchemy` is easily done using `pip`.

```
$ pip install skosprovider_sqlalchemy
```

### 1.1.2 Creating a database

Since `Skosprovider sqlalchemy` implements the `SkosProvider` interface with a relational database as a backend, you first need to create this database. To do this, please follow the instructions of your database software. If you're working with `SQLite`, you don't need to do anything.

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**Note:** Because `Skosprovider sqlalchemy` uses `SQLAlchemy` as an ORM layer, it's not tailored to any specific database. The codebase is continuously tested on both `SQLite` and `PostgreSQL`. Other databases are untested by us, but as long as they are supported by `SQLAlchemy`, they should work.

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Once your database has been created, you can initialise it with the necessary database tables that will contain your `SKOS` vocabularies and concepts.

```
$ init_skos_db sqlite:///vocabs.db
```

Let's have a look at what this script did.

```
$ sqlite3 vocabs.db
SQLite version 3.7.9 2011-11-01 00:52:41
Enter ".help" for instructions
Enter SQL statements terminated with a ";"
sqlite> .tables
collection_concept          conceptscheme_note
concept                     label
concept_hierarchy_collection labeltype
concept_hierarchy_concept   language
concept_label               match
concept_note                 matchtype
concept_related_concept     note
conceptscheme               notetype
conceptscheme_label        visitation
```

## 1.2 API Documentation

### 1.2.1 Providers module

**class** skosprovider\_sqlalchemy.providers.**SQLAlchemyProvider** (*metadata*, *session\_maker*, *\*\*kwargs*)

A `skosprovider.providers.VocabularyProvider` that uses SQLAlchemy as backend.

**expand\_strategy** = 'recurse'

Determines how the expand method will operate. Options are:

- *recurse*: Determine all narrower concepts by recursively querying the database. Can take a long time for concepts that are at the top of a large hierarchy.
- *visit*: Query the database's *Visitation* table. This table contains a nested set representation of each conceptscheme. Actually creating the data in this table needs to be scheduled.

### 1.2.2 Models module

**class** skosprovider\_sqlalchemy.models.**Collection** (*\*\*kwargs*)  
A collection as know by SKOS.

**class** skosprovider\_sqlalchemy.models.**Concept** (*\*\*kwargs*)  
A concept as know by SKOS.

**class** skosprovider\_sqlalchemy.models.**ConceptScheme** (*\*\*kwargs*)  
A SKOS conceptscheme.

**class** skosprovider\_sqlalchemy.models.**Initialiser** (*session*)  
Initialises a database.

Adds necessary values for labelType, noteType and language to the database.

The list of languages added by default is very small and will probably need to be expanded for your local needs.

**init\_all** ()  
Initialise all objects (labeltype, notetype, language).



**init\_labeltype()**

Initialise the labeltypes.

**init\_languages()**

Initialise the languages.

Only adds a small set of languages. Will probably not be sufficient for most use cases.

**init\_matchtypes()**

Initialise the matchtypes.

**init\_notetype()**

Initialise the notetypes.

**class** skosprovider\_sqlalchemy.models.**Label** (*label*, *labeltype\_id=u'prefLabel'*, *language\_id=None*)  
A label for a *Concept*, *Collection* or *ConceptScheme*.

**class** skosprovider\_sqlalchemy.models.**LabelType** (*name*, *description*)  
A labelType according to SKOS.

**class** skosprovider\_sqlalchemy.models.**Language** (*id*, *name*)  
A Language.

**class** skosprovider\_sqlalchemy.models.**Match** (\*\*kwargs)  
A match between a *Concept* in one *ConceptScheme* and those in another one.

**class** skosprovider\_sqlalchemy.models.**MatchType** (*name*, *description*)  
A matchType according to SKOS.

**class** skosprovider\_sqlalchemy.models.**Note** (*note*, *notetype\_id*, *language\_id*, *markup=None*)  
A note for a *Concept*, *Collection* or *ConceptScheme*.

**class** skosprovider\_sqlalchemy.models.**NoteType** (*name*, *description*)  
A noteType according to SKOS.

**class** skosprovider\_sqlalchemy.models.**Source** (*citation*, *markup=None*)  
The source where a certain piece of information came from.

**class** skosprovider\_sqlalchemy.models.**Thing** (\*\*kwargs)  
Abstract class for both *Concept* and *Collection*.

**class** skosprovider\_sqlalchemy.models.**Visitation** (\*\*kwargs)  
Holds several nested sets.

The visitation object and table hold several nested sets. Each *skosprovider\_sqlalchemy.models.Visitation* holds the positional information for one conceptplacement in a certain nested set.

Each conceptscheme gets its own separate nested set.

skosprovider\_sqlalchemy.models.**label** (*labels=[]*, *language=u'any'*, *sortLabel=False*)  
Provide a label for a list of labels.

Deprecated since version 0.5.0: Please use *skosprovider.skos.label()*. Starting with *skosprovider 0.6.0*, the function can function on *skosprovider\_sqlalchemy.models.Label* instances as well.

#### Parameters

- **labels** (*list*) – A list of *labels*.
- **language** (*str*) – The language for which a label should preferentially be returned. This should be a valid IANA language tag.

- **sortLabel** (*boolean*) – Should sortLabels be considered or not? If True, sortLabels will be preferred over prefLabels. Bear in mind that these are still language dependent. So, it's possible to have a different sortLabel per language.

**Return type** A *Label* or *None* if no label could be found.

`skosprovider_sqlalchemy.models.related_concepts_append_listener` (*target*, *value*, *initiator*)

Listener that ensures related concepts have a bidirectional relationship.

`skosprovider_sqlalchemy.models.related_concepts_remove_listener` (*target*, *value*, *initiator*)

Listener to remove a related concept from both ends of the relationship.

### 1.2.3 Utils module

**class** `skosprovider_sqlalchemy.utils.VisitationCalculator` (*session*)

Generates a nested set for a conceptscheme.

**visit** (*conceptscheme*)

Visit a `skosprovider_sqlalchemy.models.Conceptscheme` and calculate a nested set representation.

**Parameters** **conceptscheme** – A `skosprovider_sqlalchemy.models.Conceptscheme` for which the nested set will be calculated.

`skosprovider_sqlalchemy.utils.import_provider` (*provider*, *conceptscheme*, *session*)

Import a provider into a SQLAlchemy database.

#### Parameters

- **provider** – The `skosprovider.providers.VocabularyProvider` to import. Since the SQLAlchemy backend uses integers as keys, this backend should have id values that can be cast to int.
- **conceptscheme** – A `skosprovider_sqlalchemy.models.Conceptscheme` to import the provider into. This should be an empty scheme so that there are no possible id clashes.
- **session** – A `sqlalchemy.orm.session.Session`.

## 1.3 History

### 1.3.1 0.5.1 (2016-10-05)

- Catch linking errors when importing a provider and turn them into log warning. By linking errors we mean cases where one concept has a relation to a non-existing other concept. (#25)
- Allow building as wheel.

### 1.3.2 0.5.0 (2016-08-11)

- Update to skosprovider 0.6.0
- **Minor BC break:** A `skosprovider_sqlalchemy.models.Language` that gets cast to a string, now returns the language's ID (the IANA language code), as opposed to the language's description it would previously return.

- **Minor BC break:** The URI attribute has been made required for a `skosprovider_sqlalchemy.models.ConceptScheme`. Before it was optional, but it probably would have caused problems with skosprovider anyway.
- Due to the update to skosprovider 0.6.0, a new field `markup`, was added to a `skosprovider_sqlalchemy.models.Note`. When upgrading from a previous version of `skosprovider_sqlalchemy`, any databases created in that previous versions will need to be updated as well. Please add a field called `markup` to the `note` table.
- Inline with the skosprovider 0.6.0 update, a `languages` attribute was added to `skosprovider_sqlalchemy.models.ConceptScheme`. When upgrading from a previous version of `skosprovider_sqlalchemy`, any databases created with that previous versions will need to be updated as well. Please add a table called `conceptscheme_language` with fields `conceptscheme_id` and `language_id`. (#18)
- To comply with the skosprovider 0.6.0 update, the `sources` attribute was added to `skosprovider_sqlalchemy.models.ConceptScheme`, `skosprovider_sqlalchemy.models.Concept` and `skosprovider_sqlalchemy.models.Collection`. When upgrading from a previous version of `skosprovider_sqlalchemy`, any databases created with that previous versions will need to be updated as well. Please add a table `source` with fields `id`, `citation` and `markup`, a table `concept_source` with fields `concept_id` and `source_id` and a table `conceptscheme_source` with fields `conceptscheme_id` and `source_id`.
- All methods that return a list have been modified in line with skosprovider 0.6.0 to support sorting. Sorting is possible on `id`, `uri`, `label` and `sortlabel`. The last two are language dependent. The `sortlabel` allows custom sorting of concepts. This can be used to eg. sort concepts representing chronological periods in chronological in stead of alphabetical order. (#20)
- To comply with the skosprovider 0.6.0 update, the deprecated `skosprovider_sqlalchemy.providers.SQLAlchemyProvider.expand_concept()` was removed.
- When importing a provider, check if the languages that are being used in the provider are already in our database. If not, validate them and add them to the database. In the past the entire import would fail if not all languages had previously been added to the database. (#14)
- When importing a provider, try to import as much information as possible about the `concept_scheme` that's attached to the provider. (#19)
- When querying for individual an `conceptscheme` or `concept`, use `joinedload` to reduce the number of queries needed to collect everything. (#15)
- Deprecated the `skosprovider_sqlalchemy.models.label()` function. Please use `skosprovider.skos.label()` from now on, since this function can now operate on both `skosprovider.skos.Label` and `skosprovider_sqlalchemy.models.Label` instances. This was the reason for the BC break in this release.

### 1.3.3 0.4.2 (2015-03-02)

- Make README work better on pypi.
- Fix a further problem with the length of language identifiers. Previous fix in 0.3.0 only fixed the length of the identifiers in the `languages` table, but not in the links from the labels and the notes to the language table. [BartSaelen]
- Added some documentation about setting up a database.

### 1.3.4 0.4.1 (2014-12-18)

- Fix a bug with the deletion of a `Concept` not being possible without having it's matches deleted first. [BartSaelen]

### 1.3.5 0.4.0 (2014-10-28)

- **Major BC break:** A provider is no longer passed a database session, but a database session maker. This change was needed to get the provider to function properly in threaded web applications. This will mean changing the code where you're creating your provider. In the past, you probably called a session maker first and then passed the result of this call to the provider. Now you should just pass the session maker itself and let the provider create the sessions for you.
- Different way of fetching the `ConceptScheme` for a provider. No longer fetches a conceptscheme at provider instantiation, but when needed. Otherwise we end up with a possibly very long cached version of a conceptscheme.

### 1.3.6 0.3.0 (2014-10-17)

- Update to skosprovider 0.4.0.
- Add `ConceptScheme` information to a provider so it can be attached to `Concept` objects that are handled by the provider.
- Let provider handle superordinates and subordinate arrays.
- Let provider add notes to collections.
- Added a `Match` model to handle matches. Expand the provider to actually provide information on these matches.
- Expand the field length for language identifiers. IANA suggests that identifiers up to 35 characters should be permitted. Updated our field length to 64 to have a bit of an extra buffer.

### 1.3.7 0.2.1 (2014-08-25)

- Switch to py.test
- Add `Coveralls` support for code coverage.
- Add ability to configure the SQLAlchemy URL used for testing. Allows testing on multiple RDBMS systems.
- Run `Travis` tests for both SQLite and PostgreSQL.
- Fix a bug in `skosprovider_sqlalchemy.utils.import_provider()` when dealing with narrower collections (#8). [cahytine]
- Make the provider actually generate a `URI` if there's none in the database.

### 1.3.8 0.2.0 (2014-05-14)

- Compatibility with skosprovider 0.3.0
- Implement `skosprovider.providers.VocabularyProvider.get_by_uri()`.
- Implement `skosprovider.providers.VocabularyProvider.get_top_concepts()`.
- Implement `skosprovider.providers.VocabularyProvider.get_top_display()` and `skosprovider.providers.VocabularyProvider.get_children_display()`.
- Add a `UniqueConstraint(conceptscheme_id, concept_id)` to `Thing`. (#3)
- Rename the `colletions` attribute of `skosprovider_sqlalchemy.models.Thing` to `member_of`. (#7)

### 1.3.9 0.1.2 (2013-12-06)

- Pinned dependency on skosprovider < 0.3.0
- Pass data to `skosprovider.skos.Concept` using keywords in stead of positions.

### 1.3.10 0.1.1 (2013-11-28)

- Fixed a bug with collection members being passed instead of their ids.
- Fixed another bug where model ids were used instead of concept ids.

### 1.3.11 0.1.0

- Initial version
- Implementation of a SKOS domain model in SQLAlchemy.
- Implementation of a `skosprovider.providers.VocabularyProvider` that uses this model.
- Can query a hierarchy recursively or using nested sets.
- Utility function to import a `skosprovider.providers.VocabularyProvider` in a database.



## CHAPTER 2

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### Indices and tables

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