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RDMO is a tool to support the systematic planning, organisation and implementation of the data management throughout the course of a research project. RDMO is funded by the Deutsche Forschungsgemeinschaft (DFG).

**Home Page**  https://rdmorganiser.github.io

**Source code**  https://github.com/rdmorganiser/rdmo

**Documentation**  http://rdmo.readthedocs.io

**FAQ**  [http://www.forschungsdaten.org/index.php/FAQs](http://www.forschungsdaten.org/index.php/FAQs)

**Mailing list**  https://www.listserv.dfn.de/sympa/subscribe/rdmo

**Slack**  https://rdmo.slack.com

**Demo**  https://rdmo.aip.de

Warning: This software is currently under development and not production ready.
For demonstration, development or testing purposes, RDMO can be installed on Linux, Windows and macOS. If you, however, to set up a production environment, serving RDMO over a Network or the Internet, we strongly suggest that you use a recent Linux distribution, namely CentOS7, Debian 8 or 9, or Ubuntu 16.04.3 LTS (Xenial Xerus).

The code is mainly written in Python and should work with a Python higher than 3.4. RDMO works also on Python 2.7. Please note that for a CentOS7/Apache setup, only Python 2.7 is possible.

An installation of RDMO contains of three parts:

1. A directory which holds all the settings and customisations, custom to your installation of RDMO. We will call this directory *rdmo-app*, but you can use any name you see fit.

2. The actual *rdmo* package, which is centrally maintained by the RDMO team, is installed as a dependency in a virtual environment.

3. A database to store the content, which is generated by the users of your RDMO installation. Currently, we support Postgres, MySQL, and SQLite.

This chapter shows how these components are set up. Optional components can be installed afterwards and are covered under Configuration.

For testing and development, you can run RDMO using your regular user account. On a production system, a dedicated user account should be used. We suggest to create a user called *rdmo* with the group *rdmo* and the home directory `/srv/rdmo`: `sudo adduser rdmo --home /srv/rdmo`. We will use this user throughout this documentation.

Do not use the root user to run RDMO! It is a bad idea anyway and several steps of the installation will not work. `sudo` is used in the installation when needing root-privileges to install packages.

### 1.1 Install prerequisites

Installing the prerequisites for RDMO differs on the different operating systems and is therefore covered in different sections. Here, you need to use the superuser.
1.1.1 Linux

We recommend to install the prerequisites using the packaging system of your distribution. On Debian/Ubuntu use:

```bash
sudo apt install build-essential libxml2-dev libxslt-dev zlib1g-dev \    python3-dev python3-pip python3-venv \    git pandoc

# optional, for pdf output
sudo apt install texlive texlive-xetex
```

on RHEL/CentOS use:

```bash
sudo yum install gcc gcc-c++ libxml2-devel libxslt-devel \    python34-devel python34-pip python34-virtualenv \    git pandoc

# optional, for pdf output
sudo yum install texlive texlive-xetex texlive-mathspec texlive-euenc \    texlive-xetex-def texlive-xltxtra
```

On Ubuntu 14.04, python3-venv is not available. Please use python3.5-venv instead.

On RHEL/CentOS selinux is enabled by default. This can result in unexpected errors, depending on where you store the RDMO source code on the system. While the preferable way is to configure it correctly (which is beyond the scope of this documentation), you can also set selinux to permissive or disabled in /etc/selinux/config (and reboot afterwards).

If you want to use Python 2.7 instead of Python 3, please use the corresponding packages:

```bash
apt install python-dev python-pip python-virtualenv  # Debian/Ubuntu
yum install python-devel python-pip python-virtualenv  # RHEL/CentOS
```

1.1.2 macOS

We recommend to install the prerequisites using brew:

```bash
brew install python3  # for python 3
brew install python  # for python 2
brew install git
brew install pandoc

# optional, for pdf export
brew install texlive
```

1.1.3 Windows

On Windows, the software prerequisites need to be downloaded and installed from their particular web sites.

For python:

- download from https://www.python.org/downloads/windows/
- we recommend a version >= 3.4
- don’t forget to check ‘Add Python to environment variables’ during setup
For git:

- download from https://git-for-windows.github.io/

For the Microsoft C++ Build Tools:

- download from https://wiki.python.org/moin/WindowsCompilers

For Pandoc:

- download from https://github.com/jgm/pandoc/releases

For pdflatex (optional, for pdf export):

- download from http://miktex.org/

All further steps need to be performed using the windows shell cmd.exe. You can open it from the Start-Menu.

1.2 Obtaining the app directory

The next step is to create the rdmo-app directory by cloning the corresponding repository into the home directory of you rdmo user:

```
git clone https://github.com/rdmorganiser/rdmo-app
```

Note that this is not the main rdmo repository, only the configuration files. Inside this directory, you will find:

- a config directory, containing the main settings of your RDMO installation,
- a requirements directory, containing shortcuts to install the different mandatory and optional dependencies, and
- a manage.py script, which is the main way to interact with your RDMO installation on the command line. Most of the following steps will use this script.

The rdmo-app directory corresponds to a project in Django terms.

1.3 Install Python packages

After you have obtained the rdmo-app, you need to install the rdmo package and the other python dependencies.

Change to the rdmo-app directory and create a Virtual Environment (this is done as your user or the created rdmo user, not as root):

```
cd rdmo-app
python3 -m venv env # for python3
virtualenv env # for python2.7
source env/bin/activate # on Linux or macOS
call env\Scripts\activate.bat # on Windows
pip install --upgrade pip setuptools # update pip and setuptools
```

After the virtual environment is activated, the rdmo package can be installed using pip:

```
pip install rdmo
```

1.2. Obtaining the app directory
The virtual environment encapsulates your RDMO installation from the rest of the system. This makes it possible to run several applications with different python dependencies on one machine and to install the dependencies without root permissions.

**Important:** The virtual environment needs to be activated, using `source env/bin/activate` or `call env\Scripts\activate.bat`, everytime a new terminal is used.

### 1.4 Setup the application

#### 1.4.1 Basic setup

To set up the application, create a new file `config/settings/local.py` in your cloned `rdmo-app` directory. For the example user with the home `/srv/rdmo`, this would now be `/srv/rdmo/rdmo-app/config/settings/local.py`.

You can use `config/settings/sample.local.py` as template, i.e.:

```bash
cp config/settings/sample.local.py config/settings/local.py  # on Linux or macOS
copy config\settings\sample.local.py config\settings\local.py  # on Windows
```

Most of the settings of your RDMO instance are specified in this file. The different settings are explained in detail later in the documentation. For a minimal configuration, you need to set `DEBUG = True` to see verbose error messages and serve static files, and `SECRET_KEY` to a long random string, which you will keep secret. Your database connection is configured using the `DATABASES` variable. Database configuration is covered later in the documentation. If no `DATABASE` setting is given sqlite3 will be used as database backend.

Then, initialize the application, using:

```bash
python manage.py migrate  # initializes the database
python manage.py setup_groups  # creates groups with different permissions
python manage.py createsuperuser  # creates the admin user
```

#### 1.4.2 Third party vendor files

By default third party vendor files (like jQuery or Bootstrap javascripts) are retrieved from the content delivery networks that they are hosted on. If you would like to avoid third party requests you could host them yourself. This can be achieved easily with two simple steps.

1. download the vendor files from the cdns by running the provided script

   ```bash
   python manage.py download_vendor_files
   ```

2. make sure your `local.py` does contain the following line

   ```python
   VENDOR_CDN = False
   ```

#### 1.4.3 RDMO development server

After these steps, RDMO can be run using Djangos integrated development server:

```bash
python manage.py runserver
```
Then, RDMO is available on http://127.0.0.1:8000 in your (local) browser. The different ways RDMO can be deployed are covered in the next chapter. The newly installed RDMO instance is still empty, i.e. no questionnaire or views are available. They need to be imported and/or created as described under Management.
As already mentioned, RDMO can be run in two different setups:

- for development or testing, using the build-in Django development server.
- in production, using a web server and the wsgi protocol. We suggest to use one of the following setups:
  - Apache2 and mod_wsgi (Shibboleth can only be used with this version.)
  - nginx, gunicorn and systemd

### 2.1 Development server

Django comes with an integrated development server. It can be started using:

```
python manage.py runserver
```

Then, RDMO is available on http://localhost:8000 in your (local) browser. The development server is not suited to serve the application to the internet.

If you want the development server to be accessible from other machines in your local network you need to use:

```
python manage.py runserver 0.0.0.0:8000
```

where 8000 is the port and can be changed according to your needs. Please do not use this setup for more than testing and development, it is not secure. The Django development server does only serve the static files correctly if you have debug mode enabled. Therefore please do not forget to change the line `DEBUG = False` in your config/settings/local.py to `DEBUG = True` if you want to use it.

More information about the development server can be found in the Django documentation.
2.2 Apache and mod_wsgi

In production, you should create a dedicated user for RDMO. All steps for the installation, which do not need root access, should be done using this user. As before, we assume this user is called rdmo and it’s home is /srv/rdmo and therefore your rdmo-app is located in /srv/rdmo/rdmo-app.

Install the Apache server and mod_wsgi using:

```
# Debian/Ubuntu
sudo apt install apache2 libapache2-mod-wsgi-py3  # for python3
sudo apt install apache2 libapache2-mod-wsgi    # for python2.7

# CentOS
sudo yum install httpd mod_wsgi                 # only for python2.7
```

Next, create a virtual host configuration. Unfortunately, the different distributions use different versions of Apache and mod_wsgi and therefore require a slightly different setup:

For Debian/Ubuntu in /etc/apache2/sites-available/000-default.conf use:

```
<VirtualHost *:80>
    ServerAdmin webmaster@localhost
    DocumentRoot /var/www/html

    ErrorLog $({APACHE_LOG_DIR}/error.log
    CustomLog $({APACHE_LOG_DIR}/access.log combined

    Alias /static /srv/rdmo/rdmo-app/static_root/
    <Directory /srv/rdmo/rdmo-app/static_root/>
        Require all granted
    </Directory>

    WSGIDaemonProcess rdmo user=rdmo group=rdmo home=/srv/rdmo/rdmo-app python-home=/srv/rdmo/rdmo-app/env
    WSGIPassAuthorization On

    <Directory /srv/rdmo/rdmo-app/config/>
        <Files wsgi.py>
            Require all granted
        </Files>
    </Directory>
</VirtualHost>
```

for CentOS 7 in /etc/httpd/conf.d/vhosts.conf use:

```
<VirtualHost *:80>
    ServerAdmin webmaster@localhost
    DocumentRoot /var/www/html/

    Alias /static /srv/rdmo/rdmo-app/static_root/
    <Directory /srv/rdmo/rdmo-app/static_root/>
        Require all granted
    </Directory>

    WSGIDaemonProcess rdmo user=rdmo group=rdmo home=/srv/rdmo/rdmo-app

    <Directory /srv/rdmo/rdmo-app/config/>
        <Files wsgi.py>
            Require all granted
        </Files>
    </Directory>
</VirtualHost>
```

(continues on next page)
python-path=/srv/rdmo/rdmo-app:/srv/rdmo/rdmo-app/env/lib/python2.7/site-packages
WSGIProcessGroup rdmo
WSGIScriptAlias / /srv/rdmo/rdmo-app/config/wsgi.py process-group=rdmo
WSGIPassAuthorization On

<Directory /srv/rdmo/rdmo-app/config/>
    <Files wsgi.py>
        Require all granted
    </Files>
</Directory>
</VirtualHost>

Restart the Apache server: sudo service apache2 restart. RDMO should now be available on YOURDOMAIN. Note that the Apache user needs to have access to /srv/rdmo/rdmo-app/static_root/.

As you can see from the virtual host configurations, the static assets such as CSS and JavaScript files are served independently from the WSGI-python script. In order to do so, they need to be gathered in the static_root directory. This can be achieved by running:

generate manage.py collectstatic

in your virtual environment.

In order to apply changes to the RDMO code (e.g. after an upgrade), the webserver needs to be reloaded or the config/wsgi.py file needs to appear modified. This can be done using the touch command:

touch config/wsgi.py

Also, the collectstatic command has to be executed again. Both can be achieved by using

generate manage.py deploy

in your virtual environment.

2.3 Nginx and Gunicorn

As mentioned several times, you should create a dedicated user for RDMO. All steps for the installation, which do not need root access, should be done using this user. Here we assume this user is called rdmo and it’s home is /srv/rdmo and therefore your rdmo-app is located in /srv/rdmo/rdmo-app.

First install gunicorn inside your virtual environment:

```
pip install -r requirements/gunicorn.txt
```

Then, test gunicorn using:

```
gunicorn --bind 0.0.0.0:8000 config.wsgi:application
```

This should serve the application like runserver, but without the static assets, like CSS files and images. After the test kill the gunicorn process again.

Systemd will launch the Gunicorn process on startup and keep running. Create a new systemd service file in /etc/systemd/system/rdmo.service and enter (you will need root/sudo permissions for that):
This service needs to be started and enabled like any other service:

```
sudo systemctl start rdmo
sudo systemctl enable rdmo
```

Next, install Nginx:

```
sudo apt install nginx  # on Debian/Ubuntu
sudo yum install nginx  # on RHEL/CentOS
```

Edit the Nginx configuration as follows (again with root/sudo permissions):

```
server {
    listen 80;
    server_name YOURDOMAIN;

    location / {
        proxy_pass http://unix:/srv/rdmo/rdmo.sock;
    }

    location /static/ {
        alias /srv/rdmo/rdmo-app/static_root/;
    }
}
```

Restart Nginx. RDMO should now be available on YOURDOMAIN. Note that the unix socket /srv/rdmo/rdmo.sock needs to be accessible by Nginx.

As you can see from the virtual host configurations, the static assets such as CSS and JavaScript files are served independently from the reverse proxy to the gunicorn process. In order to do so they need to be gathered in the static_root directory. This can be achieved by running:

```
python manage.py collectstatic
```

in your virtual environment.

In order to apply changes to the RDMO code (e.g. after an upgrade), the Gunicorn process needs to be restarted:

```
sudo systemctl restart rdmo
```
The RDMO application uses the Django settings module for its configuration. To separate the base configuration and your local adjustments and secret information (e.g. database connections), RDMO splits the settings into two files:

- `config/settings/base.py`, which is part of the git repository.
- `config/settings/local.py`, which is ignored by git.

As part of the installation, `config/settings/local.py` should be created from the template `config/settings/sample.local.py`.

While technically the local settings file `config/settings/local.py` can be used to override all of the settings in `config/settings/sample.local.py`, it should be used to customize the settings already available in `config/settings/sample.local.py`.

This comprises general settings, database connections, how to send emails, the different authentication methods, the usage of themes, and caches.

### 3.1 General settings

A few general settings should be included in your `config/settings/local.py`. The first, and probably most important one, is if you run RDMO in debug mode or not:

```
DEBUG = True
```

In debug mode, verbose error pages are shown in the case something goes wrong and static assets such as CSS and JavaScript files are found by the development server automatically. The debug mode **must not** be enabled when running RDMO in production connected to the internet.

Django needs a secret key, which “should be set to a unique, unpredictable value”:

```
SECRET_KEY = 'this is not a very secret key'
```

This key must be kept secret since otherwise many of Django’s security protections fail.

In production, Django only allows requests to certain urls, which you need to specify:
ALLOWED_HOSTS = ['localhost', 'rdmo.example.com']

If you want to run RDMO under an alias like http://example.com/rdmo, you need to set the base URL:

BASE_URL = '/rdmo'

Furthermore, you might want to choose the main language for RDMO and the timezone:

LANGUAGE_CODE = 'en-us'
TIME_ZONE = 'Europe/Berlin'

# 3.2 Databases

RDMO can be used with all kind of databases supported by the Django framework. The particular database connection is defined using the setting DATABASE. An overview about the Django database settings is given here. In the following, we show the settings for PostgreSQL, MySQL, and SQLite.

## 3.2.1 PostgreSQL

PostgreSQL can be installed using:

```
# Debian/Ubuntu
sudo apt install postgresql

# CentOS
sudo yum install postgresql-server postgresql-contrib
sudo postgresql-setup initdb
sudo systemctl start postgresql
sudo systemctl enable postgresql
```

To use PostgreSQL as your database backend install psycopg2 in your virtual environment:

```
pip install -r requirements/postgres.txt
```

Then, add the following to your config/settings/local.py:

```python
DATABASES = {
    'default': {
        'ENGINE': 'django.db.backends.postgresql_psycopg2',
        'NAME': 'rdmo',
        'USER': 'rdmo',
        'PASSWORD': '',
        'HOST': '',
        'PORT': '',
    }
}
```

where Name is the name of the database, USER the PostgreSQL user, PASSWORD her password, HOST the database host, and PORT the port PostgreSQL is listening on. Note that, depending on your setup, not all settings are needed. If you are using the peer authentication methods, you only need the NAME and ENGINE settings. The user and the database can be created using:
This assumes peer authentication for the rdmo user.

The command

```bash
python manage.py migrate
```

should now create the RDMO database tables on PostgreSQL.

### 3.2.2 MySQL

MySQL (or community-developed fork MariaDB) can be installed using:

```bash
# Debian/Ubuntu
sudo apt install mysql-client mysql-server libmysqlclient-dev # for MySQL
sudo apt install mariadb-client mariadb-server libmariadbclient-dev # for MariaDB

# CentOS
sudo yum install -y mysql mysql-server mysql-devel # for MySQL
sudo yum install -y mariadb mariadb-server mariadb-devel # for MariaDB
sudo systemctl enable mariadb
sudo systemctl start mariadb
sudo mysql_secure_installation
```

To use MySQL as your database backend install `mysqlclient` in your virtual environment:

```bash
pip install -r requirements/mysql.txt
```

Then, add the following to your `config/settings/local.py`:

```python
DATABASES = {
    'default': {
        'ENGINE': 'django.db.backends.mysql',
        'NAME': 'rdmo',
        'USER': 'rdmo',
        'PASSWORD': 'not a good password',
        'HOST': '',
        'PORT': '',
        'OPTIONS': {
            'unix_socket': '',
        }
    }
}
```

to your `config/settings/local.py`. Here, `Name` is the name of the database, `USER` the MySQL user, `PASSWORD` her password, `HOST` the database host, and `PORT` the port MySQL is listening on. If you don’t use `/tmp/mysql.sock`, you can use `unix_socket` to specify its path. The user and the database can be created using:
CREATE USER 'rdmo'@'localhost' identified by 'not a good password';
GRANT ALL ON `rdmo`.* to 'rdmo'@'localhost';
CREATE DATABASE `rdmo`;

on the MySQL-shell.

The command

```python
python manage.py migrate
```

should now create the RDMO database tables on MySQL.

### 3.2.3 SQLite

SQLite is the default option in RDMO and configured in `config/settings/base.py`. We recommend it only for a development/testing setup. It can be configured in `config/settings/local.py` by adding:

```python
DATABASES = {
    'default': {
        'ENGINE': 'django.db.backends.sqlite3',
        'NAME': '',
    }
}
```

where `Name` is the name of database file.

The command

```python
python manage.py migrate
```

should now create RDMO database tables in the specified database file.

### 3.3 E-Mail

RDMO needs to send E-Mails to its users. The connection to the SMTP server is configured by several settings in your `config/settings/local.py`:

```python
EMAIL_BACKEND = 'django.core.mail.backends.smtp.EmailBackend'
EMAIL_HOST = 'localhost'
EMAIL_PORT = '25'
EMAIL_HOST_USER = ''
EMAIL_HOST_PASSWORD = ''
EMAIL_USE_TLS = False
EMAIL_USE_SSL = False
DEFAULT_FROM_EMAIL = ''
```

Here, `EMAIL_HOST` is the URL or IP of the SMTP server, `EMAIL_PORT` is the port it is listening on (usually 25, 465, or 587), and `EMAIL_HOST_USER` and `EMAIL_HOST_PASSWORD` are credentials, if the SMTP server needs authentication.

For a STARTTLS connection (usually on port 587) `EMAIL_USE_TLS` needs to be set to `True`, while `EMAIL_USE_SSL` needs to be set to `True` for an implicit TLS/SSL connection (usually on port 465).

`DEFAULT_FROM_EMAIL` sets the FROM field for the E-mails send to the users.
For a development/testing setup a simple E-mail backend, which only displays the E-mail on the terminal, can be used:

```
EMAIL_BACKEND = 'django.core.mail.backends.console.EmailBackend'
EMAIL_FROM = 'info@example.com'
```

This is also the default backend, if no E-mail settings are added to config/settings/local.py.

### 3.4 Authentication

RDMO has three main modes for Authentication:

- Regular user accounts with registration using the django-allauth library.
- Using a (read-only) connection to a LDAP server
- Installing a Shibboleth service provider next to RDMO and connect to an identity provider or even a whole Shibboleth federation.

**Important:** These modes are only tested individually and may be treated **mutually exclusive** (unless proven otherwise).

If none of the modes is enabled, only a very basic login will be available and users need to be created using the Django Admin Interface.

#### 3.4.1 Django-allauth

RDMO uses the excellent django-allauth as its main authorization library. It enables workflows for user registration and password retrieval, as well as authentication from 3rd party sites using OAUTH2.

**Accounts**

To enable regular accounts in RDMO add:

```
from rdmo.core.settings import INSTALLED_APPS, AUTHENTICATION_BACKENDS
ACCOUNT = True
ACCOUNT_SIGNUP = True
ACCOUNT_TERMS_OF_USE = False

INSTALLED_APPS += ['allauth',
                    'allauth.account',
]
AUTHENTICATION_BACKENDS.append('allauth.account.auth_backends.AuthenticationBackend')
```

to your config/settings/local.py. The setting ACCOUNT = True enables the general django-allauth features in RDMO, while ACCOUNT_SIGNUP = True enables new users to register with your RDMO instance. ACCOUNT_TERMS_OF_USE = False disables the Terms of Use. If you set it to True every registering user will have to agree to your policy. The last lines enable django-allauth to be used by RDMO.

The behavior of django-allauth can be further configured by the settings documented in the django-allauth documentation. RDMO sets some defaults, which can be found in config/settings/base.py.
Social accounts

In order to use 3rd party accounts (facebook, github, etc.) with RDMO add:

```python
from rdmo.core.settings import INSTALLED_APPS, AUTHENTICATION_BACKENDS

ACCOUNT = True
ACCOUNT_SIGNUP = True
SOCIALACCOUNT = True

INSTALLED_APPS += [
    'allauth',
    'allauth.account',
    'allauth.socialaccount',
    'allauth.socialaccount.providers.facebook',
    'allauth.socialaccount.providers.github',
    'allauth.socialaccount.providers.google',
    'allauth.socialaccount.providers.orcid',
    'allauth.socialaccount.providers.twitter',
    ...
]

AUTHENTICATION_BACKENDS.append('allauth.account.auth_backends.AuthenticationBackend')
```

to your `config/settings/local.py`. The setting `SOCIALACCOUNT = True` is used by RDMO to show certain parts of the user interface connected to 3rd party accounts, while as before, the lines after `INSTALLED_APPS` enable the feature to be used by RDMO. Each provider has a separate app you need to add to `INSTALLED_APPS`. A list of all providers supported by django-allauth can be found here.

Once the installation is complete, the credentials of your OAUTH provider need to be entered in the admin interface. This is covered in the administration chapter of this documentation.

3.4.2 LDAP

In order to use a LDAP backend with RDMO you need to install some prerequisites. On Debian/Ubuntu you can install them using:

```bash
sudo apt-get install libsasl2-dev libldap2-dev libssl-dev
```

On the python side, we use `django-auth-ldap` to connect to the LDAP server. As before, it should be installed inside the virtual environment created for RDMO using:

```bash
pip install -r requirements/ldap.txt
```

LDAP installations can be very different and we only discuss one particular example. We assume that the LDAP service is running on `ldap.example.com`. RDMO needs a System Account. In order to create it, run:

```bash
ldapmodify -x -D 'cn=Directory Manager' -W
```

on the machine running the LDAP service and type in:

```bash
dn: uid=rdmo,dc=ldap,dc=example,dc=com
changetype: add
objectclass: account
objectclass: simplesecurityobject
uid: rdmo
userPassword: YOURPASSWORD
```
and end with a blank line followed by ctrl-d.

Then, in your `config/settings/local.py` add or uncomment:

```python
import ldap
from django_auth_ldap.config import LDAPSearch
from rdmo.core.settings import AUTHENTICATION_BACKENDS
PROFILE_UPDATE = False
PROFILE_DELETE = False

AUTH_LDAP_SERVER_URI = "ldap://ldap.example.com"
AUTH_LDAP_BIND_DN = "cn=rdmo,dc=ldap,dc=example,dc=com"
AUTH_LDAP_BIND_PASSWORD = "YOURPASSWORD"
AUTH_LDAP_USER_SEARCH = LDAPSearch("dc=ldap,dc=example,dc=com", ldap.SCOPE_SUBTREE,
    "(uid=%(user)s)")

AUTH_LDAP_USER_ATTR_MAP = {
    "first_name": "givenName",
    "last_name": "sn",
    'email': 'mail'
}

AUTHENTICATION_BACKENDS.insert(
    AUTHENTICATION_BACKENDS.index('django.contrib.auth.backends.ModelBackend'),
    'django_auth_ldap.backend.LDAPBackend'
)
```

The setting `PROFILE_UPDATE = False` and `PROFILE_DELETE = False` tell RDMO to disable the update and deletion form for the user profile so that users can neither update their credentials nor delete their profile anymore. The other settings are needed by `django-auth-ldap` and are described in the `django-auth-ldap` documentation.

### 3.4.3 Shibboleth

In order to use Shibboleth with RDMO, it needs to be deployed in a production environment using Apache2. The setup is documented [here](#).

Next, install the Shibboleth Apache module for service providers from your distribution repository, e.g. for Debian/Ubuntu:

```bash
sudo apt-get install libapache2-mod-shib2
```

In addition, `django-shibboleth-remoteuser` needs to be installed in your RDMO virtual environment:

```bash
pip install -r requirements/shibboleth.txt
```

Configure your Shibboleth service provider using the files in `/etc/shibboleth/`. This may vary depending on your Identity Provider. RDMO needs the `REMOTE_SERVER` to be set and 4 attributes from your identity provider:

- a username (usually eppn)
- an E-mail address (usually mail or email)
- a first name (usually givenName)
- a last name (usually sn)

In our test environment this is accomplished by editing `/etc/shibboleth/shibboleth2.xml`:
and `/etc/shibboleth/attribute-map.xml`:

```xml
<Attribute name="urn:oid:0.9.2342.19200300.100.1.1" id="uid"/>
<Attribute name="urn:oid:2.5.4.4" id="sn"/>
<Attribute name="urn:oid:2.5.4.42" id="givenName"/>
<Attribute name="urn:oid:0.9.2342.19200300.100.1.3" id="mail"/>
```

Restart the Shibboleth service provider demon.

```
service shibd restart
```

In your Apache2 virtual host configuration, add:

```xml
<Location /Shibboleth.sso>
    SetHandler shib
</Location>
<LocationMatch /(account|domain|options|projects|questions|tasks|conditions|views)>
    AuthType shibboleth
    require shibboleth
    ShibRequireSession On
    ShibUseHeaders On
</LocationMatch>
```

In your `config/settings/local.py` add or uncomment:

```python
from rdmo.core.settings import INSTALLED_APPS, AUTHENTICATION_BACKENDS, MIDDLEWARE_CLASSES

SHIBBOLETH = True
PROFILE_UPDATE = False
PROFILE_DELETE = False

INSTALLED_APPS += ['shibboleth']
AUTHENTICATION_BACKENDS.append('shibboleth.backends.ShibbolethRemoteUserBackend')

SHIBBOLETH_ATTRIBUTE_MAP = {
    'uid': (True, 'username'),
    'givenName': (True, 'first_name'),
    'sn': (True, 'last_name'),
    'mail': (True, 'email'),
}

LOGIN_URL = '/Shibboleth.sso/Login?target=/projects'
LOGOUT_URL = '/Shibboleth.sso/Logout'
```

where the keys of `SHIBBOLETH_ATTRIBUTE_MAP`, `LOGIN_URL`, and `LOGOUT_URL` need to be modified according to your setup. The setting `SHIBBOLETH = True` disables the regular login form in RDMO, and tells RDMO to disable the update or delete form for the user profile, so that users can neither update their credentials nor delete
their profile anymore. Note that profile deletion is technically impossible because RDMO can delete from the Shibboleth database. The INSTALLED_APPS, AUTHENTICATION_BACKENDS, and MIDDLEWARE_CLASSES settings enable django-shibboleth-remoteuser to be used with RDMO.

Restart the webserver.

```
(service apache2 restart)
```

### 3.5 Themes

#### 3.5.1 Introduction

RDMO is based on Django, which allows a high level of customization by modifying the Django templates as well as the static assets (CSS files, images, etc.). There is a powerful method by which the set of files getting imported can be changed. If you create a theme folder in your rdmo-app directory the framework will use the files in this folder and not their counterparts from the RDMO source code. By doing this you can override any template or static file you desire as long as you get the folder structure right. There are two ways to create a theme.

#### 3.5.2 Create automatically

There is a manage.py script to simplify the theme creation. The script will create the theme/static and theme/templates folders, copy a basic set of files into them and add the necessary configuration line to config/settings/local.py to enable the theme. If you want to override other files, please put them into the necessary folders manually. To run the script do:

```
bash python manage.py make_theme
```

#### 3.5.3 Create manually

If you want to manually create a theme you need to do the following:

1. Create a theme folder containing a static and a templates directory inside your rdmo-app directory:

   ```shell
   mkdir -p theme/static theme/templates
   ```

2. Add the line below to your config/settings/local.py:

   ```
   THEME_DIR = os.path.join(BASE_DIR, 'theme')
   ```

3. Copy the files you want to modify into the theme folder keeping their relative paths.

#### 3.5.4 Working with themes

If you have completed the steps above templates and static files in the theme directory are used instead of the original files as long as they have the same relative path, e.g. the template theme/templates/core/base_navigation.html overrides rdmo/core/templates/core/base_navigation.html from the original code.

Usually, the RDMO template files are located in the your virtual environment, e.g. /srv/rdmo/rdmo-app/env/lib/python3.6/site-packages/rdmo/core/static/core/css/variables.scss. The exact path depends on your Python version and platform. We recommended to download the original files from the rdmo repository instead. For the example above, this would be https://raw.githubusercontent.com/rdmorganiser/rdmo/
master/rdmo/core/static/core/css/variables.scss. Please make sure to use the raw files when downloading from GitHub. If you accidentally grab the website’s html source code RDMO will throw an error.

Some files you might want to override are:

**SASS variables**

https://github.com/rdmorganiser/rdmo/blob/master/rdmo/core/static/core/css/variables.scss can be copied to theme/static/core/css/variables.scss and be used to customize colors.

**Navigation bar**

https://github.com/rdmorganiser/rdmo/blob/master/rdmo/core/templates/core/base_navigation.html can be copied to theme/templates/core/base_navigation.html and be used to customize the navbar.

**Home page text**

https://github.com/rdmorganiser/rdmo/blob/master/rdmo/core/templates/core/home_text_en.html and https://github.com/rdmorganiser/rdmo/blob/master/rdmo/core/templates/core/home_text_de.html can be copied to theme/templates/core/home_text_en.html and theme/templates/core/home_text_de.html and be used to customize text on the home page.

**Terms of Use**

The content displayed in the Terms of Use dialogue can be customized by putting templates to the appropriate locations. Two different files resembling the available languages can be used and should be located at theme/templates/account/terms_of_use_de.html and theme/templates/account/terms_of_use_en.html. Set the variable ACCOUNT_TERMS_OF_USE to True in your config/settings/local.py.

Note that updates to the RDMO package might render your theme incompatible to the RDMO code and cause errors. In this case the files in theme need to be adjusted to match their RDMO counterparts in functionality.

### 3.6 Export formats

RDMO supports exports to certain formats using the excellent Pandoc converter. The list of formats to select can be customized by changing the EXPORT_FORMATS setting in your config/settings/local.py.

```python
EXPORT_FORMATS = (
    ('pdf', _('PDF')),
    ('rtf', _('Rich Text Format')),
    ('odt', _('Open Office')),
    ('docx', _('Microsoft Office')),
    ('html', _('HTML')),
    ('markdown', _('Markdown')),
    ('mediawiki', _('mediawiki')),
    ('tex', _('LaTeX'))
)
```
The different formats supported by Pandoc can be found on the Pandoc homepage.

The page style and different other format settings can be adjusted using reference documents. Since Pandoc is used for document conversion you can find an exhaustive list of supported settings on the Pandoc manual page under the paragraph ‘–reference-doc’. Reference documents can be used for the export formats of .docx and .odt. This is achieved by defining reference documents in the config/settings/local.py. If these settings are not in your config default styles will be applied.

```plaintext
EXPORT_REFERENCE_DOCX='FULL PATH OF YOUR REFERENCE DOCX'
EXPORT_REFERENCE_ODT='FULL PATH OF YOUR REFERENCE ODT'
```

# 3.7 Cache

RDMO uses a cache for some of it’s pages. In the development setup, this is done using local-memory caching. In production, we suggest using memcached. Memcached can be installed on Debian/Ubuntu using:

```
sudo apt install memcached
```

On RHEL/CentOS a few more steps are needed. First install the package using:

```
sudo yum install memcached
```

Then edit the settings file to prevent external connections:

```
# in /etc/sysconfig/memcached
PORT="11211"
USER="memcached"
MAXCONN="1024"
CACHESIZE="64"
OPTIONS="-l 127.0.0.1"
```

Then start the service:

```
systemctl start memcached
systemctl enable memcached
```

Back in your virtual enviroment, you need to install python-memcached:

```
pip install -r requirements/memcached.txt
```

and add the following to your config/settings/local.py:

```python
CACHES = {
    'BACKEND': 'django.core.cache.backends.memcached.MemcachedCache',
    'LOCATION': '127.0.0.1:11211',
    'KEY_PREFIX': 'rdmo_default'
},
'api': {
    'BACKEND': 'django.core.cache.backends.memcached.MemcachedCache',
    'LOCATION': '127.0.0.1:11211',
    'KEY_PREFIX': 'rdmo_api'
}
}
```
3.8 Logging

Logging in Django can be very complex and is covered extensively in the Django documentation. For a suitable logging of RDMO you can add the following to your `config/settings/local.py`:

```python
import os
from . import BASE_DIR

LOGGING_DIR = '/var/log/rdmo/
LOGGING = {
    'version': 1,
    'disable_existing_loggers': True,
    'filters': {
        'require_debug_false': {
            '()': 'django.utils.log.RequireDebugFalse'
        },
        'require_debug_true': {
            '()': 'django.utils.log.RequireDebugTrue'
        }
    },
    'formatters': {
        'default': {
            'format': '[%(asctime)s] %(levelname)s: %(message)s'
        },
        'name': {
            'format': '[%(asctime)s] %(levelname)s %(name)s: %(message)s'
        },
        'console': {
            'format': '[%(asctime)s] %(message)s'
        }
    },
    'handlers': {
        'mail_admins': {
            'level': 'ERROR',
            'filters': ['require_debug_false'],
            'class': 'django.utils.log.AdminEmailHandler'
        },
        'error_log': {
            'level': 'ERROR',
            'class': 'logging.FileHandler',
            'filename': os.path.join(LOGGING_DIR, 'error.log'),
            'formatter': 'default'
        },
        'rdmo_log': {
            'level': 'DEBUG',
            'class': 'logging.FileHandler',
            'filename': os.path.join(LOGGING_DIR, 'rdmo.log'),
            'formatter': 'name'
        },
        'console': {
            'level': 'DEBUG',
            'filters': ['require_debug_true'],
            'class': 'logging.StreamHandler',
            'formatter': 'console'
        }
    },
    'loggers': {
    }
}
```

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This produces two logs:

- `/var/log/rdmo/error.log` will contain exception messages from application errors (status code: 500). The message is the same that is shown when `DEBUG = True`, which should not be the case in a production environment. In addition to the log entry, an E-mail is send to all admins specified in the `ADMINS` setting.

- `/var/log/rdmo/rdmo.log` will contain additional logging information from the RDMO code.
The Django framework offers a rich administration (or short admin) interface, which allows you to directly manipulate most of the entries in the database directly. Obviously, only users with the correct permissions are allowed to use this interface. The user created during the installation process using `./manage.py createsuperuser` has this superuser status.

The admin interface is available under the link Admin in the navigation bar. It will only be needed on rare occasions, since most of the configurations of the questionaire and the other RDMO functions can be done using the more user-friendly Management interface described in the following chapter of this documentation.

That being said, the admin interface is needed, especially after installation, to set the title and URL of the site, to configure users and groups, to configure the connection to OAUTH providers, and to create tokens to be used with the API.

### 4.1 Site configuration

![Screenshot of the site admin interface.](image)

RDMO used Django’s sites framework. It is therefore necessary to configure the Domain name and the Display name of your RDMO installation. This can be done in the admin interface under SITE. To configure your site:
1. Click on the already configured domain name example.com.
2. Enter the URL of your RDMO installation as Domain name (e.g. rdmo.aip.de).
3. Enter title of your RDMO installation as Display name (e.g. RDMO Demo).
4. Click Save to save the site.

### 4.2 Users and Groups

The users and groups of your RDMO instance can be managed under AUTHENTICATION AND AUTHORIZATION. You can create and update users and set their password directly, but most of the time this will be done by the users themselves using the account menu.

The user created in the installation process can access all features of RDMO. In order to allow other users to access the management or the admin interface, they need to have the required permissions assigned to them. This can be done in two ways: through groups or using the superuser flag.

#### 4.2.1 Groups

During the installation, the .manage create-groups command created 3 groups:

**Editor**

Users of the group editor can access the management interface and can edit all elements of the data model, except the user data entered through the structured interview.

**Reviewer**

Users of the group reviewer can access the management interface, like editors, but are not allowed to change them (Save will not work). This group can be used to demonstrate the management backend of RDMO to certain users.

**API**

Users of the group api can use the programmable API to access all elements of the data model. They will need a token to use an api client.

Existing users can be assigned to these groups to gain access to these functions:

1. Click Users under AUTHENTICATION AND AUTHORIZATION in the admin interface.
2. Click on the user to be changed.
3. Click on the group to be assigned to the user in the Available groups field.
4. Click on the little arrow to move the group to the Chosen groups field.
5. Save the user.
4.2.2 Superuser

Superusers have all permissions available and all permission checks will return positive to them. This does not only allow them to access the management and admin interfaces, but also **access all data from other user** (including the project pages).

To make a user superuser:

1. Click **Users** under **AUTHENTICATION AND AUTHORIZATION** in the admin interface.
2. Click on the user to be changed.
3. Tick the box **Superuser status**.
4. Save the user.

4.3 Social accounts

If you use allauth as your mode of authentication and configured RDMO to use one or more OAUTH provider (as described in the **Configuration chapter**), you need to register your RDMO site with theses services. This process is different from provider to provider. Usually, you need to provide a set of information about your site. Always included is a redirect or callback url. In the following we will use http://127.0.0.1:8000 as an example (which will work on the development server) and you will need to replace that with the correct url of your RDMO application in production.

4.3.1 ORCID

Login into https://orcid.org and go to the developer tools page at https://orcid.org/developer-tools. Create an app with the Redirect URI

```
http://127.0.0.1:8000/account/orcid/login/callback/
```

4.3.2 Github

Login into github and go to https://github.com/settings/applications/new and create a new app. Use

```
http://127.0.0.1:8000/account/github/login/callback/
```

4.3.3 Facebook

Login into facebook and go to https://developers.facebook.com/. Click on the top right menu **My Apps** and choose **Add a new app**. Create a new app. In the following screen choose Facebook login -> Getting started and choose **Web** as the platform. Put in a URL under which your application is accessible (Note: 127.0.0.1 will not work here.). Back on the dashboard, go to Settings -> Basic and copy the **App ID** and the **App Secret**.

4.3.4 Twitter

Login into twitter and go to https://apps.twitter.com/app/new and create a new app. Use

```
http://127.0.0.1:8000/account/facebook/login/callback/
```

as the Authorized redirect URI. Copy the Client-ID and the Client key.
4.3.5 Google

Login into google and go to https://console.developers.google.com. Create a new project. After the project is created go to Credentials on the left side and configure the OAuth Authorization screen (second tab). Then create the credentials (first tab), more precisely a OAuth Client-ID. Use

http://127.0.0.1:8000/account/google/login/callback/

as the Authorized redirect URI. Copy the Client-ID and the Client key.

Once the credentials are obtained, you need to enter them in the admin interface. To this purpose, go to Social applications under SOCIAL ACCOUNTS and click on Add social application. Then:

1. Select the corresponding provider
2. Enter a Name of your choice
3. Enter the Client id (or App ID) and the Secret key (or Client secret, Client key, App Secret)
4. Add your site to the chosen sites.
5. Click save.

4.4 API

RDMO has an API which can be used to retrieve data in a machine readable manner. The API can be accessed with any http speaking tool that is able to provide the necessary authentication token in the request’s header. In the following examples we will use curl.

4.4.1 Authentication

In order to access any data entered into RDMO through the programmable API, a user needs to have a token associated with him. This is done under AUTH TOKEN / Tokens. To create a token, click Add token on the button at the right and:

1. Select the user for the new token.
2. Save the token.

The created token can be used instead of the username and the password when making HTTP requests from a non-browser client. The token needs to be provided in the HTTP header in following form.

Authorization: Token 9944b09199c62bcf9418ad846dd0e4bbdfc6ee4b

Only Superusers are allowed to access the API. You can check if your user has the required permissions by having a look into the user’s details. If the user does not have the Superuser status any API request will fail producing status code 403.

4.4.2 API Layout / Swagger

Concerning questions about the API Layout Swagger comes in as a handy tool because it can be used to get a detailed description of the API.
What is Swagger?

Swagger is a set of tools built around the OpenAPI Specification. These tools help to design, build and document REST APIs. OpenAPI is already implemented in RDMO. The Swagger page in RDMO is provided by a python library called Django REST Swagger.

The interactive Swagger page can help you to design API queries because it gives a well-arranged interactive overview of all the available endpoints and query parameters. If you need help to get an idea about the possibilities of the RDMO API you should have a look.

Use Swagger Tools

Swagger Tools are enabled by default. The relevant entry is in your app’s `urls.py` and looks like the following.

```python
path('api/v1/', include('rdmo.core.urls.swagger')),
```

Remove it or comment it out if you do not want swagger to be available. As you can see the default swagger page’s url is `http://$YOUR_RDMO/api/v1/`.

If you request `http://$YOUR_RDMO/api/v1/?format=openapi` you get a detailed machine processable API description in JSON format.

API Structure

```
/api/v1/conditions/conditions
/api/v1/conditions/conditions/{id}

/api/v1/core

/api/v1/domain/attributes
/api/v1/domain/attributes/{id}
/api/v1/domain/entities
/api/v1/domain/entities/{id}

/api/v1/options/options
/api/v1/options/optionsets
/api/v1/options/optionsets/{id}
/api/v1/options/options/{id}

/api/v1/projects/projects
/api/v1/projects/projects/{id}
/api/v1/projects/snapshots
/api/v1/projects/snapshots/{id}
/api/v1/projects/values
/api/v1/projects/values/{id}

/api/v1/questions/catalogs
/api/v1/questions/catalogs/{id}
/api/v1/questions/questions
/api/v1/questions/questionsets
/api/v1/questions/questionsets/{id}
/api/v1/questions/questions/{id}
/api/v1/questions/sections
/api/v1/questions/sections/{id}
```

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The API structure is roughly determined by the element types of which data can be fetched. The \{id\} placeholder at the end of the URLs is indicating that an element ID can be provided to fetch data of a distinct single element. So basically we have to types of requests. The first returning lists of elements and the second returning single elements. Many of the endpoints provide multiple filter functions that are accessible using request parameters. If you for example would like to retrieve information about the admin user you could use \?username=admin as filter parameter at the end of the url.

For practical reasons all the different filters will not be named here. But you can have a look into the JSON description of the API generated using Swagger. It covers every piece of information regarding all the endpoints and their available filters. As JSON can be a hard read sometimes you could also copy and paste the content of file into the Swagger Editor to get a more consumable version of the description. If you would like to use Swagger to interact with your RDMO’s API in a web browser you could set it up for your RDMO installation. Information about how to do that are provided below in the Swagger paragraph. But let’s have a look at some request examples first.

### 4.4.3 Curl Request Examples

Note that the examples below use the \-L parameter. It tells curl to follow redirects and is necessary because the token authentication process involves a redirect. If you do not follow it you will get an empty-bodied response having status code 301.

You could for example request...

1. The project having the id 1

   
   curl -LH "Authorization: Token \$YOUR_TOKEN" \
   "https://\$YOUR_RDMO/api/v1/project/projects/1"

1. A list of all projects

   
   curl -LH "Authorization: Token \$YOUR_TOKEN" \
   "https://\$YOUR_RDMO/api/v1/project/projects"

1. A list of users in a certain project

   
   curl -LH "Authorization: Token \$YOUR_TOKEN" \
   "http://\$YOUR_RDMO/api/v1/accounts/users/?project=1"

1. A list of options belonging to optionset 1

   
   curl -LH "Authorization: Token \$YOUR_TOKEN" \
   "http://\$YOUR_RDMO/api/v1/options/options/?optionset=1"

1. A list of options having uri [https://rdmorganiser.github.io/terms/options/research_fields/216](https://rdmorganiser.github.io/terms/options/research_fields/216) Note that strings of course need to be url encoded.

   
   curl -LH "Authorization: Token \$YOUR_TOKEN" \
4.4.4 RDMO Client

There is an RDMO Client written in Python which may help you to get started using the API. It is available on GitHub.
A freshly installed instance of RDMO is not very useful without a questionnaire to fill out by the user and a set of DMP templates later to be populated by the given answers. The main idea of RDMO is that every question and every output can be customized by you. This, however, introduces a certain level of complexity. RDMO employs a datamodel organized along different Django apps and models (representing database tables). A graphical overview is given in the figure below:

*Overview of the RDMO data model*

Here, we explain the different parts of the data model. Each section has a link to a more detailed explanation how to create and edit the relevant elements.

For most users, the structured interview will be the most visible part of RDMO. It is configured using catalogs, sections, questionsets, and questions. A single installation of RDMO can have several catalogs. When creating a new project, a user can select one of these catalogs to be used with this project. A catalog has a number of sections, which themselves have question sets. Questions can be directly added to question sets. A question has a text, which will be shown in bold to the user and an optional help text. It also has a widget type, which determines which interface widget is presented to the user (e.g. text field, select field, radio buttons). The questionnaire is configured under / questions available in the management menu. More documentation about the questions management can be found here.

The domain model is the central part of the data model and connects the questions from the questionnaire with the user input. It is organized as a tree-like structure. Every piece of information about a user’s project is represented by an attribute. In this sense these attributes can be compared to a variable in source code. Attributes are the leaves of the domain model tree, that organize the connections between the different entities assigned to them. Much like files are organized along directories on a disk. Every question or questionset set must have an attribute to be connected to. An example would be the attribute with the path `project/schedule/project_start` for the start date of the project. The attribute itself has the key `project_start` and resides in the attribute `schedule`, which itself is located in the `project`.

Conditions can be connected to questionsets. Conditions control if the questionsets is valid in the current context. If questionset is not valid, it will not be shown to the user. Conditions are also needed to disable/enable option sets, tasks and can be used in views. Conditions are configured with a source attribute, which will be evaluated, a relation like “equal” or “greater than”, and a target. The target is a text string or an option. As an example, if the
source is the attribute `project/legal_aspects/ipr/yesno`, the relations is “equal to”, and the target text is “1”. The condition will be true for a project where the answer to the question connected to the attribute `project/legal_aspects/ipr/yesno` is “1” (or “yes” for a yesno widget). Conditions configured under `/conditions` are available in the management menu. More documentation about the conditions management can be found here.

**Views** allow for custom DMP templates in RDMO. To this purpose every view has a template which can be edited using the Django template syntax, which is based on HTML. Views have also a title and a help text to be shown in the project overview. Views are configured under `/views` available in the management menu. More documentation about editing views can be found here.

After filling out the interview, the user will be presented with follow up **tasks** based on his/her answers. A task has a title and a text. **Time frames** can be added to tasks, which themselves are evaluating attributes of the value type “datetime”, to use answers such as the beginning or the end of a project to compute meaningful tasks. Most of the time tasks will have a condition connected to them, to determine if this task is needed for a particular project or not. Tasks configured under `/tasks` are available in the management menu. More documentation about editing views can be found here.

The different elements of the RDMO datamodel have various parameters, which control their behavior in RDMO and can be configured using the different management pages, which are decribed on the following pages. In addition, all elements contain a set of common parameters:

* **URI prefix**

The URI prefix is the first part of the URI. As every element has a URI, every element does obviously also have a URI prefix. Semantically the prefix is only relevant when different RDMO instances share data between each other. In this case the URI prefix is used to determine which instance the data belong to. You may think of it as a kind of unique instance identifier.

When you import a question catalog or any other content from another institution these imports do have a URI prefix different from yours. If you change elements from these third party imports we strongly recommend to always adjust the URI prefix into your own one to make the changes persistent. This is necessary because a re-import of the third party content will overwrite by using the URI as identifier. Data in your database having the same URI as the imported ones will get updated and so overwritten. Please do also look into Export and Import page for a little more detail.

By convention the URI prefix has to look like a URL. It does not have to be a valid URL in terms of being resolvable. In principle you could use any kind of string as long as it fits the scheme but we recommend to use the URL of your RDMO instance. The URI prefix has to start with `http://` or `https://`. Afterwards there has to be a host name. Anything further like for instance a path is optional. Valid URI prefixes for example are: `https://rdmorganiser.github.io/terms` or `https://rdmo.aip.de`.

In edit forms of elements you will find a button looking like this . It can be used to automatically put the default URI prefix into the open form. This is very useful especially if you do not exactly remember or know the default value of your RDMO installation. The default URI prefix that this button gets is defined in the `local.py`. The button is only helpful if the value is set. We strongly recommend to add an entry like the following to your config of course having your URI prefix as value.

```python
DEFAULT_URI_PREFIX = 'https://rdmo.uni-xyz.de/terms/'
```

* **Key**

A key that is used as an internal identifier and determines, together with the URI prefix, the URI of the element.

* **Internal Comment**

An internal comment to share information to be seen by users with access to the management backend.
5.1 Questions

The questions management is available under Questions in the management menu in the navigation bar. This page will be empty after a fresh RDMo installation. We suggest to first import our domain model and, if you like, our general questionnaire. The corresponding XML-files are available at https://github.com/rdmorganiser/rdmo-catalog.

If there is at least one questionnaire imported, it will be shown automatically. Other catalogs can be selected in the sidebar on the right-hand side afterwards.

---

**Screenshot of the questions management interface**

On the left-hand side is the main display of sections, questionsets, and questions for the current catalog. For sections and questionsets the title and the key is shown. For questions and question set the key and the key of the attribute they are connected to is shown. The order of the different elements is the same as in the structured interview shown to the user. On the right side of each elements panel, icons indicate ways to interact the element. The following options are available:

- **Add** a new section, a new questionset, or a new question.
• **Update** an element to change its properties.

• **Copy** a question or questionset. This will open the same modal as update. You can change some of the properties and save the element as a new one. This can save time when creating several similar questions.

• **Delete** an element and all of its descendents (e.g. a question set and all the questions it contains). **This action cannot be undone!**

The sidebar on the right-hand side shows additional interface items:

• **Catalog** switches the view to a different Catalog.

• **Filter** filters the view according to a user given string. Only elements containing this string in their path will be shown.

• **Options** offers additional operations:

  – Update the details of the current catalog
  – Delete the current catalog
  – Create a new (empty) catalog
  – Create a new (empty) section
  – Create a new (empty) subsection
  – Create a new (empty) question set
  – Create a new (empty) question

• **Export** exports the current catalog to one of the displayed formats. While the text based formats are mainly for showing the full catalog, the XML export can be used to transfer this catalog to a different installation of RDMO.

The different elements of the questionnaire have different properties to control their behavior. As described in the introduction, all elements have an URI prefix, a key, and an internal comment only to be seen by other managers of the RDMO installation. In addition, you can edit the parameters below:

### 5.1.1 Parameters

**Catalog**

**Section**

**Question sets**

**Questions**

### 5.2 Domain

The domain model can be managed under *Domain* in the management menu in the navigation bar.

After the installation of RDMO the domain is initially empty. We suggest that all RDMO operators initially import the domain model provided by the RDMO project. Using a common domain over all RDMO instances allows us to exchange questionnaires, views and other content, and could lead to a common metadata application profile for data management planning. Our domain is available at https://github.com/rdmorganiser/rdmo-catalog. The domain is
meant to be extendable, but the core data model enables interoperability and cooperativity amongst RDMO instances and it is a good starting point to create questionnaires.

![Screenshot of the domain management interface](image)

On the left-hand side is the main display of all the attributes available in this installation of RDMO. On the right side of each elements panel, icons indicate ways to interact the element. The following options are available:

- **Add (➕)** a new attribute.
- **Update (✍️)** an attribute to change its properties.
- **Delete (⛔)** an attribute and all of its descendants. **The action will remove the attribute and all the attributes below. This action cannot be undone!**

The sidebar on the right-hand side shows additional interface items:

- **Filter** filters the view according to a user given string. Only elements containing this string in their path will be

5.2. Domain
shown.

- **Options** offers additional operations:
  - Create a new (empty) attribute

- **Export** exports the current catalog to one of the displayed formats. While the textual formats are mainly for presentation purposes, the XML export can be used to transfer the domain model to a different installation of RDMO.

The different elements of the domain model have different properties to control their behavior. As described in the introduction, all elements have an URI prefix, a key, and an internal comment only to be seen by other managers of the RDMO installation. In addition, you can edit the parameters below:

### 5.2.1 Parameters

### 5.3 Options

Options and option sets can be managed under **Options** in the management menu in the navigation bar.
### Options

<table>
<thead>
<tr>
<th>Option set</th>
<th>Options available</th>
</tr>
</thead>
<tbody>
<tr>
<td>control_tools</td>
<td>- Add a new option to an option set.</td>
</tr>
<tr>
<td>control_tools/1</td>
<td>Calibration procedure</td>
</tr>
<tr>
<td>control_tools/2</td>
<td>Repeated measurements</td>
</tr>
<tr>
<td>control_tools/3</td>
<td>Standards for data recording</td>
</tr>
<tr>
<td>control_tools/4</td>
<td>Controlled vocabularies or standard terminology</td>
</tr>
<tr>
<td>control_tools/5</td>
<td>Validation of the data collection</td>
</tr>
<tr>
<td>control_tools/6</td>
<td>Peer reviews of the data</td>
</tr>
<tr>
<td>control_tools/7</td>
<td>Others</td>
</tr>
<tr>
<td>data_protection_laws</td>
<td>- Update an option set or option to change its properties.</td>
</tr>
<tr>
<td>data_protection_laws/1</td>
<td>Bundesdatenschutzgesetz (BDSG, Federal Data Protection Act)</td>
</tr>
<tr>
<td>data_protection_laws/2</td>
<td>Landesdatenschutzgesetz Baden-Württemberg (State Data Protection Act of Baden-Württemberg)</td>
</tr>
<tr>
<td>data_protection_laws/3</td>
<td>Landesdatenschutzgesetz Bayern (State Data Protection Act of Bavaria)</td>
</tr>
<tr>
<td>data_protection_laws/4</td>
<td>Landesdatenschutzgesetz Berlin (State Data Protection Act of Berlin)</td>
</tr>
<tr>
<td>data_protection_laws/5</td>
<td>Landesdatenschutzgesetz Bremen (State Data Protection Act of Bremen)</td>
</tr>
<tr>
<td>data_protection_laws/6</td>
<td>Landesdatenschutzgesetz Brandenburg (State Data Protection Act of Brandenburg)</td>
</tr>
<tr>
<td>data_protection_laws/7</td>
<td>Landesdatenschutzgesetz Hamburg (State Data Protection Act of Hamburg)</td>
</tr>
<tr>
<td>data_protection_laws/8</td>
<td>Landesdatenschutzgesetz Mecklenburg-Vorpommern (State Data Protection Act of Mecklenburg-Vorpommern)</td>
</tr>
<tr>
<td>data_protection_laws/9</td>
<td>Landesdatenschutzgesetz Niedersachsen (State Data Protection Act of Lower Saxony)</td>
</tr>
</tbody>
</table>

**Screenshot of the options management interface**

On the left-hand side is the main display of all the option sets and options available in this installation of RDMO. Option sets show their key, while options show their path and their text. On the right side of each elements panel, icons indicate ways to interact the element. The following options are available:

- **Add** (+) a new option to an option set.
- **Update** (arrow) an option set or option to change its properties.
- **Update conditions** (question mark) of an option set. A question connected to an option set with one or more conditions, will not show the options of the set in the questionnaire, if the condition is evaluated to be false. The conditions themselves are configured in the conditions management.
- **Delete** (trash) an option set or option and, in the case of an option set, all of it’s options. **This action cannot be undone!**

5.3. **Options**
The sidebar on the right shows additional interface items:

- **Filter** filters the view according to a user given string. Only elements containing this string in their path will be shown.

- **Options** offers additional operations:
  - Create a new (empty) option set
  - Create a new (empty) option

- **Export** exports the options sets to one of the displayed formats. While the textual formats are mainly for presentation purposes, the XML export can be used to transfer the options sets to a different installation of RDMO.

Option sets and options model have different properties to control their behavior. As described in the introduction, all elements have an URI prefix, a key, and an internal comment only to be seen by other managers of the RDMO installation. In addition, you can edit the parameters below:

### 5.3.1 Parameters

**Option set**

**Option**

### 5.4 Conditions

Conditions can be created and managed under *Conditions* in the management menu in the navigation bar. They are later connected to Question sets, Option sets, or Tasks.
Screenshot of the conditions management interface.

On the left-hand side is the main display of all the conditions available in this installation of RDMO. Conditions show their key and a textual representation of what they evaluate. On the right side of each conditions panel, icons indicate ways to interact the element. The following options are available:

- **Update** (_edit) a condition to change its properties.
- **Delete** (_delete) a condition. **This action cannot be undone!**

The sidebar on the right shows additional interface items:

- **Filter** filters the view according to a user given string. Only conditions containing this string in their path will be shown.
- **Options** offers additional operations:
  - Create a new condition
• **Export** exports the conditions to one of the displayed formats. While the textual formats are mainly for presentation purposes, the XML export can be used to transfer the conditions to a different installation of RDMO.

Conditions have different properties to control their behavior. As described in the introduction, all elements have an URI prefix, a key, and an internal comment only to be seen by other managers of the RDMO installation. In addition, you can edit the parameters below.

### 5.4.1 Configuration

Conditions are configured with a source attribute, which will be evaluated, a relation like “equal” or “greater than” and a target. The target is a text string or an option. As an example, if the source is the attribute `project/legal_aspects/ipr/yesno`, the relation is “equal to”, and the target text is “1”, the condition will be true for a project where the answer to the question connected to the attribute `project/legal_aspects/ipr/yesno` is “1” (or “yes” for a yesno widget).

### 5.4.2 Parameters

### 5.5 Views

Views can be configured under Views in the management menu in the navigation bar.

**Screenshot of the views management interface**

On the left-hand side is the main display of all the views available in this installation of RDMO. Views show their key, title and description. On the right side of each views panel, icons indicate ways to interact the element. The following options are available:
• **Update** (edit) a view to change its properties.

• **Edit the template** (template) of a view.

• **Delete** (delete) a view. **This action cannot be undone!**

The sidebar on the right shows additional interface items:

• **Filter** filters the view according to a user given string. Only views containing this string in their path will be shown.

• **Options** offers additional operations:
  – Create a new view

• **Export** exports the conditions to one of the displayed formats. While the textual formats are mainly for presentation purposes, the XML export can be used to transfer the views to a different installation of RDMO.

Views have different properties to control their behavior. As described in the introduction, all elements have an URI prefix, a key, and an internal comment only to be seen by other managers of the RDMO installation. In addition, you can edit the parameters below:

### 5.5.1 Parameters
View

5.5.2 View Templates

Each view has a template, which determines how the answers given by the user are mapped to a textual document. The template is composed using the Django template syntax, which is a combination of regular HTML, variables, which get replaced with values when the template is evaluated ({{ a_variable }}), and tags, which control the logic of the template ({% a_tag %}).

In the first line of the view template you will find the load command for the available view tags. It makes the logic of the template available and should always be there.

```plaintext
{% load view_tags %}
```

Immediately afterwards there will probably be variable declarations which load sets into place holders and make them available throughout the whole template. These variables can for example be used in for loops as you will see later.
Consider an attribute `project/research_question/title` and a user, who answered the question connected to this attribute with “To boldly go where no man has gone before.”. The attribute would be available in the template as `project/research_question/title`.

The main research question of the project is: \{\$ render_value 'project/research_question/title' \}$

would, when evaluated in the context by a user in his/her project, render:

The main research question of the project is: To boldly go where no man has gone before.

Lists of multiple values can also be rendered.

\begin{verbatim}
&lt;p&gt;
  \{\$ render_value_inline_list 'project/research_question/keywords' \}$
&lt;/p&gt;
\end{verbatim}

As equivalent for the snippet above you can also use the following which gives you more control over the list layout.

\begin{verbatim}
&lt;ul&gt;
  \{\$ get_values 'project/research_question/keywords' set_index=0 as text \}$
  \{\$ for value in text \}$
    \{\$ li&gt;&lt;li&gt;\{ value.value \}&lt;/li&gt;\$\}
  \{\$ endfor \}$
&lt;/ul&gt;
\end{verbatim}

For set entities, you can use the initially declared variables. Your code would look like this.

\begin{verbatim}
\{\$ for dataset in datasets \}$
  \{\$ render_set_value dataset 'project/dataset/id' \}$
\{\$ endfor \}$
\end{verbatim}

Values can be used if they meet certain conditions. If you want to display something based on a certain value being true you can for example do this. Note that there is an `.is_false` function as well which can be used just as the mentioned counterpart.

\begin{verbatim}
\{\$ get_value 'project/dataset/sharing/yesno' as val \}$
\{\$ if val.is_true \}$
  This will be only rendered if personal_data resolves to be true.
\{\$ endif \}$
\end{verbatim}

Please consult the documentation of the Django template syntax for all the available tags and filters: https://docs.djangoproject.com/en/1.11/ref/templates/language.

### 5.6 Tasks

Tasks can be configured under `Tasks` in the management menu in the navigation bar.
Tasks

Task clarify_consequences_international_law Clarify consequences of different international jurisdictions

Please get in touch with the legal department or a respective contact person at your institution to clarify if this has consequences for the project and its data management and if yes, what consequences these are.

Task contact_data_security_officer Contact data security officer about special requirements

At least one of the datasets contains particularly sensitive personal information according to BDSG § 3, 9. Please get in touch with the data protection officer of your institution to check which additional protection measures are necessary.

Task contact_IT_department Contact IT department to acquire infrastructure resources

Please get in touch with your IT department to arrange that the required infrastructure resources are provided.

Task contact_IT_or_data_management_expert Contact IT or data management expert

Please contact an IT or data management expert to get support in terms of data usage.

Task contact_rights_owner Contact rights owner

Clarify, if and how this restricts the possibility of long-term preservation and re-use and if the rights owner is willing to grant the necessary rights.

Task create_naming_policy Create data naming policy

Create a guideline for a consistent naming of the data within the project.

Task create_data_organisation_policy Create data organisation policy

Create a policy for a consistent data organisation in the project.

Task determine_versioning_tool Determine Versioning Tool

Determine, which versioning tool will be used for the versioning.

Task finish_first_dmp Finish first DMP

The first DMP should be finished about 3 months after the project has started.

Screenshot of the tasks management interface

On the left-hand side is the main display of all the tasks available in this installation of RDMO. Tasks show their key, title and the text describing the task. On the right side of each tasks panel, icons indicate ways to interact the element. The following options are available:

- **Update** (edit) a task to change its properties.

- **Update conditions** (question) of a task. A task will only be shown to the user, if all of its conditions are evaluated **True**. The conditions themselves are configured in the **conditions management**.

- **Update the time frame** (calendar) of a task. The time frame is constructed from one or two dates from the user’s answers. This allows for tasks about a specific deadline or special period.

- **Delete** (trash) a task. **This action cannot be undone!**

The sidebar on the right-hand side shows additional interface items:
• **Filter** filters the view according to a user given string. Only tasks containing this string in their path will be shown.

• **Options** offers additional operations:
  – Create a new task

• **Export** exports the conditions to one of the displayed formats. While the textual formats are mainly for presentation purposes, the XML export can be used to transfer the tasks to a different installation of RDMO.

Tasks have different properties to control their behavior. As described in the introduction, all elements have an URI prefix, a key, and an internal comment only to be seen by other managers of the RDMO installation. In addition, you can edit the parameters below:

### 5.6.1 Parameters

**Task**

**Time frame**

### 5.7 Export and Import

RDMO offers export and import functions which are available in the right handed sidebar. The two categories offering the equally named functions do appear for every datatype (e.g. Questions, Domain, etc.). Note that these functions are context sensitive. If you for example use the Export or Import being in Tasks you can only ex- or import Tasks. This is especially important to know for the import, because it will fail and display an error if you pick an xml file that does not contain fitting content.

#### 5.7.1 Export

The export menu is displayed on the right-hand side of the screen. It consists of a list of the supported export formats which may vary depending on what page you are on. For information about how to configure the available export formats see here.

#### 5.7.2 Import

As mentioned above the import is context sensitive. It will only run if you select an xml file that fits to the page you are on and contains valid xml data. If the file is invalid or you accidentally picked a wrong document type, the parser will become aware of it and simply skip any import function. This will simply reload the page without any change of data.

You can select the file to import by clicking the select xml file text or by dragging and dropping your file onto the box containing the mentioned text.

A Project import will always create a new Project holding the imported data. *Note that for all other types (Options, Tasks, etc.) data already existing in your RDMO installation will be overwritten during an import.* The URI acts as identifier. If you import an element that equals the URI of an already existing one, the import will overwrite.

### 5.8 Role concept

You can invite other members to your projects. You have to assign them a role with certain permissions to make changes. At the moment there the following roles:
• **Owner**: If you create a new project, you are automatically its owner. However, you can assign other members to be owners as well. Owners have all permissions including deleting a project.

• **Manager**: is not allowed to delete a project, but he has all other permissions including making snapshots and make changes.

• **Author**: has read and write permissions.

• **Guest**: has only read permission.
The `rdmo` package can be conveniently upgraded using the `pip` command. However, before you perform any changes to your installation, please backup the important components to a save location.

A PostgreSQL or MySQL database can be dumped into a file using:

```
pg_dump [DBNAME] > rdmo.sql  # PostgreSQL
mysqldump -uroot -p [DBNAME] > rdmo.sql
```

Your `rdmo-app` directory (including any sqlite3 database) can be copied using the usual commands. Note that your virtual environment will not work after being moved to a different path.

In order to upgrade your RDMO installation go to your `rdmo-app` directory, activate your virtual environment, and upgrade the `rdmo` package using `pip`:

```
pip install --upgrade rdmo
```

In order to install a specific version (e.g. 0.9.0) of RDMO use:

```
pip install --upgrade rdmo==0.9.0
```

After the upgrade a database migration might be necessary:

```
python manage.py migrate
```

In any case you have to deploy the changes:

```
python manage.py deploy
```

Please check the release notes if this, or other, steps are necessary.
6.1 Upgrade to version 0.9.0

With version 0.9.0 we introduced the split into the `rdmo-app` and the centrally maintained `rdmo` package. Therefore a few additional steps are needed to upgrade any earlier version to 0.9.0 or beyond:

1. In any case perform a backup of your `rdmo` directory and your database as described above.

2. Perform the steps described in `clone` and `packages` as if you would install a new instance of RDMO.

3. Copy your old configuration from `/path/to/old/rdmo/rdmo/settings/local.py` to `/path/to/new/rdmo-app/config/settings/local.py`. The new config directory replaces the old `rdmo` directory.

4. If you already have a `theme` directory, copy it into the new `rdmo-app` folder.

5. Run a database migration (Unless you skipped several versions, the output should be No migrations to apply.):

   ```bash
   python manage.py migrate
   ```

6. Download the front-end files from the CDN. We don’t use bower and npm anymore.

   ```bash
   python manage.py download_vendor_files
   ```

7. Update the path to the `wsgi.py` script in your Apache or nginx configuration. It is now under `/path/to/new/rdmo-app/config/wsgi.py`.

8. Redeploy RDMO as described under deployment of Apache or Nginx.

If you have trouble with the upgrade process, don’t hesitate to contact the RDMO team for support.