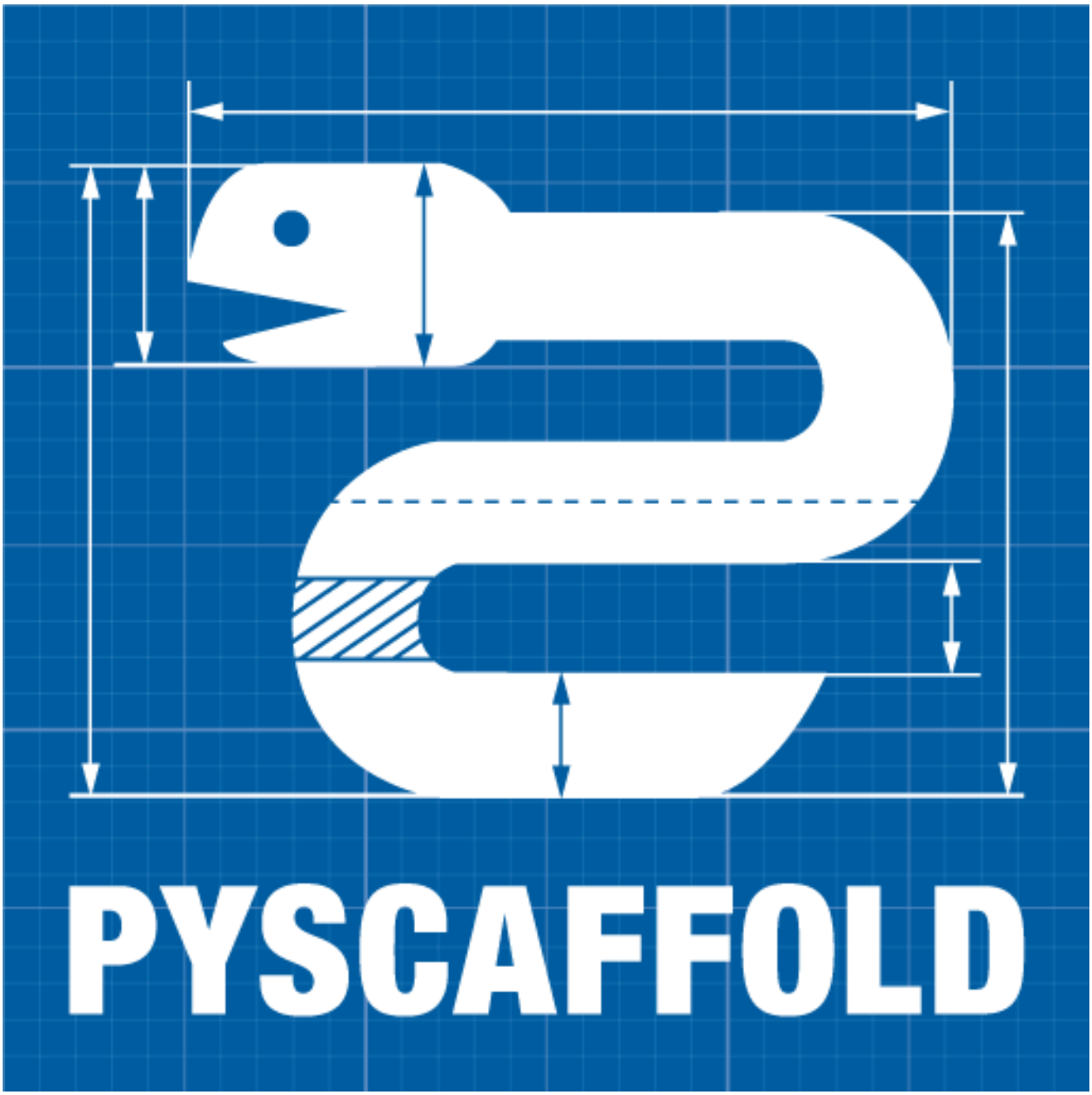


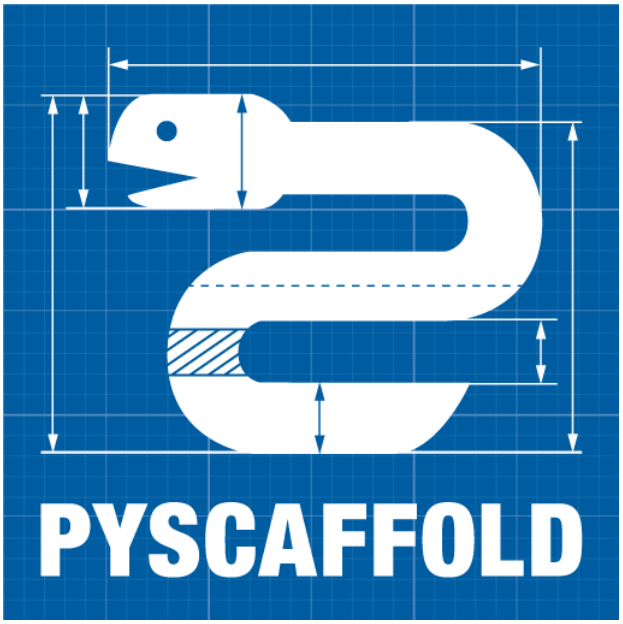
PyScaffold Documentation

Release 3.2.3.post0.dev14+ga095493

Blue Yonder

Mar 30, 2020

Contents



PyScaffold helps you setup a new Python project. It is as easy as:

```
putup my_project
```

This will create a new folder called `my_project` containing a perfect *project template* with everything you need for some serious coding. After the usual:

```
python setup.py develop
```

you are all set and ready to go which means in a Python shell you can do the following:

```
>>> from my_project.skeleton import fib
>>> fib(10)
55
```

Type `putup -h` to learn about more configuration options. PyScaffold assumes that you have Git installed and set up on your PC, meaning at least your name and email are configured. The project template in `my_project` provides you with a lot of *features*. PyScaffold 3 is compatible with Python 3.4 and greater. For legacy Python 2.7 support please install PyScaffold 2.5.

CHAPTER 1

Features

PyScaffold comes with a lot of elaborated features and configuration defaults to make the most common tasks in developing, maintaining and distributing your own Python package as easy as possible.

1.1 Configuration, Packaging & Distribution

All configuration can be done in `setup.cfg` like changing the description, url, classifiers, installation requirements and so on as defined by setuptools. That means in most cases it is not necessary to tamper with `setup.py`. The syntax of `setup.cfg` is pretty much self-explanatory and well commented, check out this *example* or setuptools' documentation.

In order to build a source, binary or wheel distribution, just run `python setup.py sdist`, `python setup.py bdist` or `python setup.py bdist_wheel` (recommended).

Uploading to PyPI

Of course uploading your package to the official Python package index PyPI for distribution also works out of the box. Just create a distribution as mentioned above and use twine to upload it to PyPI, e.g.:

```
pip install twine
twine upload dist/*
```

For this to work, you have to first register a PyPI account. If you just want to test, please be kind and use TestPyPI before uploading to PyPI.

Please also note that PyPI does not allow uploading local versions for practical reasons. Thus, you have to create a git tag before uploading a version of your distribution. Read more about it in the *versioning* section below.

Warning: Be aware that the usage of `python setup.py upload` for PyPI uploads also works but is nowadays strongly discouraged and even some of the new PyPI features won't work correctly if you don't use twine.

Namespace Packages

Optionally, namespace packages can be used, if you are planning to distribute a larger package as a collection of smaller ones. For example, use:

```
putup my_project --package my_package --namespace com.my_domain
```

to define `my_package` inside the namespace `com.my_domain` in java-style.

Package and Files Data

Additional data, e.g. images and text files, that reside within your package and are tracked by Git will automatically be included (`include_package_data = True` in `setup.cfg`). It is not necessary to have a `MANIFEST.in` file for this to work. Just make sure that all files are added to your repository. To read this data in your code, use:

```
from pkgutil import get_data
data = get_data('my_package', 'path/to/my/data.txt')
```

Starting from Python 3.7 an even better approach is using importlib.resources:

```
from importlib.resources import read_text, read_binary
data = read_text('my_package', 'path/to/my/data.txt')
```

The library importlib_resources provides a backport of this feature. Even another way, provided by setuptools's pkg_resources is:

```
from pkg_resources import resource_string
data = resource_string(__name__, 'path/to/my/data/relative/to/module.txt')
```

Yes, actually "there should be one– and preferably only one –obvious way to do it." ;-)

1.2 Versioning and Git Integration

Your project is already an initialised Git repository and `setup.py` uses the information of tags to infer the version of your project with the help of setuptools_scm. To use this feature you need to tag with the format `MAJOR.MINOR[.PATCH]` , e.g. `0.0.1` or `0.1`. Run `python setup.py --version` to retrieve the current PEP440-compliant version. This version will be used when building a package and is also accessible through `my_project.__version__`. If you want to upload to PyPI you have to tag the current commit before uploading since PyPI does not allow local versions, e.g. `0.0.post0.dev5+gc5da6ad`, for practical reasons.

Best Practices and Common Errors with Version Numbers

- **How do I get a clean version like 3.2.4 when I have 3.2.3.post0.dev9+g6817bd7?** Just commit all your changes and create a new tag using `git tag v3.2.4`. In order to build an old version checkout an old tag, e.g. `git checkout -b v3.2.3 v3.2.3` and run `python setup.py bdist_wheel`.
- **Why do I see 'unknown' as version?** In most cases this happens if your source code is no longer a proper Git repository, maybe because you moved or copied it or Git is not even installed. In general using `python setup.py install` (or `develop`) to install your package is only recommended for developers of your Python project, which have Git installed and use a proper Git repository anyway. Users of your project should always install it using the distribution you built for them e.g. `pip install my_project-3.2.3-py3-none-any.whl`. You build such a distribution by running `python setup.py bdist_wheel` and then find it under `./dist`.

- **Is there a good versioning scheme I should follow?** The most common practice is to use Semantic Versioning. Following this practice avoids the so called dependency hell for the users of your package. Also be sure to set attributes like `python_requires` and `install_requires` appropriately in `setup.cfg`.
- **Is there a best practise for distributing my package?** First of all, cloning your repository or just coping your code around is a really bad practice which comes with tons of pitfalls. The *clean* way is to first build a distribution and then give this distribution to your users. This can be done by just copying the distribution file or uploading it to some artifact store like PyPI for public packages or devpi, Nexus, etc. for private packages. Also check out this article about packaging, versioning and continuous integration.
- **Using some CI service, why is the version 'unknown' or 'my_project-0.0.post0.dev50'?** Some CI services use shallow git clones, i.e. `--depth N`, or don't download git tags to save bandwidth. To verify that your repo works as expected, run:

  ```
  git describe --dirty --tags --long --first-parent
  ```

  which is basically what setuptools_scm does to retrieve the correct version number. If this command fails, tweak how your repo is cloned depending on your CI service and make sure to also download the tags, i.e. `git fetch origin --tags`.

Pre-commit Hooks

Unleash the power of Git by using its pre-commit hooks. This feature is available through the `--pre-commit` flag. After your project's scaffold was generated, make sure pre-commit is installed, e.g. `pip install pre-commit`, then just run `pre-commit install`.

It goes unsaid that also a default `.gitignore` file is provided that is well adjusted for Python projects and the most common tools.

1.3 Sphinx Documentation

Build the documentation with `python setup.py docs` and run doctests with `python setup.py doctest` after you have Sphinx installed. Start editing the file `docs/index.rst` to extend the documentation. The documentation also works with Read the Docs.

The Numpy and Google style docstrings are activated by default. Just make sure Sphinx 1.3 or above is installed.

1.4 Dependency Management in a Breeze

PyScaffold out of the box allows developers to express abstract dependencies and take advantage of `pip` to manage installation. It also can be used together with a virtual environment to avoid *dependency hell* during both development and production stages.

In particular, PyPA's Pipenv can be integrated in any PyScaffold-generated project by following standard setuptools conventions. Keeping abstract requirements in `setup.cfg` and running `pipenv install -e .` is basically what you have to do (details in *Dependency Management*).

> **Warning:** *Experimental Feature* - Pipenv support is experimental and might change in the future

1.5 Unittest & Coverage

Run `python setup.py test` to run all unittests defined in the subfolder `tests` with the help of py.test and pytest-runner. Some sane default flags for py.test are already defined in the `[pytest]` section of `setup.cfg`. The py.test plugin pytest-cov is used to automatically generate a coverage report. It is also possible to provide additional parameters and flags on the commandline, e.g., type:

```
python setup.py test --addopts -h
```

to show the help of py.test.

JUnit and Coverage HTML/XML

For usage with a continuous integration software JUnit and Coverage XML output can be activated in `setup.cfg`. Use the flag `--travis` to generate templates of the Travis configuration files `.travis.yml` and `tests/travis_install.sh` which even features the coverage and stats system Coveralls. In order to use the virtualenv management and test tool tox the flag `--tox` can be specified. If you are using GitLab you can get a default *.gitlab-ci.yml* also running *pytest-cov* with the flag `--gitlab`.

Managing test environments with tox

Run `tox` to generate test virtual environments for various python environments defined in the generated `tox.ini`. Testing and building *sdists* for python 2.7 and python 3.4 is just as simple with tox as:

```
tox -e py27,py34
```

Environments for tests with the the static code analyzers pyflakes and pep8 which are bundled in flake8 are included as well. Run it explicitly with:

```
tox -e flake8
```

With tox, you can use the `--recreate` flag to force tox to create new environments. By default, PyScaffold's tox configuration will execute tests for a variety of python versions. If an environment is not available on the system the tests are skipped gracefully. You can rely on the tox documentation for detailed configuration options.

1.6 Management of Requirements & Licenses

Installation requirements of your project can be defined inside `setup.cfg`, e.g. `install_requires = numpy; scipy`. To avoid package dependency problems it is common to not pin installation requirements to any specific version, although minimum versions, e.g. `sphinx>=1.3`, or maximum versions, e.g. `pandas<0.12`, are used sometimes.

More specific installation requirements should go into `requirements.txt`. This file can also be managed with the help of `pip compile` from pip-tools that basically pins packages to the current version, e.g. `numpy==1.13.1`. The packages defined in `requirements.txt` can be easily installed with:

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

All licenses from choosealicense.com can be easily selected with the help of the `--license` flag.

1.7 Extensions

PyScaffold comes with several extensions:

- If you want a project setup for a *Data Science* task, just use `--dsproject` after having installed pyscaffoldext-dsproject.
- Create a Django project with the flag `--django` which is equivalent to `django-admin.py startproject my_project` enhanced by PyScaffold's features.
- Create a template for your own PyScaffold extension with `--custom-extension` after having installed pyscaffoldext-custom-extension with `pip`.
- Have a `README.md` based on MarkDown instead of `README.rst` by using `--markdown` after having installed pyscaffoldext-markdown with `pip`.
- Add a `pyproject.toml` file according to PEP 518 to your template by using `--pyproject` after having installed pyscaffoldext-pyproject with `pip`.
- With the help of Cookiecutter it is possible to further customize your project setup with a template tailored for PyScaffold. Just use the flag `--cookiecutter TEMPLATE` to use a cookiecutter template which will be refined by PyScaffold afterwards.
- ... and many more like `--gitlab` to create the necessary files for GitLab.

There is also documentation about *writing extensions*. Find more extensions within the PyScaffold organisation and consider contributing your own. All extensions can easily be installed with `pip pyscaffoldext-NAME`.

Warning: *Deprecation Notice* - In the next major release both Cookiecutter and Django extensions will be extracted into independent packages. After PyScaffold v4.0, you will need to explicitly install `pyscaffoldext-cookiecutter` and `pyscaffoldext-django` in your system/virtualenv in order to be able to use them.

1.8 Easy Updating

Keep your project's scaffold up-to-date by applying `putup --update my_project` when a new version of PyScaffold was released. An update will only overwrite files that are not often altered by users like `setup.py`. To update all files use `--update --force`. An existing project that was not setup with PyScaffold can be converted with `putup --force existing_project`. The force option is completely safe to use since the git repository of the existing project is not touched! Also check out if *configuration options* in `setup.cfg` have changed.

1.8.1 Updates from PyScaffold 2

Since the overall structure of a project set up with PyScaffold 2 differs quite much from a project generated with PyScaffold 3 it is not possible to just use the `--update` parameter. Still with some manual efforts an update from a scaffold generated with PyScaffold 2 to PyScaffold 3's scaffold is quite easy. Assume the name of our project is `old_project` with a package called `old_package` and no namespaces then just:

1) make sure your worktree is not dirty, i.e. commit all your changes,
2) run `putup old_project --force --no-skeleton -p old_package` to generate the new structure inplace and `cd` into your project,
3) move with `git mv old_package/* src/old_package/ --force` your old package over to the new `src` directory,

4) check `git status` and add untracked files from the new structure,
5) use `git difftool` to check all overwritten files, especially `setup.cfg`, and transfer custom configurations from the old structure to the new,
6) check if `python setup.py test sdist` works and commit your changes.

1.8.2 Adding features

With the help of an experimental updating functionality it is also possible to add additional features to your existing project scaffold. If a scaffold lacking `.travis.yml` was created with `putup my_project` it can later be added by issuing `putup --update my_project --travis`. For this to work, PyScaffold stores all options that were initially used to put up the scaffold under the `[pyscaffold]` section in `setup.cfg`. Be aware that right now PyScaffold provides no way to remove a feature which was once added.

CHAPTER 2

Installation

2.1 Requirements

The installation of PyScaffold only requires a recent version of setuptools, i.e. at least version 38.3, as well as a working installation of Git. Especially Windows users should make sure that the command `git` is available on the command line. Otherwise, check and update your `PATH` environment variable or run PyScaffold from the *Git Bash*.

Additionally, if you want to create a Django project or want to use cookiecutter:

- Django
- Cookiecutter

Note: It is recommended to use an isolated environment as provided by virtualenv or even better Anaconda for your work with Python in general.

2.2 Installation

Make sure you have `pip` installed, then simply type:

```
pip install --upgrade pyscaffold
```

to get the latest stable version. The most recent development version can be installed with:

```
pip install --pre --upgrade pyscaffold
```

Using `pip` also has the advantage that all requirements are automatically installed.

If you want to install PyScaffold with all extensions, run:

```
pip install --upgrade pyscaffold[all]
```

PyScaffold is also available at conda-forge and thus can be installed with conda:

```
conda install -c conda-forge pyscaffold
```

2.3 Additional Requirements

If you run commands like `python setup.py test` and `python setup.py docs` within your project, some additional requirements like py.test will be installed automatically as *egg*-files inside the `.eggs` folder. This is quite comfortable but can be confusing because these packages won't be available to other packages inside your virtual environment. In order to avoid this just install following packages inside your virtual environment before you run `setup.py` commands like *doc* and *test*:

- Sphinx
- py.test
- pytest-cov

CHAPTER 3

Examples

Just a few examples to get you an idea of how easy PyScaffold is to use:

putup my_little_project The simplest way of using PyScaffold. A directory `my_little_project` is created with a Python package named exactly the same. The MIT license will be used.

putup skynet -l gpl3 -d "Finally, the ultimate AI!" -u http://sky.net This will create a project and package named *skynet* licensed under the GPL3. The *description* inside `setup.cfg` is directly set to "Finally, the ultimate AI!" and the homepage to http://sky.net.

putup Scikit-Gravity -p skgravity -l new-bsd This will create a project named *Scikit-Gravity* but the package will be named *skgravity* with license new-BSD.

putup youtub --django --pre-commit -d "Ultimate video site for hot tub fans" This will create a web project and package named *youtub* that also includes the files created by Django's `django-admin`. The *description* in `setup.cfg` will be set and a file `.pre-commit-config.yaml` is created with a default setup for pre-commit.

putup thoroughly_tested --tox --travis This will create a project and package *thoroughly_tested* with files `tox.ini` and `.travis.yml` for Tox and Travis.

putup my_zope_subpackage --namespace zope -l gpl3 This will create a project and subpackage named *my_zope_subpackage* in the namespace *zope*. To be honest, there is really only the Zope project that comes to my mind which is using this exotic feature of Python's packaging system. Chances are high, that you will never ever need a namespace package in your life.

CHAPTER 4

Configuration

Projects set up with PyScaffold feature an easy package configuration with `setup.cfg`. Check out the example below as well as the documentation of setuptools.

```
[metadata]
name = my_project
description = A test project that was set up with PyScaffold
author = Florian Wilhelm
author-email = Florian.Wilhelm@blue-yonder.com
license = MIT
url = https://...
long-description = file: README.rst
platforms = any
classifiers =
    Development Status :: 5 - Production/Stable
    Topic :: Utilities
    Programming Language :: Python
    Programming Language :: Python :: 3
    Programming Language :: Python :: 3.4
    Programming Language :: Python :: 3.5
    Programming Language :: Python :: 3.6
    Environment :: Console
    Intended Audience :: Developers
    License :: OSI Approved :: MIT License
    Operating System :: POSIX :: Linux
    Operating System :: Unix
    Operating System :: MacOS
    Operating System :: Microsoft :: Windows

[options]
zip_safe = False
packages = find:
include_package_data = True
package_dir =
    =src
```

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```
setup_requires = pyscaffold>=3.1a0,<3.2a0
# Add here dependencies of your project (semicolon/line-separated)
install_requires =
    pandas
    scikit-learn

[options.packages.find]
where = src
exclude =
    tests

[options.extras_require]
# Add here additional requirements for extra features, like:
# pdf = ReportLab>=1.2; RXP
# rest = docutils>=0.3; pack ==1.1, ==1.3
all = django; cookiecutter
# Add here test requirements (semicolon/line-separated)
testing =
    pytest
    pytest-cov

[options.entry_points]
# Add here console scripts like:
# console_scripts =
#     script_name = ${package}.module:function
# For example:
# console_scripts =
#     fibonacci = ${package}.skeleton:run
# And any other entry points, for example:
# pyscaffold.cli =
#     awesome = pyscaffoldext.awesome.extension:AwesomeExtension

[test]
# py.test options when running `python setup.py test`
addopts = --verbose
extras = True

[tool:pytest]
# Options for py.test:
# Specify command line options as you would do when invoking py.test directly.
# e.g. --cov-report html (or xml) for html/xml output or --junitxml junit.xml
# in order to write a coverage file that can be read by Jenkins.
addopts =
    --cov pyscaffold --cov-report term-missing
    --verbose
norecursedirs =
    dist
    build
    .tox
testpaths = tests

[aliases]
release = sdist bdist_wheel upload

[bdist_wheel]
universal = 1
```

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```
[build_sphinx]
# Options for Sphinx build
source_dir = docs
build_dir = docs/_build

[devpi:upload]
# Options for the devpi: PyPI server and packaging tool
# VCS export must be deactivated since we are using setuptools-scm
no-vcs = 1
formats =
    sdist
    bdist_wheel

[flake8]
# Some sane defaults for the code style checker flake8
exclude =
    .tox
    build
    dist
    .eggs
    docs/conf.py

[pyscaffold]
# PyScaffold's parameters when the project was created.
# This will be used when updating. Do not change!
version = 3.0
package = my_package
extensions =
    namespace
namespace = ns1.ns2
```

CHAPTER 5

Dependency Management

Warning: *Experimental Feature* - PyScaffold support for virtual environment management is experimental and might change in the future.

The greatest advantage in packaging Python code (when compared to other forms of distributing programs and libraries) is that packages allow us to stand on the shoulders of giants: you don't need to implement everything by yourself, you can just declare dependencies on third-party packages and `setuptools`, `pip`, PyPI and their friends will do the heavy lifting for you.

Of course, with great power comes great responsibility. Package authors must be careful when declaring the versions of the packages they depend on, so the people consuming the final work can do reliable installations, without facing dependency hell. In the opensource community, two main strategies have emerged in the last few years:

- the first one is called **abstract** and consists of having permissive, minimal and generic dependencies, with versions specified by ranges, so anyone can install the package without many conflicts, sharing and reusing as much as possible dependencies that are already installed or are also required by other packages
- the second, called **concrete**, consists of having strict dependencies, with pinned versions, so all the users will have repeatable installations

Both approaches have advantages and disadvantages, and usually are used together in different phases of a project. As a rule of thumb, libraries tend to emphasize abstract dependencies (but can still have concrete dependencies for the development environment), while applications tend to rely on concrete dependencies (but can still have abstract dependencies specially if they are intended to be distributed via PyPI, e.g. command line tools and auxiliary WSGI apps/middleware to be mounted inside other domain-centric apps). For more information about this topic check Donald Stufft post.

Since PyScaffold aims the development of Python projects that can be easily packaged and distributed using the standard PyPI and `pip` flow, we adopt the specification of **abstract dependencies** using `setuptools' install_requires`. This basically means that if PyScaffold generated projects specify dependencies inside the `setup.cfg` file (using general version ranges), everything will work as expected.

5.1 Test Dependencies

While specifying the final dependencies for packages is pretty much straightforward (you just have to use `install_requires` inside `setup.cfg`), dependencies for running the tests can be a little bit trick.

Historically, `setuptools` provides a `tests_require` field that follows the same convention as `install_requires`, however this field is not strictly enforced, and `setuptools` doesn't really do much to enforce the packages listed will be installed before the test suite runs.

PyScaffold's recommendation is to create a `testing` field (actually you can name it whatever you want, but let's be explicit!) inside the `[options.extras_require]` section of `setup.cfg`. This way multiple test runners can have a centralised configuration and authors can avoid double bookkeeping.

If you use `pytest-runner` adding a `--extras` flag will do the trick of making sure these dependencies are installed, and if you use `tox`, the same is accomplished with the `extras` configuration field. By default PyScaffold will take care of these configurations for you.

Note: If you prefer to use just `tox` and keep everything inside `tox.ini`, please go ahead and move your test dependencies. Every should work just fine :)

Warning: PyScaffold strongly advocates the use of test runners to guarantee your project is correctly packaged/works in isolated environments. A good start is to create a new project passing the `--tox` option to `putup` and try running `tox` in your project root.

5.2 Development Environment

As previously mentioned, PyScaffold will get you covered when specifying the **abstract** or test dependencies of your package. We provide sensible configurations for `setuptools`, `tox` and `pytest-runner` out-of-the-box. In most of the cases this is enough, since developers in the Python community are used to rely on tools like `virtualenv` and have a workflow that take advantage of such configurations. As an example, someone could do:

```
$ pip install pyscaffold
$ putup myproj --tox
$ cd myproj
$ python -m venv .venv
$ source .venv/bin/activate
# ... edit setup.cfg to add dependencies ...
$ pip install -e .
$ pip install tox
$ tox
```

However, someone could argue that this process is pretty manual and laborious to maintain specially when the developer changes the **abstract** dependencies. Moreover, it is desirable to keep track of the version of each item in the dependency graph, so the developer can have environment reproducibility when trying to use another machine or discuss bugs with colleagues.

In the following sections, we describe how to use two popular command line tools, supported by PyScaffold, to tackle these issues.

5.2.1 How to integrate Pipenv

We can think in Pipenv as a virtual environment manager. It creates per-project virtualenvs and generates a `Pipfile.lock` file that contains a precise description of the dependency tree and enables re-creating the exact same environment elsewhere.

Pipenv supports two different sets of dependencies: the default one, and the *dev* set. The default set is meant to store runtime dependencies while the dev set is meant to store dependencies that are used only during development.

This separation can be directly mapped to PyScaffold strategy: basically the default set should mimic the `install_requires` option in `setup.cfg`, while the dev set should contain things like `tox`, `pytest-runner`, `sphinx`, `pre-commit`, `ptpython` or any other tool the developer uses while developing.

Note: Test dependencies are internally managed by the test runner, so we don't have to tell Pipenv about them.

The easiest way of doing so is to add a `-e .` dependency (in resemblance with the non-automated workflow) in the default set, and all the other ones in the dev set. After using Pipenv, you should add both `Pipfile` and `Pipfile.lock` to your git repository to achieve reproducibility (maintaining a single `Pipfile.lock` shared by all the developers in the same project can save you some hours of sleep).

In a nutshell, PyScaffold+Pipenv workflow looks like:

```
$ pip install pyscaffold pipenv
$ putup myproj --tox
$ cd myproj
# ... edit setup.cfg to add dependencies ...
$ pipenv install
$ pipenv install -e .  # proxy setup.cfg install_requires
$ pipenv install --dev tox sphinx  # etc
$ pipenv run tox       # use `pipenv run` to access tools inside env
$ pipenv lock          # to generate Pipfile.lock
$ git add Pipfile Pipfile.lock
```

After adding dependencies in `setup.cfg`, you can run `pipenv update` to add them to your virtual environment.

Warning: *Experimental Feature* - Pipenv is still a young project that is moving very fast. Changes in the way developers can use it are expected in the near future, and therefore PyScaffold support might change as well.

CHAPTER 6

Migration to PyScaffold

Migrating your existing project to PyScaffold is in most cases quite easy and requires only a few steps. We assume your project resides in the Git repository `my_project` and includes a package directory `my_package` with your Python modules.

Since you surely don't want to lose your Git history, we will just deploy a new scaffold in the same repository and move as well as change some files. But before you start, please make sure that your working tree is not dirty, i.e. all changes are committed and all important files are under version control.

Let's start:

1. Change into the parent folder of `my_project` and type:

   ```
   putup my_project --force --no-skeleton -p my_package
   ```

   in order to deploy the new project structure in your repository.

2. Now change into `my_project` and move your old package folder into `src` with:

   ```
   git mv my_package/* src/my_package/
   ```

   Use the same technique if your project has a test folder other than `tests` or a documentation folder other than `docs`.

3. Use `git status` to check for untracked files and add them with `git add`.

4. Eventually, use `git difftool` to check all overwritten files for changes that need to be transferred. Most important is that all configuration that you may have done in `setup.py` by passing parameters to `setup(...)` need to be moved to `setup.cfg`. You will figure that out quite easily by putting your old `setup.py` and the new `setup.cfg` template side by side. Checkout the documentation of setuptools for more information about this conversion. In most cases you will not need to make changes to the new `setup.py` file provided by PyScaffold. The only exceptions are if your project uses compiled resources, e.g. Cython.

5. In order to check that everything works, run `python setup.py install` and `python setup.py sdist`. If those two commands don't work, check `setup.cfg`, `setup.py` as well as your package under `src` again. Were all modules moved correctly? Is there maybe some `__init__.py` file missing? After

these basic commands, try also to run `python setup.py docs` and `python setup.py test` to check that Sphinx and PyTest runs correctly.

CHAPTER 7

Extending PyScaffold

PyScaffold is carefully designed to cover the essentials of authoring and distributing Python packages. Most of time, tweaking `putup` options is enough to ensure proper configuration of a project. However, for advanced use cases a deeper level of programmability may be required and PyScaffold's extension systems provides this.

PyScaffold can be extended at runtime by other Python packages. Therefore it is possible to change the behaviour of the `putup` command line tool without changing the PyScaffold code itself. In order to explain how this mechanism works, the following sections define a few important concepts and present a comprehensive guide about how to create custom extensions.

Additionally, *Cookiecutter templates* can also be used but writing a native PyScaffold extension is the preferred way.

Note: A perfect start for your own custom extension is the extension custom_extension for PyScaffold. Just install it with `pip install pyscaffoldext-custom-extension` and then create your own extension template with `putup --custom-extension pyscaffoldext-my-own-extension`.

7.1 Project Structure Representation

Each Python package project is internally represented by PyScaffold as a tree data structure, that directly relates to a directory entry in the file system. This tree is implemented as a simple (and possibly nested) `dict` in which keys indicate the path where files will be generated, while values indicate their content. For instance, the following dict:

```
{
    'project': {
        'folder': {
            'file.txt': 'Hello World!',
            'another-folder': {
              'empty-file.txt': ''
            }
        }
    }
}
```

represents a `project/folder` directory in the file system containing two entries. The first entry is a file named `file.txt` with content `Hello World!` while the second entry is a sub-directory named `another-folder`. In turn, `another-folder` contains an empty file named `empty-file.txt`.

Additionally, tuple values are also allowed in order to specify some useful metadata. In this case, the first element of the tuple is the file content. For example, the dict:

```
{
    'project': {
        'namespace': {
            'module.py': ('print("Hello World!")', helpers.NO_OVERWRITE)
        }
    }
}
```

represents a `project/namespace/module.py` file with content `print("Hello World!")`, that will not be overwritten if already exists.

Note: The `NO_OVERWRITE` flag is defined in the module *pyscaffold.api.helpers*

This tree representation is often referred in this document as **project structure** or simply **structure**.

7.2 Scaffold Actions

PyScaffold organizes the generation of a project into a series of steps with well defined purposes. Each step is called **action** and is implemented as a simple function that receives two arguments: a project structure and a dict with options (some of them parsed from command line arguments, other from default values).

An action **MUST** return a tuple also composed by a project structure and a dict with options. The return values, thus, are usually modified versions of the input arguments. Additionally an action can also have side effects, like creating directories or adding files to version control. The following pseudo-code illustrates a basic action:

```
def action(project_structure, options):
    new_struct, new_opts = modify(project_structure, options)
    some_side_effect()
    return new_struct, new_opts
```

The output of each action is used as the input of the subsequent action, and initially the structure argument is just an empty dict. Each action is uniquely identified by a string in the format `<module name>:<function name>`, similarly to the convention used for a setuptools entry point. For example, if an action is defined in the `action` function of the `extras.py` file that is part of the `pyscaffoldext.contrib` project, the **action identifier** is `pyscaffoldext.contrib.extras:action`.

By default, the sequence of actions taken by PyScaffold is:

1. *pyscaffold.api:get_default_options*
2. *pyscaffold.api:verify_options_consistency*
3. *pyscaffold.structure:define_structure*
4. pyscaffold.structure:apply_update_rules
5. *pyscaffold.structure:create_structure*
6. *pyscaffold.api:init_git*

The project structure is usually empty until **define_structure**. This action just loads the in-memory dict representation, that is only written to disk by the **create_structure** action.

Note that, this sequence varies according to the command line options. To retrieve an updated list, please use `putup --list-actions` or `putup --dry-run`.

7.3 What are Extensions?

From the standpoint of PyScaffold, an extension is just an class inheriting from *Extension* overriding and implementing certain methods. This methods allow inject actions at arbitrary positions in the aforementioned list. Furthermore, extensions can also remove actions.

7.4 Creating an Extension

In order to create an extension it is necessary to write a class that inherits from *Extension* and implements the method *activate* that receives a list of actions, registers a custom action that will be called later and returns a modified version of the list of actions:

```
from ..api import Extension
from ..api import helpers


class MyExtension(Extension):
    """Help text on commandline when running putup -h"""
    def activate(self, actions):
        """Activate extension

        Args:
            actions (list): list of actions to perform

        Returns:
            list: updated list of actions
        """
        actions = helpers.register(actions, self.action, after='create_structure')
        actions = helpers.unregister(actions, 'init_git')
        return actions

    def action(self, struct, opts):
        """Perform some actions that modifies the structure and options

        Args:
            struct (dict): project representation as (possibly) nested
                :obj:`dict`.
            opts (dict): given options, see :obj:`create_project` for
                an extensive list.

        Returns:
            struct, opts: updated project representation and options
        """
        ...
        return new_actions, new_opts
```

Note: The `register` and `unregister` methods implemented in the module *pyscaffold.api.helpers*

basically create modified copies of the action list by inserting/removing the specified functions, with some awareness about their execution order.

7.4.1 Action List Helper Methods

As implied by the previous example, the *helpers* module provides a series of useful functions and makes it easier to manipulate the action list, by using *register* and *unregister*.

Since the action order is relevant, the first function accepts special keyword arguments (`before` and `after`) that should be used to place the extension actions precisely among the default actions. The value of these arguments can be presented in 2 different forms:

```
helpers.register(actions, hook1, before='define_structure')
helpers.register(actions, hook2, after='pyscaffold.structure:create_structure')
```

The first form uses as a position reference the first action with a matching name, regardless of the module. Accordingly, the second form tries to find an action that matches both the given name and module. When no reference is given, *register* assumes as default position `after='pyscaffold.structure:define_structure'`. This position is special since most extensions are expected to create additional files inside the project. Therefore, it is possible to easily amend the project structure before it is materialized by `create_structure`.

The *unregister* function accepts as second argument a position reference which can similarly present the module name:

```
helpers.unregister(actions, 'init_git')
helpers.unregister(actions, 'pyscaffold.api:init_git')
```

Note: These functions **DO NOT** modify the actions list, instead they return a new list with the changes applied.

Note: For convenience, the functions *register* and *unregister* are aliased as instance methods of the *Extension* class.

Therefore, inside the *activate* method, one could simply call `actions = self.register(actions, self.my_action)`.

7.4.2 Structure Helper Methods

PyScaffold also provides extra facilities to manipulate the project structure. The following functions are accessible through the *helpers* module:

- *merge*
- *ensure*
- *reject*
- *modify*

The first function can be used to deep merge a dictionary argument with the current representation of the to-be-generated directory tree, automatically considering any metadata present in tuple values. On the other hand, the second and third functions can be used to ensure a single file is present or absent in the current representation of the

project structure, automatically handling parent directories. Finally, *modify* can be used to change the contents of an existing file in the project structure and/or its metadata (for example adding *NO_OVERWRITE* or *NO_CREATE* flags).

Note: Similarly to the actions list helpers, these functions also **DO NOT** modify the project structure. Instead they return a new structure with the changes applied.

The following example illustrates the implementation of a `AwesomeFiles` extension which defines the `define_awesome_files` action:

```
from pathlib import PurePath

from ..api import Extension
from ..api import helpers

MY_AWESOME_FILE = """\
# -*- coding: utf-8 -*-

__author__ = "{author}"
__copyright__ = "{author}"
__license__ = "{license}"

def awesome():
    return "Awesome!"
"""

MY_AWESOME_TEST = """\
import pytest
from {qual_pkg}.awesome import awesome

def test_awesome():
    assert awesome() == "Awesome!"
"""

class AwesomeFiles(Extension):
    """Adding some additional awesome files"""
    def activate(self, actions):
        return helpers.register(actions, self.define_awesome_files)

    def define_awesome_files(self, struct, opts):
        struct = helpers.merge(struct, {
            opts['project']: {
                'src': {
                    opts['package']: {
                        'awesome.py': MY_AWESOME_FILE.format(**opts)
                    },
                }
                'tests': {
                    'awesome_test.py': (
                        MY_AWESOME_TEST.format(**opts),
                        helpers.NO_OVERWRITE
                    )
                }
            }
        })

        struct['.python-version'] = ('3.6.1', helpers.NO_OVERWRITE)
```

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```
        for filename in ['awesome_file1', 'awesome_file2']:
            struct = helpers.ensure(
                struct,
                PurePath(opts['project'], 'src', 'awesome', filename),
                content='AWESOME!', update_rule=helpers.NO_CREATE)
                # The second argument is the file path, represented by a
                # list of file parts or a string.
                # Alternatively in this example:
                # path = '{project}/src/awesome/{filename}'.format(
                #           filename=filename, **opts)

        # The `reject` can be used to avoid default files being generated.
        struct = helpers.reject(
            struct, '{project}/src/{package}/skeleton.py'.format(**opts))
            # Alternatively in this example:
            # path = [opts['project'], 'src', opts['package'], 'skeleton.py'])

        # `modify` can be used to change contents in an existing file
        struct = helpers.modify(
            struct,
            PurePath(opts['project'], 'tests', 'awesome_test.py'),
            lambda content: 'import pdb\n' + content)

        # And/or change the update behavior
        struct = helpers.modify(struct, [opts['project'], '.travis.yml'],
                                update_rule=helpers.NO_CREATE)

        # It is import to remember the return values
        return struct, opts
```

Note: The `project` and `package` options should be used to provide the correct location of the files relative to the current working directory.

As shown by the previous example, the *`helpers`* module also presents constants that can be used as metadata. The `NO_OVERWRITE` flag avoids an existing file to be overwritten when `putup` is used in update mode. Similarly, `NO_CREATE` avoids creating a file from template in update mode, even if it does not exist.

For more sophisticated extensions which need to read and parse their own command line arguments it is necessary to override *`activate`* that receives an `argparse.ArgumentParser` argument. This object can then be modified in order to add custom command line arguments that will later be stored in the `opts` dictionary. Just remember the convention that after the command line arguments parsing, the extension function should be stored under the `extensions` attribute (a list) of the `argparse` generated object. For reference check out the implementation of the namespace extension as well as the pyproject extension which serves as a blueprint for new extensions.

7.4.3 Activating Extensions

PyScaffold extensions are not activated by default. Instead, it is necessary to add a CLI option to do it. This is possible by setting up a setuptools entry point under the `pyscaffold.cli` group. This entry point should point to our extension class, e.g. `AwesomeFiles` like defined above. If you for instance use a scaffold generated by PyScaffold to write a PyScaffold extension (we hope you do ;-), you would add the following to the `options.entry_points` section in `setup.cfg`:

```
[options.entry_points]
pyscaffold.cli =
    awesome_files = your_package.your_module:AwesomeFiles
```

7.5 Examples

Some options for the `putup` command are already implemented as extensions and can be used as reference implementation:

7.5.1 Namespace Extension

```
# -*- coding: utf-8 -*-
"""
Extension that adjust project file tree to include a namespace package.

This extension adds a **namespace** option to
:obj:`~pyscaffold.api.create_project` and provides correct values for the
options **root_pkg** and **namespace_pkg** to the following functions in the
action list.
"""

import argparse
import os
from os.path import isdir
from os.path import join as join_path

from .. import templates, utils
from ..api import Extension, helpers
from ..log import logger


class Namespace(Extension):
    """Add a namespace (container package) to the generated package."""

    def augment_cli(self, parser):
        """Add an option to parser that enables the namespace extension.

        Args:
            parser (argparse.ArgumentParser): CLI parser object
        """
        parser.add_argument(
            self.flag,
            dest=self.name,
            default=None,
            action=create_namespace_parser(self),
            metavar="NS1[.NS2]",
            help="put your project inside a namespace package")

    def activate(self, actions):
        """Register an action responsible for adding namespace to the package.

        Args:
            actions (list): list of actions to perform
```

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```
        Returns:
            list: updated list of actions
        """
        actions = helpers.register(actions, enforce_namespace_options,
                                   after='get_default_options')

        actions = helpers.register(actions, add_namespace,
                                   before='apply_update_rules')

        return helpers.register(actions, move_old_package,
                                after='create_structure')


def create_namespace_parser(obj_ref):
    """Create a namespace parser.

    Args:
        obj_ref (Extension): object reference to the actual extension

    Returns:
        NamespaceParser: parser for namespace cli argument
    """
    class NamespaceParser(argparse.Action):
        """Consumes the values provided, but also appends the extension
           function to the extensions list.
        """
        def __call__(self, parser, namespace, values, option_string=None):
            namespace.extensions.append(obj_ref)

            # Now the extra parameters can be stored
            setattr(namespace, self.dest, values)

            # save the namespace cli argument for later
            obj_ref.args = values

    return NamespaceParser


def enforce_namespace_options(struct, opts):
    """Make sure options reflect the namespace usage."""
    opts.setdefault('namespace', None)

    if opts['namespace']:
        opts['ns_list'] = utils.prepare_namespace(opts['namespace'])
        opts['root_pkg'] = opts['ns_list'][0]
        opts['qual_pkg'] = ".".join([opts['ns_list'][-1], opts['package']])

    return struct, opts


def add_namespace(struct, opts):
    """Prepend the namespace to a given file structure

    Args:
        struct (dict): directory structure as dictionary of dictionaries
        opts (dict): options of the project
```

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```
    Returns:
        tuple(dict, dict):
            directory structure as dictionary of dictionaries and input options
    """
    if not opts['namespace']:
        return struct, opts

    namespace = opts['ns_list'][-1].split('.')
    base_struct = struct
    struct = base_struct[opts['project']]['src']
    pkg_struct = struct[opts['package']]
    del struct[opts['package']]
    for sub_package in namespace:
        struct[sub_package] = {'__init__.py': templates.namespace(opts)}
        struct = struct[sub_package]
    struct[opts['package']] = pkg_struct

    return base_struct, opts


def move_old_package(struct, opts):
    """Move old package that may be eventually created without namespace

    Args:
        struct (dict): directory structure as dictionary of dictionaries
        opts (dict): options of the project

    Returns:
        tuple(dict, dict):
            directory structure as dictionary of dictionaries and input options
    """
    old_path = join_path(opts['project'], 'src', opts['package'])
    namespace_path = opts['qual_pkg'].replace('.', os.sep)
    target = join_path(opts['project'], 'src', namespace_path)

    old_exists = opts['pretend'] or isdir(old_path)
    #  ^  When pretending, pretend also an old folder exists
    #     to show a worst case scenario log to the user...

    if old_exists and opts['qual_pkg'] != opts['package']:
        if not opts['pretend']:
            logger.warning(
                '\nA folder %r exists in the project directory, and it is '
                'likely to have been generated by a PyScaffold extension or '
                'manually by one of the current project authors.\n'
                'Moving it to %r, since a namespace option was passed.\n'
                'Please make sure to edit all the files that depend on this '
                'package to ensure the correct location.\n',
                opts['package'], namespace_path)

        utils.move(old_path, target=target,
                   log=True, pretend=opts['pretend'])

    return struct, opts
```

7.5.2 No Skeleton Extension

```
# -*- coding: utf-8 -*-
"""
Extension that omits the creation of file `skeleton.py`
"""

from pathlib import PurePath as Path

from ..api import Extension, helpers


class NoSkeleton(Extension):
    """Omit creation of skeleton.py and test_skeleton.py"""
    def activate(self, actions):
        """Activate extension

        Args:
            actions (list): list of actions to perform

        Returns:
            list: updated list of actions
        """
        return self.register(
            actions,
            self.remove_files,
            after='define_structure')

    def remove_files(self, struct, opts):
        """Remove all skeleton files from structure

        Args:
            struct (dict): project representation as (possibly) nested
                :obj:`dict`.
            opts (dict): given options, see :obj:`create_project` for
                an extensive list.

        Returns:
            struct, opts: updated project representation and options
        """
        # Namespace is not yet applied so deleting from package is enough
        file = Path(opts['project'], 'src', opts['package'], 'skeleton.py')
        struct = helpers.reject(struct, file)
        file = Path(opts['project'], 'tests', 'test_skeleton.py')
        struct = helpers.reject(struct, file)
        return struct, opts
```

7.5.3 Cookiecutter Extension

```
# -*- coding: utf-8 -*-
"""
Extension that integrates cookiecutter templates into PyScaffold.

Warning:
    *Deprecation Notice* - In the next major release the Cookiecutter extension
```

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```
    will be extracted into an independent package.
    After PyScaffold v4.0, you will need to explicitly install
    ``pyscaffoldext-cookiecutter`` in your system/virtualenv in order to be
    able to use it.
"""

import argparse

from ..api import Extension
from ..api.helpers import logger, register
from ..warnings import UpdateNotSupported


class Cookiecutter(Extension):
    """Additionally apply a Cookiecutter template"""
    mutually_exclusive = True

    def augment_cli(self, parser):
        """Add an option to parser that enables the Cookiecutter extension

        Args:
            parser (argparse.ArgumentParser): CLI parser object
        """
        parser.add_argument(
            self.flag,
            dest=self.name,
            action=create_cookiecutter_parser(self),
            metavar="TEMPLATE",
            help="additionally apply a Cookiecutter template. "
                 "Note that not all templates are suitable for PyScaffold. "
                 "Please refer to the docs for more information.")

    def activate(self, actions):
        """Register before_create hooks to generate project using Cookiecutter

        Args:
            actions (list): list of actions to perform

        Returns:
            list: updated list of actions
        """
        # `get_default_options` uses passed options to compute derived ones,
        # so it is better to prepend actions that modify options.
        actions = register(actions, enforce_cookiecutter_options,
                           before='get_default_options')

        # `apply_update_rules` uses CWD information,
        # so it is better to prepend actions that modify it.
        actions = register(actions, create_cookiecutter,
                           before='apply_update_rules')

        return actions


def create_cookiecutter_parser(obj_ref):
    """Create a Cookiecutter parser.
```

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```
    Args:
        obj_ref (Extension): object reference to the actual extension

    Returns:
        NamespaceParser: parser for namespace cli argument
    """
    class CookiecutterParser(argparse.Action):
        """Consumes the values provided, but also append the extension function
        to the extensions list.
        """

        def __call__(self, parser, namespace, values, option_string=None):
            # First ensure the extension function is stored inside the
            # 'extensions' attribute:
            extensions = getattr(namespace, 'extensions', [])
            extensions.append(obj_ref)
            setattr(namespace, 'extensions', extensions)

            # Now the extra parameters can be stored
            setattr(namespace, self.dest, values)

            # save the cookiecutter cli argument for later
            obj_ref.args = values

    return CookiecutterParser


def enforce_cookiecutter_options(struct, opts):
    """Make sure options reflect the cookiecutter usage.

    Args:
        struct (dict): project representation as (possibly) nested
            :obj:`dict`.
        opts (dict): given options, see :obj:`create_project` for
            an extensive list.

    Returns:
        struct, opts: updated project representation and options
    """
    opts['force'] = True

    return struct, opts


def create_cookiecutter(struct, opts):
    """Create a cookie cutter template

    Args:
        struct (dict): project representation as (possibly) nested
            :obj:`dict`.
        opts (dict): given options, see :obj:`create_project` for
            an extensive list.

    Returns:
        struct, opts: updated project representation and options
    """
    if opts.get('update'):
```

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```
        logger.warning(UpdateNotSupported(extension='cookiecutter'))
        return struct, opts

    try:
        from cookiecutter.main import cookiecutter
    except Exception as e:
        raise NotInstalled from e

    extra_context = dict(full_name=opts['author'],
                         author=opts['author'],
                         email=opts['email'],
                         project_name=opts['project'],
                         package_name=opts['package'],
                         repo_name=opts['package'],
                         project_short_description=opts['description'],
                         release_date=opts['release_date'],
                         version='unknown',  # will be replaced later
                         year=opts['year'])

    if 'cookiecutter' not in opts:
        raise MissingTemplate

    logger.report('run', 'cookiecutter ' + opts['cookiecutter'])
    if not opts.get('pretend'):
        cookiecutter(opts['cookiecutter'],
                     no_input=True,
                     extra_context=extra_context)

    return struct, opts


class NotInstalled(RuntimeError):
    """This extension depends on the ``cookiecutter`` package."""

    DEFAULT_MESSAGE = ("cookiecutter is not installed, "
                       "run: pip install cookiecutter")

    def __init__(self, message=DEFAULT_MESSAGE, *args, **kwargs):
        super(NotInstalled, self).__init__(message, *args, **kwargs)


class MissingTemplate(RuntimeError):
    """A cookiecutter template (git url) is required."""

    DEFAULT_MESSAGE = "missing `cookiecutter` option"

    def __init__(self, message=DEFAULT_MESSAGE, *args, **kwargs):
        super(MissingTemplate, self).__init__(message, *args, **kwargs)
```

7.5.4 Django Extension

```
# -*- coding: utf-8 -*-
"""
Extension that creates a base structure for the project using django-admin.py.
```

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```
Warning:
    *Deprecation Notice* - In the next major release the Django extension
    will be extracted into an independent package.
    After PyScaffold v4.0, you will need to explicitly install
    ``pyscaffoldext-django`` in your system/virtualenv in order to be
    able to use it.
"""
import os
import shutil
from os.path import join as join_path

from .. import shell
from ..api import Extension, helpers
from ..warnings import UpdateNotSupported


class Django(Extension):
    """Generate Django project files"""
    mutually_exclusive = True

    def activate(self, actions):
        """Register hooks to generate project using django-admin.

        Args:
            actions (list): list of actions to perform

        Returns:
            list: updated list of actions
        """

        # `get_default_options` uses passed options to compute derived ones,
        # so it is better to prepend actions that modify options.
        actions = helpers.register(actions, enforce_django_options,
                                   before='get_default_options')
        # `apply_update_rules` uses CWD information,
        # so it is better to prepend actions that modify it.
        actions = helpers.register(actions, create_django_proj,
                                   before='apply_update_rules')

        return actions


def enforce_django_options(struct, opts):
    """Make sure options reflect the Django usage.

    Args:
        struct (dict): project representation as (possibly) nested
            :obj:`dict`.
        opts (dict): given options, see :obj:`create_project` for
            an extensive list.

    Returns:
        struct, opts: updated project representation and options
    """
    opts['package'] = opts['project']  # required by Django
    opts['force'] = True
    opts.setdefault('requirements', []).append('django')
```

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```
    return struct, opts


def create_django_proj(struct, opts):
    """Creates a standard Django project with django-admin.py

    Args:
        struct (dict): project representation as (possibly) nested
            :obj:`dict`.
        opts (dict): given options, see :obj:`create_project` for
            an extensive list.

    Returns:
        struct, opts: updated project representation and options

    Raises:
        :obj:`RuntimeError`: raised if django-admin.py is not installed
    """
    if opts.get('update'):
        helpers.logger.warning(UpdateNotSupported(extension='django'))
        return struct, opts

    try:
        shell.django_admin('--version')
    except Exception as e:
        raise DjangoAdminNotInstalled from e

    pretend = opts.get('pretend')
    shell.django_admin('startproject', opts['project'],
                       log=True, pretend=pretend)
    if not pretend:
        src_dir = join_path(opts['project'], 'src')
        os.mkdir(src_dir)
        shutil.move(join_path(opts['project'], opts['project']),
                    join_path(src_dir, opts['package']))

    return struct, opts


class DjangoAdminNotInstalled(RuntimeError):
    """This extension depends on the ``django-admin.py`` cli script."""

    DEFAULT_MESSAGE = ("django-admin.py is not installed, "
                       "run: pip install django")

    def __init__(self, message=DEFAULT_MESSAGE, *args, **kwargs):
        super(DjangoAdminNotInstalled, self).__init__(message, *args, **kwargs)
```

7.5.5 Pre Commit Extension

```
# -*- coding: utf-8 -*-
"""
Extension that generates configuration files for Yelp `pre-commit`_.
```

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```
.. _pre-commit: http://pre-commit.com
"""

from ..api import Extension, helpers
from ..log import logger
from ..templates import isort_cfg, pre_commit_config


class PreCommit(Extension):
    """Generate pre-commit configuration file"""
    def activate(self, actions):
        """Activate extension

        Args:
            actions (list): list of actions to perform

        Returns:
            list: updated list of actions
        """
        return (
            self.register(actions, self.add_files, after='define_structure') +
            [self.instruct_user])

    @staticmethod
    def add_files(struct, opts):
        """Add .pre-commit-config.yaml file to structure

        Since the default template uses isort, this function also provides an
        initial version of .isort.cfg that can be extended by the user
        (it contains some useful skips, e.g. tox and venv)

        Args:
            struct (dict): project representation as (possibly) nested
                :obj:`dict`.
            opts (dict): given options, see :obj:`create_project` for
                an extensive list.

        Returns:
            struct, opts: updated project representation and options
        """
        files = {
            '.pre-commit-config.yaml': (
                pre_commit_config(opts), helpers.NO_OVERWRITE
            ),
            '.isort.cfg': (
                isort_cfg(opts), helpers.NO_OVERWRITE
            ),
        }

        return helpers.merge(struct, {opts['project']: files}), opts

    @staticmethod
    def instruct_user(struct, opts):
        logger.warning(
            '\nA `.pre-commit-config.yaml` file was generated inside your '
            'project but in order to make sure the hooks will run, please '
            'don\'t forget to install the `pre-commit` package:\n\n'
```

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```
            '  cd %s\n'
            '  # it is a good idea to create and activate a virtualenv here\n'
            '  pip install pre-commit\n'
            '  pre-commit install\n'
            '  # another good idea is update the hooks to the latest version\n'
            '  # pre-commit autoupdate\n\n'
            'You might also consider including similar instructions in your '
            'docs, to remind the contributors to do the same.\n',
            opts['project'])

        return struct, opts
```

7.5.6 Tox Extension

```
# -*- coding: utf-8 -*-
"""
Extension that generates configuration files for the Tox test automation tool.
"""

from ..api import Extension, helpers
from ..templates import tox as tox_ini


class Tox(Extension):
    """Generate Tox configuration file"""
    def activate(self, actions):
        """Activate extension

        Args:
            actions (list): list of actions to perform

        Returns:
            list: updated list of actions
        """
        return self.register(
            actions,
            self.add_files,
            after='define_structure')

    def add_files(self, struct, opts):
        """Add .tox.ini file to structure

        Args:
            struct (dict): project representation as (possibly) nested
                :obj:`dict`.
            opts (dict): given options, see :obj:`create_project` for
                an extensive list.

        Returns:
            struct, opts: updated project representation and options
        """
        files = {
            'tox.ini': (tox_ini(opts), helpers.NO_OVERWRITE)
        }
```

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```
        return helpers.merge(struct, {opts['project']: files}), opts
```

7.5.7 Travis Extension

```
# -*- coding: utf-8 -*-
"""
Extension that generates configuration and script files for Travis CI.
"""

from ..api import Extension, helpers
from ..templates import travis, travis_install


class Travis(Extension):
    """Generate Travis CI configuration files"""
    def activate(self, actions):
        """Activate extension

        Args:
            actions (list): list of actions to perform

        Returns:
            list: updated list of actions
        """
        return self.register(
            actions,
            self.add_files,
            after='define_structure')

    def add_files(self, struct, opts):
        """Add some Travis files to structure

        Args:
            struct (dict): project representation as (possibly) nested
                :obj:`dict`.
            opts (dict): given options, see :obj:`create_project` for
                an extensive list.

        Returns:
            struct, opts: updated project representation and options
        """
        files = {
            '.travis.yml': (travis(opts), helpers.NO_OVERWRITE),
            'tests': {
                'travis_install.sh': (travis_install(opts),
                                      helpers.NO_OVERWRITE)
            }
        }

        return helpers.merge(struct, {opts['project']: files}), opts
```

7.5.8 GitLab-CI Extension

```
# -*- coding: utf-8 -*-
"""
Extension that generates configuration and script files for GitLab CI.
"""

from ..api import Extension, helpers
from ..templates import gitlab_ci


class GitLab(Extension):
    """Generate GitLab CI configuration files"""
    def activate(self, actions):
        """Activate extension

        Args:
            actions (list): list of actions to perform

        Returns:
            list: updated list of actions
        """
        return self.register(
            actions,
            self.add_files,
            after='define_structure')

    def add_files(self, struct, opts):
        """Add .gitlab-ci.yml file to structure

        Args:
            struct (dict): project representation as (possibly) nested
                :obj:`dict`.
            opts (dict): given options, see :obj:`create_project` for
                an extensive list.

        Returns:
            struct, opts: updated project representation and options
        """
        files = {
            '.gitlab-ci.yml': (gitlab_ci(opts), helpers.NO_OVERWRITE)
            }

        return helpers.merge(struct, {opts['project']: files}), opts
```

7.6 Conventions for Community Extensions

In order to make it easy to find PyScaffold extensions, community packages should be namespaced as in `pyscaffoldext.${EXT_NAME}` (where `${EXT_NAME}` is the name of the extension being developed). Although this naming convention slightly differs from PEP423, it is close enough and shorter.

Similarly to `sphinxcontrib-*` packages, names registered in PyPI should contain a dash `-`, instead of a dot `.`. This way, third-party extension development can be easily bootstrapped with the command:

```
putup pyscaffoldext-${EXT_NAME} -p ${EXT_NAME} --namespace pyscaffoldext --no-skeleton
```

If you put your extension code in the module `extension.py` then the `options.entry_points` section in `setup.cfg` looks like:

```
[options.entry_points]
pyscaffold.cli =
    awesome_files = pyscaffoldext.${EXT_NAME}.extension:AwesomeFiles
```

In this example, `AwesomeFiles` represents the name of the class that implementes the extension and `awesome_files` is the string used to create the flag for the `putup` command (`--awesome-files`).

7.7 Final Considerations

When writing extensions, it is important to be consistent with the default PyScaffold behavior. In particular, PyScaffold uses a `pretend` option to indicate when the actions should not run but instead just indicate the expected results to the user, that **MUST** be respected.

The `pretend` option is automatically observed for files registered in the project structure representation, but complex actions may require specialized coding. The *`helpers`* module provides a special *`logger`* object useful in these situations. Please refer to *Cookiecutter Extension* for a practical example.

Other options that should be considered are the `update` and `force` flags. See *`pyscaffold.api.create_project`* for a list of available options.

CHAPTER 8

Embedding PyScaffold

PyScaffold is expected to be used from terminal, via `putup` command line application. It is, however, possible to write an external script or program that embeds PyScaffold and use it to perform some custom actions.

The public Python API is exposed by the *pyscaffold.api* module, which contains the main function *create_project*. The following example illustrates a typical embedded usage of PyScaffold:

```
import logging

from pyscaffold.api import create_project
from pyscaffold.extenstions.tox import Tox
from pyscaffold.extenstions.travis import Travis
from pyscaffold.extenstions.namespace import Namespace
from pyscaffold.log import DEFAULT_LOGGER as LOGGER_NAME

logging.getLogger(LOGGER_NAME).setLevel(logging.INFO)

create_project(project="my-proj-name", author="Your Name",
               namespace="some.namespace", license="mit",
               extensions=[Tox('tox'),
                           Travis('travis'),
                           Namespace('namespace')])
```

Note that no built-in extension (e.g. tox, travis and namespace support) is activated by default. The `extensions` option should be manually populated when convenient.

PyScaffold uses the logging infrastructure from Python standard library, and emits notifications during its execution. Therefore, it is possible to control which messages are logged by properly setting the log level (internally, most of the messages are produced under the `INFO` level). By default, a `StreamHandler` is attached to the logger, however it is possible to replace it with a custom handler using `logging.Logger.removeHandler` and `logging.Logger.addHandler`. The logger object is available under the *logger* variable of the *pyscaffold.log* module. The default handler is available under the *handler* property of the *logger* object.

CHAPTER 9

Cookiecutter templates with PyScaffold

Cookiecutter is a flexible utility that allows the definition of templates for a diverse range of software projects. On the other hand, PyScaffold is focused in a good out-of-the-box experience for developing distributable Python packages (exclusively). Despite the different objectives, it is possible to combine the power of both tools to create a custom Python project setup. For instance, the following command creates a new package named `mypkg`, that uses a Cookiecutter template, but is enhanced by PyScaffold's features:

```
$ putup mypkg --cookiecutter gh:audreyr/cookiecutter-pypackage
```

This is roughly equivalent to first create a project using the Cookiecutter template and convert it to PyScaffold afterwards:

```
$ cookiecutter --no-input gh:audreyr/cookiecutter-pypackage project_name=mypkg
$ putup mypkg --force
```

Note: For complex Cookiecutter templates calling `cookiecutter` and `putup` separately may be a better option, since it is possible to answer specific template questions or at least set values for Cookiecutter variables.

Warning: Although using Cookiecutter templates is a viable solution to customize a project that was set up with PyScaffold, the recommended way is to help improve PyScaffold by contributing an *extension*.

9.1 Suitable templates

Note that PyScaffold will overwrite some files generated by Cookiecutter, like `setup.py`, the `__init__.py` file under the package folder and most of the `docs` folder, in order to provide setuptools_scm and sphinx integration. Therefore not all Cookiecutter templates are suitable for this approach.

Ideally, interoperable templates should focus on the file structure inside the `src` folder instead of packaging or distributing, since PyScaffold already handles it under-the-hood. This also means that your template should adhere to the

src-layout if you want to generate files within your Python package.

In addition, PyScaffold runs Cookiecutter with the `--no-input` flag activated and thus the user is not prompted for manual configuration. Instead, PyScaffold injects the following parameters:

```
author
email
project_name
package_name
project_short_description
```

Accordingly, the template file structure should be similar to:

```
cookiecutter-something/
└── {{cookiecutter.project_name}}/
    └── src/
        └── {{cookiecutter.package_name}}/
            └── ...
```

See Cookiecutter for more information about template creation.

CHAPTER 10

Contributing

PyScaffold was started by Blue Yonder developers to help automating and standardizing the process of project setups. Nowadays it is a pure community project and you are very welcome to join in our effort if you would like to contribute.

10.1 Issue Reports

If you experience bugs or in general issues with PyScaffold, please file an issue report on our issue tracker.

10.2 Code Contributions

10.2.1 Submit an issue

Before you work on any non-trivial code contribution it's best to first create an issue report to start a discussion on the subject. This often provides additional considerations and avoids unnecessary work.

10.2.2 Create an environment

Before you start coding we recommend to install Miniconda which allows to setup a dedicated development environment named `pyscaffold` with:

```
conda create -n pyscaffold python=3 six virtualenv pytest pytest-cov
```

Then activate the environment `pyscaffold` with:

```
source activate pyscaffold
```

10.2.3 Clone the repository

1. Create a Gitub account if you do not already have one.
2. Fork the project repository: click on the *Fork* button near the top of the page. This creates a copy of the code under your account on the GitHub server.
3. Clone this copy to your local disk:

   ```
   git clone git@github.com:YourLogin/pyscaffold.git
   ```

4. Run `python setup.py egg_info --egg-base .` after a fresh checkout. This will generate some critically needed files. Typically after that, you should run `python setup.py develop` to be able run `putup`.
5. Install `pre-commit`:

   ```
   pip install pre-commit
   pre-commit install
   ```

   PyScaffold project comes with a lot of hooks configured to automatically help the developer to check the code being written.
6. Create a branch to hold your changes:

   ```
   git checkout -b my-feature
   ```

   and start making changes. Never work on the master branch!
7. Start your work on this branch. When you're done editing, do:

   ```
   git add modified_files
   git commit
   ```

   to record your changes in Git, then push them to GitHub with:

   ```
   git push -u origin my-feature
   ```

8. Please check that your changes don't break any unit tests with:

   ```
   python setup.py test
   ```

   or even a more thorough test with `tox` after having installed tox with `pip install tox`. Don't forget to also add unit tests in case your contribution adds an additional feature and is not just a bugfix.

   To speed up running the tests, you can try to run them in parallel, using `pytest-xdist`. This plugin is already added to the test dependencies, so everything you need to do is adding `-n auto` or `-n <NUMBER OF PROCESS>` in the CLI. For example:

   ```
   tox -- -n 15
   ```

   Please have in mind that PyScaffold test suite is IO intensive, so using a number of processes slightly bigger than the available number of CPUs is a good idea.
9. Use flake8 to check your code style.
10. Add yourself to the list of contributors in `AUTHORS.rst`.
11. Go to the web page of your PyScaffold fork, and click "Create pull request" to send your changes to the maintainers for review. Find more detailed information creating a PR.

10.3 Release

As a PyScaffold maintainer following steps are needed to release a new version:

1. Make sure all unit tests on Cirrus-CI are green.
2. Tag the current commit on the master branch with a release tag, e.g. `v1.2.3`.
3. Clean up the `dist` and `build` folders with `rm -rf dist build` to avoid confusion with old builds and Sphinx docs.
4. Run `python setup.py dists` and check that the files in `dist` have the correct version (no `.dirty` or Git hash) according to the Git tag. Also sizes of the distributions should be less than 500KB, otherwise unwanted clutter may have been included.
5. Run `twine upload dist/*` and check that everything was uploaded to PyPI correctly.

10.4 Troubleshooting

> I've got a strange error related to versions in `test_update.py` when executing the test suite or about an *entry_point* that cannot be found.

Try to remove all the egg files or the complete egg folder, i.e. `.eggs`, as well as the `*.egg-info` folders in the `src` folder or potentially in the root of your project. Afterwards run `python setup.py egg_info --egg-base .` again.

CHAPTER 11

Frequently Asked Questions

In case you have a general question that is not answered here, consider submitting a new issue.

1. **Why would I use PyScaffold instead of Cookiecutter?**

   PyScaffold is focused on a good out-of-the-box experience for developing distributable Python packages (exclusively). The idea is to standardize the structure of Python packages. Thus, PyScaffold sticks to

   > "There should be one– and preferably only one –obvious way to do it."

   from the Zen of Python. The long-term goal is that PyScaffold becomes for Python what Cargo is for Rust. Still, with the help of PyScaffold's *extension system* customizing a project scaffold is possible.

   Cookiecutter on the other hand is a really flexible templating tool that allows you to define own templates according to your needs. Although some standard templates are provided that will give you quite similar results as PyScaffold, the overall goal of the project is quite different.

2. **Does my project depend on PyScaffold when I use it to set my project up?**

   The short answer is no if you later distribute your project in the recommended wheel format. The longer answer is that only during development PyScaffold is needed as a setup dependency. That means if someone clones your repository and runs `setup.py`, `setuptools` checks for the `setup_requires` argument which includes PyScaffold and installs PyScaffold automatically as egg file into `.eggs` if PyScaffold is not yet installed. This mechanism is provided by `setuptools` and definitely beyond the scope of this answer. The same applies for the deprecated source distribution (`sdist`) but not for a binary distribution (`bdist`). Anyways, the recommend way is nowadays a binary wheel distribution (`bdist_wheel`) which will not depend on PyScaffold at all.

3. **Why does PyScaffold 3 have a `src` folder which holds the actual Python package?**

This avoids quite many problems compared to the case when the actual Python package resides in the same folder as `setup.py`. A nice blog post by Ionel gives a thorough explanation why this is so. In a nutshell, the most severe problem comes from the fact that Python imports a package by first looking at the current working directory and then into the `PYTHONPATH` environment variable. If your current working directory is the root of your project directory you are thus not testing the installation of your package but the local package directly. Eventually, this always leads to huge confusion (*"But the unit tests ran perfectly on my machine!"*).

4. **Can I use PyScaffold 3 to develop a Python package that is Python 2 & 3 compatible?**

   Python 3 is actually only needed for the `putup` command and whenever you use `setup.py`. This means that with PyScaffold 3 you have to use Python 3 during the development of your package for practical reasons. If you develop the package using six you can still make it Python 2 & 3 compatible by creating a *universal* `bdist_wheel` package. This package can then be installed and run from Python 2 and 3.

5. **How can I get rid of PyScaffold when my project was set up using it?**

   First of all, I would really love to understand **why** you want to remove it and **what** you don't like about it. You can create an issue for that or just text me on Twitter. To answer the question, it's actually really simple. Within `setup.py` just remove the `use_pyscaffold` argument from the `setup()` call which will deactivate all of PyScaffold's functionality that goes beyond what is provided by `setuptools`. In practice, following things will **no** longer work:

   - `python setup.py --version` and the dynamic versioning according to the git tags when creating distributions, just put e.g. `version = 0.1` in the `metadata` section of `setup.cfg` instead,
   - `python setup.py test` and `python setup.py doctest`, just use `py.test` directly,
   - `python setup.py docs` for building your Sphinx documentation, just enter the `docs` folder and type `make html` instead.

   That's already everything you gonna lose. Not that much. You will still benefit from:

   - the smart project layout,
   - the declarative configuration with `setup.cfg` which comes from `setuptools`,
   - some sane defaults in Sphinx' `conf.py`,
   - `.gitignore` with some nice defaults and other dot files depending on the flags used when running `putup`,
   - some sane defaults for py.test.

   For further cleanups, feel free to remove `pyscaffold` from the `setup_requires` key in `setup.cfg` as well as the complete `[pyscaffold]` section.

CHAPTER 12

License

```
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CHAPTER 13

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CHAPTER 14

Changelog

14.1 Development version

14.1.1 Version 4.0

- Support for Python 3.4 dropped, issue #226

14.2 Current versions

14.2.1 Version 3.2.3, 2019-10-12

- Updated `configupdater` to version 1.0.1
- Changed Travis to Cirrus CI
- Fix some problems with Windows

14.3 Older versions

14.3.1 Version 3.2.2, 2019-09-12

- Write files as UTF-8, fixes `codec can't encode characters` error

14.3.2 Version 3.2.1, 2019-07-11

- Updated pre-commit configuration and set max-line-length to 88 (Black's default)
- Change build folder of Sphinx's Makefile

- Fix creation of empty files which were just ignored before

14.3.3 Version 3.2, 2019-06-30

- *deprecated* use of lists with `helpers.{modify,ensure,reject}`, issue #211
- Add support for `os.PathLike` objects in `helpers.{modify,ensure,reject}`, issue #211
- Remove `release` alias in `setup.cfg`, use `twine` instead
- Set `project-urls` and `long-description-content-type` in `setup.cfg`, issue #216
- Added additional command line argument `very-verbose`
- Assure clean workspace when updating existing project, issue #190
- Show stacktrace on errors if `--very-verbose` is used
- Updated `configupdater` to version 1.0
- Use `pkg_resources.resource_string` instead of `pkgutil.get_data` for templates
- Update `setuptools_scm` to version 3.3.3
- Updated pytest-runner to version 5.1
- Some fixes regarding the order of executing extensions
- Consider `GIT_AUTHOR_NAME` and `GIT_AUTHOR_EMAIL` environment variables
- Updated `tox.ini`
- Switch to using tox in `.travis.yml` template
- Reworked all official extensions `--pyproject`, `--custom-extension` and `--markdown`

14.3.4 Version 3.1, 2018-09-05

- Officially dropped Python 2 support, issue #177
- Moved `entry_points` and `setup_requires` to `setup.cfg`, issue #176
- Updated `travis.yml` template, issue #181
- Set `install_requires` to setuptools>=31
- Better isolation of unit tests, issue #119
- Updated tox template, issues #160 & #161
- Use `pkg_resources.parse_version` instead of old `LooseVersion` for parsing
- Use `ConfigUpdater` instead of `ConfigParser`
- Lots of internal cleanups and improvements
- Updated pytest-runner to version 4.2
- Updated setuptools_scm to version 3.1
- Fix Django extension problem with src-layout, issue #196
- *experimental* extension for MarkDown usage in README, issue #163
- *experimental* support for Pipenv, issue #140
- *deprecated* built-in Cookiecutter and Django extensions (to be moved to separated packages), issue #175

14.3.5 Version 2.5.11, 2018-04-14

- Updated pbr to version 4.0.2
- Fixes Sphinx version 1.6 regression, issue #152

14.3.6 Version 3.0.3, 2018-04-14

- Set install_requires to setuptools>=30.3.0

14.3.7 Version 3.0.2, 2018-03-21

- Updated setuptools_scm to version 1.17.0
- Fix wrong docstring in skeleton.py about entry_points, issue #147
- Fix error with setuptools version 39.0 and above, issue #148
- Fixes in documentation, thanks Vicky

14.3.8 Version 2.5.10, 2018-03-21

- Updated setuptools_scm to version 1.17.0

14.3.9 Version 2.5.9, 2018-03-20

- Updated setuptools_scm to version 1.16.1
- Fix error with setuptools version 39.0 and above, issue #148

14.3.10 Version 3.0.1, 2018-02-13

- Fix confusing error message when `python setup.py docs` and Sphinx is not installed, issue #142
- Fix 'unknown' version in case project name differs from the package name, issue #141
- Fix missing `file:` attribute in long-description of setup.cfg
- Fix `sphinx-apidoc` invocation problem with Sphinx 1.7

14.3.11 Version 3.0, 2018-01-07

- Improved Python API thanks to an extension system
- Dropped pbr in favor of setuptools >= 30.3.0
- Updated setuptools_scm to v1.15.6
- Changed `my_project/my_package` to recommended `my_project/src/my_package` structure
- Renamed `CHANGES.rst` to more standard `CHANGELOG.rst`
- Added platforms parameter in `setup.cfg`
- Call Sphinx api-doc from `conf.py`, issue #98

- Included six 1.11.0 as contrib sub-package
- Added `CONTRIBUTING.rst`
- Removed `test-requirements.txt` from template
- Added support for GitLab
- License change from New BSD to MIT
- FIX: Support of git submodules, issue #98
- Support of Cython extensions, issue #48
- Removed redundant `--with-` from most command line flags
- Prefix `n` was removed from the local_version string of dirty versions
- Added a `--pretend` flag for easier development of extensions
- Added a `--verbose` flag for more output what PyScaffold is doing
- Use pytest-runner 4.4 as contrib package
- Added a `--no-skeleton` flag to omit the creation of `skeleton.py`
- Save parameters used to create project scaffold in `setup.cfg` for later updating

A special thanks goes to Anderson Bravalheri for his awesome support and inovex for sponsoring this release.

14.3.12 Version 2.5.8, 2017-09-10

- Use `sphinx.ext.imgmath` instead of `sphinx.ext.mathjax`
- Added `--with-gitlab-ci` flag for GitLab CI support
- Fix Travis install template dirties git repo, issue #107
- Updated setuptools_scm to version 1.15.6
- Updated pbr to version 3.1.1

14.3.13 Version 2.5.7, 2016-10-11

- Added encoding to __init__.py
- Few doc corrections in setup.cfg
- [tool:pytest] instead of [pytest] in setup.cfg
- Updated skeleton
- Switch to Google Sphinx style
- Updated setuptools_scm to version 1.13.1
- Updated pbr to version 1.10.0

14.3.14 Version 2.5.6, 2016-05-01

- Prefix error message with ERROR:
- Suffix of untagged commits changed from {version}-{hash} to {version}-n{hash}
- Check if package identifier is valid
- Added log level command line flags to the skeleton
- Updated pbr to version 1.9.1
- Updated setuptools_scm to version 1.11.0

14.3.15 Version 2.5.5, 2016-02-26

- Updated pbr to master at 2016-01-20
- Fix sdist installation bug when no git is installed, issue #90

14.3.16 Version 2.5.4, 2016-02-10

- Fix problem with `fibonacci` terminal example
- Update setuptools_scm to v1.10.1

14.3.17 Version 2.5.3, 2016-01-16

- Fix classifier metadata (`classifiers` to `classifier` in `setup.cfg`)

14.3.18 Version 2.5.2, 2016-01-02

- Fix `is_git_installed`

14.3.19 Version 2.5.1, 2016-01-01

- Fix: Do some sanity checks first before gathering default options
- Updated setuptools_scm to version 1.10.0

14.3.20 Version 2.5, 2015-12-09

- Usage of `test-requirements.txt` instead of `tests_require` in `setup.py`, issue #71
- Removed `--with-numpydoc` flag since this is now included by default with `sphinx.ext.napoleon` in Sphinx 1.3 and above
- Added small template for unittest
- Fix for the example skeleton file when using namespace packages
- Fix typo in devpi:upload section, issue #82
- Include `pbr` and `setuptools_scm` in PyScaffold to avoid dependency problems, issue #71 and #72
- Cool logo was designed by Eva Schmücker, issue #66

14.3.21 Version 2.4.4, 2015-10-29

- Fix problem with bad upload of version 2.4.3 to PyPI, issue #80

14.3.22 Version 2.4.3, 2015-10-27

- Fix problem with version numbering if setup.py is not in the root directory, issue #76

14.3.23 Version 2.4.2, 2015-09-16

- Fix version conflicts due to too tight pinning, issue #69

14.3.24 Version 2.4.1, 2015-09-09

- Fix installation with additional requirements `pyscaffold[ALL]`
- Updated pbr version to 1.7

14.3.25 Version 2.4, 2015-09-02

- Allow different py.test options when invoking with `py.test` or `python setup.py test`
- Check if Sphinx is needed and add it to *setup_requires*
- Updated pre-commit plugins
- Replaced pytest-runner by an improved version
- Let pbr do `sphinx-apidoc`, removed from `conf.py`, issue #65

Note: Due to the switch to a modified pytest-runner version it is necessary to update `setup.cfg`. Please check the *example*.

14.3.26 Version 2.3, 2015-08-26

- Format of setup.cfg changed due to usage of pbr, issue #59
- Much cleaner setup.py due to usage of pbr, issue #59
- PyScaffold can be easily called from another script, issue #58
- Internally dictionaries instead of namespace objects are used for options, issue #57
- Added a section for devpi in setup.cfg, issue #62

Note: Due to the switch to pbr, it is necessary to update `setup.cfg` according to the new syntax.

14.3.27 Version 2.2.1, 2015-06-18

- FIX: Removed putup console script in setup.cfg template

14.3.28 Version 2.2, 2015-06-01

- Allow recursive inclusion of data files in setup.cfg, issue #49
- Replaced hand-written PyTest runner by pytest-runner, issue #47
- Improved default README.rst, issue #51
- Use tests/conftest.py instead of tests/__init__.py, issue #52
- Use setuptools_scm for versioning, issue #43
- Require setuptools>=9.0, issue #56
- Do not create skeleton.py during an update, issue #55

Note: Due to the switch to *setuptools_scm* the following changes apply:

- use `python setup.py --version` instead of `python setup.py version`
- `git archive` can no longer be used for packaging (and was never meant for it anyway)
- initial tag `v0.0` is no longer necessary and thus not created in new projects
- tags do no longer need to start with *v*

14.3.29 Version 2.1, 2015-04-16

- Use alabaster as default Sphinx theme
- Parameter data_files is now a section in setup.cfg
- Allow definition of extras_require in setup.cfg
- Added a CHANGES.rst file for logging changes
- Added support for cookiecutter
- FIX: Handle an empty Git repository if necessary

14.3.30 Version 2.0.4, 2015-03-17

- Typo and wrong Sphinx usage in the RTD documentation

14.3.31 Version 2.0.3, 2015-03-17

- FIX: Removed misleading *include_package_data* option in setup.cfg
- Allow selection of a proprietary license
- Updated some documentations
- Added -U as short parameter for –update

14.3.32 Version 2.0.2, 2015-03-04

- FIX: Version retrieval with setup.py install
- argparse example for version retrieval in skeleton.py
- FIX: import my_package should be quiet (verbose=False)

14.3.33 Version 2.0.1, 2015-02-27

- FIX: Installation bug under Windows 7

14.3.34 Version 2.0, 2015-02-25

- Split configuration and logic into setup.cfg and setup.py
- Removed .pre from version string (newer PEP 440)
- FIX: Sphinx now works if package name does not equal project name
- Allow namespace packages with –with-namespace
- Added a skeleton.py as a console_script template
- Set *v0.0* as initial tag to support PEP440 version inference
- Integration of the Versioneer functionality into setup.py
- Usage of *data_files* configuration instead of *MANIFEST.in*
- Allow configuration of *package_data* in *setup.cfg*
- Link from Sphinx docs to AUTHORS.rst

14.3.35 Version 1.4, 2014-12-16

- Added numpydoc flag –with-numpydoc
- Fix: Add django to requirements if –with-django
- Fix: Don't overwrite index.rst during update

14.3.36 Version 1.3.2, 2014-12-02

- Fix: path of Travis install script

14.3.37 Version 1.3.1, 2014-11-24

- Fix: –with-tox tuple bug #28

14.3.38 Version 1.3, 2014-11-17

- Support for Tox (https://tox.readthedocs.org/)
- flake8: exclude some files
- Usage of UTF8 as file encoding
- Fix: create non-existent files during update
- Fix: unit tests on MacOS
- Fix: unit tests on Windows
- Fix: Correct version when doing setup.py install

14.3.39 Version 1.2, 2014-10-13

- Support pre-commit hooks (http://pre-commit.com/)

14.3.40 Version 1.1, 2014-09-29

- Changed COPYING to LICENSE
- Support for all licenses from http://choosealicense.com/
- Fix: Allow update of license again
- Update to Versioneer 0.12

14.3.41 Version 1.0, 2014-09-05

- Fix when overwritten project has a git repository
- Documentation updates
- License section in Sphinx
- Django project support with –with-django flag
- Travis project support with –with-travis flag
- Replaced sh with own implementation
- Fix: new *git describe* version to PEP440 conversion
- conf.py improvements
- Added source code documentation
- Fix: Some Python 2/3 compatibility issues
- Support for Windows
- Dropped Python 2.6 support
- Some classifier updates

14.3.42 Version 0.9, 2014-07-27

- Documentation updates due to RTD
- Added a –force flag
- Some cleanups in setup.py

14.3.43 Version 0.8, 2014-07-25

- Update to Versioneer 0.10
- Moved sphinx-apidoc from setup.py to conf.py
- Better support for *make html*

14.3.44 Version 0.7, 2014-06-05

- Added Python 3.4 tests and support
- Flag –update updates only some files now
- Usage of setup_requires instead of six code

14.3.45 Version 0.6.1, 2014-05-15

- Fix: Removed six dependency in setup.py

14.3.46 Version 0.6, 2014-05-14

- Better usage of six
- Return non-zero exit status when doctests fail
- Updated README
- Fixes in Sphinx Makefile

14.3.47 Version 0.5, 2014-05-02

- Simplified some Travis tests
- Nicer output in case of errors
- Updated PyScaffold's own setup.py
- Added –junit_xml and –coverage_xml/html option
- Updated .gitignore file

14.3.48 Version 0.4.1, 2014-04-27

- Problem fixed with pytest-cov installation

14.3.49 Version 0.4, 2014-04-23

- PEP8 and PyFlakes fixes
- Added –version flag
- Small fixes and cleanups

14.3.50 Version 0.3, 2014-04-18

- PEP8 fixes
- More documentation
- Added update feature
- Fixes in setup.py

14.3.51 Version 0.2, 2014-04-15

- Checks when creating the project
- Fixes in COPYING
- Usage of sh instead of GitPython
- PEP8 fixes
- Python 3 compatibility
- Coverage with Coverall.io
- Some more unittests

14.3.52 Version 0.1.2, 2014-04-10

- Bugfix in Manifest.in
- Python 2.6 problems fixed

14.3.53 Version 0.1.1, 2014-04-10

- Unittesting with Travis
- Switch to string.Template
- Minor bugfixes

14.3.54 Version 0.1, 2014-04-03

- First release

CHAPTER 15

pyscaffold

15.1 pyscaffold package

15.1.1 Subpackages

pyscaffold.api package

Submodules

pyscaffold.api.helpers module

Useful functions for manipulating the action list and project structure.

`pyscaffold.api.helpers.`**`NO_CREATE = 1`**
Do not create the file during an update

`pyscaffold.api.helpers.`**`NO_OVERWRITE = 0`**
Do not overwrite an existing file during update (still created if not exists)

`pyscaffold.api.helpers.`**`ensure`**(*struct*, *path*, *content=None*, *update_rule=None*)
Ensure a file exists in the representation of the project tree with the provided content. All the parent directories are automatically created.

Parameters

- **`struct`** (*`dict`*) – project representation as (possibly) nested `dict`. See *`merge`*.
- **`path`** (*`os.PathLike`*) – path-like string or object relative to the structure root. The following examples are equivalent:

```
from pathlib import PurePath

'docs/api/index.html'
PurePath('docs', 'api', 'index.html')
```

Deprecated - Alternatively, a list with the parts of the path can be provided, ordered from the structure root to the file itself.

- **content** (*str*) – file text contents, `None` by default. The old content is preserved if `None`.
- **update_rule** – see *FileOp*, `None` by default

Returns updated project tree representation

Return type dict

Note: Use an empty string as content to ensure a file is created empty.

Warning: *Deprecation Notice* - In the next major release, the usage of lists for the `path` argument will result in an error. Please use `pathlib.PurePath` instead.

pyscaffold.api.helpers.**logger = <ReportLogger pyscaffold.log (WARNING)>**
Logger wrapper, that provides methods like *report*. See *ReportLogger*.

pyscaffold.api.helpers.**merge**(*old*, *new*)
Merge two dict representations for the directory structure.

Basically a deep dictionary merge, except from the leaf update method.

Parameters

- **old** (*dict*) – directory descriptor that takes low precedence during the merge
- **new** (*dict*) – directory descriptor that takes high precedence during the merge

The directory tree is represented as a (possibly nested) dictionary. The keys indicate the path where a file will be generated, while the value indicates the content. Additionally, tuple values are allowed in order to specify the rule that will be followed during an `update` operation (see *FileOp*). In this case, the first element is the file content and the second element is the update rule. For example, the dictionary:

```
{'project': {
    'namespace': {
        'module.py': ('print("Hello World!")',
                      helpers.NO_OVERWRITE)}}
```

represents a `project/namespace/module.py` file with content `print("Hello World!")`, that will be created only if not present.

Returns resulting merged directory representation

Return type dict

Note: Use an empty string as content to ensure a file is created empty. (`None` contents will not be created).

pyscaffold.api.helpers.**modify**(*struct*, *path*, *modifier=<function _id_func>*, *update_rule=None*)
Modify the contents of a file in the representation of the project tree.

If the given path, does not exist the parent directories are automatically created.

Parameters

- **struct** (*dict*) – project representation as (possibly) nested `dict`. See *merge*.

- **path** (*os.PathLike*) – path-like string or object relative to the structure root. The following examples are equivalent:

```
from pathlib import PurePath

'docs/api/index.html'
PurePath('docs', 'api', 'index.html')
```

  Deprecated - Alternatively, a list with the parts of the path can be provided, ordered from the structure root to the file itself.

- **modifier** (*callable*) – function (or callable object) that receives the old content as argument and returns the new content. If no modifier is passed, the identity function will be used. Note that, if the file does not exist in `struct`, `None` will be passed as argument. Example:

```
modifier = lambda old: (old or '') + 'APPENDED CONTENT'!
modifier = lambda old: 'PREPENDED CONTENT!' + (old or '')
```

- **update_rule** – see *FileOp*, `None` by default. Note that, if no `update_rule` is passed, the previous one is kept.

Returns updated project tree representation

Return type dict

Note: Use an empty string as content to ensure a file is created empty (`None` contents will not be created).

Warning: *Deprecation Notice* - In the next major release, the usage of lists for the `path` argument will result in an error. Please use `pathlib.PurePath` instead.

pyscaffold.api.helpers.**register**(*actions*, *action*, *before=None*, *after=None*)

Register a new action to be performed during scaffold.

Parameters

- **actions** (*list*) – previous action list.
- **action** (*callable*) – function with two arguments: the first one is a (nested) dict representing the file structure of the project and the second is a dict with scaffold options. This function **MUST** return a tuple with two elements similar to its arguments. Example:

```
def do_nothing(struct, opts):
    return (struct, opts)
```

- ****kwargs** (*dict*) – keyword arguments make it possible to choose a specific order when executing actions: when `before` or `after` keywords are provided, the argument value is used as a reference position for the new action. Example:

```
helpers.register(actions, do_nothing,
                 after='create_structure')
    # Look for the first action with a name
    # `create_structure` and inserts `do_nothing` after it.
    # If more than one registered action is named
    # `create_structure`, the first one is selected.
```

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```
helpers.register(
    actions, do_nothing,
    before='pyscaffold.structure:create_structure')
    # Similar to the previous example, but the probability
    # of name conflict is decreased by including the module
    # name.
```

When no keyword argument is provided, the default execution order specifies that the action will be performed after the project structure is defined, but before it is written to the disk. Example:

```
helpers.register(actions, do_nothing)
    # The action will take place after
    # `pyscaffold.structure:define_structure`
```

Returns modified action list.

Return type list

pyscaffold.api.helpers.**reject**(*struct*, *path*)

Remove a file from the project tree representation if existent.

Parameters

- **struct** (*dict*) – project representation as (possibly) nested `dict`. See *merge*.
- **path** (*os.PathLike*) – path-like string or object relative to the structure root. The following examples are equivalent:

```
from pathlib import PurePath

'docs/api/index.html'
PurePath('docs', 'api', 'index.html')
```

Deprecated - Alternatively, a list with the parts of the path can be provided, ordered from the structure root to the file itself.

Returns modified project tree representation

Return type dict

Warning: *Deprecation Notice* - In the next major release, the usage of lists for the `path` argument will result in an error. Please use `pathlib.PurePath` instead.

pyscaffold.api.helpers.**unregister**(*actions*, *reference*)

Prevent a specific action to be executed during scaffold.

Parameters

- **actions** (*list*) – previous action list.
- **reference** (*str*) – action identifier. Similarly to the keyword arguments of *register* it can assume two formats:
  - the name of the function alone,
  - the name of the module followed by `:` and the name of the function

Returns modified action list.

Return type list

Module contents

Exposed API for accessing PyScaffold via Python.

class pyscaffold.api.**Extension**(*name*)
Bases: object

Base class for PyScaffold's extensions

Parameters **name** (*str*) – How the extension should be named. Default: name of class By default, this value is used to create the activation flag in PyScaffold cli.

activate(*actions*)
Activates the extension by registering its functionality

Parameters **actions** (*list*) – list of action to perform

Returns updated list of actions

Return type list

augment_cli(*parser*)
Augments the command-line interface parser

A command line argument `--FLAG` where FLAG=''self.name'' is added which appends `self.activate` to the list of extensions. As help text the docstring of the extension class is used. In most cases this method does not need to be overwritten.

Parameters **parser** – current parser object

flag

mutually_exclusive = False

static register(**args*, ***kwargs*)
Shortcut for *helpers.register*

static unregister(**args*, ***kwargs*)
Shortcut for *helpers.unregister*

pyscaffold.api.**create_project**(*opts=None*, ***kwargs*)
Create the project's directory structure

Parameters

- **opts** (*dict*) – options of the project
- ****kwargs** – extra options, passed as keyword arguments

Returns a tuple of *struct* and *opts* dictionary

Return type tuple

Valid options include:

Naming

- **project** (*str*)
- **package** (*str*)

Package Information

- **author** (*str*)
- **email** (*str*)
- **release_date** (*str*)
- **year** (*str*)
- **title** (*str*)
- **description** (*str*)
- **url** (*str*)
- **classifiers** (*str*)
- **requirements** (*list*)

PyScaffold Control

- **update** (*bool*)
- **force** (*bool*)
- **pretend** (*bool*)
- **extensions** (*list*)

Some of these options are equivalent to the command line options, others are used for creating the basic python package meta information, but the last tree can change the way PyScaffold behaves.

When the **force** flag is `True`, existing files will be overwritten. When the **update** flag is `True`, PyScaffold will consider that some files can be updated (usually the packaging boilerplate), but will keep others intact. When the **pretend** flag is `True`, the project will not be created/updated, but the expected outcome will be logged.

Finally, the **extensions** list may contain any function that follows the extension API. Note that some PyScaffold features, such as travis, tox and pre-commit support, are implemented as built-in extensions. In order to use these features it is necessary to include the respective functions in the extension list. All built-in extensions are accessible via *`pyscaffold.extensions`* submodule.

Note that extensions may define extra options. For example, built-in cookiecutter extension define a `cookiecutter` option that should be the address to the git repository used as template.

`pyscaffold.api.`**`discover_actions`**(*extensions*)

Retrieve the action list.

This is done by concatenating the default list with the one generated after activating the extensions.

Parameters

- **`extensions`** (*`list`*) – list of functions responsible for activating the
- **`extensions.`** –

Returns scaffold actions.

Return type list

`pyscaffold.api.`**`get_default_options`**(*struct*, *opts*)

Compute all the options that can be automatically derived.

This function uses all the available information to generate sensible defaults. Several options that can be derived are computed when possible.

Parameters

- **`struct`** (*`dict`*) – project representation as (possibly) nested `dict`.

- **opts** (*dict*) – given options, see *create_project* for an extensive list.

Returns project representation and options with default values set

Return type dict, dict

Raises

- *DirectoryDoesNotExist* – when PyScaffold is told to update an nonexistent directory
- *GitNotInstalled* – when git command is not available
- *GitNotConfigured* – when git does not know user information

Note: This function uses git to determine some options, such as author name and email.

pyscaffold.api.**init_git**(*struct*, *opts*)
Add revision control to the generated files.

Parameters

- **struct** (*dict*) – project representation as (possibly) nested `dict`.
- **opts** (*dict*) – given options, see *create_project* for an extensive list.

Returns updated project representation and options

Return type dict, dict

pyscaffold.api.**verify_options_consistency**(*struct*, *opts*)
Perform some sanity checks about the given options.

Parameters

- **struct** (*dict*) – project representation as (possibly) nested `dict`.
- **opts** (*dict*) – given options, see *create_project* for an extensive list.

Returns updated project representation and options

Return type dict, dict

pyscaffold.api.**verify_project_dir**(*struct*, *opts*)
Check if PyScaffold can materialize the project dir structure.

Parameters

- **struct** (*dict*) – project representation as (possibly) nested `dict`.
- **opts** (*dict*) – given options, see *create_project* for an extensive list.

Returns updated project representation and options

Return type dict, dict

pyscaffold.contrib package

Subpackages

pyscaffold.contrib.setuptools_scm package

Submodules

pyscaffold.contrib.setuptools_scm.config module

configuration

class pyscaffold.contrib.setuptools_scm.config.**Configuration**(*relative_to=None*, *root='.'*)

Bases: object

Global configuration model

absolute_root

fallback_root

fallback_version = None

local_scheme = None

parse = None

relative_to

root

tag_regex

version_scheme = None

write_to = None

write_to_template = None

pyscaffold.contrib.setuptools_scm.discover module

pyscaffold.contrib.setuptools_scm.discover.**iter_matching_entrypoints**(*path*, *entrypoint*)

pyscaffold.contrib.setuptools_scm.file_finder module

pyscaffold.contrib.setuptools_scm.file_finder.**scm_find_files**(*path*, *scm_files*, *scm_dirs*)

setuptools compatible file finder that follows symlinks

- path: the root directory from which to search
- scm_files: set of scm controlled files and symlinks (including symlinks to directories)
- scm_dirs: set of scm controlled directories (including directories containing no scm controlled files)

scm_files and scm_dirs must be absolute with symlinks resolved (realpath), with normalized case (normcase)

Spec here: http://setuptools.readthedocs.io/en/latest/setuptools.html# adding-support-for-revision-control-systems

pyscaffold.contrib.setuptools_scm.file_finder_git module

pyscaffold.contrib.setuptools_scm.file_finder_git.**git_find_files**(*path=''*)

pyscaffold.contrib.setuptools_scm.file_finder_hg module

pyscaffold.contrib.setuptools_scm.file_finder_hg.**hg_find_files**(*path=''*)

pyscaffold.contrib.setuptools_scm.git module

class pyscaffold.contrib.setuptools_scm.git.**GitWorkdir**(*path*)
Bases: object

experimental, may change at any time

count_all_nodes()

do_ex(*cmd*)

fetch_shallow()

classmethod from_potential_worktree(*wd*)

get_branch()

is_dirty()

is_shallow()

node()

pyscaffold.contrib.setuptools_scm.git.**fail_on_shallow**(*wd*)
experimental, may change at any time

pyscaffold.contrib.setuptools_scm.git.**fetch_on_shallow**(*wd*)
experimental, may change at any time

pyscaffold.contrib.setuptools_scm.git.**parse**(*root*, *describe_command='git describe –dirty –tags –long –match *.*'*, *pre_parse=<function warn_on_shallow>*, *config=None*)

Parameters **pre_parse** – experimental pre_parse action, may change at any time

pyscaffold.contrib.setuptools_scm.git.**warn_on_shallow**(*wd*)
experimental, may change at any time

pyscaffold.contrib.setuptools_scm.hacks module

pyscaffold.contrib.setuptools_scm.hacks.**fallback_version**(*root*, *config=None*)

pyscaffold.contrib.setuptools_scm.hacks.**parse_pip_egg_info**(*root*, *config=None*)

pyscaffold.contrib.setuptools_scm.hacks.**parse_pkginfo**(*root*, *config=None*)

pyscaffold.contrib.setuptools_scm.hg module

pyscaffold.contrib.setuptools_scm.hg.**archival_to_version**(*data*, *config=None*)

pyscaffold.contrib.setuptools_scm.hg.**get_graph_distance**(*root*, *rev1*, *rev2='.'*)

pyscaffold.contrib.setuptools_scm.hg.**get_latest_normalizable_tag**(*root*)

pyscaffold.contrib.setuptools_scm.hg.**parse**(*root*, *config=None*)

pyscaffold.contrib.setuptools_scm.hg.**parse_archival**(*root*, *config=None*)

pyscaffold.contrib.setuptools_scm.integration module

pyscaffold.contrib.setuptools_scm.integration.**find_files**(*path=''*)

pyscaffold.contrib.setuptools_scm.integration.**version_keyword**(*dist*, *keyword*, *value*)

pyscaffold.contrib.setuptools_scm.utils module

utils

pyscaffold.contrib.setuptools_scm.utils.**data_from_mime**(*path*)

pyscaffold.contrib.setuptools_scm.utils.**do**(*cmd*, *cwd='.'*)

pyscaffold.contrib.setuptools_scm.utils.**do_ex**(*cmd*, *cwd='.'*)

pyscaffold.contrib.setuptools_scm.utils.**ensure_stripped_str**(*str_or_bytes*)

pyscaffold.contrib.setuptools_scm.utils.**function_has_arg**(*fn*, *argname*)

pyscaffold.contrib.setuptools_scm.utils.**has_command**(*name*)

pyscaffold.contrib.setuptools_scm.utils.**trace**(**k*)

pyscaffold.contrib.setuptools_scm.version module

class pyscaffold.contrib.setuptools_scm.version.**ScmVersion**(*tag_version*, *distance=None*, *node=None*, *dirty=False*, *preformatted=False*, *branch=None*, ***kw*)

Bases: object

exact

extra

format_choice(*clean_format*, *dirty_format*, ***kw*)

format_next_version(*guess_next*, *fmt='{guessed}.dev{distance}'*, ***kw*)

format_with(*fmt*, ***kw*)

exception pyscaffold.contrib.setuptools_scm.version.**SetuptoolsOutdatedWarning**

Bases: Warning

pyscaffold.contrib.setuptools_scm.version.**callable_or_entrypoint**(*group*, *callable_or_name*)

pyscaffold.contrib.setuptools_scm.version.**format_version**(*version*, ***config*)

pyscaffold.contrib.setuptools_scm.version.**get_local_dirty_tag**(*version*)

pyscaffold.contrib.setuptools_scm.version.**get_local_node_and_date**(*version*)

pyscaffold.contrib.setuptools_scm.version.**get_local_node_and_timestamp**(*version*, *fmt='%Y%m%d%H%M%S'*

pyscaffold.contrib.setuptools_scm.version.**guess_next_dev_version**(*version*)

pyscaffold.contrib.setuptools_scm.version.**guess_next_simple_semver**(*version*, *retain*, *increment=True*)

pyscaffold.contrib.setuptools_scm.version.**guess_next_version**(*tag_version*)

pyscaffold.contrib.setuptools_scm.version.**meta**(*tag*, *distance=None*, *dirty=False*, *node=None*, *preformatted=False*, *config=None*, ***kw*)

pyscaffold.contrib.setuptools_scm.version.**postrelease_version**(*version*)

pyscaffold.contrib.setuptools_scm.version.**simplified_semver_version**(*version*)

pyscaffold.contrib.setuptools_scm.version.**tag_to_version**(*tag*, *config=None*)
take a tag that might be prefixed with a keyword and return only the version part :param config: optional configuration object

pyscaffold.contrib.setuptools_scm.version.**tags_to_versions**(*tags*, *config=None*)
take tags that might be prefixed with a keyword and return only the version part :param tags: an iterable of tags :param config: optional configuration object

pyscaffold.contrib.setuptools_scm.win_py31_compat module

Module contents

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pyscaffold.contrib.setuptools_scm.**dump_version**(*root*, *version*, *write_to*, *template=None*)

pyscaffold.contrib.setuptools_scm.**get_version**(*root='.'*, *version_scheme='guess-next-dev'*, *local_scheme='node-and-date'*, *write_to=None*, *write_to_template=None*, *relative_to=None*, *tag_regex=None*, *fallback_version=None*, *fallback_root='.'*, *parse=None*, *git_describe_command=None*)
If supplied, relative_to should be a file from which root may be resolved. Typically called by a script or module that is not in the root of the repository to direct setuptools_scm to the root of the repository by supplying `__file__`.

pyscaffold.contrib.setuptools_scm.**version_from_scm**(*root*)

Submodules

pyscaffold.contrib.configupdater module

Configuration file updater.

A configuration file consists of sections, lead by a "[section]" header, and followed by "name: value" entries, with continuations and such in the style of RFC 822.

The basic idea of ConfigUpdater is that a configuration file consists of three kinds of building blocks: sections, comments and spaces for separation. A section itself consists of three kinds of blocks: options, comments and spaces. This gives us the corresponding data structures to describe a configuration file.

A general block object contains the lines which were parsed and make up the block. If a block object was not changed then during writing the same lines that were parsed will be used to express the block. In case a block, e.g. an option, was changed, it is marked as *updated* and its values will be transformed into a corresponding string during an update of a configuration file.

Note: ConfigUpdater was created by starting from Python's ConfigParser source code and changing it according to my needs. Thus this source code is subject to the PSF License in a way but I am not a lawyer.

---

exception pyscaffold.contrib.configupdater.**NoSectionError**(*section*)
Bases: configparser.Error

Raised when no section matches a requested option.

exception pyscaffold.contrib.configupdater.**DuplicateOptionError**(*section*, *option*, *source=None*, *lineno=None*)
Bases: configparser.Error

Raised by strict parsers when an option is repeated in an input source.

Current implementation raises this exception only when an option is found more than once in a single file, string or dictionary.

exception pyscaffold.contrib.configupdater.**DuplicateSectionError**(*section*, *source=None*, *lineno=None*)
Bases: configparser.Error

Raised when a section is repeated in an input source.

Possible repetitions that raise this exception are: multiple creation using the API or in strict parsers when a section is found more than once in a single input file, string or dictionary.

exception pyscaffold.contrib.configupdater.**NoOptionError**(*option*, *section*)
Bases: configparser.Error

A requested option was not found.

exception pyscaffold.contrib.configupdater.**NoConfigFileReadError**
Bases: configparser.Error

Raised when no configuration file was read but update requested.

exception pyscaffold.contrib.configupdater.**ParsingError**(*source=None*, *filename=None*)
Bases: configparser.Error

Raised when a configuration file does not follow legal syntax.

append(*lineno*, *line*)

filename
Deprecated, use 'source'.

exception pyscaffold.contrib.configupdater.**MissingSectionHeaderError**(*filename*, *lineno*, *line*)

Bases: configparser.ParsingError

Raised when a key-value pair is found before any section header.

class pyscaffold.contrib.configupdater.**ConfigUpdater**(*allow_no_value=False*, ***, *delimiters=('=', ':')*, *comment_prefixes='#'*, *';')*, *inline_comment_prefixes=None*, *strict=True*, *space_around_delimiters=True*)

Bases: pyscaffold.contrib.configupdater.Container, collections.abc.MutableMapping

Parser for updating configuration files.

ConfigUpdater follows the API of ConfigParser with some differences:

- inline comments are treated as part of a key's value,
- only a single config file can be updated at a time,
- empty lines in values are not valid,
- the original case of sections and keys are kept,
- control over the position of a new section/key.

Following features are **deliberately not** implemented:

- interpolation of values,
- propagation of parameters from the default section,
- conversions of values,
- passing key/value-pairs with `default` argument,
- non-strict mode allowing duplicate sections and keys.

NONSPACECRE = re.compile('\\S')

OPTCRE = re.compile('\n (?P<option>.*?) # very permissive!\n \\s*(?P<vi>=|:)\\s* # any

OPTCRE_NV = re.compile('\n (?P<option>.*?) # very permissive!\n \\s*(?: # any number

SECTCRE = re.compile('\n \\[# [\n (?P<header>[^]]+) # very permissive!\n \\] #]\n ',

add_section(*section*)

Create a new section in the configuration.

Raise DuplicateSectionError if a section by the specified name already exists. Raise ValueError if name is DEFAULT.

Parameters **section** (str or Section) – name or Section type

get(*section*, *option*)

Gets an option value for a given section.

Parameters

- **section** (*str*) – section name
- **option** (*str*) – option name

Returns Option object holding key/value pair

Return type Option

has_option(*section*, *option*)
Checks for the existence of a given option in a given section.

Parameters

- **section** (*str*) – name of section
- **option** (*str*) – name of option

Returns whether the option exists in the given section

Return type bool

has_section(*section*)
Returns whether the given section exists.

Parameters **section** (*str*) – name of section

Returns wether the section exists

Return type bool

items(*section=<object object>*)
Return a list of (name, value) tuples for options or sections.

If section is given, return a list of tuples with (name, value) for each option in the section. Otherwise, return a list of tuples with (section_name, section_type) for each section.

Parameters **section** (*str*) – optional section name, default UNSET

Returns list of Section or Option objects

Return type list

options(*section*)
Returns list of configuration options for the named section.

Parameters **section** (*str*) – name of section

Returns list of option names

Return type list

optionxform(*optionstr*)
Converts an option key to lower case for unification

Parameters **optionstr** (*str*) – key name

Returns unified option name

Return type str

read(*filename*, *encoding=None*)
Read and parse a filename.

Parameters

- **filename** (*str*) – path to file
- **encoding** (*str*) – encoding of file, default None

read_file(*f*, *source=None*)
Like read() but the argument must be a file-like object.

The `f` argument must be iterable, returning one line at a time. Optional second argument is the `source` specifying the name of the file being read. If not given, it is taken from f.name. If `f` has no `name` attribute, `<???>` is used.

Parameters

- **f** – file like object
- **source** (*str*) – reference name for file object, default None

read_string(*string*, *source='<string>'*)
Read configuration from a given string.

Parameters

- **string** (*str*) – string containing a configuration
- **source** (*str*) – reference name for file object, default '<string>'

remove_option(*section*, *option*)
Remove an option.

Parameters

- **section** (*str*) – section name
- **option** (*str*) – option name

Returns whether the option was actually removed

Return type bool

remove_section(*name*)
Remove a file section.

Parameters **name** – name of the section

Returns whether the section was actually removed

Return type bool

sections()
Return a list of section names

Returns list of section names

Return type list

sections_blocks()
Returns all section blocks

Returns list of `Section` blocks

Return type list

set(*section*, *option*, *value=None*)
Set an option.

Parameters

- **section** (*str*) – section name
- **option** (*str*) – option name
- **value** (*str*) – value, default None

to_dict()
Transform to dictionary

Returns dictionary with same content

Return type dict

update_file()
Update the read-in configuration file.

validate_format(***kwargs*)
Call ConfigParser to validate config

Parameters **kwargs** – are passed to `configparser.ConfigParser`

write(*fp*)
Write an .ini-format representation of the configuration state.

Parameters **fp** (*file-like object*) – open file handle

pyscaffold.contrib.ptr module

Implementation

class pyscaffold.contrib.ptr.**CustomizedDist**(*attrs=None*)
Bases: setuptools.dist.Distribution

allow_hosts = None

fetch_build_egg(*req*)
Specialized version of Distribution.fetch_build_egg that respects respects allow_hosts and index_url.

index_url = None

class pyscaffold.contrib.ptr.**PyTest**(*dist*, ***kw*)
Bases: setuptools.command.test.test

```
>>> import setuptools
>>> dist = setuptools.Distribution()
>>> cmd = PyTest(dist)
```

static ensure_setuptools_version()
Due to the fact that pytest-runner is often required (via setup-requires directive) by toolchains that never invoke it (i.e. they're only installing the package, not testing it), instead of declaring the dependency in the package metadata, assert the requirement at run time.

finalize_options()
Set final values for all the options that this command supports. This is always called as late as possible, ie. after any option assignments from the command-line or from other commands have been done. Thus, this is the place to code option dependencies: if 'foo' depends on 'bar', then it is safe to set 'foo' from 'bar' as long as 'foo' still has the same value it was assigned in 'initialize_options()'.

This method must be implemented by all command classes.

initialize_options()
Set default values for all the options that this command supports. Note that these defaults may be overridden by other commands, by the setup script, by config files, or by the command-line. Thus, this is not the place to code dependencies between options; generally, 'initialize_options()' implementations are just a bunch of "self.foo = None" assignments.

This method must be implemented by all command classes.

install_dists(*dist*)
Extend install_dists to include extras support

install_extra_dists(*dist*)
Install extras that are indicated by markers or install all extras if '–extras' is indicated.

static marker_passes(*marker*)
Given an environment marker, return True if the marker is valid and matches this environment.

run()
Override run to ensure requirements are available in this session (but don't install them anywhere).

run_tests()
Invoke pytest, replacing argv. Return result code.

user_options = [('extras', None, 'Install (all) setuptools extras when running tests')

Module contents

Contribution packages used by PyScaffold

All packages inside `contrib` are external packages that come with their own licences and are not part of the PyScaffold source code itself. The reason for shipping these dependencies directly is to avoid problems in the resolution of `setup_requires` dependencies that occurred more often than not, see issues #71 and #72.

Currently the contrib packages are:

1) setuptools_scm v3.3.3
2) pytest-runner 5.1
3) configupdater 1.0

The packages/modules were just copied over.

pyscaffold.contrib.**scm_find_files**(**args*, ***kwargs*)

pyscaffold.contrib.**scm_get_local_dirty_tag**(**args*, ***kwargs*)

pyscaffold.contrib.**scm_get_local_node_and_date**(**args*, ***kwargs*)

pyscaffold.contrib.**scm_guess_next_dev_version**(**args*, ***kwargs*)

pyscaffold.contrib.**scm_parse_archival**(**args*, ***kwargs*)

pyscaffold.contrib.**scm_parse_git**(**args*, ***kwargs*)

pyscaffold.contrib.**scm_parse_hg**(**args*, ***kwargs*)

pyscaffold.contrib.**scm_parse_pkginfo**(**args*, ***kwargs*)

pyscaffold.contrib.**scm_postrelease_version**(**args*, ***kwargs*)

pyscaffold.contrib.**warn_about_deprecated_pyscaffold**()

pyscaffold.contrib.**write_pbr_json**(**args*, ***kwargs*)

pyscaffold.extensions package

Submodules

pyscaffold.extensions.cookiecutter module

Extension that integrates cookiecutter templates into PyScaffold.

Warning: *Deprecation Notice* - In the next major release the Cookiecutter extension will be extracted into an independent package. After PyScaffold v4.0, you will need to explicitly install `pyscaffoldext-cookiecutter` in your system/virtualenv in order to be able to use it.

class pyscaffold.extensions.cookiecutter.**Cookiecutter**(*name*)

Bases: *pyscaffold.api.Extension*

Additionally apply a Cookiecutter template

activate(*actions*)

Register before_create hooks to generate project using Cookiecutter

Parameters **actions** (*list*) – list of actions to perform

Returns updated list of actions

Return type list

augment_cli(*parser*)

Add an option to parser that enables the Cookiecutter extension

Parameters **parser** (*argparse.ArgumentParser*) – CLI parser object

mutually_exclusive = True

exception pyscaffold.extensions.cookiecutter.**MissingTemplate**(*message='missing 'cookiecutter' option'*, **args*, ***kwargs*)

Bases: RuntimeError

A cookiecutter template (git url) is required.

DEFAULT_MESSAGE = 'missing `cookiecutter` option'

exception pyscaffold.extensions.cookiecutter.**NotInstalled**(*message='cookiecutter is not installed, run: pip install cookiecutter'*, **args*, ***kwargs*)

Bases: RuntimeError

This extension depends on the `cookiecutter` package.

DEFAULT_MESSAGE = 'cookiecutter is not installed, run: pip install cookiecutter'

pyscaffold.extensions.cookiecutter.**create_cookiecutter**(*struct*, *opts*)

Create a cookie cutter template

Parameters

- **struct** (*dict*) – project representation as (possibly) nested `dict`.
- **opts** (*dict*) – given options, see `create_project` for an extensive list.

Returns updated project representation and options

Return type struct, opts

pyscaffold.extensions.cookiecutter.**create_cookiecutter_parser**(*obj_ref*)

Create a Cookiecutter parser.

Parameters **obj_ref** (Extension) – object reference to the actual extension

Returns parser for namespace cli argument

Return type NamespaceParser

pyscaffold.extensions.cookiecutter.**enforce_cookiecutter_options**(*struct*, *opts*)
Make sure options reflect the cookiecutter usage.

Parameters

- **struct** (*dict*) – project representation as (possibly) nested dict.
- **opts** (*dict*) – given options, see create_project for an extensive list.

Returns updated project representation and options

Return type struct, opts

pyscaffold.extensions.django module

Extension that creates a base structure for the project using django-admin.py.

Warning: *Deprecation Notice* - In the next major release the Django extension will be extracted into an independent package. After PyScaffold v4.0, you will need to explicitly install pyscaffoldext-django in your system/virtualenv in order to be able to use it.

class pyscaffold.extensions.django.**Django**(*name*)
Bases: *pyscaffold.api.Extension*

Generate Django project files

activate(*actions*)
Register hooks to generate project using django-admin.

Parameters **actions** (*list*) – list of actions to perform

Returns updated list of actions

Return type list

mutually_exclusive = True

exception pyscaffold.extensions.django.**DjangoAdminNotInstalled**(*message='django-admin.py is not installed, run: pip install django'*, **args*, ***kwargs*)
Bases: RuntimeError

This extension depends on the django-admin.py cli script.

DEFAULT_MESSAGE = 'django-admin.py is not installed, run: pip install django'

pyscaffold.extensions.django.**create_django_proj**(*struct*, *opts*)
Creates a standard Django project with django-admin.py

Parameters

- **struct** (*dict*) – project representation as (possibly) nested dict.
- **opts** (*dict*) – given options, see create_project for an extensive list.

Returns updated project representation and options

Return type struct, opts

Raises `RuntimeError` – raised if django-admin.py is not installed

`pyscaffold.extensions.django.`**`enforce_django_options`**(*struct*, *opts*)
Make sure options reflect the Django usage.

Parameters

- **`struct`** (*dict*) – project representation as (possibly) nested `dict`.
- **`opts`** (*dict*) – given options, see `create_project` for an extensive list.

Returns updated project representation and options

Return type struct, opts

pyscaffold.extensions.gitlab_ci module

Extension that generates configuration and script files for GitLab CI.

`class` `pyscaffold.extensions.gitlab_ci.`**`GitLab`**(*name*)
Bases: *pyscaffold.api.Extension*

Generate GitLab CI configuration files

`activate`(*actions*)
Activate extension

Parameters **`actions`** (*list*) – list of actions to perform

Returns updated list of actions

Return type list

`add_files`(*struct*, *opts*)
Add .gitlab-ci.yml file to structure

Parameters

- **`struct`** (*dict*) – project representation as (possibly) nested `dict`.
- **`opts`** (*dict*) – given options, see `create_project` for an extensive list.

Returns updated project representation and options

Return type struct, opts

pyscaffold.extensions.namespace module

Extension that adjust project file tree to include a namespace package.

This extension adds a **namespace** option to *create_project* and provides correct values for the options **root_pkg** and **namespace_pkg** to the following functions in the action list.

`class` `pyscaffold.extensions.namespace.`**`Namespace`**(*name*)
Bases: *pyscaffold.api.Extension*

Add a namespace (container package) to the generated package.

`activate`(*actions*)
Register an action responsible for adding namespace to the package.

Parameters **`actions`** (*list*) – list of actions to perform

Returns updated list of actions

Return type list

augment_cli(*parser*)
Add an option to parser that enables the namespace extension.

Parameters **parser** (*argparse.ArgumentParser*) – CLI parser object

pyscaffold.extensions.namespace.**add_namespace**(*struct*, *opts*)
Prepend the namespace to a given file structure

Parameters

- **struct** (*dict*) – directory structure as dictionary of dictionaries
- **opts** (*dict*) – options of the project

Returns directory structure as dictionary of dictionaries and input options

Return type tuple(dict, dict)

pyscaffold.extensions.namespace.**create_namespace_parser**(*obj_ref*)
Create a namespace parser.

Parameters **obj_ref** (Extension) – object reference to the actual extension

Returns parser for namespace cli argument

Return type NamespaceParser

pyscaffold.extensions.namespace.**enforce_namespace_options**(*struct*, *opts*)
Make sure options reflect the namespace usage.

pyscaffold.extensions.namespace.**move_old_package**(*struct*, *opts*)
Move old package that may be eventually created without namespace

Parameters

- **struct** (*dict*) – directory structure as dictionary of dictionaries
- **opts** (*dict*) – options of the project

Returns directory structure as dictionary of dictionaries and input options

Return type tuple(dict, dict)

pyscaffold.extensions.no_skeleton module

Extension that omits the creation of file *skeleton.py*

class pyscaffold.extensions.no_skeleton.**NoSkeleton**(*name*)
Bases: *pyscaffold.api.Extension*

Omit creation of skeleton.py and test_skeleton.py

activate(*actions*)
Activate extension

Parameters **actions** (*list*) – list of actions to perform

Returns updated list of actions

Return type list

remove_files(*struct*, *opts*)
Remove all skeleton files from structure

Parameters

- **struct** (*dict*) – project representation as (possibly) nested `dict`.
- **opts** (*dict*) – given options, see `create_project` for an extensive list.

Returns updated project representation and options

Return type struct, opts

pyscaffold.extensions.pre_commit module

Extension that generates configuration files for Yelp pre-commit.

class pyscaffold.extensions.pre_commit.**PreCommit**(*name*)
Bases: *pyscaffold.api.Extension*

Generate pre-commit configuration file

activate(*actions*)
Activate extension

Parameters **actions** (*list*) – list of actions to perform

Returns updated list of actions

Return type list

static add_files(*struct*, *opts*)
Add .pre-commit-config.yaml file to structure

Since the default template uses isort, this function also provides an initial version of .isort.cfg that can be extended by the user (it contains some useful skips, e.g. tox and venv)

Parameters

- **struct** (*dict*) – project representation as (possibly) nested `dict`.
- **opts** (*dict*) – given options, see `create_project` for an extensive list.

Returns updated project representation and options

Return type struct, opts

static instruct_user(*struct*, *opts*)

pyscaffold.extensions.tox module

Extension that generates configuration files for the Tox test automation tool.

class pyscaffold.extensions.tox.**Tox**(*name*)
Bases: *pyscaffold.api.Extension*

Generate Tox configuration file

activate(*actions*)
Activate extension

Parameters **actions** (*list*) – list of actions to perform

Returns updated list of actions

Return type list

add_files(*struct*, *opts*)
Add .tox.ini file to structure

Parameters

- **struct** (*dict*) – project representation as (possibly) nested dict.
- **opts** (*dict*) – given options, see create_project for an extensive list.

Returns updated project representation and options

Return type struct, opts

pyscaffold.extensions.travis module

Extension that generates configuration and script files for Travis CI.

class pyscaffold.extensions.travis.**Travis**(*name*)
Bases: *pyscaffold.api.Extension*

Generate Travis CI configuration files

activate(*actions*)
Activate extension

Parameters **actions** (*list*) – list of actions to perform

Returns updated list of actions

Return type list

add_files(*struct*, *opts*)
Add some Travis files to structure

Parameters

- **struct** (*dict*) – project representation as (possibly) nested dict.
- **opts** (*dict*) – given options, see create_project for an extensive list.

Returns updated project representation and options

Return type struct, opts

Module contents

Built-in extensions for PyScaffold.

pyscaffold.templates package

Module contents

Templates for all files of a project's scaffold

pyscaffold.templates.**authors**(*opts*)
Template of AUTHORS.rst

Parameters **opts** – mapping parameters as dictionary

Returns file content as string

Return type str

pyscaffold.templates.**changelog**(*opts*)
Template of CHANGELOG.rst

Parameters **opts** – mapping parameters as dictionary

Returns file content as string

Return type str

pyscaffold.templates.**conftest_py**(*opts*)
Template of conftest.py

Parameters **opts** – mapping parameters as dictionary

Returns file content as string

Return type str

pyscaffold.templates.**coveragerc**(*opts*)
Template of .coveragerc

Parameters **opts** – mapping parameters as dictionary

Returns file content as string

Return type str

pyscaffold.templates.**get_template**(*name*)
Retrieve the template by name

Parameters **name** – name of template

Returns template

Return type string.Template

pyscaffold.templates.**gitignore**(*opts*)
Template of .gitignore

Parameters **opts** – mapping parameters as dictionary

Returns file content as string

Return type str

pyscaffold.templates.**gitignore_empty**(*opts*)
Template of empty .gitignore

Parameters **opts** – mapping parameters as dictionary

Returns file content as string

Return type str

pyscaffold.templates.**gitlab_ci**(*opts*)
Template of .gitlab-ci.yml

Parameters **opts** – mapping parameters as dictionary

Returns file content as string

Return type str

pyscaffold.templates.**init**(*opts*)
Template of __init__.py

Parameters **opts** – mapping parameters as dictionary

Returns file content as string

Return type str

pyscaffold.templates.**isort_cfg**(*opts*)
Template of .isort.cfg

Parameters **opts** – mapping parameters as dictionary

Returns file content as string

Return type str

pyscaffold.templates.**license**(*opts*)
Template of LICENSE.txt

Parameters **opts** – mapping parameters as dictionary

Returns file content as string

Return type str

pyscaffold.templates.**licenses = {'affero': 'license_affero_3.0', 'apache': 'license_apacl**
All available licences

pyscaffold.templates.**namespace**(*opts*)
Template of __init__.py defining a namespace package

Parameters **opts** – mapping parameters as dictionary

Returns file content as string

Return type str

pyscaffold.templates.**pre_commit_config**(*opts*)
Template of .pre-commit-config.yaml

Parameters **opts** – mapping parameters as dictionary

Returns file content as string

Return type str

pyscaffold.templates.**readme**(*opts*)
Template of README.rst

Parameters **opts** – mapping parameters as dictionary

Returns file content as string

Return type str

pyscaffold.templates.**requirements**(*opts*)
Template of requirements.txt

Parameters **opts** – mapping parameters as dictionary

Returns file content as string

Return type str

pyscaffold.templates.**setup_cfg**(*opts*)
Template of setup.cfg

Parameters **opts** – mapping parameters as dictionary

Returns file content as string

Return type str

pyscaffold.templates.**setup_py**(*opts*)
Template of setup.py

Parameters **opts** – mapping parameters as dictionary

Returns file content as string

Return type str

pyscaffold.templates.**skeleton**(*opts*)
Template of skeleton.py defining a basic console script

Parameters **opts** – mapping parameters as dictionary

Returns file content as string

Return type str

pyscaffold.templates.**sphinx_authors**(*opts*)
Template of authors.rst

Parameters **opts** – mapping parameters as dictionary

Returns file content as string

Return type str

pyscaffold.templates.**sphinx_changelog**(*opts*)
Template of changelog.rst

Parameters **opts** – mapping parameters as dictionary

Returns file content as string

Return type str

pyscaffold.templates.**sphinx_conf**(*opts*)
Template of conf.py

Parameters **opts** – mapping parameters as dictionary

Returns file content as string

Return type str

pyscaffold.templates.**sphinx_index**(*opts*)
Template of index.rst

Parameters **opts** – mapping parameters as dictionary

Returns file content as string

Return type str

pyscaffold.templates.**sphinx_license**(*opts*)
Template of license.rst

Parameters **opts** – mapping parameters as dictionary

Returns file content as string

Return type str

pyscaffold.templates.**sphinx_makefile**(*opts*)
Template of Sphinx's Makefile

Parameters **opts** – mapping parameters as dictionary

Returns file content as string

Return type str

pyscaffold.templates.**test_skeleton**(*opts*)
Template of unittest for skeleton.py

Parameters **opts** – mapping parameters as dictionary

Returns file content as string

Return type str

pyscaffold.templates.**tox**(*opts*)
Template of tox.ini

Parameters **opts** – mapping parameters as dictionary

Returns file content as string

Return type str

pyscaffold.templates.**travis**(*opts*)
Template of .travis.yml

Parameters **opts** – mapping parameters as dictionary

Returns file content as string

Return type str

pyscaffold.templates.**travis_install**(*opts*)
Template of travis_install.sh

Parameters **opts** – mapping parameters as dictionary

Returns file content as string

Return type str

15.1.2 Submodules

15.1.3 pyscaffold.cli module

Command-Line-Interface of PyScaffold

pyscaffold.cli.**add_default_args**(*parser*)
Add the default options and arguments to the CLI parser.

Parameters **parser** (*argparse.ArgumentParser*) – CLI parser object

pyscaffold.cli.**list_actions**(*opts*)
Do not create a project, just list actions considering extensions

Parameters **opts** (*dict*) – command line options as dictionary

pyscaffold.cli.**main**(*args*)
Main entry point for external applications

Parameters **args** (*[str]*) – command line arguments

pyscaffold.cli.**parse_args**(*args*)
Parse command line parameters respecting extensions

Parameters **args** (*[str]*) – command line parameters as list of strings

Returns command line parameters

Return type dict

pyscaffold.cli.**process_opts**(*opts*)
Process and enrich command line arguments

Parameters **opts** (*dict*) – dictionary of parameters

Returns dictionary of parameters from command line arguments

Return type dict

pyscaffold.cli.**run**()
Entry point for console script

pyscaffold.cli.**run_scaffold**(*opts*)
Actually scaffold the project, calling the python API

Parameters **opts** (*dict*) – command line options as dictionary

15.1.4 pyscaffold.exceptions module

Custom exceptions used by PyScaffold to identify common deviations from the expected behavior.

exception pyscaffold.exceptions.**ActionNotFound**(*name*, **args*, ***kwargs*)
Bases: KeyError

Impossible to find the required action.

exception pyscaffold.exceptions.**DirectoryAlreadyExists**
Bases: RuntimeError

The project directory already exists, but no `update` or `force` option was used.

exception pyscaffold.exceptions.**DirectoryDoesNotExist**
Bases: RuntimeError

No directory was found to be updated.

exception pyscaffold.exceptions.**GitDirtyWorkspace**(*message="Your working tree is dirty. Commit your changes first or use '–force'.", *args, **kwargs*)
Bases: RuntimeError

Workspace of git is empty.

DEFAULT_MESSAGE = "Your working tree is dirty. Commit your changes first or use '--for

exception pyscaffold.exceptions.**GitNotConfigured**(*message='Make sure git is configured. Run:n git config –global user.email "you@example.com"n git config –global user.name "Your Name"nto set your account's default identity.', *args, **kwargs*)
Bases: RuntimeError

PyScaffold tries to read user.name and user.email from git config.

DEFAULT_MESSAGE = 'Make sure git is configured. Run:\n git config --global user.email

exception pyscaffold.exceptions.**GitNotInstalled**(*message='Make sure git is installed and working.', *args, **kwargs*)
Bases: RuntimeError

PyScaffold requires git to run.

DEFAULT_MESSAGE = 'Make sure git is installed and working.'

exception pyscaffold.exceptions.**InvalidIdentifier**
Bases: RuntimeError

Python requires a specific format for its identifiers.

https://docs.python.org/3.6/reference/lexical_analysis.html#identifiers

exception pyscaffold.exceptions.**NoPyScaffoldProject**(*message='Could not update project. Was it generated with PyScaffold?'*, **args*, ***kwargs*)
Bases: RuntimeError

PyScaffold cannot update a project that it hasn't generated

DEFAULT_MESSAGE = 'Could not update project. Was it generated with PyScaffold?'

exception pyscaffold.exceptions.**OldSetuptools**(*message='Your setuptools version is too old (<38.3). Use 'pip install -U setuptools' to upgrade.nIf you have the deprecated 'distribute' package installed remove it or update to version 0.7.3.'*, **args*, ***kwargs*)
Bases: RuntimeError

PyScaffold requires a recent version of setuptools.

DEFAULT_MESSAGE = 'Your setuptools version is too old (<38.3). Use `pip install -U set

exception pyscaffold.exceptions.**PyScaffoldTooOld**(*message='setup.cfg has no section [pyscaffold]! Are you trying to update a pre 3.0 version?'*, **args*, ***kwargs*)
Bases: RuntimeError

PyScaffold cannot update a pre 3.0 version

DEFAULT_MESSAGE = 'setup.cfg has no section [pyscaffold]! Are you trying to update a p

exception pyscaffold.exceptions.**ShellCommandException**(*message*, **args*, ***kwargs*)
Bases: RuntimeError

Outputs proper logging when a ShellCommand fails

15.1.5 pyscaffold.info module

Provide general information about the system, user etc.

class pyscaffold.info.**GitEnv**
Bases: enum.Enum

An enumeration.

author_date = 'GIT_AUTHOR_DATE'

author_email = 'GIT_AUTHOR_EMAIL'

author_name = 'GIT_AUTHOR_NAME'

committer_date = 'GIT_COMMITTER_DATE'

committer_email = 'GIT_COMMITTER_EMAIL'

committer_name = 'GIT_COMMITTER_NAME'

pyscaffold.info.**best_fit_license**(*txt*)
Finds proper license name for the license defined in txt

Parameters **txt** (*str*) – license name

Returns license name

Return type str

pyscaffold.info.**check_git**()
Checks for git and raises appropriate exception if not

Raises

- *GitNotInstalled* – when git command is not available
- *GitNotConfigured* – when git does not know user information

pyscaffold.info.**email**()
Retrieve the user's email

Returns user's email

Return type str

pyscaffold.info.**is_git_configured**()
Check if user.name and user.email is set globally in git

Check first git environment variables, then config settings. This will also return false if git is not available at all.

Returns True if it is set globally, False otherwise

Return type bool

pyscaffold.info.**is_git_installed**()
Check if git is installed

Returns True if git is installed, False otherwise

Return type bool

pyscaffold.info.**is_git_workspace_clean**(*path*)
Checks if git workspace is clean

Parameters **path** (*str*) – path to git repository

Returns condition if workspace is clean or not

Return type

bool

Raises: *GitNotInstalled*: when git command is not available *GitNotConfigured*: when git does not know user information

pyscaffold.info.**project**(*opts*)
Update user options with the options of an existing PyScaffold project

Params: opts (dict): options of the project

Returns options with updated values

Return type dict

Raises

- *PyScaffoldTooOld* – when PyScaffold is to old to update from
- *NoPyScaffoldProject* – when project was not generated with PyScaffold

pyscaffold.info.**username**()
Retrieve the user's name

Returns user's name

Return type str

15.1.6 pyscaffold.integration module

Integration part for hooking into distutils/setuptools

Rationale: The `use_pyscaffold` keyword is unknown to setuptools' setup(...) command, therefore the `entry_points` are checked for a function to handle this keyword which is `pyscaffold_keyword` below. This is where we hook into setuptools and apply the magic of setuptools_scm as well as other commands.

pyscaffold.integration.**build_cmd_docs**()
Return Sphinx's BuildDoc if available otherwise a dummy command

Returns command object

Return type Command

pyscaffold.integration.**local_version2str**(*version*)
Create the local part of a PEP440 version string

Parameters **version** (setuptools_scm.version.ScmVersion) – version object

Returns local version

Return type str

pyscaffold.integration.**pyscaffold_keyword**(*dist*, *keyword*, *value*)
Handles the *use_pyscaffold* keyword of the setup(...) command

Parameters

- **dist** (setuptools.dist) – distribution object as
- **keyword** (*str*) – keyword argument = 'use_pyscaffold'
- **value** – value of the keyword argument

pyscaffold.integration.**setuptools_scm_config**(*value*)
Generate the configuration for setuptools_scm

Parameters **value** – value from entry_point

Returns dictionary of options

Return type dict

pyscaffold.integration.**version2str**(*version*)
Creates a PEP440 version string

Parameters **version** (setuptools_scm.version.ScmVersion) – version object

Returns version string

Return type str

15.1.7 pyscaffold.log module

Custom logging infrastructure to provide execution information for the user.

class pyscaffold.log.**ColoredReportFormatter**(*fmt=None*, *datefmt=None*, *style='%'*)
Bases: *pyscaffold.log.ReportFormatter*

Format logs with ANSI colors.

ACTIVITY_STYLES = {'create': ('green', 'bold'), 'delete': ('red', 'bold'), 'invoke':

CONTEXT_PREFIX = '\x1b[35m\x1b[1mfrom\x1b[0m'

LOG_STYLES = {'critical': ('red', 'bold'), 'debug': ('green',), 'error': ('red',),

SUBJECT_STYLES = {'invoke': ('blue',)}

TARGET_PREFIX = '\x1b[35m\x1b[1mto\x1b[0m'

format_activity(*activity*)
Format the activity keyword.

format_default(*record*)
Format default log messages.

format_subject(*subject*, *activity=None*)
Format the subject of the activity.

class pyscaffold.log.**ReportFormatter**(*fmt=None*, *datefmt=None*, *style='%'*)
Bases: logging.Formatter

Formatter that understands custom fields in the log record.

ACTIVITY_MAXLEN = 12

CONTEXT_PREFIX = 'from'

SPACING = ' '

TARGET_PREFIX = 'to'

create_padding(*activity*)
Create the appropriate padding in order to align activities.

format(*record*)
Compose message when a record with report information is given.

format_activity(*activity*)
Format the activity keyword.

format_context(*context*, *_activity=None*)
Format extra information about the activity context.

format_default(*record*)
Format default log messages.

format_path(*path*)
Simplify paths to avoid wasting space in terminal.

format_report(*record*)
Compose message when a custom record is given.

format_subject(*subject*, *_activity=None*)
Format the subject of the activity.

format_target(*target*, *_activity=None*)
Format extra information about the activity target.

class pyscaffold.log.**ReportLogger**(*logger=None*, *handler=None*, *formatter=None*, *extra=None*)
Bases: logging.LoggerAdapter

Suitable wrapper for PyScaffold CLI interactive execution reports.

Parameters

- **logger** (*logging.Logger*) – custom logger to be used. Optional: the default logger will be used.
- **handlers** (*logging.Handler*) – custom logging handler to be used. Optional: a logging.StreamHandler is used by default.
- **formatter** (*logging.Formatter*) – custom formatter to be used. Optional: by default a *ReportFormatter* is created and used.
- **extra** (*dict*) – extra attributes to be merged into the log record. Options, empty by default.

wrapped
underlying logger object.

Type logging.Logger

handler
stream handler configured for providing user feedback in PyScaffold CLI.

Type logging.Handler

formatter
formatter configured in the default handler.

Type logging.Formatter

nesting
current nesting level of the report.

Type int

copy()
Produce a copy of the wrapped logger.

Sometimes, it is better to make a copy of th report logger to keep indentation consistent.

indent(*count=1*)
Temporarily adjust padding while executing a context.

Example

```
from pyscaffold.log import logger
logger.report('invoke', 'custom_action')
with logger.indent():
   logger.report('create', 'some/file/path')

# Expected logs:
# -------------------------------------
#       invoke  custom_action
#       create    some/file/path
```

(continues on next page)

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```
# ------------------------------------
# Note how the spacing between activity and subject in the
# second entry is greater than the equivalent in the first one.
```

Note: This method is not thread-safe and should be used with care.

level
Effective level of the logger

process(*msg*, *kwargs*)
Method overridden to augment LogRecord with the *nesting* attribute.

report(*activity*, *subject*, *context=None*, *target=None*, *nesting=None*, *level=20*)
Log that an activity has occurred during scaffold.

Parameters

- **activity** (*str*) – usually a verb or command, e.g. `create`, `invoke`, `run`, `chdir`...
- **subject** (*str*) – usually a path in the file system or an action identifier.
- **context** (*str*) – path where the activity take place.
- **target** (*str*) – path affected by the activity
- **nesting** (*int*) – optional nesting level. By default it is calculated from the activity name.
- **level** (*int*) – log level. Defaults to `logging.INFO`. See `logging` for more information.

Notes

This method creates a custom log record, with additional fields: **activity**, **subject**, **context**, **target** and **nesting**, but an empty **msg** field. The *ReportFormatter* creates the log message from the other fields.

Often **target** and **context** complement the logs when **subject** does not hold all the necessary information. For example:

```
logger.report('copy', 'my/file', target='my/awesome/path')
logger.report('run', 'command', context='current/working/dir')
```

pyscaffold.log.**configure_logger**(*opts*)
Configure the default logger

Parameters **opts** (*dict*) – command line parameters

pyscaffold.log.**logger = <ReportLogger pyscaffold.log (WARNING)>**
Default logger configured for PyScaffold.

15.1.8 pyscaffold.repo module

Functionality for working with a git repository

pyscaffold.repo.**add_tag**(*project*, *tag_name*, *message=None*, ***kwargs*)
Add an (annotated) tag to the git repository.

Parameters

- **project** (*str*) – path to the project
- **tag_name** (*str*) – name of the tag
- **message** (*str*) – optional tag message

Additional keyword arguments are passed to the *git* callable object.

pyscaffold.repo.**get_git_root**(*default=None*)
Return the path to the top-level of the git repository or *default*.

Parameters **default** (*str*) – if no git root is found, default is returned

Returns top-level path or *default*

Return type str

pyscaffold.repo.**git_tree_add**(*struct*, *prefix=''*, ***kwargs*)
Adds recursively a directory structure to git

Parameters

- **struct** (*dict*) – directory structure as dictionary of dictionaries
- **prefix** (*str*) – prefix for the given directory structure

Additional keyword arguments are passed to the *git* callable object.

pyscaffold.repo.**init_commit_repo**(*project*, *struct*, ***kwargs*)
Initialize a git repository

Parameters

- **project** (*str*) – path to the project
- **struct** (*dict*) – directory structure as dictionary of dictionaries

Additional keyword arguments are passed to the *git* callable object.

pyscaffold.repo.**is_git_repo**(*folder*)
Check if a folder is a git repository

Parameters **folder** (*str*) – path

15.1.9 pyscaffold.shell module

Shell commands like git, django-admin.py etc.

class pyscaffold.shell.**ShellCommand**(*command*, *shell=True*, *cwd=None*)
Bases: object

Shell command that can be called with flags like git('add', 'file')

Parameters

- **command** (*str*) – command to handle
- **shell** (*bool*) – run the command in the shell
- **cwd** (*str*) – current working dir to run the command

The produced command can be called with the following keyword arguments:

- **log** (*bool*): log activity when true. `False` by default.
- **pretend** (*bool*): skip execution (but log) when pretending. `False` by default.

The positional arguments are passed to the underlying shell command.

pyscaffold.shell.**command_exists**(*cmd*)
Check if command exists

Parameters **cmd** – executable name

pyscaffold.shell.**django_admin = <pyscaffold.shell.ShellCommand object>**
Command for django-admin.py

pyscaffold.shell.**get_git_cmd**(***args*)
Retrieve the git shell command depending on the current platform

Parameters ****args** – additional keyword arguments to *ShellCommand*

pyscaffold.shell.**git = <pyscaffold.shell.ShellCommand object>**
Command for git

pyscaffold.shell.**shell_command_error2exit_decorator**(*func*)
Decorator to convert given ShellCommandException to an exit message

This avoids displaying nasty stack traces to end-users

15.1.10 pyscaffold.structure module

Functionality to generate and work with the directory structure of a project

class pyscaffold.structure.**FileOp**
Bases: object

Namespace for file operations during an update

NO_CREATE = 1
Do not create the file during an update

NO_OVERWRITE = 0
Do not overwrite an existing file during update (still created if not exists)

pyscaffold.structure.**create_structure**(*struct*, *opts*, *prefix=None*)
Manifests a directory structure in the filesystem

Parameters

- **struct** (*dict*) – directory structure as dictionary of dictionaries
- **opts** (*dict*) – options of the project
- **prefix** (*str*) – prefix path for the structure

Returns directory structure as dictionary of dictionaries (similar to input, but only containing the files that actually changed) and input options

Return type tuple(dict, dict)

Raises RuntimeError – raised if content type in struct is unknown

pyscaffold.structure.**define_structure**(*_*, *opts*)
Creates the project structure as dictionary of dictionaries

Parameters

- **_** (*dict*) – previous directory structure (ignored)
- **opts** (*dict*) – options of the project

Returns structure as dictionary of dictionaries and input options

Return type tuple(dict, dict)

15.1.11 pyscaffold.termui module

Basic support for ANSI code formatting.

pyscaffold.termui.**curses_available**()
Check if the curses package from stdlib is available.

Usually not available for windows, but its presence indicates that the terminal is capable of displaying some UI.

Returns result of check

Return type bool

pyscaffold.termui.**decorate**(*msg*, **styles*)
Use ANSI codes to format the message.

Parameters

- **msg** (*str*) – string to be formatted
- ***styles** (*list*) – the remaining arguments should be strings that represent the 8 basic ANSI colors. `clear` and `bold` are also supported. For background colors use `on_<color>`.

Returns styled and formatted message

Return type str

pyscaffold.termui.**init_colorama**()
Initialize colorama if it is available.

Returns result of check

Return type bool

pyscaffold.termui.**isatty**(*stream=None*)
Detect if the given stream/stdout is part of an interactive terminal.

Parameters **stream** – optionally the stream to check

Returns result of check

Return type bool

pyscaffold.termui.**supports_color**(*stream=None*)
Check if the stream is supposed to handle coloring.

Returns result of check

Return type bool

15.1.12 pyscaffold.update module

Functionality to update one PyScaffold version to another

pyscaffold.update.**add_entrypoints**(*struct*, *opts*)
Add [options.entry_points] to setup.cfg

Parameters

- **struct** (*dict*) – previous directory structure (ignored)

- **opts** (*dict*) – options of the project

Returns structure as dictionary of dictionaries and input options

Return type tuple(dict, dict)

pyscaffold.update.**add_setup_requires**(*struct*, *opts*)
Add *setup_requires* in setup.cfg

Parameters

- **struct** (*dict*) – previous directory structure (ignored)
- **opts** (*dict*) – options of the project

Returns structure as dictionary of dictionaries and input options

Return type tuple(dict, dict)

pyscaffold.update.**apply_update_rule_to_file**(*path*, *value*, *opts*)
Applies the update rule to a given file path

Parameters

- **path** (*str*) – file path
- **value** (*tuple or str*) – content (and update rule)
- **opts** (*dict*) – options of the project, containing the following flags:
  - **update**: if the project already exists and should be updated
  - **force**: overwrite all the files that already exist

Returns content of the file if it should be generated or None otherwise.

pyscaffold.update.**apply_update_rules**(*struct*, *opts*, *prefix=None*)
Apply update rules using *FileOp* to a directory structure.

As a result the filtered structure keeps only the files that actually will be written.

Parameters

- **opts** (*dict*) – options of the project, containing the following flags:
  - **update**: when the project already exists and should be updated
  - **force**: overwrite all the files that already exist
- **struct** (*dict*) – directory structure as dictionary of dictionaries (in this tree representation, each leaf can be just a string or a tuple also containing an update rule)
- **prefix** (*str*) – prefix path for the structure

Returns directory structure with keys removed according to the rules (in this tree representation, all the leaves are strings) and input options

Return type tuple(dict, dict)

pyscaffold.update.**get_curr_version**(*project_path*)
Retrieves the PyScaffold version that put up the scaffold

Parameters **project_path** – path to project

Returns version specifier

Return type Version

pyscaffold.update.**invoke_action**(*action*, *struct*, *opts*)
Invoke action with proper logging.

Parameters

- **struct** (*dict*) – project representation as (possibly) nested `dict`.
- **opts** (*dict*) – given options, see `create_project` for an extensive list.

Returns updated project representation and options

Return type tuple(dict, dict)

pyscaffold.update.**read_setupcfg**(*project_path*)
Reads-in setup.cfg for updating

Parameters **project_path** (*str*) – path to project

Returns:

pyscaffold.update.**update_pyscaffold_version**(*project_path*, *pretend*)
Update *setup_requires* in setup.cfg

Parameters

- **project_path** (*str*) – path to project
- **pretend** (*bool*) – only pretend to do something

pyscaffold.update.**version_migration**(*struct*, *opts*)
Migrations from one version to another

Parameters

- **struct** (*dict*) – previous directory structure (ignored)
- **opts** (*dict*) – options of the project

Returns structure as dictionary of dictionaries and input options

Return type tuple(dict, dict)

15.1.13 pyscaffold.utils module

Miscellaneous utilities and tools

pyscaffold.utils.**ERROR_INVALID_NAME = 123**
Windows-specific error code indicating an invalid pathname.

pyscaffold.utils.**chdir**(*path*, ***kwargs*)
Contextmanager to change into a directory

Parameters **path** (*str*) – path to change current working directory to

Keyword Arguments

- **log** (*bool*) – log activity when true. Default: `False`.
- **pretend** (*bool*) – skip execution (but log) when pretending. Default `False`.

pyscaffold.utils.**check_setuptools_version**()
Check minimum required version of setuptools

Check that setuptools has all necessary capabilities for setuptools_scm as well as support for configuration with the help of `setup.cfg`.

Raises `OldSetuptools` – raised if necessary capabilities are not met

pyscaffold.utils.**create_directory**(*path*, *update=False*, *pretend=False*)
Create a directory in the given path.

This function reports the operation in the logs.

Parameters

- **path** (*str*) – path in the file system where contents will be written.
- **update** (*bool*) – false by default. A OSError is raised when update is false and the directory already exists.
- **pretend** (*bool*) – false by default. Directory is not created when pretending, but operation is logged.

pyscaffold.utils.**create_file**(*path*, *content*, *pretend=False*)
Create a file in the given path.

This function reports the operation in the logs.

Parameters

- **path** (*str*) – path in the file system where contents will be written.
- **content** (*str*) – what will be written.
- **pretend** (*bool*) – false by default. File is not written when pretending, but operation is logged.

pyscaffold.utils.**dasherize**(*word*)
Replace underscores with dashes in the string.

Example:

```
>>> dasherize("foo_bar")
"foo-bar"
```

Parameters **word** (*str*) – input word

Returns input word with underscores replaced by dashes

pyscaffold.utils.**exceptions2exit**(*exception_list*)
Decorator to convert given exceptions to exit messages

This avoids displaying nasty stack traces to end-users

Parameters **[Exception]** (*exception_list*) – list of exceptions to convert

pyscaffold.utils.**get_id**(*function*)
Given a function, calculate its identifier.

A identifier is a string in the format <module name>:<function name>, similarly to the convention used for setuptools entry points.

Note: This function does not return a Python 3 __qualname__ equivalent. If the function is nested inside another function or class, the parent name is ignored.

Parameters **function** (*callable*) – function object

Returns identifier

Return type str

pyscaffold.utils.**get_setup_requires_version**()
Determines the proper *setup_requires* string for PyScaffold

E.g. setup_requires = pyscaffold>=3.0a0,<3.1a0

Returns requirement string for setup_requires

Return type str

pyscaffold.utils.**is_pathname_valid**(*pathname*)
Check if a pathname is valid

Code by Cecil Curry from StackOverflow

Parameters **pathname** (*str*) – string to validate

Returns *True* if the passed pathname is a valid pathname for the current OS; *False* otherwise.

pyscaffold.utils.**is_valid_identifier**(*string*)
Check if string is a valid package name

Parameters **string** (*str*) – package name

Returns True if string is valid package name else False

Return type bool

pyscaffold.utils.**levenshtein**(*s1*, *s2*)
Calculate the Levenshtein distance between two strings

Parameters

- **s1** (*str*) – first string
- **s2** (*str*) – second string

Returns distance between s1 and s2

Return type int

pyscaffold.utils.**localize_path**(*path_string*)
Localize path for Windows, Unix, i.e. / or :param path_string: path using / :type path_string: str

Returns path depending on OS

Return type str

pyscaffold.utils.**make_valid_identifier**(*string*)
Try to make a valid package name identifier from a string

Parameters **string** (*str*) – invalid package name

Returns valid package name as string or `RuntimeError`

Return type str

Raises `InvalidIdentifier` – raised if identifier can not be converted

pyscaffold.utils.**move**(**src*, ***kwargs*)
Move files or directories to (into) a new location

Parameters ***src** (*str[]*) – one or more files/directories to be moved

Keyword Arguments

- **target** (*str*) – if target is a directory, `src` will be moved inside it. Otherwise, it will be the new path (note that it may be overwritten)
- **log** (*bool*) – log activity when true. Default: `False`.

- **pretend** (*bool*) – skip execution (but log) when pretending. Default `False`.

`pyscaffold.utils.`**`on_ro_error`**(*func*, *path*, *exc_info*)
Error handler for `shutil.rmtree`.

If the error is due to an access error (read only file) it attempts to add write permission and then retries.

If the error is for another reason it re-raises the error.

Usage : `shutil.rmtree(path, onerror=onerror)`

Parameters

- **func** (*callable*) – function which raised the exception
- **path** (*str*) – path passed to *func*
- **exc_info** (*tuple of str*) – exception info returned by sys.exc_info()

`pyscaffold.utils.`**`prepare_namespace`**(*namespace_str*)
Check the validity of namespace_str and split it up into a list

Parameters **namespace_str** (*str*) – namespace, e.g. "com.blue_yonder"

Returns list of namespaces, e.g. ["com", "com.blue_yonder"]

Return type [str]

Raises `InvalidIdentifier` – raised if namespace is not valid

`pyscaffold.utils.`**`rm_rf`**(*path*)
Remove a path by all means like *rm -rf* in Linux.

Args (str): Path to remove:

15.1.14 pyscaffold.warnings module

Warnings used by PyScaffold to identify issues that can be safely ignored but that should be displayed to the user.

exception `pyscaffold.warnings.`**`UpdateNotSupported`**(**args*, *extension=None*, ***kwargs*)
Bases: `RuntimeWarning`

Extensions that make use of external generators are not able to do updates by default.

`DEFAULT_MESSAGE = 'Updating code generated using external tools is not supported. The`

15.1.15 Module contents

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Indices and tables

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