

Software Deployment

Deploy Python Modules

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Introduction

Table of contents

1. Introduction
2. Setup script
3. Distribution archives

Definitions

- **Module:** Bloc of **code** that can be **imported** within other code:
 - **Pure Python Module:** Written in **python**
In a single **.py** file
 - **Extension Module:** Written in a **low level** language (C/C++) Usually stored as **.so** file
- **Package: Module** containing **other modules:**
 - Folder contained in the filesystem
 - Folder containing a **`__init__.py`** file

Definitions

Module distribution: Set of Python modules distributed together.

- Single downloadable
- Imprecisely called *package*
- **Pure module distribution:**
Python only
- **non-pure module distribution:**
At least one extension module
- **Distribution root:** Top level
(contains a `setup.py` file)

Tasks

- Write a **setup script** (`setup.py`)
- Write a **setup configuration file**
- Create a **source distribution**
- (Create built (binaries) distributions)

`https://docs.python.org/2/distutils/introduction.html`

Setup script

- **Package** providing support to **build** and **install** Python modules
- Handles **Pure python** and **C extensions**
- **distutils** (old)
- **setuptools** (new)

Definition

Goal: **describe** module distribution to **setuptools** (or **Distutils**):

- name
- version
- code files to include
- ...

Example

<https://packaging.python.org/tutorials/packaging-projects/>

```
import setuptools

with open("README.md", "r") as fh:
    long_description = fh.read()

setuptools.setup(
    name="example-pkg-your-username",
    version="0.0.1",
    author="Example Author",
    author_email="author@example.com",
    description="A small example package",
    long_description=long_description,
    long_description_content_type="text/markdown",
    url="https://github.com/pypa/sampleproject",
    packages=setuptools.find_packages(),
    classifiers=[
        "Programming Language :: Python :: 3",
        "License :: OSI Approved :: MIT License",
        "Operating System :: OS Independent",
    ],
)
```

Some important arguments

- **name**: distribution name
Letters, numbers "-", and "_". (not used in pypi.org)
- **version**: Package version
- **author** and **author_email**
- **description**: Short description (one sentence)
- **long_description**: Detailed description.
- **long_description_content_type**:
Long description markup type in (e.g., markdown)
- **url**: project homepage (e.g., GitHub link)
- **packages**: List of Python import packages
(to include in distribution package)
- **classifiers**: meta-information for **pip**
(e.g. python 3 / 2 compatibility, license, OS ...)
- **install_requires**: list with dependencies

Distribution archives

Install setuptools and wheel

```
pip install --upgrade setuptools wheel
```

- **pip:**
Tool to install Python packages
- **setuptools**
Tool to build and distribute Python distributions.
- **wheel:**
Extension of **setuptools**

Run setup

```
python setup.py sdist bdist_wheel
```

- A **dist/** folder is generated:
- Within dist a file is created
- Creates **built distribution**:
 - **.whl** file in **dist/**
 - Distribution format with files and metadata
 - Installation: Simply by placing it in the right location.
- Creates **source archive file**:
 - **.tar.gz** file in **dist/**
 - Raw source code

Upload Distribution Archive

- Register account on Test PyPI

`https://test.pypi.org/account/register/`

- Separate instance of **pip** package index for tests and **experiments**
- install **twine**: `pip install --upgrade twine`
- Run Twine to upload the archives located in **dist**:
`twine upload --repository-url https://test.pypi.org/legacy/ dist/*`
- Package on TestPyPI: e.g.

`https://test.pypi.org/project/example-pkg-your-username`

- You can create a **.pypirc** file (in the home directory) to avoid typing the username and password: `https://docs.python.org/3/distutils/packageindex.html#pypirc`

`https://truveris.github.io/articles/configuring-pypirc/`

Install the new package

```
pip install --index-url  
https://test.pypi.org/simple/ --no-deps  
example-pkg-your-username
```

- Flag `--index-url`: specify TestPyPI (and not PyPI).
- `--no-deps` flag: specify no dependencies (better for tests)

- <https://packaging.python.org/tutorials/packaging-projects/>
- <https://packaging.python.org/guides/distributing-packages-using-setuptools/>
- <https://www.python.org/dev/peps/pep-0440>