

Mehanizam priključaka u Python-u

setuptools

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setuptools

- Python biblioteka koja obezbeđuje podršku za pakovanje, distribuciju i instalaciju Python biblioteka i aplikacija.
- Metapodaci se navode u `setup.py` fajlu:

Minimalni primer:

```
from setuptools import setup, find_packages

setup(
    name="HelloWorld",
    version="0.1",
    packages=find_packages(),
)
```

<https://setuptools.readthedocs.io/en/latest/setuptools.html#developer-s-guide>

setuptools primer

```
from setuptools import setup, find_packages

setup(
    name="HelloWorld",
    version="0.1",
    packages=find_packages(),
    scripts=['say_hello.py'],

    install_requires=['docutils>=0.3'],

    package_data={
        '': ['*.txt', '*.rst'],
        'hello': ['*.msg'],
    },

    author="Me",
    author_email="me@example.com",
    description="This is an Example Package",
    license="PSF",
    keywords="hello world example examples",
    url="http://example.com/HelloWorld/"
)
```

<https://setuptools.readthedocs.io/en/latest/setuptools.html#developer-s-guide>

Verzije paketa

```
>>> from pkg_resources import parse_version
>>> parse_version('1.9.a.dev') == parse_version('1.9a0dev')
True
>>> parse_version('2.1-rc2') < parse_version('2.1')
True
>>> parse_version('0.6a9dev-r41475') < parse_version('0.6a9')
True
```

<https://setuptools.readthedocs.io/en/latest/setuptools.html#specifying-your-project-s-version>

Komandne skripte

```
setup(
    # ...
    entry_points={
        'console_scripts': [
            'foo = my_package.some_module:main_func',
            'bar = other_module:some_func',
        ],
        'gui_scripts': [
            'baz = my_package_gui:start_func',
        ]
    }
)
```

<https://setuptools.readthedocs.io/en/latest/setuptools.html#automatic-script-creation>

Zavisnosti

```
setup(  
    ...  
    install_requires=['docutils>=0.3'],  
)
```

Podržane su različite šeme za verzije:

```
docutils >= 0.3  
  
# comment lines and \ continuations are allowed in requirement strings  
BazSpam ==1.1, ==1.2, ==1.3, ==1.4, ==1.5, \  
    ==1.6, ==1.7 # and so are line-end comments  
  
PEAK[FastCGI, reST]>=0.5a4  
  
setuptools==0.5a7
```

<https://setuptools.readthedocs.io/en/latest/setuptools.html#declaring-dependencies>

Zavisnosti

- PyPI - *Python Package Index*
- wheel fajl
- `.py` fajl
- VCS repozitorijum (Git, Subversion, Mercurial)

<https://setuptools.readthedocs.io/en/latest/setuptools.html#dependencies-that-aren-t-in-pypi>

Opzione zavisnosti

```
setup(
    name="Project-A",
    ...
    extras_require={
        'PDF': ["ReportLab>=1.2", "RXP"],
        'reST': ["docutils>=0.3"],
    }
)
```

```
setup(
    name="Project-A",
    ...
    entry_points={
        'console_scripts': [
            'rst2pdf = project_a.tools.pdfgen [PDF]',
            'rst2html = project_a.tools.htmlgen',
            # more script entry points ...
        ],
    }
)
```

```
setup(
    name="Project-B",
    install_requires=["Project-A[PDF]"],
    ...
)
```

<https://setuptools.readthedocs.io/en/latest/setuptools.html#declaring-extras-optional-features-with-their-own-dependencies>

Podaci

```
from setuptools import setup, find_packages
setup(
    ...
    # Koristi MANIFEST.in
    include_package_data=True
)
```

Ili na primer ako imamo stablo prikazano sa desne strane:

```
from setuptools import setup, find_packages
setup(
    ...
    packages=find_packages('src'),
    package_dir={'': 'src'},

    package_data={
        '': ['*.txt'],
        'mypkg': ['data/*.dat'],
    }
)
```

```
setup.py
src/
  mypkg/
    __init__.py
    mypkg.txt
    data/
      somefile.dat
      otherdata.dat
```

<https://setuptools.readthedocs.io/en/latest/setuptools.html#including-data-files>

Instalacija

- Meta-podaci iz `setup.py` su dovoljni da se obavi instalacija paketa:

```
$ python setup.py install
```

- U modu za razvoj:

```
$ python setup.py develop
```

- Instalacija se obavlja u virtuelno okruženje (*virtualenv*) ukoliko je aktivno.

Manifest fajl

- `MANIFEST.in` - šablon na osnovu kojeg se generiše `MANIFEST` fajl koji sadrži punu listu fajlova koji čine distribuciju.

```
include AUTHORS.rst

include CONTRIBUTING.rst
include HISTORY.rst
include LICENSE
include README.rst

recursive-include tests *
recursive-exclude * __pycache__
recursive-exclude * *.py[co]

recursive-include docs *.rst conf.py Makefile make.bat *.jpg *.png *.gif
```

- Podrazumevano se fajlovi definisani manifestom dodaju na standardni skup definisan `setup.py` fajlom.

<https://docs.python.org/3/distutils/sourcedist.html>

Kreiranje *source* distribucije

```
$ python setup.py sdist
running sdist
running egg_info
creating sokprimer.egg-info
writing sokprimer.egg-info/PKG-INFO
writing top-level names to sokprimer.egg-info/top_level.txt
writing dependency_links to sokprimer.egg-info/dependency_links.txt
writing manifest file 'sokprimer.egg-info/SOURCES.txt'
...
copying tests/test_sokprimer.py -> sokprimer-0.1.0/tests
Writing sokprimer-0.1.0/setup.cfg
creating dist
Creating tar archive
removing 'sokprimer-0.1.0' (and everything under it)
```

Kreiran je fajl

`dist/sokprimer-0.1.0.tar.gz`

Kreiranje binarne distribucije

- Koristiti *wheel* format - zamenjuje stari egg binarni format.
- Prekompajliran za određenu arhitekturu.

pkg_resources

- Python paket koji se distribuira kao deo `setuptools` biblioteke.
- Pristup resursima biblioteke u vreme izvršavanja.
- Izgradnja proširivih aplikacija/biblioteka kroz registraciju i otkrivanje paketa.

ResourceManagement API

```
import pkg_resources
my_data = pkg_resources.resource_string(__name__, "foo.dat")
```

```
from pkg_resources import Requirement, resource_filename
filename = resource_filename(Requirement.parse("MyProject"), "sample.conf")
```


Priključci

- pkg_resources Entry Point

```
setup(  
    ...  
    entry_points={  
        'textx_lang': [  
            'er = er.lang:main',  
        ]  
    }  
)
```

- Ime je `textx_lang`. Kolekcija parova ključ:vrednost. Ključ je `er`, vrednost je funkcija `main` iz modula `er.lang`.

Otkrivanje priključaka

```
def get_language(language_name):  
    """  
    Returns a callable that instantiates meta-model for the given language.  
    """  
  
    langs = list(pkg_resources.iter_entry_points(group='textx_lang',  
                                                name=language_name))  
  
    if not langs:  
        raise TextXError('Language "{}" is not registered.'  
                          .format(language_name))  
  
    if len(langs) > 1:  
        # Multiple languages defined with the same name  
        raise TextXError('Language "{}" registered multiple times:\n{ }'  
                          .format(language_name,  
                                  "\n".join([l.dist for l in langs])))  
  
    return langs[0].load()
```

- Više detalja: http://setuptools.readthedocs.io/en/latest/pkg_resources.html#entry-points

Kreiranje projekta

- Alat `cookiecutter` kreira projekte na osnovu šablona.
- Kreiranje Python paketa:

```
$ pip install cookiecutter
...
$ cookiecutter https://github.com/audreyr/cookiecutter-pypackage
Cloning into 'cookiecutter-pypackage'...
remote: Counting objects: 1914, done.
remote: Compressing objects: 100% (30/30), done.
remote: Total 1914 (delta 15), reused 0 (delta 0), pack-reused 1884
Receiving objects: 100% (1914/1914), 308.18 KiB | 356.00 KiB/s, done.
Resolving deltas: 100% (1106/1106), done.
full_name [Audrey Roy Greenfeld]: Igor Dejanovic
email [aroy@alum.mit.edu]: igor DOT dejanovic AT gmail
github_username [audreyr]: igordejanovic
project_name [Python Boilerplate]: SOK-Primer
project_slug [sok-primer]: sokprimer
...
```

Kreiranje projekta

Dobijamo delimično konfigurisan projekat.

```
$ cd sokprimer
$ ls -la
total 84
drwxr-xr-x 6 igor users 4096 Nov 20 14:39 .
drwxr-xr-x 25 igor users 4096 Nov 20 14:39 ..
-rw-r--r-- 1 igor users 167 Nov 20 14:39 AUTHORS.rst
-rw-r--r-- 1 igor users 3275 Nov 20 14:39 CONTRIBUTING.rst
drwxr-xr-x 2 igor users 4096 Nov 20 14:39 docs
-rw-r--r-- 1 igor users 292 Nov 20 14:39 .editorconfig
drwxr-xr-x 2 igor users 4096 Nov 20 14:39 .github
-rw-r--r-- 1 igor users 777 Nov 20 14:39 .gitignore
-rw-r--r-- 1 igor users 89 Nov 20 14:39 HISTORY.rst
-rw-r--r-- 1 igor users 1074 Nov 20 14:39 LICENSE
-rw-r--r-- 1 igor users 2303 Nov 20 14:39 Makefile
-rw-r--r-- 1 igor users 264 Nov 20 14:39 MANIFEST.in
-rw-r--r-- 1 igor users 1068 Nov 20 14:39 README.rst
-rw-r--r-- 1 igor users 145 Nov 20 14:39 requirements_dev.txt
-rw-r--r-- 1 igor users 342 Nov 20 14:39 setup.cfg
-rw-r--r-- 1 igor users 1471 Nov 20 14:39 setup.py
drwxr-xr-x 2 igor users 4096 Nov 20 14:39 sokprimer
drwxr-xr-x 2 igor users 4096 Nov 20 14:39 tests
-rw-r--r-- 1 igor users 430 Nov 20 14:39 tox.ini
-rw-r--r-- 1 igor users 3761 Nov 20 14:39 travis_pypi_setup.py
-rw-r--r-- 1 igor users 778 Nov 20 14:39 .travis.yml
```

Finalne napomene

- Umesto `setup.py` može se koristiti deklarativni stil u vidu `setup.cfg` konfiguracionog fajla. Videti [Configuring setuptools using setup.cfg files](#)
- PEP 517 definiše kako se paket gradi.
- PEP 518 definiše zavisnosti za vreme izgradnje (*build dependencies*).
- Za kraće objašnjenje PEP 517 i PEP 518 videti ovaj blog.

