This library is the reference implementation of the Python wheel packaging standard, as defined in PEP 427.

It has two different roles:

1. A `setuptools` extension for building wheels that provides the `bdist_wheel` `setuptools` command
2. A command line tool for working with wheel files
To build a wheel for your project:

```bash
python -m pip install build
python -m build --wheel
```

The wheel will go to `dist/yourproject-<tags>.whl`.

If you want to make universal (Python 2/3 compatible, pure Python) wheels, add the following section to your `setup.cfg`:

```ini
[bdist_wheel]
universal = 1
```

To convert an `.egg` or file to a wheel:

```bash
wheel convert youreggfile.egg
```

Similarly, to convert a Windows installer (made using `python setup.py bdist_wininst`) to a wheel:

```bash
wheel convert yourinstaller.exe
```
You can use pip to install wheel:

```shell
pip install wheel
```

If you do not have pip installed, see its documentation for installation instructions.

If you prefer using your system package manager to install Python packages, you can typically find the wheel package under one of the following package names:

- python-wheel
- python3-wheel

### 2.1 Python and OS Compatibility

wheel should work on any Python implementation and operating system and is compatible with Python version 3.7 and upwards.
3.1 Building Wheels

To build a wheel for your project:

```
python -m pip install build
python -m build --wheel
```

This will build any C extensions in the project and then package those and the pure Python code into a .whl file in the `dist` directory.

If your project contains no C extensions and is expected to work on both Python 2 and 3, you will want to tell wheel to produce universal wheels by adding this to your `setup.cfg` file:

```
[bdist_wheel]
universal = 1
```

3.2 Including license files in the generated wheel file

Several open source licenses require the license text to be included in every distributable artifact of the project. By default, wheel conveniently includes files matching the following glob patterns in the `.dist-info` directory:

- AUTHORS*
- COPYING*
- LICEN[CS]E*
- NOTICE*

This can be overridden by setting the `license_files` option in the `[metadata]` section of the project’s `setup.cfg`. For example:
No matter the path, all the matching license files are written in the wheel in the .dist-info directory based on their file name only.

By specifying an empty license_files option, you can disable this functionality entirely.

---

### 3.3 Converting Eggs to Wheels

The wheel tool is capable of converting eggs to the wheel format. It works on both .egg files and .egg directories, and you can convert multiple eggs with a single command:

```shell
wheel convert blah-1.2.3-py2.7.egg foo-2.0b1-py3.5.egg
```

The command supports wildcard expansion as well (via `iglob()`) to accommodate shells that do not do such expansion natively:

```shell
wheel convert *.egg
```

By default, the resulting wheels are written to the current working directory. This can be changed with the `--dest-dir` option:

```shell
wheel convert --dest-dir /tmp blah-1.2.3-py2.7.egg
```

---

### 3.4 Installing Wheels

To install a wheel file, use `pip`:

```bash
$ pip install someproject-1.5.0-py2-py3-none.whl
```
4.1 wheel convert

4.1.1 Usage

wheel convert [options] <egg_file_or_directory> [egg_file_or_directory...]

4.1.2 Description

Convert one or more eggs (.egg; made with bdist_egg) or Windows installers (.exe; made with bdist_wininst) into wheels.

Egg names must match the standard format:

- <project>-<version>-pyX.Y for pure Python wheels
- <project>-<version>-pyX.Y-<arch> for binary wheels

4.1.3 Options

-d, --dest-dir <dir>
Directory to store the generated wheels in (defaults to current directory).

4.1.4 Examples

- Convert a single egg file:

  $ wheel convert foobar-1.2.3-py2.7.egg
  $ ls *.whl
  foobar-1.2.3-py27-none.whl


• If the egg file name is invalid:

```bash
$ wheel convert pycharm-debug.egg
"pycharm-debug.egg" is not a valid egg name (must match at least name-version-pYX.
˓
→Y.egg)
$ echo $? 
1
```

4.2 wheel unpack

4.2.1 Usage

```bash
wheel unpack <wheel_file>
```

4.2.2 Description

Unpack the given wheel file.

This is the equivalent of `unzip <wheel_file>`, except that it also checks that the hashes and file sizes match with those in `RECORD` and exits with an error if it encounters a mismatch.

4.2.3 Options

- `-d, --dest-dir <dir>`
  Directory to unpack the wheel into.

4.2.4 Examples

• Unpack a wheel:

```bash
$ wheel unpack someproject-1.5.0-py2-py3-none.whl
Unpacking to: ./someproject-1.5.0
```

• If a file’s hash does not match:

```bash
$ wheel unpack someproject-1.5.0-py2-py3-none.whl
Unpacking to: ./someproject-1.5.0
Traceback (most recent call last):
...
wheel.install.BadWheelFile: Bad hash for file 'mypackage/module.py'
$ echo $? 
1
```
4.3 wheel pack

4.3.1 Usage

wheel pack <wheel_directory>

4.3.2 Description

Repack a previously unpacked wheel file.

This command can be used to repack a wheel file after its contents have been modified. This is the equivalent of `zip -r <wheel_file> <wheel_directory>` except that it regenerates the RECORD file which contains hashes of all included files.

4.3.3 Options

- `-d, --dest-dir <dir>`
  Directory to put the new wheel file into.

- `--build-number <tag>`
  Override the build tag in the new wheel file name

4.3.4 Examples

- Unpack a wheel, add a dummy module and then repack it (with a new build number):

```bash
$ wheel unpack someproject-1.5.0-py2-py3-none.whl
Unpacking to: ./someproject-1.5.0
$ touch someproject-1.5.0/somepackage/module.py
$ wheel pack --build-number 2 someproject-1.5.0
Repacking wheel as ./someproject-1.5.0-2-py2-py3-none.whl...OK
```
CHAPTER 5

Development

5.1 Pull Requests

- Submit Pull Requests against the main branch.
- Provide a good description of what you’re doing and why.
- Provide tests that cover your changes and try to run the tests locally first.

**Example.** Assuming you set up GitHub account, forked wheel repository from https://github.com/pypa/wheel to your own page via web interface, and your fork is located at https://github.com/yourname/wheel

```bash
$ git clone git@github.com:pypa/wheel.git
$ cd wheel
# ...
$ git diff
$ git add <modified> ...
$ git status
$ git commit
```

You may reference relevant issues in commit messages (like #1259) to make GitHub link issues and commits together, and with phrase like “fixes #1259” you can even close relevant issues automatically. Now push the changes to your fork:

```bash
$ git push git@github.com:yourname/wheel.git
```


5.2 Automated Testing

All pull requests and merges to main branch are tested in GitHub Actions based on the workflows in the .github directory.

The only way to trigger the test suite to run again for a pull request is to submit another change to the pull branch.
5.3 Running Tests Locally

Python requirements: tox or pytest

To run the tests via tox against all matching interpreters:

$ tox

To run the tests via tox against a specific environment:

$ tox -e py35

Alternatively, you can run the tests via pytest using your default interpreter:

$ pip install -e .[test]  # Installs the test dependencies
$ pytest  # Runs the tests with the current interpreter

The above pip install command will replace the current interpreter’s installed wheel package with the development package being tested. If you use this workflow, it is recommended to run it under a virtualenv.

5.4 Getting Involved

The wheel project welcomes help in the following ways:

- Making Pull Requests for code, tests, or docs.
- Commenting on open issues and pull requests.
- Helping to answer questions on the mailing list.

5.5 Release Process

To make a new release:

1. Edit docs/news.rst and replace **UNRELEASED** with a release version and date, like **X.Y.Z (20XX-YY-ZZ)**.
2. Replace the __version__ attribute in src/wheel/__init__.py with the same version number as above (without the date of course).
3. Create a new git tag matching the version exactly
4. Push the new tag to GitHub

Pushing a new tag to GitHub will trigger the publish workflow which package the project and publish the resulting artifacts to PyPI.
CHAPTER 6

Release Notes

0.38.4 (2022-11-09)
• Fixed PKG-INFO conversion in bdist_wheel mangling UTF-8 header values in METADATA (PR by Anderson Bravalheri)

0.38.3 (2022-11-08)
• Fixed install failure when used with --no-binary, reported on Ubuntu 20.04, by removing setup_requires from setup.cfg

0.38.2 (2022-11-05)
• Fixed regression introduced in v0.38.1 which broke parsing of wheel file names with multiple platform tags

0.38.1 (2022-11-04)
• Removed install dependency on distutils
• The future-proof fix in 0.36.0 for converting PyPy’s SOABI into a abi tag was faulty. Fixed so that future changes in the SOABI will not change the tag.

0.38.0 (2022-10-21)
• Dropped support for Python < 3.7
• Updated vendored packaging to 21.3
• Replaced all uses of distutils with setuptools
• The handling of license_files (including glob patterns and default values) is now delegated to setuptools>=57.0.0 (#466). The package dependencies were updated to reflect this change.
• Fixed potential DoS attack via the WHEEL_INFO_RE regular expression
• Fixed ValueError: ZIP does not support timestamps before 1980 when using SOURCE_DATE_EPOCH=0 or when on-disk timestamps are earlier than 1980-01-01. Such timestamps are now changed to the minimum value before packaging.

0.37.1 (2021-12-22)
• Fixed wheel pack duplicating the WHEEL contents when the build number has changed (#415)
• Fixed parsing of file names containing commas in RECORD (PR by Hood Chatham)

0.37.0 (2021-08-09)
• Added official Python 3.10 support
• Updated vendored packaging library to v20.9

0.36.2 (2020-12-13)
• Updated vendored packaging library to v20.8
• Fixed wheel sdist missing LICENSE.txt
• Don’t use default macos/arm64 deployment target in calculating the platform tag for fat binaries (PR by Ronald Oussoren)

0.36.1 (2020-12-04)
• Fixed AssertionError when MACOSX_DEPLOYMENT_TARGET was set to 11 (PR by Grzegorz Bokota and François-Xavier Coudert)
• Fixed regression introduced in 0.36.0 on Python 2.7 when a custom generator name was passed as unicode (Scikit-build) (TypeError: 'unicode' does not have the buffer interface)

0.36.0 (2020-12-01)
• Added official Python 3.9 support
• Updated vendored packaging library to v20.7
• Switched to always using LF as line separator when generating WHEEL files (on Windows, CRLF was being used instead)
• The ABI tag is taken from the sysconfig SOABI value. On PyPy the SOABI value is pypy37-pp73 which is not compliant with PEP 3149, as it should have both the API tag and the platform tag. This change future-proofs any change in PyPy’s SOABI tag to make sure only the ABI tag is used by wheel.
• Fixed regression and test for bdist_wheel --plat-name. It was ignored for C extensions in v0.35, but the regression was not detected by tests.

0.35.1 (2020-08-14)
• Replaced install dependency on packaging with a vendored copy of its tags module
• Fixed bdist_wheel not working on FreeBSD due to mismatching platform tag name (it was not being converted to lowercase)

0.35.0 (2020-08-13)
• Switched to the packaging library for computing wheel tags
• Fixed a resource leak in WheelFile.open() (PR by Jon Dufresne)

0.34.2 (2020-01-30)
• Fixed installation of wheel from sdist on environments without Unicode file name support

0.34.1 (2020-01-27)
• Fixed installation of wheel from sdist which was broken due to a chicken and egg problem with PEP 517 and setuptools_scm

0.34.0 (2020-01-27)
• Dropped Python 3.4 support
• Added automatic platform tag detection for macOS binary wheels (PR by Grzegorz Bokota)
• Added the --compression= option to the bdist_wheel command
• Fixed PyPy tag generation to work with the updated semantics (#328)
• Updated project packaging and testing configuration for PEP 517
• Moved the contents of setup.py to setup.cfg
• Fixed duplicate RECORD file when using wheel pack on Windows
• Fixed bdist_wheel failing at cleanup on Windows with a read-only source tree
• Fixed wheel pack not respecting the existing build tag in WHEEL
• Switched the project to use the “src” layout
• Switched to setuptools_scm for versioning

0.33.6 (2019-08-18)
• Fixed regression from 0.33.5 that broke building binary wheels against the limited ABI
• Fixed egg2wheel compatibility with the future release of Python 3.10 (PR by Anthony Sottile)

0.33.5 (2019-08-17)
• Don’t add the m ABI flag to wheel names on Python 3.8 (PR by rdb)
• Updated MANIFEST.in to include many previously omitted files in the sdist

0.33.4 (2019-05-12)
• Reverted PR #289 (adding directory entries to the wheel file) due to incompatibility with distlib.wheel

0.33.3 (2019-05-10) (redacted release)
• Fixed wheel build failures on some systems due to all attributes being preserved (PR by Matt Wozniski)

0.33.2 (2019-05-08) (redacted release)
• Fixed empty directories missing from the wheel (PR by Jason R. Coombs)

0.33.1 (2019-02-19)
• Fixed the --build-number option for wheel pack not being applied

0.33.0 (2019-02-11)
• Added the --build-number option to the wheel pack command
• Fixed bad shebangs sneaking into wheels
• Fixed documentation issue with wheel pack erroneously being called wheel repack
• Fixed filenames with “bad” characters (like commas) not being quoted in RECORD (PR by Paul Moore)
• Sort requirements extras to ensure deterministic builds (PR by PoncinMatthieu)
• Forced inplace = False when building a C extension for the wheel

0.32.3 (2018-11-18)
• Fixed compatibility with Python 2.7.0 – 2.7.3
• Fixed handling of direct URL requirements with markers (PR by Benoit Pierre)

0.32.2 (2018-10-20)
• Fixed build number appearing in the .dist-info directory name
• Made wheel file name parsing more permissive
• Fixed wrong Python tag in wheels converted from eggs (PR by John T. Wodder II)

0.32.1 (2018-10-03)
• Fixed AttributeError: 'Requirement' object has no attribute 'url' on setup-tools/pkg_resources versions older than 18.8 (PR by Benoit Pierre)
• Fixed AttributeError: 'module' object has no attribute 'algorithms_available' on Python < 2.7.9 (PR by Benoit Pierre)
• Fixed permissions on the generated .dist-info/RECORD file

0.32.0 (2018-09-29)
• Removed wheel signing and verifying features
• Removed the “wheel install” and “wheel installscripts” commands
• Added the wheel pack command
• Allowed multiple license files to be specified using the license_files option
• Deprecated the license_file option
• Eliminated duplicate lines from generated requirements in .dist-info/METADATA (thanks to Wim Glenn for the contribution)
• Fixed handling of direct URL specifiers in requirements (PR by Benoit Pierre)
• Fixed canonicalization of extras (PR by Benoit Pierre)
• Warn when the deprecated [wheel] section is used in setup.cfg (PR by Jon Dufresne)

0.31.1 (2018-05-13)
• Fixed arch as None when converting eggs to wheels

0.31.0 (2018-04-01)
• Fixed displaying of errors on Python 3
• Fixed single digit versions in wheel files not being properly recognized
• Fixed wrong character encodings being used (instead of UTF-8) to read and write RECORD (this sometimes crashed bdist_wheel too)
• Enabled Zip64 support in wheels by default
• Metadata-Version is now 2.1
• Dropped DESCRIPTION.rst and metadata.json from the list of generated files
• Dropped support for the non-standard, undocumented provides-extra and requires-dist keywords in setup.cfg metadata
• Deprecated all wheel signing and signature verification commands
• Removed the (already defunct) tool extras from setup.py

0.30.0 (2017-09-10)
• Added py-limited-api {cp32|cp33|cp34} flag to produce cpNN.abi3.{arch} tags on CPython 3.
• Documented the license_file metadata key
• Improved Python, abi tagging for wheel convert. Thanks Ales Erjavec.
• Fixed > being prepended to lines starting with “From” in the long description
• Added support for specifying a build number (as per PEP 427). Thanks Ian Cordasco.
• Made the order of files in generated ZIP files deterministic. Thanks Matthias Bach.
• Made the order of requirements in metadata deterministic. Thanks Chris Lamb.
• Fixed `wheel install` clobbering existing files
• Improved the error message when trying to verify an unsigned wheel file
• Removed support for Python 2.6, 3.2 and 3.3.

0.29.0 (2016-02-06)
• Fix compression type of files in archive (Issue #155, Pull Request #62, thanks Xavier Fernandez)

0.28.0 (2016-02-05)
• Fix file modes in archive (Issue #154)

0.27.0 (2016-02-05)
• Support forcing a platform tag using `--plat-name` on pure-Python wheels, as well as nonstandard platform tags on non-pure wheels (Pull Request #60, Issue #144, thanks Andrés Díaz)
• Add SOABI tags to platform-specific wheels built for Python 2.X (Pull Request #55, Issue #63, Issue #101)
• Support reproducible wheel files, wheels that can be rebuilt and will hash to the same values as previous builds (Pull Request #52, Issue #143, thanks Barry Warsaw)
• Support for changes in keyring >= 8.0 (Pull Request #61, thanks Jason R. Coombs)
• Use the file context manager when checking if `dependency_links.txt` is empty, fixes problems building wheels under PyPy on Windows (Issue #150, thanks Cosimo Lupo)
• Don’t attempt to (recursively) create a build directory ending with .. (invalid on all platforms, but code was only executed on Windows) (Issue #91)
• Added the PyPA Code of Conduct (Pull Request #56)

0.26.0 (2015-09-18)
• Fix multiple entrypoint comparison failure on Python 3 (Issue #148)

0.25.0 (2015-09-16)
• Add Python 3.5 to tox configuration
• Deterministic (sorted) metadata
• Fix tagging for Python 3.5 compatibility
• Support py2-none-‘arch’ and py3-none-‘arch’ tags
• Treat data-only wheels as pure
• Write to temporary file and rename when using `wheel install --force`

0.24.0 (2014-07-06)
• The python tag used for pure-python packages is now .pyN (major version only). This change actually occurred in 0.23.0 when the `--python-tag` option was added, but was not explicitly mentioned in the changelog then.
• wininst2wheel and egg2wheel removed. Use “wheel convert [archive]” instead.
• Wheel now supports setuptools style conditional requirements via the `extras_require={}` syntax. Separate ‘extra’ names from conditions using the : character. Wheel’s own setup.py does this. (The empty-string extra is the same as `install_requires`). These conditional requirements should work the same whether the package is installed by wheel or by setup.py.
0.23.0 (2014-03-31)

- Compatibility tag flags added to the bdist_wheel command
- sdist should include files necessary for tests
- ‘wheel convert’ can now also convert unpacked eggs to wheel
- Rename pydist.json to metadata.json to avoid stepping on the PEP
- The --skip-scripts option has been removed, and not generating scripts is now the default. The option was a temporary approach until installers could generate scripts themselves. That is now the case with pip 1.5 and later. Note that using pip 1.4 to install a wheel without scripts will leave the installation without entry-point wrappers. The “wheel install-scripts” command can be used to generate the scripts in such cases.
- Thank you contributors

0.22.0 (2013-09-15)

- Include entry_points.txt, scripts a.k.a. commands, in experimental pydist.json
- Improved test_requires parsing
- Python 2.6 fixes, “wheel version” command courtesy pombredanne

0.21.0 (2013-07-20)

- Pregenerated scripts are the default again.
- “setup.py bdist_wheel --skip-scripts” turns them off.
- setuptools is no longer a listed requirement for the ‘wheel’ package. It is of course still required in order for bdist_wheel to work.
- “python -m wheel” avoids importing pkg_resources until it’s necessary.

0.20.0

- No longer include console_scripts in wheels. Ordinary scripts (shell files, standalone Python files) are included as usual.
- Include new command “python -m wheel install-scripts [distribution [distribution ...]]” to install the console_scripts (setuptools-style scripts using pkg_resources) for a distribution.

0.19.0 (2013-07-19)

- pymeta.json becomes pydist.json

0.18.0 (2013-07-04)

- Python 3 Unicode improvements

0.17.0 (2013-06-23)

- Support latest PEP-426 “pymeta.json” (json-format metadata)

0.16.0 (2013-04-29)

- Python 2.6 compatibility bugfix (thanks John McFarlane)
- Bugfix for C-extension tags for CPython 3.3 (using SOABI)
- Bugfix for bdist_wininst converter “wheel convert”
- Bugfix for dists where “is pure” is None instead of True or False
- Python 3 fix for moving Unicode Description to metadata body
- Include rudimentary API documentation in Sphinx (thanks Kevin Horn)
0.15.0 (2013-01-14)
• Various improvements

0.14.0 (2012-10-27)
• Changed the signature format to better comply with the current JWS spec. Breaks all existing signatures.
  • Include `wheel unsign` command to remove RECORD.jws from an archive.
  • Put the description in the newly allowed payload section of PKG-INFO (METADATA) files.

0.13.0 (2012-10-17)
• Use distutils instead of sysconfig to get installation paths; can install headers.
  • Improve WheelFile() sort.
  • Allow bootstrap installs without any pkg_resources.

0.12.0 (2012-10-06)
• Unit test for wheel.tool.install

0.11.0 (2012-10-17)
• API cleanup

0.10.3 (2012-10-03)
• Scripts fixer fix

0.10.2 (2012-10-02)
• Fix keygen

0.10.1 (2012-09-30)
• Preserve attributes on install.

0.10.0 (2012-09-30)
• Include a copy of pkg_resources. Wheel can now install into a virtualenv that does not have distribute (though
  most packages still require pkg_resources to actually work; wheel install distribute)
  • Define a new setup.cfg section [wheel]. universal=1 will apply the py2.py3-none-any tag for pure python wheels.

0.9.7 (2012-09-20)
• Only import dirspec when needed. dirspec is only needed to find the configuration for keygen/signing operations.

0.9.6 (2012-09-19)
• requires-dist from setup.cfg overwrites any requirements from setup.py Care must be taken that the requirements
  are the same in both cases, or just always install from wheel.
  • drop dirspec requirement on win32
  • improved command line utility, adds ‘wheel convert [egg or wininst]’ to convert legacy binary formats to wheel

0.9.5 (2012-09-15)
• Wheel’s own wheel file can be executed by Python, and can install itself: python wheel-0.9.5-py27-none-any/wheel install ...
  • Use argparse; basic wheel install command should run with only stdlib dependencies.
  • Allow requires_dist in setup.cfg’s [metadata] section. In addition to dependencies in setup.py, but will only be
    interpreted when installing from wheel, not from sdist. Can be qualified with environment markers.
0.9.4 (2012-09-11)
• Fix wheel.signatures in sdist

0.9.3 (2012-09-10)
• Integrated digital signatures support without C extensions.
• Integrated “wheel install” command (single package, no dependency resolution) including compatibility check.
• Support Python 3.3
• Use Metadata 1.3 (PEP 426)

0.9.2 (2012-08-29)
• Automatic signing if WHEEL_TOOL points to the wheel binary
• Even more Python 3 fixes

0.9.1 (2012-08-28)
• ‘wheel sign’ uses the keys generated by ‘wheel keygen’ (instead of generating a new key at random each time)
• Python 2/3 encoding/decoding fixes
• Run tests on Python 2.6 (without signature verification)

0.9 (2012-08-22)
• Updated digital signatures scheme
• Python 3 support for digital signatures
• Always verify RECORD hashes on extract
• ‘wheel’ command line tool to sign, verify, unpack wheel files

0.8 (2012-08-17)
• none/any draft pep tags update
• improved wininst2wheel script
• doc changes and other improvements

0.7 (2012-07-28)
• sort .dist-info at end of wheel archive
• Windows & Python 3 fixes from Paul Moore
• pep8
• scripts to convert wininst & egg to wheel

0.6 (2012-07-23)
• require distribute >= 0.6.28
• stop using verlib

0.5 (2012-07-17)
• working pretty well

0.4.2 (2012-07-12)
• hyphenated name fix

0.4 (2012-07-11)
• improve test coverage
• improve Windows compatibility
• include tox.ini courtesy of Marc Abramowitz
• draft hmac sha-256 signing function

0.3 (2012-07-04)
• prototype egg2wheel conversion script

0.2 (2012-07-03)
• Python 3 compatibility

0.1 (2012-06-30)
• Initial version
Symbols
- `build-number <tag>`
  - command line option, 11
- `d, -dest-dir <dir>`
  - command line option, 9–11

C
  command line option
  - `build-number <tag>, 11`
  - `d, -dest-dir <dir>, 9–11`

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  Python Enhancement Proposals
  - PEP 517, 17