

6.1.3 “Compiled” Python files

To speed up loading modules, Python caches the compiled version of each module in the `__pycache__` directory under the name `module.version.pyc`, where the version encodes the format of the compiled file; it generally contains the Python version number. For example, in CPython release 3.3 the compiled version of `spam.py` would be cached as `__pycache__/spam.cpython-33.pyc`. This naming convention allows compiled modules from different releases and different versions of Python to coexist.

Python checks the modification date of the source against the compiled version to see if it’s out of date and needs to be recompiled. This is a completely automatic process. Also, the compiled modules are platform-independent, so the same library can be shared among systems with different architectures.

Python does not check the cache in two circumstances. First, it always recompiles and does not store the result for the module that’s loaded directly from the command line. Second, it does not check the cache if there is no source module. To support a non-source (compiled only) distribution, the compiled module must be in the source directory, and there must not be a source module.

Some tips for experts:

- You can use the `-O` or `-OO` switches on the Python command to reduce the size of a compiled module. The `-O` switch removes assert statements, the `-OO` switch removes both assert statements and `__doc__` strings. Since some programs may rely on having these available, you should only use this option if you know what you’re doing. “Optimized” modules have an `opt-` tag and are usually smaller. Future releases may change the effects of optimization.
- A program doesn’t run any faster when it is read from a `.pyc` file than when it is read from a `.py` file; the only thing that’s faster about `.pyc` files is the speed with which they are loaded.
- The module `compileall` can create `.pyc` files for all modules in a directory.
- There is more detail on this process, including a flow chart of the decisions, in [PEP 3147](#).

6.2 Standard Modules

Python comes with a library of standard modules, described in a separate document, the Python Library Reference (“Library Reference” hereafter). Some modules are built into the interpreter; these provide access to operations that are not part of the core of the language but are nevertheless built in, either for efficiency or to provide access to operating system primitives such as system calls. The set of such modules is a configuration option which also depends on the underlying platform. For example, the `winreg` module is only provided on Windows systems. One particular module deserves some attention: `sys`, which is built into every Python interpreter. The variables `sys.ps1` and `sys.ps2` define the strings used as primary and secondary prompts:

```
>>> import sys
>>> sys.ps1
'>>> '
>>> sys.ps2
'... '
>>> sys.ps1 = 'C> '
C> print('Yuck!')
Yuck!
C>
```

These two variables are only defined if the interpreter is in interactive mode.

The variable `sys.path` is a list of strings that determines the interpreter’s search path for modules. It is initialized to a default path taken from the environment variable `PYTHONPATH`, or from a built-in default if `PYTHONPATH` is not set. You can modify it using standard list operations:

```
>>> import sys
>>> sys.path.append('/ufs/guido/lib/python')
```