What's New In Python 3.6

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This article explains the new features in Python 3.6, compared to 3.5. Python 3.6 was released on December 23, 2016. See the changelog for a full list of changes.

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> ```
>     .. seealso::
>
>         :pep:`494` - Python 3.6 Release Schedule
> ```

Summary -- Release highlights

New syntax features:

- :ref:`PEP 498 <whatsnew36-pep498>`, formatted string literals.

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- :ref:`PEP 515 <whatsnew36-pep515>`, underscores in numeric literals.

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- :ref:`PEP 526 <whatsnew36-pep526>`, syntax for variable annotations.

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- :ref:`PEP 525 <whatsnew36-pep525>`, asynchronous generators.

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- :ref:`PEP 530 <whatsnew36-pep530>`: asynchronous comprehensions.

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New library modules:

- :mod:`secrets`: :ref:`PEP 506 -- Adding A Secrets Module To The Standard Library <whatsnew36-pep506>`.

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CPython implementation improvements:

- The :ref:`dict <typesmapping>` type has been reimplemented to use a :ref:`more compact representation <whatsnew36-compactdict>` based on a proposal by Raymond Hettinger and similar to the PyPy dict implementation. This resulted in dictionaries using 20% to 25% less memory when compared to Python 3.5.

- Customization of class creation has been simplified with the :ref:`new protocol <whatsnew36-pep487>`.

- The class attribute definition order is :ref:`now preserved <whatsnew36-pep520>`.

- The order of elements in `**kwargs` now :ref:`corresponds to the order <whatsnew36-pep468>` in which keyword arguments were passed to the function.

- DTrace and SystemTap :ref:`probing support <whatsnew36-tracing>` has been added.

- The new :ref:`PYTHONMALLOC <whatsnew36-pythonmalloc>` environment variable can now be used to debug the interpreter memory allocation and access errors.

Significant improvements in the standard library:

- The :mod:`asyncio` module has received new features, significant usability and performance improvements, and a fair amount of bug fixes. Starting with Python 3.6 the `asyncio` module is no longer provisional and its API is considered stable.

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- A new :ref:`file system path protocol <whatsnew36-pep519>` has been implemented to support :term:`path-like objects <path-like object>`. All standard library functions operating on paths have been updated to work with the new protocol.

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- The :mod:`datetime` module has gained support for :ref:`Local Time Disambiguation <whatsnew36-pep495>`.

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- The :mod:`typing` module received a number of :ref:`improvements <whatsnew36-typing>`.

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- The :mod:`tracemalloc` module has been significantly reworked and is now used to provide better output for :exc:`ResourceWarning` as well as provide better diagnostics for memory allocation errors. See the :ref:`PYTHONMALLOC section <whatsnew36-pythonmalloc>` for more information.

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Security improvements:

- The new :mod:`secrets` module has been added to simplify the generation of cryptographically strong pseudo-random numbers suitable for managing secrets such as account authentication, tokens, and similar.

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- On Linux, :func:`os.urandom` now blocks until the system urandom entropy pool is initialized to increase the security. See the PEP 524 for the rationale.

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- The :mod:`hashlib` and :mod:`ssl` modules now support OpenSSL 1.1.0.

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- The default settings and feature set of the :mod:`ssl` module have been improved.

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- The :mod:`hashlib` module received support for the BLAKE2, SHA-3 and SHAKE hash algorithms and the :func:`~hashlib.scrypt` key derivation function.

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Windows improvements:

- :ref:`PEP 528 <whatsnew36-pep528>` and :ref:`PEP 529 <whatsnew36-pep529>`, Windows filesystem and console encoding changed to UTF-8.

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resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, line 151); *backlink*

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- The `py.exe` launcher, when used interactively, no longer prefers Python 2 over Python 3 when the user doesn't specify a version (via command line arguments or a config file). Handling of shebang lines remains unchanged - "python" refers to Python 2 in that case.

- `python.exe` and `pythonw.exe` have been marked as long-path aware, which means that the 260 character path limit may no longer apply. See :ref:`removing the MAX_PATH limitation <max-path>` for details.

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- A `._pth` file can be added to force isolated mode and fully specify all search paths to avoid registry and environment lookup. See :ref:`the documentation <windows_finding_modules>` for more information.

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- A `python36.zip` file now works as a landmark to infer :envvar:`PYTHONHOME`. See :ref:`the documentation <windows_finding_modules>` for more information.

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New Features

PEP 498: Formatted string literals

PEP 498 introduces a new kind of string literals: *f-strings*, or :ref:`formatted string literals <f-strings>`.

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Formatted string literals are prefixed with `'f'` and are similar to the format strings accepted by :meth:`str.format`. They contain replacement fields surrounded by curly braces. The replacement fields are expressions, which are evaluated at run time, and then formatted using the :func:`format` protocol:

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```
>>> name = "Fred"
>>> f"He said his name is {name}."
'He said his name is Fred.'
>>> width = 10
>>> precision = 4
>>> value = decimal.Decimal("12.34567")
>>> f"result: {value:{width}.{precision}}"  # nested fields
'result:      12.35'
```

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```
.. seealso::

    :pep:`498` -- Literal String Interpolation.
       PEP written and implemented by Eric V. Smith.

    :ref:`Feature documentation <f-strings>`.
```

PEP 526: Syntax for variable annotations

PEP 484 introduced the standard for type annotations of function parameters, a.k.a. type hints. This PEP adds syntax to Python for annotating the types of variables including class variables and instance variables:

```
primes: List[int] = []

captain: str  # Note: no initial value!

class Starship:
    stats: Dict[str, int] = {}
```

Just as for function annotations, the Python interpreter does not attach any particular meaning to variable annotations and only stores them in the __annotations__ attribute of a class or module.

In contrast to variable declarations in statically typed languages, the goal of annotation syntax is to provide an easy way to specify structured type metadata for third party tools and libraries via the abstract syntax tree and the __annotations__ attribute.

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.. seealso::

    :pep:`526` -- Syntax for variable annotations.
       PEP written by Ryan Gonzalez, Philip House, Ivan Levkivskyi, Lisa Roach,
       and Guido van Rossum. Implemented by Ivan Levkivskyi.

    Tools that use or will use the new syntax:
    `mypy <http://www.mypy-lang.org/>`_,
    `pytype <https://github.com/google/pytype>`_, PyCharm, etc.
```

PEP 515: Underscores in Numeric Literals

PEP 515 adds the ability to use underscores in numeric literals for improved readability. For example:

```
>>> 1_000_000_000_000_000
1000000000000000
>>> 0x_FF_FF_FF_FF
4294967295
```

Single underscores are allowed between digits and after any base specifier. Leading, trailing, or multiple underscores in a row are not allowed.

The :ref:`string formatting <formatspec>` language also now has support for the '_' option to signal the use of an underscore for a thousands separator for floating point presentation types and for integer presentation type 'd'. For integer presentation types 'b', 'o', 'x', and 'X', underscores will be inserted every 4 digits:

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```
>>> '{:_}'.format(1000000)
'1_000_000'
>>> '{:_x}'.format(0xFFFFFFFF)
'ffff_ffff'
```

PEP 525: Asynchronous Generators

PEP 492 introduced support for native coroutines and `async` / `await` syntax to Python 3.5. A notable limitation of the Python 3.5 implementation is that it was not possible to use `await` and `yield` in the same function body. In Python 3.6 this restriction has been lifted, making it possible to define *asynchronous generators*:

```
async def ticker(delay, to):
    """Yield numbers from 0 to *to* every *delay* seconds."""
    for i in range(to):
        yield i
        await asyncio.sleep(delay)
```

The new syntax allows for faster and more concise code.

PEP 530: Asynchronous Comprehensions

PEP 530 adds support for using `async for` in list, set, dict comprehensions and generator expressions:

```
result = [i async for i in aiter() if i % 2]
```

Additionally, `await` expressions are supported in all kinds of comprehensions:

```
result = [await fun() for fun in funcs if await condition()]
```

PEP 487: Simpler customization of class creation

It is now possible to customize subclass creation without using a metaclass. The new `__init_subclass__` classmethod will be called on the base class whenever a new subclass is created:

```
class PluginBase:
    subclasses = []

    def __init_subclass__(cls, **kwargs):
        super().__init_subclass__(**kwargs)
        cls.subclasses.append(cls)

class Plugin1(PluginBase):
```

```
        pass

    class Plugin2(PluginBase):
        pass
```

In order to allow zero-argument :func:`super` calls to work correctly from :meth:`~object.__init_subclass__` implementations, custom metaclasses must ensure that the new `__classcell__` namespace entry is propagated to `type.__new__` (as described in :ref:`class-object-creation`).

PEP 487: Descriptor Protocol Enhancements

PEP 487 extends the descriptor protocol to include the new optional :meth:`~object.__set_name__` method. Whenever a new class is defined, the new method will be called on all descriptors included in the definition, providing them with a reference to the class being defined and the name given to the descriptor within the class namespace. In other words, instances of descriptors can now know the attribute name of the descriptor in the owner class:

```
class IntField:
    def __get__(self, instance, owner):
        return instance.__dict__[self.name]

    def __set__(self, instance, value):
        if not isinstance(value, int):
            raise ValueError(f'expecting integer in {self.name}')
        instance.__dict__[self.name] = value

    # this is the new initializer:
    def __set_name__(self, owner, name):
        self.name = name

class Model:
    int_field = IntField()
```

```
:ref:`Feature documentation <descriptors>`
```

PEP 519: Adding a file system path protocol

File system paths have historically been represented as :class:`str` or :class:`bytes` objects. This has led to people who write code which operate on file system paths to assume that such objects are only one of those two types (an :class:`int` representing a file descriptor does not count as that is not a file path). Unfortunately that assumption prevents alternative object representations of file system paths like :mod:`pathlib` from working with pre-existing code, including Python's standard library.

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To fix this situation, a new interface represented by :class:`os.PathLike` has been defined. By implementing the :meth:`~os.PathLike.__fspath__` method, an object signals that it represents a path. An object can then provide a low-level representation of a file system path as a :class:`str` or :class:`bytes` object. This means an object is considered :term:`path-like <path-like object>` if it implements :class:`os.PathLike` or is a :class:`str` or :class:`bytes` object which represents a file system path. Code can use :func:`os.fspath`, :func:`os.fsdecode`, or :func:`os.fsencode` to explicitly get a :class:`str` and/or :class:`bytes` representation of a path-like object.

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The built-in :func:`open` function has been updated to accept :class:`os.PathLike` objects, as have all relevant functions in the :mod:`os` and :mod:`os.path` modules, and most other functions and classes in the standard library. The :class:`os.DirEntry` class and relevant classes in :mod:`pathlib` have also been updated to implement :class:`os.PathLike`.

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The hope is that updating the fundamental functions for operating on file system paths will lead to third-party code to implicitly support all :term:`path-like objects <path-like object>` without any code changes, or at least very minimal ones (e.g. calling :func:`os.fspath` at the beginning of code before operating on a path-like object).

Here are some examples of how the new interface allows for :class:`pathlib.Path` to be used more easily and transparently with pre-existing code:

```
>>> import pathlib
>>> with open(pathlib.Path("README")) as f:
...     contents = f.read()
...
>>> import os.path
>>> os.path.splitext(pathlib.Path("some_file.txt"))
('some_file', '.txt')
>>> os.path.join("/a/b", pathlib.Path("c"))
'/a/b/c'
>>> import os
>>> os.fspath(pathlib.Path("some_file.txt"))
'some_file.txt'
```

(Implemented by Brett Cannon, Ethan Furman, Dusty Phillips, and Jelle Zijlstra.)

PEP 495: Local Time Disambiguation

In most world locations, there have been and will be times when local clocks are moved back. In those times, intervals are introduced in which local clocks show the same time twice in the same day. In these situations, the information displayed on a local clock (or stored in a Python datetime instance) is insufficient to identify a particular moment in time.

PEP 495 adds the new *fold* attribute to instances of :class:`datetime.datetime` and :class:`datetime.time` classes to differentiate between two moments in time for which local times are the same:

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```
>>> u0 = datetime(2016, 11, 6, 4, tzinfo=timezone.utc)
>>> for i in range(4):
...     u = u0 + i*HOUR
...     t = u.astimezone(Eastern)
...     print(u.time(), 'UTC =', t.time(), t.tzname(), t.fold)
...
04:00:00 UTC = 00:00:00 EDT 0
05:00:00 UTC = 01:00:00 EDT 0
06:00:00 UTC = 01:00:00 EST 1
07:00:00 UTC = 02:00:00 EST 0
```

The values of the :attr:`fold <datetime.datetime.fold>` attribute have the value 0 for all instances except those that represent the second (chronologically) moment in time in an ambiguous case.

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```
.. seealso::

   :pep:`495` -- Local Time Disambiguation
      PEP written by Alexander Belopolsky and Tim Peters, implementation
      by Alexander Belopolsky.
```

PEP 529: Change Windows filesystem encoding to UTF-8

Representing filesystem paths is best performed with str (Unicode) rather than bytes. However, there are some situations where using bytes is sufficient and correct.

Prior to Python 3.6, data loss could result when using bytes paths on Windows. With this change, using bytes to represent paths is now supported on Windows, provided those bytes are encoded with the encoding returned by :func:`sys.getfilesystemencoding()`, which now defaults to `'utf-8'`.

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 511**); *backlink*

Unknown interpreted text role "func".

Applications that do not use str to represent paths should use :func:`os.fsencode()` and :func:`os.fsdecode()` to ensure their bytes are correctly encoded. To revert to the previous behaviour, set :envvar:`PYTHONLEGACYWINDOWSFSENCODING` or call :func:`sys._enablelegacywindowsfsencoding`.

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 516**); *backlink*

Unknown interpreted text role "func".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 516**); *backlink*

Unknown interpreted text role "func".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 516**); *backlink*

Unknown interpreted text role "envvar".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 516**); *backlink*

Unknown interpreted text role "func".

See PEP 529 for more information and discussion of code modifications that may be required.

PEP 528: Change Windows console encoding to UTF-8

The default console on Windows will now accept all Unicode characters and provide correctly read str objects to Python code. `sys.stdin`, `sys.stdout` and `sys.stderr` now default to utf-8 encoding.

This change only applies when using an interactive console, and not when redirecting files or pipes. To revert to the previous behaviour for interactive console use, set :envvar:`PYTHONLEGACYWINDOWSSTDIO`.

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 535**); *backlink*
>
> Unknown interpreted text role "envvar".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 539**)
>
> Unknown directive type "seealso".
>
> ```
>     .. seealso::
>
>        :pep:`528` -- Change Windows console encoding to UTF-8
>           PEP written and implemented by Steve Dower.
> ```

PEP 520: Preserving Class Attribute Definition Order

Attributes in a class definition body have a natural ordering: the same order in which the names appear in the source. This order is now preserved in the new class's :attr:`~object.__dict__` attribute.

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 550**); *backlink*
>
> Unknown interpreted text role "attr".

Also, the effective default class *execution* namespace (returned from :ref:`type.__prepare__() <prepare>`) is now an insertion-order-preserving mapping.

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 554**); *backlink*
>
> Unknown interpreted text role "ref".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 558**)
>
> Unknown directive type "seealso".
>
> ```
>     .. seealso::
>
>        :pep:`520` -- Preserving Class Attribute Definition Order
>           PEP written and implemented by Eric Snow.
> ```

PEP 468: Preserving Keyword Argument Order

`**kwargs` in a function signature is now guaranteed to be an insertion-order-preserving mapping.

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 572**)
>
> Unknown directive type "seealso".
>
> ```
>     .. seealso::
>
>        :pep:`468` -- Preserving Keyword Argument Order
>           PEP written and implemented by Eric Snow.
> ```

New :ref:`dict <typesmapping>` implementation

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-

Unknown interpreted text role "ref".

The :ref:`dict <typesmapping>` type now uses a "compact" representation based on a proposal by Raymond Hettinger which was first implemented by PyPy. The memory usage of the new :func:`dict` is between 20% and 25% smaller compared to Python 3.5.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, **line 583);** *backlink*

Unknown interpreted text role "ref".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, **line 583);** *backlink*

Unknown interpreted text role "func".

The order-preserving aspect of this new implementation is considered an implementation detail and should not be relied upon (this may change in the future, but it is desired to have this new dict implementation in the language for a few releases before changing the language spec to mandate order-preserving semantics for all current and future Python implementations; this also helps preserve backwards-compatibility with older versions of the language where random iteration order is still in effect, e.g. Python 3.5).

(Contributed by INADA Naoki in :issue:`27350`. Idea originally suggested by Raymond Hettinger.)

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, **line 600);** *backlink*

Unknown interpreted text role "issue".

PEP 523: Adding a frame evaluation API to CPython

While Python provides extensive support to customize how code executes, one place it has not done so is in the evaluation of frame objects. If you wanted some way to intercept frame evaluation in Python there really wasn't any way without directly manipulating function pointers for defined functions.

PEP 523 changes this by providing an API to make frame evaluation pluggable at the C level. This will allow for tools such as debuggers and JITs to intercept frame evaluation before the execution of Python code begins. This enables the use of alternative evaluation implementations for Python code, tracking frame evaluation, etc.

This API is not part of the limited C API and is marked as private to signal that usage of this API is expected to be limited and only applicable to very select, low-level use-cases. Semantics of the API will change with Python as necessary.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, **line 628)**

Unknown directive type "seealso".

```
.. seealso::

   :pep:`523` -- Adding a frame evaluation API to CPython
      PEP written by Brett Cannon and Dino Viehland.
```

PYTHONMALLOC environment variable

The new :envvar:`PYTHONMALLOC` environment variable allows setting the Python memory allocators and installing debug hooks.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, **line 639);** *backlink*

Unknown interpreted text role "envvar".

It is now possible to install debug hooks on Python memory allocators on Python compiled in release mode using PYTHONMALLOC=debug. Effects of debug hooks:

- Newly allocated memory is filled with the byte 0xCB
- Freed memory is filled with the byte 0xDB
- Detect violations of the Python memory allocator API. For example, :c:func:`PyObject_Free` called on a memory block allocated by :c:func:`PyMem_Malloc`.

- Detect writes before the start of a buffer (buffer underflows)
- Detect writes after the end of a buffer (buffer overflows)
- Check that the :term:`GIL <global interpreter lock>` is held when allocator functions of :c:data:`PYMEM_DOMAIN_OBJ` (ex: :c:func:`PyObject_Malloc`) and :c:data:`PYMEM_DOMAIN_MEM` (ex: :c:func:`PyMem_Malloc`) domains are called.

Checking if the GIL is held is also a new feature of Python 3.6.

See the :c:func:`PyMem_SetupDebugHooks` function for debug hooks on Python memory allocators.

It is now also possible to force the usage of the :c:func:`malloc` allocator of the C library for all Python memory allocations using `PYTHONMALLOC=malloc`. This is helpful when using external memory debuggers like Valgrind on a Python compiled in release mode.

On error, the debug hooks on Python memory allocators now use the :mod:`tracemalloc` module to get the traceback where a memory block was allocated.

Example of fatal error on buffer overflow using `python3.6 -X tracemalloc=5` (store 5 frames in traces):

```
Debug memory block at address p=0x7fbcd41666f8: API 'o'
    4 bytes originally requested
    The 7 pad bytes at p-7 are FORBIDDENBYTE, as expected.
    The 8 pad bytes at tail=0x7fbcd41666fc are not all FORBIDDENBYTE (0xfb):
        at tail+0: 0x02 *** OUCH
        at tail+1: 0xfb
        at tail+2: 0xfb
        at tail+3: 0xfb
        at tail+4: 0xfb
        at tail+5: 0xfb
        at tail+6: 0xfb
        at tail+7: 0xfb
    The block was made by call #1233329 to debug malloc/realloc.
    Data at p: 1a 2b 30 00

Memory block allocated at (most recent call first):
  File "test/test_bytes.py", line 323
  File "unittest/case.py", line 600
  File "unittest/case.py", line 648
  File "unittest/suite.py", line 122
  File "unittest/suite.py", line 84

Fatal Python error: bad trailing pad byte

Current thread 0x00007fbcdbd32700 (most recent call first):
  File "test/test_bytes.py", line 323 in test_hex
  File "unittest/case.py", line 600 in run
  File "unittest/case.py", line 648 in __call__
  File "unittest/suite.py", line 122 in run
  File "unittest/suite.py", line 84 in __call__
  File "unittest/suite.py", line 122 in run
  File "unittest/suite.py", line 84 in __call__
  ...
```

(Contributed by Victor Stinner in :issue:`26516` and :issue:`26564`.)

DTrace and SystemTap probing support

Python can now be built `--with-dtrace` which enables static markers for the following events in the interpreter:

- function call/return
- garbage collection started/finished
- line of code executed.

This can be used to instrument running interpreters in production, without the need to recompile specific :ref:`debug builds <debug-build>` or providing application-specific profiling/debugging code.

More details in :ref:`instrumentation`.

The current implementation is tested on Linux and macOS. Additional markers may be added in the future.

(Contributed by Łukasz Langa in :issue:`21590`, based on patches by Jesús Cea Avión, David Malcolm, and Nikhil Benesch.)

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, line 733`); *backlink*
>
> Unknown interpreted text role "issue".

Other Language Changes

Some smaller changes made to the core Python language are:

- A `global` or `nonlocal` statement must now textually appear before the first use of the affected name in the same scope. Previously this was a :exc:`SyntaxWarning`.

  > **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, line 742`); *backlink*
  >
  > Unknown interpreted text role "exc".

- It is now possible to set a :ref:`special method <specialnames>` to `None` to indicate that the corresponding operation is not available. For example, if a class sets :meth:`__iter__` to `None`, the class is not iterable. (Contributed by Andrew Barnert and Ivan Levkivskyi in :issue:`25958`.)

  > **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, line 746`); *backlink*
  >
  > Unknown interpreted text role "ref".

  > **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, line 746`); *backlink*
  >
  > Unknown interpreted text role "meth".

  > **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, line 746`); *backlink*
  >
  > Unknown interpreted text role "issue".

- Long sequences of repeated traceback lines are now abbreviated as "`[Previous line repeated {count} more times]`" (see :ref:`whatsnew36-traceback` for an example). (Contributed by Emanuel Barry in :issue:`26823`.)

  > **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, line 752`); *backlink*
  >
  > Unknown interpreted text role "ref".

  > **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, line 752`); *backlink*
  >
  > Unknown interpreted text role "issue".

- Import now raises the new exception :exc:`ModuleNotFoundError` (subclass of :exc:`ImportError`) when it cannot find a module. Code that currently checks for ImportError (in try-except) will still work. (Contributed by Eric Snow in :issue:`15767`.)

  > **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, line 757`); *backlink*
  >
  > Unknown interpreted text role "exc".

  > **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-`

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 757); *backlink*
>
> Unknown interpreted text role "exc".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 757); *backlink*
>
> Unknown interpreted text role "issue".

- Class methods relying on zero-argument `super()` will now work correctly when called from metaclass methods during class creation. (Contributed by Martin Teichmann in :issue:`23722`.)

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 762); *backlink*
>
> Unknown interpreted text role "issue".

New Modules

secrets

The main purpose of the new :mod:`secrets` module is to provide an obvious way to reliably generate cryptographically strong pseudo-random values suitable for managing secrets, such as account authentication, tokens, and similar.

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 775); *backlink*
>
> Unknown interpreted text role "mod".

> **Warning**
>
> Note that the pseudo-random generators in the :mod:`random` module should *NOT* be used for security purposes. Use :mod:`secrets` on Python 3.6+ and :func:`os.urandom()` on Python 3.5 and earlier.
>
> > **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 781); *backlink*
> >
> > Unknown interpreted text role "mod".
>
> > **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 781); *backlink*
> >
> > Unknown interpreted text role "mod".
>
> > **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 781); *backlink*
> >
> > Unknown interpreted text role "func".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 785)
>
> Unknown directive type "seealso".
>
> ```
> .. seealso::
>
>     :pep:`506` -- Adding A Secrets Module To The Standard Library
>       PEP written and implemented by Steven D'Aprano.
> ```

Improved Modules

array

Exhausted iterators of :class:`array.array` will now stay exhausted even if the iterated array is extended. This is consistent with the behavior of other mutable sequences.

Contributed by Serhiy Storchaka in :issue:`26492`.

ast

The new :class:`ast.Constant` AST node has been added. It can be used by external AST optimizers for the purposes of constant folding.

Contributed by Victor Stinner in :issue:`26146`.

asyncio

Starting with Python 3.6 the `asyncio` module is no longer provisional and its API is considered stable.

Notable changes in the :mod:`asyncio` module since Python 3.5.0 (all backported to 3.5.x due to the provisional status):

- The :func:`~asyncio.get_event_loop` function has been changed to always return the currently running loop when called from coroutines and callbacks. (Contributed by Yury Selivanov in :issue:`28613`.)

- The :func:`~asyncio.ensure_future` function and all functions that use it, such as :meth:`loop.run_until_complete() <asyncio.loop.run_until_complete>`, now accept all kinds of :term:`awaitable objects <awaitable>`. (Contributed by Yury Selivanov.)

- **System Message: ERROR/3 (**`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`**, line 826);** *backlink*

  Unknown interpreted text role "meth".

- **System Message: ERROR/3 (**`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`**, line 826);** *backlink*

  Unknown interpreted text role "term".

- New :func:`~asyncio.run_coroutine_threadsafe` function to submit coroutines to event loops from other threads. (Contributed by Vincent Michel.)

  System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`**, line 831);** *backlink*

  Unknown interpreted text role "func".

- New :meth:`Transport.is_closing() <asyncio.BaseTransport.is_closing>` method to check if the transport is closing or closed. (Contributed by Yury Selivanov.)

  System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`**, line 835);** *backlink*

  Unknown interpreted text role "meth".

- The :meth:`loop.create_server() <asyncio.loop.create_server>` method can now accept a list of hosts. (Contributed by Yann Sionneau.)

  System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`**, line 839);** *backlink*

  Unknown interpreted text role "meth".

- New :meth:`loop.create_future() <asyncio.loop.create_future>` method to create Future objects. This allows alternative event loop implementations, such as uvloop, to provide a faster :class:`asyncio.Future` implementation. (Contributed by Yury Selivanov in :issue:`27041`.)

  System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`**, line 843);** *backlink*

  Unknown interpreted text role "meth".

  System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`**, line 843);** *backlink*

  Unknown interpreted text role "class".

  System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`**, line 843);** *backlink*

  Unknown interpreted text role "issue".

- New :meth:`loop.get_exception_handler() <asyncio.loop.get_exception_handler>` method to get the current exception handler. (Contributed by Yury Selivanov in :issue:`27040`.)

  System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`**, line 850);** *backlink*

Unknown interpreted text role "meth".

- New :meth:`StreamReader.readuntil() <asyncio.StreamReader.readuntil>` method to read data from the stream until a separator bytes sequence appears. (Contributed by Mark Korenberg.)

- The performance of :meth:`StreamReader.readexactly() <asyncio.StreamReader.readexactly>` has been improved. (Contributed by Mark Korenberg in :issue:`28370`.)

- The :meth:`loop.getaddrinfo() <asyncio.loop.getaddrinfo>` method is optimized to avoid calling the system `getaddrinfo` function if the address is already resolved. (Contributed by A. Jesse Jiryu Davis.)

- The :meth:`loop.stop() <asyncio.loop.stop>` method has been changed to stop the loop immediately after the current iteration. Any new callbacks scheduled as a result of the last iteration will be discarded. (Contributed by Guido van Rossum in :issue:`25593`.)

- :meth:`Future.set_exception <asyncio.futures.Future.set_exception>` will now raise :exc:`TypeError` when passed an instance of the :exc:`StopIteration` exception. (Contributed by Chris Angelico in :issue:`26221`.)

- New :meth:`loop.connect_accepted_socket() <asyncio.loop.connect_accepted_socket>` method to be used by servers that accept connections outside of asyncio, but that use asyncio to handle them. (Contributed by Jim Fulton in :issue:`27392`.)

- `TCP_NODELAY` flag is now set for all TCP transports by default. (Contributed by Yury Selivanov in :issue:`27456`.)

- New :meth:`loop.shutdown_asyncgens() <asyncio.loop.shutdown_asyncgens>` to properly close pending asynchronous generators before closing the loop. (Contributed by Yury Selivanov in :issue:`28003`.)

- :class:`Future <asyncio.Future>` and :class:`Task <asyncio.Task>` classes now have an optimized C implementation which makes asyncio code up to 30% faster. (Contributed by Yury Selivanov and INADA Naoki in :issue:`26081` and :issue:`28544`.)

Unknown interpreted text role "class".

binascii

The :func:`~binascii.b2a_base64` function now accepts an optional *newline* keyword argument to control whether the newline character is appended to the return value. (Contributed by Victor Stinner in :issue:`25357`.)

cmath

The new :const:`cmath.tau` (τ) constant has been added. (Contributed by Lisa Roach in :issue:`12345`, see PEP 628 for details.)

New constants: :const:`cmath.inf` and :const:`cmath.nan` to match :const:`math.inf` and :const:`math.nan`, and also :const:`cmath.infj` and :const:`cmath.nanj` to match the format used by complex repr. (Contributed by Mark Dickinson in :issue:`23229`.)

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 914**); *backlink*

Unknown interpreted text role "const".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 914**); *backlink*

Unknown interpreted text role "const".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 914**); *backlink*

Unknown interpreted text role "issue".

collections

The new :class:`~collections.abc.Collection` abstract base class has been added to represent sized iterable container classes. (Contributed by Ivan Levkivskyi, docs by Neil Girdhar in :issue:`27598`.)

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 923**); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 923**); *backlink*

Unknown interpreted text role "issue".

The new :class:`~collections.abc.Reversible` abstract base class represents iterable classes that also provide the :meth:`__reversed__` method. (Contributed by Ivan Levkivskyi in :issue:`25987`.)

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 927**); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 927**); *backlink*

Unknown interpreted text role "meth".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 927**); *backlink*

Unknown interpreted text role "issue".

The new :class:`~collections.abc.AsyncGenerator` abstract base class represents asynchronous generators. (Contributed by Yury Selivanov in :issue:`28720`.)

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 931**); *backlink*

Unknown interpreted text role "class".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 931**); *backlink*

Unknown interpreted text role "issue".

The :func:`~collections.namedtuple` function now accepts an optional keyword argument *module*, which, when specified, is used for the `__module__` attribute of the returned named tuple class. (Contributed by Raymond Hettinger in :issue:`17941`.)

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 935**); *backlink*

Unknown interpreted text role "func".

The *verbose* and *rename* arguments for :func:`~collections.namedtuple` are now keyword-only. (Contributed by Raymond Hettinger in :issue:`25628`.)

Recursive :class:`collections.deque` instances can now be pickled. (Contributed by Serhiy Storchaka in :issue:`26482`.)

concurrent.futures

The :class:`ThreadPoolExecutor <concurrent.futures.ThreadPoolExecutor>` class constructor now accepts an optional *thread_name_prefix* argument to make it possible to customize the names of the threads created by the pool. (Contributed by Gregory P. Smith in :issue:`27664`.)

contextlib

The :class:`contextlib.AbstractContextManager` class has been added to provide an abstract base class for context managers. It provides a sensible default implementation for *__enter__()* which returns `self` and leaves *__exit__()* an abstract method. A matching class has been added to the :mod:`typing` module as :class:`typing.ContextManager`. (Contributed by Brett Cannon in :issue:`25609`.)

datetime

The :class:`~datetime.datetime` and :class:`~datetime.time` classes have the new :attr:`~time.fold` attribute used to disambiguate local time when necessary. Many functions in the :mod:`datetime` have been updated to support local time disambiguation. See :ref:`Local Time Disambiguation <whatsnew36-pep495>` section for more information. (Contributed by Alexander Belopolsky in :issue:`24773`.)

The :meth:`datetime.strftime() <datetime.datetime.strftime>` and :meth:`date.strftime() <datetime.date.strftime>` methods now support ISO 8601 date directives %G, %u and %V. (Contributed by Ashley Anderson in :issue:`12006`.)

The :func:`datetime.isoformat() <datetime.datetime.isoformat>` function now accepts an optional *timespec* argument that specifies the number of additional components of the time value to include. (Contributed by Alessandro Cucci and Alexander Belopolsky in :issue:`19475`.)

The :meth:`datetime.combine() <datetime.datetime.combine>` now accepts an optional *tzinfo* argument. (Contributed by Alexander Belopolsky in :issue:`27661`.)

decimal

New :meth:`Decimal.as_integer_ratio() <decimal.Decimal.as_integer_ratio>` method that returns a pair `(n, d)` of integers that represent the given :class:`~decimal.Decimal` instance as a fraction, in lowest terms and with a positive denominator:

```
>>> Decimal('-3.14').as_integer_ratio()
(-157, 50)
```

(Contributed by Stefan Krah amd Mark Dickinson in :issue:`25928`.)

distutils

The `default_format` attribute has been removed from :class:`distutils.command.sdist.sdist` and the `formats` attribute defaults to `['gztar']`. Although not anticipated, any code relying on the presence of `default_format` may need to be adapted. See :issue:`27819` for more details.

email

The new email API, enabled via the *policy* keyword to various constructors, is no longer provisional. The :mod:`email` documentation has been reorganized and rewritten to focus on the new API, while retaining the old documentation for the legacy API. (Contributed by R. David Murray in :issue:`24277`.)

The :mod:`email.mime` classes now all accept an optional *policy* keyword. (Contributed by Berker Peksag in :issue:`27331`.)

The :class:`~email.generator.DecodedGenerator` now supports the *policy* keyword.

There is a new :mod:`~email.policy` attribute, :attr:`~email.policy.Policy.message_factory`, that controls what class is used by default when the parser creates new message objects. For the :attr:`email.policy.compat32` policy this is :class:`~email.message.Message`, for the new policies it is :class:`~email.message.EmailMessage`. (Contributed by R. David Murray in :issue:`20476`.)

encodings

On Windows, added the `'oem'` encoding to use CP_OEMCP, and the `'ansi'` alias for the existing `'mbcs'` encoding, which uses the CP_ACP code page. (Contributed by Steve Dower in :issue:`27959`.)

enum

Two new enumeration base classes have been added to the :mod:`enum` module: :class:`~enum.Flag` and :class:`~enum.IntFlags`. Both are used to define constants that can be combined using the bitwise operators. (Contributed by Ethan Furman in :issue:`23591`.)

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, line 1054`); *backlink***
>
> Unknown interpreted text role "mod".

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, line 1054`); *backlink***
>
> Unknown interpreted text role "class".

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, line 1054`); *backlink***
>
> Unknown interpreted text role "class".

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, line 1054`); *backlink***
>
> Unknown interpreted text role "issue".

Many standard library modules have been updated to use the :class:`~enum.IntFlags` class for their constants.

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, line 1059`); *backlink***
>
> Unknown interpreted text role "class".

The new :class:`enum.auto` value can be used to assign values to enum members automatically:

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, line 1062`); *backlink***
>
> Unknown interpreted text role "class".

```
>>> from enum import Enum, auto
>>> class Color(Enum):
...     red = auto()
...     blue = auto()
...     green = auto()
...
>>> list(Color)
[<Color.red: 1>, <Color.blue: 2>, <Color.green: 3>]
```

faulthandler

On Windows, the :mod:`faulthandler` module now installs a handler for Windows exceptions: see :func:`faulthandler.enable`. (Contributed by Victor Stinner in :issue:`23848`.)

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, line 1078`); *backlink***
>
> Unknown interpreted text role "mod".

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, line 1078`); *backlink***
>
> Unknown interpreted text role "func".

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, line 1078`); *backlink***
>
> Unknown interpreted text role "issue".

fileinput

:func:`~fileinput.hook_encoded` now supports the *errors* argument. (Contributed by Joseph Hackman in :issue:`25788`.)

> **System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, **line 1086);** *backlink*
>
> Unknown interpreted text role "func".

> **System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, **line 1086);** *backlink*
>
> Unknown interpreted text role "issue".

hashlib

:mod:`hashlib` supports OpenSSL 1.1.0. The minimum recommend version is 1.0.2. (Contributed by Christian Heimes in :issue:`26470`.)

> **System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, **line 1093);** *backlink*
>
> Unknown interpreted text role "mod".

> **System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, **line 1093);** *backlink*
>
> Unknown interpreted text role "issue".

BLAKE2 hash functions were added to the module. :func:`~hashlib.blake2b` and :func:`~hashlib.blake2s` are always available and support the full feature set of BLAKE2. (Contributed by Christian Heimes in :issue:`26798` based on code by Dmitry Chestnykh and Samuel Neves. Documentation written by Dmitry Chestnykh.)

> **System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, **line 1096);** *backlink*
>
> Unknown interpreted text role "func".

> **System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, **line 1096);** *backlink*
>
> Unknown interpreted text role "func".

> **System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, **line 1096);** *backlink*
>
> Unknown interpreted text role "issue".

The SHA-3 hash functions :func:`~hashlib.sha3_224`, :func:`~hashlib.sha3_256`, :func:`~hashlib.sha3_384`, :func:`~hashlib.sha3_512`, and SHAKE hash functions :func:`~hashlib.shake_128` and :func:`~hashlib.shake_256` were added. (Contributed by Christian Heimes in :issue:`16113`. Keccak Code Package by Guido Bertoni, Joan Daemen, Michaël Peeters, Gilles Van Assche, and Ronny Van Keer.)

> **System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, **line 1102);** *backlink*
>
> Unknown interpreted text role "func".

> **System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, **line 1102);** *backlink*
>
> Unknown interpreted text role "func".

> **System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, **line 1102);** *backlink*
>
> Unknown interpreted text role "func".

> **System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, **line 1102);** *backlink*

The password-based key derivation function :func:`~hashlib.scrypt` is now available with OpenSSL 1.1.0 and newer. (Contributed by Christian Heimes in :issue:`27928`.)

http.client

:meth:`HTTPConnection.request() <http.client.HTTPConnection.request>` and :meth:`~http.client.HTTPConnection.endheaders` both now support chunked encoding request bodies. (Contributed by Demian Brecht and Rolf Krahl in :issue:`12319`.)

idlelib and IDLE

The idlelib package is being modernized and refactored to make IDLE look and work better and to make the code easier to understand, test, and improve. Part of making IDLE look better, especially on Linux and Mac, is using ttk widgets, mostly in the dialogs. As a result, IDLE no longer runs with tcl/tk 8.4. It now requires tcl/tk 8.5 or 8.6. We recommend running the latest release of either.

'Modernizing' includes renaming and consolidation of idlelib modules. The renaming of files with partial uppercase names is similar to the renaming of, for instance, Tkinter and TkFont to tkinter and tkinter.font in 3.0. As a result, imports of idlelib files that worked in 3.5 will usually not work in 3.6. At least a module name change will be needed (see idlelib/README.txt), sometimes more. (Name changes contributed by Al Swiegart and Terry Reedy in :issue:`24225`. Most idlelib patches since have been and will be part of the process.)

In compensation, the eventual result with be that some idlelib classes will be easier to use, with better APIs and docstrings explaining

them. Additional useful information will be added to idlelib when available.

New in 3.6.2:

Multiple fixes for autocompletion. (Contributed by Louie Lu in :issue:`15786`.)

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 1147**); *backlink*
>
> Unknown interpreted text role "issue".

New in 3.6.3:

Module Browser (on the File menu, formerly called Class Browser), now displays nested functions and classes in addition to top-level functions and classes. (Contributed by Guilherme Polo, Cheryl Sabella, and Terry Jan Reedy in :issue:`1612262`.)

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 1151**); *backlink*
>
> Unknown interpreted text role "issue".

The IDLE features formerly implemented as extensions have been reimplemented as normal features. Their settings have been moved from the Extensions tab to other dialog tabs. (Contributed by Charles Wohlganger and Terry Jan Reedy in :issue:`27099`.)

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 1157**); *backlink*
>
> Unknown interpreted text role "issue".

The Settings dialog (Options, Configure IDLE) has been partly rewritten to improve both appearance and function. (Contributed by Cheryl Sabella and Terry Jan Reedy in multiple issues.)

New in 3.6.4:

The font sample now includes a selection of non-Latin characters so that users can better see the effect of selecting a particular font. (Contributed by Terry Jan Reedy in :issue:`13802`.) The sample can be edited to include other characters. (Contributed by Serhiy Storchaka in :issue:`31860`.)

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 1168**); *backlink*
>
> Unknown interpreted text role "issue".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 1168**); *backlink*
>
> Unknown interpreted text role "issue".

New in 3.6.6:

Editor code context option revised. Box displays all context lines up to maxlines. Clicking on a context line jumps the editor to that line. Context colors for custom themes is added to Highlights tab of Settings dialog. (Contributed by Cheryl Sabella and Terry Jan Reedy in :issue:`33642`, :issue:`33768`, and :issue:`33679`.)

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 1176**); *backlink*
>
> Unknown interpreted text role "issue".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 1176**); *backlink*
>
> Unknown interpreted text role "issue".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 1176**); *backlink*
>
> Unknown interpreted text role "issue".

On Windows, a new API call tells Windows that tk scales for DPI. On Windows 8.1+ or 10, with DPI compatibility properties of the Python binary unchanged, and a monitor resolution greater than 96 DPI, this should make text and lines sharper. It should otherwise have no effect. (Contributed by Terry Jan Reedy in :issue:`33656`.)

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1182);** *backlink*
>
> Unknown interpreted text role "issue".

New in 3.6.7:

Output over N lines (50 by default) is squeezed down to a button. N can be changed in the PyShell section of the General page of the Settings dialog. Fewer, but possibly extra long, lines can be squeezed by right clicking on the output. Squeezed output can be expanded in place by double-clicking the button or into the clipboard or a separate window by right-clicking the button. (Contributed by Tal Einat in :issue:`1529353`.)

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1190);** *backlink*
>
> Unknown interpreted text role "issue".

importlib

Import now raises the new exception :exc:`ModuleNotFoundError` (subclass of :exc:`ImportError`) when it cannot find a module. Code that current checks for `ImportError` (in try-except) will still work. (Contributed by Eric Snow in :issue:`15767`.)

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1201);** *backlink*
>
> Unknown interpreted text role "exc".

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1201);** *backlink*
>
> Unknown interpreted text role "exc".

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1201);** *backlink*
>
> Unknown interpreted text role "issue".

:class:`importlib.util.LazyLoader` now calls :meth:`~importlib.abc.Loader.create_module` on the wrapped loader, removing the restriction that :class:`importlib.machinery.BuiltinImporter` and :class:`importlib.machinery.ExtensionFileLoader` couldn't be used with :class:`importlib.util.LazyLoader`.

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1206);** *backlink*
>
> Unknown interpreted text role "class".

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1206);** *backlink*
>
> Unknown interpreted text role "meth".

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1206);** *backlink*
>
> Unknown interpreted text role "class".

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1206);** *backlink*
>
> Unknown interpreted text role "class".

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1206);** *backlink*
>
> Unknown interpreted text role "class".

:func:`importlib.util.cache_from_source`, :func:`importlib.util.source_from_cache`, and :func:`importlib.util.spec_from_file_location` now accept a :term:`path-like object`.

inspect

The :func:`inspect.signature() <inspect.signature>` function now reports the implicit `.0` parameters generated by the compiler for comprehension and generator expression scopes as if they were positional-only parameters called `implicit0`. (Contributed by Jelle Zijlstra in :issue:`19611`.)

To reduce code churn when upgrading from Python 2.7 and the legacy :func:`inspect.getargspec` API, the previously documented deprecation of :func:`inspect.getfullargspec` has been reversed. While this function is convenient for single/source Python 2/3 code bases, the richer :func:`inspect.signature` interface remains the recommended approach for new code. (Contributed by Nick Coghlan in :issue:`27172`)

json

:func:`json.load` and :func:`json.loads` now support binary input. Encoded JSON should be represented using either UTF-8, UTF-16, or UTF-32. (Contributed by Serhiy Storchaka in :issue:`17909`.)

Unknown interpreted text role "func".

logging

The new :meth:`WatchedFileHandler.reopenIfNeeded() <logging.handlers.WatchedFileHandler.reopenIfNeeded>` method has been added to add the ability to check if the log file needs to be reopened. (Contributed by Marian Horban in :issue:`24884`.)

math

The tau (τ) constant has been added to the :mod:`math` and :mod:`cmath` modules. (Contributed by Lisa Roach in :issue:`12345`, see PEP 628 for details.)

multiprocessing

:ref:`Proxy Objects <multiprocessing-proxy_objects>` returned by :func:`multiprocessing.Manager` can now be nested. (Contributed by Davin Potts in :issue:`6766`.)

os

See the summary of :ref:`PEP 519 <whatsnew36-pep519>` for details on how the :mod:`os` and :mod:`os.path` modules now support :term:`path-like objects <path-like object>`.

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 1270**); *backlink*
>
> Unknown interpreted text role "ref".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 1270**); *backlink*
>
> Unknown interpreted text role "mod".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 1270**); *backlink*
>
> Unknown interpreted text role "mod".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 1270**); *backlink*
>
> Unknown interpreted text role "term".

:func:`~os.scandir` now supports :class:`bytes` paths on Windows.

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 1274**); *backlink*
>
> Unknown interpreted text role "func".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 1274**); *backlink*
>
> Unknown interpreted text role "class".

A new :meth:`~os.scandir.close` method allows explicitly closing a :func:`~os.scandir` iterator. The :func:`~os.scandir` iterator now supports the :term:`context manager` protocol. If a :func:`scandir` iterator is neither exhausted nor explicitly closed a :exc:`ResourceWarning` will be emitted in its destructor. (Contributed by Serhiy Storchaka in :issue:`25994`.)

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 1276**); *backlink*
>
> Unknown interpreted text role "meth".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 1276**); *backlink*
>
> Unknown interpreted text role "func".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 1276**); *backlink*
>
> Unknown interpreted text role "func".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 1276**); *backlink*
>
> Unknown interpreted text role "term".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 1276**); *backlink*
>
> Unknown interpreted text role "func".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 1276**); *backlink*
>
> Unknown interpreted text role "exc".

On Linux, :func:`os.urandom` now blocks until the system urandom entropy pool is initialized to increase the security. See the PEP 524 for the rationale.

The Linux `getrandom()` syscall (get random bytes) is now exposed as the new :func:`os.getrandom` function. (Contributed by Victor Stinner, part of the PEP 524)

pathlib

:mod:`pathlib` now supports :term:`path-like objects <path-like object>`. (Contributed by Brett Cannon in :issue:`27186`.)

See the summary of :ref:`PEP 519 <whatsnew36-pep519>` for details.

pdb

The :class:`~pdb.Pdb` class constructor has a new optional *readrc* argument to control whether `.pdbrc` files should be read.

pickle

Objects that need `__new__` called with keyword arguments can now be pickled using :ref:`pickle protocols <pickle-protocols>` older than protocol version 4. Protocol version 4 already supports this case. (Contributed by Serhiy Storchaka in :issue:`24164`.)

pickletools

:func:`pickletools.dis()` now outputs the implicit memo index for the MEMOIZE opcode. (Contributed by Serhiy Storchaka in :issue:`25382`.)

pydoc

The :mod:`pydoc` module has learned to respect the MANPAGER environment variable. (Contributed by Matthias Klose in :issue:`8637`.)

:func:`help` and :mod:`pydoc` can now list named tuple fields in the order they were defined rather than alphabetically. (Contributed by Raymond Hettinger in :issue:`24879`.)

random

The new :func:`~random.choices` function returns a list of elements of specified size from the given population with optional weights. (Contributed by Raymond Hettinger in :issue:`18844`.)

re

Added support of modifier spans in regular expressions. Examples: `'(?i:p)ython'` matches `'python'` and `'Python'`, but not `'PYTHON'`; `'(?i)g(?-i:v)r'` matches `'GvR'` and `'gvr'`, but not `'GVR'`. (Contributed by Serhiy Storchaka in :issue:`433028`.)

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1347); *backlink*
>
> Unknown interpreted text role "issue".

Match object groups can be accessed by `__getitem__`, which is equivalent to `group()`. So `mo['name']` is now equivalent to `mo.group('name')`. (Contributed by Eric Smith in :issue:`24454`.)

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1352); *backlink*
>
> Unknown interpreted text role "issue".

:class:`~re.Match` objects now support :meth:`index-like objects <object.__index__>` as group indices. (Contributed by Jeroen Demeyer and Xiang Zhang in :issue:`27177`.)

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1356); *backlink*
>
> Unknown interpreted text role "class".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1356); *backlink*
>
> Unknown interpreted text role "meth".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1356); *backlink*
>
> Unknown interpreted text role "issue".

readline

Added :func:`~readline.set_auto_history` to enable or disable automatic addition of input to the history list. (Contributed by Tyler Crompton in :issue:`26870`.)

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1365); *backlink*
>
> Unknown interpreted text role "func".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1365); *backlink*
>
> Unknown interpreted text role "issue".

rlcompleter

Private and special attribute names now are omitted unless the prefix starts with underscores. A space or a colon is added after some completed keywords. (Contributed by Serhiy Storchaka in :issue:`25011` and :issue:`25209`.)

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1373); *backlink*
>
> Unknown interpreted text role "issue".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1373); *backlink*
>
> Unknown interpreted text role "issue".

shlex

The :class:`~shlex.shlex` has much :ref:`improved shell compatibility <improved-shell-compatibility>` through the new *punctuation_chars* argument to control which characters are treated as punctuation. (Contributed by Vinay Sajip in :issue:`1521950`.)

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 1381**); *backlink*
>
> Unknown interpreted text role "class".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 1381**); *backlink*
>
> Unknown interpreted text role "ref".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 1381**); *backlink*
>
> Unknown interpreted text role "issue".

site

When specifying paths to add to :attr:`sys.path` in a *.pth* file, you may now specify file paths on top of directories (e.g. zip files). (Contributed by Wolfgang Langner in :issue:`26587`).

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 1391**); *backlink*
>
> Unknown interpreted text role "attr".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 1391**); *backlink*
>
> Unknown interpreted text role "issue".

sqlite3

:attr:`sqlite3.Cursor.lastrowid` now supports the `REPLACE` statement. (Contributed by Alex LordThorsen in :issue:`16864`.)

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 1399**); *backlink*
>
> Unknown interpreted text role "attr".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 1399**); *backlink*
>
> Unknown interpreted text role "issue".

socket

The :func:`~socket.socket.ioctl` function now supports the :data:`~socket.SIO_LOOPBACK_FAST_PATH` control code. (Contributed by Daniel Stokes in :issue:`26536`.)

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 1406**); *backlink*
>
> Unknown interpreted text role "func".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 1406**); *backlink*
>
> Unknown interpreted text role "data".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 1406**); *backlink*
>
> Unknown interpreted text role "issue".

The :meth:`~socket.socket.getsockopt` constants `SO_DOMAIN`, `SO_PROTOCOL`, `SO_PEERSEC`, and `SO_PASSSEC` are now supported. (Contributed by Christian Heimes in :issue:`26907`.)

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-

The :meth:`~socket.socket.setsockopt` now supports the `setsockopt(level, optname, None, optlen: int)` form. (Contributed by Christian Heimes in :issue:`27744`.)

The socket module now supports the address family :data:`~socket.AF_ALG` to interface with Linux Kernel crypto API. `ALG_*`, `SOL_ALG` and :meth:`~socket.socket.sendmsg_afalg` were added. (Contributed by Christian Heimes in :issue:`27744` with support from Victor Stinner.)

New Linux constants `TCP_USER_TIMEOUT` and `TCP_CONGESTION` were added. (Contributed by Omar Sandoval, :issue:`26273`).

socketserver

Servers based on the :mod:`socketserver` module, including those defined in :mod:`http.server`, :mod:`xmlrpc.server` and :mod:`wsgiref.simple_server`, now support the :term:`context manager` protocol. (Contributed by Aviv Palivoda in :issue:`26404`.)

The :attr:`~socketserver.StreamRequestHandler.wfile` attribute of :class:`~socketserver.StreamRequestHandler` classes now implements the :class:`io.BufferedIOBase` writable interface. In particular, calling :meth:`~io.BufferedIOBase.write` is now guaranteed to send the data in full. (Contributed by Martin Panter in :issue:`26721`.)

ssl

:mod:`ssl` supports OpenSSL 1.1.0. The minimum recommend version is 1.0.2. (Contributed by Christian Heimes in :issue:`26470`.)

3DES has been removed from the default cipher suites and ChaCha20 Poly1305 cipher suites have been added. (Contributed by Christian Heimes in :issue:`27850` and :issue:`27766`.)

:class:`~ssl.SSLContext` has better default configuration for options and ciphers. (Contributed by Christian Heimes in :issue:`28043`.)

SSL session can be copied from one client-side connection to another with the new :class:`~ssl.SSLSession` class. TLS session resumption can speed up the initial handshake, reduce latency and improve performance (Contributed by Christian Heimes in :issue:`19500` based on a draft by Alex Warhawk.)

The new :meth:`~ssl.SSLContext.get_ciphers` method can be used to get a list of enabled ciphers in order of cipher priority.

All constants and flags have been converted to :class:`~enum.IntEnum` and :class:`~enum.IntFlags`. (Contributed by Christian Heimes in :issue:`28025`.)

Server and client-side specific TLS protocols for :class:`~ssl.SSLContext` were added. (Contributed by Christian Heimes in :issue:`28085`.)

statistics

A new :func:`~statistics.harmonic_mean` function has been added. (Contributed by Steven D'Aprano in :issue:`27181`.)

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1479); *backlink***
>
> Unknown interpreted text role "func".

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1479); *backlink***
>
> Unknown interpreted text role "issue".

struct

:mod:`struct` now supports IEEE 754 half-precision floats via the `'e'` format specifier. (Contributed by Eli Stevens, Mark Dickinson in :issue:`11734`.)

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1486); *backlink***
>
> Unknown interpreted text role "mod".

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1486); *backlink***
>
> Unknown interpreted text role "issue".

subprocess

:class:`subprocess.Popen` destructor now emits a :exc:`ResourceWarning` warning if the child process is still running. Use the context manager protocol (`with proc: ...`) or explicitly call the :meth:`~subprocess.Popen.wait` method to read the exit status of the child process. (Contributed by Victor Stinner in :issue:`26741`.)

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1494); *backlink***
>
> Unknown interpreted text role "class".

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1494); *backlink***
>
> Unknown interpreted text role "exc".

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1494); *backlink***
>
> Unknown interpreted text role "meth".

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1494); *backlink***
>
> Unknown interpreted text role "issue".

The :class:`subprocess.Popen` constructor and all functions that pass arguments through to it now accept *encoding* and *errors* arguments. Specifying either of these will enable text mode for the *stdin*, *stdout* and *stderr* streams. (Contributed by Steve Dower in :issue:`6135`.)

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1500); *backlink***
>
> Unknown interpreted text role "class".

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1500); *backlink***
>
> Unknown interpreted text role "issue".

sys

The new :func:`~sys.getfilesystemencodeerrors` function returns the name of the error mode used to convert between Unicode filenames and bytes filenames. (Contributed by Steve Dower in :issue:`27781`.)

On Windows the return value of the :func:`~sys.getwindowsversion` function now includes the *platform_version* field which contains the accurate major version, minor version and build number of the current operating system, rather than the version that is being emulated for the process (Contributed by Steve Dower in :issue:`27932`.)

telnetlib

:class:`~telnetlib.Telnet` is now a context manager (contributed by Stéphane Wirtel in :issue:`25485`).

time

The :class:`~time.struct_time` attributes :attr:`tm_gmtoff` and :attr:`tm_zone` are now available on all platforms.

timeit

The new :meth:`Timer.autorange() <timeit.Timer.autorange>` convenience method has been added to call :meth:`Timer.timeit() <timeit.Timer.timeit>` repeatedly so that the total run time is greater or equal to 200 milliseconds. (Contributed by Steven D'Aprano in :issue:`6422`.)

:mod:`timeit` now warns when there is substantial (4x) variance between best and worst times. (Contributed by Serhiy Storchaka in :issue:`23552`.)

tkinter

Added methods :meth:`~tkinter.Variable.trace_add`, :meth:`~tkinter.Variable.trace_remove` and :meth:`~tkinter.Variable.trace_info` in the :class:`tkinter.Variable` class. They replace old methods :meth:`~tkinter.Variable.trace_variable`, :meth:`~tkinter.Variable.trace`, :meth:`~tkinter.Variable.trace_vdelete` and :meth:`~tkinter.Variable.trace_vinfo` that use obsolete Tcl commands and might not work in future versions of Tcl. (Contributed by Serhiy Storchaka in :issue:`22115`).

traceback

Both the traceback module and the interpreter's builtin exception display now abbreviate long sequences of repeated lines in tracebacks as shown in the following example:

```
>>> def f(): f()
...
>>> f()
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
  File "<stdin>", line 1, in f
  File "<stdin>", line 1, in f
  File "<stdin>", line 1, in f
  [Previous line repeated 995 more times]
RecursionError: maximum recursion depth exceeded
```

(Contributed by Emanuel Barry in :issue:`26823`.)

tracemalloc

The :mod:`tracemalloc` module now supports tracing memory allocations in multiple different address spaces.

The new :class:`~tracemalloc.DomainFilter` filter class has been added to filter block traces by their address space (domain).

(Contributed by Victor Stinner in :issue:`26588`.)

typing

Since the :mod:`typing` module is :term:`provisional <provisional API>`, all changes introduced in Python 3.6 have also been backported to Python 3.5.x.

The :mod:`typing` module has a much improved support for generic type aliases. For example `Dict[str, Tuple[S, T]]` is now a

valid type annotation. (Contributed by Guido van Rossum in Github #195.)

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 1604**); *backlink*
>
> Unknown interpreted text role "mod".

The :class:`typing.ContextManager` class has been added for representing :class:`contextlib.AbstractContextManager`. (Contributed by Brett Cannon in :issue:`25609`.)

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 1610**); *backlink*
>
> Unknown interpreted text role "class".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 1610**); *backlink*
>
> Unknown interpreted text role "class".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 1610**); *backlink*
>
> Unknown interpreted text role "issue".

The :class:`typing.Collection` class has been added for representing :class:`collections.abc.Collection`. (Contributed by Ivan Levkivskyi in :issue:`27598`.)

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 1614**); *backlink*
>
> Unknown interpreted text role "class".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 1614**); *backlink*
>
> Unknown interpreted text role "class".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 1614**); *backlink*
>
> Unknown interpreted text role "issue".

The :const:`typing.ClassVar` type construct has been added to mark class variables. As introduced in PEP 526, a variable annotation wrapped in ClassVar indicates that a given attribute is intended to be used as a class variable and should not be set on instances of that class. (Contributed by Ivan Levkivskyi in Github #280.)

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 1618**); *backlink*
>
> Unknown interpreted text role "const".

A new :const:`~typing.TYPE_CHECKING` constant that is assumed to be `True` by the static type checkers, but is `False` at runtime. (Contributed by Guido van Rossum in Github #230.)

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 1625**); *backlink*
>
> Unknown interpreted text role "const".

A new :func:`~typing.NewType` helper function has been added to create lightweight distinct types for annotations:

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 1630**); *backlink*
>
> Unknown interpreted text role "func".

```
from typing import NewType
```

```
UserId = NewType('UserId', int)
some_id = UserId(524313)
```

The static type checker will treat the new type as if it were a subclass of the original type. (Contributed by Ivan Levkivskyi in Github #189.)

unicodedata

The :mod:`unicodedata` module now uses data from Unicode 9.0.0. (Contributed by Benjamin Peterson.)

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1646); *backlink***
>
> Unknown interpreted text role "mod".

unittest.mock

The :class:`~unittest.mock.Mock` class has the following improvements:

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1654); *backlink***
>
> Unknown interpreted text role "class".

- Two new methods, :meth:`Mock.assert_called() <unittest.mock.Mock.assert_called>` and :meth:`Mock.assert_called_once() <unittest.mock.Mock.assert_called_once>` to check if the mock object was called. (Contributed by Amit Saha in :issue:`26323`.)

  > **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1656); *backlink***
  >
  > Unknown interpreted text role "meth".

  > **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1656); *backlink***
  >
  > Unknown interpreted text role "meth".

  > **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1656); *backlink***
  >
  > Unknown interpreted text role "issue".

- The :meth:`Mock.reset_mock() <unittest.mock.Mock.reset_mock>` method now has two optional keyword only arguments: *return_value* and *side_effect*. (Contributed by Kushal Das in :issue:`21271`.)

  > **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1662); *backlink***
  >
  > Unknown interpreted text role "meth".

  > **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1662); *backlink***
  >
  > Unknown interpreted text role "issue".

urllib.request

If a HTTP request has a file or iterable body (other than a bytes object) but no `Content-Length` header, rather than throwing an error, :class:`~urllib.request.AbstractHTTPHandler` now falls back to use chunked transfer encoding. (Contributed by Demian Brecht and Rolf Krahl in :issue:`12319`.)

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1671); *backlink***

Unknown interpreted text role "class".

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1671);** *backlink*
>
> Unknown interpreted text role "issue".

urllib.robotparser

:class:`~urllib.robotparser.RobotFileParser` now supports the `Crawl-delay` and `Request-rate` extensions. (Contributed by Nikolay Bogoychev in :issue:`16099`.)

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1681);** *backlink*
>
> Unknown interpreted text role "class".

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1681);** *backlink*
>
> Unknown interpreted text role "issue".

venv

:mod:`venv` accepts a new parameter `--prompt`. This parameter provides an alternative prefix for the virtual environment. (Proposed by Łukasz Balcerzak and ported to 3.6 by Stéphane Wirtel in :issue:`22829`.)

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1689);** *backlink*
>
> Unknown interpreted text role "mod".

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1689);** *backlink*
>
> Unknown interpreted text role "issue".

warnings

A new optional *source* parameter has been added to the :func:`warnings.warn_explicit` function: the destroyed object which emitted a :exc:`ResourceWarning`. A *source* attribute has also been added to :class:`warnings.WarningMessage` (contributed by Victor Stinner in :issue:`26568` and :issue:`26567`).

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1697);** *backlink*
>
> Unknown interpreted text role "func".

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1697);** *backlink*
>
> Unknown interpreted text role "exc".

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1697);** *backlink*
>
> Unknown interpreted text role "class".

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1697);** *backlink*
>
> Unknown interpreted text role "issue".

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1697);** *backlink*
>
> Unknown interpreted text role "issue".

When a :exc:`ResourceWarning` warning is logged, the :mod:`tracemalloc` module is now used to try to retrieve the traceback where the destroyed object was allocated.

Example with the script `example.py`:

```
import warnings

def func():
    return open(__file__)

f = func()
f = None
```

Output of the command `python3.6 -Wd -X tracemalloc=5 example.py`:

```
example.py:7: ResourceWarning: unclosed file <_io.TextIOWrapper name='example.py' mode='r' encoding='UTF-8
  f = None
Object allocated at (most recent call first):
  File "example.py", lineno 4
    return open(__file__)
  File "example.py", lineno 6
    f = func()
```

The "Object allocated at" traceback is new and is only displayed if :mod:`tracemalloc` is tracing Python memory allocations and if the :mod:`warnings` module was already imported.

winreg

Added the 64-bit integer type :data:`REG_QWORD <winreg.REG_QWORD>`. (Contributed by Clement Rouault in :issue:`23026`.)

winsound

Allowed keyword arguments to be passed to :func:`Beep <winsound.Beep>`, :func:`MessageBeep <winsound.MessageBeep>`, and :func:`PlaySound <winsound.PlaySound>` (:issue:`27982`).

xmlrpc.client

The :mod:`xmlrpc.client` module now supports unmarshalling additional data types used by the Apache XML-RPC implementation for numerics and `None`. (Contributed by Serhiy Storchaka in :issue:`26885`.)

zipfile

A new :meth:`ZipInfo.from_file() <zipfile.ZipInfo.from_file>` class method allows making a :class:`~zipfile.ZipInfo` instance from a filesystem file. A new :meth:`ZipInfo.is_dir() <zipfile.ZipInfo.is_dir>` method can be used to check if the :class:`~zipfile.ZipInfo` instance represents a directory. (Contributed by Thomas Kluyver in :issue:`26039`.)

The :meth:`ZipFile.open() <zipfile.ZipFile.open>` method can now be used to write data into a ZIP file, as well as for extracting data. (Contributed by Thomas Kluyver in :issue:`26039`.)

zlib

The :func:`~zlib.compress` and :func:`~zlib.decompress` functions now accept keyword arguments. (Contributed by Aviv Palivoda in :issue:`26243` and Xiang Zhang in :issue:`16764` respectively.)

Optimizations

- The Python interpreter now uses a 16-bit wordcode instead of bytecode which made a number of opcode optimizations possible. (Contributed by Demur Rumed with input and reviews from Serhiy Storchaka and Victor Stinner in :issue:`26647` and :issue:`28050`.)

- The :class:`asyncio.Future` class now has an optimized C implementation. (Contributed by Yury Selivanov and INADA Naoki in :issue:`26081`.)

- The :class:`asyncio.Task` class now has an optimized C implementation. (Contributed by Yury Selivanov in :issue:`28544`.)

- Various implementation improvements in the :mod:`typing` module (such as caching of generic types) allow up to 30 times performance improvements and reduced memory footprint.

- The ASCII decoder is now up to 60 times as fast for error handlers `surrogateescape`, `ignore` and `replace` (Contributed by Victor Stinner in :issue:`24870`).

- The ASCII and the Latin1 encoders are now up to 3 times as fast for the error handler `surrogateescape` (Contributed by Victor Stinner in :issue:`25227`).

- The UTF-8 encoder is now up to 75 times as fast for error handlers `ignore`, `replace`, `surrogateescape`, `surrogatepass` (Contributed by Victor Stinner in :issue:`25267`).

- The UTF-8 decoder is now up to 15 times as fast for error handlers `ignore`, `replace` and `surrogateescape` (Contributed by Victor Stinner in :issue:`25301`).

- `bytes % args` is now up to 2 times faster. (Contributed by Victor Stinner in :issue:`25349`).

- `bytearray % args` is now between 2.5 and 5 times faster. (Contributed by Victor Stinner in :issue:`25399`).

Unknown interpreted text role "issue".

- Optimize :meth:`bytes.fromhex` and :meth:`bytearray.fromhex`: they are now between 2x and 3.5x faster. (Contributed by Victor Stinner in :issue:`25401`).

- Optimize `bytes.replace(b'', b'.')` and `bytearray.replace(b'', b'.')`: up to 80% faster. (Contributed by Josh Snider in :issue:`26574`).

- Allocator functions of the :c:func:`PyMem_Malloc` domain (:c:data:`PYMEM_DOMAIN_MEM`) now use the :ref:`pymalloc memory allocator <pymalloc>` instead of :c:func:`malloc` function of the C library. The pymalloc allocator is optimized for objects smaller or equal to 512 bytes with a short lifetime, and use :c:func:`malloc` for larger memory blocks. (Contributed by Victor Stinner in :issue:`26249`).

- :func:`pickle.load` and :func:`pickle.loads` are now up to 10% faster when deserializing many small objects (Contributed by Victor Stinner in :issue:`27056`).

- Passing :term:`keyword arguments <keyword argument>` to a function has an overhead in comparison with passing :term:`positional arguments <positional argument>`. Now in extension functions implemented with using Argument Clinic this overhead is significantly decreased. (Contributed by Serhiy Storchaka in :issue:`27574`).

- Optimized :func:`~glob.glob` and :func:`~glob.iglob` functions in the :mod:`glob` module; they are now about 3--6 times faster. (Contributed by Serhiy Storchaka in :issue:`25596`).

Unknown interpreted text role "mod".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`**, line 1841);** *backlink*

Unknown interpreted text role "issue".

- Optimized globbing in :mod:`pathlib` by using :func:`os.scandir`; it is now about 1.5--4 times faster. (Contributed by Serhiy Storchaka in :issue:`26032`).

  System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`**, line 1845);** *backlink*

  Unknown interpreted text role "mod".

  System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`**, line 1845);** *backlink*

  Unknown interpreted text role "func".

  System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`**, line 1845);** *backlink*

  Unknown interpreted text role "issue".

- :class:`xml.etree.ElementTree` parsing, iteration and deepcopy performance has been significantly improved. (Contributed by Serhiy Storchaka in :issue:`25638`, :issue:`25873`, and :issue:`25869`.)

  System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`**, line 1849);** *backlink*

  Unknown interpreted text role "class".

  System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`**, line 1849);** *backlink*

  Unknown interpreted text role "issue".

  System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`**, line 1849);** *backlink*

  Unknown interpreted text role "issue".

  System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`**, line 1849);** *backlink*

  Unknown interpreted text role "issue".

- Creation of :class:`fractions.Fraction` instances from floats and decimals is now 2 to 3 times faster. (Contributed by Serhiy Storchaka in :issue:`25971`.)

  System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`**, line 1854);** *backlink*

  Unknown interpreted text role "class".

  System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`**, line 1854);**

Build and C API Changes

- Python now requires some C99 support in the toolchain to build. Most notably, Python now uses standard integer types and macros in place of custom macros like `PY_LONG_LONG`. For more information, see PEP 7 and :issue:`17884`.

- Cross-compiling CPython with the Android NDK and the Android API level set to 21 (Android 5.0 Lollipop) or greater runs successfully. While Android is not yet a supported platform, the Python test suite runs on the Android emulator with only about 16 tests failures. See the Android meta-issue :issue:`26865`.

- The `--enable-optimizations` configure flag has been added. Turning it on will activate expensive optimizations like PGO. (Original patch by Alecsandru Patrascu of Intel in :issue:`26359`.)

- The :term:`GIL <global interpreter lock>` must now be held when allocator functions of :c:data:`PYMEM_DOMAIN_OBJ` (ex: :c:func:`PyObject_Malloc`) and :c:data:`PYMEM_DOMAIN_MEM` (ex: :c:func:`PyMem_Malloc`) domains are called.

- New :c:func:`Py_FinalizeEx` API which indicates if flushing buffered data failed. (Contributed by Martin Panter in

:issue:`5319`.)

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1880);** *backlink*
>
> Unknown interpreted text role "c:func".

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1880);** *backlink*
>
> Unknown interpreted text role "issue".

- :c:func:`PyArg_ParseTupleAndKeywords` now supports :ref:`positional-only parameters <positional-only_parameter>`. Positional-only parameters are defined by empty names. (Contributed by Serhiy Storchaka in :issue:`26282`).

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1884);** *backlink*
>
> Unknown interpreted text role "c:func".

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1884);** *backlink*
>
> Unknown interpreted text role "ref".

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1884);** *backlink*
>
> Unknown interpreted text role "issue".

- `PyTraceback_Print` method now abbreviates long sequences of repeated lines as "`[Previous line repeated {count} more times]`". (Contributed by Emanuel Barry in :issue:`26823`.)

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1889);** *backlink*
>
> Unknown interpreted text role "issue".

- The new :c:func:`PyErr_SetImportErrorSubclass` function allows for specifying a subclass of :exc:`ImportError` to raise. (Contributed by Eric Snow in :issue:`15767`.)

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1893);** *backlink*
>
> Unknown interpreted text role "c:func".

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1893);** *backlink*
>
> Unknown interpreted text role "exc".

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 1893);** *backlink*
>
> Unknown interpreted text role "issue".

- The new :c:func:`PyErr_ResourceWarning` function can be used to generate a :exc:`ResourceWarning` providing the source of the resource allocation. (Contributed by Victor Stinner in :issue:`26567`.)

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`**, line 1897);** *backlink*

Unknown interpreted text role "c:func".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`**, line 1897);** *backlink*

Unknown interpreted text role "exc".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`**, line 1897);** *backlink*

Unknown interpreted text role "issue".

- The new :c:func:`PyOS_FSPath` function returns the file system representation of a :term:`path-like object`. (Contributed by Brett Cannon in :issue:`27186`.)

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`**, line 1901);** *backlink*

Unknown interpreted text role "c:func".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`**, line 1901);** *backlink*

Unknown interpreted text role "term".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`**, line 1901);** *backlink*

Unknown interpreted text role "issue".

- The :c:func:`PyUnicode_FSConverter` and :c:func:`PyUnicode_FSDecoder` functions will now accept :term:`path-like objects <path-like object>`.

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`**, line 1905);** *backlink*

Unknown interpreted text role "c:func".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`**, line 1905);** *backlink*

Unknown interpreted text role "c:func".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`**, line 1905);** *backlink*

Unknown interpreted text role "term".

Other Improvements

- When :option:`--version` (short form: :option:`-V`) is supplied twice, Python prints :data:`sys.version` for detailed information.

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`**, line 1912);** *backlink*

Unknown interpreted text role "option".

```
$ ./python -VV
Python 3.6.0b4+ (3.6:223967b49e49+, Nov 21 2016, 20:55:04)
[GCC 4.2.1 Compatible Apple LLVM 8.0.0 (clang-800.0.42.1)]
```

Deprecated

New Keywords

`async` and `await` are not recommended to be used as variable, class, function or module names. Introduced by PEP 492 in Python 3.5, they will become proper keywords in Python 3.7. Starting in Python 3.6, the use of `async` or `await` as names will generate a :exc:`DeprecationWarning`.

Deprecated Python behavior

Raising the :exc:`StopIteration` exception inside a generator will now generate a :exc:`DeprecationWarning`, and will trigger a :exc:`RuntimeError` in Python 3.7. See :ref:`whatsnew-pep-479` for details.

The :meth:`__aiter__` method is now expected to return an asynchronous iterator directly instead of returning an awaitable as previously. Doing the former will trigger a :exc:`DeprecationWarning`. Backward compatibility will be removed in Python 3.7. (Contributed by Yury Selivanov in :issue:`27243`.)

Unknown interpreted text role "exc".

A backslash-character pair that is not a valid escape sequence now generates a :exc:`DeprecationWarning`. Although this will eventually become a :exc:`SyntaxError`, that will not be for several Python releases. (Contributed by Emanuel Barry in :issue:`27364`.)

When performing a relative import, falling back on `__name__` and `__path__` from the calling module when `__spec__` or `__package__` are not defined now raises an :exc:`ImportWarning`. (Contributed by Rose Ames in :issue:`25791`.)

Deprecated Python modules, functions and methods

asynchat

The :mod:`asynchat` has been deprecated in favor of :mod:`asyncio`. (Contributed by Mariatta in :issue:`25002`.)

asyncore

The :mod:`asyncore` has been deprecated in favor of :mod:`asyncio`. (Contributed by Mariatta in :issue:`25002`.)

dbm

Unlike other :mod:`dbm` implementations, the :mod:`dbm.dumb` module creates databases with the `'rw'` mode and allows modifying the database opened with the `'r'` mode. This behavior is now deprecated and will be removed in 3.8. (Contributed by Serhiy Storchaka in :issue:`21708`.)

distutils

The undocumented `extra_path` argument to the :class:`~distutils.Distribution` constructor is now considered deprecated and will raise a warning if set. Support for this parameter will be removed in a future Python release. See :issue:`27919` for details.

grp

The support of non-integer arguments in :func:`~grp.getgrgid` has been deprecated. (Contributed by Serhiy Storchaka in :issue:`26129`.)

importlib

The :meth:`importlib.machinery.SourceFileLoader.load_module` and :meth:`importlib.machinery.SourcelessFileLoader.load_module` methods are now deprecated. They were the only remaining implementations of :meth:`importlib.abc.Loader.load_module` in :mod:`importlib` that had not been deprecated in previous versions of Python in favour of :meth:`importlib.abc.Loader.exec_module`.

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The :class:`importlib.machinery.WindowsRegistryFinder` class is now deprecated. As of 3.6.0, it is still added to :attr:`sys.meta_path` by default (on Windows), but this may change in future releases.

os

Undocumented support of general :term:`bytes-like objects <bytes-like object>` as paths in :mod:`os` functions, :func:`compile` and similar functions is now deprecated. (Contributed by Serhiy Storchaka in :issue:`25791` and :issue:`26754`.)

re

Support for inline flags `(?letters)` in the middle of the regular expression has been deprecated and will be removed in a future

Python version. Flags at the start of a regular expression are still allowed. (Contributed by Serhiy Storchaka in :issue:`22493`.)

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 2027**); *backlink*
>
> Unknown interpreted text role "issue".

ssl

OpenSSL 0.9.8, 1.0.0 and 1.0.1 are deprecated and no longer supported. In the future the :mod:`ssl` module will require at least OpenSSL 1.0.2 or 1.1.0.

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 2035**); *backlink*
>
> Unknown interpreted text role "mod".

SSL-related arguments like `certfile`, `keyfile` and `check_hostname` in :mod:`ftplib`, :mod:`http.client`, :mod:`imaplib`, :mod:`poplib`, and :mod:`smtplib` have been deprecated in favor of `context`. (Contributed by Christian Heimes in :issue:`28022`.)

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 2039**); *backlink*
>
> Unknown interpreted text role "mod".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 2039**); *backlink*
>
> Unknown interpreted text role "mod".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 2039**); *backlink*
>
> Unknown interpreted text role "mod".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 2039**); *backlink*
>
> Unknown interpreted text role "mod".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 2039**); *backlink*
>
> Unknown interpreted text role "mod".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 2039**); *backlink*
>
> Unknown interpreted text role "issue".

A couple of protocols and functions of the :mod:`ssl` module are now deprecated. Some features will no longer be available in future versions of OpenSSL. Other features are deprecated in favor of a different API. (Contributed by Christian Heimes in :issue:`28022` and :issue:`26470`.)

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 2044**); *backlink*
>
> Unknown interpreted text role "mod".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 2044**); *backlink*
>
> Unknown interpreted text role "issue".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 2044**); *backlink*
>
> Unknown interpreted text role "issue".

tkinter

The :mod:`tkinter.tix` module is now deprecated. :mod:`tkinter` users should use :mod:`tkinter.ttk` instead.

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 2052); *backlink*

Unknown interpreted text role "mod".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 2052); *backlink*

Unknown interpreted text role "mod".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 2052); *backlink*

Unknown interpreted text role "mod".

venv

The `pyvenv` script has been deprecated in favour of `python3 -m venv`. This prevents confusion as to what Python interpreter `pyvenv` is connected to and thus what Python interpreter will be used by the virtual environment. (Contributed by Brett Cannon in :issue:`25154`.)

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 2058); *backlink*

Unknown interpreted text role "issue".

Deprecated functions and types of the C API

Undocumented functions :c:func:`PyUnicode_AsEncodedObject`, :c:func:`PyUnicode_AsDecodedObject`, :c:func:`PyUnicode_AsEncodedUnicode` and :c:func:`PyUnicode_AsDecodedUnicode` are deprecated now. Use the :ref:`generic codec based API <codec-registry>` instead.

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 2067); *backlink*

Unknown interpreted text role "c:func".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 2067); *backlink*

Unknown interpreted text role "c:func".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 2067); *backlink*

Unknown interpreted text role "c:func".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 2067); *backlink*

Unknown interpreted text role "c:func".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 2067); *backlink*

Unknown interpreted text role "ref".

Deprecated Build Options

The `--with-system-ffi` configure flag is now on by default on non-macOS UNIX platforms. It may be disabled by using `--without-system-ffi`, but using the flag is deprecated and will not be accepted in Python 3.7. macOS is unaffected by this change. Note that many OS distributors already use the `--with-system-ffi` flag when building their system Python.

Removed

API and Feature Removals

- Unknown escapes consisting of `'\'` and an ASCII letter in regular expressions will now cause an error. In replacement templates for :func:`re.sub` they are still allowed, but deprecated. The :const:`re.LOCALE` flag can now only be used with binary patterns.

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 2089);** *backlink*
>
> Unknown interpreted text role "func".

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 2089);** *backlink*
>
> Unknown interpreted text role "const".

- `inspect.getmoduleinfo()` was removed (was deprecated since CPython 3.3). :func:`inspect.getmodulename` should be used for obtaining the module name for a given path. (Contributed by Yury Selivanov in :issue:`13248`.)

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 2094);** *backlink*
>
> Unknown interpreted text role "func".

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 2094);** *backlink*
>
> Unknown interpreted text role "issue".

- `traceback.Ignore` class and `traceback.usage`, `traceback.modname`, `traceback.fullmodname`, `traceback.find_lines_from_code`, `traceback.find_lines`, `traceback.find_strings`, `traceback.find_executable_lines` methods were removed from the :mod:`traceback` module. They were undocumented methods deprecated since Python 3.2 and equivalent functionality is available from private methods.

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 2099);** *backlink*
>
> Unknown interpreted text role "mod".

- The `tk_menuBar()` and `tk_bindForTraversal()` dummy methods in :mod:`tkinter` widget classes were removed (corresponding Tk commands were obsolete since Tk 4.0).

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 2106);** *backlink*
>
> Unknown interpreted text role "mod".

- The :meth:`~zipfile.ZipFile.open` method of the :class:`zipfile.ZipFile` class no longer supports the `'U'` mode (was deprecated since Python 3.4). Use :class:`io.TextIOWrapper` for reading compressed text files in :term:`universal newlines` mode.

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 2110);** *backlink*
>
> Unknown interpreted text role "meth".

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, line 2110);** *backlink*
>
> Unknown interpreted text role "class".

- The undocumented `IN`, `CDROM`, `DLFCN`, `TYPES`, `CDIO`, and `STROPTS` modules have been removed. They had been available in the platform specific `Lib/plat-*/` directories, but were chronically out of date, inconsistently available across platforms, and unmaintained. The script that created these modules is still available in the source distribution at :source:`Tools/scripts/h2py.py`.

- The deprecated `asynchat.fifo` class has been removed.

Porting to Python 3.6

This section lists previously described changes and other bugfixes that may require changes to your code.

Changes in 'python' Command Behavior

- The output of a special Python build with defined `COUNT_ALLOCS`, `SHOW_ALLOC_COUNT` or `SHOW_TRACK_COUNT` macros is now off by default. It can be re-enabled using the `-X showalloccount` option. It now outputs to `stderr` instead of `stdout`. (Contributed by Serhiy Storchaka in :issue:`23034`.)

Changes in the Python API

- :func:`open() <open>` will no longer allow combining the `'U'` mode flag with `'+'`. (Contributed by Jeff Balogh and John O'Connor in :issue:`2091`.)

- :mod:`sqlite3` no longer implicitly commits an open transaction before DDL statements.

- On Linux, :func:`os.urandom` now blocks until the system urandom entropy pool is initialized to increase the security.

- When :meth:`importlib.abc.Loader.exec_module` is defined, :meth:`importlib.abc.Loader.create_module` must also be defined.

- :c:func:`PyErr_SetImportError` now sets :exc:`TypeError` when its **msg** argument is not set. Previously only `NULL` was returned.

- The format of the `co_lnotab` attribute of code objects changed to support a negative line number delta. By default, Python does not emit bytecode with a negative line number delta. Functions using `frame.f_lineno`, `PyFrame_GetLineNumber()` or `PyCode_Addr2Line()` are not affected. Functions directly decoding `co_lnotab` should be updated to use a signed 8-bit integer type for the line number delta, but this is only required to support applications using a negative line number delta. See `Objects/lnotab_notes.txt` for the `co_lnotab` format and how to decode it, and see the PEP 511 for the rationale.

- The functions in the :mod:`compileall` module now return booleans instead of `1` or `0` to represent success or failure, respectively. Thanks to booleans being a subclass of integers, this should only be an issue if you were doing identity checks for `1` or `0`. See :issue:`25768`.

- Reading the :attr:`~urllib.parse.SplitResult.port` attribute of :func:`urllib.parse.urlsplit` and :func:`~urllib.parse.urlparse` results now raises :exc:`ValueError` for out-of-range values, rather than returning :const:`None`. See :issue:`20059`.

- The :mod:`imp` module now raises a :exc:`DeprecationWarning` instead of :exc:`PendingDeprecationWarning`.

- The following modules have had missing APIs added to their :attr:`__all__` attributes to match the documented APIs: :mod:`calendar`, :mod:`cgi`, :mod:`csv`, :mod:`~xml.etree.ElementTree`, :mod:`enum`, :mod:`fileinput`, :mod:`ftplib`, :mod:`logging`, :mod:`mailbox`, :mod:`mimetypes`, :mod:`optparse`, :mod:`plistlib`, :mod:`smtpd`, :mod:`subprocess`, :mod:`tarfile`, :mod:`threading` and :mod:`wave`. This means they will export new symbols when `import *` is used. (Contributed by Joel Taddei and Jacek Kołodziej in :issue:`23883`.)

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 2183**); *backlink*

Unknown interpreted text role "mod".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 2183**); *backlink*

Unknown interpreted text role "mod".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 2183**); *backlink*

Unknown interpreted text role "mod".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 2183**); *backlink*

Unknown interpreted text role "mod".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 2183**); *backlink*

Unknown interpreted text role "mod".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 2183**); *backlink*

Unknown interpreted text role "mod".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 2183**); *backlink*

Unknown interpreted text role "mod".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 2183**); *backlink*

Unknown interpreted text role "mod".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 2183**); *backlink*

Unknown interpreted text role "mod".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 2183**); *backlink*

Unknown interpreted text role "mod".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 2183**); *backlink*

Unknown interpreted text role "mod".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst,` **line 2183);** *backlink*

Unknown interpreted text role "mod".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst,` **line 2183);** *backlink*

Unknown interpreted text role "mod".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst,` **line 2183);** *backlink*

Unknown interpreted text role "mod".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst,` **line 2183);** *backlink*

Unknown interpreted text role "mod".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst,` **line 2183);** *backlink*

Unknown interpreted text role "mod".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst,` **line 2183);** *backlink*

Unknown interpreted text role "issue".

- When performing a relative import, if `__package__` does not compare equal to `__spec__.parent` then :exc:`ImportWarning` is raised. (Contributed by Brett Cannon in :issue:`25791`.)

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst,` **line 2194);** *backlink*

Unknown interpreted text role "exc".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst,` **line 2194);** *backlink*

Unknown interpreted text role "issue".

- When a relative import is performed and no parent package is known, then :exc:`ImportError` will be raised. Previously, :exc:`SystemError` could be raised. (Contributed by Brett Cannon in :issue:`18018`.)

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst,` **line 2198);** *backlink*

Unknown interpreted text role "exc".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst,` **line 2198);** *backlink*

Unknown interpreted text role "exc".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-`

resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, **line 2198);**
backlink

Unknown interpreted text role "issue".

- Servers based on the :mod:`socketserver` module, including those defined in :mod:`http.server`, :mod:`xmlrpc.server` and :mod:`wsgiref.simple_server`, now only catch exceptions derived from :exc:`Exception`. Therefore if a request handler raises an exception like :exc:`SystemExit` or :exc:`KeyboardInterrupt`, :meth:`~socketserver.BaseServer.handle_error` is no longer called, and the exception will stop a single-threaded server. (Contributed by Martin Panter in :issue:`23430`.)

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, **line 2202);**
backlink

Unknown interpreted text role "mod".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, **line 2202);**
backlink

Unknown interpreted text role "mod".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, **line 2202);**
backlink

Unknown interpreted text role "mod".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, **line 2202);**
backlink

Unknown interpreted text role "mod".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, **line 2202);**
backlink

Unknown interpreted text role "exc".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, **line 2202);**
backlink

Unknown interpreted text role "exc".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, **line 2202);**
backlink

Unknown interpreted text role "exc".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, **line 2202);**
backlink

Unknown interpreted text role "meth".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, **line 2202);**
backlink

Unknown interpreted text role "issue".

- :func:`spwd.getspnam` now raises a :exc:`PermissionError` instead of :exc:`KeyError` if the user doesn't have privileges.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-

resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, line 2211);
backlink

Unknown interpreted text role "func".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, line 2211);
backlink

Unknown interpreted text role "exc".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, line 2211);
backlink

Unknown interpreted text role "exc".

- The :meth:`socket.socket.close` method now raises an exception if an error (e.g. `EBADF`) was reported by the underlying system call. (Contributed by Martin Panter in :issue:`26685`.)

  System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, line 2214);
  backlink

  Unknown interpreted text role "meth".

  System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, line 2214);
  backlink

  Unknown interpreted text role "issue".

- The *decode_data* argument for the :class:`smtpd.SMTPChannel` and :class:`smtpd.SMTPServer` constructors is now `False` by default. This means that the argument passed to :meth:`~smtpd.SMTPServer.process_message` is now a bytes object by default, and `process_message()` will be passed keyword arguments. Code that has already been updated in accordance with the deprecation warning generated by 3.5 will not be affected.

  System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, line 2218);
  backlink

  Unknown interpreted text role "class".

  System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, line 2218);
  backlink

  Unknown interpreted text role "class".

  System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, line 2218);
  backlink

  Unknown interpreted text role "meth".

- All optional arguments of the :func:`~json.dump`, :func:`~json.dumps`, :func:`~json.load` and :func:`~json.loads` functions and :class:`~json.JSONEncoder` and :class:`~json.JSONDecoder` class constructors in the :mod:`json` module are now :ref:`keyword-only <keyword-only_parameter>`. (Contributed by Serhiy Storchaka in :issue:`18726`.)

  System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, line 2226);
  backlink

  Unknown interpreted text role "func".

  System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, line 2226);
  backlink

Unknown interpreted text role "func".

- Subclasses of :class:`type` which don't override `type.__new__` may no longer use the one-argument form to get the type of an object.

- As part of PEP 487, the handling of keyword arguments passed to :class:`type` (other than the metaclass hint, `metaclass`) is now consistently delegated to :meth:`object.__init_subclass__`. This means that :meth:`type.__new__` and :meth:`type.__init__` both now accept arbitrary keyword arguments, but :meth:`object.__init_subclass__` (which is called from :meth:`type.__new__`) will reject them by default. Custom metaclasses accepting additional keyword arguments will need to adjust their calls to :meth:`type.__new__` (whether direct or via :class:`super`) accordingly.

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, line 2236`); *backlink*
>
> Unknown interpreted text role "meth".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, line 2236`); *backlink*
>
> Unknown interpreted text role "meth".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, line 2236`); *backlink*
>
> Unknown interpreted text role "meth".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, line 2236`); *backlink*
>
> Unknown interpreted text role "meth".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, line 2236`); *backlink*
>
> Unknown interpreted text role "meth".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, line 2236`); *backlink*
>
> Unknown interpreted text role "meth".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, line 2236`); *backlink*
>
> Unknown interpreted text role "class".

- In :class:`distutils.command.sdist.sdist`, the `default_format` attribute has been removed and is no longer honored. Instead, the gzipped tarfile format is the default on all platforms and no platform-specific selection is made. In environments where distributions are built on Windows and zip distributions are required, configure the project with a `setup.cfg` file containing the following:

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, line 2245`); *backlink*
>
> Unknown interpreted text role "class".

```
[sdist]
formats=zip
```

This behavior has also been backported to earlier Python versions by Setuptools 26.0.0.

- In the :mod:`urllib.request` module and the :meth:`http.client.HTTPConnection.request` method, if no Content-Length header field has been specified and the request body is a file object, it is now sent with HTTP 1.1 chunked encoding. If a file object has to be sent to a HTTP 1.0 server, the Content-Length value now has to be specified by the caller. (Contributed by Demian Brecht and Rolf Krahl with tweaks from Martin Panter in :issue:`12319`.)

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, line 2261`); *backlink*
>
> Unknown interpreted text role "mod".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, line 2261`);

backlink

Unknown interpreted text role "meth".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, **line 2261**); *backlink*

Unknown interpreted text role "issue".

- The :class:`~csv.DictReader` now returns rows of type :class:`~collections.OrderedDict`. (Contributed by Steve Holden in :issue:`27842`.)

  System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, **line 2270**); *backlink*

  Unknown interpreted text role "class".

  System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, **line 2270**); *backlink*

  Unknown interpreted text role "class".

  System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, **line 2270**); *backlink*

  Unknown interpreted text role "issue".

- The :const:`crypt.METHOD_CRYPT` will no longer be added to `crypt.methods` if unsupported by the platform. (Contributed by Victor Stinner in :issue:`25287`.)

  System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, **line 2274**); *backlink*

  Unknown interpreted text role "const".

  System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, **line 2274**); *backlink*

  Unknown interpreted text role "issue".

- The *verbose* and *rename* arguments for :func:`~collections.namedtuple` are now keyword-only. (Contributed by Raymond Hettinger in :issue:`25628`.)

  System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, **line 2278**); *backlink*

  Unknown interpreted text role "func".

  System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, **line 2278**); *backlink*

  Unknown interpreted text role "issue".

- On Linux, :func:`ctypes.util.find_library` now looks in `LD_LIBRARY_PATH` for shared libraries. (Contributed by Vinay Sajip in :issue:`9998`.)

  System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, **line 2282**); *backlink*

  Unknown interpreted text role "func".

- The :class:`imaplib.IMAP4` class now handles flags containing the `']'` character in messages sent from the server to improve real-world compatibility. (Contributed by Lita Cho in :issue:`21815`.)

- The :func:`mmap.write() <mmap.write>` function now returns the number of bytes written like other write methods. (Contributed by Jakub Stasiak in :issue:`26335`.)

- The :func:`pkgutil.iter_modules` and :func:`pkgutil.walk_packages` functions now return :class:`~pkgutil.ModuleInfo` named tuples. (Contributed by Ramchandra Apte in :issue:`17211`.)

- :func:`re.sub` now raises an error for invalid numerical group references in replacement templates even if the pattern is not found in the string. The error message for invalid group references now includes the group index and the position of the reference. (Contributed by SilentGhost, Serhiy Storchaka in :issue:`25953`.)

- :class:`zipfile.ZipFile` will now raise :exc:`NotImplementedError` for unrecognized compression values. Previously a plain :exc:`RuntimeError` was raised. Additionally, calling :class:`~zipfile.ZipFile` methods on a closed ZipFile or calling the :meth:`~zipfile.ZipFile.write` method on a ZipFile created with mode 'r' will raise a :exc:`ValueError`. Previously, a :exc:`RuntimeError` was raised in those scenarios.

- when custom metaclasses are combined with zero-argument :func:`super` or direct references from methods to the implicit __class__ closure variable, the implicit __classcell__ namespace entry must now be passed up to type.__new__ for initialisation. Failing to do so will result in a :exc:`DeprecationWarning` in Python 3.6 and a :exc:`RuntimeError` in Python 3.8.

- With the introduction of :exc:`ModuleNotFoundError`, import system consumers may start expecting import system replacements to raise that more specific exception when appropriate, rather than the less-specific :exc:`ImportError`. To provide future compatibility with such consumers, implementors of alternative import systems that completely replace :func:`__import__` will need to update their implementations to raise the new subclass when a module can't be found at all. Implementors of compliant plugins to the default import system shouldn't need to make any changes, as the default import system will raise the new subclass when appropriate.

Changes in the C API

- The :c:func:`PyMem_Malloc` allocator family now uses the :ref:`pymalloc allocator <pymalloc>` rather than the system :c:func:`malloc`. Applications calling :c:func:`PyMem_Malloc` without holding the GIL can now crash. Set the :envvar:`PYTHONMALLOC` environment variable to `debug` to validate the usage of memory allocators in your application. See :issue:`26249`.

- :c:func:`Py_Exit` (and the main interpreter) now override the exit status with 120 if flushing buffered data failed. See :issue:`5319`.

CPython bytecode changes

There have been several major changes to the :term:`bytecode` in Python 3.6.

- The Python interpreter now uses a 16-bit wordcode instead of bytecode. (Contributed by Demur Rumed with input and reviews from Serhiy Storchaka and Victor Stinner in :issue:`26647` and :issue:`28050`.)

- The new :opcode:`FORMAT_VALUE` and :opcode:`BUILD_STRING` opcodes as part of the :ref:`formatted string literal <whatsnew36-pep498>` implementation. (Contributed by Eric Smith in :issue:`25483` and Serhiy Storchaka in :issue:`27078`.)

- The new :opcode:`BUILD_CONST_KEY_MAP` opcode to optimize the creation of dictionaries with constant keys. (Contributed by Serhiy Storchaka in :issue:`27140`.)

- The function call opcodes have been heavily reworked for better performance and simpler implementation. The :opcode:`MAKE_FUNCTION`, :opcode:`CALL_FUNCTION`, :opcode:`CALL_FUNCTION_KW` and :opcode:`BUILD_MAP_UNPACK_WITH_CALL` opcodes have been modified, the new :opcode:`CALL_FUNCTION_EX` and :opcode:`BUILD_TUPLE_UNPACK_WITH_CALL` have been added, and `CALL_FUNCTION_VAR`, `CALL_FUNCTION_VAR_KW` and `MAKE_CLOSURE` opcodes have been removed. (Contributed by Demur Rumed in :issue:`27095`, and Serhiy Storchaka in :issue:`27213`, :issue:`28257`.)

- The new :opcode:`SETUP_ANNOTATIONS` and :opcode:`STORE_ANNOTATION` opcodes have been added to support the new :term:`variable annotation` syntax. (Contributed by Ivan Levkivskyi in :issue:`27985`.)

Notable changes in Python 3.6.2

New `make regen-all` build target

To simplify cross-compilation, and to ensure that CPython can reliably be compiled without requiring an existing version of Python to already be available, the autotools-based build system no longer attempts to implicitly recompile generated files based on file modification times.

Instead, a new `make regen-all` command has been added to force regeneration of these files when desired (e.g. after an initial version of Python has already been built based on the pregenerated versions).

More selective regeneration targets are also defined - see :source:`Makefile.pre.in` for details.

Unknown interpreted text role "source".

(Contributed by Victor Stinner in :issue:\`23404\`.)

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 2395**); *backlink*
>
> Unknown interpreted text role "issue".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 2397**)
>
> Unknown directive type "versionadded".
>
> ```
>     .. versionadded:: 3.6.2
> ```

Removal of `make touch` build target

The `make touch` build target previously used to request implicit regeneration of generated files by updating their modification times has been removed.

It has been replaced by the new `make regen-all` target.

(Contributed by Victor Stinner in :issue:\`23404\`.)

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 2408**); *backlink*
>
> Unknown interpreted text role "issue".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 2410**)
>
> Unknown directive type "versionchanged".
>
> ```
>     .. versionchanged:: 3.6.2
> ```

Notable changes in Python 3.6.4

The `PyExc_RecursionErrorInst` singleton that was part of the public API has been removed as its members being never cleared may cause a segfault during finalization of the interpreter. (Contributed by Xavier de Gaye in :issue:\`22898\` and :issue:\`30697\`.)

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 2416**); *backlink*
>
> Unknown interpreted text role "issue".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 2416**); *backlink*
>
> Unknown interpreted text role "issue".

Notable changes in Python 3.6.5

The :func:\`locale.localeconv\` function now sets temporarily the `LC_CTYPE` locale to the `LC_NUMERIC` locale in some cases. (Contributed by Victor Stinner in :issue:\`31900\`.)

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 2425**); *backlink*
>
> Unknown interpreted text role "func".

> **System Message: ERROR/3** (`D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst`, **line 2425**); *backlink*
>
> Unknown interpreted text role "issue".

Notable changes in Python 3.6.7

In 3.6.7 the :mod:`tokenize` module now implicitly emits a NEWLINE token when provided with input that does not have a trailing new line. This behavior now matches what the C tokenizer does internally. (Contributed by Ammar Askar in :issue:`33899`.)

> **System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, line 2432);** *backlink*
>
> Unknown interpreted text role "mod".

> **System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, line 2432);** *backlink*
>
> Unknown interpreted text role "issue".

Notable changes in Python 3.6.10

Due to significant security concerns, the *reuse_address* parameter of :meth:`asyncio.loop.create_datagram_endpoint` is no longer supported. This is because of the behavior of the socket option SO_REUSEADDR in UDP. For more details, see the documentation for loop.create_datagram_endpoint(). (Contributed by Kyle Stanley, Antoine Pitrou, and Yury Selivanov in :issue:`37228`.)

> **System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, line 2440);** *backlink*
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Notable changes in Python 3.6.13

Earlier Python versions allowed using both ; and & as query parameter separators in :func:`urllib.parse.parse_qs` and :func:`urllib.parse.parse_qsl`. Due to security concerns, and to conform with newer W3C recommendations, this has been changed to allow only a single separator key, with & as the default. This change also affects :func:`cgi.parse` and :func:`cgi.parse_multipart` as they use the affected functions internally. For more details, please see their respective documentation. (Contributed by Adam Goldschmidt, Senthil Kumaran and Ken Jin in :issue:`42967`.)

> **System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, line 2450);** *backlink*
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> **System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\whatsnew\[cpython-main][Doc][whatsnew]3.6.rst, line 2450);** *backlink*
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