

CVE-2019-9948: Avoid file reading by disallowing `local-file://` and `local_file://` URL schemes in `URLopener().open()` and `URLopener().retrieve()` of `mod:'urllib.request'`.

**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 7); [backlink](#)

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Prevent fold function used in email header encoding from entering infinite loop when there are too many non-ASCII characters in a header.

Updated blake2 implementation which uses secure memset implementation provided by platform.

Allow unpacking in the right hand side of annotated assignments. In particular, `t: Tuple[int, ...] = x, y, *z` is now allowed.

All structseq objects are now tracked by the garbage collector. Patch by Pablo Galindo.

Make the `co_argcount` attribute of code objects represent the total number of positional arguments (including positional-only arguments). The value of `co_posonlyargcount` can be used to distinguish which arguments are positional only, and the difference (`co_argcount - co_posonlyargcount`) is the number of positional-or-keyword arguments. Patch by Pablo Galindo.

Constructors of `:class:'int'`, `:class:'float'` and `:class:'complex'` will now use the `meth:~object.__index__` special method, if available and the corresponding method `meth:~object.__int__`, `meth:~object.__float__` or `meth:~object.__complex__` is not available.

**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 71); [backlink](#)

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**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 71); [backlink](#)

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**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 71); [backlink](#)

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**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 71); [backlink](#)

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**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 71); [backlink](#)

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Add native thread ID (TID) support to OpenBSD.

Implemented per opcode cache mechanism and `LOAD_GLOBAL` instruction use it. `LOAD_GLOBAL` is now about 40% faster. Contributed by Yury Selivanov, and Inada Naoki.

Fix crash in `PyAST_FromNodeObject()` when `flags` is `NULL`.

Freeing a great many small objects could take time quadratic in the number of arenas, due to using linear search to keep `obmalloc.c`'s list of usable arenas sorted by order of number of free memory pools. This is accomplished without search now, leaving the worst-case time linear in the number of arenas. For programs where this quite visibly matters (typically with more than 100

thousand small objects alive simultaneously), this can greatly reduce the time needed to release their memory.

Fix possible overflow in `wrap_lenfunc()` when `sizeof(long) < sizeof(Py_ssize_t)` (e.g., 64-bit Windows).

Improve the AST for "debug" f-strings, which use '=' to print out the source of the expression being evaluated. Delete `expr_text` from the `FormattedValue` node, and instead use a `Constant` string node (possibly merged with adjacent constant expressions inside the f-string).

The `bytes.hex`, `bytearray.hex`, and `memoryview.hex` methods as well as the `binascii.hexlify` and `b2a_hex` functions now have the ability to include an optional separator between hex bytes. This functionality was inspired by MicroPython's `hexlify` implementation.

Add `:func:`os.memfd_create``.

**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 161); [backlink](#)

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Added new `replace()` method to the code type (`:class:`types.CodeType``).

**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 170); [backlink](#)

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Implement `:func:`socket.if_nameindex()``, `:func:`socket.if_nametoindex()``, and `:func:`socket.if_indextoname()`` on Windows.

**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 179); [backlink](#)

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**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 179); [backlink](#)

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**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 179); [backlink](#)

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`:func:`PyErr_WriteUnraisable`` now creates a traceback object if there is no current traceback. Moreover, call `:func:`PyErr_NormalizeException`` and `:func:`PyException_SetTraceback`` to normalize the exception value. Ignore any error.

**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 189); [backlink](#)

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**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 189); [backlink](#)

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**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 189); [backlink](#)

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Only accept text after `# type: ignore` if the first character is ASCII. This is to disallow things like `# type: ignoreÃ©`.

Store text appearing after a `# type: ignore` comment in the AST. For example a type ignore like `# type: ignore[E1000]` will have the string `"[E1000]"` stored in its AST node.

Treat line continuation at EOF as a `SyntaxError` by Anthony Sottile.

Fix a crash when calling a C function with a keyword dict (`f(**kwargs)`) and changing the dict `kwargs` while that function is running.

Fix possible signed integer overflow when handling slices.

Add NamedExpression kind support to ast\_unparse.c

A `:exc:'SyntaxError'` is now raised if a code blocks that will be optimized away (e.g. if conditions that are always false) contains syntax errors. Patch by Pablo Galindo.

**System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 259); [backlink](#)**

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Allow computation of modular inverses via three-argument `pow`: the second argument is now permitted to be negative in the case where the first and third arguments are relatively prime.

Update the Unicode database to version 12.1.0.

Avoid caching attributes of classes which type defines `mro()` to avoid a hard cache invalidation problem.

The `FrameType` stack is now correctly cleaned up if the execution ends with a return and the stack is not empty.

The `compile()` builtin functions now support the `ast.PyCF_ALLOW_TOP_LEVEL_AWAIT` flag, which allow to compile sources that contains top-level `await`, `async with` or `async for`. This is useful to evaluate `async`-code from with an already `async` functions; for example in a custom REPL.

Implement PEP 578, adding `sys.audit`, `io.open_code` and related APIs.

Correct return type for `UserList` slicing operations. Patch by Michael Blahay, Erick Cervantes, and vaultah

Move `PyRuntimeState.warnings` into per-interpreter state (via "module state").

Removed `__str__` implementations from builtin types `:class:'bool'`, `:class:'int'`, `:class:'float'`, `:class:'complex'` and few classes from the standard library. They now inherit `__str__()` from `:class:'object'`.

**System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 352); [backlink](#)**

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**System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 352); [backlink](#)**

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**System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 352); [backlink](#)**

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**System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 352); [backlink](#)**

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**System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 352); [backlink](#)**

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Add `a =` feature f-strings for debugging. This can precede `!s`, `!r`, or `!a`. It produces the text of the expression, followed by an equal sign, followed by the repr of the value of the expression. So `f'{3*9+15=}'` would be equal to the string `'3*9+15=42'`. If `=` is specified, the default conversion is set to `!r`, unless a format spec is given, in which case the formatting behavior is unchanged, and `__format__` will be used.

Save the live exception during `import.c's remove_module()`.

`pymalloc` returns memory blocks aligned by 16 bytes, instead of 8 bytes, on 64-bit platforms to conform x86-64 ABI. Recent compilers assume this alignment more often. Patch by Inada Naoki.

A long-since-meaningless check for `getpid() == main_pid` was removed from Python's internal C signal handler.

Fix incorrect use of `%p` in format strings. Patch by Zackery Spytz.

`builtins.help()` now prefixes `async` for `async` functions

Add native thread ID (TID) to threading.Thread objects (supported platforms: Windows, FreeBSD, Linux, macOS)

Added fix for broken symlinks in combination with pathlib

Added new trashcan macros to deal with a double deallocation that could occur when the `tp_dealloc` of a subclass calls the `tp_dealloc` of a base class and that base class uses the trashcan mechanism. Patch by Jeroen Demeyer.

Do not clear `:data:sys.flags` and `:data:sys.float_info` during shutdown. Patch by Zackery Spytz

**System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 457); [backlink](#)**

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**System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 457); [backlink](#)**

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Expose `:func:copy_file_range` as a low level API in the `:mod:os` module.

**System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 467); [backlink](#)**

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**System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 467); [backlink](#)**

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Remove cross-version binary compatibility requirement in `tp_flags`.

Port binascii to PEP 489 multiphase initialization. Patch by Marcel Plch.

Added `:func:math.perm`.

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Add `SSLContext.num_tickets` to control the number of TLSv1.3 session tickets.

Fix the error handling in `:meth:msilib.SummaryInformation.GetProperty`. Patch by Zackery Spytz

**System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 512); [backlink](#)**

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The `fcntl` module now contains file sealing constants for sealing of memfds.

Add `get_origin()` and `get_args()` introspection helpers to `typing` module.

`:meth:msilib.Directory.start_component()` no longer fails if `keyfile` is not `None`.

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Add the `asyncio.Task.get_coro()` method to publicly expose the tasks's coroutine object.

Make `:func:asyncio.create_subprocess_exec` accept path-like arguments.

**System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 561); [backlink](#)**

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Change default `max_workers` of `ThreadPoolExecutor` from `cpu_count() * 5` to `min(32, cpu_count() + 4)`. Previous value was unreasonably large on many cores machines.

`:func:`_thread.start_new_thread`` now logs uncaught exception raised by the function using `:func:`sys.unraisablehook``, rather than `:func:`sys.excepthook``, so the hook gets access to the function which raised the exception.

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**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 581); [backlink](#)

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On macOS, the `:mod:`multiprocessing`` module now uses `spawn` start method by default.

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Fix destructor `:class:`_pyio.BytesIO`` and `:class:`_pyio.TextIOWrapper``: initialize their `_buffer` attribute as soon as possible (in the class body), because it's used by `__del__()` which calls `close()`.

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**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 603); [backlink](#)

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PEP 544: Add `Protocol` and `@runtime_checkable` to the `typing` module.

The functions `sys.set_coroutine_wrapper` and `sys.get_coroutine_wrapper` that were deprecated and marked for removal in 3.8 have been removed.

Handle late binding and attribute access in `:class:`unittest.mock.AsyncMock`` setup for autospeccing. Document newly implemented async methods in `:class:`unittest.mock.MagicMock``.

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PEP 589: Add `TypedDict` to the `typing` module.

PEP 586: Add `Literal` to the `typing` module.

PEP 591: Add `Final` qualifier and `@final` decorator to the `typing` module.

Don't log `OSError` based exceptions if a fatal error has occurred in `asyncio` transport. Peer can generate almost any `OSError`, user cannot avoid these exceptions by fixing own code. Errors are still propagated to user code, it's just logging them is pointless and pollute `asyncio` logs.

`:func:`syntable.syntable`` now accepts the same input types for source code as the built-in `:func:`compile`` function. Patch by Dino Viehland.

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Implement asyncio REPL

Return safe to use proxy socket object from `transport.get_extra_info('socket')`

Make `asyncio.CancelledError` a `BaseException`.

This will address the common mistake many asyncio users make: an "except Exception" clause breaking Tasks cancellation.

In addition to this change, we stop inheriting `asyncio.TimeoutError` and `asyncio.InvalidStateError` from their `concurrent.futures.*` counterparts. There's no point for these exceptions to share the inheritance chain.

Add a new `:func:`threading.excepthook`` function which handles uncaught `:meth:`threading.Thread.run`` exception. It can be overridden to control how uncaught `:meth:`threading.Thread.run`` exceptions are handled.

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Handle `:func:`unittest.mock.patch`` used as a decorator on async functions.

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Add support for calling `:func:`next`` with the mock resulting from `:func:`unittest.mock.mock_open``

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Allow whitespace only header encoding in `email.header` - by Batuhan Taskaya

PDB command `args` now display positional only arguments. Patch contributed by RÃ©mi Lapeyre.

PDB command `args` now display keyword only arguments. Patch contributed by RÃ©mi Lapeyre.

Add missing names to `typing.__all__`: `ChainMap`, `ForwardRef`, `OrderedDict` - by Anthony Sottile.

Add `SupportsIndex` protocol to the typing module to allow type checking to detect classes that can be passed to `hex()`, `oct()` and



`bin()`.

Implement `unittest.IsolatedAsyncioTestCase` to help testing asyncio-based code.

`:func:'fileinput.input'` and `:class:'fileinput.FileInput'` **bufsize** argument has been removed (was deprecated and ignored since Python 3.6), and as a result the **mode** and **openhook** arguments have been made keyword-only.

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Starting with Python 3.3, importing ABCs from `:mod:'collections'` is deprecated, and import should be done from `:mod:'collections.abc'`. Still being able to import from `:mod:'collections'` was marked for removal in 3.8, but has been delayed to 3.9; documentation and `DeprecationWarning` clarified.

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Implement `__repr__` for `WeakSet` objects.

Fix `:exc:'NameError'` in `:meth:'urllib.request.URLopener.retrieve'`. Patch by Karthikeyan Singaravelan.

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Fix the folding of email header when the `max_line_length` is 0 or None and the header contains non-ascii characters. Contributed by Licht Takeuchi (@Licht-T).

`:func:'shutil.copystat'` now ignores `:const:'errno.EINVAL'` on `:func:'os.setxattr'` which may occur when copying files on filesystems without extended attributes support.

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main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 875); [backlink](#)

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Original patch by Giampaolo Rodola, updated by Ying Wang.

Python child processes can now access the status of their parent process using `multiprocessing.process.parent_process`

Deprecate `@coroutine` for sake of `async def`.

Fix bug in `__rmod__` of `UserString` - by Batuhan Taskaya.

Remove a message about an unhandled exception in a task when `writer.write()` is used without `await` and `writer.drain()` fails with an exception.

Introduce `:class:'asyncio.Stream'` class that merges `:class:'asyncio.StreamReader'` and `:class:'asyncio.StreamWriter'` functionality. `:class:'asyncio.Stream'` can work in readonly, writeonly and readwrite modes. Provide `:func:'asyncio.connect'`, `:func:'asyncio.connect_unix'`, `:func:'asyncio.connect_read_pipe'` and `:func:'asyncio.connect_write_pipe'` factories to open `:class:'asyncio.Stream'` connections. Provide `:class:'asyncio.StreamServer'` and `:class:'UnixStreamServer'` to serve servers with `asyncio.Stream` API. Modify `:func:'asyncio.create_subprocess_shell'` and `:func:'asyncio.create_subprocess_exec'` to use `:class:'asyncio.Stream'` instead of deprecated `:class:'StreamReader'` and `:class:'StreamWriter'`. Deprecate `:class:'asyncio.StreamReader'` and `:class:'asyncio.StreamWriter'`. Deprecate usage of private classes, e.g. `:class:'asyncio.FlowControlMixing'` and `:class:'asyncio.StreamReaderProtocol'` outside of `asyncio` package.

**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 926); [backlink](#)

Unknown interpreted text role "class".

**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 926); [backlink](#)

Unknown interpreted text role "class".

**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 926); [backlink](#)

Unknown interpreted text role "class".

**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 926); [backlink](#)

Unknown interpreted text role "class".

**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 926); [backlink](#)

Unknown interpreted text role "func".

**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 926); [backlink](#)

Unknown interpreted text role "func".

**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 926); [backlink](#)

Unknown interpreted text role "func".

**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 926); [backlink](#)

Unknown interpreted text role "func".

**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 926); [backlink](#)

Unknown interpreted text role "class".



**System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 926); [backlink](#)**

Unknown interpreted text role "class".

**System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 926); [backlink](#)**

Unknown interpreted text role "class".

**System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 926); [backlink](#)**

Unknown interpreted text role "func".

**System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 926); [backlink](#)**

Unknown interpreted text role "func".

**System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 926); [backlink](#)**

Unknown interpreted text role "class".

**System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 926); [backlink](#)**

Unknown interpreted text role "class".

**System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 926); [backlink](#)**

Unknown interpreted text role "class".

**System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 926); [backlink](#)**

Unknown interpreted text role "class".

**System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 926); [backlink](#)**

Unknown interpreted text role "class".

**System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 926); [backlink](#)**

Unknown interpreted text role "class".

**System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 926); [backlink](#)**

Unknown interpreted text role "class".

Added validation of integer prefixes to the construction of IP networks and interfaces in the `ipaddress` module.

Add an extend action to `argparser`.

Fix a bug making a `SharedMemoryManager` instance and its parent process use two separate `resource_tracker` processes.

Adds a grammar to `lib2to3.pygram` that contains `exec` as a function not as statement.

The function `time.clock()` was deprecated in 3.3 in favor of `time.perf_counter()` and marked for removal in 3.8, it has removed.

Fix asyncio discarding IPv6 scopes when ensuring hostname resolutions internally

Add new function `:func:`math.isqrt`` to compute integer square roots.

**System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 1007); [backlink](#)**

Unknown interpreted text role "func".

Introduce the `importlib.metadata` module with (provisional) support for reading metadata from third-party packages.

When using `type_comments=True` in `ast.parse`, treat `# type: ignore` followed by a non-alphanumeric character and then arbitrary text as a `type ignore`, instead of requiring nothing but whitespace or another comment. This is to permit formations such as `# type: ignore[E1000]`.

`cp65001` encoding (Windows code page 65001) becomes an alias to `utf_8` encoding.

The `multiprocessing.resource_tracker` replaces the `multiprocessing.semaphore_tracker` module. Other than semaphores, `resource_tracker` also tracks shared memory segments.

The `Cache` and `Statement` objects of the `:mod:`sqlite3`` module are not exposed to the user. Patch by Aviv Palivoda.

**System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 1059); [backlink](#)**

Unknown interpreted text role "mod".

In `shutil.copystat()`, first copy extended file attributes and then file permissions, since extended attributes can only be set on the destination while it is still writeable.

Add new `:func:`sys.unraisablehook`` function which can be overridden to control how "unraisable exceptions" are handled. It is called when an exception has occurred but there is no way for Python to handle it. For example, when a destructor raises an exception or during garbage collection (`:func:`gc.collect``).

**System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 1080); [backlink](#)**

Unknown interpreted text role "func".

**System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 1080); [backlink](#)**

Unknown interpreted text role "func".

Introducing `zipfile.Path`, a `pathlib`-compatible wrapper for traversing zip files.

Fix an issue where `os.posix_spawn()` would incorrectly raise a `TypeError` when `file_actions` is `None`.

Handle exceptions raised by functions added by `concurrent.futures.add_done_callback` correctly when the `Future` has already completed.

Limit `max_workers` in `ProcessPoolExecutor` to 61 to work around a `WaitForMultipleObjects` limitation.

Fix `:class:`~logging.handlers.QueueListener`` to call `queue.task_done()` upon stopping. Patch by Bar Harel.

**System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 1133); [backlink](#)**

Unknown interpreted text role "class".

Forbid creation of asyncio stream objects like `StreamReader`, `StreamWriter`, `Process`, and their protocols outside of asyncio package.

Provide both sync and async calls for `StreamWriter.write()` and `StreamWriter.close()`

Properly handle SSL connection closing in asyncio `StreamWriter.drain()` call.

Implement PEP 574 (pickle protocol 5 with out-of-band buffers).

`functools.lru_cache()` can now be used as a straight decorator in addition to its existing usage as a function that returns a decorator.

Add a `:exc:`~gzip.BadGzipFile`` exception to the `:mod:`gzip`` module.

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

main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 1191); [backlink](#)

Unknown interpreted text role "exc".

**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 1191); [backlink](#)

Unknown interpreted text role "mod".

Optimized write buffering in C implementation of `TextIOWrapper`. Writing ASCII string to `TextIOWrapper` with `ascii`, `latin1`, or `utf-8` encoding is about 20% faster. Patch by Inada Naoki.

Don't mark `wsgiref.simple_server.SimpleServer` as multi-threaded since `wsgiref.simple_server.WSGIServer` is single-threaded.

`:func:`py_compile.compile`` now supports silent mode. Patch by Joannah Nanjekye

**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 1221); [backlink](#)

Unknown interpreted text role "func".

Fix double exceptions in `:class:`wsgiref.handlers.BaseHandler`` by calling its `:meth:`~wsgiref.handlers.BaseHandler.close`` method only when no exception is raised.

**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 1231); [backlink](#)

Unknown interpreted text role "class".

**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 1231); [backlink](#)

Unknown interpreted text role "meth".

Improved the repr of regular expression flags.

The signature of Python functions can now be overridden by specifying the `__text_signature__` attribute.

Reinitialize logging.Handler locks in forked child processes instead of attempting to acquire them all in the parent before forking only to be released in the child process. The acquire/release pattern was leading to deadlocks in code that has implemented any form of chained logging handlers that depend upon one another as the lock acquisition order cannot be guaranteed.

Throw a `TypeError` instead of an `AssertionError` when using an invalid type annotation with `singledispatch`.

Allow reduction methods to return a 6-item tuple where the 6th item specifies a custom state-setting method that's called instead of the regular `__setstate__` method.

enable custom reduction callback registration for functions and classes in `_pickle.c`, using the new Pickler's attribute `reducer_override`

Fix a bug crashing `SharedMemoryManager` instances in interactive sessions after a `ctrl-c` (`KeyboardInterrupt`) was sent

Fix `mmap` fail for `VxWorks`

`:meth:`csv.DictWriter.writeheader`` now returns the return value of the underlying `:meth:`csv.Writer.writerow`` method. Patch contributed by Ashish Nitin Patil.

**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 1325); [backlink](#)

Unknown interpreted text role "meth".

**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 1325); [backlink](#)

Unknown interpreted text role "meth".

Parsing `.mo` files now ignores comments starting and ending with `##-##-##`.

Enable `plistlib` to read and write binary `plist` files that were created as a `KeyedArchive` file. Specifically, this allows the `plistlib` to process `0x80` tokens as `UID` objects.

Add posix module support for VxWorks.

Asyncio: Remove inner callback on outer cancellation in shield

Fix `meth: asyncio.SelectorEventLoop.subprocess_exec()` leaks file descriptors if `Popen` fails and called with `stdin=subprocess.PIPE`. Patch by Niklas Fiekas.

**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 1374); [backlink](#)

Unknown interpreted text role "meth".

`func: unittest.mock.mock_open` results now respects the argument of `read([size])`. Patch contributed by RÃ©mi Lapeyre.

**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 1385); [backlink](#)

Unknown interpreted text role "func".

Implement `func: math.comb` that returns binomial coefficient, that computes the number of ways to choose k items from n items without repetition and without order. Patch by Yash Aggarwal and Keller Fuchs.

**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 1395); [backlink](#)

Unknown interpreted text role "func".

Fixed permission errors in `class: tempfile.TemporaryDirectory` clean up. Previously `TemporaryDirectory.cleanup()` failed when non-writable or non-searchable files or directories were created inside a temporary directory.

**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 1406); [backlink](#)

Unknown interpreted text role "class".

Add debugging helpers to ssl module. It's now possible to dump key material and to trace TLS protocol. The default and stdlib contexts also support SSLKEYLOGFILE env var.

Added AsyncMock to support using unittest to mock asyncio coroutines. Patch by Lisa Roach.

`dataclasses.InitVar`: Exposes the type used to create the init var.

Fix serialization of messages containing encoded strings when the `policy.linesep` is set to a multi-character string. Patch by Jens Troeger.

Performance of `func: functools.reduce` is slightly improved. Patch by Sergey Fedoseev.

**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 1458); [backlink](#)

Unknown interpreted text role "func".

Fix a bug in `class: codecs.StreamRecoder` where seeking might leave old data in a buffer and break subsequent read calls. Patch by Ammar Askar.

**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 1468); [backlink](#)

Unknown interpreted text role "class".

The `mod: shlex` module now exposes `func: shlex.join`, the inverse of `func: shlex.split`. Patch by Bo Bayles.

**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 1478); [backlink](#)

Unknown interpreted text role "mod".

**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 1478); [backlink](#)

Unknown interpreted text role "func".

**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 1478); [backlink](#)

Unknown interpreted text role "func".

`meth: asyncio.AbstractEventLoop.create_datagram_endpoint`: Do not connect UDP socket when broadcast is allowed. This allows to receive replies after a UDP broadcast.

**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 1488); [backlink](#)

Unknown interpreted text role "meth".

Change ThreadPoolExecutor to use existing idle threads before spinning up new ones.

Added support for bytes and path-like objects in `func: subprocess.Popen` on Windows. The `args` parameter now accepts a `term: path-like object` if `shell` is `False` and a sequence containing bytes and path-like objects. The `executable` parameter now accepts a bytes and `term: path-like object`. The `cwd` parameter now accepts a bytes object. Based on patch by Anders Lorentsen.

**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 1509); [backlink](#)

Unknown interpreted text role "func".

**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 1509); [backlink](#)

Unknown interpreted text role "term".

**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 1509); [backlink](#)

Unknown interpreted text role "term".

`class: pathlib.Path.unlink` now accepts a `missing_ok` parameter to avoid a `exc: FileNotFoundError` from being raised. Patch by Robert Buchholz.

**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 1523); [backlink](#)

Unknown interpreted text role "class".

**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 1523); [backlink](#)

Unknown interpreted text role "exc".

Allow `class: mmap.mmap` objects to access the `madvise()` system call (through `meth: mmap.mmap.madvise`).

**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 1533); [backlink](#)

Unknown interpreted text role "class".

**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 1533); [backlink](#)

Unknown interpreted text role "meth".

Added support for ZIP files with disks set to 0. Such files are commonly created by builtin tools on Windows when use ZIP64 extension. Patch by Francisco Facioni.

`trace.py` can now run modules via `python3 -m trace -t --module module_name`

Changed `:func:`unittest.mock.patch.dict`` to return the patched dictionary when used as context manager. Patch by Vadim Tsander.

**System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 1563); [backlink](#)**

Unknown interpreted text role "func".

Added a `__copy__()` to `collections.UserList` and `collections.UserDict` in order to correctly implement shallow copying of the objects. Patch by Bar Harel.

`\r`, `\0` and `\x1a` (end-of-file on Windows) are now escaped in protocol 0 pickles of Unicode strings. This allows to load them without loss from files open in text mode in Python 2.

`_thread.interrupt_main()` now avoids setting the Python error status if the `SIGINT` signal is ignored or not handled by Python.

Clarify that some types have unstable constructor signature between Python versions.

Improve documentation of the `stdin`, `stdout`, and `stderr` arguments of the `asyncio.subprocess_exec` function to specify which values are supported. Also mention that decoding as text is not supported.

Add a few tests to verify that the various values passed to the `std*` arguments actually work.

Improve version added references in `typing` module - by Anthony Sottile.

What's new now mentions `SSLContext.hostname_checks_common_name` instead of `SSLContext.host_flags`.

Add a note to the `curses.addstr()` documentation to warn that multiline strings can cause segfaults because of an ncurses bug.

Added C API Documentation for `Time_FromTimeAndFold` and `PyDateTime_FromDateAndTimeAndFold` as per PEP 495. Patch by Edison Abahurire.

More of the legacy distutils documentation has been either pruned, or else more clearly marked as being retained solely until the `setuptools` documentation covers it independently.

Add detail to the documentation on the `pty.spawn` function.

Remove deprecation and document `urllib.parse.unwrap()`. Patch contributed by RÃ©mi Lapeyre.

Added the context variable in glossary.

Clarify that `copy()` is not part of the `MutableSequence` ABC.

Make `codecs.StreamRecoder.writelines` take a list of bytes.

Added documentation for `func.factorial` to indicate that returns integer values

Expand object.`__doc__` (docstring) to make it clearer. Modify `pydoc.py` so that `help(object)` lists object methods (for other classes, `help` omits methods of the object base class.)

Modify `test_coroutines`, `test_cprofile`, `test_generators`, `test_raise`, `test_ssl` and `test_yield_from` to use `:func:`test.support.catch_unraisable_exception`` rather than `:func:`test.support.captured_stderr``.

**System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 1746); [backlink](#)**

Unknown interpreted text role "func".

**System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 1746); [backlink](#)**

Unknown interpreted text role "func".

Fix `test_memfd_create` on older Linux Kernels.

Test with OpenSSL 1.1.1c

Add `:func:`test.support.catch_unraisable_exception``: context manager catching unraisable exception using `:func:`sys.unraisablehook``.

**System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 1775); [backlink](#)**

Unknown interpreted text role "func".

**System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 1775); [backlink](#)**

Unknown interpreted text role "func".



The main regrtest process now always removes all temporary directories of worker processes even if they crash or if they are killed on KeyboardInterrupt (CTRL+c).

"python3 -m test -jN ..." now continues the execution of next tests when a worker process crash (CHILD\_ERROR state). Previously, the test suite stopped immediately. Use --failfast to stop at the first error.

Update Lib/test/selfsigned\_pythontestdotnet.pem to match self-signed.pythontest.net's new TLS certificate.

Skip httpplib and nntplib networking tests when they would otherwise fail due to a modern OS or distro with a default OpenSSL policy of rejecting connections to servers with weak certificates.

Add tests for several C API functions in the `mod:`datetime`` module. Patch by Edison Abahurire.

**System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 1828); [backlink](#)**  
Unknown interpreted text role "mod".

Fix test\_multiprocessing in test\_venv if platform lacks functioning sem\_open.

To embed Python into an application, a new --embed option must be passed to python3-config --libs --embed to get -lpython3.8 (link the application to libpython). To support both 3.8 and older, try python3-config --libs --embed first and fallback to python3-config --libs (without --embed) if the previous command fails.

Add a pkg-config python-3.8-embed module to embed Python into an application: pkg-config python-3.8-embed --libs includes -lpython3.8. To support both 3.8 and older, try pkg-config python-X.Y-embed --libs first and fallback to pkg-config python-X.Y --libs (without --embed) if the previous command fails (replace X.Y with the Python version).

On the other hand, pkg-config python3.8 --libs no longer contains -lpython3.8. C extensions must not be linked to libpython (except on Android, case handled by the script); this change is backward incompatible on purpose.

"make install" now runs compileall in parallel.

include of STATUS\_CONTROL\_C\_EXIT without depending on MSC compiler

Update to OpenSSL 1.1.1b for Windows.

Add Windows support for UDP transports for the Proactor Event Loop. Patch by Adam Meily.

The `c:macro:`Py_DEPRECATED`` macro has been implemented for MSVC.

**System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 1910); [backlink](#)**  
Unknown interpreted text role "c:macro".

Support building Python on macOS without /usr/include installed. As of macOS 10.14, system header files are only available within an SDK provided by either the Command Line Tools or the Xcode app.

Replace now redundant .context\_use\_ps1 with .prompt\_last\_line. This finishes change started in bpo-31858.

Make idlib.run runnable; add test clause.

Print any argument other than None or int passed to SystemExit or sys.exit().

When saving a file, call os.fsync() so bits are flushed to e.g. USB drive.

In browser.py, remove extraneous sorting by line number since dictionary was created in line number order.

Handle strings like u"bar" correctly in Tools/parser/unparse.py. Patch by Chih-Hsuan Yen.

Implement the [PEP 587](#) "Python Initialization Configuration".

Fix crashes when attempting to use the modulo parameter when \_\_ipow\_\_ is implemented in C.

Update `c:func:`PyObject_CallMethodObjArgs`` and `_PyObject_CallMethodIdObjArgs` to use `_PyObject_GetMethod` to avoid creating a bound method object in many cases. Patch by Michael J. Sullivan.

**System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 2007); [backlink](#)**  
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Implement [PEP 590](#): Vectorcall: a fast calling protocol for CPython. This is a new protocol to optimize calls of custom callable objects.

Py\_Main() now returns the exitcode rather than calling Py\_Exit(exitcode) when calling PyErr\_Print() if the current exception type is SystemExit.

Add new type flag `PY_TPFLAGS_METHOD_DESCRIPTOR` for objects behaving like unbound methods. These are objects supporting the optimization given by the `LOAD_METHOD/CALL_METHOD` opcodes. See PEP 590.

The `:func:'PyEval_ReInitThreads'` function has been removed from the C API. It should not be called explicitly; use `:func:'PyOS_AfterFork_Child'` instead.

**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 2050); [backlink](#)

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**System Message: ERROR/3** (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ [cpython-main] [Misc] [NEWS.d] 3.8.0b1.rst, line 2050); [backlink](#)

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