

Add volatile to the accumulator variable in `hmac.compare_digest`, making constant-time-defeating optimizations less likely. `types.GenericAlias` will now raise a `TypeError` when attempting to initialize with a keyword argument. Previously, this would cause the interpreter to crash if the interpreter was compiled with debug symbols. This does not affect interpreters compiled for release. Patch by Ken Jin.

Several built-in and standard library types now ensure that their internal result tuples are always tracked by the `:term:` 'garbage collector <garbage collection>':

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 29); [backlink](#)

Unknown interpreted text role "term".

- `:meth:` `collections.OrderedDict.items()` <collections.OrderedDict>

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 33); [backlink](#)

Unknown interpreted text role "meth".

- `:meth:` `dict.items`

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 35); [backlink](#)

Unknown interpreted text role "meth".

- `:func:` `enumerate`

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 37); [backlink](#)

Unknown interpreted text role "func".

- `:func:` `functools.reduce`

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 39); [backlink](#)

Unknown interpreted text role "func".

- `:func:` `itertools.combinations`

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 41); [backlink](#)

Unknown interpreted text role "func".

- `:func:` `itertools.combinations_with_replacement`

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 43); [backlink](#)

Unknown interpreted text role "func".

- `:func:` `itertools.permutations`

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 45); [backlink](#)

Unknown interpreted text role "func".

- `:func:`itertools.product``

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 47); [backlink](#)

Unknown interpreted text role "func".

- `:func:`itertools.zip_longest``

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 49); [backlink](#)

Unknown interpreted text role "func".

- `:func:`zip``

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 51); [backlink](#)

Unknown interpreted text role "func".

Previously, they could have become untracked by a prior garbage collection. Patch by Brandt Bucher.

Improve handling of exceptions near recursion limit. Converts a number of Fatal Errors in RecursionErrors.

PEP 626: After a return, the `f_lineno` attribute of a frame is always the last line executed.

Speed up comparison of bytes objects with non-bytes objects when option `:option:`-b`` is specified. Speed up comparison of bytearray objects with non-buffer object.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 83); [backlink](#)

Unknown interpreted text role "option".

Port the `_warnings` extension module to the multi-phase initialization API (PEP 489). Patch by Victor Stinner.

On Windows, the `SIGINT` event, `_PyOS_SigintEvent()`, is now created even if Python is configured to not install signal handlers (if `:c:member:`PyConfig.install_signal_handlers`` equals to 0, or `Py_InitializeEx(0)`).

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 104); [backlink](#)

Unknown interpreted text role "c:member".

Allow assignment expressions in set literals and set comprehensions as per PEP 572. Patch by Pablo Galindo.

Change function parameters annotations internal representation to tuple of strings. Patch provided by Yurii Karabas.

Fix a regression introduced by the new parser, where an unparenthesized walrus operator was not allowed within generator expressions.

Allow an unparenthesized walrus in subscript indexes.

Make sure that the compiler front-end produces a well-formed control flow graph. Be more aggressive in the compiler back-end, as it is now safe to do so.

On Windows, fix a regression in signal handling which prevented to interrupt a program using CTRL+C. The signal handler can be run in a thread different than the Python thread, in which case the test deciding if the thread can handle signals is wrong.

`:class:`types.GenericAlias`` objects can now be the targets of weakrefs.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 178); [backlink](#)

Unknown interpreted text role "class".

Optimise constant subexpressions that appear as part of named expressions (previously the AST optimiser did not descend into named expressions). Patch by Nick Coghlan.

Fixed a bug with the LOAD_ATTR opcode cache that was not respecting monkey-patching a class-level attribute to make it a descriptor. Patch by Pablo Galindo.

Convert `mod:'queue'` to use heap types.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 209); [backlink](#)

Unknown interpreted text role "mod".

Improved accuracy of line tracing events and `f_lineno` attribute of `Frame` objects. See PEP 626 for details.

Convert `mod:'mmap'` to use heap types.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 228); [backlink](#)

Unknown interpreted text role "mod".

Allow `GenericAlias` objects to use `ref: union type expressions <types-union>`. This allows expressions like `list[int] | dict[float, str]` where previously a `TypeError` would have been thrown. This also fixes union type expressions not deduplicating `GenericAlias` objects. (Contributed by Ken Jin in [issue: 42233](#).)

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 237); [backlink](#)

Unknown interpreted text role "ref".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 237); [backlink](#)

Unknown interpreted text role "issue".

The import system triggers a *ImportWarning* when it falls back to using `load_module()`.

`CGIHTTPRequestHandler.run_cgi()` HTTP_ACCEPT improperly parsed. Replace the special purpose `getallmatchingheaders` with generic `get_all` method and add relevant tests.

Original Patch by Martin Panter. Modified by Senthil Kumaran.

Fix issue when `dis` failed to parse function that has no line numbers. Patch provided by Yurii Karabas.

`:func:'inspect.findsource'` now raises `:exc:'OSError'` instead of `:exc:'IndexError'` when `:attr:'co_lineno'` of a code object is greater than the file length. This can happen, for example, when a file is edited after it was imported. PR by Irit Katriel.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 283); [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) 3.10.0a3.rst, line 283); [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) 3.10.0a3.rst, line 283); [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) 3.10.0a3.rst, line 283); [backlink](#)

Unknown interpreted text role "attr".

Fix handling of trailing comments by `:func:'inspect.getsource'`.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 295); [backlink](#)

Unknown interpreted text role "func".

Remove unexpected call of `__bool__` when passing a `spec_arg` argument to a `Mock`.

Added `itertools.pairwise()`

Fix `test_master_read()` so that it succeeds on all platforms that either raise `OSError` or return `b""` upon reading from master.

`ChainMap.__iter__` no longer calls `__getitem__` on underlying maps

`:class:`~traceback.TracebackException`` no longer holds a reference to the exception's traceback object. Consequently, instances of `TracebackException` for equivalent but non-equal exceptions now compare as equal.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 342); [backlink](#)

Unknown interpreted text role "class".

Make `test_openpty()` avoid unexpected success due to number of rows and/or number of columns being `= 0`.

Remove loop parameter from `asyncio.subprocess` and `asyncio.tasks` functions. Patch provided by Yurii Karabas.

Remove loop parameter from `asyncio.open_connection` and `asyncio.start_server` functions. Patch provided by Yurii Karabas.

Add `:func:`platform.freedesktop_os_release`` function to parse `freedesktop.org` `os-release` files.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 383); [backlink](#)

Unknown interpreted text role "func".

Removed the `formatter` module, which was deprecated in Python 3.4. It is somewhat obsolete, little used, and not tested. It was originally scheduled to be removed in Python 3.6, but such removals were delayed until after Python 2.7 EOL. Existing users should copy whatever classes they use into their code. Patch by Dong-hee Na and and Terry J. Reedy.

Deprecate `zipimport.zipimporter.load_module()` in favour of `exec_module()`.

Updated tests for the `pty` library. `test_basic()` has been changed to `test_openpty()`; this additionally checks if slave termios and slave winsize are being set properly by `pty.openpty()`. In order to add support for FreeBSD, NetBSD, OpenBSD, and Darwin, this also adds `test_master_read()`, which demonstrates that `pty.spawn()` should not depend on an `OSError` to exit from its copy loop.

Remove loop parameter from `__init__` in all `asyncio.locks` and `asyncio.Queue` classes. Patch provided by Yurii Karabas.

Make `:class:`filecmp.dircmp`` respect subclassing. Now the `:attr:`filecmp.dircmp.subdirs`` behaves as expected when subclassing `dircmp`.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 439); [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) 3.10.0a3.rst, line 439); [backlink](#)

Unknown interpreted text role "attr".

The exception `:exc:`socket.timeout`` is now an alias of `:exc:`TimeoutError``.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 449); [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) 3.10.0a3.rst, line 449); [backlink](#)

Unknown interpreted text role "exc".

Support signal module on VxWorks.

We fixed an issue in `pickle.whichmodule` in which importing `multiprocessing` could change the how pickle identifies which module an object belongs to, potentially breaking the unpickling of those objects.

Simplify the `:mod:'importlib'` external bootstrap code: `importlib._bootstrap_external` now uses regular imports to import builtin modules. When it is imported, the builtin `:func:'__import__()` function is already fully working and so can be used to import builtin modules like `:mod:'sys'`. Patch by Victor Stinner.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 478); [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) 3.10.0a3.rst, line 478); [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) 3.10.0a3.rst, line 478); [backlink](#)

Unknown interpreted text role "mod".

Convert `_sre` module types to heap types (PEP 384). Patch by Erlend E. Aasland.

subprocess module update for DragonFlyBSD support.

Port the `_signal` extension module to the multi-phase initialization API (PEP 489). Patch by Victor Stinner and Mohamed Koubaa.

`:func:'time.time()'`, `:func:'time.perf_counter()'` and `:func:'time.monotonic()'` functions can no longer fail with a Python fatal error, instead raise a regular Python exception on failure.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 520); [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) 3.10.0a3.rst, line 520); [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) 3.10.0a3.rst, line 520); [backlink](#)

Unknown interpreted text role "func".

Fixed `:meth:'tkinter.ttk.Style.map'`. The function accepts now the representation of the default state as empty sequence (as returned by `Style.map()`). The structure of the result is now the same on all platform and does not depend on the value of `wantobjects`.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 531); [backlink](#)

Unknown interpreted text role "meth".

Fix various issues with `typing.Literal` parameter handling (flatten, deduplicate, use type to cache key). Patch provided by Yurii Karabas.

`:func:'time.perf_counter()'` on Windows and `:func:'time.monotonic()'` on macOS are now system-wide. Previously, they used an offset computed at startup to reduce the precision loss caused by the float type. Use `:func:'time.perf_counter_ns()'` and `:func:'time.monotonic_ns()'` added in Python 3.7 to avoid this precision loss.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 553); [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) 3.10.0a3.rst, line 553); [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) 3.10.0a3.rst, line 553); [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) 3.10.0a3.rst, line 553); [backlink](#)

Unknown interpreted text role "func".

Fixed support of non-BMP characters in `mod:`tkinter`` on macOS.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 566); [backlink](#)

Unknown interpreted text role "mod".

Fix the `:class:`threading.Thread`` class at fork: do nothing if the thread is already stopped (ex: fork called at Python exit). Previously, an error was logged in the child process.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 575); [backlink](#)

Unknown interpreted text role "class".

Port `_ssl` extension module to heap types.

The `onerror` callback from `shutil.rmtree` now receives correct function when `os.open` fails.

Fix `os.sendfile()` on illumos.

Add `:data:`threading._excepthook`` to allow retrieving the original value of `:func:`threading.excepthook`` in case it is set to a broken or a different value. Patch by Mario Corchero.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 614); [backlink](#)

Unknown interpreted text role "data".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 614); [backlink](#)

Unknown interpreted text role "func".

Implement PEP 451/spec methods on `zipimport.zipimporter`: `find_spec()`, `create_module()`, and `exec_module()`.

This also allows for the documented deprecation of `find_loader()`, `find_module()`, and `load_module()`.

Mock objects which are not unsafe will now raise an `AttributeError` if an attribute with the prefix `assert`, `aseert`, or `assrt` is accessed, in addition to this already happening for the prefixes `assert` or `assret`.

`sqlite3.OptimizedUnicode` has been undocumented and obsolete since Python 3.3, when it was made an alias to `:class:`str``. It is now deprecated, scheduled for removal in Python 3.12.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 649); [backlink](#)

Unknown interpreted text role "class".

Added `:func:`threading.gettrace`` and `:func:`threading.getprofile`` to retrieve the functions set by `:func:`threading.settrace`` and `:func:`threading.setprofile`` respectively. Patch by Mario Corchero.

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

main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 660); [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) 3.10.0a3.rst, line 660); [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) 3.10.0a3.rst, line 660); [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) 3.10.0a3.rst, line 660); [backlink](#)

Unknown interpreted text role "func".

Fixed writing binary Plist files larger than 4 GiB.

On Unix, the `func.os.device_encoding` function now returns `'UTF-8'` rather than the device encoding if the `ref`Python UTF-8 Mode <utf8-mode>` is enabled.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 680); [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) 3.10.0a3.rst, line 680); [backlink](#)

Unknown interpreted text role "ref".

webbrowser: Ignore `NotADirectoryError` when calling `xdg-settings`.

Fix a stack overflow error for `asyncio Task` or `Future repr()`.

The overflow occurs under some circumstances when a `Task` or `Future` recursively returns itself.

Improve `asyncio.wait` function to create the futures set just one time.

Update various modules in the stdlib to fall back on `__spec__.loader` when `__loader__` isn't defined on a module.

The `load_module()` methods found in `importlib` now trigger a `DeprecationWarning`.

Windows: Change `sysconfig.get_config_var('EXT_SUFFIX')` to the expected full `platform_tag.extension` format. Previously it was hard-coded to `.pyd`, now it is compatible with `distutils.sysconfig` and will result in something like `.cp38-win_amd64.pyd`. This brings windows into conformance with the other platforms.

The `func:traceback.format_exception`, `func:traceback.format_exception_only`, and `func:traceback.print_exception` functions can now take an exception object as a positional-only argument.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 754); [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) 3.10.0a3.rst, line 754); [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) 3.10.0a3.rst, line 754); [backlink](#)

Unknown interpreted text role "func".

Enum: fix regression involving inheriting a multiply-inherited enum

Convert `mod:'sqlite3'` to use heap types (PEP 384). Patch by Erlend E. Aasland.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 775); [backlink](#)

Unknown interpreted text role "mod".

Added support for the XPath != operator in xml.etree

Fix `meth:pprint.PrettyPrinter.format` overrides being ignored for contents of small containers. The `func:pprint._safe_repr` function was removed.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 794); [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) 3.10.0a3.rst, line 794); [backlink](#)

Unknown interpreted text role "func".

Expose the `c:func:splice` as `func:os.splice` in the `mod:os` module. Patch by Pablo Galindo

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 804); [backlink](#)

Unknown interpreted text role "c:func".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 804); [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) 3.10.0a3.rst, line 804); [backlink](#)

Unknown interpreted text role "mod".

Clarify the error message for `exc:asyncio.IncompleteReadError` when expected is None.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 814); [backlink](#)

Unknown interpreted text role "exc".

Add async context manager support for `contextlib.nullcontext`.

`attr:pathlib.PurePath.parents` now supports negative indexing. Patch contributed by Yaroslav Pankovych.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 833); [backlink](#)

Unknown interpreted text role "attr".

Added missing `connect_accepted_socket()` method to `asyncio.AbstractEventLoop`.

Extracting a symlink from a tarball should succeed and overwrite the symlink if it already exists. The fix is to remove the existing file or symlink before extraction. Based on patch by Chris AtLee, Jeffrey Kintscher, and Senthil Kumaran.

`mod:urlib.request` and `mod:http.client` now send `http/1.1 ALPN` extension during TLS handshake when no custom context is supplied.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 865); [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) 3.10.0a3.rst, line 865); [backlink](#)

Unknown interpreted text role "mod".

Add `func.os.eventfd` to provide a low level interface for Linux's event notification file descriptor.

Add `AsyncContextDecorator` to `contextlib` to support async context manager as a decorator.

Fix time-of-check/time-of-action issue in `subprocess.Popen.send_signal`.

Add an `is_async` identifier to `mod:`pycbr``'s `Function` objects. Patch by Batuhan Taskaya

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 904); [backlink](#)

Unknown interpreted text role "mod".

Add slice support to `attr:`pathlib.PurePath.parents``.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 914); [backlink](#)

Unknown interpreted text role "attr".

Tentative to deprecate `make_suspicious` by first removing it from the CI and documentation builds, but keeping it around for manual uses.

Fix the URL for the IMAP protocol documents.

Language and version switchers, previously maintained in every cpython branches, are now handled by `docsbuild-script`.

Re-enable `test_gdb` on `gdb 9.2` and newer: https://bugzilla.redhat.com/show_bug.cgi?id=1866884 bug is fixed in `gdb 10.1`.

Fix `test_asyncio.test_call_later()` race condition: don't measure `asyncio` performance in the `call_later()` unit test. The test failed randomly on the CI.

Fix `test_netrc` on `VxWorks`: create temporary directories using `temp_cwd()`.

skip `test_getaddrinfo_ipv6_scopeid_symbolic` and `test_getnameinfo_ipv6_scopeid_symbolic` on `VxWorks`

skip `test_test` of `test_mailcap` on `VxWorks`

add shell requirement for `test_pipes`

skip some tests related to `fifo` on `VxWorks`

Fix `test_doctest.py` failures for `VxWorks`.

Include `_testinternalcapi` module in Windows installer for test suite

`test_ssl`: skip `test_min_max_version_mismatch` when `TLS 1.0` is not available

Fix `os` module failures for `VxWorks RTOS`.

Fix `fifo` test cases for `VxWorks RTOS`.

remove `libnet` dependency from `detect_socket()` for `VxWorks`

Fix a race condition in "make regen-all" when `make -jN` option is used to run jobs in parallel. The `clinic.py` script now only use atomic write to write files. Moreover, generated files are now left unchanged if the content does not change, to not change the file modification time.

Fix building `pycore_bitutils.h` internal header on old clang version without `__builtin_bswap16()` (ex: Xcode 4.6.3 on Mac OS X 10.7). Patch by Joshua Root and Victor Stinner.

It is no longer possible to build the `_ctypes` extension module without `c:type:`wchar_t`` type: remove `CTYPES_UNICODE` macro. Anyway, the `c:type:`wchar_t`` type is required to build Python. Patch by Victor Stinner.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 1097); [backlink](#)

Unknown interpreted text role "c:type".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 1097); [backlink](#)

Unknown interpreted text role "c:type".

Support was removed for AIX 5.3 and below. See [:issue:40680](#).

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 1108); [backlink](#)

Unknown interpreted text role "issue".

Addressed three compiler warnings found by undefined behavior sanitizer (ubsan).

Remove macro definition of `copysign` (to `_copysign`) in headers.

The Windows launcher now properly handles Python 3.10 when listing installed Python versions.

Fix build on macOS Big Sur when `MACOSX_DEPLOYMENT_TARGET=11`

Ensure `distutils.unixccompiler.find_library_file` can find system provided libraries on macOS 11.

Add support for macOS 11 and Apple Silicon systems.

It is now possible to build "Universal 2" binaries using `--enable-universalsdk --with-universal-archs=universal2`.

Binaries build on later macOS versions can be deployed back to older versions (tested up to macOS 10.9), when using the correct deployment target. This is tested using Xcode 11 and later.

Added Darwin specific `madvise` options to `mmap` module.

The `--enable-universalsdk` and `--with-universal-archs` options for the configure script now check that the specified architectures can be used.

Keep IDLE running on macOS. Remove obsolete workaround that prevented running files with shortcuts when using new universal2 installers built on macOS 11.

Fix reporting offset of the RE error in searchengine.

Get docstrings for IDLE calltips more often by using `inspect.getdoc`.

The `smelly.py` script now also checks the Python dynamic library and extension modules, not only the Python static library. Make also the script more verbose: explain what it does.

Allow `:file:'Tools/i18n/pygettext.py'` to detect calls to `gettext` in f-strings.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 1240); [backlink](#)

Unknown interpreted text role "file".

The `:c:func:'PyType_FromSpecWithBases'` and `:c:func:'PyType_FromModuleAndSpec'` functions now accept a single class as the `bases` argument.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 1250); [backlink](#)

Unknown interpreted text role "c:func".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 1250); [backlink](#)

Unknown interpreted text role "c:func".

Port `:mod:'select'` extension module to multiphase initialization ([PEP 489](#)).

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 1261); [backlink](#)

Unknown interpreted text role "mod".

Port `_posixsubprocess` extension module to multiphase initialization ([PEP 489](#)).

Port `_posixshm` extension module to multiphase initialization ([PEP 489](#))

Port `_struct` extension module to multiphase initialization ([PEP 489](#))

Port `:mod:'spwd'` extension module to multiphase initialization ([PEP 489](#))

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

main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 1299); [backlink](#)

Unknown interpreted text role "mod".

Port `mod:gc` extension module to multiphase initialization ([PEP 489](#))

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 1308); [backlink](#)

Unknown interpreted text role "mod".

Port `_queue` extension module to multiphase initialization ([PEP 489](#))

Convert `:c:func:Py_TYPE` and `:c:func:Py_SIZE` back to macros to allow using them as an l-value. Many third party C extension modules rely on the ability of using `Py_TYPE()` and `Py_SIZE()` to set an object type and size: `Py_TYPE(obj) = type;` and `Py_SIZE(obj) = size;`.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 1326); [backlink](#)

Unknown interpreted text role "c:func".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 1326); [backlink](#)

Unknown interpreted text role "c:func".

Port `mod:symtable` extension module to multiphase initialization ([PEP 489](#))

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 1338); [backlink](#)

Unknown interpreted text role "mod".

Port `mod:grp` and `mod:pwd` extension modules to multiphase initialization ([PEP 489](#))

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 1348); [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) 3.10.0a3.rst, line 1348); [backlink](#)

Unknown interpreted text role "mod".

Port `_random` extension module to multiphase initialization ([PEP 489](#))

Port `_hashlib` extension module to multiphase initialization ([PEP 489](#))

Removed the undocumented `PyOS_InitInterrupts()` function. Initializing Python already implicitly installs signal handlers: see `:c:member:PyConfig.install_signal_handlers`. Patch by Victor Stinner.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 1376); [backlink](#)

Unknown interpreted text role "c:member".

The `Py_TRASHCAN_BEGIN` macro no longer accesses `PyTypeObject` attributes, but now can get the condition by calling the new private `:c:func:_PyTrash_cond()` function which hides implementation details.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 1387); [backlink](#)

Unknown interpreted text role "c:func".

`:c:func:Py_GetPath`, `:c:func:Py_GetPrefix`, `:c:func:Py_GetExecPrefix`, `:c:func:Py_GetProgramFullPath`, `:c:func:Py_GetPythonHome` and `:c:func:Py_GetProgramName` functions now return `NULL` if called before `:c:func:Py_Initialize`

(before Python is initialized). Use the new `ref:Python Initialization Configuration API <init-config>` to get the `ref:Python Path Configuration. <init-path-config>`. Patch by Victor Stinner.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 1398); [backlink](#)

Unknown interpreted text role "c:func".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 1398); [backlink](#)

Unknown interpreted text role "c:func".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 1398); [backlink](#)

Unknown interpreted text role "c:func".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 1398); [backlink](#)

Unknown interpreted text role "c:func".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 1398); [backlink](#)

Unknown interpreted text role "c:func".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 1398); [backlink](#)

Unknown interpreted text role "c:func".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 1398); [backlink](#)

Unknown interpreted text role "c:func".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 1398); [backlink](#)

Unknown interpreted text role "ref".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 1398); [backlink](#)

Unknown interpreted text role "ref".

The `c:func:PyConfig_Read` function now only parses `c:member:PyConfig.argv` arguments once: `c:member:PyConfig.parse_argv` is set to 2 after arguments are parsed. Since Python arguments are stripped from `c:member:PyConfig.argv`, parsing arguments twice would parse the application options as Python options.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 1413); [backlink](#)

Unknown interpreted text role "c:func".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 1413); [backlink](#)

Unknown interpreted text role "c:member".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 1413); [backlink](#)

Unknown interpreted text role "c:member".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 1413); [backlink](#)

Unknown interpreted text role "c:member".

Added `:c:func:`Py_NewRef`` and `:c:func:`Py_XNewRef`` functions to increment the reference count of an object and return the object. Patch by Victor Stinner.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 1426); [backlink](#)

Unknown interpreted text role "c:func".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 1426); [backlink](#)

Unknown interpreted text role "c:func".

When `:c:func:`Py_Initialize`` is called twice, the second call now updates more `:mod:`sys`` attributes for the configuration, rather than only `:data:`sys.argv``. Patch by Victor Stinner.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 1437); [backlink](#)

Unknown interpreted text role "c:func".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 1437); [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) 3.10.0a3.rst, line 1437); [backlink](#)

Unknown interpreted text role "data".

The `:c:func:`PyType_FromModuleAndSpec`` function now accepts NULL `tp_doc` slot.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 1448); [backlink](#)

Unknown interpreted text role "c:func".

Added `:c:func:`PyModule_AddObjectRef`` function: similar to `:c:func:`PyModule_AddObject`` but don't steal a reference to the value on success. Patch by Victor Stinner.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 1458); [backlink](#)

Unknown interpreted text role "c:func".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 1458); [backlink](#)

Unknown interpreted text role "c:func".

The `:c:data:`METH_FASTCALL`` calling convention is added to the limited API. The functions `:c:func:`PyModule_AddType``, `:c:func:`PyType_FromModuleAndSpec``, `:c:func:`PyType_GetModule`` and `:c:func:`PyType_GetModuleState`` are added to the limited API on Windows.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 1469); [backlink](#)

Unknown interpreted text role "c:data".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 1469); [backlink](#)

Unknown interpreted text role "c:func".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 1469); [backlink](#)

Unknown interpreted text role "c:func".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 1469); [backlink](#)

Unknown interpreted text role "c:func".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 1469); [backlink](#)

Unknown interpreted text role "c:func".

Add dedicated entry to PyAsyncMethods for sending values

`:c:func:PyType_GetSlot()` can now accept static types.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 1490); [backlink](#)

Unknown interpreted text role "c:func".

`:c:func:PyList_SET_ITEM`, `:c:func:PyTuple_SET_ITEM` and `:c:func:PyCell_SET` macros can no longer be used as l-value or r-value. For example, `x = PyList_SET_ITEM(a, b, c)` and `PyList_SET_ITEM(a, b, c) = x` now fail with a compiler error. It prevents bugs like `if (PyList_SET_ITEM (a, b, c) < 0) ... test`. Patch by Zackery Spytz and Victor Stinner.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 1499); [backlink](#)

Unknown interpreted text role "c:func".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 1499); [backlink](#)

Unknown interpreted text role "c:func".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Misc\NEWS.d\ (cpython-main) (Misc) (NEWS.d) 3.10.0a3.rst, line 1499); [backlink](#)

Unknown interpreted text role "c:func".